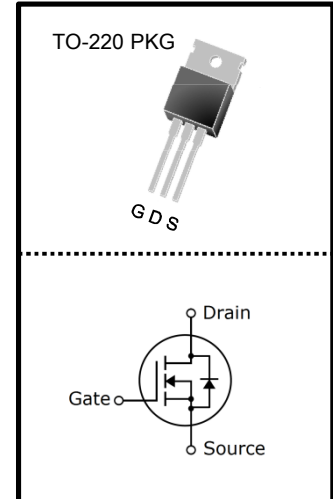


80V N-Channel MOSFET

| | | |
|------------|------------------|-------|
| BV_{DSS} | $R_{DS(ON) MAX}$ | I_D |
| 80V | 15m Ω | 75A |

Features

- ◆ $R_{DS(ON)}$ (Max 0.015 Ω) @ $V_{GS}=10V$
- ◆ Gate Charge : 80.0 nC (Typical)
- ◆ Improved dv/dt capability
- ◆ 100% EAS Tested



General Description

This device is suitable for

- §. DC-DC converters, DC motor control for fixed tool and e-Bike
- §. Power management in portable tools
- §. Amp and car booster

Absolute Maximum Ratings ($T_c = 25^\circ C$ unless otherwise specified)

| Symbol | Parameter | Value | Units |
|----------------|---|-----------|---------------|
| V_{DSS} | Drain to Source Voltage | 80 | V |
| I_D | Continuous Drain Current (@ $T_c=25^\circ C$) | 75 | A |
| | Continuous Drain Current (@ $T_c=100^\circ C$) | 52.5 | A |
| I_{DM} | Drain Current Pulsed (Note1) | 300 | A |
| V_{GS} | Gate to Source Voltage | ± 20 | V |
| E_{AS} | Single Pulsed Avalanche Energy (Note2) | 1310 | mJ |
| E_{AR} | Repetitive Avalanche Energy (Note1) | 17.3 | mJ |
| dv/dt | Peak Diode Recovery dv/dt (Note3) | 7 | V/ns |
| P_D | Total Power Dissipation (@ $T_c=25^\circ C$) [*] | 170 | W |
| | Derating Factor above 25 $^\circ C$ | 1.15 | W/ $^\circ C$ |
| T_J, T_{STG} | Operating Junction and Storage Temperature | -55 ~ 175 | $^\circ C$ |
| T_L | Maximum Lead Temperature for soldering process, 1/8 from case for 5 seconds | 300 | $^\circ C$ |

Thermal Resistance Characteristics

| Symbol | Parameter | Value | | | Units |
|-----------------|---|-------|---------|------|--------------|
| | | Min | Typical | Max | |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | - | - | 0.87 | $^\circ C/W$ |
| $R_{\theta CS}$ | Thermal Resistance, Case-to-Sink | - | 0.5 | - | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | - | - | 62.5 | $^\circ C/W$ |

※When mounted on the minimum pad size recommended(PCB Mount)

Electrical Characteristics(T_C = 25°C Unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|-------------------------------------|---|---|-----|-------|-------|-------|
| Off Characteristics | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 80 | - | - | V |
| ΔBV _{DSS} /ΔT _J | Breakdown Voltage Temperature Coefficient | I _D =250μA, Referenced to 25°C | - | 0.08 | - | V/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V | - | - | 1 | μA |
| | | V _{DS} =64V, T _C =150°C | - | - | 10 | μA |
| I _{GSS} | Gate-Source Forward Leakage Current | V _{GS} =20V, V _{DS} =0V | - | - | 100 | nA |
| | Gate-Source Reverse Leakage Current | V _{GS} =-20V, V _{DS} =0V | - | - | -100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 2.0 | - | 4.0 | V |
| R _{DS(on)} | Static Drain-Source On-State Resistance | V _{GS} =10V, I _D =25A | - | 0.012 | 0.015 | Ω |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, f=1 MHz | - | 2600 | 3380 | pF |
| C _{oss} | Output Capacitance | | - | 940 | 1220 | |
| C _{rss} | Reverse Transfer Capacitance | | - | 210 | 275 | |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-On Delay Time | V _{DD} =30V, I _D =25A, R _G =50Ω (Note 4,5) | - | 30 | 70 | ns |
| t _r | Turn-On Rise Time | | - | 225 | 460 | |
| t _{d(off)} | Turn-off Delay Time | | - | 165 | 340 | |
| t _f | Turn-off Fall Time | | - | 155 | 320 | |
| Q _g | Total Gate Charge | V _{DS} =48V, I _D =50A, V _{GS} =10V (Note 4,5) | - | 80 | 105 | nC |
| Q _{gs} | Gate-Source Charge | | - | 15 | - | nC |
| Q _{gd} | Gate-Drain Charge | | - | 32 | - | nC |

Source-Drain Diode Ratings and Characteristics

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|-----------------|---|---|-----|-----|-----|-------|
| I _S | Continuous Source-Drain diode Forward Current | | - | - | 75 | A |
| I _{SM} | Pulsed Source-Drain diode Forward Current | | - | - | 300 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =50A | - | - | 1.5 | V |
| t _{rr} | Reverse Recovery Time | V _{GS} =0V, I _S =50A, di/dt=100A/us | - | 90 | - | ns |
| Q _{rr} | Reverse Recovery Charge | | - | 250 | - | nC |

※Notes:

1. Repetitive Rating : pulse width limited by maximum junction temperature
2. L=220μH, I_{AS}=50A, R_G=0 Ω, V_{DD}=25V, Starting T_J=25°C
3. I_{SD}≤50A, di/dt≤300A/us, V_{DD}≤BV_{DSS}, Starting T_J=25°C
4. Pulse Test : Pulse width ≤300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Fig 1. Breakdown Voltage Variation vs. Junction Temperature

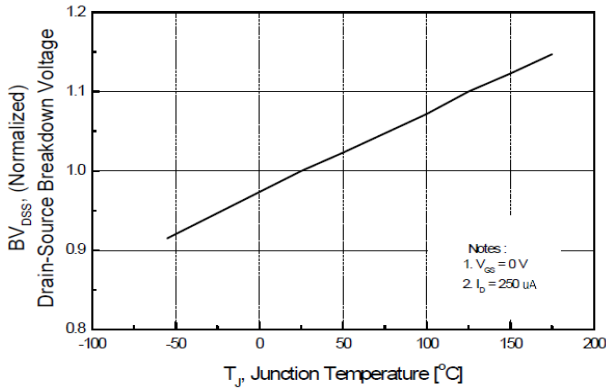


Fig 2. On-Resistance Variation vs. Junction Temperature

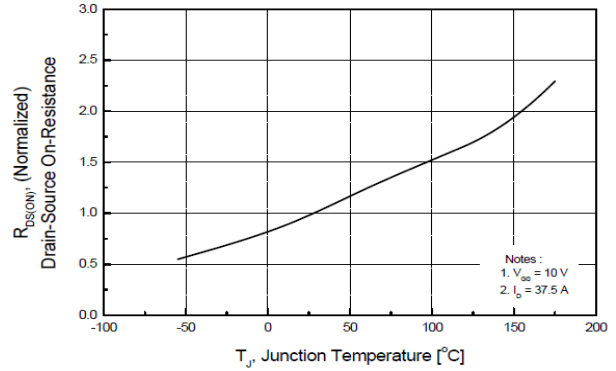


Fig 3. Maximum Safe Operating Area

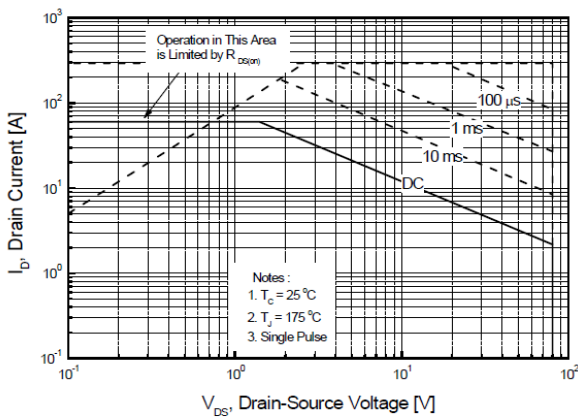


Fig 4. On State Current vs. Allowable Case Temperature

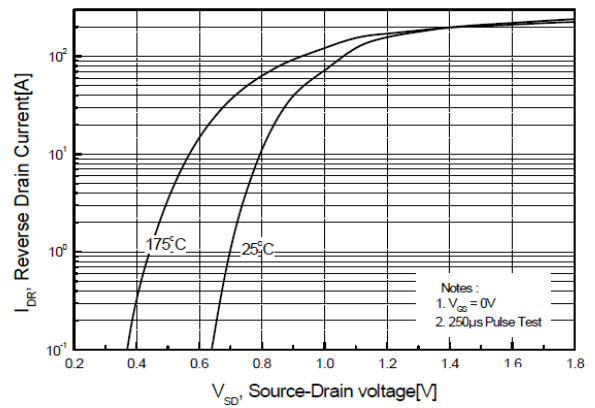


Fig 5. Maximum Drain Current vs. Case Temperature

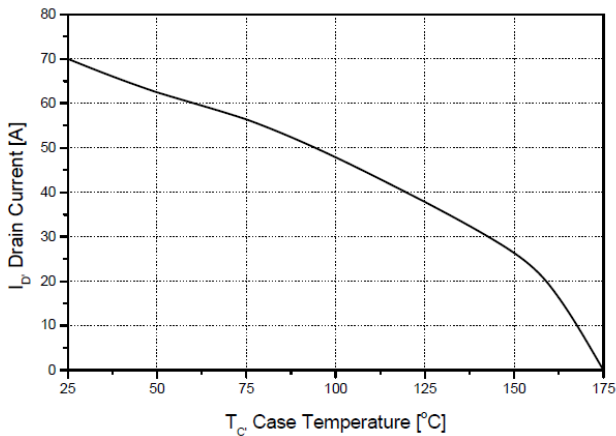
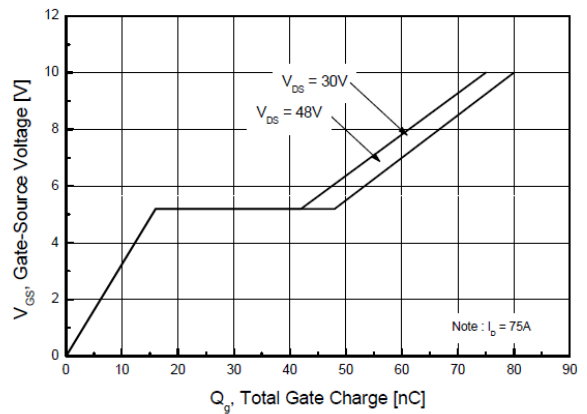
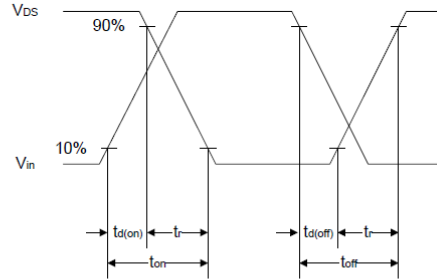
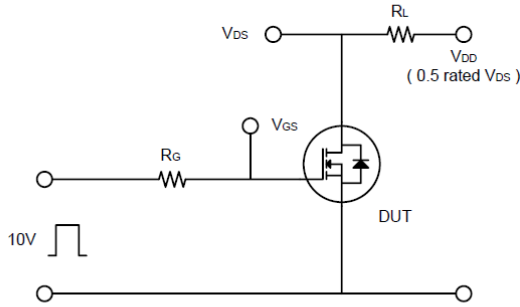


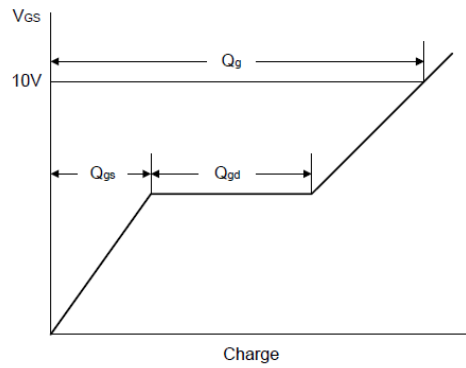
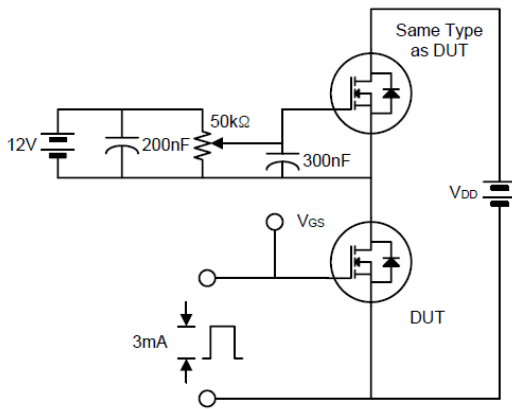
Fig 6. Gate Charge Characteristics



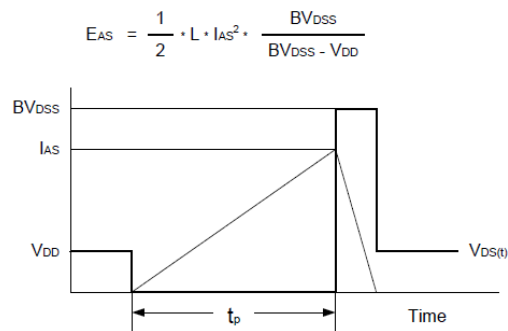
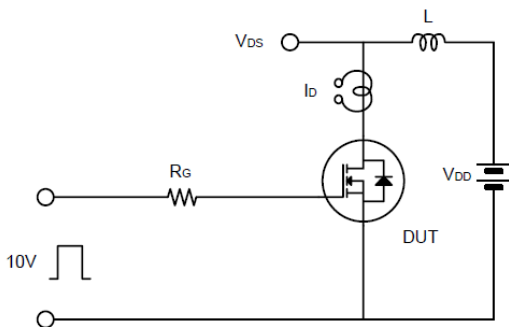
Characteristics Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

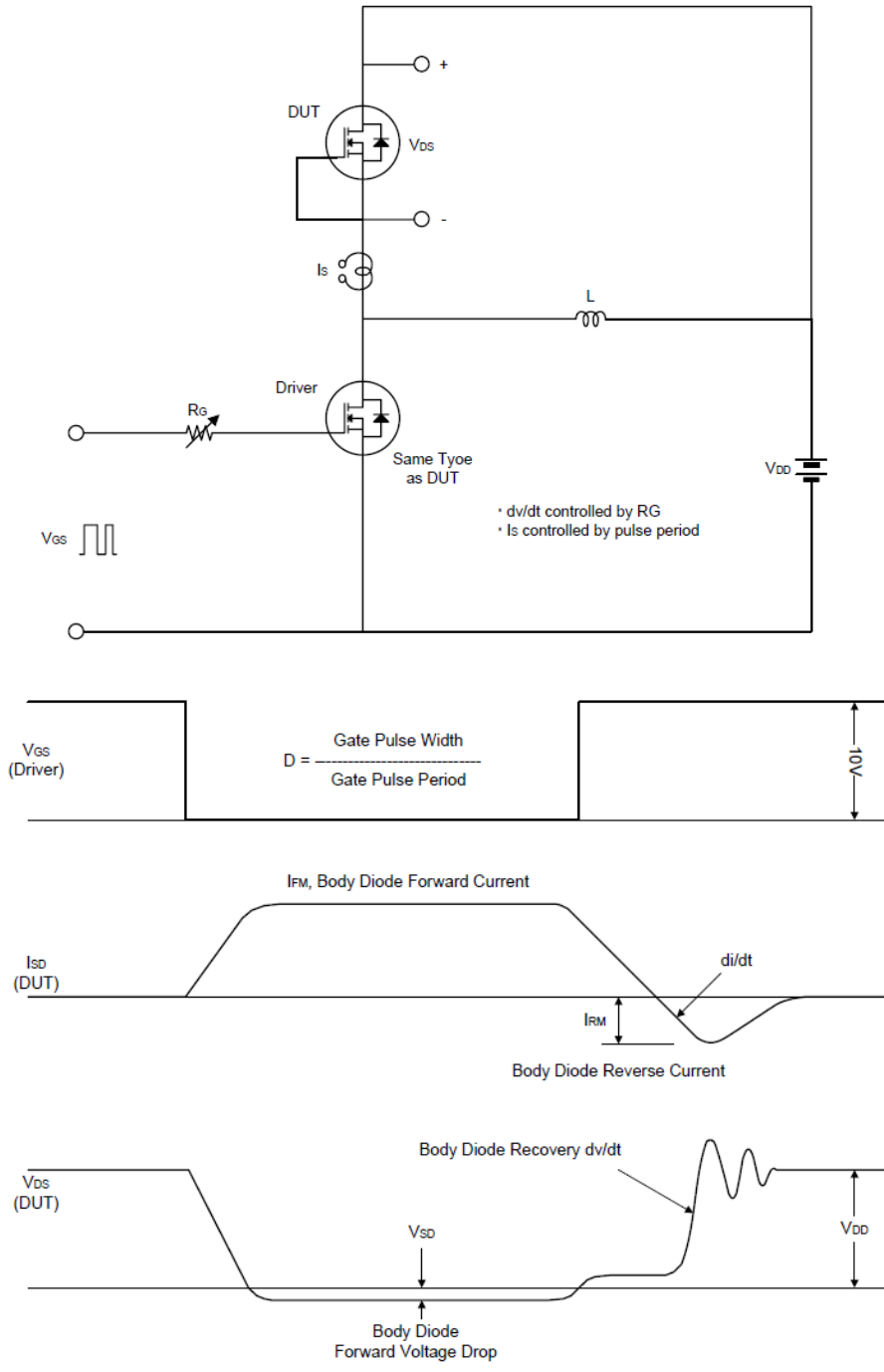


Gate Charge Test Circuit & Waveform



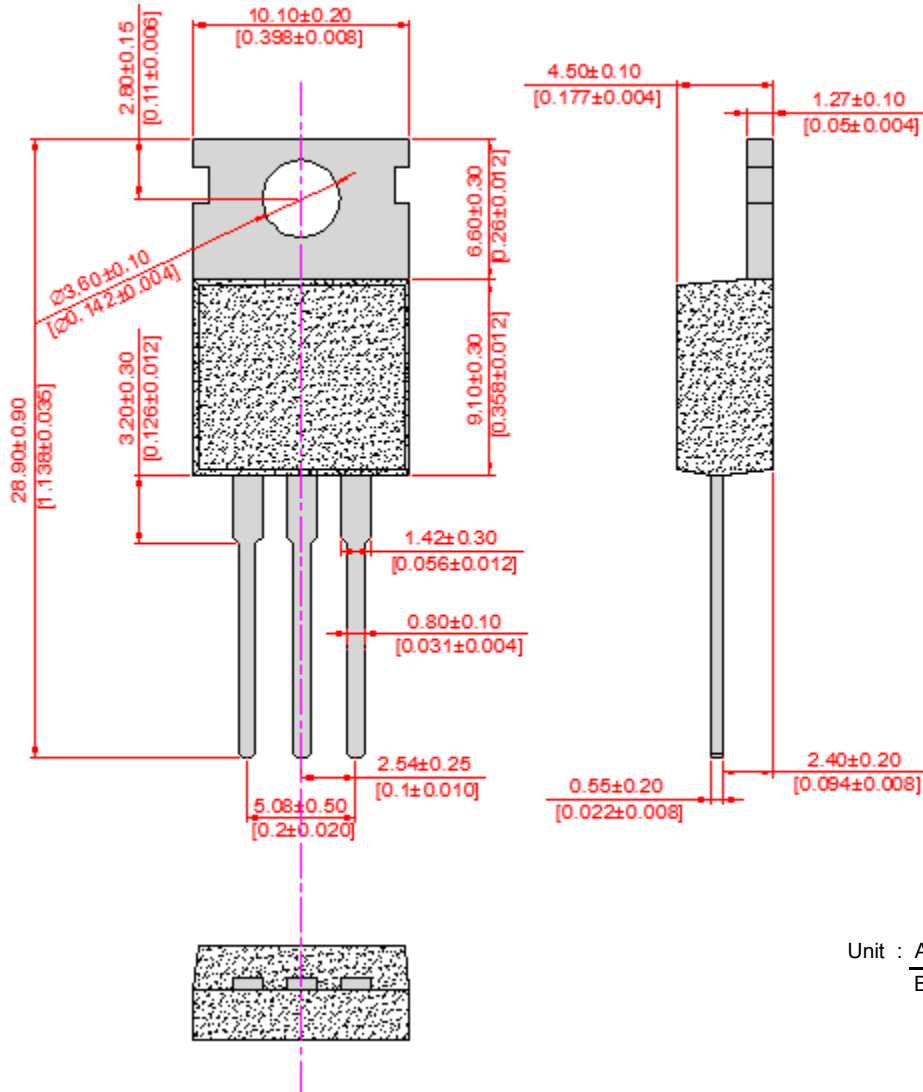
Unclamped Inductive Switching Test Circuit & Waveform

Characteristics Test Circuit & Waveform (continued)



Peak Diode Recovery dv/dt Test Circuit & Waveforms

TO-220 PACKAGE DIMENSION



Unit : A (mm)
B (inch)