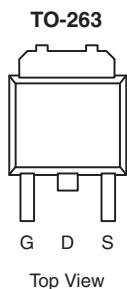


P-Channel 100-V (D-S) MOSFET

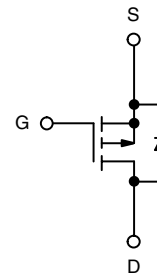
| PRODUCT SUMMARY | | | |
|---------------------|------------------------------------|--------------------|-----------------------|
| V _{DS} (V) | R _{DS(on)} (Ω) | I _D (A) | Q _g (Typ.) |
| - 100 | 0.019 at V _{GS} = - 10 V | - 90 | 97 nC |
| | 0.021 at V _{GS} = - 4.5 V | - 85 | |

FEATURES

- TrenchFET[®] Power MOSFET
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT


Drain Connected to Tab

Ordering Information: SUM90P10-19L-E3 (Lead (Pb)-free)


P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted | | | | |
|---|-------------------------|-----------------------------------|------------------------|------|
| Parameter | | Symbol | Limit | Unit |
| Drain-Source Voltage | | V _{DS} | - 100 | V |
| Gate-Source Voltage | | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 150 °C) | T _C = 25 °C | I _D | - 90 | A |
| | T _C = 125 °C | | - 52 | |
| | T _A = 25 °C | | - 17.2 ^{b, c} | |
| | T _A = 125 °C | | - 9.9 ^{b, c} | |
| Pulsed Drain Current | | I _{DM} | - 90 | |
| Continuous Source-Drain Diode Current | T _C = 25 °C | I _S | - 250 | |
| | T _A = 25 °C | | - 9 ^{b, c} | |
| Avalanche Current | | I _{AS} | - 70 | |
| Single-Pulse Avalanche Energy | L = 0.1 mH | E _{AS} | 245 | mJ |
| Maximum Power Dissipation | T _C = 25 °C | P _D | 375 | W |
| | T _C = 125 °C | | 125 | |
| | T _A = 25 °C | | 13.6 ^{b, c} | |
| | T _A = 125 °C | | 4.5 ^{b, c} | |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | - 55 to 175 | °C |

| THERMAL RESISTANCE RATINGS | | | | | |
|---|--------------|-------------------|---------|---------|------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient ^{b, d} | t ≤ 10 s | R _{thJA} | 8 | 11 | °C/W |
| Maximum Junction-to-Case (Drain) | Steady State | R _{thJC} | 0.33 | 0.4 | |

Notes:

a. Package Limited.

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 10 s.

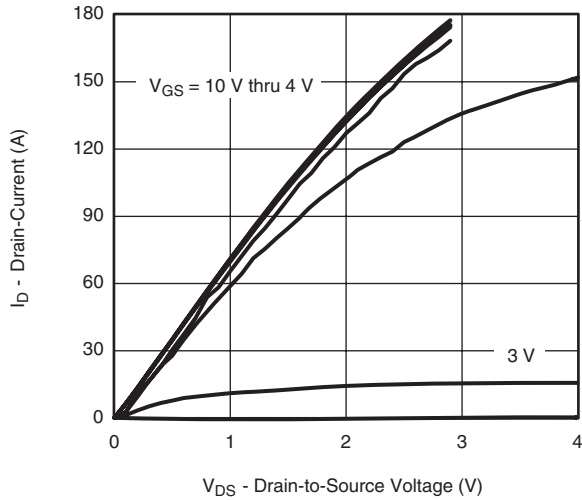
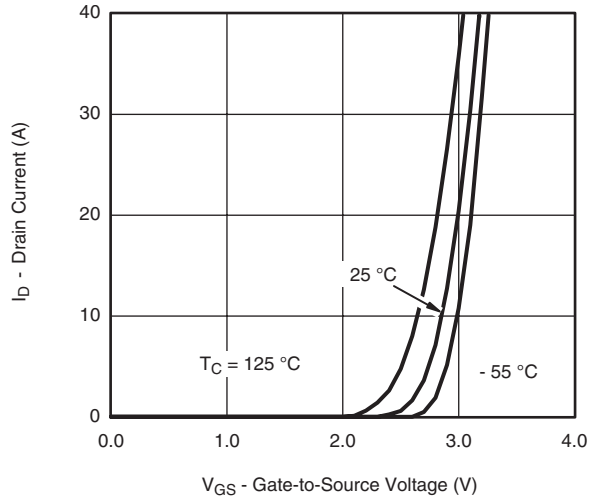
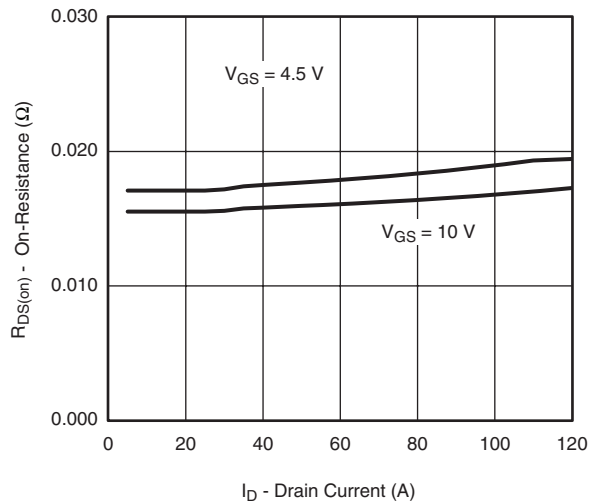
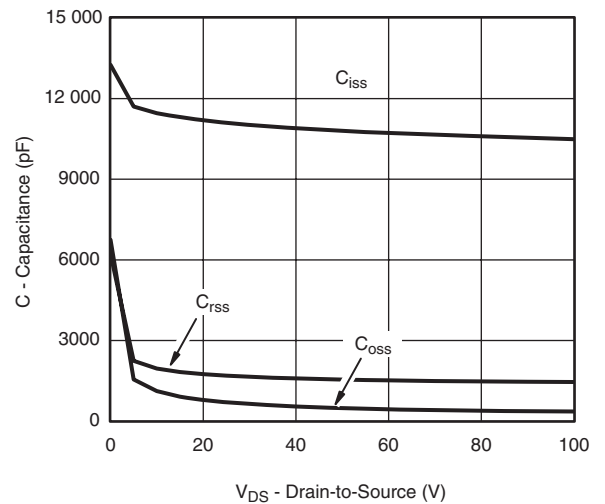
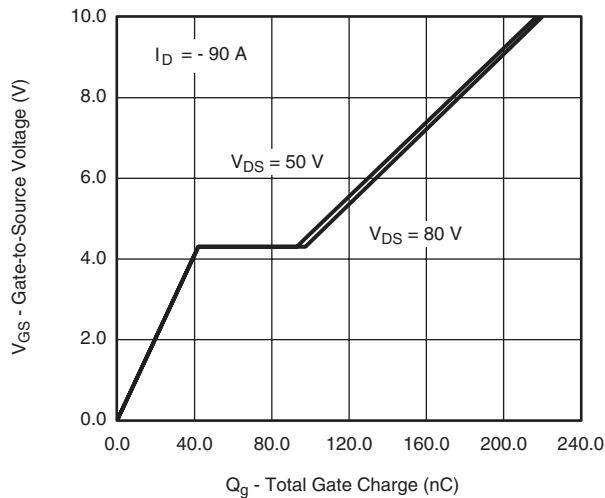
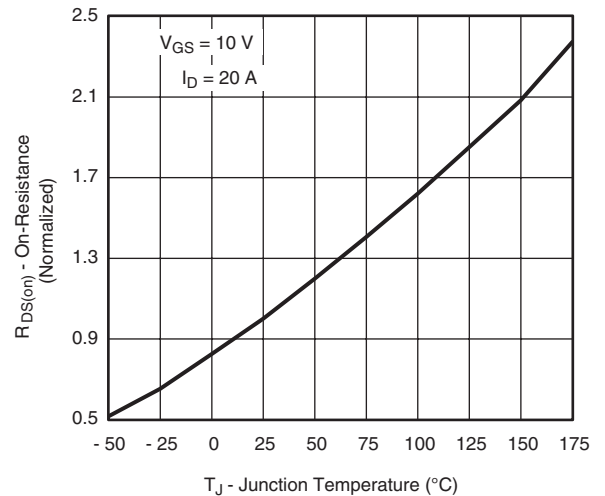
d. Maximum under Steady State conditions is 40 °C/W.

| SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|---|-------------------------|--|-------|--------|-----------|----------------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$ | - 100 | | | V |
| V_{DS} Temperature Coefficient | $\Delta V_{DS}/T_J$ | $I_D = -250\text{ }\mu\text{A}$ | | - 125 | | mV/ $^\circ\text{C}$ |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}/T_J$ | | | 5.9 | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$ | - 1 | | - 3 | V |
| Gate-Source Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}$ | | | - 1 | μA |
| | | $V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$ | | | - 500 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \geq 10\text{ V}, V_{GS} = -10\text{ V}$ | - 90 | | | A |
| Drain-Source On-State Resistance ^a | $R_{DS(on)}$ | $V_{GS} = -10\text{ V}, I_D = -20\text{ A}$ | | 0.0156 | 0.019 | Ω |
| | | $V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$ | | 0.0173 | 0.021 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = -15\text{ V}, I_D = -20\text{ A}$ | | 80 | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = -50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | | 11100 | | pF |
| Output Capacitance | C_{oss} | | | 700 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 1690 | | |
| Total Gate Charge | Q_g | $V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V}, I_D = -90\text{ A}$ | | 217 | 326 | nC |
| | | | | 97 | 146 | |
| Gate-Source Charge | Q_{gs} | $V_{DS} = -50\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -90\text{ A}$ | | 42 | | |
| Gate-Drain Charge | Q_{gd} | | | 51 | | |
| Gate Resistance | R_g | $f = 1\text{ MHz}$ | | 3.5 | | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = -50\text{ V}, R_L = 0.56\text{ }\Omega$ $I_D \cong -90\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$ | | 20 | 30 | ns |
| Rise Time | t_r | | | 510 | 855 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 145 | 220 | |
| Fall Time | t_f | | | 870 | 1300 | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Source-Drain Diode Current | I_S | $T_C = 25\text{ }^\circ\text{C}$ | | | - 90 | A |
| Pulse Diode Forward Current ^a | I_{SM} | | | | - 250 | |
| Body Diode Voltage | V_{SD} | $I_S = -20\text{ A}$ | | - 0.8 | - 1.5 | V |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F = -20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$ | | 80 | 120 | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | | | 220 | 330 | nC |
| Reverse Recovery Fall Time | t_a | | | 56 | | ns |
| Reverse Recovery Rise Time | t_b | | | 24 | | |

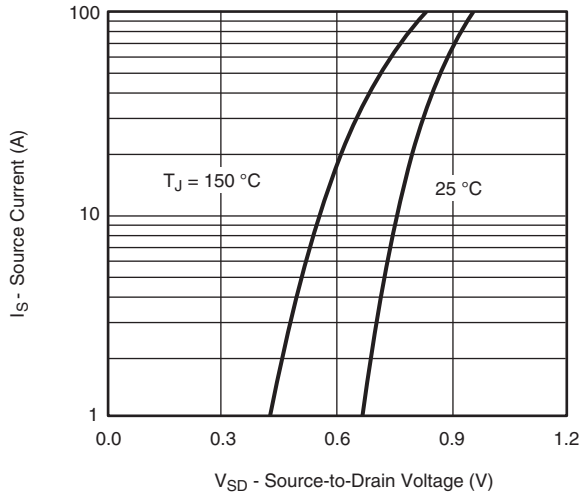
Notes

- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

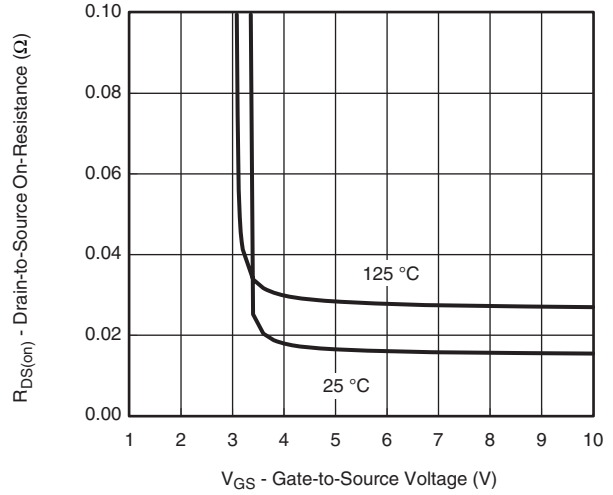
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

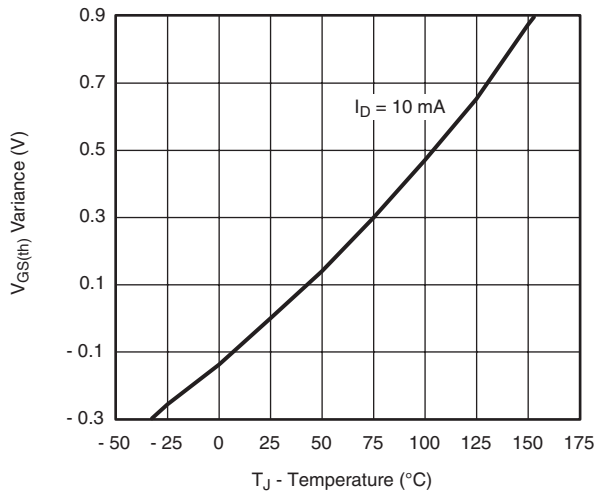
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



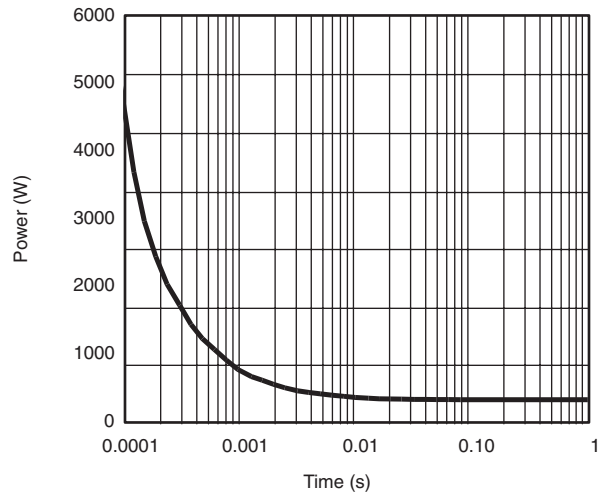
Source-Drain Diode Forward Voltage



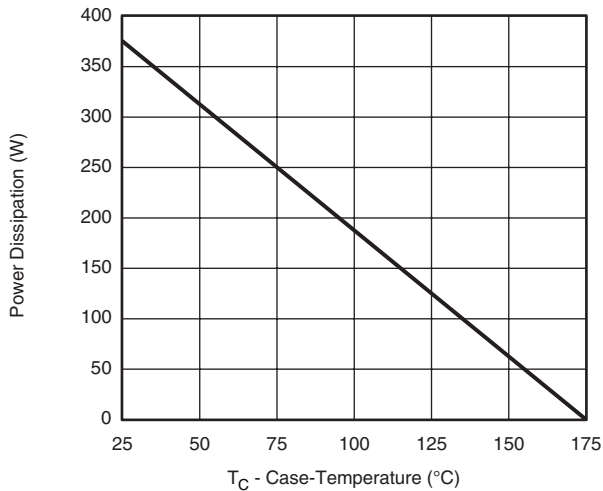
On-Resistance vs. Gate-to-Source Voltage



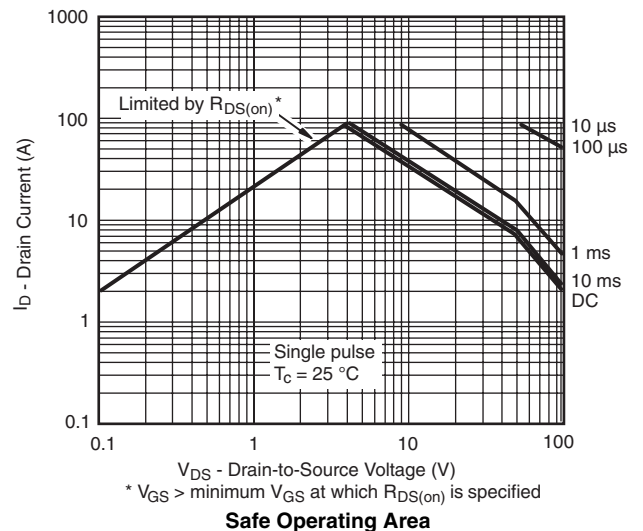
Threshold Voltage



Single Pulse, Junction-to-Case ($T_C = 25^\circ\text{C}$)

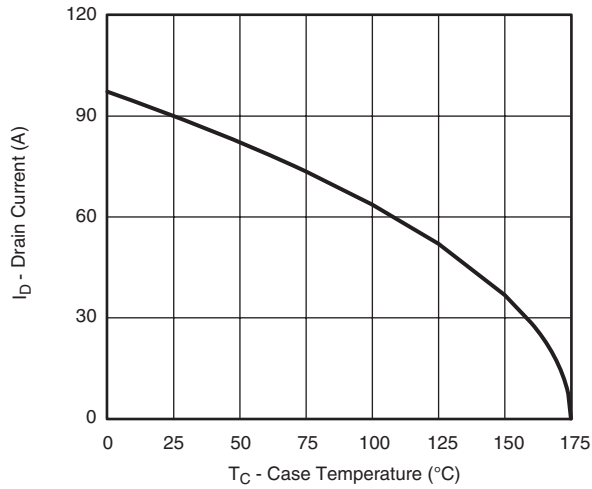


Power Derating (Junction-to-Case)

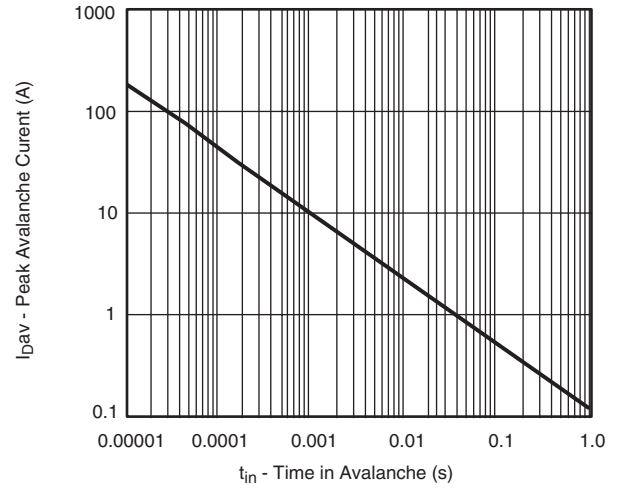


Safe Operating Area

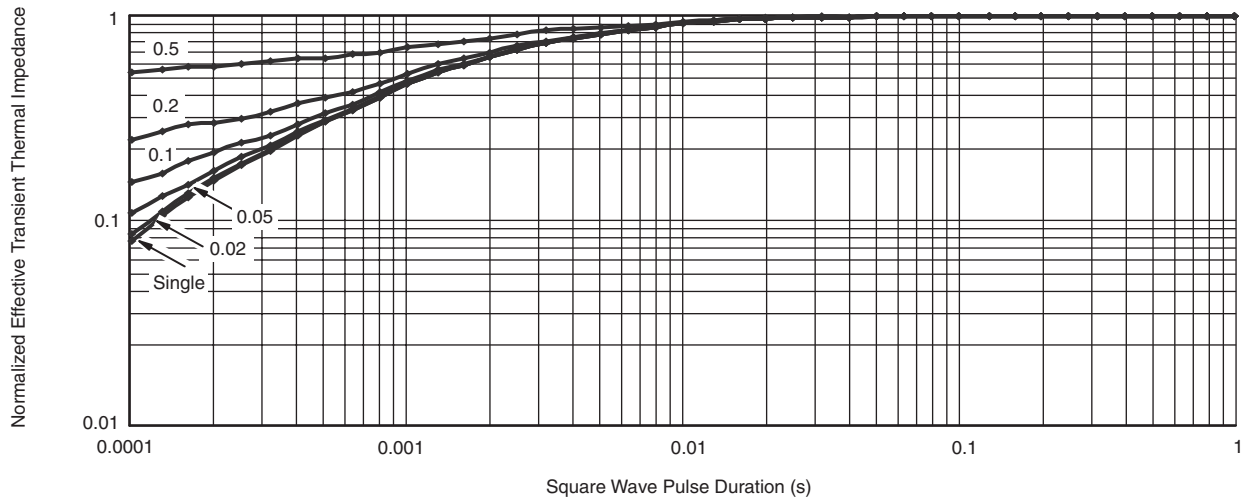
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Max Avalanche and Drain Current vs. Case Temperature



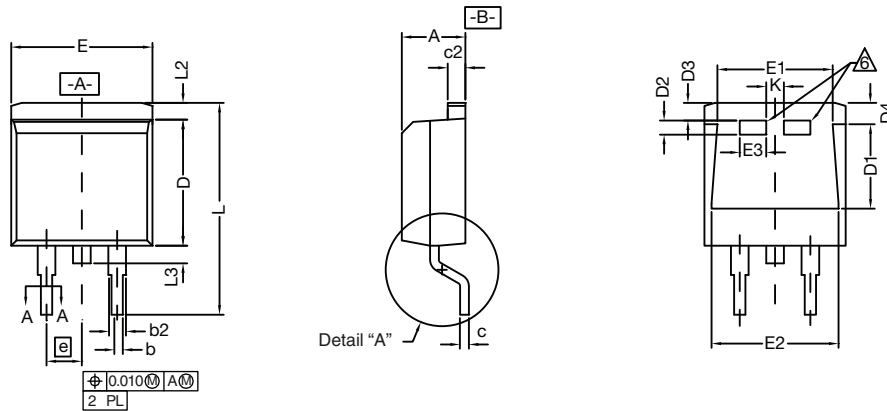
Avalanche Current vs. Time



Normalized Thermal Transient Impedance, Junction-to-Case

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TO-263 (D²PAK): 3-LEAD



| DIM. | INCHES | | MILLIMETERS | | |
|---------------------------------|------------|-------|-------------|--------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 0.160 | 0.190 | 4.064 | 4.826 | |
| b | 0.020 | 0.039 | 0.508 | 0.990 | |
| b1 | 0.020 | 0.035 | 0.508 | 0.889 | |
| b2 | 0.045 | 0.055 | 1.143 | 1.397 | |
| c* | Thin lead | 0.013 | 0.018 | 0.330 | 0.457 |
| | Thick lead | 0.023 | 0.028 | 0.584 | 0.711 |
| c1 | Thin lead | 0.013 | 0.017 | 0.330 | 0.431 |
| | Thick lead | 0.023 | 0.027 | 0.584 | 0.685 |
| c2 | 0.045 | 0.055 | 1.143 | 1.397 | |
| D | 0.340 | 0.380 | 8.636 | 9.652 | |
| D1 | 0.220 | 0.240 | 5.588 | 6.096 | |
| D2 | 0.038 | 0.042 | 0.965 | 1.067 | |
| D3 | 0.045 | 0.055 | 1.143 | 1.397 | |
| D4 | 0.044 | 0.052 | 1.118 | 1.321 | |
| E | 0.380 | 0.410 | 9.652 | 10.414 | |
| E1 | 0.245 | - | 6.223 | - | |
| E2 | 0.355 | 0.375 | 9.017 | 9.525 | |
| E3 | 0.072 | 0.078 | 1.829 | 1.981 | |
| e | 0.100 BSC | | 2.54 BSC | | |
| K | 0.045 | 0.055 | 1.143 | 1.397 | |
| L | 0.575 | 0.625 | 14.605 | 15.875 | |
| L1 | 0.090 | 0.110 | 2.286 | 2.794 | |
| L2 | 0.040 | 0.055 | 1.016 | 1.397 | |
| L3 | 0.050 | 0.070 | 1.270 | 1.778 | |
| L4 | 0.010 BSC | | 0.254 BSC | | |
| M | - | 0.002 | - | 0.050 | |
| ECN: T13-0707-Rev. K, 30-Sep-13 | | | | | |
| DWG: 5843 | | | | | |

Notes

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
- This feature is for thick lead.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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