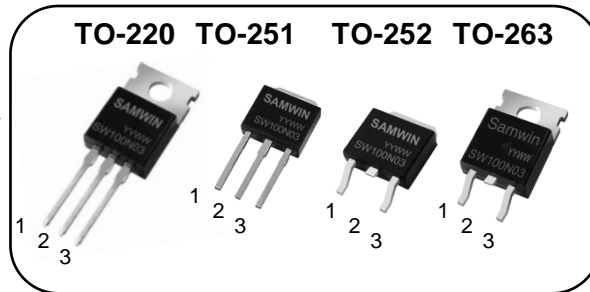


## N-channel MOSFET

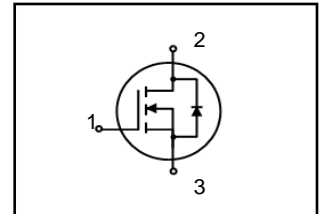
### Features

- High ruggedness
- $R_{DS(ON)}$  (Max 5.3m $\Omega$ )@ $V_{GS}=10V$
- 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 m $\Omega$



### 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	$\pm 20$	V
$E_{AS}$	Single pulsed Avalanche Energy (note 2)	875	mJ
$P_D$	Total power dissipation (@ $T_C=25^\circ C$ )	100	W
	Derating Factor above 25 $^\circ C$	0.67	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
		Min.	Typ.	Max.	
$R_{thjc}$	Thermal resistance, Junction to case			1.5	$^\circ C/W$
$R_{thcs}$	Thermal resistance, Case to Sink		0.5		$^\circ C/W$
$R_{thja}$	Thermal resistance, Junction to ambient			62.5	$^\circ C/W$

## 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	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Drain to source leakage current	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=24V, T_C=125^\circ\text{C}$	-	-	100	$\mu A$
$I_{GSS}$	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	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	-	3.0	V
$R_{DS(ON)}$	Drain to source on state resistance	$V_{GS}=10V, I_D = 50A$	-	4.2	5.3	m $\Omega$
<b>Dynamic characteristics</b>						
$C_{iss}$	Input capacitance	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	9500	-	pF
$C_{oss}$	Output capacitance		-	800	-	
$C_{rss}$	Reverse transfer capacitance		-	300	-	
$t_{d(on)}$	Turn on delay time	$V_{DS}=15V, I_D=1A, R_G=6\Omega, V_{GS}=10V$	-	25.7	50	ns
$t_r$	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	-	

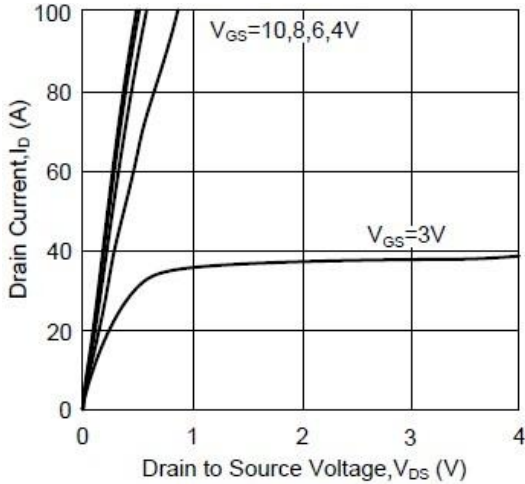
## Source to drain diode ratings characteristics

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

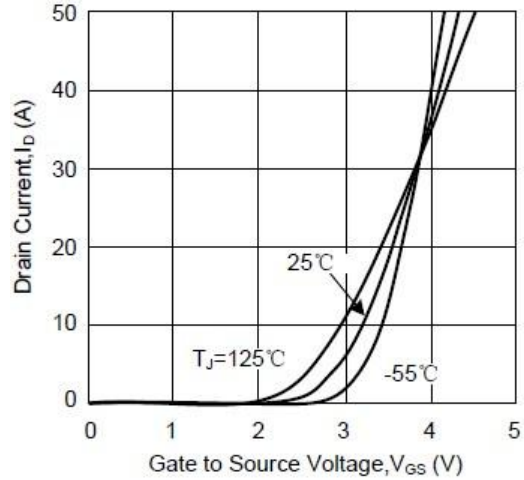
### ※. Notes

1. Repeative rating : pulse width limited by junction temperature.
2.  $L = 200\mu H, I_{AS} = 110A, V_{DD} = 25V, R_G=25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 110A, di/dt = 300A/\mu s, V_{DD} \leq BV_{DSS}, \text{Starting } T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width  $\leq 300\mu s, \text{duty cycle } \leq 2\%$
5. Essentially independent of operating temperature.

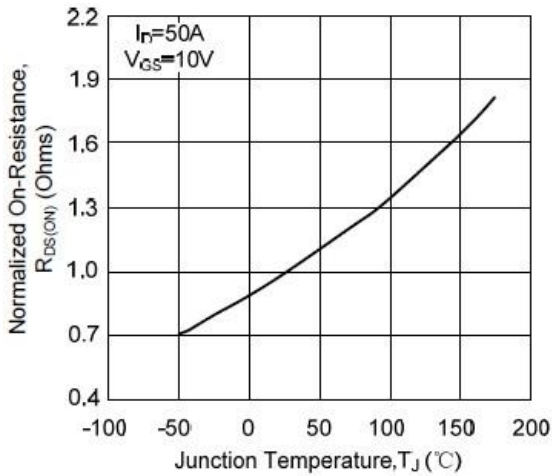
**Fig. 1. Output Characteristics**



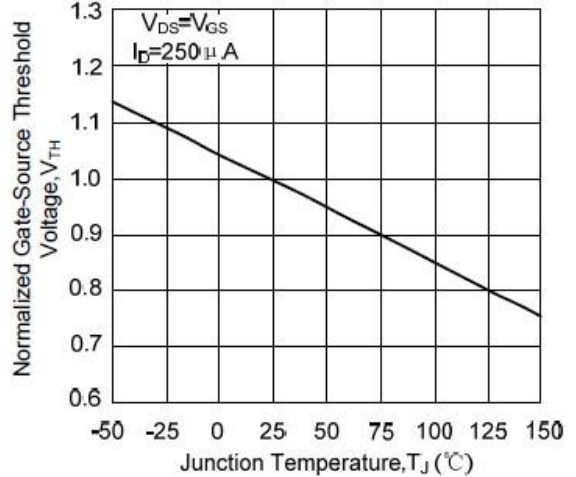
**Fig. 2. Transfer characteristics**



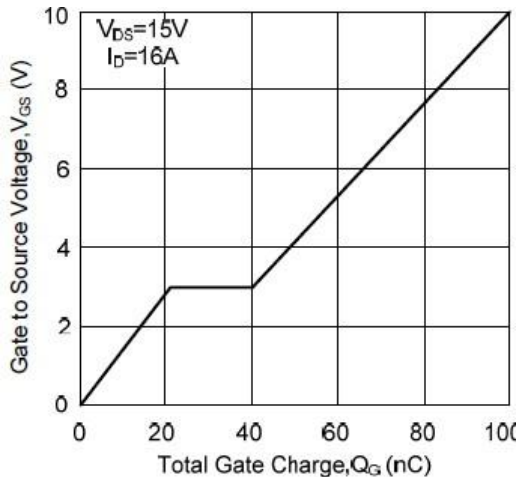
**Fig. 3. On-resistance variation with Temperature**



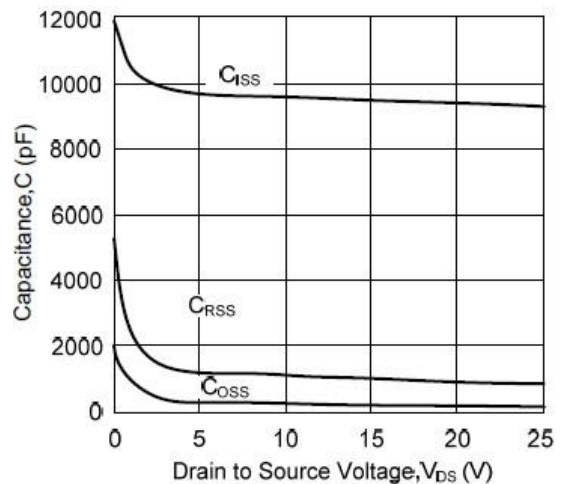
**Fig. 4. Gate Threshold Variation with Temperature**



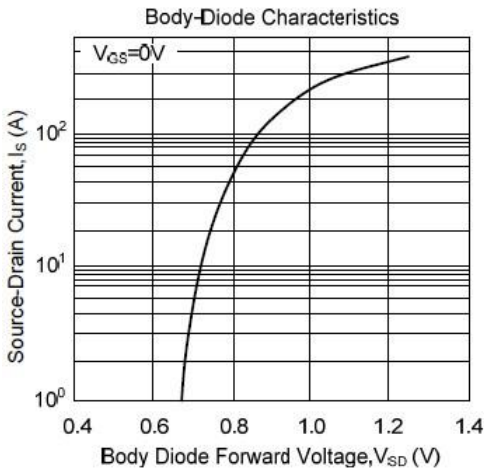
**Fig. 5. Gate-Charge characteristics**



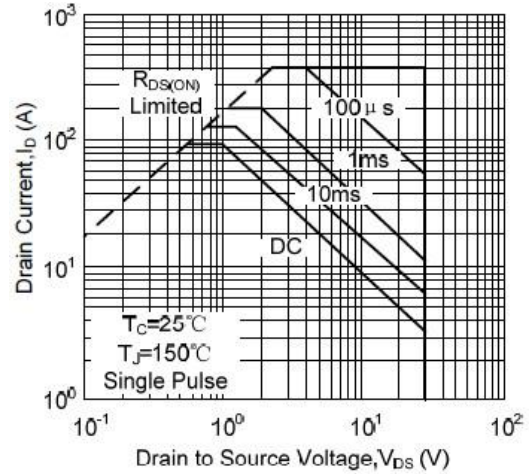
**Fig. 6. Capacitance Characteristics**



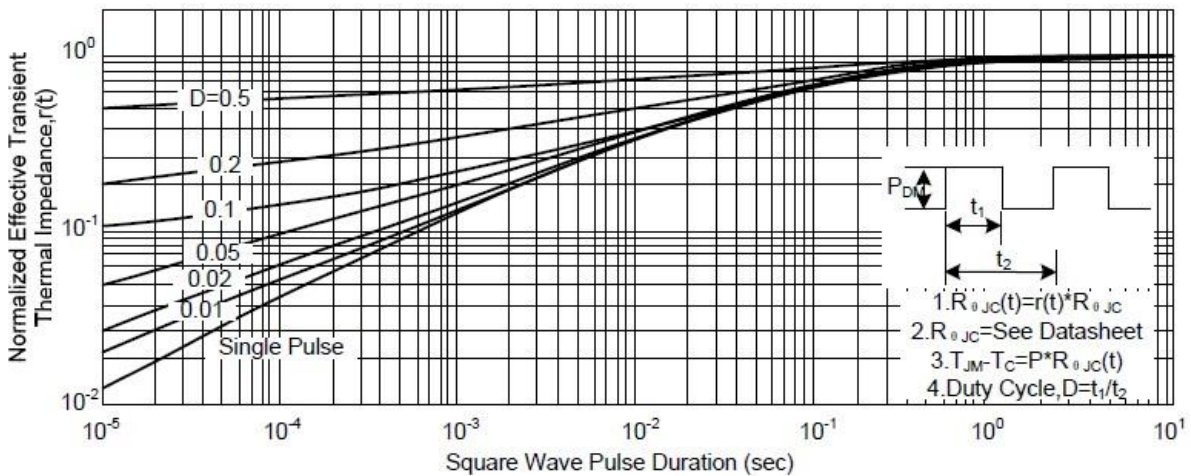
**Fig 7. Body-Diode Characteristics**



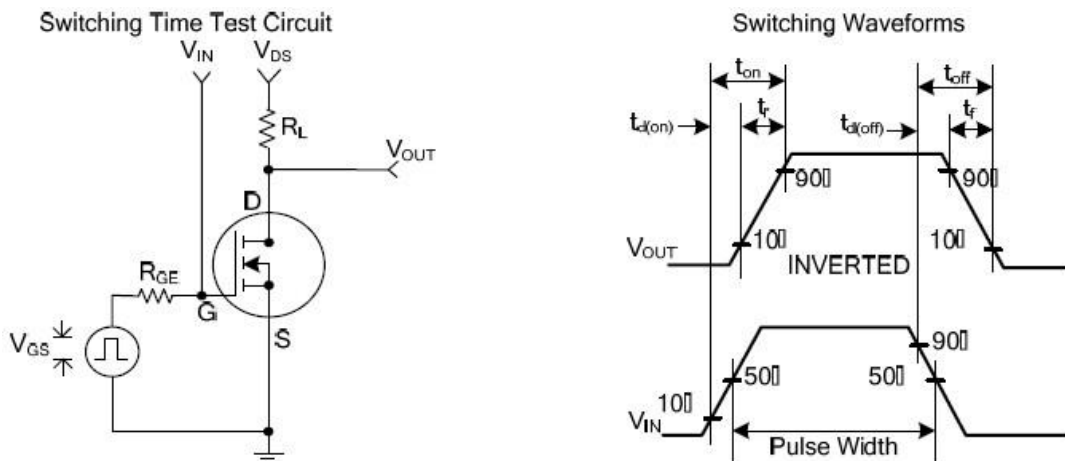
**Fig. 8. Maximum Safe Operating Area**



**Fig. 9. Normalized Thermal Transient Impedance Curve**



**Fig.10. Test Circuit And Waveform**



## 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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