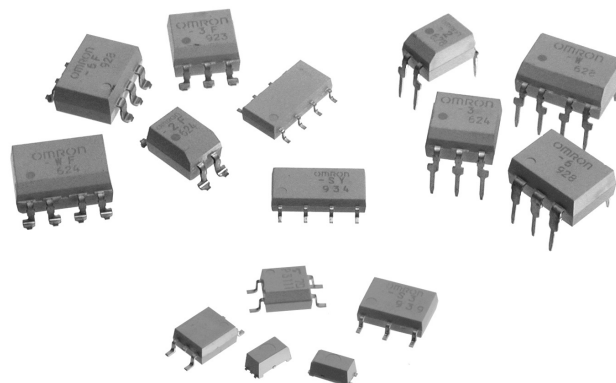


# MOS FET Relays G3VM Series

## Wide Range of Contact Forms, Sizes and Package Types

- Controls load voltages up to 600 V.
- Terminal packages include PCB through-hole, SMT gullwing, SOP, and SSOP.
- Low ON-resistance, low output capacitance, current limiting, and high dielectric (5000 VAC) models available.
- Packaged for efficient automatic insertion: PCB through-hole and SMT are in tubes; tape-and-reel packaging is standard for SOP and SSOP models, and optional for SMT models ("TR" suffix).
- Complete specifications follow, divided by Package Type, Terminals and Contact Form.



## Typical Applications

### ■ Communications

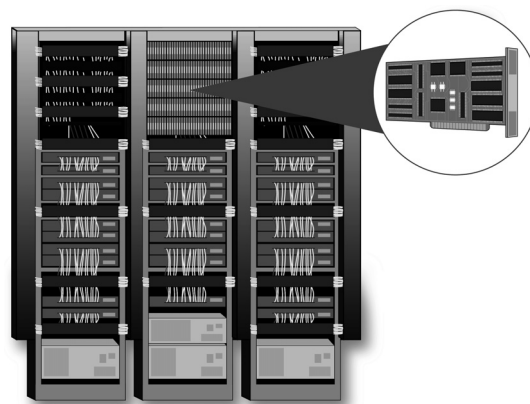
- Local area network equipment
- Central office circuit boards for subscriber line interfaces, multiplexers and other routing equipment
- Wireless communications for cell phones and pagers
- Set-top TV boxes with internal modems
- Fax machines
- PCMCIA card
- Internal modems for PDA equipment and laptop computers

### ■ Test & Measurement

- Board testers
- IC testers
- Portable voltage testers

### ■ Security

- Alarm control boards
- Home security systems
- Garage door openers



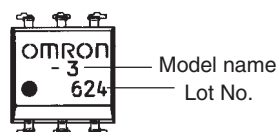
# Selection Guide

| Load voltage | Contact form     | Package/Terminal shape | No. of terminals | Model             | Load current (mA) | Voltage withstand (VAC) | ON resistance (max.) | Output capacitance | Additional features | Page no.          |                   |                   |                   |    |
|--------------|------------------|------------------------|------------------|-------------------|-------------------|-------------------------|----------------------|--------------------|---------------------|-------------------|-------------------|-------------------|-------------------|----|
| 20V          | 1 Form A         | SMT                    | 8                | <b>G3VM-22FO</b>  | 150               | 2,500                   | 4 Ω                  | 8 pF (typ.)        | Low ON resistance   | 62                |                   |                   |                   |    |
|              |                  |                        | 4                | <b>G3VM-21GR</b>  | 160               | 1,500                   | 8 Ω                  | 2.5 pF (max.)      | Low pF•Ω            | 70                |                   |                   |                   |    |
|              |                  | SSOP                   | 4                | <b>G3VM-21GR1</b> | 300               | 1,500                   | 1.5 Ω                | 12 pF (max.)       | Low pF•Ω            | 70                |                   |                   |                   |    |
|              |                  |                        | 4                | <b>G3VM-21LR</b>  | 150               | 1,500                   | 8 Ω                  | 12 pF (max.)       | —                   | 88                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-21LR1</b> | 300               | 1,500                   | 1.5 Ω                | 12 pF (max.)       | Low pF•Ω            | 88                |                   |                   |                   |    |
| 40V          | 1 Form A         | SOP                    | 4                | <b>G3VM-41GR3</b> | 80                | 1,500                   | 37 Ω                 | 1.4 pF (max.)      | —                   | 72                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41GR4</b> | 250               | 1,500                   | 3 Ω                  | 7 pF (max.)        | Low pF•Ω            | 74                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41GR5</b> | 300               | 1,500                   | 1.5 Ω                | 14 pF (max.)       | Low pF•Ω            | 74                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41GR6</b> | 120               | 1,500                   | 15 Ω                 | 2 pF (max.)        | Low pF•Ω            | 74                |                   |                   |                   |    |
|              |                  | SSOP                   | 4                | <b>G3VM-41LR3</b> | 80                | 1,500                   | 35 Ω                 | 1.4 pF (max.)      | —                   | 88                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41LR4</b> | 250               | 1,500                   | 3 Ω                  | 7 pF (max.)        | Low pF•Ω            | 90                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41LR5</b> | 300               | 1,500                   | 1.5 Ω                | 14 pF (max.)       | Low pF•Ω            | 90                |                   |                   |                   |    |
|              |                  |                        |                  | <b>G3VM-41LR6</b> | 120               | 1,500                   | 15 Ω                 | 2 pF (max.)        | Low pF•Ω            | 90                |                   |                   |                   |    |
|              |                  |                        |                  | 60V               | 1 Form A          | Thru-hole               | 4                    | <b>G3VM-61A</b>    | 500                 | 2,500             | 2 Ω               | 140 pF (max.)     | Low ON resistance | 32 |
|              |                  |                        |                  |                   |                   |                         |                      | <b>G3VM-61A1</b>   | 500                 | 2,500             | 2 Ω               | 130 pF (typ.)     | Low ON resistance | 34 |
| 6            | <b>G3VM-61B</b>  | 500                    | 2,500            | 2 Ω               | 140 pF (max.)     |                         | Low ON resistance    | 38                 |                     |                   |                   |                   |                   |    |
|              | <b>G3VM-61B1</b> | 500                    | 2,500            | 2 Ω               | 130 pF (typ.)     |                         | Low ON resistance    | 40                 |                     |                   |                   |                   |                   |    |
|              | <b>G3VM-V</b>    | 300                    | 2,500            | 2 Ω               | 170 pF (typ.)     |                         | Low ON resistance    | 40                 |                     |                   |                   |                   |                   |    |
| 8            | <b>G3VM-61CP</b> | 500                    | 2,500            | 0.6 Ω             | 500 pF (max.)     |                         | Low ON resistance    | 42                 |                     |                   |                   |                   |                   |    |
|              | <b>G3VM-61CR</b> | 2000                   | 1,500            | 0.12 Ω            | 1400 pF (max.)    |                         | Low ON resistance    | 44                 |                     |                   |                   |                   |                   |    |
| SMT          | 4                | <b>G3VM-61D</b>        | 500              | 2,500             | 2 Ω               |                         | 140 pF (max.)        | Low ON resistance  | 52                  |                   |                   |                   |                   |    |
|              |                  | <b>G3VM-61D1</b>       | 500              | 2,500             | 2 Ω               |                         | 130 pF (typ.)        | Low ON resistance  | 54                  |                   |                   |                   |                   |    |
|              |                  | 6                      | <b>G3VM-61E</b>  | 500               | 2,500             |                         | 2 Ω                  | 140 pF (max.)      | Low ON resistance   | 58                |                   |                   |                   |    |
|              |                  |                        | <b>G3VM-61E1</b> | 500               | 2,500             |                         | 2 Ω                  | 130 pF (typ.)      | Low ON resistance   | 60                |                   |                   |                   |    |
| 60 V         | 1 Form A         | SMT                    | 6                | <b>G3VM-VF</b>    | 300               |                         | 2,500                | 2 Ω                | 170 pF (typ.)       | Low ON resistance | 60                |                   |                   |    |
|              |                  |                        |                  | 8                 | <b>G3VM-61FP</b>  | 500                     | 2,500                | 0.6 Ω              | 500 pF (max.)       | Low ON resistance | 64                |                   |                   |    |
|              |                  |                        |                  |                   | <b>G3VM-61FR</b>  | 2000                    | 1,500                | 0.12 Ω             | 1400 pF (max.)      | Low ON resistance | 64                |                   |                   |    |
|              |                  |                        | SOP              | 4                 | <b>G3VM-61G1</b>  | 400                     | 1,500                | 2 Ω                | 130 pF (typ.)       | Low ON resistance | 76                |                   |                   |    |
|              |                  |                        |                  |                   | <b>G3VM-S1</b>    | 400                     | 1,500                | 2 Ω                | 140 pF (max.)       | Low ON resistance | 76                |                   |                   |    |
|              |                  |                        |                  |                   | <b>G3VM-61H1</b>  | 400                     | 1,500                | 2 Ω                | 130 pF (typ.)       | Low ON resistance | 80                |                   |                   |    |
|              |                  | 2 Form A               | Thru-hole        | 8                 | <b>G3VM-62C1</b>  | 500                     | 2,500                | 2 Ω                | 130 pF (typ.)       | Low ON resistance | 46                |                   |                   |    |
|              |                  |                        |                  |                   | SMT               | <b>G3VM-62F1</b>        | 500                  | 2,500              | 2 Ω                 | 130 pF (typ.)     | Low ON resistance | 66                |                   |    |
|              |                  |                        |                  |                   |                   | SOP                     | <b>G3VM-62J1</b>     | 400                | 1,500               | 2 Ω               | 130 pF (typ.)     | Low ON resistance | 84                |    |
|              |                  | <b>G3VM-SY</b>         | 300              | 1,500             | 2 Ω               |                         | 140 pF (max.)        | Low ON resistance  | 86                  |                   |                   |                   |                   |    |
|              |                  | 80 V                   | 1 Form A         | SOP               | 4                 | <b>G3VM-81G1</b>        | 350                  | 1,500              | 1.2 Ω               | 40 pF (max.)      | Low ON resistance | 76                |                   |    |
|              |                  |                        |                  |                   | 6                 | <b>G3VM-81HR</b>        | 1250                 | 1,500              | 0.15 Ω              | 1000 pF (max.)    | Low ON resistance | 80                |                   |    |
| 200 V        | 1 Form A         | SOP                    | 4                | <b>G3VM-S5</b>    | 150               | 1,500                   | 8 Ω                  | 100 pF (typ.)      | —                   | 78                |                   |                   |                   |    |

| Load voltage | Contact form | Package/<br>Terminal<br>shape | No. of<br>terminals | Model                     | Load<br>current<br>(mA) | Voltage<br>withstand<br>(VAC) | ON<br>resistance<br>(max.) | Output<br>capacitance | Additional<br>features | Page no.           |                  |    |    |
|--------------|--------------|-------------------------------|---------------------|---------------------------|-------------------------|-------------------------------|----------------------------|-----------------------|------------------------|--------------------|------------------|----|----|
| 350 V        | 1 Form A     | Thru-hole                     | 4                   | G3VM-2                    | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 30                 |                  |    |    |
|              |              |                               |                     | G3VM-2L                   | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | Current limiting       | 30                 |                  |    |    |
|              |              |                               |                     | G3VM-351A                 | 120                     | 2,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 30                 |                  |    |    |
|              |              |                               | 6                   | G3VM-351B                 | 120                     | 2,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 34                 |                  |    |    |
|              |              |                               |                     | G3VM-3                    | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 36                 |                  |    |    |
|              |              |                               |                     | G3VM-3L                   | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | Current limiting       | 36                 |                  |    |    |
| 350 V        | 1 Form A     | SMT                           | 4                   | G3VM-2F                   | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 50                 |                  |    |    |
|              |              |                               |                     | G3VM-2FL                  | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | Current limiting       | 50                 |                  |    |    |
|              |              |                               |                     | G3VM-351D                 | 120                     | 2,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 50                 |                  |    |    |
|              |              |                               | 6                   | G3VM-351E                 | 120                     | 2,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 54                 |                  |    |    |
|              |              |                               |                     | G3VM-3F                   | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 56                 |                  |    |    |
|              |              |                               |                     | G3VM-3FL                  | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | Current limiting       | 56                 |                  |    |    |
|              |              |                               | SOP                 | 4                         | G3VM-351G               | 110                           | 1,500                      | 35 Ω                  | 30 pF (typ.)           | —                  | 70               |    |    |
|              |              |                               |                     |                           | G3VM-S2                 | 120                           | 1,500                      | 35 Ω                  | 75 pF (typ.)           | —                  | 78               |    |    |
|              |              |                               |                     | 6                         | G3VM-351H               | 110                           | 1,500                      | 35 Ω                  | 30 pF (typ.)           | —                  | 78               |    |    |
|              |              |                               |                     |                           | G3VM-S3                 | 120                           | 1,500                      | 35 Ω                  | 75 pF (typ.)           | —                  | 82               |    |    |
|              |              |                               |                     | 1 Form A<br>+<br>1 Form B | Thru-hole               | 8                             | G3VM-355CR                 | 120                   | 2,500                  | 25 Ω               | 65 pF (typ.)     | —  | 44 |
|              |              |                               |                     |                           |                         |                               | G3VM-355FR                 | 120                   | 2,500                  | 25 Ω               | 65 pF (typ.)     | —  | 64 |
|              | G3VM-355JR   | 120                           | 2,500               |                           |                         |                               | 25 Ω                       | 65 pF (typ.)          | —                      | 82                 |                  |    |    |
|              | 2 Form A     | Thru-hole                     | 8                   | G3VM-352C                 | 120                     | 2,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 44                 |                  |    |    |
|              |              |                               |                     | G3VM-W                    | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 46                 |                  |    |    |
|              |              |                               |                     | G3VM-WL                   | 120                     | 2,500                         | 35 Ω                       | 75 pF (typ.)          | Current limiting       | 48                 |                  |    |    |
|              |              |                               |                     | SMT                       | 8                       | G3VM-352F                     | 120                        | 2,500                 | 35 Ω                   | 30 pF (typ.)       | —                | 66 |    |
|              |              |                               |                     |                           |                         | G3VM-WF                       | 120                        | 2,500                 | 35 Ω                   | 75 pF (typ.)       | —                | 68 |    |
|              |              |                               |                     |                           |                         | G3VM-WFL                      | 120                        | 2,500                 | 35 Ω                   | 75 pF (typ.)       | Current limiting | 68 |    |
|              |              | SOP                           | 8                   | G3VM-352J                 | 110                     | 1,500                         | 35 Ω                       | 30 pF (typ.)          | —                      | 82                 |                  |    |    |
|              |              |                               |                     | G3VM-SW                   | 120                     | 1,500                         | 35 Ω                       | 75 pF (typ.)          | —                      | 84                 |                  |    |    |
| 1 Form B     |              | Thru-hole                     | 4                   | G3VM-353A                 | 150                     | 2,500                         | 25 Ω                       | 100 pF (typ.)         | —                      | 32                 |                  |    |    |
|              |              |                               |                     | G3VM-353B                 | 150                     | 2,500                         | 25 Ω                       | 100 pF (typ.)         | —                      | 34                 |                  |    |    |
|              |              |                               | SMT                 | 4                         | G3VM-353D               | 150                           | 2,500                      | 25 Ω                  | 100 pF (typ.)          | —                  | 52               |    |    |
|              |              |                               |                     |                           | G3VM-353E               | 150                           | 2,500                      | 25 Ω                  | 100 pF (typ.)          | —                  | 54               |    |    |
|              | 350 V        |                               | 1 Form B            | SOP                       | 4                       | G3VM-353G                     | 120                        | 1,500                 | 25 Ω                   | 130 pF (typ.)      | —                | 72 |    |
|              |              |                               |                     |                           | 6                       | G3VM-353H                     | 120                        | 1,500                 | 25 Ω                   | 65 pF (typ.)       | —                | 80 |    |
| 2 Form B     |              | Thru-hole                     | 8                   | G3VM-354C                 | 120                     | 2,500                         | 35 Ω                       | 100 pF (typ.)         | —                      | 48                 |                  |    |    |
|              |              |                               |                     | G3VM-354F                 | 120                     | 2,500                         | 35 Ω                       | 100 pF (typ.)         | —                      | 68                 |                  |    |    |
|              |              |                               |                     | G3VM-354J                 | 120                     | 1,500                         | 25 Ω                       | 65 pF (typ.)          | —                      | 86                 |                  |    |    |
|              |              |                               |                     | G3VM-401A                 | 120                     | 2,500                         | 35 Ω                       | 70 pF (typ.)          | —                      | 32                 |                  |    |    |
| 400 V        | 1 Form A     | Thru-hole                     | 4                   | G3VM-401A                 | 120                     | 2,500                         | 35 Ω                       | 70 pF (typ.)          | —                      | 32                 |                  |    |    |
|              |              |                               |                     | 6                         | G3VM-401B               | 120                           | 2,500                      | 35 Ω                  | 75 pF (typ.)           | —                  | 36               |    |    |
|              |              |                               |                     |                           | G3VM-401BY              | 120                           | 5,000                      | 35 Ω                  | 75 pF (typ.)           | High I/O isolation | 38               |    |    |
|              |              |                               | SMT                 | 4                         | G3VM-401D               | 120                           | 2,500                      | 35 Ω                  | 70 pF (typ.)           | —                  | 52               |    |    |
|              |              |                               |                     |                           | G3VM-401E               | 120                           | 2,500                      | 35 Ω                  | 75 pF (typ.)           | —                  | 56               |    |    |
|              |              |                               |                     | 6                         | G3VM-401EY              | 120                           | 5,000                      | 35 Ω                  | 75 pF (typ.)           | High I/O isolation | 58               |    |    |
|              |              | 2 Form A                      | Thru-hole           | 8                         | G3VM-401G               | 120                           | 1,500                      | 35 Ω                  | 70 pF (typ.)           | —                  | 72               |    |    |
|              |              |                               |                     |                           | G3VM-402C               | 120                           | 2,500                      | 35 Ω                  | 70 pF (typ.)           | —                  | 46               |    |    |
|              |              |                               |                     |                           | G3VM-402F               | 120                           | 2,500                      | 35 Ω                  | 70 pF (typ.)           | —                  | 66               |    |    |
|              |              |                               |                     |                           | G3VM-402J               | 120                           | 2,500                      | 35 Ω                  | 70 pF (typ.)           | —                  | 84               |    |    |
| 600 V        | 1 Form A     | Thru-hole                     | 6                   | G3VM-601BY                | 100                     | 5,000                         | 45 Ω                       | 100 pF (typ.)         | High I/O isolation     | 38                 |                  |    |    |
|              |              | SMT                           | 6                   | G3VM-601EY                | 100                     | 5,000                         | 35 Ω                       | 100 pF (typ.)         | High I/O isolation     | 58                 |                  |    |    |

# Part Number Index and Ordering Information

Note: "G3VM" is not printed on the actual product.



The following tables show standard quantities of G3VM relays as shipped in tubes or tape-and-reel packaging. Dimensions for tape-and-reel parts are shown in individual data sheets that follow.

| Description            | Packaging     | Standard pack quantity | Model          | Page no. |
|------------------------|---------------|------------------------|----------------|----------|
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-2         | 30       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-2F        | 50       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-2F(TR)    | 50       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-2FL       | 50       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-2FL(TR)   | 50       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-2L        | 30       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-21GR      | 70       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-21GR(TR)  | 70       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-21GR1     | 70       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-21GR1(TR) | 70       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-21LR      | 88       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-21LR1     | 88       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-22FO      | 62       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-22FO(TR)  | 62       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-3         | 36       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-3F        | 56       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-3F(TR)    | 56       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-3FL       | 56       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-3FL(TR)   | 56       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-3L        | 36       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-351A      | 30       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-351B      | 34       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-351D      | 50       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-351D(TR)  | 50       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-351E      | 54       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-351E(TR)  | 54       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-351G      | 70       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-351G(TR)  | 70       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-351H      | 78       |
| MOSFETSOP RELAY        | Tape-and-reel | 2500                   | G3VM-351H(TR)  | 78       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-352C      | 44       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-352F      | 66       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-352F(TR)  | 66       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-352J      | 82       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-352J(TR)  | 82       |

| Description            | Packaging     | Standard pack quantity | Model          | Page no. |
|------------------------|---------------|------------------------|----------------|----------|
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-353A      | 32       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-353B      | 34       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-353D      | 52       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-353D(TR)  | 52       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-353E      | 54       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-353E(TR)  | 54       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-353G      | 72       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-353G(TR)  | 72       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-353H      | 80       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-353H(TR)  | 80       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-354C      | 48       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-354F      | 68       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-354F(TR)  | 68       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-354J      | 86       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-354J(TR)  | 86       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-355CR     | 44       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-355FR     | 64       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-355FR(TR) | 64       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-355JR     | 82       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-355JR(TR) | 82       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-41GR3     | 72       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-41GR3(TR) | 72       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-41GR4     | 74       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-41GR4(TR) | 74       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-41GR5     | 74       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-41GR5(TR) | 74       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-41GR6     | 74       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-41GR6(TR) | 74       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-41LR3     | 88       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-41LR4     | 90       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-41LR5     | 90       |
| MOSFET SSOP RELAY      | Tape-and-reel | 1500                   | G3VM-41LR6     | 90       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-401A      | 32       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-401B      | 36       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-401BY     | 38       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-401D      | 52       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-401D(TR)  | 52       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-401E      | 56       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-401E(TR)  | 56       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-401EY     | 58       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-401EY(TR) | 58       |

This table continues on the next page.

| Description            | Packaging     | Standard pack quantity | Model          | Page no. |
|------------------------|---------------|------------------------|----------------|----------|
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-401G      | 72       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-401G(TR)  | 72       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-402C      | 46       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-402F      | 66       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-402F(TR)  | 66       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-402J      | 84       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-402J(TR)  | 84       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61A       | 32       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61A1      | 34       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61B       | 38       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61B1      | 40       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61CP      | 42       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-61CR      | 44       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61D       | 52       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61D(TR)   | 52       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61D1      | 54       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61D1(TR)  | 54       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61E       | 58       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61E(TR)   | 58       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61E1      | 60       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61E1(TR)  | 60       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61FP      | 64       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61FP(TR)  | 64       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-61FR      | 64       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-61FR(TR)  | 64       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-61G1      | 76       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-61G1(TR)  | 76       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-61H1      | 80       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-61H1(TR)  | 80       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-62C1      | 46       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-62F1      | 66       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-62F1(TR)  | 66       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-62J1      | 84       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-62J1(TR)  | 84       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-601BY     | 38       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-601EY     | 58       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-601EY(TR) | 58       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-81G1      | 76       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-81G1(TR)  | 76       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-81HR      | 80       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-81HR(TR)  | 80       |

| Description            | Packaging     | Standard pack quantity | Model        | Page no. |
|------------------------|---------------|------------------------|--------------|----------|
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-S1      | 76       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-S1(TR)  | 76       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-S2      | 78       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-S2(TR)  | 78       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-S3      | 82       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-S3(TR)  | 82       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-S5      | 78       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-S5(TR)  | 78       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-SW      | 84       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-SW(TR)  | 84       |
| MOSFET SOP RELAY       | Tube          | 50                     | G3VM-SY      | 86       |
| MOSFET SOP RELAY       | Tape-and-reel | 2500                   | G3VM-SY(TR)  | 86       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-V       | 40       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-VF      | 60       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-VF(TR)  | 60       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-W       | 46       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-WF      | 68       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-WF(TR)  | 68       |
| MOSFET SMT RELAY       | Tube          | 50                     | G3VM-WFL     | 68       |
| MOSFET SMT RELAY       | Tape-and-reel | 1500                   | G3VM-WFL(TR) | 68       |
| MOSFET THRU-HOLE RELAY | Tube          | 50                     | G3VM-WL      | 48       |

Specifications tables begin on the following page.

# Specifications

## G3VM-2, -2L, -351A

### Maximum Rating

| Parameter                      |                                | Comments and conditions               |         | G3VM-2                                | G3VM-2L                               | G3VM-351A                             |
|--------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals  |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                    | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                                |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                                | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                                | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 6 V                                   | 5 V                                   |
| Junction temperature ( $T_J$ ) |                                |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)              | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 350 V (AC or DC peak)                 | 350 V                                 |
|                                | Continuous load current        | $I_O$                                 |         | 120 mA                                | 120 mA                                | 120 mA                                |
|                                | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                                | Junction temperature ( $T_J$ ) |                                       |         |                                       | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength            |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                    | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                                | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +100 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                             | Comments and conditions       |         | G3VM-2          | G3VM-2L         | G3VM-351A                             |
|----------------------------------|---------------------------------------------|-------------------------------|---------|-----------------|-----------------|---------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )               | $I_F=10$ mA                   | Min.    | 1.0 V           | 1.0 V           | 1.0 V                                 |
|                                  |                                             |                               | Typical | 1.15 V          | 1.15 V          | 1.15 V                                |
|                                  |                                             |                               | Max.    | 1.3 V           | 1.3 V           | 1.3 V                                 |
|                                  | Reverse current                             | $I_R$                         | Max.    | 10 $\mu$ A      | 10 $\mu$ A      | 10 $\mu$ A                            |
|                                  | Reverse voltage                             | $V_R$                         | Max.    | 5 V             | 6 V             | 5 V                                   |
|                                  | Capacitance ( $C_T$ )                       | $V = 0$ ;<br>freq. = 1 MHz    | Typical | 30 pF           | 30 pF           | 30 pF                                 |
| Keep ON LED current ( $I_{FT}$ ) | $I_O = 120$ mA                              | Typical                       | 2 mA    | 1 mA            | 1 mA            |                                       |
|                                  |                                             | Max.                          | 3 mA    | 3 mA            | 3 mA            |                                       |
|                                  |                                             |                               |         |                 |                 |                                       |
| Output                           | ON-resistance ( $R_{ON}$ )                  | $I_{ON}=120$ mA<br>$I_F=5$ mA | Typical | 22 $\Omega$     | 22 $\Omega$     | 35 $\Omega$ (25 $\Omega$ , $t < 1$ s) |
|                                  |                                             |                               | Max.    | 35 $\Omega$     | 35 $\Omega$     | 50 $\Omega$ (35 $\Omega$ , $t < 1$ s) |
|                                  | OFF-state leakage current ( $I_{LEAK}$ )    | $V_{OFF} = 350$ V             | Max.    | 1.0 $\mu$ A     | 1.0 $\mu$ A     | 1.0 $\mu$ A                           |
| Limit current ( $I_{LIM}$ )      | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms | Min.                          | —       | 150 mA          | —               |                                       |
|                                  |                                             | Max.                          | —       | 300 mA          | —               |                                       |
| Transfer characteristics         | I/O capacitance                             | $(C_{I/O})$                   | Typical | 0.8 pF          | 0.8 pF          | 0.8 pF                                |
|                                  | I/O resistance                              | $(R_{I/O})$                   | Min.    | 1000 M $\Omega$ | 1000 M $\Omega$ | 1000 M $\Omega$                       |
|                                  | Operate time                                | $(t_{ON})$                    | Max.    | 1.0 ms          | 1.0 ms          | 1.0 ms                                |
|                                  | Release time                                | $(t_{OFF})$                   | Max.    | 1.0 ms          | 1.0 ms          | 1.0 ms                                |



### Optimum Operating Conditions

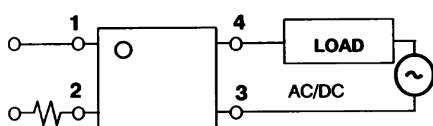
| Parameter                   | Comments and conditions | G3VM-2         | G3VM-2L      | G3VM-351A    |
|-----------------------------|-------------------------|----------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max. 280 V     | 280 V        | 280 V        |
| Operate LED forward current | $I_F$                   | Min. 5 mA      | 5 mA         | 5 mA         |
|                             |                         | Typical 7.5 mA | 7.5 mA       | 7.5 mA       |
|                             |                         | Max. 25 mA     | 25 mA        | 25 mA        |
| Continuous load current     | $I_O$                   | Max. 100 mA    | 100 mA       | 100 mA       |
| Ambient temperature         | $T_A$                   | -20° to 65°C   | -20° to 65°C | -20° to 65°C |

### Dimensions

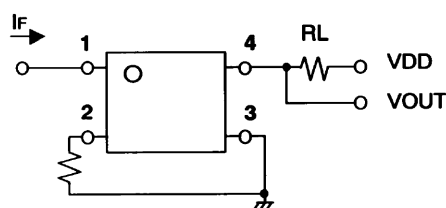
| Item       | G3VM-2      | G3VM-2L     | G3VM-351A   |
|------------|-------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 | See page 92 |

### Connections

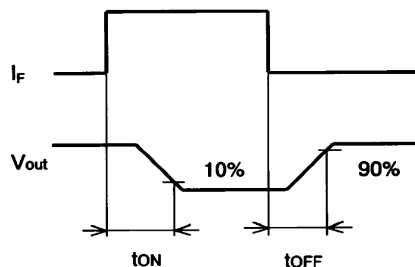
#### G3VM-2, 2L



#### G3VM-2, 2L, 351A



### Timing Chart



## G3VM-353A, -401A, -61A

### Maximum Rating

| Parameter                      |                                | Comments and conditions               |         | G3VM-353A                             | G3VM-401A                             | G3VM-61A                              |
|--------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals  |                                | —                                     |         | 1 Form B/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                    | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                                |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                                | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                                | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
| Junction temperature ( $T_J$ ) |                                |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)              | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 400 V                                 | 60 V                                  |
|                                | Continuous load current        | $I_O$                                 |         | 150 mA                                | 120 mA                                | 500 mA                                |
|                                | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.5 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -5.0 mA/ $^\circ\text{C}$             |
|                                | Junction temperature ( $T_J$ ) |                                       |         |                                       | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength            |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                    | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                                | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                             | Comments and conditions       |         | G3VM-353A       | G3VM-401A       | G3VM-61A                      |
|----------------------------------|---------------------------------------------|-------------------------------|---------|-----------------|-----------------|-------------------------------|
| Input                            | LED forward voltage ( $V_F$ )               | $I_F=10$ mA                   | Min.    | 1.0 V           | 1.0 V           | 1.0 V                         |
|                                  |                                             |                               | Typical | 1.15 V          | 1.15 V          | 1.15 V                        |
|                                  |                                             |                               | Max.    | 1.3 V           | 1.3 V           | 1.3 V                         |
|                                  | Reverse current                             | $I_R$                         | Max.    | 10 $\mu$ A      | 10 $\mu$ A      | 10 $\mu$ A                    |
|                                  | Reverse voltage                             | $V_R$                         | Max.    | 5 V             | 5 V             | 5 V                           |
|                                  | Capacitance ( $C_T$ )                       | $V = 0$ ;<br>freq. = 1 MHz    | Typical | 30 pF           | 30 pF           | 30 pF                         |
| Keep ON LED current ( $I_{FT}$ ) | $I_O = 120$ mA                              | Typical                       | 1 mA    | 1 mA            | 1 mA            |                               |
|                                  |                                             | Max.                          | 3 mA    | 3 mA            | 3 mA            |                               |
|                                  |                                             |                               |         |                 |                 |                               |
| Output                           | ON-resistance ( $R_{ON}$ )                  | $I_{ON}=150$ mA<br>$I_F=5$ mA | Typical | 15 $\Omega$     | 18 $\Omega$     | 1 $\Omega$ ( $I_{ON}=500$ mA) |
|                                  |                                             |                               | Max.    | 25 $\Omega$     | 35 $\Omega$     | 2 $\Omega$ ( $I_{ON}=500$ mA) |
|                                  | OFF-state leakage current ( $I_{LEAK}$ )    | At $V_{OFF}$                  | Max.    | 1.0 $\mu$ A     | 1.0 $\mu$ A     | 1.0 $\mu$ A                   |
| Limit current ( $I_{LIM}$ )      | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms | Min.                          | —       | —               | —               |                               |
|                                  |                                             | Max.                          | —       | —               | —               |                               |
| Transfer characteristics         | I/O capacitance                             | ( $C_{I/O}$ )                 | Typical | 0.8 pF          | 0.8 pF          | 0.8 pF                        |
|                                  | I/O resistance                              | ( $R_{I/O}$ )                 | Min.    | 1000 M $\Omega$ | 1000 M $\Omega$ | 1000 M $\Omega$               |
|                                  | Operate time                                | ( $t_{ON}$ )                  | Max.    | 1.0 ms          | 1.0 ms          | 1.0 ms<br>( $I_F = 10$ mA)    |
|                                  | Release time                                | ( $t_{OFF}$ )                 | Max.    | 3.0 ms          | 1.0 ms          | 1.0 ms<br>( $I_F = 10$ mA)    |

### Optimum Operating Conditions

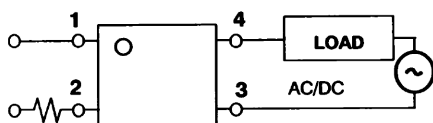
| Parameter                   |       | Comments and conditions |      | G3VM-353A                           | G3VM-401A                           | G3VM-61A                            |
|-----------------------------|-------|-------------------------|------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max. | 280 V                               | 320 V                               | 48 V                                |
| Operate LED forward current | $I_F$ | Min.                    |      | 5 mA                                | 5 mA                                | 5 mA                                |
|                             |       | Typical                 |      | —                                   | 7.5 mA                              | 7.5 mA                              |
|                             |       | Max.                    |      | 25 mA                               | 25 mA                               | 25 mA                               |
| Continuous load current     |       | $I_O$                   | Max. | 150 mA                              | 100 mA                              | 400 mA                              |
| Ambient temperature         |       | $T_A$                   |      | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ |

Dimensions

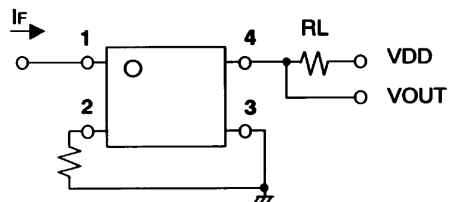
| Item       | G3VM-353A   | G3VM-401A   | G3VM-61A    |
|------------|-------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 | See page 92 |

Connections

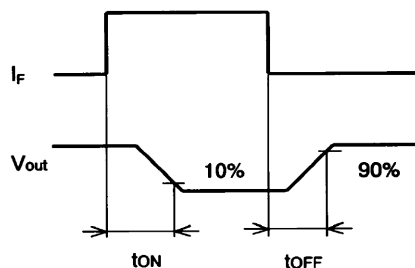
G3VM-353A



G3VM-353A, 401A, 61A



Timing Chart



**G3VM-61A1, -351B, -353B**

**Maximum Rating**

| Parameter                     |                                | Comments and conditions               |         | G3VM-61A1                             | G3VM-351B                                          | G3VM-353B                                          |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/6 pins                                    | 1 Form B/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                              | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                                | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                                | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  | 350 V                                              | 350 V                                              |
|                               | Continuous load current        | $I_O$                                 |         | 500 mA                                | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) | 150 mA (for A)<br>150 mA (for B)<br>300 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.5 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                              | 2500 VAC                                           | 2500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$              |

**Electrical Characteristics**

| Parameter                        |                                          | Comments and conditions                     |             | G3VM-61A1                     | G3VM-351B                                       | G3VM-353B                                       |
|----------------------------------|------------------------------------------|---------------------------------------------|-------------|-------------------------------|-------------------------------------------------|-------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                                 | Min.        | 1.0 V                         | 1.0 V                                           | 1.0 V                                           |
|                                  |                                          |                                             | Typical     | 1.15 V                        | 1.15 V                                          | 1.15 V                                          |
|                                  |                                          |                                             | Max.        | 1.3 V                         | 1.3 V                                           | 1.3 V                                           |
|                                  | Reverse current                          | $I_R$                                       | Max.        | 10 $\mu$ A                    | 10 $\mu$ A                                      | 10 $\mu$ A                                      |
|                                  | Reverse voltage                          | $V_R$                                       | Max.        | 5 V                           | 5 V                                             | 5 V                                             |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz                  |             | Typical                       | 30 pF                                           | 30 pF                                           |
| Keep ON LED current ( $I_{FT}$ ) | $I_O = 120$ mA                           | Typical                                     | 1.6 mA      | 1 mA                          | 1 mA                                            |                                                 |
|                                  |                                          | Max.                                        | 3 mA        | 3 mA                          | 3 mA                                            |                                                 |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                                  | Typical     | 1 $\Omega$ ( $I_{ON}=500$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 15 $\Omega$ ( $I_{ON}=150$ mA) for connection A |
|                                  |                                          |                                             | Max.        | 2 $\Omega$ ( $I_{ON}=500$ mA) | 50 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 25 $\Omega$ ( $I_{ON}=150$ mA) for connection A |
|                                  |                                          |                                             | Typical     | —                             | 28 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 8 $\Omega$ ( $I_{ON}=150$ mA) for connection B  |
|                                  |                                          |                                             | Max.        | —                             | 40 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 14 $\Omega$ ( $I_{ON}=150$ mA) for connection B |
|                                  |                                          |                                             | Typical     | —                             | 14 $\Omega$ ( $I_{ON}=240$ mA) for connection C | 4 $\Omega$ ( $I_{ON}=300$ mA) for connection C  |
|                                  |                                          |                                             | Max.        | —                             | 20 $\Omega$ ( $I_{ON}=240$ mA) for connection C | 7 $\Omega$ ( $I_{ON}=300$ mA) for connection C  |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                                |             | Max.                          | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                     |
|                                  | Limit current ( $I_{LIM}$ )              | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms | Min.        | —                             | —                                               | —                                               |
|                                  |                                          |                                             | Max.        | —                             | —                                               | —                                               |
|                                  | Transfer characteristics                 | I/O capacitance                             | $(C_{I/O})$ | Typical                       | 0.8 pF                                          | 0.8 pF                                          |
| I/O resistance                   |                                          | $(R_{I/O})$                                 | Min.        | 1000 M $\Omega$               | 1000 M $\Omega$                                 | 1000 M $\Omega$                                 |
| Operate time                     |                                          | $(t_{ON})$                                  | Max.        | 2.0 ms                        | 1.0 ms                                          | 1.0 ms                                          |
| Release time                     |                                          | $(t_{OFF})$                                 | Max.        | 0.5 ms                        | 1.0 ms                                          | 3.0 ms                                          |

### Optimum Operating Conditions

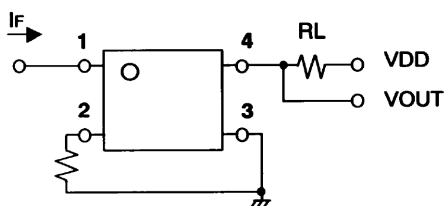
| Parameter                   | Comments and conditions | G3VM-61A1      | G3VM-351B    | G3VM-353B    |
|-----------------------------|-------------------------|----------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max. 48 V      | 280 V        | 280 V        |
| Operate LED forward current | $I_F$                   | Min. 5 mA      | 5 mA         | 5 mA         |
|                             |                         | Typical 7.5 mA | 10 mA        | —            |
|                             |                         | Max. 25 mA     | 25 mA        | 25 mA        |
|                             |                         | Max. 500 mA    | 100 mA       | 150 mA       |
| Continuous load current     | $I_O$                   | Max. 500 mA    | 100 mA       | 150 mA       |
| Ambient temperature         | $T_A$                   | -20° to 65°C   | -20° to 65°C | -20° to 65°C |

### Dimensions

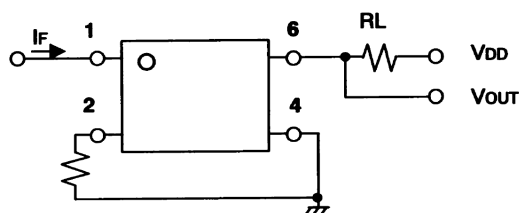
| Item       | G3VM-61A1   | G3VM-351B   | G3VM-353B   |
|------------|-------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 | See page 92 |

### Connections

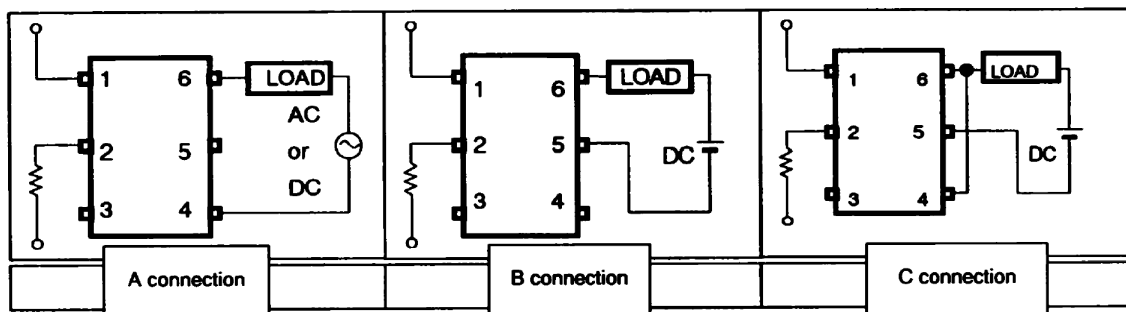
#### G3VM-61A1



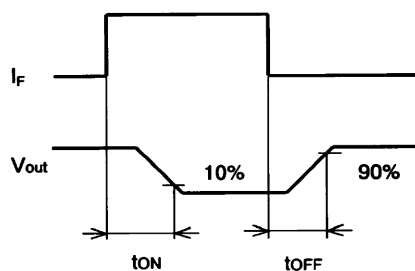
#### G3VM-351B, -353B



#### G3VM-351B, -353B



### Timing Chart



## G3VM-3, -3L, -401B

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-3                                             | G3VM-3L                               | G3VM-401B                                          |
|-------------------------------|--------------------------------|---------------------------------------|---------|----------------------------------------------------|---------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                    | 1 Form A/6 pins                       | 1 Form A/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                              | 50 mA                                 | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                | 1 A                                   | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                | 5 V                                   | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                               | 350 V                                 | 400 V                                              |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA (for A)<br>120 mA (for B)<br>160 mA (for C) | 120 mA                                | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                                           | 2500 VAC                              | 2500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +100 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions                     |             | G3VM-3                                             | G3VM-3L                        | G3VM-401B                                          |             |
|----------------------------------|------------------------------------------|---------------------------------------------|-------------|----------------------------------------------------|--------------------------------|----------------------------------------------------|-------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                                 | Min.        | 1.0 V                                              | 1.0 V                          | 1.0 V                                              |             |
|                                  |                                          |                                             | Typical     | 1.15 V                                             | 1.15 V                         | 1.15 V                                             |             |
|                                  |                                          |                                             | Max.        | 1.3 V                                              | 1.3 V                          | 1.3 V                                              |             |
|                                  | Reverse current                          | $I_R$                                       | Max.        | 10 $\mu$ A                                         | 10 $\mu$ A                     | 10 $\mu$ A                                         |             |
|                                  | Reverse voltage                          | $V_R$                                       | Max.        | 5 V                                                | 5 V                            | 5 V                                                |             |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz                  |             | Typical                                            | 30 pF                          | 30 pF                                              | 30 pF       |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 |                                             | Typical     | —                                                  | —                              | 1 mA                                               |             |
|                                  |                                          |                                             | Max.        | 3 mA                                               | 3 mA                           | 3 mA                                               |             |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                                  | Typical     | 22 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 22 $\Omega$ ( $I_{ON}=120$ mA) | 17 $\Omega$ ( $I_{ON}=120$ mA) for<br>connection A |             |
|                                  |                                          |                                             | Max.        | 35 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 35 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) for<br>connection A |             |
|                                  |                                          |                                             | Typical     | 16 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B | —                              | 11 $\Omega$ ( $I_{ON}=120$ mA) for<br>connection B |             |
|                                  |                                          |                                             | Max.        | 23 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B | —                              | 20 $\Omega$ ( $I_{ON}=120$ mA) for<br>connection B |             |
|                                  |                                          |                                             | Typical     | 8 $\Omega$ ( $I_{ON}=160$ mA)<br>for connection C  | —                              | 6 $\Omega$ ( $I_{ON}=240$ mA) for<br>connection C  |             |
|                                  |                                          |                                             | Max.        | 12 $\Omega$ ( $I_{ON}=160$ mA)<br>for connection C | —                              | 10 $\Omega$ ( $I_{ON}=240$ mA) for<br>connection C |             |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                                |             | Max.                                               | 1.0 $\mu$ A                    | 1.0 $\mu$ A                                        | 1.0 $\mu$ A |
|                                  | Limit current ( $I_{LIM}$ )              | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms |             | Min.                                               | —                              | 150 mA                                             | —           |
|                                  |                                          |                                             |             | Max.                                               | —                              | 300 mA                                             | —           |
|                                  | Transfer characteristics                 | I/O capacitance                             | $(C_{I/O})$ |                                                    | Typical                        | 0.8 pF                                             | 0.8 pF      |
| I/O resistance                   |                                          | $(R_{I/O})$                                 |             | Min.                                               | 1000 M $\Omega$                | 1000 M $\Omega$                                    |             |
| Operate time                     |                                          | $(t_{ON})$                                  |             | Max.                                               | 1.0 ms                         | 1.0 ms                                             |             |
| Release time                     |                                          | $(t_{OFF})$                                 |             | Max.                                               | 1.0 ms                         | 1.0 ms                                             |             |

### Optimum Operating Conditions

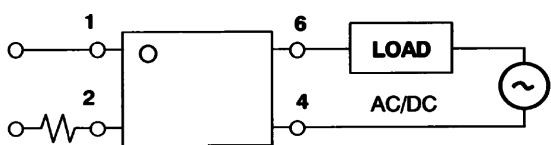
| Parameter                   | Comments and conditions | G3VM-3         | G3VM-3L      | G3VM-401B    |
|-----------------------------|-------------------------|----------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max. 280 V     | 280 V        | 320 V        |
| Operate LED forward current | $I_F$                   | Min. 5 mA      | 5 mA         | 5 mA         |
|                             |                         | Typical 7.5 mA | 10 mA        | 7.5 mA       |
|                             |                         | Max. 25 mA     | 25 mA        | 25 mA        |
|                             |                         | Max. 120 mA    | 120 mA       | 120 mA       |
| Continuous load current     | $I_O$                   | Max. 120 mA    | 120 mA       | 120 mA       |
| Ambient temperature         | $T_A$                   | -20° to 65°C   | -20° to 65°C | -20° to 65°C |

### Dimensions

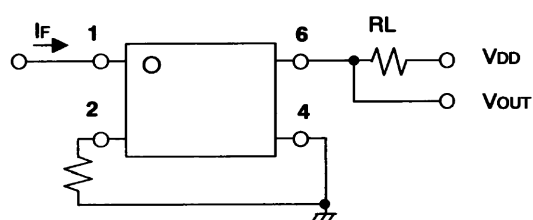
| Item       | G3VM-3      | G3VM-3L     | G3VM-401B   |
|------------|-------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 | See page 92 |

### Connections

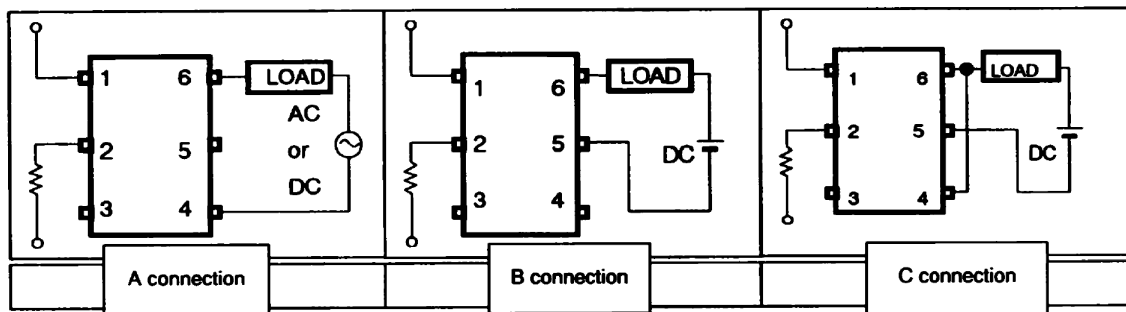
#### G3VM-3L



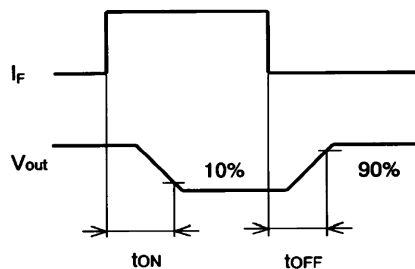
#### G3VM-3, -3L, -401B



#### G3VM-3, -401B



### Timing Chart



## G3VM-401BY, -601BY, -61B

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-401BY                                         | G3VM-601BY                                         | G3VM-61B                                            |
|-------------------------------|--------------------------------|---------------------------------------|---------|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                    | 1 Form A/6 pins                                    | 1 Form A/6 pins                                     |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                              | 50 mA                                              | 50 mA                                               |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                | 1 A                                                | 1 A                                                 |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                           |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                | 5 V                                                | 5 V                                                 |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                                |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 400 V                                              | 600 V                                              | 60 V                                                |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) | 100 mA (for A)<br>100 mA (for B)<br>200 mA (for C) | 500 mA (for A)<br>500 mA (for B)<br>1000 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.0 mA/ $^\circ\text{C}$ (for A)                  | -5.0 mA/ $^\circ\text{C}$ (for A)                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                                |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 5000 VAC                                           | 5000 VAC                                           | 2500 VAC                                            |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$       | -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$       | -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$        |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$      | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$      | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$       |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions                  |               | G3VM-401BY                                      | G3VM-601BY                                      | G3VM-61B                                          |
|----------------------------------|------------------------------------------|------------------------------------------|---------------|-------------------------------------------------|-------------------------------------------------|---------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                              | Min.          | 1.0 V                                           | 1.0 V                                           | 1.0 V                                             |
|                                  |                                          |                                          | Typical       | 1.15 V                                          | 1.15 V                                          | 1.15 V                                            |
|                                  |                                          |                                          | Max.          | 1.3 V                                           | 1.3 V                                           | 1.3 V                                             |
|                                  | Reverse current                          | $I_R$                                    | Max.          | 10 $\mu$ A                                      | 10 $\mu$ A                                      | 10 $\mu$ A                                        |
|                                  | Reverse voltage                          | $V_R$                                    | Max.          | 5 V                                             | 5 V                                             | 5 V                                               |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz               | Typical       | 30 pF                                           | 30 pF                                           | 30 pF                                             |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                                  | —             | —                                               | —                                               |                                                   |
|                                  |                                          | Max.                                     | 3 mA          | 5 mA                                            | 3 mA                                            |                                                   |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                               | Typical       | 17 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 30 $\Omega$ ( $I_{ON}=100$ mA) for connection A | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection A    |
|                                  |                                          |                                          | Max.          | 35 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 45 $\Omega$ ( $I_{ON}=100$ mA) for connection A | 2 $\Omega$ ( $I_{ON}=500$ mA) for connection A    |
|                                  |                                          |                                          | Typical       | 11 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 23 $\Omega$ ( $I_{ON}=100$ mA) for connection B | 0.5 $\Omega$ ( $I_{ON}=500$ mA) for connection B  |
|                                  |                                          |                                          | Max.          | 20 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 35 $\Omega$ ( $I_{ON}=100$ mA) for connection B | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection B    |
|                                  |                                          |                                          | Typical       | 6 $\Omega$ ( $I_{ON}=240$ mA) for connection C  | 12 $\Omega$ ( $I_{ON}=200$ mA) for connection C | 0.3 $\Omega$ ( $I_{ON}=1000$ mA) for connection C |
|                                  |                                          |                                          | Max.          | 10 $\Omega$ ( $I_{ON}=240$ mA) for connection C | 18 $\Omega$ ( $I_{ON}=200$ mA) for connection C | —                                                 |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                             | Max.          | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                       |
|                                  | Limit current ( $I_{LIM}$ )              | $I_F = 5$ mA, $V_{DD} = 5$ V, $t = 5$ ms | Min.          | —                                               | —                                               | —                                                 |
|                                  |                                          |                                          | Max.          | —                                               | —                                               | —                                                 |
|                                  | Transfer characteristics                 | I/O capacitance                          | ( $C_{I/O}$ ) | Typical                                         | 0.8 pF                                          | 0.8 pF                                            |
| I/O resistance                   |                                          | ( $R_{I/O}$ )                            | Min.          | 1000 M $\Omega$                                 | 1000 M $\Omega$                                 | 1000 M $\Omega$                                   |
| Operate time                     |                                          | ( $t_{ON}$ )                             | Max.          | 1.0 ms                                          | 1.5 ms                                          | 1.0 ms                                            |
| Release time                     |                                          | ( $t_{OFF}$ )                            | Max.          | 1.0 ms                                          | 1.0 ms                                          | 1.0 ms                                            |



### Optimum Operating Conditions

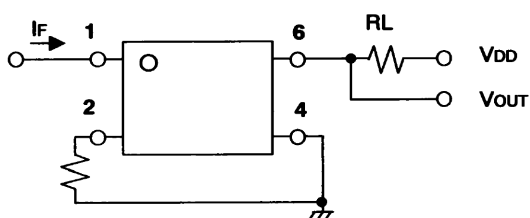
| Parameter                   | Comments and conditions |         | G3VM-401BY   | G3VM-601BY   | G3VM-61B     |
|-----------------------------|-------------------------|---------|--------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 320 V        | 480 V        | 48 V         |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA         | 7.5 mA       | 5 mA         |
|                             |                         | Typical | 7.5 mA       | 15 mA        | 7.5 mA       |
|                             |                         | Max.    | 25 mA        | 25 mA        | 25 mA        |
|                             |                         |         |              |              |              |
| Continuous load current     | $I_O$                   | Max.    | 120 mA       | 100 mA       | 400 mA       |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C | -20° to 65°C | -20° to 65°C |

### Dimensions

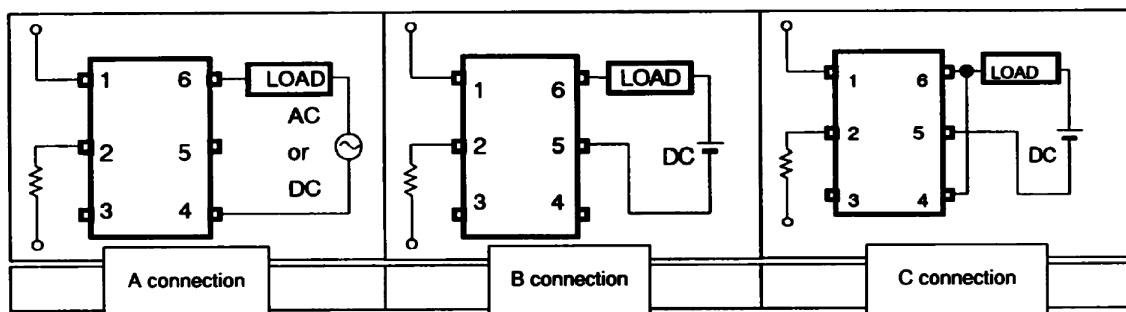
| Item       | G3VM-401BY  | G3VM-601BY  | G3VM-61B    |
|------------|-------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 | See page 92 |

### Connections

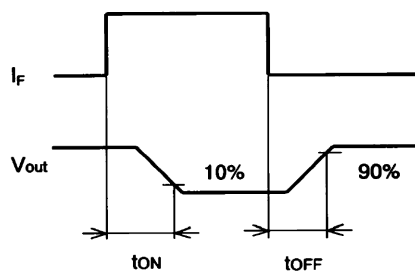
G3VM-401BY, -601BY, -61B



G3VM-401BY, -601BY, -61B



### Timing Chart



## G3VM-61B1, -V

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-61B1                                           | G3VM-V                                             |
|-------------------------------|--------------------------------|---------------------------------------|---------|-----------------------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                     | 1 Form A/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                               | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                 | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                           | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                 | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                                | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                                | 60 V                                               |
|                               | Continuous load current        | $I_O$                                 |         | 500 mA (for A)<br>500 mA (for B)<br>1000 mA (for C) | 300 mA (for A)<br>450 mA (for B)<br>600 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$ (for A)                   | -3.0 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                                | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                                            | 2500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$                | -20 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$               | -55 $^\circ$ to +100 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter    |                                          | Comments and conditions                     |              | G3VM-61B1                                          | G3VM-V                                            |                 |
|--------------|------------------------------------------|---------------------------------------------|--------------|----------------------------------------------------|---------------------------------------------------|-----------------|
| Input        | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                                 | Min.         | 1.0 V                                              | 1.0 V                                             |                 |
|              |                                          |                                             | Typical      | 1.15 V                                             | 1.15 V                                            |                 |
|              |                                          |                                             | Max.         | 1.3 V                                              | 1.3 V                                             |                 |
|              | Reverse current                          | $I_R$                                       | Max.         | 10 $\mu$ A                                         | 10 $\mu$ A                                        |                 |
|              | Reverse voltage                          | $V_R$                                       | Max.         | 5 V                                                | 5 V                                               |                 |
|              | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz                  | Typical      | 30 pF                                              | 30 pF                                             |                 |
| Output       | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                                  | Typical      | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection A     | 1.4 $\Omega$ ( $I_{ON}=300$ mA) for connection A  |                 |
|              |                                          |                                             | Max.         | 2 $\Omega$ ( $I_{ON}=500$ mA) for connection A     | 2 $\Omega$ ( $I_{ON}=300$ mA) for connection A    |                 |
|              |                                          |                                             | Typical      | 0.5 $\Omega$ ( $I_{ON}=500$ mA) for connection B   | 0.7 $\Omega$ ( $I_{ON}=450$ mA) for connection B  |                 |
|              |                                          |                                             | Max.         | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection B     | 1 $\Omega$ ( $I_{ON}=450$ mA) for connection B    |                 |
|              |                                          |                                             | Typical      | 0.25 $\Omega$ ( $I_{ON}=1000$ mA) for connection C | 0.35 $\Omega$ ( $I_{ON}=600$ mA) for connection C |                 |
|              |                                          |                                             | Max.         | —                                                  | 0.5 $\Omega$ ( $I_{ON}=600$ mA) for connection C  |                 |
|              | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                                | Max.         | 1.0 $\mu$ A                                        | 1.0 $\mu$ A                                       |                 |
|              | Limit current ( $I_{LIM}$ )              | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms | Min.         | —                                                  | —                                                 |                 |
|              |                                          |                                             | Max.         | —                                                  | —                                                 |                 |
|              | Transfer characteristics                 | I/O capacitance                             | ( $C_{IO}$ ) | Typical                                            | 0.8 pF                                            | 0.8 pF          |
|              |                                          | I/O resistance                              | ( $R_{IO}$ ) | Min.                                               | 1000 M $\Omega$                                   | 1000 M $\Omega$ |
|              |                                          | Operate time                                | ( $t_{ON}$ ) | Max.                                               | 2.0 ms                                            | 1.0 ms          |
| Release time |                                          | ( $t_{OFF}$ )                               | Max.         | 0.5 ms                                             | 1.0 ms                                            |                 |

### Optimum Operating Conditions

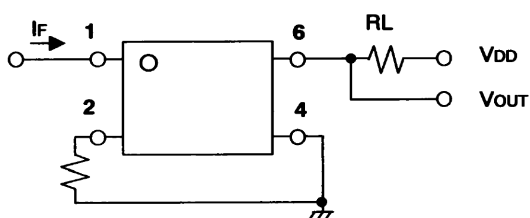
| Parameter                   | Comments and conditions |         | G3VM-61B1    | G3VM-V       |
|-----------------------------|-------------------------|---------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V         | 48V          |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA         | 7.5 mA       |
|                             |                         | Typical | 7.5 mA       | 15 mA        |
|                             |                         | Max.    | 25 mA        | 25 mA        |
|                             |                         | Max.    | 500 mA       | 300 mA       |
| Continuous load current     | $I_O$                   | Max.    | 500 mA       | 300 mA       |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C | -20° to 80°C |

### Dimensions

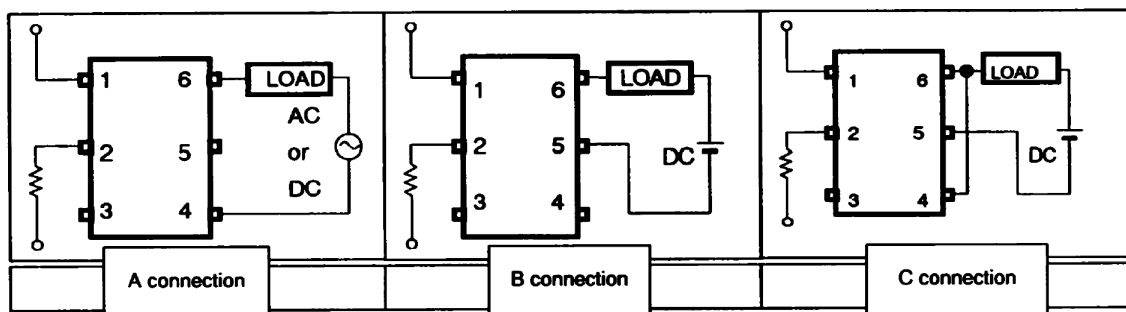
| Item       | G3VM-61B1   | G3VM-V      |
|------------|-------------|-------------|
| Dimensions | See page 92 | See page 92 |

### Connections

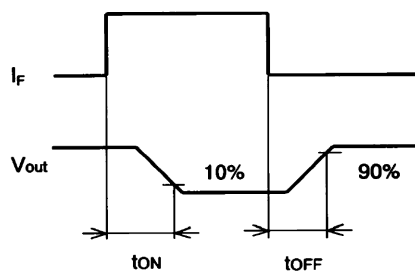
#### G3VM-61B1, -V



#### G3VM-61B1, -V



### Timing Chart



## G3VM-61CP

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-61CP                             |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 6 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 500 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | Tstg with no icing                    |         | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-61CP                       |
|--------------------------|------------------------------------------|----------------------------|---------|---------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                           |
|                          |                                          |                            | Typical | 1.2 V                           |
|                          |                                          |                            | Max.    | 1.4 V                           |
|                          | Reverse current                          | $I_R$                      | Max.    | 15 $\mu$ A                      |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 6 V                             |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 15 pF                           |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                   | Typical | —                               |
| Max.                     |                                          |                            | 5 mA    |                                 |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 0.3 $\Omega$ ( $I_{ON}=500$ mA) |
|                          |                                          |                            | Max.    | 0.6 $\Omega$ ( $I_{ON}=500$ mA) |
|                          |                                          |                            | Typical | —                               |
|                          |                                          |                            | Max.    | —                               |
|                          |                                          |                            | Typical | —                               |
|                          |                                          |                            | Max.    | —                               |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                     |
|                          | Capacitance                              | COFF                       | Typical | 200 pF                          |
| Max.                     |                                          |                            | 500 pF  |                                 |
| Transfer characteristics | I/O capacitance                          | ( $C_{I/O}$ )              | Typical | 0.8 pF                          |
|                          | I/O resistance                           | ( $R_{I/O}$ )              | Min.    | 1000 M $\Omega$                 |
|                          | Operate time                             | ( $t_{ON}$ )               | Max.    | 2.0 ms                          |
|                          | Release time                             | ( $t_{OFF}$ )              | Max.    | 0.5 ms                          |

### Optimum Operating Conditions

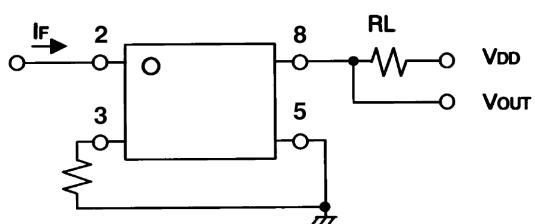
| Parameter                   | Comments and conditions |         | G3VM-61CP    |
|-----------------------------|-------------------------|---------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V         |
| Operate LED forward current | $I_F$                   | Min.    | 10 mA        |
|                             |                         | Typical | — mA         |
|                             |                         | Max.    | 30 mA        |
| Continuous load current     | $I_O$                   | Max.    | 500 mA       |
| Ambient temperature         | $T_A$                   |         | -25° to 50°C |

### Dimensions

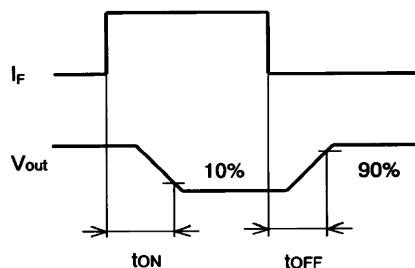
| Item       | G3VM-61CP   |
|------------|-------------|
| Dimensions | See page 93 |

### Connections

#### G3VM-61CP



### Timing Chart



## G3VM-61CR, 355CR, 352C

### Maximum Rating

| Parameter                     |                                | Comments and conditions                  |         | G3VM-61CR                             | G3VM-355CR                            | G3VM-352C                             |
|-------------------------------|--------------------------------|------------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                        |         | 1 Form A/8 pins                       | 1FormA+1FormB/<br>8 pins              | 2 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                    | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse,<br>100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$              |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                    | Max.    | 6 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                          |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                                |         | 60 V                                  | 350 V                                 | 350 V                                 |
|                               | Continuous load current        | $I_O$                                    |         | 2000 mA                               | 120 mA                                | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$              |         | -20 mA/ $^\circ\text{C}$              | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                          |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.               |         | 1500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                      |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing                  |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |             | G3VM-61CR     | G3VM-355CR                     | G3VM-352C                                |                 |
|----------------------------------|------------------------------------------|----------------------------|-------------|---------------|--------------------------------|------------------------------------------|-----------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.        | 1.0 V         | 1.0 V                          | 1.0 V                                    |                 |
|                                  |                                          |                            | Typical     | 1.2 V         | 1.15 V                         | 1.15 V                                   |                 |
|                                  |                                          |                            | Max.        | 1.4 V         | 1.3 V                          | 1.3 V                                    |                 |
|                                  | Reverse current                          | $I_R$                      | Max.        | 10 $\mu$ A    | 10 $\mu$ A                     | 10 $\mu$ A                               |                 |
|                                  | Reverse voltage                          | $V_R$                      | Max.        | 6 V           | 5 V                            | 5 V                                      |                 |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |             | Typical       | 15 pF                          | 30 pF                                    | 30 pF           |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 |                            | Typical     | —             | 1 mA                           | 1 mA                                     |                 |
|                                  |                                          |                            | Max.        | 5 mA          | 3 mA                           | 3 mA                                     |                 |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA (1a)            | Typical     | —             | 15 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ (25 $\Omega$ , $t \leq 1$ s) |                 |
|                                  |                                          |                            | Max.        | 0.12 $\Omega$ | 25 $\Omega$ ( $I_{ON}=120$ mA) | 50 $\Omega$ (35 $\Omega$ , $t \leq 1$ s) |                 |
|                                  |                                          | $I_F=0$ mA (1b)            | Typical     | —             | 15 $\Omega$ ( $I_{ON}=120$ mA) | —                                        |                 |
|                                  |                                          |                            | Max.        | —             | 25 $\Omega$ ( $I_{ON}=120$ mA) | —                                        |                 |
|                                  |                                          |                            | Typical     | —             | —                              | —                                        |                 |
|                                  |                                          |                            | Max.        | —             | —                              | —                                        |                 |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               |             | Max.          | 4.0 $\mu$ A                    | 1.0 $\mu$ A                              | 1.0 $\mu$ A     |
|                                  | Capacitance                              | COFF                       |             | Typical       | —                              | —                                        | — pF            |
|                                  |                                          |                            |             | Max.          | —                              | —                                        | — pF            |
|                                  | Transfer characteristics                 | I/O capacitance            | $(C_{I/O})$ |               | Typical                        | 0.8 pF                                   | 0.8 pF          |
| I/O resistance                   |                                          | $(R_{I/O})$                |             | Min.          | 1000 M $\Omega$                | 1000 M $\Omega$                          | 1000 M $\Omega$ |
| Operate time                     |                                          | $(t_{ON})$                 |             | Max.          | 5.0 ms                         | 1.0 ms                                   | 1.0 ms          |
| Release time                     |                                          | $(t_{OFF})$                |             | Max.          | 3.5 ms                         | 3.0 ms                                   | 1.0 ms          |

### Optimum Operating Conditions

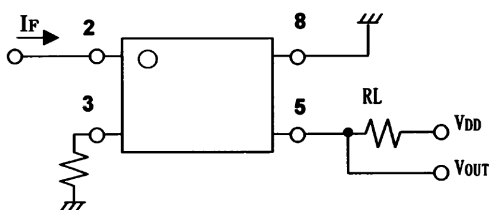
| Parameter                   | Comments and conditions |         | G3VM-61CR    | G3VM-355CR   | G3VM-352C    |
|-----------------------------|-------------------------|---------|--------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V         | 280V         | 280 V        |
| Operate LED forward current | $I_F$                   | Min.    | 10 mA        | 5 mA         | 5 mA         |
|                             |                         | Typical | — mA         | —            | 7.5 mA       |
|                             |                         | Max.    | 30 mA        | 25 mA        | 25 mA        |
| Continuous load current     | $I_O$                   | Max.    | 2000 mA      | 120 mA       | 100 mA       |
| Ambient temperature         | $T_A$                   |         | -25° to 50°C | -20° to 65°C | -20° to 65°C |

### Dimensions

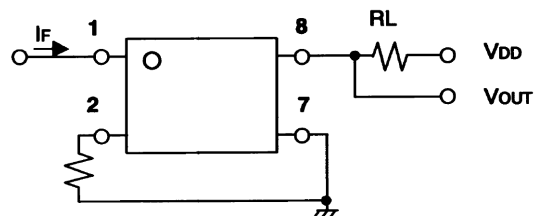
| Item       | G3VM-61CR   | G3VM-355CR  | G3VM-352C   |
|------------|-------------|-------------|-------------|
| Dimensions | See page 93 | See page 93 | See page 93 |

### Connections

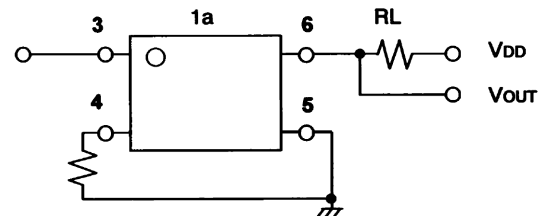
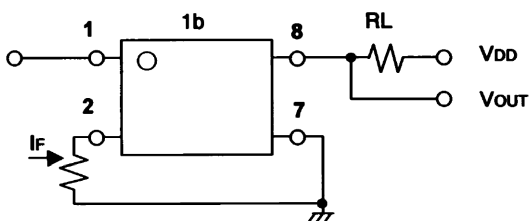
#### G3VM-61CR



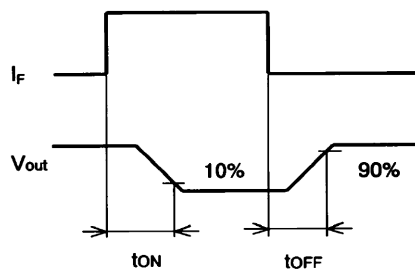
#### G3VM-352C



#### G3VM-355CR



### Timing Chart



## G3VM-402C, -62C1, -W

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-402C                             | G3VM-62C1                             | G3VM-W                                |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                       | 2 Form A/8 pins                       | 2 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 400 V                                 | 60 V                                  | 350 V                                 |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 500 mA                                | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -5.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |               | G3VM-402C                      | G3VM-62C1                       | G3VM-W                         |
|----------------------------------|------------------------------------------|----------------------------|---------------|--------------------------------|---------------------------------|--------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.          | 1.0 V                          | 1.0 V                           | 1.0 V                          |
|                                  |                                          |                            | Typical       | 1.15 V                         | 1.15 V                          | 1.15 V                         |
|                                  |                                          |                            | Max.          | 1.3 V                          | 1.3 V                           | 1.3 V                          |
|                                  | Reverse current                          | $I_R$                      | Max.          | 10 $\mu$ A                     | 10 $\mu$ A                      | 10 $\mu$ A                     |
|                                  | Reverse voltage                          | $V_R$                      | Max.          | 5 V                            | 5 V                             | 5 V                            |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |               | Typical                        | 30 pF                           | 30 pF                          |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | 1             | 1.6 mA                         | 2 mA                            |                                |
|                                  |                                          | Max.                       | 3 mA          | 3 mA                           | 3 mA                            |                                |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA (1a)            | Typical       | 18 $\Omega$ ( $I_{ON}=120$ mA) | 1.0 $\Omega$ ( $I_{ON}=500$ mA) | 22 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  |                                          |                            | Max.          | 35 $\Omega$ ( $I_{ON}=120$ mA) | 2.0 $\Omega$ ( $I_{ON}=500$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  |                                          | $I_F=0$ mA (1b)            | Typical       | —                              | —                               | —                              |
|                                  |                                          |                            | Max.          | —                              | —                               | —                              |
|                                  |                                          |                            | Typical       | —                              | —                               | —                              |
|                                  |                                          |                            | Max.          | —                              | —                               | —                              |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.          | 1.0 $\mu$ A                    | 1.0 $\mu$ A                     | 1.0 $\mu$ A                    |
|                                  | Capacitance                              | COFF                       | Typical       | —                              | —                               | —                              |
|                                  |                                          |                            | Max.          | —                              | —                               | —                              |
|                                  | Transfer characteristics                 | I/O capacitance            | ( $C_{I/O}$ ) | Typical                        | 0.8 pF                          | 0.8 pF                         |
| I/O resistance                   |                                          | ( $R_{I/O}$ )              | Min.          | 1000 M $\Omega$                | 1000 M $\Omega$                 | 1000 M $\Omega$                |
| Operate time                     |                                          | ( $t_{ON}$ )               | Max.          | 1.0 ms                         | 2.0 ms                          | 1.0 ms                         |
| Release time                     |                                          | ( $t_{OFF}$ )              | Max.          | 1.0 ms                         | 0.5 ms                          | 1.0 ms                         |



### Optimum Operating Conditions

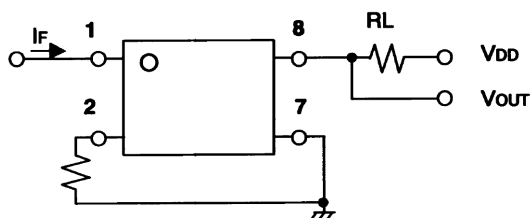
| Parameter                   | Comments and conditions |         | G3VM-402C    | G3VM-62C1    | G3VM-W       |
|-----------------------------|-------------------------|---------|--------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 320 V        | 48 V         | 280 V        |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA         | 5 mA         | 5 mA         |
|                             |                         | Typical | 7.5 mA       | 7.5          | 7.5 mA       |
|                             |                         | Max.    | 25 mA        | 25 mA        | 25 mA        |
| Continuous load current     | $I_O$                   | Max.    | 100 mA       | 500 mA       | 100 mA       |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C | -20° to 65°C | -20° to 65°C |

### Dimensions

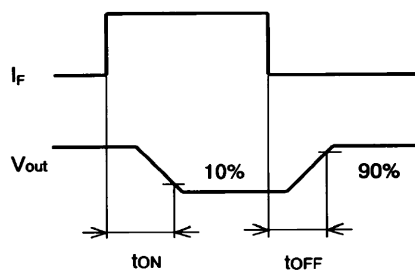
| Item       | G3VM-402C   | G3VM-62C1   | G3VM-W      |
|------------|-------------|-------------|-------------|
| Dimensions | See page 93 | See page 93 | See page 93 |

### Connections

G3VM-402C, -62C1, -W



### Timing Chart



## G3VM-WL, -354C

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-WL                                       | G3VM-354C                                     |
|-------------------------------|--------------------------------|---------------------------------------|---------|-----------------------------------------------|-----------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                               | 2 Form B/8 pins                               |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                         | 50 mA                                         |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                           | 1 A                                           |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                     | -0.5 mA/ $^\circ\text{C}$                     |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 6 V                                           | 5 V                                           |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                          | 125 $^\circ\text{C}$                          |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                         | 350 V                                         |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                        | 150 mA                                        |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$                     | -1.5 mA/ $^\circ\text{C}$                     |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                          | 125 $^\circ\text{C}$                          |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                                      | 2500 VAC                                      |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$  | -40 $^\circ\text{C}$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$ | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-WL                        | G3VM-354C                      |
|----------------------------------|------------------------------------------|----------------------------|---------|--------------------------------|--------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                          | 1.0 V                          |
|                                  |                                          |                            | Typical | 1.15 V                         | 1.15 V                         |
|                                  |                                          |                            | Max.    | 1.3 V                          | 1.3 V                          |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                     | 10 $\mu$ A                     |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 6 V                            | 5 V                            |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                          | 30 pF                          |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | 1       | 1 mA                           |                                |
|                                  |                                          | Max.                       | 3 mA    | 3 mA                           |                                |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 22 $\Omega$ ( $I_{ON}=120$ mA) | 15 $\Omega$ ( $I_{ON}=150$ mA) |
|                                  |                                          |                            | Max.    | 35 $\Omega$ ( $I_{ON}=120$ mA) | 25 $\Omega$ ( $I_{ON}=150$ mA) |
|                                  |                                          |                            | Typical | —                              | —                              |
|                                  |                                          |                            | Max.    | —                              | —                              |
|                                  |                                          |                            | Typical | —                              | —                              |
|                                  |                                          |                            | Max.    | —                              | —                              |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                    |
|                                  | Limit current                            | $I_{LIM}$                  | Min.    | 150 mA                         | —                              |
| Max.                             |                                          |                            | 300 mA  | —                              |                                |
| Transfer characteristics         | I/O capacitance                          | ( $C_{I/O}$ )              | Typical | 0.8 pF                         | 0.8 pF                         |
|                                  | I/O resistance                           | ( $R_{I/O}$ )              | Min.    | 1000 M $\Omega$                | 1000 M $\Omega$                |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                         | 1.0 ms                         |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.    | 1.0 ms                         | 3.0 ms                         |

### Optimum Operating Conditions

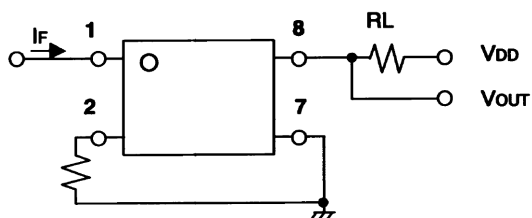
| Parameter                   | Comments and conditions | G3VM-WL        | G3VM-354C    |
|-----------------------------|-------------------------|----------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max. 280 V     | 280 V        |
| Operate LED forward current | $I_F$                   | Min. 5 mA      | 5 mA         |
|                             |                         | Typical 7.5 mA | —            |
|                             |                         | Max. 25 mA     | 25 mA        |
| Continuous load current     | $I_O$                   | Max. 100 mA    | 150 mA       |
| Ambient temperature         | $T_A$                   | -20° to 65°C   | -20° to 65°C |

### Dimensions

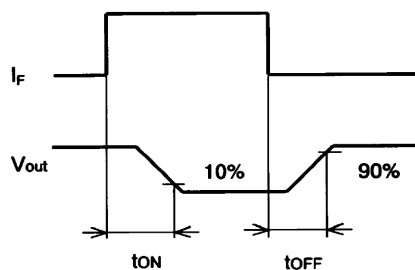
| Item       | G3VM-WL     | G3VM-354C   |
|------------|-------------|-------------|
| Dimensions | See page 93 | See page 93 |

### Connections

G3VM-WL, -354C



### Timing Chart



## G3VM-2F(TR), -2FL(TR), -351D(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-2F,<br>G3VM-2F(TR)               | G3VM-2FL,<br>G3VM-2FL(TR)             | G3VM-351D,<br>G3VM-351D(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 6 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 350 V                                 | 350 V                                 |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 120 mA                                | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +100 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                             | Comments and conditions       |                        | G3VM-2F,<br>G3VM-2F(TR) | G3VM-2FL,<br>G3VM-2FL(TR) | G3VM-351D,<br>G3VM-351D(TR)           |                 |
|----------------------------------|---------------------------------------------|-------------------------------|------------------------|-------------------------|---------------------------|---------------------------------------|-----------------|
| Input                            | LED forward voltage ( $V_F$ )               | $I_F=10$ mA                   | Min.                   | 1.0 V                   | 1.0 V                     | 1.0 V                                 |                 |
|                                  |                                             |                               | Typical                | 1.15 V                  | 1.15 V                    | 1.15 V                                |                 |
|                                  |                                             |                               | Max.                   | 1.3 V                   | 1.3 V                     | 1.3 V                                 |                 |
|                                  | Reverse current                             | $I_R$                         | Max.                   | 10 $\mu$ A              | 10 $\mu$ A                | 10 $\mu$ A                            |                 |
|                                  | Reverse voltage                             | $V_R$                         | Max.                   | 5 V                     | 6 V                       | 5 V                                   |                 |
|                                  | Capacitance ( $C_T$ )                       | $V = 0$ ;<br>freq. = 1 MHz    |                        | Typical                 | 30 pF                     | 30 pF                                 | 30 pF           |
| Keep ON LED current ( $I_{FT}$ ) | $I_O$                                       | Typical                       | 2 mA ( $I_O = 100$ mA) | 1 mA ( $I_O = 120$ mA)  | 1 mA ( $I_O = 120$ mA)    |                                       |                 |
|                                  |                                             | Max.                          | 3 mA ( $I_O = 100$ mA) | 3 mA ( $I_O = 120$ mA)  | 3 mA ( $I_O = 120$ mA)    |                                       |                 |
| Output                           | ON-resistance ( $R_{ON}$ )                  | $I_{ON}=120$ mA<br>$I_F=5$ mA | Typical                | 22 $\Omega$             | 22 $\Omega$               | 35 $\Omega$ (25 $\Omega$ , $t < 1$ s) |                 |
|                                  |                                             |                               | Max.                   | 35 $\Omega$             | 35 $\Omega$               | 50 $\Omega$ (35 $\Omega$ , $t < 1$ s) |                 |
|                                  | OFF-state leakage current ( $I_{LEAK}$ )    | $V_{OFF} = 350$ V             |                        | Max.                    | 1.0 $\mu$ A               | 1.0 $\mu$ A                           | 1.0 $\mu$ A     |
| Limit current ( $I_{LIM}$ )      | $I_F = 5$ mA, $V_{DD} = 5$ V,<br>$t = 5$ ms | Min.                          | —                      | 150 mA                  | —                         |                                       |                 |
|                                  |                                             | Max.                          | —                      | 300 mA                  | —                         |                                       |                 |
| Transfer characteristics         | I/O capacitance                             | $(C_{I/O})$                   |                        | Typical                 | 0.8 pF                    | 0.8 pF                                | 0.8 pF          |
|                                  | I/O resistance                              | $(R_{I/O})$                   |                        | Min.                    | 1000 M $\Omega$           | 1000 M $\Omega$                       | 1000 M $\Omega$ |
|                                  | Operate time                                | $(t_{ON})$                    |                        | Max.                    | 1.0 ms                    | 1.0 ms                                | 1.0 ms          |
|                                  | Release time                                | $(t_{OFF})$                   |                        | Max.                    | 1.0 ms                    | 1.0 ms                                | 1.0 ms          |

### Optimum Operating Conditions

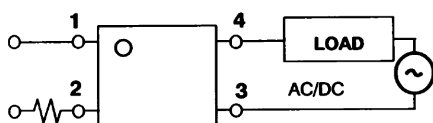
| Parameter                   | Comments and conditions |         | G3VM-2F,<br>G3VM-2F(TR) | G3VM-2FL,<br>G3VM-2FL(TR) | G3VM-351D,<br>G3VM-351D(TR) |
|-----------------------------|-------------------------|---------|-------------------------|---------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 280 V                   | 280 V                     | 280 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                    | 5 mA                      | 5 mA                        |
|                             |                         | Typical | 7.5 mA                  | 7.5 mA                    | 7.5 mA                      |
|                             |                         | Max.    | 25 mA                   | 25 mA                     | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 100 mA                  | 100 mA                    | 100 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C            | -20° to 65°C              | -20° to 65°C                |

### Dimensions

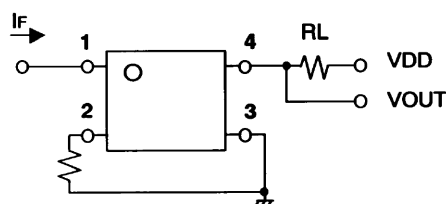
| Item       | G3VM-2F,<br>G3VM-2F(TR) | G3VM-2FL,<br>G3VM-2FL(TR) | G3VM-351D,<br>G3VM-351D(TR) |
|------------|-------------------------|---------------------------|-----------------------------|
| Dimensions | See pages 94, 98        | See pages 94, 98          | See pages 94, 98            |

### Connections

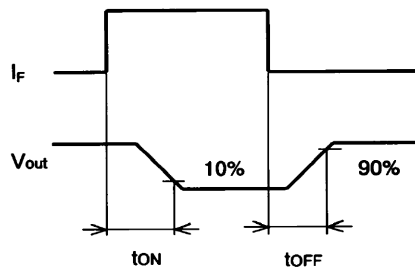
G3VM-2F, -2F(TR), -2FL, -2FL(TR)



G3VM-2F, -2F(TR), -2FL, -2FL(TR), -351D, -351D(TR)



### Timing Chart



## G3VM-353D(TR), -401D(TR), -61D(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-353D,<br>G3VM-353D(TR)           | G3VM-401D,<br>G3VM-401D(TR)           | G3VM-61D,<br>G3VM-61D(TR)             |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form B/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 400 V                                 | 60 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 150 mA                                | 120 mA                                | 500 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.5 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -5.0 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-353D,<br>G3VM-353D(TR)    | G3VM-401D,<br>G3VM-401D(TR)    | G3VM-61D,<br>G3VM-61D(TR)     |
|----------------------------------|------------------------------------------|----------------------------|---------|--------------------------------|--------------------------------|-------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                          | 1.0 V                          | 1.0 V                         |
|                                  |                                          |                            | Typical | 1.15 V                         | 1.15 V                         | 1.15 V                        |
|                                  |                                          |                            | Max.    | 1.3 V                          | 1.3 V                          | 1.3 V                         |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                     | 10 $\mu$ A                     | 10 $\mu$ A                    |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 5 V                            | 5 V                            | 5 V                           |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                        | 30 pF                          | 30 pF                         |
| Keep ON LED current ( $I_{FT}$ ) | At $I_{ON}$                              | Typical                    | 1 mA    | 1 mA                           | 1 mA                           |                               |
|                                  |                                          | Max.                       | 3 mA    | 3 mA                           | 3 mA                           |                               |
| Output                           | ON-resistance ( $R_{ON}$ )               | At $I_O$                   | Typical | 15 $\Omega$ ( $I_{ON}=150$ mA) | 18 $\Omega$ ( $I_{ON}=120$ mA) | 1 $\Omega$ ( $I_{ON}=500$ mA) |
|                                  |                                          |                            | Max.    | 25 $\Omega$ ( $I_{ON}=150$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) | 2 $\Omega$ ( $I_{ON}=500$ mA) |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                   |
| Limit current ( $I_{LIM}$ )      | $I_F = 5$ mA, $V_{DD} = 5$ V, $t = 5$ ms | Min.                       | —       | —                              | —                              |                               |
|                                  |                                          | Max.                       | —       | —                              | —                              |                               |
| Transfer characteristics         | I/O capacitance                          | $(C_{IO})$                 | Typical | 0.8 pF                         | 0.8 pF                         | 0.8 pF                        |
|                                  | I/O resistance                           | $(R_{IO})$                 | Min.    | 1000 M $\Omega$                | 1000 M $\Omega$                | 1000 M $\Omega$               |
|                                  | Operate time                             | $(t_{ON})$                 | Max.    | 1.0 ms                         | 1.0 ms                         | 1.0 ms<br>( $I_F = 10$ mA)    |
|                                  | Release time                             | $(t_{OFF})$                | Max.    | 3.0 ms                         | 1.0 ms                         | 1.0 ms<br>( $I_F = 10$ mA)    |

### Optimum Operating Conditions

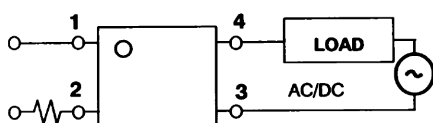
| Parameter                   | Comments and conditions |         | G3VM-353D,<br>G3VM-353D(TR) | G3VM-401D,<br>G3VM-401D(TR) | G3VM-61D,<br>G3VM-61D(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-----------------------------|---------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 280 V                       | 320 V                       | 48 V                      |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                        | 5 mA                        | 5 mA                      |
|                             |                         | Typical | —                           | 7.5 mA                      | 7.5 mA                    |
|                             |                         | Max.    | 25 mA                       | 25 mA                       | 25 mA                     |
| Continuous load current     | $I_O$                   | Max.    | 150 mA                      | 100 mA                      | 400 mA                    |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                | -20° to 65°C                | -20° to 65°C              |

### Dimensions

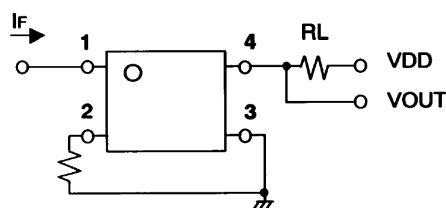
| Item       | G3VM-353D,<br>G3VM-353D(TR) | G3VM-401D,<br>G3VM-401D(TR) | G3VM-61D,<br>G3VM-61D(TR) |
|------------|-----------------------------|-----------------------------|---------------------------|
| Dimensions | See pages 94, 98            | See pages 94, 98            | See pages 94, 98          |

### Connections

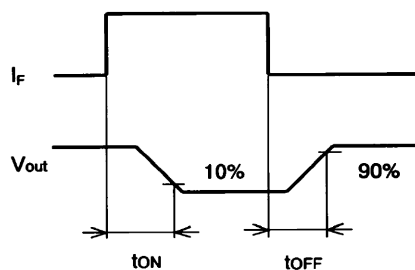
G3VM-353D, -353D(TR)



G3VM-353D, -353D(TR), -401D, -401D(TR), -61D, -61D(TR)



### Timing Chart



## G3VM-61D1(TR), -351E(TR), -353E(TR)

### Maximum Rating

| Parameter                      |                                | Comments and conditions               |         | G3VM-61D1,<br>G3VM-61D1(TR)           | G3VM-351E,<br>G3VM-351E(TR)                        | G3VM-353E,<br>G3VM-353E(TR)                        |
|--------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals  |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/6 pins                                    | 1 Form B/6 pins                                    |
| Input (LED)                    | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                              | 50 mA                                              |
|                                |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                                | 1 A                                                |
|                                | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                          |
|                                | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                                | 5 V                                                |
| Junction temperature ( $T_j$ ) |                                |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               |
| Output (Detector)              | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  | 350 V                                              | 350 V                                              |
|                                | Continuous load current        | $I_O$                                 |         | 500 mA                                | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) | 150 mA (for A)<br>150 mA (for B)<br>300 mA (for C) |
|                                | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.5 mA/ $^\circ\text{C}$ (for A)                  |
|                                | Junction temperature ( $T_j$ ) |                                       |         |                                       | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               |
| Dielectric strength            |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                              | 2500 VAC                                           | 2500 VAC                                           |
| Temperature                    | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$               |
|                                | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-61D1,<br>G3VM-61D1(TR)   | G3VM-351E,<br>G3VM-351E(TR)                     | G3VM-353E,<br>G3VM-353E(TR)                     |
|----------------------------------|------------------------------------------|----------------------------|---------|-------------------------------|-------------------------------------------------|-------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                         | 1.0 V                                           | 1.0 V                                           |
|                                  |                                          |                            | Typical | 1.15 V                        | 1.15 V                                          | 1.15 V                                          |
|                                  |                                          |                            | Max.    | 1.3 V                         | 1.3 V                                           | 1.3 V                                           |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                    | 10 $\mu$ A                                      | 10 $\mu$ A                                      |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 5 V                           | 5 V                                             | 5 V                                             |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                       | 30 pF                                           | 30 pF                                           |
| Keep ON LED current ( $I_{FT}$ ) | At $I_{ON}$                              | Typical                    | 1.6 mA  | 1 mA                          | 1 mA                                            |                                                 |
|                                  |                                          | Max.                       | 3 mA    | 3 mA                          | 3 mA                                            |                                                 |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 1 $\Omega$ ( $I_{ON}=500$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 15 $\Omega$ ( $I_{ON}=150$ mA) for connection A |
|                                  |                                          |                            | Max.    | 2 $\Omega$ ( $I_{ON}=500$ mA) | 50 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 25 $\Omega$ ( $I_{ON}=150$ mA) for connection A |
|                                  |                                          |                            | Typical | —                             | 28 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 8 $\Omega$ ( $I_{ON}=150$ mA) for connection B  |
|                                  |                                          |                            | Max.    | —                             | 40 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 14 $\Omega$ ( $I_{ON}=150$ mA) for connection B |
|                                  |                                          |                            | Typical | —                             | 14 $\Omega$ ( $I_{ON}=240$ mA) for connection C | 4 $\Omega$ ( $I_{ON}=300$ mA) for connection C  |
|                                  |                                          |                            | Max.    | —                             | 20 $\Omega$ ( $I_{ON}=240$ mA) for connection C | 7 $\Omega$ ( $I_{ON}=300$ mA) for connection C  |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                   | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                     |
| Transfer characteristics         | I/O capacitance                          | ( $C_{IO}$ )               | Typical | 0.8 pF                        | 0.8 pF                                          | 0.8 pF                                          |
|                                  | I/O resistance                           | ( $R_{IO}$ )               | Min.    | 1000 M $\Omega$               | 1000 M $\Omega$                                 | 1000 M $\Omega$                                 |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.    | 2.0 ms                        | 1.0 ms                                          | 1.0 ms                                          |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.    | 0.5 ms                        | 1.0 ms                                          | 3.0 ms                                          |



### Optimum Operating Conditions

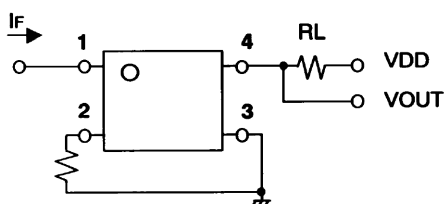
| Parameter                   | Comments and conditions |         | G3VM-61D1,<br>G3VM-61D1(TR) | G3VM-351E,<br>G3VM-351E(TR) | G3VM-353E,<br>G3VM-353E(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-----------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V                        | 280 V                       | 280 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                        | 5 mA                        | 5 mA                        |
|                             |                         | Typical | 7.5 mA                      | 10 mA                       | —                           |
|                             |                         | Max.    | 25 mA                       | 25 mA                       | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 500 mA                      | 100 mA                      | 150 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                | -20° to 65°C                | -20° to 65°C                |

### Dimensions

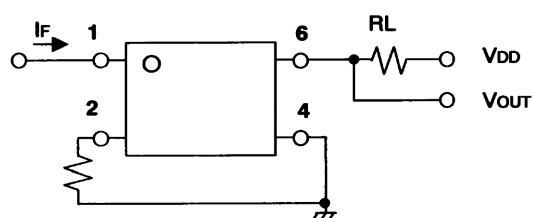
| Item       | G3VM-61D1,<br>G3VM-61D1(TR) | G3VM-351E,<br>G3VM-351E(TR) | G3VM-353E,<br>G3VM-353E(TR) |
|------------|-----------------------------|-----------------------------|-----------------------------|
| Dimensions | See pages 94, 98            | See pages 94, 99            | See pages 94, 99            |

### Connections

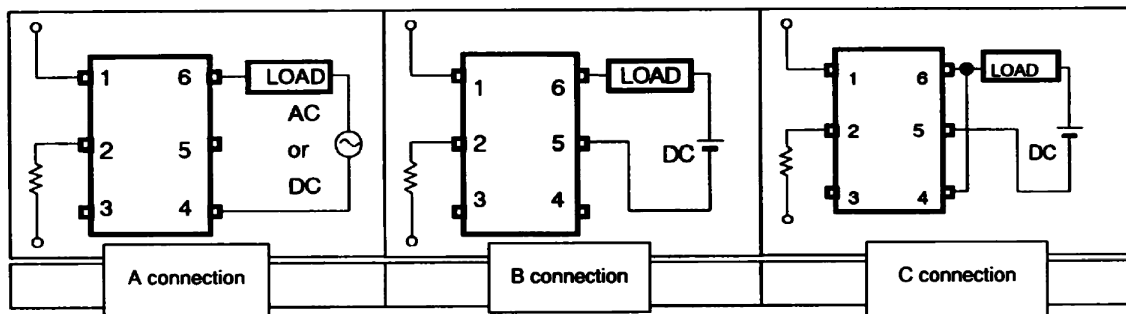
G3VM-61D1, -61D(TR)



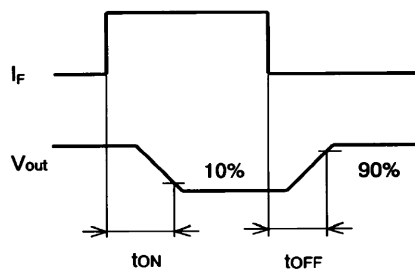
G3VM-351E, -351E(TR), -353E, -353E(TR)



G3VM-351E, -351E(TR), -353E, -353E(TR)



### Timing Chart



## G3VM-3F(TR), -3FL(TR), -401E(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-3F,<br>G3VM-3F(TR)                            | G3VM-3FL,<br>G3VM-3FL(TR)             | G3VM-401E,<br>G3VM-401E(TR)                        |
|-------------------------------|--------------------------------|---------------------------------------|---------|----------------------------------------------------|---------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                    | 1 Form A/6 pins                       | 1 Form A/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                              | 50 mA                                 | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                | 1 A                                   | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                | 5 V                                   | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                              | 350 V                                 | 400 V                                              |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA (for A)<br>120 mA (for B)<br>160 mA (for C) | 120 mA                                | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                                           | 2500 VAC                              | 2500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +100 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |             | G3VM-3F,<br>G3VM-3F(TR)                            | G3VM-3FL,<br>G3VM-3FL(TR)                          | G3VM-401E,<br>G3VM-401E(TR)                        |
|----------------------------------|------------------------------------------|----------------------------|-------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.        | 1.0 V                                              | 1.0 V                                              | 1.0 V                                              |
|                                  |                                          |                            | Typical     | 1.15 V                                             | 1.15 V                                             | 1.15 V                                             |
|                                  |                                          |                            | Max.        | 1.3 V                                              | 1.3 V                                              | 1.3 V                                              |
|                                  | Reverse current                          | $I_R$                      | Max.        | 10 $\mu$ A                                         | 10 $\mu$ A                                         | 10 $\mu$ A                                         |
|                                  | Reverse voltage                          | $V_R$                      | Max.        | 5 V                                                | 5 V                                                | 5 V                                                |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |             | Typical                                            | 30 pF                                              | 30 pF                                              |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | —           | —                                                  | 1 mA                                               |                                                    |
|                                  |                                          | Max.                       | 3 mA        | 3 mA                                               | 3 mA                                               |                                                    |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical     | 22 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 22 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 17 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A |
|                                  |                                          |                            | Max.        | 35 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 35 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 35 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A |
|                                  |                                          |                            | Typical     | 16 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B | —                                                  | 11 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B |
|                                  |                                          |                            | Max.        | 23 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B | —                                                  | 20 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B |
|                                  |                                          |                            | Typical     | 8 $\Omega$ ( $I_{ON}=160$ mA)<br>for connection C  | —                                                  | 6 $\Omega$ ( $I_{ON}=240$ mA)<br>for connection C  |
|                                  |                                          |                            | Max.        | 12 $\Omega$ ( $I_{ON}=160$ mA)<br>for connection C | —                                                  | 10 $\Omega$ ( $I_{ON}=240$ mA)<br>for connection C |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.        | 1.0 $\mu$ A                                        | 1.0 $\mu$ A                                        | 1.0 $\mu$ A                                        |
|                                  | Limit current                            | $(I_{LIM})$                | Min.        | —                                                  | 150 mA                                             | —                                                  |
|                                  |                                          |                            | Max.        | —                                                  | 300 mA                                             | —                                                  |
|                                  | Transfer characteristics                 | I/O capacitance            | $(C_{I/O})$ | Typical                                            | 0.8 pF                                             | 0.8 pF                                             |
| I/O resistance                   |                                          | $(R_{I/O})$                | Min.        | 1000 M $\Omega$                                    | 1000 M $\Omega$                                    | 1000 M $\Omega$                                    |
| Operate time                     |                                          | $(t_{ON})$                 | Max.        | 1.0 ms                                             | 1.0 ms                                             | 1.0 ms                                             |
| Release time                     |                                          | $(t_{OFF})$                | Max.        | 1.0 ms                                             | 1.0 ms                                             | 1.0 ms                                             |

### Optimum Operating Conditions

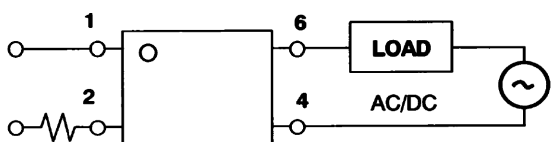
| Parameter                   | Comments and conditions |         | G3VM-3F,<br>G3VM-3F(TR) | G3VM-3FL,<br>G3VM-3FL(TR) | G3VM-401E,<br>G3VM-401E(TR) |
|-----------------------------|-------------------------|---------|-------------------------|---------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 280 V                   | 280 V                     | 320 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                    | 5 mA                      | 5 mA                        |
|                             |                         | Typical | 7.5 mA                  | 7.5 mA                    | 7.5 mA                      |
|                             |                         | Max.    | 25 mA                   | 25 mA                     | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 120 mA                  | 120 mA                    | 120 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C            | -20° to 65°C              | -20° to 65°C                |

### Dimensions

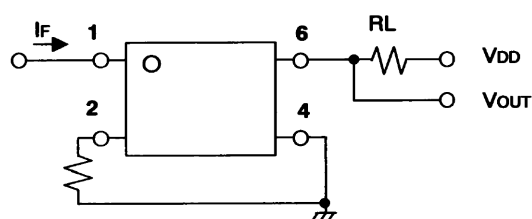
| Item       | G3VM-3F,<br>G3VM-3F(TR) | G3VM-3FL,<br>G3VM-3FL(TR) | G3VM-401E,<br>G3VM-401E(TR) |
|------------|-------------------------|---------------------------|-----------------------------|
| Dimensions | See pages 94, 99        | See pages 94, 99          | See pages 94, 99            |

### Connections

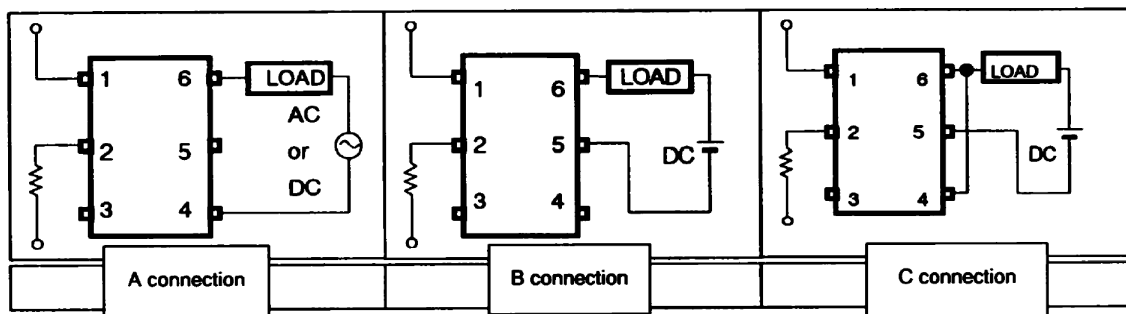
G3VM-3FL, -3FL(TR)



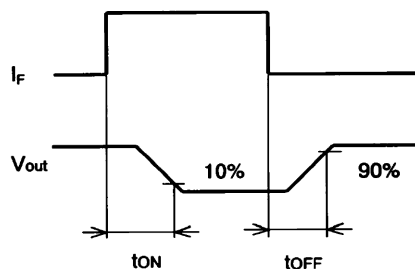
G3VM-3F, -3F(TR), -3FL, -3FL(TR), -401E, -401E(TR)



G3VM-3F, -3F(TR), -401E, -401E(TR)



### Timing Chart



## G3VM-401EY(TR), -601EY(TR), G3VM-61E(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-401EY,<br>G3VM-401EY(TR)                      | G3VM-601EY,<br>G3VM-601EY(TR)                      | G3VM-61E,<br>G3VM-61E(TR)                           |
|-------------------------------|--------------------------------|---------------------------------------|---------|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                    | 1 Form A/6 pins                                    | 1 Form A/6 pins                                     |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                              | 50 mA                                              | 50 mA                                               |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                | 1 A                                                | 1 A                                                 |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                           |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                | 5 V                                                | 5 V                                                 |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                                |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 400 V                                              | 600 V                                              | 60 V                                                |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) | 100 mA (for A)<br>100 mA (for B)<br>200 mA (for C) | 500 mA (for A)<br>500 mA (for B)<br>1000 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$ (for A)                  | -1.0 mA/ $^\circ\text{C}$ (for A)                  | -5.0 mA/ $^\circ\text{C}$ (for A)                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                                |
| Dielectric strength           |                                | $V_{i/O}$ for 1 minute min.           |         | 5000 VAC                                           | 5000 VAC                                           | 2500 VAC                                            |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$                |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$               |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-401EY,<br>G3VM-401EY(TR)                   | G3VM-601EY,<br>G3VM-601EY(TR)                    | G3VM-61E,<br>G3VM-61E(TR)                         |
|----------------------------------|------------------------------------------|----------------------------|---------|-------------------------------------------------|--------------------------------------------------|---------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                                           | 1.0 V                                            | 1.0 V                                             |
|                                  |                                          |                            | Typical | 1.15 V                                          | 1.15 V                                           | 1.15 V                                            |
|                                  |                                          |                            | Max.    | 1.3 V                                           | 1.3 V                                            | 1.3 V                                             |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                                      | 10 $\mu$ A                                       | 10 $\mu$ A                                        |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 5 V                                             | 5 V                                              | 5 V                                               |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                                         | 30 pF                                            | 30 pF                                             |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 |                            | Typical | —                                               | 1.6 mA                                           | —                                                 |
|                                  |                                          |                            | Max.    | 3 mA                                            | 5 mA                                             | 3 mA                                              |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 17 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 22 $\Omega$ ( $I_{ON}=100$ mA) for connection A  | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection A    |
|                                  |                                          |                            |         | Max.                                            | 35 $\Omega$ ( $I_{ON}=120$ mA) for connection A  | 35 $\Omega$ ( $I_{ON}=100$ mA) for connection A   |
|                                  |                                          |                            | Typical | 11 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 17 $\Omega$ ( $I_{ON}=100$ mA) for connection B  | 0.5 $\Omega$ ( $I_{ON}=500$ mA) for connection B  |
|                                  |                                          |                            |         | Max.                                            | 20 $\Omega$ ( $I_{ON}=120$ mA) for connection B  | 27 $\Omega$ ( $I_{ON}=100$ mA) for connection B   |
|                                  |                                          |                            | Typical | 6 $\Omega$ ( $I_{ON}=240$ mA) for connection C  | 8.5 $\Omega$ ( $I_{ON}=200$ mA) for connection C | 0.3 $\Omega$ ( $I_{ON}=1000$ mA) for connection C |
|                                  |                                          |                            |         | Max.                                            | 10 $\Omega$ ( $I_{ON}=240$ mA) for connection C  | 13.5 $\Omega$ ( $I_{ON}=200$ mA) for connection C |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                      | 1.0 $\mu$ A                                       |
| Transfer characteristics         | I/O capacitance                          | ( $C_{i/O}$ )              | Typical | 0.8 pF                                          | 0.8 pF                                           | 0.8 pF                                            |
|                                  | I/O resistance                           | ( $R_{i/O}$ )              | Min.    | 1000 M $\Omega$                                 | 1000 M $\Omega$                                  | 1000 M $\Omega$                                   |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                                          | 1.5 ms                                           | 1.0 ms                                            |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.    | 1.0 ms                                          | 1.0 ms                                           | 1.0 ms                                            |

### Optimum Operating Conditions

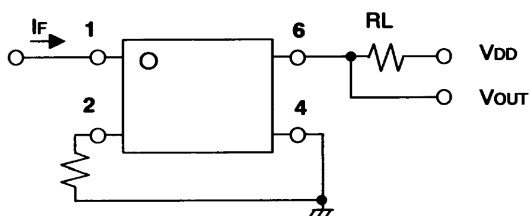
| Parameter                   | Comments and conditions |         | G3VM-401EY,<br>G3VM-401EY(TR) | G3VM-601EY,<br>G3VM-601EY(TR) | G3VM-61E,<br>G3VM-61E(TR) |
|-----------------------------|-------------------------|---------|-------------------------------|-------------------------------|---------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 320 V                         | 480 V                         | 48 V                      |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                          | 5 mA                          | 5 mA                      |
|                             |                         | Typical | 7.5 mA                        | —                             | 7.5 mA                    |
|                             |                         | Max.    | 25 mA                         | 25 mA                         | 25 mA                     |
| Continuous load current     | $I_O$                   | Max.    | 120 mA                        | 100 mA                        | 400 mA                    |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                  | -20° to 65°C                  | -20° to 65°C              |

### Dimensions

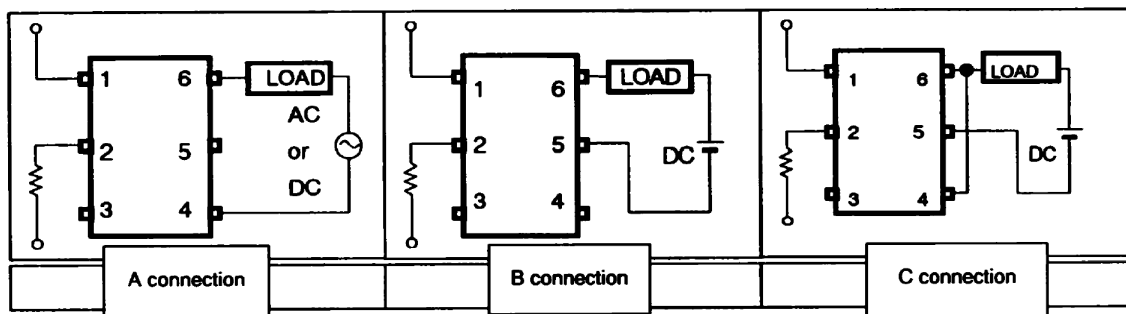
| Item       | G3VM-401EY,<br>G3VM-401EY(TR) | G3VM-601EY,<br>G3VM-601EY(TR) | G3VM-61E,<br>G3VM-61E(TR) |
|------------|-------------------------------|-------------------------------|---------------------------|
| Dimensions | See pages 94, 99              | See pages 94, 99              | See pages 94, 99          |

### Connections

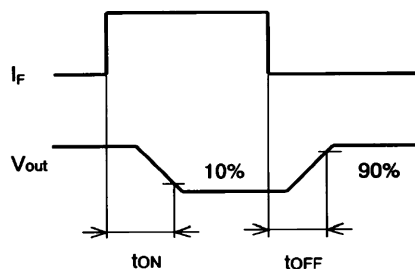
G3VM-401EY, -401EY(TR), -601EY, -601EY(TR), -61E, -61E(TR)



G3VM-401EY, -401EY(TR), -601EY, -601EY(TR), -61E, -61E(TR)



### Timing Chart



## G3VM-61E1(TR), -VF(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-61E1,<br>G3VM-61E1(TR)                         | G3VM-VF,<br>G3VM-VF(TR)                            |
|-------------------------------|--------------------------------|---------------------------------------|---------|-----------------------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/6 pins                                     | 1 Form A/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                               | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                 | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                           | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                 | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                                | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                                | 60 V                                               |
|                               | Continuous load current        | $I_O$                                 |         | 500 mA (for A)<br>500 mA (for B)<br>1000 mA (for C) | 300 mA (for A)<br>450 mA (for B)<br>600 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$ (for A)                   | -3.0 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                                | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                                            | 2500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$                | -20 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$               | -55 $^\circ$ to +100 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter                                |                               | Comments and conditions    |         | G3VM-61E1,<br>G3VM-61E1(TR)                        | G3VM-VF,<br>G3VM-VF(TR)                           |
|------------------------------------------|-------------------------------|----------------------------|---------|----------------------------------------------------|---------------------------------------------------|
| Input                                    | LED forward voltage ( $V_F$ ) | $I_F=10$ mA                | Min.    | 1.0 V                                              | 1.0 V                                             |
|                                          |                               |                            | Typical | 1.15 V                                             | 1.15 V                                            |
|                                          |                               |                            | Max.    | 1.3 V                                              | 1.3 V                                             |
|                                          | Reverse current               | $I_R$                      | Max.    | 10 $\mu$ A                                         | 10 $\mu$ A                                        |
|                                          | Reverse voltage               | $V_R$                      | Max.    | 5 V                                                | 5 V                                               |
|                                          | Capacitance ( $C_T$ )         | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                                            | 30 pF                                             |
| Keep ON LED current ( $I_{FT}$ )         | At $I_O$                      |                            | Typical | 1.6 mA                                             | 1 mA                                              |
|                                          |                               |                            | Max.    | 3 mA                                               | 5 mA                                              |
| Output                                   | ON-resistance ( $R_{ON}$ )    | $I_F=5$ mA                 | Typical | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection A     | 1.4 $\Omega$ ( $I_{ON}=300$ mA) for connection A  |
|                                          |                               |                            | Max.    | 2 $\Omega$ ( $I_{ON}=500$ mA) for connection A     | 2 $\Omega$ ( $I_{ON}=300$ mA) for connection A    |
|                                          |                               |                            | Typical | 0.5 $\Omega$ ( $I_{ON}=500$ mA) for connection B   | 0.7 $\Omega$ ( $I_{ON}=450$ mA) for connection B  |
|                                          |                               |                            | Max.    | 1 $\Omega$ ( $I_{ON}=500$ mA) for connection B     | 1 $\Omega$ ( $I_{ON}=450$ mA) for connection B    |
|                                          |                               |                            | Typical | 0.25 $\Omega$ ( $I_{ON}=1000$ mA) for connection C | 0.35 $\Omega$ ( $I_{ON}=600$ mA) for connection C |
|                                          |                               |                            | Max.    | —                                                  | 0.5 $\Omega$ ( $I_{ON}=600$ mA) for connection C  |
| OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                  |                            | Max.    | 1.0 $\mu$ A                                        | 1.0 $\mu$ A                                       |
| Transfer characteristics                 | I/O capacitance               | $(C_{IO})$                 |         | Typical                                            | 0.8 pF                                            |
|                                          | I/O resistance                | $(R_{IO})$                 |         | Min.                                               | 1000 M $\Omega$                                   |
|                                          | Operate time                  | $(t_{ON})$                 |         | Max.                                               | 2.0 ms                                            |
|                                          | Release time                  | $(t_{OFF})$                |         | Max.                                               | 0.5 ms                                            |

### Optimum Operating Conditions

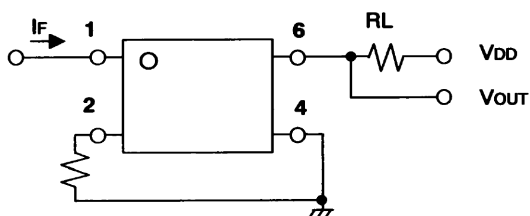
| Parameter                   | Comments and conditions |         | G3VM-61E1,<br>G3VM-61E1(TR) | G3VM-VF,<br>G3VM-VF(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V                        | 48 V                    |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                        | 7.5 mA                  |
|                             |                         | Typical | 7.5 mA                      | 15 mA                   |
|                             |                         | Max.    | 25 mA                       | 25 mA                   |
| Continuous load current     | $I_O$                   | Max.    | 500 mA                      | 300 mA                  |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                | -20° to 80°C            |

### Dimensions

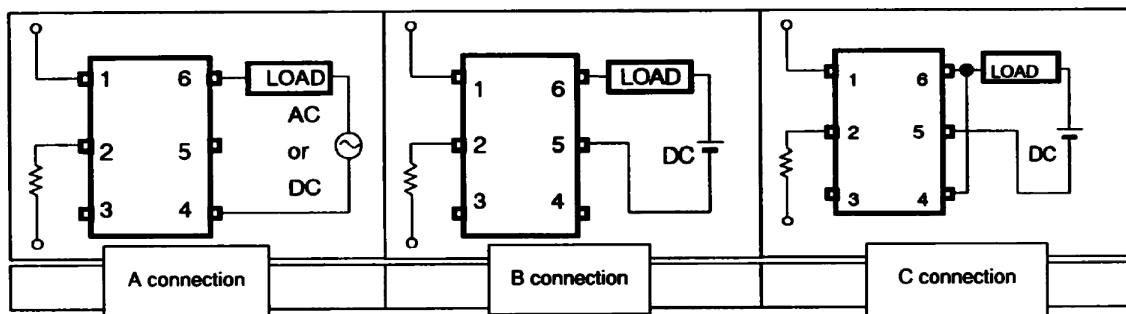
| Item       | G3VM-61E1,<br>G3VM-61E1(TR) | G3VM-VF,<br>G3VM-VF(TR) |
|------------|-----------------------------|-------------------------|
| Dimensions | See pages 94, 99            | See pages 94, 99        |

### Connections

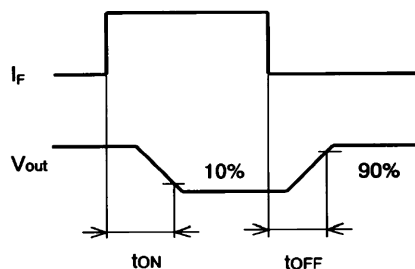
G3VM-61E1, -61E1(TR), -VF, -VF(TR)



G3VM-61E1, -61E1(TR), -VF, -VF(TR)



### Timing Chart



## G3VM-22FO(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-22FO,<br>G3VM-22FO(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 6 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 20 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 150 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.5 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                                |                               | Comments and conditions |             | G3VM-22FO,<br>G3VM-22FO(TR)   |
|------------------------------------------|-------------------------------|-------------------------|-------------|-------------------------------|
| Input                                    | LED forward voltage ( $V_F$ ) | $I_F=10$ mA             | Min.        | 1.0 V                         |
|                                          |                               |                         | Typical     | 1.15 V                        |
|                                          |                               |                         | Max.        | 1.3 V                         |
|                                          | Reverse current               | $I_R$                   | Max.        | 10 $\mu$ A                    |
|                                          | Reverse voltage               | $V_R$                   | Max.        | 6 V                           |
|                                          | Capacitance ( $C_T$ )         | $V = 0$ ; freq. = 1 MHz |             | Typical                       |
| Keep ON LED current ( $I_{FT}$ )         | At $I_O$                      | Typical                 | 1.5 mA      |                               |
|                                          |                               | Max.                    | 5 mA        |                               |
| Output                                   | ON-resistance ( $R_{ON}$ )    | $I_F=5$ mA              | Typical     | 2 $\Omega$ ( $I_{ON}=150$ mA) |
|                                          |                               |                         | Max.        | 4 $\Omega$ ( $I_{ON}=150$ mA) |
|                                          |                               |                         | Typical     | —                             |
|                                          |                               |                         | Max.        | —                             |
|                                          |                               |                         | Typical     | —                             |
|                                          |                               |                         | Max.        | —                             |
| OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                  | Max.                    | 1.0 $\mu$ A |                               |
| Transfer characteristics                 | I/O capacitance               | ( $C_{I/O}$ )           | Typical     | 0.8 pF                        |
|                                          | I/O resistance                | ( $R_{I/O}$ )           | Min.        | 1000 M $\Omega$               |
|                                          | Operate time                  | ( $t_{ON}$ )            | Max.        | 1.0 ms                        |
|                                          | Release time                  | ( $t_{OFF}$ )           | Max.        | 1.0 ms                        |



### Optimum Operating Conditions

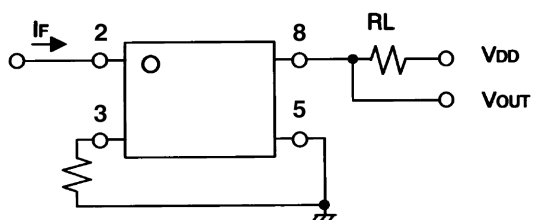
| Parameter                   | Comments and conditions |         | G3VM-22FO,<br>G3VM-22FO(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 20 V                        |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                        |
|                             |                         | Typical | — mA                        |
|                             |                         | Max.    | 30 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 150 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                |

### Dimensions

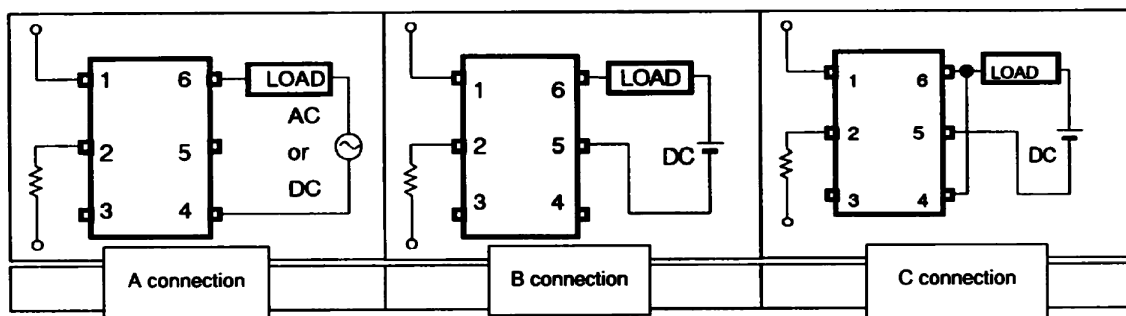
| Item       | G3VM-22FO,<br>G3VM-22FO(TR) |
|------------|-----------------------------|
| Dimensions | See pages 95, 99            |

### Connections

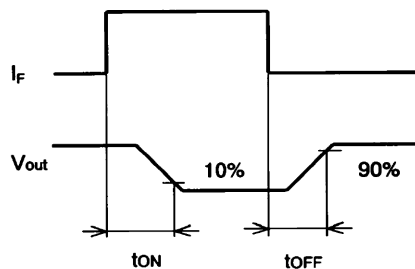
G3VM-22FO, -22FO(TR)



G3VM-22FO, -22FO(TR)



### Timing Chart



## G3VM-61FP(TR), -61FR(TR), -355FR(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-61FP,<br>G3VM-61FP(TR)           | G3VM-61FR,<br>G3VM-61FR(TR)           | G3VM-355FR,<br>G3VM-355FR(TR)         |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/8 pins                       | 1 Form A/8 pins                       | 1FormA+1FormB/ 8 pins                 |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 6 V                                   | 6 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  | 60 V                                  | 350 V                                 |
|                               | Continuous load current        | $I_O$                                 |         | 500 mA                                | 2000 mA                               | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -5.0 mA/ $^\circ\text{C}$             | -20 mA/ $^\circ\text{C}$              | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 1500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-61FP,<br>G3VM-61FP(TR)     | G3VM-61FR,<br>G3VM-61FR(TR)       | G3VM-355FR,<br>G3VM-355FR(TR)  |
|----------------------------------|------------------------------------------|----------------------------|---------|---------------------------------|-----------------------------------|--------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                           | 1.0 V                             | 1.0 V                          |
|                                  |                                          |                            | Typical | 1.2 V                           | 1.2 V                             | 1.15 V                         |
|                                  |                                          |                            | Max.    | 1.4 V                           | 1.4 V                             | 1.3 V                          |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                      | 10 $\mu$ A                        | 10 $\mu$ A                     |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 6 V                             | 6 V                               | 5 V                            |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 15 pF                           | 15 pF                             | 30 pF                          |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | —       | —                               | 1 mA                              |                                |
|                                  |                                          | Max.                       | 5 mA    | 5 mA                            | 3 mA                              |                                |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA (1a)            | Typical | 0.3 $\Omega$ ( $I_{ON}=500$ mA) | —                                 | 15 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  |                                          |                            | Max.    | 0.6 $\Omega$ ( $I_{ON}=500$ mA) | 0.12 $\Omega$ ( $I_{ON}=1000$ mA) | 25 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  |                                          | $I_F=0$ mA (1b)            | Typical | —                               | —                                 | 15 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  |                                          |                            | Max.    | —                               | —                                 | 25 $\Omega$ ( $I_{ON}=120$ mA) |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                     | 4.0 $\mu$ A                       | 1.0 $\mu$ A                    |
|                                  | Capacitance                              | $C_{OFF}$                  | Typical | 200 pF                          | —                                 | —                              |
| Transfer characteristics         | I/O capacitance                          | ( $C_{I/O}$ )              | Typical | 0.8 pF                          | 0.8 pF                            | 0.8 pF                         |
|                                  | I/O resistance                           | ( $R_{I/O}$ )              | Min.    | 1000 M $\Omega$                 | 1000 M $\Omega$                   | 1000 M $\Omega$                |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.    | 2.0 ms                          | 5.0 ms                            | 1.0 ms                         |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.    | 0.5 ms                          | 3.5 ms                            | 3.0 ms                         |

### Optimum Operating Conditions

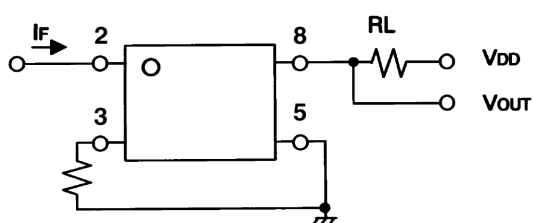
| Parameter                   | Comments and conditions |         | G3VM-61FP,<br>G3VM-61FP(TR) | G3VM-61FR,<br>G3VM-61FR(TR) | G3VM-355FR,<br>G3VM-355FR(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-----------------------------|-------------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 48 V                        | 48 V                        | 280 V                         |
| Operate LED forward current | $I_F$                   | Min.    | 10 mA                       | 10 mA                       | 5 mA                          |
|                             |                         | Typical | — mA                        | —                           | —                             |
|                             |                         | Max.    | 30 mA                       | 30 mA                       | 25 mA                         |
| Continuous load current     | $I_O$                   | Max.    | 500 mA                      | 2000 mA                     | 120 mA                        |
| Ambient temperature         | $T_A$                   |         | -25° to 50°C                | -20° to 50°C                | -20° to 65°C                  |

### Dimensions

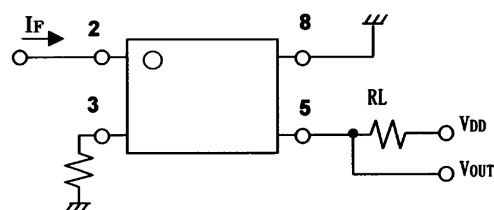
| Item       | G3VM-61FP,<br>G3VM-61FP(TR) | G3VM-61FR,<br>G3VM-61FR(TR) | G3VM-355FR,<br>G3VM-355FR(TR) |
|------------|-----------------------------|-----------------------------|-------------------------------|
| Dimensions | See pages 95, 99            | See pages 95, 99            | See pages 95, 99              |

### Connections

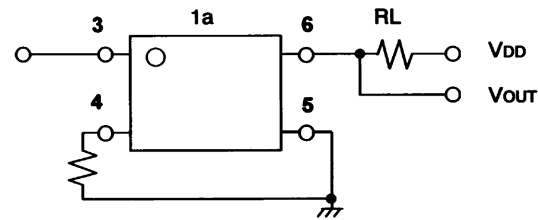
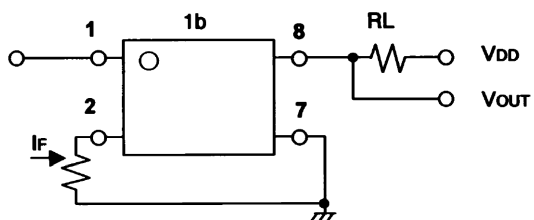
G3VM-61FP, -61FP(TR)



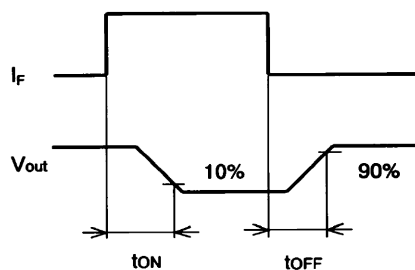
G3VM-61FR, -61FR(TR)



G3VM-355FR, -355FR(TR)



### Timing Chart



## G3VM-352F(TR), -402F(TR), -62F1(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-352F,<br>G3VM-352F(TR)           | G3VM-402F,<br>G3VM-402F(TR)           | G3VM-62F1,<br>G3VM-62F1(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                       | 2 Form A/8 pins                       | 2 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 400 V                                 | 60 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 120 mA                                | 500 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -5.0 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-352F,<br>G3VM-352F(TR)           | G3VM-402F,<br>G3VM-402F(TR)    | G3VM-62F1,<br>G3VM-62F1(TR)     |
|--------------------------|------------------------------------------|----------------------------|---------|---------------------------------------|--------------------------------|---------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                                 | 1.0 V                          | 1.0 V                           |
|                          |                                          |                            | Typical | 1.15 V                                | 1.15 V                         | 1.15 V                          |
|                          |                                          |                            | Max.    | 1.3 V                                 | 1.3 V                          | 1.3 V                           |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                            | 10 $\mu$ A                     | 10 $\mu$ A                      |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                                   | 5 V                            | 5 V                             |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                                 | 30 pF                          | 30 pF                           |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                   | Typical | 1                                     | 1 mA                           | 1.6 mA                          |
|                          |                                          |                            | Max.    | 3 mA                                  | 3 mA                           | 3 mA                            |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 35 $\Omega$ (25 $\Omega$ , $t < 1$ s) | 18 $\Omega$ ( $I_{ON}=120$ mA) | 1.0 $\Omega$ ( $I_{ON}=500$ mA) |
|                          |                                          |                            | Max.    | 50 $\Omega$ (35 $\Omega$ , $t < 1$ s) | 35 $\Omega$ ( $I_{ON}=120$ mA) | 2.0 $\Omega$ ( $I_{ON}=500$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                           | 1.0 $\mu$ A                    | 1.0 $\mu$ A                     |
|                          | Capacitance                              | COFF                       | Typical | —                                     | —                              | —                               |
| Max.                     |                                          |                            | —       | —                                     | —                              |                                 |
| Transfer characteristics | I/O capacitance                          | ( $C_{IO}$ )               | Typical | 0.8 pF                                | 0.8 pF                         | 0.8 pF                          |
|                          | I/O resistance                           | ( $R_{IO}$ )               | Min.    | 1000 M $\Omega$                       | 1000 M $\Omega$                | 1000 M $\Omega$                 |
|                          | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                                | 1.0 ms                         | 2.0 ms                          |
|                          | Release time                             | ( $t_{OFF}$ )              | Max.    | 1.0 ms                                | 1.0 ms                         | 0.5 ms                          |

### Optimum Operating Conditions

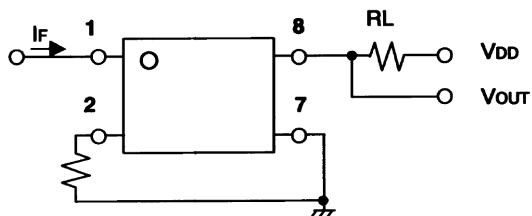
| Parameter                   |       | Comments and conditions |        | G3VM-352F,<br>G3VM-352F(TR)         | G3VM-402F,<br>G3VM-402F(TR)         | G3VM-62F1,<br>G3VM-62F1(TR)         |
|-----------------------------|-------|-------------------------|--------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max.   | 280 V                               | 320 V                               | 48 V                                |
| Operate LED forward current | $I_F$ | Min.                    | 5 mA   | 5 mA                                | 5 mA                                |                                     |
|                             |       | Typical                 | 7.5 mA | 7.5                                 | 7.5 mA                              |                                     |
|                             |       | Max.                    | 25 mA  | 25 mA                               | 25 mA                               |                                     |
| Continuous load current     |       | $I_O$                   | Max.   | 100 mA                              | 100 mA                              | 500 mA                              |
| Ambient temperature         |       | $T_A$                   |        | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ |

**Dimensions**

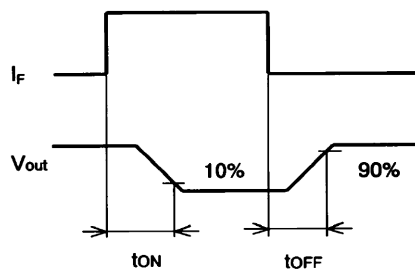
| Item       | G3VM-352F,<br>G3VM-352F(TR) | G3VM-402F,<br>G3VM-402F(TR) | G3VM-62F1,<br>G3VM-62F1(TR) |
|------------|-----------------------------|-----------------------------|-----------------------------|
| Dimensions | See pages 95, 99            | See pages 95, 99            | See pages 95,99             |

**Connections**

G3VM-352FR, -352FR(TR), -402F, -402F(TR), -62F1, -62F1(TR)



**Timing Chart**



## G3VM-WF(TR), -WFL(TR), -354F(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-WF,<br>G3VM-WF(TR)               | G3VM-WFL,<br>G3VM-WFL(TR)             | G3VM-354F,<br>G3VM-354F(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                       | 2 Form A/8 pins                       | 2 Form B/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 6 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 350 V                                 | 350 V                                 |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 120 mA                                | 150 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -1.5 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 2500 VAC                              | 2500 VAC                              | 2500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +100 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-WF,<br>G3VM-WF(TR)        | G3VM-WFL,<br>G3VM-WFL(TR)      | G3VM-354F,<br>G3VM-354F(TR)    |                 |
|--------------------------|------------------------------------------|----------------------------|---------|--------------------------------|--------------------------------|--------------------------------|-----------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                          | 1.0 V                          | 1.0 V                          |                 |
|                          |                                          |                            | Typical | 1.15 V                         | 1.15 V                         | 1.15 V                         |                 |
|                          |                                          |                            | Max.    | 1.3 V                          | 1.3 V                          | 1.3 V                          |                 |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                     | 10 $\mu$ A                     | 10 $\mu$ A                     |                 |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                            | 6 V                            | 5 V                            |                 |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                        | 30 pF                          | 30 pF                          | 30 pF           |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 22 $\Omega$ ( $I_{ON}=120$ mA) | 22 $\Omega$ ( $I_{ON}=120$ mA) | 15 $\Omega$ ( $I_{ON}=300$ mA) |                 |
|                          |                                          |                            | Max.    | 35 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) | 25 $\Omega$ ( $I_{ON}=300$ mA) |                 |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               |         | Max.                           | 1.0 $\mu$ A                    | 1.0 $\mu$ A                    | 1.0 $\mu$ A     |
|                          | Limit current                            | $I_{LIM}$                  | Min.    | —                              | 150 mA                         | —                              |                 |
| Max.                     |                                          |                            | —       | 300 mA                         | —                              |                                |                 |
| Transfer characteristics | I/O capacitance                          | $(C_{I/O})$                |         | Typical                        | 0.8 pF                         | 0.8 pF                         | 0.8 pF          |
|                          | I/O resistance                           | $(R_{I/O})$                |         | Min.                           | 1000 M $\Omega$                | 1000 M $\Omega$                | 1000 M $\Omega$ |
|                          | Operate time                             | $(t_{ON})$                 |         | Max.                           | 1.0 ms                         | 1.0 ms                         | 1.0 ms          |
|                          | Release time                             | $(t_{OFF})$                |         | Max.                           | 1.0 ms                         | 1.0 ms                         | 3.0 ms          |

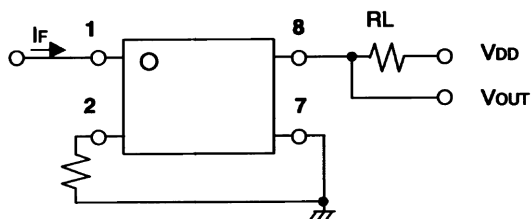
### Optimum Operating Conditions

| Parameter                   |       | Comments and conditions |        | G3VM-WF,<br>G3VM-WF(TR)             | G3VM-WFL,<br>G3VM-WFL(TR)           | G3VM-354F,<br>G3VM-354F(TR)         |
|-----------------------------|-------|-------------------------|--------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max.   | 280 V                               | 280 V                               | 280 V                               |
| Operate LED forward current | $I_F$ | Min.                    | 5 mA   | 5 mA                                | 5 mA                                | 5 mA                                |
|                             |       | Typical                 | 7.5 mA | 7.5 mA                              | —                                   |                                     |
|                             |       | Max.                    | 25 mA  | 25 mA                               | 25 mA                               |                                     |
| Continuous load current     |       | $I_O$                   | Max.   | 100 mA                              | 100 mA                              | 150 mA                              |
| Ambient temperature         |       | $T_A$                   |        | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ |

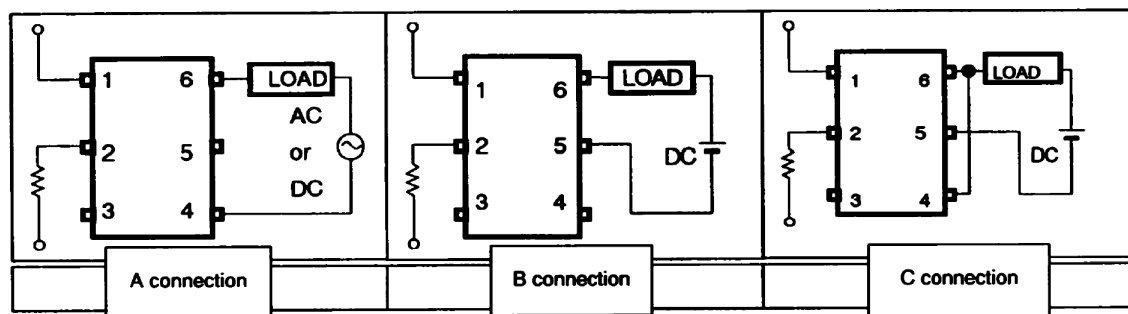
Dimensions

| Item       | G3VM-WF,<br>G3VM-WF(TR) | G3VM-WFL,<br>G3VM-WFL(TR) | G3VM-354F,<br>G3VM-354F(TR) |
|------------|-------------------------|---------------------------|-----------------------------|
| Dimensions | See pages 95, 99        | See pages 95, 99          | See pages 95, 99            |

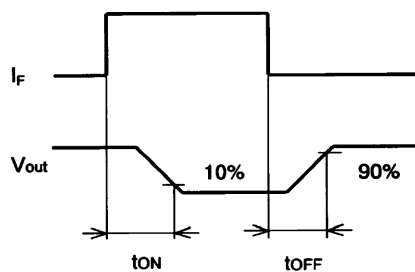
Connections



G3VM-WF, -WF(TR), -WFL, -WFL(TR), -354F, -354F(TR)



Timing Chart



## G3VM-21GR(TR), -21GR1(TR), -351G(TR)

### Maximum Rating

| Parameter                      |                                | Comments and conditions               |         | G3VM-21GR,<br>G3VM-21GR(TR)           | G3VM-21GR1,<br>G3VM-21GR1(TR)         | G3VM-351G,<br>G3VM-351G(TR)           |
|--------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals  |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                    | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                                |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                                | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                                | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
| Junction temperature ( $T_J$ ) |                                |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)              | Output voltage strength        | $V_{OFF}$                             |         | 20 V                                  | 20 V                                  | 350 V                                 |
|                                | Continuous load current        | $I_O$                                 |         | 160 mA                                | 300 mA                                | 110 mA                                |
|                                | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.6 mA/ $^\circ\text{C}$             | -3.0 mA/ $^\circ\text{C}$             | -1.1 mA/ $^\circ\text{C}$             |
|                                | Junction temperature ( $T_J$ ) |                                       |         |                                       | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength            |                                | $V_{IO}$ for 1 minute min.            |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                    | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                                | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |                        | G3VM-21GR,<br>G3VM-21GR(TR) | G3VM-21GR1,<br>G3VM-21GR1(TR)     | G3VM-351G,<br>G3VM-351G(TR)           |
|----------------------------------|------------------------------------------|----------------------------|------------------------|-----------------------------|-----------------------------------|---------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.                   | 1.0 V                       | 1.0 V                             | 1.0 V                                 |
|                                  |                                          |                            | Typical                | 1.15 V                      | 1.15 V                            | 1.15 V                                |
|                                  |                                          |                            | Max.                   | 1.3 V                       | 1.3 V                             | 1.3 V                                 |
|                                  | Reverse current                          | $I_R$                      | Max.                   | 10 $\mu$ A                  | 10 $\mu$ A                        | 10 $\mu$ A                            |
|                                  | Reverse voltage                          | $V_R$                      | Max.                   | 5 V                         | 5 V                               | 5 V                                   |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical                | 15 pF                       | 15 pF                             | 30 pF                                 |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | —                      | —                           | 1 mA ( $I_O = 100$ mA)            |                                       |
|                                  |                                          | Max.                       | 4 mA ( $I_O = 100$ mA) | 4 mA ( $I_O = 100$ mA)      | 3 mA ( $I_O = 100$ mA)            |                                       |
| Output                           | ON-resistance ( $R_{ON}$ )               | At $I_{ON}$<br>$I_F=5$ mA  | Typical                | 5 $\Omega$                  | 1 $\Omega$ ( $I_{ON} = 300$ mA)   | 35 $\Omega$ (25 $\Omega$ , $t < 1$ s) |
|                                  |                                          |                            | Max.                   | 8 $\Omega$                  | 1.5 $\Omega$ ( $I_{ON} = 300$ mA) | 50 $\Omega$ (35 $\Omega$ , $t < 1$ s) |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | $V_{OFF} = 350$ V          | Max.                   | 1.0 $\mu$ A                 | 1.0 $\mu$ A                       | 1.0 $\mu$ A                           |
|                                  | OFF capacitance                          | $C_{OFF}$                  | Min.                   | 1.0 pF                      | 5.0 pF                            | —                                     |
| Max.                             |                                          |                            | 2.0 pF                 | 12.0 pF                     | —                                 |                                       |
| Transfer characteristics         | I/O capacitance                          | ( $C_{IO}$ )               | Typical                | 0.8 pF                      | 0.8 pF                            | 0.8 pF                                |
|                                  | I/O resistance                           | ( $R_{IO}$ )               | Min.                   | 1000 M $\Omega$             | 1000 M $\Omega$                   | 1000 M $\Omega$                       |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.                   | 0.5 ms                      | 0.5 ms                            | 1.0 ms                                |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.                   | 0.5 ms                      | 0.5 ms                            | 1.0 ms                                |



### Optimum Operating Conditions

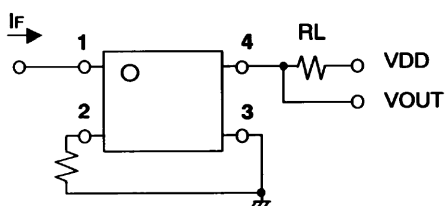
| Parameter                   | Comments and conditions |         | G3VM-21GR,<br>G3VM-21GR(TR) | G3VM-21GR1,<br>G3VM-21GR1(TR) | G3VM-351G,<br>G3VM-351G(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-------------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 20 V                        | 20 V                          | 280 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 7 mA                        | 7 mA                          | 5 mA                        |
|                             |                         | Typical | —                           | —                             | 7.5 mA                      |
|                             |                         | Max.    | 30 mA                       | 30 mA                         | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 160 mA                      | 300 mA                        | 100 mA                      |
| Ambient temperature         | $T_A$                   |         | -25° to 60°C                | -25° to 60°C                  | -20° to 65°C                |

### Dimensions

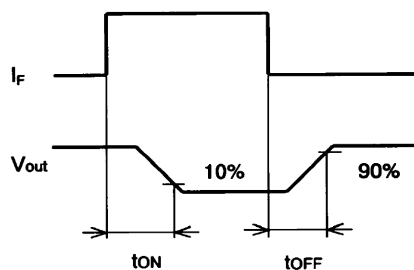
| Item       | G3VM-21GR,<br>G3VM-21GR(TR) | G3VM-21GR1,<br>G3VM-21GR1(TR) | G3VM-351G,<br>G3VM-351G(TR) |
|------------|-----------------------------|-------------------------------|-----------------------------|
| Dimensions | See pages 96, 100           | See pages 96, 100             | See pages 96, 100           |

### Connections

G3VM-21GR, -21GR(TR), -21GR1, -21GR1(TR), -351G, -351G(TR)



### Timing Chart



## G3VM-353G(TR), -401G(TR), -41GR3(TR)

### Maximum Rating

| Parameter                      |                                | Comments and conditions               |         | G3VM-353G,<br>G3VM-353G(TR)           | G3VM-401G,<br>G3VM-401G(TR)           | G3VM-41GR3,<br>G3VM-41GR3(TR)         |
|--------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals  |                                | —                                     |         | 1 Form B/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                    | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                                |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                                | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                                | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
| Junction temperature ( $T_J$ ) |                                |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)              | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 400 V                                 | 40 V                                  |
|                                | Continuous load current        | $I_O$                                 |         | 120 mA                                | 120 mA                                | 80 mA                                 |
|                                | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             | -0.8 mA/ $^\circ\text{C}$             |
|                                | Junction temperature ( $T_J$ ) |                                       |         |                                       | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength            |                                | $V_{IO}$ for 1 minute min.            |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                    | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                                | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-353G,<br>G3VM-353G(TR)    | G3VM-401G,<br>G3VM-401G(TR)    | G3VM-41GR3,<br>G3VM-41GR3(TR) |
|--------------------------|------------------------------------------|----------------------------|---------|--------------------------------|--------------------------------|-------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                          | 1.0 V                          | 1.0 V                         |
|                          |                                          |                            | Typical | 1.15 V                         | 1.15 V                         | 1.15 V                        |
|                          |                                          |                            | Max.    | 1.3 V                          | 1.3 V                          | 1.3 V                         |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                     | 10 $\mu$ A                     | 10 $\mu$ A                    |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                            | 5 V                            | 5 V                           |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                          | 30 pF                          | 15 pF                         |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_{ON}$                | Typical | 1 mA                           | 1 mA                           | —                             |
|                          |                                          |                            | Max.    | 3 mA                           | 3 mA                           | 4 mA                          |
| Output                   | ON-resistance ( $R_{ON}$ )               | At $I_O$                   | Typical | 15 $\Omega$ ( $I_{ON}=120$ mA) | 17 $\Omega$ ( $I_{ON}=120$ mA) | 25 $\Omega$ ( $I_{ON}=80$ mA) |
|                          |                                          |                            | Max.    | 25 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ ( $I_{ON}=80$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                   |
|                          | Capacitance                              | $C_{OFF}$                  | Typical | —                              | —                              | —                             |
| Max.                     |                                          |                            | —       | —                              | —                              |                               |
| Transfer characteristics | I/O capacitance                          | ( $C_{IO}$ )               | Typical | 0.8 pF                         | 0.8 pF                         | 0.8 pF                        |
|                          | I/O resistance                           | ( $R_{IO}$ )               | Min.    | 1000 M $\Omega$                | 1000 M $\Omega$                | 1000 M $\Omega$               |
|                          | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                         | 1.0 ms                         | 0.5 ms                        |
|                          | Release time                             | ( $t_{OFF}$ )              | Max.    | 3.0 ms                         | 1.0 ms                         | 0.5 ms                        |

### Optimum Operating Conditions

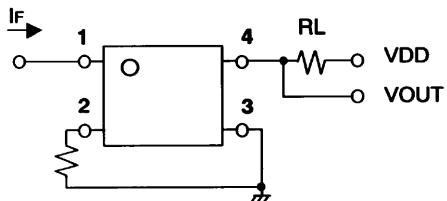
| Parameter                   |       | Comments and conditions |      | G3VM-353G,<br>G3VM-353G(TR)         | G3VM-401G,<br>G3VM-401G(TR)         | G3VM-41GR3,<br>G3VM-41GR3(TR)       |
|-----------------------------|-------|-------------------------|------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max. | 280 V                               | 320 V                               | 32 V                                |
| Operate LED forward current | $I_F$ | Min.                    |      | 5 mA                                | 5 mA                                | 10 mA                               |
|                             |       | Typical                 |      | —                                   | 7.5 mA                              | —                                   |
|                             |       | Max.                    |      | 25 mA                               | 25 mA                               | 30 mA                               |
| Continuous load current     |       | $I_O$                   | Max. | 120 mA                              | 120 mA                              | 80 mA                               |
| Ambient temperature         |       | $T_A$                   |      | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ |

**Dimensions**

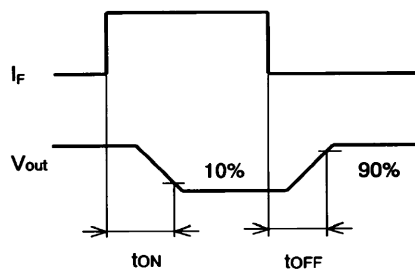
| Item       | G3VM-353G,<br>G3VM-353G(TR) | G3VM-401G,<br>G3VM-401G(TR) | G3VM-41GR3,<br>G3VM-41GR3(TR) |
|------------|-----------------------------|-----------------------------|-------------------------------|
| Dimensions | See pages 96, 100           | See pages 96, 100           | See pages 96, 100             |

**Connections**

G3VM-353G, -353G(TR), -401D, -401D(TR), -41GR3, -41GR3(TR)



**Timing Chart**



## G3VM-41GR4(TR), -41GR5(TR), -41GR6(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-41GR4,<br>G3VM-41GR4(TR)         | G3VM-41GR5,<br>G3VM-41GR5(TR)         | G3VM-41GR6,<br>G3VM-41GR6(TR)         |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 40 V                                  | 40 V                                  | 40 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 250 mA                                | 300 mA                                | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -2.5 mA/ $^\circ\text{C}$             | -3.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -40 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |                         | G3VM-41GR4,<br>G3VM-41GR4(TR) | G3VM-41GR5,<br>G3VM-41GR5(TR)   | G3VM-41GR6,<br>G3VM-41GR6(TR)  |
|--------------------------|------------------------------------------|----------------------------|-------------------------|-------------------------------|---------------------------------|--------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.                    | 1.0 V                         | 1.0 V                           | 1.0 V                          |
|                          |                                          |                            | Typical                 | 1.15 V                        | 1.15 V                          | 1.15 V                         |
|                          |                                          |                            | Max.                    | 1.3 V                         | 1.3 V                           | 1.3 V                          |
|                          | Reverse current                          | $I_R$                      | Max.                    | 10 $\mu$ A                    | 10 $\mu$ A                      | 10 $\mu$ A                     |
|                          | Reverse voltage                          | $V_R$                      | Max.                    | 5 V                           | 5 V                             | 5 V                            |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical                 | 15 pF                         | 15 pF                           | 15 pF                          |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_{ON}$                | Typical                 | —                             | —                               | —                              |
| Max.                     |                                          |                            | 4 mA ( $I_{ON}=100$ mA) | 4 mA ( $I_{ON}=100$ mA)       | 4 mA ( $I_{ON}=100$ mA)         |                                |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical                 | 2 $\Omega$ ( $I_{ON}=250$ mA) | 1.0 $\Omega$ ( $I_{ON}=120$ mA) | 10 $\Omega$ ( $I_{ON}=120$ mA) |
|                          |                                          |                            | Max.                    | 3 $\Omega$ ( $I_{ON}=250$ mA) | 1.5 $\Omega$ ( $I_{ON}=120$ mA) | 15 $\Omega$ ( $I_{ON}=120$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.                    | 1.0 $\mu$ A                   | 1.0 $\mu$ A                     | 1.0 $\mu$ A                    |
|                          | Capacitance                              | $C_{OFF}$                  | Typical                 | 5.0 pF                        | 10 pF                           | 1.0 pF                         |
|                          |                                          |                            | Max.                    | 7.0 pF                        | 14 pF                           | 2.0 pF                         |
| Transfer characteristics | I/O capacitance                          | $(C_{I/O})$                | Typical                 | 0.8 pF                        | 0.8 pF                          | 0.8 pF                         |
|                          | I/O resistance                           | $(R_{I/O})$                | Min.                    | 1000 M $\Omega$               | 1000 M $\Omega$                 | 1000 M $\Omega$                |
|                          | Operate time                             | $(t_{ON})$                 | Max.                    | 0.5 ms                        | 0.5 ms                          | 0.5 ms                         |
|                          | Release time                             | $(t_{OFF})$                | Max.                    | 0.5 ms                        | 0.5 ms                          | 0.5 ms                         |

### Optimum Operating Conditions

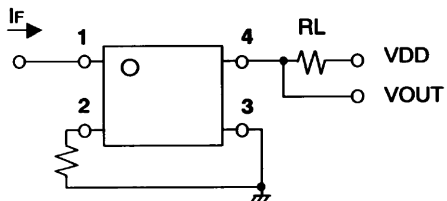
| Parameter                   |       | Comments and conditions |      | G3VM-41GR4,<br>G3VM-41GR4(TR)       | G3VM-41GR5,<br>G3VM-41GR5(TR)       | G3VM-41GR6,<br>G3VM-41GR6(TR)       |
|-----------------------------|-------|-------------------------|------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max. | 32 V                                | 32 V                                | 32 V                                |
| Operate LED forward current | $I_F$ | Min.                    |      | 10 mA                               | 10 mA                               | 10 mA                               |
|                             |       | Typical                 |      | —                                   | —                                   | —                                   |
|                             |       | Max.                    |      | 30 mA                               | 30 mA                               | 30 mA                               |
| Continuous load current     |       | $I_O$                   | Max. | 250 mA                              | 300 mA                              | 120 mA                              |
| Ambient temperature         |       | $T_A$                   |      | -25 $^\circ$ to 60 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ |

**Dimensions**

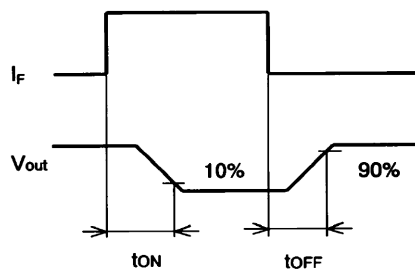
| Item       | G3VM-41GR4,<br>G3VM-41GR4(TR) | G3VM-41GR5,<br>G3VM-41GR5(TR) | G3VM-41GR6,<br>G3VM-41GR6(TR) |
|------------|-------------------------------|-------------------------------|-------------------------------|
| Dimensions | See pages 96, 100             | See pages 96, 100             | See pages 96, 100             |

**Connections**

G3VM-41GR4, -41GR4(TR), -41GR5, -41GR5(TR), - 41GR6, -41GR6(TR)



**Timing Chart**



## G3VM-61G1(TR), -81G1(TR), -S1(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-61G1,<br>G3VM-61G1(TR)           | G3VM-81G1,<br>G3VM-81G1(TR)           | G3VM-S1,<br>G3VM-S1(TR)               |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  | 80 V                                  | 60 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 400 mA                                | 350 mA                                | 400 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -4.0 mA/ $^\circ\text{C}$             | -3.5 mA/ $^\circ\text{C}$             | -4.0 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-61G1,<br>G3VM-61G1(TR)   | G3VM-81G1,<br>G3VM-81G1(TR)     | G3VM-S1,<br>G3VM-S1(TR)       |
|--------------------------|------------------------------------------|----------------------------|---------|-------------------------------|---------------------------------|-------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                         | 1.0 V                           | 1.0 V                         |
|                          |                                          |                            | Typical | 1.15 V                        | 1.15 V                          | 1.15 V                        |
|                          |                                          |                            | Max.    | 1.3 V                         | 1.3 V                           | 1.3 V                         |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                    | 10 $\mu$ A                      | 10 $\mu$ A                    |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                           | 5 V                             | 5 V                           |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                         | 15 pF                           | 30 pF                         |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                   | Typical | 1.6 mA                        | 1.0 mA                          | 1 mA                          |
|                          |                                          |                            | Max.    | 3 mA                          | 4.0 mA                          | 3 mA                          |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 1 $\Omega$ ( $I_{ON}=400$ mA) | 1.0 $\Omega$ ( $I_{ON}=350$ mA) | 1 $\Omega$ ( $I_{ON}=400$ mA) |
|                          |                                          |                            | Max.    | 2 $\Omega$ ( $I_{ON}=400$ mA) | 1.2 $\Omega$ ( $I_{ON}=350$ mA) | 2 $\Omega$ ( $I_{ON}=400$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                   | 1.0 $\mu$ A                     | 1.0 $\mu$ A                   |
|                          | Limit current                            | $(I_{LIM})$                | Min.    | —                             | —                               | —                             |
| Max.                     |                                          |                            | —       | —                             | —                               |                               |
| Transfer characteristics | I/O capacitance                          | $(C_{I/O})$                | Typical | 0.8 pF                        | 0.8 pF                          | 0.8 pF                        |
|                          | I/O resistance                           | $(R_{I/O})$                | Min.    | 1000 M $\Omega$               | 1000 M $\Omega$                 | 1000 M $\Omega$               |
|                          | Operate time                             | $(t_{ON})$                 | Max.    | 2.0 ms                        | 0.5 ms                          | 2.0 ms                        |
|                          | Release time                             | $(t_{OFF})$                | Max.    | 0.5 ms                        | 0.5 ms                          | 1.0 ms                        |

### Optimum Operating Conditions

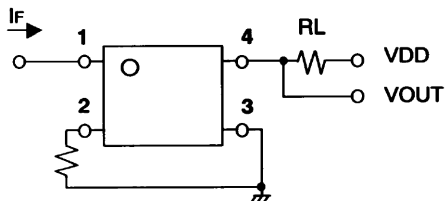
| Parameter                   |       | Comments and conditions |        | G3VM-61G1,<br>G3VM-61G1(TR)         | G3VM-81G1,<br>G3VM-81G1(TR)         | G3VM-S1,<br>G3VM-S1(TR)             |
|-----------------------------|-------|-------------------------|--------|-------------------------------------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max.   | 48 V                                | 64 V                                | 48 V                                |
| Operate LED forward current | $I_F$ | Min.                    | 5 mA   | 5 mA                                | 5 mA                                | 5 mA                                |
|                             |       | Typical                 | 7.5 mA | —                                   | 7.5 mA                              |                                     |
|                             |       | Max.                    | 25 mA  | 30 mA                               | 25 mA                               |                                     |
| Continuous load current     |       | $I_O$                   | Max.   | 400 mA                              | 350 mA                              | 300 mA                              |
| Ambient temperature         |       | $T_A$                   |        | -20 $^\circ$ to 65 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ |

**Dimensions**

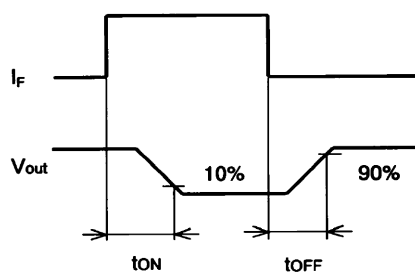
| Item       | G3VM-61G1,<br>G3VM-61G1(TR) | G3VM-81G1,<br>G3VM-81G1(TR) | G3VM-S1,<br>G3VM-S1(TR) |
|------------|-----------------------------|-----------------------------|-------------------------|
| Dimensions | See pages 96, 100           | See pages 96, 100           | See pages 96, 100       |

**Connections**

G3VM-61G1, -61G1(TR), -81G1, -81G1(TR), -S1, -S1(TR)



**Timing Chart**



## G3VM-S2(TR), -S5(TR), -351H(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-S2,<br>G3VM-S2(TR)               | G3VM-S5,<br>G3VM-S5(TR)               | G3VM-351H,<br>G3VM-351H(TR)                        |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|----------------------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/6 pins                                    |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                              |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                                |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$                          |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                                |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                 | 200 V                                 | 350 V                                              |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 150 mA                                | 110 mA (for A)<br>110 mA (for B)<br>220 mA (for C) |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -1.5 mA/ $^\circ\text{C}$             | -1.1 mA/ $^\circ\text{C}$ (for A)                  |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                               |
| Dielectric strength           |                                | $V_{i/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                                           |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$               |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +100 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$              |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions |         | G3VM-S2,<br>G3VM-S2(TR)        | G3VM-S5,<br>G3VM-S5(TR)       | G3VM-351H,<br>G3VM-351H(TR)                     |
|----------------------------------|------------------------------------------|-------------------------|---------|--------------------------------|-------------------------------|-------------------------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA             | Min.    | 1.0 V                          | 1.0 V                         | 1.0 V                                           |
|                                  |                                          |                         | Typical | 1.15 V                         | 1.15 V                        | 1.15 V                                          |
|                                  |                                          |                         | Max.    | 1.3 V                          | 1.3 V                         | 1.3 V                                           |
|                                  | Reverse current                          | $I_R$                   |         | 10 $\mu$ A                     | 10 $\mu$ A                    | 10 $\mu$ A                                      |
|                                  | Reverse voltage                          | $V_R$                   | Max.    | 5 V                            | 5 V                           | 5 V                                             |
|                                  | Capacitance (CT)                         | $V = 0$ ; freq. = 1 MHz |         | 30 pF                          | 30 pF                         | 30 pF                                           |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                 | 1 mA    | 1 mA                           | 1 mA                          |                                                 |
|                                  |                                          | Max.                    | 3 mA    | 3 mA                           | 3 mA                          |                                                 |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA              | Typical | 22 $\Omega$ ( $I_{ON}=120$ mA) | 5 $\Omega$ ( $I_{ON}=150$ mA) | 35 $\Omega$ ( $I_{ON}=110$ mA) for connection A |
|                                  |                                          |                         | Max.    | 35 $\Omega$ ( $I_{ON}=120$ mA) | 8 $\Omega$ ( $I_{ON}=150$ mA) | 50 $\Omega$ ( $I_{ON}=110$ mA) for connection A |
|                                  |                                          |                         | Typical | —                              | —                             | 28 $\Omega$ ( $I_{ON}=110$ mA) for connection B |
|                                  |                                          |                         | Max.    | —                              | —                             | 40 $\Omega$ ( $I_{ON}=110$ mA) for connection B |
|                                  |                                          |                         | Typical | —                              | —                             | 14 $\Omega$ ( $I_{ON}=220$ mA) for connection C |
|                                  |                                          |                         | Max.    | —                              | —                             | 20 $\Omega$ ( $I_{ON}=220$ mA) for connection C |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$            | Max.    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                   | 1.0 $\mu$ A                                     |
| Transfer characteristics         | I/O capacitance                          | ( $C_{i/O}$ )           | Typical | 0.8 pF                         | 0.8 pF                        | 0.8 pF                                          |
|                                  | I/O resistance                           | ( $R_{i/O}$ )           | Min.    | 1000 M $\Omega$                | 1000 M $\Omega$               | 1000 M $\Omega$                                 |
|                                  | Operate time                             | ( $t_{ON}$ )            | Max.    | 1.0 ms                         | 1.5 ms                        | 1.0 ms                                          |
|                                  | Release time                             | ( $t_{OFF}$ )           | Max.    | 1.0 ms                         | 1.0 ms                        | 1.0 ms                                          |



### Optimum Operating Conditions

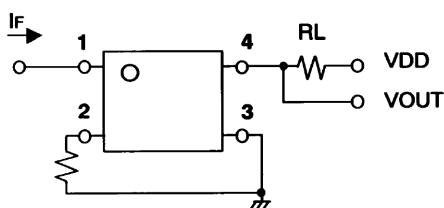
| Parameter                   | Comments and conditions |         | G3VM-S2,<br>G3VM-S2(TR) | G3VM-S5,<br>G3VM-S5(TR) | G3VM-351H,<br>G3VM-351H(TR) |
|-----------------------------|-------------------------|---------|-------------------------|-------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 280 V                   | 200 V                   | 280 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                    | 5 mA                    | 5 mA                        |
|                             |                         | Typical | 7.5 mA                  | 7.5 mA                  | 10 mA                       |
|                             |                         | Max.    | 25 mA                   | 25 mA                   | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 100 mA                  | 120 mA                  | 100 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C            | -20° to 65°C            | -20° to 65°C                |

### Dimensions

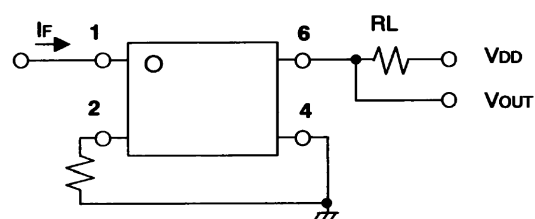
| Item       | G3VM-S2,<br>G3VM-S2(TR) | G3VM-S5,<br>G3VM-S5(TR) | G3VM-351H,<br>G3VM-351H(TR) |
|------------|-------------------------|-------------------------|-----------------------------|
| Dimensions | See pages 96, 100       | See pages 96, 100       | See pages 96, 101           |

### Connections

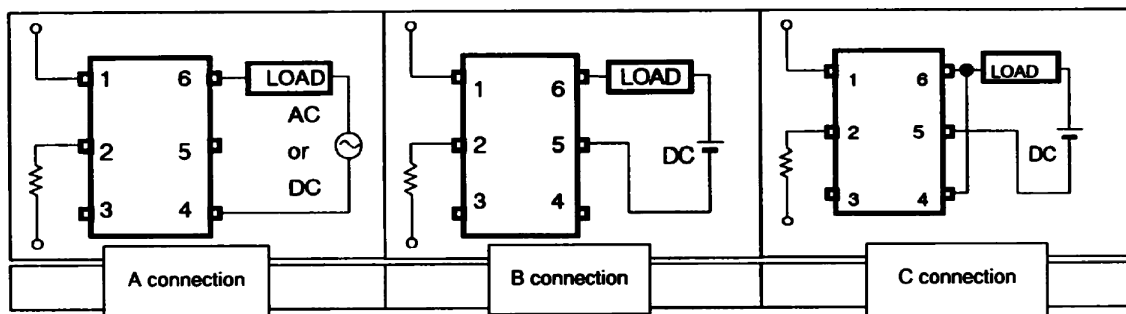
G3VM-S2, -S2(TR), -S5, -S5(TR)



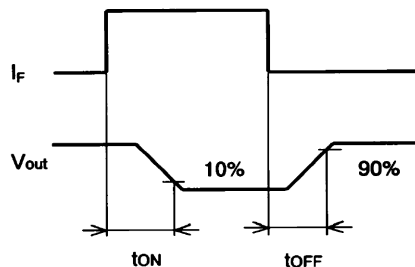
G3VM-351H, -351H(TR)



G3VM-351H, -351H(TR)



### Timing Chart



## G3VM-353H(TR), -61H1(TR), -81HR(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-353H,<br>G3VM-353H(TR)                        | G3VM-61H1,<br>G3VM-61H1(TR)                        | G3VM-81HR,<br>G3VM-81HR(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|----------------------------------------------------|----------------------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form B/6 pins                                    | 1 Form A/6 pins                                    | 1 Form A/6 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                              | 50 mA                                              | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                                | 1 A                                                | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                                | 5 V                                                | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 350 V                                              | 60 V                                               | 80 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA (for A)<br>120 mA (for B)<br>240 mA (for C) | 400 mA (for A)<br>400 mA (for B)<br>800 mA (for C) | 1250 mA                               |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$                          | -4.0 mA/ $^\circ\text{C}$                          | -12.5 mA/ $^\circ\text{C}$            |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.            |         | 1500 VAC                                           | 1500 VAC                                           | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$               | -20 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$              | -40 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-353H,<br>G3VM-353H(TR)                     | G3VM-61H1,<br>G3VM-61H1(TR)                       | G3VM-81HR,<br>G3VM-81HR(TR)       |
|----------------------------------|------------------------------------------|----------------------------|---------|-------------------------------------------------|---------------------------------------------------|-----------------------------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                                           | 1.0 V                                             | 1.0 V                             |
|                                  |                                          |                            | Typical | 1.15 V                                          | 1.15 V                                            | 1.15 V                            |
|                                  |                                          |                            | Max.    | 1.3 V                                           | 1.3 V                                             | 1.3 V                             |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                                      | 10 $\mu$ A                                        | 10 $\mu$ A                        |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 5 V                                             | 5 V                                               | 5 V                               |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                                         | 30 pF                                             | 30 pF                             |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 | Typical                    | 1 mA    | 1.6 mA                                          | 2 mA                                              |                                   |
|                                  |                                          | Max.                       | 3 mA    | 3 mA                                            | 5 mA                                              |                                   |
| Output                           | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 15 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 1 $\Omega$ ( $I_{ON}=400$ mA) for connection A    | 0.11 $\Omega$ ( $I_{ON}=1250$ mA) |
|                                  |                                          |                            | Max.    | 25 $\Omega$ ( $I_{ON}=120$ mA) for connection A | 2 $\Omega$ ( $I_{ON}=400$ mA) for connection A    | 0.15 $\Omega$ ( $I_{ON}=1250$ mA) |
|                                  |                                          |                            | Typical | 8 $\Omega$ ( $I_{ON}=120$ mA) for connection B  | 0.5 $\Omega$ ( $I_{ON}=400$ mA) for connection B  | —                                 |
|                                  |                                          |                            | Max.    | 14 $\Omega$ ( $I_{ON}=120$ mA) for connection B | 1 $\Omega$ ( $I_{ON}=400$ mA) for connection B    | —                                 |
|                                  |                                          |                            | Typical | 4 $\Omega$ ( $I_{ON}=240$ mA) for connection C  | 0.25 $\Omega$ ( $I_{ON}=800$ mA) for connection C | —                                 |
|                                  |                                          |                            | Max.    | —                                               | —                                                 | —                                 |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                                     | 1.0 $\mu$ A                                       | 1.5 $\mu$ A                       |
| Transfer characteristics         | I/O capacitance                          | ( $C_{IO}$ )               | Typical | 0.8 pF                                          | 0.8 pF                                            | 0.8 pF                            |
|                                  | I/O resistance                           | ( $R_{IO}$ )               | Min.    | 1000 M $\Omega$                                 | 1000 M $\Omega$                                   | 1000 M $\Omega$                   |
|                                  | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                                          | 2.0 ms                                            | 3.0 ms                            |
|                                  | Release time                             | ( $t_{OFF}$ )              | Max.    | 3.0 ms                                          | 0.5 ms                                            | 1.0 ms                            |

### Optimum Operating Conditions

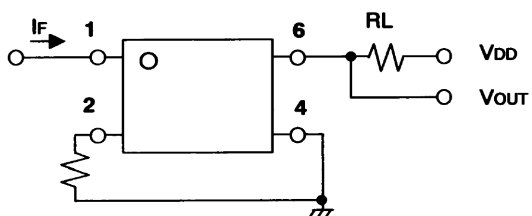
| Parameter                   | Comments and conditions | G3VM-353H, G3VM-353H(TR) |      |         | G3VM-61H1, G3VM-61H1(TR) |      | G3VM-81HR, G3VM-81HR(TR) |              |  |
|-----------------------------|-------------------------|--------------------------|------|---------|--------------------------|------|--------------------------|--------------|--|
|                             |                         | Max.                     | Min. | Typical | Max.                     | Max. | Max.                     | Max.         |  |
| Output voltage strength     | $V_{DD}$                | 280 V                    |      |         | 48V                      |      |                          | 64 V         |  |
| Operate LED forward current | $I_F$                   | 5 mA                     |      |         | 5 mA                     |      |                          | 5 mA         |  |
|                             |                         | —                        |      |         | 7.5 mA                   |      |                          | —            |  |
|                             |                         | 25 mA                    |      |         | 25 mA                    |      |                          | 30 mA        |  |
| Continuous load current     | $I_O$                   | 120 mA                   |      |         | 400 mA                   |      |                          | 1250 mA      |  |
| Ambient temperature         | $T_A$                   | -20° to 65°C             |      |         | -20° to 65°C             |      |                          | -25° to 60°C |  |

### Dimensions

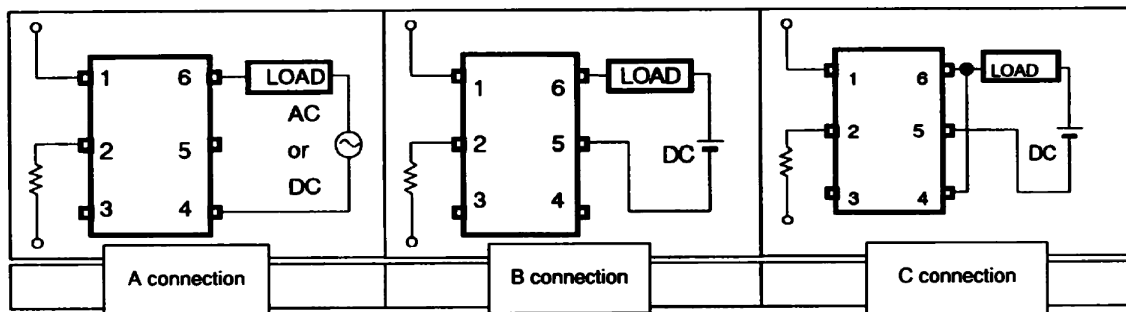
| Item       | G3VM-353H, G3VM-353H(TR) | G3VM-61H1, G3VM-61H1(TR) | G3VM-81HR, G3VM-81HR(TR) |
|------------|--------------------------|--------------------------|--------------------------|
| Dimensions | See pages 96, 101        | See pages 96, 101        | See pages 96, 101        |

### Connections

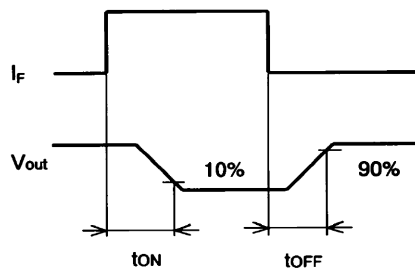
G3VM-353H, -353H(TR), -61H1, -61H1(TR), -81HR, -81HR(TR)



G3VM-353H, -353H(TR), -61H1, -61H1(TR), -81HR, -81HR(TR)



### Timing Chart



## G3VM-S3(TR), -355JR(TR), -352J(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions                  |         | G3VM-S3,<br>G3VM-S3(TR)                            | G3VM-355JR,<br>G3VM-355JR(TR)         | G3VM-352J,<br>G3VM-352J(TR)           |
|-------------------------------|--------------------------------|------------------------------------------|---------|----------------------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                        |         | 1 Form A/6 pins                                    | 1FormA+1FormB/<br>8 pins              | 2 Form A/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                    | Typical | 50 mA                                              | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse,<br>100 pps) | Max.    | 1 A                                                | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$              |         | -0.5 mA/ $^\circ\text{C}$                          | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                    | Max.    | 5 V                                                | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                          |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                                |         | 350 V                                              | 350 V                                 | 350 V                                 |
|                               | Continuous load current        | $I_O$                                    |         | 120 mA (for A)<br>120 mA (for B)<br>160 mA (for C) | 120 mA                                | 110 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$              |         | -1.2 mA/ $^\circ\text{C}$                          | -1.2 mA/ $^\circ\text{C}$             | -1.1 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                          |         | 125 $^\circ\text{C}$                               | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{IO}$ for 1 minute min.               |         | 1500 VAC                                           | 2500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                      |         | -20 $^\circ$ to +85 $^\circ\text{C}$               | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing                  |         | -55 $^\circ$ to +125 $^\circ\text{C}$              | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions                            |         | G3VM-S3,<br>G3VM-S3(TR)                            | G3VM-355JR,<br>G3VM-355JR(TR)  | G3VM-352J,<br>G3VM-352J(TR)           |
|--------------------------|------------------------------------------|----------------------------------------------------|---------|----------------------------------------------------|--------------------------------|---------------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                                        | Min.    | 1.0 V                                              | 1.0 V                          | 1.0 V                                 |
|                          |                                          |                                                    | Typical | 1.15 V                                             | 1.15 V                         | 1.15 V                                |
|                          |                                          |                                                    | Max.    | 1.3 V                                              | 1.3 V                          | 1.3 V                                 |
|                          | Reverse current                          | $I_R$                                              | Max.    | 10 $\mu$ A                                         | 10 $\mu$ A                     | 10 $\mu$ A                            |
|                          | Reverse voltage                          | $V_R$                                              | Max.    | 5 V                                                | 5 V                            | 5 V                                   |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz                         | Typical | 30 pF                                              | 30 pF                          | 30 pF                                 |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                                           | Typical | —                                                  | 1 mA                           | 1 mA                                  |
|                          |                                          |                                                    | Max.    | 3 mA                                               | 3 mA                           | 3 mA                                  |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                                         | Typical | 22 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 15 $\Omega$ ( $I_{ON}=120$ mA) | 35 $\Omega$ (25 $\Omega$ , $t < 1$ s) |
|                          |                                          |                                                    | Max.    | 35 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection A | 25 $\Omega$ ( $I_{ON}=120$ mA) | 50 $\Omega$ (35 $\Omega$ , $t < 1$ s) |
|                          |                                          |                                                    | Typical | —                                                  | —                              | —                                     |
|                          |                                          |                                                    | Max.    | 25 $\Omega$ ( $I_{ON}=120$ mA)<br>for connection B | —                              | —                                     |
|                          |                                          |                                                    | Typical | —                                                  | —                              | —                                     |
|                          | Max.                                     | 15 $\Omega$ ( $I_{ON}=160$ mA)<br>for connection C | —       | —                                                  |                                |                                       |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$                                       | Max.    | 1.0 $\mu$ A                                        | 1.0 $\mu$ A                    | 1.0 $\mu$ A                           |
| Transfer characteristics | I/O capacitance                          | $(C_{I/O})$                                        | Typical | 0.8 pF                                             | 0.8 pF                         | 0.8 pF                                |
|                          | I/O resistance                           | $(R_{I/O})$                                        | Min.    | 1000 M $\Omega$                                    | 1000 M $\Omega$                | 1000 M $\Omega$                       |
|                          | Operate time                             | $(t_{ON})$                                         | Max.    | 1.0 ms                                             | 1.0 ms                         | 1.0 ms                                |
|                          | Release time                             | $(t_{OFF})$                                        | Max.    | 1.0 ms                                             | 1.0 ms                         | 1.0 ms                                |

### Optimum Operating Conditions

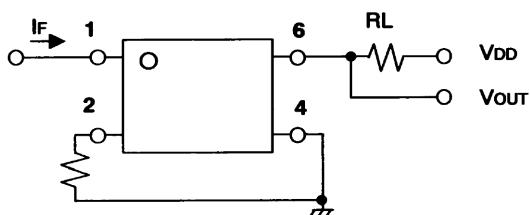
| Parameter                   | Comments and conditions |         | G3VM-S3,<br>G3VM-S3(TR) | G3VM-355JR,<br>G3VM-355JR(TR) | G3VM-352J,<br>G3VM-352J(TR) |
|-----------------------------|-------------------------|---------|-------------------------|-------------------------------|-----------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 280 V                   | 280V                          | 280 V                       |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                    | 5 mA                          | 5 mA                        |
|                             |                         | Typical | 7.5 mA                  | —                             | 10 mA                       |
|                             |                         | Max.    | 25 mA                   | 25 mA                         | 25 mA                       |
| Continuous load current     | $I_O$                   | Max.    | 100 mA                  | 120 mA                        | 100 mA                      |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C            | -20° to 65°C                  | -20° to 65°C                |

### Dimensions

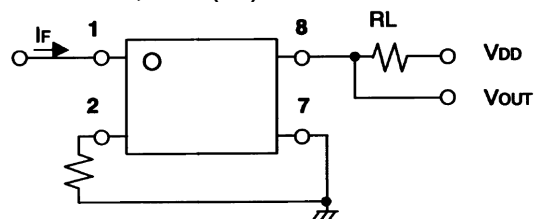
| Item       | G3VM-S3,<br>G3VM-S3(TR) | G3VM-355JR,<br>G3VM-355JR(TR) | G3VM-352J,<br>G3VM-352J(TR) |
|------------|-------------------------|-------------------------------|-----------------------------|
| Dimensions | See pages 96, 101       | See pages 97, 102             | See pages 97, 102           |

### Connections

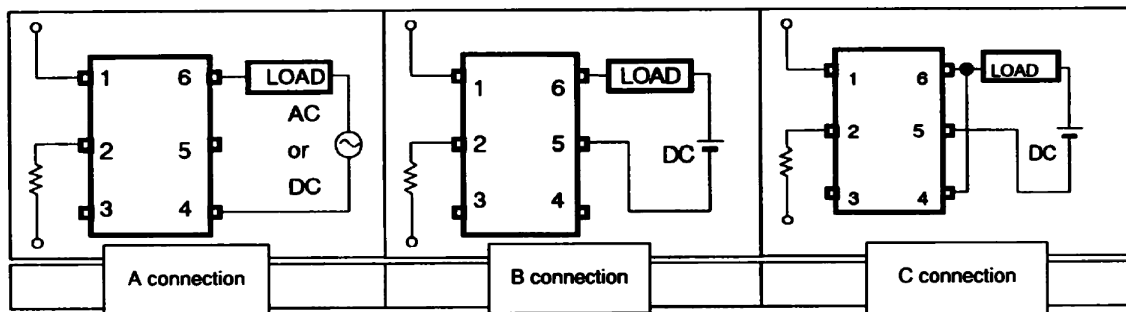
G3VM-S3, -S3(TR)



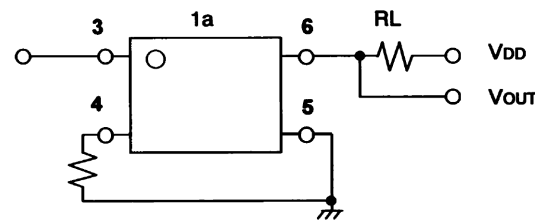
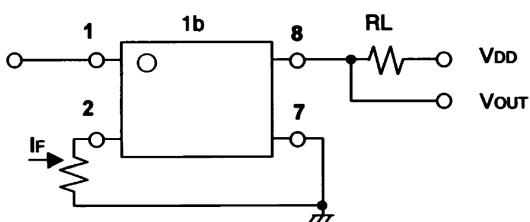
G3VM-352J, -352J(TR)



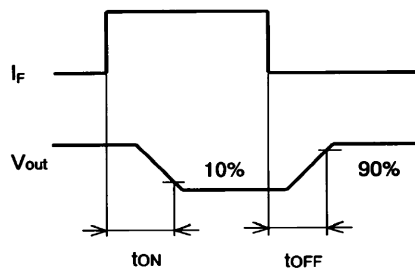
G3VM-S3, -S3(TR)



G3VM-355JR, -355JR(TR)



### Timing Chart



## G3VM-402J(TR), -62J1(TR), -SW(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-402J,<br>G3VM-402J(TR)           | G3VM-62J1,<br>G3VM-62J1(TR)           | G3VM-SW,<br>G3VM-SW(TR)               |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                       | 2 Form A/8 pins                       | 2 Form A/ 8 pins                      |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 400 V                                 | 60 V                                  | 350 V, DC or AC peak                  |
|                               | Continuous load current        | $I_O$                                 |         | 120 mA                                | 400 mA                                | 100 mA (1+2 ch)<br>120 mA (1 ch)      |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.2 mA/ $^\circ\text{C}$             | -4.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$ (1 ch)      |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-402J,<br>G3VM-402J(TR)    | G3VM-62J1,<br>G3VM-62J1(TR)     | G3VM-SW,<br>G3VM-SW(TR)        |
|--------------------------|------------------------------------------|----------------------------|---------|--------------------------------|---------------------------------|--------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                          | 1.0 V                           | 1.0 V                          |
|                          |                                          |                            | Typical | 1.15 V                         | 1.15 V                          | 1.15 V                         |
|                          |                                          |                            | Max.    | 1.3 V                          | 1.3 V                           | 1.3 V                          |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                     | 10 $\mu$ A                      | 10 $\mu$ A                     |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                            | 5 V                             | 5 V                            |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                          | 30 pF                           | 30 pF                          |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                   | Typical | 1 mA                           | 1.6 mA                          | —                              |
| Max.                     |                                          |                            | 3 mA    | 3 mA                           | 3 mA                            |                                |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA (1a)            | Typical | 17 $\Omega$ ( $I_{ON}=120$ mA) | 1.0 $\Omega$ ( $I_{ON}=400$ mA) | 22 $\Omega$ ( $I_{ON}=120$ mA) |
|                          |                                          |                            | Max.    | 35 $\Omega$ ( $I_{ON}=120$ mA) | 2.0 $\Omega$ ( $I_{ON}=400$ mA) | 35 $\Omega$ ( $I_{ON}=120$ mA) |
|                          |                                          | $I_F=0$ mA (1b)            | Typical | —                              | —                               | —                              |
|                          |                                          |                            | Max.    | —                              | —                               | —                              |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                    | 1.0 $\mu$ A                     | 1.0 $\mu$ A                    |
|                          | Capacitance                              | $C_{OFF}$                  | Typical | —                              | —                               | —                              |
| Max.                     |                                          |                            | —       | —                              | —                               |                                |
| Transfer characteristics | I/O capacitance                          | ( $C_{I/O}$ )              | Typical | 0.8 pF                         | 0.8 pF                          | 0.8 pF                         |
|                          | I/O resistance                           | ( $R_{I/O}$ )              | Min.    | 1000 M $\Omega$                | 1000 M $\Omega$                 | 1000 M $\Omega$                |
|                          | Operate time                             | ( $t_{ON}$ )               | Max.    | 1.0 ms                         | 2.0 ms                          | 1.0 ms                         |
|                          | Release time                             | ( $t_{OFF}$ )              | Max.    | 1.0 ms                         | 0.5 ms                          | 1.0 ms                         |

### Optimum Operating Conditions

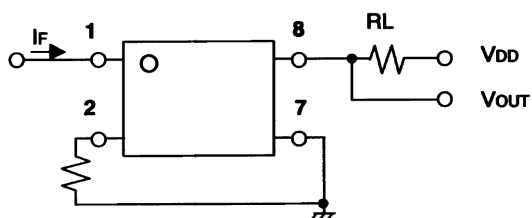
| Parameter                   | Comments and conditions |         | G3VM-402J,<br>G3VM-402J(TR) | G3VM-62J1,<br>G3VM-62J1(TR) | G3VM-SW,<br>G3VM-SW(TR) |
|-----------------------------|-------------------------|---------|-----------------------------|-----------------------------|-------------------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 320 V                       | 48 V                        | 280 V                   |
| Operate LED forward current | $I_F$                   | Min.    | 5 mA                        | 5 mA                        | 5 mA                    |
|                             |                         | Typical | 7.5 mA                      | 7.5 mA                      | 7.5 mA                  |
|                             |                         | Max.    | 25 mA                       | 25 mA                       | 25 mA                   |
| Continuous load current     | $I_O$                   | Max.    | 120 mA                      | 400 mA                      | 100 mA                  |
| Ambient temperature         | $T_A$                   |         | -20° to 65°C                | -20° to 65°C                | -20° to 65°C            |

### Dimensions

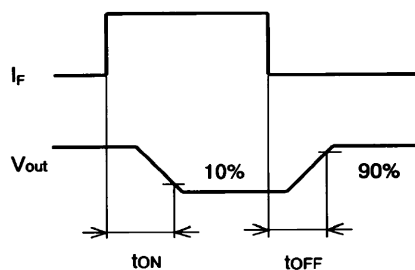
| Item       | G3VM-402J,<br>G3VM-402J(TR) | G3VM-62J1,<br>G3VM-62J1(TR) | G3VM-SW,<br>G3VM-SW(TR) |
|------------|-----------------------------|-----------------------------|-------------------------|
| Dimensions | See pages 97, 102           | See pages 97, 102           | See pages 97, 102       |

### Connections

G3VM-402J, -402J(TR), -62J1, -62J1(TR), -SW, -SW(TR)



### Timing Chart



## G3VM-SY(TR), -354J(TR)

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-SY,<br>G3VM-SY(TR)               | G3VM-354J,<br>G3VM-354J(TR)           |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 2 Form A/8 pins                       | 2 Form B/8 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 60 V                                  | 350 V                                 |
|                               | Continuous load current        | $I_O$                                 |         | 200 mA (1+2 ch)<br>300 mA (1 ch)      | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -3.0 mA/ $^\circ\text{C}$ (1 ch)      | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -40 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -55 $^\circ$ to +125 $^\circ\text{C}$ | -55 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions    |         | G3VM-SY,<br>G3VM-SY(TR)         | G3VM-354J,<br>G3VM-354J(TR)    |
|--------------------------|------------------------------------------|----------------------------|---------|---------------------------------|--------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                           | 1.0 V                          |
|                          |                                          |                            | Typical | 1.15 V                          | 1.15 V                         |
|                          |                                          |                            | Max.    | 1.3 V                           | 1.3 V                          |
|                          | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                      | 10 $\mu$ A                     |
|                          | Reverse voltage                          | $V_R$                      | Max.    | 5 V                             | 5 V                            |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz | Typical | 30 pF                           | 30 pF                          |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_O$                   | Typical | —                               | 1 mA                           |
| Max.                     |                                          |                            | 3 mA    | 3 mA                            |                                |
| Output                   | ON-resistance ( $R_{ON}$ )               | $I_F=5$ mA                 | Typical | 1.4 $\Omega$ ( $I_{ON}=300$ mA) | 15 $\Omega$ ( $I_{ON}=120$ mA) |
|                          |                                          |                            | Max.    | 2.0 $\Omega$ ( $I_{ON}=300$ mA) | 25 $\Omega$ ( $I_{ON}=120$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$               | Max.    | 1.0 $\mu$ A                     | 1.0 $\mu$ A                    |
|                          | Capacitance                              | $C_{OFF}$                  | Typical | —                               | —                              |
| Max.                     |                                          |                            | —       | —                               |                                |
| Transfer characteristics | I/O capacitance                          | ( $C_{I/O}$ )              | Typical | 0.8 pF                          | 0.8 pF                         |
|                          | I/O resistance                           | ( $R_{I/O}$ )              | Min.    | 1000 M $\Omega$                 | 1000 M $\Omega$                |
|                          | Operate time                             | ( $t_{ON}$ )               | Max.    | 2.0 ms                          | 1.0 ms                         |
|                          | Release time                             | ( $t_{OFF}$ )              | Max.    | 1.0 ms                          | 3.0 ms                         |

### Optimum Operating Conditions

| Parameter                   |       | Comments and conditions |       | G3VM-SY,<br>G3VM-SY(TR)             | G3VM-354J,<br>G3VM-354J(TR)         |
|-----------------------------|-------|-------------------------|-------|-------------------------------------|-------------------------------------|
| Output voltage strength     |       | $V_{DD}$                | Max.  | 48 V                                | 280 V                               |
| Operate LED forward current | $I_F$ | Min.                    | 5 mA  | 5 mA                                |                                     |
|                             |       | Typical                 | 10 mA | —                                   |                                     |
|                             |       | Max.                    | 25 mA | 25 mA                               |                                     |
| Continuous load current     |       | $I_O$                   | Max.  | 200 mA                              | 120 mA                              |
| Ambient temperature         |       | $T_A$                   |       | -20 $^\circ$ to 65 $^\circ\text{C}$ | -20 $^\circ$ to 65 $^\circ\text{C}$ |

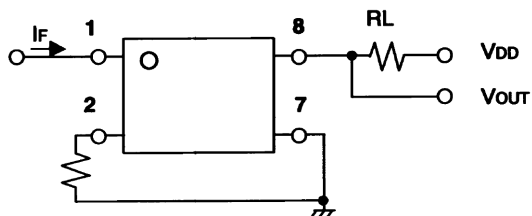


**Dimensions**

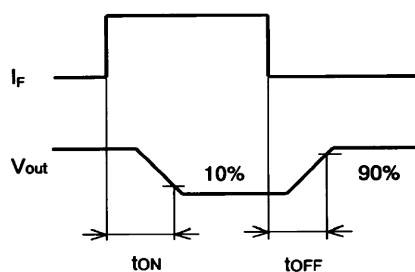
| Item       | G3VM-SY,<br>G3VM-SY(TR) | G3VM-354J,<br>G3VM-354J(TR) |
|------------|-------------------------|-----------------------------|
| Dimensions | See pages 97, 102       | See pages 97, 102           |

**Connections**

G3VM-SY, -SY(TR), -354J, -354J(TR)



**Timing Chart**



## G3VM-21LR, -21LR1, -41LR3

### Maximum Rating

| Parameter                     |                                | Comments and conditions               |         | G3VM-21LR                             | G3VM-21LR1                            | G3VM-41LR3                            |
|-------------------------------|--------------------------------|---------------------------------------|---------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                     |         | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$                                 | Typical | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) | Max.    | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$           |         | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$                                 | Max.    | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_j$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                             |         | 20 V                                  | 20 V                                  | 40 V                                  |
|                               | Continuous load current        | $I_O$                                 |         | 160 mA                                | 450 mA                                | 80 mA                                 |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$           |         | -1.6 mA/ $^\circ\text{C}$             | -4.5 mA/ $^\circ\text{C}$             | -0.8 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_j$ ) |                                       |         | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.           |         | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                   |         | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing               |         | -40 $^\circ$ to +125 $^\circ\text{C}$ | -40 $^\circ$ to +125 $^\circ\text{C}$ | -40 $^\circ$ to +100 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                        |                                          | Comments and conditions    |         | G3VM-21LR                    | G3VM-21LR1                        | G3VM-41LR3            |                 |
|----------------------------------|------------------------------------------|----------------------------|---------|------------------------------|-----------------------------------|-----------------------|-----------------|
| Input                            | LED forward voltage ( $V_F$ )            | $I_F=10$ mA                | Min.    | 1.0 V                        | 1.0 V                             | 1.0 V                 |                 |
|                                  |                                          |                            | Typical | 1.15 V                       | 1.15 V                            | 1.15 V                |                 |
|                                  |                                          |                            | Max.    | 1.3 V                        | 1.3 V                             | 1.3 V                 |                 |
|                                  | Reverse current                          | $I_R$                      | Max.    | 10 $\mu$ A                   | 10 $\mu$ A                        | 10 $\mu$ A            |                 |
|                                  | Reverse voltage                          | $V_R$                      | Max.    | 5 V                          | 5 V                               | 5 V                   |                 |
|                                  | Capacitance ( $C_T$ )                    | $V = 0$ ;<br>freq. = 1 MHz |         | Typical                      | 15 pF                             | 15 pF                 | 15 pF           |
| Keep ON LED current ( $I_{FT}$ ) | At $I_O$                                 |                            | Typical | —                            | —                                 | —                     |                 |
|                                  |                                          |                            | Max.    | 4 mA ( $I_O = 100$ mA)       | 4 mA ( $I_O = 100$ mA)            | 4 mA ( $I_O = 80$ mA) |                 |
| Output                           | ON-resistance ( $R_{ON}$ )               | At $I_{ON}$<br>$I_F=5$ mA  | Typical | 5 $\Omega$ ( $I_O = 160$ mA) | 0.8 $\Omega$ ( $I_{ON} = 450$ mA) | 25 $\Omega$           |                 |
|                                  |                                          |                            | Max.    | 8 $\Omega$ ( $I_O = 160$ mA) | 1.2 $\Omega$ ( $I_{ON} = 450$ mA) | 35 $\Omega$           |                 |
|                                  | OFF-state leakage current ( $I_{LEAK}$ ) | $V_{OFF} = 350$ V          |         | Max.                         | 1.0 nA                            | 1.0 nA                | 1.0 nA          |
|                                  | OFF capacitance                          | $C_{OFF}$                  |         | Min.                         | 1.0 pF                            | 5.0 pF                | 0.6 pF          |
|                                  |                                          | Max.                       | 2.5 pF  | 12.0 pF                      | 1.4 pF                            |                       |                 |
| Transfer characteristics         | I/O capacitance                          | $(C_{I/O})$                |         | Typical                      | 0.8 pF                            | 0.8 pF                | 0.8 pF          |
|                                  | I/O resistance                           | $(R_{I/O})$                |         | Min.                         | 1000 M $\Omega$                   | 1000 M $\Omega$       | 1000 M $\Omega$ |
|                                  | Operate time                             | $(t_{ON})$                 |         | Max.                         | 0.5 ms                            | 0.5 ms                | 1.0 ms          |
|                                  | Release time                             | $(t_{OFF})$                |         | Max.                         | 0.5 ms                            | 0.5 ms                | 1.0 ms          |

### Optimum Operating Conditions

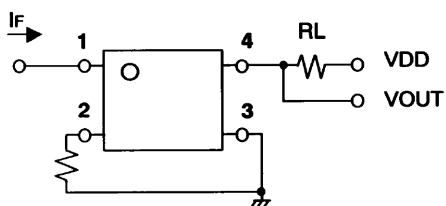
| Parameter                   | Comments and conditions |         | G3VM-21LR    | G3VM-21LR1   | G3VM-41LR3   |
|-----------------------------|-------------------------|---------|--------------|--------------|--------------|
| Output voltage strength     | $V_{DD}$                | Max.    | 32 V         | 20 V         | 32 V         |
| Operate LED forward current | $I_F$                   | Min.    | 7 mA         | 10 mA        | 10 mA        |
|                             |                         | Typical | —            | —            | —            |
|                             |                         | Max.    | 30 mA        | 30 mA        | 30 mA        |
| Continuous load current     | $I_O$                   | Max.    | 160 mA       | 450 mA       | 80 mA        |
| Ambient temperature         | $T_A$                   |         | -25° to 60°C | -25° to 60°C | -25° to 60°C |

### Dimensions

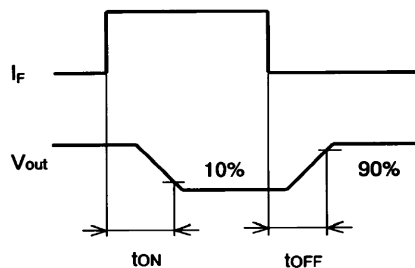
| Item       | G3VM-21LR   | G3VM-21LR1  | G3VM-41LR3  |
|------------|-------------|-------------|-------------|
| Dimensions | See page 97 | See page 97 | See page 97 |

### Connections

G3VM-21LR, -21LR1, -41LR3



### Timing Chart



## G3VM-41LR4, -41LR5, -41LR6

### Maximum Rating

| Parameter                     |                                | Comments and conditions                    | G3VM-41LR4                            | G3VM-41LR5                            | G3VM-41LR6                            |
|-------------------------------|--------------------------------|--------------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Contact form/no. of terminals |                                | —                                          | 1 Form A/4 pins                       | 1 Form A/4 pins                       | 1 Form A/4 pins                       |
| Input (LED)                   | LED forward current            | $I_F$ Typical                              | 50 mA                                 | 50 mA                                 | 50 mA                                 |
|                               |                                | $I_{FP}$ (100 $\mu$ s pulse, 100 pps) Max. | 1 A                                   | 1 A                                   | 1 A                                   |
|                               | Forward current derating       | $T_a \geq 25^\circ\text{C}$                | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             | -0.5 mA/ $^\circ\text{C}$             |
|                               | Reverse voltage                | $V_R$ Max.                                 | 5 V                                   | 5 V                                   | 5 V                                   |
|                               | Junction temperature ( $T_J$ ) |                                            | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Output (Detector)             | Output voltage strength        | $V_{OFF}$                                  | 40 V                                  | 40 V                                  | 40 V                                  |
|                               | Continuous load current        | $I_O$                                      | 250 mA                                | 300 mA                                | 120 mA                                |
|                               | ON-state current derating      | $T_a \geq 25^\circ\text{C}$                | -2.5 mA/ $^\circ\text{C}$             | -3.0 mA/ $^\circ\text{C}$             | -1.2 mA/ $^\circ\text{C}$             |
|                               | Junction temperature ( $T_J$ ) |                                            | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  | 125 $^\circ\text{C}$                  |
| Dielectric strength           |                                | $V_{I/O}$ for 1 minute min.                | 1500 VAC                              | 1500 VAC                              | 1500 VAC                              |
| Temperature                   | Ambient                        | $T_a$ with no icing                        | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  | -20 $^\circ$ to +85 $^\circ\text{C}$  |
|                               | Storage                        | $T_{stg}$ with no icing                    | -40 $^\circ$ to +125 $^\circ\text{C}$ | -40 $^\circ$ to +125 $^\circ\text{C}$ | -40 $^\circ$ to +125 $^\circ\text{C}$ |

### Electrical Characteristics

| Parameter                |                                          | Comments and conditions                       | G3VM-41LR4                    | G3VM-41LR5                      | G3VM-41LR6                     |
|--------------------------|------------------------------------------|-----------------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| Input                    | LED forward voltage ( $V_F$ )            | $I_F=10$ mA Min.                              | 1.0 V                         | 1.0 V                           | 1.0 V                          |
|                          |                                          | Typical                                       | 1.15 V                        | 1.15 V                          | 1.15 V                         |
|                          |                                          | Max.                                          | 1.3 V                         | 1.3 V                           | 1.3 V                          |
|                          | Reverse current                          | $I_R$ Max.                                    | 10 $\mu$ A                    | 10 $\mu$ A                      | 10 $\mu$ A                     |
|                          | Reverse voltage                          | $V_R$ Max.                                    | 5 V                           | 5 V                             | 5 V                            |
|                          | Capacitance ( $C_T$ )                    | $V = 0$ ; freq. = 1 MHz                       | Typical                       | 15 pF                           | 15 pF                          |
|                          | Keep ON LED current ( $I_{FT}$ )         | At $I_{ON}$ Typical                           | —                             | —                               | —                              |
|                          |                                          | Max.                                          | 4 mA ( $I_{ON}=100$ mA)       | 4 mA ( $I_{ON}=100$ mA)         | 4 mA ( $I_{ON}=100$ mA)        |
| Output                   | ON-resistance ( $R_{ON}$ )               | At $I_O$ Typical                              | 2 $\Omega$ ( $I_{ON}=250$ mA) | 1.0 $\Omega$ ( $I_{ON}=300$ mA) | 10 $\Omega$ ( $I_{ON}=120$ mA) |
|                          |                                          | Max.                                          | 3 $\Omega$ ( $I_{ON}=250$ mA) | 1.5 $\Omega$ ( $I_{ON}=300$ mA) | 15 $\Omega$ ( $I_{ON}=120$ mA) |
|                          | OFF-state leakage current ( $I_{LEAK}$ ) | At $V_{OFF}$ Max.                             | 1.0 nA                        | 1.0 nA                          | 1.0 nA                         |
|                          | Limit current ( $I_{LIM}$ )              | $I_F = 5$ mA, $V_{DD} = 5$ V, $t = 5$ ms Min. | 5 pF                          | 10 pF                           | 1.0 pF                         |
|                          |                                          | Max.                                          | 7 pF                          | 14 pF                           | 2.0 pF                         |
| Transfer characteristics | I/O capacitance                          | ( $C_{I/O}$ ) Typical                         | 0.8 pF                        | 0.8 pF                          | 0.8 pF                         |
|                          | I/O resistance                           | ( $R_{I/O}$ ) Min.                            | 1000 M $\Omega$               | 1000 M $\Omega$                 | 1000 M $\Omega$                |
|                          | Operate time                             | ( $t_{ON}$ ) Max.                             | 0.5 ms                        | 0.5 ms                          | 0.5 ms                         |
|                          | Release time                             | ( $t_{OFF}$ ) Max.                            | 0.5 ms                        | 0.5 ms                          | 0.5 ms                         |

### Optimum Operating Conditions

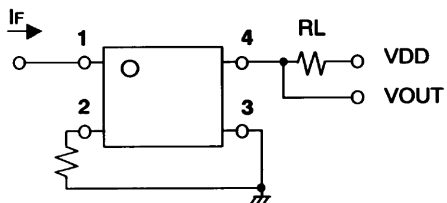
| Parameter                   | Comments and conditions | G3VM-41LR4                          | G3VM-41LR5                          | G3VM-41LR6                          |       |
|-----------------------------|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------|
| Output voltage strength     | $V_{DD}$ Max.           | 32 V                                | 32 V                                | 32 V                                |       |
| Operate LED forward current | $I_F$                   | Min.                                | 10 mA                               | 10 mA                               | 10 mA |
|                             |                         | Typical                             | —                                   | —                                   | —     |
|                             |                         | Max.                                | 30 mA                               | 30 mA                               | 30 mA |
| Continuous load current     | $I_O$ Max.              | 250 mA                              | 300 mA                              | 120 mA                              |       |
| Ambient temperature         | $T_A$                   | -25 $^\circ$ to 60 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ | -25 $^\circ$ to 60 $^\circ\text{C}$ |       |

**Dimensions**

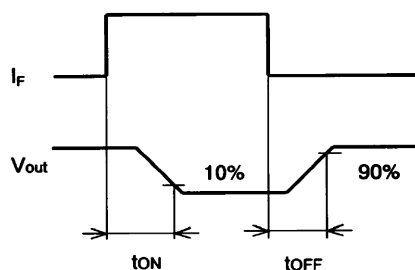
| Item       | G3VM-41LR4  | G3VM-41LR5  | G3VM-41LR6  |
|------------|-------------|-------------|-------------|
| Dimensions | See page 97 | See page 97 | See page 97 |

**Connections**

G3VM-41LR, -41L5, -41LR6



**Timing Chart**

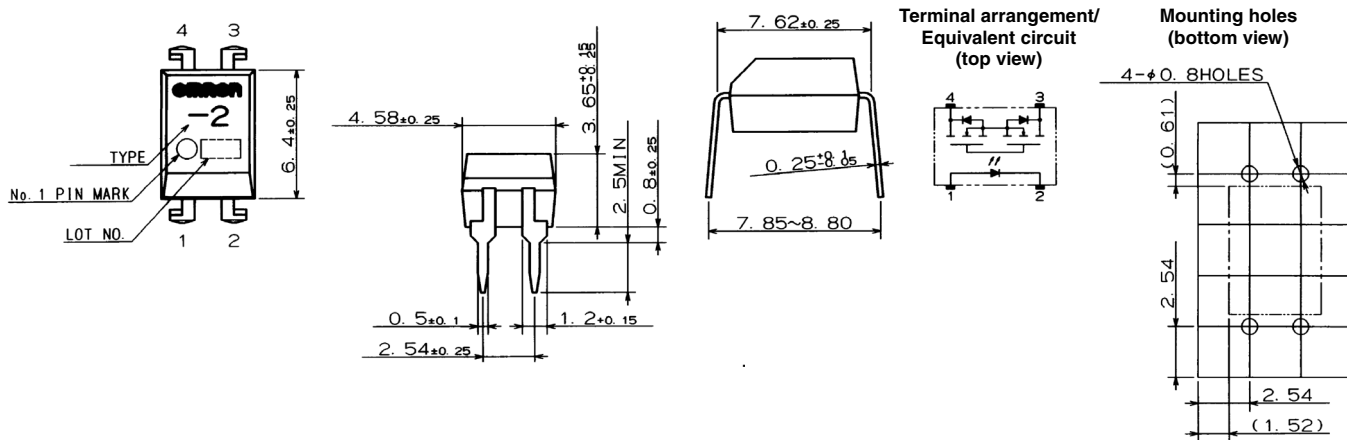


# Dimensions

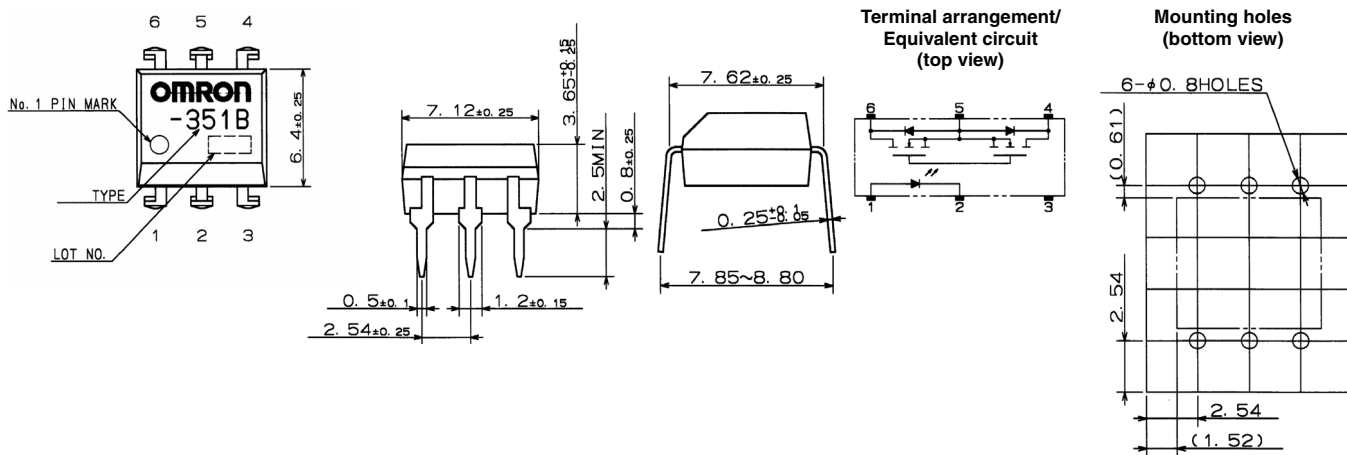
Unit: mm

## ■ PCB Through-Hole Models

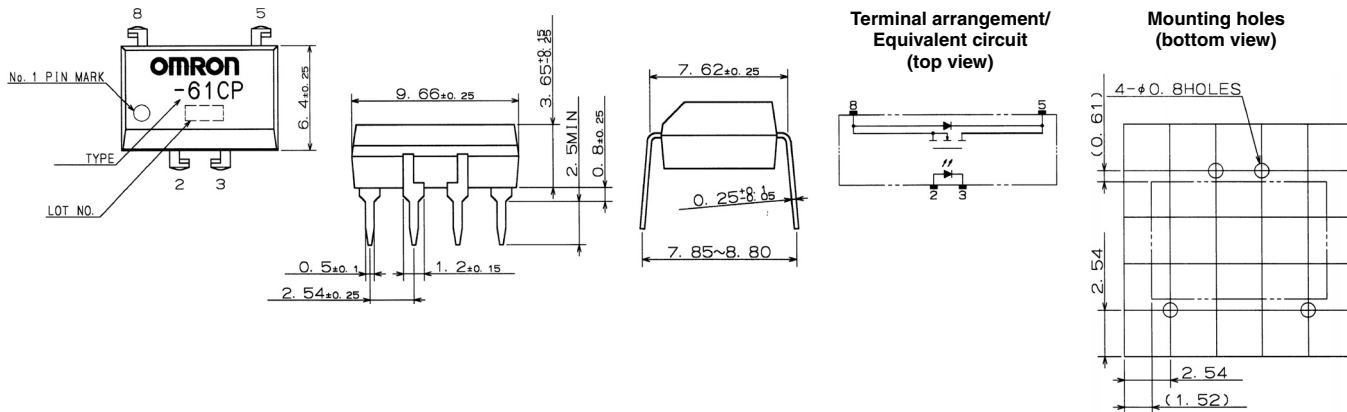
G3VM-2, G3VM-2L, G3VM-351A, G3VM-353A, G3VM-401A, G3VM-61A, G3VM-61A1



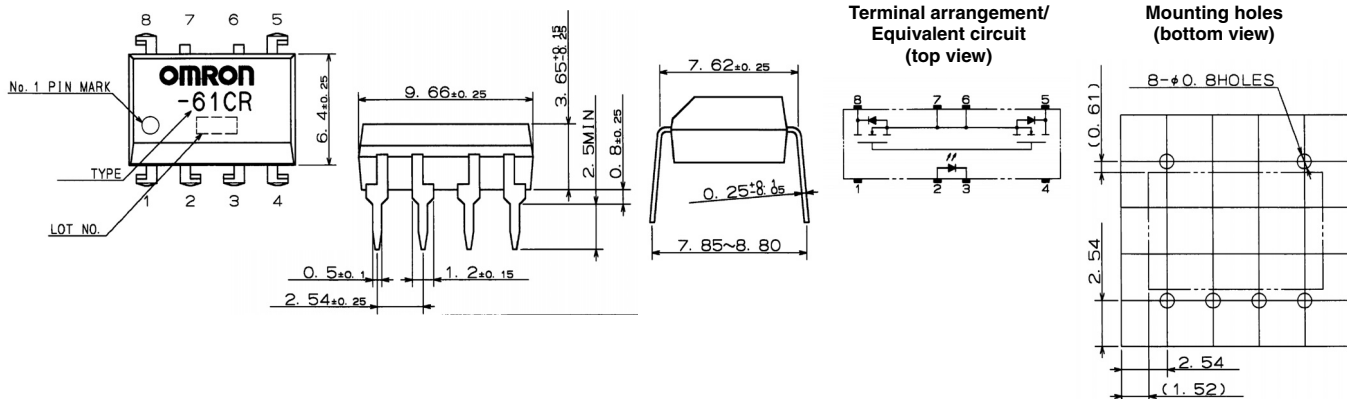
G3VM-351B, G3VM-353B, G3VM-3, G3VM-3L, G3VM-401B, G3VM-401BY, G3VM-601BY, G3VM-61B, G3VM-61B1, G3VM-V



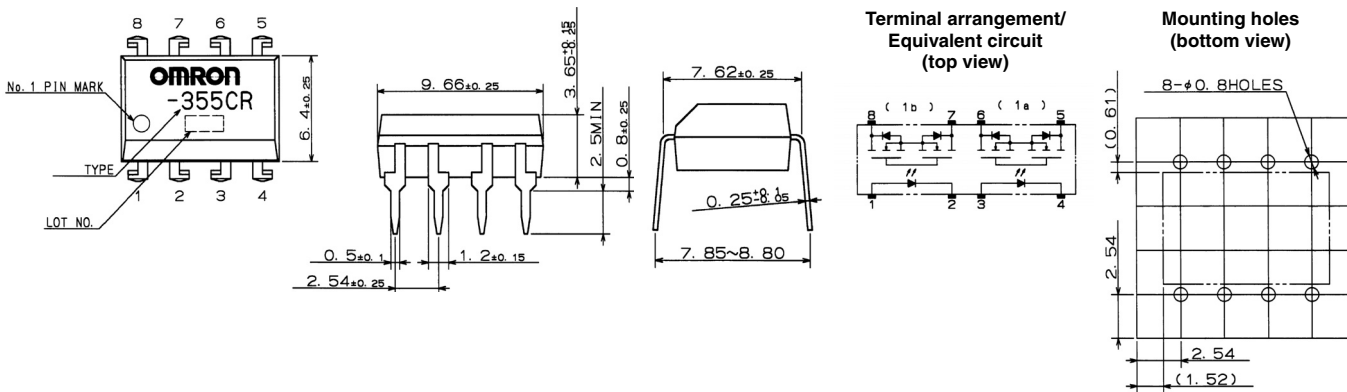
**G3VM-61CP**



**G3VM-61CR**



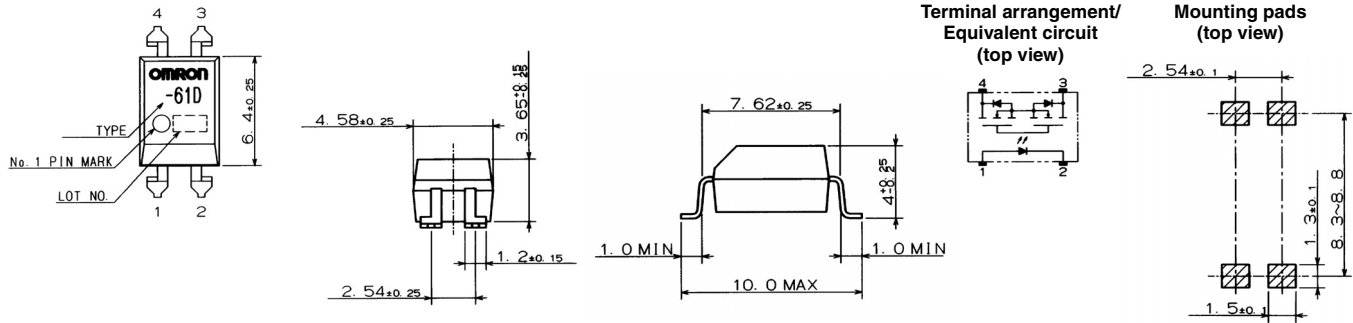
**G3VM-355CR, G3VM-352C, G3VM-402C, G3VM-62C1, G3VM-W, G3VM-WL, G3VM-354C**



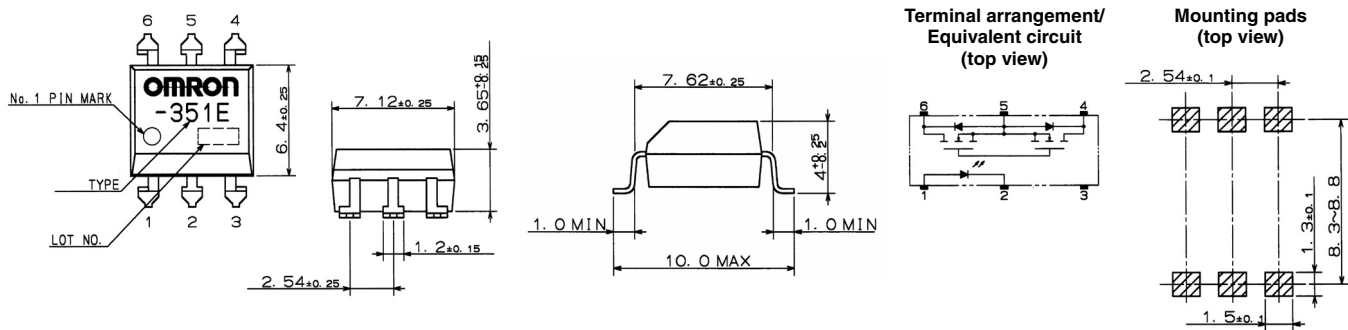
## ■ Surface Mount (SMT) Models

Dimensions also apply to SMT models with (TR) suffix indicating tape-and-reel packaging.

**G3VM-2F, G3VM-2FL, G3VM-351D, G3VM-353D, G3VM-401D, G3VM-61D, G3VM-61D1**

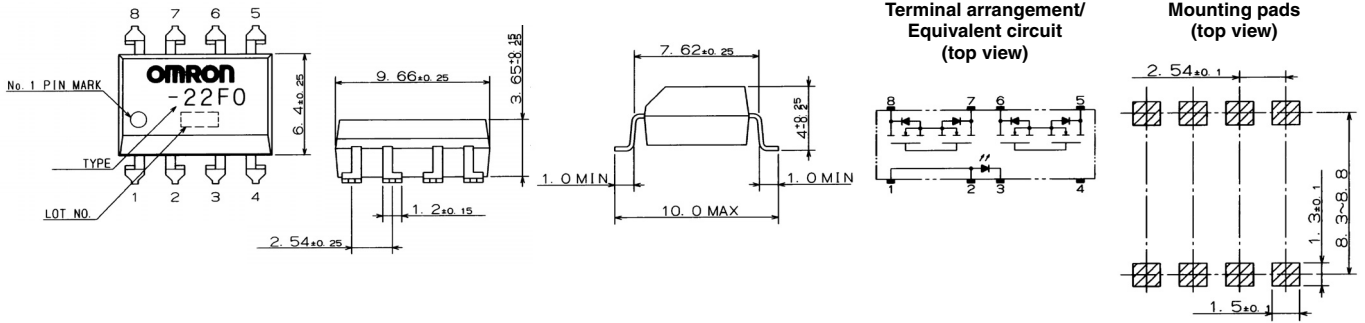


**G3VM-351E, G3VM-353E, G3VM-3F, G3VM-3FL, G3VM-401E, G3VM-401EY, G3VM-601EY, G3VM-61E, G3VM-61E1, G3VM-VF**

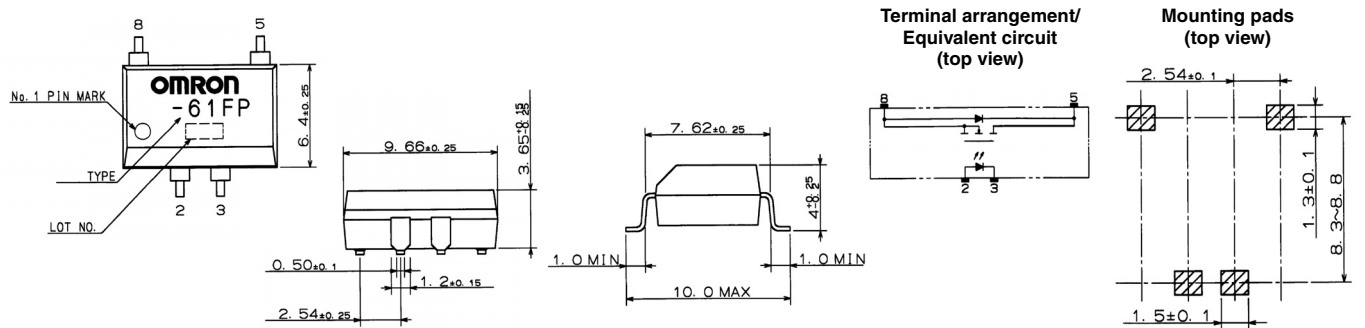




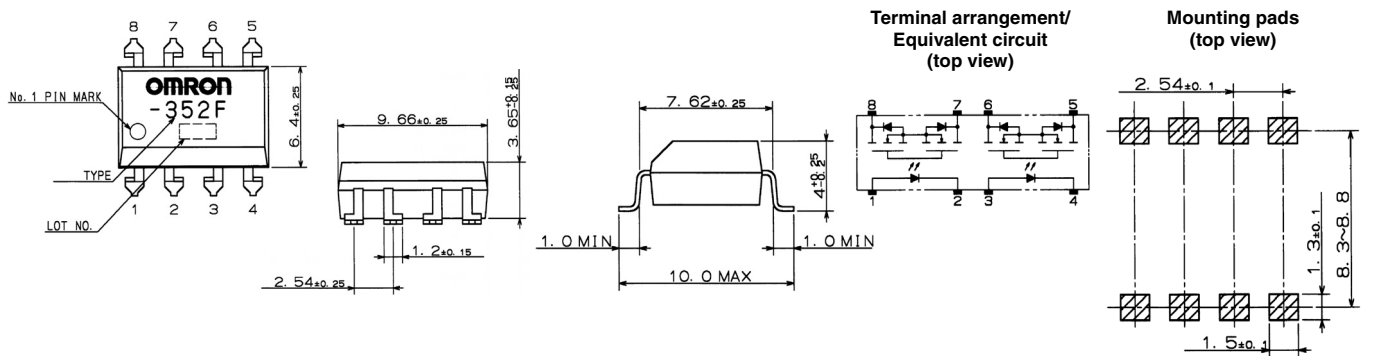
G3VM-22FO, G3VM-61FR



G3VM-61FP



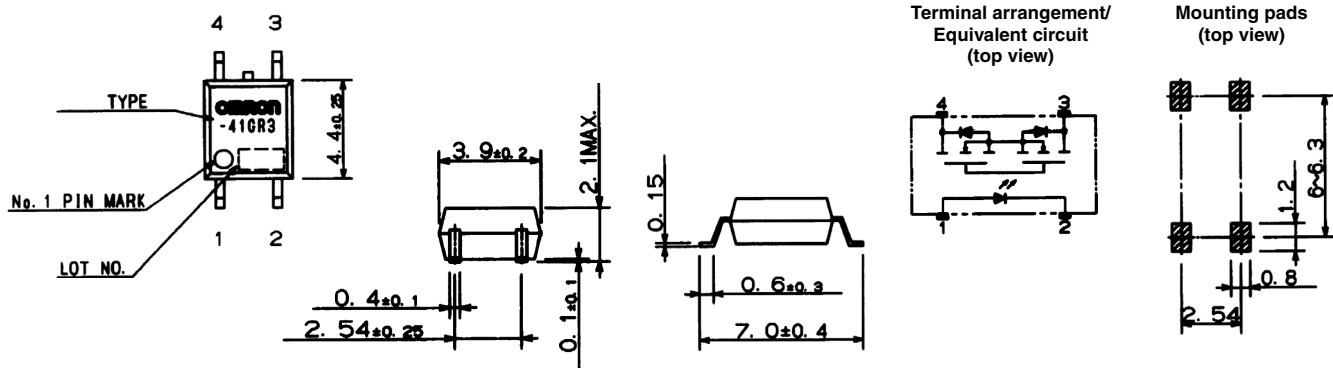
G3VM-355FR, G3VM-352F, G3VM-402F, G3VM-62F1, G3VM-WF, G3VM-WFL, G3VM-354F



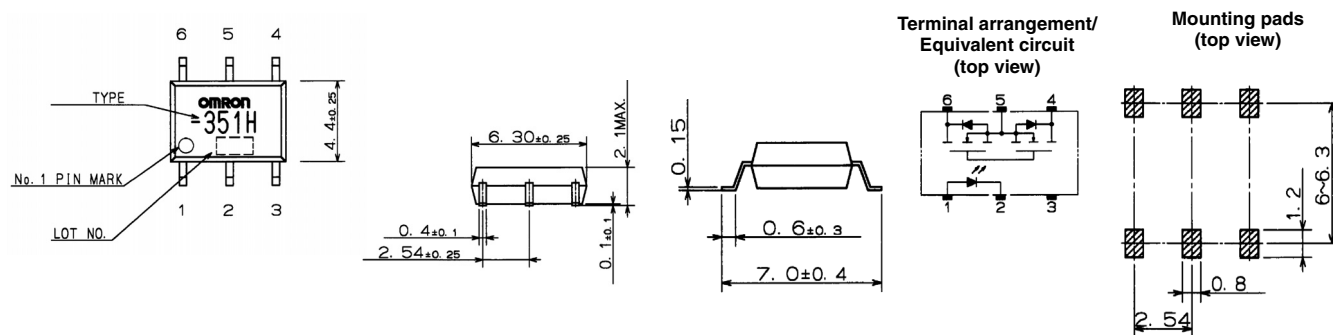
## ■ SOP Models

Dimensions also apply to SOP models with (TR) suffix indicating tape-and-reel packaging.

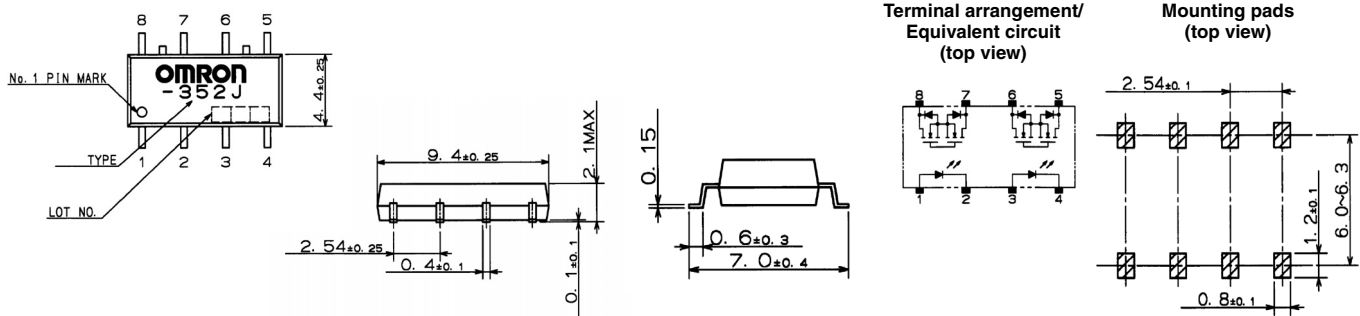
G3VM-21GR, G3VM-21GR1, G3VM-351G, G3VM-353G, G3VM-401G, G3VM-41GR3, G3VM-41GR4, G3VM-41GR5, G3VM-41GR6, G3VM-61G1, G3VM-81G1, G3VM-S1, G3VM-S2, G3VM-S5



G3VM-351H, G3VM-353H, G3VM-61H1, G3VM-81HR, G3VM-S3

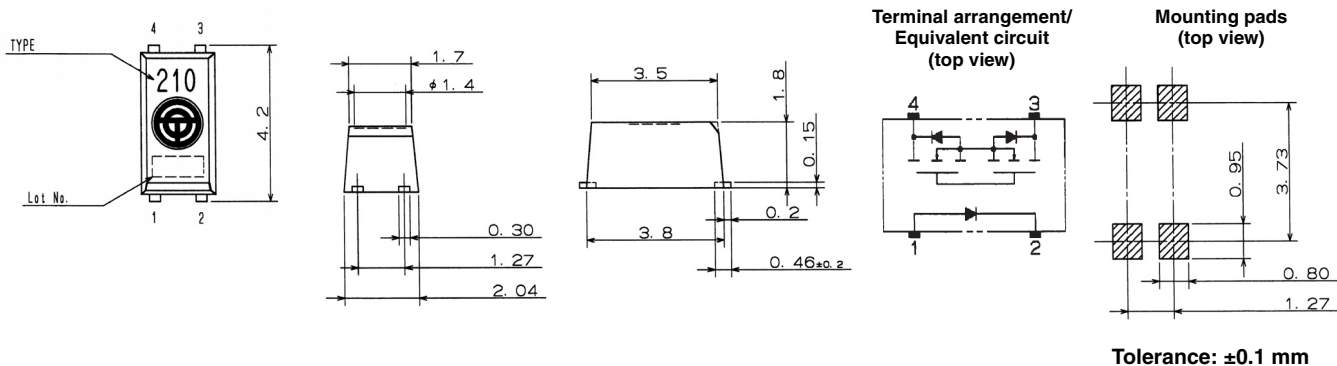


G3VM-352J, G3VM-354J, G3VM-355JR, G3VM-402J, G3VM-62J1, G3VM-SW, G3VM-SY



■ SSOP Models

G3VM-21LR, G3VM-21LR1, G3VM-41LR3, G3VM-41LR4, G3VM-41LR5, G3VM-41R6



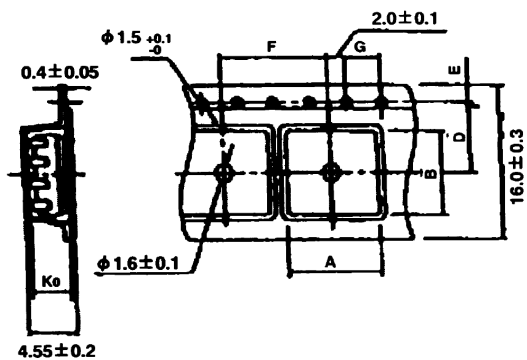
# Tape-and-Reel Dimensions

Unit: mm

## ■ Surface Mount (SMT) Models

G3VM-2F(TR), G3VM-2FL(TR), G3VM-351D(TR), G3VM-353D(TR), G3VM-401D(TR), G3VM-61D(TR), G3VM-61D1(TR)

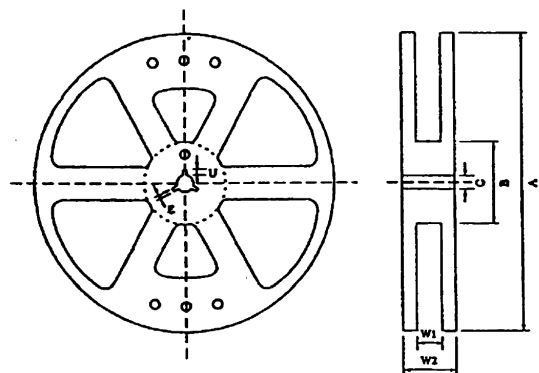
Type Figuration



(Unit: mm)  
Tolerance: ±0.1

| Symbol | Dimension | Remarks                                                                        |
|--------|-----------|--------------------------------------------------------------------------------|
| A      | 10.4      | —                                                                              |
| B      | 7.6       | —                                                                              |
| K0     | 4.1       | Internal                                                                       |
| F      | 12.0      | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| G      | 4.0       | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| E      | 1.75      | From the edge to reel hole                                                     |
| D      | 12.0      | From reel hole to center                                                       |

Reel Figuration



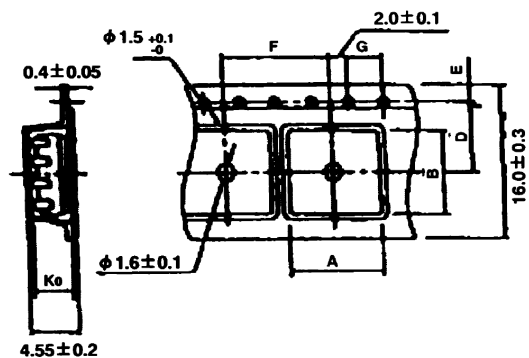
(Unit: mm)

| Symbol | Dimension          |
|--------|--------------------|
| A      | $\phi 380 \pm 2.0$ |
| W1     | $17.5 \pm 0.5$     |
| W2     | $21.5 \pm 1.0$     |
| B      | $\phi 80 \pm 1.0$  |
| C      | $\phi 13 \pm 0.5$  |
| E      | $2.0 \pm 0.5$      |
| U      | $4.0 \pm 0.5$      |

G3VM-351E(TR), G3VM-353E(TR), G3VM-3F(TR), G3VM-3FL(TR), G3VM-401E(TR), G3VM-401EY(TR), G3VM-601EY(TR), G3VM-61E(TR), G3VM-61E1(TR), G3VM-VF(TR), G3VM-22FO(TR), G3VM-61FP(TR), G3VM-61FR(TR), G3VM-355FR(TR), G3VM-352F(TR), G3VM-402F(TR), G3VM-62F1(TR), G3VM-WF(TR), G3VM-WFL(TR), G3VM-354F(TR)

Type Figuration

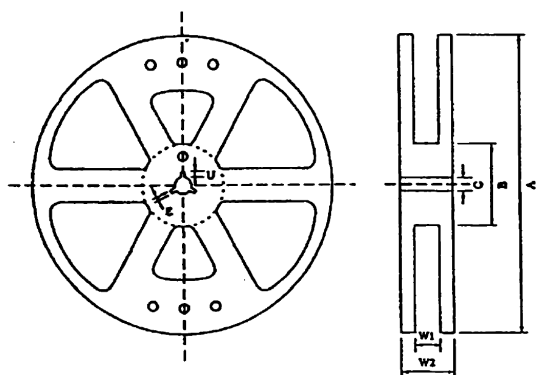
(Unit: mm)  
Tolerance: ±0.1



| Symbol | Dimension  | Remarks                                                     |
|--------|------------|-------------------------------------------------------------|
| A      | 10.4 ± 0.1 | —                                                           |
| B      | 10.1 ± 0.1 | —                                                           |
| K0     | 4.1 ± 0.1  | Internal                                                    |
| F      | 12.0 ± 0.1 | Total Height <sup>+0.1</sup> / <sub>-0.3</sub> / 10 pitches |
| G      | 4.0 ± 0.1  | Total Height <sup>+0.1</sup> / <sub>-0.3</sub> / 10 pitches |
| E      | 1.75 ± 0.1 | From the edge to reel hole                                  |
| D      | 7.5 ± 0.1  | From reel hole to center                                    |

Reel Figuration

(Unit: mm)

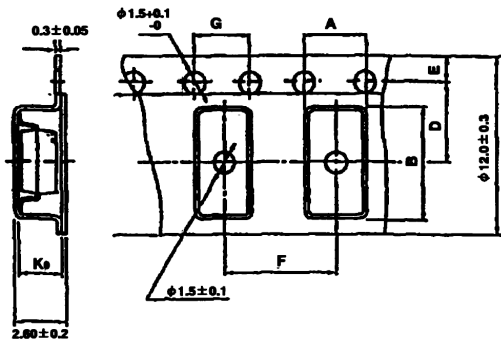


| Symbol | Dimension   |
|--------|-------------|
| A      | φ 380 ± 2.0 |
| W1     | 17.5 ± 0.5  |
| W2     | 21.5 ± 1.0  |
| B      | φ 80 ± 1.0  |
| C      | φ 13 ± 0.5  |
| E      | 2.0 ± 0.5   |
| U      | 4.0 ± 0.5   |

■ SOP Models

G3VM-21GR(TR), G3VM-21GR1(TR), G3VM-351G(TR), G3VM-353G(TR), G3VM-401G(TR), G3VM-41GR3(TR), G3VM-41GR4(TR), G3VM-41GR5(TR), G3VM-41GR6(TR), G3VM-61G1(TR), G3VM-81G1(TR), G3VM-S1(TR), G3VM-S2(TR), G3VM-S5(TR)

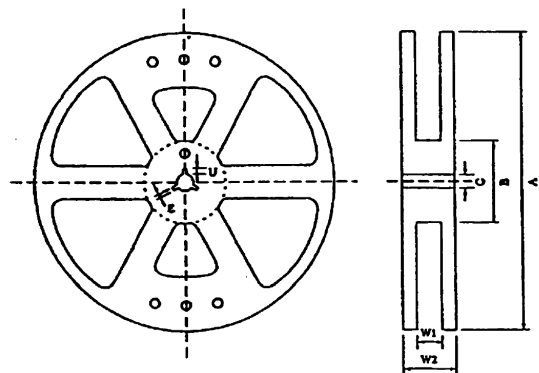
Type Figuration



(Unit: mm)  
Tolerance: ±0.1

| Symbol | Dimension  | Remarks                                                                        |
|--------|------------|--------------------------------------------------------------------------------|
| A      | 4.3 ± 0.1  | —                                                                              |
| B      | 7.5 ± 0.1  | —                                                                              |
| K0     | 2.4 ± 0.1  | Internal                                                                       |
| F      | 8.0 ± 0.1  | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| G      | 4.0 ± 0.1  | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| E      | 1.75 ± 0.1 | From the edge to reel hole                                                     |
| D      | 5.5 ± 0.1  | From reel hole to center                                                       |

Reel Figuration



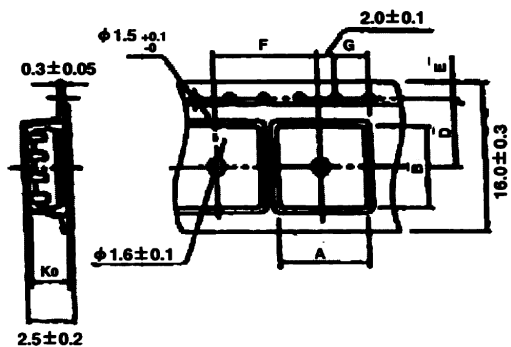
(Unit: mm)

| Symbol | Dimension   |
|--------|-------------|
| A      | φ 380 ± 2.0 |
| W1     | 17.5 ± 0.5  |
| W2     | 21.5 ± 1.0  |
| B      | φ 80 ± 1.0  |
| C      | φ 13 ± 0.5  |
| E      | 2.0 ± 0.5   |
| U      | 4.0 ± 0.5   |

G3VM-351H(TR), G3VM-353H(TR), G3VM-61H1(TR), G3VM-81HR(TR), G3VM-S3(TR)

Type Figuration

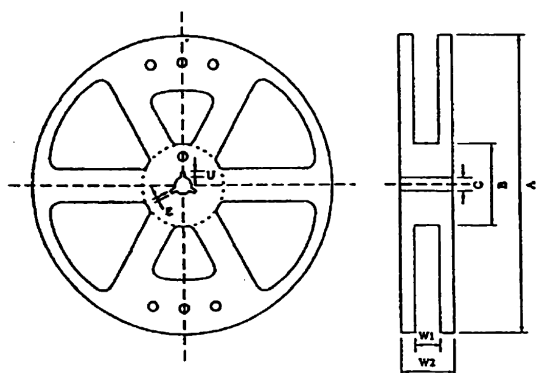
(Unit: mm)  
Tolerance: ±0.1



| Symbol | Dimension  | Remarks                                                     |
|--------|------------|-------------------------------------------------------------|
| A      | 7.5 ± 0.1  | —                                                           |
| B      | 6.7 ± 0.1  | —                                                           |
| K0     | 2.3 ± 0.1  | Internal                                                    |
| F      | 12.0 ± 0.1 | Total Height <sup>+0.1</sup> / <sub>-0.3</sub> / 10 pitches |
| G      | 4.0 ± 0.1  | Total Height <sup>+0.1</sup> / <sub>-0.3</sub> / 10 pitches |
| E      | 1.75 ± 0.1 | From the edge to reel hole                                  |
| D      | 7.5 ± 0.1  | From reel hole to center                                    |

Reel Figuration

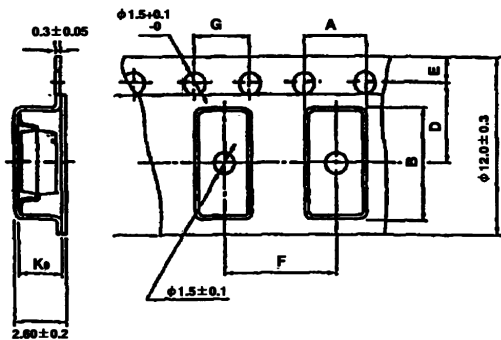
(Unit: mm)



| Symbol | Dimension   |
|--------|-------------|
| A      | φ 380 ± 2.0 |
| W1     | 17.5 ± 0.5  |
| W2     | 21.5 ± 1.0  |
| B      | φ 80 ± 1.0  |
| C      | φ 13 ± 0.5  |
| E      | 2.0 ± 0.5   |
| U      | 4.0 ± 0.5   |

G3VM-352J(TR), G3VM-354J(TR), G3VM-355JR(TR), G3VM-402J(TR), G3VM-62J1(TR), G3VM-SW(TR), G3VM-SY(TR)

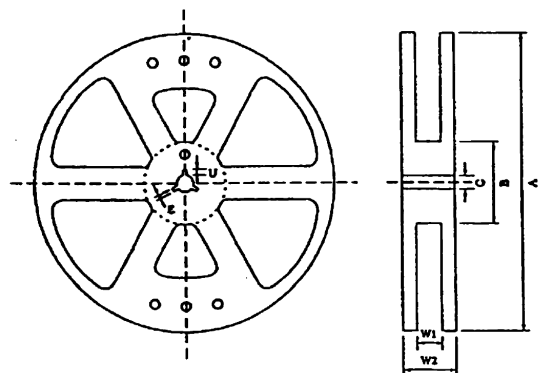
Type Figuration



(Unit: mm)  
Tolerance: ±0.1

| Symbol | Dimension  | Remarks                                                                        |
|--------|------------|--------------------------------------------------------------------------------|
| A      | 7.5 ± 0.1  | —                                                                              |
| B      | 10.5 ± 0.1 | —                                                                              |
| K0     | 2.2 ± 0.1  | Internal                                                                       |
| F      | 12.0 ± 0.1 | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| G      | 4.0 ± 0.1  | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| E      | 1.75 ± 0.1 | From the edge to reel hole                                                     |
| D      | 7.5 ± 0.1  | From reel hole to center                                                       |

Reel Figuration



(Unit: mm)

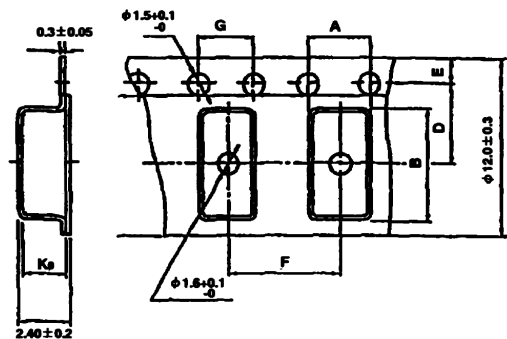
| Symbol | Dimension   |
|--------|-------------|
| A      | φ 380 ± 2.0 |
| W1     | 17.5 ± 0.5  |
| W2     | 21.5 ± 1.0  |
| B      | φ 80 ± 1.0  |
| C      | φ 13 ± 0.5  |
| E      | 2.0 ± 0.5   |
| U      | 4.0 ± 0.5   |



## ■ SSOP Models

G3VM-21LR, G3VM-21LR1, G3VM-41LR3, G3VM-41LR4, G3VM-41LR5, G3VM-41R6

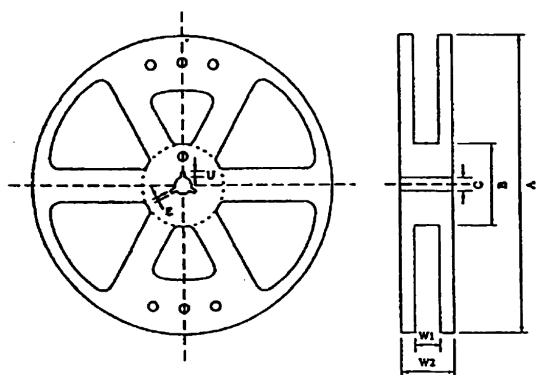
Type Figuration



(Unit: mm)  
Tolerance: ±0.1

| Symbol | Dimension  | Remarks                                                                        |
|--------|------------|--------------------------------------------------------------------------------|
| A      | 2.35 ± 0.1 | —                                                                              |
| B      | 4.5 ± 0.1  | —                                                                              |
| K0     | 2.1 ± 0.1  | Internal                                                                       |
| F      | 4.0 ± 0.1  | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| G      | 4.0 ± 0.1  | Total Height $\begin{smallmatrix} +0.1 \\ -0.3 \end{smallmatrix}$ / 10 pitches |
| E      | 1.75 ± 0.1 | From the edge to reel hole                                                     |
| D      | 5.5 ± 0.1  | From reel hole to center                                                       |

Reel Figuration



(Unit: mm)

| Symbol | Dimension   |
|--------|-------------|
| A      | φ 380 ± 2.0 |
| W1     | 17.5 ± 0.5  |
| W2     | 21.5 ± 1.0  |
| B      | φ 80 ± 1.0  |
| C      | φ 13 ± 0.5  |
| E      | 2.0 ± 0.5   |
| U      | 4.0 ± 0.5   |

# Precautions

## ⚠ WARNING

Always turn the power off before wiring, or an electric shock may occur.

Do not touch the SSR terminal section (the recharge section) while the power supply is connected. Contact with the recharge section will result in an electric shock.

## ⚠ Caution

Do not use excess voltage or current in the SSR input or output circuits. Otherwise, damage to the SSR or a fire will result.

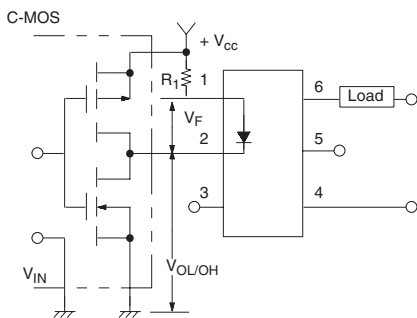
Conduct wiring and soldering correctly according to soldering conditions. If the product is used with incomplete wiring, overheating will occur and may result in a fire.

## ■ Reflow Solder Conditions

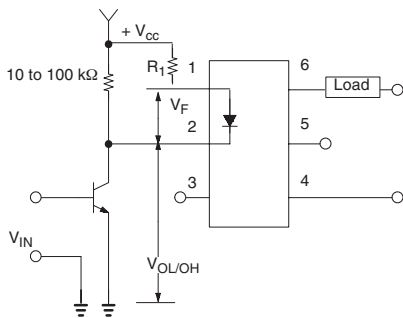
G3VM relays are designed to withstand a maximum soldering temperature of 260°C for 10 seconds.

## ■ Typical Relay Driving Circuit Examples

### C-MOS



### Transistor



Use the following formula to obtain the LED current limiting resistance value to assure that the Relay operates accurately.

$$R_1 = \frac{V_{CC} - V_{OL} - V_F(ON)}{5 \text{ to } 20 \text{ mA}}$$

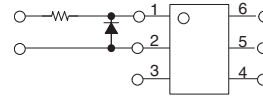
Use the following formula to obtain the LED forward voltage value to assure that the Relay releases accurately.

$$V_{F(OFF)} = V_{CC} - V_{OH} < 0.8 \text{ V}$$

## ■ Protection from Surge Voltage on the Input Terminals

If any reversed surge voltage is imposed on the input terminals, insert a diode in parallel to the input terminals as shown in the following circuit diagram and do not impose a reversed voltage value of 3 V or more.

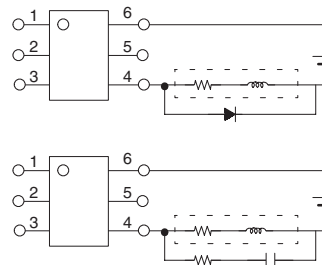
### Spike Voltage Protection Circuit Example



## ■ Protection from Spike Voltage on the Output Terminals

If a spike voltage exceeding the absolute maximum rated value is generated between the output terminals, insert a C-R snubber or clamping diode in parallel to the load as shown in the following circuit diagram to limit the spike voltage.

### Spike Voltage Protection Circuit Example

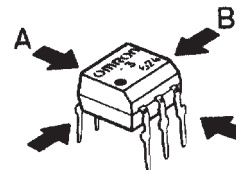


## ■ Unused Terminals

Terminal 3 is connected to the internal circuit. Do not connect anything to terminal 3 externally.

## ■ Relay Holding Force for Automatic Mounting

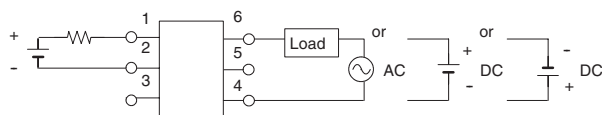
A Relay must not be imposed with a force exceeding 200 gf (1.96 N) in the A or B direction shown in the following illustration when the Relay is mounted automatically, or the characteristics of the Relay may change.



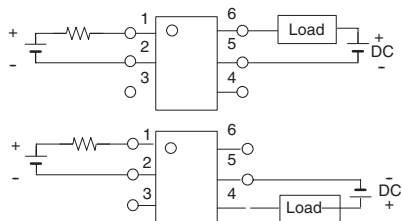
## ■ Load Connection

Do not short-circuit the input and output terminals while the Relay is operating or the Relay may malfunction.

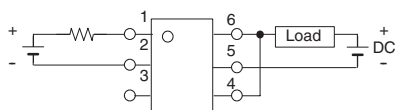
### AC Connection



### DC Single Connection



### DC Parallel Connection





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