

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Up To 2kV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ
- Terminal Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

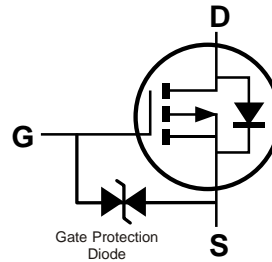


ESD PROTECTED TO 2kV

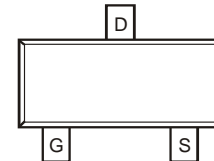
SOT23



Top View



Internal Schematic



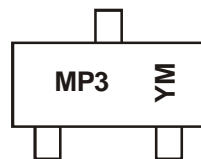
Top View

## Ordering Information (Note 5 & 6)

| Part Number | Compliance | Case  | Packaging                |
|-------------|------------|-------|--------------------------|
| DMP2035U-7  | Standard   | SOT23 | 3,000 / 7" Tape & Reel   |
| DMP2035UQ-7 | Automotive | SOT23 | 3,000 / 7" Tape & Reel   |
| DMP2035U-13 | Standard   | SOT23 | 10,000 / 13" Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
  5. The ESD gate protection diode is only designed to protect against ESD events. No gate-source voltage greater than the maximum  $V_{GSS}$  rating (given on page 2) can be applied.
  6. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



MP3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2009 | ~ | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|---|------|------|------|------|------|------|------|------|------|
| Code | W    | ~ | E    | F    | G    | H    | I    | J    | K    | L    | M    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic  |              |  | Symbol           | Value        | Unit |
|---|--------------|--|------------------|--------------|------|
| Drain-Source Voltage                                      |              |  | V <sub>DSS</sub> | -20          | V    |
| Gate-Source Voltage                                       |              |  | V <sub>GSS</sub> | ±10          | V    |
| Continuous Drain Current (Note 8) V <sub>GS</sub> = -4.5V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -4.9<br>-4.0 | A    |
| Pulsed Drain Current (Note 9)                             |              |  | I <sub>DM</sub>  | -24          | A    |
| Maximum Continuous Body Diode Forward Current (Note 8)    |              |  | I <sub>S</sub>   | -1.2         | A    |
| Pulsed Body Diode Forward Current (Note 9)                |              |  | I <sub>SM</sub>  | -24          | A    |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 7)                 | P <sub>D</sub>                    | 0.81        | W    |
| Thermal Resistance, Junction to Ambient (Note 7) | R <sub>θJA</sub>                  | 153.5       | °C/W |
| Total Power Dissipation (Note 8)                 | P <sub>D</sub>                    | 1.2         | W    |
| Thermal Resistance, Junction to Ambient (Note 8) | R <sub>θJA</sub>                  | 100         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic   | Symbol              | Min  | Typ   | Max  | Unit | Test Condition  |
|--|---------------------|------|-------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 10)</b>                   |                     |      |       |      |      |   |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | -20  | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA   |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —    | —     | -1.0 | μA   | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —    | —     | ±10  | μA   | V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS (Note 10)</b>                    |                     |      |       |      |      |   |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | -0.4 | -0.7  | -1.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA   |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | —    | 23    | 35   | mΩ   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A   |
|  |                     |      | 30    | 45   |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -4.0A   |
|  |                     |      | 41    | 62   |      | V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -2.0A   |
| Forward Transfer Admittance                            | Y <sub>fs</sub>     | —    | 14    | —    | s    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A   |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —    | -0.7  | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A  |
| <b>DYNAMIC CHARACTERISTICS (Note 11)</b>               |                     |      |       |      |      |   |
| Input Capacitance                                      | C <sub>iss</sub>    | —    | 1,610 | —    | pF   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                                     | C <sub>oss</sub>    | —    | 157   | —    | pF   |   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —    | 145   | —    | pF   |   |
| Gate Resistance  | R <sub>g</sub>      | —    | 9.45  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz  |
| Total Gate Charge                                      | Q <sub>g</sub>      | —    | 15.4  | —    | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V,<br>I <sub>D</sub> = -4A  |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —    | 2.5   | —    | nC   |   |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —    | 3.3   | —    | nC   |   |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —    | 16.8  | —    | ns   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V,<br>R <sub>L</sub> = 10Ω, R <sub>g</sub> = 6.0Ω, I <sub>D</sub> = -1A |
| Turn-On Rise Time                                      | t <sub>R</sub>      | —    | 12.4  | —    | ns   |   |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —    | 94.1  | —    | ns   |   |
| Turn-Off Fall Time                                     | t <sub>F</sub>      | —    | 42.4  | —    | ns   |   |

- Notes:
7. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  8. Device mounted on FR-4 substrate PC board, 2oz copper, with 25mm X 25mm square copper plate.
  9. Repetitive rating, pulse width limited by junction temperature.
  10. Short duration pulse test used to minimize self-heating effect.
  11. Guaranteed by design. Not subject to product testing.

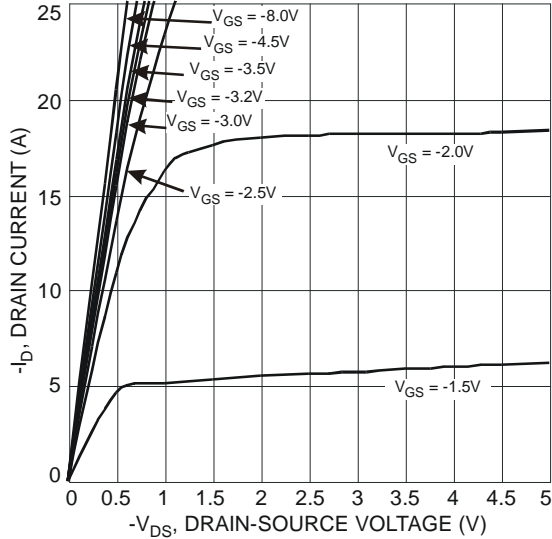


Fig. 1 Typical Output Characteristic

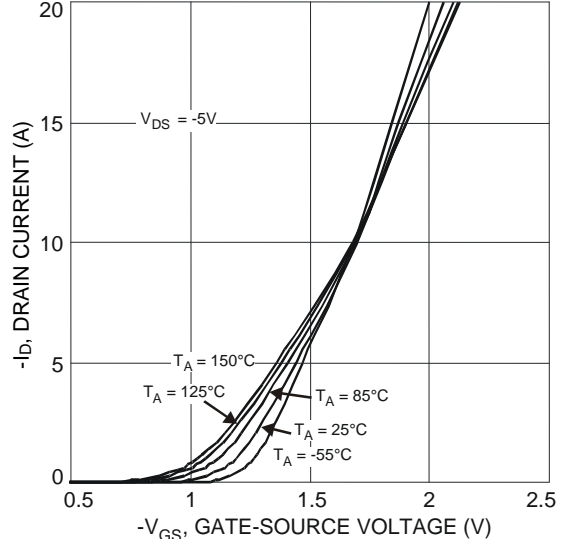


Fig. 2 Typical Transfer Characteristic

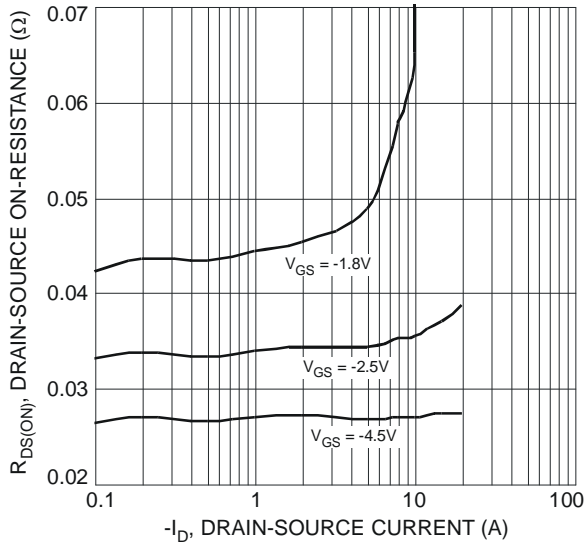


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

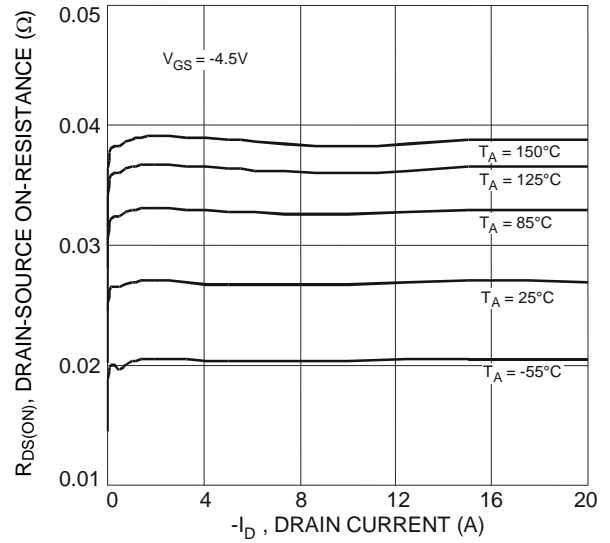


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

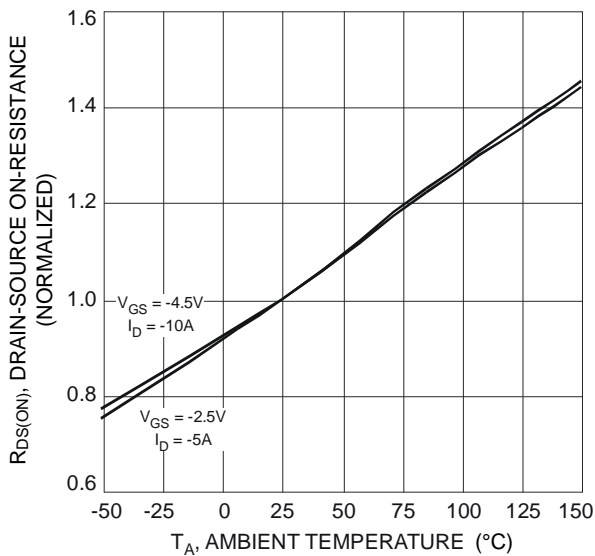


Fig. 5 On-Resistance Variation with Temperature

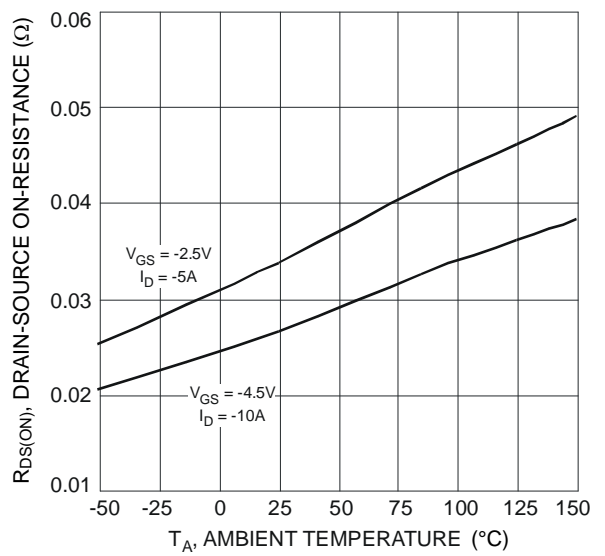


Fig. 6 On-Resistance Variation with Temperature

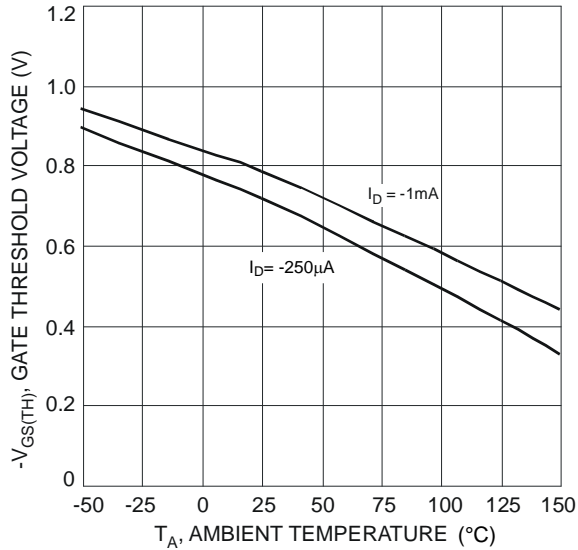


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

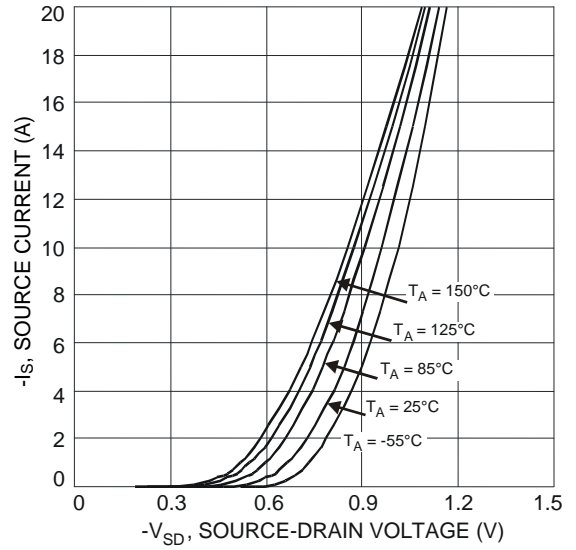


Fig. 8 Diode Forward Voltage vs. Current

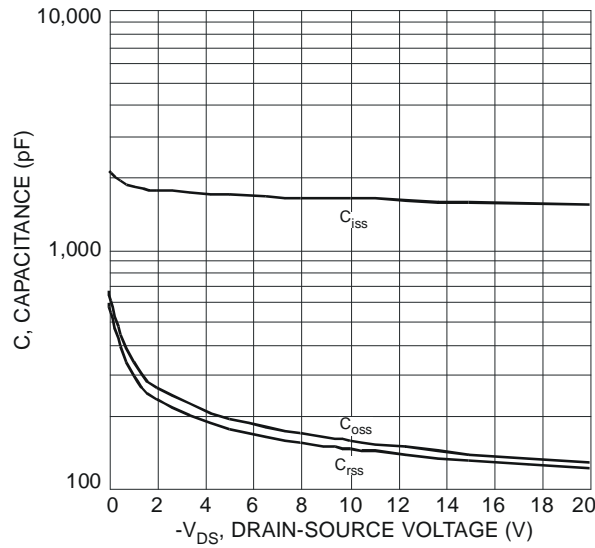


Fig. 9 Typical Total Capacitance

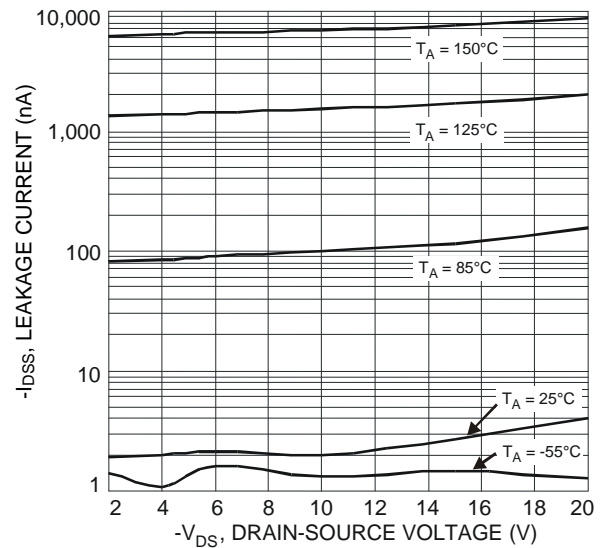


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

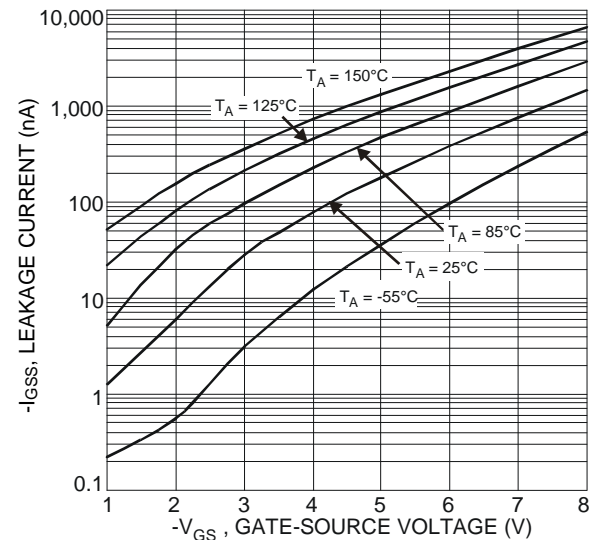


Fig. 11 Gate-Source Leakage Current vs. Voltage

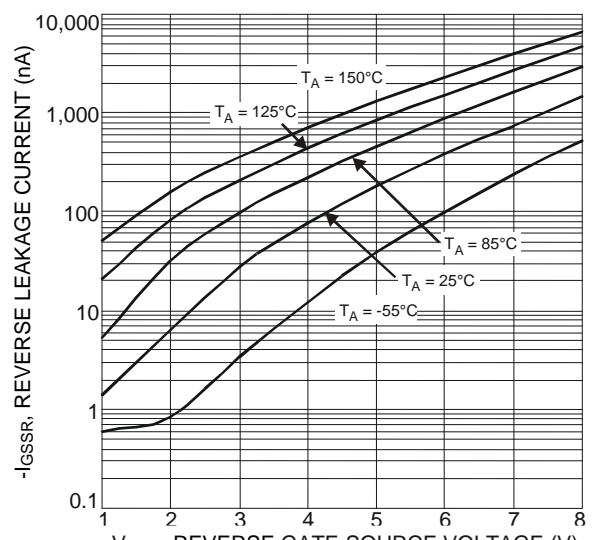
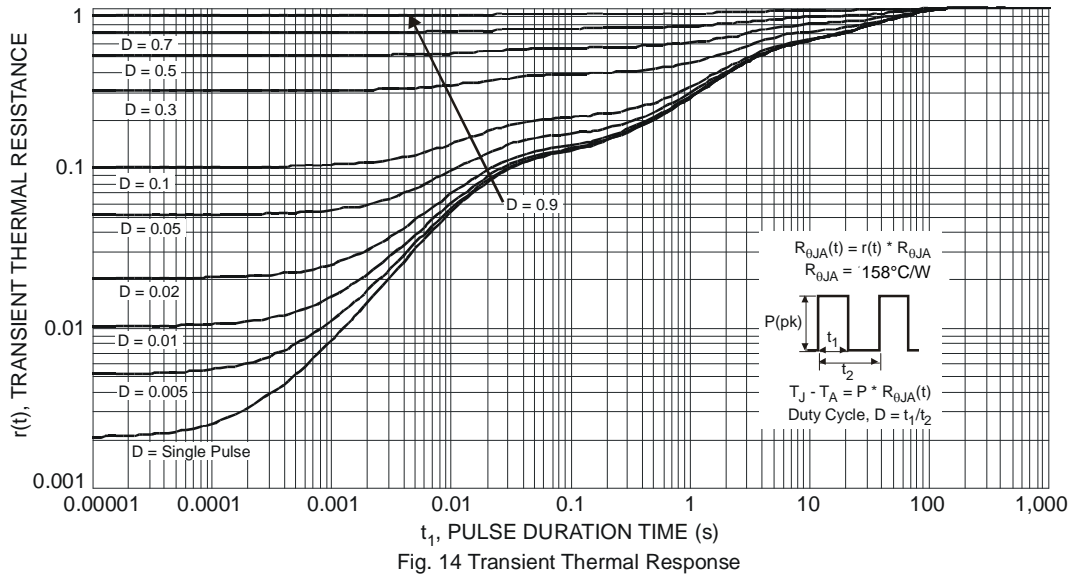
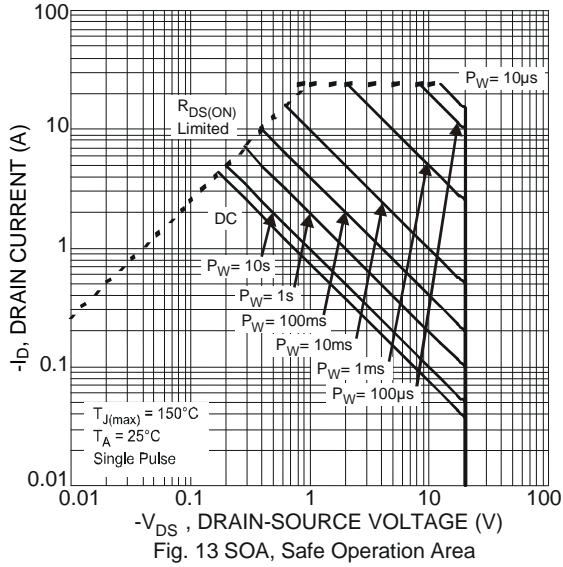


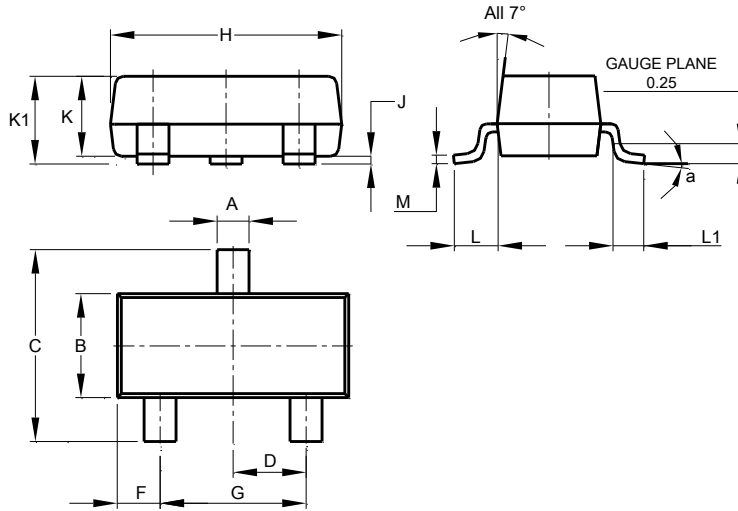
Fig. 12 Reverse Gate-Source Leakage Current vs. Voltage



## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT23

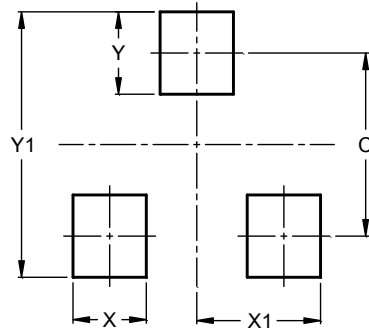


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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