

Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _A = +25°C |
|-------------------|--------------------------------|--|
| 60V | 85mΩ @ V _{GS} = 10V | 2.5A |
| | 120mΩ @ V _{GS} = 4.5V | 2.0A |

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC Converters
- Power Management Functions
- Backlighting

Features and Benefits

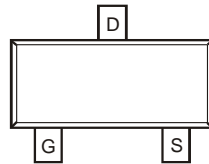
- N MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN6075SQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

Mechanical Data

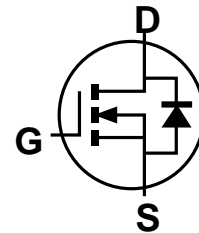
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (B)
- Weight: 0.008 grams (Approximate)



Top View



Top View



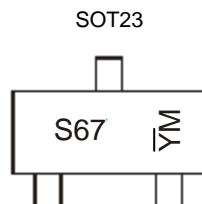
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|-------|-------------------|
| DMN6075SQ-7 | SOT23 | 3000/Tape & Reel |
| DMN6075SQ-13 | SOT23 | 10000/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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



S67 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------|------|------|------|------|------|------|------|------|------|
| Code | G | H | I | J | K | L | M | N | O |

| 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_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit | |
|---|------------------|------------------------|------|---|
| Drain-Source Voltage | V _{DSS} | 60 | V | |
| Gate-Source Voltage | V _{GSS} | ±20 | V | |
| Continuous Drain Current (Note 5) V _{GS} = 10V | Steady State | T _A = +25°C | 2.0 | A |
| | | T _A = +70°C | 1.5 | |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C | 2.5 | A |
| | | T _A = +70°C | 2.0 | |
| Maximum Body Diode Forward Current (Note 5) | I _S | 2.0 | A | |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | I _{DM} | 12 | A | |
| Pulsed Source Current (10µs Pulse, Duty Cycle = 1%) | I _{SM} | 12 | A | |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit | |
|--|-----------------------------------|------------------------|------|---|
| Total Power Dissipation (Note 5) | P _D | T _A = +25°C | 0.8 | W |
| | | T _A = +70°C | 0.5 | |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 157 | °C/W | |
| Total Power Dissipation (Note 6) | P _D | T _A = +25°C | 1.15 | W |
| | | T _A = +70°C | 0.7 | |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 110 | °C/W | |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C | |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|------|------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 1.0 | µA | V _{DS} = 60V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | — | 3 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 69 | 85 | mΩ | V _{GS} = 10V, I _D = 3.2A |
| | | — | 75 | 120 | | V _{GS} = 4.5V, I _D = 2.8A |
| Diode Forward Voltage | V _{SD} | — | 0.8 | 1.2 | V | V _{GS} = 0V, I _S = 2.5A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 606 | — | pF | V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 32.6 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 24.6 | — | pF | |
| Gate Resistance | R _g | — | 1.5 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 12.3 | — | nC | V _{DS} = 30V, I _D = 3A |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 5.6 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 1.7 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 1.9 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 3.5 | — | ns | V _{GS} = 10V, V _{DS} = 30V, R _g = 20Ω, R _L = 50Ω |
| Turn-On Rise Time | t _R | — | 4.1 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 35 | — | ns | |
| Turn-Off Fall Time | t _F | — | 11 | — | ns | |

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

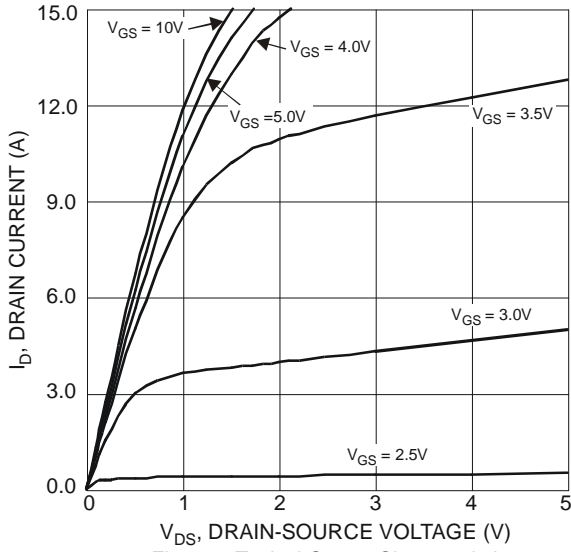


Figure 1 Typical Output Characteristics

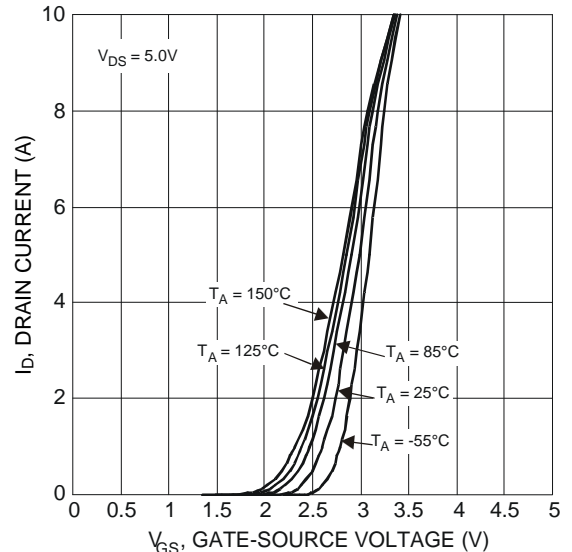


Figure 2 Typical Transfer Characteristics

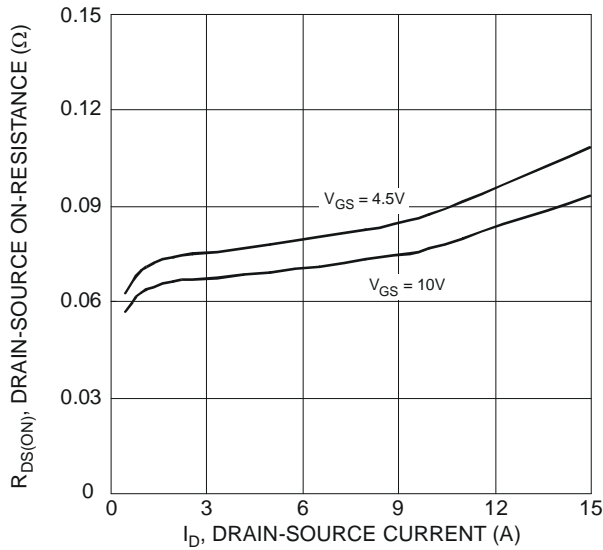


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

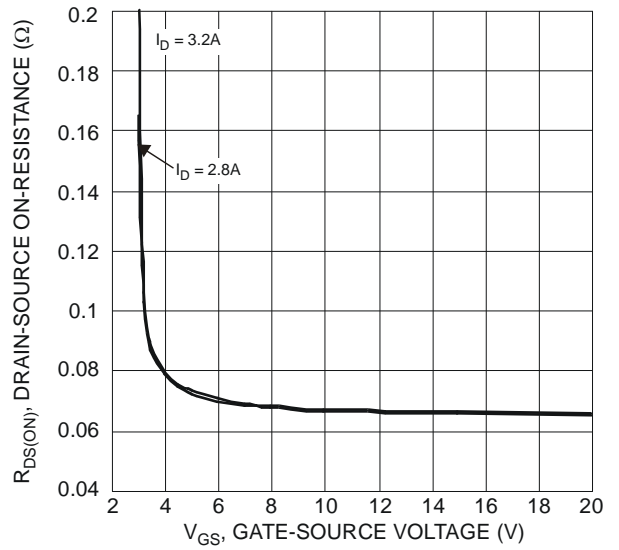


Figure 4 Typical Transfer Characteristics

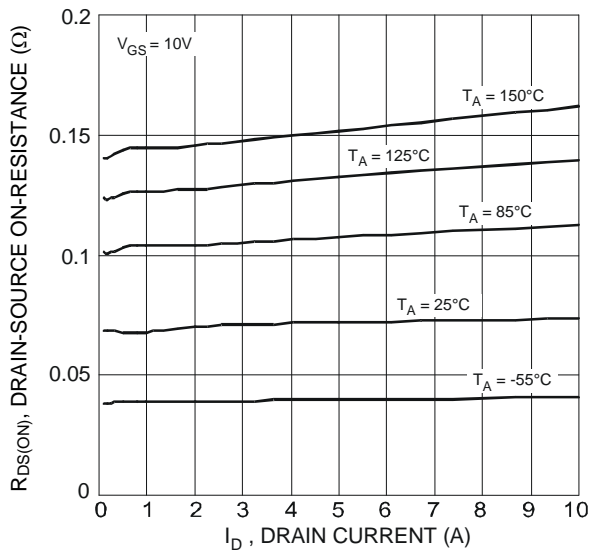


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

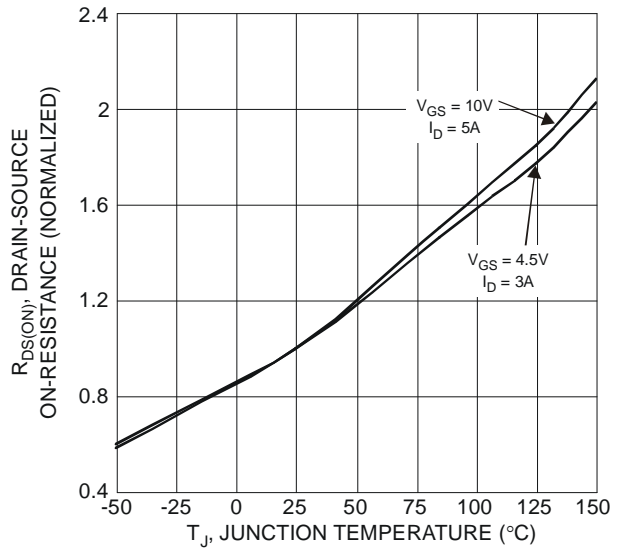


Figure 6 On-Resistance Variation with Temperature

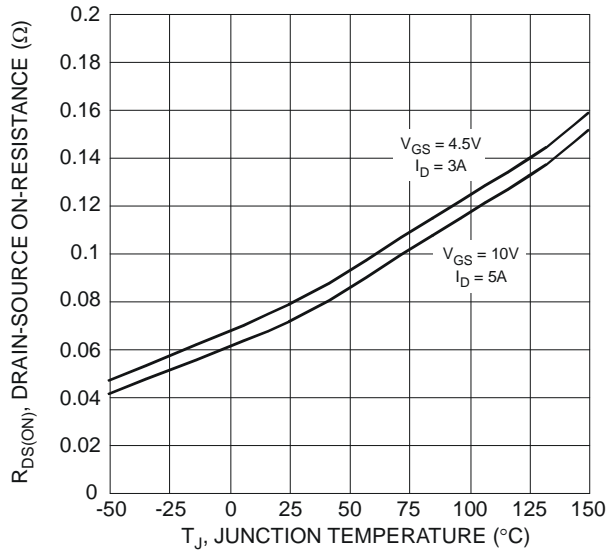


Figure 7 On-Resistance Variation with Temperature

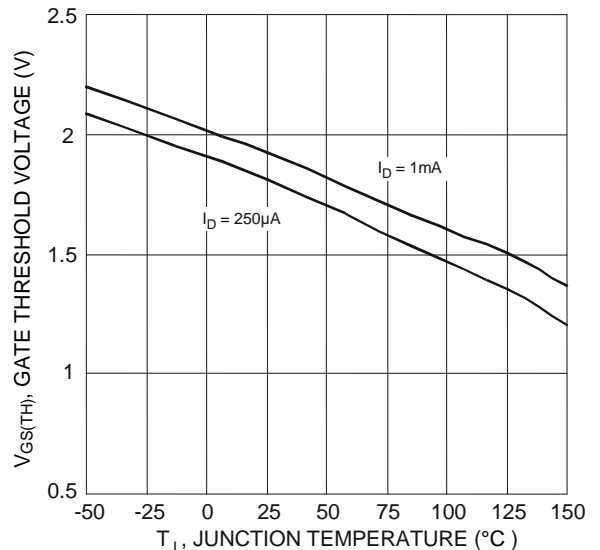


Figure 8 Gate Threshold Variation vs. Junction Temperature

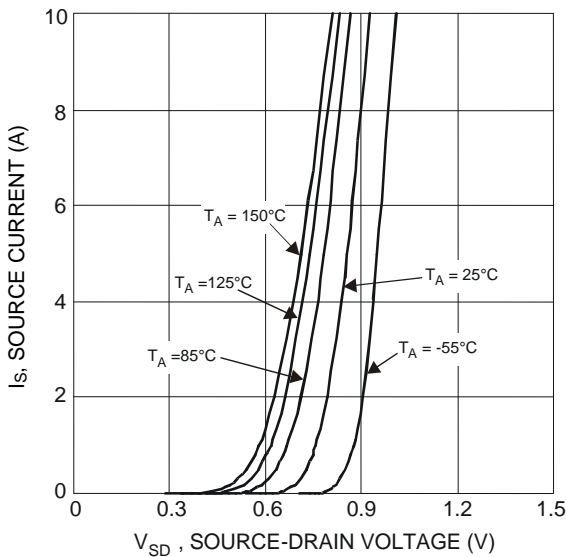


Figure 9 Diode Forward Voltage vs. Current

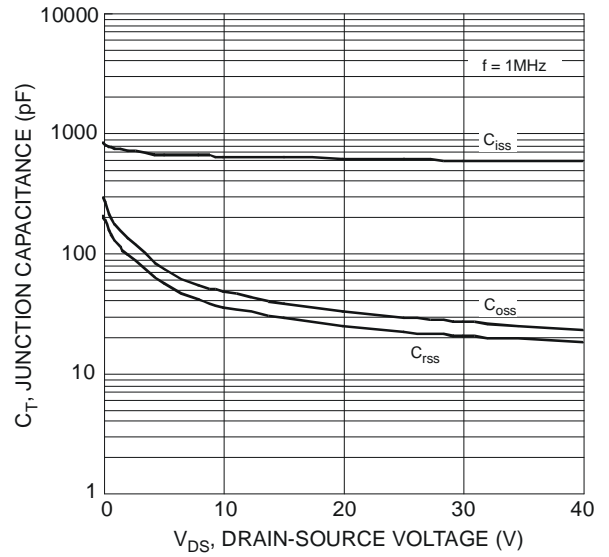


Figure 10 Typical Junction Capacitance

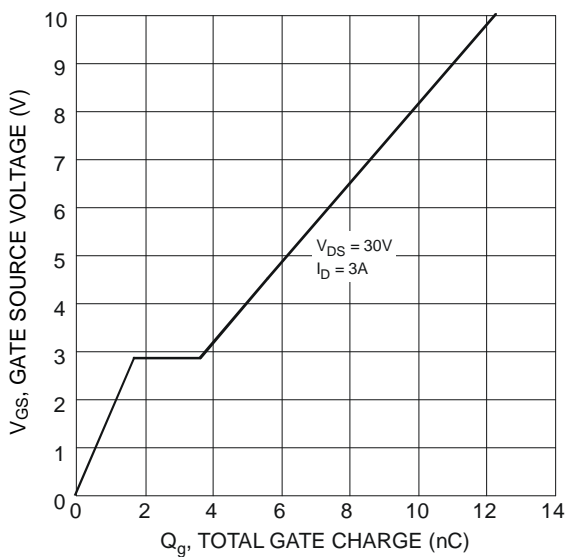


Figure 11 Gate Charge

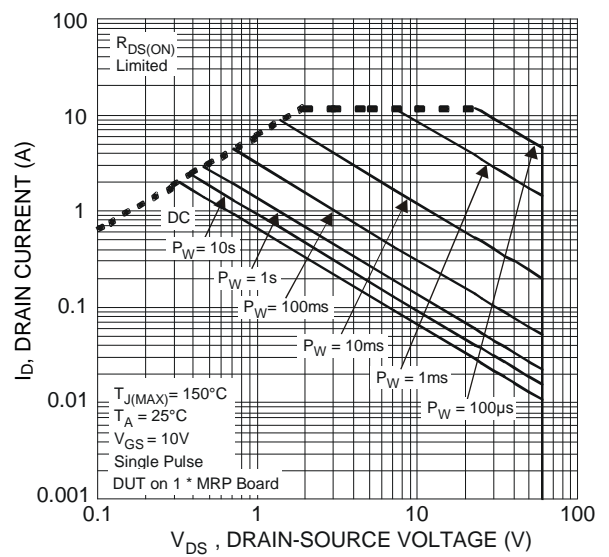
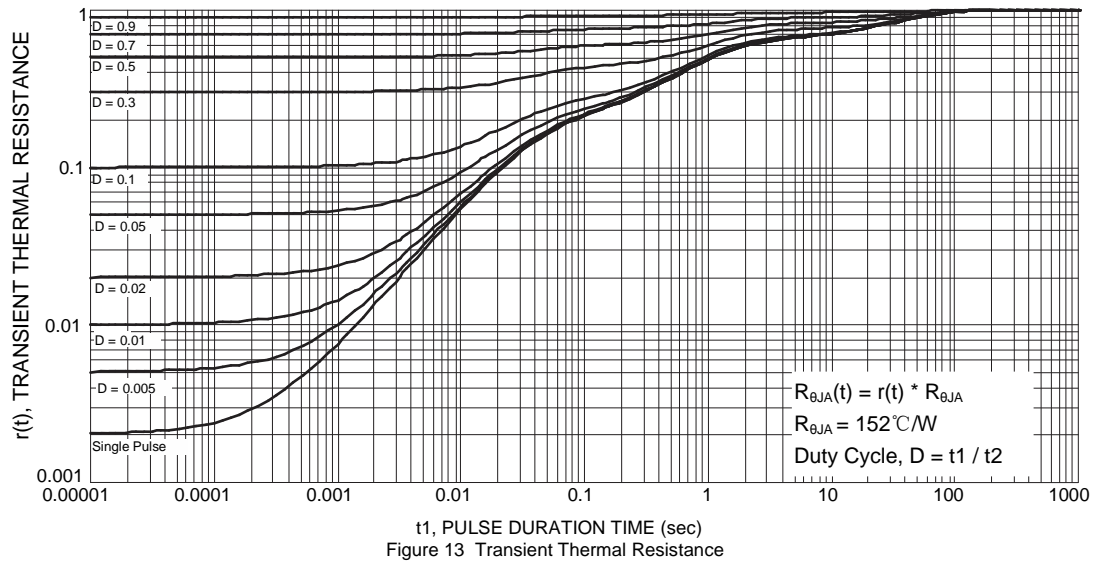


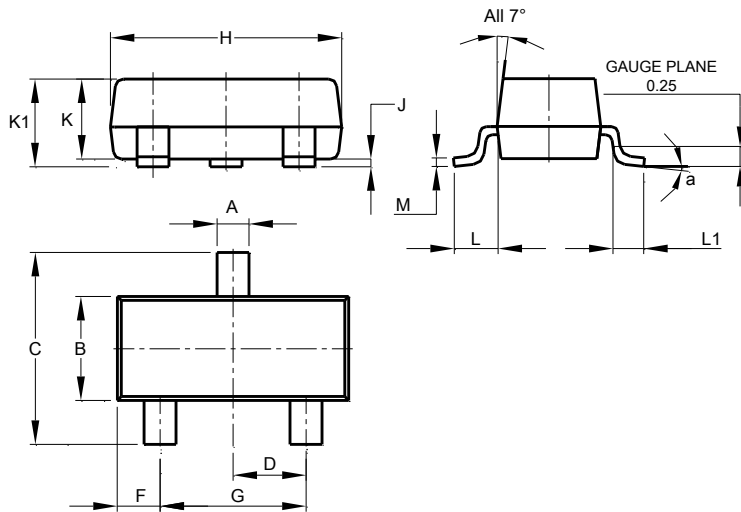
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23

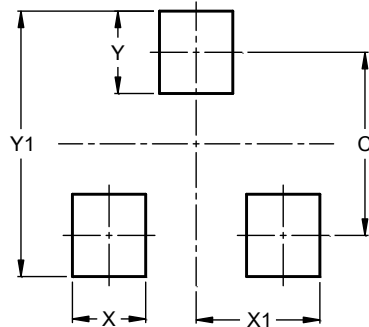


| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 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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