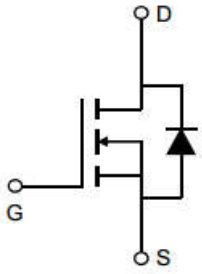
迈诺斯科技

# IRF530

## 100V N-Channel Power MOSFET

## DESCRIPTION

The IRF530 uses advanced trench technology to provide excellent RDS(ON), low gate charge. It can be used in a wide variety of applications.




Schematic diagram


TO-220

## Application

① Power switching application
② Hard switched and High frequency circuits
③ Uninterruptible power supply

## KEY CHARACTERISTICS

① VDS=100V,ID=15A
RDS(ON) < 90mΩ @ VGS=10V RDS(ON) < 115mΩ @ VGS=4.5V
② High density cell design for lower Rdson
③ Fully characterized avalanche voltage and current
④ Good stability and uniformity with high EAS
⑤ Excellent package for good heat dissipation
**100% UIS TESTED！**
**100% DVDS TESTED！**

## Package Marking And Ordering Information

| Device Marking | Ordering Codes | Package | Product Code | Packing |
|---|---|---|---|---|
| IRF530 | IRF530 | TO-220 | IRF530 | Tube |

## Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | 15 | A |
| Drain Current-Pulsed (Note 1) | $I_{DM}$ | 40 | A |
| Maximum Power Dissipation(Tc=25℃) | $P_D$ | 31 | W |
| Single pulse avalanche energy(Note 2) | $E_{AS}$ | 21 | mJ |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 To 175 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Case | $R_{\theta JC}$ | 4.8 | ℃/W |

## Electrical Characteristics (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $B_{VDSS}$ | $V_{GS}$=0V $I_D$=250μA | 100 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1 | 1.8 | 2.4 | V |
| Drain-Source On-State Resistance(Note 3) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=5A | - | 80 | 90 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | | 90 | 115 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=25V,$I_D$=3.6A | - | 5 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=25V,$V_{GS}$=0V, f=1.0MHz | - | 680 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 110 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 85 | - | pF |
| **Switching Characteristics (Note 4)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=50V,$I_D$=5A, $V_{GS}$=10V,$R_{GEN}$=2.5Ω | - | 10 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 7 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 34 | - | nS |
| Turn-Off Fall Time | $t_f$ | | | 9 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=80V,$I_D$=3A $V_{GS}$=10V | - | 16 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 5 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V,$I_S$=15A | - | - | 1.2 | V |

## Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2.EAS condition :T j=25℃,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4.Guaranteed by design, not subject to production.

## Characteristics Curves

**Figure 1 Output Characteristics**

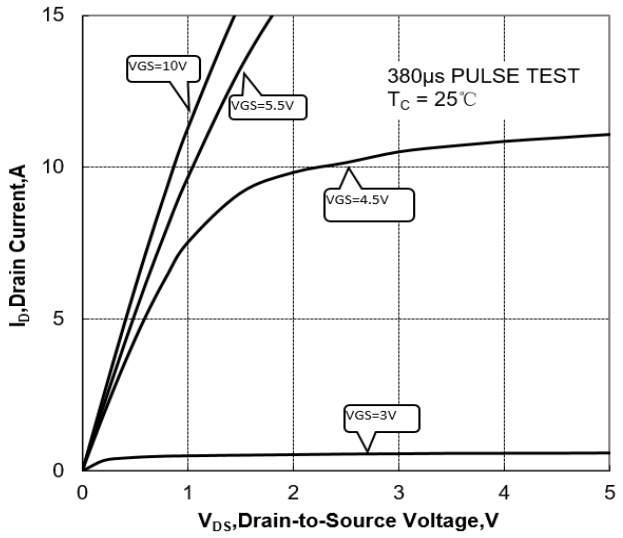



**Figure 2 Transfer Characteristics**

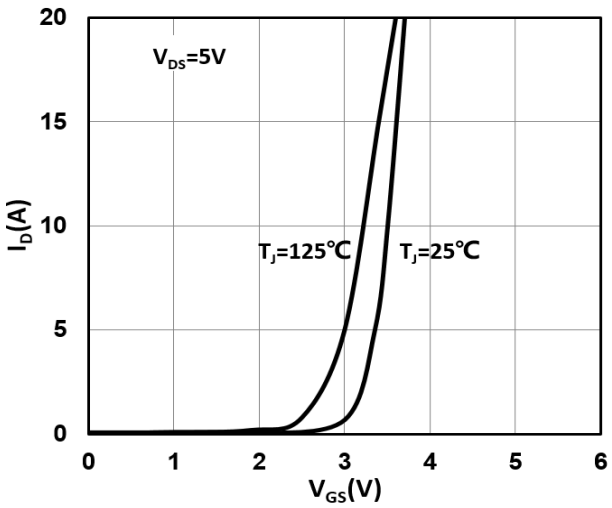



**Figure 3 On-Resistance vs. ID and VGS**

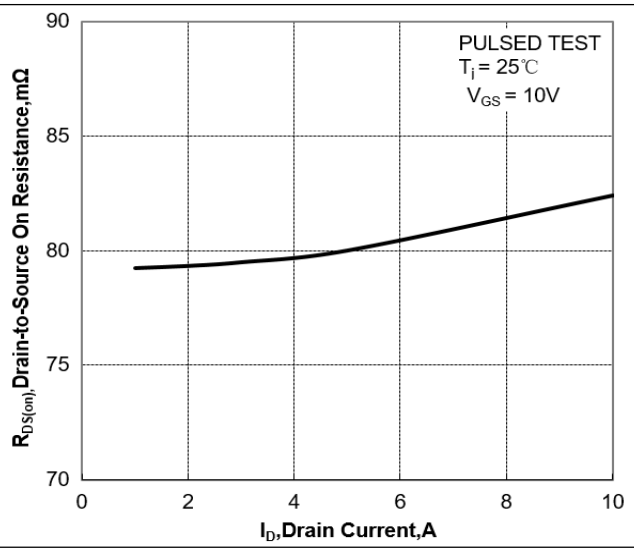



**Figure 4 On-Resistance vs. Junction Temperature**

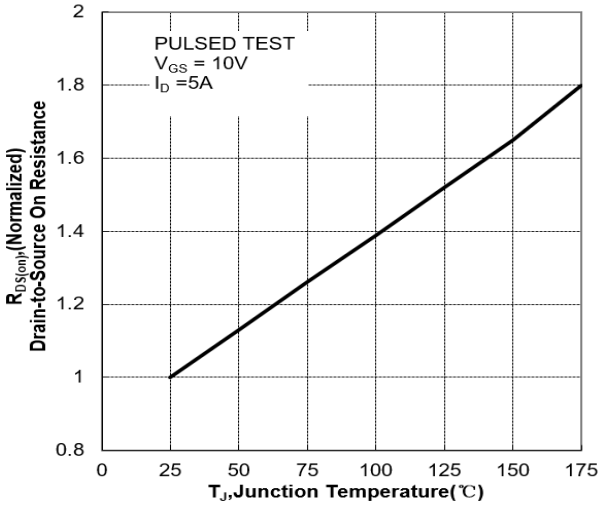



**Figure 5 On-Resistance vs. VGS**

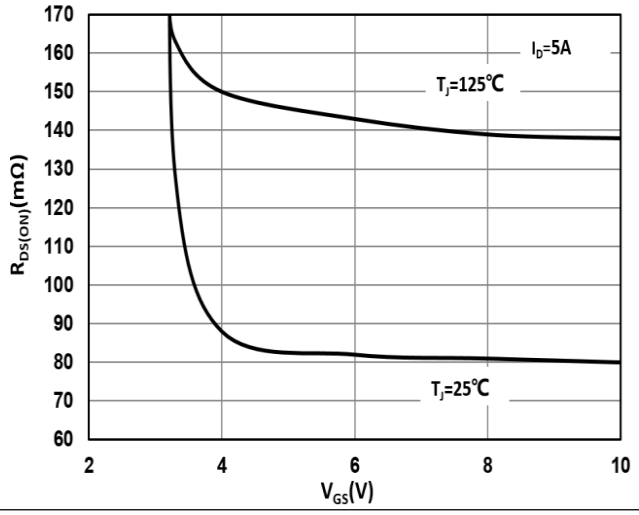



**Figure 6 Body Diode Forward Voltage**

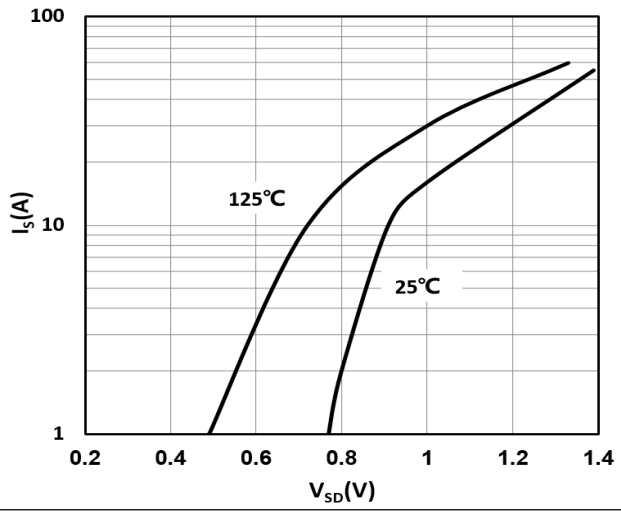


**Figure 7 Gate-Charge Characteristics**

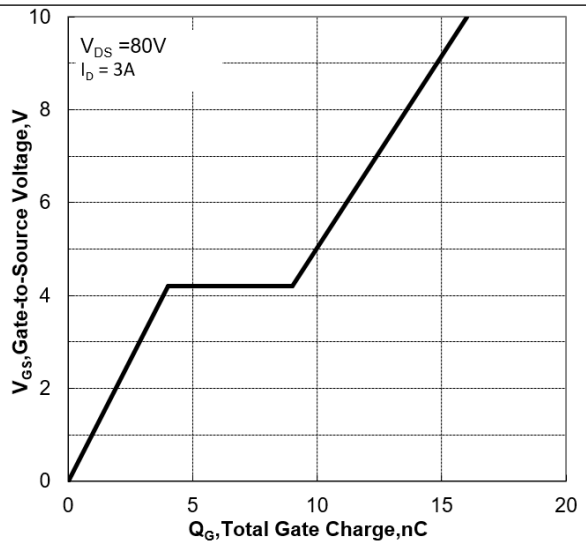



**Figure 8 Capacitance Characteristics**

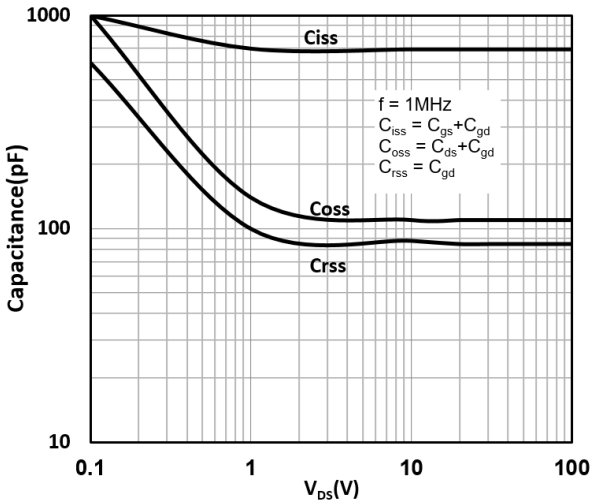



**Figure 9 Maximum Forward Biased Safe Operation Area**

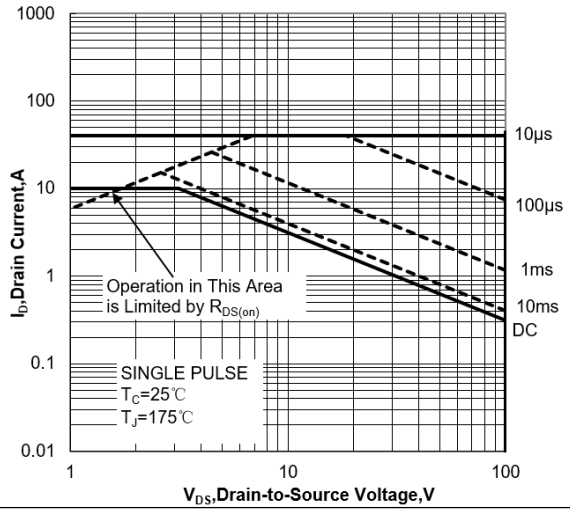



**Figure 10 Single Pulse Power Rating Junction-to-Ambient**

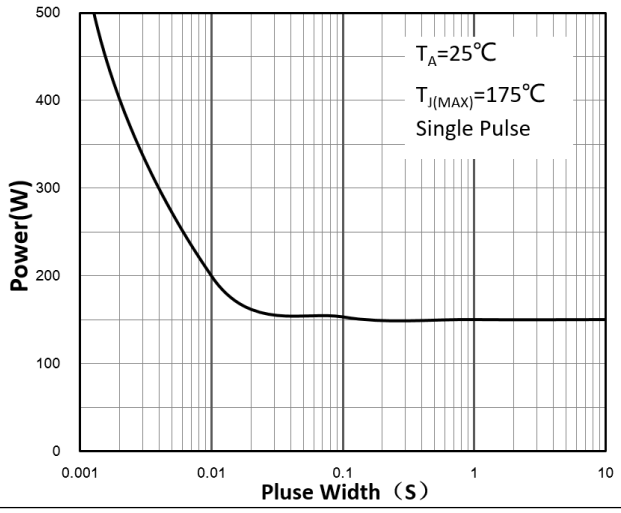
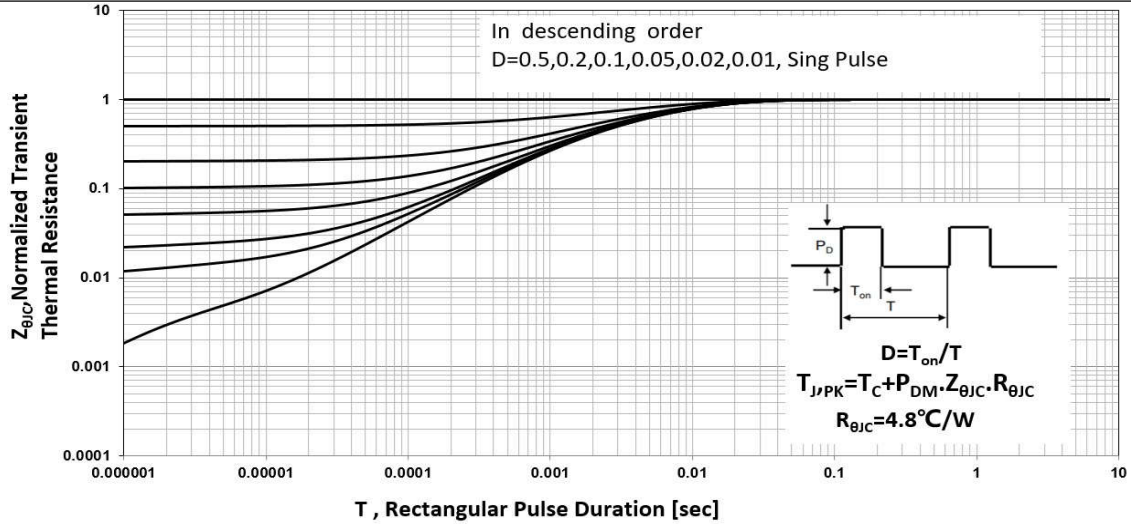
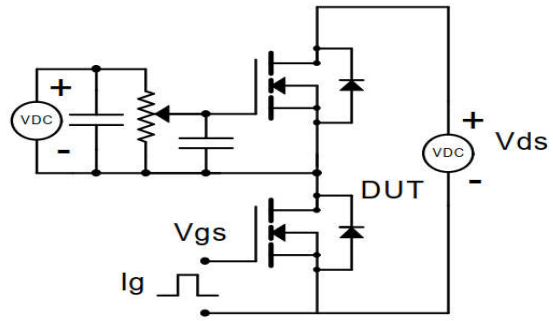
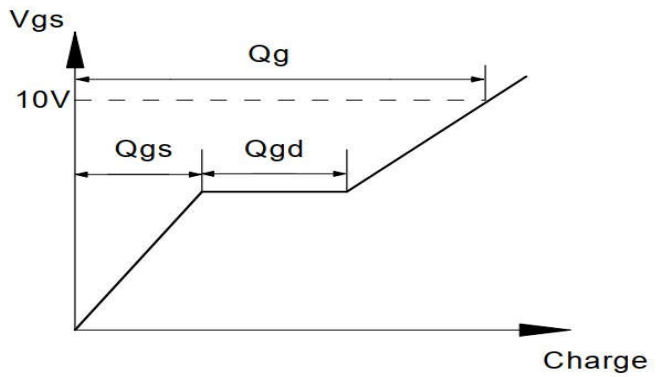
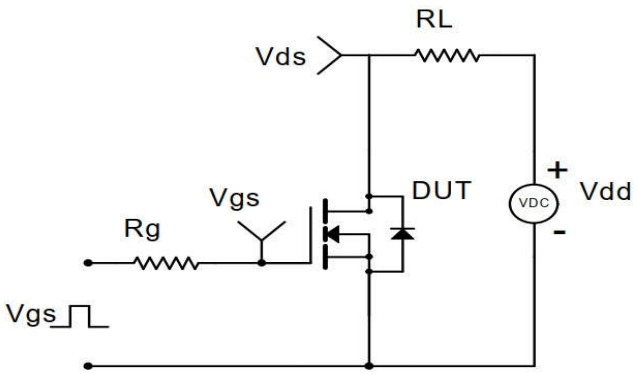
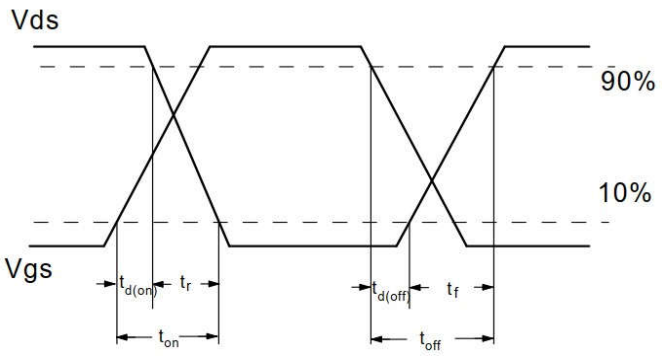
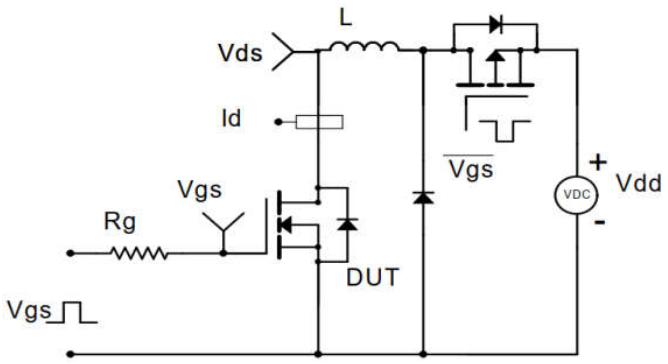
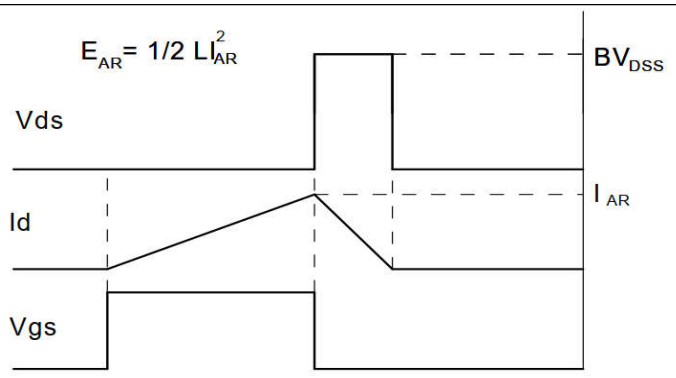
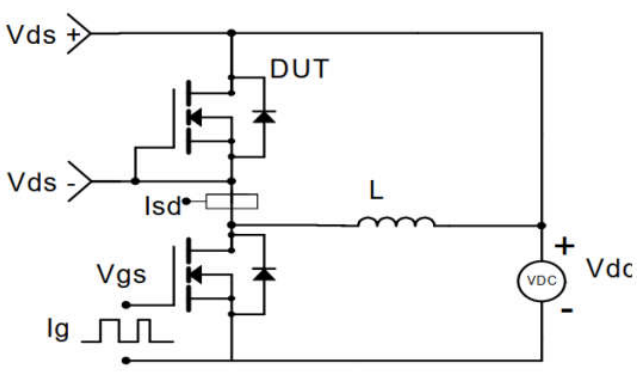
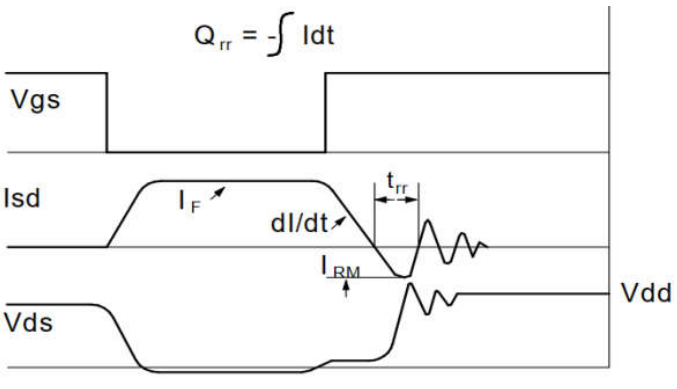


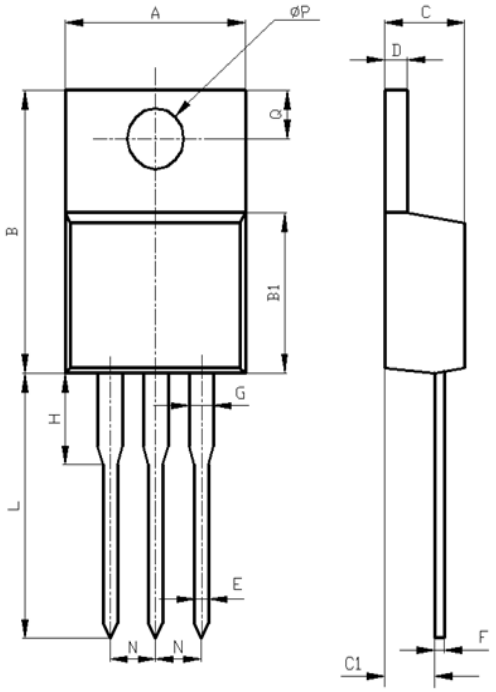

**Figure 11Normalized Maximum Transient Thermal Impedance**



## Test Circuit and Waveform

| Gate Charge Test Circuit | Gate Charge Test Waveform |
|---|---|
|  |  |
| **Resistive Switching Test Circuit** | **Resistive Switching Test Waveforms** |
|  |  |
| **Unclamped Inductive Switching (UIS) Test Circuit** | **Unclamped Inductive Switching (UIS) Test Waveforms** |
|  |  |
| **Diode Recovery Test Circuit** | **Diode Recovery Test Waveforms** |
|  |  |

## Package Description




| Items | Values（mm） | |
|---|---|---|
| | MIN | MAX |
| A | 9.60 | 10.6 |
| B | 15.0 | 16.0 |
| B1 | 8.90 | 9.50 |
| C | 4.30 | 4.80 |
| C1 | 2.30 | 3.10 |
| D | 1.20 | 1.40 |
| E | 0.70 | 0.90 |
| F | 0.30 | 0.60 |
| G | 1.17 | 1.37 |
| H | 2.70 | 3.80 |
| L | 12.6 | 14.8 |
| N | 2.34 | 2.74 |
| Q | 2.40 | 3.00 |

**TO-220 Package**

**NOTE:**

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change withoutprior notice.

**CONTACT:**

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