

Description

The SX2309MI 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

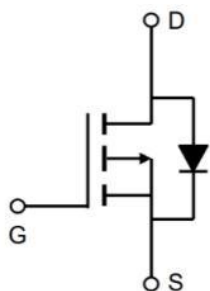
$V_{DS} = -20V$ $I_D = -12A$

$R_{DS(ON)} < 15m\Omega$ @ $V_{GS} = -4.5V$

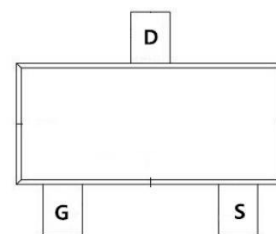
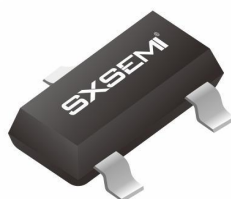
Application

electronic cigarette

Load switch



SOT-23-3L



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
$I_D @ T_c = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-12	A
$I_D @ T_c = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-8.5	A
I_{DM}	Pulsed Drain Current ²	-36	A
$P_D @ T_c = 25^\circ C$	Total Power Dissipation ³	2.4	W
TSTG	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-Case ¹	3.9	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-to-Source breakdown voltage	V _{GS} = 0V, I _D = 250μA	-20	-24	—	V
R _{DS(on)}	Static Drain-to-Source on-resistance	V _{GS} = -4.5V, I _D = -10A	—	10	15	mΩ
		V _{GS} = -2.5V, I _D = -8.9A	—	12	16	
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 250μA	-0.5	0.6	-1.2	V
I _{DSS}	Drain-to-Source leakage current	V _{DS} = -12V, V _{GS} = 0V	—	—	-1	μA
I _{GSS}	Gate-to-Source forward leakage	V _{GS} = 8V	—	—	100	nA
		V _{GS} = -8V	—	—	-100	
g _{FS}	Forward Transconductance	V _{DS} = -5V, I _D = -10A	-3	—	—	S
Q _g	Total gate charge	I _D = -10A, V _{DD} = -6V, V _{GS} = -4.5V	—	21	—	nC
Q _{gs}	Gate-to-Source charge		—	2.5	—	
Q _{gd}	Gate-to-Drain("Miller") charge		—	6	—	
t _{d(on)}	Turn-on delay time	V _{GS} = -4.5V, V _{DD} = -6V, I _D = -10A, R _{GEN} = 6Ω	—	30	—	ns
t _r	Rise time		—	48	—	
t _{d(off)}	Turn-Off delay time		—	97	—	
t _f	Fall time		—	65	—	
C _{iss}	Input capacitance	V _{GS} = 0V V _{DS} = -6V f = 1MHz	—	2138	—	pF
C _{oss}	Output capacitance		—	273	—	
C _{rss}	Reverse transfer capacitance		—	236	—	
I _S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode.	—	—	-30	A
I _{SM}	Pulsed Source Current (Body Diode)		—	—	-90	A
V _{SD}	Diode Forward Voltage	I _S = -2A, V _{GS} = 0V	—	-0.77	-1.2	V
t _{rr}	Reverse Recovery Time	T _J = 25°C, I _F = -10A, di/dt = 100A/μs	—	16	—	ns
Q _{rr}	Reverse Recovery Charge		—	5.9	—	uC

Note :

- 1、The data tested by surface mounted on a 1 inch 2 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

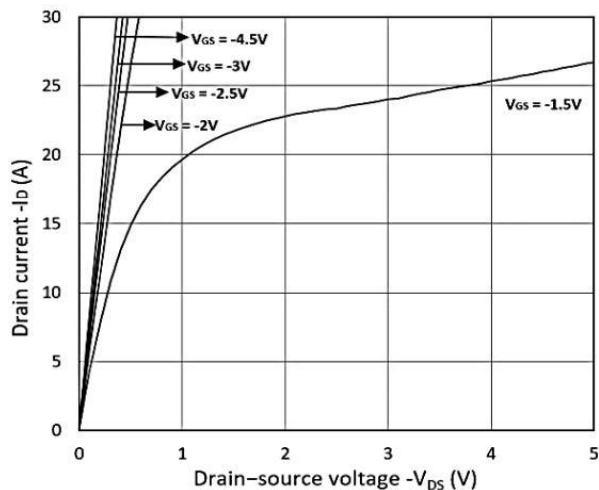


Figure 1. Output Characteristics

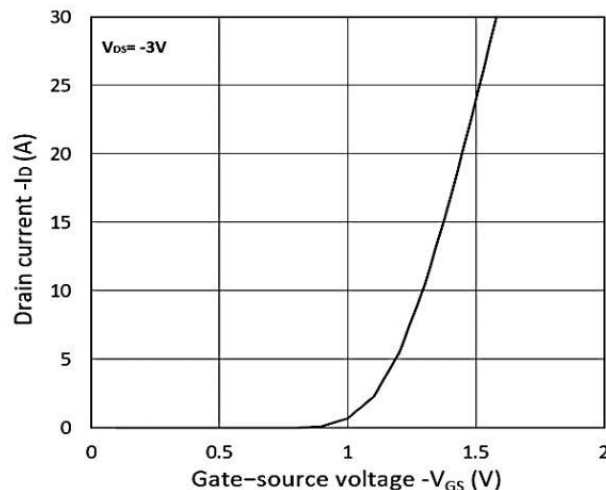


Figure 2. Transfer Characteristics

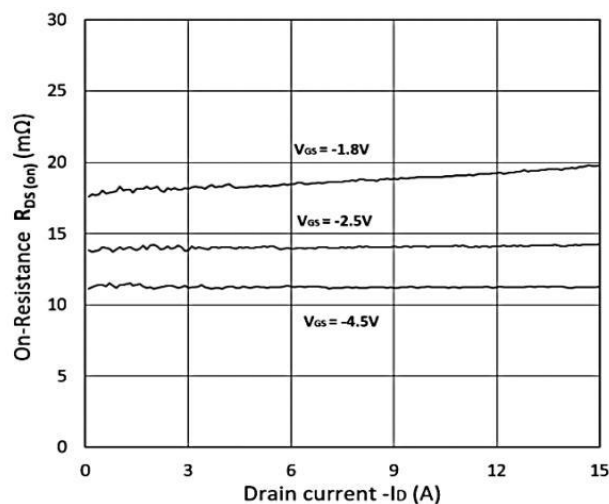


Figure 3. $R_{DS(ON)}$ vs. I_D

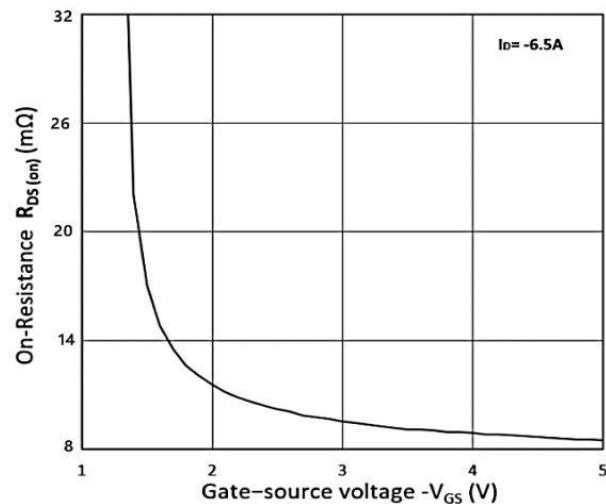


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

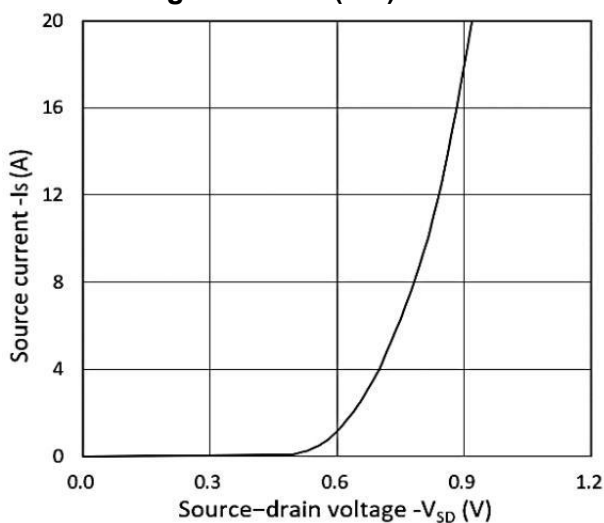


Figure 5. Forward Characteristics of Reverse

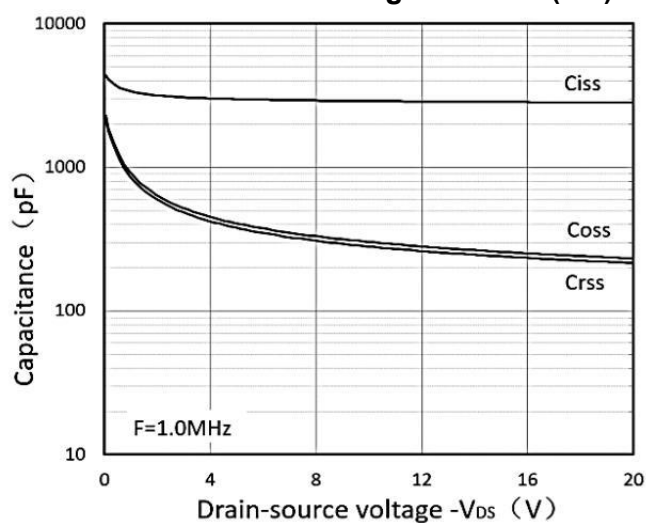
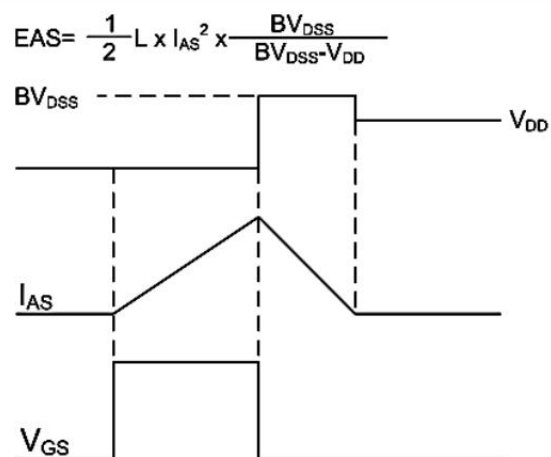
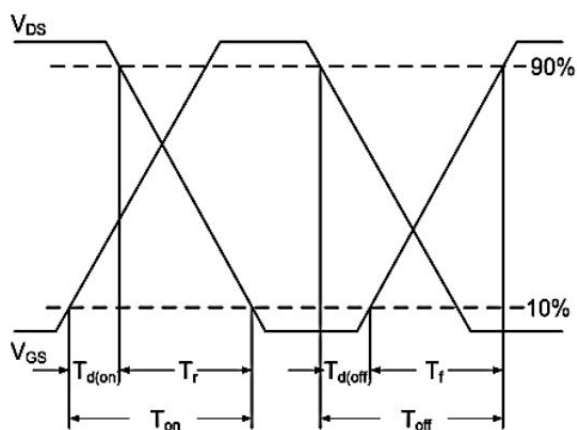
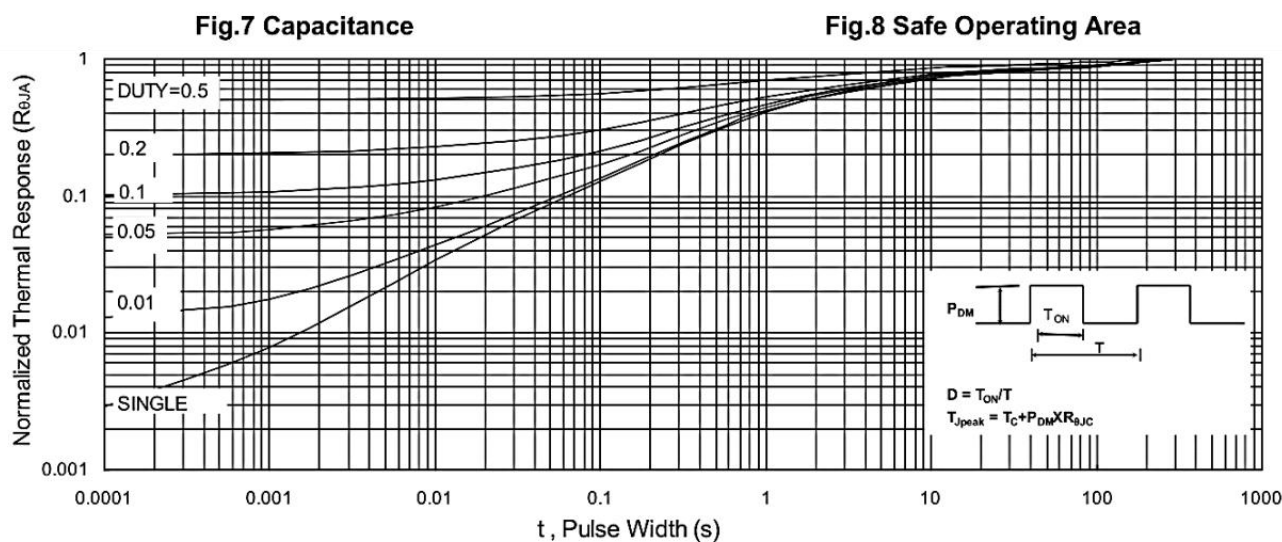
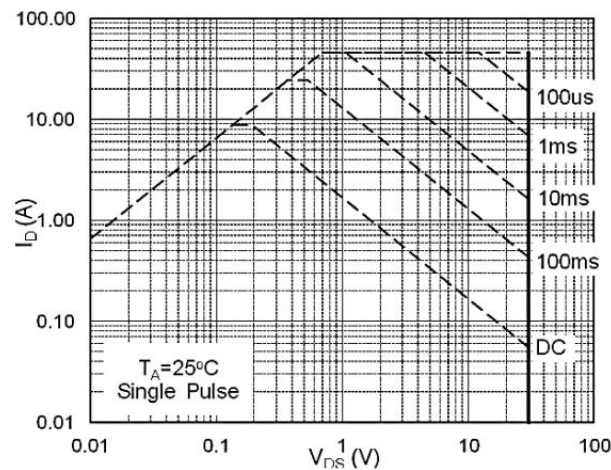
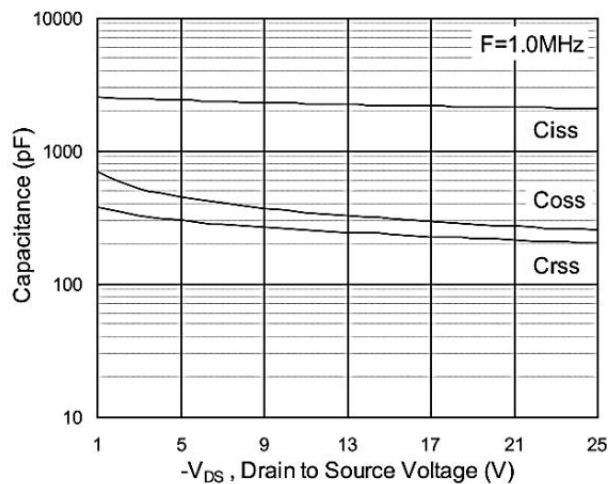
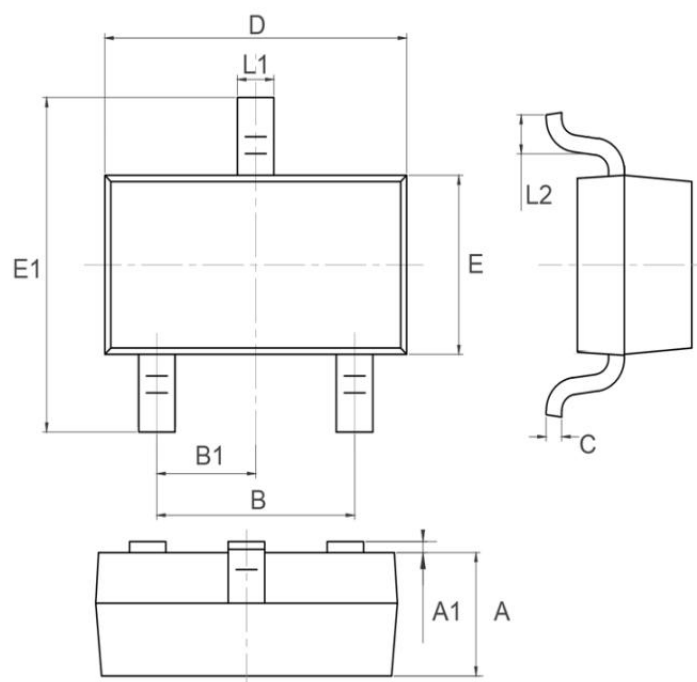


Figure 6. Capacitance Characteristics

Typical Characteristics



Package Mechanical Data-SOT23-3L-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	1	1.1	1.2
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.1	0.15	0.2
D	2.82	2.92	3.02
E	1.5	1.6	1.7
E1	2.65	2.8	2.95
L1	0.3	0.4	0.5
L2	0.3	0.45	0.6

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23-3L		3000