

Description

The SX10N04MSI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 40V$ $I_D = 10A$

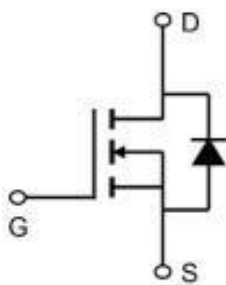
$R_{DS(ON)} < 20m\Omega @ V_{GS}=10V$

Application

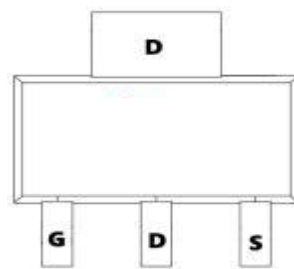
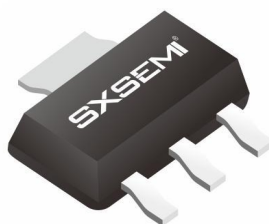
Automotive lighting

Load switch

Uninterruptible power supply



SOT-223-3L



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

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _A =25°C	Continuous Drain Current ¹	10	A
I _D @T _A =70°C	Continuous Drain Current ¹	6.7	A
I _{DM}	Pulsed Drain Current ²	50	A
E _{AS}	Single Pulse Avalanche Energy ³	31	mJ
I _{AS}	Avalanche Current	25	A
P _D @T _A =25°C	Total Power Dissipation ⁴	1.9	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-ambient ¹	65	°C/W

Electrical Characteristics@T_J=25°C(unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40	44	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.032	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =7A	---	15	20	mΩ
		V _{GS} =4.5V , I _D =6A	---	18	25	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	---	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4.8	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =32V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =7A	---	32	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.1	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =32V , V _{GS} =4.5V , I _D =7A	---	9.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.8	---	
Q _{gd}	Gate-Drain Charge		---	3.9	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =20V , V _{GS} =10V , R _G =3.3Ω I _D =7A	---	2.8	---	ns
T _r	Rise Time		---	40.4	---	
T _{d(off)}	Turn-Off Delay Time		---	22.8	---	
T _f	Fall Time		---	6.4	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	1013	---	pF
C _{oss}	Output Capacitance		---	107	---	
C _{rss}	Reverse Transfer Capacitance		---	76	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	8.4	A
I _{SM}	Pulsed Source Current ^{2,5}	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	50	A
V _{SD}	Diode Forward Voltage ²		---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =7A , dI/dt=100A/μs , T _J =25°C	---	10	---	nS
Q _{rr}	Reverse Recovery Charge		---	3.3	---	nC

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

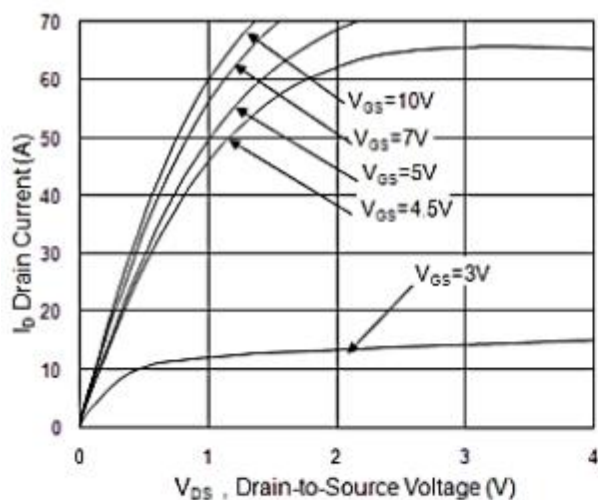


Fig.1 Typical Output Characteristics

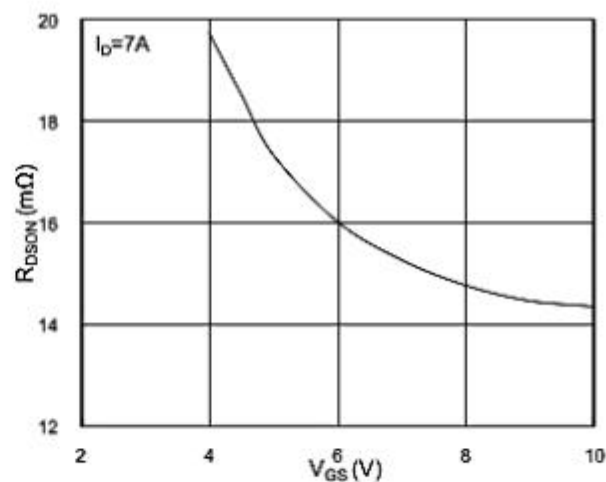


Fig.2 On-Resistance vs. G-S Voltage

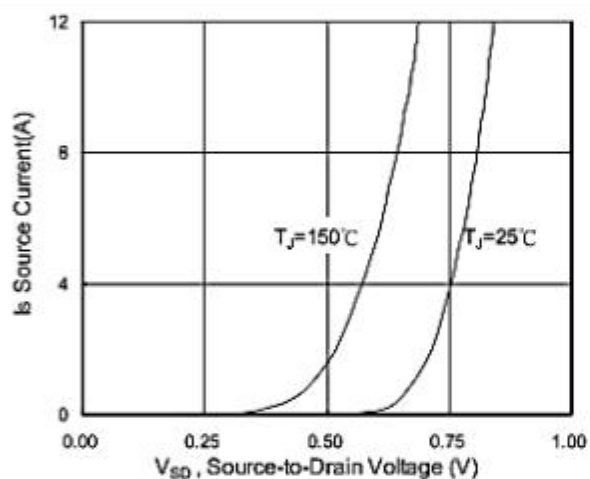


Fig.3 Forward Characteristics of Reverse

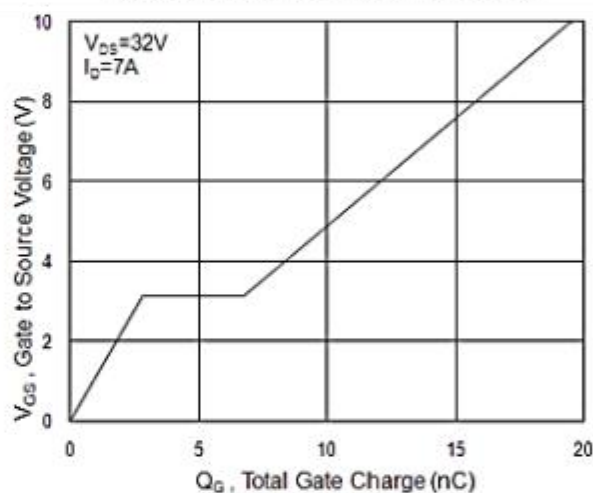


Fig.4 Gate-Charge Characteristics

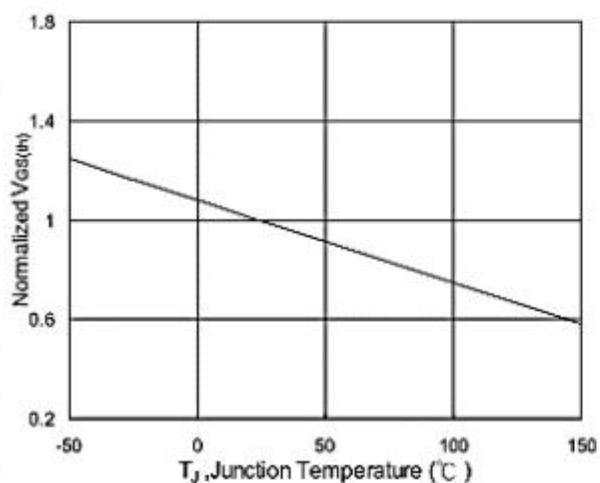


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

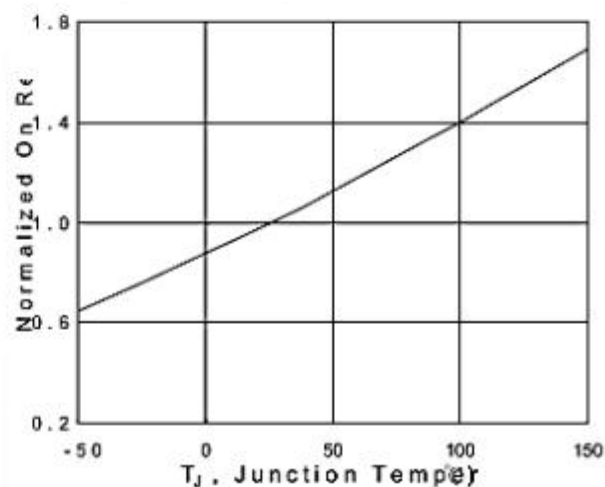
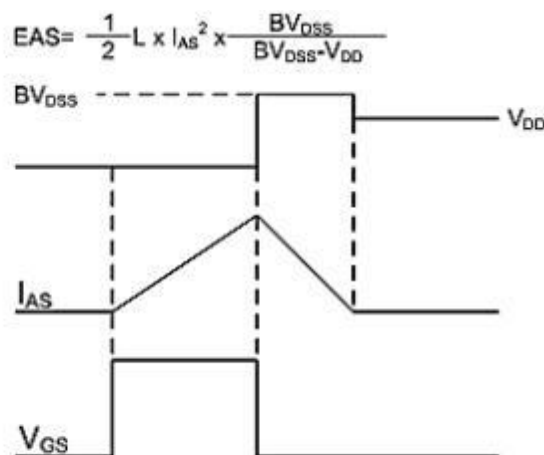
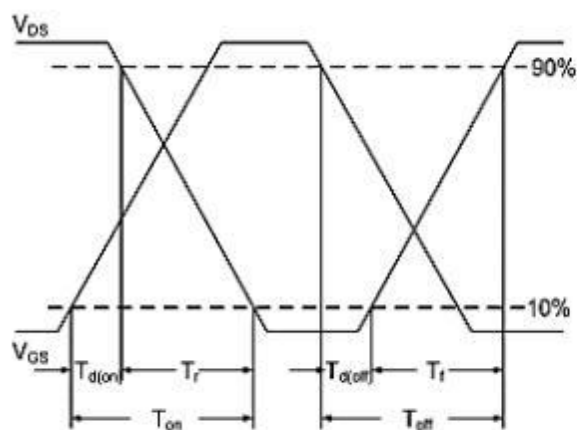
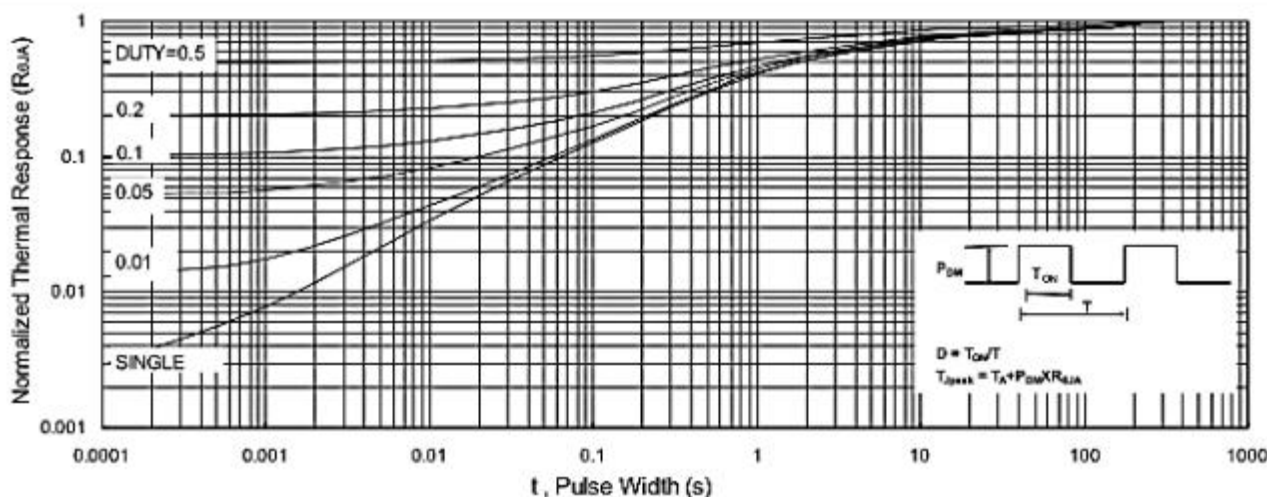
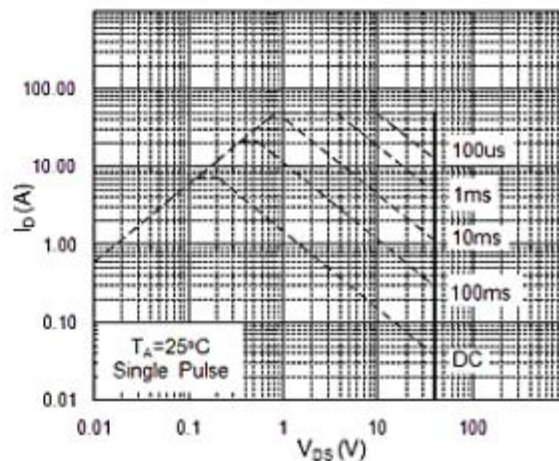
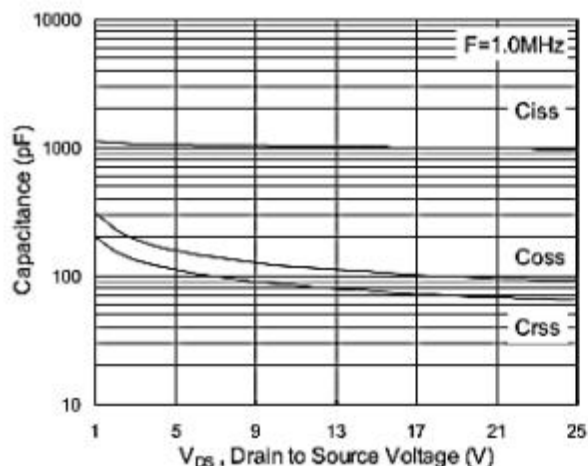
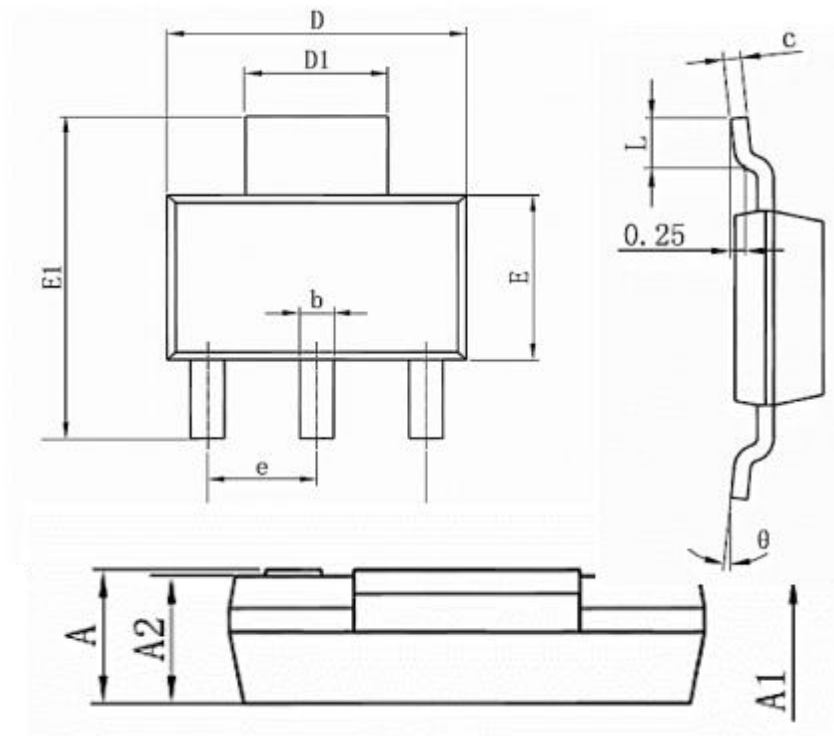


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics



Package Mechanical Data:SOT223-3L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.52	1.8	0.06	0.049
A1	0.000	0.100	0.000	0.004
A2	1.5	1.7	0.059	0.045
b	0.66	0.82	0.026	0.032
c	0.25	0.35	0.010	0.014
D	6.2	6.4	0.244	0.252
D1	2.9	3.1	0.114	0.122
E	3.3	3.7	0.130	0.146
E1	6.83	7.07	0.269	0.278
e	2.300(BSC)		0.037(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.15	0.035	0.045
θ	0°	10°	0°	10°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT223-3L		3000