

Product Summary

| | | |
|---------------|---|---|
| $V_{(BR)DSS}$ | $R_{DS(ON) \max}$ | $I_D \max$ $T_A = +25^\circ\text{C}$ |
| -20V | 120m Ω @ $V_{GS} = -4.5\text{V}$ | -3A |
| | 150m Ω @ $V_{GS} = -2.5\text{V}$ | |

Description and Applications

This MOSFET is 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.

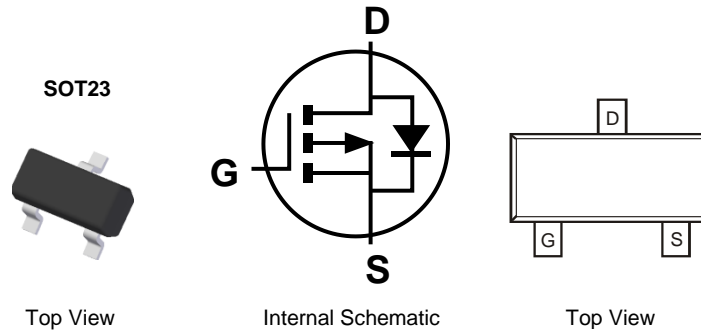
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control

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)**

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
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

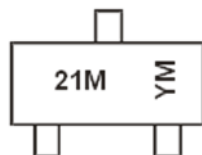
NEW PRODUCT


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|-------|--------------------|
| DMG2301L-7 | SOT23 | 3,000/Tape & Reel |
| DMG2301L-13 | SOT23 | 10,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See 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.
 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 <http://www.diodes.com/products/packages.html>.

Marking Information



21M = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: C = 2015)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|
| Code | B | C | D | E | F | G | H |

| 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 | Units |
|---|------------------|-------|-------|
| Drain-Source Voltage | V _{DSS} | -20 | V |
| Gate-Source Voltage | V _{GSS} | ±8 | V |
| Continuous Drain Current (Note 5) V _{GS} = -4.5V | I _D | -3 | A |
| Steady State T _A = +25°C T _A = +70°C | | -1 | |
| Pulsed Drain Current (Note 6) | I _{DM} | -10 | A |
| Drain-Source Diode Forward Current (t < 5 sec) | I _S | -0.75 | A |

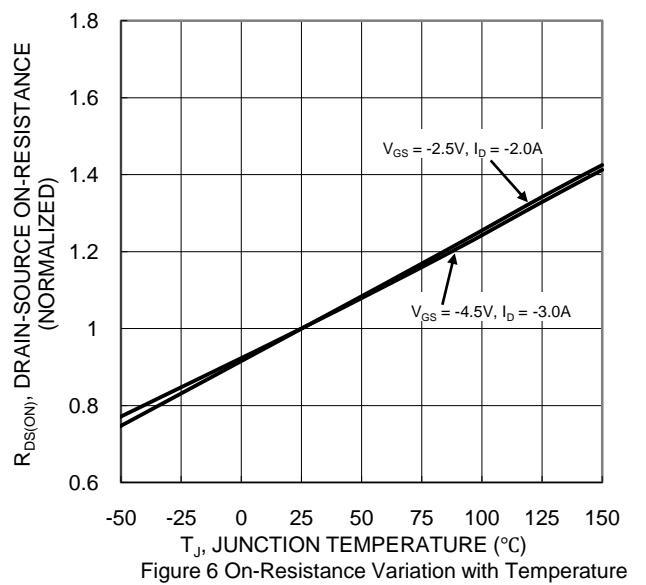
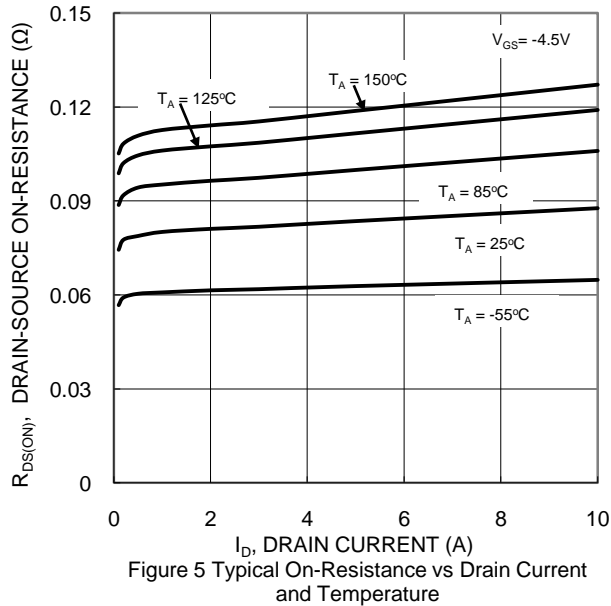
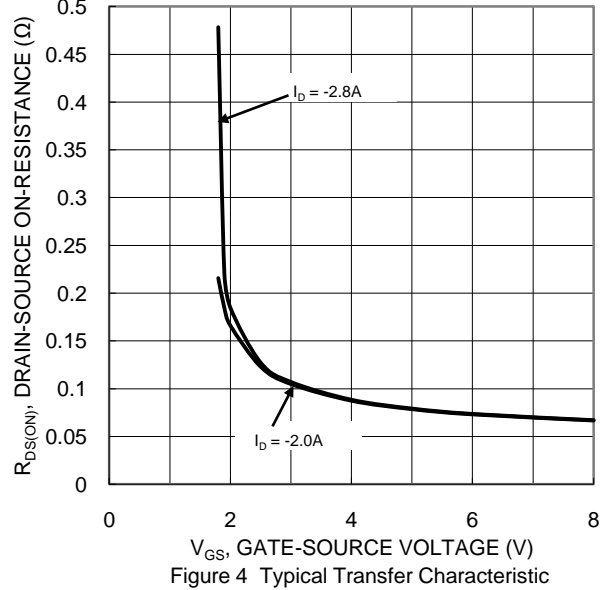
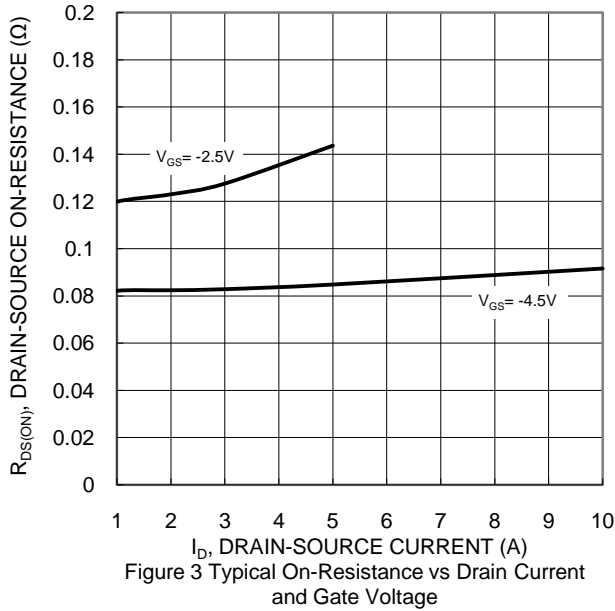
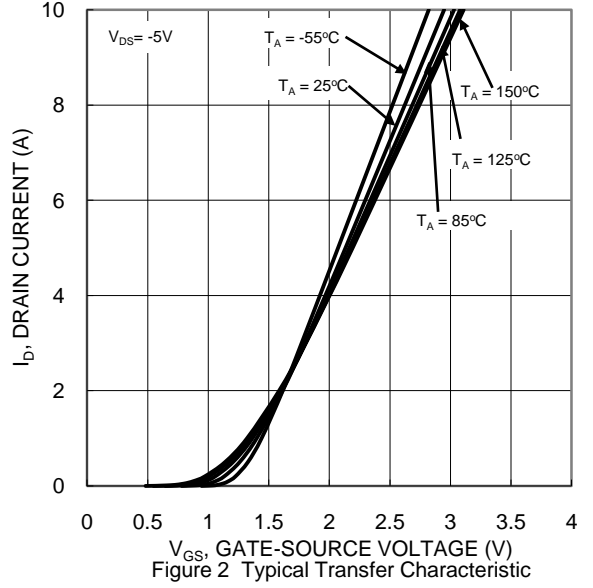
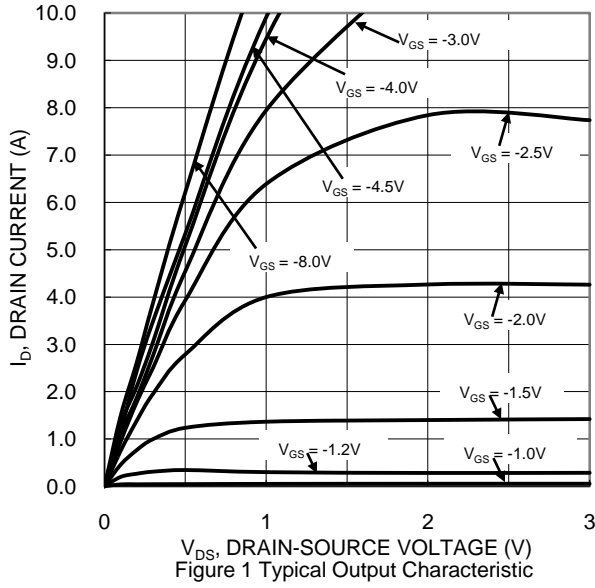
Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 1.5 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5) | R _{θJA} | 83 | °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} | -20 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | -1.0 | μA | V _{DS} = -16V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±6V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | -0.4 | — | -1.2 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 120 | mΩ | V _{GS} = -4.5V, I _D = -2.8A |
| | | | | 150 | | V _{GS} = -2.5V, I _D = -2.0A |
| Diode Forward Voltage | V _{SD} | — | — | -1.2 | V | V _{GS} = 0V, I _S = -0.75A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 476 | — | pF | V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 53 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 45 | — | pF | |
| Total Gate Charge | Q _g | — | 5.5 | — | nC | V _{GS} = -4.5V, V _{DS} = -6V, I _D = -2.8A |
| Gate-Source Charge | Q _{gs} | — | 0.9 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 1.8 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 5 | — | ns | V _{DS} = -6V, V _{GS} = -4.5V, R _{GEN} = 6Ω, I _D = -1A |
| Turn-On Rise Time | t _R | — | 10 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 30 | — | ns | |
| Turn-Off Fall Time | t _F | — | 20 | — | ns | |

- Notes:
- Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.



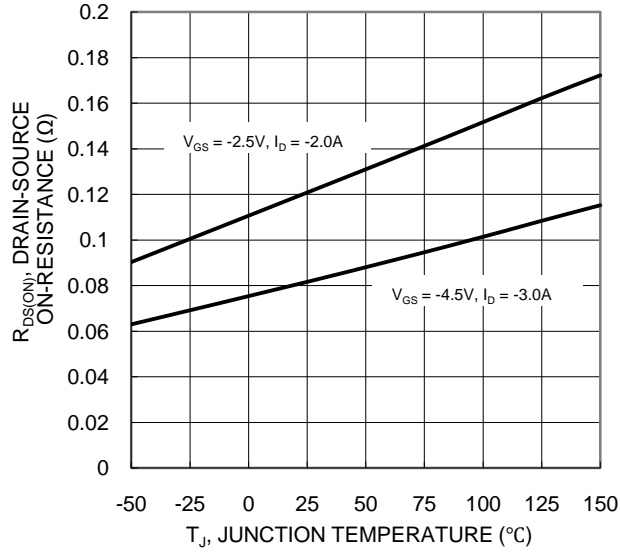


Figure 7 On-Resistance Variation with Temperature

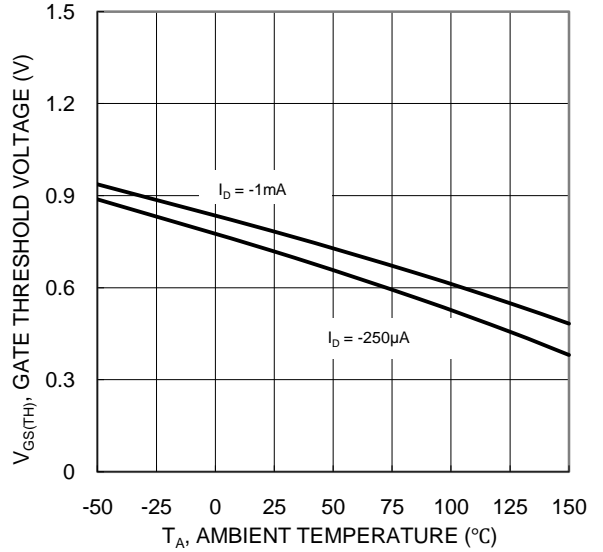


Figure 8 Gate Threshold Variation vs Ambient Temperature

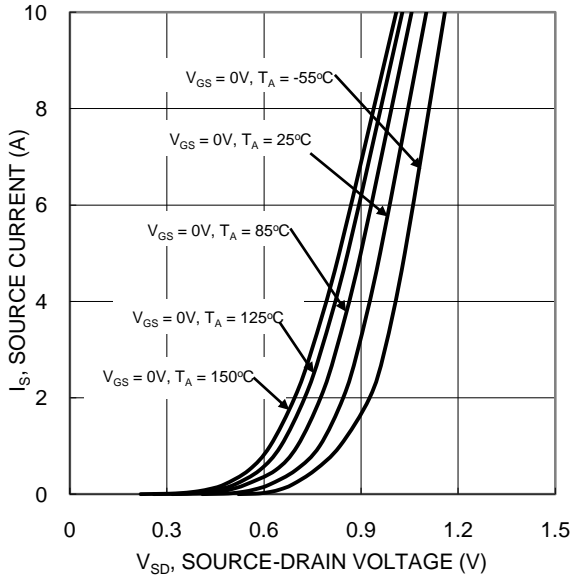


Figure 9 Diode Forward Voltage vs. Current

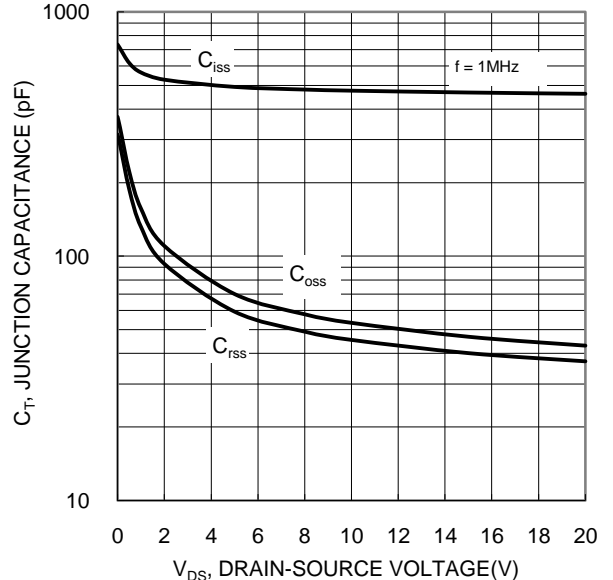


Figure 10 Typical Junction Capacitance

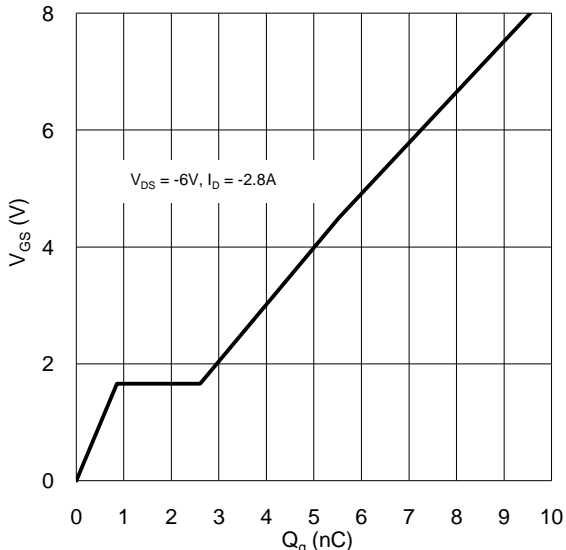


Figure 11 Gate Charge

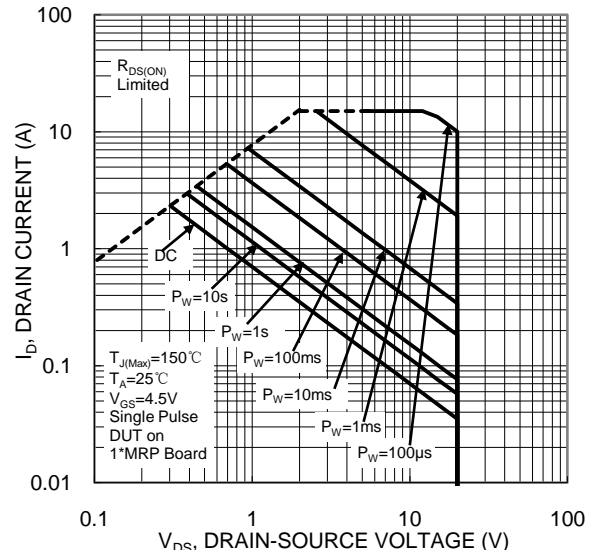


Figure 12 SOA, Safe Operation Area

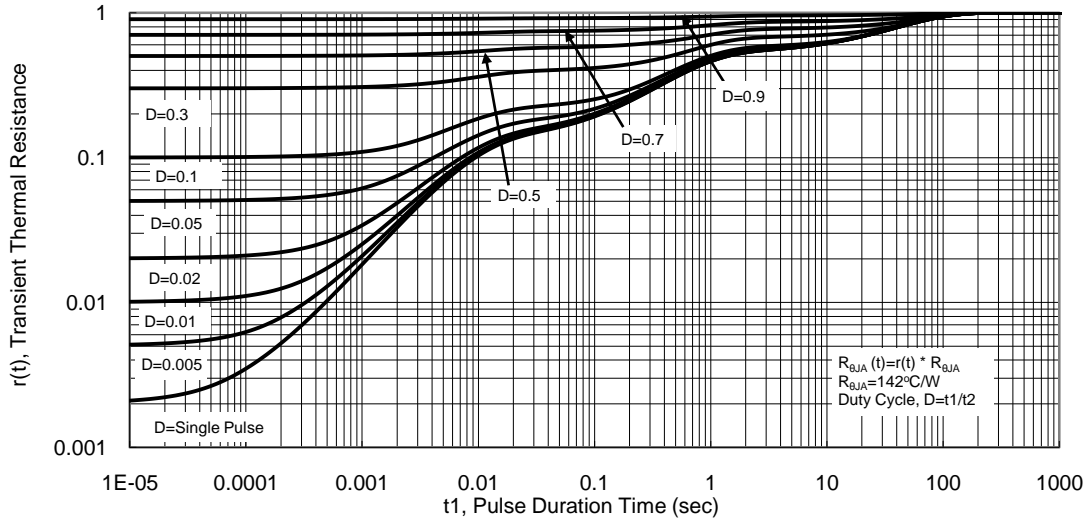
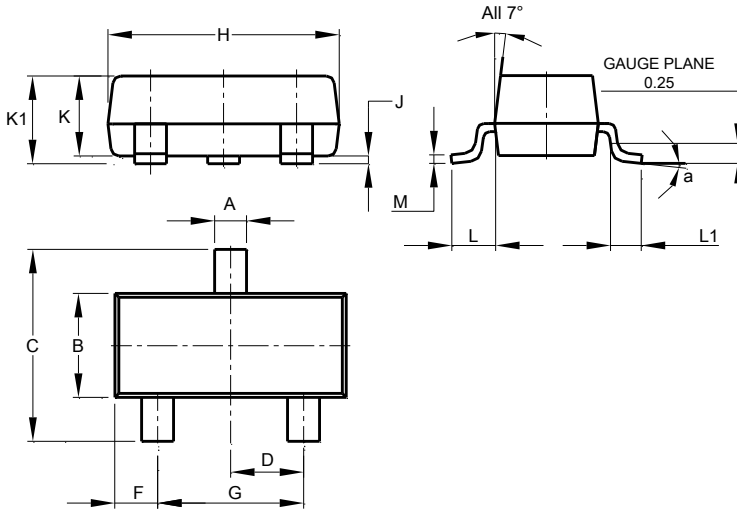


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

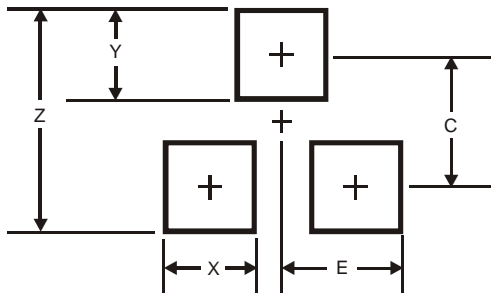
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 |
| a | 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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