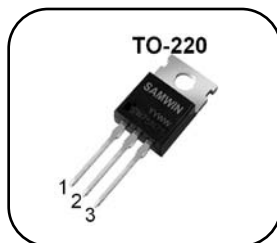


## N-channel MOSFET

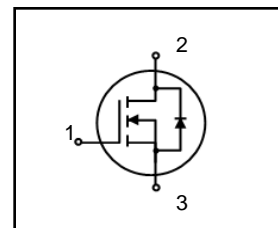
### Features

- High ruggedness
- $R_{DS(ON)}$  (Max 8m  $\Omega$ ) @  $V_{GS}=10V$
- Gate Charge (Typ 126nC)
- Improved dv/dt Capability
- 100% Avalanche Tested



1. Gate 2. Drain 3. Source

$BV_{DSS}$	: 75V
$I_D$	: 75A
$R_{DS(ON)}$	: 8m $\Omega$



### General Description

This power MOSFET is produced with advanced VDMOS technology of SAMWIN. 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 switch mode power supply.

### Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 75N75	SW 75N75	TO-220	TUBE

### 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)	28	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single pulsed Avalanche Energy (note 2)	1004	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	$^\circ C$

\*. Drain current is limited by junction temperature.

### Thermal characteristics

Symbol	Parameter	Value	Unit
$R_{thjc}$	Thermal resistance, Junction to case	0.4	$^\circ C/W$
$R_{thcs}$	Thermal resistance, Case to Sink	0.5	$^\circ C/W$
$R_{thja}$	Thermal resistance, Junction to ambient	60	$^\circ C/W$

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
$\Delta BV_{DSS} / \Delta T_J$	Breakdown voltage temperature coefficient	$I_D=250\mu A$ , referenced to $25^\circ\text{C}$	-	0.07	-	V/ $^\circ\text{C}$
$I_{DSS}$	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	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
	Gate to source leakage current, reverse	$V_{GS}=-20V, V_{DS}=0V$	-	-	-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	$V_{GS}=10V, I_D = 37.5A$		6	8	m $\Omega$
$G_{fs}$	Forward Transconductance	$V_{DS} = 40 V, I_D = 37.5 A$	20			S
<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	$V_{DS}=60V, I_D=75A, R_G=25\Omega$ (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	$V_{DS}=37.5V, V_{GS}=10V, I_D=75A$ (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.	$I_S=75A, V_{GS}=0V$	-	-	1.5	V
$T_{rr}$	Reverse recovery time	$I_S=75A, V_{GS}=0V,$	-	36.5	-	ns
$Q_{rr}$	Breakdown voltage charge	$di_f/dt=100A/\mu s$	-	52	-	nC

## ※. Notes

1. Repetitive 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. On-state characteristics

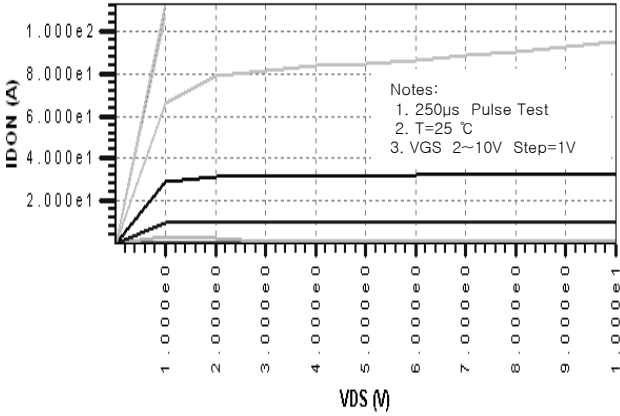


Fig. 2. On-resistance variation vs. drain current and gate voltage

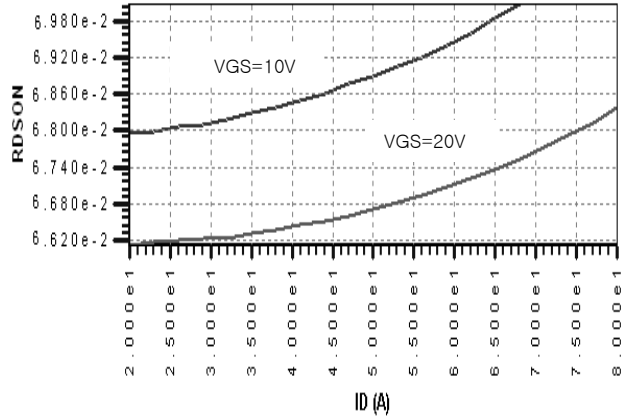


Fig. 3. Gate charge characteristics

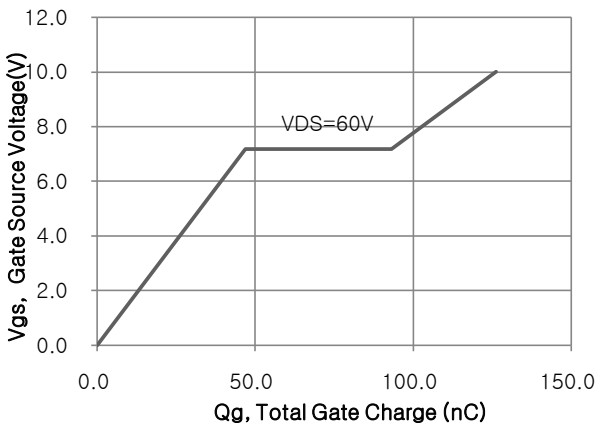


Fig. 4. On state current vs. diode forward voltage

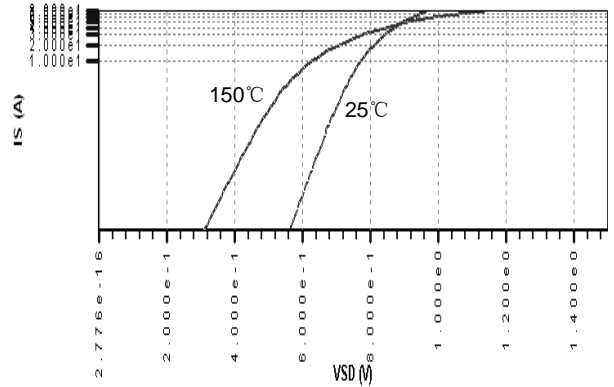


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

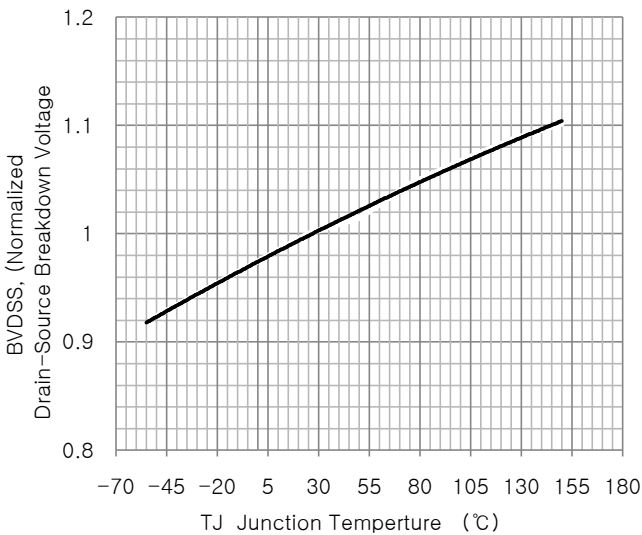


Fig. 6. On resistance variation vs. junction temperature

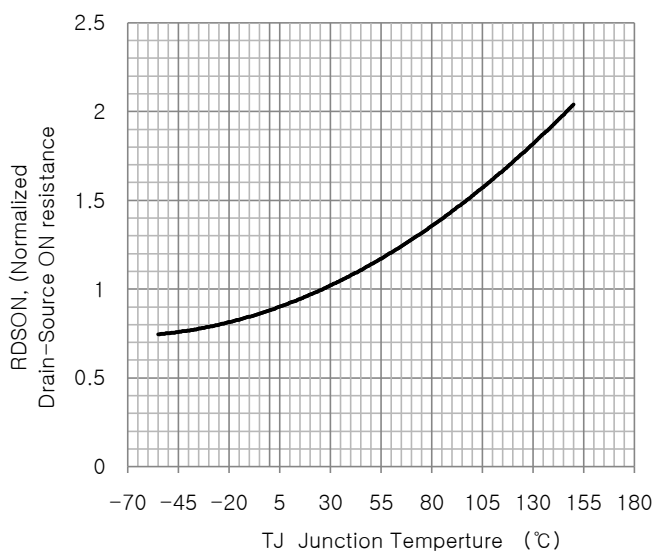


Fig. 7. Maximum safe operating area

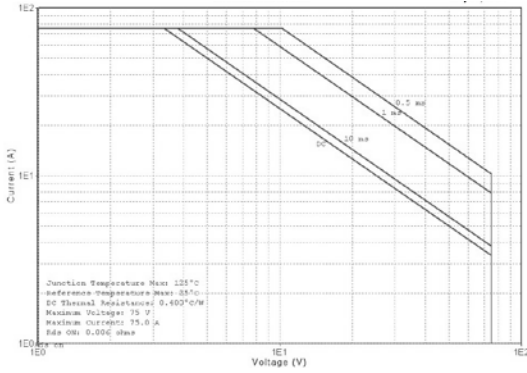


Fig. 8. Transient thermal response curve

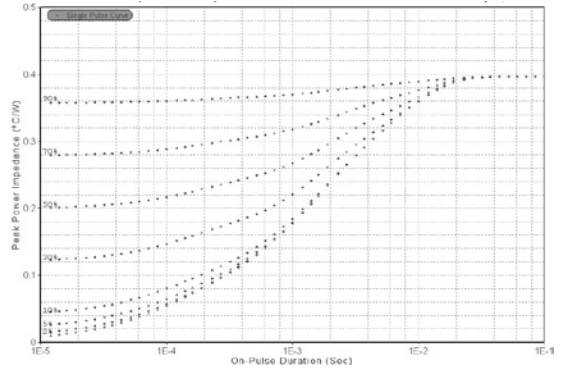


Fig. 9. Gate charge test circuit & waveform

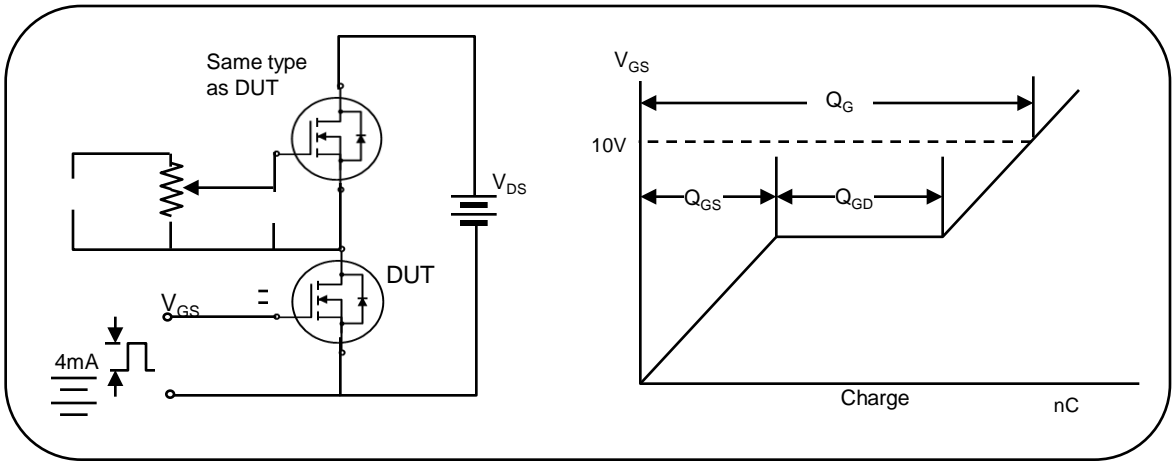


Fig. 10. Switching time test circuit & waveform

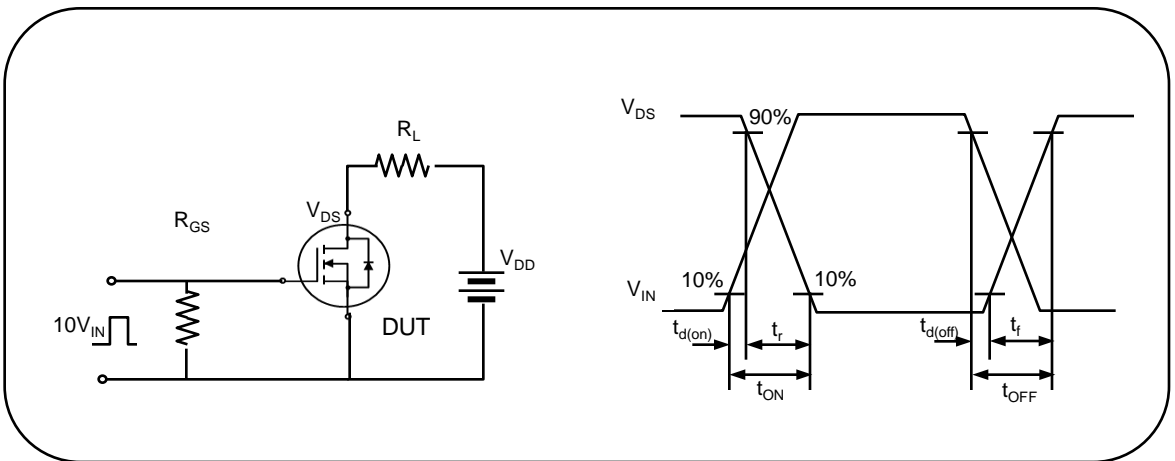


Fig. 11. Unclamped Inductive switching test circuit & waveform

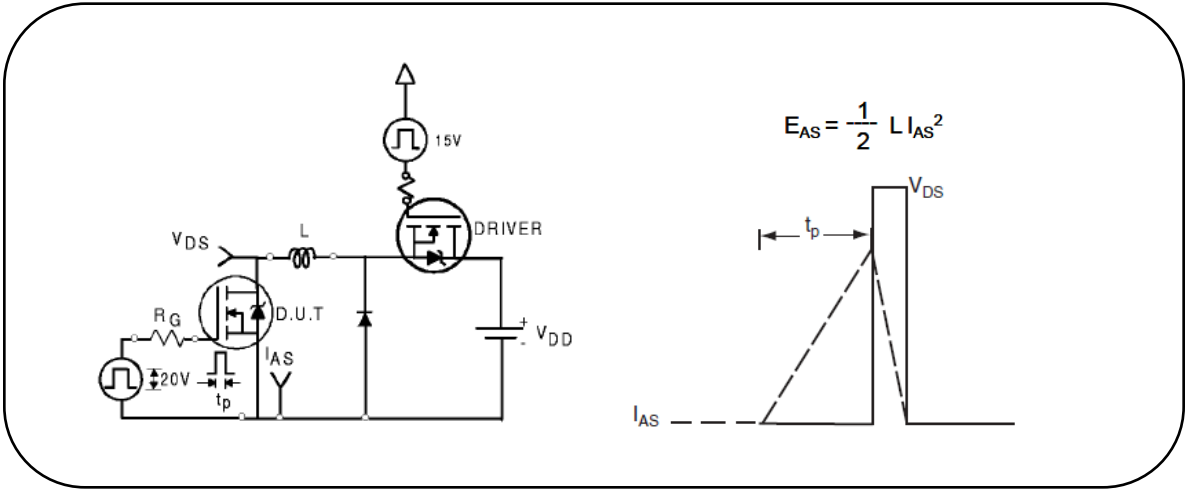


Fig.12 . Peak diode recovery dv/dt test circuit & waveform

