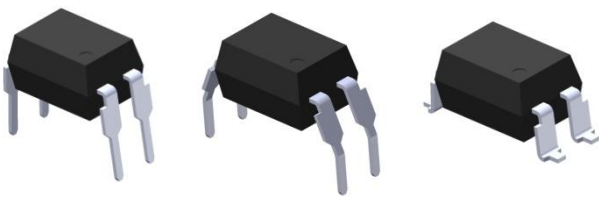


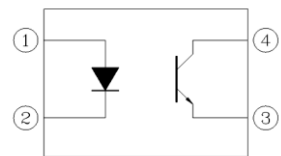
### 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER EL817-G Series



#### Features:

- Halogens free.  
(Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso = 5000Vrms )
- Creepage distance > 7.62mm
- Operating temperature up to +110°C
- Compact small outline package
- Compliance with EU REACH.
- The product itself will remain within RoHS compliant version
- UL and cUL approved(No.E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

#### Schematic



#### Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

#### Description

The EL817-G series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector. They are packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

#### Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

**Absolute Maximum Ratings (Ta=25°C)**

|                                     | Parameter  | Symbol    | Rating     | Unit  |
|-------------------------------------|--|-----------|------------|-------|
| Input                               | Forward current                                    | $I_F$     | 60         | mA    |
|                                     | Peak forward current (1us, pulse)                  | $I_{FP}$  | 1          | A     |
|                                     | Reverse voltage                                    | $V_R$     | 6          | V     |
|                                     | Power dissipation                                  | $P_D$     | 100        | mW    |
|                                     | Derating factor (above $T_a = 100^\circ\text{C}$ ) |           | 2.9        | mW/°C |
| Output                              | Power dissipation                                  | $P_C$     | 150        | mW    |
|                                     | Derating factor (above $T_a = 100^\circ\text{C}$ ) |           | 5.8        | mW/°C |
|                                     | Collector current                                  | $I_C$     | 50         | mA    |
|                                     | Collector-Emitter voltage                          | $V_{CEO}$ | 80         | V     |
|                                     | Emitter-Collector voltage                          | $V_{ECO}$ | 7          | V     |
| Total Power Dissipation             |  | $P_{TOT}$ | 200        | mW    |
| Isolation Voltage* <sup>1</sup>     |  | $V_{ISO}$ | 5000       | V rms |
| Operating Temperature               |  | $T_{OPR}$ | -55 to 110 | °C    |
| Storage Temperature                 |  | $T_{STG}$ | -55 to 125 | °C    |
| Soldering Temperature* <sup>2</sup> |  | $T_{SOL}$ | 260        | °C    |

Notes:

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

\*2 For 10 seconds

**Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

**Input**

| Parameter         | Symbol   | Min. | Typ. | Max. | Unit          | Condition                |
|-------------------|----------|------|------|------|---------------|--------------------------|
| Forward Voltage   | $V_F$    | -    | 1.2  | 1.4  | V             | $I_F = 20\text{mA}$      |
| Reverse Current   | $I_R$    | -    | -    | 10   | $\mu\text{A}$ | $V_R = 4\text{V}$        |
| Input capacitance | $C_{in}$ | -    | 30   | 250  | pF            | $V = 0, f = 1\text{kHz}$ |

**Output**

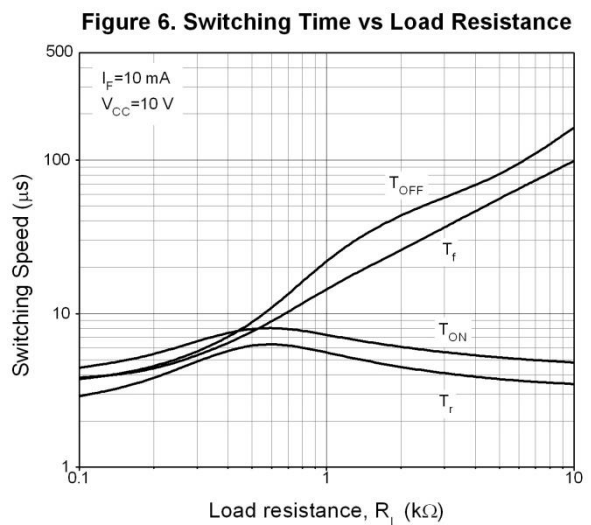
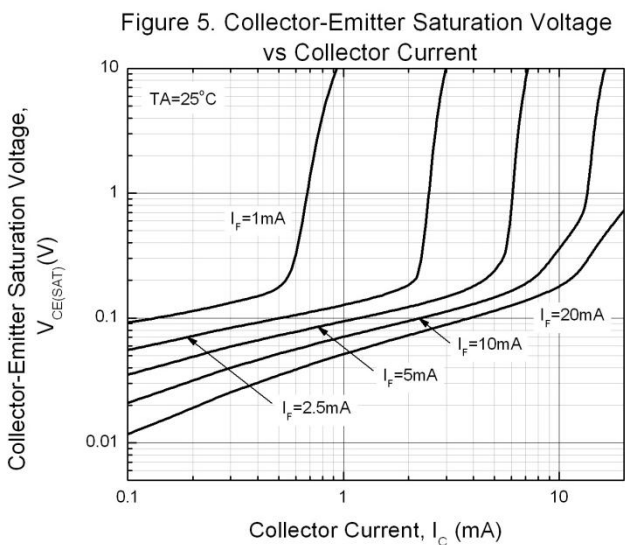
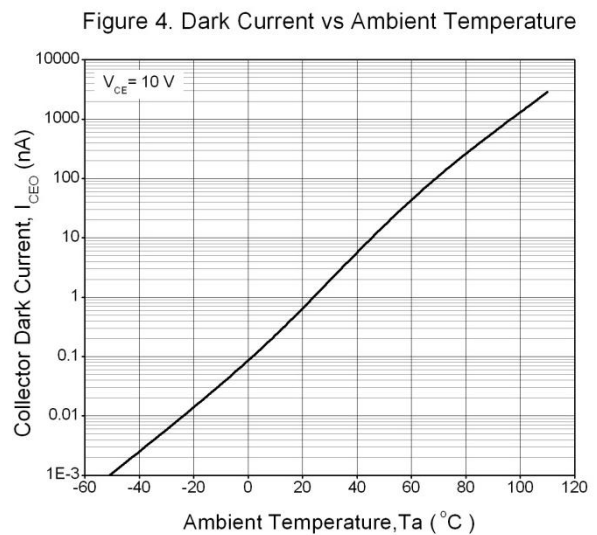
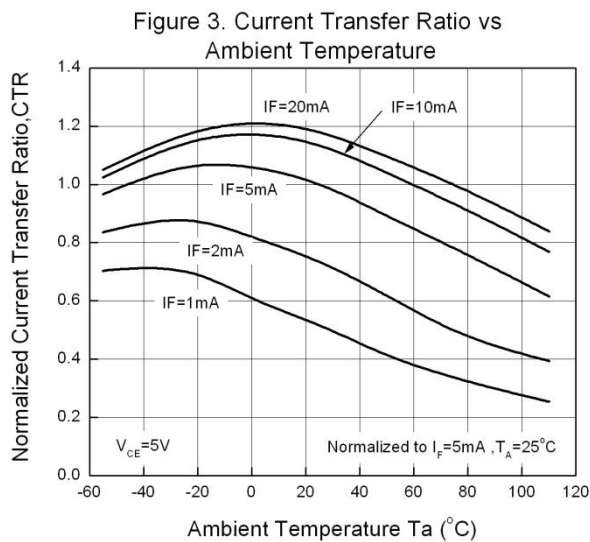
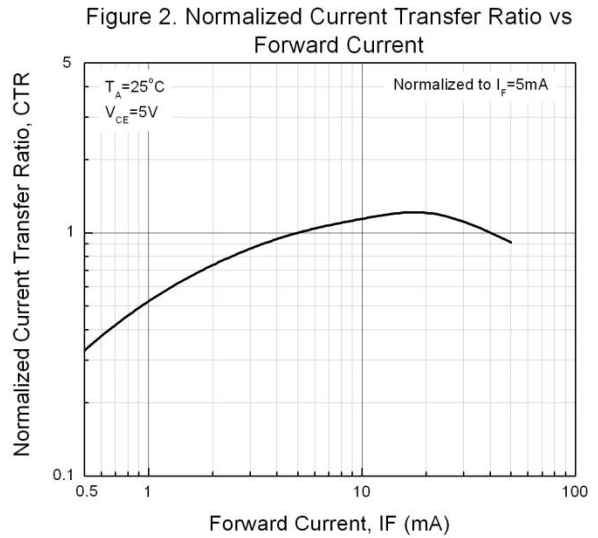
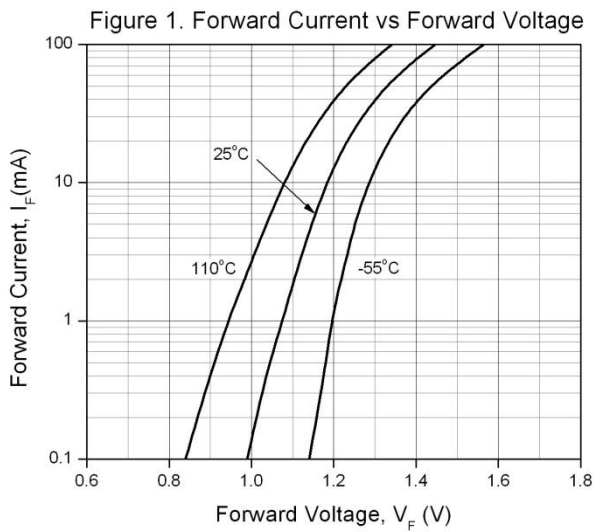
| Parameter                           | Symbol     | Min | Typ. | Max. | Unit | Condition                               |
|-------------------------------------|------------|-----|------|------|------|---|
| Collector-Emitter dark current      | $I_{CEO}$  | -   | -    | 100  | nA   | $V_{CE} = 20\text{V}, I_F = 0\text{mA}$ |
| Collector-Emitter breakdown voltage | $BV_{CEO}$ | 80  | -    | -    | V    | $I_C = 0.1\text{mA}$                    |
| Emitter-Collector breakdown voltage | $BV_{ECO}$ | 7   | -    | -    | V    | $I_E = 0.1\text{mA}$                    |

**Transfer Characteristics**

| Parameter                            | Symbol        | Min                | Typ. | Max. | Unit          | Condition  |
|--------------------------------------|---------------|--------------------|------|------|---------------|--|
| Current Transfer ratio               | EL817         | 50                 | -    | 600  | %             | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$                               |
|                                      | EL817A        | 80                 | -    | 160  |               |  |
|                                      | EL817B        | 130                | -    | 260  |               |  |
|                                      | EL817C        | 200                | -    | 400  |               |  |
|                                      | EL817D        | 300                | -    | 600  |               |  |
|                                      | EL817X        | 100                | -    | 200  |               |  |
|                                      | EL817Y        | 150                | -    | 300  |               |  |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | -                  | 0.1  | 0.2  | V             | $I_F = 20\text{mA}, I_C = 1\text{mA}$                                |
| Isolation resistance                 | $R_{IO}$      | $5 \times 10^{10}$ | -    | -    | $\Omega$      | $V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$                   |
| Floating capacitance                 | $C_{IO}$      | -                  | 0.6  | 1.0  | pF            | $V_{IO} = 0, f = 1\text{MHz}$  |
| Cut-off frequency                    | $f_c$         | -                  | 80   | -    | kHz           | $V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$ |
| Rise time                            | $t_r$         | -                  | 6    | 18   | $\mu\text{s}$ | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$              |
| Fall time                            | $t_f$         | -                  | 8    | 18   | $\mu\text{s}$ |  |

\* Typical values at  $T_a = 25^\circ\text{C}$

Typical Electro-Optical Characteristics Curves



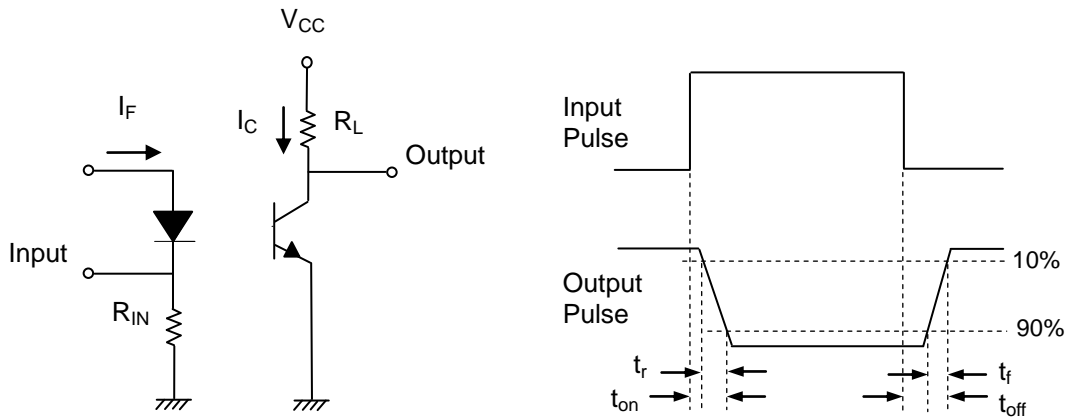


Figure 7. Switching Time Test Circuit & Waveforms

**Order Information**

**Part Number**

**EL817X(Y)(Z)-FVG**

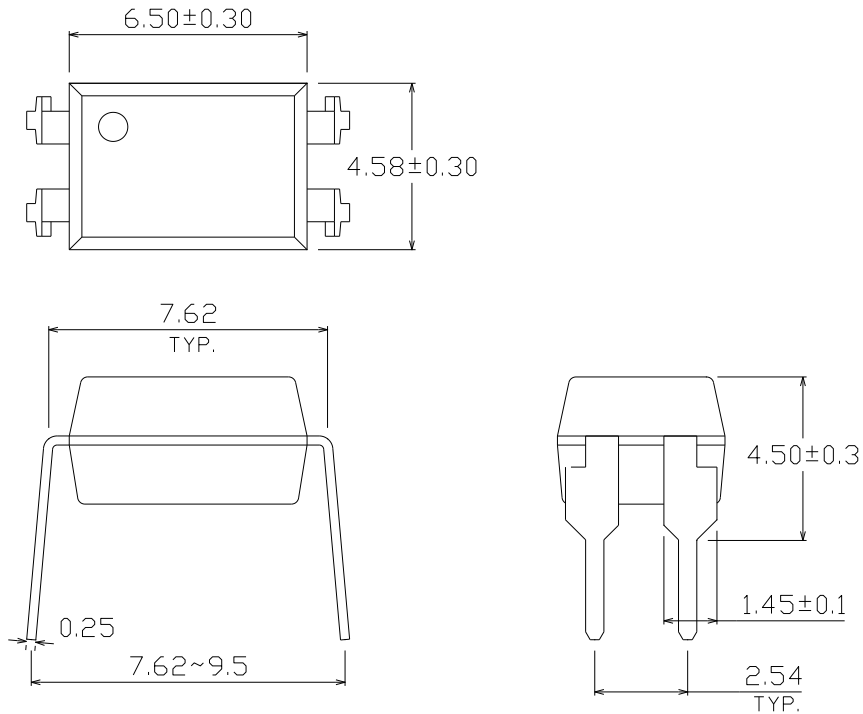
**Note**

- X = Lead form option (S, S1, S2, M or none)
- Y = CTR Rank (A, B, C, D, X, Y or none)
- Z = Tape and reel option (TU, TD or none)
- F = Lead frame option (F: Iron, None: copper)
- V = VDE safety (optional)
- G = Halogens free

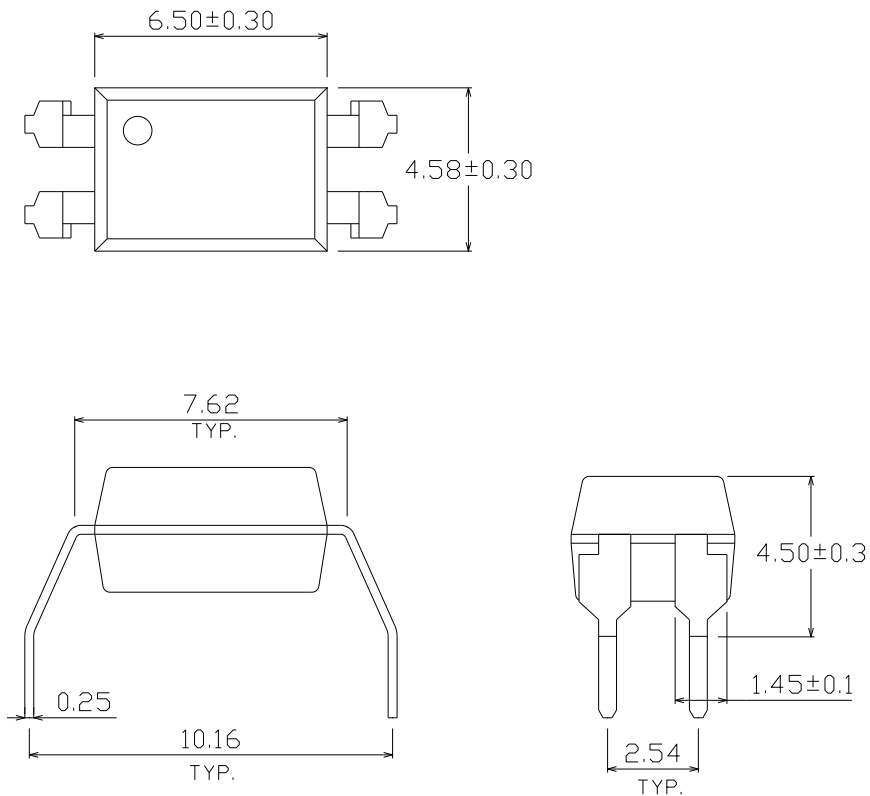
| Option  | Description   | Packing quantity    |
|---------|---|---------------------|
| None    | Standard DIP-4  | 100 units per tube  |
| M       | Wide lead bend (0.4 inch spacing)                             | 100 units per tube  |
| S (TU)  | Surface mount lead form + TU tape & reel option               | 1500 units per reel |
| S (TD)  | Surface mount lead form + TD tape & reel option               | 1500 units per reel |
| S1 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 1500 units per reel |
| S1 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 1500 units per reel |
| S2 (TU) | Surface mount lead form (low profile) + TU tape & reel option | 2000 units per reel |
| S2 (TD) | Surface mount lead form (low profile) + TD tape & reel option | 2000 units per reel |

Package Dimension (Dimensions in mm)

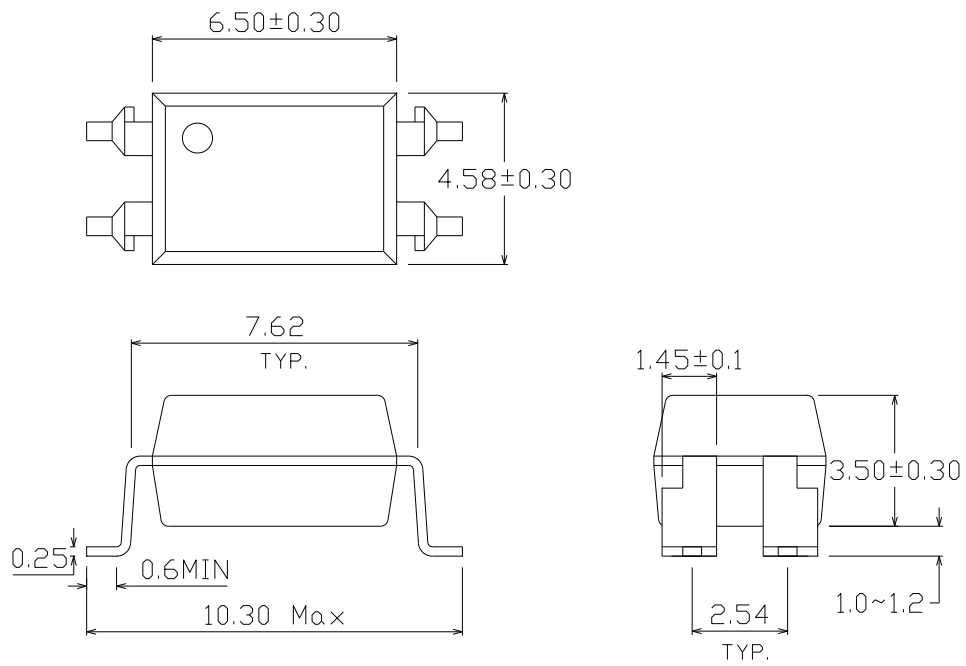
Standard DIP Type



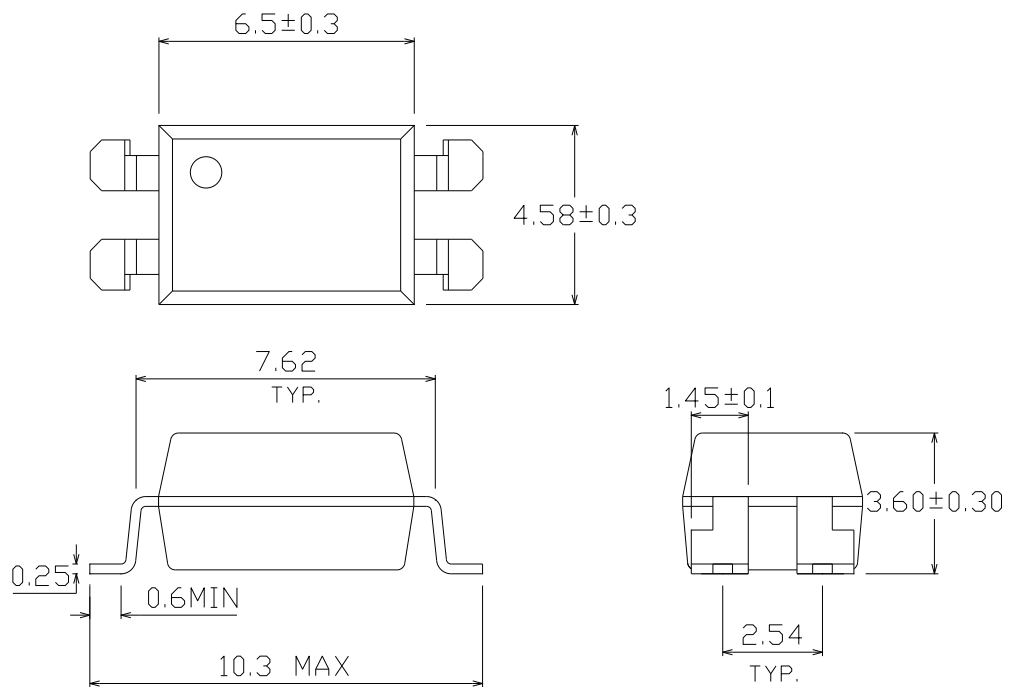
Option M Type



Option S Type

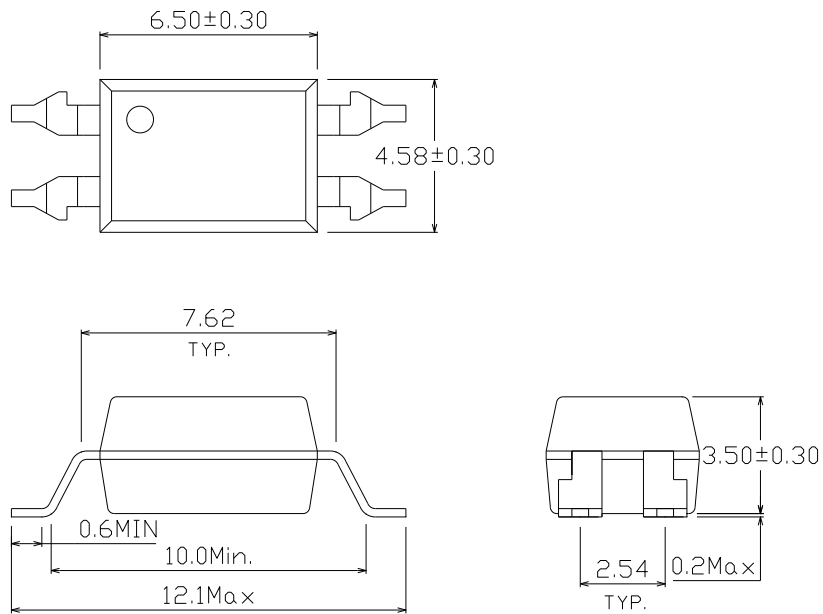


Option S1 Type



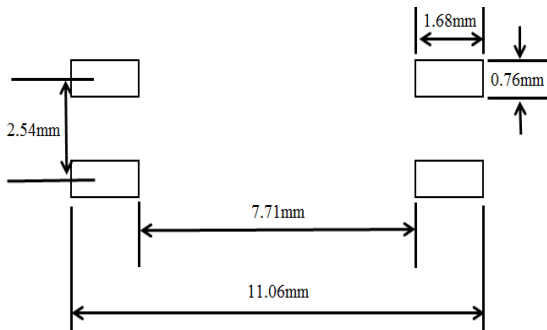


Option S2 Type

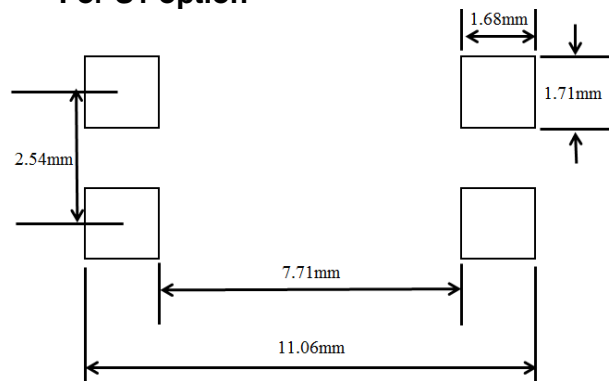


Recommended pad layout for surface mount leadform

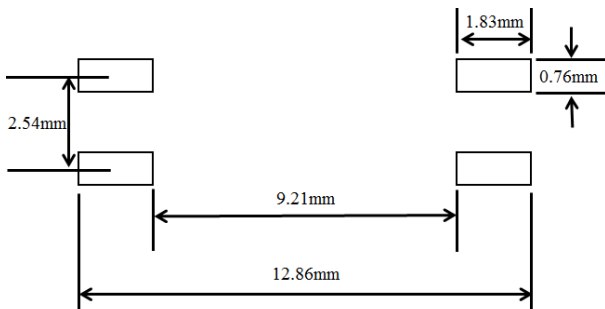
For S option



For S1 option



For S2 option



Notes

Suggested pad dimension is just for reference only.  
 Please modify the pad dimension based on individual need.

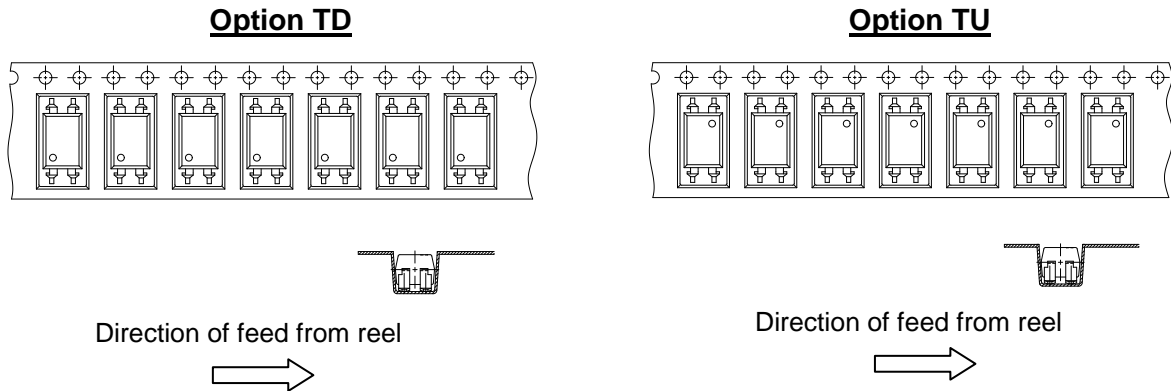
## Device Marking



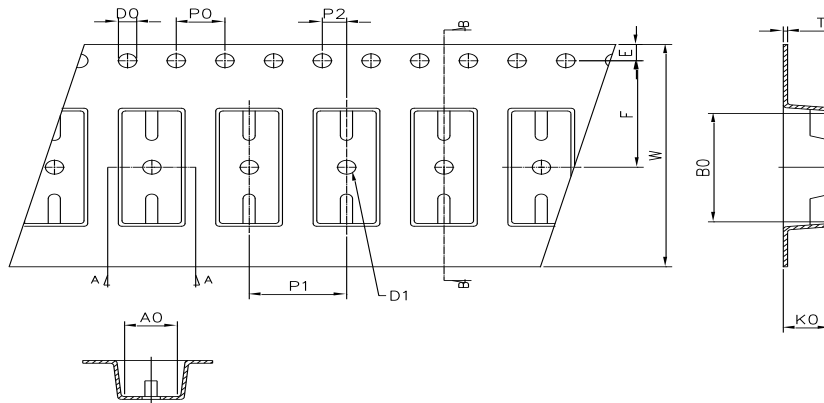
## Notes

|     |  |
|-----|--|
| EL  | denotes EVERLIGHT                              |
| 817 | denotes Device Number                          |
| F   | denotes Factory Code (G: China and Green part) |
| R   | denotes CTR Rank (A, B, C, D, X, Y or none)    |
| Y   | denotes 1 digit Year code                      |
| WW  | denotes 2 digit Week code                      |
| V   | denotes VDE (optional)                         |

**Tape & Reel Packing Specifications**



**Tape dimensions**

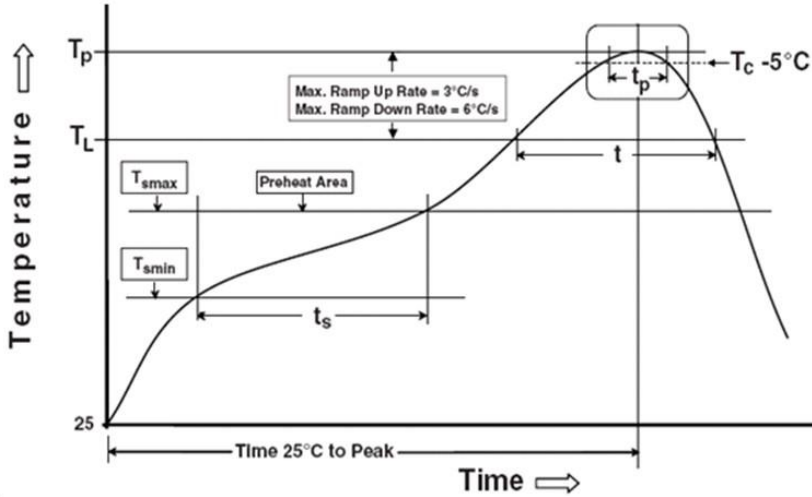


|                        |           |           |           |           |           |           |
|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dimension No.          | <b>Ao</b> | <b>Bo</b> | <b>Do</b> | <b>D1</b> | <b>E</b>  | <b>F</b>  |
| Dimension (mm)<br>S.S1 | 4.90±0.1  | 10.40±0.1 | 1.5±0.1   | 1.50±0.1  | 1.75±0.1  | 7.50±0.1  |
| Dimension (mm)<br>S2   | 4.88±0.1  | 12.55±0.1 | 1.5±0.1   | 1.50±0.1  | 1.75±0.1  | 11.5±0.1  |
| Dimension No.          | <b>Po</b> | <b>P1</b> | <b>P2</b> | <b>t</b>  | <b>W</b>  | <b>Ko</b> |
| Dimension (mm)<br>S.S1 | 4.00±0.1  | 8.00±0.1  | 2.00±0.1  | 0.40±0.1  | 16.00±0.3 | 4.60±0.1  |
| Dimension (mm)<br>S2   | 4.00±0.1  | 8.00±0.1  | 2.00±0.1  | 0.40±0.1  | 24.00±0.3 | 4.00±0.1  |

## Precautions for Use

### 1. Soldering Condition

#### 1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

#### Preheat

|   |                 |
|---|-----------------|
| Temperature min (T <sub>smmin</sub> )                             | 150 °C          |
| Temperature max (T <sub>smax</sub> )                              | 200°C           |
| Time (T <sub>smmin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> ) | 60-120 seconds  |
| Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )       | 3 °C/second max |

#### Other

|   |                  |
|---|------------------|
| Liquidus Temperature (T <sub>L</sub> )                            | 217 °C           |
| Time above Liquidus Temperature (t <sub>L</sub> )                 | 60-100 sec       |
| Peak Temperature (T <sub>p</sub> )                                | 260°C            |
| Time within 5 °C of Actual Peak Temperature: T <sub>p</sub> - 5°C | 30 s             |
| Ramp- Down Rate from Peak Temperature                             | 6°C /second max. |
| Time 25°C to peak temperature                                     | 8 minutes max.   |
| Reflow times  | 3 times          |

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