

Description

The SX2312BI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

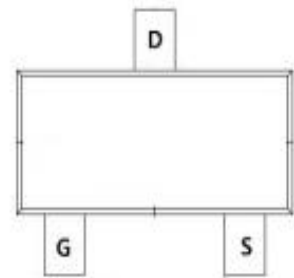
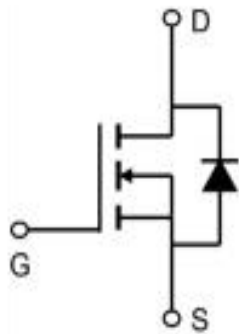
$V_{DS}=20V$ $I_D=6.2A$

$R_{DS(ON)} < 20m\Omega$ @ $V_{GS}=4.5V$

Application

Lithium battery protection

Mobile phone fast charging



Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ C$	Continuous Drain Current ¹	6.2	A
$I_D@T_A=70^\circ C$	Continuous Drain Current ¹	4.1	A
I_{DM}	Pulsed Drain Current ²	24	A
$PD@T_A=25^\circ C$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	85	$^\circ C/W$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	20	22	---	V
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=5A$		16	20	mΩ
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=2.5V$, $I_D=4A$		22	30	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	0.5	0.7	1.2	V
IDSS	Drain-Source Leakage Current	$V_{DS}=16V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 8V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V$, $I_D=3.5A$	---	20	---	S
Qg	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=7A$	---	11.4	---	nC
Qgs	Gate-Source Charge		---	1.6	---	
Qgd	Gate-Drain Charge		---	2.9	---	
Td(on)	Turn-On Delay Time	$V_{DD}=10V$, $V_{GS}=4.5V$, $R_G=3.3$ $I_D=5A$	---	5	---	ns
Tr	Rise Time		---	32.4	---	
Td(off)	Turn-Off Delay Time		---	28	---	
Tf	Fall Time		---	9	---	
Ciss	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	863	---	pF
Coss	Output Capacitance		---	87	---	
Crss	Reverse Transfer Capacitance		---	71	---	
IS	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	6	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2、The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

4、The power dissipation is limited by 175°C junction temperature

5、The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Characteristics

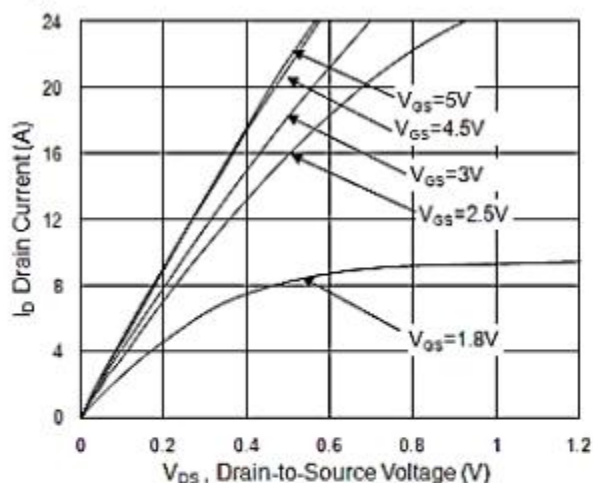


Fig.1 Typical Output Characteristics

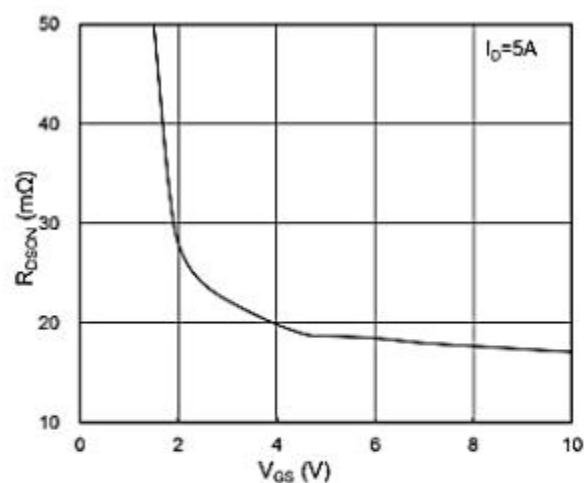


Fig.2 On-Resistance vs. Gate-Source Voltage

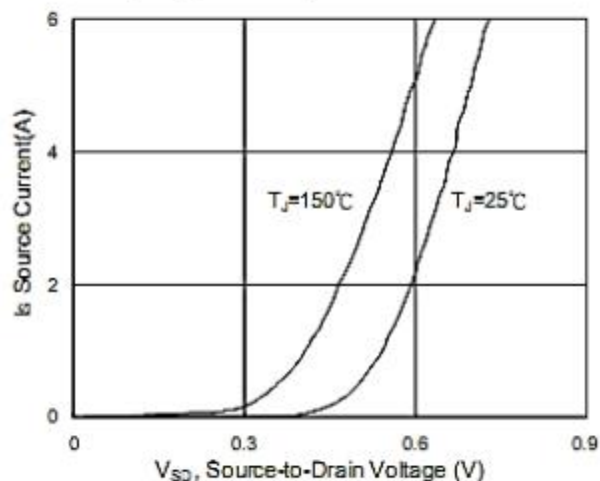


Fig.3 Forward Characteristics of Reverse

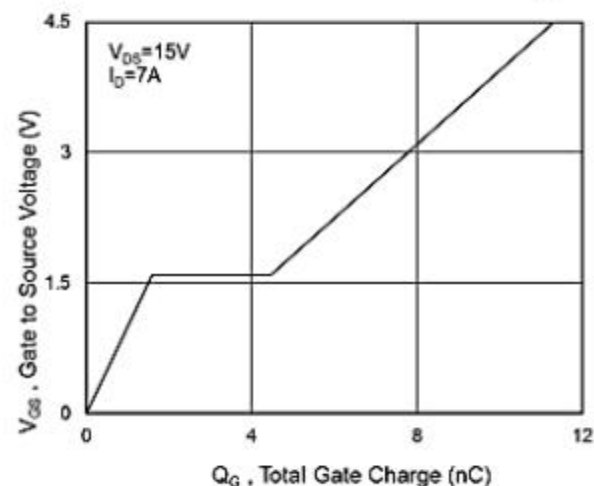


Fig.4 Gate-Charge Characteristics

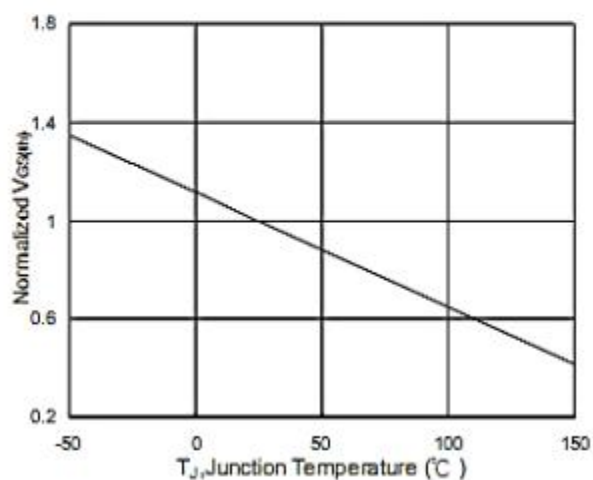


Fig.5 $V_{GS(th)}$ vs. T_J

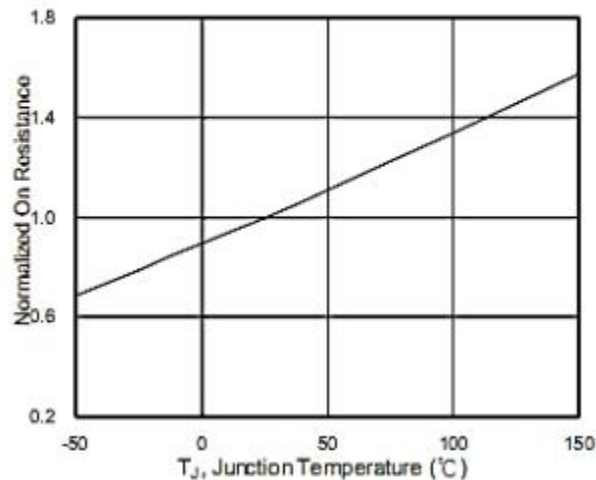


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

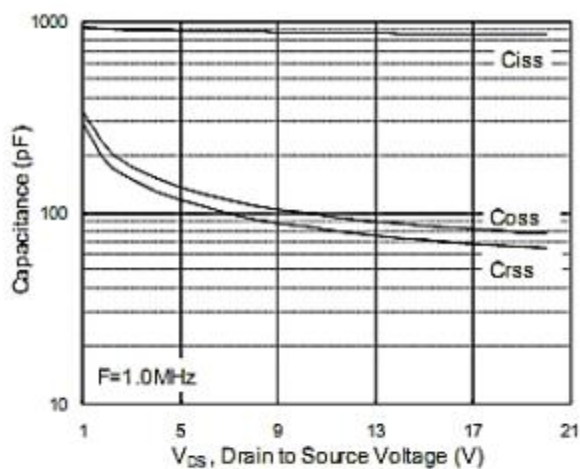


Fig.7 Capacitance

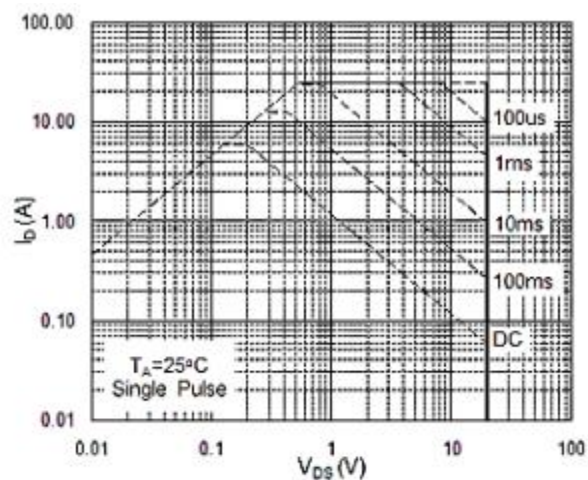


Fig.8 Safe Operating Area

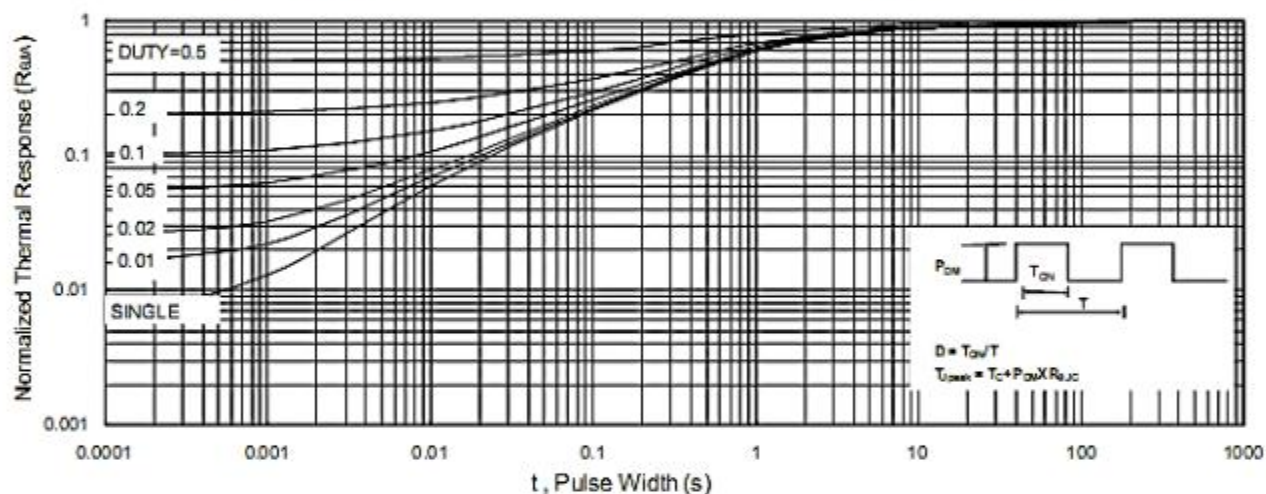


Fig.9 Normalized Maximum Transient Thermal Impedance

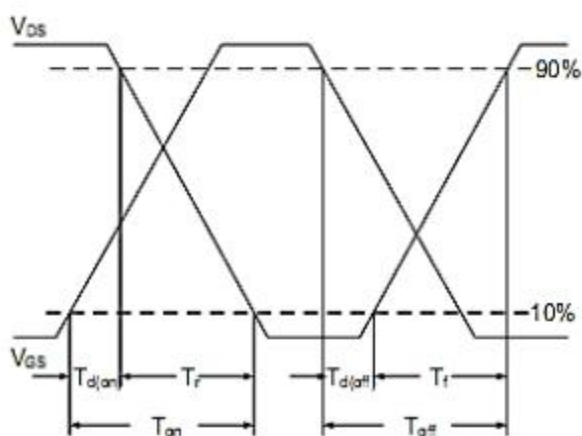


Fig.10 Switching Time Waveform

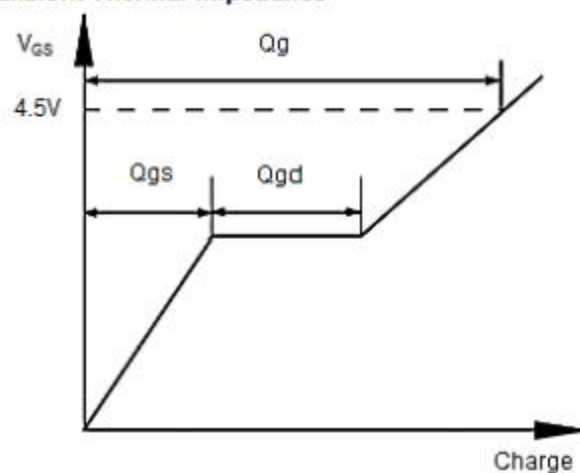
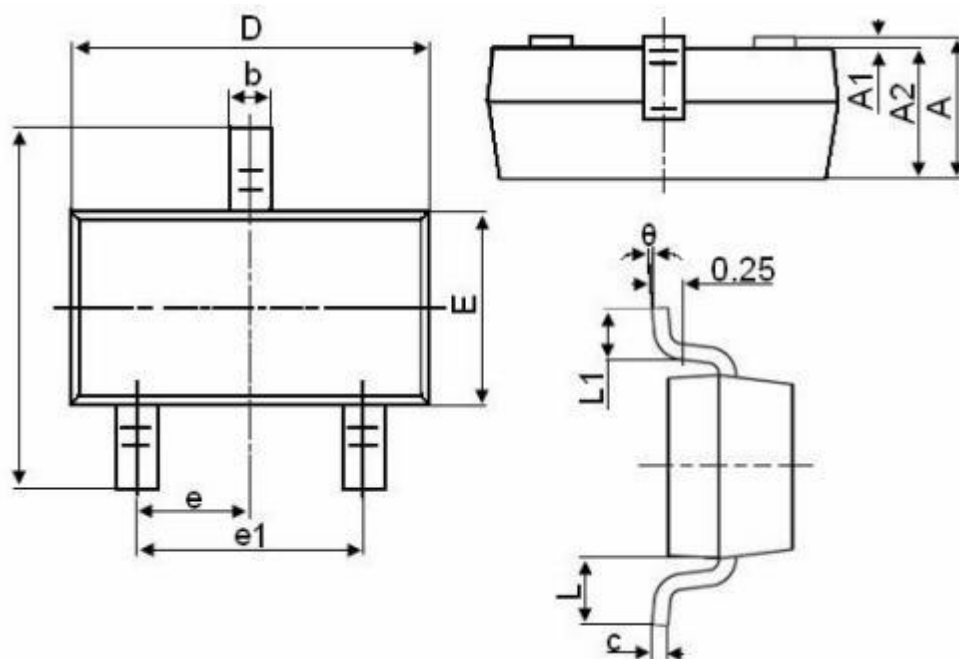


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-XC-Single



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23		3000