

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE8295AD uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

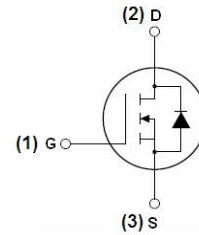
General Features

- $V_{DS} = 82V, I_D = 95A$
 $R_{DS(ON)} < 7.0 m\Omega @ V_{GS} = 10V$ (Typ: 6m Ω)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Special designed for converters and power controls
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

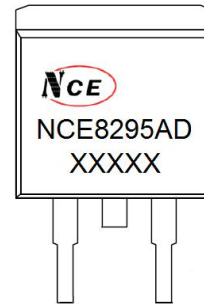
Application

- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

100% UIS TESTED!
100% ΔV_{ds} TESTED!



Schematic diagram



Marking and pin assignment



TO-263-2L top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|-----------|----------------|-----------|------------|----------|
| NCE8295AD | NCE8295AD | TO-263-2L | - | - | - |

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

| Parameter | Symbol | Limit | Unit |
|--|--------------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 82 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 95 | A |
| Drain Current-Continuous($T_C = 100^\circ C$) | $I_D(100^\circ C)$ | 67 | A |
| Pulsed Drain Current | I_{DM} | 320 | A |
| Maximum Power Dissipation | P_D | 170 | W |
| Derating factor | | 1.13 | W/ $^\circ C$ |
| Single pulse avalanche energy (Note 5) | E_{AS} | 529 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | $^\circ C$ |

Thermal Characteristic

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

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

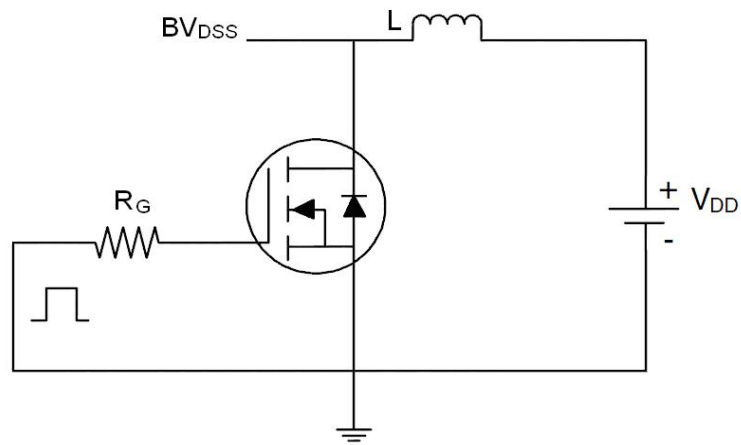
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|--|-----|-------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 82 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=82V, V_{GS}=0V$ | - | - | 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 | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=20A$ | - | 6 | 7.0 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=20A$ | - | 50 | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$ | - | 5633 | - | PF |
| Output Capacitance | C_{oss} | | - | 268 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 226 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=40V, R_L=15\Omega$ $R_G=2.5\Omega, V_{GS}=10V$ | - | 18 | - | nS |
| Turn-on Rise Time | t_r | | - | 12 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 56 | - | nS |
| Turn-Off Fall Time | t_f | | - | 15 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=40V, I_D=50A,$ $V_{GS}=10V$ | - | 109.3 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 35.1 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 25.8 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=95A$ | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 95 | A |
| Reverse Recovery Time | t_{rr} | $T_J=25^{\circ}\text{C}, I_F=100A$ $di/dt=100A/\mu s$ (Note3) | - | - | 37 | nS |
| Reverse Recovery Charge | Q_{rr} | | - | - | 58 | nC |

Notes:

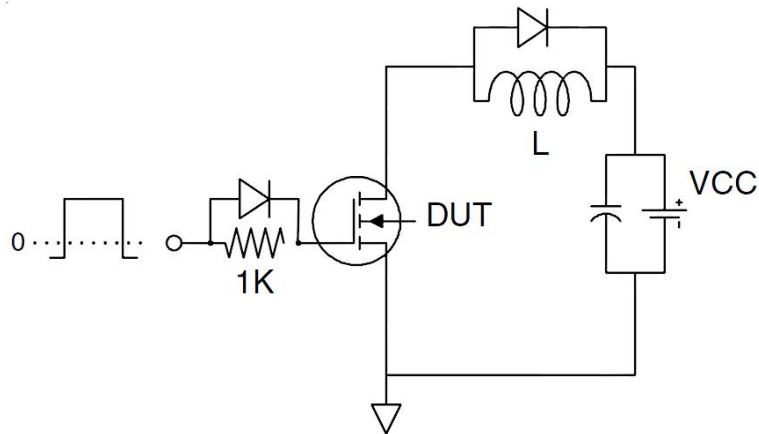
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=40V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Test Circuit

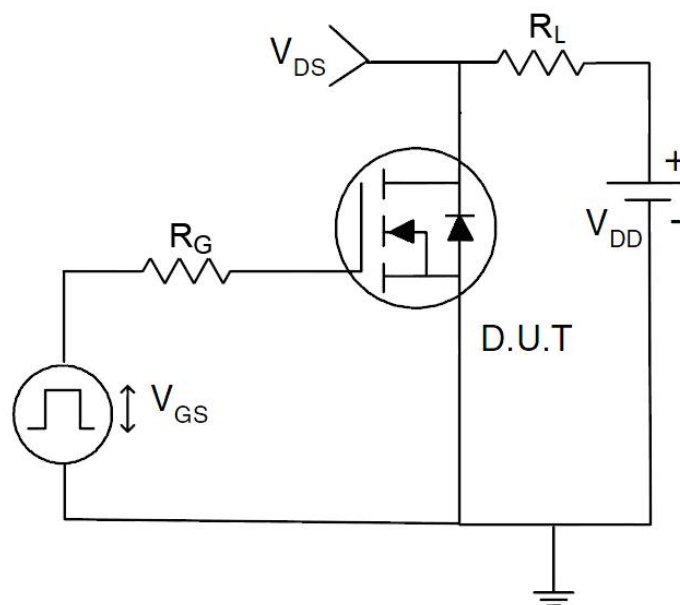
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

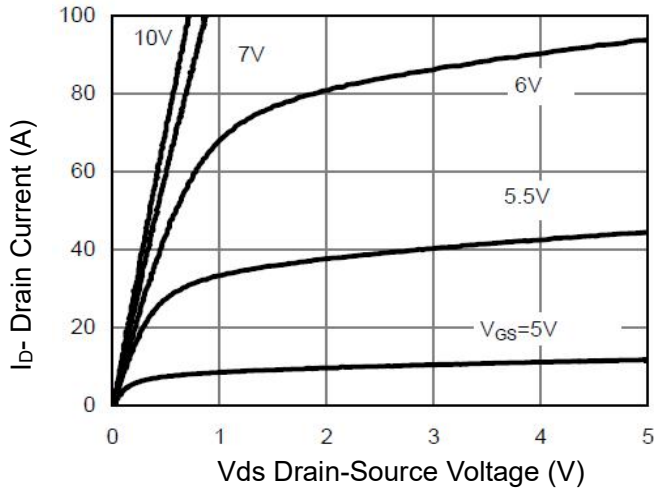


Figure 1 Output Characteristics

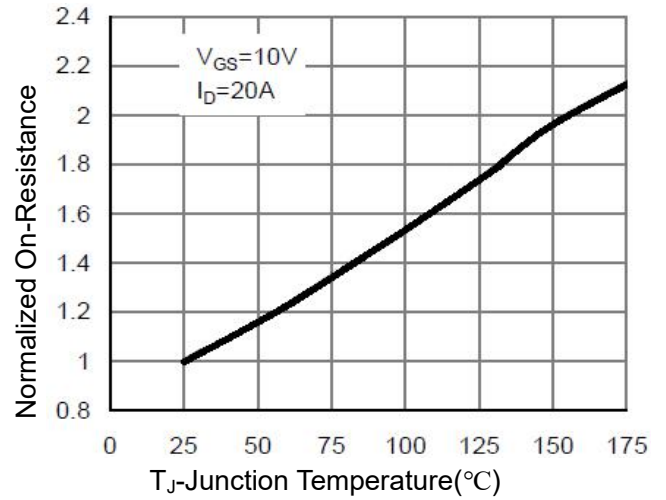


Figure 4 R_{dson} -Junction Temperature

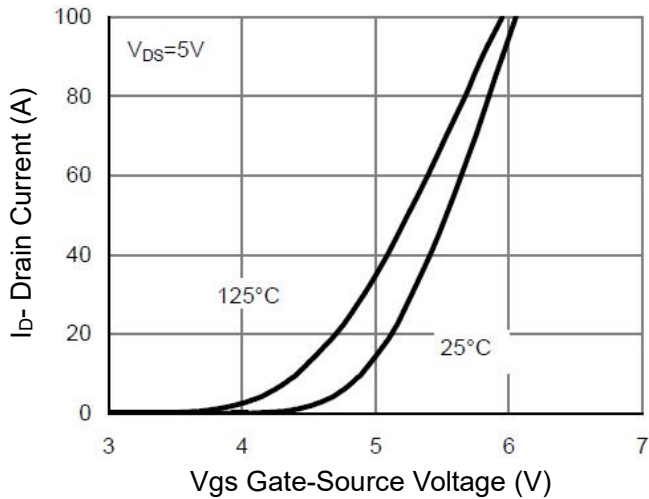


Figure 2 Transfer Characteristics

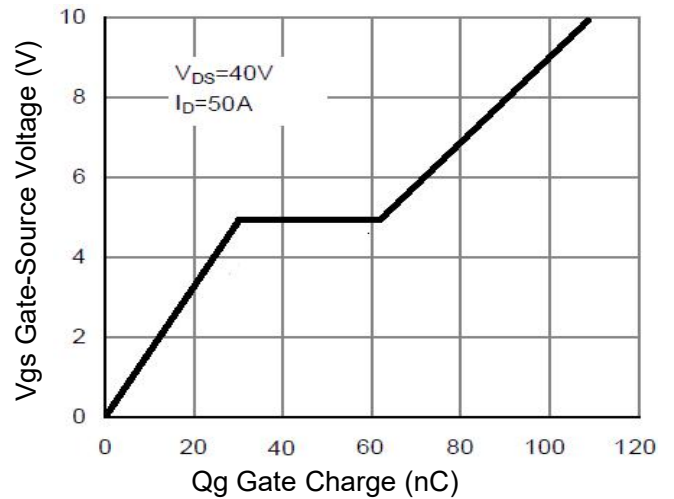


Figure 5 Gate Charge

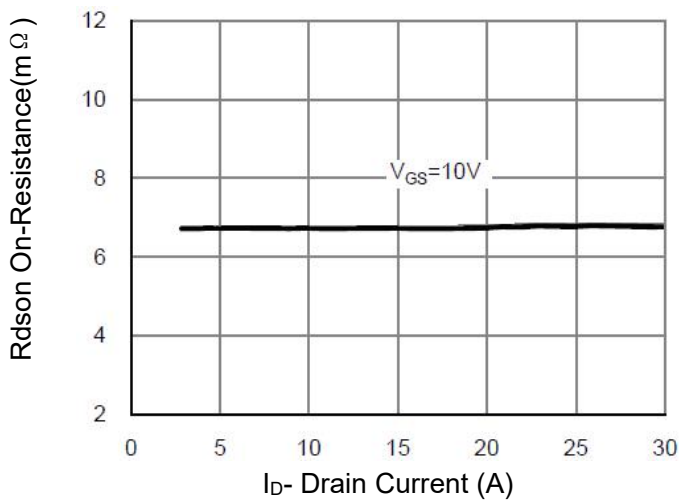


Figure 3 R_{dson} - Drain Current

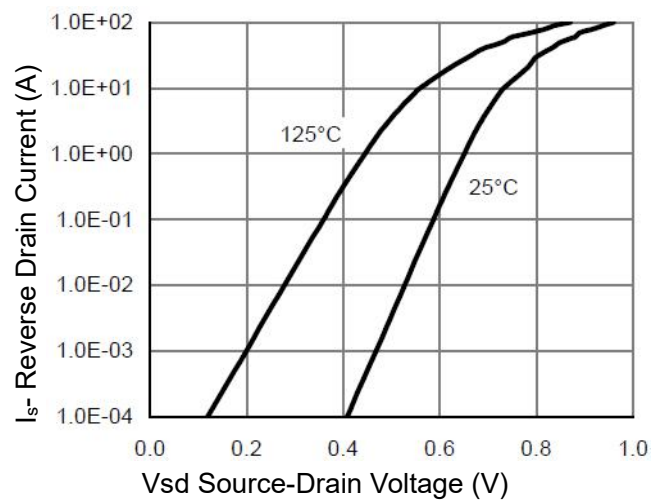


Figure 6 Source- Drain Diode Forward

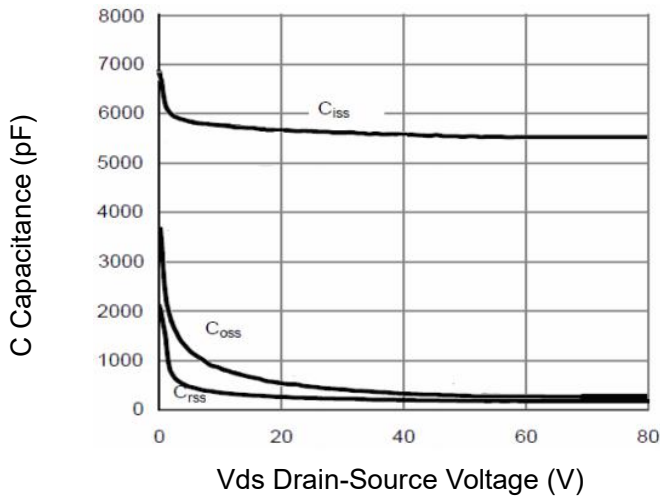


Figure 7 Capacitance vs Vds

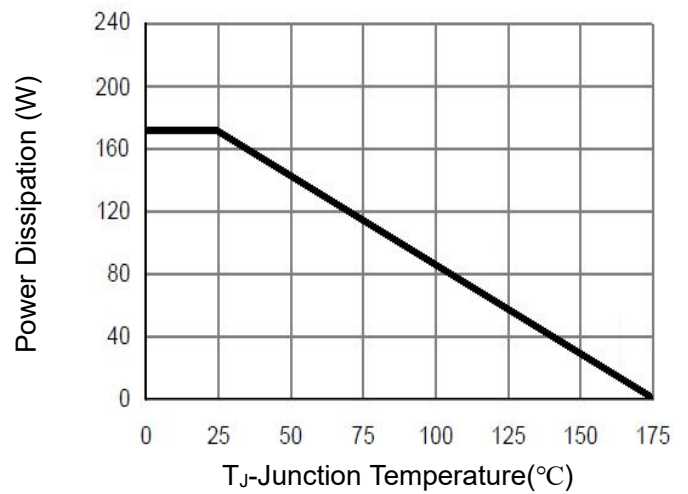


Figure 9 Power De-rating

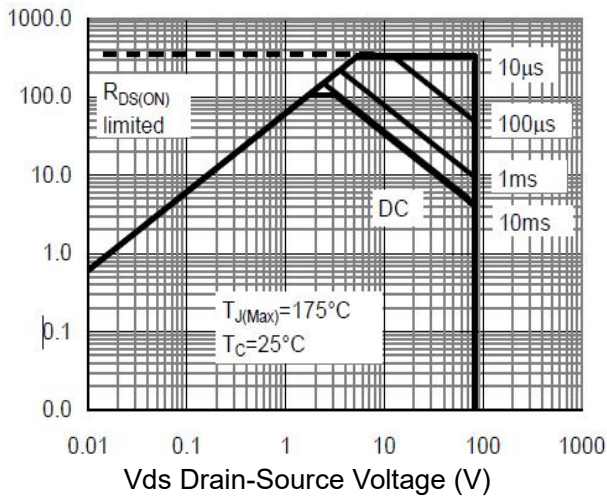


Figure 8 Safe Operation Area

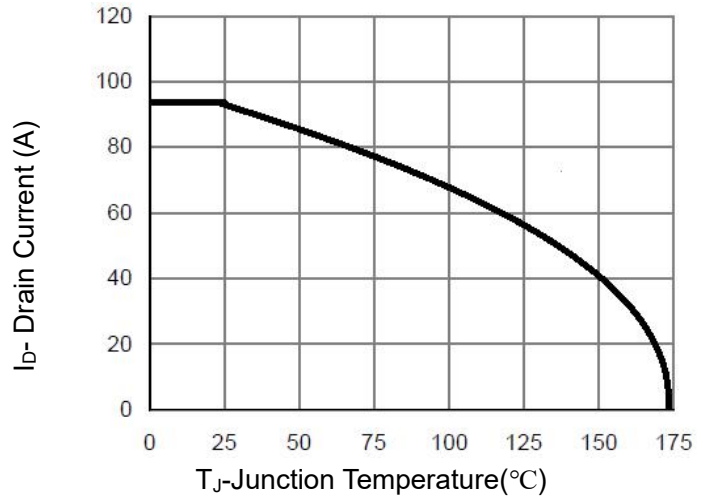


Figure 10 Id Current De-rating

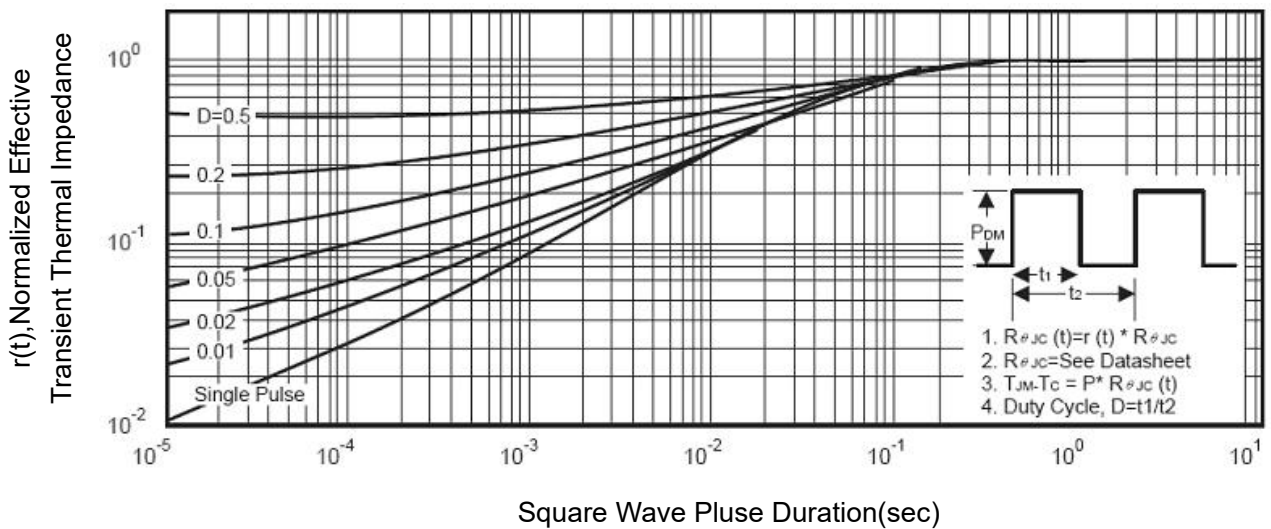
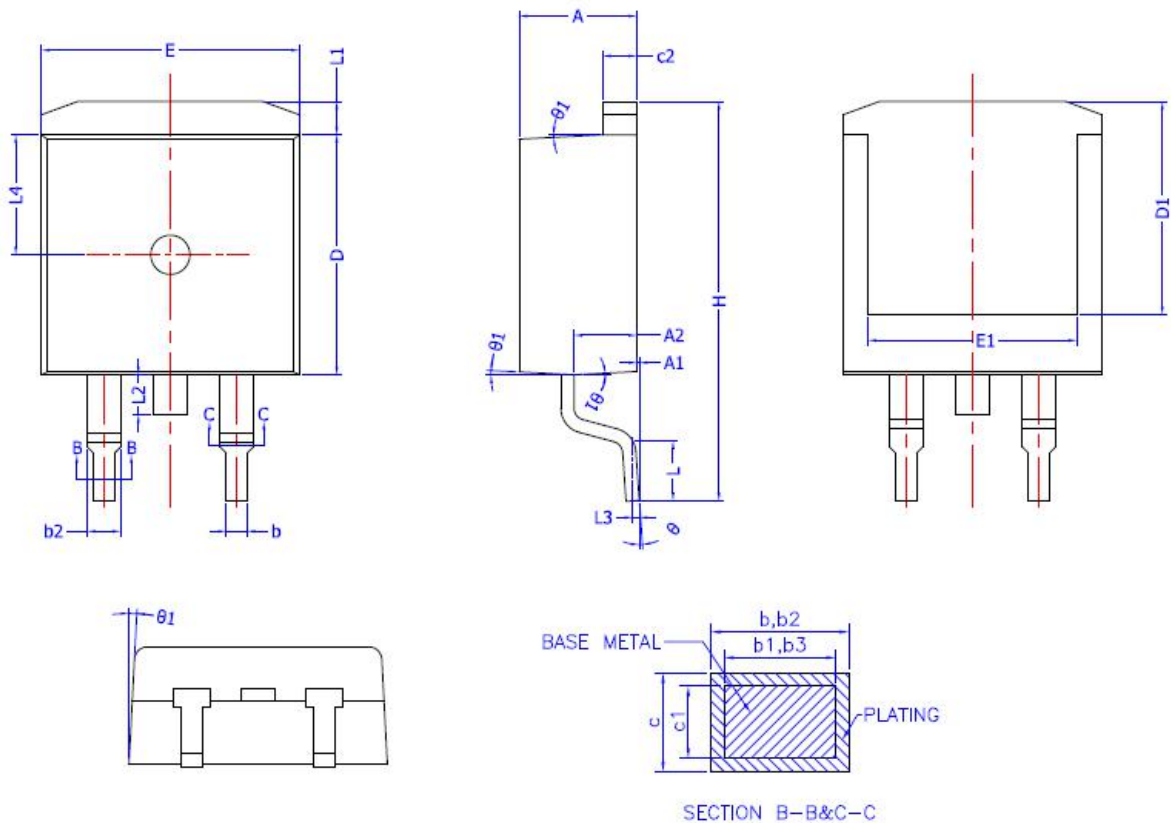


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-2L Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|----------|-------|-------|
| A | 4.40 | 4.50 | 4.60 |
| A1 | 0 | 0.10 | 0.25 |
| A2 | 2.20 | 2.40 | 2.60 |
| b | 0.76 | — | 0.89 |
| b1 | 0.75 | 0.80 | 0.85 |
| b2 | 1.23 | — | 1.37 |
| b3 | 1.22 | 1.27 | 1.32 |
| c | 0.47 | — | 0.60 |
| c1 | 0.46 | 0.51 | 0.56 |
| c2 | 1.25 | 1.30 | 1.35 |
| D | 9.10 | 9.20 | 9.30 |
| D1 | 8.00 | — | — |
| E | 9.80 | 9.90 | 10.00 |
| E1 | 7.80 | — | — |
| e | 2.54 BSC | | |
| H | 14.90 | 15.30 | 15.70 |
| L | 2.00 | 2.30 | 2.60 |
| L1 | 1.17 | 1.27 | 1.40 |
| L2 | — | — | 1.75 |
| L3 | 0.25BSC | | |
| L4 | 4.60 REF | | |
| θ | 0° | — | 8° |
| θ1 | 1° | 3° | 5° |

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