

NCE N-Channel Enhancement Mode Power MOSFET

Description

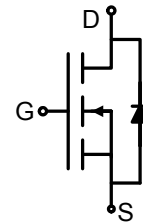
The NCE3008M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other switching application.

General Feature

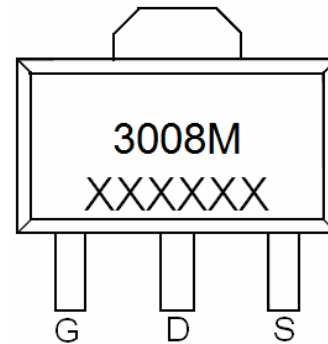
- $V_{DS} = 30V, I_D = 8A$
 $R_{DS(ON)} < 22.5m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 32m\Omega @ V_{GS} = 4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- Battery switch
- DC/DC converter



Schematic diagram



SOT-89 -3L top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|-----------|
| 3008M | NCE3008M | SOT-89-3L | Ø180mm | 12mm | 1000units |

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

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 8 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | 30 | A |
| Maximum Power Dissipation | P_D | 3.5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|---|-----------------|----|--------------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 35 | $^\circ C/W$ |
|---|-----------------|----|--------------|

Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------------|------------|-------------------------------|-----|-----|-----|---------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | - | - | 1 | μA |

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|--------------|---|-----|------|-----------|------------|
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics <small>(Note 3)</small> | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.6 | 2.4 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=8A$ | - | 19.8 | 22.5 | m Ω |
| | | $V_{GS}=4.5V, I_D=6A$ | - | 27 | 31 | m Ω |
| Dynamic Characteristics <small>(Note4)</small> | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 564 | - | PF |
| Output Capacitance | C_{oss} | | - | 75 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 66 | - | PF |
| Switching Characteristics <small>(Note 4)</small> | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=30V, I_D=1.5A$ $V_{GS}=10V, R_{GEN}=1\Omega$ | - | 9 | - | nS |
| Turn-on Rise Time | t_r | | - | 10 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 15 | - | nS |
| Turn-Off Fall Time | t_f | | - | 5 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=30V, I_D=8A,$ $V_{GS}=10V$ | - | 14.2 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.5 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3.6 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage <small>(Note 3)</small> | V_{SD} | $V_{GS}=0V, I_S=8A$ | - | - | 1.2 | V |
| Diode Forward Current <small>(Note 2)</small> | I_S | | - | - | 8 | A |

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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

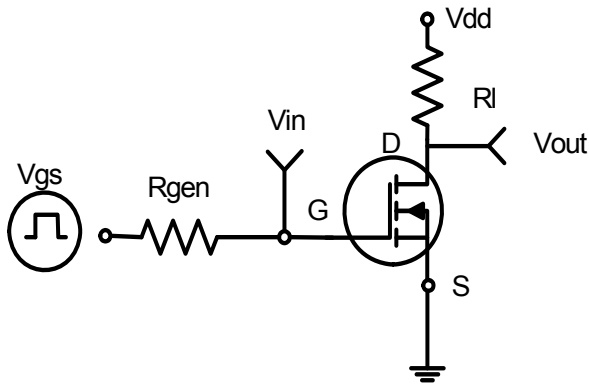


Figure 1 Switching Test Circuit

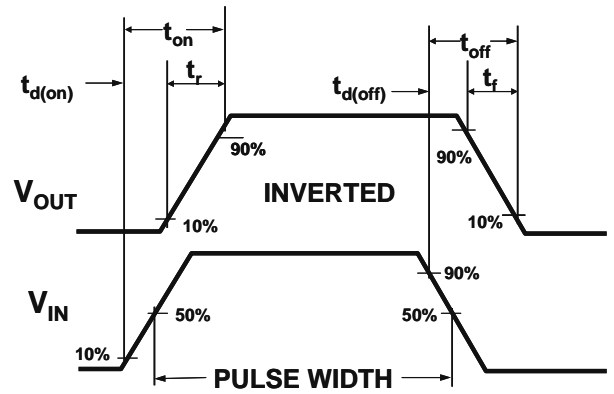


Figure 2 Switching Waveforms

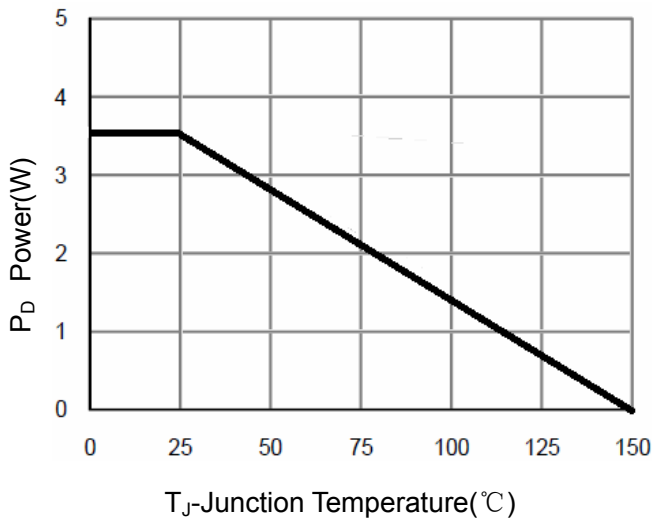


Figure 3 Power Dissipation

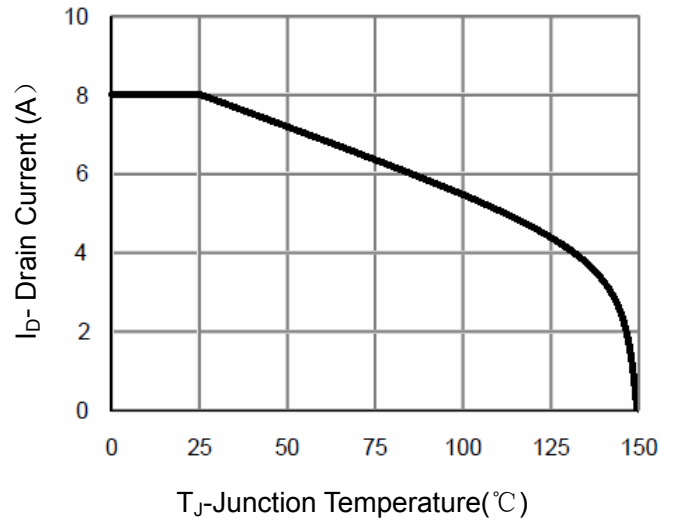


Figure 4 Drain Current

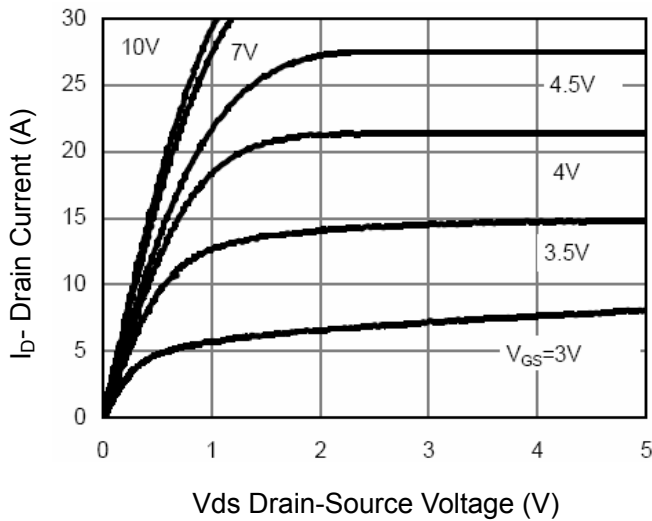


Figure 5 Output Characteristics

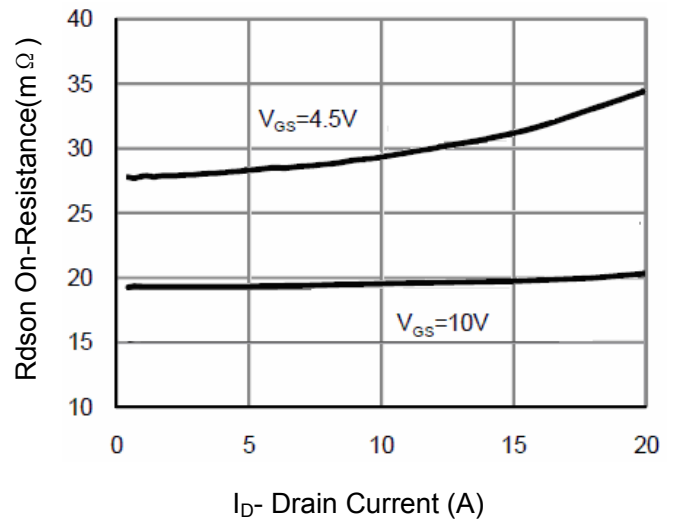


Figure 6 Drain-Source On-Resistance

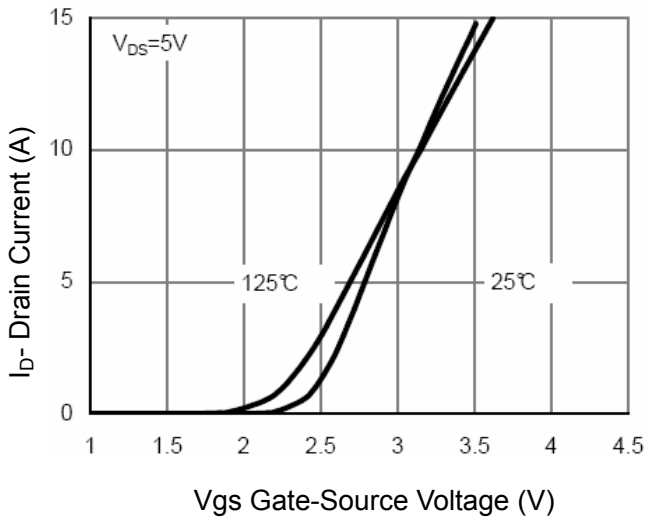


Figure 7 Transfer Characteristics

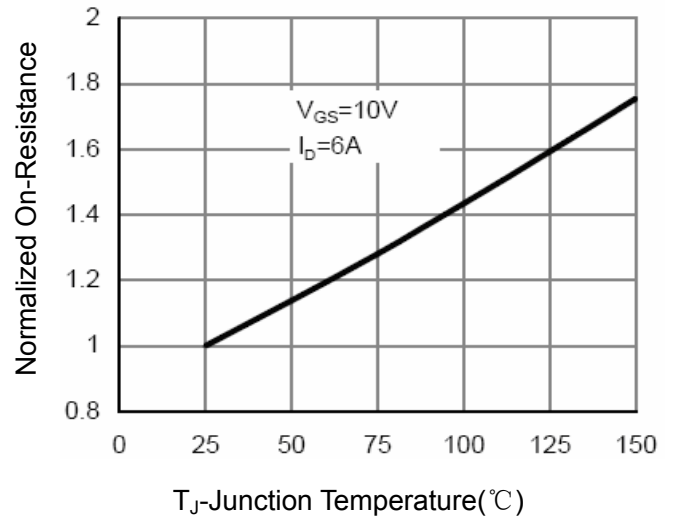


Figure 8 Drain-Source On-Resistance

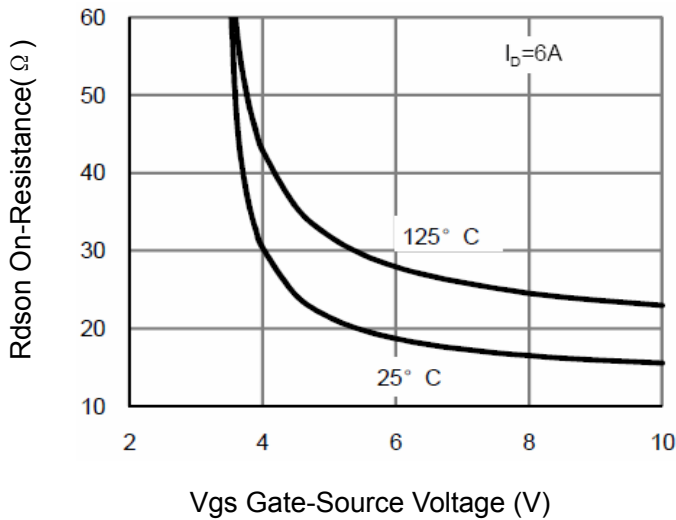


Figure 9 Rdson vs Vgs

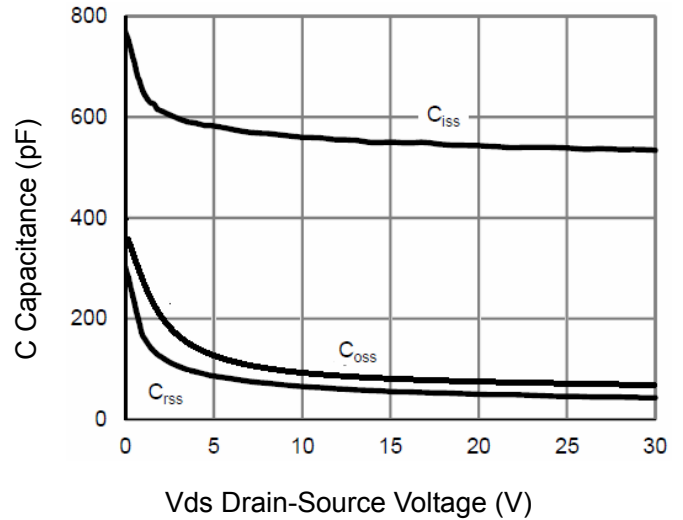


Figure 10 Capacitance vs Vds

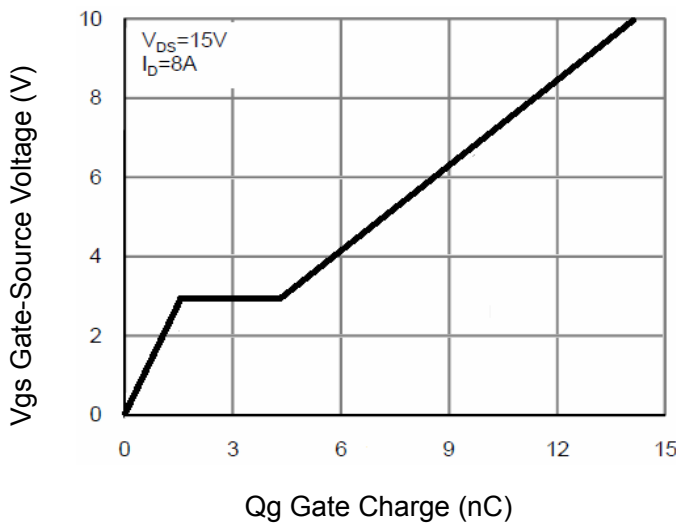


Figure 11 Gate Charge

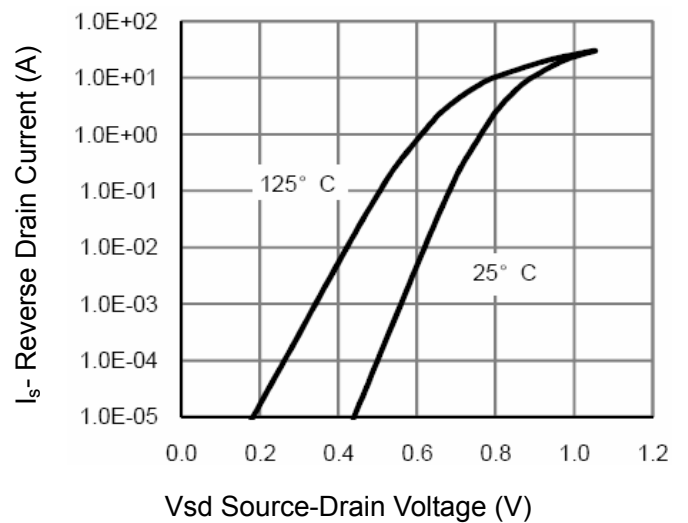


Figure 12 Source- Drain Diode Forward

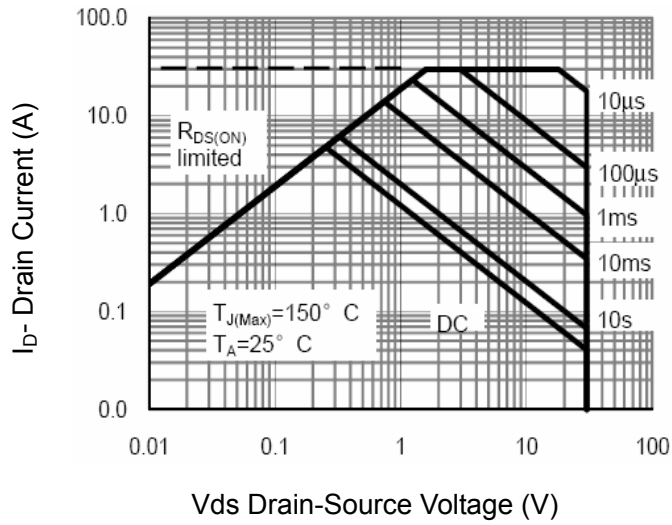


Figure 13 Safe Operation Area

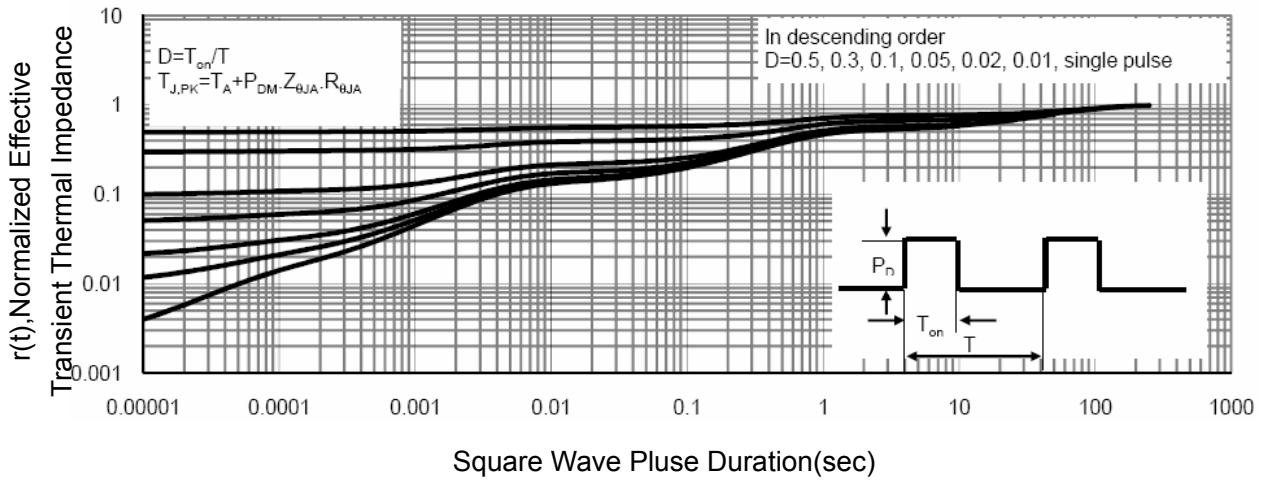
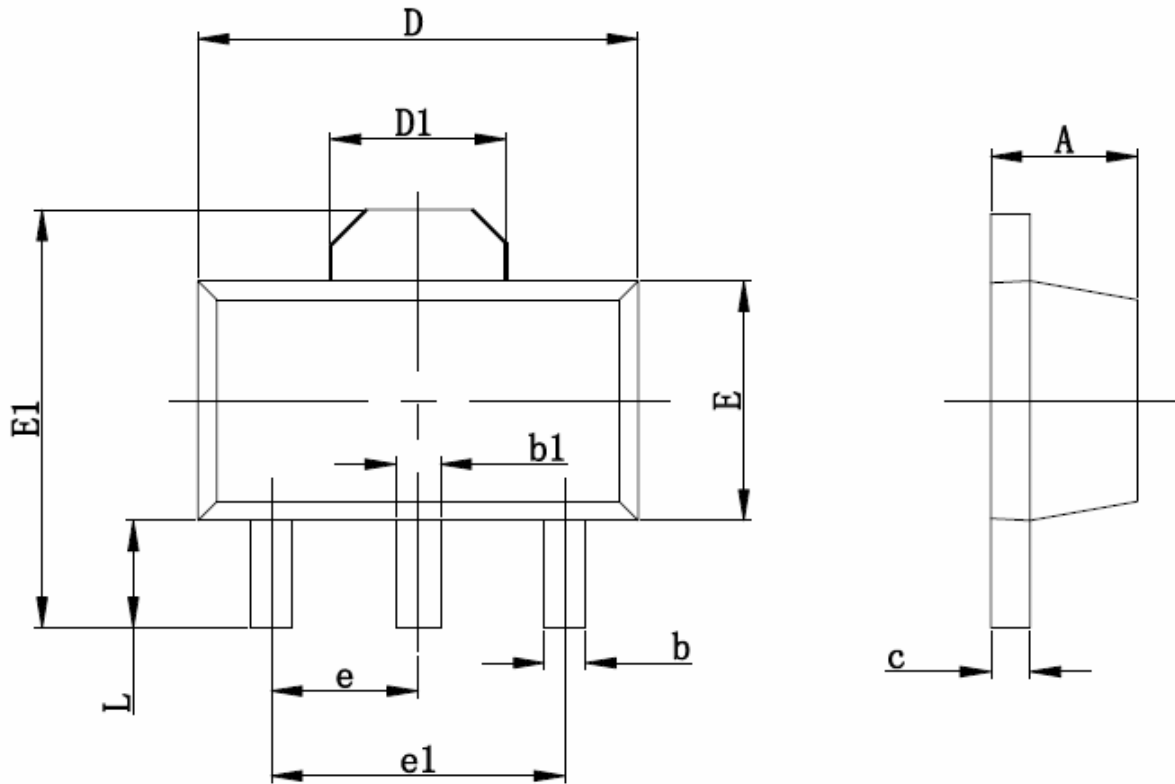


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-89-3L Package Information


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.350 | 0.520 | 0.013 | 0.197 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF | | 0.061 REF | |
| E | 2.350 | 2.550 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP | | 0.060TYP | |
| e1 | 3.000 TYP | | 0.118TYP | |
| L | 0.900 | 1.100 | 0.035 | 0.047 |

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