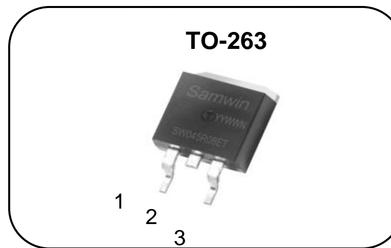
N-channel Enhanced mode TO-263 MOSFET

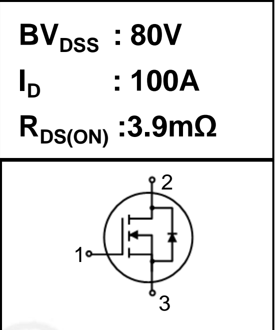
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 3.9mΩ)@V_{GS}=10V
- Low Gate Charge (Typ 139nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Synchronous Rectification, Li Battery Protect Board, Inverter



1. Gate 2. Drain 3. Source

BV_{DSS} : 80V
I_D : 100A
$R_{DS(ON)}$:3.9mΩ



General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW B 045R08ET	SW045R08ET	TO-263	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		80	V
I_D	Continuous drain current (@T_C=25°C)		100*	A
	Continuous drain current (@T_C=100°C)		63*	A
I_{DM}	Drain current pulsed	(note 1)	400	A
V_{GS}	Gate to source voltage		±20	V
E_{AS}	Single pulsed avalanche energy	(note 2)	1511	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	57	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		208	W
	Derating factor above 25°C		1.7	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

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.6	°C/W
R_{thja}	Thermal resistance, Junction to ambient	57	°C/W

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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	80			V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.06		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=80V, V_{GS}=0V			1	uA
		V_{DS}=64V, T_C=125°C			50	uA
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
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=50A		3.9	4.9	mΩ
		V_{GS}=10V, I_D=100A		4.0	5	mΩ
G_{fs}	Forward transconductance	V_{DS}=10V, I_D=30A		102		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		6230		pF
C_{oss}	Output capacitance			854		
C_{rss}	Reverse transfer capacitance			714		
$t_{d(on)}$	Turn on delay time	V_{DS}=40V, I_D=30A, R_G=25Ω, V_{GS}=10V (note 4,5)		79		ns
t_r	Rising time			270		
$t_{d(off)}$	Turn off delay time			279		
t_f	Fall time			248		
Q_g	Total gate charge	V_{DS}=64V, V_{GS}=10V, I_D=30A (note 4,5)		139		nC
Q_{gs}	Gate-source charge			25		
Q_{gd}	Gate-drain charge			61		
R_g	Gate resistance	V_{DS}=0V, Scan F mode		1.8		Ω

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			100	A
I_{SM}	Pulsed source current				400	A
V_{SD}	Diode forward voltage drop.	I_S=100A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=30A, V_{GS}=0V, dI_F/dt=100A/us		58		ns
Q_{rr}	Reverse recovery charge			100		nC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L =3.4mH, I_{AS} =30A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 30A, 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.

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Fig. 1. On-state characteristics

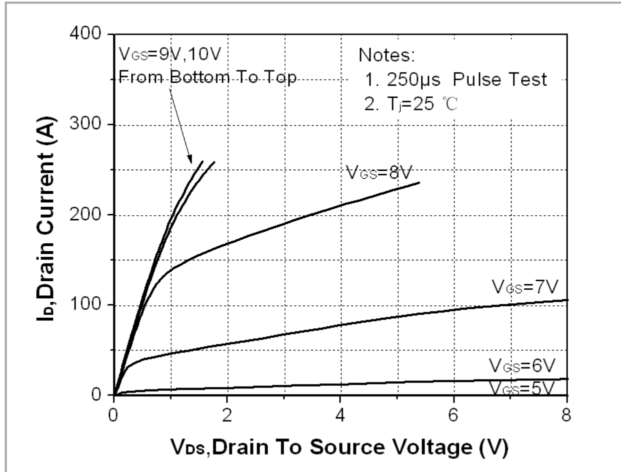

Fig. 2. Transfer characteristics

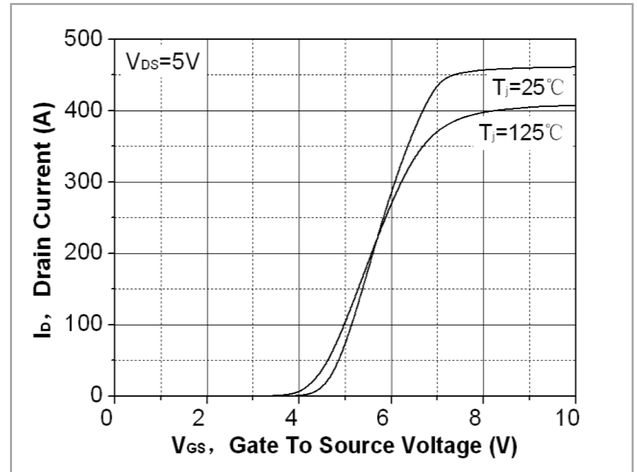

Fig. 3. On-resistance variation vs. drain current and gate voltage

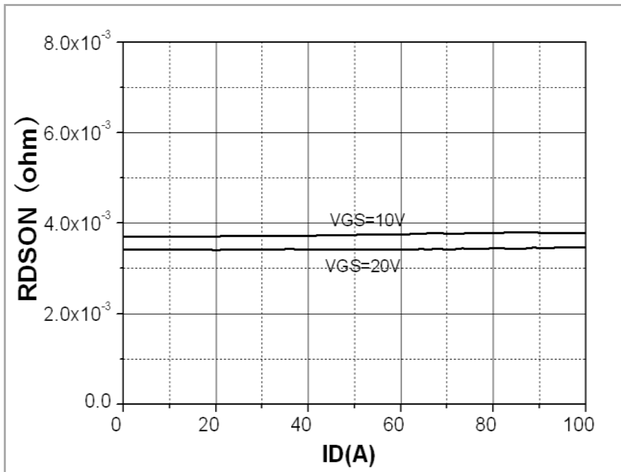

Fig. 4. On-state current vs. diode forward voltage

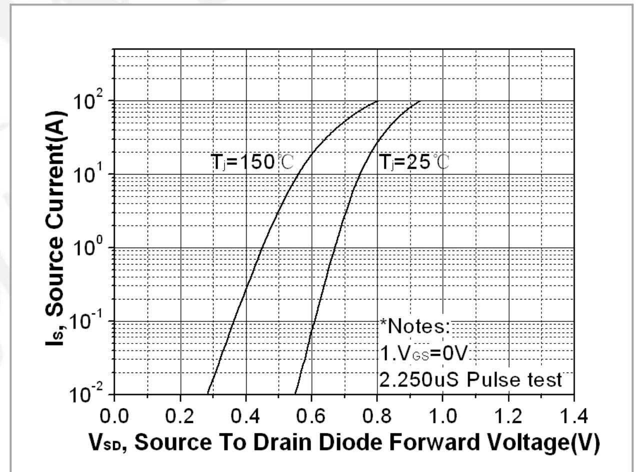

Fig 5. Breakdown voltage variation vs. junction temperature

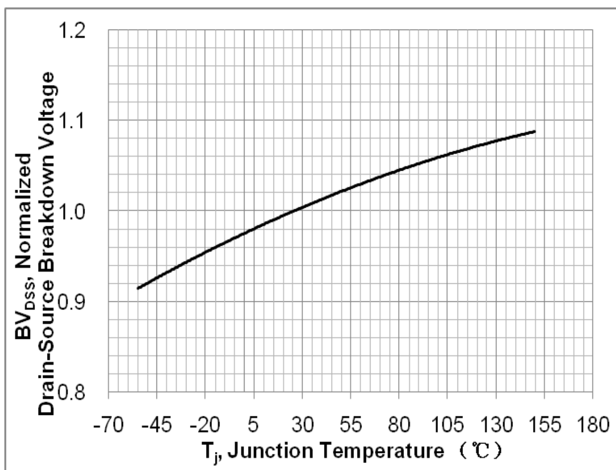

Fig. 6. On-resistance variation vs. junction temperature

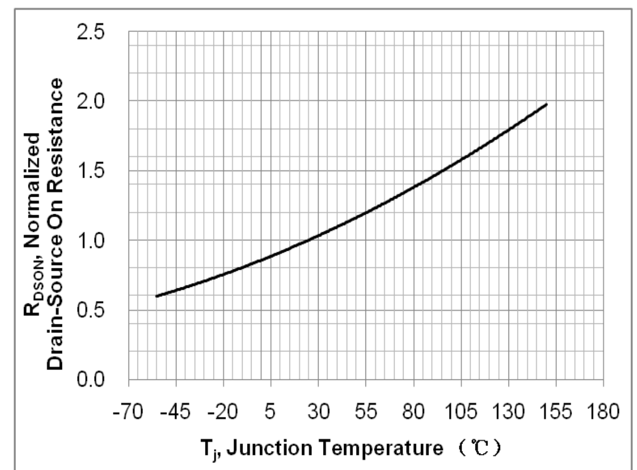

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Fig. 7. Gate charge characteristics

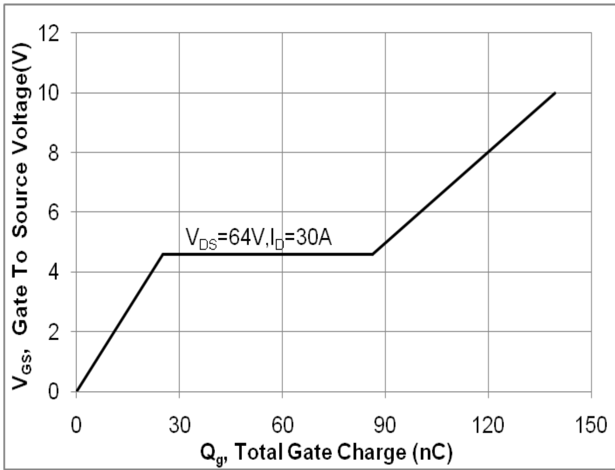

Fig. 8. Capacitance Characteristics

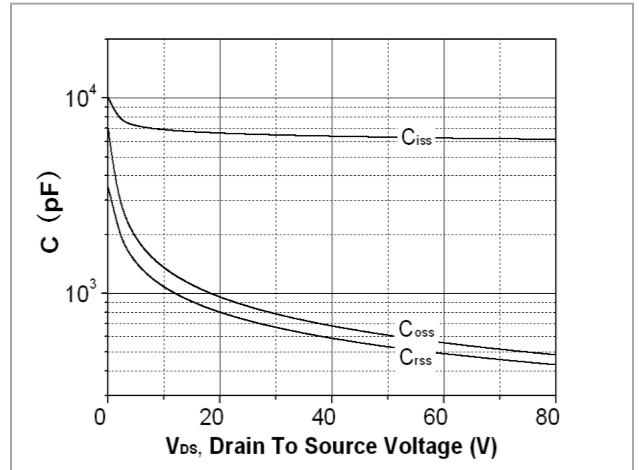

Fig. 9. Maximum safe operating area

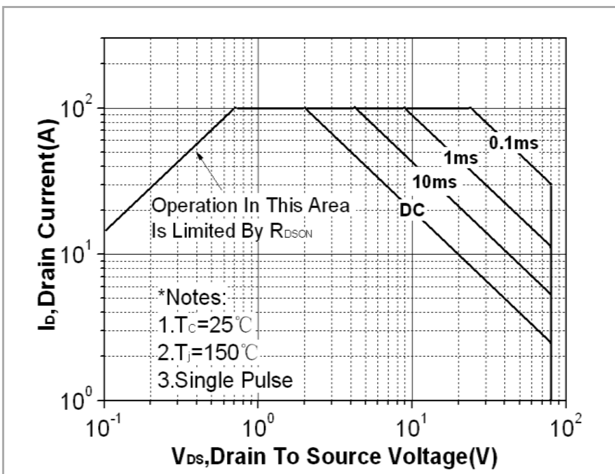

Fig. 10. Transient thermal response curve

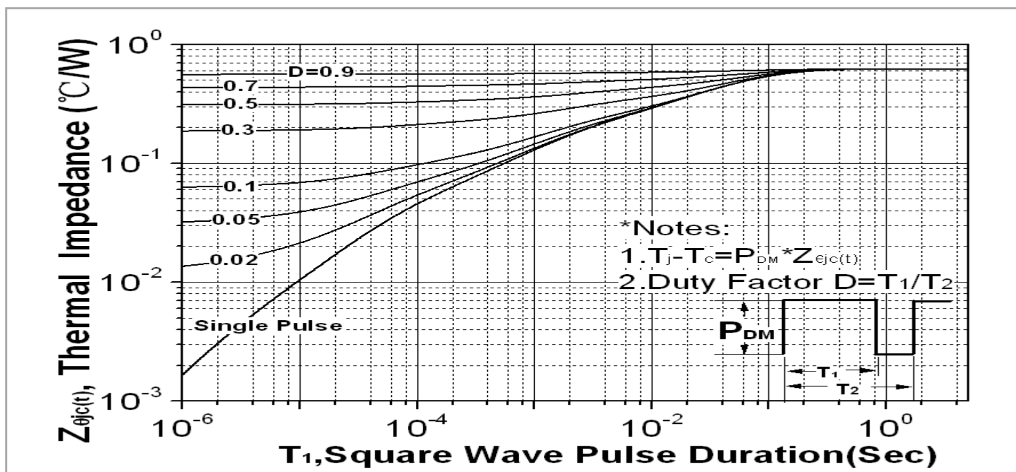

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Fig. 11. Gate charge test circuit & waveform

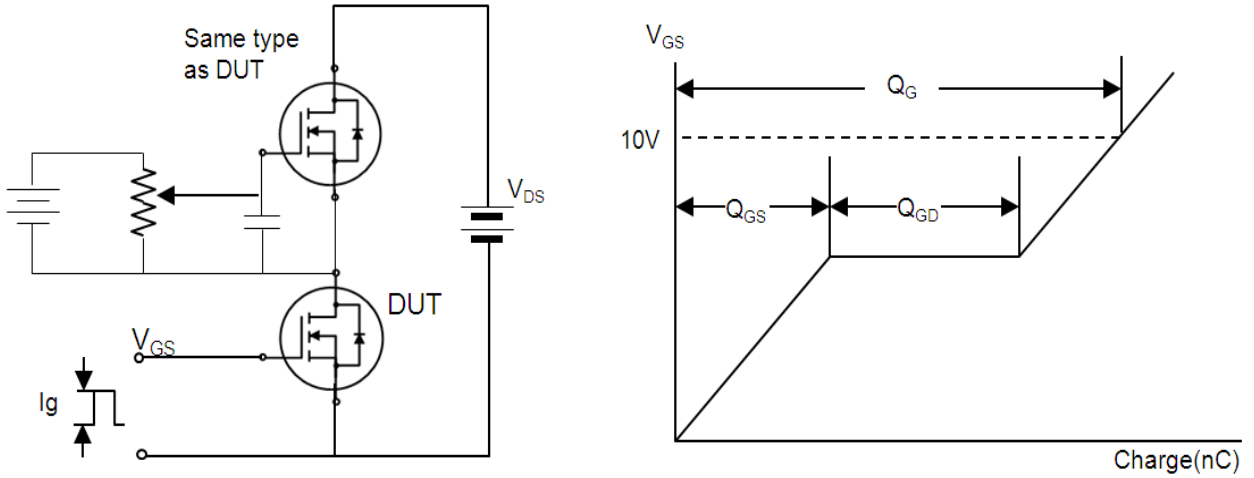


Fig. 12. Switching time test circuit & waveform

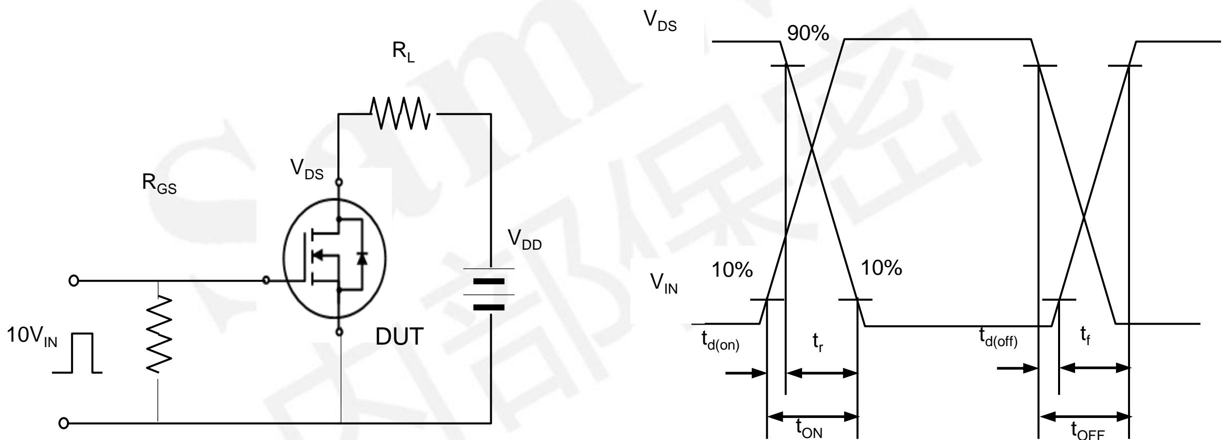
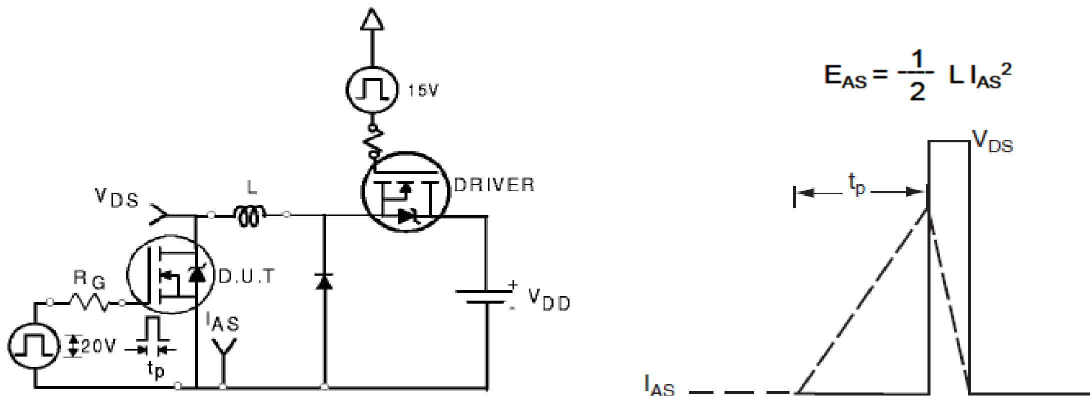


Fig. 13. Unclamped Inductive switching test circuit & waveform



$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

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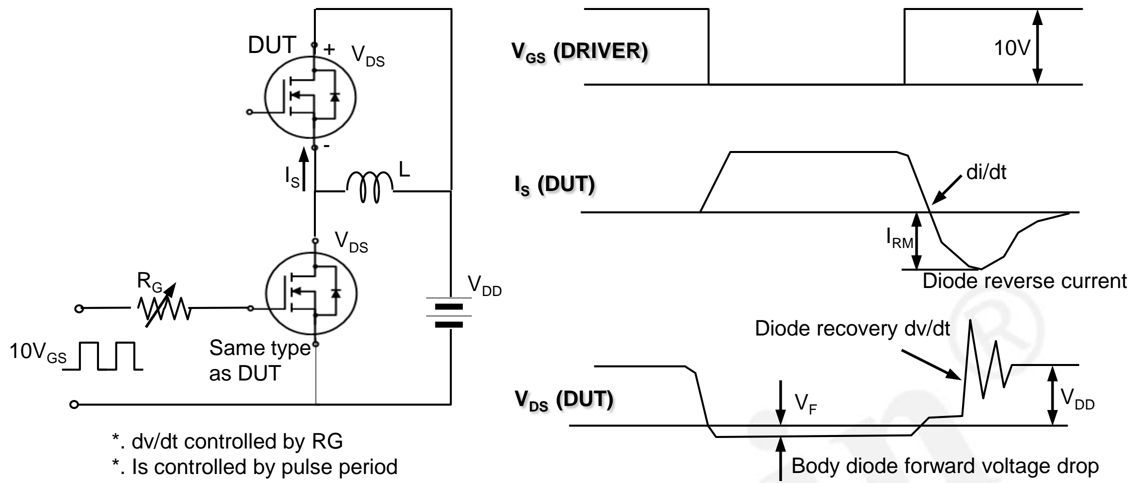
Fig. 14. Peak diode recovery dv/dt test circuit & waveform



Samwin 内部保密

DISCLAIMER

* All the data & curve in this document was tested in XI’ AN SEMIPOWER TESTING & APPLICATION CENTE R.

* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability tes .

* Qualification standards can also be found on the Web site (**http://www.semipower.com.cn**)

* Suggestions for improvement are appreciated, Please send your suggestions to **samwin@samwinsemi.com**

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