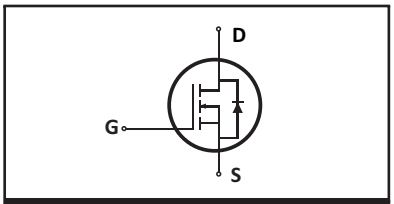
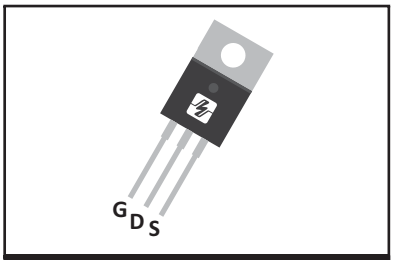
N-CHANNEL POWER MOSFET



SCHEMATIC SYMBOL



TO-220 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. 0.008Ω)@V_{GS}=10V
- Gate Charge (Typ.126nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to Source Voltage	75	V
I_D	Continuous Drain Current (@T_C=25 °C)	75	A
	Continuous Drain Current (@T_C=100 °C)	70	A
I_{DM}	Drain current pulsed (note 1)	280	A
V_{GS}	Gate to Source Voltage	±20	V
E_{AS}	Single pulsed Avalanche Energy (note 2)	1674	mJ
E_{AR}	Repetitive Avalanche Energy (note 1)	45	mJ
dv/dt	Peak diode Recovery dv/dt (note 3)	7	V/ns
P_D	Total power dissipation (@T_C=25 °C)	312	W
	Derating Factor above 25°C	2.5	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	0.4	°C/W
R_{thja}	Thermal resistance, Junction to ambient	60	

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	75	-	-	V
I_{DSS}	Drain to source leakage current	V_{DS}=75V,V_{GS}=0V	-	-	1	uA
		V_{DS}=75V,T_C=125°C	-	-	20	uA
I_{GSS}	Gate to source leakage current, forward	V_{DS}=20V,V_{GS}=0V	-	-	100	nA
	Gate to source leakage current, reverse	V_{DS}=-20V,V_{GS}=0V	-	-	-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS},I_D=250uA	2.0	-	4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V,I_D=40A			0.008	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V,V_{DS}=25V,f=1MHz	-	960	1260	pF
C_{oss}	Output capacitance		-	110	135	
C_{rss}	Reverse transfer capacitance		-	15	18	
$t_{d(on)}$	Turn on delay time	V_{DS}=37.5V,I_D=75A,R_G=25ohm (note 4,5)	-	37	80	ns
tr	Rising time		-	67	100	
$t_{d(off)}$	Turn off delay time		-	72	150	
t_f	Fall time		-	30	80	
Q_g	Total gate charge	V_{DS}=60V,V_{GS}=10V,I_D=75A (note 4,5)	-	126	180	nC
Q_{gs}	Gate -source charge		-	46	-	
Q_{gd}	Gate -drain charge		-	47	-	

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	-	-	75	A
I_{SM}	Pulsed source current		-	-	300	A
V_{SD}	Diode forward voltage drop.	I_S=75A, V_{GS}=0V	-	-	1.2	V
T_{rr}	Reverse recovery time	I_S=75A, V_{GS}=0V dI$_F$/d$_t$=100A/us	-	36.5	-	ns
Q_{rr}	Breakdown voltage temperature		-	52	-	nC

Notes

1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 0.36mH, I_{AS}= 75A, V_{DD}= 50V, R_G=25Ω, Starting T_J= 25°C
3. I_{SD}≤ 75A, di/dt = 100A/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

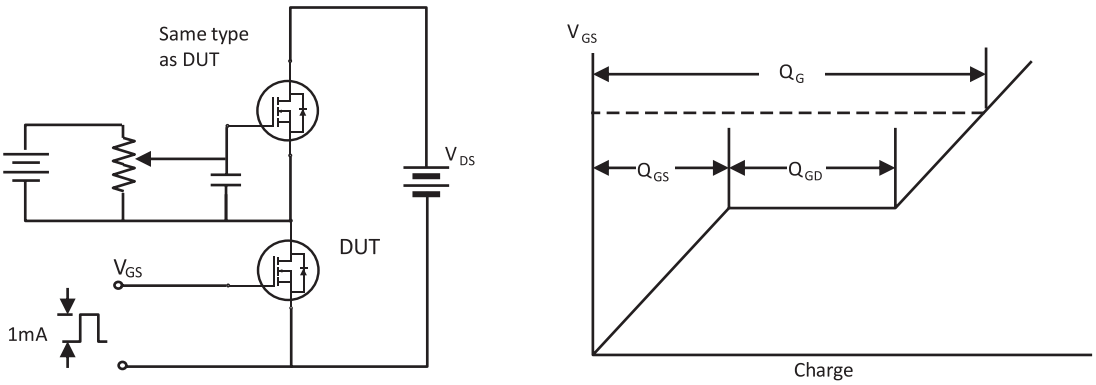


Fig. 2. Switching time test circuit & waveform

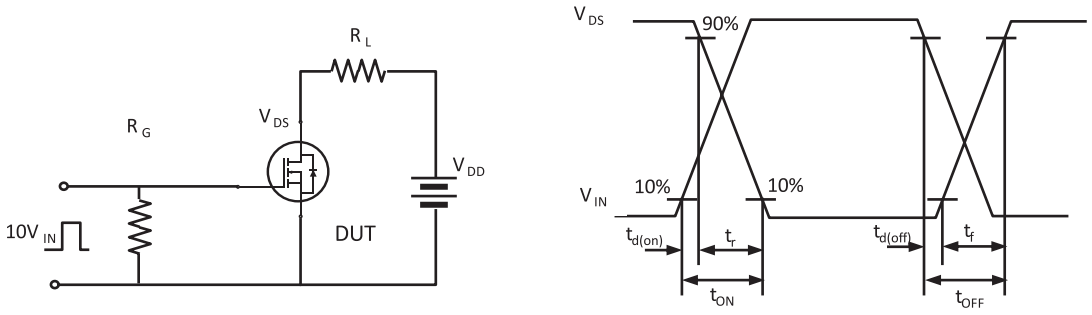


Fig. 3. Unclamped Inductive switching test circuit & waveform

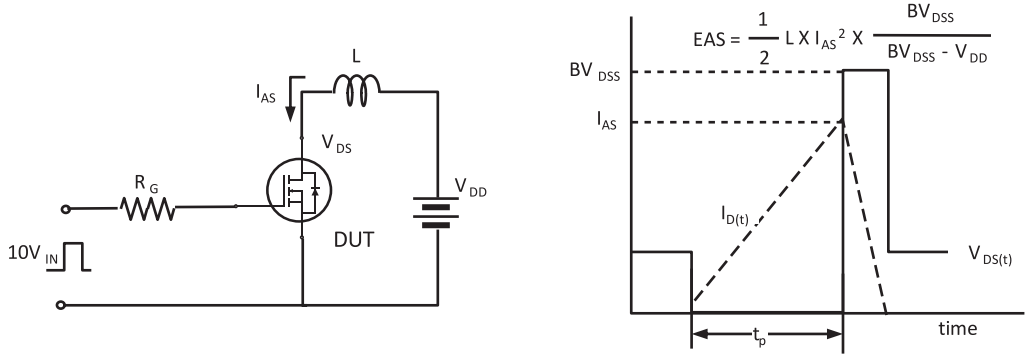
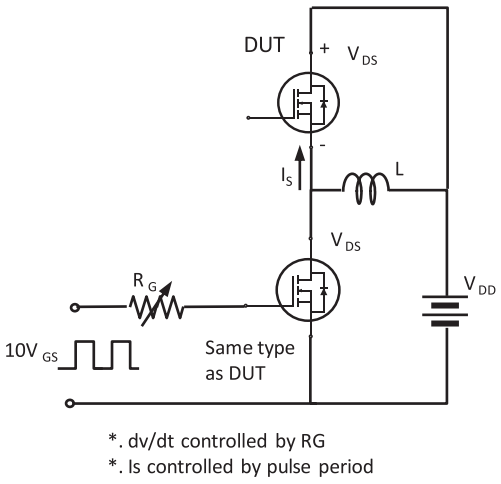
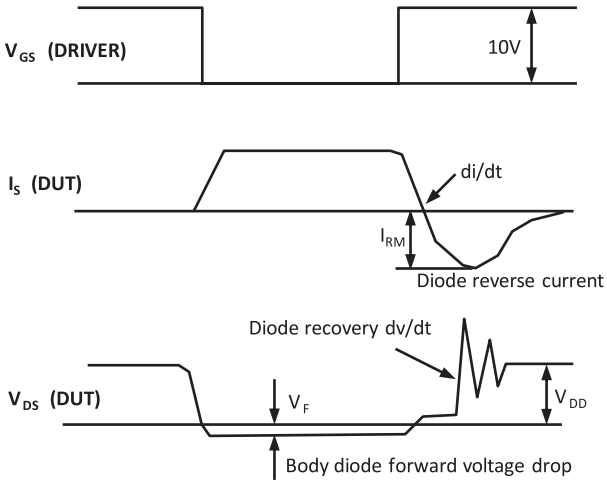


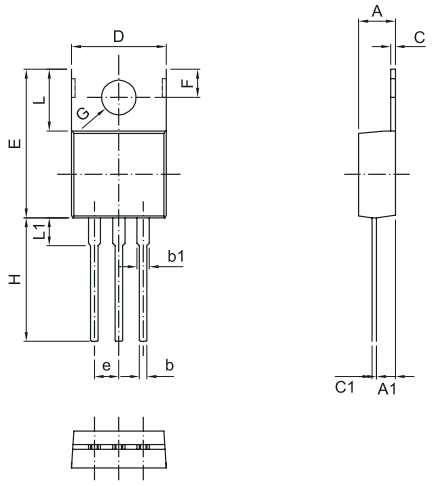
Fig. 4. Peak diode recovery dv/dt test circuit & waveform





PACKAGE DIMENSIONS

TO-220AB



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.56	4.83	0.140	0.190
A1	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b1	1.14	1.78	0.045	0.070
C	0.51	1.40	0.020	0.055
C1	0.36	0.61	0.014	0.024
D	9.65	10.67	0.380	0.420
E	14.22	16.51	0.560	0.650
e	2.54BSC		0.10BSC	
F	2.54	3.05	0.100	0.120
G	3.53	3.90	0.139	0.154
H	12.70	14.73	0.500	0.580
L	5.84	6.86	0.230	0.270
L1	-	6.35	-	0.250

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