

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------|
| 60V | 1.8Ω @ $V_{GS} = 10\text{V}$ | 440mA |
| | 2.1Ω @ $V_{GS} = 4.5\text{V}$ | 410mA |

Description

This new generation 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.

Applications

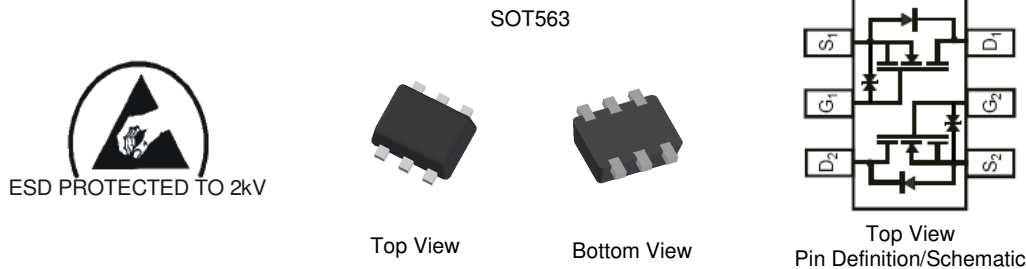
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- DC-DC Converters
- Power Management Functions

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- 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**

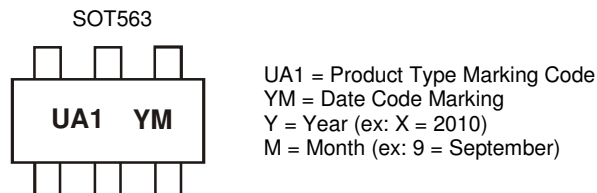
Mechanical Data

- Case: SOT563
- 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 **Ⓔ3**
- Terminal Connections: See Diagram Below
- Weight: 0.006 grams (Approximate)


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|--------|---------------------|
| DMG1026UV-7 | SOT563 | 3,000 / Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


Date Code Key

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

| 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 | 410 | mA |
| | | T _A = +85°C | | 300 | |
| Continuous Drain Current (Note 6) V _{GS} = 10V | t ≤ 10s | T _A = +25°C | I _D | 440 | mA |
| | | T _A = +85°C | | 320 | |
| Continuous Drain Current (Note 5) V _{GS} = 4.5V | Steady State | T _A = +25°C | I _D | 380 | mA |
| | | T _A = +85°C | | 270 | |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | t ≤ 10s | T _A = +25°C | I _D | 410 | mA |
| | | T _A = +85°C | | 295 | |
| Pulsed Drain Current (Note 7) | | | I _{DM} | 1.0 | A |

Thermal Characteristics

| Characteristic | Symbol | Max | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 0.58 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5) | R _{θJA} | 213 | °C/W |
| Power Dissipation (Note 6) t ≤ 10s | P _D | 0.65 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6) t ≤ 10s | R _{θJA} | 192 | °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} | 60 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 1.0 | μA | V _{DS} = 50V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±50 | nA | V _{GS} = ±5V, V _{DS} = 0V |
| | | — | — | ±150 | nA | V _{GS} = ±10V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | — | 1.8 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 1.2 | 1.8 | Ω | V _{GS} = 10V, I _D = 500mA |
| | | — | 1.4 | 2.1 | | V _{GS} = 4.5V, I _D = 200mA |
| Forward Transfer Admittance | Y _{fs} | 80 | 580 | — | mS | V _{DS} = 10V, I _D = 200mA |
| Continuous Source Current (Note 8) | I _S | — | — | 200 | mA | — |
| Diode Forward Voltage | V _{SD} | — | 0.8 | 1.3 | V | V _{GS} = 0V, I _S = 200mA |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iSS} | — | 32 | — | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 4.4 | — | | |
| Reverse Transfer Capacitance | C _{rSS} | — | 2.9 | — | | |
| Gate Resistance | R _g | — | 126 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge | Q _g | — | 0.45 | — | pC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA |
| Gate-Source Charge | Q _{gs} | — | 0.08 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 0.08 | — | | |
| Turn-On Delay Time | t _{D(on)} | — | 3.4 | — | ns | V _{GS} = 10V, V _{DS} = 30V, R _L = 150Ω, R _G = 25Ω, I _D = 200mA |
| Turn-On Rise Time | t _r | — | 3.4 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 26.4 | — | ns | |
| Turn-Off Fall Time | t _f | — | 16.3 | — | ns | |

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 PCB with minimum recommended pad layout, measured in t ≤ 10s.
 - Repetitive rating, pulse width limited by junction temperature, 10μs pulse, duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

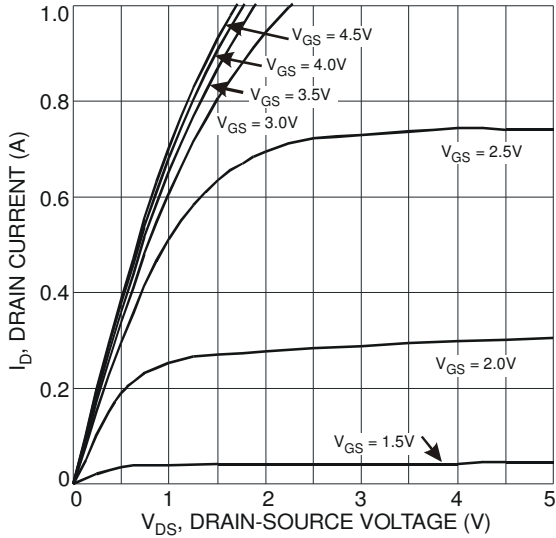


Figure 1 Typical Output Characteristic

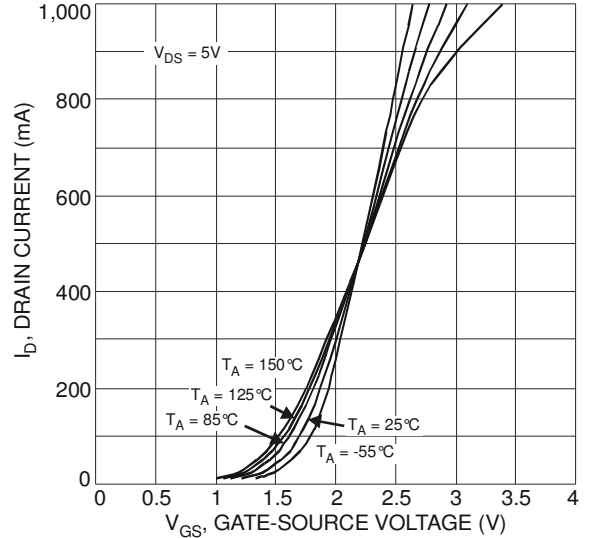


Figure 2 Typical Transfer Characteristic

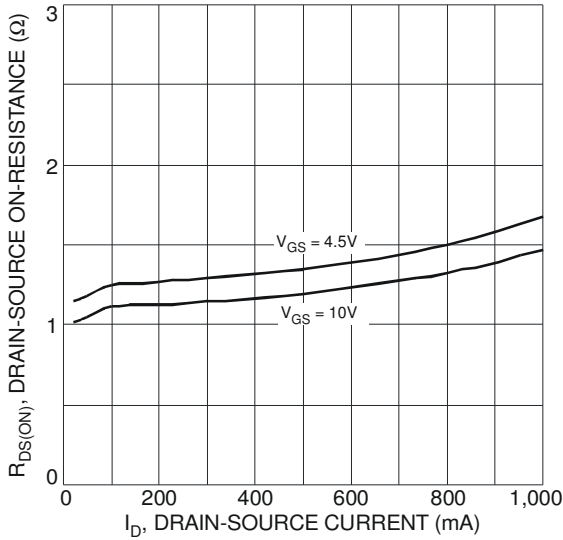


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

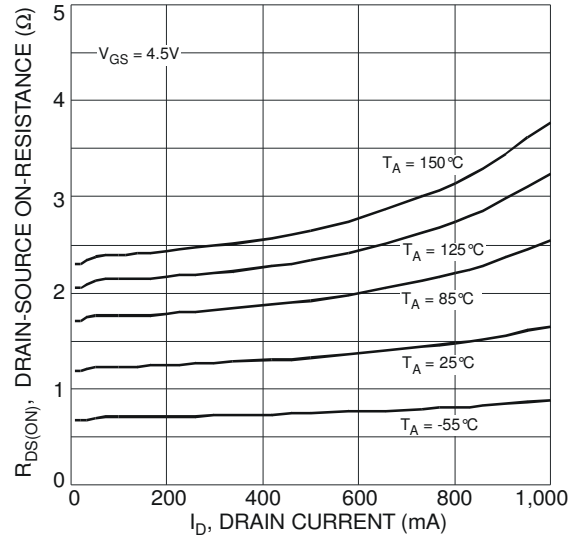


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

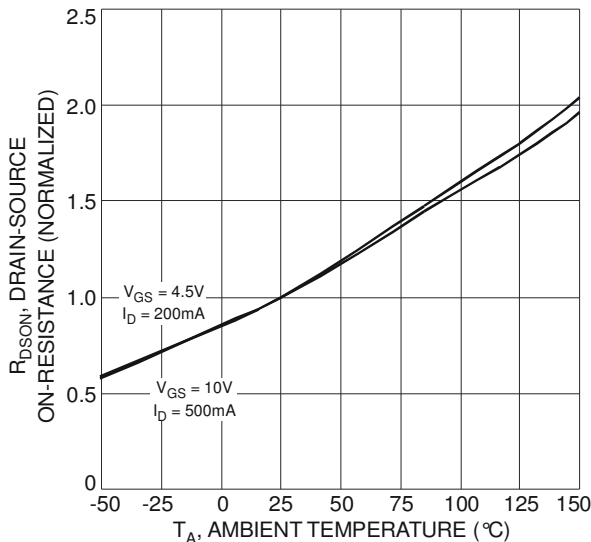


Figure 5 On-Resistance Variation with Temperature

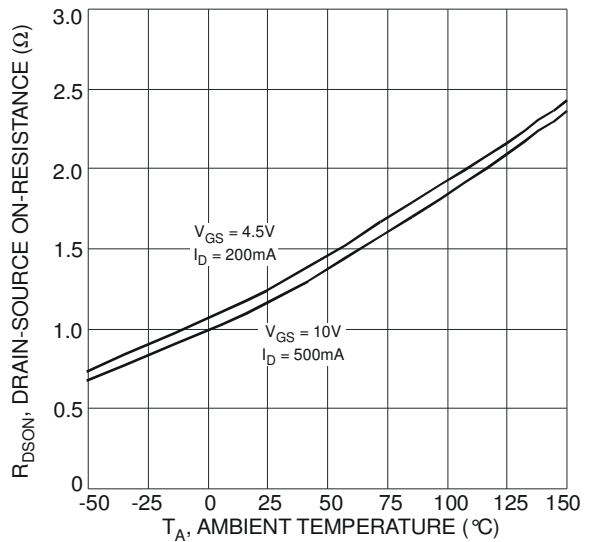


Figure 6 On-Resistance Variation with Temperature

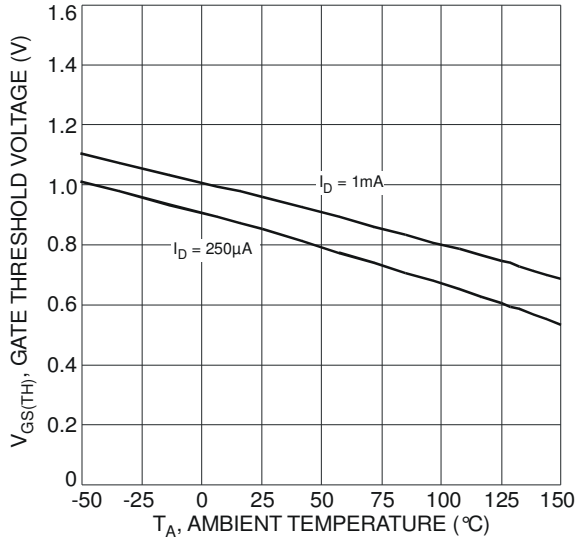


Figure 7 Gate Threshold Variation vs. Ambient Temperature

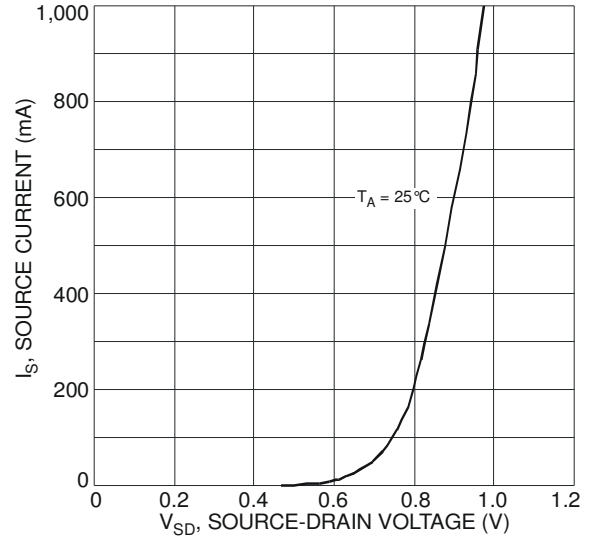


Figure 8 Diode Forward Voltage vs. Current

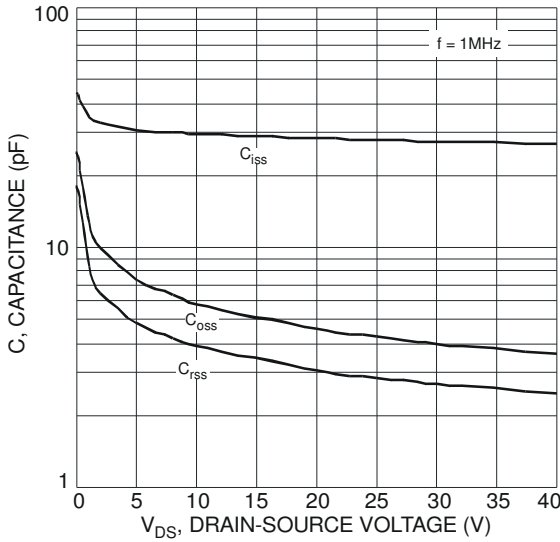


Figure 9 Typical Total Capacitance

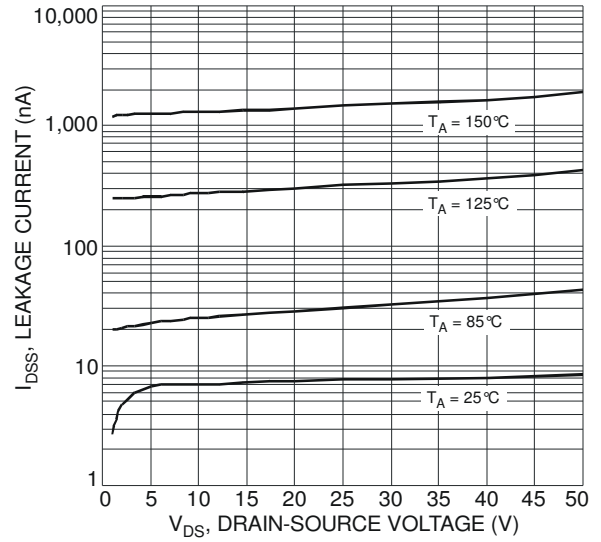


Figure 10 Typical Leakage Current vs. Drain-Source Voltage

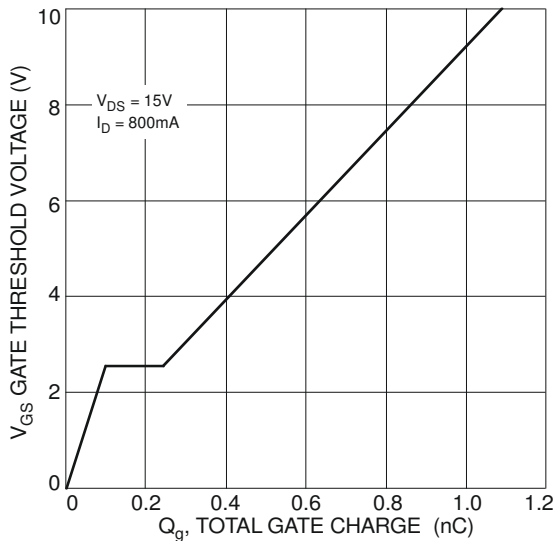


Figure 11 Gate Charge

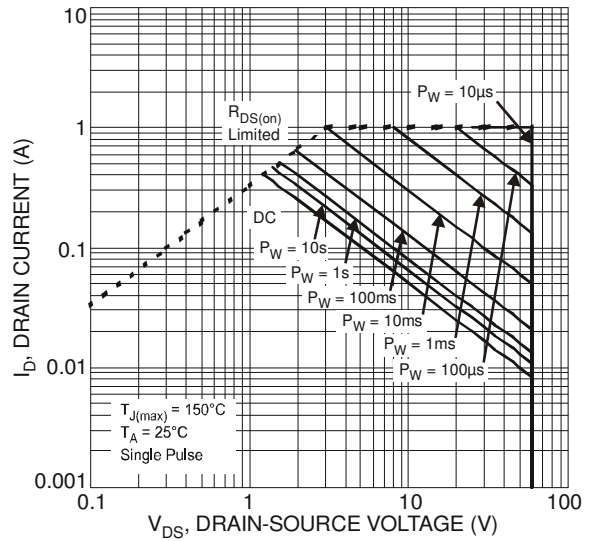


Figure 12 SOA, Safe Operation Area

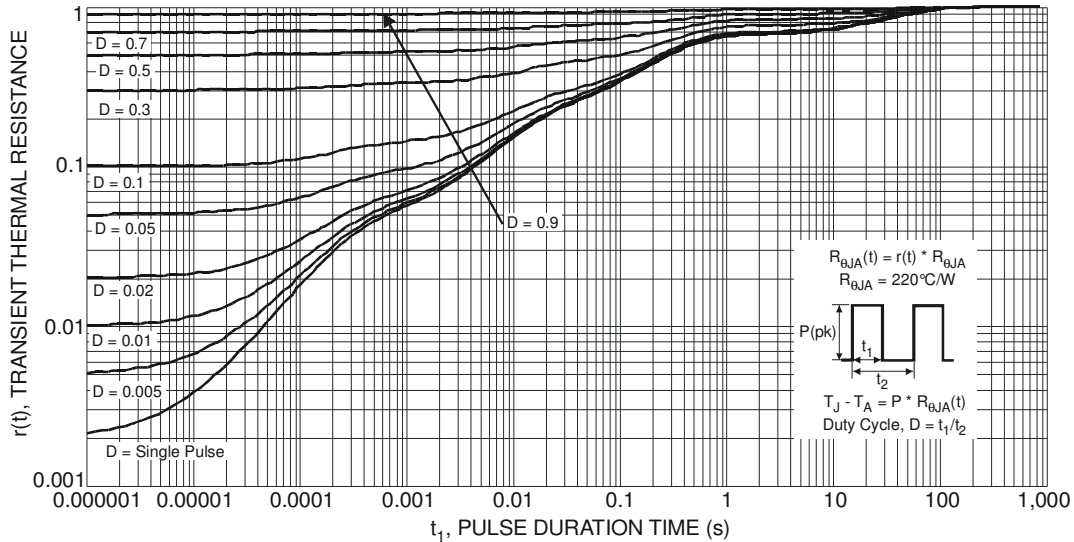
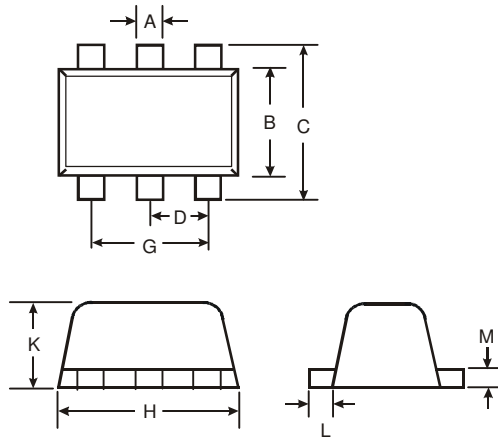


Figure 13 Transient Thermal Response

Package Outline Dimensions

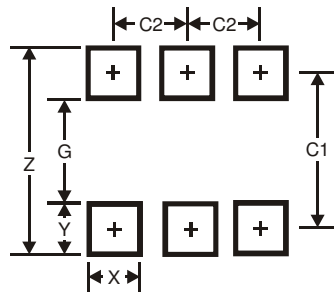
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | - | - | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| 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 | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C1 | 1.7 |
| C2 | 0.5 |

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