## 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

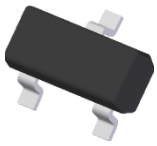
## Features and Benefits

- 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.**

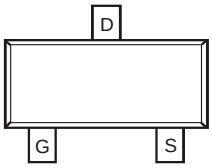
## Mechanical Data

- 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 e3
- Weight: 0.008 grams (Approximate)

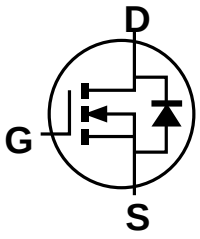
SOT23



Top View




Top View




Equivalent Circuit

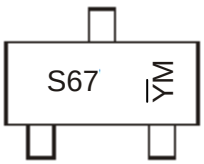
## Ordering Information (Note 4)

| 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

SOT23




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 | $I_D$ | 2.0 | A |
| | | $T_A$ = +70°C | | 1.5 | |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C | $I_D$ | 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) | $T_A$ = +25°C | $P_D$ | 0.8 | W |
| | $T_A$ = +70°C | | 0.5 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 157 | °C/W |
| Total Power Dissipation (Note 6) | $T_A$ = +25°C | $P_D$ | 1.15 | W |
| | $T_A$ = +70°C | | 0.7 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 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.

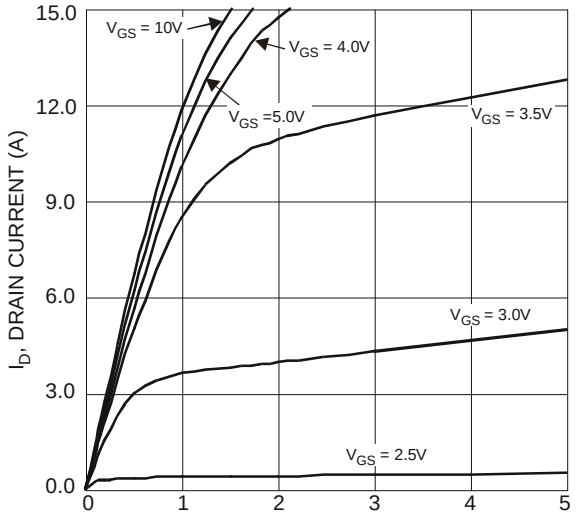



Figure 1 Typical Output Characteristics

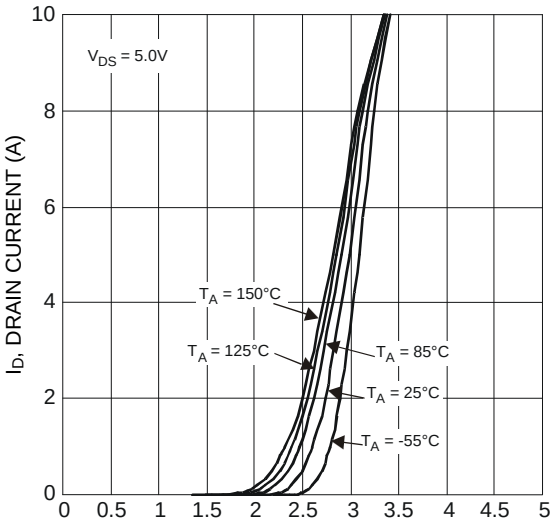



Figure 2 Typical Transfer Characteristics

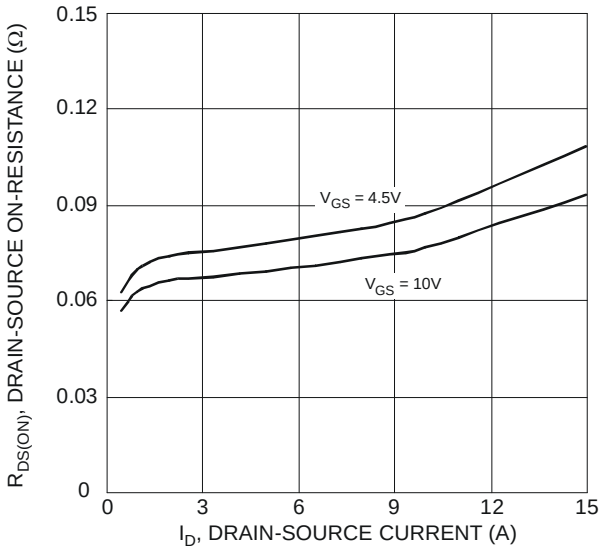



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

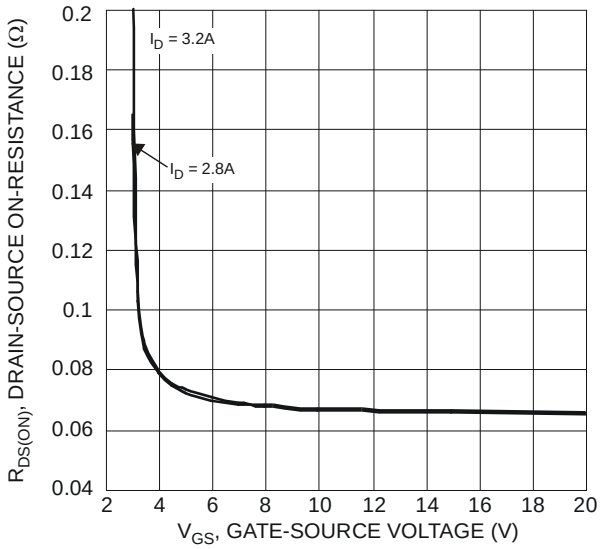



Figure 4 Typical Transfer Characteristics

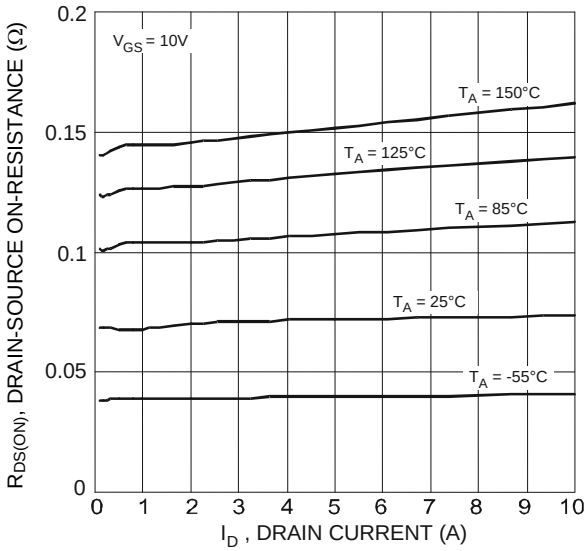



Figure 5 Typical On-Resistance vs. Drain Current and Temperature

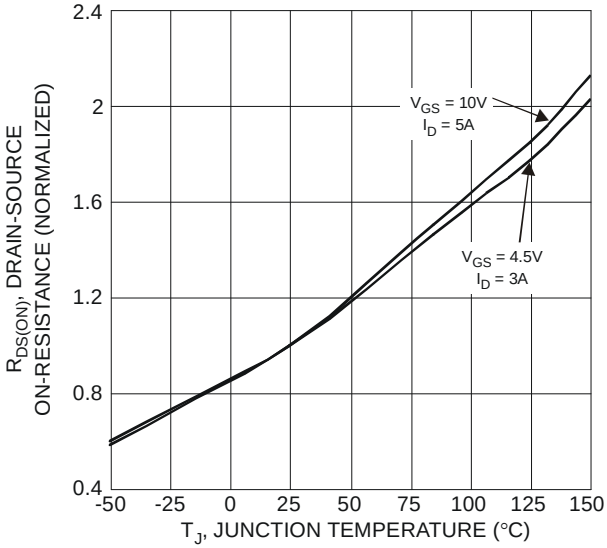



Figure 6 On-Resistance Variation with Temperature

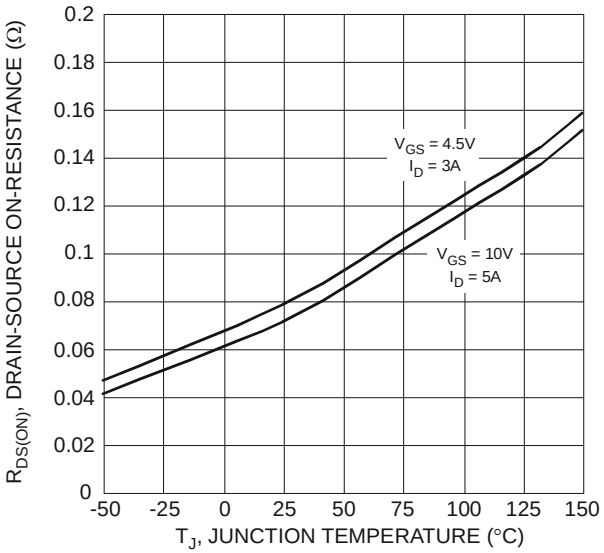



Figure 7 On-Resistance Variation with Temperature

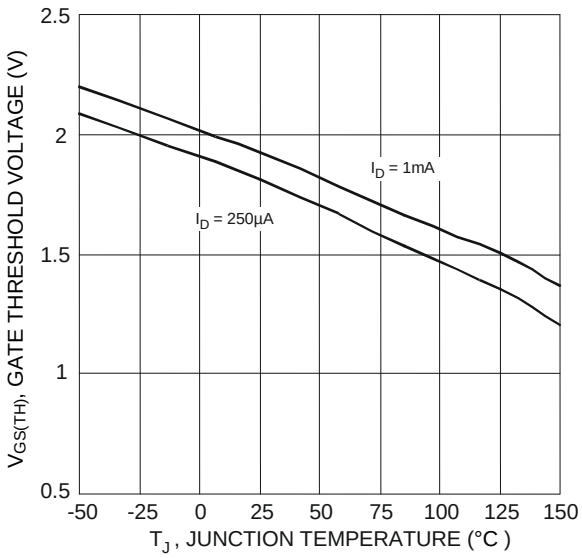



Figure 8 Gate Threshold Variation vs. Junction Temperature

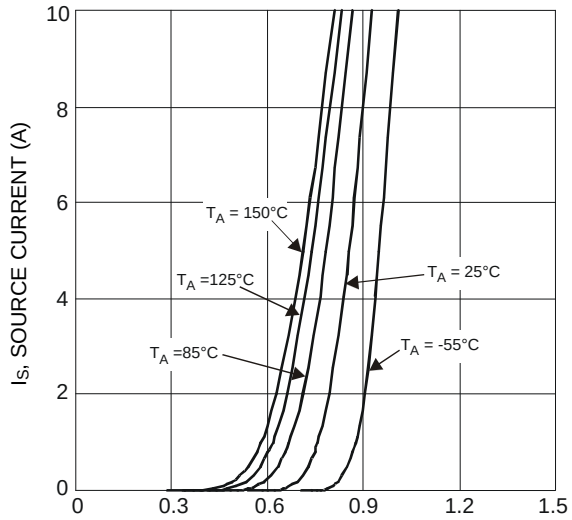



Figure 9 Diode Forward Voltage vs. Current

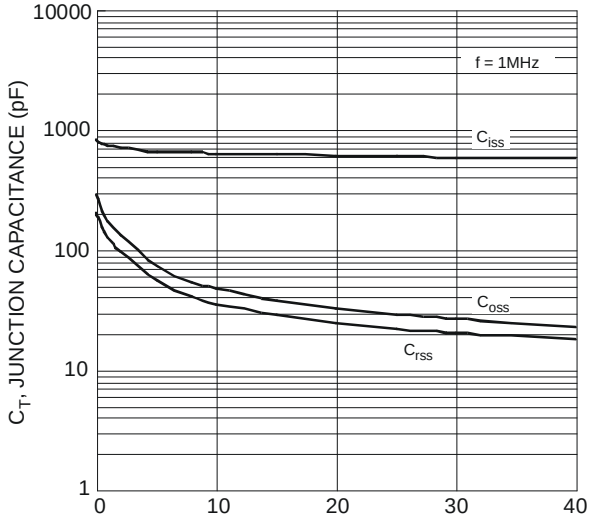



Figure 10 Typical Junction Capacitance

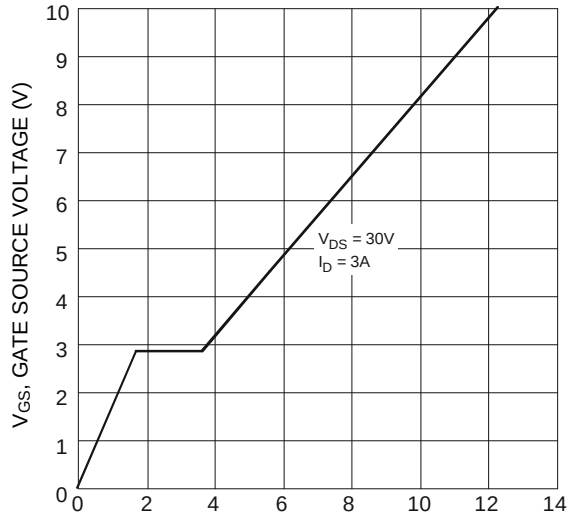



Figure 11 Gate Charge

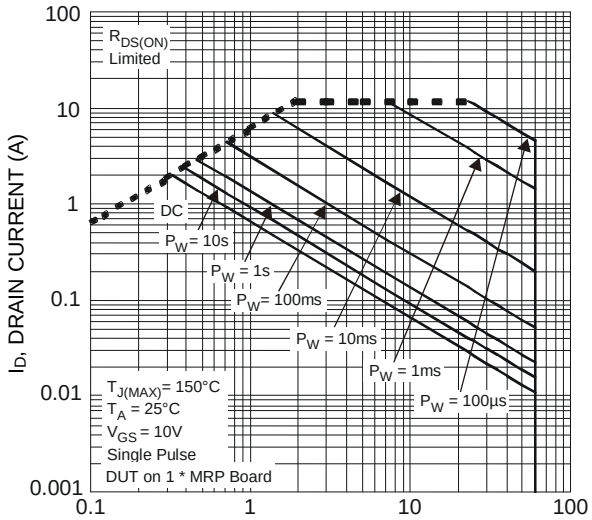



Figure 12 SOA, Safe Operation Area

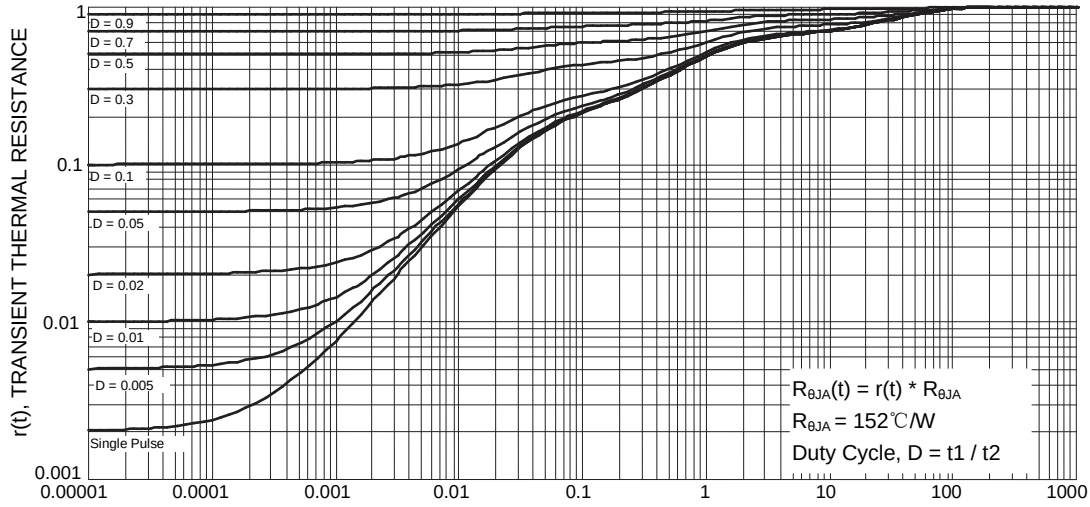
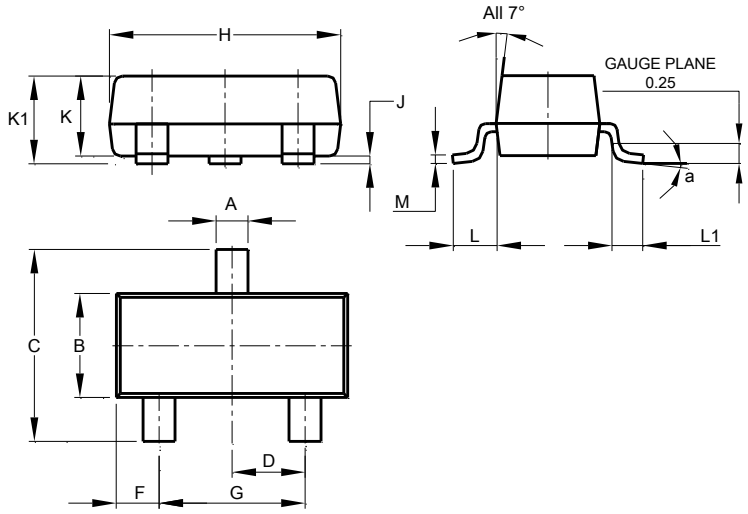



Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

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

**SOT23**

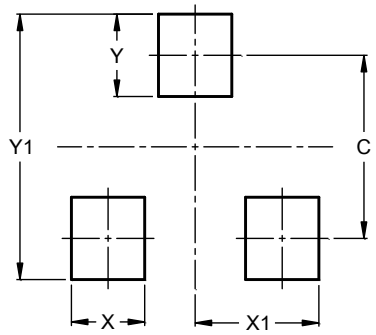



| SOT23 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.37 | 0.51 | 0.40 |
| **B** | 1.20 | 1.40 | 1.30 |
| **C** | 2.30 | 2.50 | 2.40 |
| **D** | 0.89 | 1.03 | 0.915 |
| **F** | 0.45 | 0.60 | 0.535 |
| **G** | 1.78 | 2.05 | 1.83 |
| **H** | 2.80 | 3.00 | 2.90 |
| **J** | 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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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