

60V N-Channel Power MOSFET

DESCRIPTION

The MPG100N06 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

Application

- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

KEY CHARACTERISTICS

- $V_{DS} = 60V, I_D = 100A$
- $R_{DS(ON)} < 7m\Omega @ V_{GS}=10V$
- Special process technology for high ESD capability
- High density cell design for lower R_{Dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

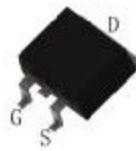
100% UIS TESTED!
100% DVDS TESTED!



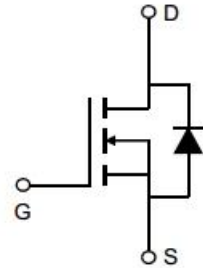
TO-220 Top View



TO-252-2L Top View



TO-263-2L Top View



Schematic diagram

Package Marking And Ordering Information

| Device Marking | Ordering Codes | Package | Product Code | Packing |
|----------------|----------------|-----------|--------------|-----------|
| M100N06 | MPG100N06 | TO-220 | MPG100N06 | Tube |
| M100N06 | MDT100N06 | TO-252-2L | MDT100N06 | Tape Reel |
| M100N06 | MPS100N06 | TO-263-2L | MPS100N06 | Tape Reel |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Drain Current-Continuous | I_D | 100 | A |
| Drain Current-Pulsed (Note 1) | I_{DM} | 380 | A |
| Maximum Power Dissipation($T_c=25^\circ C$) | P_D | 143 | W |
| Single pulse avalanche energy(Note 2) | E_{AS} | 260 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | °C |

Thermal Characteristic

| | | | |
|--|-----------------|------|------|
| Thermal Resistance,Junction-to-Case | $R_{\theta JC}$ | 1.05 | °C/W |
| Thermal Resistance,Junction-to-Ambient | $R_{\theta JA}$ | 62.5 | °C/W |

Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|--------------|---|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 60 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=60V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 2.8 | 4 | V |
| Drain-Source On-State Resistance ^(Note 3) | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=30A$ | - | 6.0 | 7.0 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=15A$ | - | 15 | - | S |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=30V, V_{GS}=0V,$ $f=1.0MHz$ | - | 3700 | - | pF |
| Output Capacitance | C_{oss} | | - | 345 | - | pF |
| Reverse Transfer Capacitance | C_{rss} | | - | 270 | - | pF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=30V, I_D=30A,$ $V_{GS}=10V, R_{GEN}=3\Omega$ | - | 19 | - | nS |
| Turn-on Rise Time | t_r | | - | 36 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 45 | - | nS |
| Turn-Off Fall Time | t_f | | - | 24 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=48V, I_D=30A$ $V_{GS}=10V$ | - | 80 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 25 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 22 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=1A$ | - | - | 1.2 | V |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. E_{AS} condition : $T_j=25^\circ C, L=0.5mH, V_{DD}=50V, V_G=10V, R_g=25\Omega$.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production.

Characteristics Curves

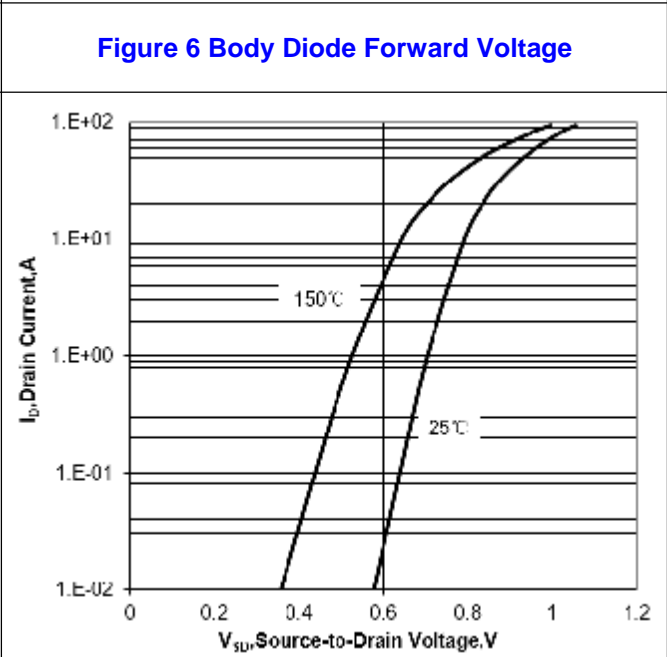
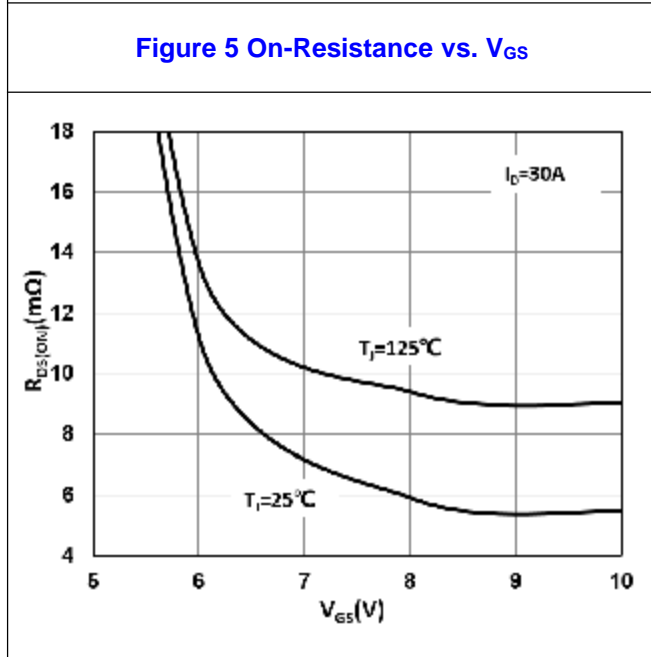
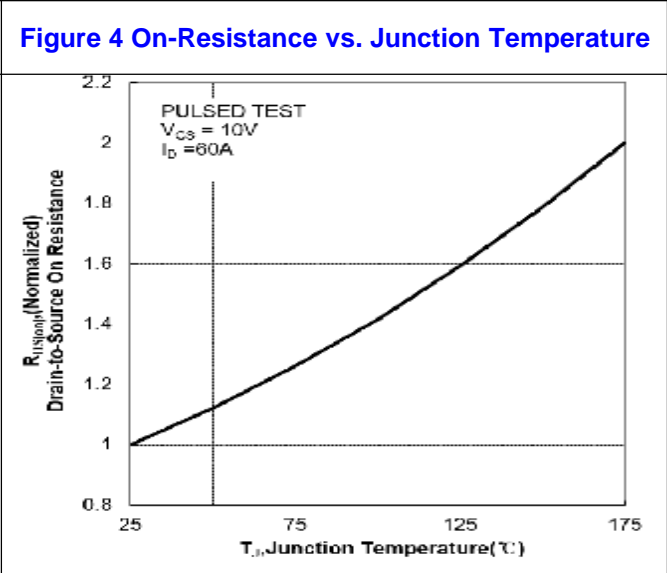
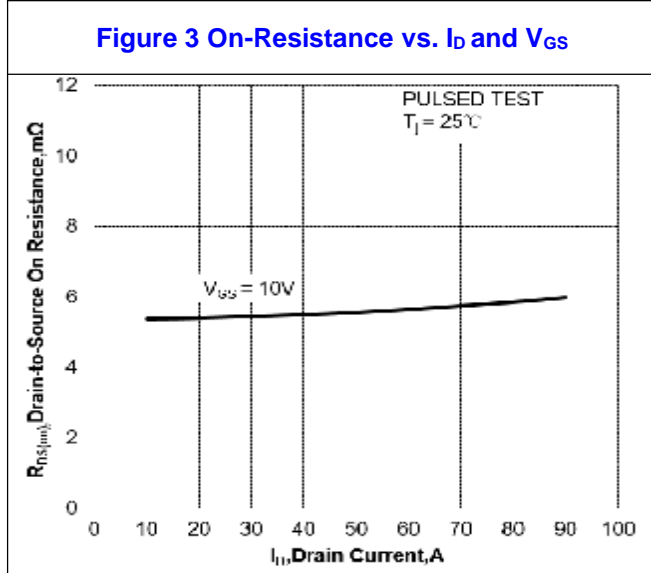
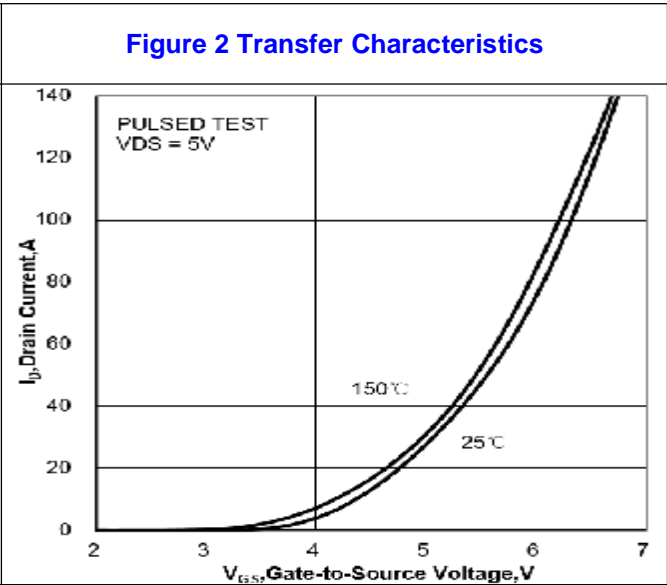
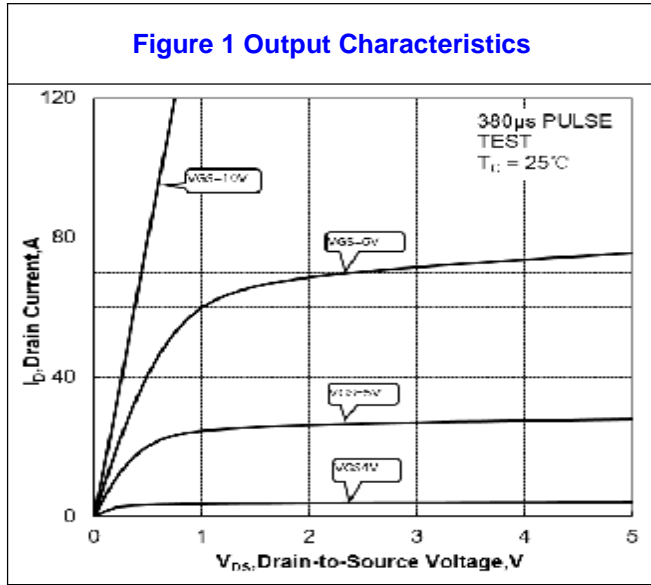


Figure 7 Gate-Charge Characteristics

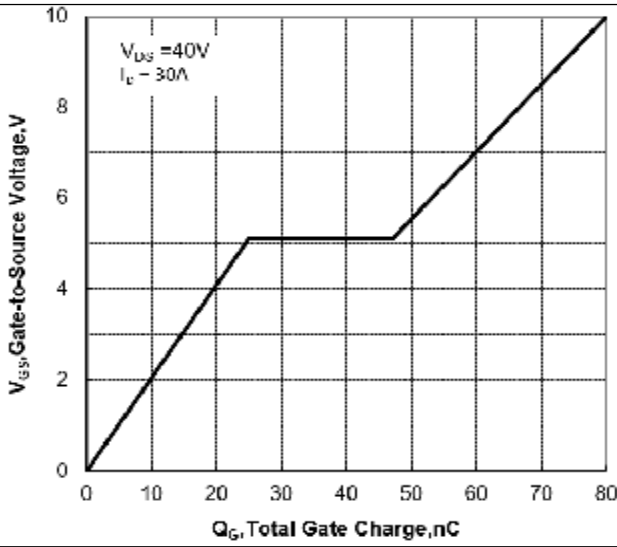


Figure 8 Capacitance Characteristics

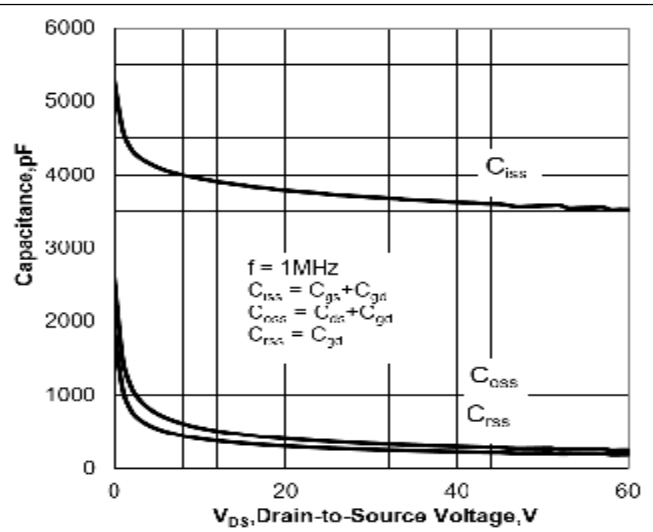


Figure 9 Maximum Forward Biased Safe Operation Area

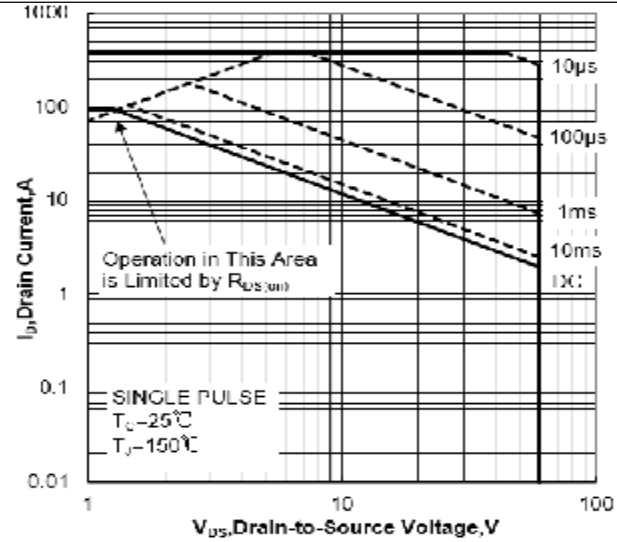


Figure 10 Single Pulse Power Rating Junction-to-Ambient

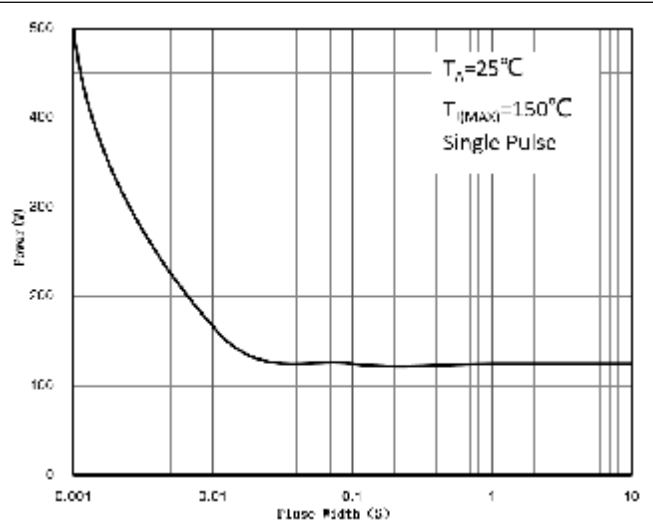
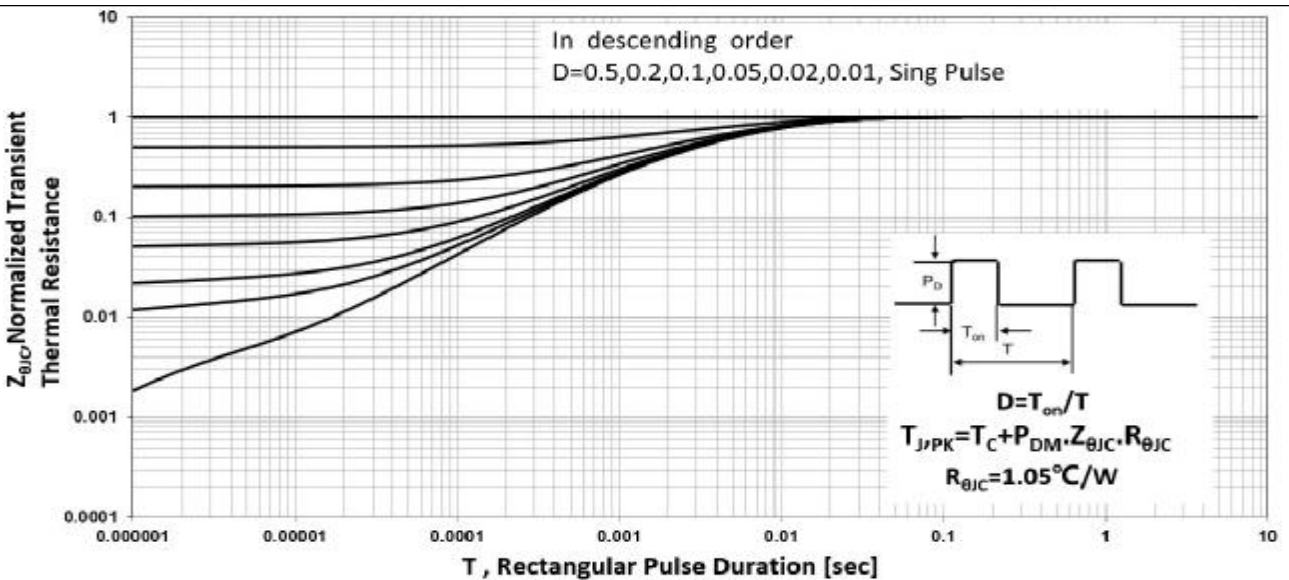
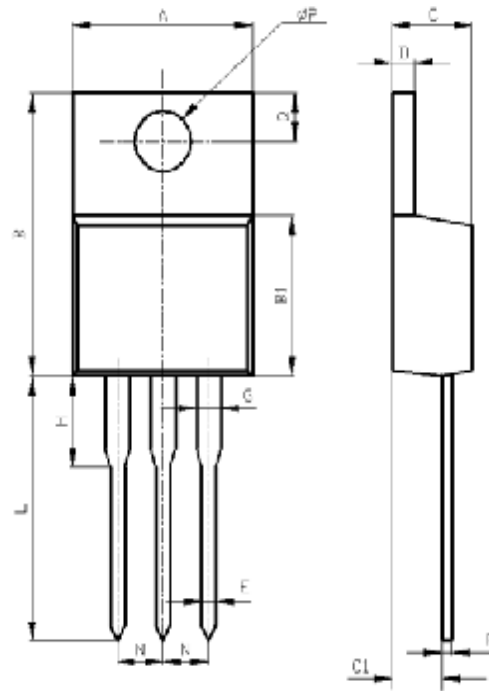


Figure 11 Normalized Maximum Transient Thermal Impedance

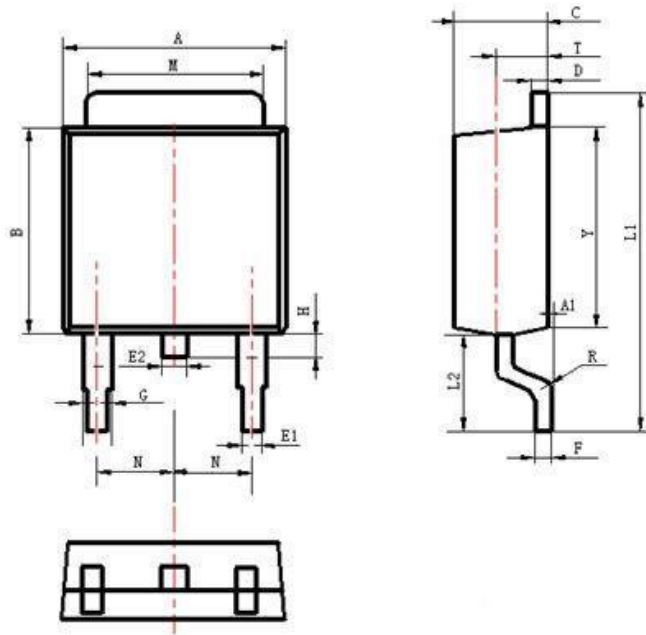


Package Description



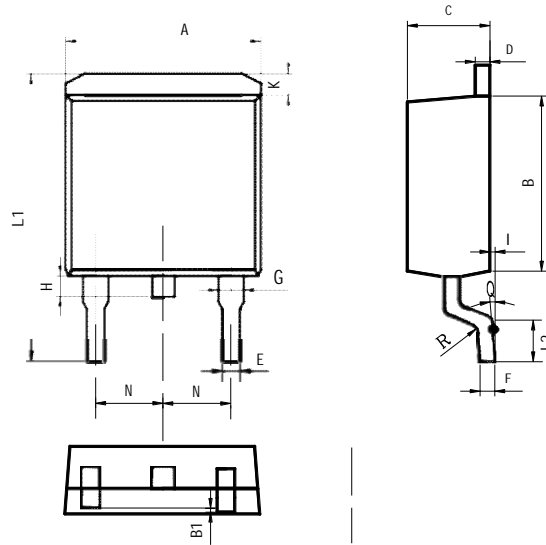
| Items | Values(mm) | |
|----------|------------|------|
| | MIN | MAX |
| A | 9.60 | 10.6 |
| B | 15.0 | 16.0 |
| B1 | 8.90 | 9.50 |
| C | 4.30 | 4.80 |
| C1 | 2.30 | 3.10 |
| D | 1.20 | 1.40 |
| E | 0.70 | 0.90 |
| F | 0.30 | 0.60 |
| G | 1.17 | 1.37 |
| H | 2.70 | 3.80 |
| L | 12.6 | 14.8 |
| N | 2.34 | 2.74 |
| Q | 2.40 | 3.00 |
| ΦP | 3.50 | 3.90 |

TO-220 Package



| Items | Values(mm) | |
|-------|------------|-------|
| | MIN | MAX |
| A | 6.30 | 6.90 |
| A1 | 0 | 0.13 |
| B | 5.70 | 6.30 |
| C | 2.10 | 2.50 |
| D | 0.30 | 0.60 |
| E1 | 0.60 | 0.90 |
| E2 | 0.70 | 1.00 |
| F | 0.30 | 0.60 |
| G | 0.70 | 1.20 |
| L1 | 9.60 | 10.50 |
| L2 | 2.70 | 3.10 |
| H | 0.60 | 1.00 |
| M | 5.10 | 5.50 |
| N | 2.09 | 2.49 |
| R | 0.3 | |
| T | 1.40 | 1.60 |
| Y | 5.10 | 6.30 |

TO-252 Package



| Items | Values(mm) | |
|-------|------------|-------|
| | MIN | MAX |
| A | 9.80 | 10.40 |
| B | 8.90 | 9.50 |
| B1 | 0 | 0.10 |
| C | 4.40 | 4.80 |
| D | 1.16 | 1.37 |
| E | 0.70 | 0.95 |
| F | 0.30 | 0.60 |
| G | 1.07 | 1.47 |
| H | 1.30 | 1.80 |
| K | 0.95 | 1.37 |
| L1 | 14.50 | 16.50 |
| L2 | 1.60 | 2.30 |
| I | 0 | 0.2 |
| Q | 0° | 8° |
| R | 0.4 | |
| N | 2.39 | 2.69 |

TO-263 Package