# N-Channel Enhancement Mode Power MOSFET

## Description

The GT070N15MA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

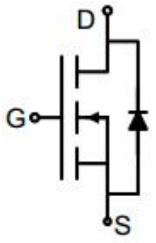
AEC-Q101 Qualified

## General Features

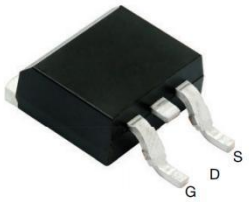
- $V_{DS}$ 150V
- $I_D$ (at $V_{GS}$ = 10V) 140A
- $R_{DS(ON)}$ (at $V_{GS}$ = 10V) < 5.8mΩ
- 100% Avalanche Tested
- RoHS Compliant

## Application

- Power switch
- DC/DC converters




Schematic diagram




TO-263

## Ordering Information

| Device | Package | Marking | Packaging |
|---|---|---|---|
| GT070N15MA | TO-263 | GT070N15 | 800pcs/Reel |

## Absolute Maximum Ratings $T_C$ = 25ºC, unless otherwise noted

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 150 | V |
| Continuous Drain Current | $T_C$ = 25ºC | $I_D$ | 140 | A |
| | $T_C$ = 100ºC | | 89 | |
| Pulsed Drain Current (note1) | | $I_{DM}$ | 560 | A |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Power Dissipation | | $P_D$ | 320 | W |
| Single pulse avalanche energy （note2） | | $E_{AS}$ | 420 | mJ |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 To 150 | ºC |

## Thermal Resistance

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient | $R_{thJA}$ | 55 | ºC/W |
| Thermal Resistance, Junction-to-Case | $R_{thJC}$ | 0.39 | ºC/W |

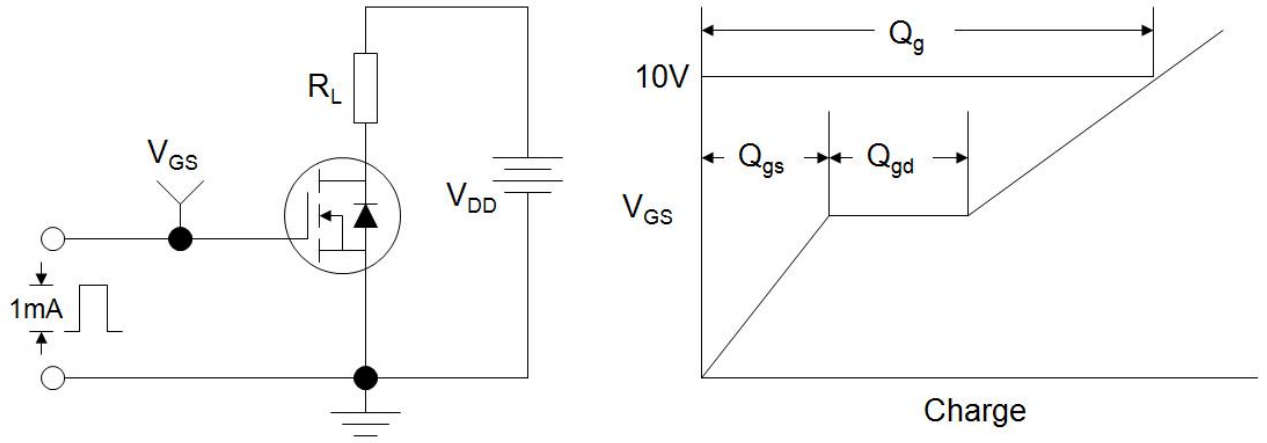
**Specifications** $T_J$ = 25ºC, unless otherwise noted

| Parameter | Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 150 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 150V, $V_{GS}$ = 0V | -- | -- | 1 | μA |
| Gate-Source Leakage | $I_{GSS}$ | $V_{GS}$ = ±20V | -- | -- | ±100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | 3.0 | 4.0 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 30A | -- | 4.8 | 5.8 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{GS}$ = 5V, $I_D$ = 30A | -- | 35 | -- | S |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 75V, f = 0.8MHz | -- | 5850 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 600 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 18 | -- | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ = 75V, $I_D$ = 30A, $V_{GS}$ = 10V | -- | 89 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 29 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 22 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 75V, $I_D$ = 30A, $R_G$ = 4.7Ω | -- | 17 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 70 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 47 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 15 | -- | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | $T_C$ = 25ºC | -- | -- | 140 | A |
| Body Diode Voltage | $V_{SD}$ | $T_J$ = 25ºC, $I_{SD}$ = 30A, $V_{GS}$ = 0V | -- | -- | 1.2 | V |
| Reverse Recovery Charge | Qrr | $I_F$ = 30A, $V_{GS}$ = 0V di/dt=100A/us | -- | 146 | -- | nC |
| Reverse Recovery Time | Trr | | -- | 63 | -- | ns |

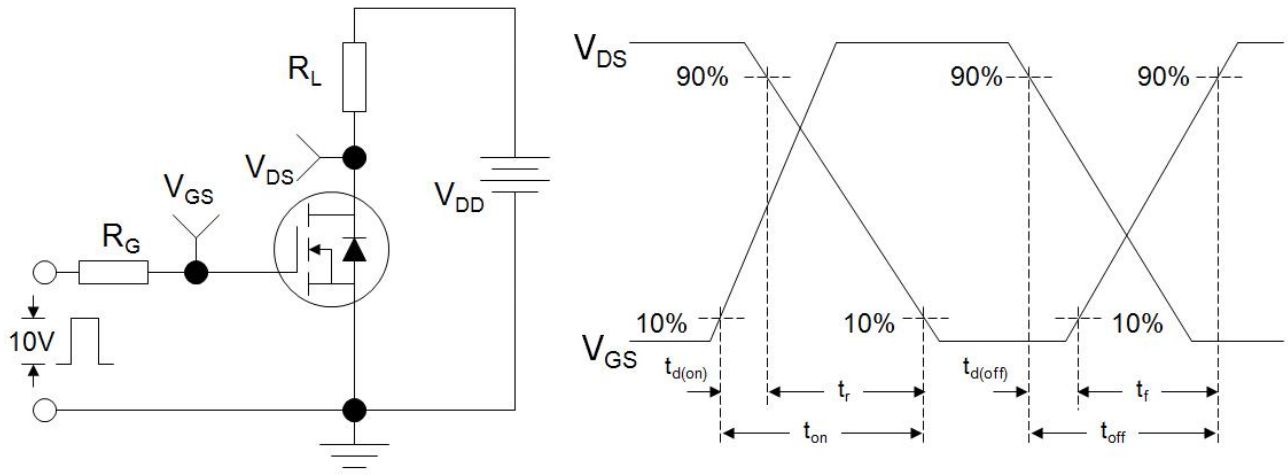
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 1156mJ when the device is tested until failure
3. Identical low side and high side switch with identical $R_G$

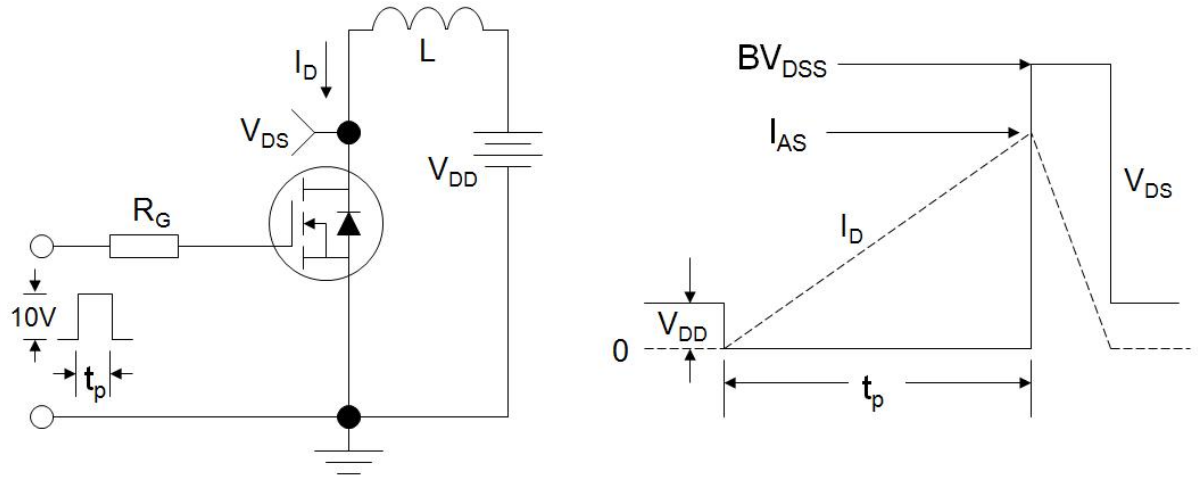
**Gate Charge Test Circuit**




**Switch Time Test Circuit**




**EAS Test Circuit**



## Typical Characteristics $T_J$ = 25ºC, unless otherwise noted

**Figure 1. Output Characteristics**

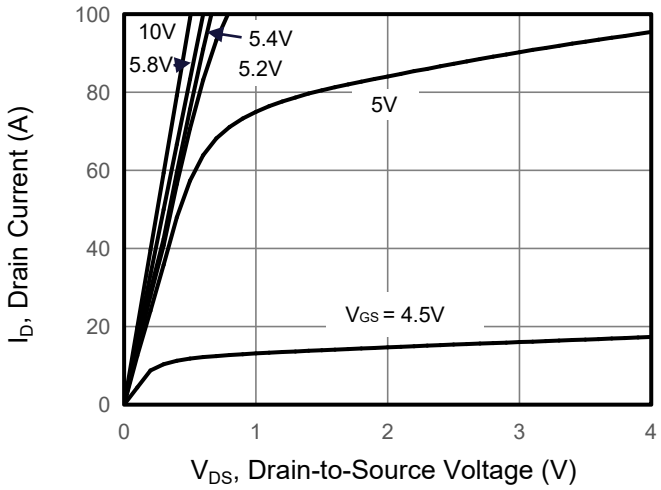



**Figure 2. Transfer Characteristics**

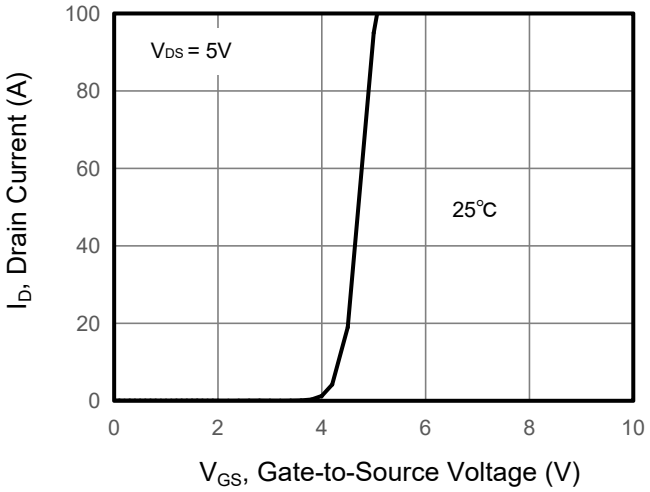



**Figure 3. Drain Source On Resistance**

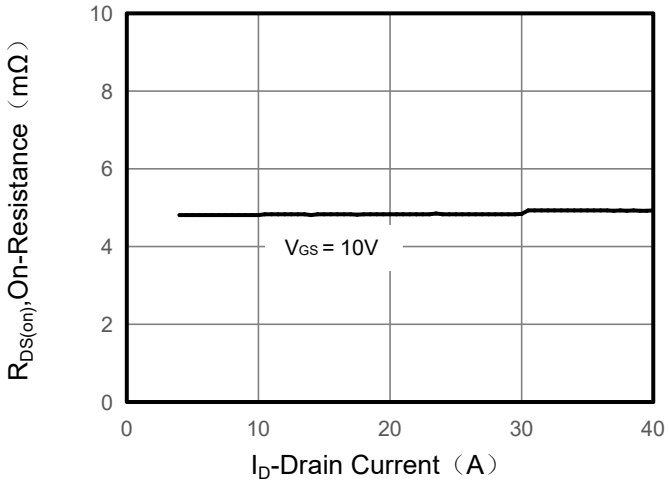



**Figure 4. Gate Charge**

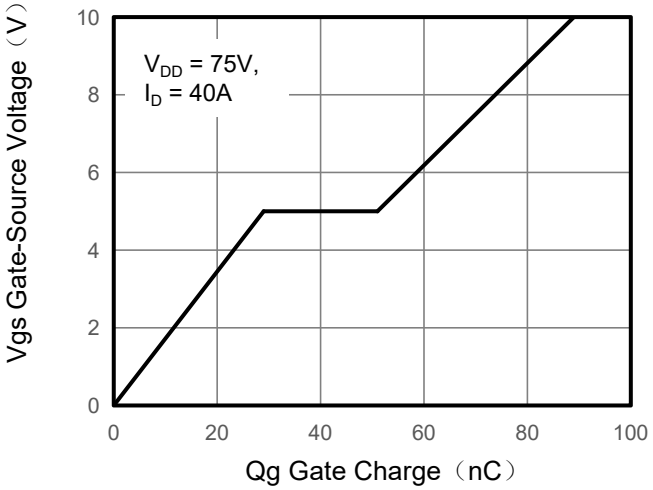



**Figure 5. Capacitance**

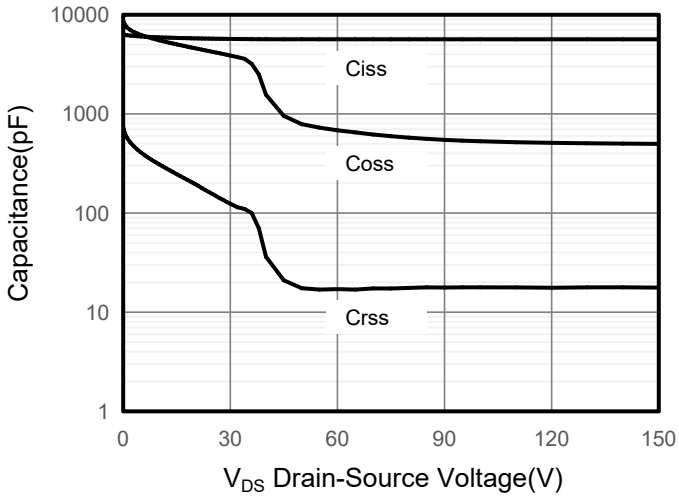
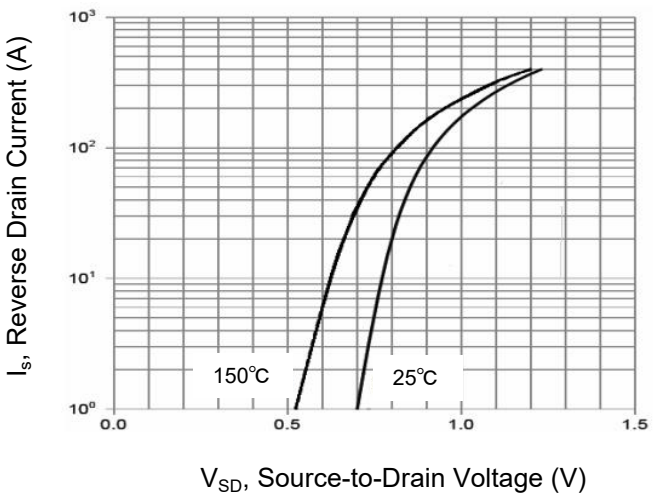



**Figure 6. Source-Drain Diode Forward**



**Typical Characteristics** $T_J$ = 25ºC, unless otherwise noted

**Figure 7. Drain-Source On-Resistance**

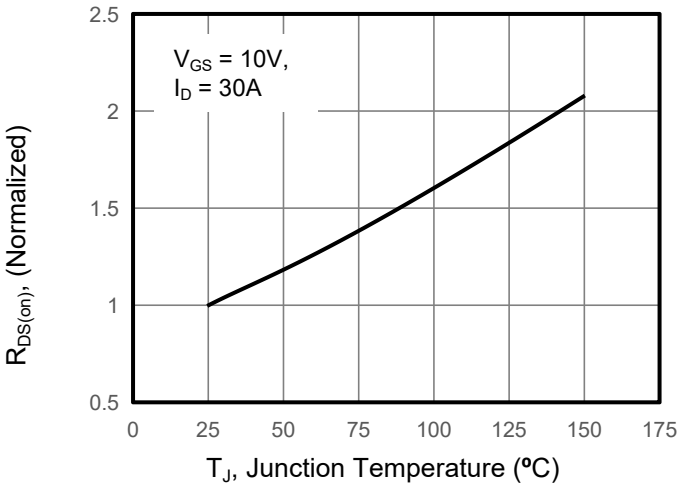



**Figure 8. Safe Operation Area**

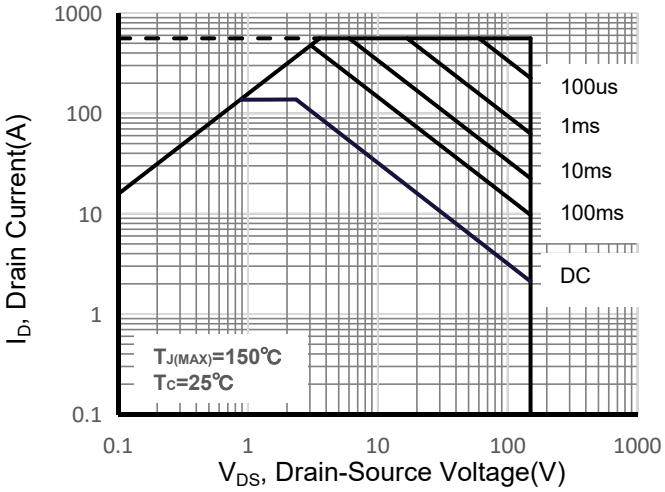



**Figure 9. Maximum Continuous Drain Current vs Case Temperature**

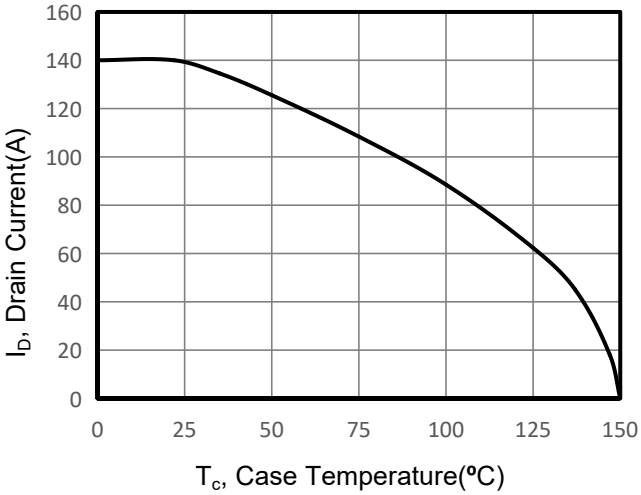
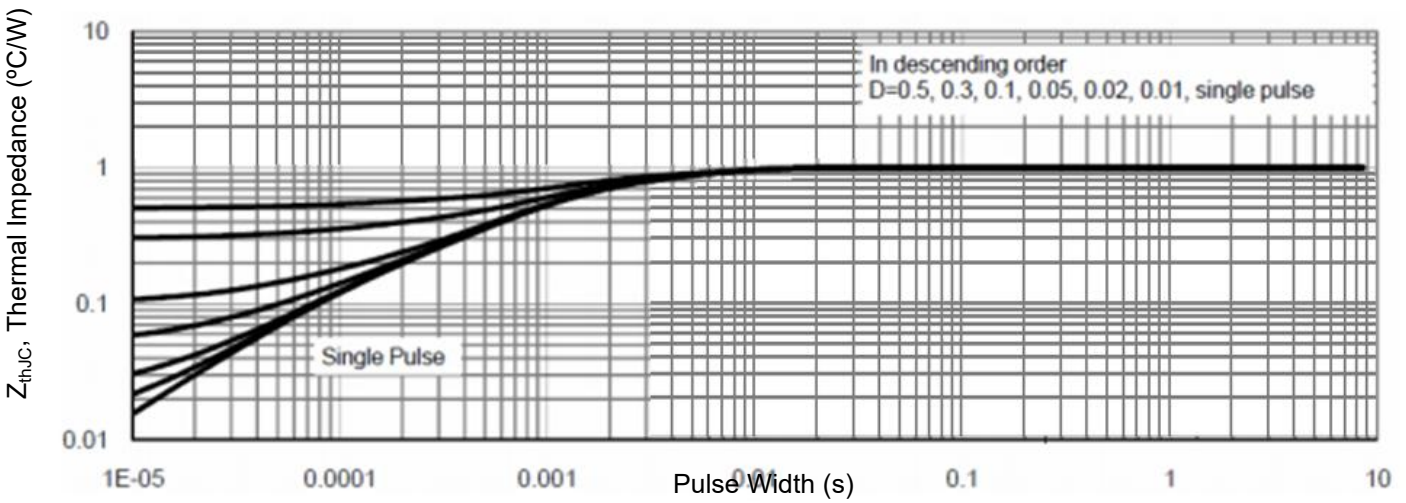
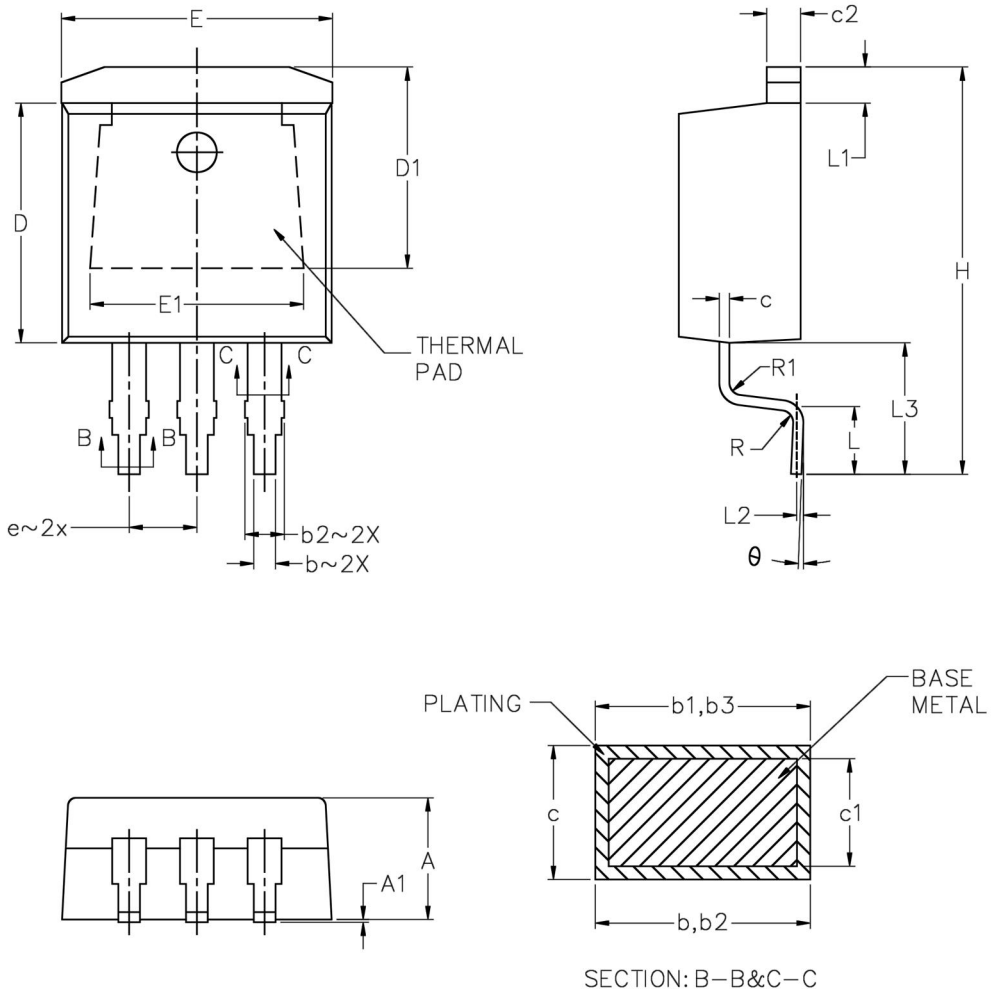



**Figure 10. Normalized Maximum Transient Thermal Impedance**



## TO-263 Package Information




| SYMBOLS | COMMON | | | |
|---|---|---|---|---|
| | MM | | INCH | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 4.064 | 4.826 | 0.160 | 0.190 |
| A1 | 0.000 | 0.254 | 0.000 | 0.010 |
| b | 0.508 | 0.991 | 0.020 | 0.039 |
| b1 | 0.508 | 0.889 | 0.020 | 0.035 |
| b2 | 1.143 | 1.778 | 0.045 | 0.070 |
| b3 | 1.143 | 1.727 | 0.045 | 0.068 |
| c | 0.381 | 0.737 | 0.015 | 0.029 |
| c1 | 0.381 | 0.584 | 0.015 | 0.023 |
| c2 | 1.143 | 1.651 | 0.045 | 0.065 |
| D | 8.382 | 9.652 | 0.330 | 0.380 |
| D1 | 6.858 | — | 0.270 | — |
| E | 9.652 | 10.668 | 0.380 | 0.420 |
| E1 | 6.223 | — | 0.245 | — |
| e | 2.540 BSC. | | 0.100 BSC. | |
| H | 14.605 | 15.875 | 0.575 | 0.625 |
| L | 1.778 | 2.794 | 0.070 | 0.110 |
| L1 | — | 1.676 | — | 0.066 |
| L2 | 0.254 BSC | | 0.010 BSC | |
| L3 | 4.780 | 5.280 | 0.188 | 0.208 |
| R | 0.460 TYP | | 0.018 TYP | |
| R1 | 0.460 TYP | | 0.018 TYP | |
| θ | 0° | 8° | 0° | 8° |