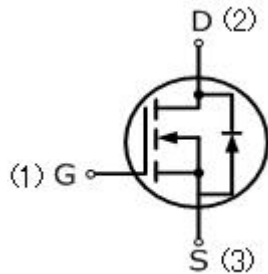


10N50TF

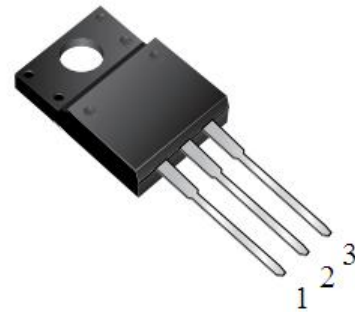
10 Amps,500 Volts N-CHANNEL Power MOSFET

FEATURE

- 10A,500V, $R_{DS(ON)MAX}=0.75\ \Omega$ @ $V_{GS}=10V/5A$
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- Halogen free



TO-220TF



Absolute Maximum Ratings($T_C=25^\circ\text{C}$, unless otherwise noted)

| Parameter | Symbol | 10N50TF | UNIT |
|--|------------------|-----------|------------------|
| Drain-Source Voltage | V_{DSS} | 500 | V |
| Gate-Source Voltage | V_{GSS} | ± 30 | |
| Continuous Drain Current | I_D | 10 | A |
| Pulsed Drain Current(Note1) | I_{DM} | 40 | |
| Single Pulse Avalanche Energy (Note 2) | E_{AS} | 580 | mJ |
| Reverse Diode dV/dt (Note 3) | dv/dt | 5 | V/ns |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55to+150 | $^\circ\text{C}$ |
| Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds | T_L | 260 | $^\circ\text{C}$ |
| Mounting Torque | 6-32 or M3 screw | 10 | lbf • in |
| | | 1.1 | N • m |

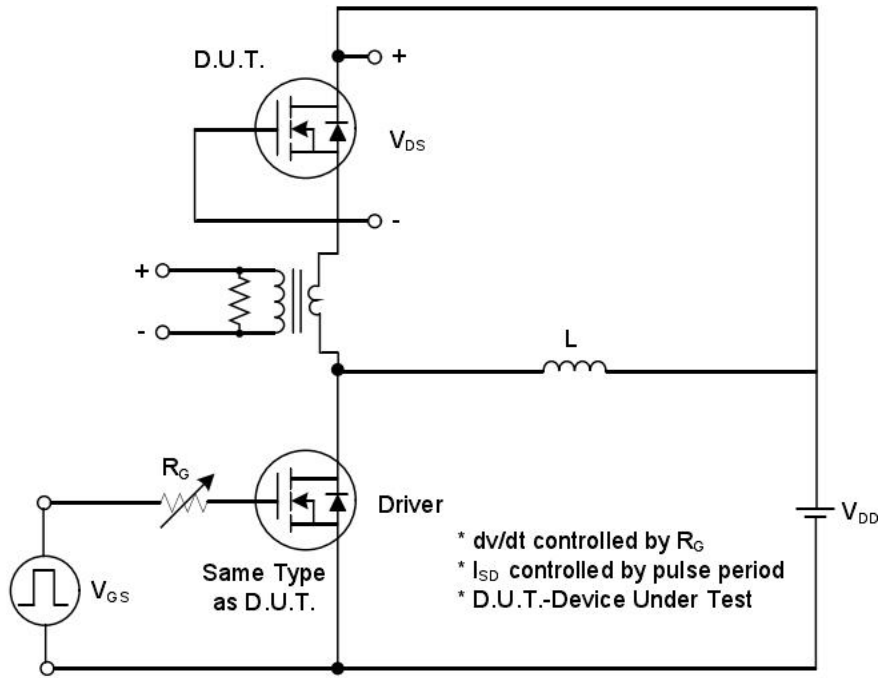
| Parameter | Symbol | 10N50TF | Units |
|---|---------------------------------|---------|---------------------------|
| Thermal resistance , Channel to Case | $R_{th(ch-c)}$ | 3.13 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance , Channel to Ambient | $R_{th(ch-a)}$ | 62.5 | $^\circ\text{C}/\text{W}$ |
| Maximum Power Dissipation | $T_C=25^\circ\text{C}$ P_D | 40 | W |

| Electrical Characteristics (T_c=25°C, unless otherwise noted) | | | | | | |
|--|--|---|-----|-------|------|-------|
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250uA | 500 | — | — | V |
| Breakdown Temperature Coefficient | ΔBV _{DSS} /ΔT _J | Reference to 25°C , I _D =250uA | — | 0.6 | — | V/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =500V, V _{GS} =0V | — | — | 1 | uA |
| Gate-Body Leakage Current, Forward | I _{GSSF} | V _{GS} =30V, V _{DS} =0V | — | — | 100 | nA |
| Gate-Body Leakage Current, Reverse | I _{GSSR} | V _{GS} =-30V, V _{DS} =0V | — | — | -100 | nA |
| On Characteristics | | | | | | |
| Gate-Source Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250uA | 2 | — | 4 | V |
| Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} =10V, I _D =5A | — | 0.5 | 0.75 | Ω |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1.0MHZ | — | 1620 | — | pF |
| Output Capacitance | C _{oss} | | — | 154 | — | pF |
| Reverse Transfer Capacitance | C _{rss} | | — | 8.4 | — | pF |
| Switching Characteristics | | | | | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} =250V, I _D =10A, R _G =10Ω (Note3,4) | — | 26 | — | ns |
| Turn-On Rise Time | t _r | | — | 20 | — | ns |
| Turn-Off Delay Time | t _{d(off)} | | — | 52 | — | ns |
| Turn-Off Fall Time | t _f | | — | 21 | — | ns |
| Total Gate Charge | Q _g | V _{DS} =400V, I _D =10A, V _{GS} =10V, (Note3,4) | — | 32 | — | nC |
| Gate-Source Charge | Q _{gs} | | — | 7.9 | — | nC |
| Gate-Drain Charge | Q _{gd} | | — | 12 | — | nC |
| Drain-Source Body Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Diode Forward Current | I _S | | — | — | 10 | A |
| Pulsed Diode Forward Current | I _{SM} | | — | — | 40 | A |
| Diode Forward Voltage | V _{SD} | I _S =10A, V _{GS} =0V | — | — | 1.5 | V |
| Reverse Recovery Time | t _{rr} | V _{GS} =0V, I _S =10A, dI _F /dt=100A/us, (Note4) | — | 411 | — | ns |
| Reverse Recovery Charge | Q _{rr} | | — | 2.588 | — | uC |

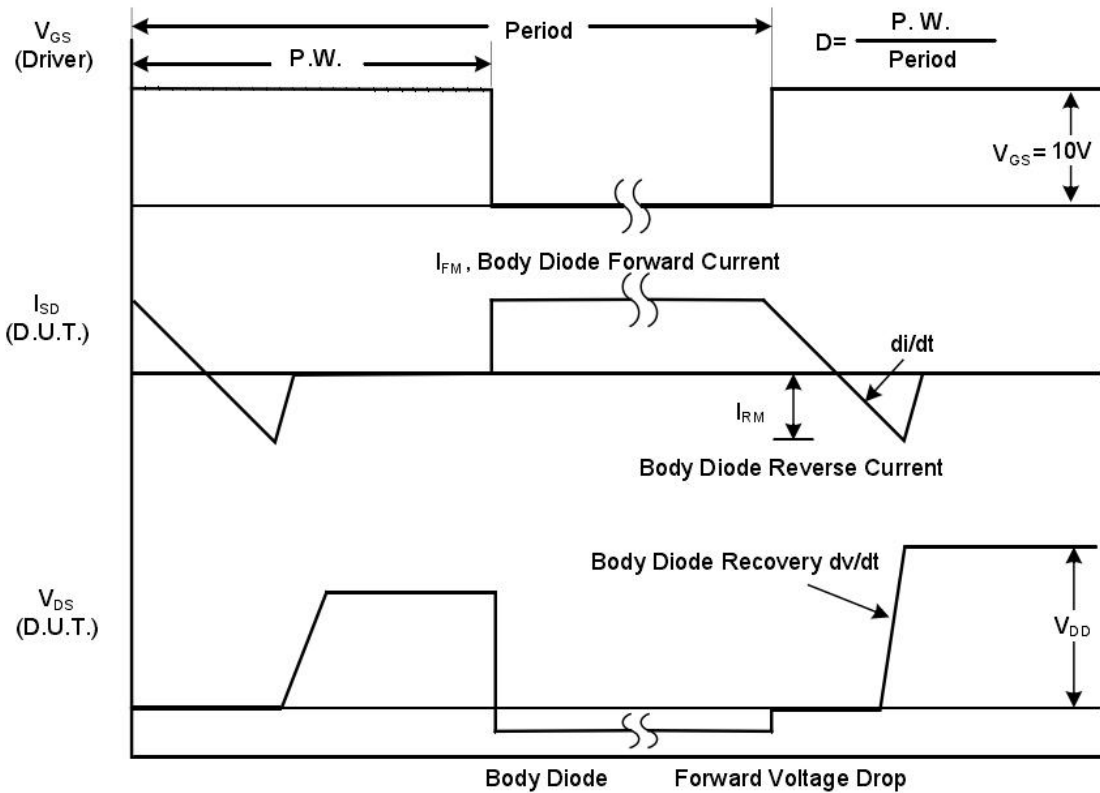
Notes

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. L=10mH, I_{AS}=10.8A, starting T_J=25°C.
3. I_{SD}=10A, dI/dt ≤ 100A/us, V_{DD} ≤ BV_{DSS}, starting T_J=25°C, Pulse width ≤ 300us; duty cycle ≤ 2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.

TEST CIRCUIT AND WAVEFORM



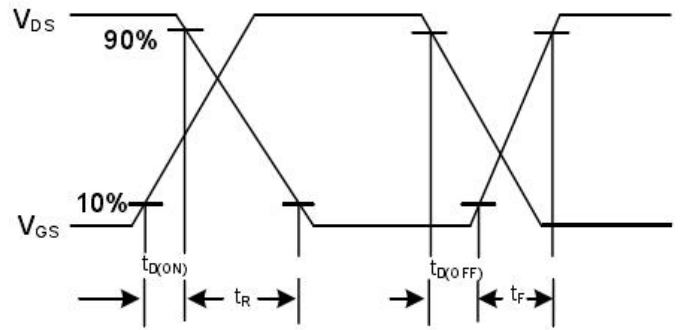
Peak Diode Recovery dv/dt Test Circuit



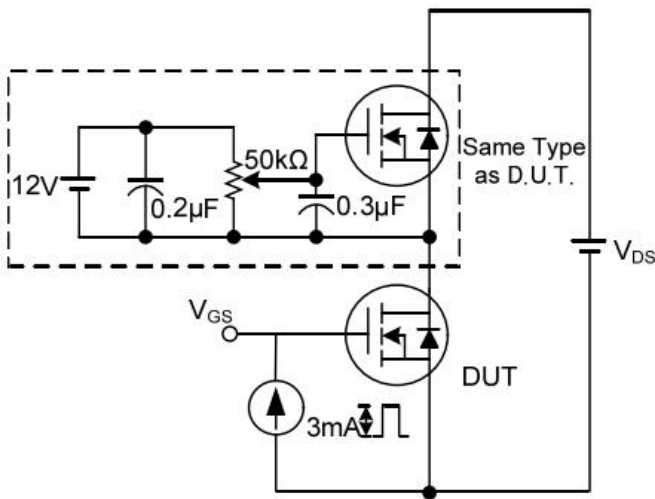
Peak Diode Recovery dv/dt Waveforms



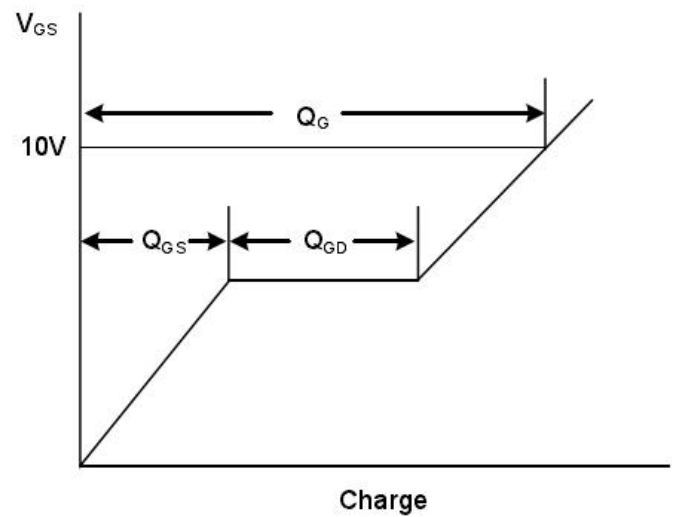
Switching Test Circuit



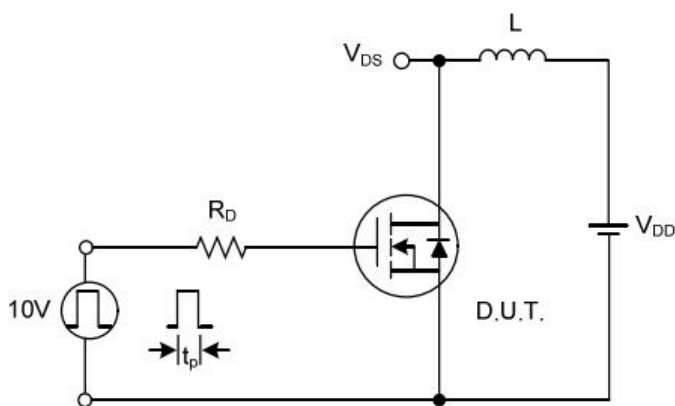
Switching Waveforms



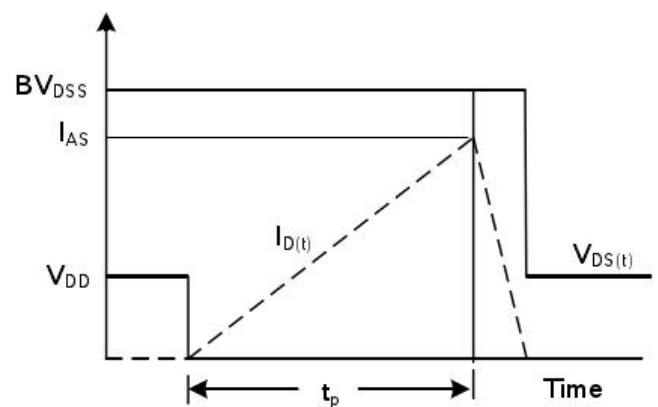
Gate Charge Test Circuit



Gate Charge Waveform

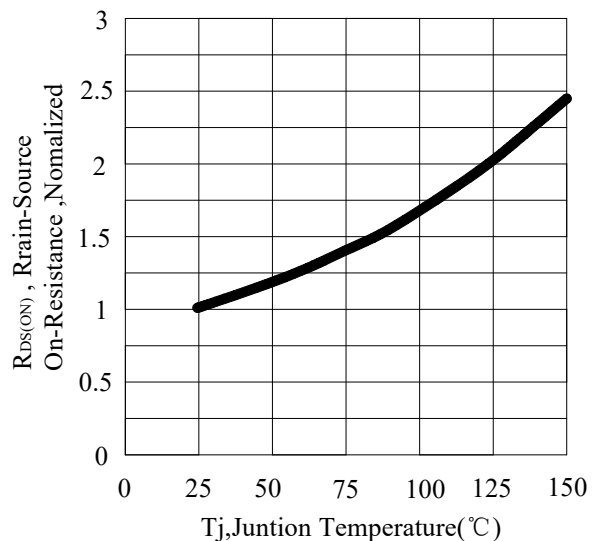
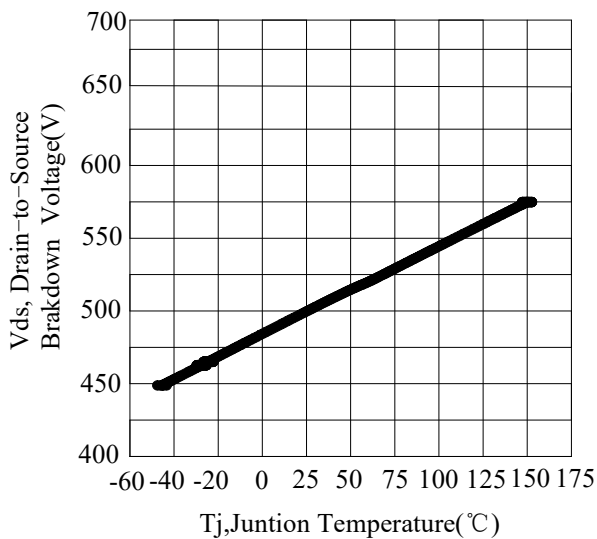
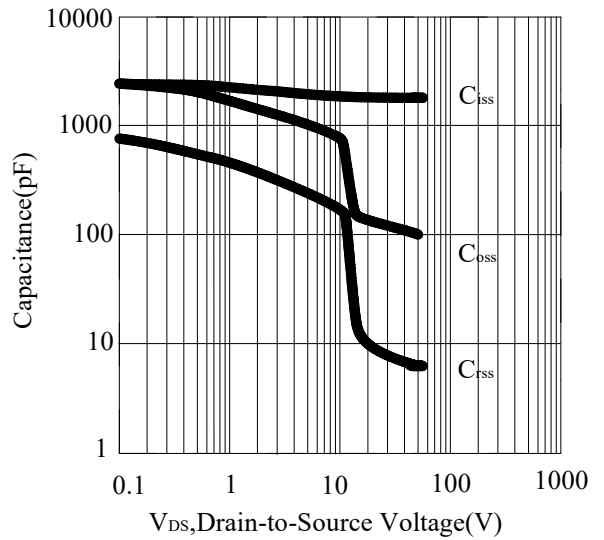
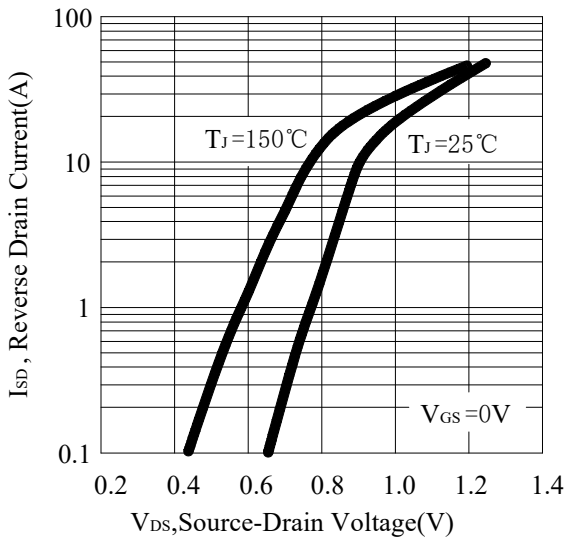
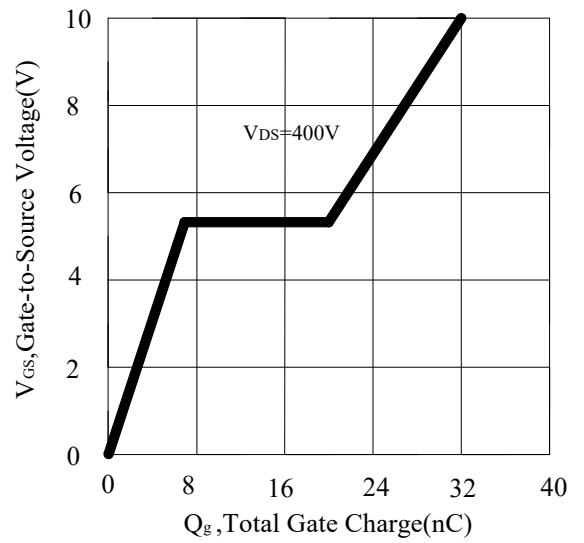
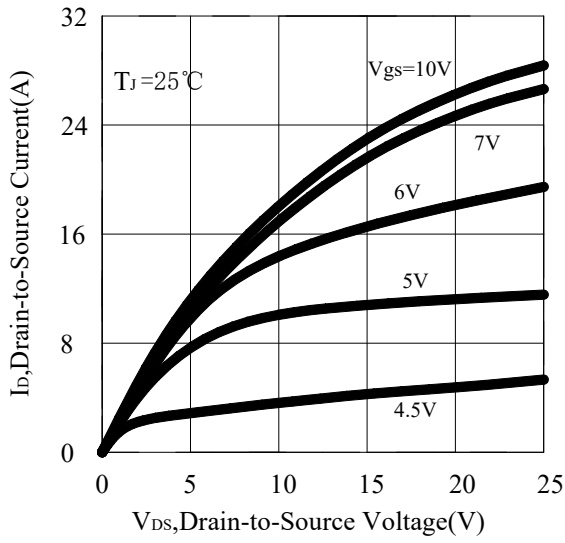


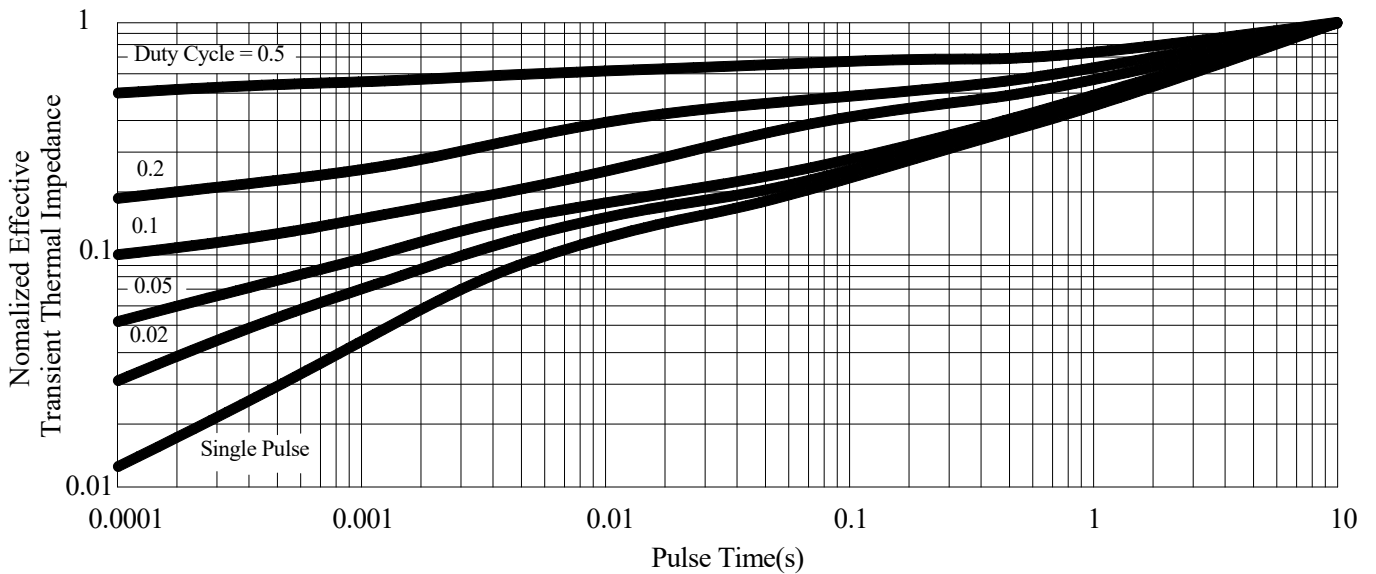
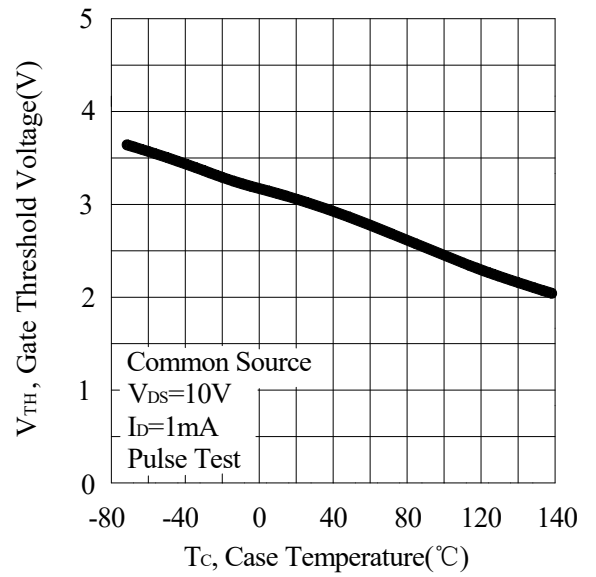
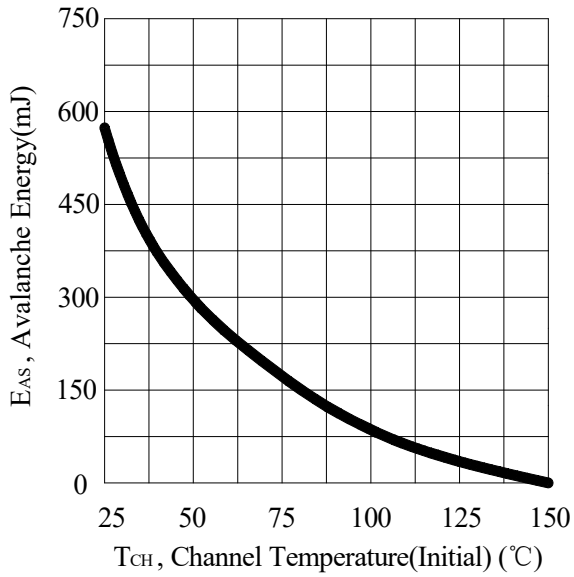
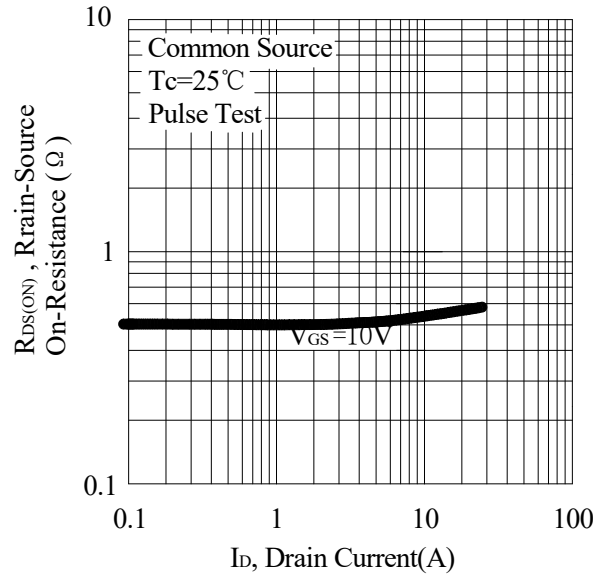
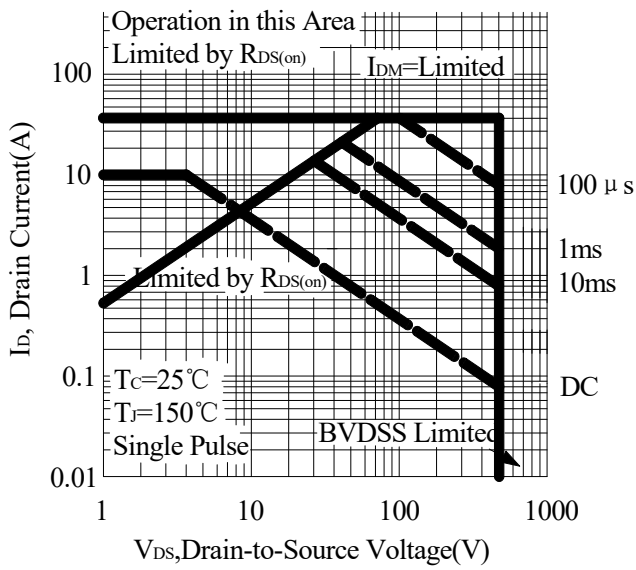
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

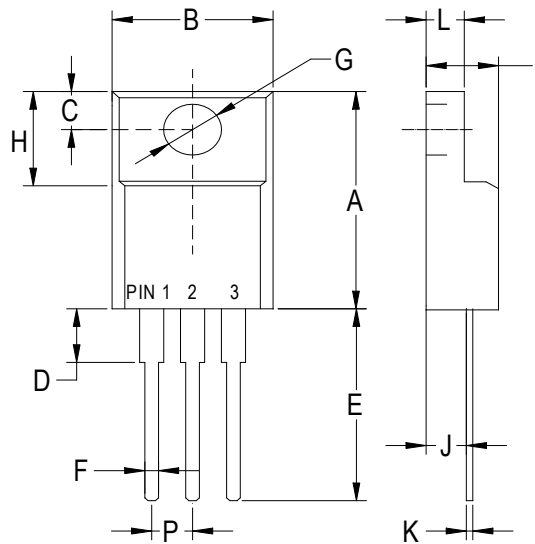
RATING AND CHARACTERISTIC CURVES





PACKAGE OUTLINE DIMENSIONS

TO-220TF



| TO-220TF | | |
|----------|-------------|-------------|
| Dim | Min | Max |
| A | .590 (15.0) | .650 (16.5) |
| B | .393 (10.0) | .414 (10.5) |
| C | .118 (3.00) | .138 (3.50) |
| D | .118 (3.00) | .146 (3.70) |
| E | .512 (13.0) | .551 (14.0) |
| F | .028 (0.70) | .035 (0.90) |
| G | .114 (2.90) | .138 (3.50) |
| H | .255 (6.50) | .280 (7.10) |
| I | .173 (4.40) | .197 (5.00) |
| J | .102 (2.60) | .110 (2.80) |
| K | .018 (0.45) | .026 (0.65) |
| L | .092 (2.35) | .109 (2.75) |
| P | .890 (2.25) | .113 (2.85) |

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