# N-Channel Enhancement Mode Power MOSFET

## Description

The GT080N10KA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

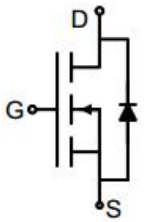
AEC-Q101 Qualified

## General Features

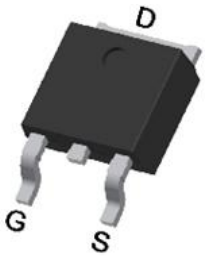
- $V_{DS}$ 100V
- $I_D$ (at $V_{GS}$ = 10V) 70A
- $R_{DS(ON)}$ (at $V_{GS}$ = 10V) < 8mΩ
- $R_{DS(ON)}$ (at $V_{GS}$ = 4.5V) < 9.5mΩ
- 100% Avalanche Tested
- RoHS Compliant

## Application

- Power switch
- DC/DC converters




Schematic diagram




TO-252

## Ordering Information

| Device | Package | Marking | Packaging |
|---|---|---|---|
| GT080N10KA | TO-252 | GT080N10 | 2500pcs/Reel |

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

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Continuous Drain Current | $T_C$ = 25ºC | $I_D$ | 70 | A |
| | $T_C$ = 100ºC | | 44 | |
| Pulsed Drain Current (note1) | | $I_{DM}$ | 280 | A |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Power Dissipation | | $P_D$ | 100 | W |
| Single pulse avalanche energy （note2） | | $E_{AS}$ | 144 | 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 | $R_{thJA}$ | 50 | ºC/W |
| Maximum Junction-to-Case | $R_{thJC}$ | 1.25 | ºC/W |

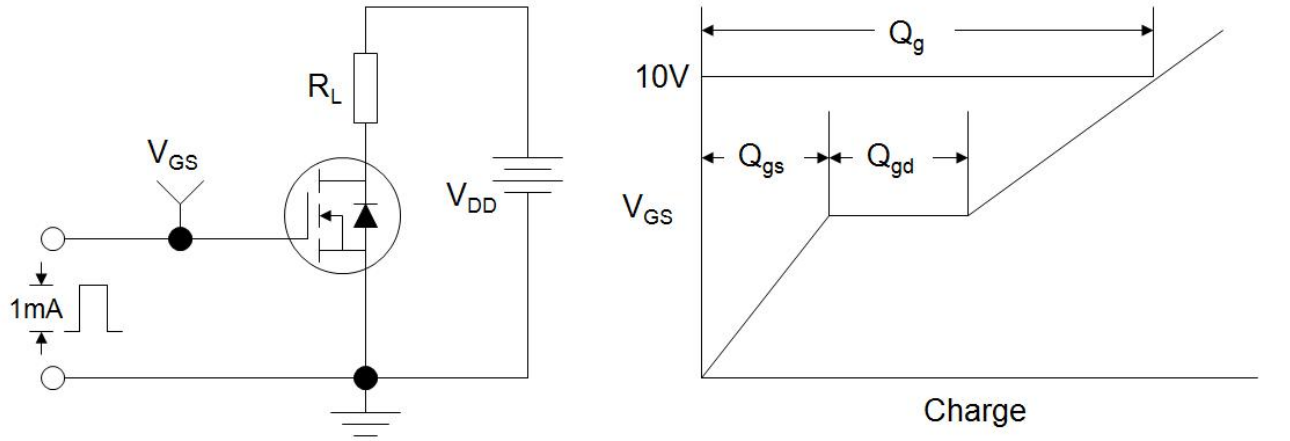
**Specifications** $T_J$ = 25ºC, unless otherwise noted

| Parameter | Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 100 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 100V, $V_{GS}$ = 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 | 1.0 | 1.7 | 2.5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | -- | 6.2 | 8.0 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 20A | -- | 7.8 | 9.5 | |
| Forward Transconductance | $g_{FS}$ | $V_{GS}$ = 5V, $I_D$ = 20A | -- | 48 | -- | S |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 50V, f = 1.0MHz | -- | 2800 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 380 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 10 | -- | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ = 50V, $I_D$ = 20A, $V_{GS}$ = 10V | -- | 50 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 8 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 10 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 50V, $I_D$ = 20A, $R_G$ = 1.6Ω | -- | 12 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 9 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 27 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 7 | -- | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | $T_C$ = 25ºC | -- | -- | 70 | A |
| Body Diode Voltage | $V_{SD}$ | $T_J$ = 25ºC, $I_{SD}$ = 20A, $V_{GS}$ = 0V | -- | -- | 1.2 | V |
| Reverse Recovery Charge | Qrr | $I_F$ = 20A, $V_{GS}$ = 0V di/dt=100A/us | -- | 87 | -- | nC |
| Reverse Recovery Time | Trr | | -- | 49 | -- | ns |

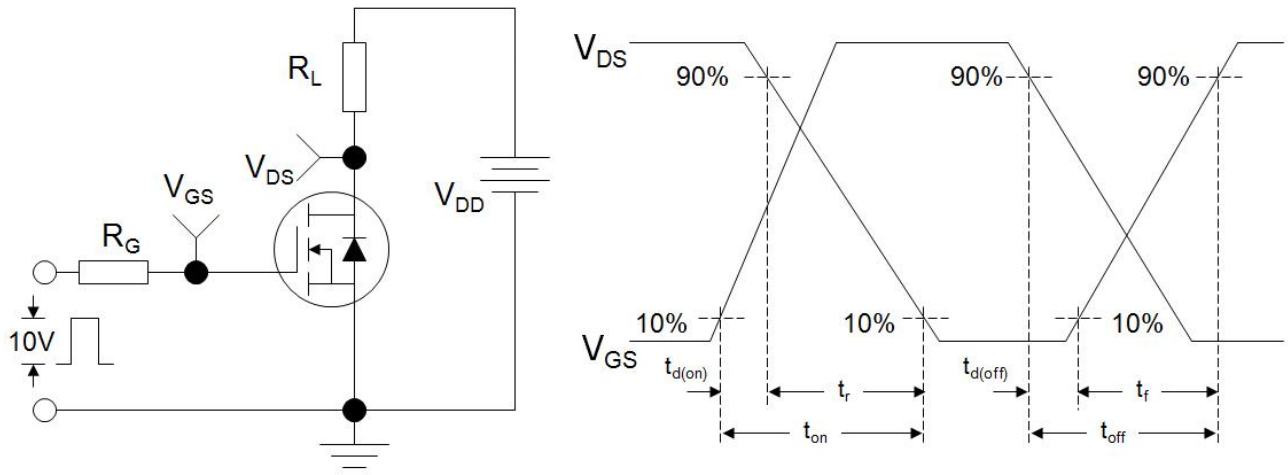
**Notes**

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 400mJ when the device is tested until failure
3. Identical low side and high side switch with identical $R_G$

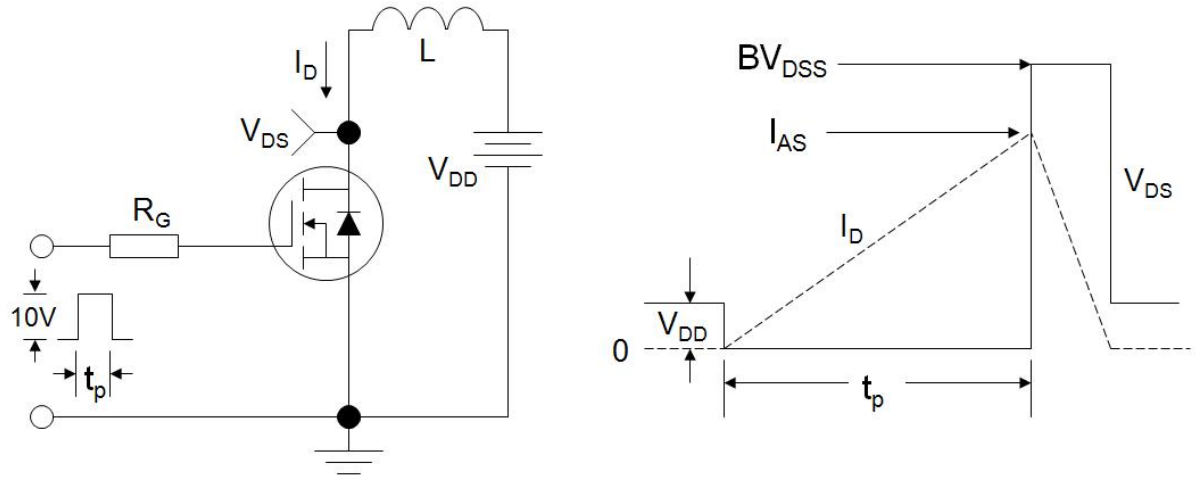
**Gate Charge Test Circuit**




**Switch Time Test Circuit**




**EAS Test Circuit**



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

**Figure 1. Output Characteristics**

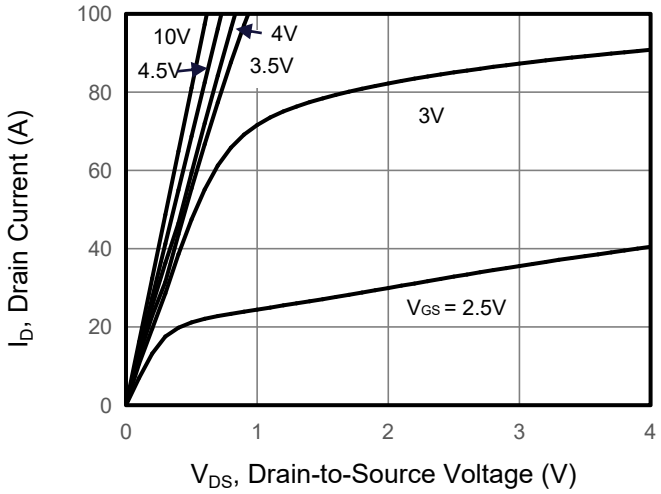



**Figure 2. Transfer Characteristics**

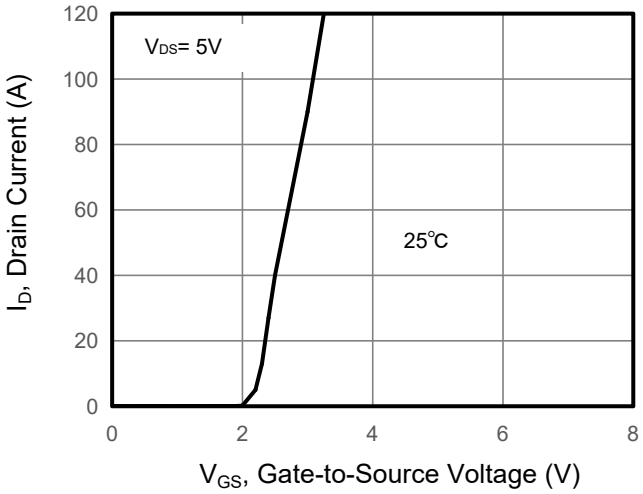



**Figure 3. Drain Source On Resistance**

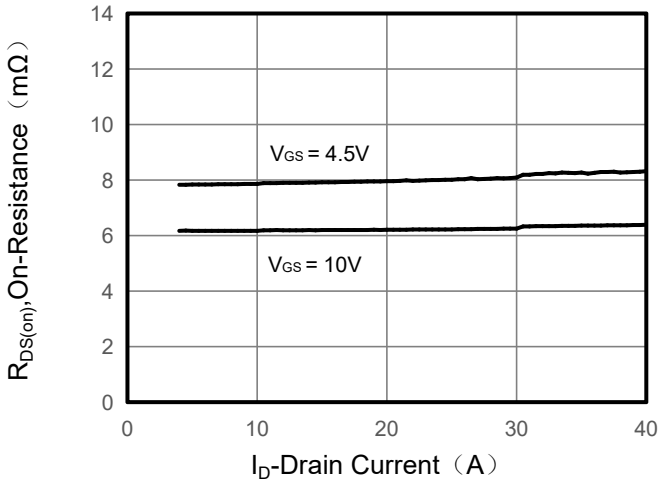



**Figure 4. Gate Charge**

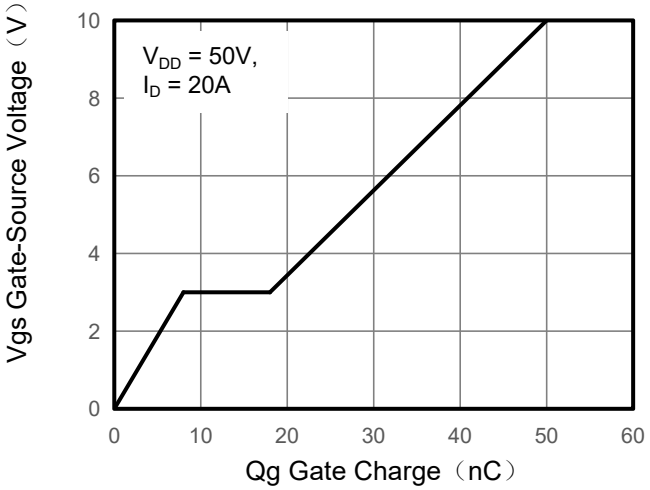



**Figure 5. Capacitance**

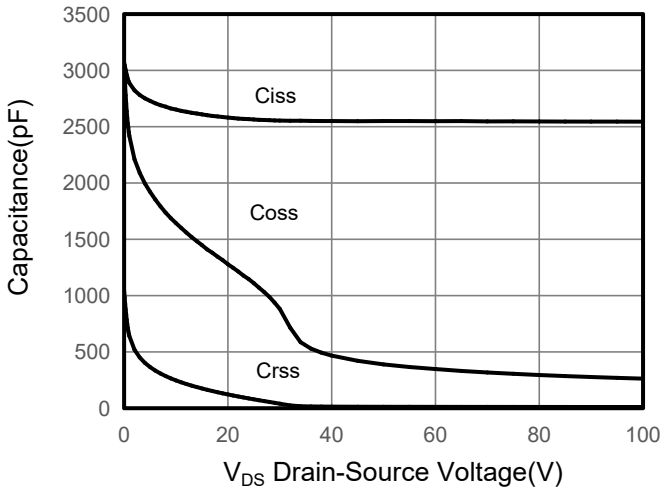
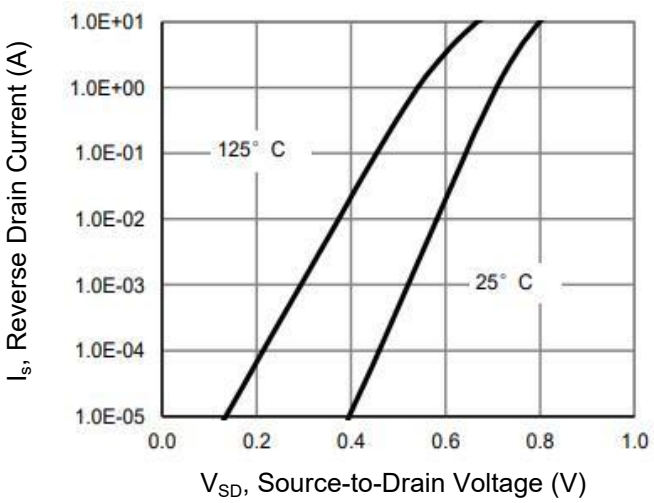



**Figure 6. Source-Drain Diode Forward**



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

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

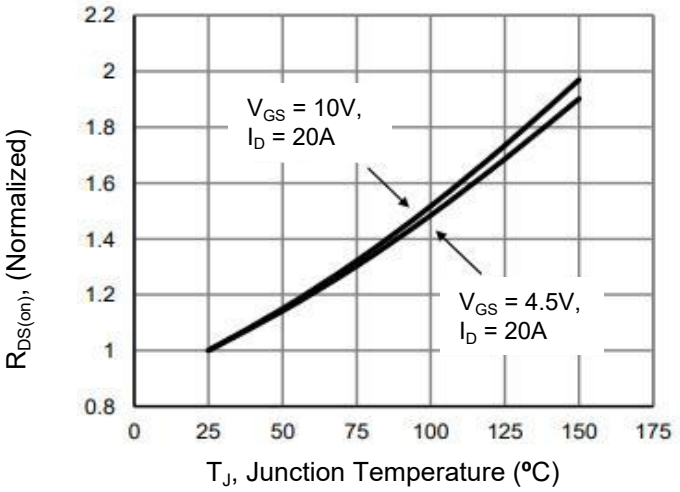



**Figure 8. Safe Operation Area**

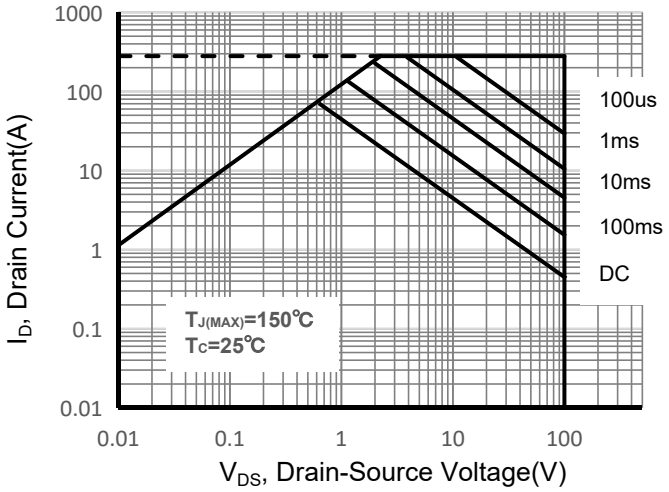



**Figure 9. Maximum Continuous Drain Current vs Case Temperature**

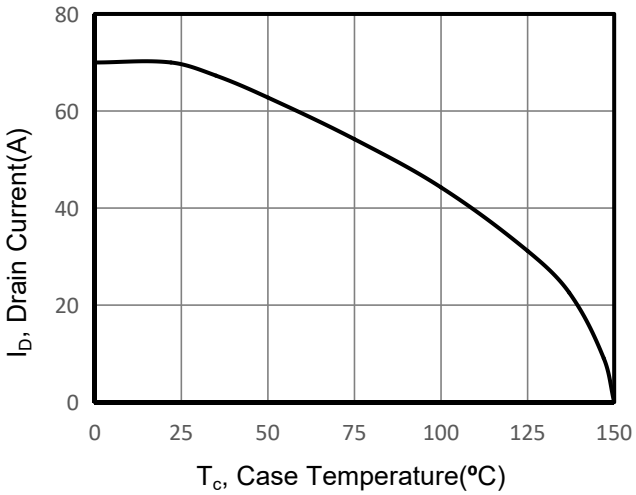
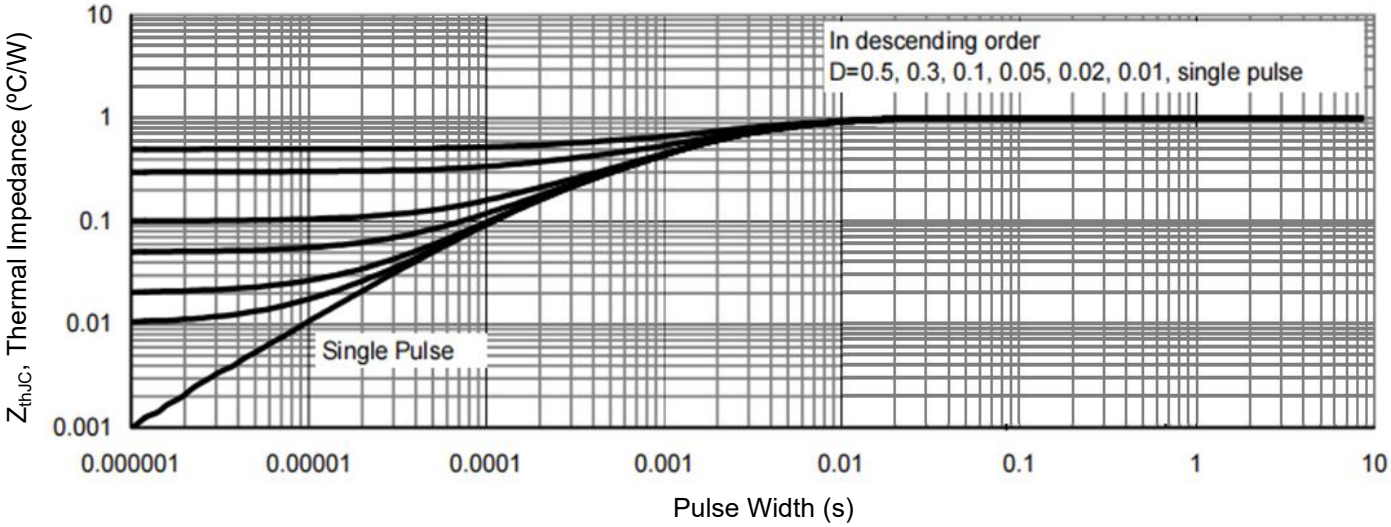
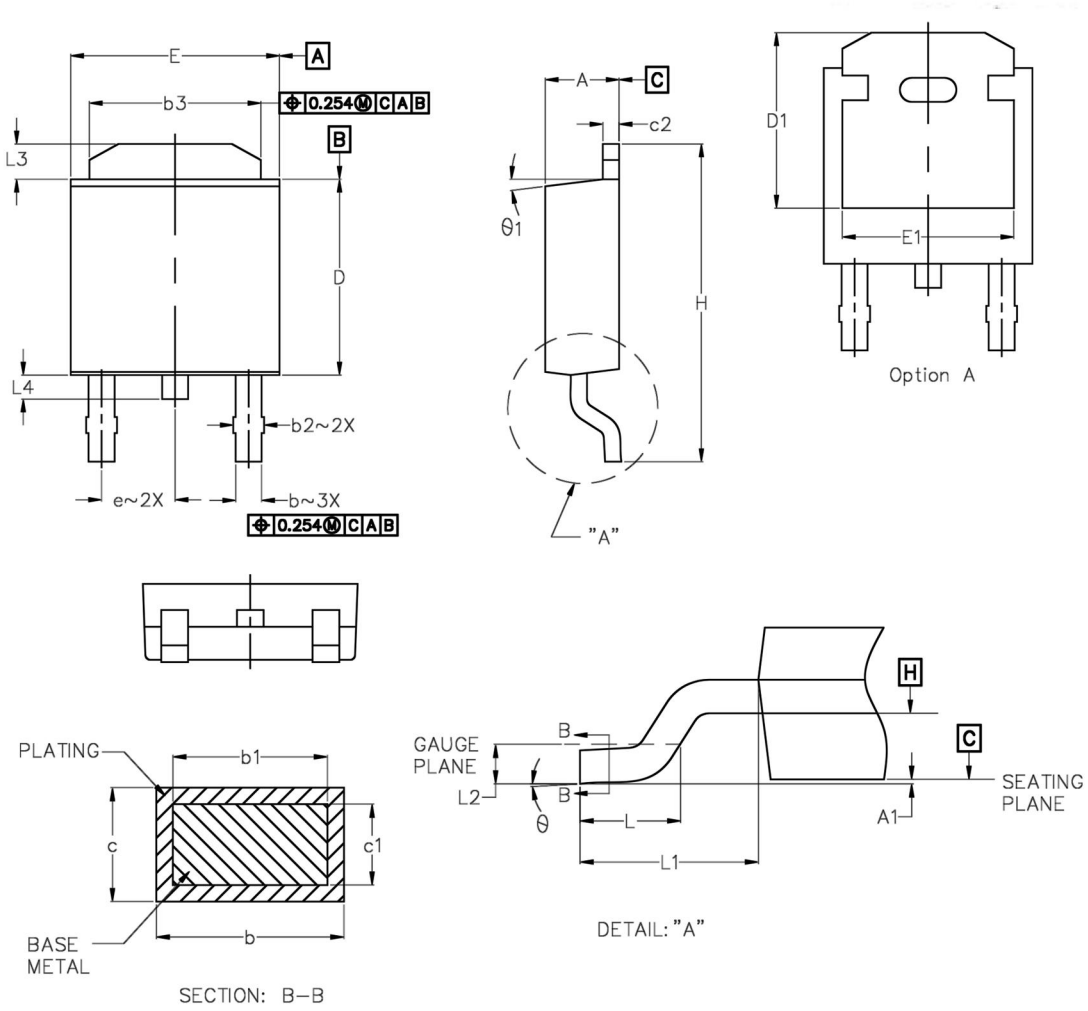



**Figure 10. Normalized Maximum Transient Thermal Impedance**



## TO-252 Package Information




| SYMBOLS | COMMON | | | |
|---|---|---|---|---|
| | MM | | INCH | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 2.184 | 2.387 | 0.086 | 0.094 |
| A1 | — | 0.127 | — | 0.005 |
| b | 0.750 | 0.890 | 0.029 | 0.035 |
| b1 | 0.750 | 0.860 | 0.029 | 0.034 |
| b2 | 0.762 | 1.143 | 0.030 | 0.045 |
| b3 | 4.953 | 5.461 | 0.195 | 0.215 |
| c | 0.460 | 0.610 | 0.018 | 0.024 |
| c1 | 0.410 | 0.559 | 0.016 | 0.022 |
| c2 | 0.460 | 0.889 | 0.018 | 0.035 |
| D | 5.969 | 6.223 | 0.235 | 0.245 |
| D1 | 5.207 | — | 0.205 | — |
| E | 6.350 | 6.731 | 0.250 | 0.265 |
| E1 | 4.318 | — | 0.170 | — |
| e | 2.290 BSC | | 0.090 BSC | |
| H | 9.398 | 10.414 | 0.370 | 0.410 |
| L | 1.397 | 1.778 | 0.055 | 0.070 |
| L1 | 2.743 BSC | | 0.108 BSC | |
| L2 | 0.508 BSC | | 0.020 BSC | |
| L3 | 0.889 | 1.270 | 0.035 | 0.050 |
| L4 | — | 1.016 | — | 0.040 |
| θ | 0° | 10° | 0° | 10° |
| θ1 | 0° | 15° | 0° | 15° |