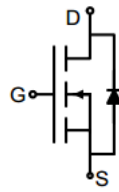
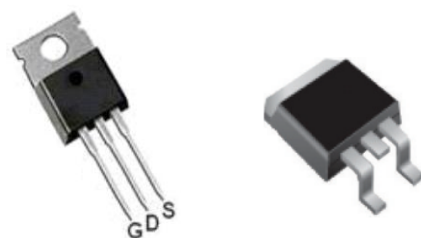


## N-Channel Enhancement Mode Power MOSFET

|                                                                                                                                                                                                                                                                                                                              |                |                                                                                                          |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------|------------------|
| <b>Description</b><br><br>The GT100N12 uses advanced trench technology to provide excellent $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.                                                                                                                                                |                | <br>Schematic Diagram |                  |
| <b>General Features</b> <ul style="list-style-type: none"> <li>• <math>V_{DS}</math> 120V</li> <li>• <math>I_D</math> (at <math>V_{GS} = 10V</math>) 70A</li> <li>• <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 10m<math>\Omega</math></li> <li>• 100% Avalanche Tested</li> <li>• RoHS Compliant</li> </ul> |                | <br>TO-220 TO-263      |                  |
| <b>Application</b> <ul style="list-style-type: none"> <li>• Synchronous Rectification in SMPS or LED Driver</li> <li>• UPS</li> <li>• Motor Control</li> <li>• BMS</li> <li>• High Frequency Circuit</li> </ul>                                                                                                              |                |                                                                                                          |                  |
| <b>Device</b>                                                                                                                                                                                                                                                                                                                | <b>Package</b> | <b>Marking</b>                                                                                           | <b>Packaging</b> |
| GT100N12T                                                                                                                                                                                                                                                                                                                    | TO-220         | GT100N12                                                                                                 | 50pcs/Tube       |
| GT100N12M                                                                                                                                                                                                                                                                                                                    | TO-263         | GT100N12                                                                                                 | 800pcs/Reel      |

### Absolute Maximum Ratings $T_C = 25^{\circ}C$ , unless otherwise noted

| Parameter                                        | Symbol         | Value      | Unit        |
|--------------------------------------------------|----------------|------------|-------------|
| Drain-Source Voltage                             | $V_{DS}$       | 120        | V           |
| Continuous Drain Current                         | $I_D$          | 70         | A           |
| Pulsed Drain Current (note1)                     | $I_{DM}$       | 280        | A           |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V           |
| Power Dissipation                                | $P_D$          | 120        | W           |
| Single pulse avalanche energy (note3)            | $E_{AS}$       | 352        | mJ          |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | -55 To 150 | $^{\circ}C$ |

### Thermal Resistance

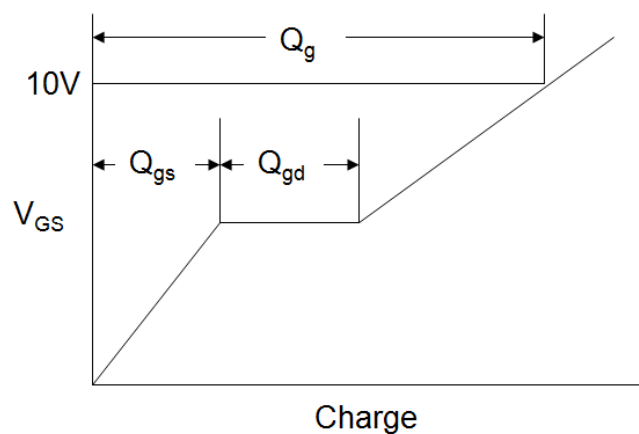
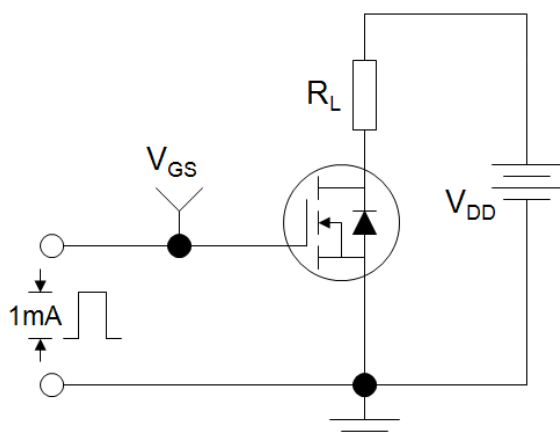
| Parameter                            | Symbol     | Value | Unit          |
|--------------------------------------|------------|-------|---------------|
| Thermal Resistance, Junction-to-Case | $R_{thJC}$ | 1.25  | $^{\circ}C/W$ |

| Specifications T <sub>j</sub> = 25°C, unless otherwise noted |                      |                                                                          |       |      |      |      |
|--------------------------------------------------------------|----------------------|--------------------------------------------------------------------------|-------|------|------|------|
| Parameter                                                    | Symbol               | Test Conditions                                                          | Value |      |      | Unit |
|                                                              |                      |                                                                          | Min.  | Typ. | Max. |      |
| Static Parameters                                            |                      |                                                                          |       |      |      |      |
| Drain-Source Breakdown Voltage                               | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                             | 120   | --   | --   | V    |
| Zero Gate Voltage Drain Current                              | I <sub>DSS</sub>     | V <sub>DS</sub> = 120V, V <sub>GS</sub> = 0V                             | --    | --   | 1    | μA   |
| Gate-Source Leakage                                          | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20V                                                   | --    | --   | ±100 | nA   |
| Gate-Source Threshold Voltage                                | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA               | 2.5   | 3    | 3.5  | V    |
| Drain-Source On-Resistance                                   | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 35A                              | --    | 8    | 10   | mΩ   |
| Forward Transconductance                                     | g <sub>FS</sub>      | V <sub>Ds</sub> =5V,I <sub>b</sub> =35A                                  | --    | 60   | --   | S    |
| Dynamic Parameters                                           |                      |                                                                          |       |      |      |      |
| Input Capacitance                                            | C <sub>iss</sub>     | V <sub>GS</sub> = 0V,<br>V <sub>DS</sub> = 60V,<br>f = 1.0MHz            | --    | 3050 | --   | pF   |
| Output Capacitance                                           | C <sub>oss</sub>     |                                                                          | --    | 280  | --   |      |
| Reverse Transfer Capacitance                                 | C <sub>rss</sub>     |                                                                          | --    | 22   | --   |      |
| Total Gate Charge                                            | Q <sub>g</sub>       | V <sub>DS</sub> = 60V,<br>I <sub>D</sub> = 35A,<br>V <sub>GS</sub> = 10V | --    | 50   | --   | nC   |
| Gate-Source Charge                                           | Q <sub>gs</sub>      |                                                                          | --    | 17   | --   |      |
| Gate-Drain Charge                                            | Q <sub>gd</sub>      |                                                                          | --    | 15   | --   |      |
| Turn-on Delay Time                                           | t <sub>d(on)</sub>   | V <sub>DD</sub> = 60V,<br>I <sub>D</sub> = 35A,<br>R <sub>G</sub> = 1.6Ω | --    | 15   | --   | ns   |
| Turn-on Rise Time                                            | t <sub>r</sub>       |                                                                          | --    | 10   | --   |      |
| Turn-off Delay Time                                          | t <sub>d(off)</sub>  |                                                                          | --    | 34   | --   |      |
| Turn-off Fall Time                                           | t <sub>f</sub>       |                                                                          | --    | 8    | --   |      |
| Drain-Source Body Diode Characteristics                      |                      |                                                                          |       |      |      |      |
| Continuous Body Diode Current                                | I <sub>S</sub>       | T <sub>C</sub> = 25°C                                                    | --    | --   | 70   | A    |
| Body Diode Voltage                                           | V <sub>SD</sub>      | T <sub>J</sub> = 25°C, I <sub>SD</sub> = 25A, V <sub>GS</sub> = 0V       | --    | --   | 1.2  | V    |
| Reverse Recovery Time                                        | trr                  | I <sub>S</sub> = 35A, V <sub>GS</sub> = 0V<br>di/dt=100A/us              | --    | 60   | --   | ns   |

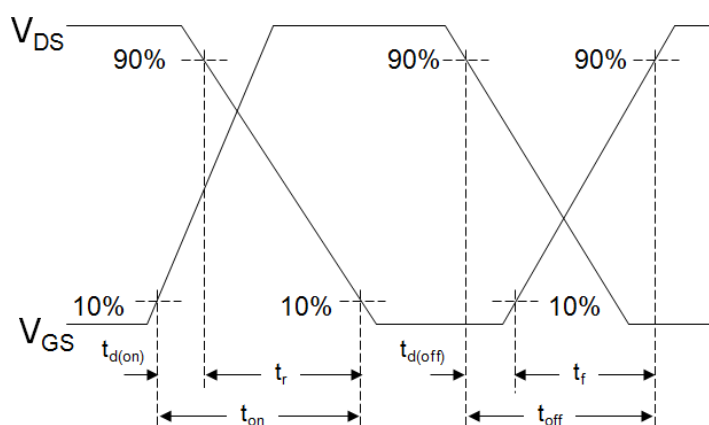
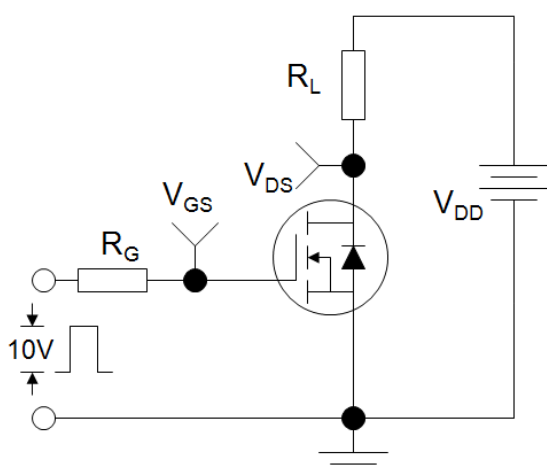
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$
3. EAS condition :  $T_J=25^{\circ}\text{C}$  ,  $V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_g=25\Omega$

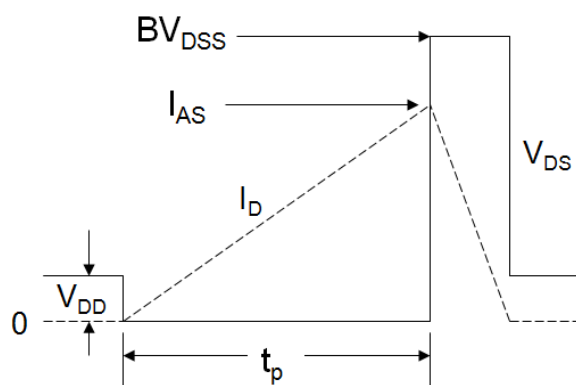
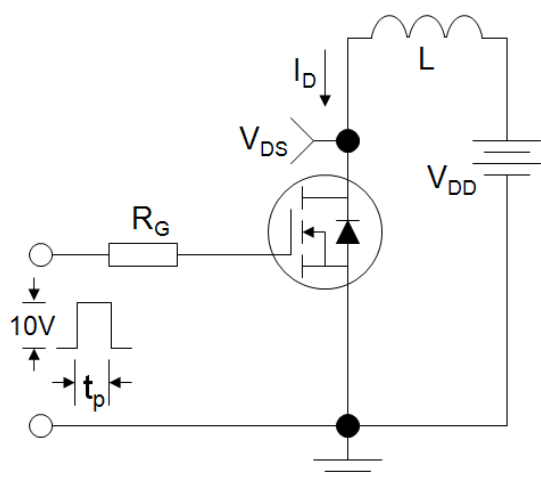
Gate Charge Test Circuit



EAS Test Circuit



Switch Time Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

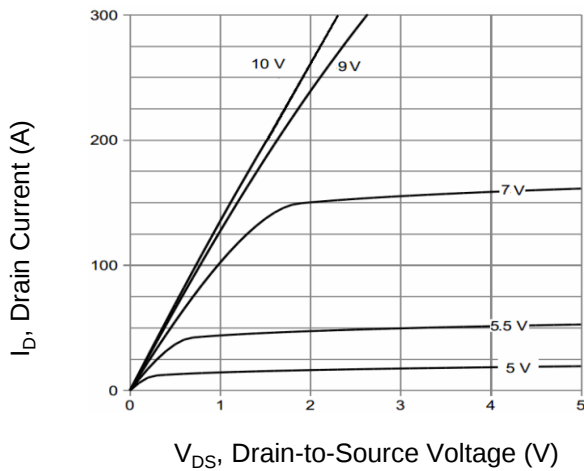


Figure 2. Transfer Characteristics

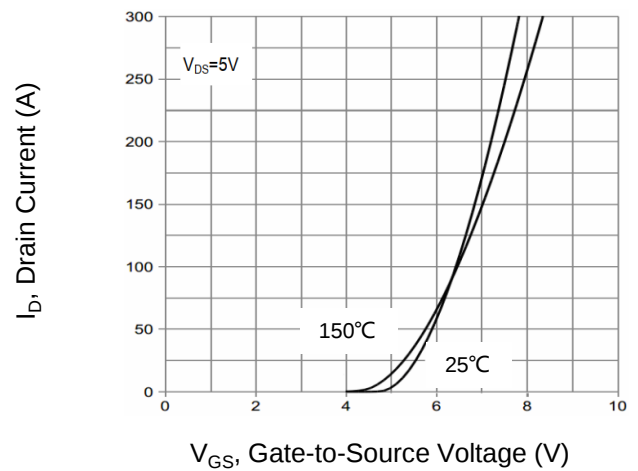


Figure 3. Gate Charge

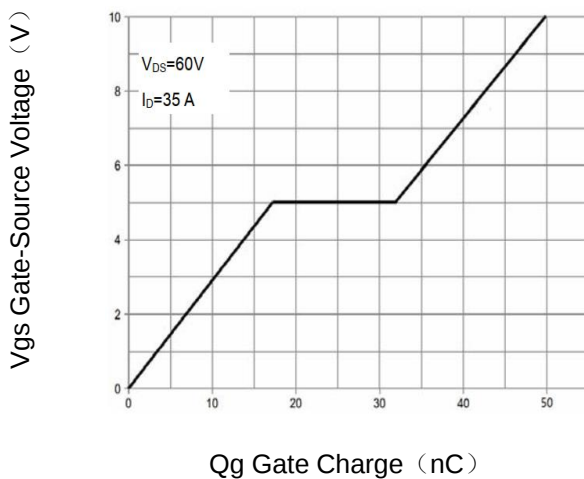


Figure 4. Drain Source On Resistance

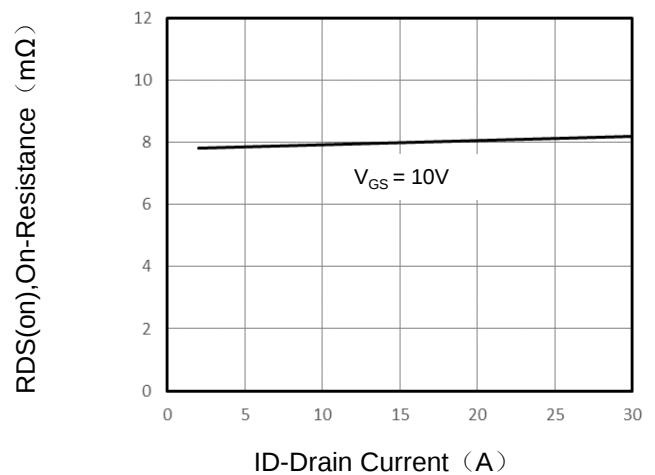


Figure 5. Capacitance vs Vds

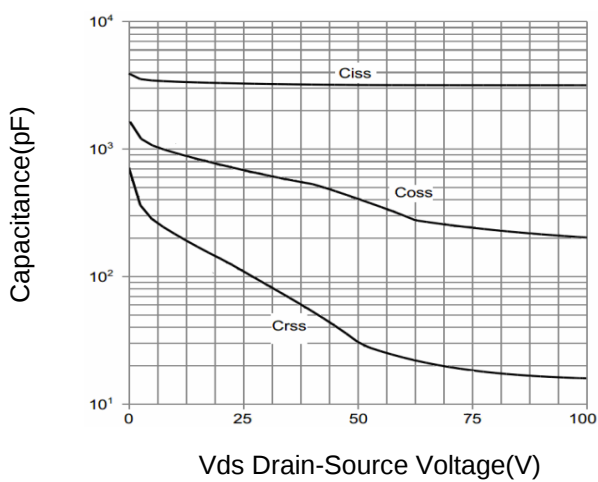
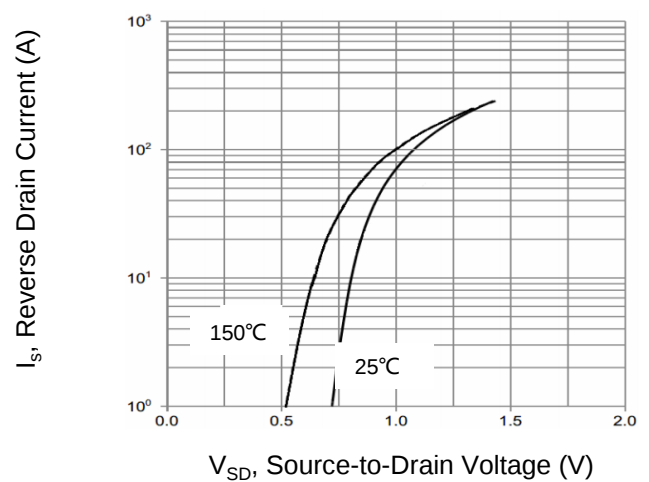


Figure 6. Source-Drain Diode Forward



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Drain-Source On-Resistance

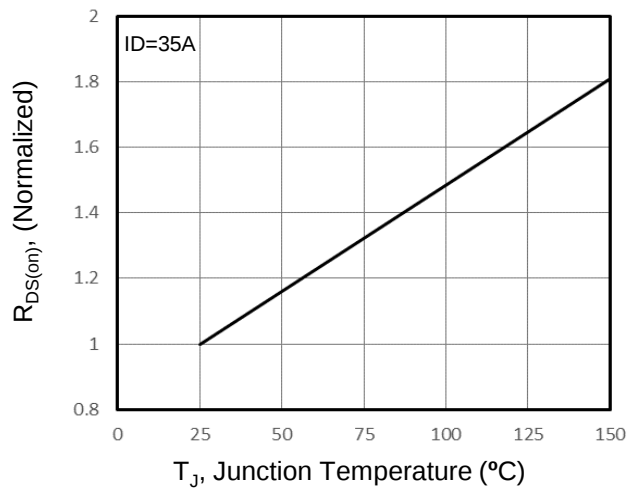


Figure 8. Safe Operation Area

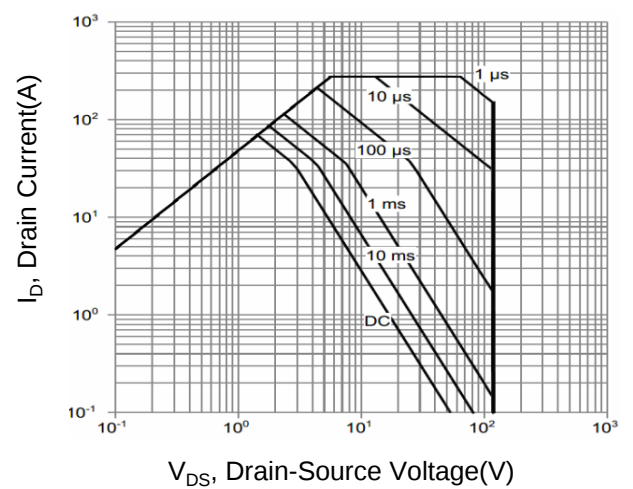
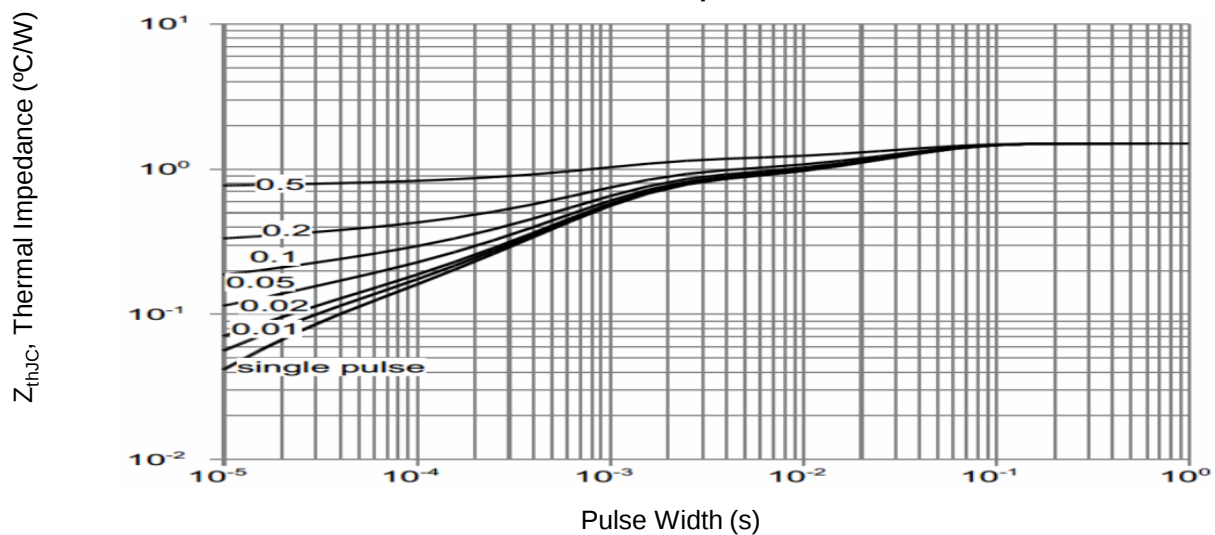
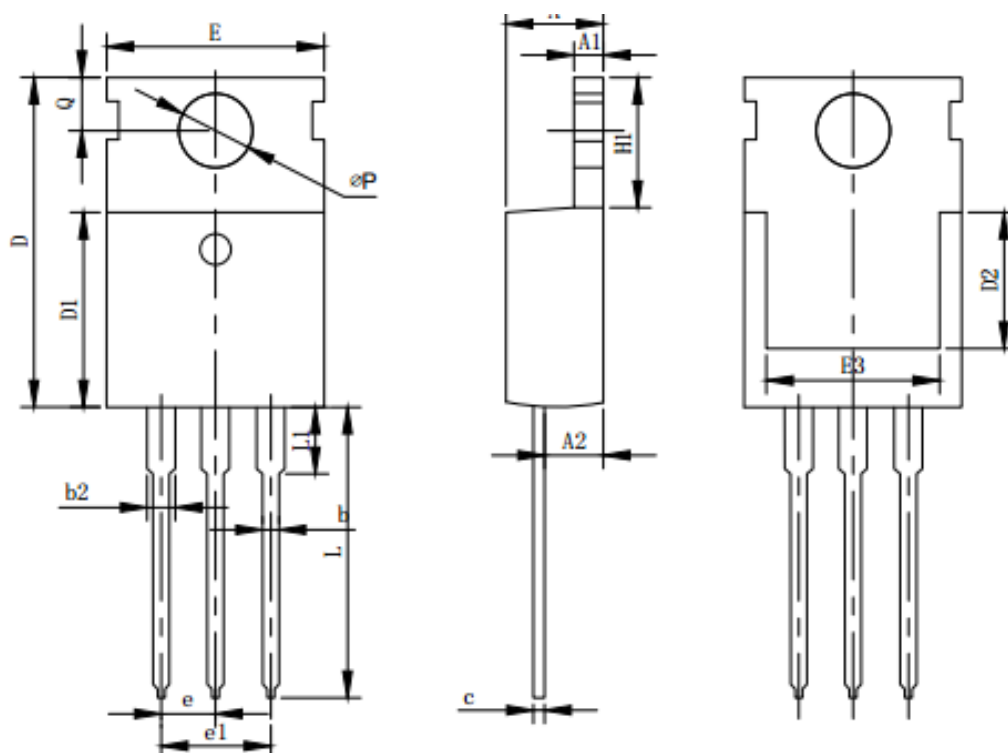


Figure 9. Normalized Maximum Transient Thermal Impedance

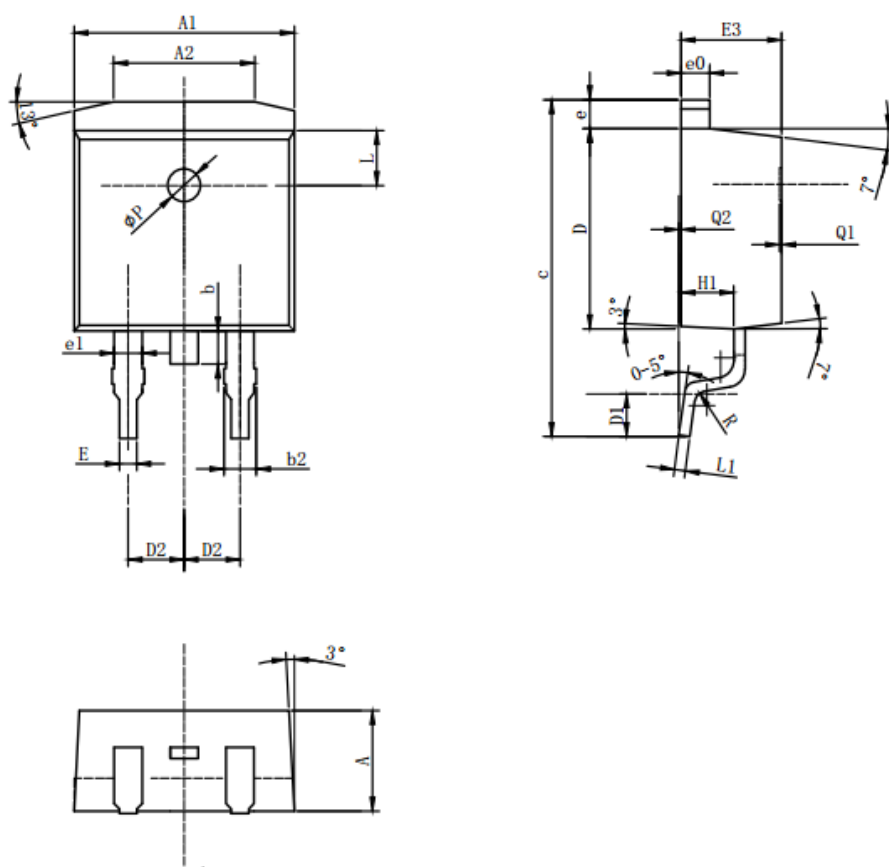


## TO-220 Package Information



| Symbol | Dimensions in Millimeters |      |      |
|--------|---------------------------|------|------|
|        | MIN.                      | NOM. | MAX. |
| A      | 4.37                      | 4.57 | 4.7  |
| A1     | 1.25                      | 1.3  | 1.4  |
| A2     | 2.2                       | 2.4  | 2.6  |
| b      | 0.7                       | 0.8  | 0.95 |
| b2     | 1.7                       | 1.27 | 1.47 |
| c      | 0.45                      | 0.5  | 0.6  |
| D      | 15.1                      | 15.6 | 16.1 |
| D1     | 8.8                       | 9.1  | 9.4  |
| D2     | 5.5                       |      |      |
| E      | 9.7                       | 10   | 10.3 |
| e      | 2.54BSC                   |      |      |
| e1     | 5.08BSC                   |      |      |
| H1     | 6.25                      | 6.5  | 6.85 |
| L      | 12.75                     | 13.5 | 13.8 |
| L1     |                           | 3.1  | 3.4  |
| øP     | 3.4                       | 3.6  | 3.8  |
| Q      | 2.6                       | 2.8  | 3    |

## TO-263 Package Information



## COMMON DIMENSIONS

| SYMBOL   | mm    |       |       |
|----------|-------|-------|-------|
|          | MIN   | NOM   | MAX   |
| A        | 4.52  | 4.57  | 4.62  |
| A1       | 9.95  | 10.00 | 10.05 |
| A2       | 6.30  | 6.40  | 6.50  |
| b        | 1.30  | 1.50  | 1.70  |
| b2       | 1.17  | 1.27  | 1.37  |
| c        | 14.80 | 15.00 | 15.20 |
| D        | 9.05  | 9.10  | 9.15  |
| D1       | 1.90  | 2.10  | 2.30  |
| D2       | -     | 2.54  | -     |
| E        | -     | 0.80  | -     |
| E3       | -     | 4.57  | -     |
| e        | -     | 1.30  | -     |
| e0       | -     | 1.30  | -     |
| e1       | 1.73  | 3     | -     |
| H1       | -     | 2.40  | -     |
| L        | -     | 2.50  | -     |
| L1       | -     | 0.50  | -     |
| $\phi P$ | -     | 1.50  | -     |
| R        | -     | 0.50  | -     |
| Q1       | 0.10  | -     | 0.15  |
| Q2       | 0     | -     | 0.02  |