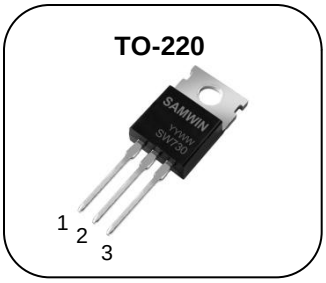
N-channel MOSFET

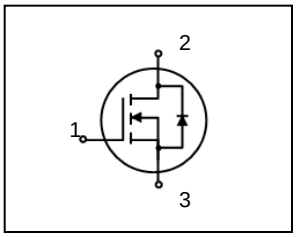
Features

- High ruggedness
- $R_{DS(ON)}$ (Max 1.0Ω)@V_{GS}=10V
- Gate Charge (Typ 32nC)
- Improved dv/dt Capability
- 100% Avalanche Tested



1. Gate 2. Drain 3. Source

BV_{DSS} : 400V
I_D : 6.5A
$R_{DS(ON)}$: 1.0ohm



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. It is mainly suitable for half bridge or full bridge resonant topology like a electronic ballast, and also low power switching mode power appliances.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 730	SW730	TO-220	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		400	V
I_D	Continuous Drain Current (@T_C=25°C)		6.5	A
	Continuous Drain Current (@T_C=100°C)		3.8	A
I_{DM}	Drain current pulsed	(note 1)	26	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single pulsed Avalanche Energy	(note 2)	450	mJ
E_{AR}	Repetitive Avalanche Energy	(note 1)	9.2	mJ
dv/dt	Peak diode Recovery dv/dt	(note 3)	5.3	V/ns
P_D	Total power dissipation (@T_C=25°C)		92	W
	Derating Factor above 25°C		0.74	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			1.35	°C/W
R_{thcs}	Thermal resistance, Case to Sink		0.5		°C/W
R_{thja}	Thermal resistance, Junction to ambient			62.5	°C/W

Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

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	400	-	-	V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C	-	0.54	-	V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=400V, V_{GS}=0V	-	-	1	uA
		V_{DS}=320V, T_C=125°C	-	-	20	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V	-	-	100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V	-	-	-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0	-	4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.25A		0.8	1.0	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		570	750	pF
C_{oss}	Output capacitance			160	215	
C_{rss}	Reverse transfer capacitance			30	40	
$t_{d(on)}$	Turn on delay time	V_{DS}=200V, I_D=6.5A, R_G=25Ω		28	36	ns
tr	Rising time			74	96	
$t_{d(off)}$	Turn off delay time			128	230	
t_f	Fall time			30	50	
Q_g	Total gate charge	V_{DS}=320V, V_{GS}=10V, I_D=6.5A		32	42	nC
Q_{gs}	Gate-source charge			4		
Q_{gd}	Gate-drain charge			10		

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	-	-	6.5	A
I_{SM}	Pulsed source current		-	-	26	A
V_{SD}	Diode forward voltage drop.	I_S=6.5A, V_{GS}=0V	-	-	1.5	V
T_{rr}	Reverse recovery time	I_S=6.5A, V_{GS}=0V, dI_F/dt=100A/us	-	320	-	ns
Q_{rr}	Breakdown voltage temperature		-	1.46	-	uC

※. Notes

1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 19.4mH, I_{AS} = 6.5A, V_{DD} = 50V, R_G=50Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6.5A, di/dt = 300A/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.

Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

Fig. 1. On-state characteristics

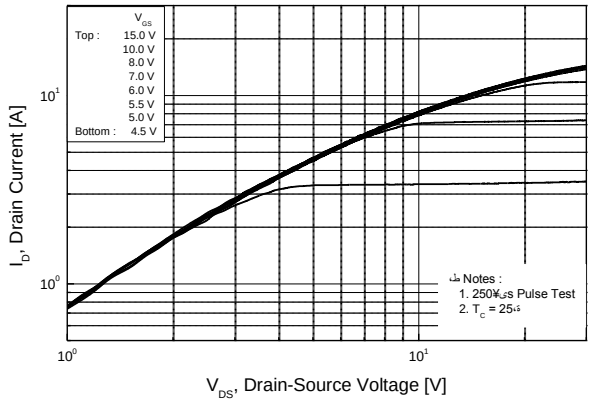


Fig. 2. Transfer characteristics

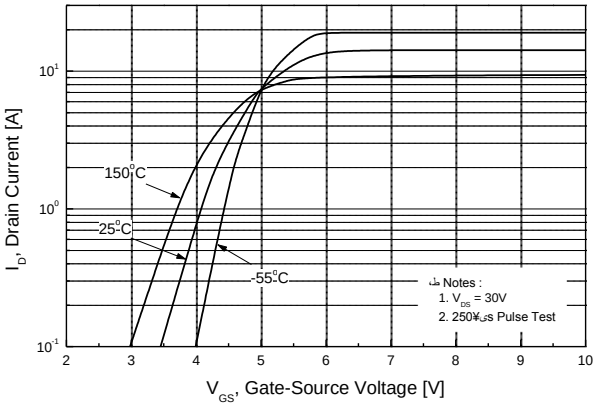


Fig. 3. On-resistance variation vs. drain current and gate voltage

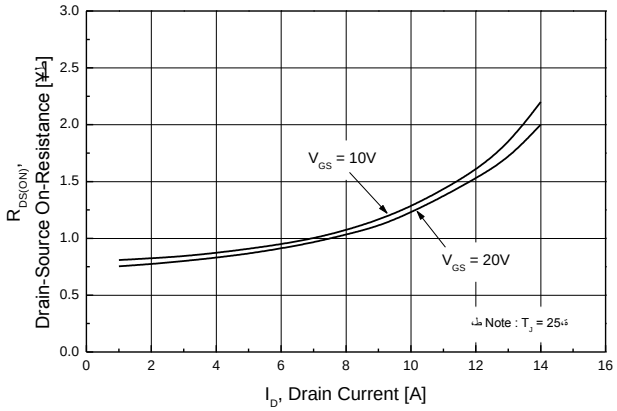


Fig. 4. On state current vs. diode forward voltage

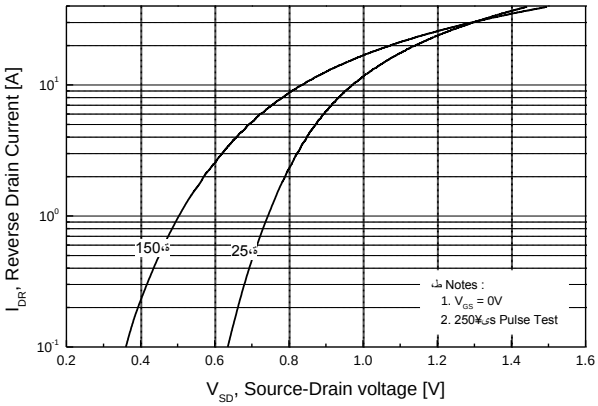


Fig. 5. Capacitance characteristics (Non-Repetitive)

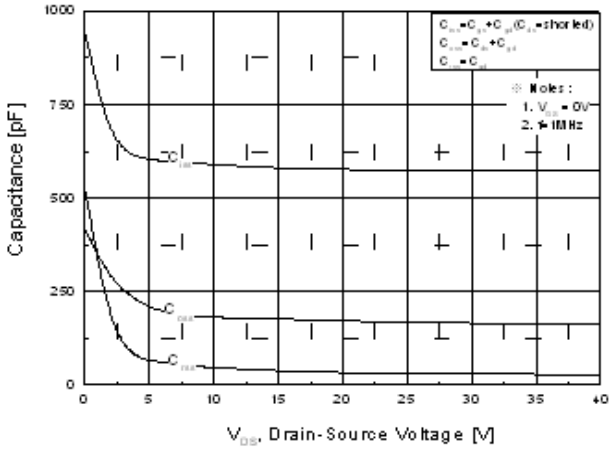
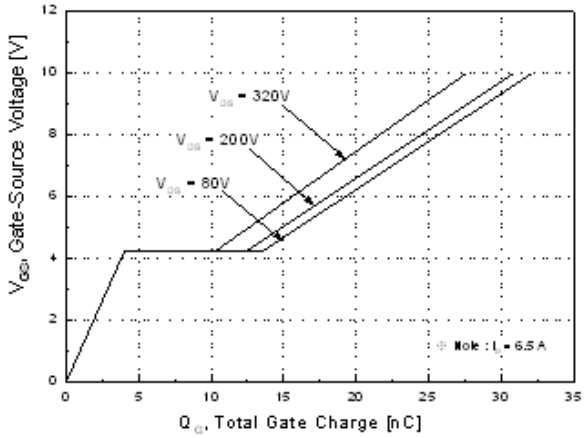


Fig. 6. Gate charge characteristics



Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

Fig 7. Breakdown Voltage Variation vs. Junction Temperature

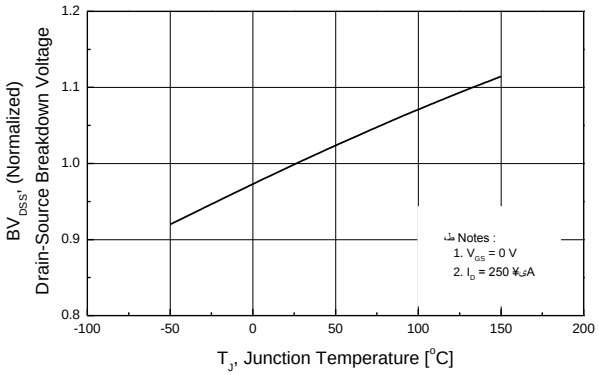


Fig. 8. On resistance variation vs. junction temperature

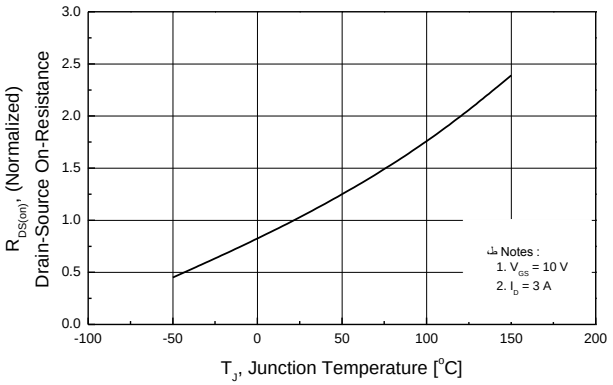


Fig. 9. Maximum drain current vs. case temperature.

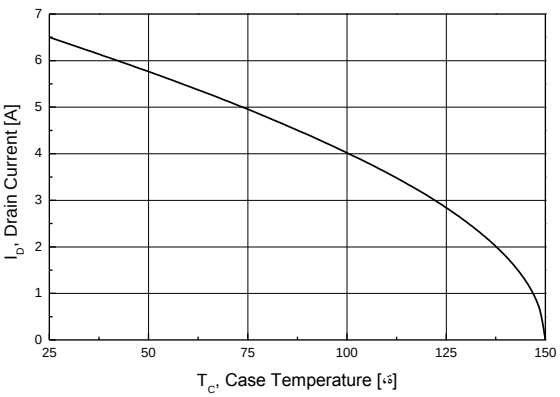


Fig. 10. Maximum safe operating area

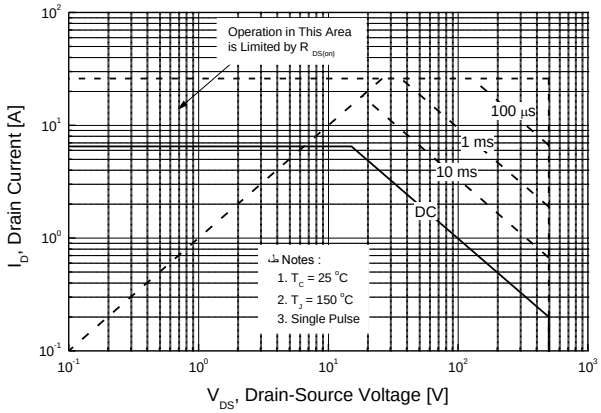
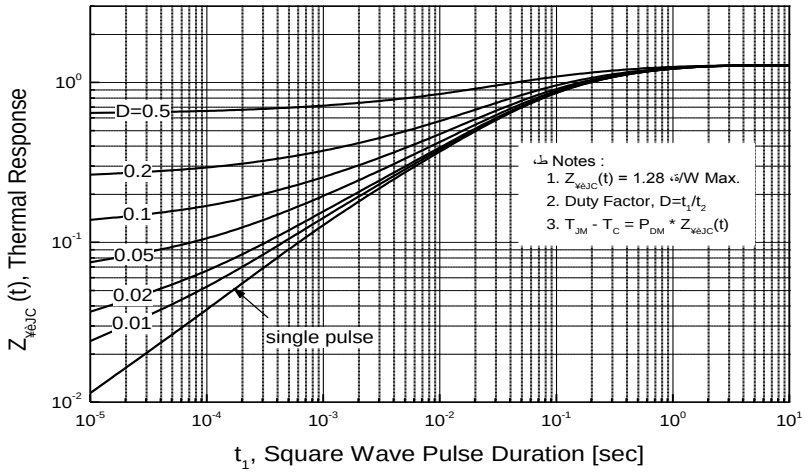


Fig. 11. Transient thermal response curve



Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

Fig. 12. Gate charge test circuit & waveform

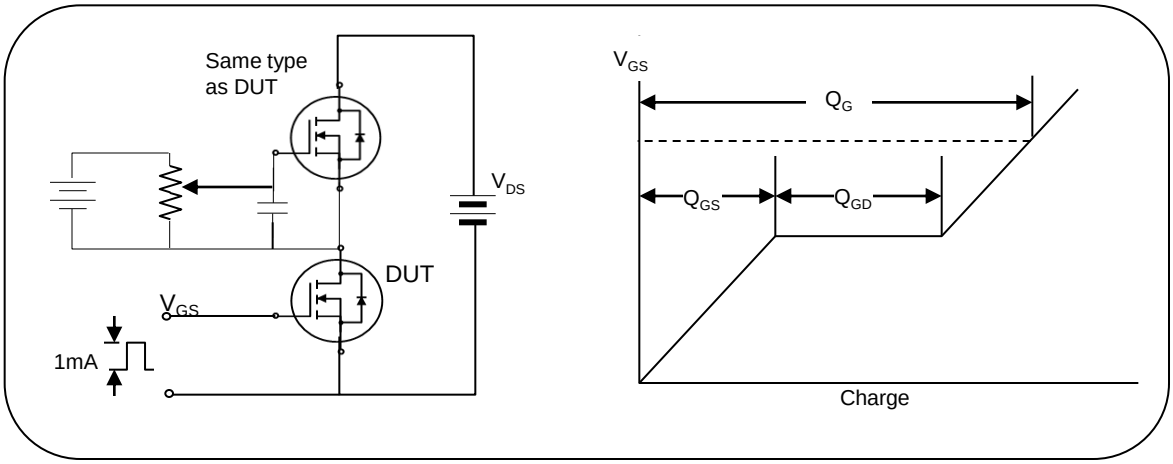


Fig. 13. Switching time test circuit & waveform

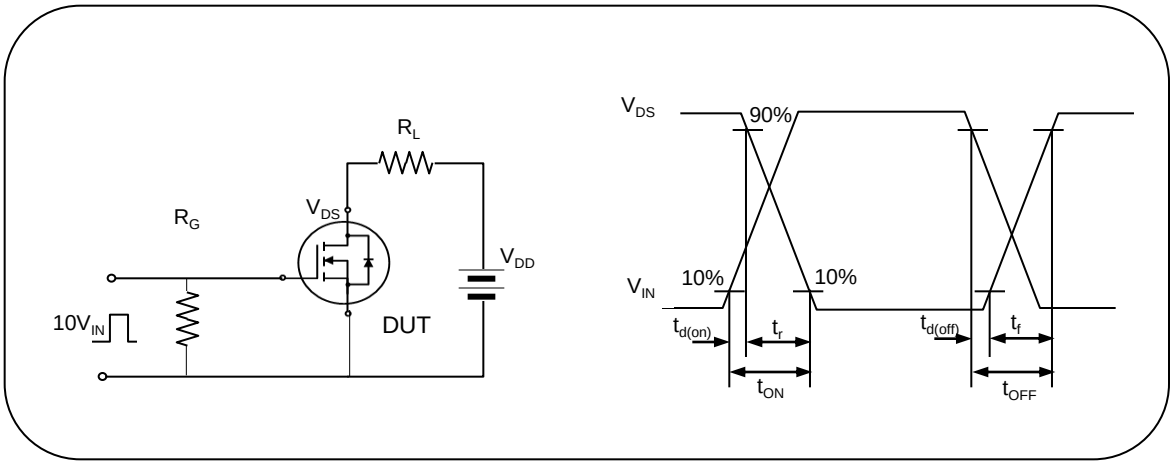
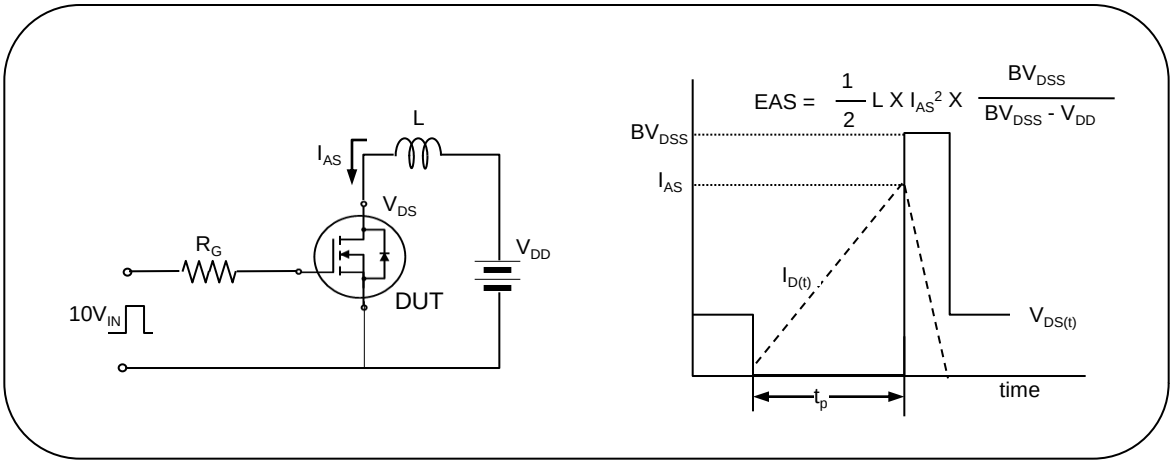
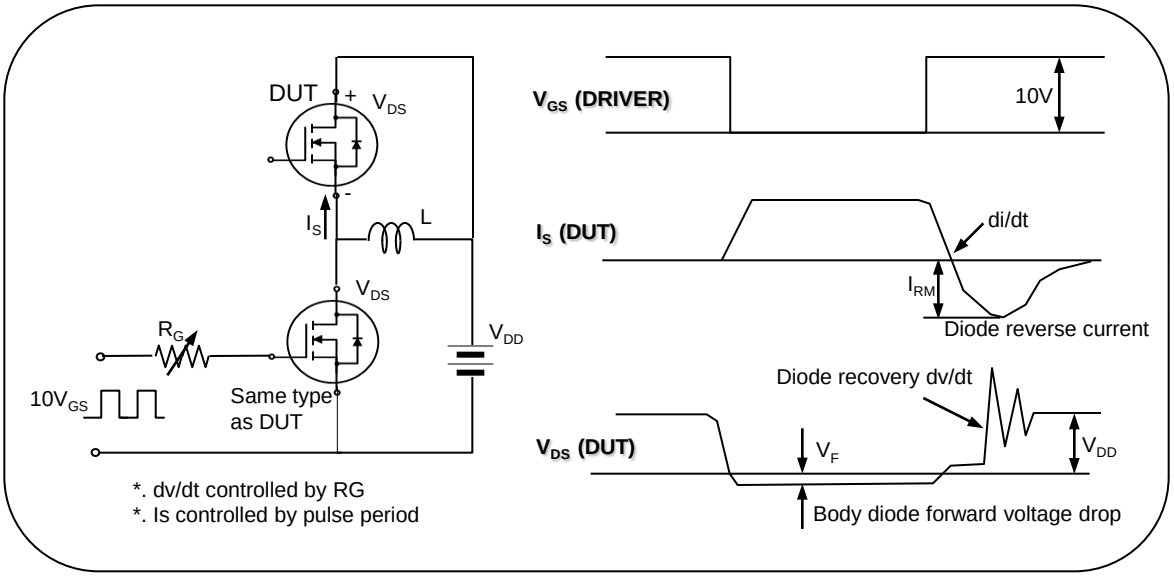


Fig. 14. Unclamped Inductive switching test circuit & waveform



Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

Fig. 15. Peak diode recovery dv/dt test circuit & waveform



Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.

REVISION HISTORY

Revision No.	Changed Characteristics	Responsible	Date	Issuer
REV 1.0	Origination, First Release	Alice Nie	2007.12.05	XZQ
REV 2.0	Updated the format of datasheet and added Order Codes.	Alice Nie	2011.03.24	XZQ

芯派科技 SEMiPOWER
西安芯派电子科技有限公司
地址：西安市高新区高新一路25号创新大厦MF6
电话：029 - 88253717 传真：029 - 88251977

芯源科技 SAMWIN
深圳市南方芯源科技有限公司
地址：深圳市福田区天安数码城时代大厦A座2005
电话：0755 - 83981818 传真：0755 - 83476838

Copyright@ SEMIPOWER Electronic Technology Co., Ltd. All rights reserved.