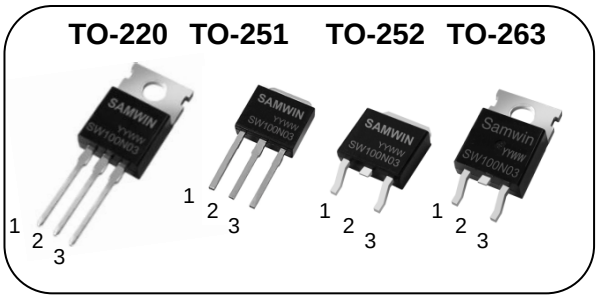
N-channel MOSFET

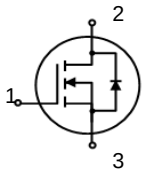
Features

- High ruggedness
- $R_{DS(ON)}$ (Max 5.3mΩ)@V_{GS}=10V
- Gate Charge (Typ 146nC)
- Improved dv/dt Capability
- 100% Avalanche Tested



1. Gate 2. Drain 3. Source

BV_{DSS} : 30V
I_D : 100A
$R_{DS(ON)}$: 5.3 mΩ



General Description

This N-channel enhancement mode field-effect power transistor using SAMWIN semiconductor's advanced planar stripe, DMOS technology intended for battery Operated systems like a DC-DC converter motor control , ups ,audio amplifier. Also, especially designed to minimize $R_{DS(ON)}$, low gate charge and high rugged avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 100N03	SW100N03	TO-220	TUBE
2	SW I 100N03	SW100N03	TO-251	TUBE
3	SW D 100N03	SW100N03	TO-252	REEL
4	SW B 100N03	SW100N03	TO-263	REEL

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		30	V
I_D	Continuous Drain Current		100	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)	875	mJ
P_D	Total power dissipation (@T_C=25°C)		100	W
	Derating Factor above 25°C		0.67	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
		Min.	Typ.	Max.	
R_{thjc}	Thermal resistance, Junction to case			1.5	°C/W
R_{thcs}	Thermal resistance, Case to Sink		0.5		°C/W
R_{thja}	Thermal resistance, Junction to ambient			62.5	°C/W

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Electrical characteristic (T_C = 25ºC 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	30	-	-	V
I_{DSS}	Drain to source leakage current	V_{DS}=30V, V_{GS}=0V	-	-	1	uA
		V_{DS}=24V, T_C=125ºC	-	-	100	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	1.0	-	3.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 50A	-	4.2	5.3	mΩ
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz	-	9500	-	pF
C_{oss}	Output capacitance		-	800	-	
C_{rss}	Reverse transfer capacitance		-	300	-	
$t_{d(on)}$	Turn on delay time	V_{DS}=15V, I_D=1A, R_G=6Ω ,VGS=10V	-	25.7	50	ns
tr	Rising time		-	10	20	
$t_{d(off)}$	Turn off delay time		-	128	200	
t_f	Fall time		-	34	70	
Q_g	Total gate charge	V_{DS}=15V, V_{GS}=5V, I_D=16A	-	50	65	nC
Q_{gs}	Gate-source charge		-	20.8	-	
Q_{gd}	Gate-drain charge		-	19	-	

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	-	-	90	A
V_{SD}	Diode forward voltage drop.	I_S=110A, V_{GS}=0V	-	-	1.5	V

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 200uH, I_{AS} = 110A, V_{DD} = 25V, R_G=25Ω, Starting T_J = 25ºC
3. I_{SD} ≤ 110A, di/dt = 300A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25ºC
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

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Fig. 1. Output Characteristics

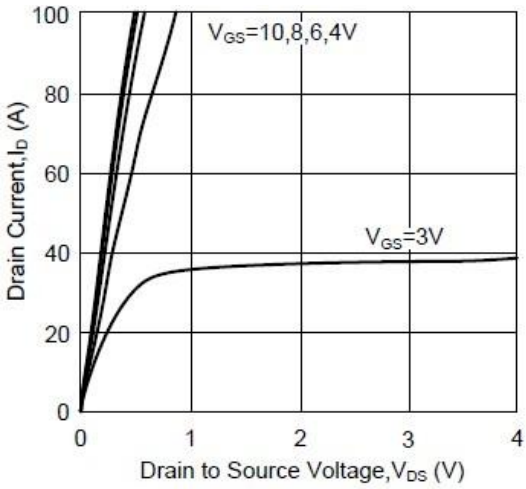

Fig. 2. Transfer characteristics

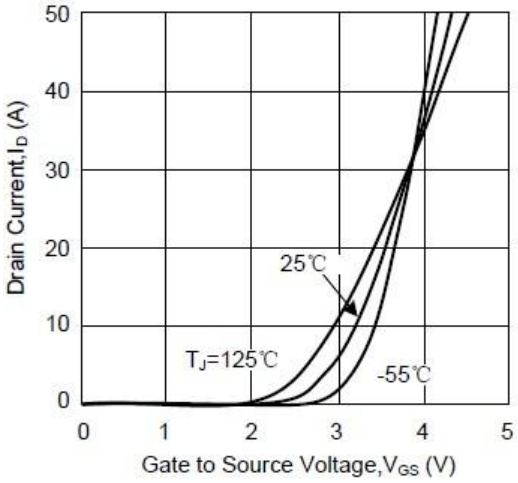

Fig. 3. On-resistance variation with Temperature

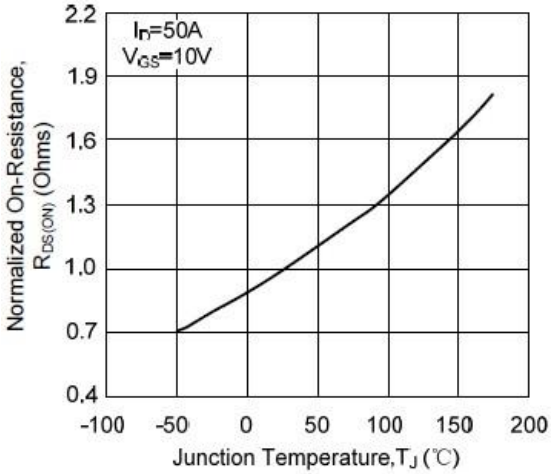

Fig. 4. Gate Threshold Variation with Temperature

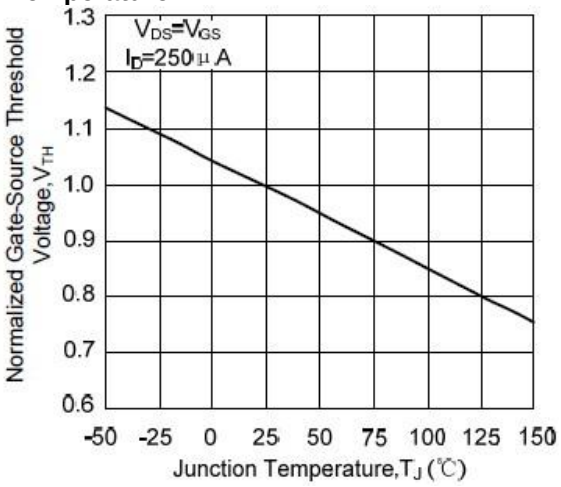

Fig. 5. Gate-Charge characteristics

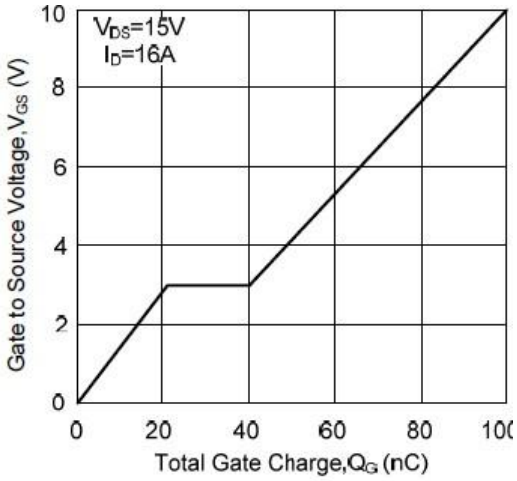

Fig. 6. Capacitance Characteristics

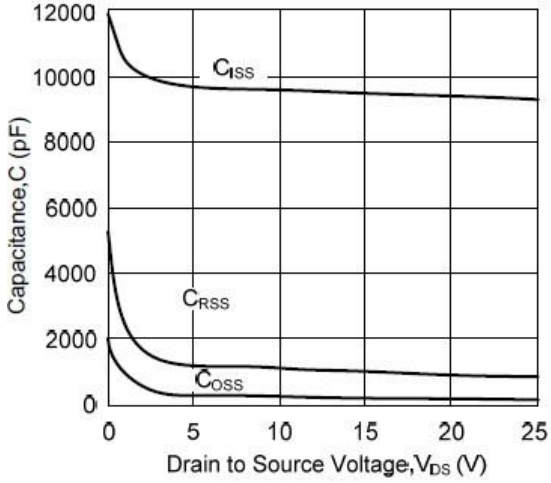

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Fig 7. Body-Diode Characteristics

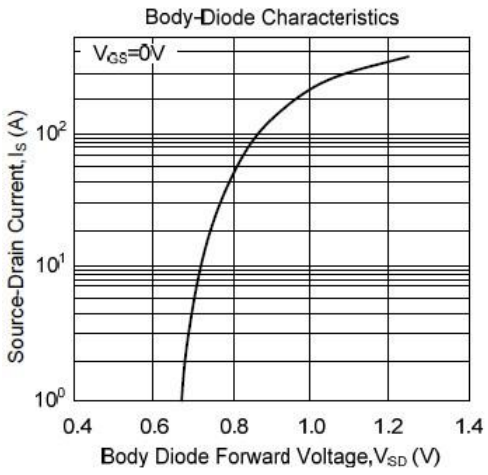


Fig. 8. Maximum Safe Operating Area

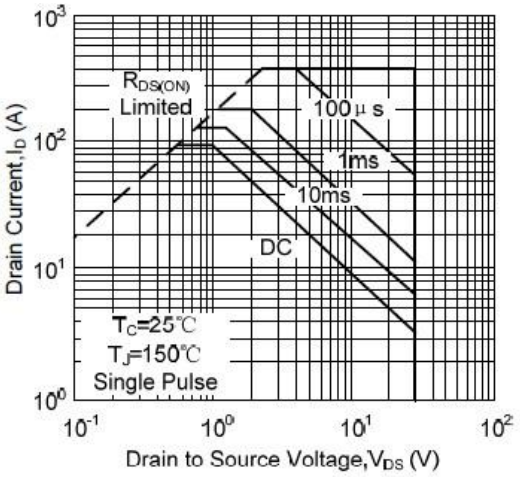


Fig. 9. Normalized Thermal Transient Impedance Curve

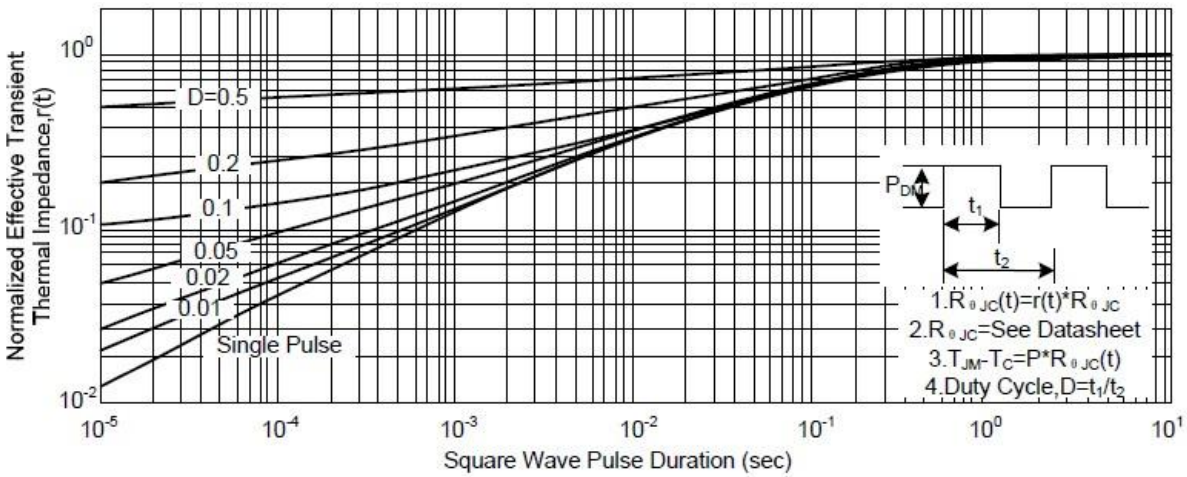
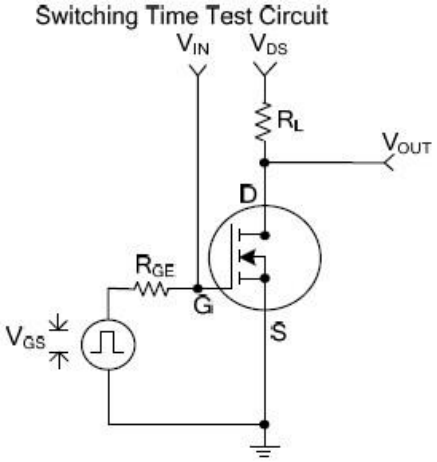
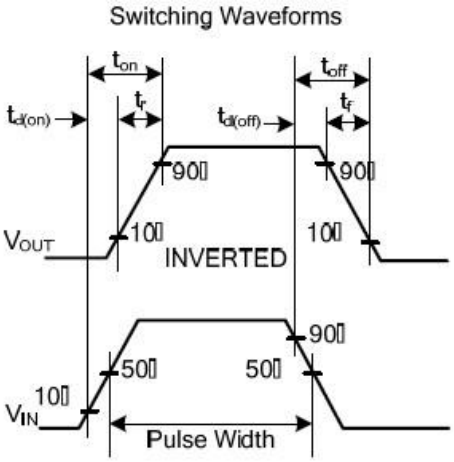


Fig.10. Test Circuit And Waveform





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REVISION HISTORY

Revision No.	Changed Characteristics	Responsible	Date	Issuer
REV 1.0	Origination, First Release	Alice Nie	2010.12.05	XZQ
REV 2.0	Updated the format of datasheet and added Order Codes.	Alice Nie	2011.06.02	XZQ

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