

SOT-23 Plastic-Encapsulate MOSFETS

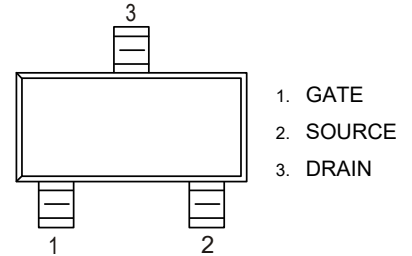
SI2308 N-Channel Enhancement Mode MOSFET

$V_{DS} = 60V$ $I_D = 4.0A$

$R_{DS(ON)}$ TYP = $70m\Omega @ V_{GS} = 10V$

SOT-23

RoHS
COMPLIANT



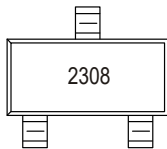
Features

- Improved dv/dt capability
- Fast switching
- Green Device Available

Application

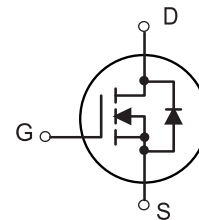
- Motor Drive
- Power Tools
- LED Lighting

MARKING



2308= Device code

Equivalent circuit



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A = 25^\circ C$	I_D	4.0	A
	$T_A = 100^\circ C$		2.0	A
Drain Current-Pulsed (Note1)		I_{DM}	12.8	A
Maximum Power Dissipation		P_D	1.56	W
Operating Junction Temperature Range		T_J	-50 to 125	$^\circ C$
Storage Temperature Range		T_{stg}	-55 to 150	$^\circ C$
Thermal Resistance From Junction To Ambient		$R_{\theta JA}$	80	$^\circ C/W$

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =48V, V _{GS} =0V, T _J =125°C	-	-	10	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.4	2.5	V
V _{GS(th)} Temperature Coefficient	Δ V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	-	-5	-	mV/°C
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3A	-	60	75	mΩ
		V _{GS} =4.5V, I _D =2A	-	70	85	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =5.5A	-	7	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	500	-	pF
Output Capacitance	C _{oss}		-	45	-	pF
Reverse Transfer Capacitance	C _{rss}		-	16	-	pF
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1.0MHz	-	2	-	Ω
Switching Characteristics						
Turn-on Delay Time ^(Note2, 3)	t _{d(on)}	V _{DD} =30V, I _D =1A V _{GS} =10V, R _G =3.3Ω	-	2.9	-	nS
Turn-on Rise Time ^(Note2, 3)	t _r		-	9.5	-	nS
Turn-Off Delay Time ^(Note2,3)	t _{d(off)}		-	18.4	-	nS
Turn-Off Fall Time ^(Note2,3)	t _f		-	5.3	-	nS
Total Gate Charge ^(Note2,3)	Q _g	V _{DS} =48V, I _D =3A, V _{GS} =10V	-	9.3	-	nC
Gate-Source Charge ^(Note2,3)	Q _{gs}		-	2.1	-	nC
Gate-Drain Charge ^(Note2,3)	Q _{gd}		-	1.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =1.0A	-	-	1.2	V
Diode continous forward current	I _S	V _G =V _D =0V , Force Current	-	-	4.0	A
Diode pulse current	I _{SM}		-	-	6.0	A
Reverse recovery time ^(Note2)	t _{rr}	V _{GS} =30 V, I _S =1 A. di/dt=100A/μs	-	23.2	-	nS
Reverse recovery charge ^(Note2)	Q _{rr}		-	14.3	-	nC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Switching characteristics are independent of operating junction temperatures
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

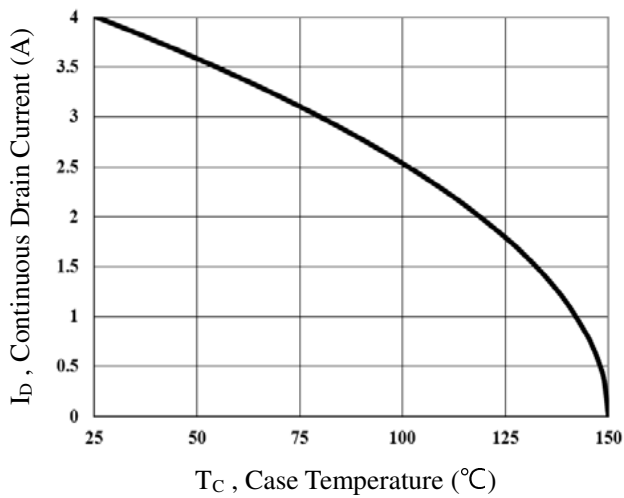


Fig.1 Continuous Drain Current vs. T_C

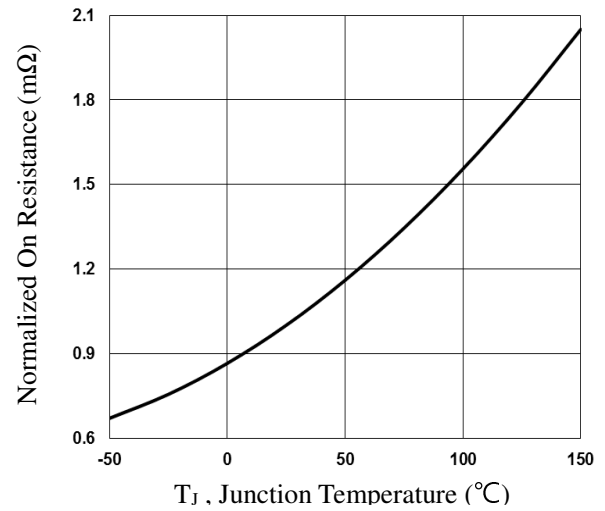


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

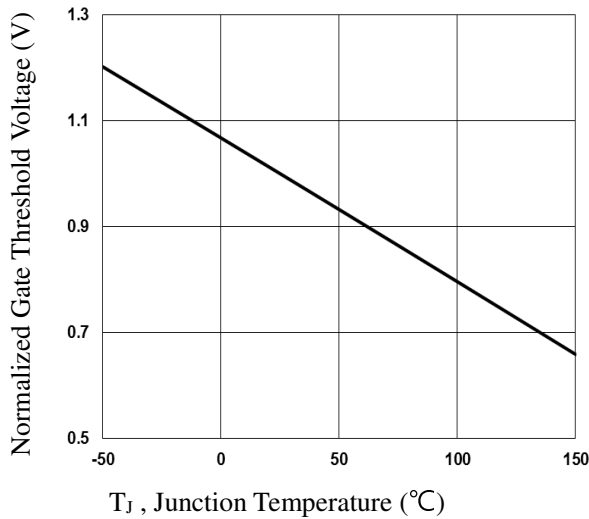


Fig.3 Normalized V_{th} vs. T_J

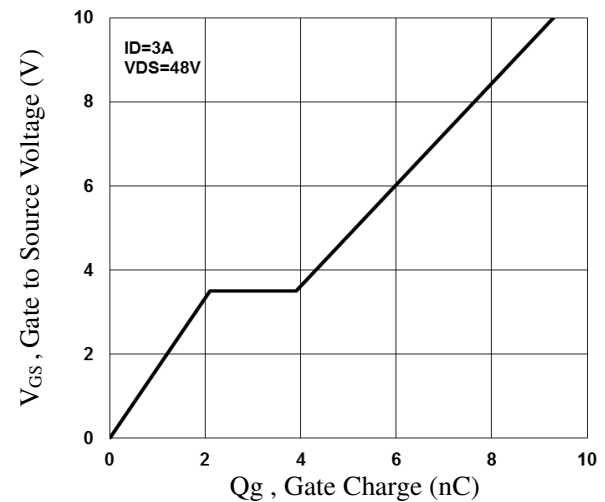


Fig.4 Gate Charge Waveform

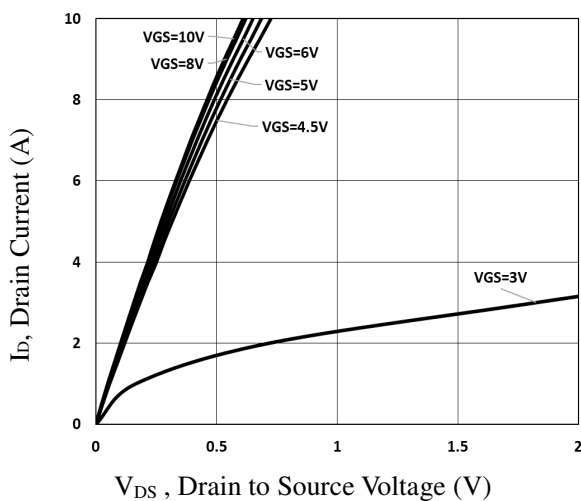


Fig.5 Typical Output Characteristics

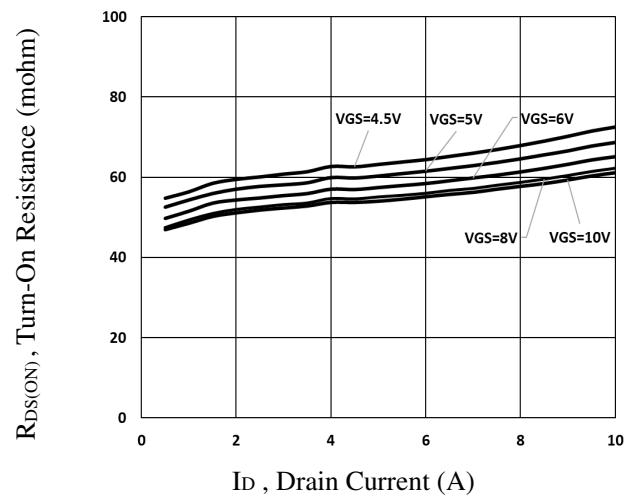


Fig.6 Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristics

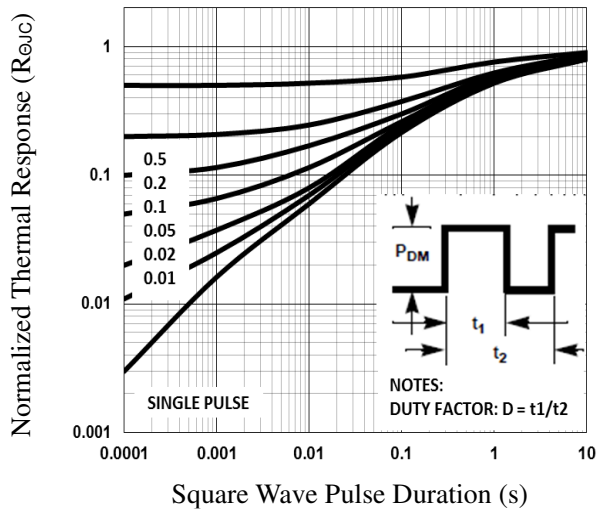


Fig.7 Normalized Transient Response

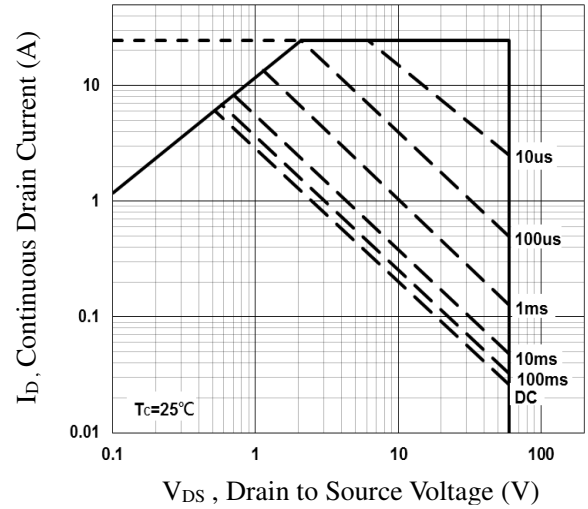


Fig.8 Maximum Safe Operation Area

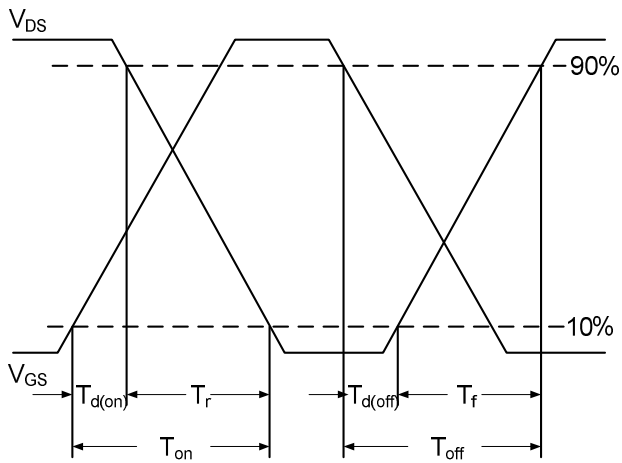
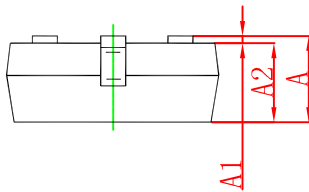
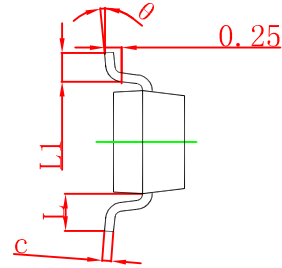
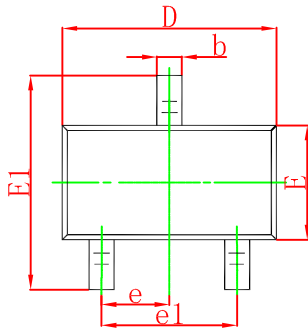


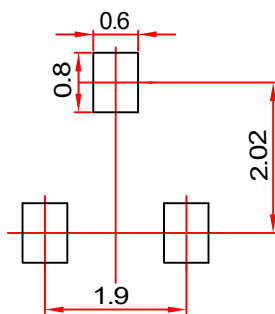
Fig.9 Switching Time Waveform

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.400	0.035	0.055
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in/millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

Package and Ordering Information

Package	Outline	Reel Size	Reel DIA. (mm)	Q'TY/Reel (pcs)
SOT-23	TAPING	7"	330	3000