

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMG1013UWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

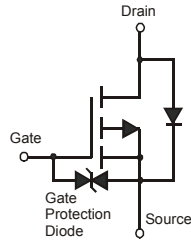
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.006 grams (Approximate)



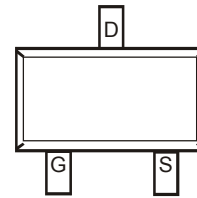
ESD PROTECTED



Top View



Equivalent Circuit



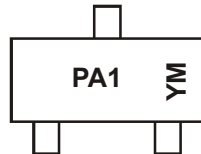
Top View

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|--------|---------------------|
| DMG1013UWQ-7 | SOT323 | 3000 / Tape & Reel |
| DMG1013UWQ-13 | SOT323 | 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



PA1 = Product Type Marking Code
 YM or YM = Date Code Marking
 Y or Y = Year (ex: 1 = 2021)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Code | V | | I | J | K | L | M | N | O | P | R | S |

| 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|-----------------------------------|--------------|---------------------------|-----------|---------|------|
| Drain-Source Voltage | | | V_{DSS} | -20 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 6 | V |
| Continuous Drain Current (Note 5) | Steady State | $T_A = +25^\circ\text{C}$ | I_D | -0.82 | A |
| | | $T_A = +85^\circ\text{C}$ | | -0.54 | |
| Pulsed Drain Current (Note 6) | | | I_{DM} | -3 | A |

Thermal Characteristics

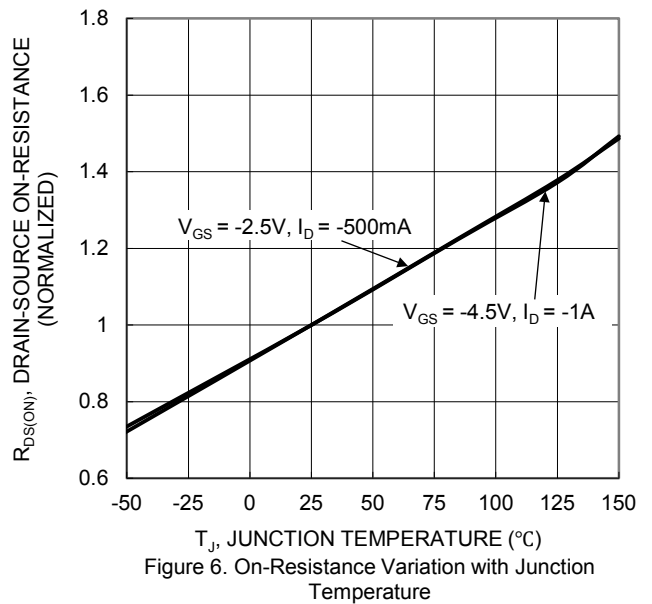
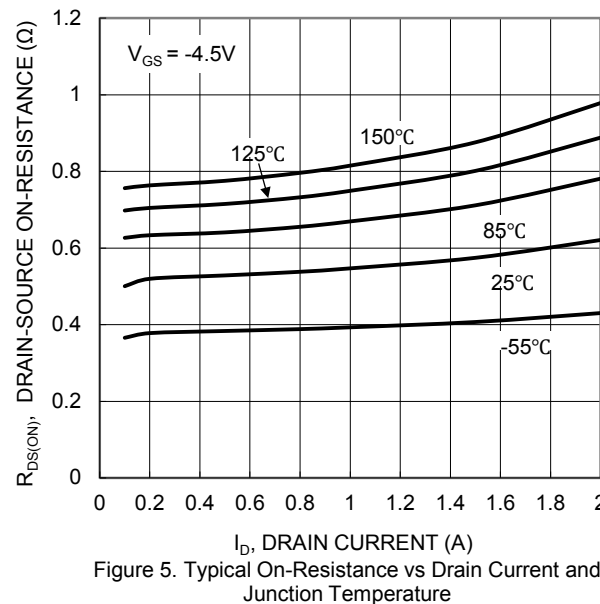
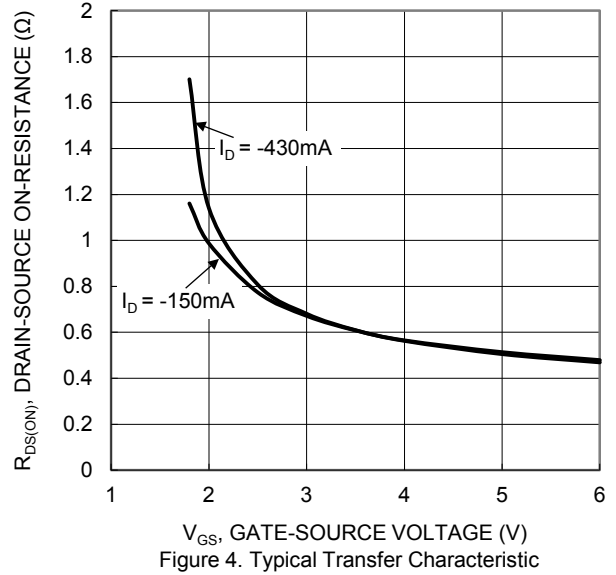
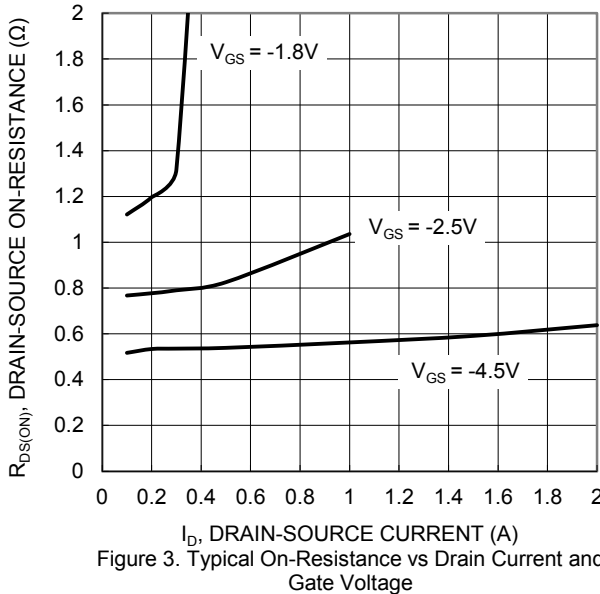
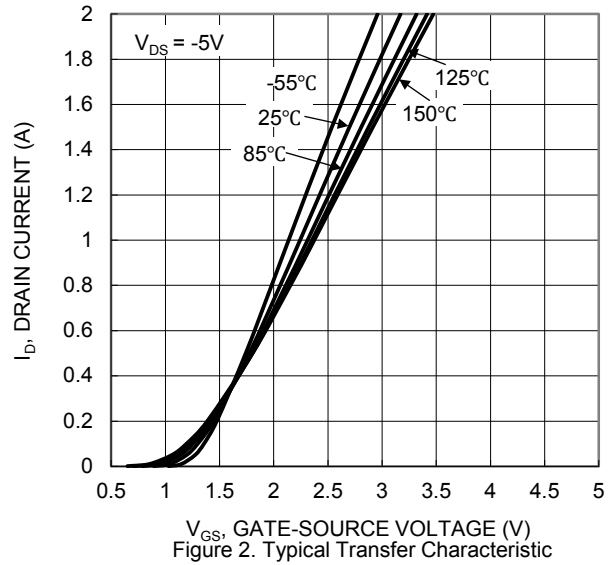
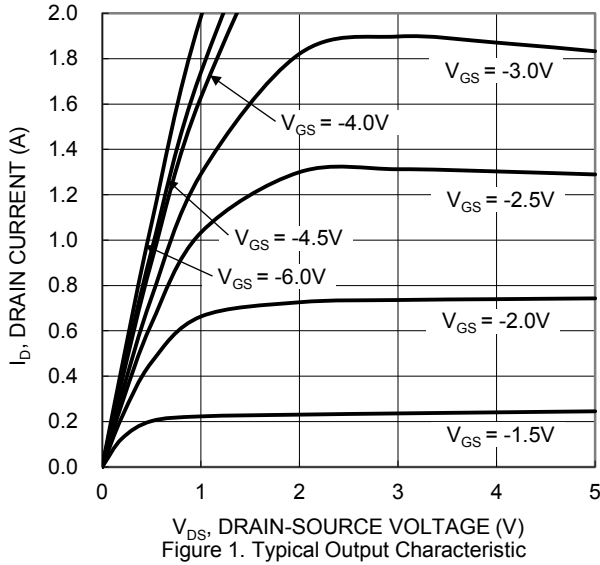
| Characteristic | | Symbol | Value | Unit |
|---|--------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation (Note 5) | | P_D | 0.31 | W |
| Thermal Resistance, Junction to Ambient | @ $T_A = +25^\circ\text{C}$ (Note 5) | $R_{\theta JA}$ | 398 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

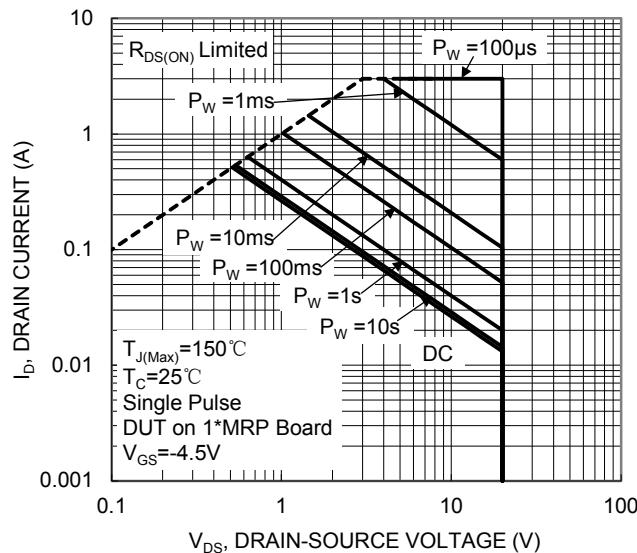
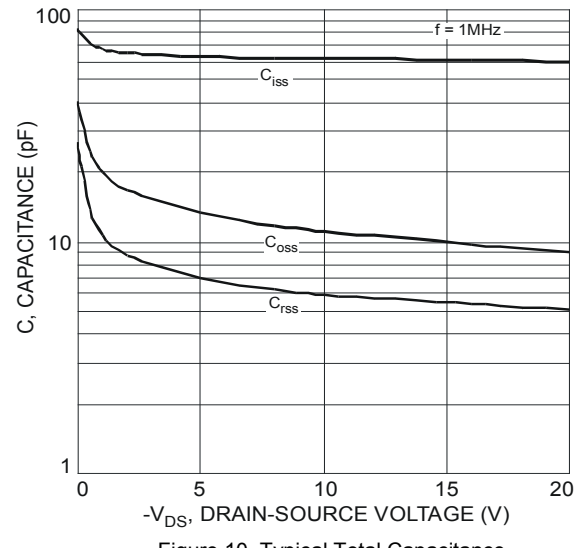
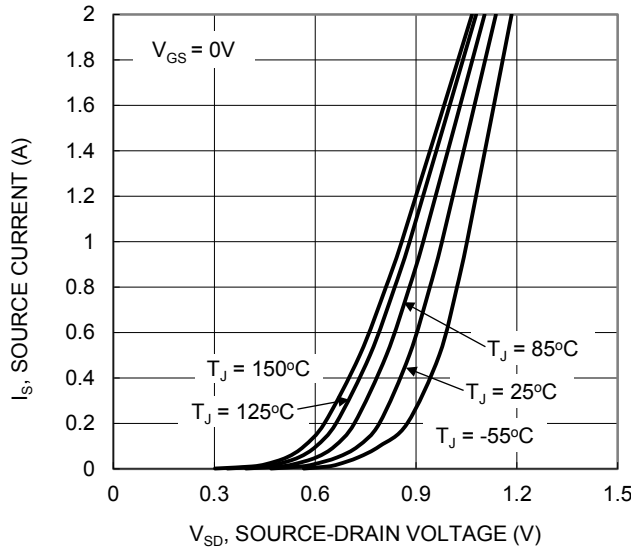
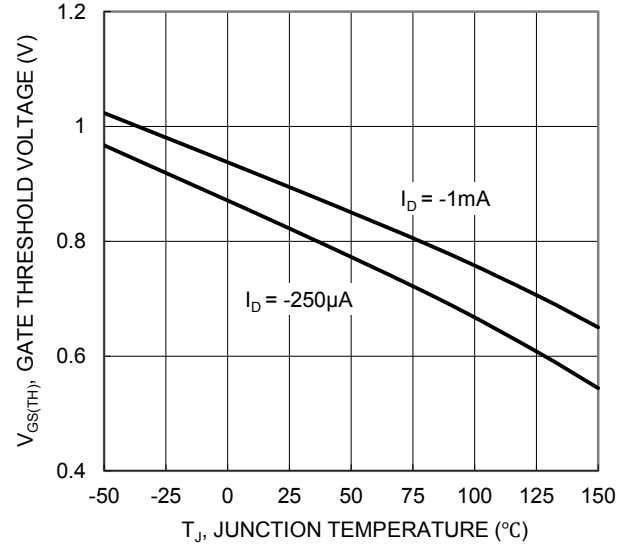
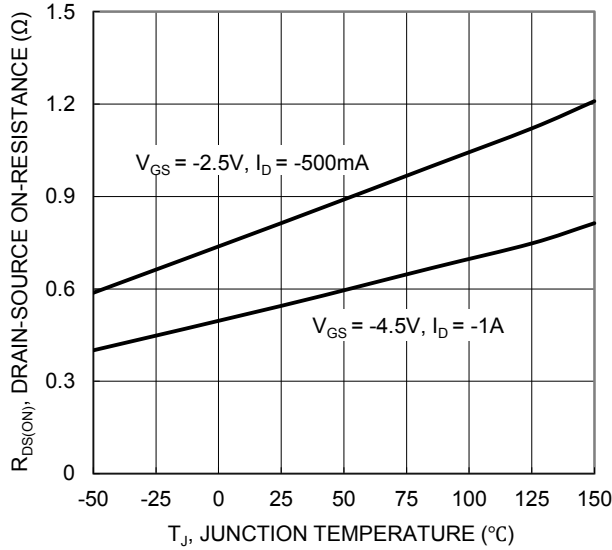
Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 6. Repetitive rating, pulse width limited by junction temperature.

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|------|-------|-----------|---------------|--|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -20 | - | - | V | $V_{GS} = 0V, I_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | I_{DSS} | - | - | -100 | nA | $V_{DS} = -20V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 2.0 | μA | $V_{GS} = \pm 4.5V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.5 | - | -1.0 | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 0.5 | 0.75 | Ω | $V_{GS} = -4.5V, I_D = -430\text{mA}$ |
| | | | 0.7 | 1.05 | | $V_{GS} = -2.5V, I_D = -300\text{mA}$ |
| | | | 1.0 | 1.5 | | $V_{GS} = -1.8V, I_D = -150\text{mA}$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 0.9 | - | S | $V_{DS} = -10V, I_D = -250\text{mA}$ |
| Diode Forward Voltage | V_{SD} | - | -0.8 | -1.2 | V | $V_{GS} = 0V, I_S = -150\text{mA}$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | - | 59.76 | - | pF | $V_{DS} = -16V, V_{GS} = 0V, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 12.07 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 6.36 | - | pF | |
| Total Gate Charge | Q_g | - | 622.4 | - | pC | $V_{GS} = -4.5V, V_{DS} = -10V, I_D = -250\text{mA}$ |
| Gate-Source Charge | Q_{gs} | - | 100.3 | - | pC | |
| Gate-Drain Charge | Q_{gd} | - | 132.2 | - | pC | |
| Turn-On Delay Time | $t_{D(ON)}$ | - | 5.1 | - | ns | $V_{DD} = -10V, V_{GS} = -4.5V, R_L = 47\Omega, R_G = 10\Omega, I_D = -200\text{mA}$ |
| Turn-On Rise Time | t_R | - | 8.1 | - | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | - | 28.4 | - | ns | |
| Turn-Off Fall Time | t_F | - | 20.7 | - | ns | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.





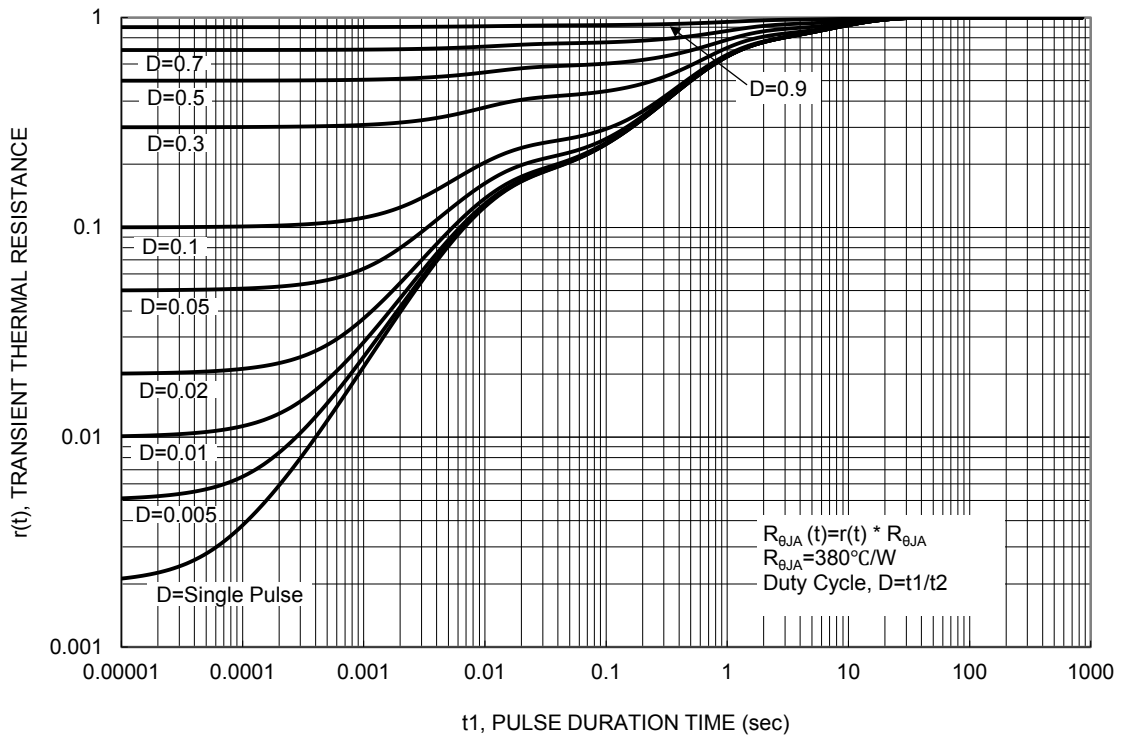
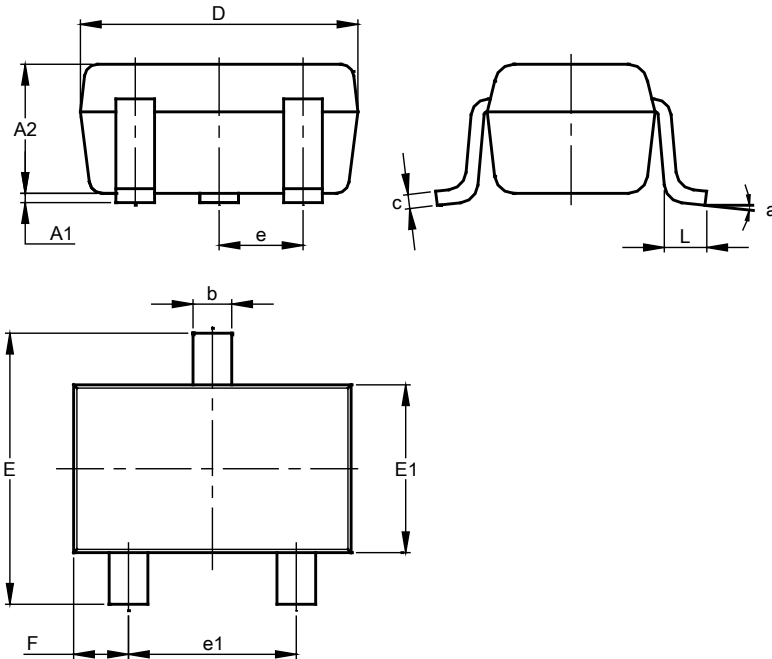


Figure 12. Transient Thermal Resistance

Package Outline Dimensions

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

SOT323

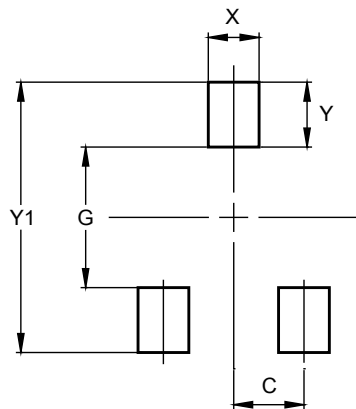


| SOT323 | | | |
|----------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.25 | 0.40 | 0.30 |
| c | 0.10 | 0.18 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| e1 | 1.20 | 1.40 | 1.30 |
| F | 0.375 | 0.475 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 8° | | |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT323



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.470 |
| Y | 0.600 |
| Y1 | 2.500 |

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