

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$        | $I_D \text{ max}$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------|------------------------------------------------|
| -30V          | 90mΩ @ $V_{GS} = -10\text{V}$   | -3.8A                                          |
|               | 134mΩ @ $V_{GS} = -4.5\text{V}$ | -3.1A                                          |

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

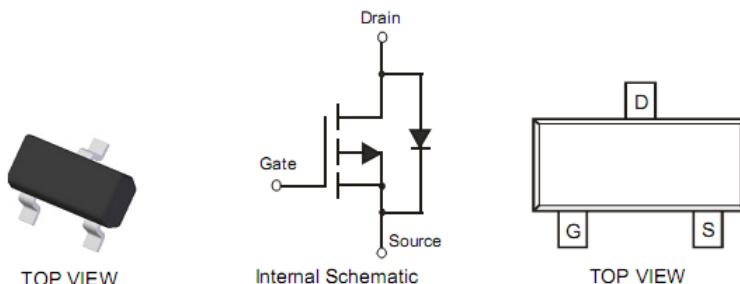
- General Purpose Interfacing Switch
- Power Management Functions
- Load Switch for Portable Devices

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- 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**

## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.08 grams (approximate)

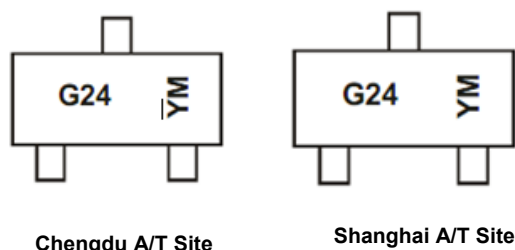


## Ordering Information (Notes 4 & 5)

| Part Number | Compliance | Case   | Packaging       |
|-------------|------------|--------|-----------------|
| DMG2307L-7  | Standard   | SOT-23 | 3000Tape & Reel |
| DMG2307LQ-7 | Automotive | SOT-23 | 3000Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - 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 [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



G24 = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | W    | X    | Y    | Z    | A    | B    | C    | D    | E    | F    |

| 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        | Units |
|-----------------------------------------------------------|--------------|--------------------------------------------------|------------------|--------------|-------|
| Drain-Source Voltage                                      |              |                                                  | V <sub>DSS</sub> | -30          | V     |
| Gate-Source Voltage                                       |              |                                                  | V <sub>GSS</sub> | ±20          | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V  | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -2.5<br>-2.0 | A     |
| Continuous Drain Current (Note 7) V <sub>GS</sub> = -10V  | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -3.8<br>-3.0 | A     |
| Continuous Drain Current (Note 7) V <sub>GS</sub> = -10V  | t ≤ 10sec    | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -4.6<br>-3.6 | A     |
| Continuous Drain Current (Note 7) 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>   | -3.1<br>-2.5 | A     |
| Pulsed Drain Current (Note 7)                             |              |                                                  | I <sub>DM</sub>  | -20          | A     |

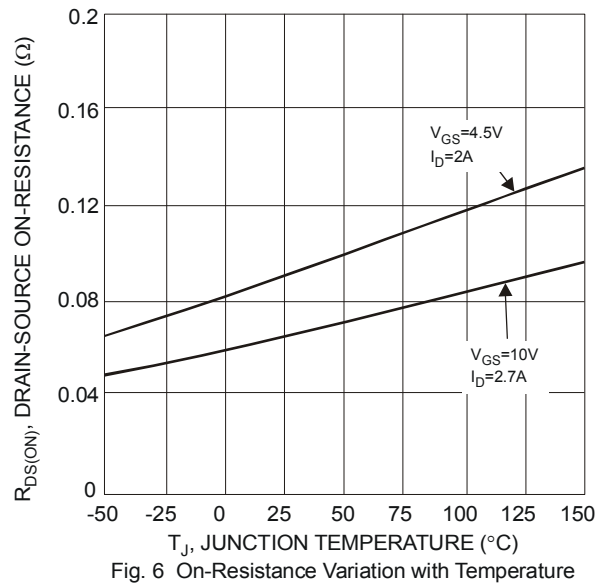
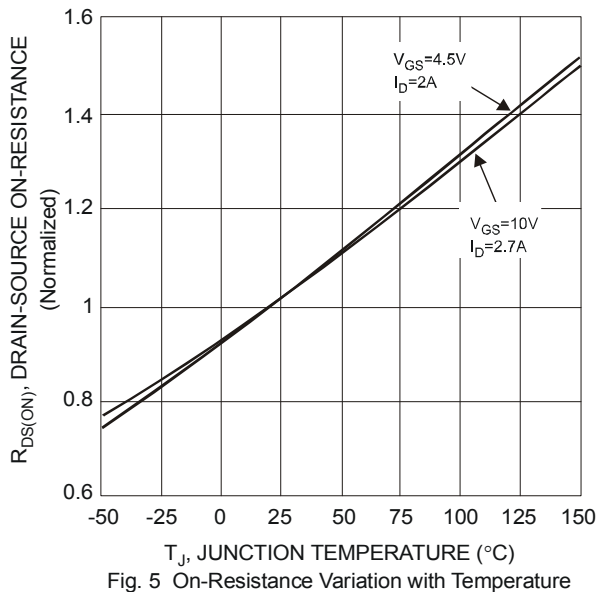
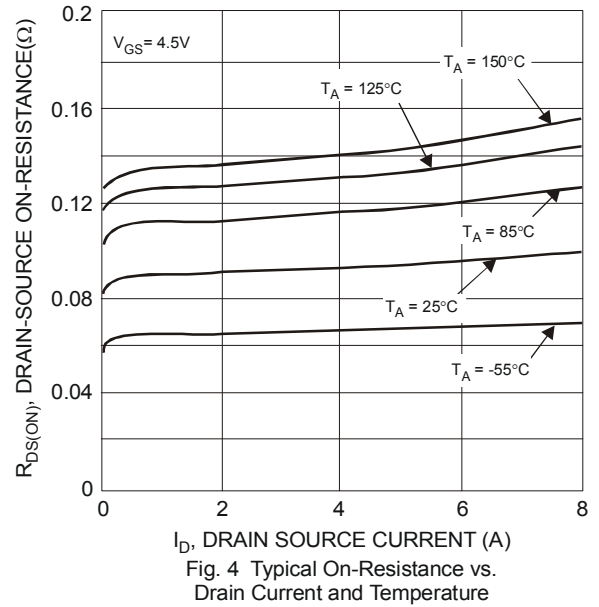
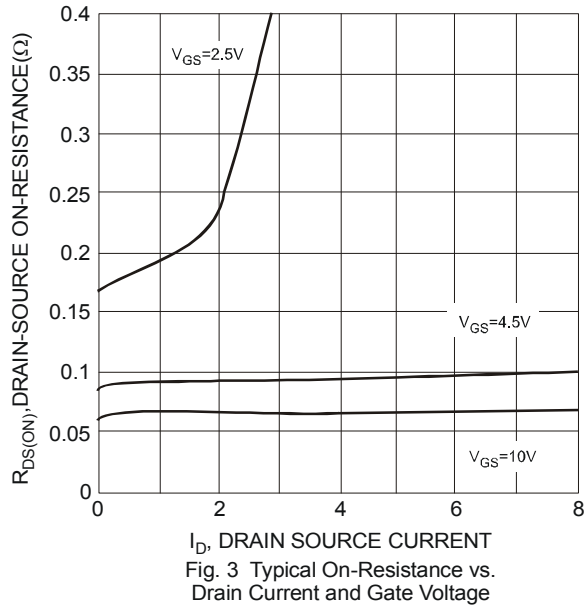
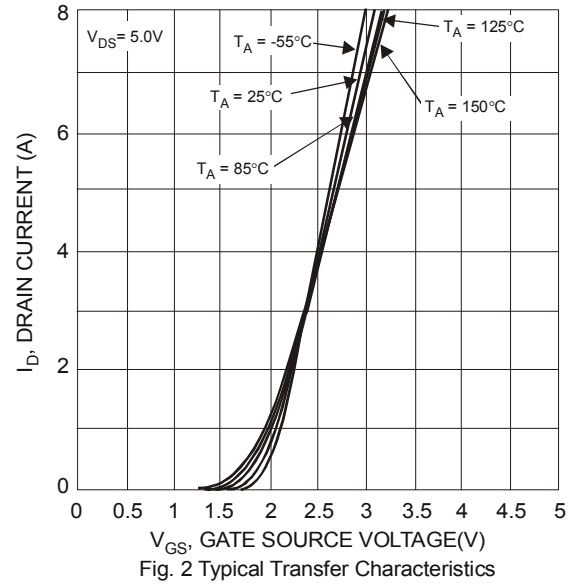
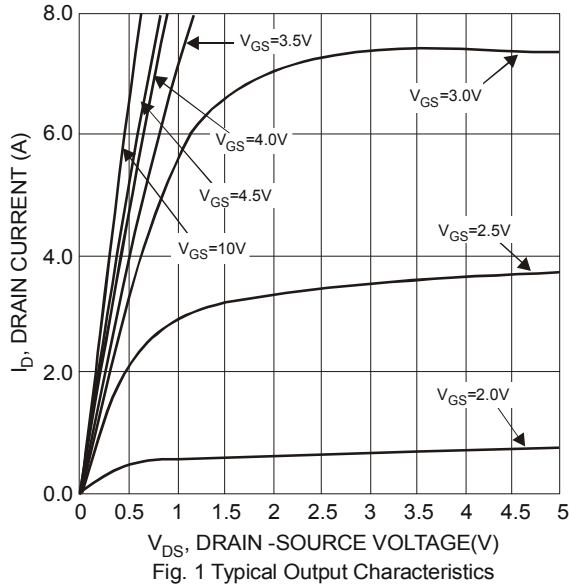
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                             | Symbol                            | Value       | Units |
|------------------------------------------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6)                           | P <sub>D</sub>                    | 0.76        | W     |
| Thermal Resistance, Junction to Ambient (Note 6)           | R <sub>θJA</sub>                  | 159         | °C/W  |
| Total Power Dissipation (Note 7)                           | P <sub>D</sub>                    | 1.36        | W     |
| Thermal Resistance, Junction to Ambient (Note 7)           | R <sub>θJA</sub>                  | 94          | °C/W  |
| Total Power Dissipation (Note 7) t ≤ 10sec                 | P <sub>D</sub>                    | 1.9         | W     |
| Thermal Resistance, Junction to Ambient (Note 7) t ≤ 10sec | R <sub>θJA</sub>                  | 65.8        | °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 8)</b>                     |                     |      |       |      |      |                                                                                                                       |
| Drain-Source Breakdown Voltage                          | BV <sub>DSS</sub>   | -30  | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                                         |
| Zero Gate Voltage Drain Current @T <sub>C</sub> = +25°C | I <sub>DSS</sub>    | —    | —     | -1.0 | μA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V                                                                          |
| Gate-Source Leakage                                     | I <sub>GSS</sub>    | —    | —     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                          |
| <b>ON CHARACTERISTICS (Note 8)</b>                      |                     |      |       |      |      |                                                                                                                       |
| Gate Threshold Voltage                                  | V <sub>GS(th)</sub> | -1.0 | —     | -3.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                                           |
| Static Drain-Source On-Resistance                       | R <sub>DS(on)</sub> | —    | 70    | 90   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.5A                                                                        |
|                                                         |                     | —    | 105   | 134  |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.5A                                                                       |
| Forward Transfer Admittance                             | Y <sub>fs</sub>     | —    | 4.8   | —    | S    | V <sub>DS</sub> = -10V, I <sub>D</sub> = -2.5A                                                                        |
| Diode Forward Voltage (Note 7)                          | V <sub>SD</sub>     | —    | -0.75 | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A                                                                            |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>                 |                     |      |       |      |      |                                                                                                                       |
| Input Capacitance                                       | C <sub>iss</sub>    | —    | 371.3 | —    | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                                           |
| Output Capacitance                                      | C <sub>oss</sub>    | —    | 51.3  | —    | pF   |                                                                                                                       |
| Reverse Transfer Capacitance                            | C <sub>rss</sub>    | —    | 45.9  | —    | pF   |                                                                                                                       |
| Gate Resistance                                         | R <sub>g</sub>      | —    | 17    | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                                                |
| Total Gate Charge (V <sub>GS</sub> = -4.5V)             | Q <sub>g</sub>      | —    | 4.0   | —    | nC   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V,<br>I <sub>D</sub> = -3A                                               |
| Total Gate Charge (V <sub>GS</sub> = -10V)              | Q <sub>g</sub>      | —    | 8.2   | —    | nC   |                                                                                                                       |
| Gate-Source Charge                                      | Q <sub>gs</sub>     | —    | 0.9   | —    | nC   |                                                                                                                       |
| Gate-Drain Charge                                       | Q <sub>gd</sub>     | —    | 1.2   | —    | nC   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V,<br>R <sub>L</sub> = 15Ω, R <sub>G</sub> = 6Ω,<br>I <sub>D</sub> = -1A |
| Turn-On Delay Time                                      | t <sub>D(on)</sub>  | —    | 4.8   | —    | ns   |                                                                                                                       |
| Turn-On Rise Time                                       | t <sub>r</sub>      | —    | 7.3   | —    | ns   |                                                                                                                       |
| Turn-Off Delay Time                                     | t <sub>D(off)</sub> | —    | 22.4  | —    | ns   |                                                                                                                       |
| Turn-Off Fall Time                                      | t <sub>f</sub>      | —    | 13.4  | —    | ns   |                                                                                                                       |

- Notes: 6. Device mounted on FR-4 PCB, with minimum recommended pad layout.  
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.  
8. Short duration pulse test used to minimize self-heating effect.  
9. Guaranteed by design. Not subject to product testing.



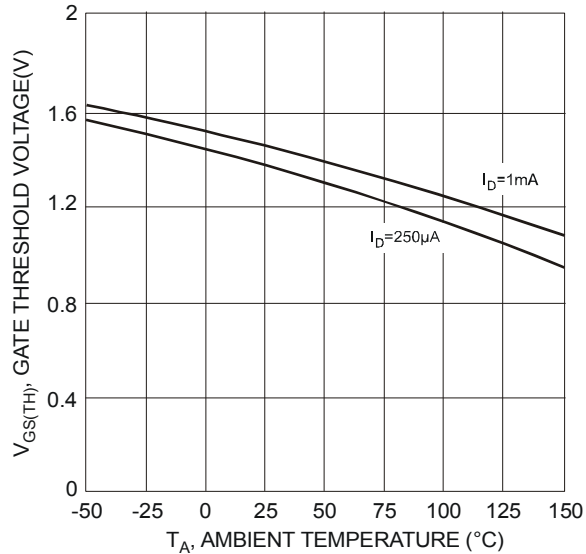


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

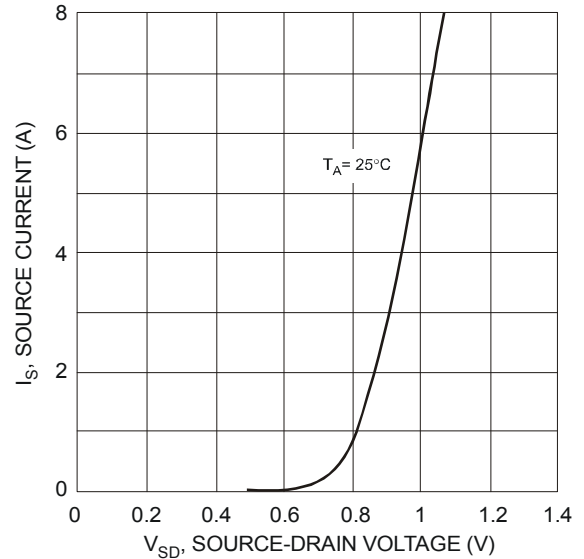


Fig. 8 Diode Forward Voltage vs. Current

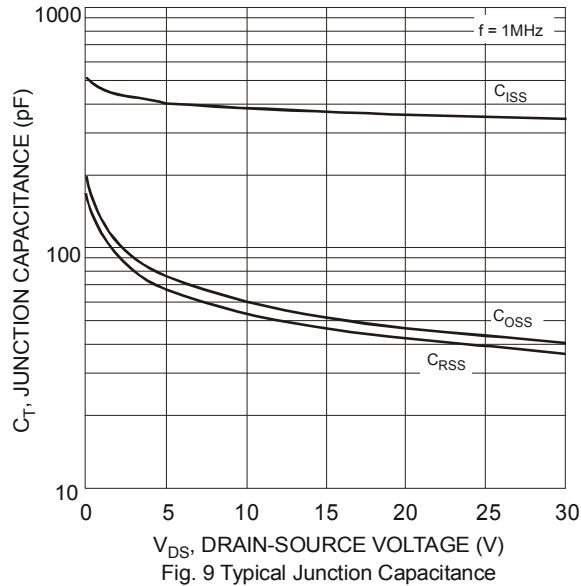


Fig. 9 Typical Junction Capacitance

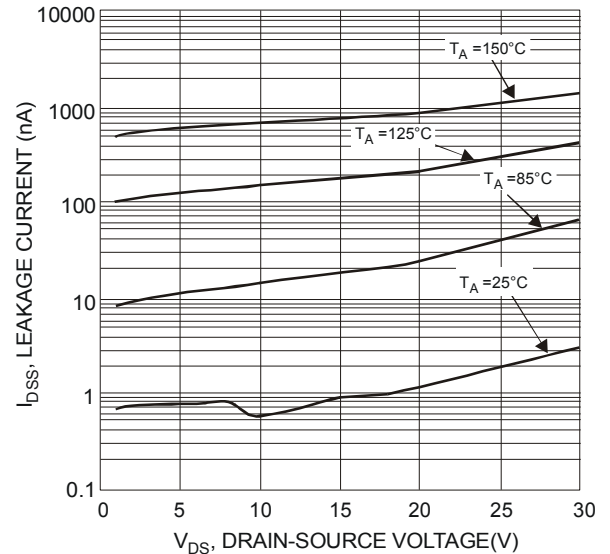


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

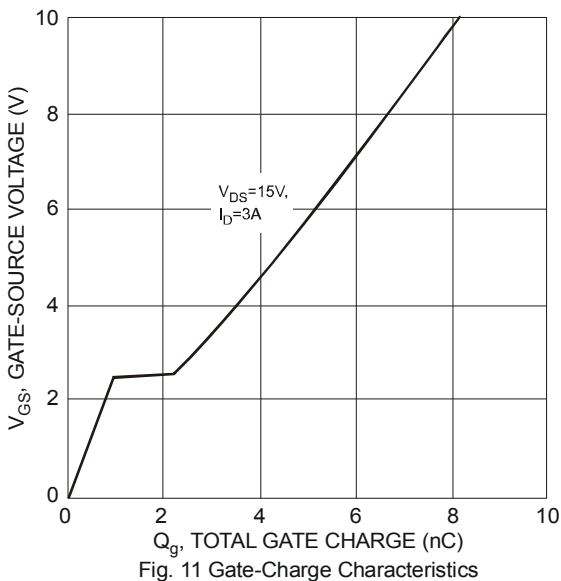


Fig. 11 Gate-Charge Characteristics

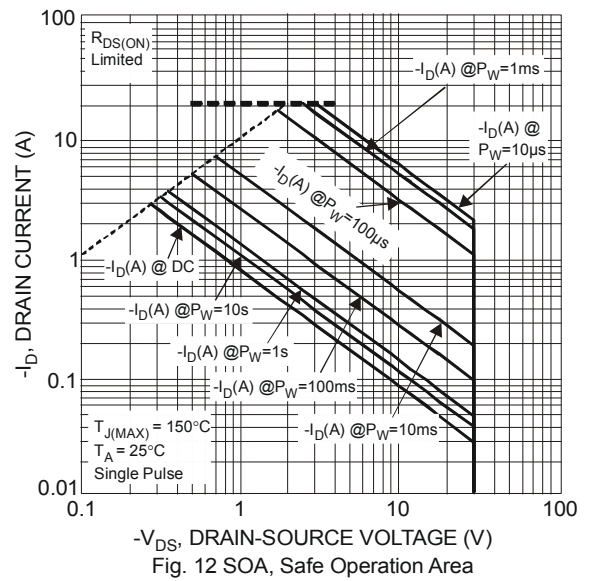
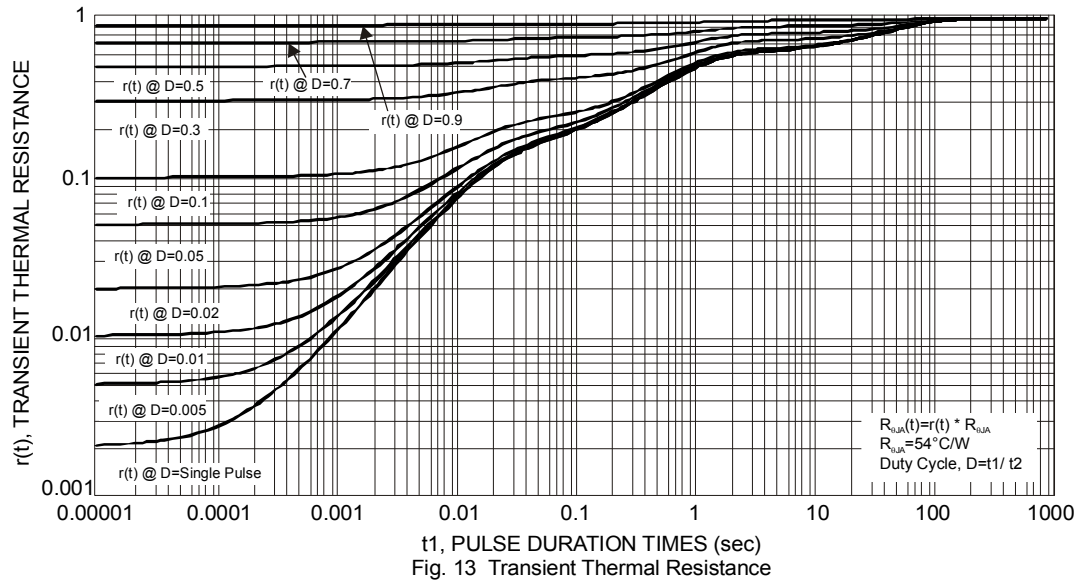
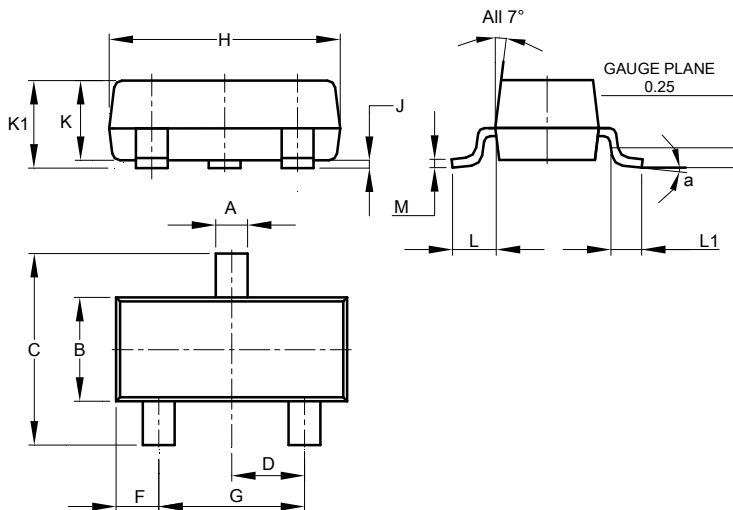


Fig. 12 SOA, Safe Operation Area



## Package Outline Dimensions

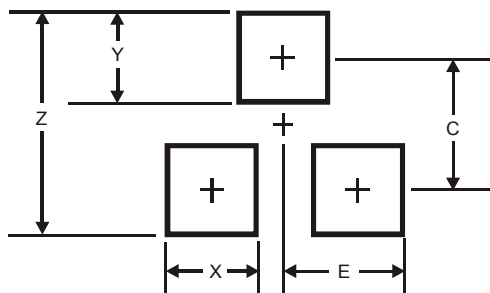
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 |
| α                    | 8°    |       |       |
| All Dimensions in mm |       |       |       |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

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