

N-Channel Enhancement Mode Power MOSFET

Description

The RM100N60HD uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

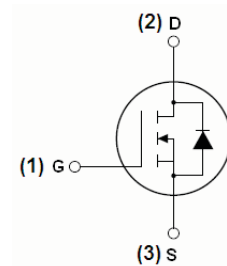
General Feature

- $V_{DS} = 60V, I_D = 100A$
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS} = 10V$ (Typ: 5.7m Ω)
- Special process technology for high ESD capability
- High density cell design for ultra low R_{Dson}
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply
- Halogen-free

100% UIS TESTED!
100% ΔV_{ds} TESTED!



Schematic diagram



TO-263 top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| 100N60 | RM100N60HD | TO-263 | - | - | - |

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|--------------------|----------|------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 100 | A |
| Drain Current-Continuous ($T_C = 100^\circ C$) | $I_D(100^\circ C)$ | 70 | A |
| Pulsed Drain Current | I_{DM} | 320 | A |

| | | | |
|---|----------------|------------|------|
| Maximum Power Dissipation | P_D | 170 | W |
| Derating factor | | 1.13 | W/°C |
| Single pulse avalanche energy ^(Note 5) | E_{AS} | 550 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | °C |

Thermal Characteristic

| | | | |
|--|-----------------|------|------|
| Thermal Resistance, Junction-to-Case ^(Note 2) | $R_{\theta Jc}$ | 0.88 | °C/W |
|--|-----------------|------|------|

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

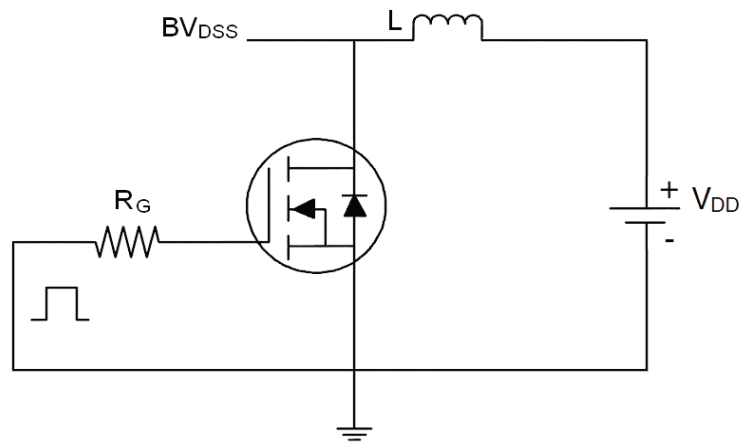
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|--------------|---|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 60 | 65 | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=60V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 3 | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=40A$ | - | 5.7 | 6.5 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=10V, I_D=40A$ | - | 50 | - | S |
| Dynamic Characteristics ^(Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=30V, V_{GS}=0V,$ $F=1.0\text{MHz}$ | - | 4800 | - | PF |
| Output Capacitance | C_{oss} | | - | 440 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 260 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=30V, I_D=1A$ $V_{GS}=10V, R_{GEN}=2.5\Omega$ | - | 16.8 | - | nS |
| Turn-on Rise Time | t_r | | - | 10.8 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 55 | - | nS |
| Turn-Off Fall Time | t_f | | - | 13.6 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$ | - | 85 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 18 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 28 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V_{SD} | $V_{GS}=0V, I_S=20A$ | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I_S | - | - | - | 90 | A |
| Reverse Recovery Time | t_{rr} | $T_J = 25^\circ\text{C}, I_F = 40A$ $di/dt = 100A/\mu\text{s}$ ^(Note 3) | - | 38 | - | nS |
| Reverse Recovery Charge | Q_{rr} | | - | 53 | - | nC |
| Forward Turn-On Time | t_{on} | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

Notes:

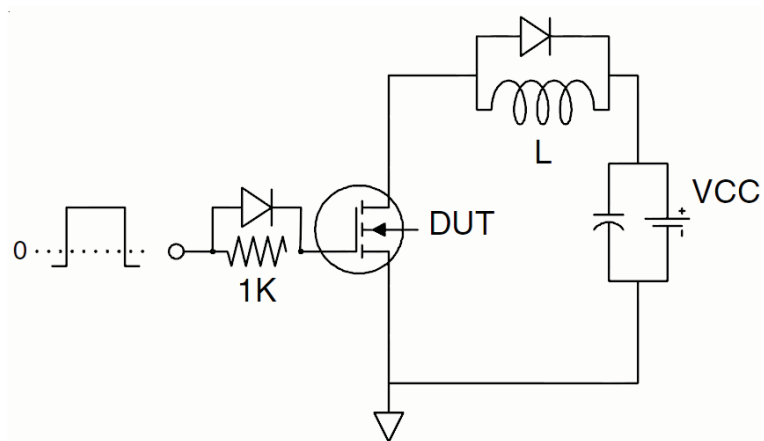
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Test circuit

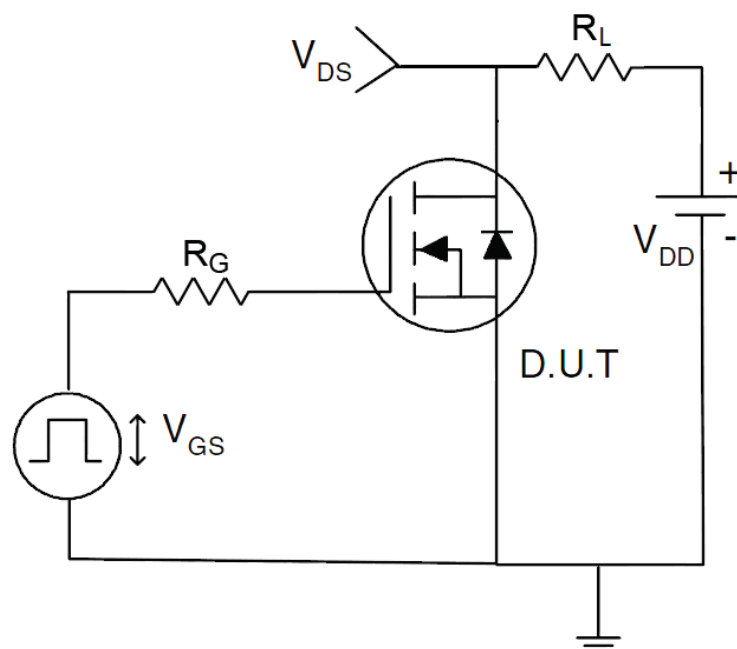
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



RATING AND CHARACTERISTICS CURVES (RM100N60HD)

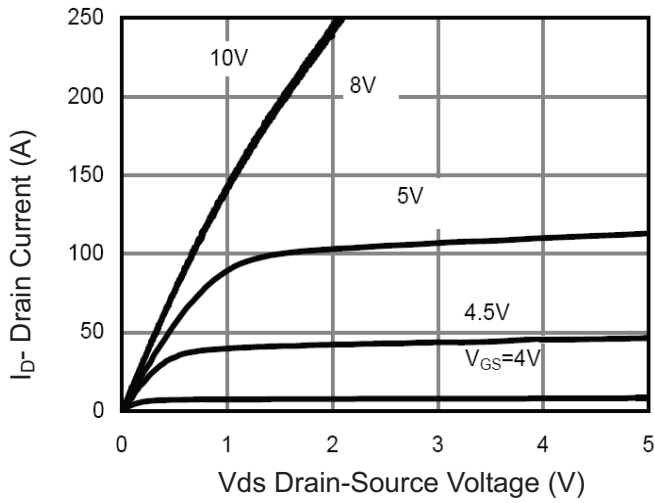


Figure 1 Output Characteristics

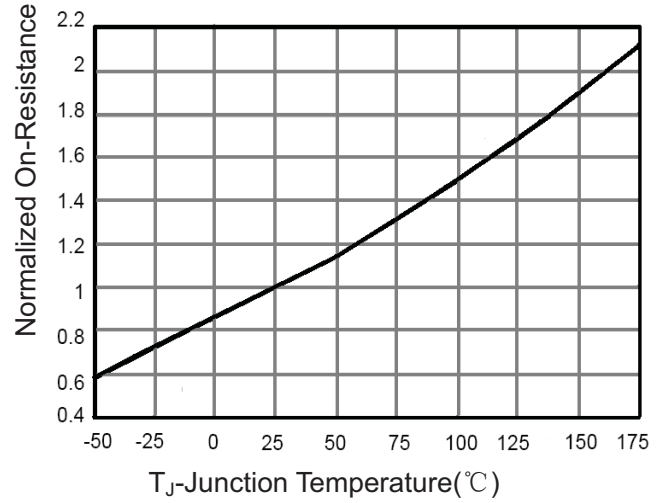


Figure 4 Rdson-Junction Temperature

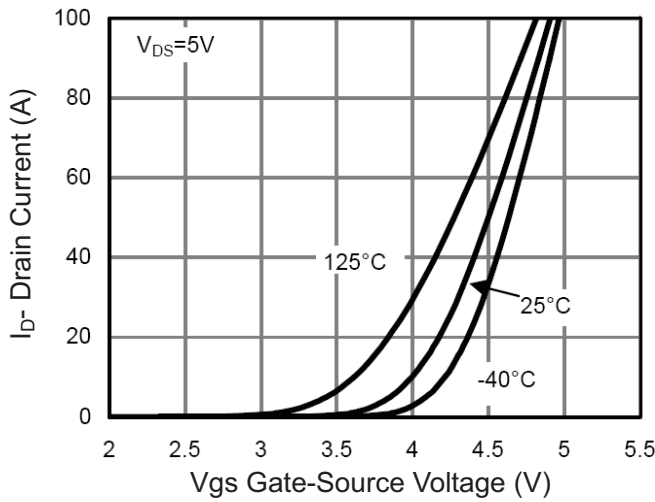


Figure 2 Transfer Characteristics

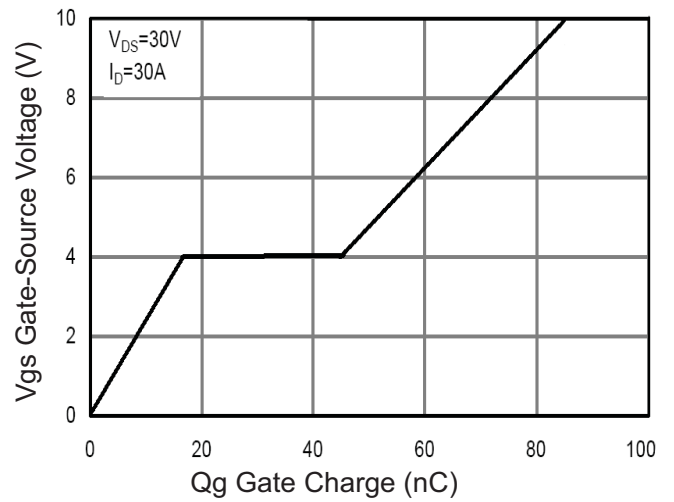


Figure 5 Gate Charge

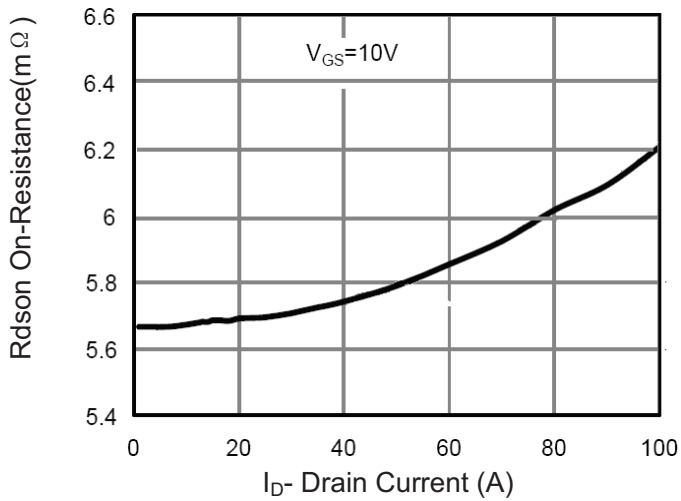


Figure 3 Rdson- Drain Current

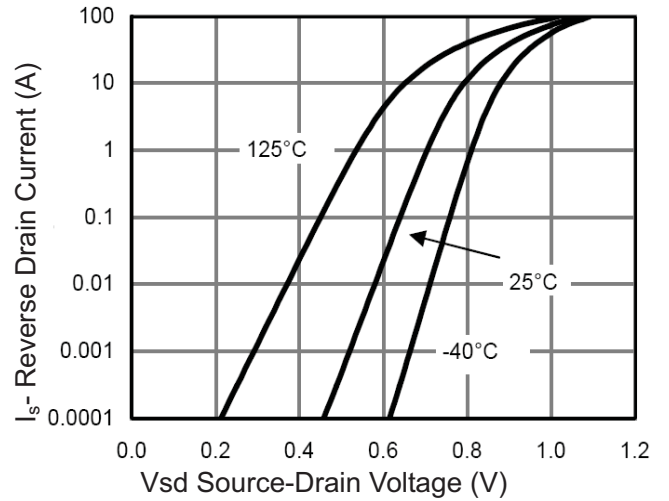


Figure 6 Source- Drain Diode Forward

RATING AND CHARACTERISTICS CURVES (RM100N60HD)

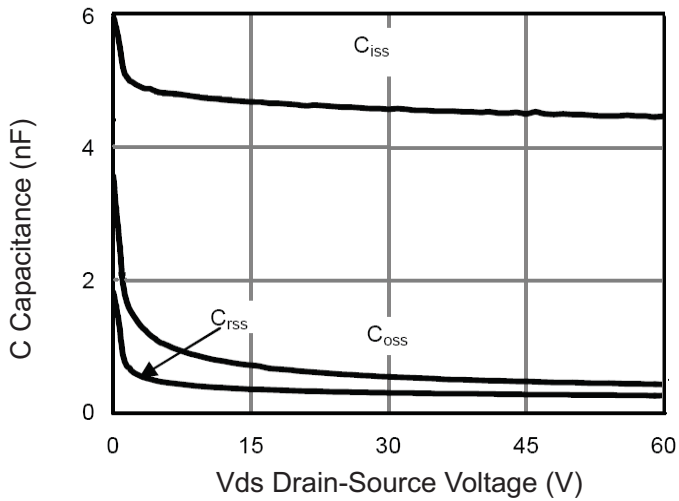


Figure 7 Capacitance vs Vds

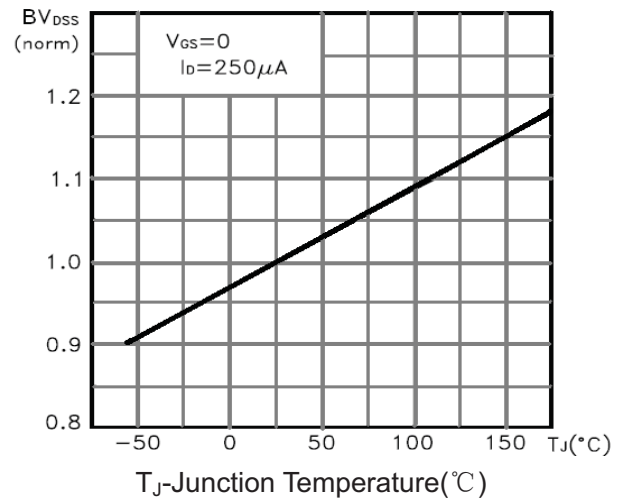


Figure 9 BV_{DSS} vs Junction Temperature

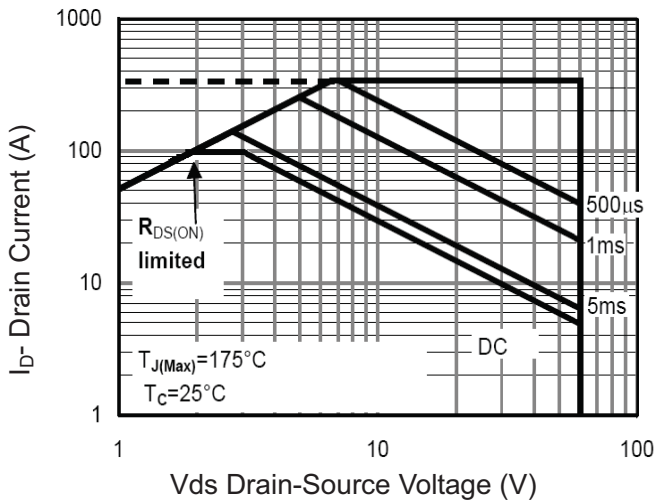


Figure 8 Safe Operation Area

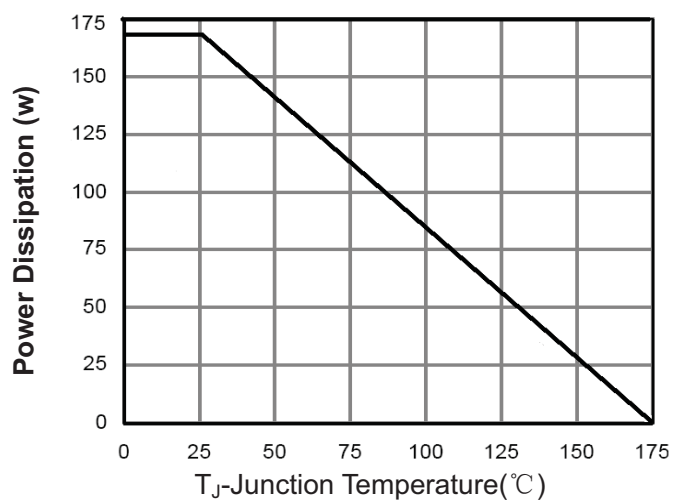


Figure 10 Power De-rating

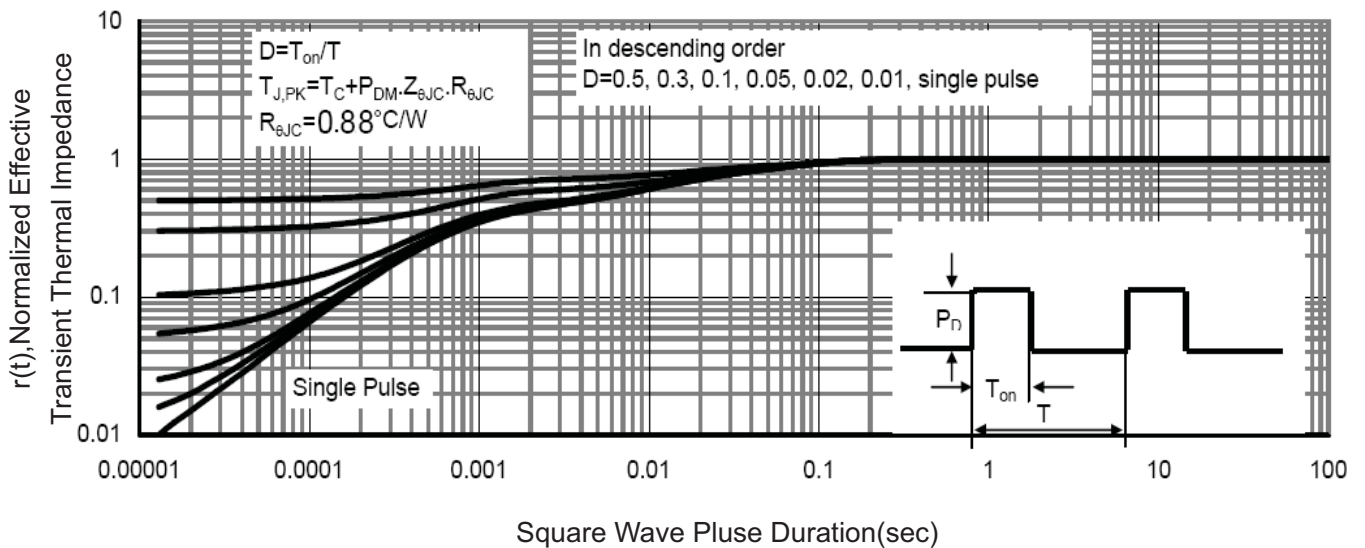
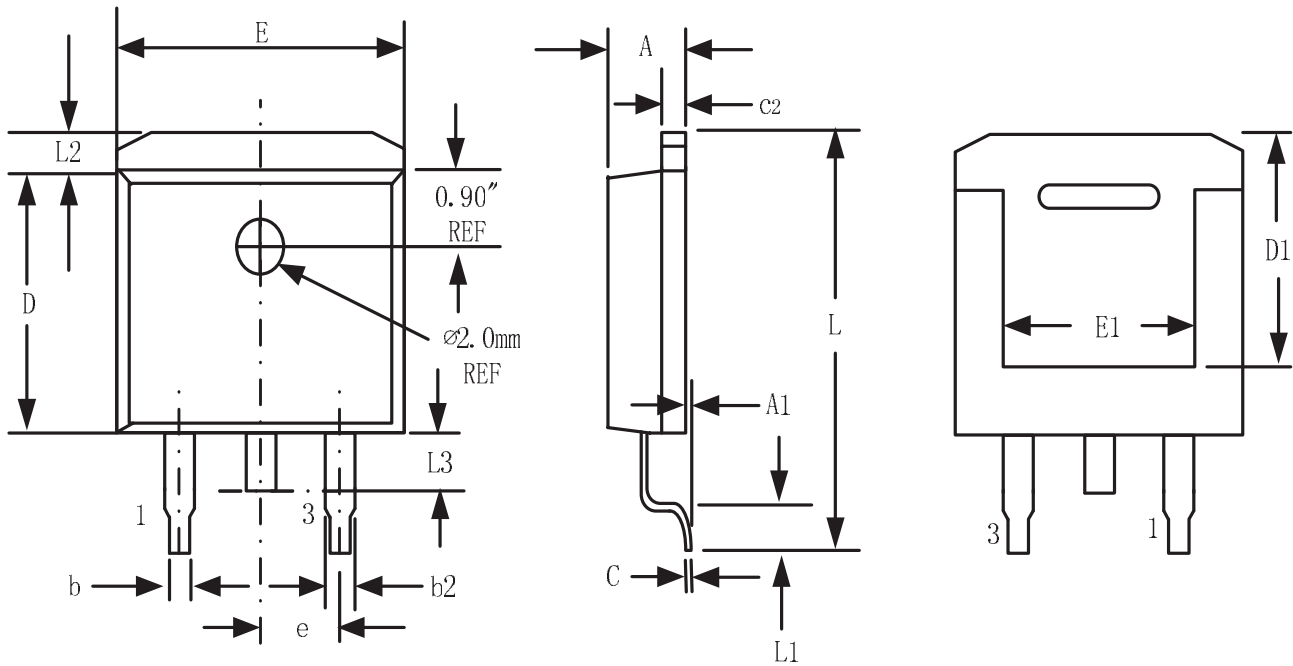


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.57 | 0.170 | 0.180 |
| A1 | - | 0.25 | | 0.010 |
| b | 0.71 | 0.94 | 0.028 | 0.037 |
| b2 | 1.15 | 1.40 | 0.045 | 0.055 |
| c | 0.46 | 0.61 | 0.018 | 0.024 |
| c2 | 1.22 | 1.40 | 0.048 | 0.055 |
| D | 8.89 | 9.40 | 0.350 | 0.370 |
| D1 | 8.01 | 8.23 | 0.315 | 0.324 |
| E | 10.04 | 10.28 | 0.395 | 0.405 |
| E1 | 7.88 | 8.08 | 0.310 | 0.318 |
| e | 2.54 BSC | | 0.100 BSC | |
| L | 14.73 | 15.75 | 0.580 | 0.620 |
| L1 | 2.29 | 2.79 | 0.090 | 0.110 |
| L2 | 1.15 | 1.39 | 0.045 | 0.055 |
| L3 | 1.27 | 1.77 | 0.050 | 0.070 |

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