# N-Channel Enhancement Mode Power MOSFET

## Description

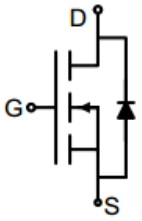
The GT045N10 uses advanced trench technology to provide excellent $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

## General Features

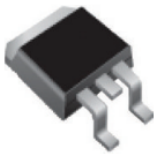
- $V_{DS}$ 100V
- $I_D$ (at $V_{GS}$ = 10V) 130A
- $R_{DS(ON)}$ (at $V_{GS}$ = 10V) < 4.5mΩ
- $R_{DS(ON)}$ (at $V_{GS}$ = 4.5V) < 6.3mΩ
- 100% Avalanche Tested
- RoHS Compliant

## Application

- Power switch
- DC/DC converters
- BMS




Schematic Diagram



TO-263


| Device | Package | Marking | Packaging |
|---|---|---|---|
| GT045N10M | TO-263 | GT045N10 | 800pcs/Reel |
| GT045N10T | TO-220 | GT045N10 | 50pcs/Tube |

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

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Continuous Drain Current | | $I_D$ | 130 | A |
| Pulsed Drain Current | (note1) | $I_{DM}$ | 240 | A |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Single Pulse Avalanche Energy | (note2) | EAS | 42 | mJ |
| Power Dissipation | | $P_D$ | 156 | W |
| 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 | $R_{thJA}$ | 62.5 | ºC/W |
| Thermal Resistance, Junction-to-Case | $R_{thJc}$ | 0.8 | ºC/W |

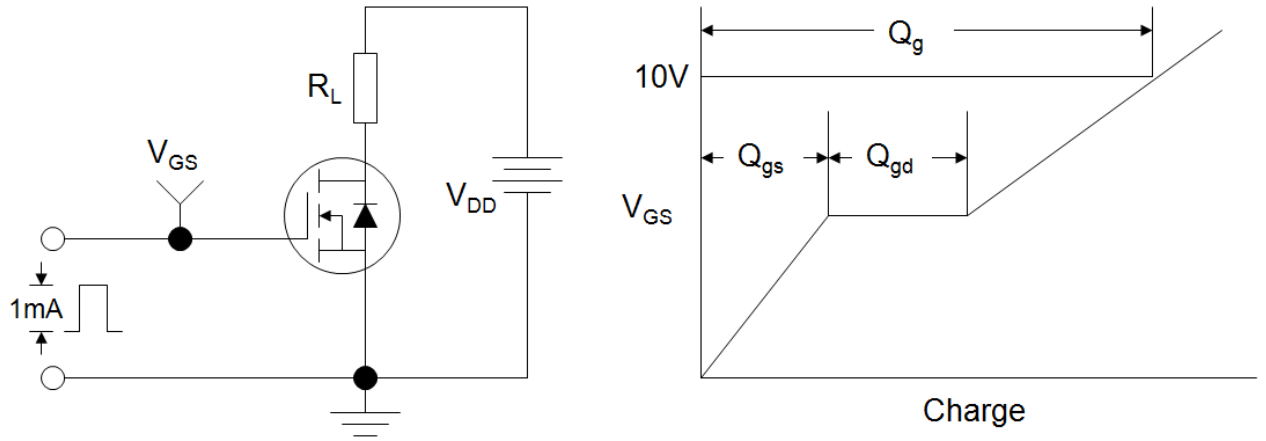
**Specifications** $T_J$ = 25ºC, unless otherwise noted

| 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 | 2 | 3 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | -- | 4.1 | 4.5 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 20A | -- | 6.0 | 6.3 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=10V,$I_D$=20A | -- | 60 | -- | S |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 50V, f = 1.0MHz | -- | 6124 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 792 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 15 | -- | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ = 50V, $I_D$ = 20A, $V_{GS}$ = 10V | -- | 101.6 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 20.6 | -- | |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 28.7 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 50V, $I_D$ = 20A, $R_G$ = 4.5Ω | -- | 28.2 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 7.5 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 81.9 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 20.1 | -- | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | $T_C$ = 25ºC | -- | -- | 130 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | -- | -- | 390 | |
| Body Diode Voltage | $V_{SD}$ | $T_J$ = 25ºC, $I_{SD}$ = 20A, $V_{GS}$ = 0V | -- | -- | 1.3 | V |

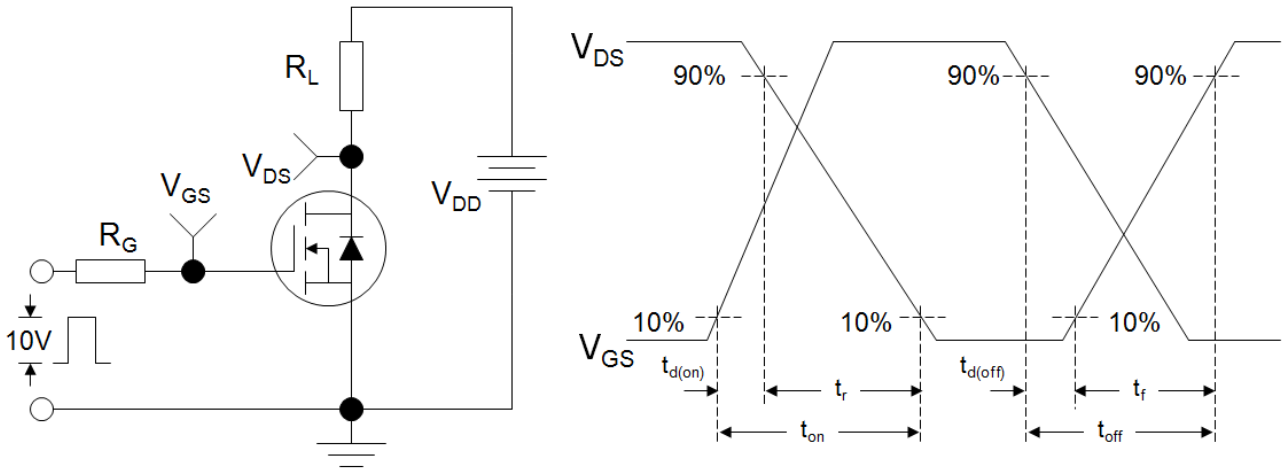
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS}$ = 23A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25°C
3. Identical low side and high side switch with identical $R_G$

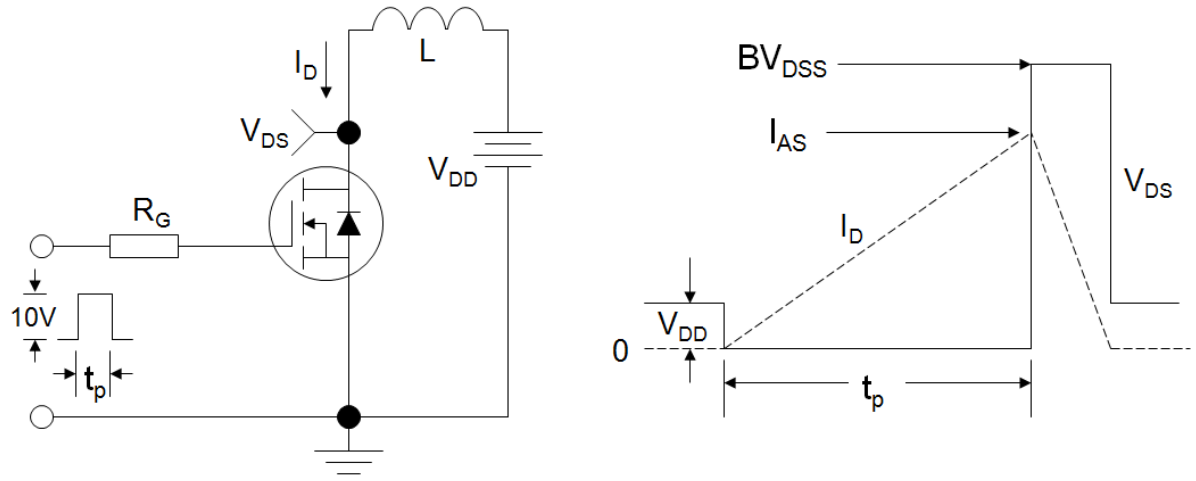
**Gate Charge Test Circuit**




**Switch Time Test Circuit**




**EAS Test Circuit**



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

**Figure 1. Output Characteristics**

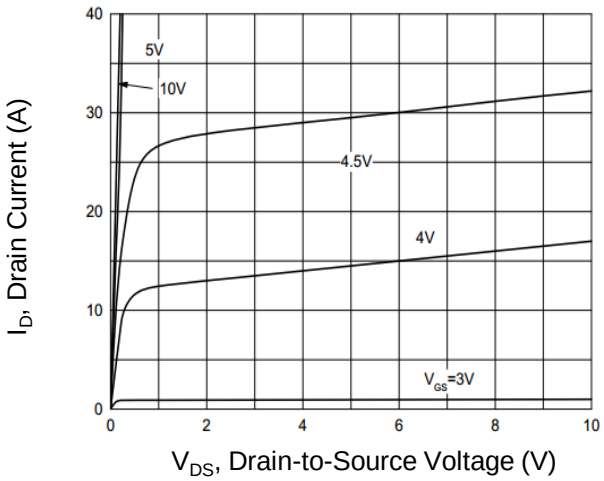



**Figure 2. Transfer Characteristics**

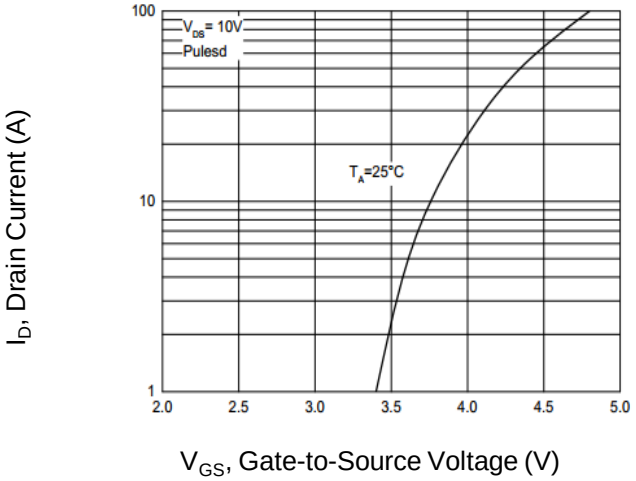



**Figure 3.Rdson-Drain Current**

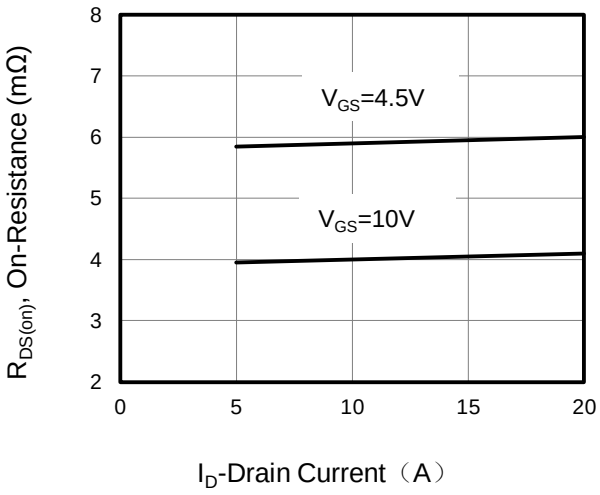



**Figure 4. Gate Charge**

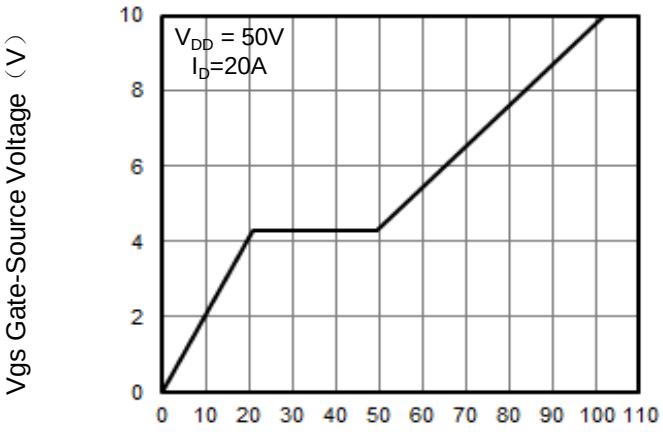



**Figure 5. Capacitance vs Vds**

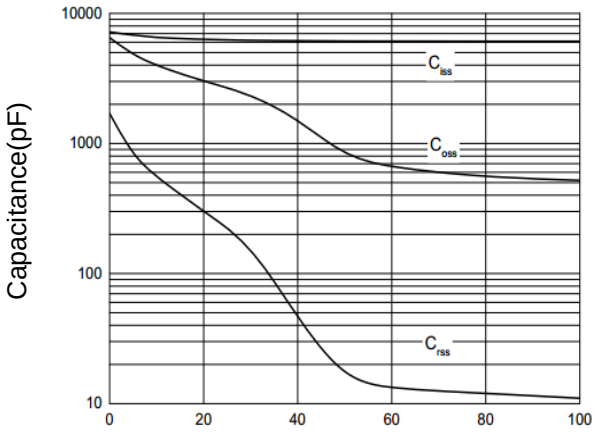
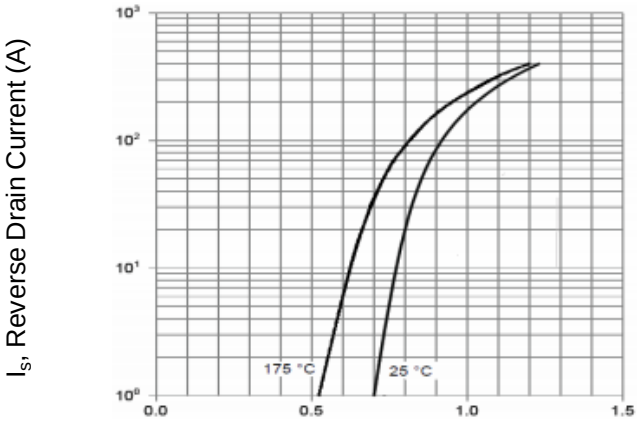



**Figure 6. Source-Drain Diode Forward**



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

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

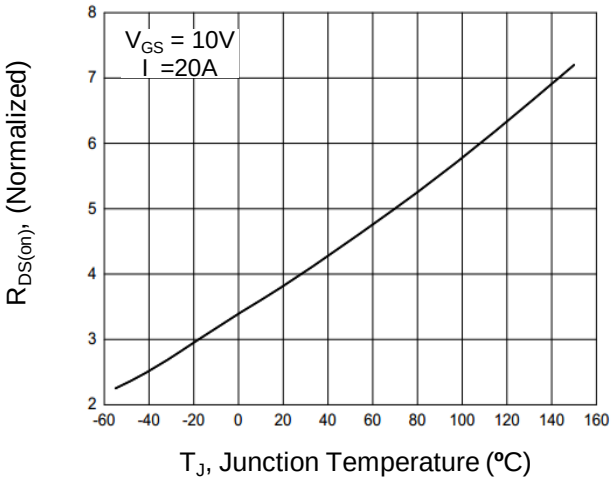



**Figure 8. Safe Operation Area**

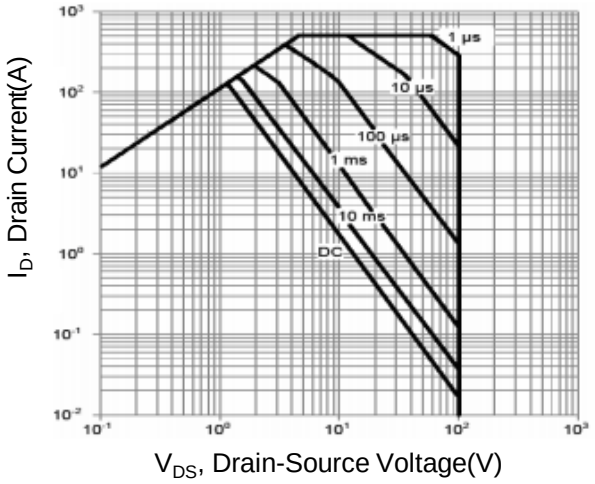
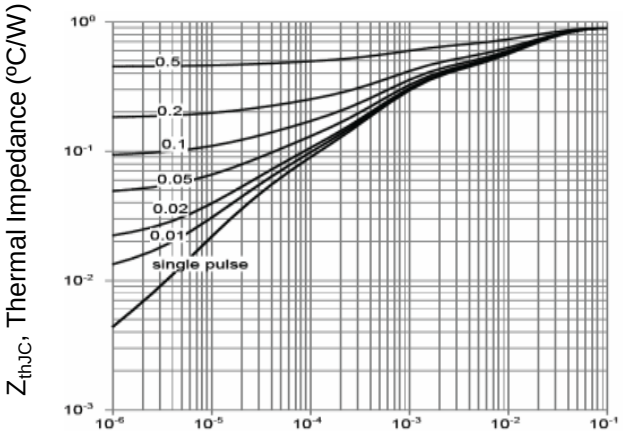
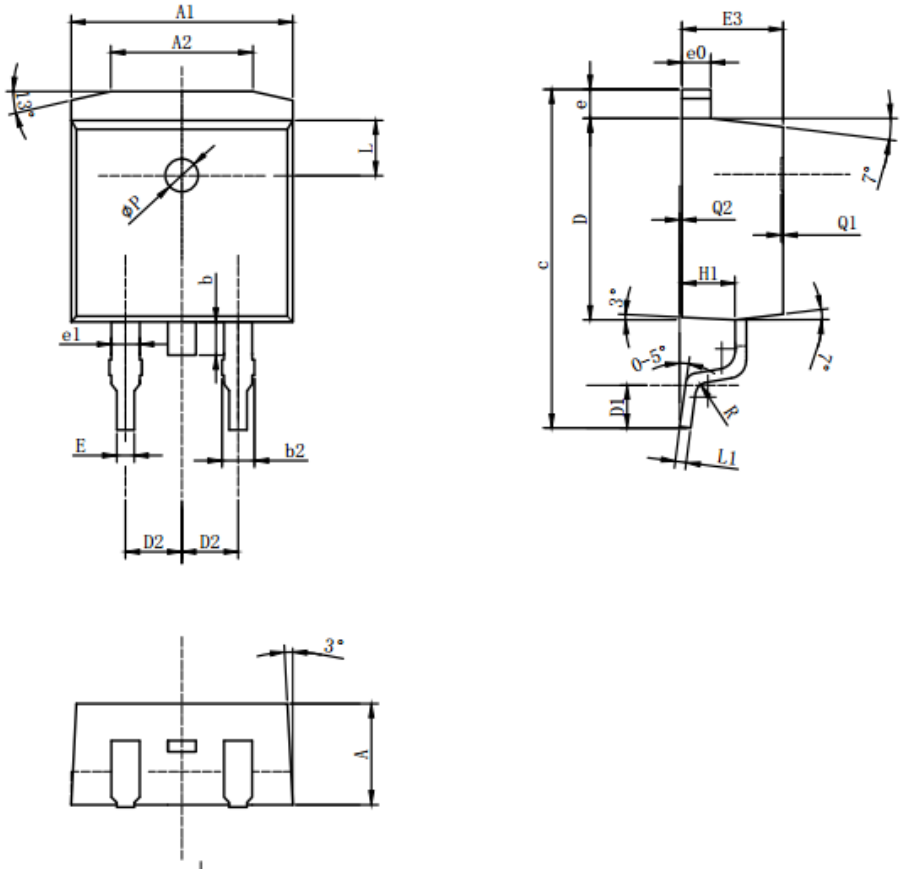



**Figure 9. Normalized Maximum Transient Thermal Impedance**



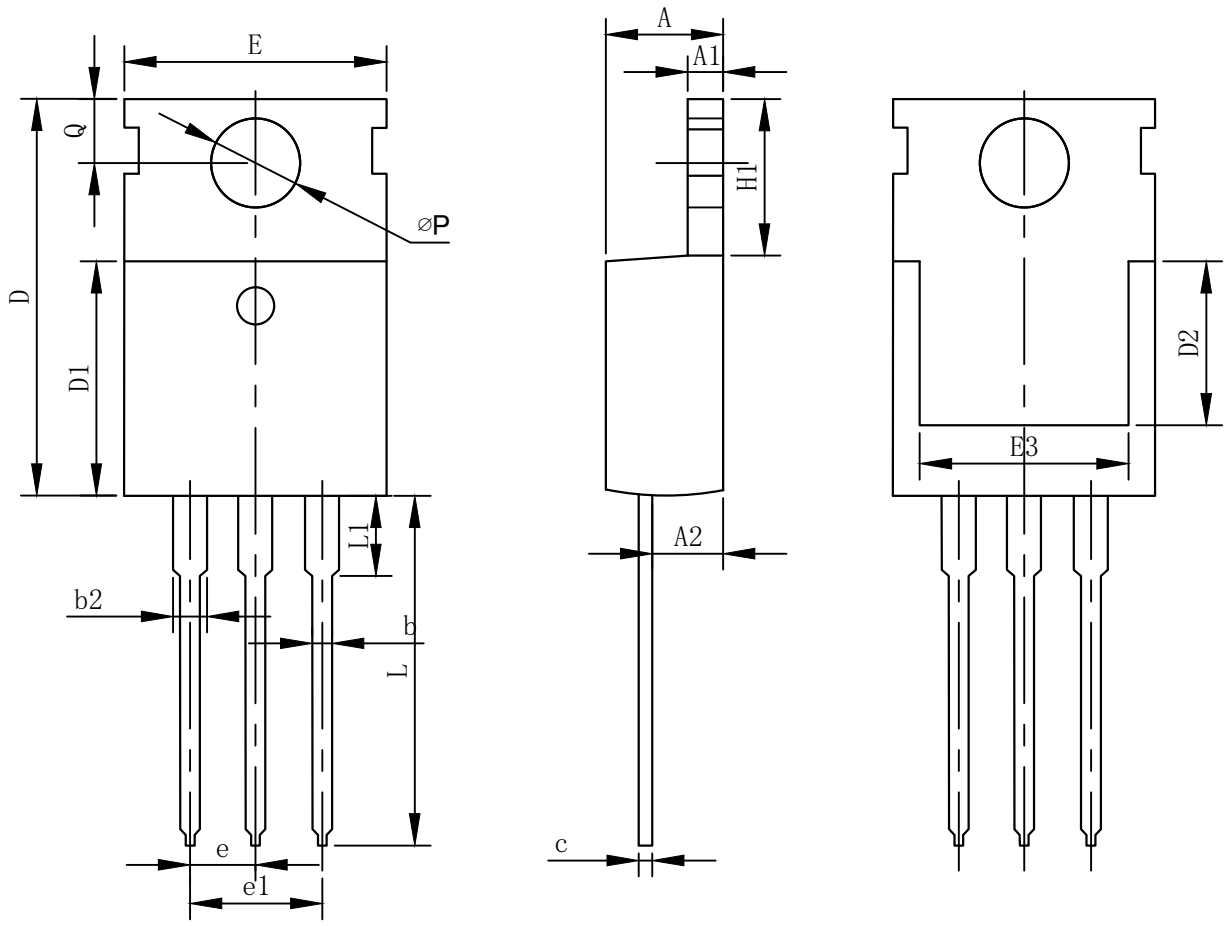
## TO-263 Package Information




COMMON DIMENSIONS

| SYMBO | 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 | – |
| ΦP | – | 1.50 | – |
| R | – | 0.50 | – |
| Q1 | 0.10 | – | 0.15 |
| Q2 | 0 | – | 0.02 |

## TO-220 Package information




COMMONDIMENSIONS

| SYMBO | mm | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 4.37 | 4.57 | 4.70 |
| A1 | 1.25 | 1.30 | 1.40 |
| A2 | 2.20 | 2.40 | 2.60 |
| b | 0.70 | 0.80 | 0.95 |
| b2 | 1.70 | 1.27 | 1.47 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.10 | 15.60 | 16.10 |
| D1 | 8.80 | 9.10 | 9.40 |
| D2 | 5.50 | - | - |
| E | 9.70 | 10.00 | 10.30 |
| E3 | 7.00 | - | - |
| e | 2.54BSC | | |
| e1 | 5.08BSC | | |
| H1 | 6.25 | 6.50 | 6.85 |
| L | 12.75 | 13.50 | 13.80 |
| L1 | - | 3.10 | 3.40 |
| ϕP | 3.40 | 3.60 | 3.80 |
| Q | 2.60 | 2.80 | 3.00 |

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