

Description

The SX3416AI 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

$V_{DS} = 20V$ $I_D = 6.8A$

$R_{DS(ON)} < 22m\Omega$ @ $V_{GS}=4.5V$

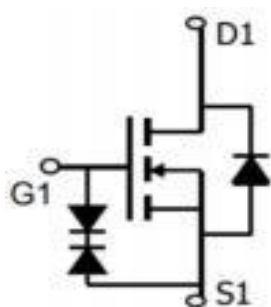
$ESD \geq 2500HBM$

Application

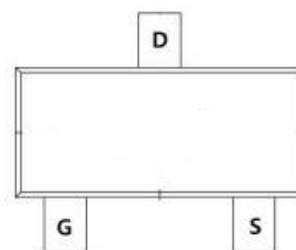
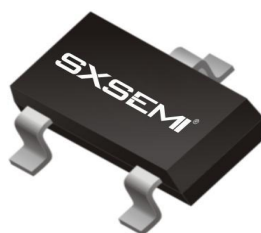
Lithium battery protection

Wireless impact

Mobile phone fast charging



SOT-23



Absolute Maximum Ratings ($T_c=25^\circ C$ 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	6.8	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current	6.0	A
I_{DM}	Pulsed Drain Current ²	30	A
$P_D @ T_A = 25^\circ C$	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	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-ambient ¹	85	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	22		V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.65	1.2	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =4A		15	22	mΩ
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =2.5V, I _D =3A		20	30	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±10V, V _{DS} =0V			±100	nA
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHZ		780		pF
C _{oss}	Output Capacitance			140		
C _{rss}	Reverse Transfer Capacitance			80		
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A		11		nC
Q _{gs}	Gate-Source Charge			2.3		
Q _{gd}	Gate-Drain Charge			2.9		
t _{D(on)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A, R _{GEN} =3Ω		9		ns
t _r	Turn-on Rise Time			30		
t _{D(off)}	Turn-off Delay Time			35		
t _f	Turn-off fall Time			10		
V _{SD}	Diode Forward Voltage	I _S =6.8A, V _{GS} =0V			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 ≤ 300us , duty cycle ≤ 2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation

Typical Characteristics

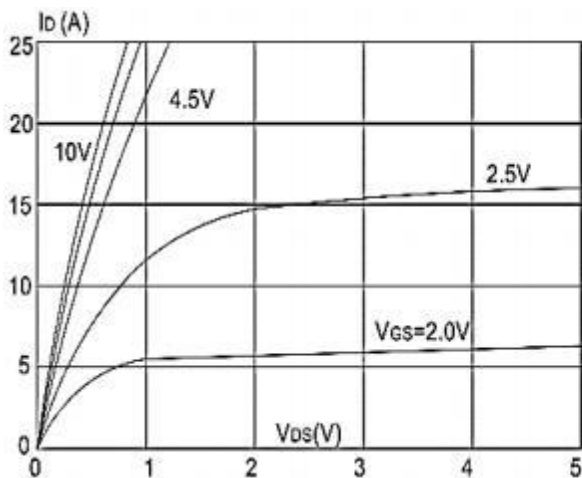


Figure 1: Output Characteristics

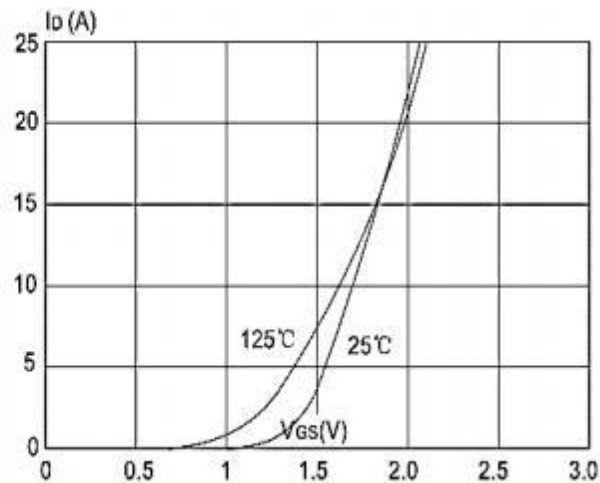


Figure 2: Typical Transfer Characteristics

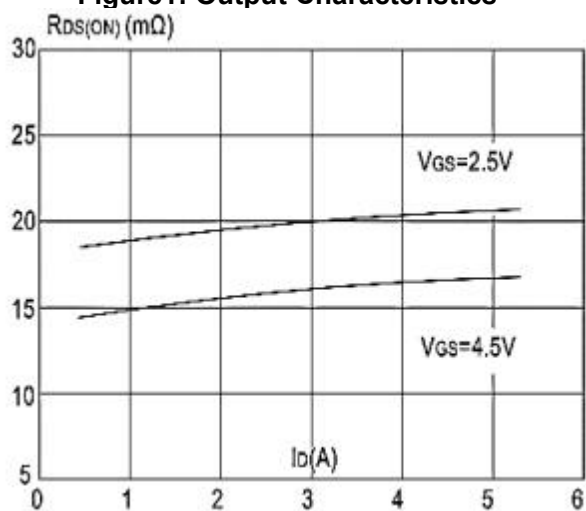


Figure 3: On-resistance vs. Drain Current

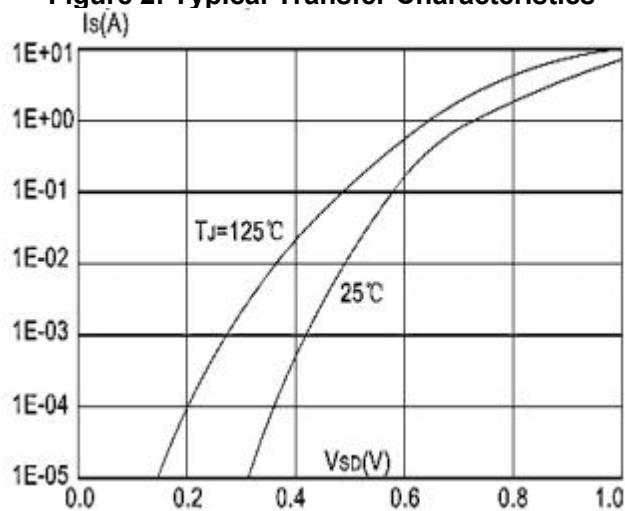


Figure 4: Body Diode Characteristics

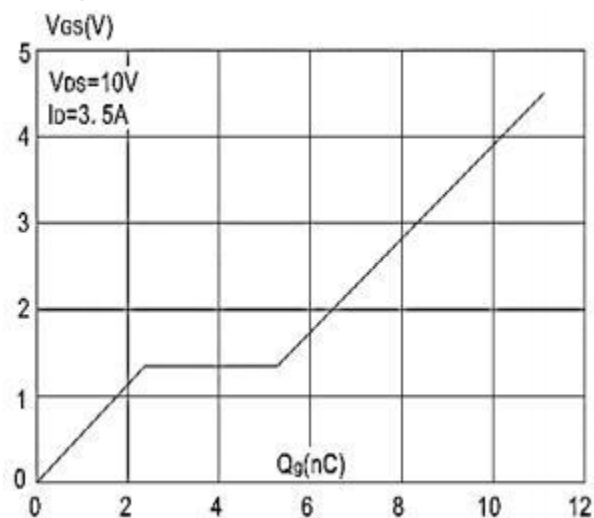


Figure 5: Gate Charge Characteristics

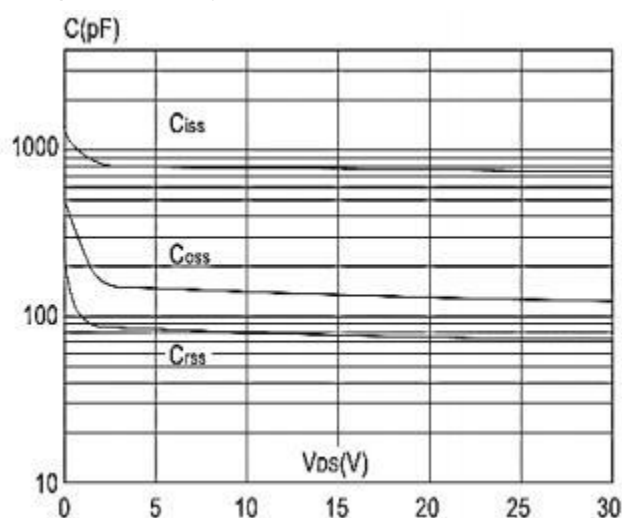


Figure 6: Capacitance Characteristics

Typical Characteristics

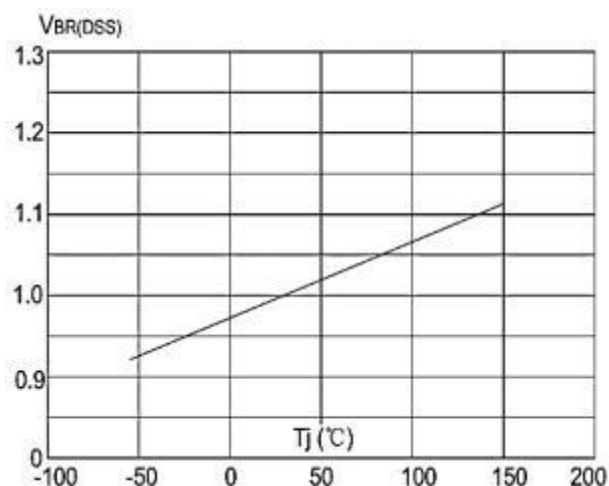


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

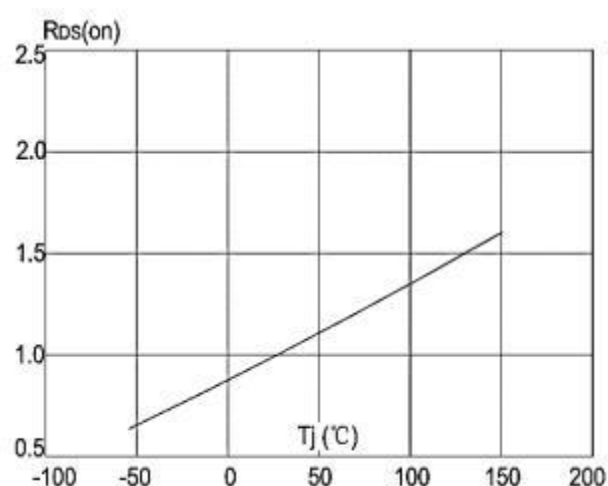


Figure 8: Normalized on Resistance vs. Junction Temperature

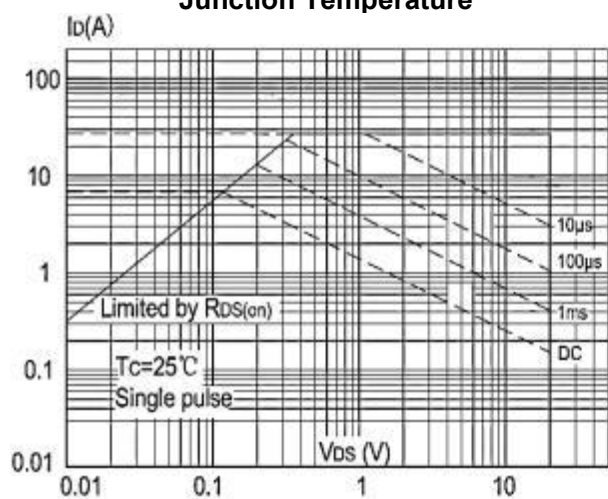


Figure 9: Maximum Safe Operating Area

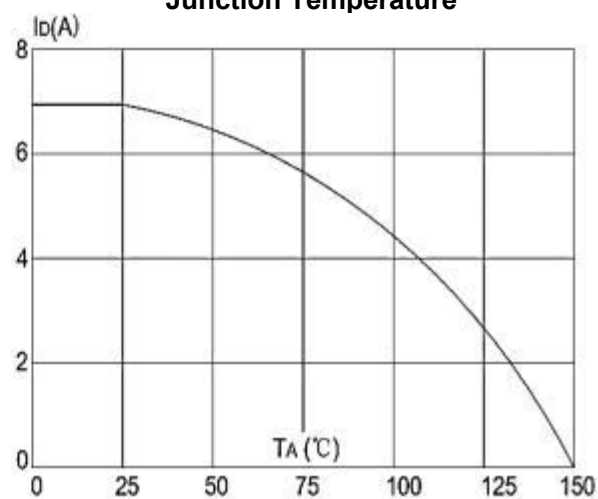


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

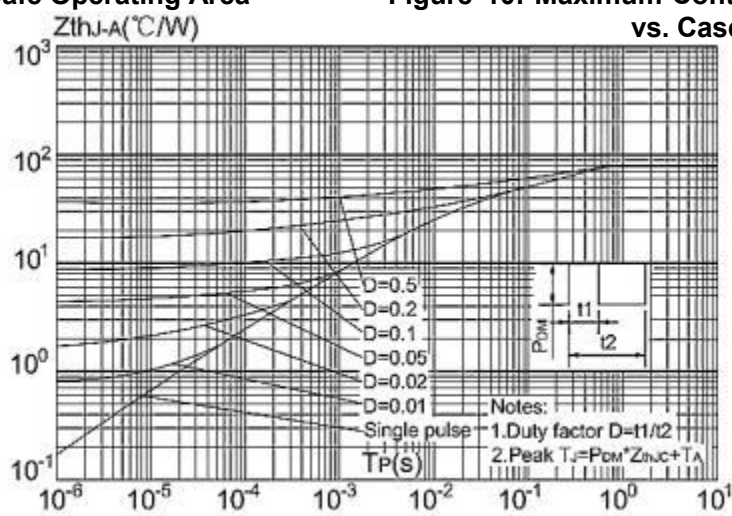
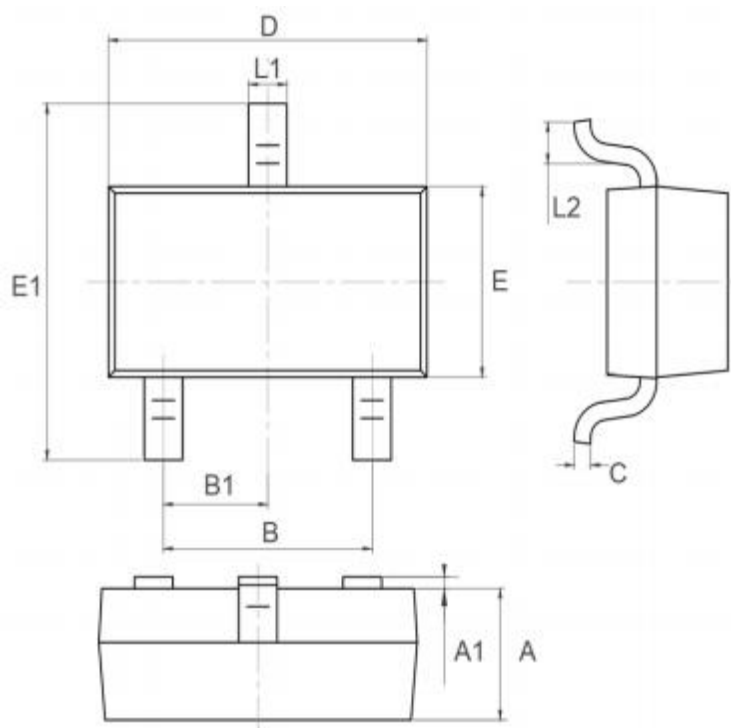


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-SOT23-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	0.9	1	1.1
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.08	0.115	0.15
D	2.8	2.9	3
E	1.2	1.3	1.4
E1	2.25	2.4	2.55
L1	0.3	0.4	0.5
L2	0.2	0.35	0.5

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23		3000