

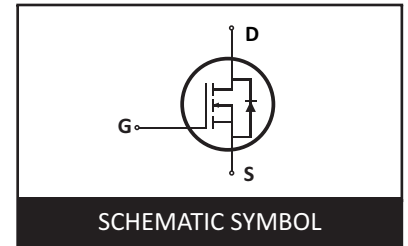
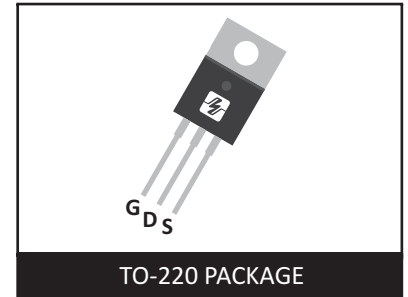
# N-CHANNEL POWER MOSFET

## 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. 0.008 $\Omega$ )@ $V_{GS}=10V$
- Gate Charge (Typ.126nC)
- Improved dv/dt Capability
- 100% Avalanche Tested


**SCHEMATIC SYMBOL**

**TO-220 PACKAGE**

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain to Source Voltage	75	V
$I_D$	Continuous Drain Current (@ $T_C=25^\circ C$ )	75	A
	Continuous Drain Current (@ $T_C=100^\circ C$ )	70	A
$I_{DM}$	Drain current pulsed (note 1)	280	A
$V_{GS}$	Gate to Source Voltage	$\pm 20$	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 (@ $T_C=25^\circ C$ )	312	W
	Derating Factor above 25 $^\circ C$	2.5	W/ $^\circ C$
$T_{STG}, T_J$	Operating Junction Temperature & Storage Temperature	-55 ~ + 150	$^\circ C$
$T_L$	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300	$^\circ C$

## THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{thjc}$	Thermal resistance, Junction to case	0.4	$^\circ C/W$
$R_{thja}$	Thermal resistance, Junction to ambient	60	

**ELECTRICAL CHARACTERISTIC (  $T_C = 25^\circ\text{C}$  unless otherwise specified )**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
<b>Off characteristics</b>						
$BV_{DSS}$	Drain to source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	75	-	-	V
$I_{DSS}$	Drain to source leakage current	$V_{DS}=75V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=75V, T_C=125^\circ\text{C}$	-	-	20	$\mu A$
$I_{GSS}$	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
<b>On characteristics</b>						
$V_{GS(TH)}$	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	$V_{GS}=10V, I_D=40A$			0.008	$\Omega$
<b>Dynamic characteristics</b>						
$C_{iss}$	Input capacitance	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$	-	960	1260	pF
$C_{oss}$	Output capacitance		-	110	135	
$C_{rss}$	Reverse transfer capacitance		-	15	18	
$t_{d(on)}$	Turn on delay time	$V_{DS}=37.5V, I_D=75A, R_G=25\text{ohm}$ (note 4,5)	-	37	80	ns
$t_r$	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	-	

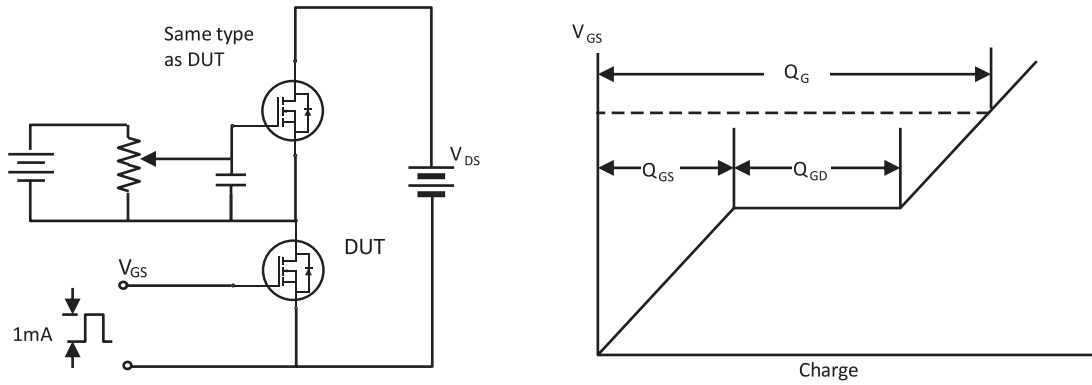
**SOURCE TO DRAIN DIODE RATINGS CHARACTERISTICS**

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	$I_S=75A, V_{GS}=0V$	-	36.5	-	ns
$Q_{rr}$	Breakdown voltage temperature	$di/dt=100A/\mu s$	-	52	-	nC

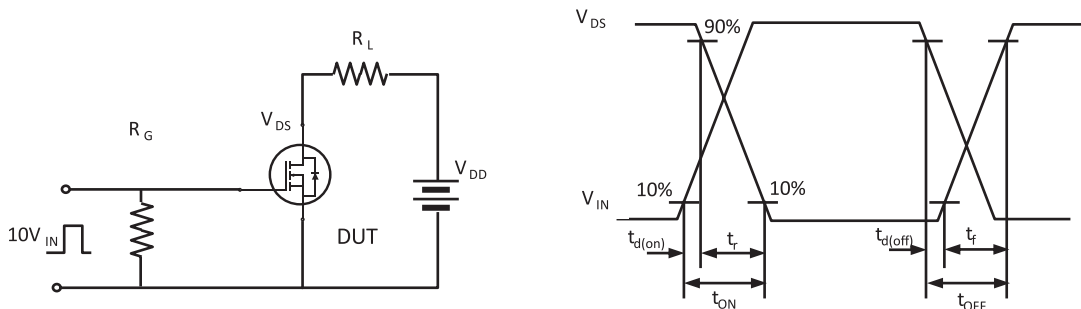
**Notes**

1. Repeattive rating : pulse width limited by junction temperature.
2.  $L = 0.36\text{mH}, I_{AS} = 75A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 75A, di/dt = 100A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
5. Essentially independent of operating temperature.

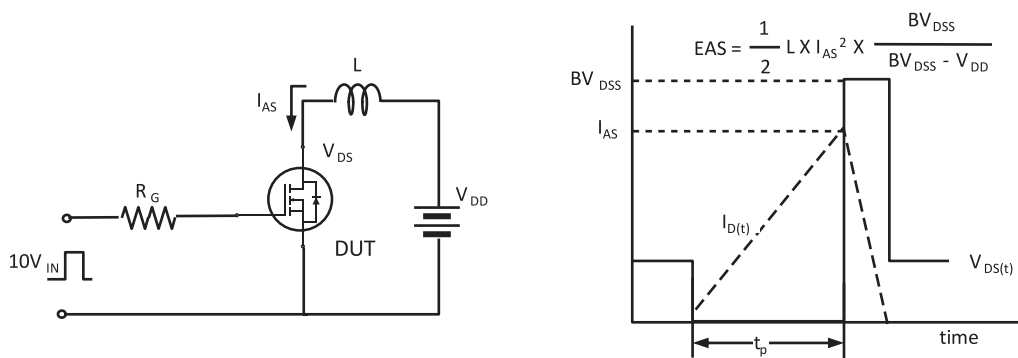
**Fig. 1. Gate charge test circuit & waveform**



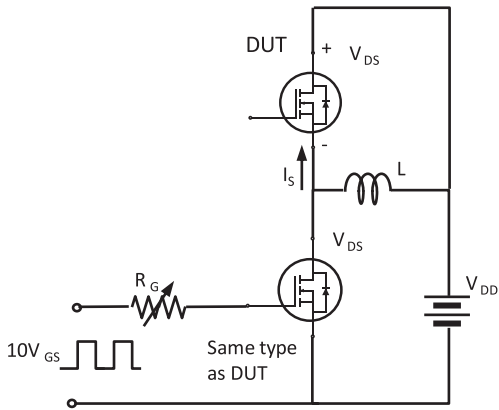
**Fig. 2. Switching time test circuit & waveform**



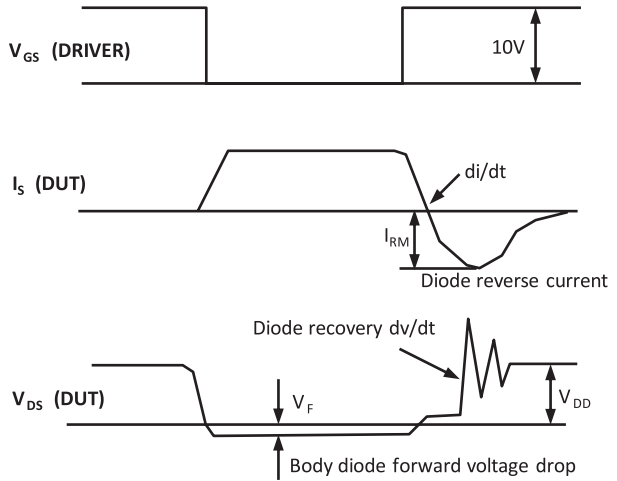
**Fig. 3. Unclamped Inductive switching test circuit & waveform**



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



\*. dv/dt controlled by RG  
 \*. I<sub>S</sub> controlled by pulse period



**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

## 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](mailto:sales@semiwill.com)  
Customer Service: [cs@semiwill.com](mailto:cs@semiwill.com)  
Technical Support: [fae@semiwill.com](mailto:fae@semiwill.com)

### By Fax

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

COPYRIGHT ©SEMIWILL 2009 - This literature is subject to all applicable copyright laws and is not for resale in any manner.

SPECIFICATIONS: SEMIWILL reserves the right to change the electrical and or mechanical characteristics described herein without notice.

DESIGN CHANGES: SEMIWILL reserves the right to discontinue product lines without notice and that the final judgement concerning selection and specifications is the buyer's and that in furnishing engineering and technical assistance. SEMIWILL assumes no responsibility with respect to the selection or specifications of such products. SEMIWILL makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SEMIWILL assume any liability arising out of the application or use of any product or circuit and specifically disclaims any and all liability without limitation special, consequential or incidental damages.

LIFE SUPPORT POLICY: SEMIWILL products are not authorized for use in life support systems without written consent from the factory.