## DESCRIPTION

The AM04N80 is available in TO-251, TO-252 Package

## FEATURE

- Proprietary New Planar Technology
- $R_{DS(ON),typ.}$=3.7 Ω@$V_{GS}$=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

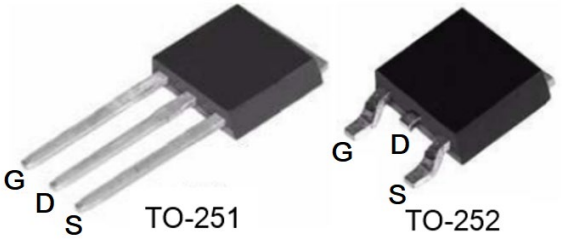
## APPLICATION

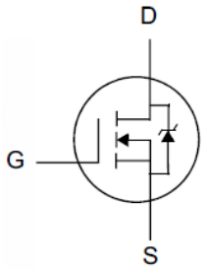
- CRT
- TV/Monitor

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| TO-251<br>SPQ: 80pcs /Tube | TD3 | AM04N80TD3U |
| | | AM04N80TD3VU |
| TO-252<br>SPQ: 2,500pcs/Reel | D | AM04N80DR |
| | | AM04N80DVR |
| Note | V: Halogen free Package<br>R: Tape & Reel<br>U: Tube | |
| AiT provides all RoHS products | | |

## PIN DESCRIPTION




| Pin# | Symbol | Function |
|---|---|---|
| 1 | G | Gate |
| 2 | D | Drain |
| 3 | S | Source |

## ABSOLUTE MAXIMUM RATINGS

$T_A$ = 25°C, unless otherwise specified.

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-to-Source Voltage (1) | $V_{DSS}$ | 800 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | ±30 | |
| Continuous Drain Current | $I_D$ | 4 | A |
| Continuous Drain Current @ Tc=100℃ | $I_{D\ @\ Tc\ =100℃}$ | Fig 3. | |
| Pulsed Drain Current at VGS=10V (2) | $I_{DM}$ | Fig 6. | |
| Single Pulse Avalanche Energy | $E_{AS}$ | 650 | mJ |
| Peak Diode Recovery dv/dt (3) | dv/dt | 5.0 | V/ns |
| Power Dissipation | $P_D$ | 85 | W |
| Derating Factor above 25℃ | | 0.68 | W/℃ |
| Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds | $T_L$<br>$T_{PAK}$ | 300<br>260 | ℃ |
| Operating and Storage Temperature Range | $T_J$& $T_{STG}$ | -55 to 150 | |
| **THERMAL RESISTANCE** | | | |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.47 | ℃/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 75 | |

(1) $T_A$=+25℃ to +150℃

(2) Repetitive rating; pulse width limited by maximum junction temperature.

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 800 | | | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=800V, $V_{GS}$=0V | | | 1 | uA |
| | | $V_{DS}$=640V, $V_{GS}$=0V, $T_A$ =125℃ | | | 100 | |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=+30V, $V_{DS}$=0V | | | +100 | nA |
| | | $V_{GS}$=-30V, $V_{DS}$=0V | | | -100 | |
| **ON CHARACTERISTICS** | | | | | | |
| Static Drain-to-Source On-Resistance (4) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=2.0A | | 3.7 | 4.8 | Ω |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 2.0 | | 4.0 | V |
| Forward Transconductance (4) | gfs | $V_{DS}$=15V, $I_D$=4.0A | | 5.5 | | S |
| **Dynamic CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=25V, f=1.0MHz | | 490 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 25 | | |
| Output Capacitance | $C_{oss}$ | | | 50 | | |
| Total Gate Charge | $Q_g$ | $V_{DD}$=400V, $I_D$=4A, $V_{GS}$=0 to 10V | | 16 | | nC |
| Gate-to-Source Charge | $Q_{gs}$ | | | 3.0 | | |
| Gate-to-Drain (Miller) Charge | $Q_{gd}$ | | | 6.0 | | |
| **Resistive Switching CHARACTERISTICS** | | | | | | |
| Turn-on Delay Time | $t_{d(ON)}$ | $V_{DD}$=400V, $I_D$=4A, $V_{GS}$=10V $R_G$=12Ω | | 10 | | nS |
| Rise Time | $t_{rise}$ | | | 10 | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | | 30 | | |
| Fall Time | $t_{fall}$ | | | 15 | | |
| **Source-Drain Diode CHARACTERISTICS** | | | | | | |
| Continuous Source Current (4) | $I_{SD}$ | Integral PN-diode in MOSFET | | | 4.0 | A |
| Pulsed Source Current (4) | $I_{SM}$ | | | | 16 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=4.0A, $V_{GS}$=0V | | | 1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_{GS}$=0V, $I_F$=4.0A, $di_F/dt$=100A/μs | | 235 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | | 446 | | nC |

(3) $I_{SD}$= 4A di/dt < 100 A/μs, $V_{DD}$ < $BV_{DSS}$, $T_J$=+150°C.

(4) Pulse width≤380μs; duty cycle≤2%.

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Maximum Effective Thermal Impedance, Junction-to-Case

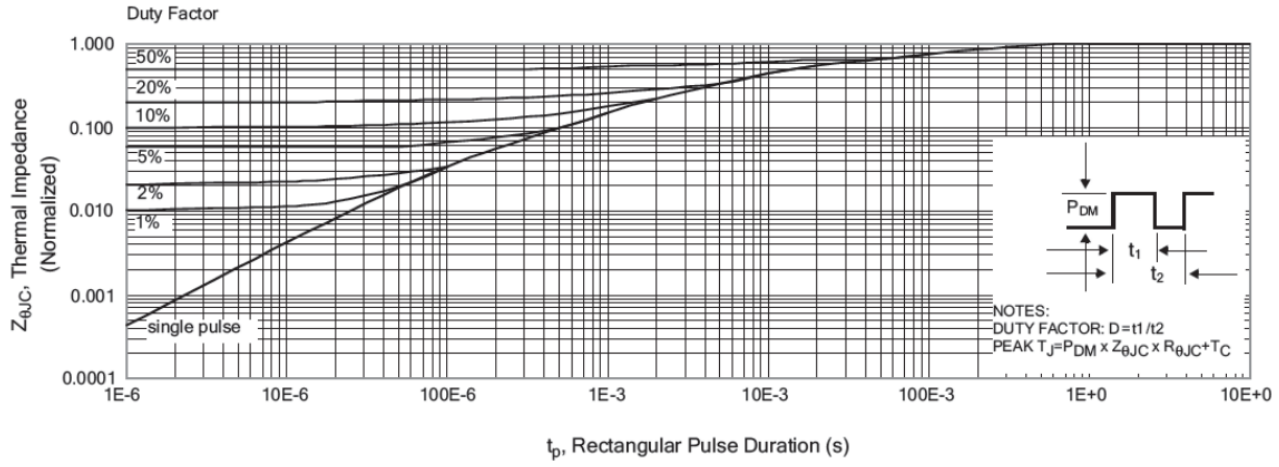



Fig 2. Maximum Power Dissipation vs Case Temperature

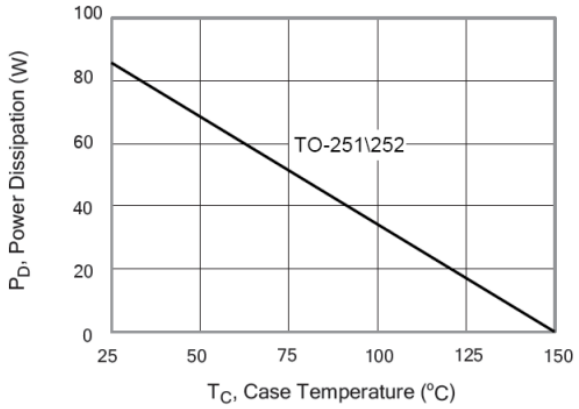



Fig 3. Maximum Continuous Drain Current vs Case Temperature

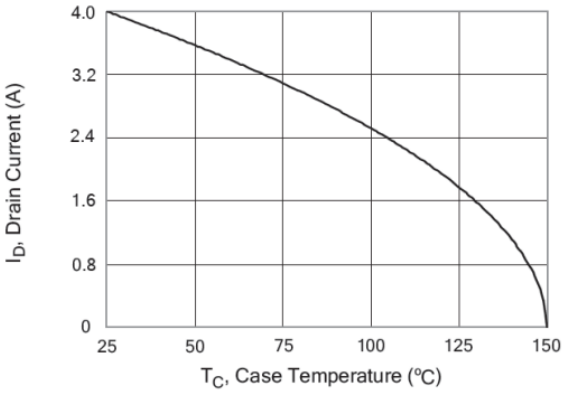



Fig 4. Typical Output Characteristics

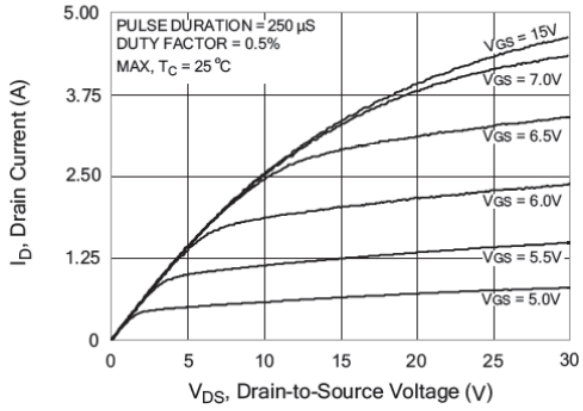



Fig 5. Typical Drain-to-Source ON Resistance Vs Gate Voltage and Drain Current

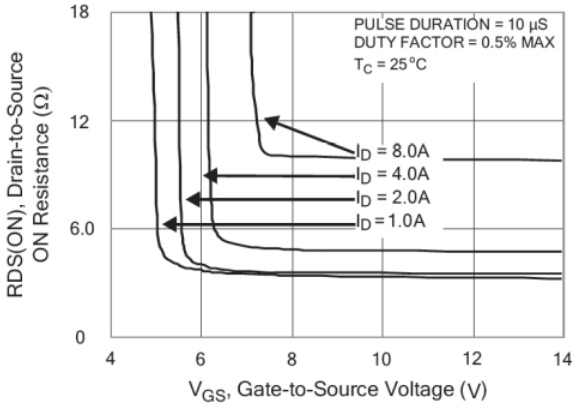


Fig 6. Maximum Peak Current Capability

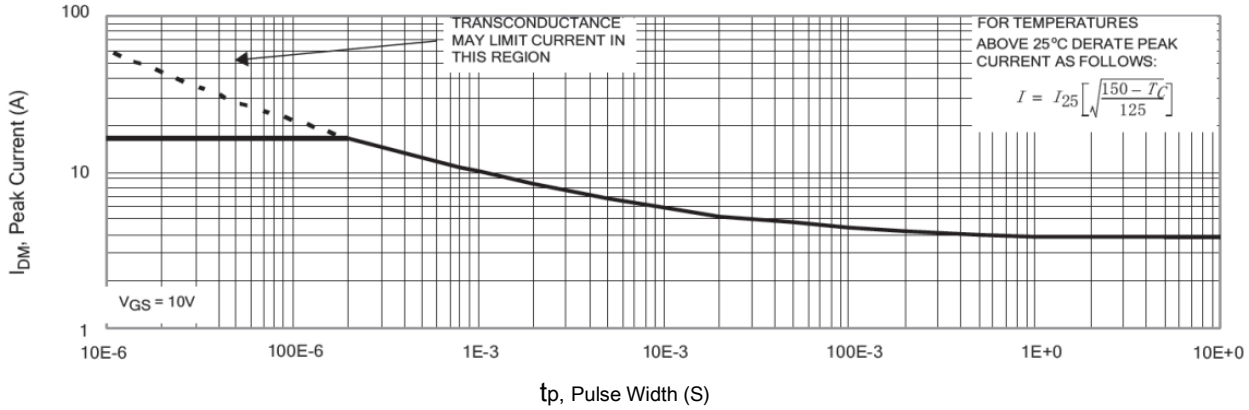



Fig 7. Typical Transfer Characteristics

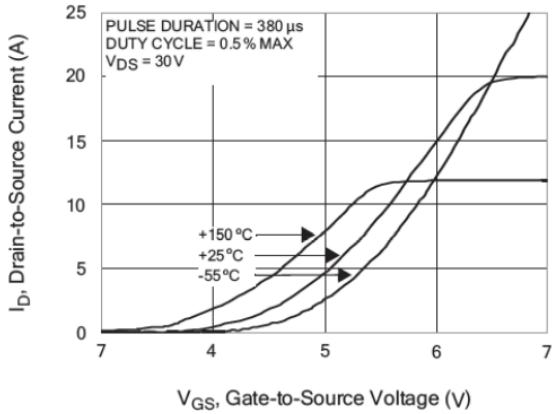



Fig 8. Unclamped Inductive Switching Capability

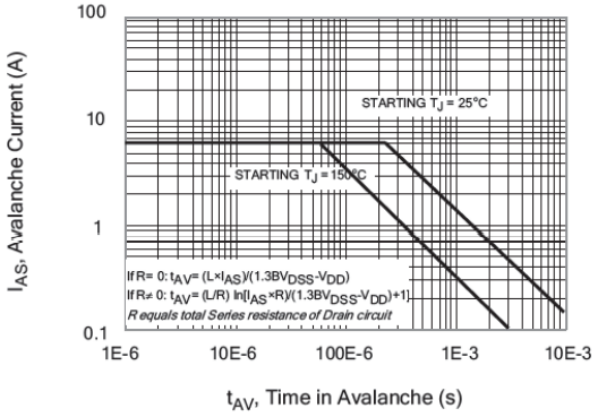



Fig 9. Typical Drain-to-Source ON Resistance vs Drain Current

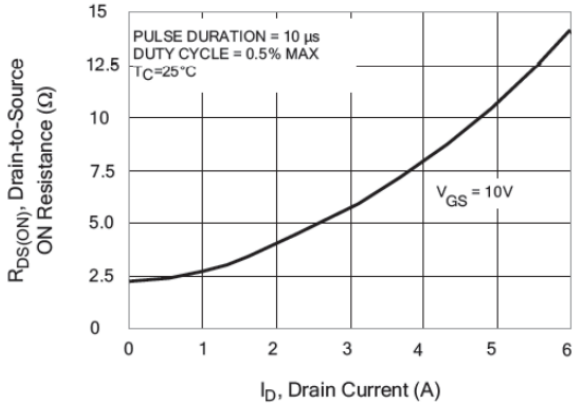



Fig 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

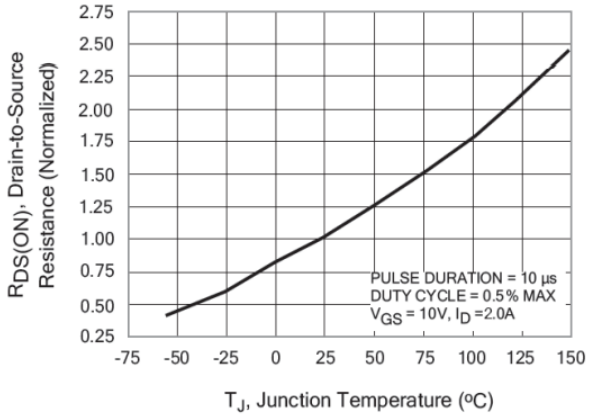


Fig11. Typical Breakdown Voltage vs Junction Temperature

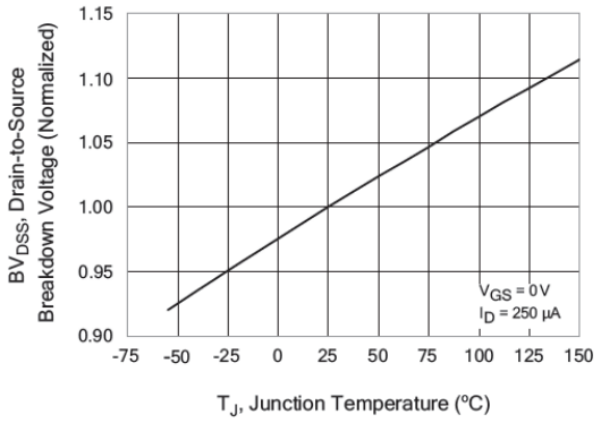



Fig 12. Typical Threshold Voltage vs Junction Temperature

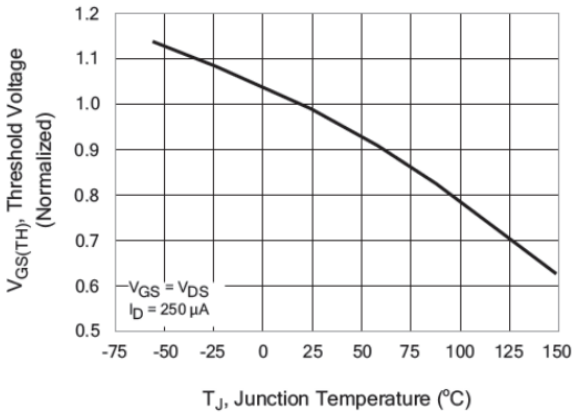



Fig 13. Maximum Safe Operating Area

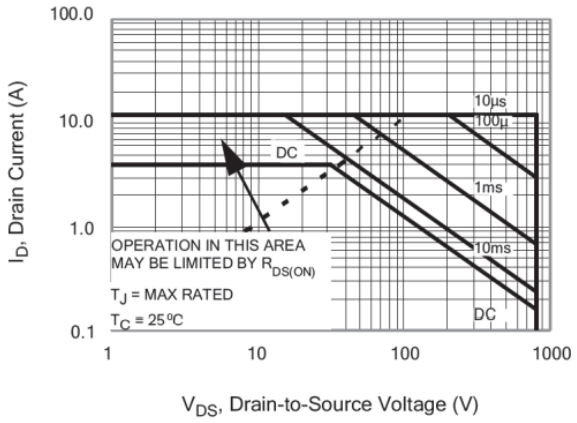



Fig 14. Typical Capacitance vs Drain-to-Source Voltage

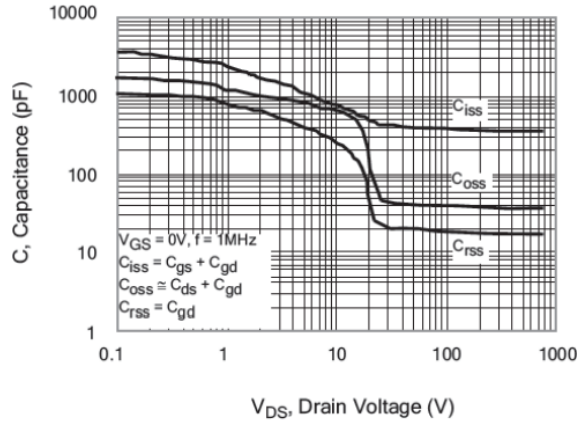



Fig 15. Typical Gate Charge vs Gate-to-Source Voltage

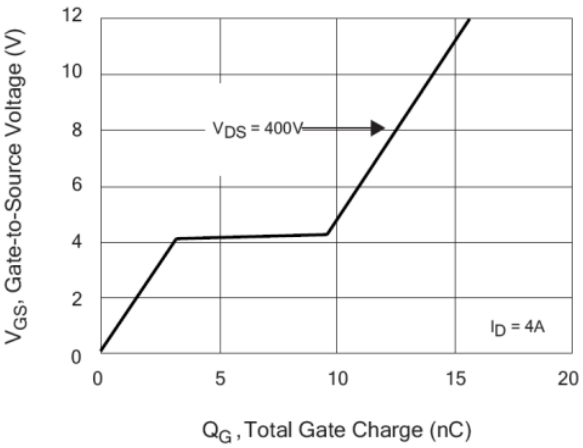
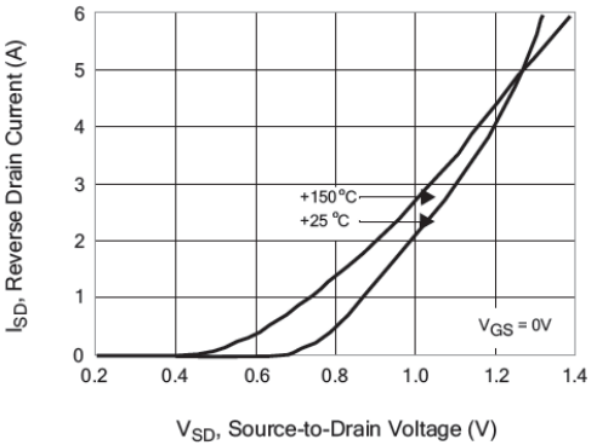



Fig 16. Typical Body Diode Transfer Characteristics



## TEST CIRCUITS AND WAVEFORMS

Fig 17. Peak Diode Recovery dv/dt Test Circuit

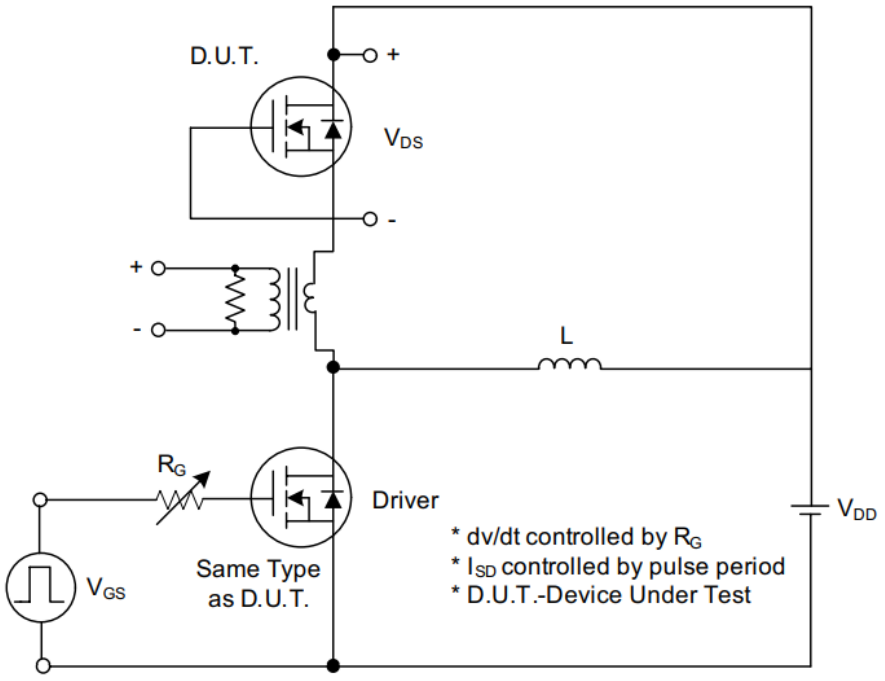



Fig 18. Peak Diode Recovery dv/dt Waveforms

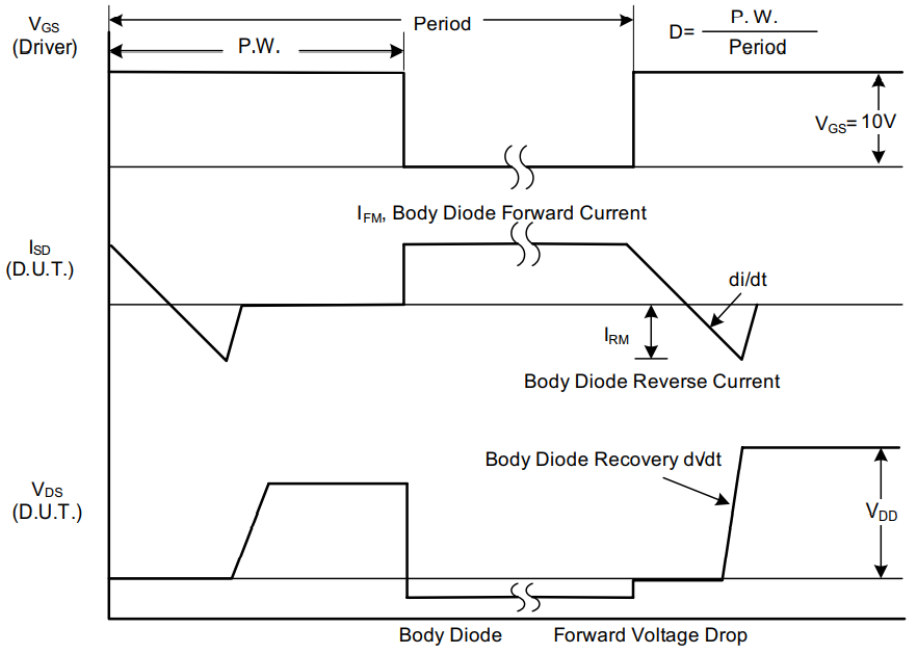


Fig 19. Switching Test Circuit

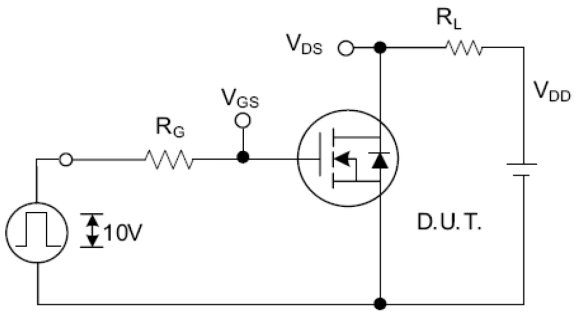



Fig 20. Switching Waveforms

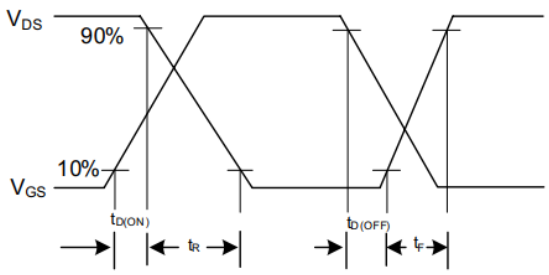



Fig 21. Gate Charge Test Circuit

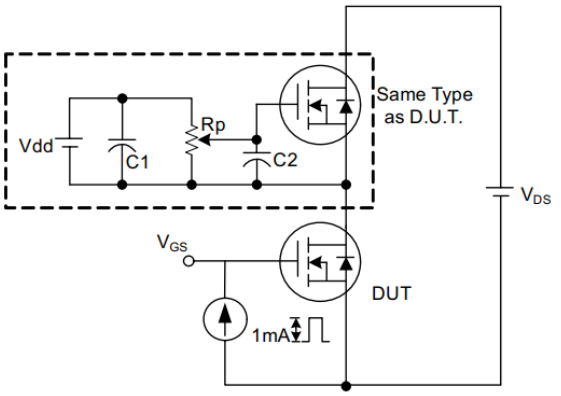



Fig 22. Gate Charge Waveform

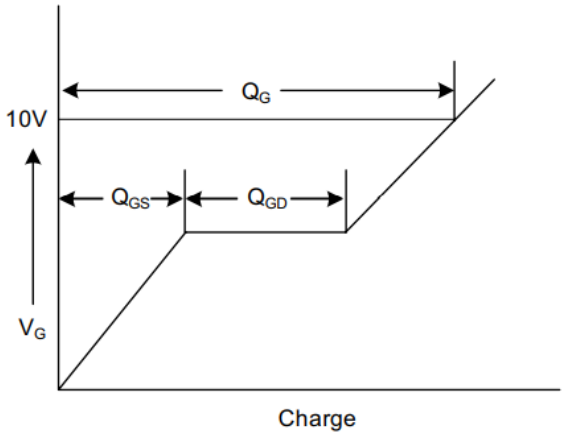



Fig 23. Unclamped Inductive Switching Test Circuit

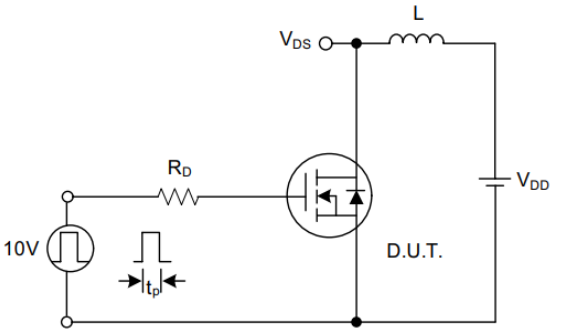
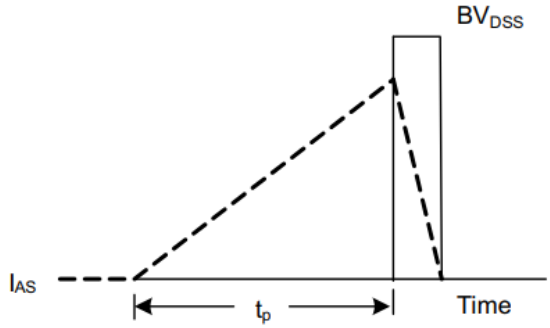
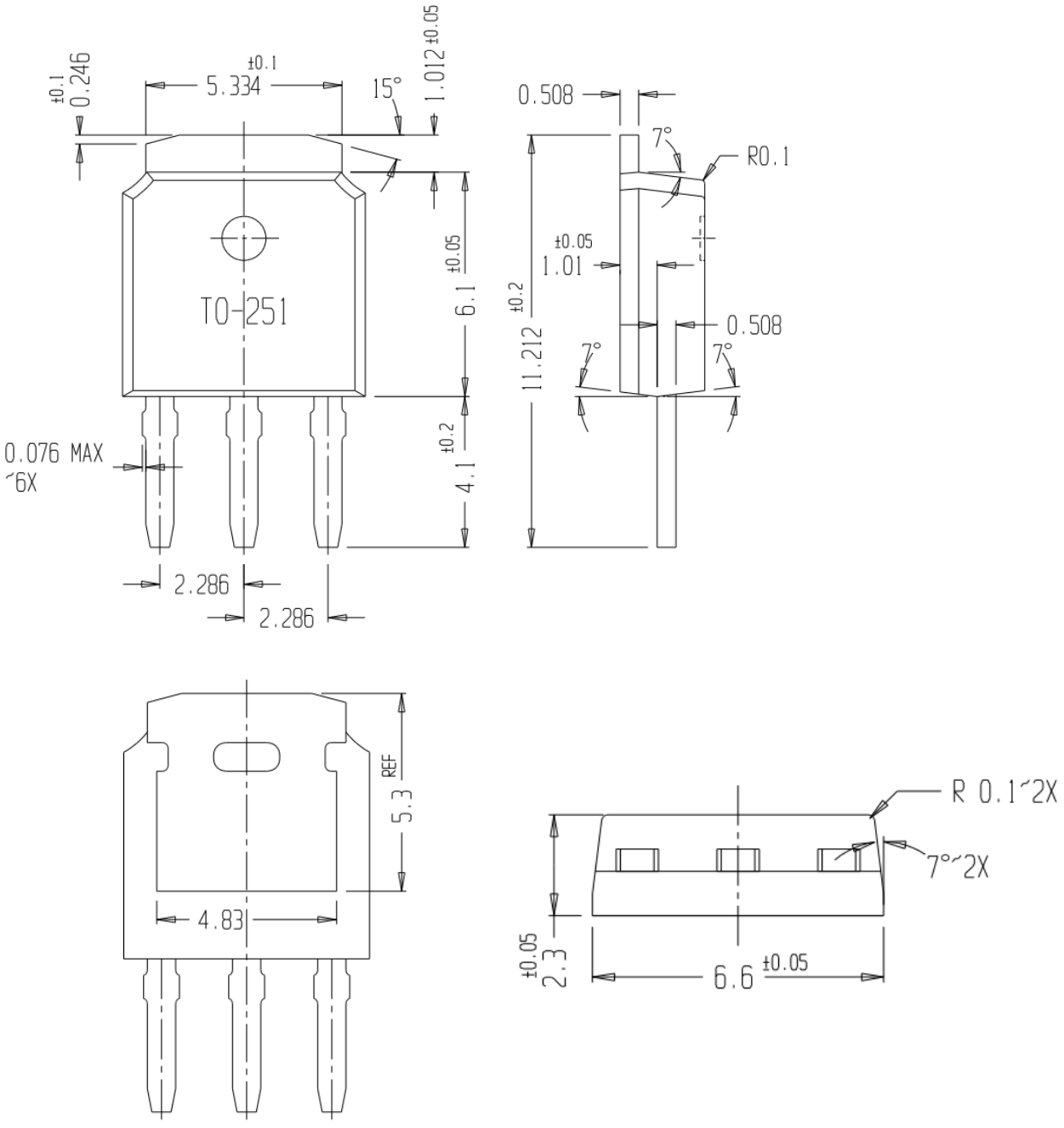



Fig 24. Unclamped Inductive Switching Waveforms

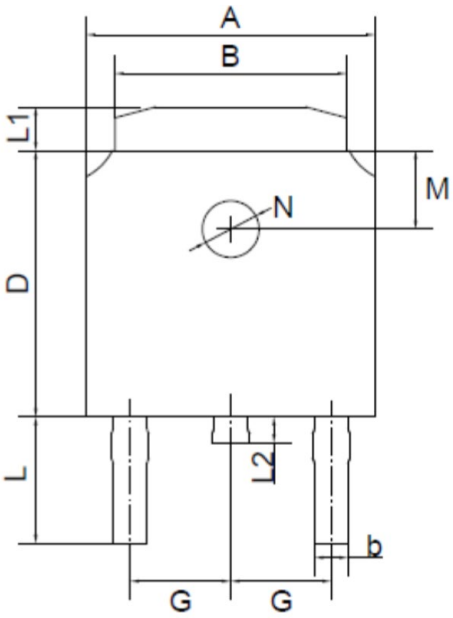


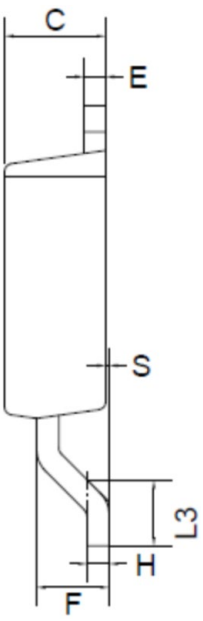
## PACKAGE INFORMATION

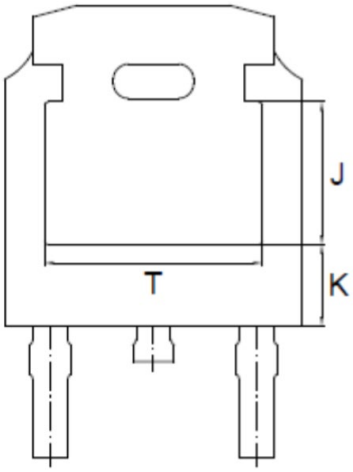
Dimension in TO-251 (Unit: mm)



Dimension in TO-252 (Unit: mm)




| Symbol | Min. | Max. |
|---|---|---|
| A | 6.3 | 6.7 |
| B | 5.1 | 5.5 |
| b | 0.3 | 0.8 |
| C | 2.1 | 2.5 |
| D | 5.9 | 6.3 |
| E | 0.4 | 0.6 |
| F | 1.3 | 1.8 |
| G | 2.29TYPICAL | |
| H | 0.45 | 0.55 |
| L | 2.7 | 3.1 |
| L1 | 0.8 | 1.2 |
| L2 | 0.6 | 1.0 |
| L3 | 1.40 | 1.75 |
| S | 0.0 | 0.1 |
| M | 1.8 TYPICAL | |
| N | 1.3 TYPICAL | |
| J | 3.16 ref. | |
| K | 1.80 ref. | |
| T | 4.83 ref. | |

## IMPORTANT NOTICE

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