

Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _A = +25°C |
|-------------------|---------------------------------|--|
| -60V | 155mΩ @ V _{GS} = -10V | -2.4A |
| | 240mΩ @ V _{GS} = -4.5V | -1.9A |

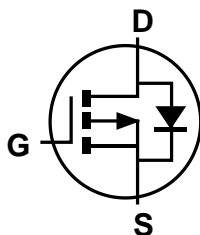
Description and Applications

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.

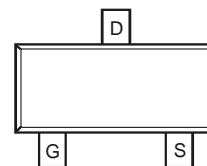
- Battery Charging
- Power Management Functions
- DC-DC Converters
- Load Switch



Top View



Internal Schematic



Top View

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMPH6250SQ](#))**

Mechanical Data

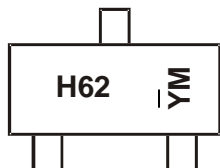
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|-------|-------------------|
| DMPH6250S-7 | SOT23 | 3000/Tape & Reel |
| DMPH6250S-13 | SOT23 | 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



H62 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | F | G | H | I | J | K | L | M | N | O |

| 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} | -60 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$ | I_D | $T_A = +25^\circ\text{C}$ -2.4 | A |
| Steady State $T_A = +100^\circ\text{C}$ | | -1.5 | |
| Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%) | I_{DM} | -13 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | I_S | -1.6 | A |
| Pulsed Body Diode Forward Current (380 μs Pulse, Duty Cycle = 1%) | I_{SM} | -13 | A |
| Avalanche Current, $L = 0.1\text{mH}$ | I_{AS} | -12 | A |
| Avalanche Energy, $L = 0.1\text{mH}$ | E_{AS} | 8 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 5) | P_D | 0.92 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5) | $R_{\theta JA}$ | 165 | $^\circ\text{C/W}$ |
| Power Dissipation (Note 6) | P_D | 1.62 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6) | $R_{\theta JA}$ | 93.1 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|------|------|-----------|---------------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -60 | — | — | V | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | I_{DSS} | — | — | -1.0 | μA | $V_{DS} = -60\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -1.0 | -1.9 | -3.0 | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 112 | 155 | m Ω | $V_{GS} = -10\text{V}, I_D = -2\text{A}$ |
| | | — | 149 | 240 | | $V_{GS} = -4.5\text{V}, I_D = -2\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | -0.8 | -1.2 | V | $V_{GS} = 0\text{V}, I_S = -1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{ISS} | — | 512 | — | pF | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{OSS} | — | 31.3 | — | pF | |
| Reverse Transfer Capacitance | C_{RSS} | — | 23.2 | — | pF | |
| Gate Resistance | R_g | — | 11.9 | — | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ |
| Total Gate Charge ($V_{GS} = -4.5\text{V}$) | Q_g | — | 4.0 | — | nC | $V_{DS} = -30\text{V}, I_D = -2\text{A}$ |
| Total Gate Charge ($V_{GS} = -10\text{V}$) | Q_{q1} | — | 8.3 | — | nC | |
| Gate-Source Charge | Q_{gs} | — | 1.2 | — | nC | |
| Gate-Drain Charge | Q_{gd} | — | 1.7 | — | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 12.5 | — | ns | $V_{DD} = -30\text{V}, V_{GS} = -10\text{V},$ $I_D = -1.0\text{A}, R_G = 50\Omega$ |
| Turn-On Rise Time | t_R | — | 13.4 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 96.0 | — | ns | |
| Turn-Off Fall Time | t_F | — | 39.1 | — | ns | |
| Body Diode Reverse Recovery Time | t_{RR} | — | 9.6 | — | ns | $I_F = -1\text{A}, di/dt = 100\text{A}/\mu\text{s}$ |
| Body Diode Reverse Recovery Charge | Q_{RR} | — | 3.1 | — | nC | $I_F = -1\text{A}, di/dt = 100\text{A}/\mu\text{s}$ |

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

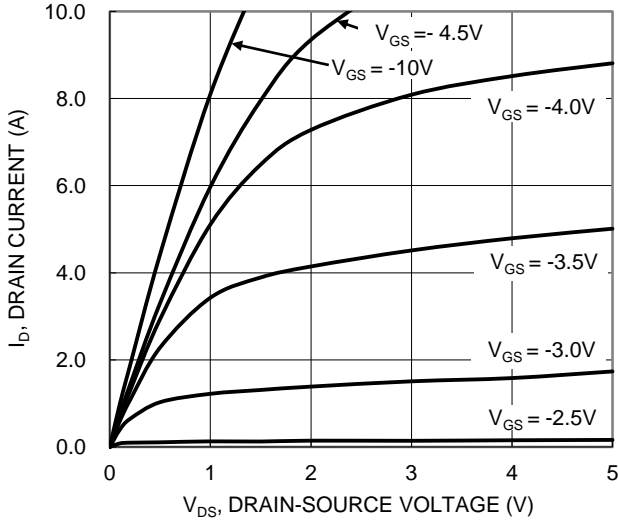


Figure 1. Typical Output Characteristic

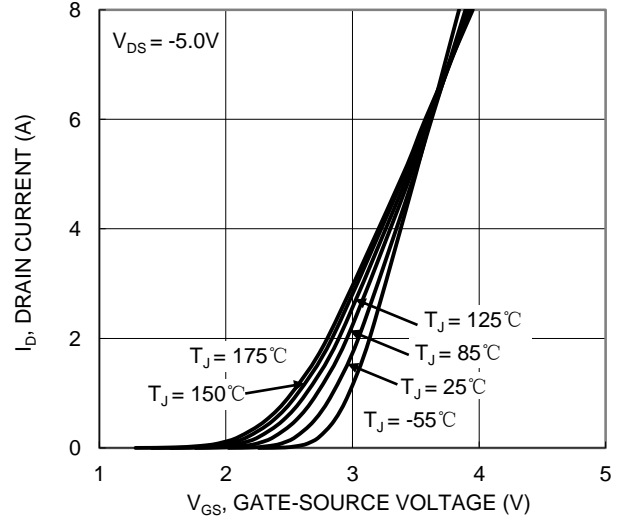


Figure 2. Typical Transfer Characteristic

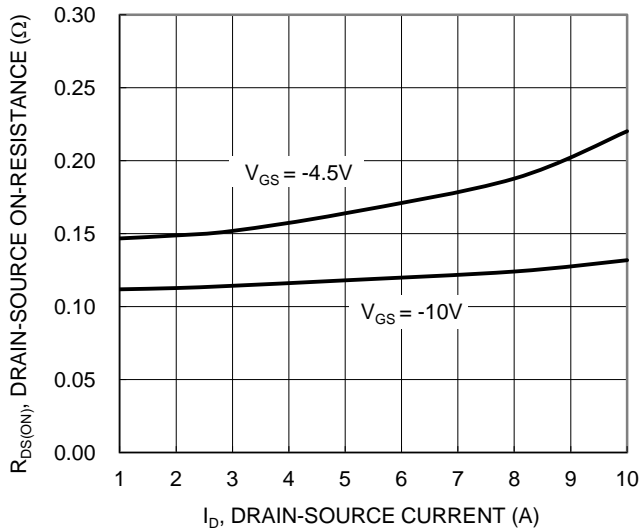


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

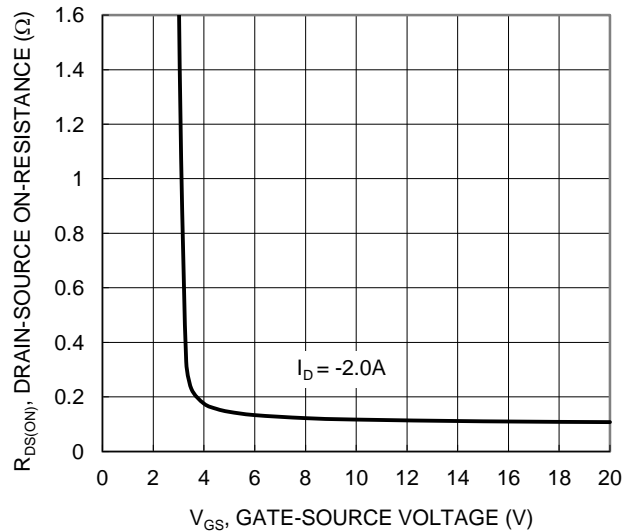


Figure 4. Typical Transfer Characteristic

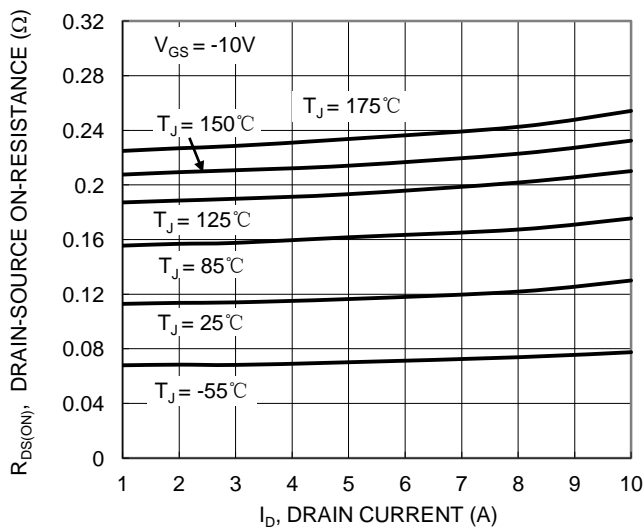


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

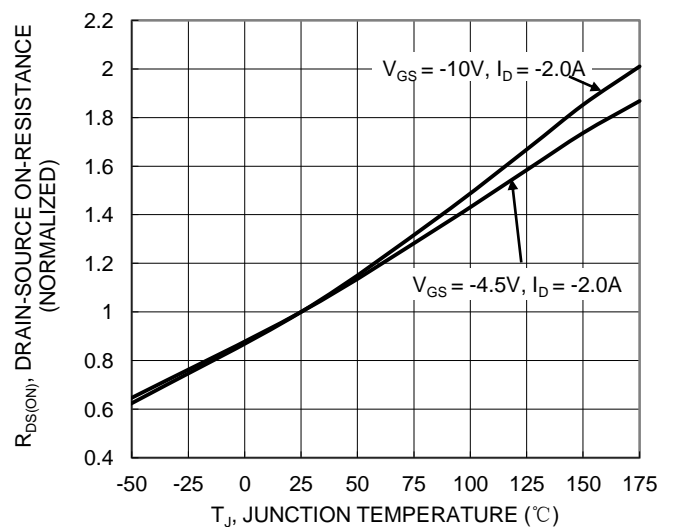
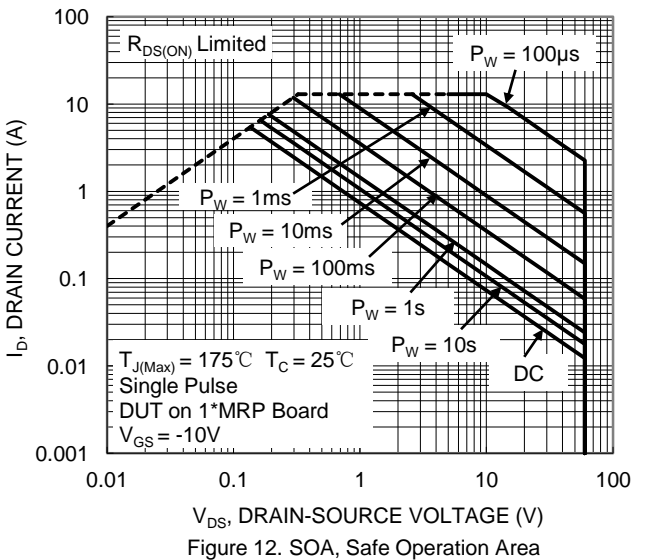
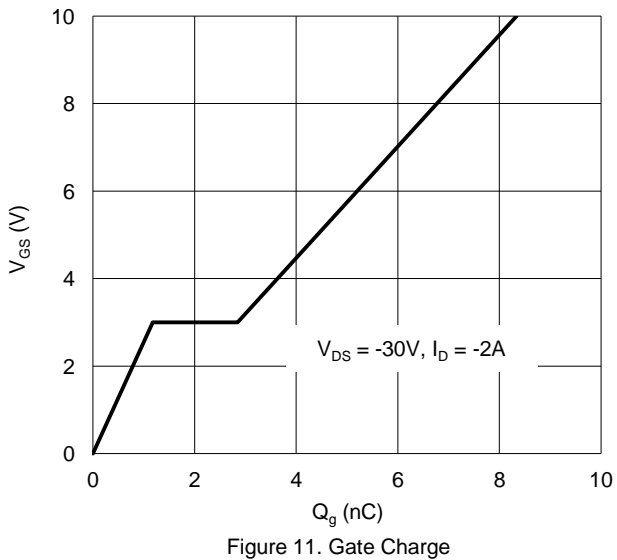
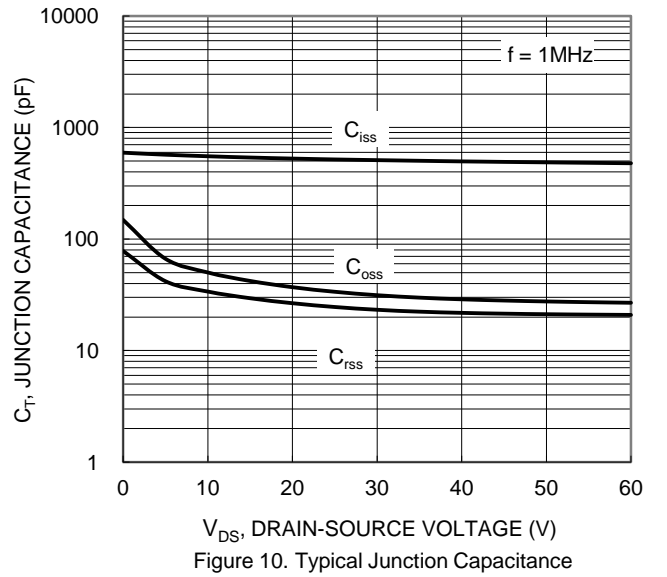
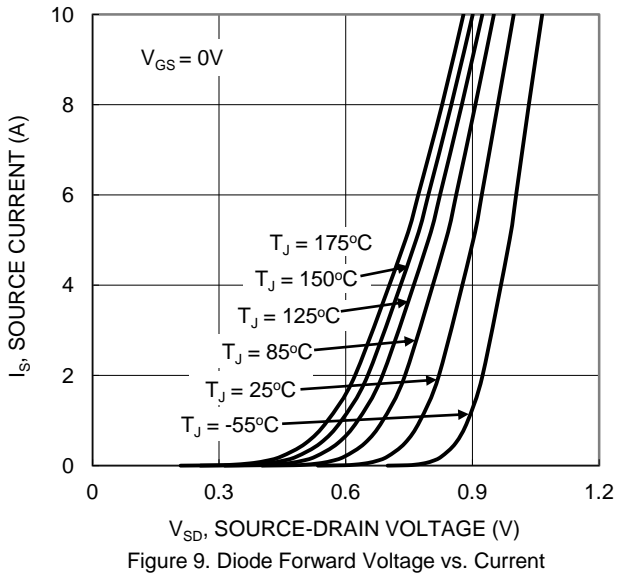
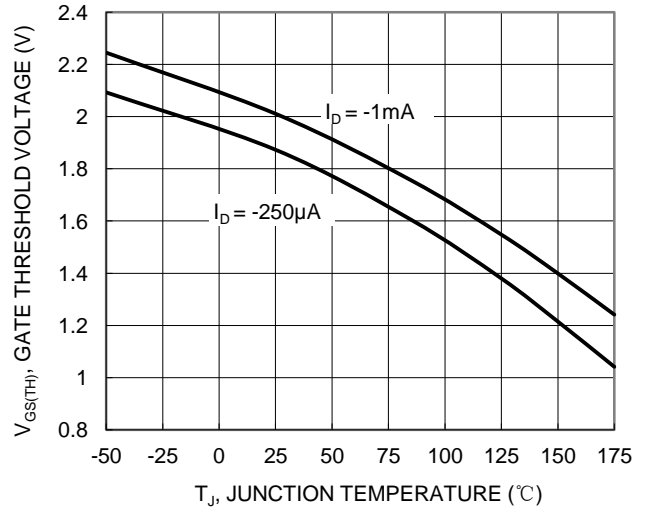
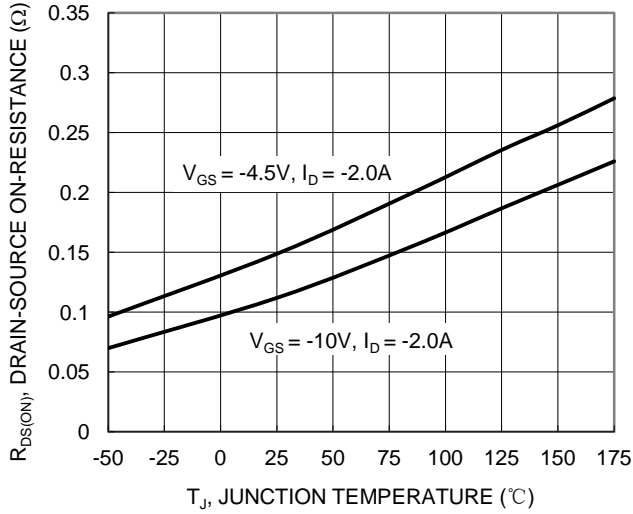


Figure 6. On-Resistance Variation with Temperature



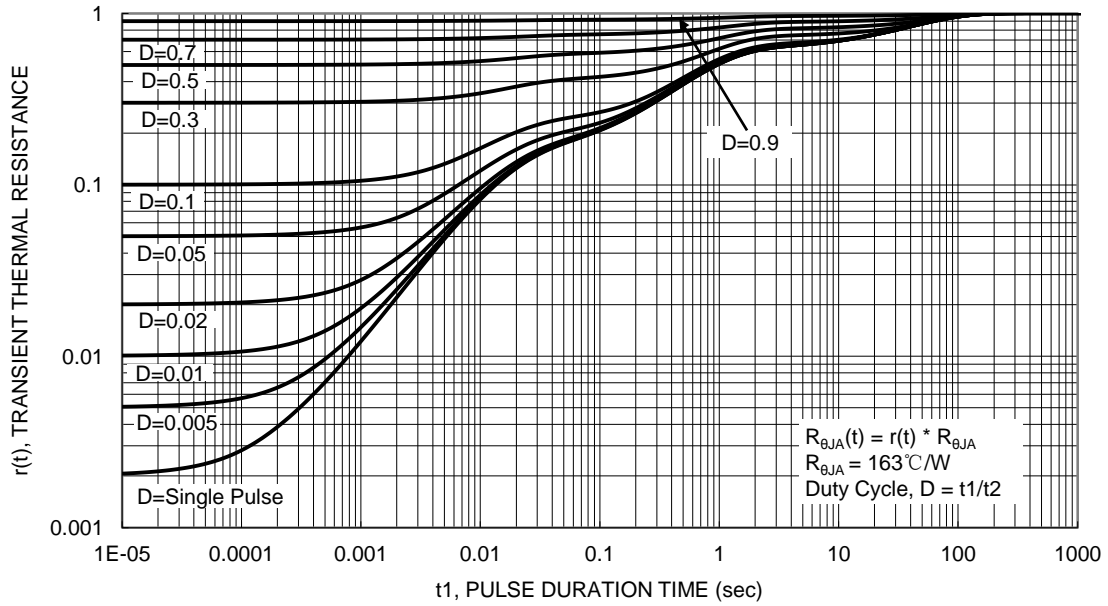
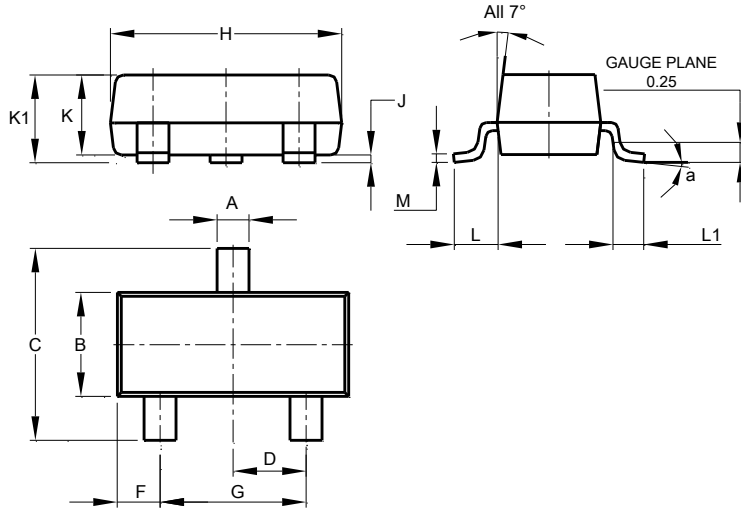


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT23

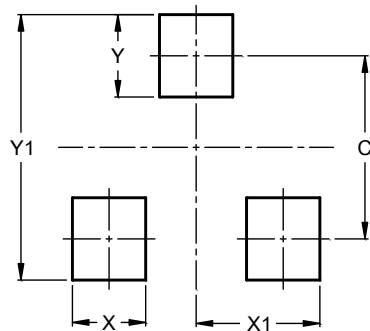


| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 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 | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.0 |
| X | 0.8 |
| X1 | 1.35 |
| Y | 0.9 |
| Y1 | 2.9 |

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