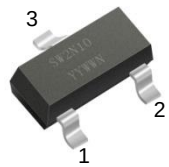
N-channel SOT-23 MOSFET

Features

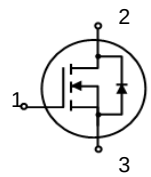
- High ruggedness
- $R_{DS(ON)}$ (Max0.24Ω)@V_{GS}=10V
- Gate Charge (Typical 13nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

SOT-23



1. Gate 2. Source 3. Drain

BV_{DSS} : 100V
I_D : 2A
$R_{DS(ON)}$:0.24Ω



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. This power MOSFET is usually used at high efficient DC to DC converter block and switch mode power supply.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW E 2N10	SW2N10	SOT-23	RELL

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		100	V
I_D	Continuous Drain Current (@T_C=25°C)		2*	A
	Continuous Drain Current (@T_C=100°C)		1.26*	A
I_{DM}	Drain current pulsed	(note 1)	8	A
V_{GS}	Gate to Source Voltage		±15	V
E_{AS}	Single pulsed Avalanche Energy	(note 2)	64	mJ
E_{AR}	Repetitive Avalanche Energy	(note 1)	5	mJ
dv/dt	Peak diode Recovery dv/dt	(note 3)	5	V/ns
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.

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	100			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.1		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=100V, V_{GS}=0V			1	uA
		V_{DS}=80V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=15V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-15V, V_{DS}=0V			100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	1		3	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =3.5A		0.20	0.24	Ω
		V_{GS}=4.5V, I_D =2A		0.22	0.24	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		550		pF
C_{oss}	Output capacitance			50		
C_{rss}	Reverse transfer capacitance			33		
$t_{d(on)}$	Turn on delay time	V_{DS}=50V, I_D=2A, R_G=25Ω (note 4, 5)		3.5		ns
tr	Rising time			22		
$t_{d(off)}$	Turn off delay time			40		
t_f	Fall time			25		
Q_g	Total gate charge	V_{DS}=80V, V_{GS}=10V, I_D=2A (note 4, 5)		13		nC
Q_{gs}	Gate-source charge			1.7		
Q_{gd}	Gate-drain charge			3.2		

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			2	A
I_{SM}	Pulsed source current				8	A
V_{SD}	Diode forward voltage drop.	I_S=2A, V_{GS}=0V			1.1	V
T_{rr}	Reverse recovery time	I_S=2A, V_{GS}=0V, dI_F/dt=100A/us		28		ns
Q_{rr}	Reverse recovery Charge			33		nC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 32.1mH, I_{AS} = 2A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 2A, 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.

Fig. 1. On-state characteristics

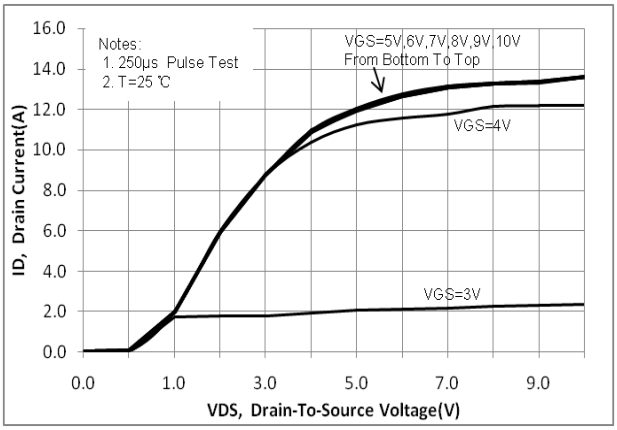


Fig. 2. On-resistance variation vs. drain current and gate voltage

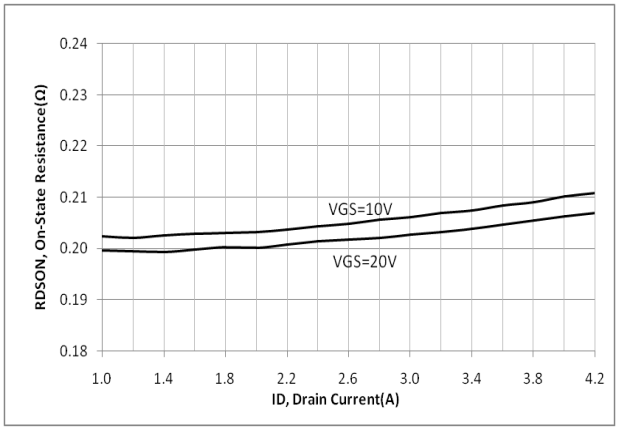


Fig. 3. Gate charge characteristics

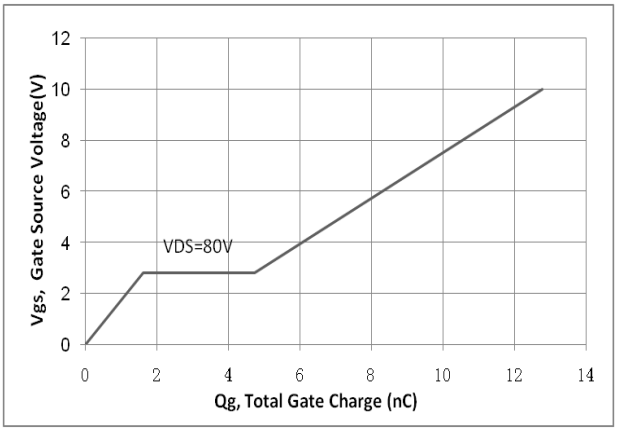


Fig. 4. On state current vs. diode forward voltage

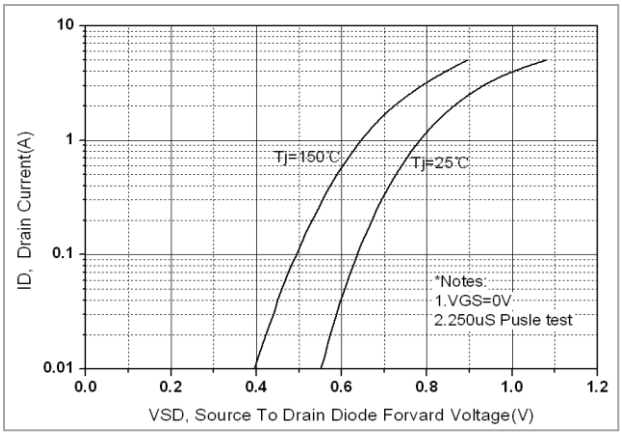


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

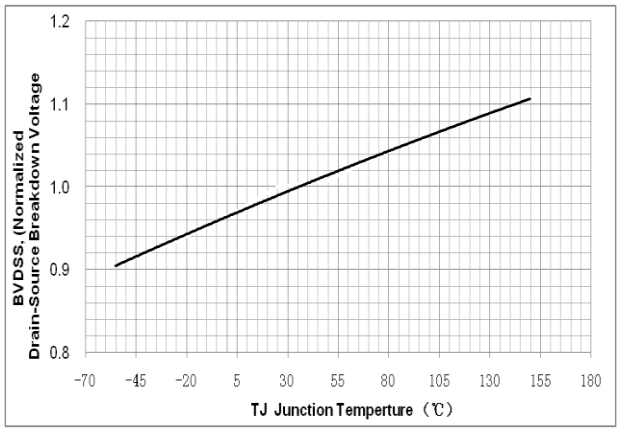


Fig. 6. On resistance variation vs. junction temperature

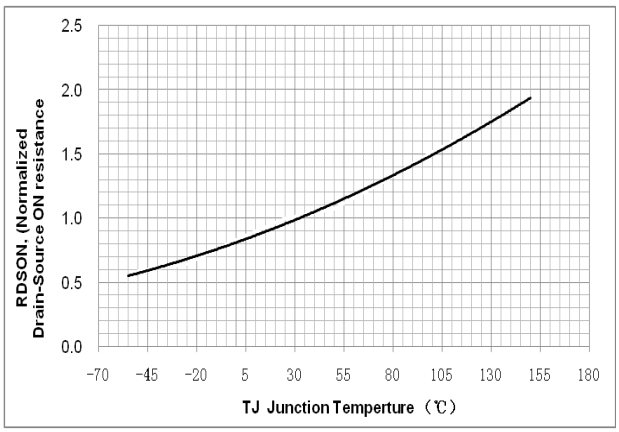


Fig. 7. Capacitance Characteristics

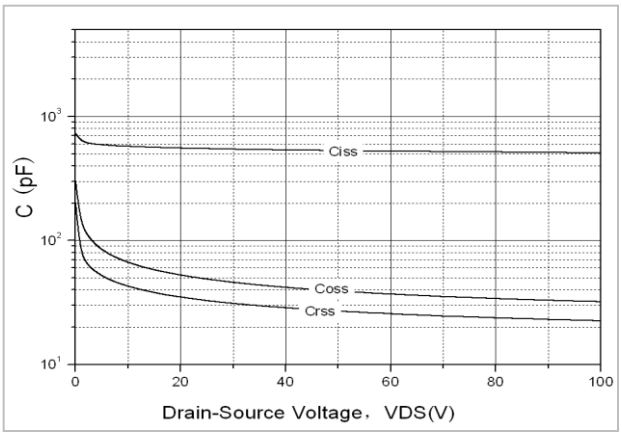


Fig. 8. Gate charge test circuit & waveform

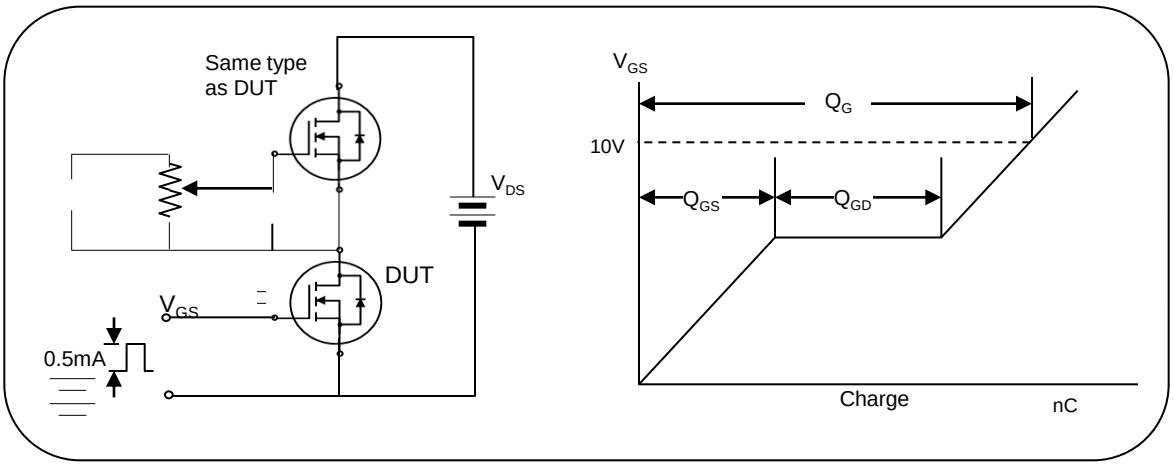


Fig. 9. Switching time test circuit & waveform

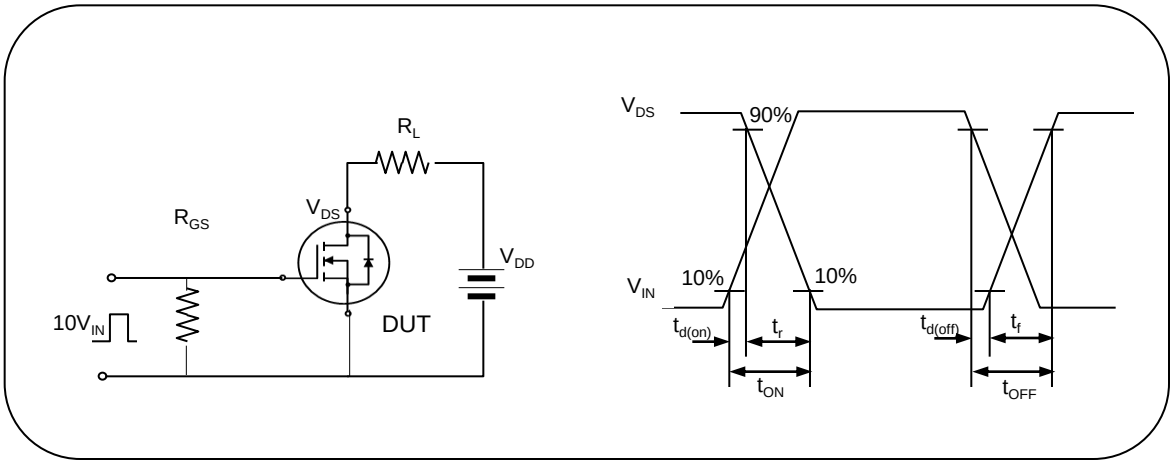


Fig. 10. Unclamped Inductive switching test circuit & waveform

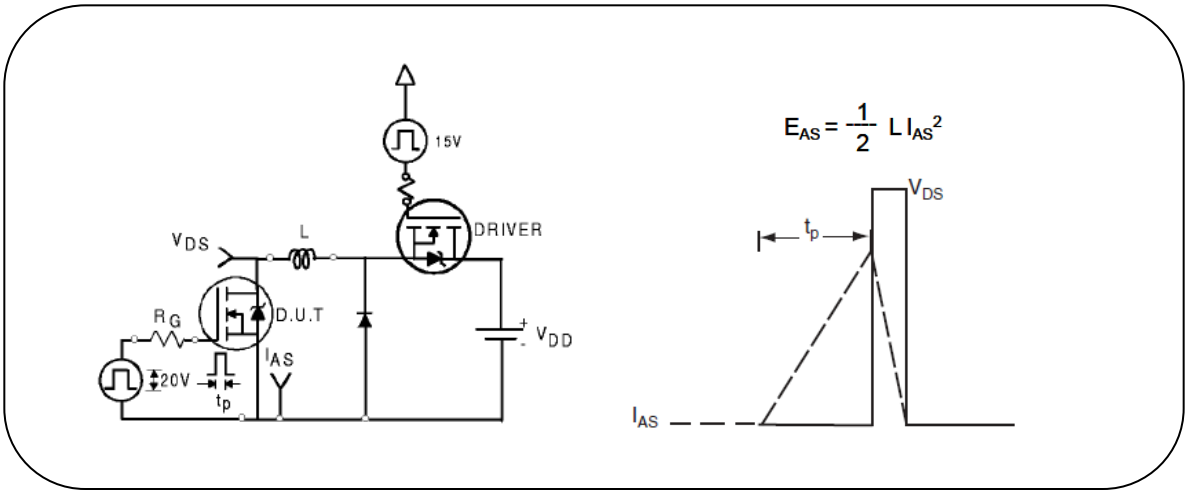


Fig. 11. Peak diode recovery dv/dt test circuit & waveform