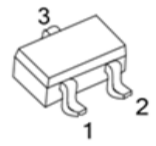
N-channel Enhanced mode SOT-23 MOSFET

Features

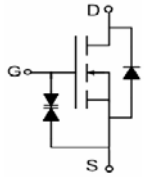
- High Switching Speed
- Low $R_{DS(ON)}$ (Typ 2.3Ω)@V_{GS}=5V
- Low $R_{DS(ON)}$ (Typ 1.75Ω)@V_{GS}=10V
- Low Gate Charge (Typ 1.7nC)
- Application: Small Servo Motor Control, Switch

SOT-23



1. Gate 2. Source 3. Drain

BV_{DSS} : 60V
I_D : 0.3A
$R_{DS(ON)}$: 1.75Ω @V_{GS}=10V



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.

LEAD-FREE RoHS

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW E 2N7002	SW2N7002	SOT-23	REEL

Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to source voltage	60	V
I_D	Continuous drain current (@T_C=25°C)	0.3*	A
	Continuous drain current (@T_C=100°C)	0.19*	A
I_{DM}	Drain current pulsed (note 1)	1.2	A
V_{GS}	Gate to source voltage	±20	V
P_D	Total power dissipation (@T_C=25°C)	0.35	W
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thja}	Thermal resistance, Junction to ambient(note 2)	350	°C/W

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	60			V
I_{DSS}	Drain to source leakage current	V_{DS}=60V, V_{GS}=0V			1	uA
		V_{DS}=48V, T_C=125ºC			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=10V, V_{DS}=0V			500	nA
		V_{GS}=20V, V_{DS}=0V			10	uA
	Gate to source leakage current, reverse	V_{GS}=-10V, V_{DS}=0V			-500	nA
		V_{GS}=-20V, V_{DS}=0V			-10	uA
On characteristics (note 3)						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	1.0		2.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=5V, I_D = 0.4A		2.3	3	Ω
		V_{GS}=10V, I_D = 0.5A		1.75	2	Ω
G_{fs}	Forward transconductance	V_{DS} = 10 V, I_D = 0.2 A		0.3		S
Dynamic characteristics(note 4)						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		36		pF
C_{oss}	Output capacitance			18		
C_{rss}	Reverse transfer capacitance			3		
$t_{d(on)}$	Turn on delay time	V_{DS}=30V, V_{GS}=10V , I_D=0.2A R_G=10Ω		13		ns
t_r	Rising time			25		
$t_{d(off)}$	Turn off delay time			46		
t_f	Fall time			29		
Q_g	Total gate charge	V_{DS}=10V, V_{GS}=4.5V, I_D=0.3A		1.7		nC

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			0.2	A
I_{SM}	Pulsed source current				0.8	A
V_{SD}	Diode forward voltage drop.	I_S=0.2A, V_{GS}=0V			1.4	V

※. Notes

1. Repeatitive rating : pulse width limited by junction temperature.
2. Surface Mounted on FR4 Board,t ≤ 2%.
3. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
4. Guaranteed by design,not subject to production.

Fig. 1. On-state characteristics

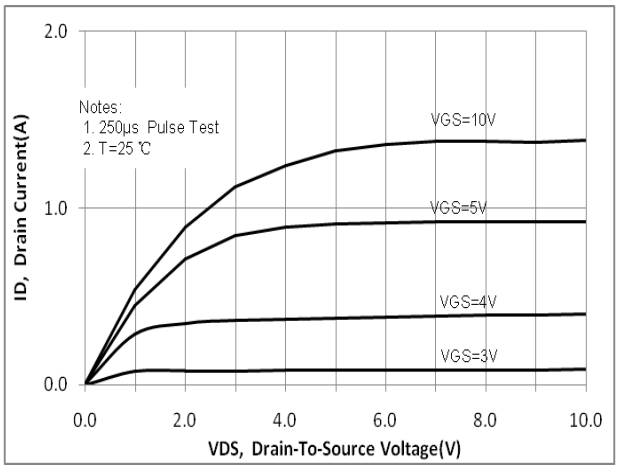


Fig. 2. On-resistance variation vs. drain current and gate voltage

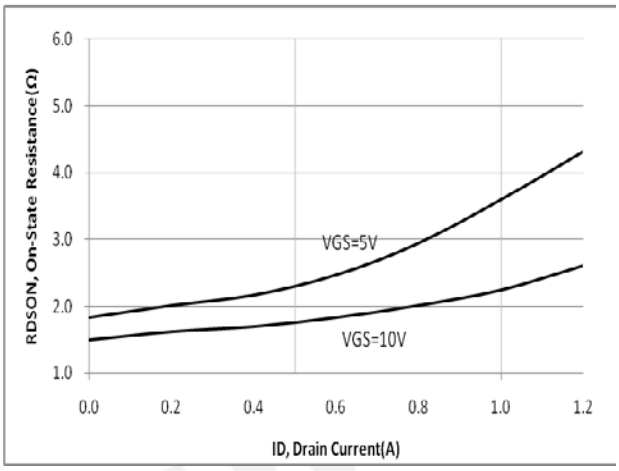


Fig. 3. Gate charge characteristics

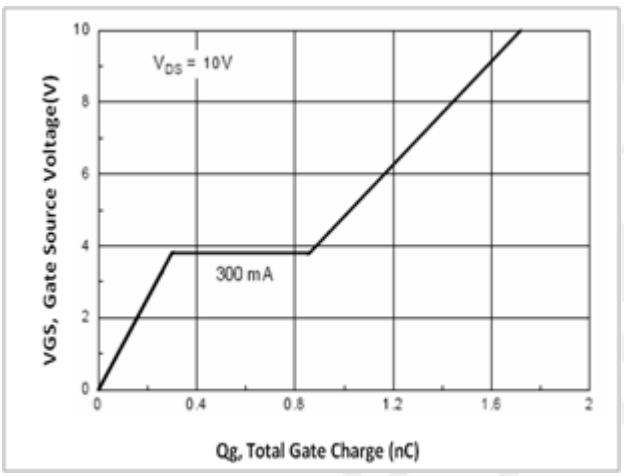


Fig. 4. Maximum safe operating area

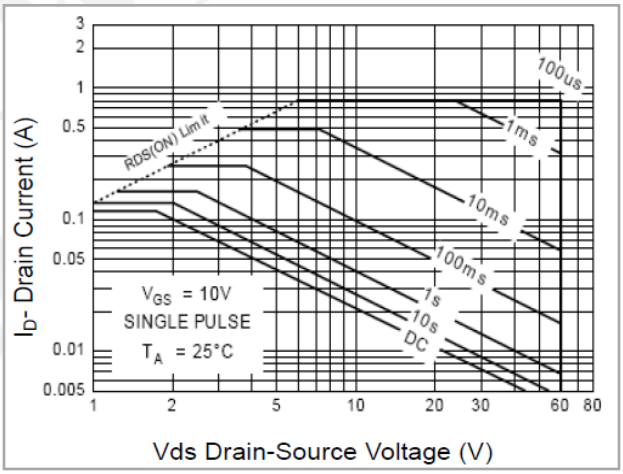


Fig. 5. Capacitance Characteristics

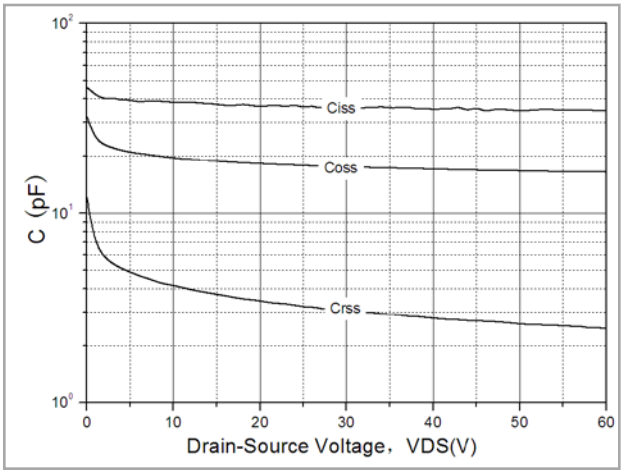


Fig. 6. Transient thermal response curve

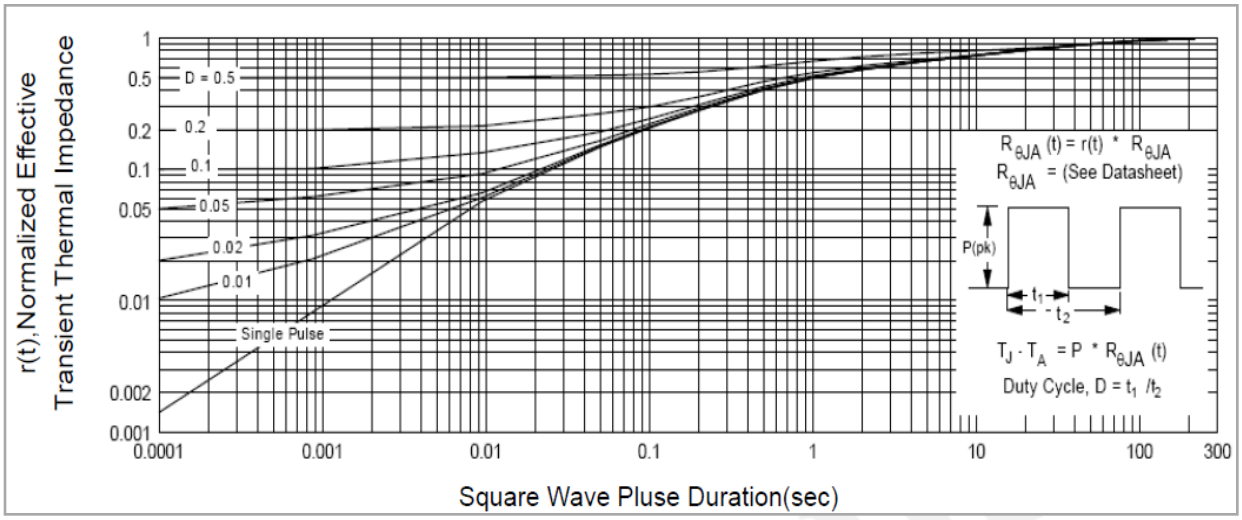


Fig. 7. Gate charge test circuit & waveform

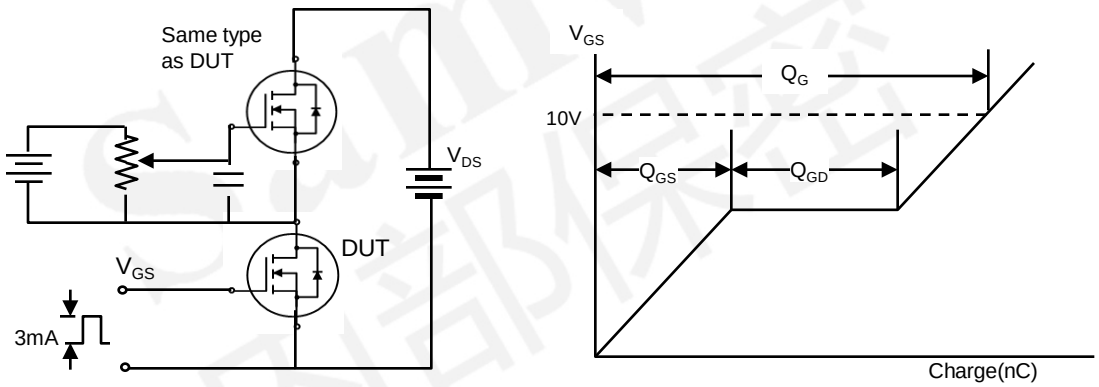
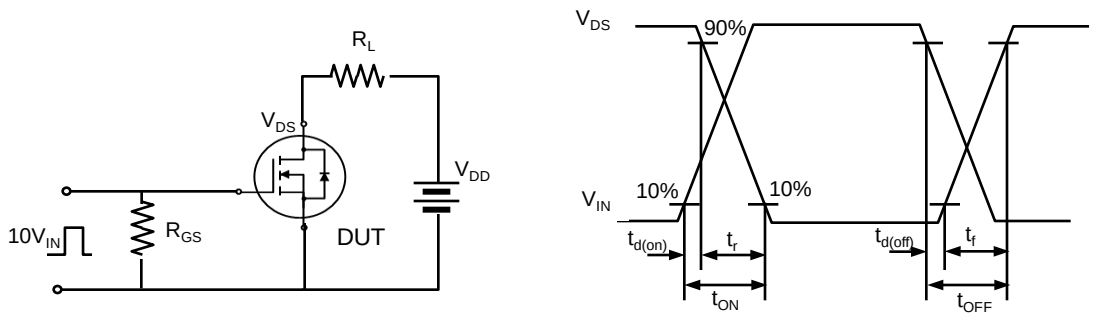


Fig. 8. Switching time test circuit & waveform



DISCLAIMER

* All the data & curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* 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**