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DMG2307L

P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) max}$ | $I_D max$ $T_A = +25^{\circ}C$ |
|---------------|----------------------------------|-----------------------------------|
| -30V | 90m Ω @ $V_{GS} = -10V$ | -3.8A |
| | 134m Ω @ $V_{GS} = -4.5V$ | -3.1A |

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)**
- **Qualified to AEC-Q101 standards for High Reliability**

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.

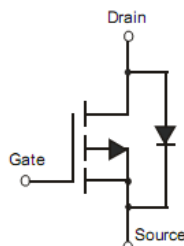
- General Purpose Interfacing Switch
- Power Management Functions
- Load Switch for Portable Devices

Mechanical Data

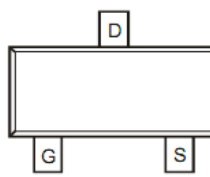
- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.08 grams (approximate)



TOP VIEW



Internal Schematic



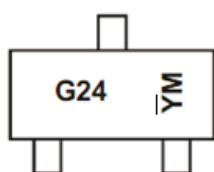
TOP VIEW

Ordering Information (Notes 4 & 5)

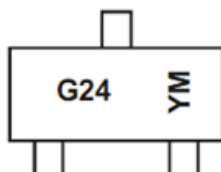
| Part Number | Compliance | Case | Packaging |
|-------------|------------|--------|-----------------|
| DMG2307L-7 | Standard | SOT-23 | 3000Tape & Reel |
| DMG2307LQ-7 | Automotive | SOT-23 | 3000Tape & Reel |

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



Chengdu A/T Site



Shanghai A/T Site

G24 = Product Type Marking Code
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)
 Y or Y = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | W | X | Y | Z | A | B | C | D | E | F |

| 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} | -30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| 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 | |
| Continuous Drain Current (Note 7) V _{GS} = -10V | Steady State | T _A = +25°C | I _D | -3.8 | A |
| | | T _A = +70°C | | -3.0 | |
| Continuous Drain Current (Note 7) V _{GS} = -10V | t ≤ 10sec | T _A = +25°C | I _D | -4.6 | A |
| | | T _A = +70°C | | -3.6 | |
| Continuous Drain Current (Note 7) V _{GS} = -4.5V | Steady State | T _A = +25°C | I _D | -3.1 | A |
| | | T _A = +70°C | | -2.5 | |
| Pulsed Drain Current (Note 7) | | | I _{DM} | -20 | A |

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

| Characteristic | Symbol | Value | Units |
|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6) | P _D | 0.76 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 159 | °C/W |
| Total Power Dissipation (Note 7) | P _D | 1.36 | W |
| Thermal Resistance, Junction to Ambient (Note 7) | R _{θJA} | 94 | °C/W |
| Total Power Dissipation (Note 7) t ≤ 10sec | P _D | 1.9 | W |
| Thermal Resistance, Junction to Ambient (Note 7) t ≤ 10sec | R _{θJA} | 65.8 | °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 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -30 | - | - | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current @T _C = +25°C | I _{DSS} | - | - | -1.0 | μA | V _{DS} = -30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | - | - | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1.0 | - | -3.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | - | 70 | 90 | mΩ | V _{GS} = -10V, I _D = -2.5A |
| | | - | 105 | 134 | | V _{GS} = -4.5V, I _D = -2.5A |
| Forward Transfer Admittance | Y _{fs} | - | 4.8 | - | S | V _{DS} = -10V, I _D = -2.5A |
| Diode Forward Voltage (Note 7) | V _{SD} | - | -0.75 | -1.0 | V | V _{GS} = 0V, I _S = -1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | - | 371.3 | - | pF | V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | - | 51.3 | - | pF | |
| Reverse Transfer Capacitance | C _{rss} | - | 45.9 | - | pF | |
| Gate Resistance | R _g | - | 17 | - | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = -4.5V) | Q _g | - | 4.0 | - | nC | V _{GS} = -10V, V _{DS} = -15V, I _D = -3A |
| Total Gate Charge (V _{GS} = -10V) | Q _g | - | 8.2 | - | nC | |
| Gate-Source Charge | Q _{gs} | - | 0.9 | - | nC | |
| Gate-Drain Charge | Q _{gd} | - | 1.2 | - | nC | |
| Turn-On Delay Time | t _{D(on)} | - | 4.8 | - | ns | V _{DS} = -15V, V _{GS} = -10V, R _L = 15Ω, R _G = 6Ω, I _D = -1A |
| Turn-On Rise Time | t _r | - | 7.3 | - | ns | |
| Turn-Off Delay Time | t _{D(off)} | - | 22.4 | - | ns | |
| Turn-Off Fall Time | t _f | - | 13.4 | - | ns | |

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



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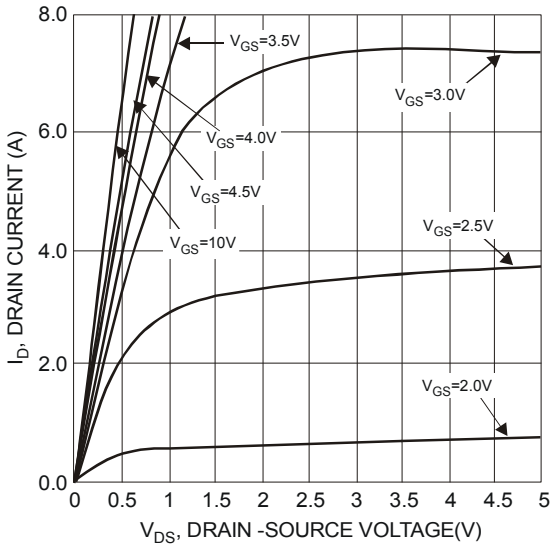


Fig. 1 Typical Output Characteristics

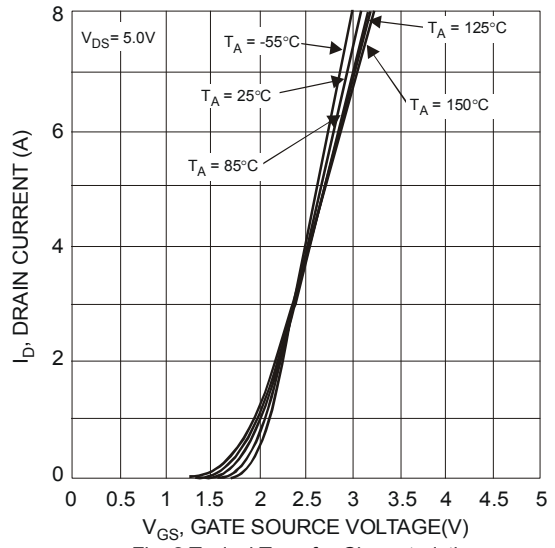


Fig. 2 Typical Transfer Characteristics

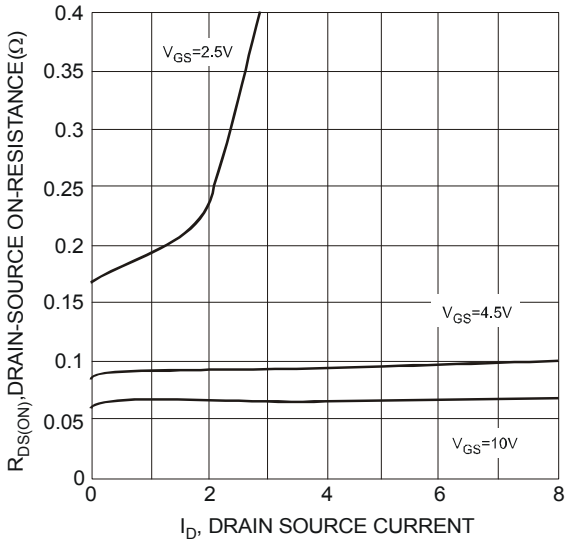


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

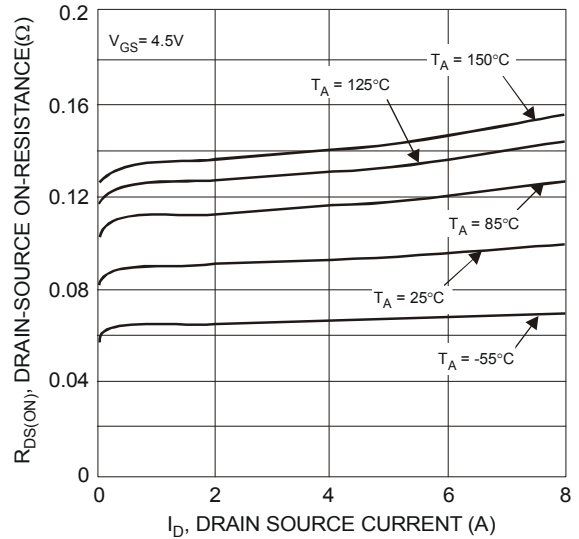


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

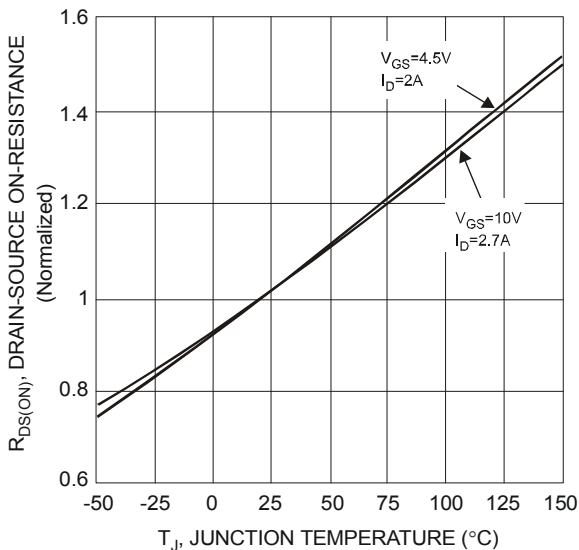


Fig. 5 On-Resistance Variation with Temperature

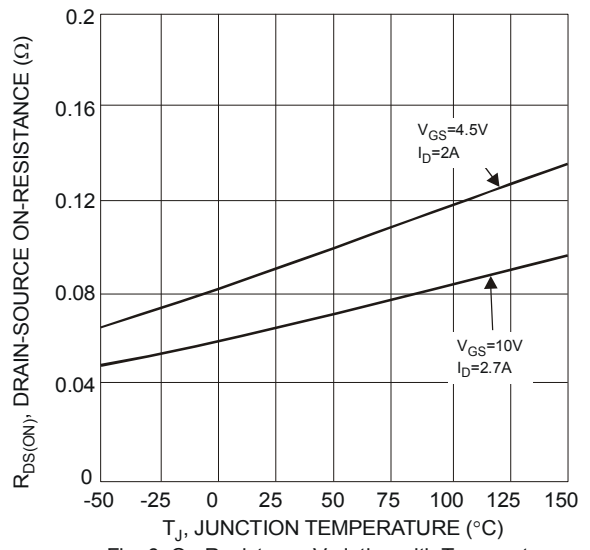


Fig. 6 On-Resistance Variation with Temperature



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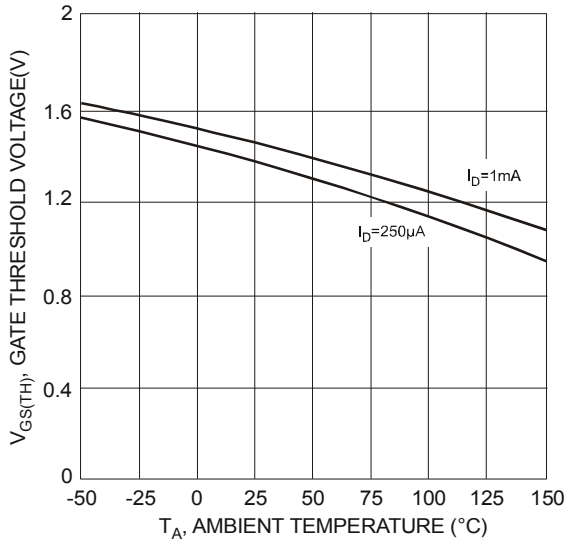


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

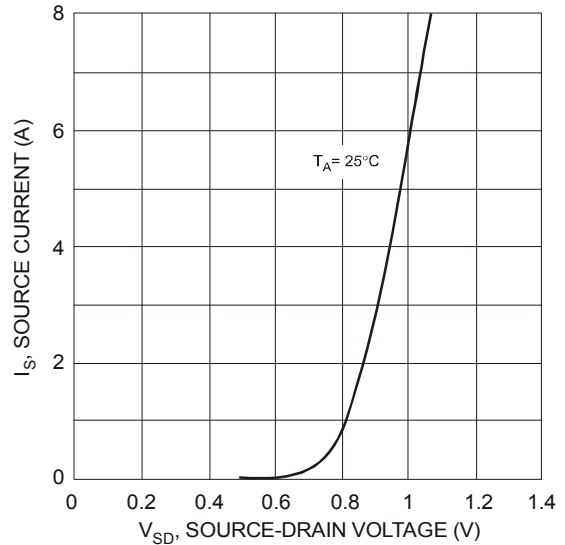


Fig. 8 Diode Forward Voltage vs. Current

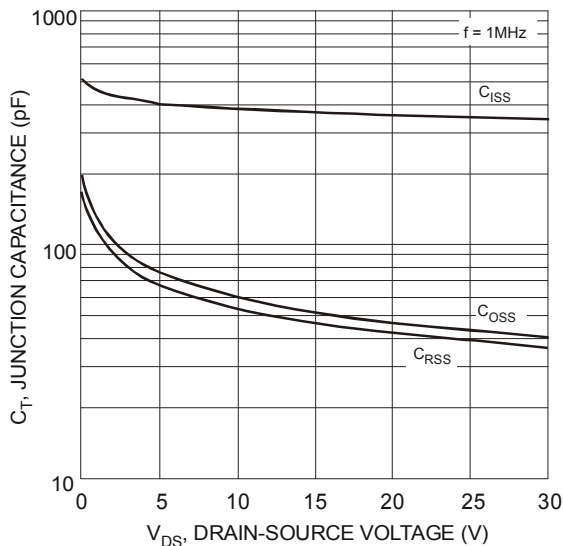


Fig. 9 Typical Junction Capacitance

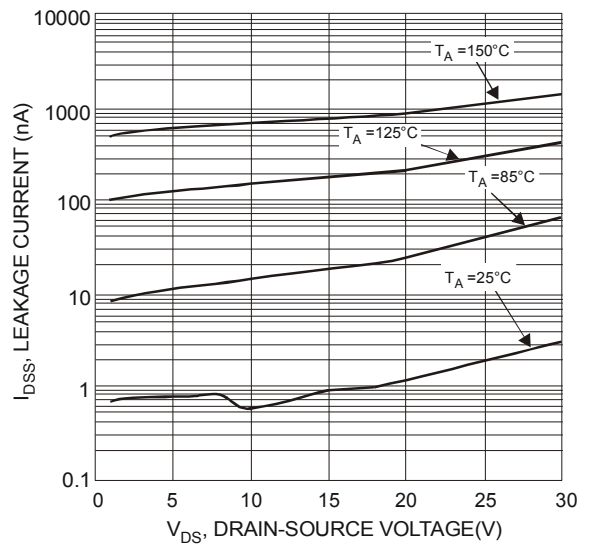


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

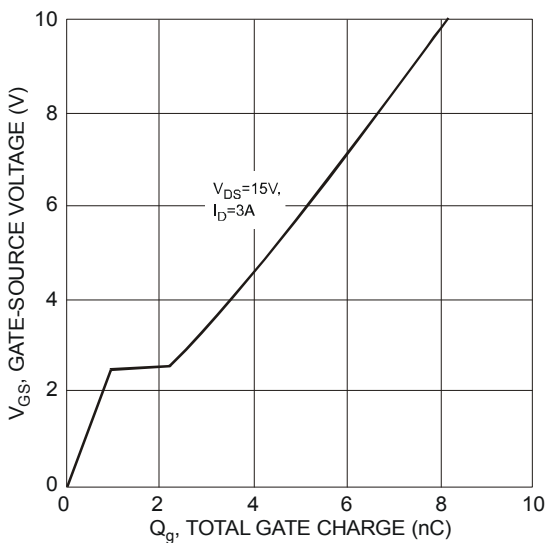


Fig. 11 Gate-Charge Characteristics

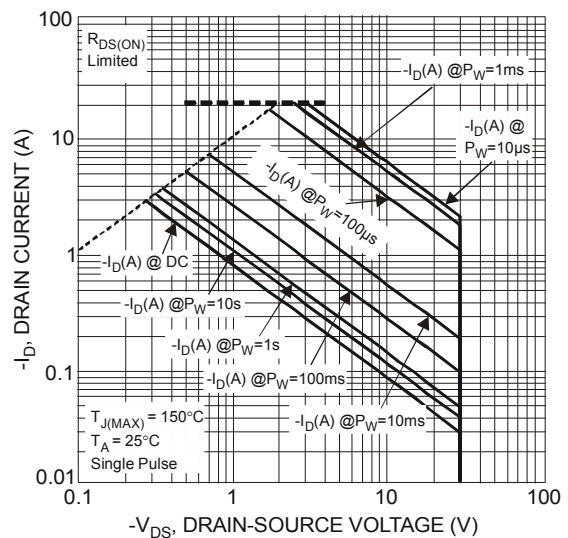


Fig. 12 SOA, Safe Operation Area



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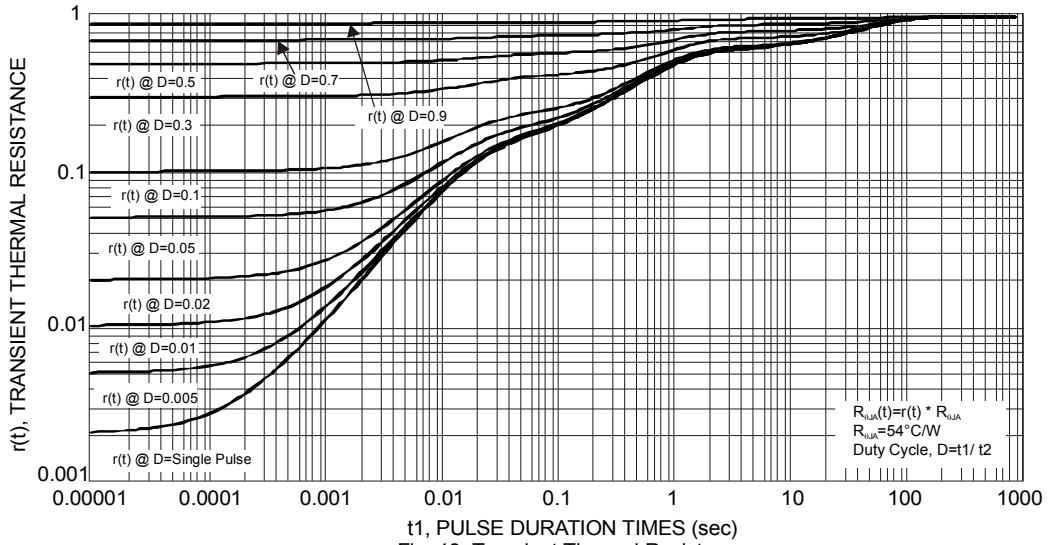
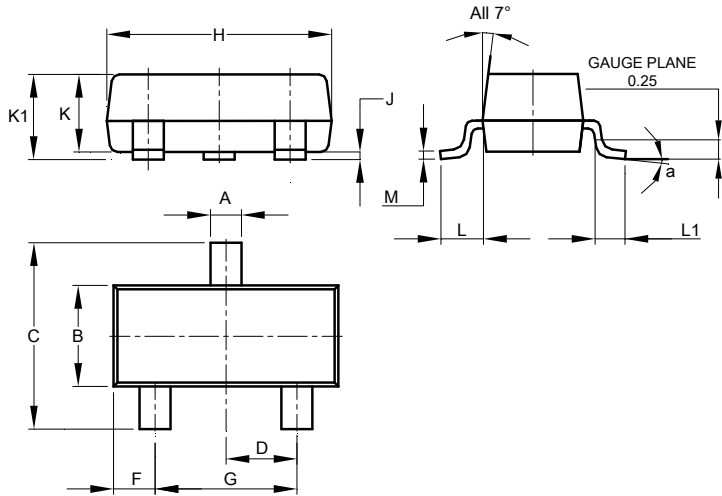


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

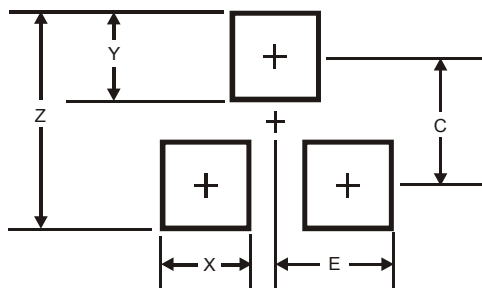
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 | 1.025 |
| 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 |
| α | 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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