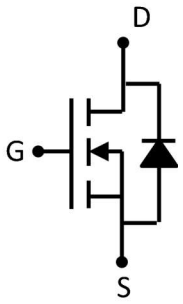
# APG080N12

**N-Channel Enhancement Mosfet**

**DATA SHEET**

## Feature

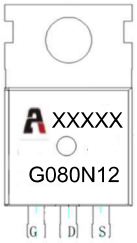
- 120V,106A
  $R_{DS(ON)}$ <8.0mΩ@$V_{GS}$=10V (TYP:6.5mΩ)
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge




Schematic diSgram

## Application

- PWM applications
- Load Switch
- Power management




**Marking and pin assignment**

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|---|---|---|---|---|---|
| G080N12 | APG080N12 | TO-220 | - | - | 1000 |

## ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 120 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current ($T_a$ =25℃) | $I_D$ | 106 | A |
| Continuous Drain Current ($T_a$ =100℃) | $I_D$ | 67 | A |
| Pulsed Drain Current (1) | $I_{DM}$ | 424 | A |
| Singel Pulsed Avalanche Energy (2) | $E_{AS}$ | 480 | mJ |
| Power Dissipation | $P_D$ | 147 | W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 0.85 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS($T_a$=25℃ unless otherwise noted)

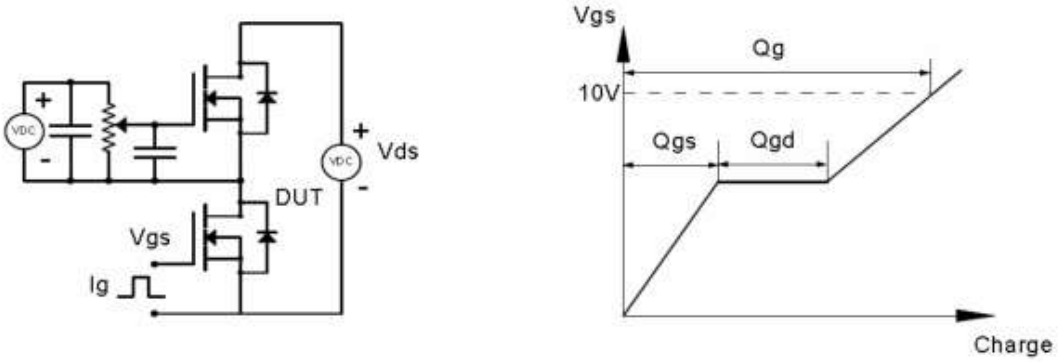
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =250μA | 120 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =120V, $V_{GS}$ = 0V | - | - | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±20V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate threshold voltage(3) | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 2.0 | 3.0 | 4.0 | V |
| Drain-source on-resistance(3) | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =40A | - | 6.5 | 8.0 | mΩ |
| **Dynamic characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =60V, $V_{GS}$ =0V, f =1MHz | - | 3770 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 352 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 17 | - | |
| **Switching characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=50V, $I_D$=50A, $V_{GS}$=10V, $R_G$=3Ω | - | 22 | - | ns |
| Turn-on rise time | $t_r$ | | - | 18 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 49 | - | |
| Turn-off fall time | $t_f$ | | - | 19 | - | |
| Total Gate Charge | Qg | VDS=50V, ID=50A, VGS=10V | - | 56 | - | nC |
| Gate-Source Charge | Qgs | | - | 12 | - | |
| Gate-Drain Charge | Qgd | | - | 14 | - | |
| Reverse Recovery Chrage | Qrr | $I_F$=30A,di/dt=100A/us | | 102 | | nC |
| Reverse Recovery Time | Trr | $I_F$=30A,di/dt=100A/us | | 66 | | ns |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage(3) | $V_{DS}$ | $V_{GS}$ =0V, $I_S$=50A | - | - | 1.3 | V |
| Diode Forward current(4) | $I_S$ | | - | - | 106 | A |

**Notes:**

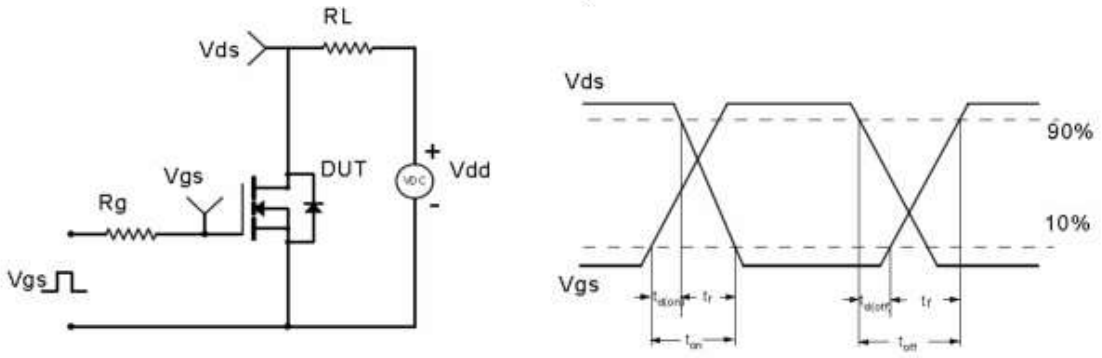
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:$T_J$=25℃,$V_{DD}$=50V,$R_G$=25Ω,L=0.5Mh
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

## Test Circuit & Waveform

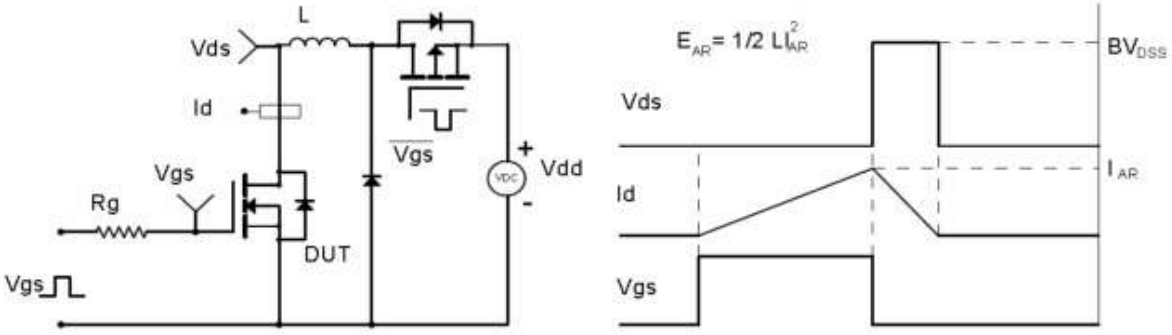
Gate Charge Test Circuit & Waveform



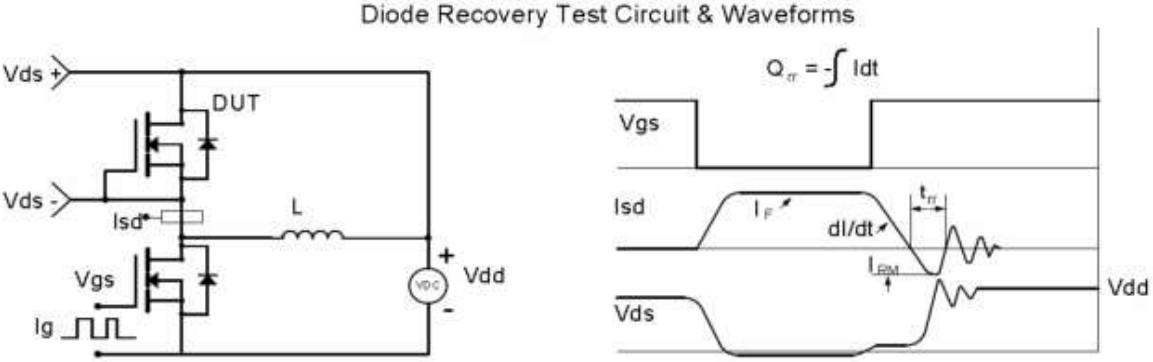

Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms



## Typical Performance Characteristics

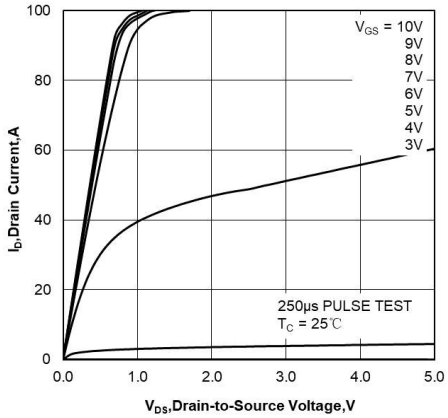



**Figure 1. Output Characteristics**

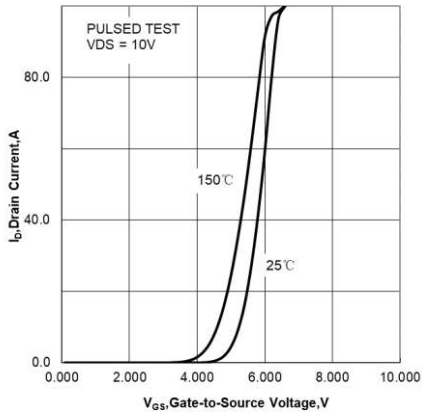



**Figure 2. Transfer Characteristics**

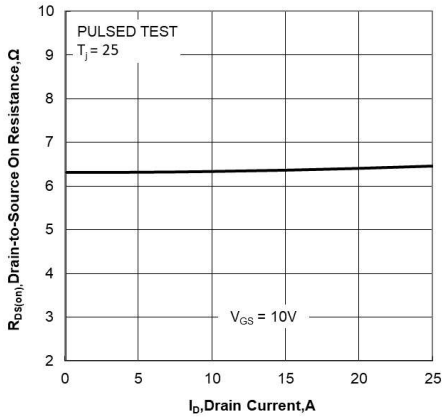



**Figure 3. Drain-to-Source On Resistance vs Drain Current**

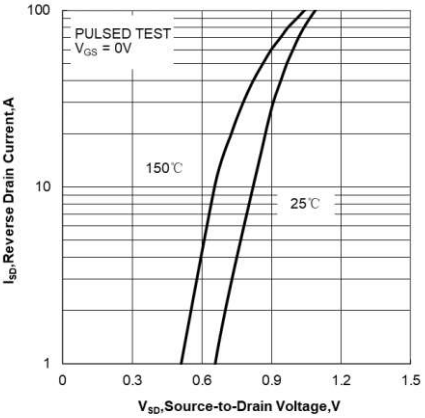



**Figure 4. Body Diode Forward Voltage vs Source Current and Temperature**

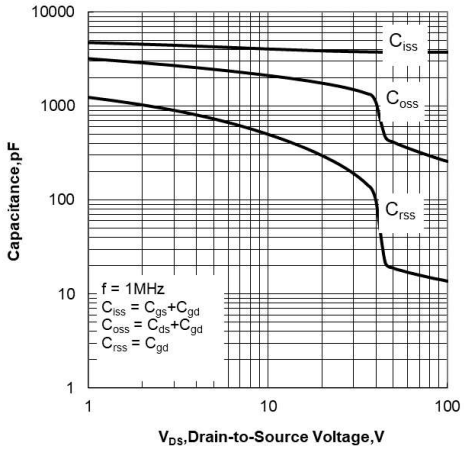



**Figure 5. Capacitance Characteristics**

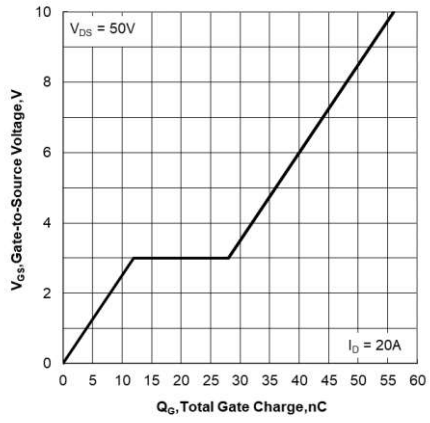



**Figure 6. Gate Charge Characteristics**

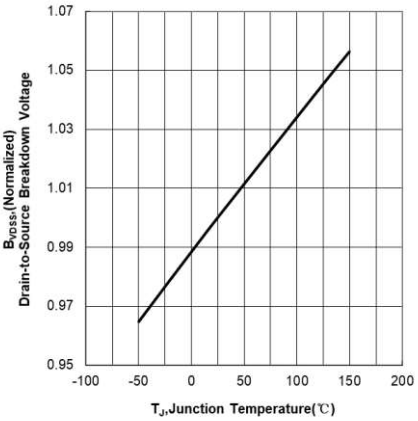



**Figure 7. Normalized Breakdown Voltage vs Junction Temperature**

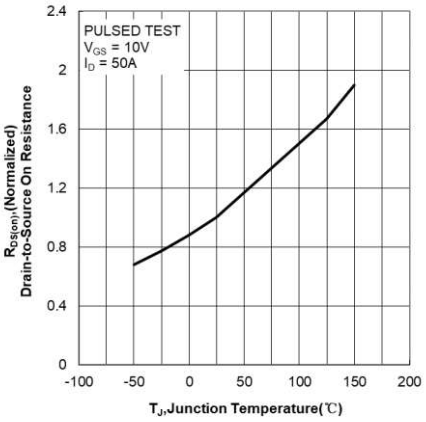



**Figure 8. Normalized On Resistance vs Junction Temperature**

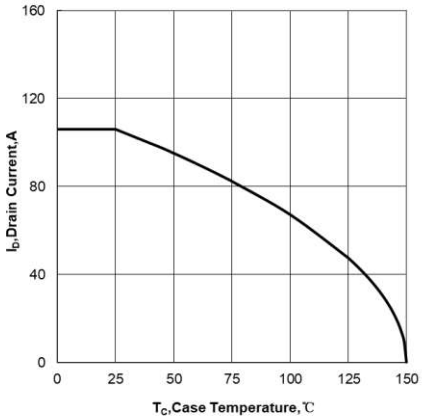



**Figure 9. Maximum Continuous Drain Current vs Case Temperature**

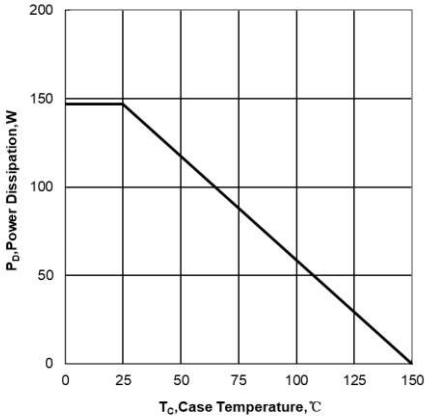



**Figure 10. Maximum Power Dissipation vs Case Temperature**

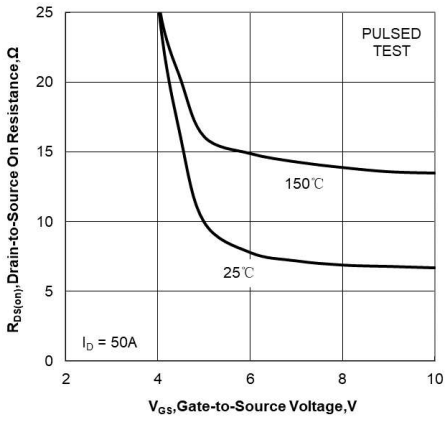



**Figure11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current**

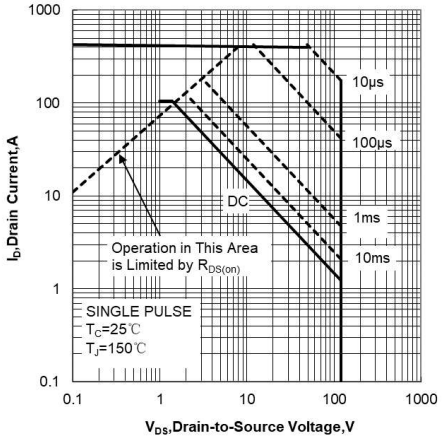



**Figure 12. Maximum Safe Operating Area**

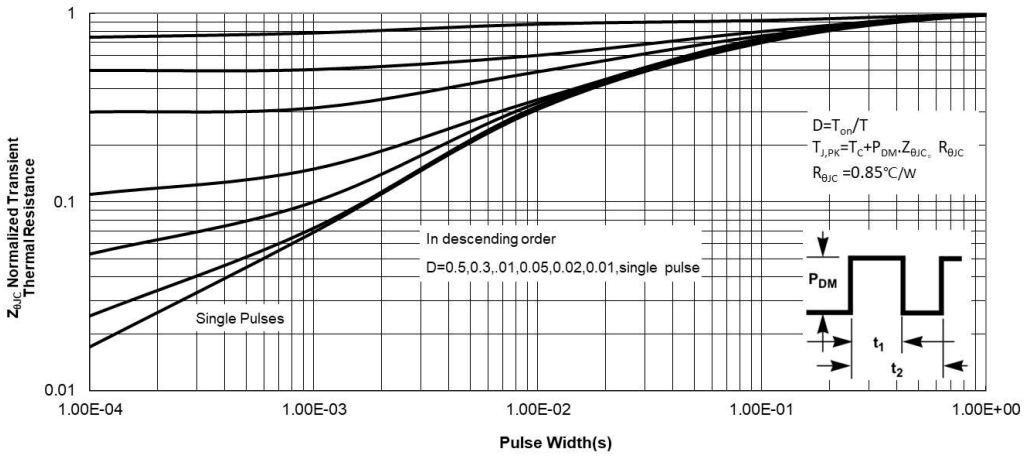
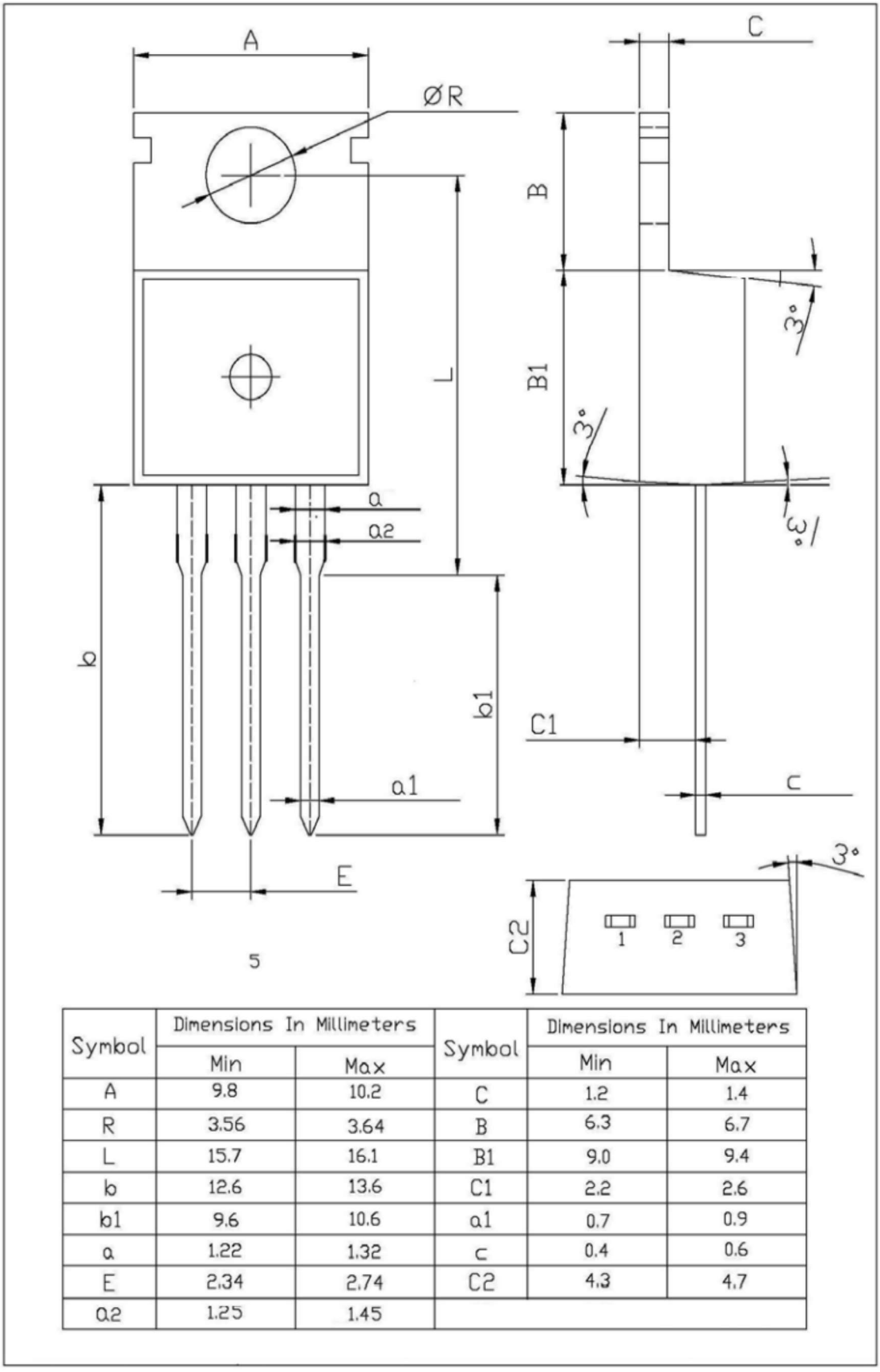



**Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

## TO-220 Package Information




| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| A | 9.8 | 10.2 | C | 1.2 | 1.4 |
| R | 3.56 | 3.64 | B | 6.3 | 6.7 |
| L | 15.7 | 16.1 | B1 | 9.0 | 9.4 |
| b | 12.6 | 13.6 | C1 | 2.2 | 2.6 |
| b1 | 9.6 | 10.6 | a1 | 0.7 | 0.9 |
| a | 1.22 | 1.32 | c | 0.4 | 0.6 |
| E | 2.34 | 2.74 | C2 | 4.3 | 4.7 |
| a2 | 1.25 | 1.45 | | | |