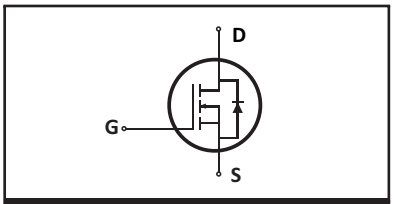
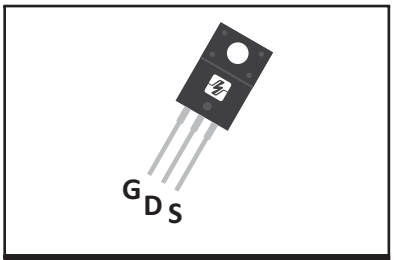
N-CHANNEL POWER MOSFET



SCHEMATIC SYMBOL



TO-220F PACKAGE

DESCRIPTION

This MOSFET is produced with advanced VDMOS technology of SEMIWILL. This technology enable power MOSFET to have better characteristics , such as fast switching time , low on resistance, low gate charge and especially excellent avalanche characteristics . This power MOSFET is usually used at high efficient DC to DC converter block and SMPS. It's typical application is TV and monitor.

FEATURES

- High ruggedness
- $R_{DS(ON)}$(Max. 1.8Ω)@V_{GS}=10V
- Gate Charge (Typ.26nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to Source Voltage	900	V
I_D	Continuous Drain Current (@T_C=25 °C)	7.0	A
	Continuous Drain Current (@T_C=100 °C)	4.4	A
I_{DM}	Drain current pulsed (note 1)	28	A
V_{GS}	Gate to Source Voltage	±30	V
E_{AS}	Single pulsed Avalanche Energy (note 2)	780	mJ
E_{AR}	Repetitive Avalanche Energy (note 1)	21	mJ
dv/dt	Peak diode Recovery dv/dt (note 3)	4.0	V/ns
P_D	Total power dissipation (@T_C=25 °C)	32	W
	Derating Factor above 25°C	0.8	W/°C
T_{STG} , T_J	Operating Junction Temperature & Storage Temperature	-55 ~ + 150	°C
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300	°C

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	3.87	°C/W
R_{thja}	Thermal resistance, Junction to ambient	62.5	

ELECTRICAL CHARACTERISTIC (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V,I_D=250uA	900	-	-	V
I_{DSS}	Drain to source leakage current	V_{DS}=800V,V_{GS}=0V	-	-	10	uA
		V_{DS}=640V,T_C=125°C	-	-	100	uA
I_{GSS}	Gate to source leakage current, forward	V_{DS}=30V,V_{GS}=0V	-	-	100	nA
	Gate to source leakage current, reverse	V_{DS}=-30V,V_{GS}=0V	-	-	-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS},I_D=250uA	3.0	-	5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V,I_D=1.5A	-	-	1.8	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V,V_{DS}=25V,f=1MHz	-	1440	1880	pF
C_{oss}	Output capacitance		-	140	185	
C_{rss}	Reverse transfer capacitance		-	17	23	
$t_{d(on)}$	Turn on delay time	V_{DS}=400V,I_D=3.0A,R_G=25ohm (note 4,5)	-	35	80	ns
tr	Rising time		-	80	170	
$t_{d(off)}$	Turn off delay time		-	95	200	
t_f	Fall time		-	55	120	
Q_g	Total gate charge	V_{DS}=640V,V_{GS}=10V,I_D=3.0A (note 4,5)	-	40	52	nC
Q_{gs}	Gate -source charge		-	8.5	-	
Q_{gd}	Gate -drain charge		-	20	-	

SOURCE TO DRAIN DIODE RATINGS CHARACTERISTICS

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET	-	-	6.4	A
I_{SM}	Pulsed source current		-	-	25.6	A
V_{SD}	Diode forward voltage drop.	I_S=3.0A, V_{GS}=0V	-	-	1.4	V
T_{rr}	Reverse recovery time	I_S=3.0A, V_{GS}=0V dIF/dt=100A/us	-	400	-	ns
Q_{rr}	Breakdown voltage temperature		-	4.3	-	uC

Notes

1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 67mH, I_{AS}= 3.0A, V_{DD}= 50V, R_G=25Ω, Starting T_J= 25 ℃
3. I_{SD}≤ 3.0A, di/dt = 200A/us, V_{DD}≤ BV_{DSS}, Staring T_J=25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. Gate charge test circuit & waveform

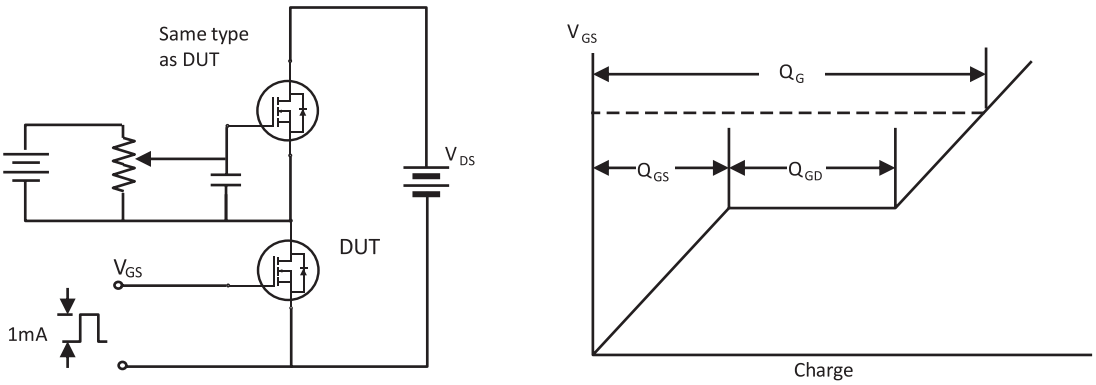


Fig. 2. Switching time test circuit & waveform

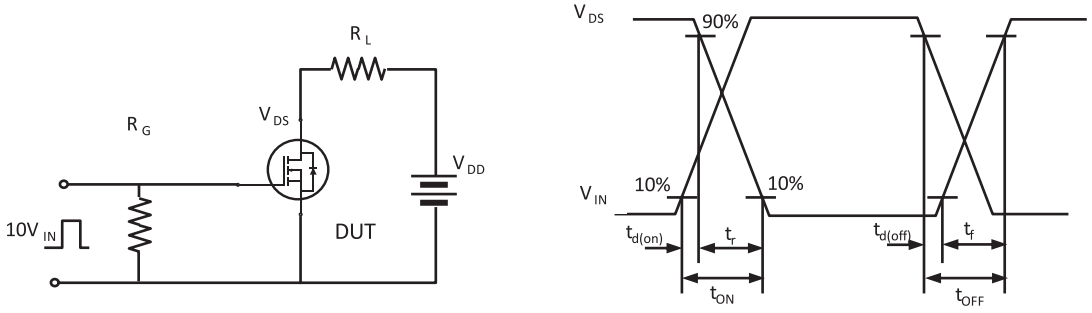


Fig. 3. Unclamped Inductive switching test circuit & waveform

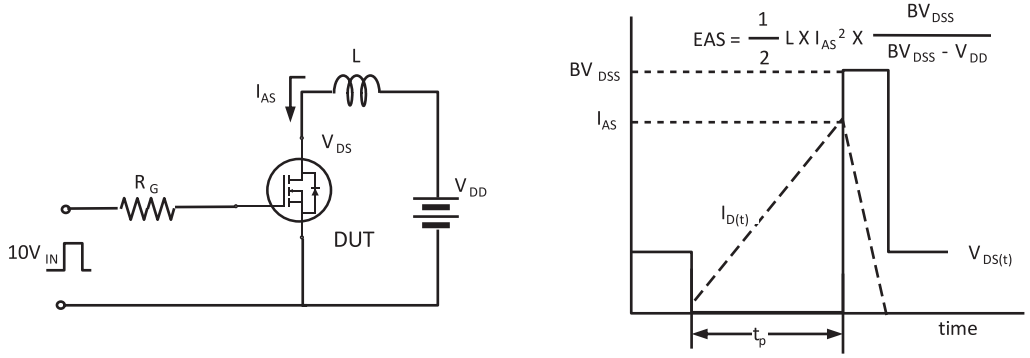
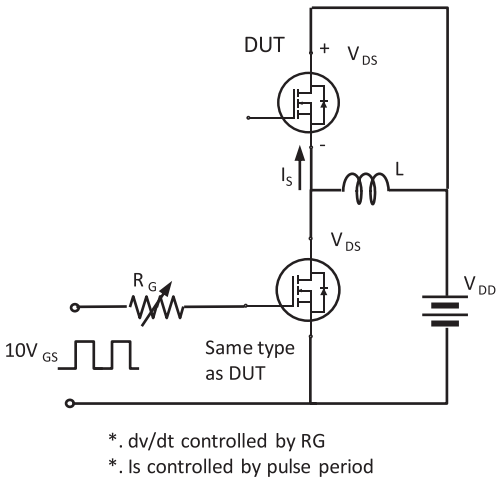
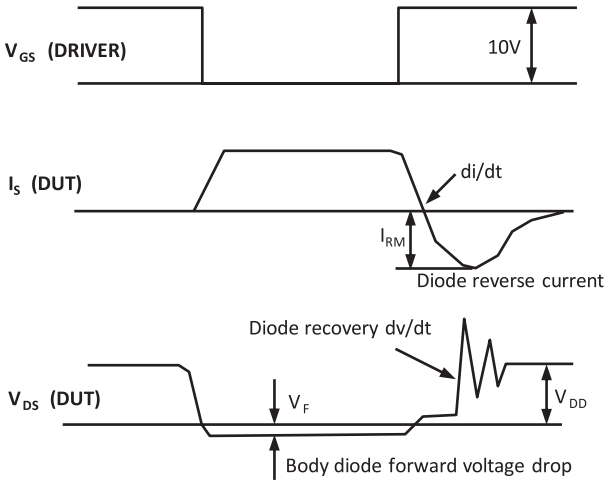


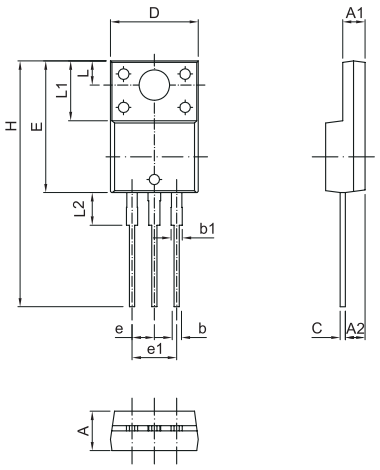
Fig. 4. Peak diode recovery dv/dt test circuit & waveform





PACKAGE DIMENSIONS

TO-220F



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.60	2.80	0.102	0.110
A2	2.45	2.55	0.096	0.100
b	0.50	0.75	0.020	0.030
b1	1.10	1.40	0.043	0.055
C	0.50	0.70	0.020	0.028
D	9.70	10.30	0.382	0.406
E	14.70	15.30	0.579	0.602
e	2.54TYP		0.10TYP	
e1	4.88	5.28	0.192	0.208
H	27.40	28.60	1.079	1.126
L	2.50	3.00	0.098	0.118
L1	6.70	6.90	0.264	0.272
L2	3.60	3.80	0.142	0.150

CONTACT US

Headquarters
A Building Caohejing I&E Park
Pujiang Minhang Shanghai
China

Web
http://www.semiwill.com

By Telephone
General: 86-21-34637654
Sales: 86-21-34637458
Customer Service: 86-21-34637172

By Email
Sales: sales@semiwill.com
Customer Service: cs@semiwill.com
Technical Support: fae@semiwill.com

By Fax
General: 86-21-34637173
Sales:86-21-39650654