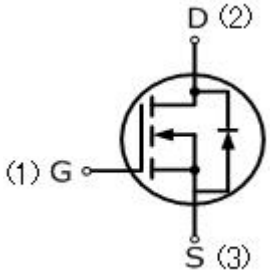
# 13N50TF

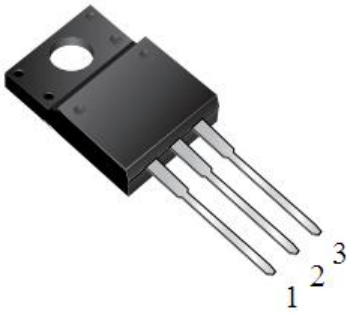
## 13 Amps,500 Volts N-CHANNEL Power MOSFET

### FEATURE

- 13A,500V,$R_{DS(ON)MAX}$=0.5 Ω @$V_{GS}$=10V/6.5A
- Low gate charge
- Low $C_{iss}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capabilitv
- Halogen free




TO-220TF




**Absolute Maximum Ratings**($T_C$=25℃,unless otherwise noted)

| Parameter | Symbol | 13N50TF | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 500 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±30 | |
| Continuous Drain Current | $I_D$ | 13 | A |
| Pulsed Drain Current(Note1) | $I_{DM}$ | 52 | |
| Single Pulse Avalanche Energy (Note 2) | $E_{AS}$ | 840 | mJ |
| Reverse Diode dV/dt (Note 3) | dv/dt | 5 | V/ns |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55to+150 | ℃ |
| Maximum lead temperature for soldering purposes, 1/8″from case for 5 seconds | $T_L$ | 260 | ℃ |

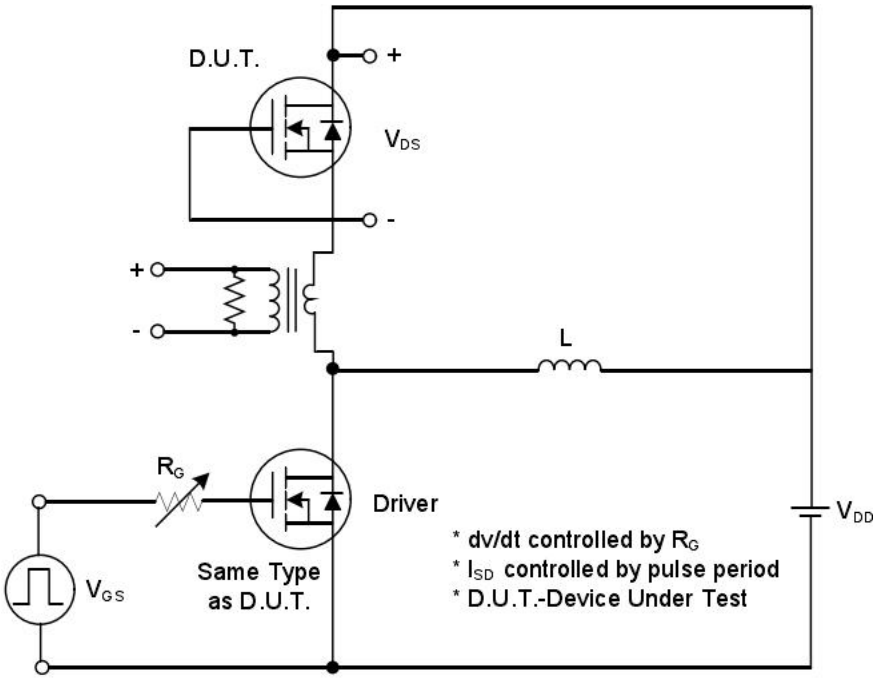
| Parameter | | Symbol | 13N50TF | Units |
|---|---|---|---|---|
| Thermal resistance , Channel to Case | | $R_{th(ch-c)}$ | 2.98 | ℃/W |
| Thermal resistance , Channel to Ambient | | $R_{th(ch-a)}$ | 62.5 | ℃/W |
| Maximum Power Dissipation | $T_C$=25℃ | $P_D$ | 42 | W |

| **Electrical Characteristics** ($T_c$=25℃,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 | $\Delta BV_{DSS}$ /$\Delta T_J$ | Reference to 25℃ , $I_D$=250uA | — | 0.6 | — | V/℃ |
| 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,$I_D$=6.5A | — | 0.4 | 0.5 | Ω |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V,$V_{GS}$=0V, f=1.0MHZ | — | 1957 | — | pF |
| Output Capacitance | $C_{oss}$ | | — | 195 | — | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | — | 11 | — | pF |
| **Switching Characteristics** | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=250V,$I_D$=13A, $R_G$=10Ω (Note3,4) | — | 28 | — | ns |
| Turn-On Rise Time | $t_r$ | | — | 21 | — | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | — | 62 | — | ns |
| Turn-Off Fall Time | $t_f$ | | — | 32 | — | ns |
| Total Gate Charge | Qg | $V_{DS}$=400V,$I_D$=13A, $V_{GS}$=10V, (Note3,4) | — | 40 | — | nC |
| Gate-Source Charge | Qgs | | — | 9.2 | — | nC |
| Gate-Drain Charge | Qgd | | — | 14 | — | nC |
| **Drain-Source Body Diode Charcteristics and Maximum Ratings** | | | | | | |
| Continuous Diode Forward Current | $I_S$ | | — | — | 13 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | — | — | 52 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=13A,$V_{GS}$=0V | — | — | 1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_{GS}$=0V,$I_S$=13A, $dI_F/dt$=100A/us, (Note4) | — | 360 | — | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | — | 3.55 | — | uC |

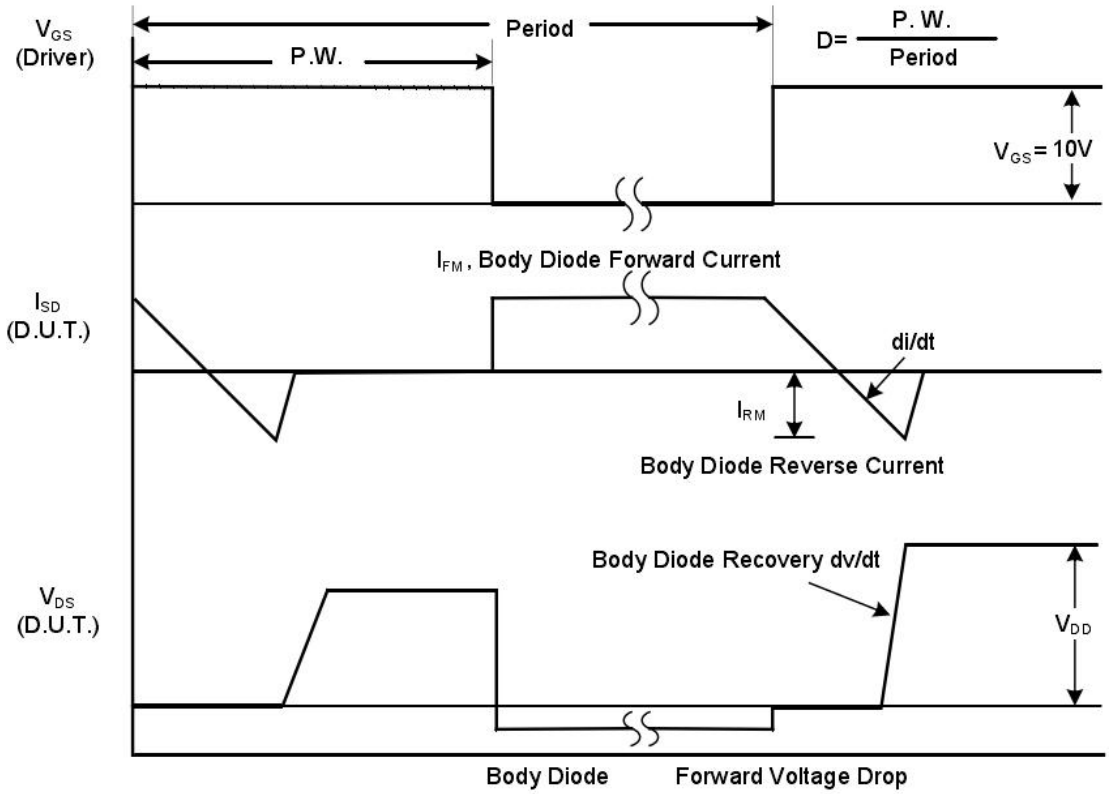
**Notes**

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. L=10mH,$I_{AS}$=13A , starling $T_J$=25℃.
3. $I_{SD}$=10A,dI/dt≤100A/us,$V_{DD}$≤$BV_{DSS}$,starting $T_J$=25℃,Pulse width≤300us;duty cycle≤2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.

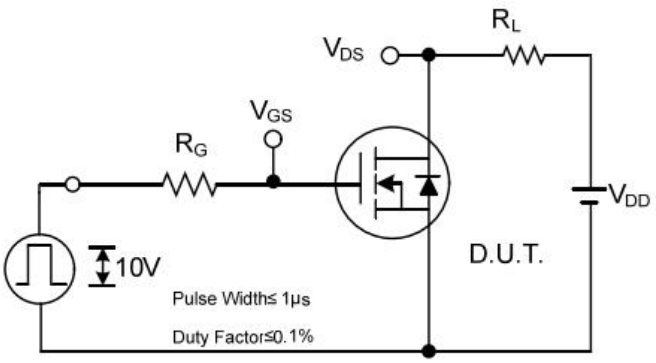
## TEST CIRCUIT AND WAVEFORM



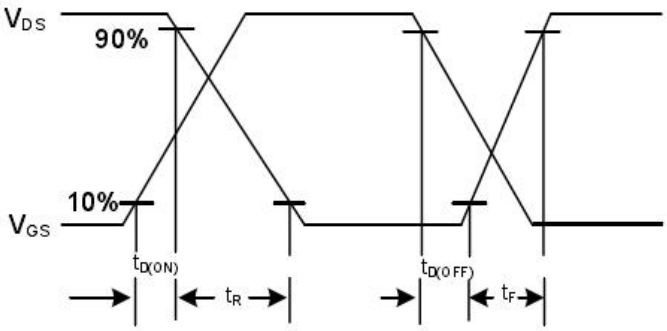

**Peak Diode Recovery dv/dt Test Circuit**



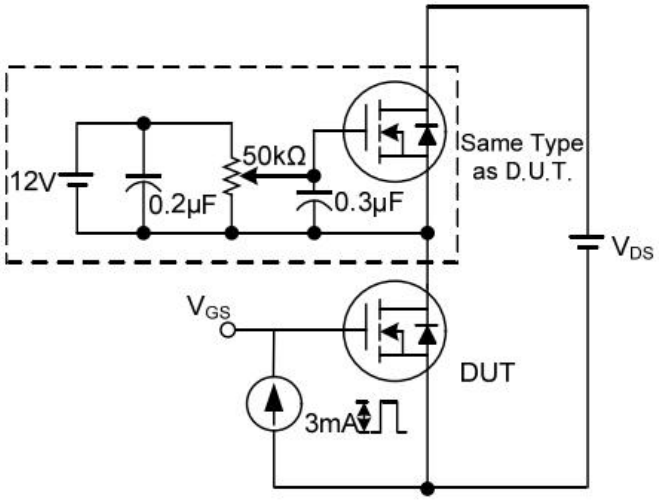

**Peak Diode Recovery dv/dt Waveforms**



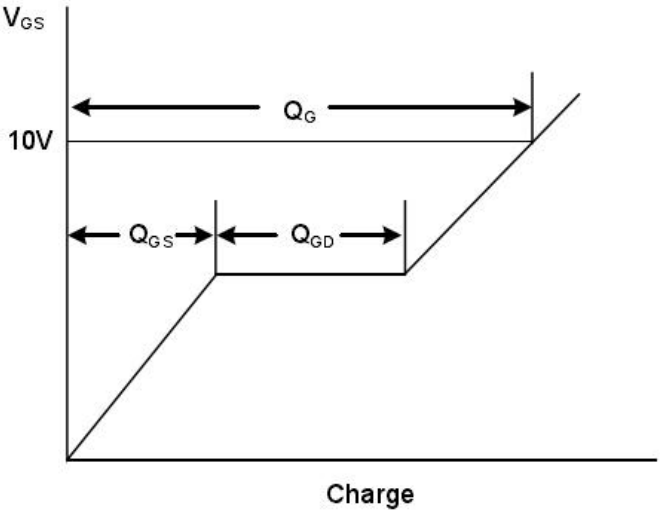

**Switching Test Circuit**



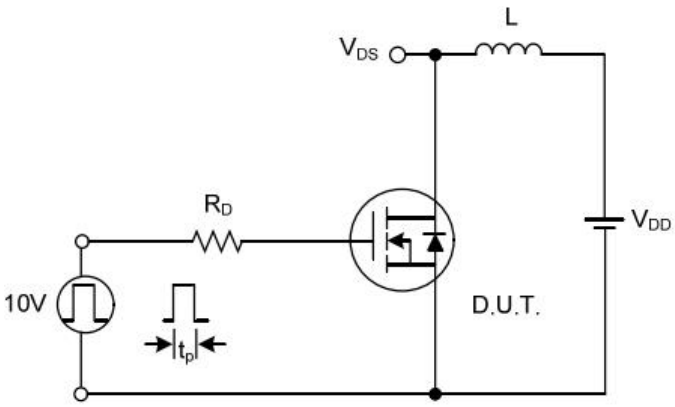

**Switching Waveforms**



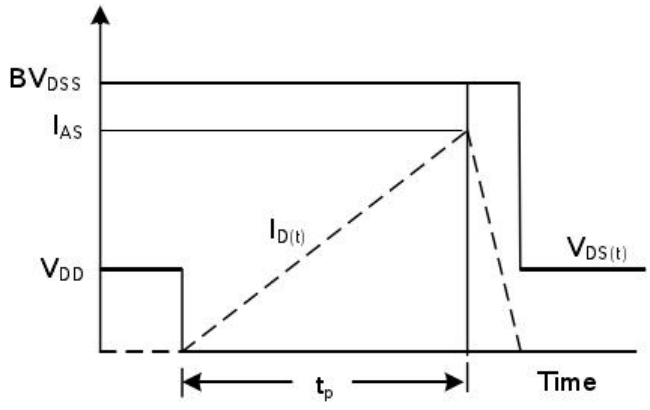

**Gate Charge Test Circuit**




**Gate Charge Waveform**

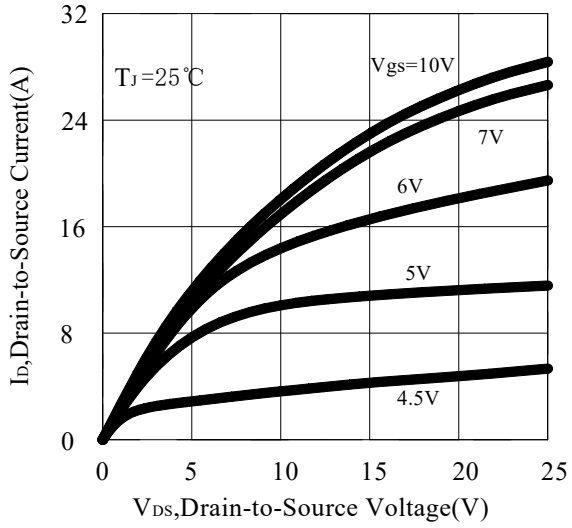


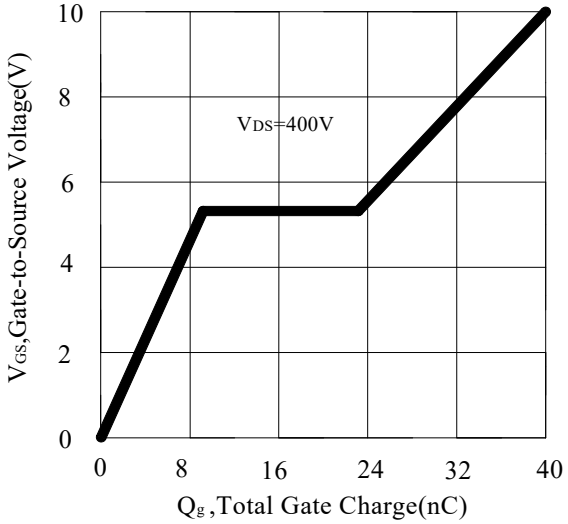

**Unclamped Inductive Switching Test Circuit**

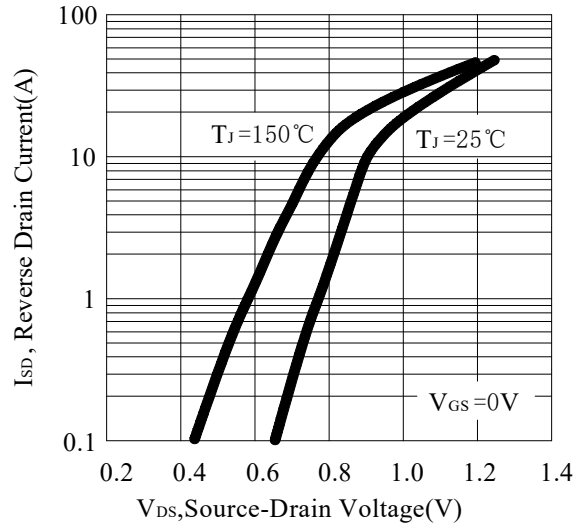


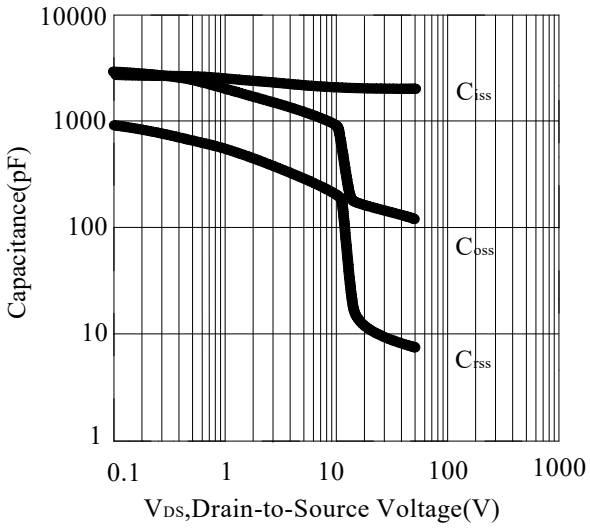

**Unclamped Inductive Switching Waveforms**

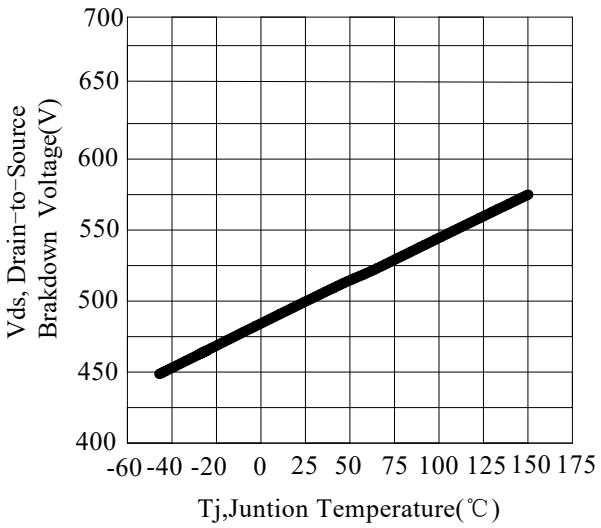
## RATINGAND CHARACTERISTIC CURVES

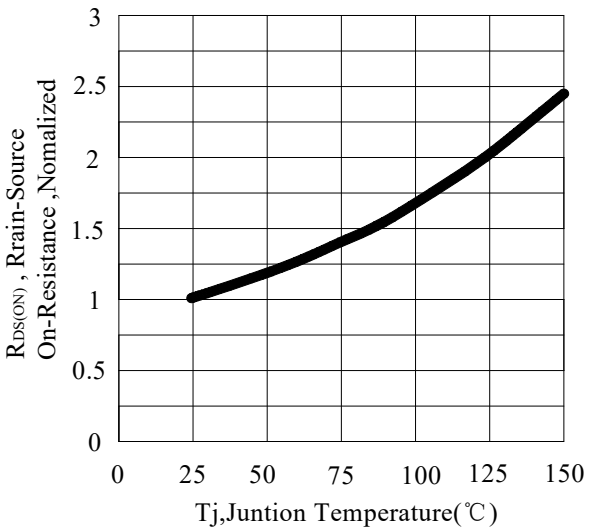


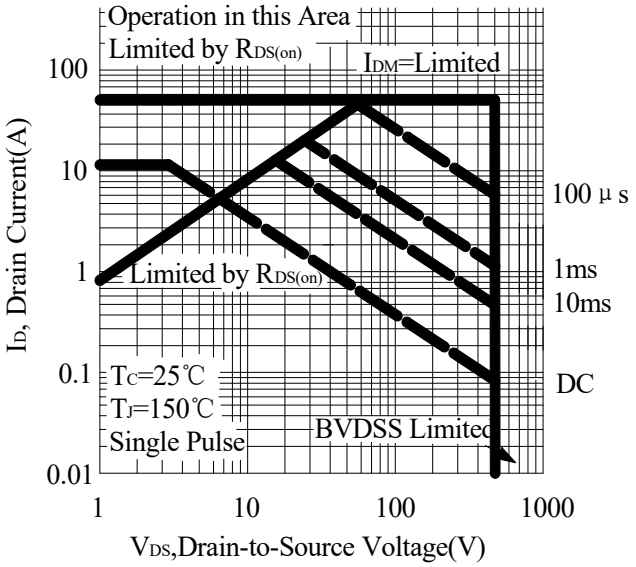



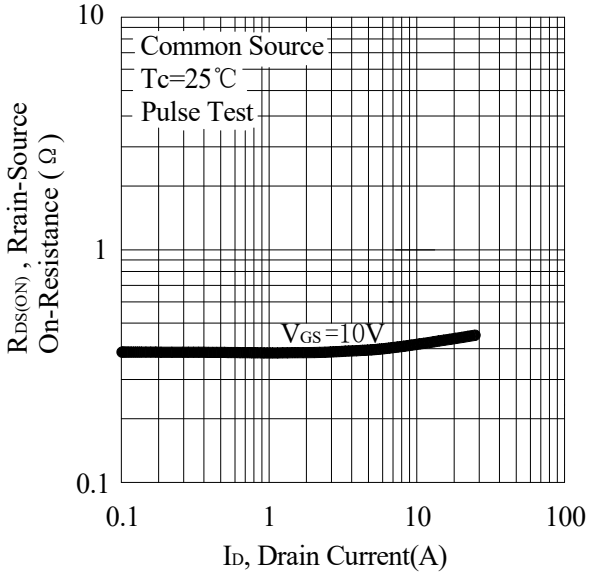



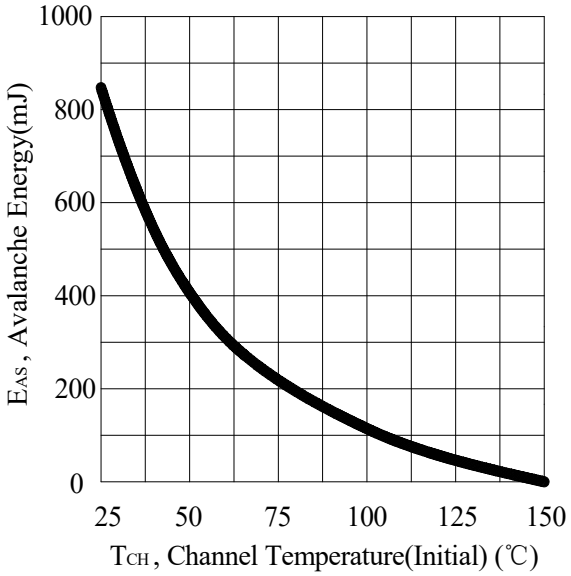



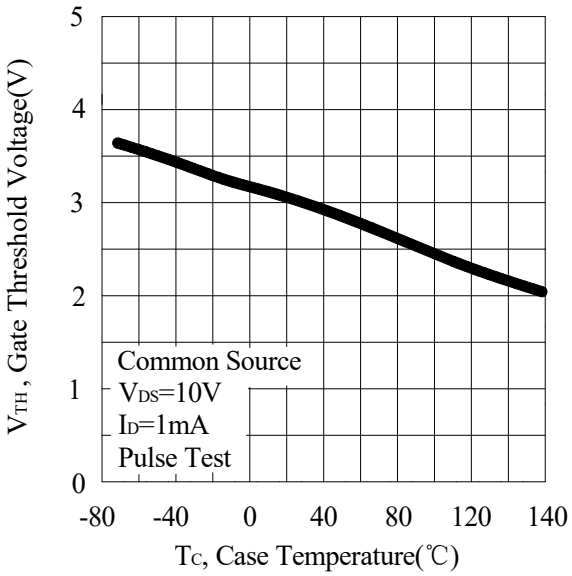



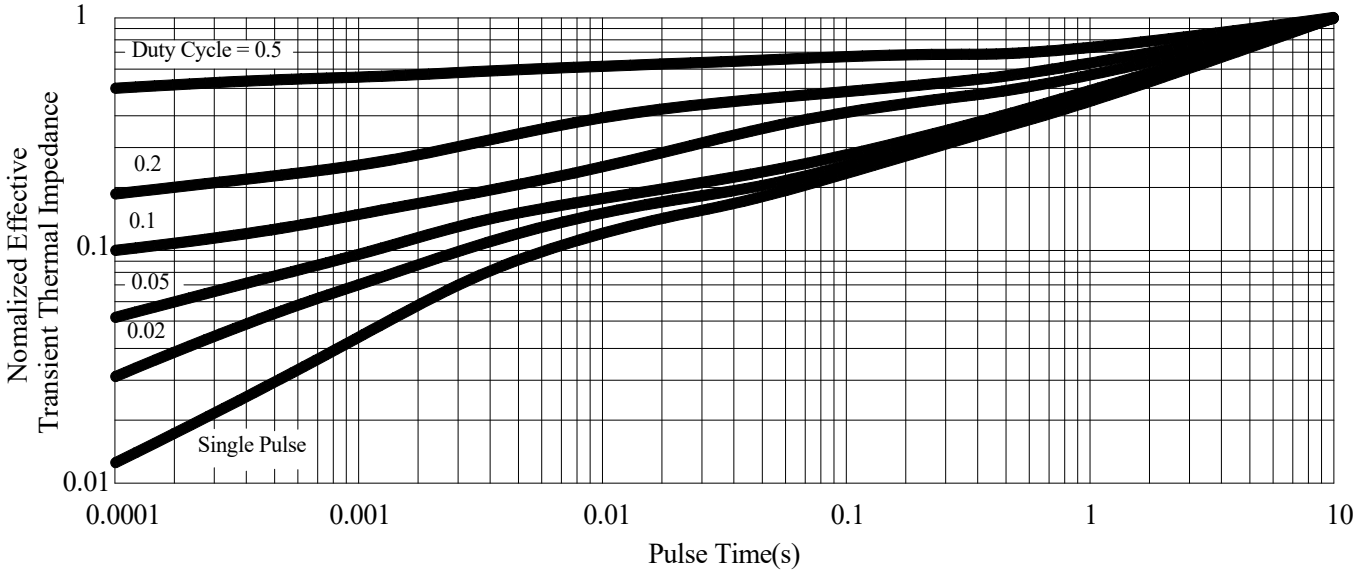




Operation in this Area
Limited by RDS(on)
IDM=Limited
100 μ s
1ms
10ms
DC
Limited by RDS(on)
TC=25℃
TJ=150℃
Single Pulse
BVDSS Limited
ID, Drain Current(A)
VDS,Drain-to-Source Voltage(V)


Common Source
Tc=25℃
Pulse Test
VGS =10V
RDS(ON) , Rrain-Source On-Resistance ( Ω)
ID, Drain Current(A)

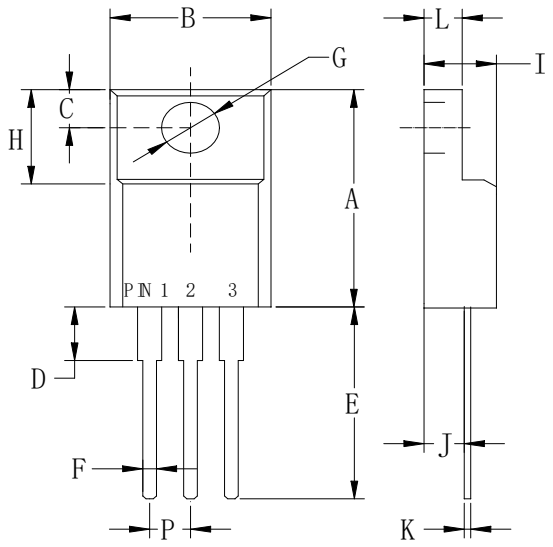

EAS , Avalanche Energy(mJ)
TCH , Channel Temperature(Initial) (℃)


Common Source
VDS=10V
ID=1mA
Pulse Test
VTH , Gate Threshold Voltage(V)
TC, Case Temperature(℃)


Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Nomalized Effective Transient Thermal Impedance
Pulse Time(s)

# 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) |

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** MOSFET ***category:***

***Click to view products by*** Pingwei ***manufacturer:***

Other Similar products are found below :

IRFD120 JANTX2N5237 2SK2267(Q) BUK455-60A/B TK100A10N1,S4X(S MIC4420CM-TR VN1206L NDP4060 SI4482DY IRS2092STRPBF-EL IPS70R2K0CEAKMA1 TK31J60W5,S1VQ(O TK31J60W,S1VQ(O TK16J60W,S1VQ(O 2SK2614(TE16L1,Q) DMN1017UCP3-7 EFC2J004NUZTDG P85W28HP2F-7071 DMN1053UCP4-7 NTE2384 DMC2700UDMQ-7 DMN2080UCB4-7 DMN61D9UWQ-13 US6M2GTR DMN31D5UDJ-7 DMP22D4UFO-7B IPS60R3K4CEAKMA1 DMN1006UCA6-7 DMN16M9UCA6-7 STF5N65M6 IRF40H233XTMA1 STU5N65M6 DMN6022SSD-13 DMN13M9UCA6-7 DMTH10H4M6SPS-13 IPS60R360PFD7SAKMA1 DMN2990UFB-7B SSM3K35CT,L3F IPLK60R1K0PFD7ATMA1 2N7002W-G MCAC30N06Y-TP IPWS65R035CFD7AXKSA1 MCQ7328-TP SSM3J143TU,LXHF DMN12M3UCA6-7 PJMF280N65E1_T0_00201 PJMF380N65E1_T0_00201 PJMF280N60E1_T0_00201 PJMF600N65E1_T0_00201 PJMF900N65E1_T0_00201