

Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _A = +25°C |
|-------------------|---------------------------------|--|
| -40V | 80mΩ @ V _{GS} = -10V | -3.4A |
| | 100mΩ @ V _{GS} = -4.5V | -3.0A |

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

Features and Benefits

- 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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMP4065SQ](#))**

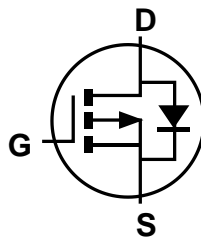
Mechanical Data

- 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)

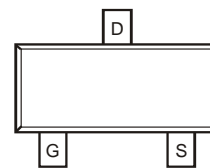
SOT23 (Standard)



Top View



Internal Schematic



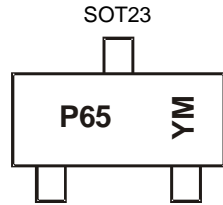
Top View

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|------------------|--------------------|
| DMP4065S-7 | SOT23 (Standard) | 3,000/Tape & Reel |
| DMP4065S-13 | SOT23 (Standard) | 10,000/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



P65 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: 1 = 2021)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

| Year | 2015 | ... | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|------|------|-----|------|------|------|------|------|------|------|------|------|------|
| Code | C | ... | 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°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|------------------|------------------------|------|
| Drain-Source Voltage | V _{DSS} | -40 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 5) V _{GS} = -10V | Steady State | T _A = +25°C | -2.4 |
| | | T _A = +70°C | -1.9 |
| Continuous Drain Current (Note 6) V _{GS} = -10V | Steady State | T _A = +25°C | -3.4 |
| | | T _A = +70°C | -2.7 |
| Pulsed Drain Current | I _{DM} | -20 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 0.72 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5) | R _{θJA} | 171 | °C/W |
| Power Dissipation (Note 6) | P _D | 1.4 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6) | R _{θJA} | 90 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

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.

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} | -40 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | -1.0 | μA | V _{DS} = -40V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| 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)} | — | 64 | 80 | mΩ | V _{GS} = -10V, I _D = -4.2A |
| | | | 85 | 100 | | V _{GS} = -4.5V, I _D = -3.3A |
| Diode Forward Voltage | V _{SD} | — | -0.7 | -1.2 | V | V _{GS} = 0V, I _S = -1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 587 | — | pF | V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 88 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 40 | — | pF | |
| Gate Resistance | R _g | — | 4 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = -4.5V) | Q _g | — | 6.1 | — | nC | V _{DS} = -20V, I _D = -4.2A |
| Total Gate Charge (V _{GS} = -10V) | Q _g | — | 12.2 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 1.8 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.4 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 3.6 | — | ns | |
| Turn-On Rise Time | t _R | — | 2.9 | — | ns | V _{DD} = -15V, V _{GS} = -10V, I _D = -1.0A, R _G = 6Ω |
| Turn-Off Delay Time | t _{D(OFF)} | — | 36.3 | — | ns | |
| Turn-Off Fall Time | t _F | — | 15.3 | — | ns | |

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

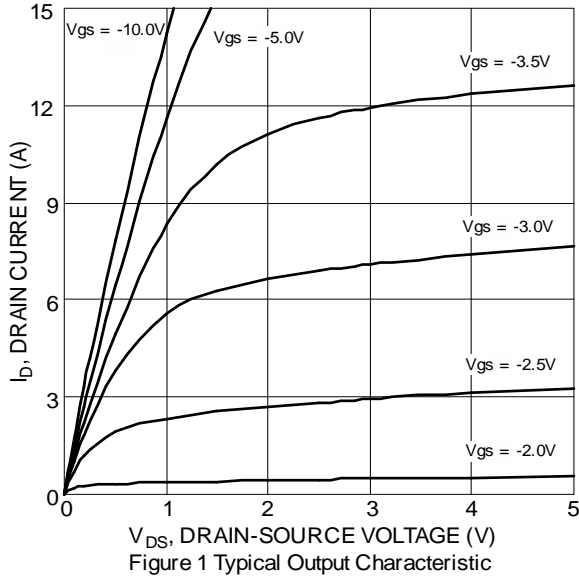


Figure 1 Typical Output Characteristic

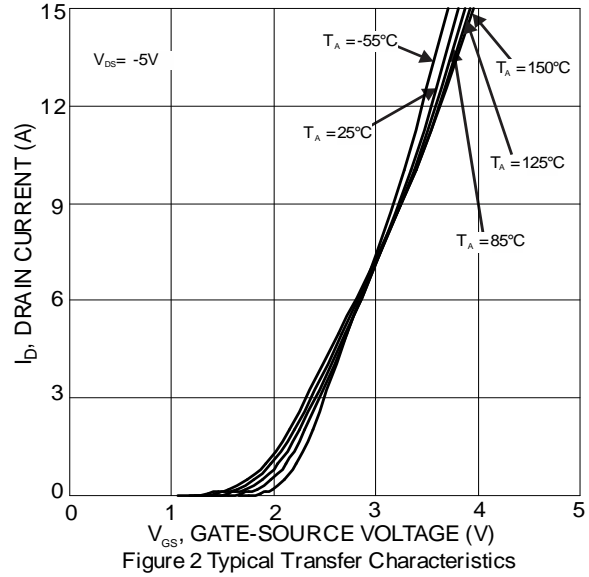


Figure 2 Typical Transfer Characteristics

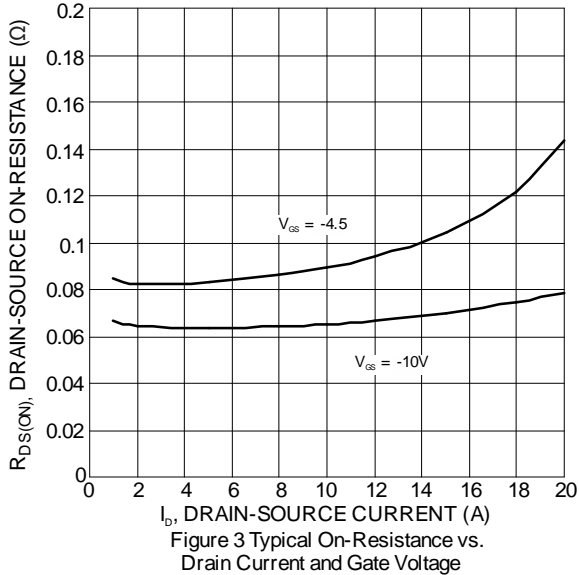


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

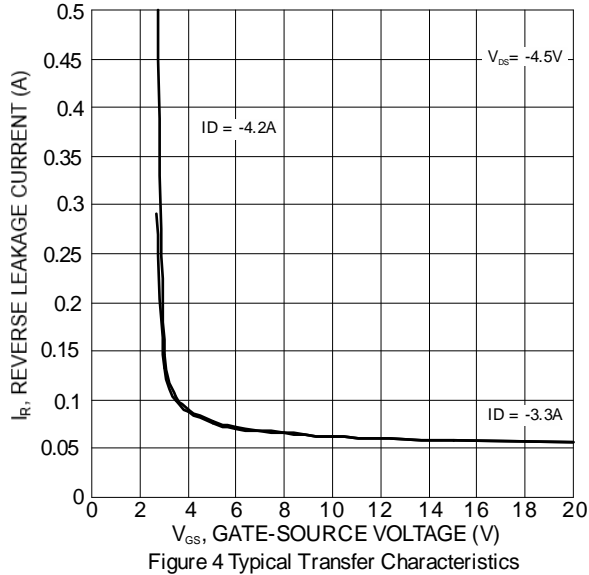


Figure 4 Typical Transfer Characteristics

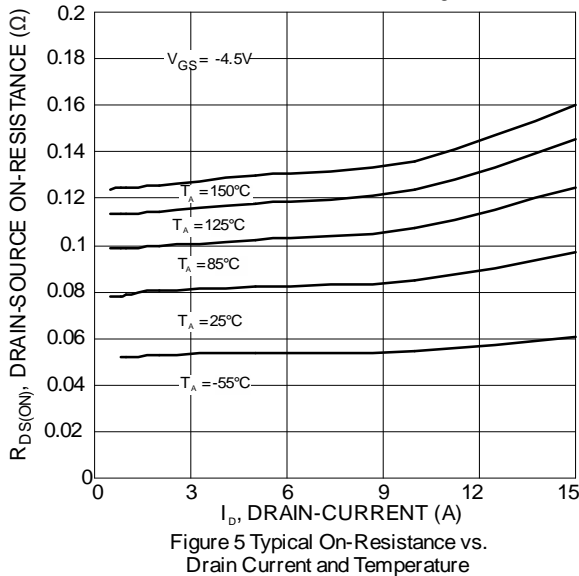


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

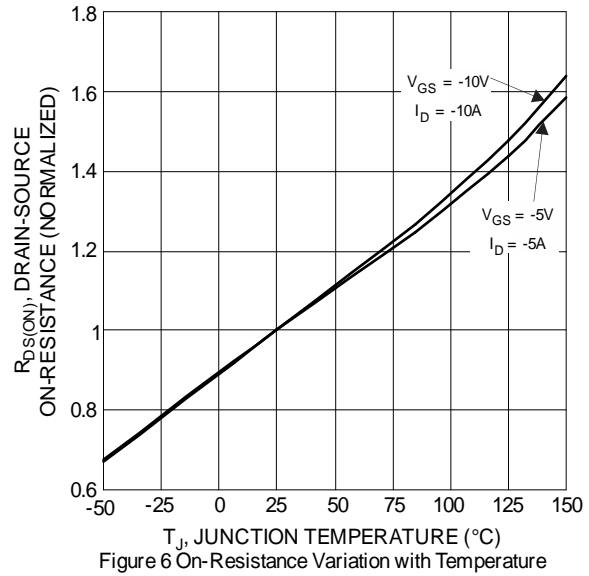


Figure 6 On-Resistance Variation with Temperature

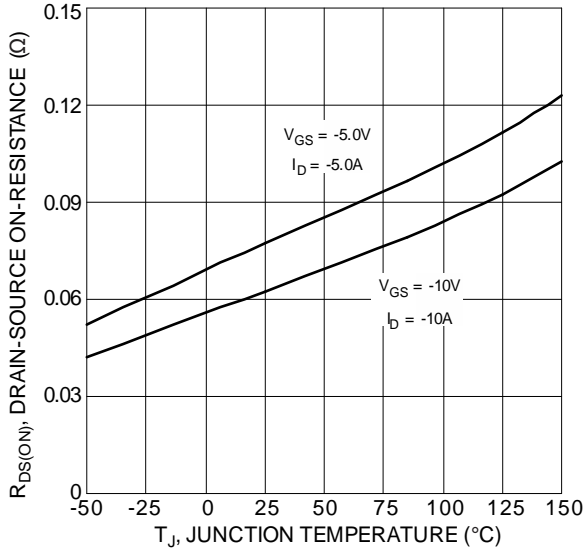


Figure 7 On-Resistance Variation with Temperature

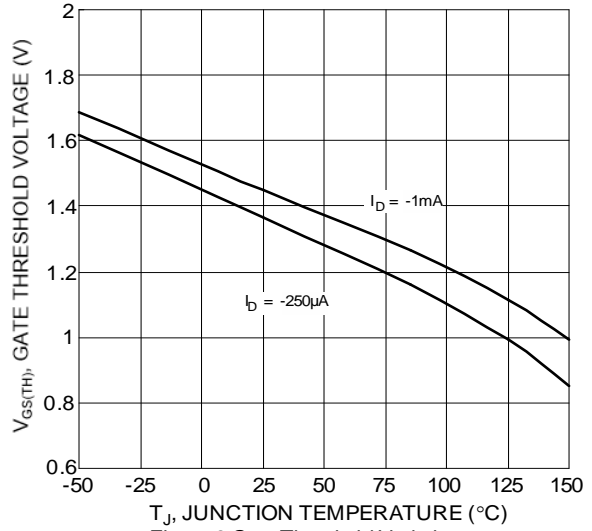


Figure 8 Gate Threshold Variation vs. Junction Temperature

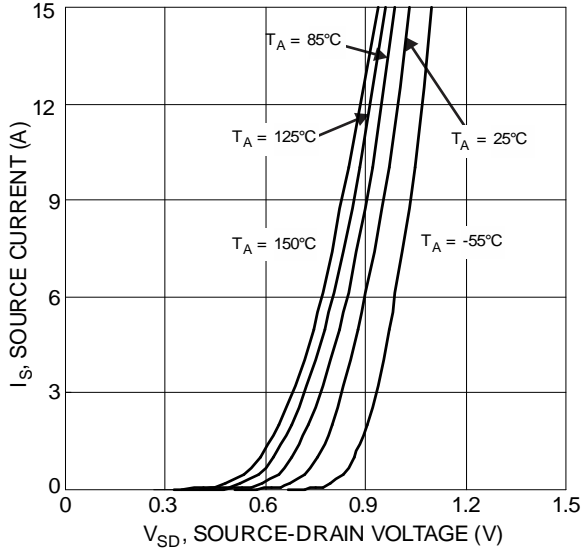


Figure 9 Diode Forward Voltage vs. Current

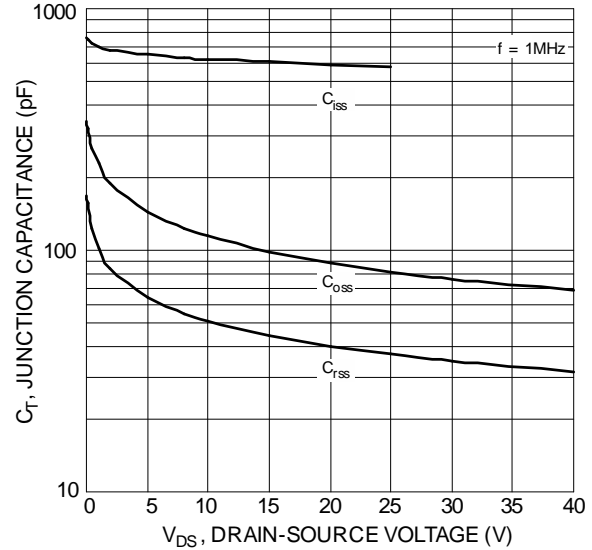


Figure 10 Typical Junction Capacitance

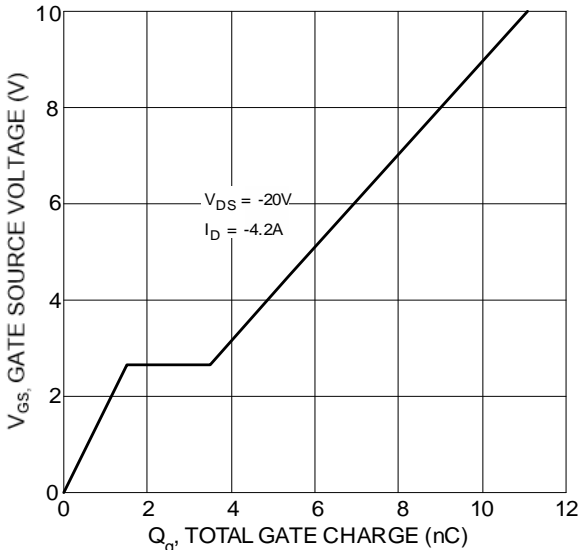


Figure 11 Gate Charge

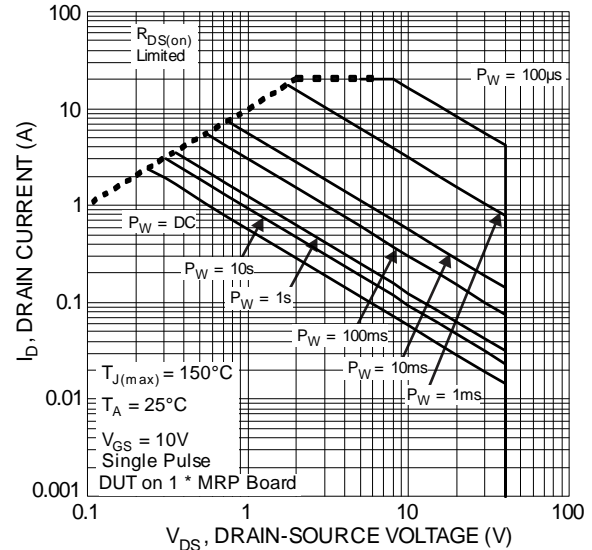


Figure 12 SOA, Safe Operation Area

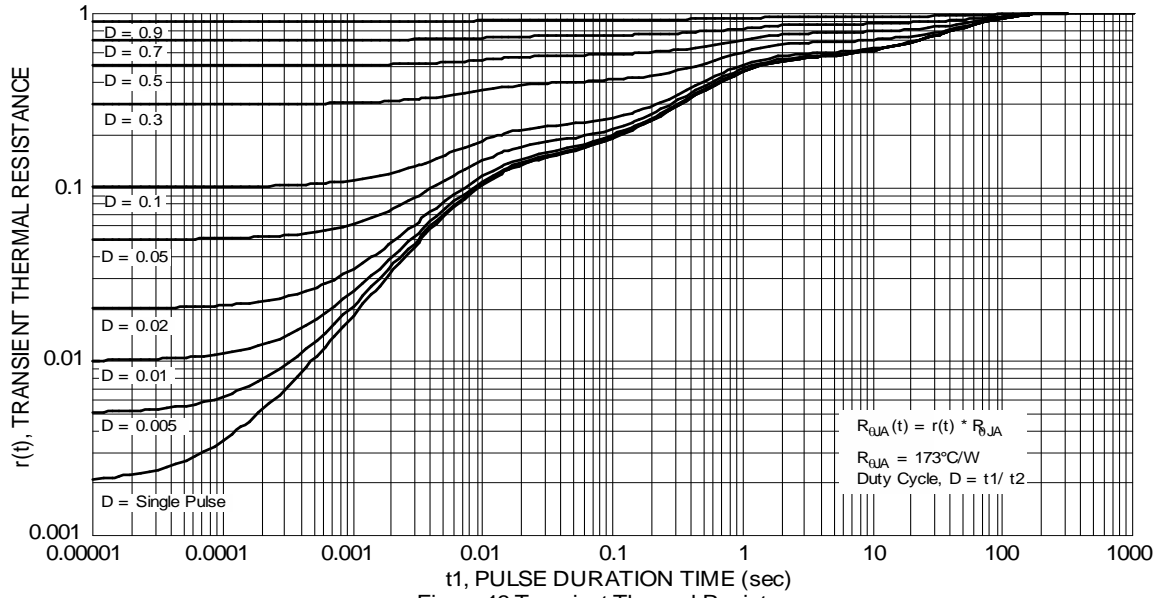
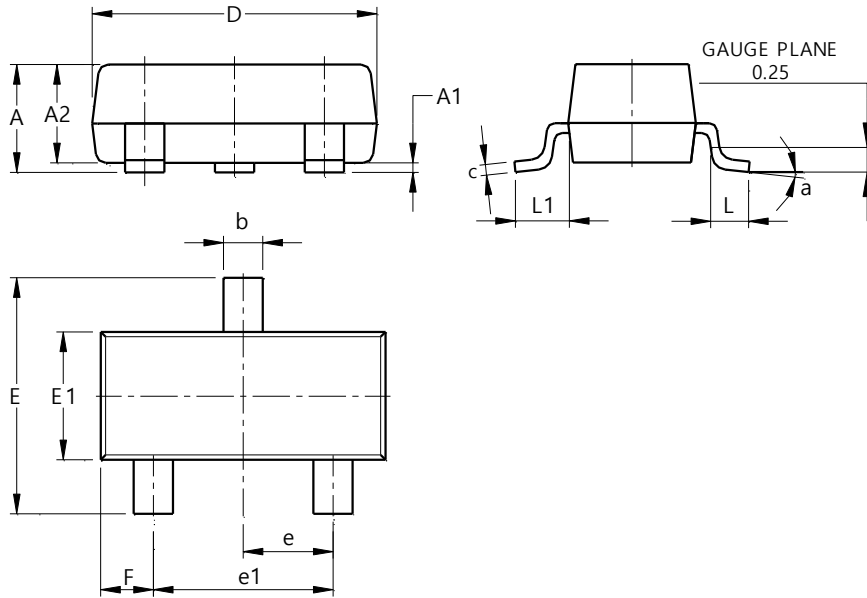


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

SOT23 (Standard)

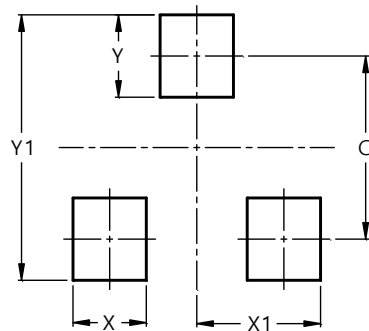


| SOT23 (Standard) | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.90 | 1.15 | 1.025 |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.85 | 1.10 | 0.975 |
| b | 0.30 | 0.51 | 0.40 |
| c | 0.080 | 0.202 | 0.11 |
| D | 2.80 | 3.00 | 2.90 |
| E | 2.25 | 2.55 | 2.40 |
| E1 | 1.20 | 1.40 | 1.30 |
| e | 0.89 | 1.03 | 0.915 |
| e1 | 1.78 | 2.05 | 1.83 |
| F | 0.40 | 0.60 | 0.535 |
| L1 | 0.45 | 0.61 | 0.55 |
| L | 0.25 | 0.55 | 0.40 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT23 (Standard)



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

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