

## Features

- Uses Geener advanced MOS technology
- Extremely low on-resistance  $R_{DS(on)}$
- Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- Qualified according to JEDEC criteria

## Applications

- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

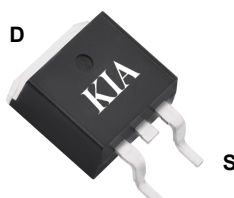
## Product Summary

|              |               |
|--------------|---------------|
| $V_{DS}$     | 100V          |
| $R_{DS(on)}$ | 1.5m $\Omega$ |
| $I_D$        | 330A          |

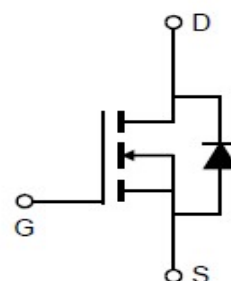
**100% DVDS Tested**  
**100% Avalanche Tested**



TOLL



TO-263



## Package Marking and Ordering Information

| Part #     | Marking    | Package | Packing | Reel Size | Tape Width | Qty     |
|------------|------------|---------|---------|-----------|------------|---------|
| KCB012N10N | KCB012N10N | TO-263  | Tape    | N/A       | N/A        | 1000pcs |
| KCT012N10N | KCT012N10N | TOLL    | Tape    | N/A       | N/A        | 2000pcs |

## Absolute Maximum Ratings

| Parameter                                                                                                     | Symbol                | Value            | Unit             |
|---------------------------------------------------------------------------------------------------------------|-----------------------|------------------|------------------|
| Drain-source voltage                                                                                          | $V_{DS}$              | 100              | V                |
| Continuous drain current<br>$T_C = 25^\circ\text{C}$<br>$T_A = 25^\circ\text{C}$<br>$T_C = 100^\circ\text{C}$ | $I_D$                 | 330<br>33<br>246 | A                |
| Pulsed drain current ( $T_C = 25^\circ\text{C}$ , $t_p$ limited by $T_{jmax}$ )                               | $I_{D \text{ pulse}}$ | 1320             | A                |
| Avalanche energy, single pulse ( $L=0.5\text{mH}$ , $R_g=25\Omega$ )                                          | $E_{AS}$              | 540              | mJ               |
| Gate-Source voltage                                                                                           | $V_{GS}$              | $\pm 20$         | V                |
| Power dissipation ( $T_C = 25^\circ\text{C}$ )                                                                | $P_{tot}$             | 431              | W                |
| Operating junction and storage temperature                                                                    | $T_j, T_{stg}$        | -55...+150       | $^\circ\text{C}$ |

## Thermal Resistance

| Parameter                                              | Symbol     | Max  | Unit |
|--------------------------------------------------------|------------|------|------|
| Thermal resistance, junction – case.                   | $R_{thJC}$ | 0.29 | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | 40   |      |

## Electrical Characteristic (at $T_j = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| Parameter | Symbol | Value |      |      | Unit | Test Condition |
|-----------|--------|-------|------|------|------|----------------|
|           |        | min.  | typ. | max. |      |                |

## Static Characteristic

|                                  |              |     |            |            |           |                                                                                   |
|----------------------------------|--------------|-----|------------|------------|-----------|-----------------------------------------------------------------------------------|
| Drain-source breakdown voltage   | $BV_{DSS}$   | 100 | -          | -          | V         | $V_{GS}=0V, I_D=250\mu A$                                                         |
| Gate threshold voltage           | $V_{GS(th)}$ | 2.4 | 3          | 3.6        | V         | $V_{DS}=V_{GS}, I_D=250\mu A$                                                     |
| Zero gate voltage drain current  | $I_{DSS}$    | -   | -          | 1          | $\mu A$   | $V_{DS}=100V, V_{GS}=0V$<br>$T_j=25^{\circ}\text{C}$<br>$T_j=125^{\circ}\text{C}$ |
| Gate-source leakage current      | $I_{GSS}$    | -   | -          | $\pm 100$  | nA        | $V_{GS}=\pm 20V, V_{DS}=0V$                                                       |
| Drain-source on-state resistance | $R_{DS(on)}$ | -   | 1.4<br>1.2 | 1.8<br>1.5 | $m\Omega$ | $V_{GS}=10V, I_D=50A$<br>TO-263<br>TOLL                                           |
| Transconductance                 | $g_{fs}$     | -   | 260        | -          | S         | $V_{DS}=5V, I_D=50A$                                                              |

## Dynamic Characteristic

|                              |              |   |       |          |    |                                                             |
|------------------------------|--------------|---|-------|----------|----|-------------------------------------------------------------|
| Input Capacitance            | $C_{iss}$    | - | 15800 | -        | pF | $V_{GS}=0V, V_{DS}=50V,$<br>$f=1\text{MHz}$                 |
| Output Capacitance           | $C_{oss}$    | - | 1930  | -        |    |                                                             |
| Reverse Transfer Capacitance | $C_{rss}$    | - | 75    | -        |    |                                                             |
| Gate Total Charge            | $Q_G$        | - | 260   | -        | nC | $V_{GS}=10V, V_{DS}=50V,$<br>$I_D=100A$                     |
| Gate-Source charge           | $Q_{gs}$     | - | 75    | -        |    |                                                             |
| Gate-Drain charge            | $Q_{gd}$     | - | 76    | -        |    |                                                             |
| Turn-on delay time           | $t_{d(on)}$  | - | 81    | -        | ns | $V_{GS}=10V, V_{DS}=50V, R_{GEN}$<br>$=4.7\Omega, I_D=100A$ |
| Rise time                    | $t_r$        | - | 178   | -        |    |                                                             |
| Turn-off delay time          | $t_{d(off)}$ | - | 167   | -        |    |                                                             |
| Fall time                    | $t_f$        | - | 68    | -        |    |                                                             |
| Gate resistance              | $R_G$        | - | 1     | $\Omega$ |    | $V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$                       |

### Body Diode Characteristic

| Parameter                          | Symbol   | Value |      |      | Unit | Test Condition                    |
|------------------------------------|----------|-------|------|------|------|-----------------------------------|
|                                    |          | min.  | typ. | max. |      |                                   |
| Body Diode Forward Voltage         | $V_{SD}$ | -     | 0.85 | 1.1  | V    | $V_{GS}=0V, I_F=100A$             |
| Body Diode Reverse Recovery Time   | $t_{rr}$ | -     | 92   | -    | ns   | $I_F=20A,$<br>$dI/dt=100A/\mu s;$ |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | -     | 200  | -    | nC   |                                   |

## Electrical characteristics diagrams

Fig.1 Typ. transfer characteristics

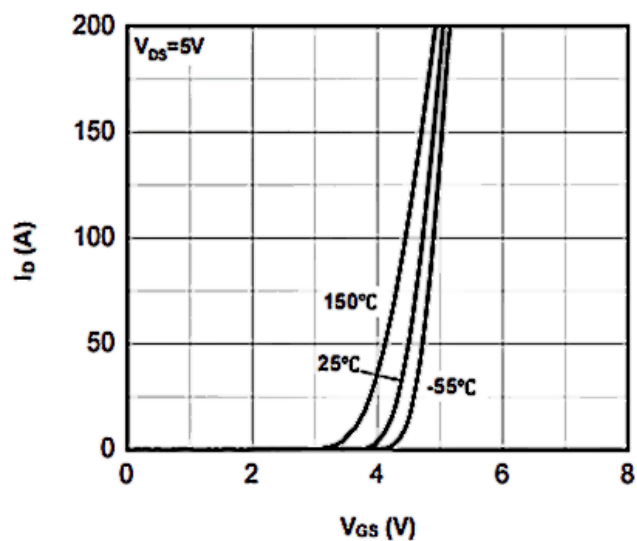


Fig.2 Typ. output characteristics

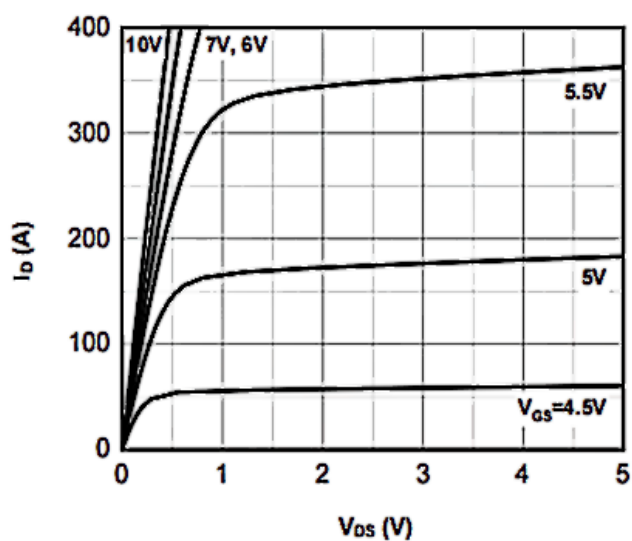


Fig.3 Normalized on-resistance vs drain current

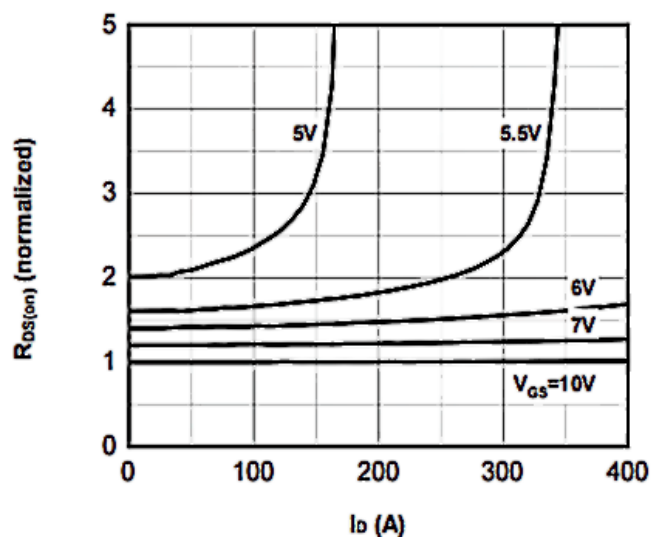


Fig.4 Typ. on-resistance vs gate-source voltage

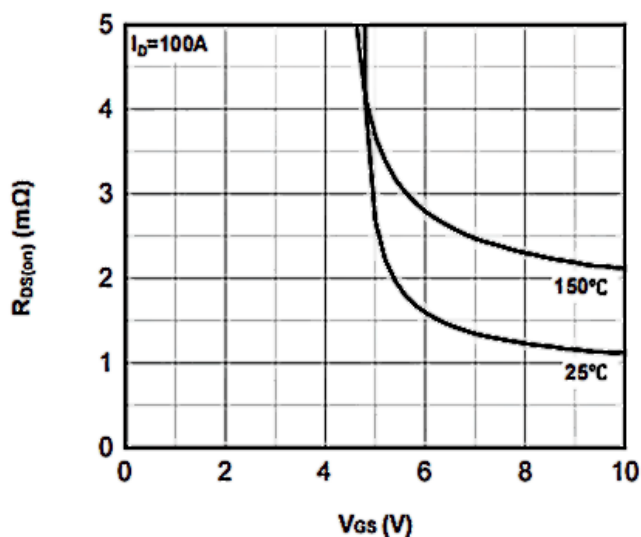


Fig.5 Normalized on-resistance vs junction temperature

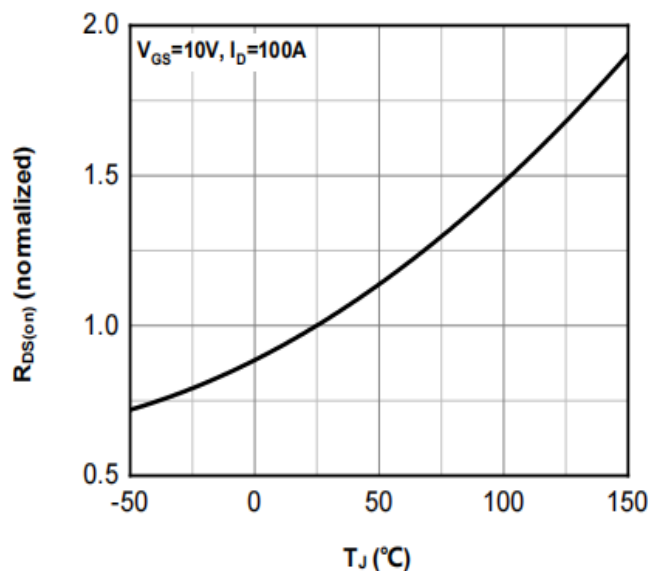


Fig.6 Typ. gate charge

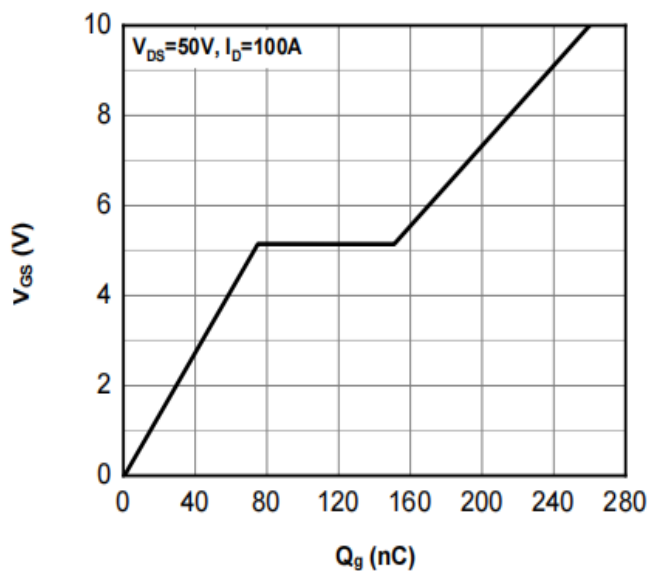


Fig.7 Typ. forward characteristics of body diode

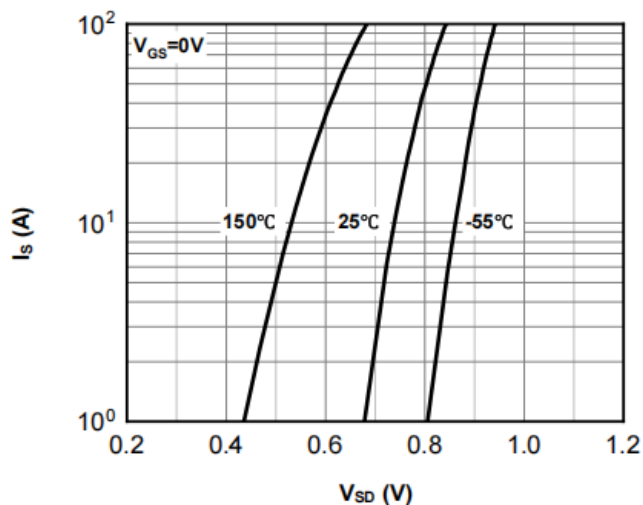


Fig.8 Safe operating area

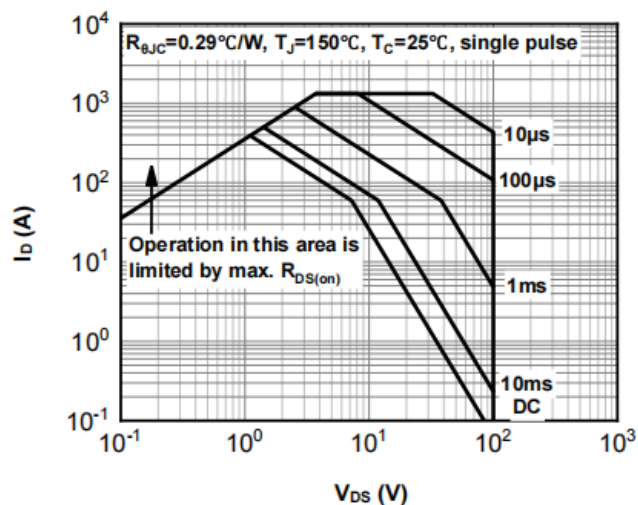


Fig.9 Typ. Capacitance

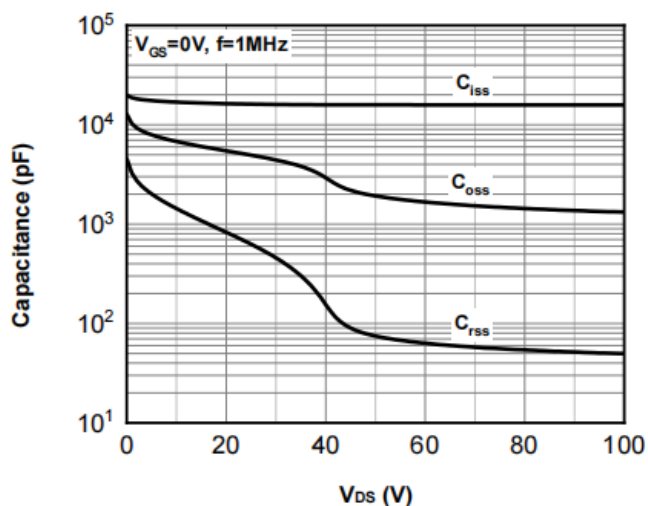


Fig.10 Single pulse maximum power dissipation

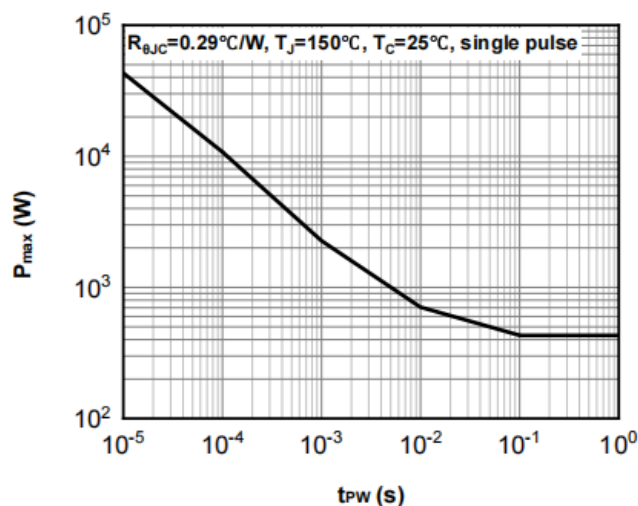


Fig.11 Max. power dissipation vs case temperature

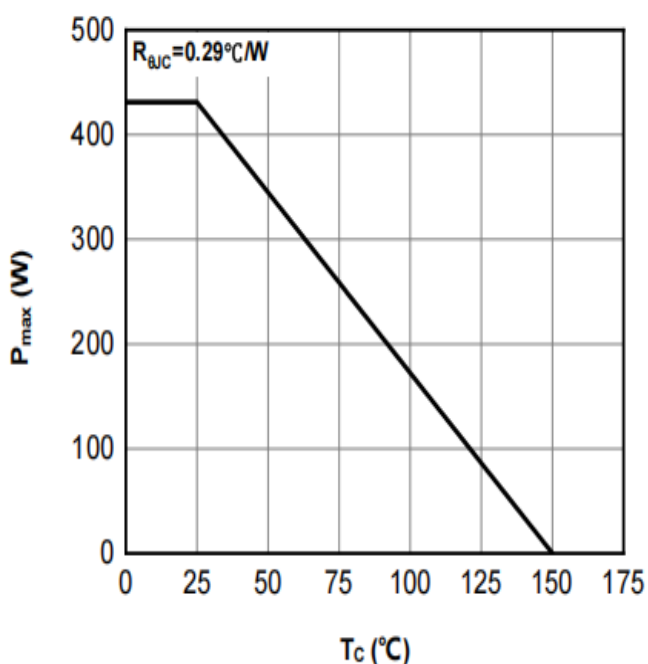


Fig.12 Max. continuous drain current vs case temperature

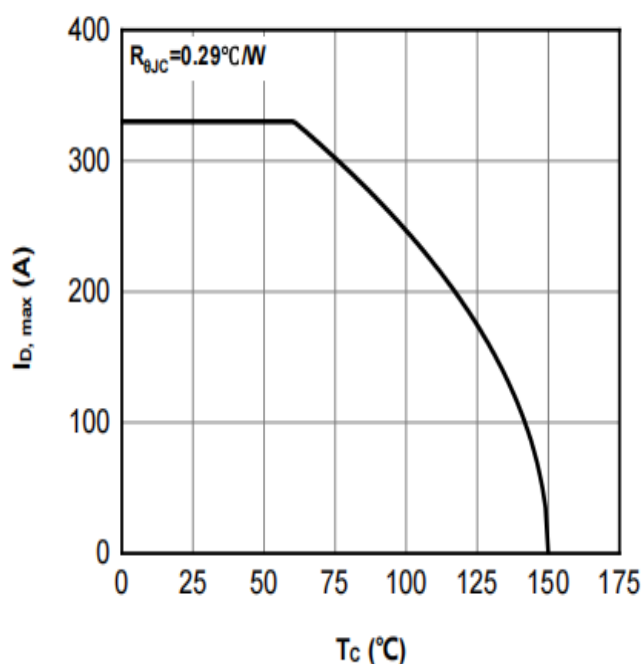


Fig.13 Normalized  $V_{(BR)DSS}$  vs junction temperature

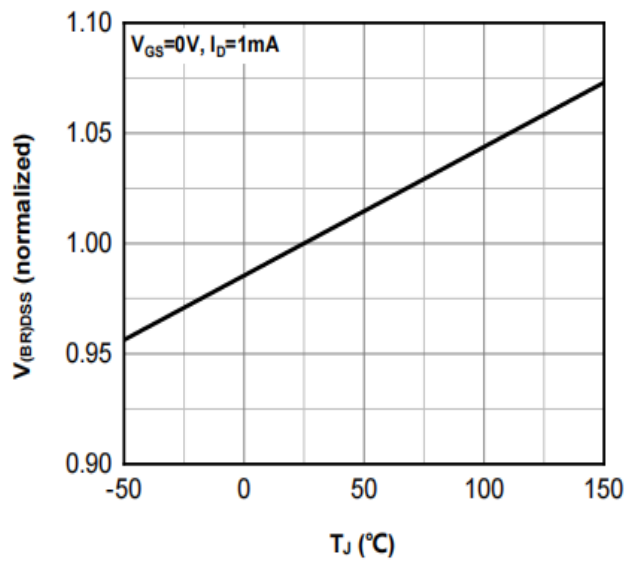


Fig.14 Normalized  $V_{GS(th)}$  vs junction temperature

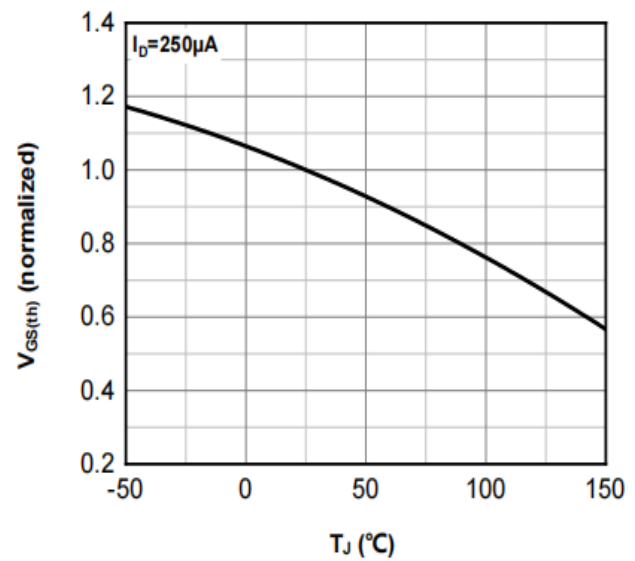
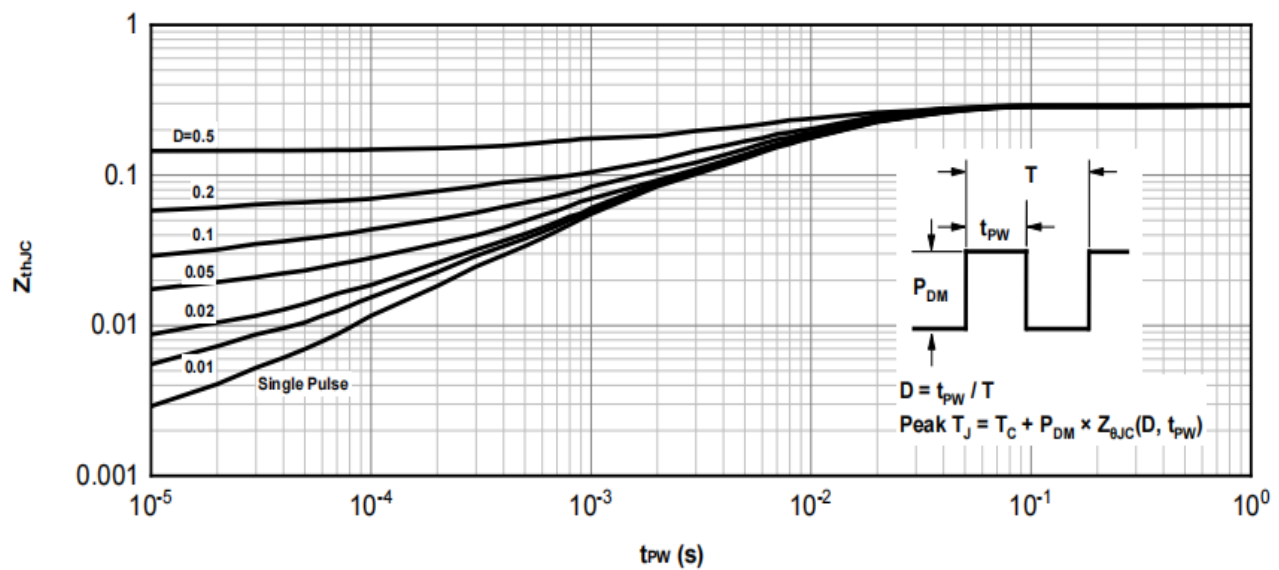
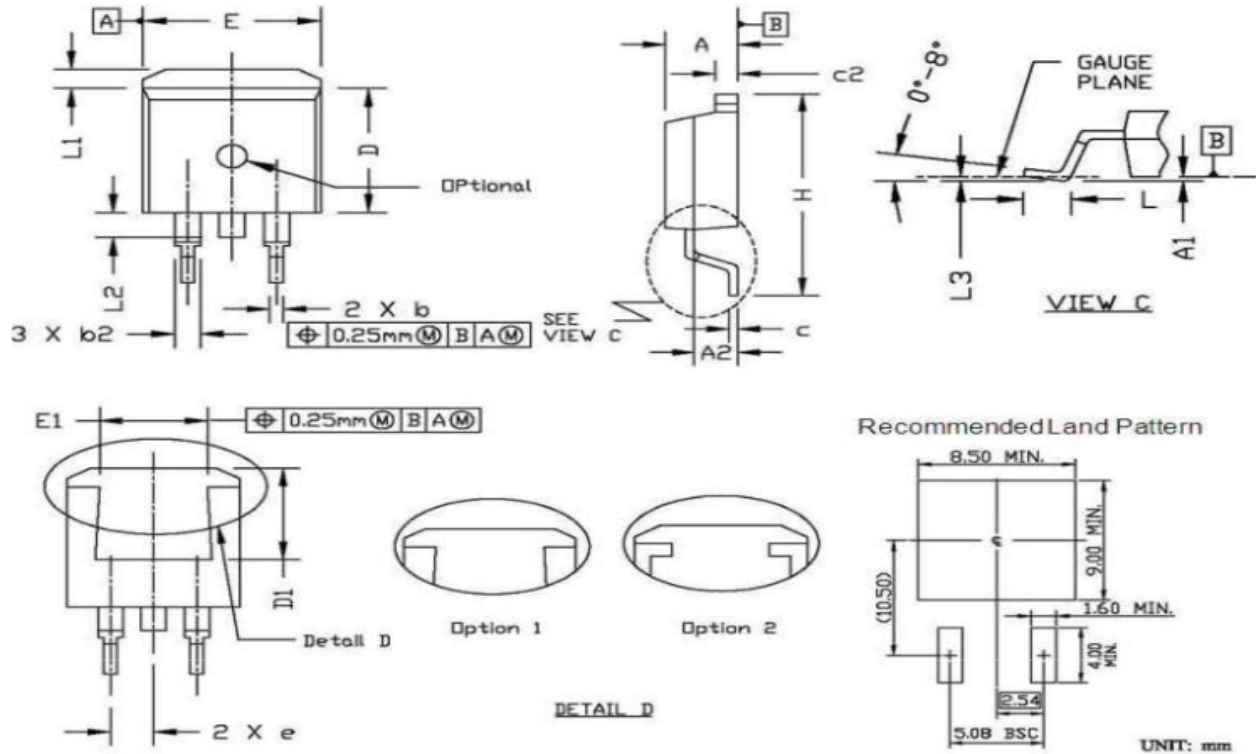


Fig.15 Transient thermal impedance from junction to case

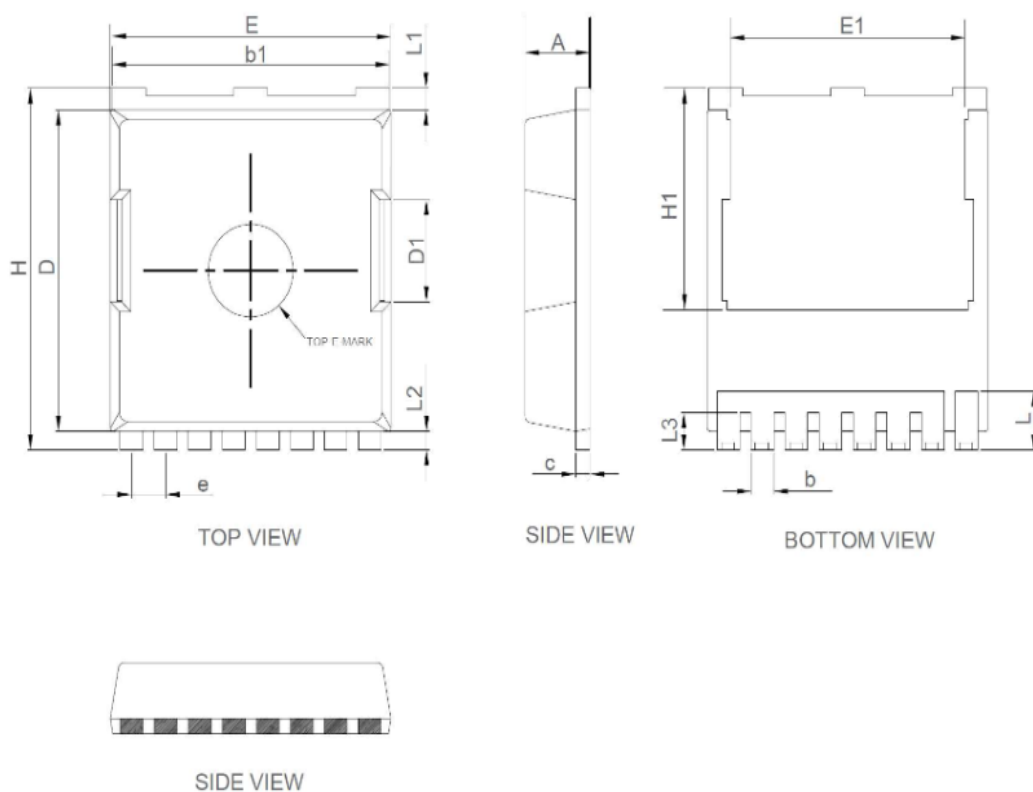


**Package Outline: TO-263**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 4.30                      | 4.86  | 0.169                | 0.191 |
| A1     | 0.00                      | 0.25  | 0.000                | 0.010 |
| A2     | 2.34                      | 2.79  | 0.092                | 0.110 |
| b      | 0.68                      | 0.94  | 0.027                | 0.037 |
| b2     | 1.15                      | 1.35  | 0.045                | 0.053 |
| c      | 0.33                      | 0.65  | 0.013                | 0.026 |
| c2     | 1.17                      | 1.40  | 0.046                | 0.055 |
| D      | 8.38                      | 9.45  | 0.330                | 0.372 |
| D1     | 6.90                      | 8.17  | 0.272                | 0.322 |
| e      | 2.54 BSC.                 |       | 0.100 BSC.           |       |
| E      | 9.78                      | 10.50 | 0.385                | 0.413 |
| E1     | 6.50                      | 8.60  | 0.256                | 0.339 |
| H      | 14.61                     | 15.88 | 0.575                | 0.625 |
| L      | 2.24                      | 3.00  | 0.088                | 0.118 |
| L1     | 0.70                      | 1.60  | 0.028                | 0.063 |
| L2     | 1.00                      | 1.78  | 0.039                | 0.070 |
| L3     | 0.00                      | 0.25  | 0.000                | 0.010 |

Package Outline: TOLL



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 2.15                      | 2.45  | 0.085                | 0.096 |
| b      | 0.60                      | 0.90  | 0.024                | 0.035 |
| b1     | 9.65                      | 9.95  | 0.380                | 0.392 |
| c      | 0.35                      | 0.65  | 0.014                | 0.026 |
| D      | 10.18                     | 10.70 | 0.401                | 0.421 |
| D1     | 3.15                      | 3.45  | 0.124                | 0.136 |
| E      | 9.70                      | 10.10 | 0.382                | 0.398 |
| E1     | 7.35                      | 8.45  | 0.289                | 0.333 |
| e      | 1.10                      | 1.30  | 0.043                | 0.051 |
| H      | 11.45                     | 11.95 | 0.451                | 0.470 |
| H1     | 6.55                      | 7.50  | 0.258                | 0.295 |
| L      | 1.35                      | 2.10  | 0.053                | 0.083 |
| L1     | 0.50                      | 0.90  | 0.020                | 0.035 |
| L2     | 0.40                      | 0.80  | 0.016                | 0.031 |
| L3     | 0.95                      | 1.35  | 0.037                | 0.053 |