

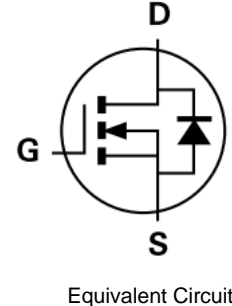
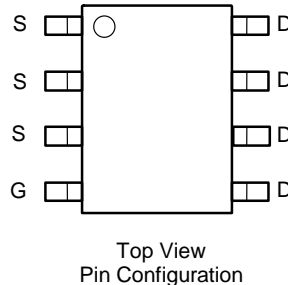
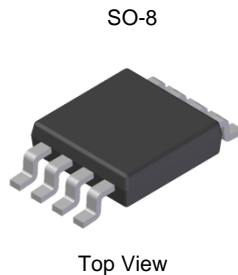
Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _C = +25°C |
|-------------------|-------------------------------|--|
| 30V | 2.7mΩ @ V _{GS} = 10V | 78A |
| | 4mΩ @ V _{GS} = 4.5V | 64A |

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.

- Backlighting
- Power Management Functions
- DC-DC Converters



Features and Benefits

- Low R_{DS(ON)} – Minimizes On-State Losses
 - Excellent Q_{gd} x R_{DS(ON)} Product (FOM)
 - Advanced Technology for DC-DC Converters
 - Small Form Factor Thermally Efficient Package Enables Higher Density End Products
 - 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
 - **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 [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.
- <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

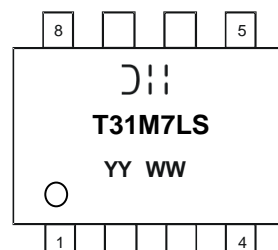
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|------|-------------------|
| DMT31M7LSS-13 | SO-8 | 2,500/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



☐☐☐ = Manufacturer's Marking
 T31M7LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Year (ex: 21 = 2021)
 WW or WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|------------------|------------------------------|------|
| Drain-Source Voltage | V _{DSS} | 30 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current, V _{GS} = 10V (Note 6) | I _D | T _A = +25°C 25 | A |
| | | T _A = +70°C 20 | |
| Continuous Drain Current, V _{GS} = 10V (Note 7) | I _D | T _C = +25°C 78 | A |
| | | T _C = +70°C 63 | |
| Maximum Continuous Body Diode Forward Current (Note 6) | I _S | 3.3 | A |
| Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%) | I _{DM} | 150 | A |
| Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%) | I _{SM} | 150 | A |
| Avalanche Current, L=0.1mH (Note 8) | I _{AS} | 59 | A |
| Avalanche Energy, L=0.1mH (Note 8) | E _{AS} | 176 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 1.7 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 73 | °C/W |
| Total Power Dissipation (Note 6) | P _D | 2.2 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 56 | °C/W |
| Thermal Resistance, Junction to Case (Note 7) | R _{θJC} | 5.9 | °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 9) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 24V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| 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)} | — | 2.1 | 2.7 | mΩ | V _{GS} = 10V, I _D = 20A |
| | | — | 2.6 | 4 | | V _{GS} = 4.5V, I _D = 20A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.0 | V | V _{GS} = 0V, I _S = 2A |
| DYNAMIC CHARACTERISTICS (Note 10) | | | | | | |
| Input Capacitance | C _{iss} | — | 5492 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 2261 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 317 | — | | |
| Gate Resistance | R _g | — | 1.6 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 84 | — | nC | V _{DD} = 15V, I _D = 20A |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 43 | — | | |
| Gate-Source Charge | Q _{gs} | — | 13 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 12 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 15 | — | ns | V _{DD} = 15V, V _{GS} = 10V, R _g = 3Ω, I _D = 20A |
| Turn-On Rise Time | t _r | — | 7 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 55 | — | | |
| Turn-Off Fall Time | t _f | — | 41 | — | | |
| Reverse Recovery Time | t _{RR} | — | 33 | — | ns | I _F = 15A, dI/dt = 500A/µs |
| Reverse Recovery Charge | Q _{RR} | — | 55 | — | nC | I _F = 15A, dI/dt = 500A/µs |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

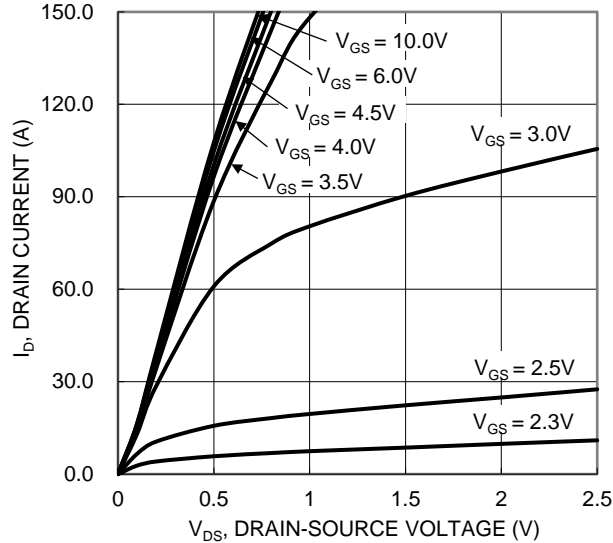


Figure 1. Typical Output Characteristic

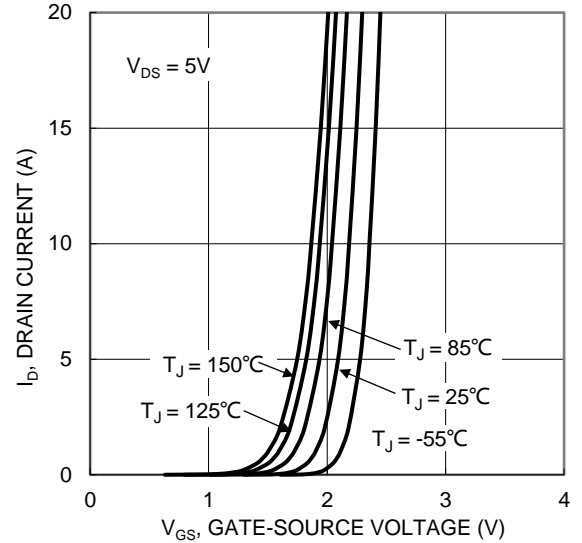


Figure 2. Typical Transfer Characteristic

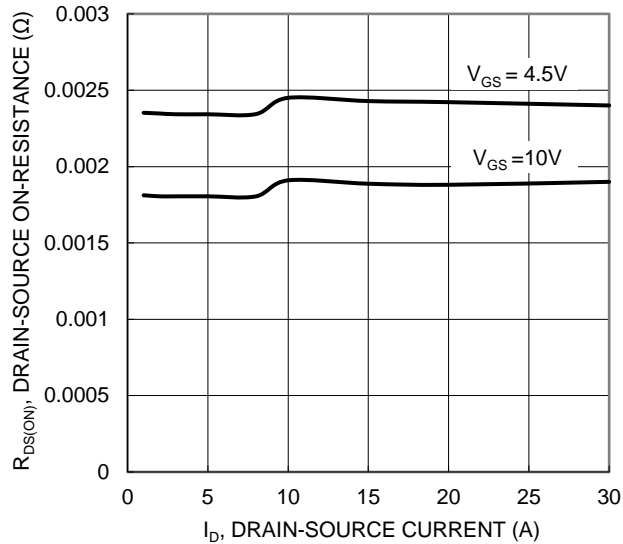


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

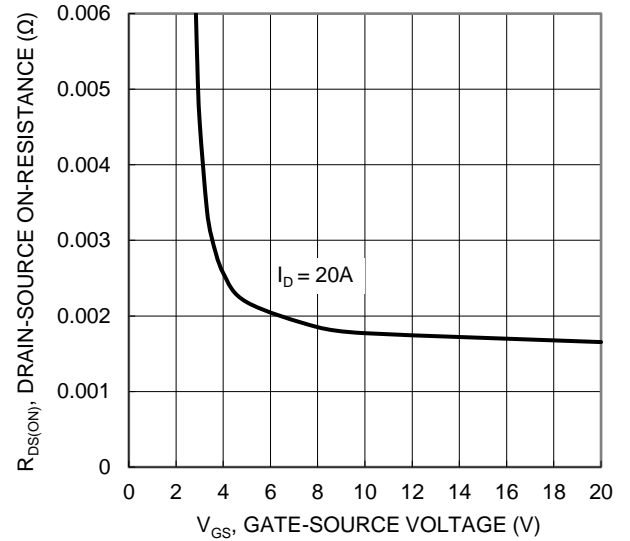


Figure 4. Typical Transfer Characteristic

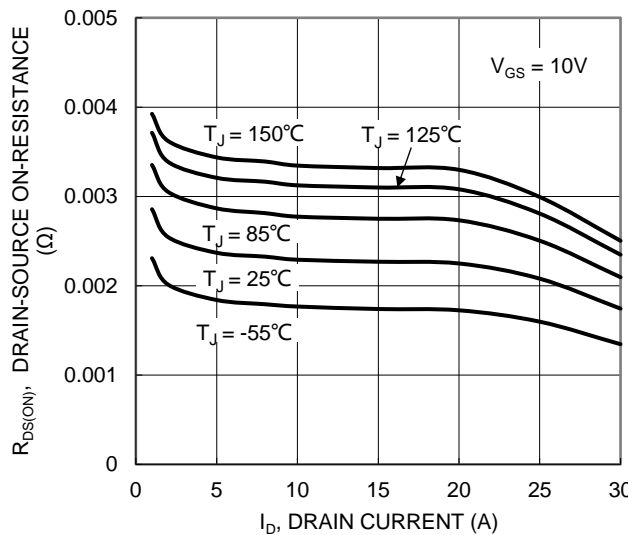


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

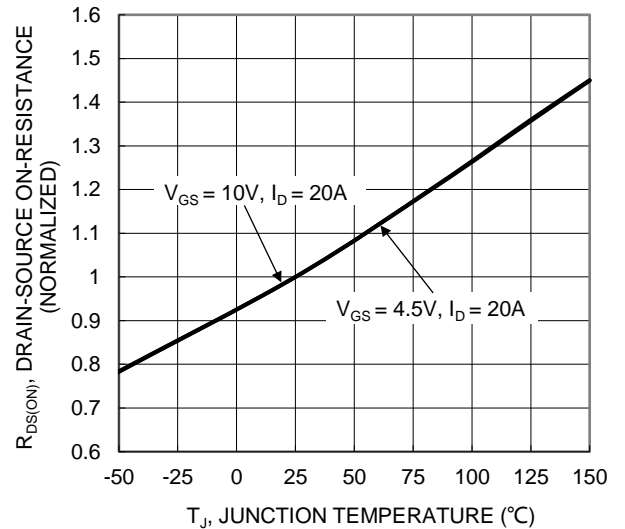
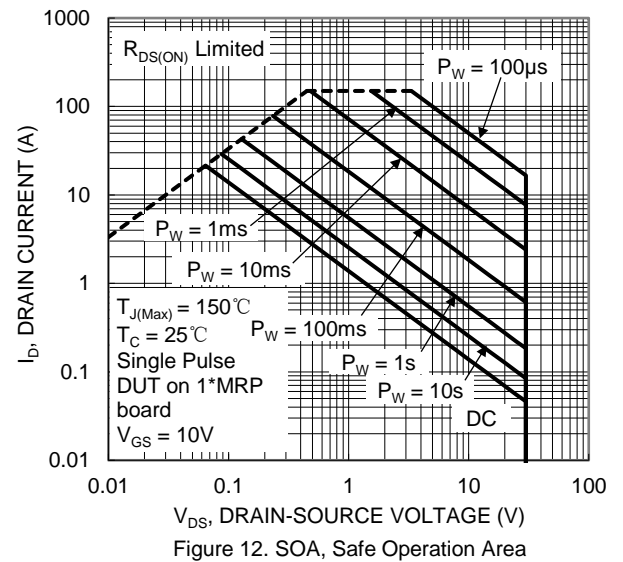
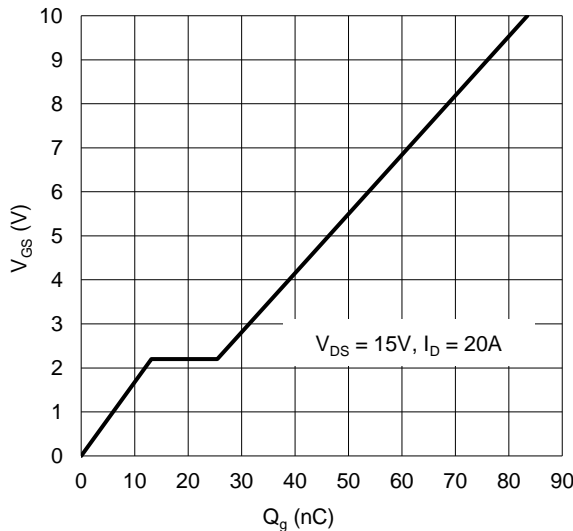
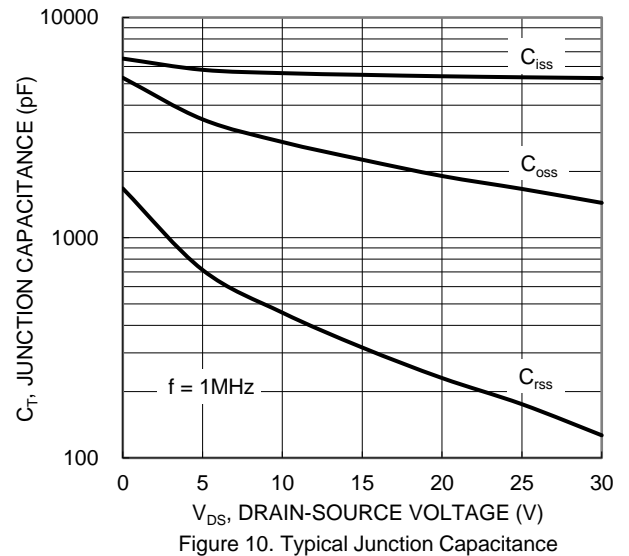
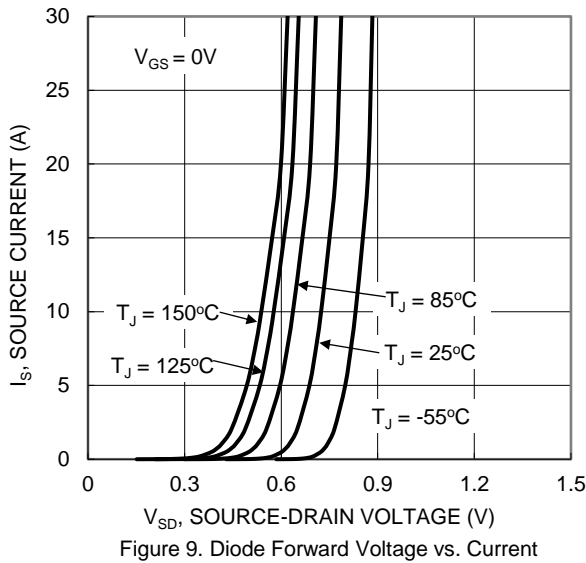
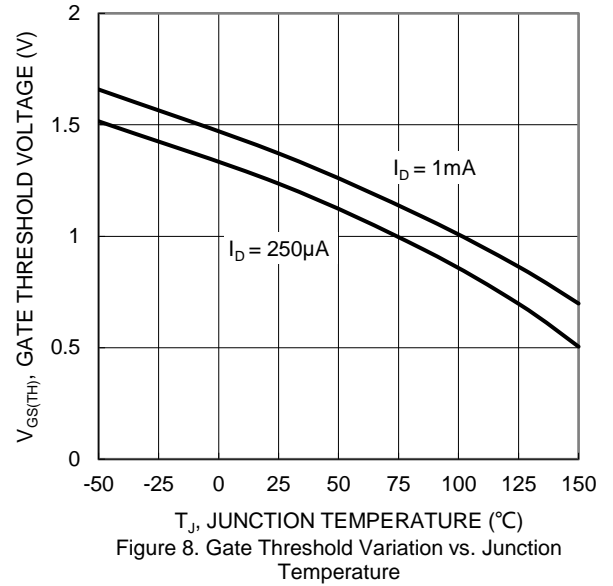
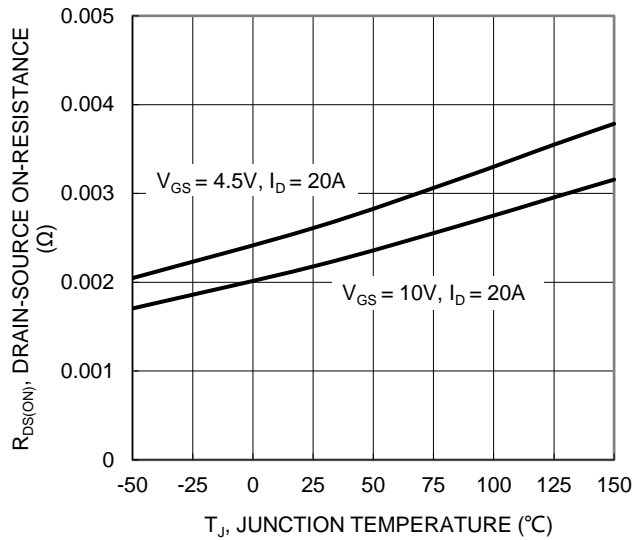


Figure 6. On-Resistance Variation with Temperature



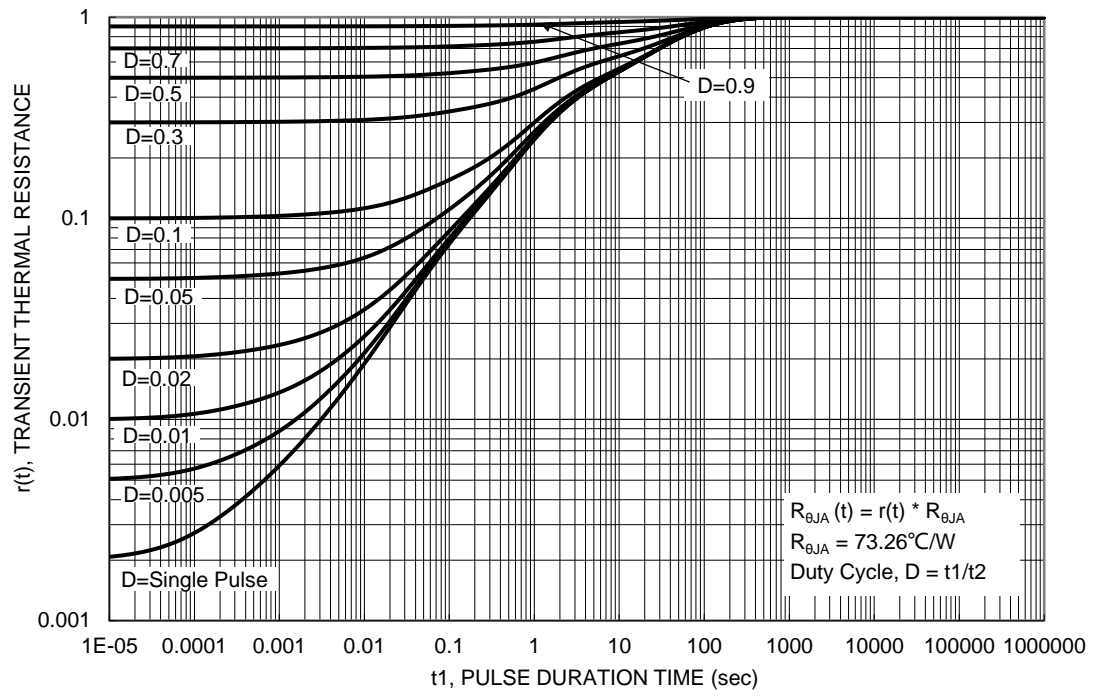
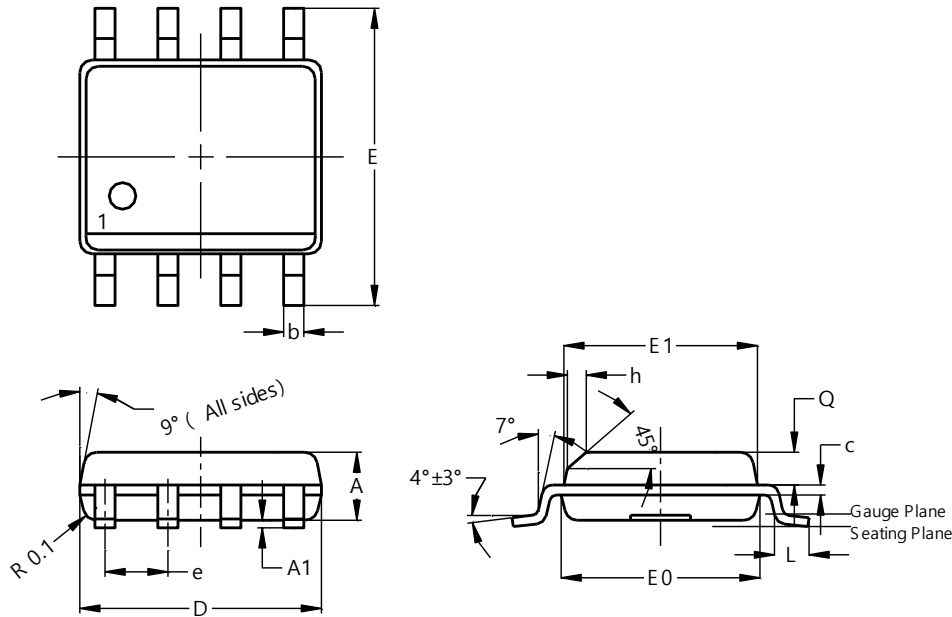


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

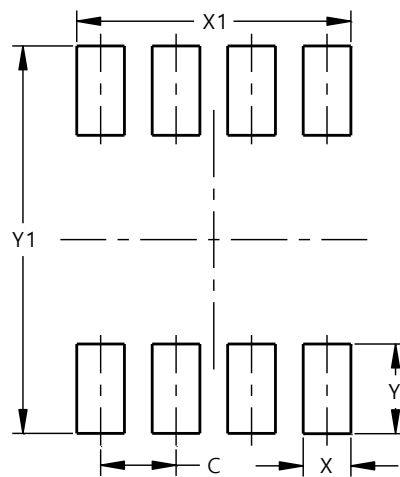


| SO-8 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.50 | 1.45 |
| A1 | 0.10 | 0.20 | 0.15 |
| b | 0.30 | 0.50 | 0.40 |
| c | 0.15 | 0.25 | 0.20 |
| D | 4.85 | 4.95 | 4.90 |
| E | 5.90 | 6.10 | 6.00 |
| E1 | 3.80 | 3.90 | 3.85 |
| E0 | 3.85 | 3.95 | 3.90 |
| e | -- | -- | 1.27 |
| h | -- | -- | 0.35 |
| L | 0.62 | 0.82 | 0.72 |
| Q | 0.60 | 0.70 | 0.65 |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SO-8



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.27 |
| X | 0.802 |
| X1 | 4.612 |
| Y | 1.505 |
| Y1 | 6.50 |

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