

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$ | $I_D \text{ max}$ $T_A = 25^\circ\text{C}$ |
|---------------|--------------------------------|---|
| 20V | 56mΩ @ $V_{GS} = 4.5\text{V}$ | 2.8A |
| | 65mΩ @ $V_{GS} = 2.5\text{V}$ | 2.6A |
| | 93mΩ @ $V_{GS} = 1.8\text{V}$ | 2.2A |
| | 140mΩ @ $V_{GS} = 1.5\text{V}$ | 1.8A |

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.

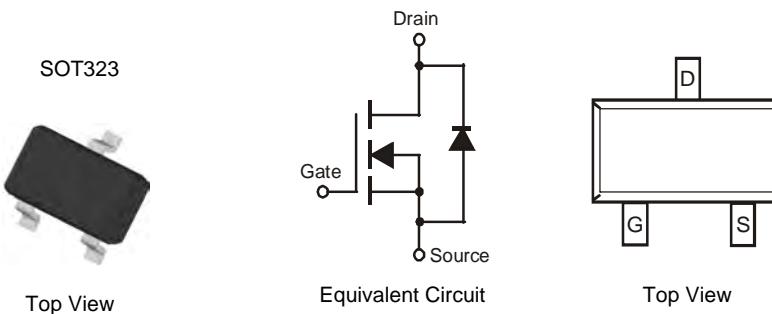
- General Purpose Interfacing Switch
- Power Management Functions
- DC-DC Converters
- Analog Switch

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Lead Free By Design/RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 standards for High Reliability

Mechanical Data

- Case: SOT323
- 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 Alloy42 leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.027 grams (approximate)



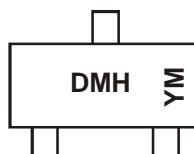
Ordering Information (Note 3)

| Part Number | Case | Packaging |
|-------------|--------|------------------|
| DMN2065UW-7 | SOT323 | 3000/Tape & Reel |

Notes:

1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



DMH = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|------|------|------|------|
| Code | Y | Z | A | B | C | D | E |
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul |
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Month | Aug | Sep | Oct | Nov | Dec | | |
| Code | 8 | 9 | O | N | D | | |

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|--|------------------|--|-----------|------------|-------|
| Drain-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 12 | V |
| Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$ | Steady State | $T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$ | I_D | 2.8 2.3 | A |
| | $t < 10\text{s}$ | $T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$ | I_D | 3.1 2.6 | A |
| Continuous Drain Current (Note 5) $V_{GS} = 1.8\text{V}$ | Steady State | $T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$ | I_D | 2.2 1.7 | A |
| | $t < 10\text{s}$ | $T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$ | I_D | 2.4 1.9 | A |
| Pulsed Drain Current (10us pulse, duty cycle=1%) | | | I_{DM} | 30 | A |
| Maximum Body Diode Forward Current (Note 4) | | | I_S | 1.2 | A |

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

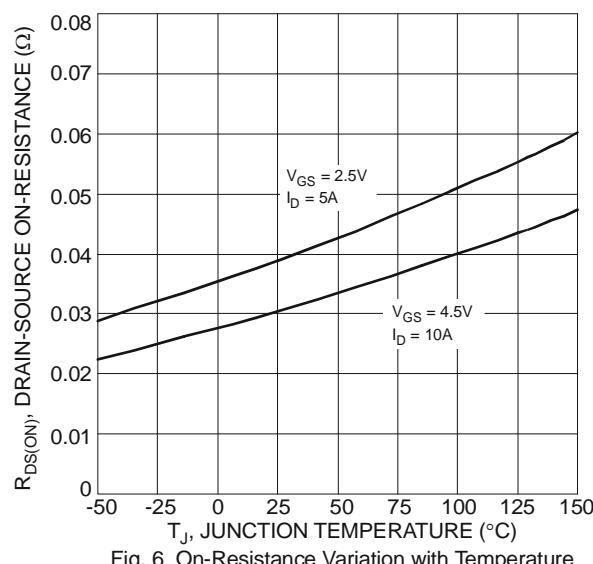
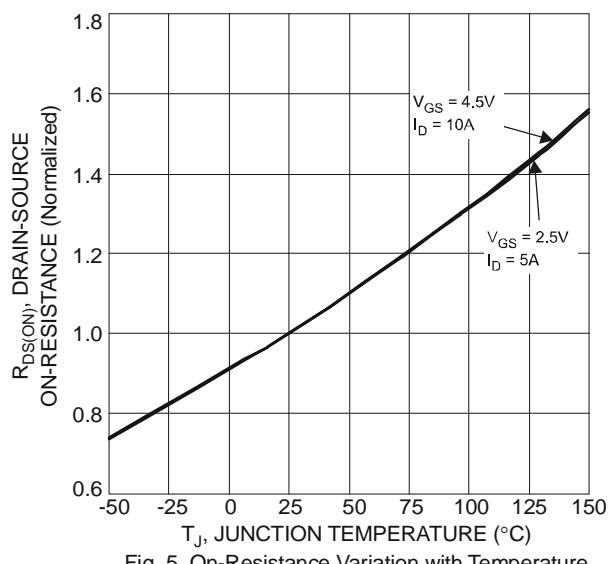
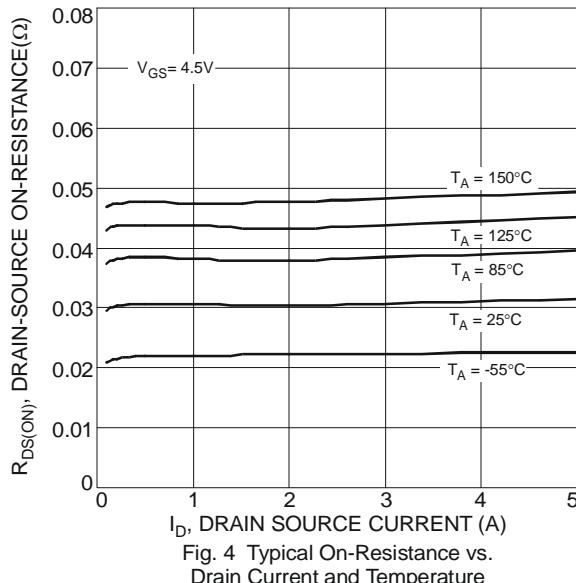
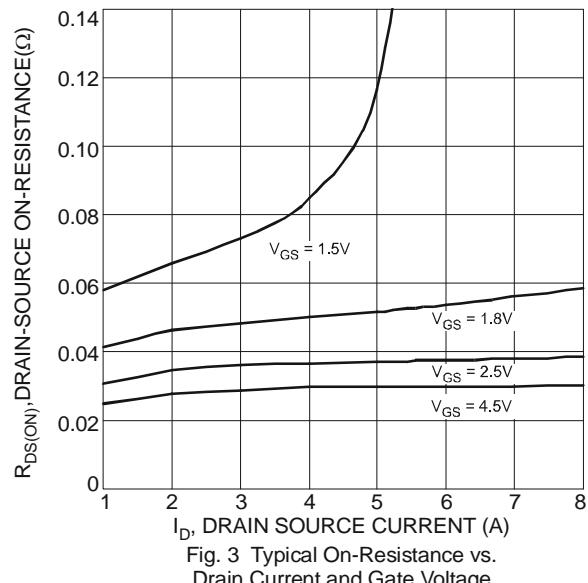
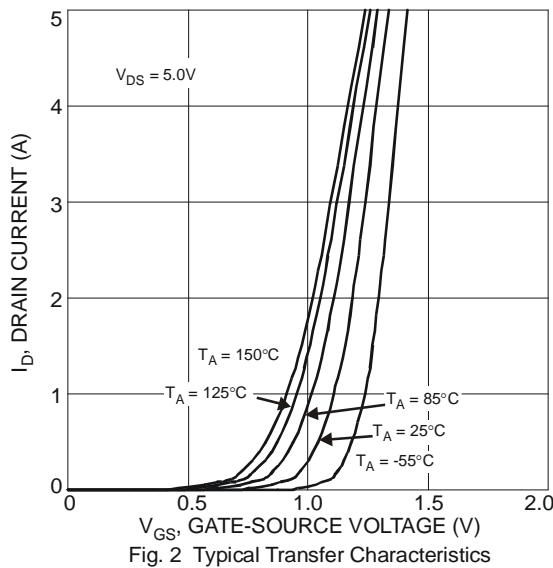
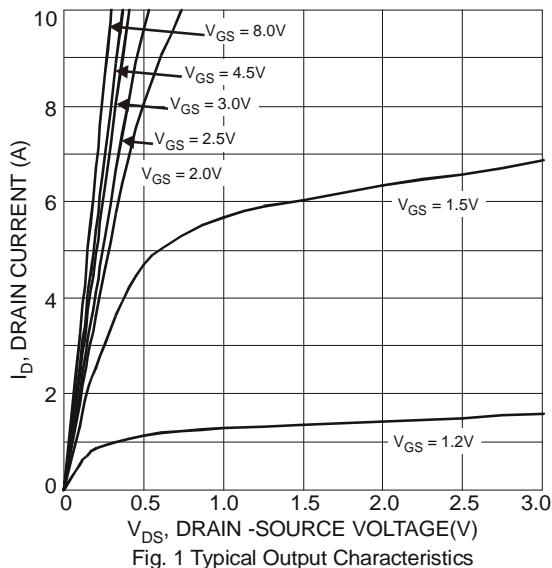
| Characteristic | | | Symbol | Value | Units |
|--|------------------|--|-----------------|-------------|---------------------------|
| Total Power Dissipation (Note 4) | | | P_D | 0.43 | W |
| Thermal Resistance, Junction to Ambient (Note 4) | Steady state | | $R_{\theta JA}$ | 296 | $^\circ\text{C}/\text{W}$ |
| | $t < 10\text{s}$ | | | 252 | $^\circ\text{C}/\text{W}$ |
| Total Power Dissipation (Note 5) | | | P_D | 0.7 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | | $R_{\theta JA}$ | 178 | $^\circ\text{C}/\text{W}$ |
| | $t < 10\text{s}$ | | | 151 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|------|-------|---------|------------------|--|
| OFF CHARACTERISTICS (Note 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | - | - | V | $V_{GS} = 0\text{V}, I_D = 1\text{mA}$ |
| Zero Gate Voltage Drain Current @ $T_c = 25^\circ\text{C}$ | I_{DSS} | - | - | 1 | μA | $V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 1 | μA | $V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.35 | - | 1.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(\text{ON})}$ | - | 52 | 56 | $\text{m}\Omega$ | $V_{GS} = 4.5\text{V}, I_D = 2\text{A}$ |
| | | - | 59 | 65 | | $V_{GS} = 2.5\text{V}, I_D = 2\text{A}$ |
| | | - | 60 | 93 | | $V_{GS} = 1.8\text{V}, I_D = 1\text{A}$ |
| | | - | 75 | 140 | | $V_{GS} = 1.5\text{V}, I_D = 0.5\text{A}$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 7 | - | S | $V_{DS} = 5\text{V}, I_D = 3.8\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | 0.7 | 1.0 | V | $V_{GS} = 0\text{V}, I_S = 1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 7) | | | | | | |
| Input Capacitance | C_{iss} | - | 400.0 | - | pF | $V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 73.8 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 65.6 | - | pF | |
| Total Gate Charge | Q_g | - | 5.4 | - | nC | $V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 6\text{A}$ |
| Gate-Source Charge | Q_{gs} | - | 0.7 | - | nC | |
| Gate-Drain Charge | Q_{gd} | - | 1.4 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 3.5 | - | ns | $V_{DD} = 10\text{V}, V_{GS} = 5\text{V}, R_L = 1.7\Omega, R_G = 6\Omega,$ |
| Turn-On Rise Time | t_r | - | 9.7 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 23.8 | - | ns | |
| Turn-Off Fall Time | t_f | - | 7.2 | - | ns | |

Notes:

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



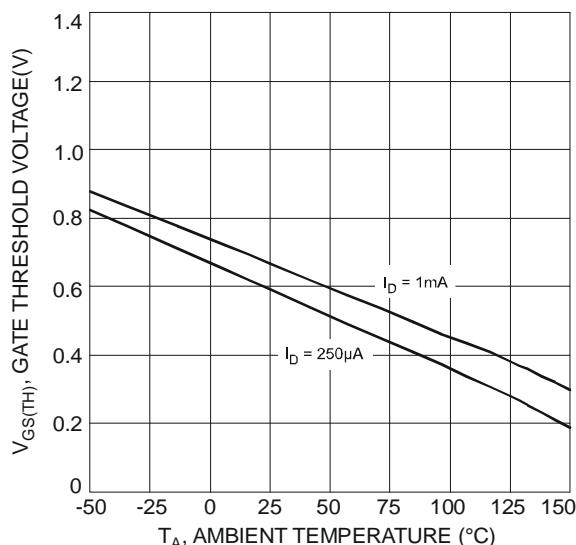


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

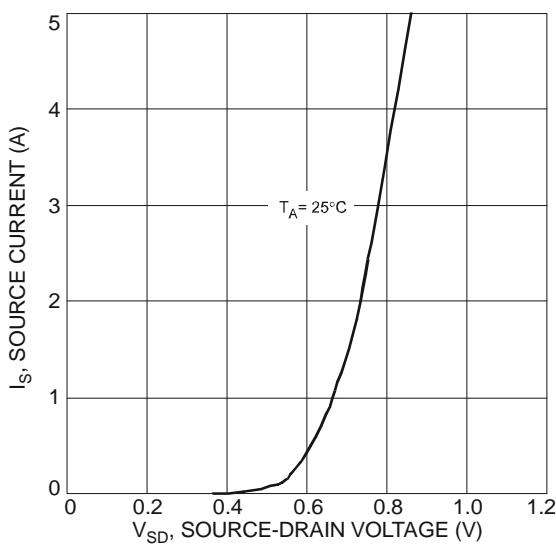


Fig. 8 Diode Forward Voltage vs. Current

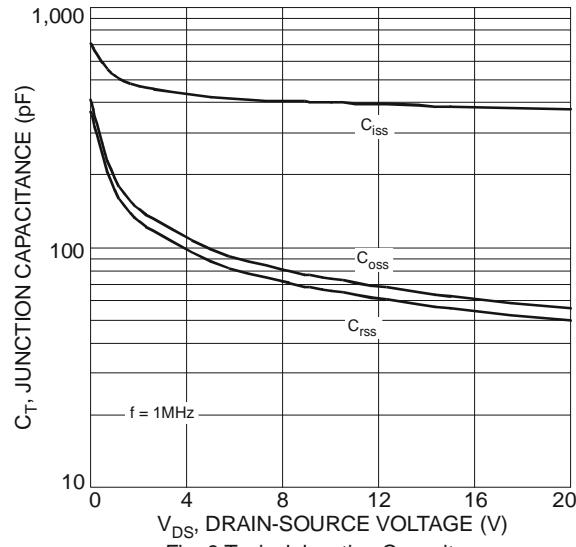


Fig. 9 Typical Junction Capacitance

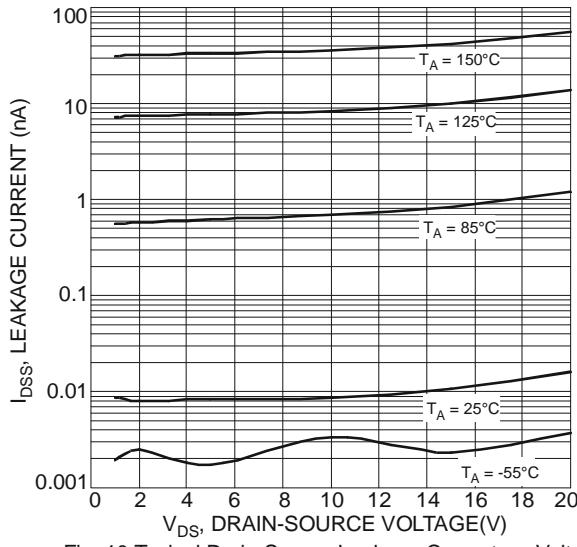


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

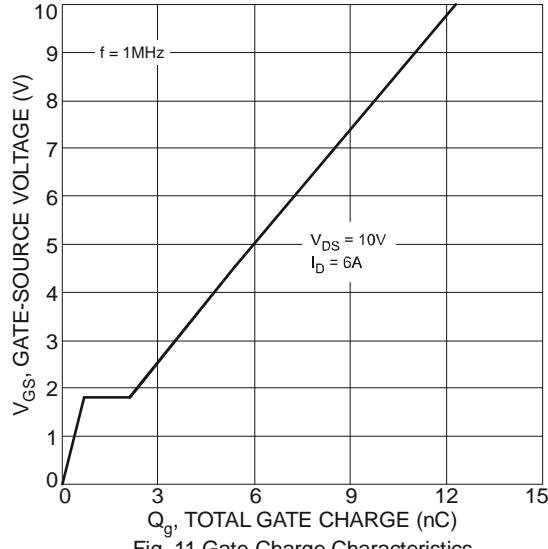


Fig. 11 Gate-Charge Characteristics

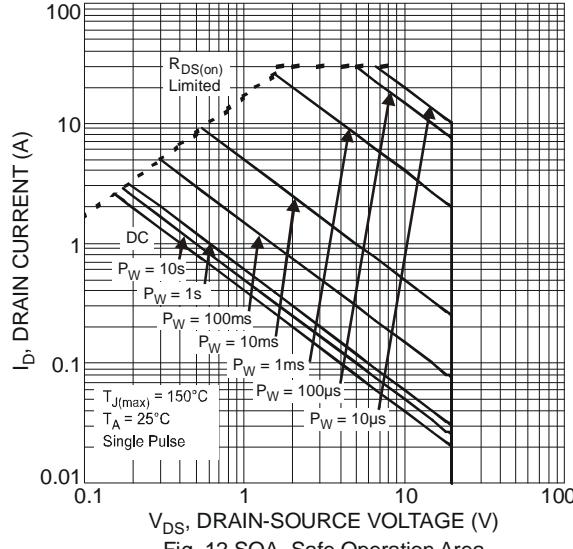
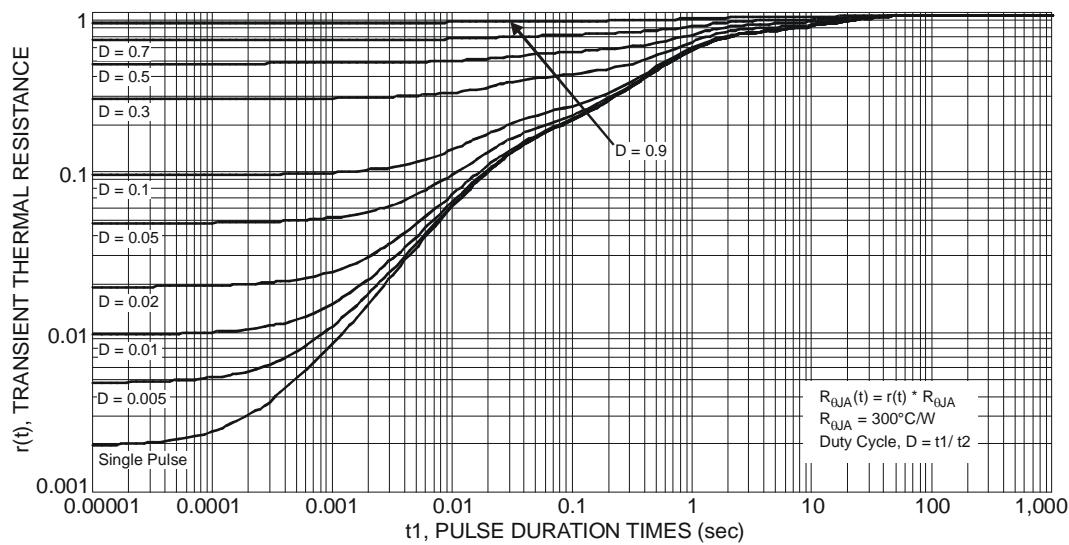
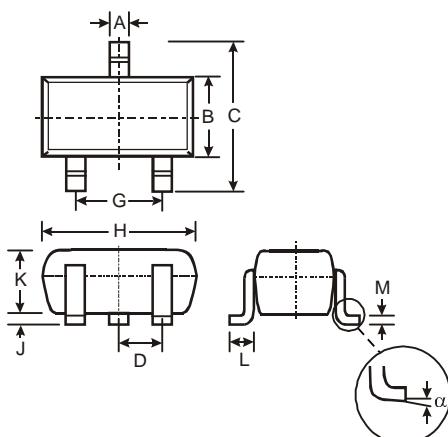


Fig. 12 SOA, Safe Operation Area

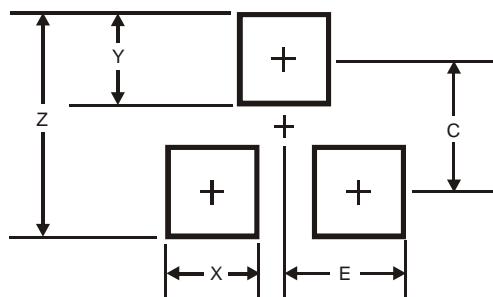


Package Outline Dimensions



| SOT323 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | - | - | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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