

Description

The SX4N06SI 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

$V_{DS}=60V$ $I_D=4.8A$

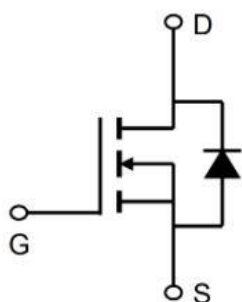
$R_{DS(ON)} < 95m\Omega$ @ $V_{GS}=10V$

Application

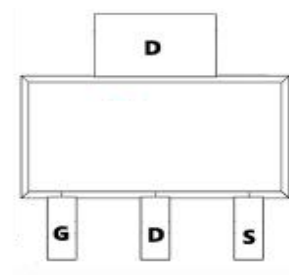
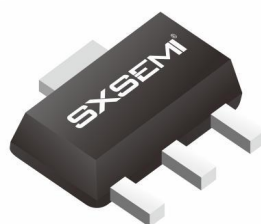
Battery protection

Load switch

Uninterruptible power supply



SOT-89-3L



Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	4.8	A
$I_D@T_c=100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	2.0	A
I_{DM}	Pulsed Drain Current ²	15	A
EAS	Single Pulse Avalanche Energy ³	6.2	mJ
$P_D@T_c=25^\circ\text{C}$	Total Power Dissipation ⁴	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	48	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	60	65	---	V
$\Delta BVDSS/\Delta T_J$	BV _{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.054	---	V/ $^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=2A$	---	72	95	m Ω
		$V_{GS}=4.5V$, $I_D=1A$	---	85	100	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.5	2.5	V
$\Delta V_{GS(th)}$	V _{GS(th)} Temperature Coefficient		---	-4.96	---	mV/ $^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=48V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	uA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V$, $I_D=2A$	---	13	---	S
Qg	Total Gate Charge (4.5V)	$V_{DS}=48V$, $V_{GS}=4.5V$, $I_D=2A$	---	5	7.0	nC
Qgs	Gate-Source Charge		---	1.68	2.4	
Qgd	Gate-Drain Charge		---	1.9	2.7	
Td(on)	Turn-On Delay Time	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=2A$	---	1.6	3.2	ns
T _r	Rise Time		---	7.2	13	
Td(off)	Turn-Off Delay Time		---	25	50	
T _f	Fall Time		---	14.4	28.8	
Ciss	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	511	715	pF
Coss	Output Capacitance		---	38	53	
Crss	Reverse Transfer Capacitance		---	25	35	
IS	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	2.3	A
ISM	Pulsed Source Current ^{2,4}		---	---	9.2	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
trr	Reverse Recovery Time	$I_F=2A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	9.7	---	nS
Q _{rr}	Reverse Recovery Charge		---	5.8	---	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=2A$
- 4、The power dissipation is limited by 150°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

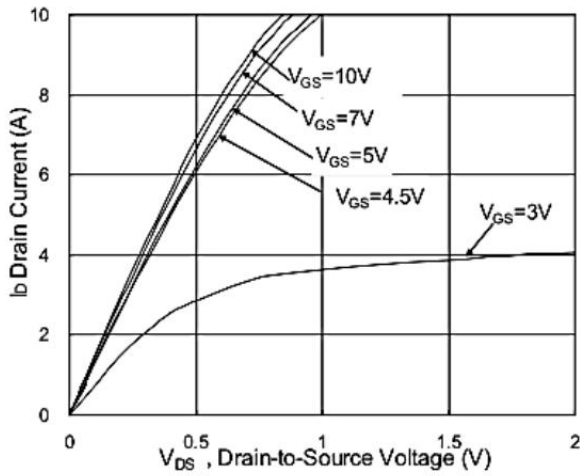


Fig.1 Typical Output Characteristics

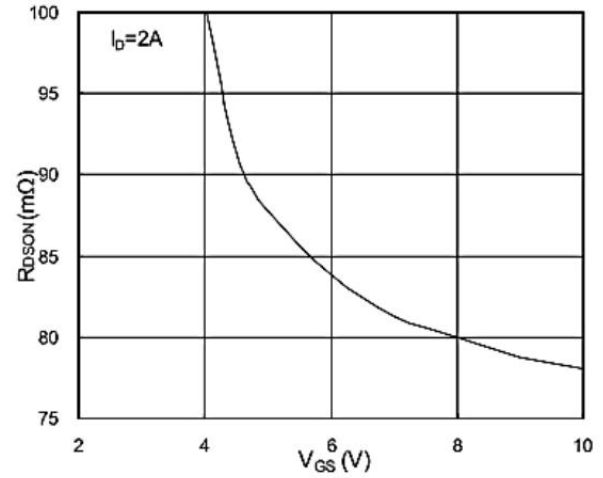


Fig.2 On-Resistance v.s Gate-Source

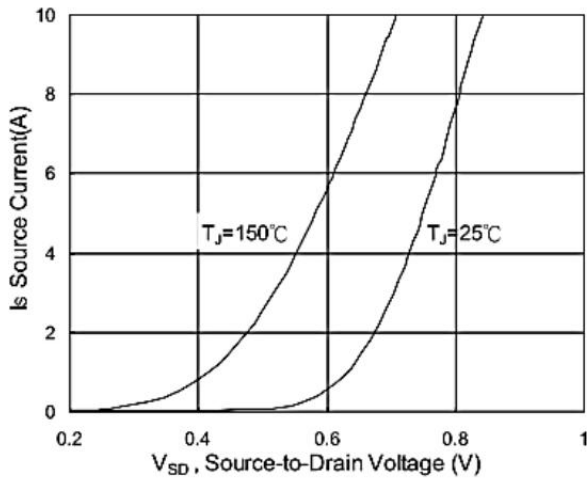


Fig.3 Forward Characteristics of Reverse

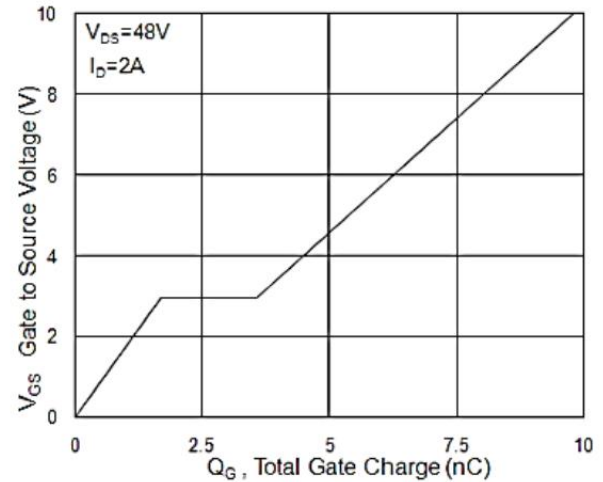


Fig.4 Gate-Charge Characteristics

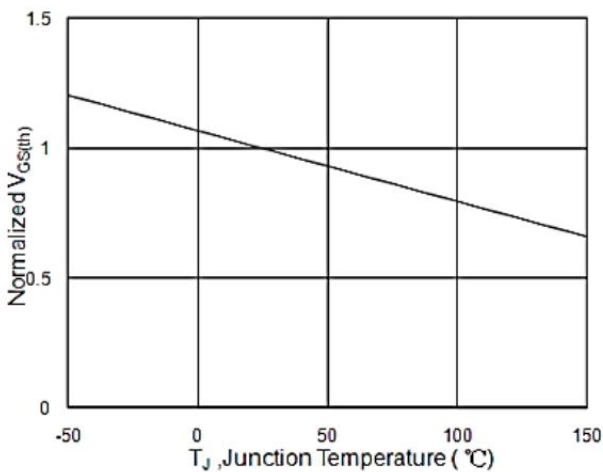


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

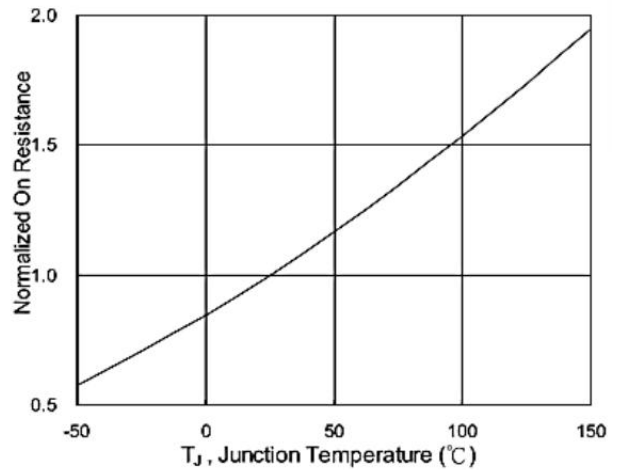


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Typical Characteristics

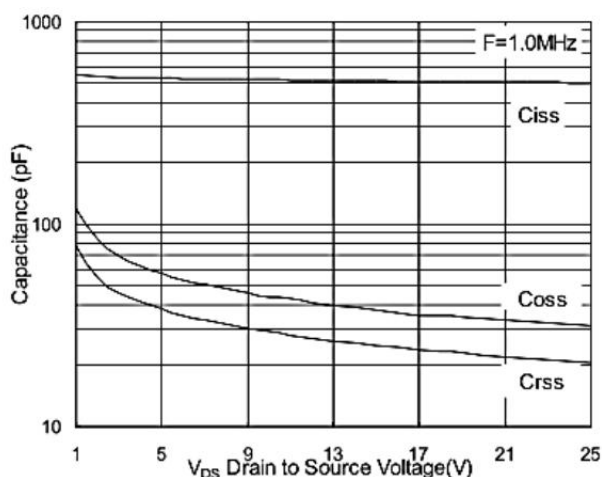


Fig.7 Capacitance

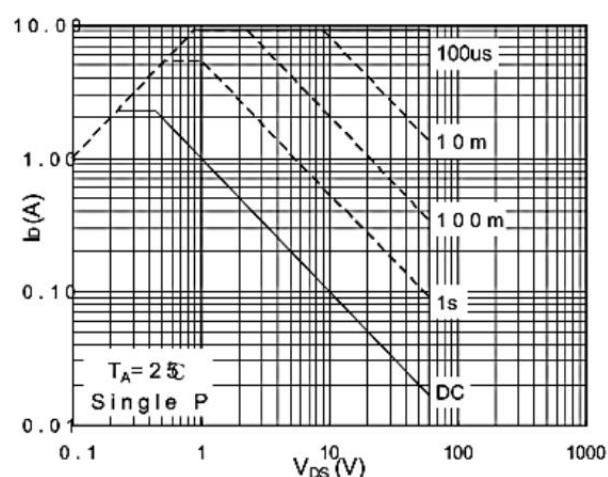


Fig.8 Safe Operating Area

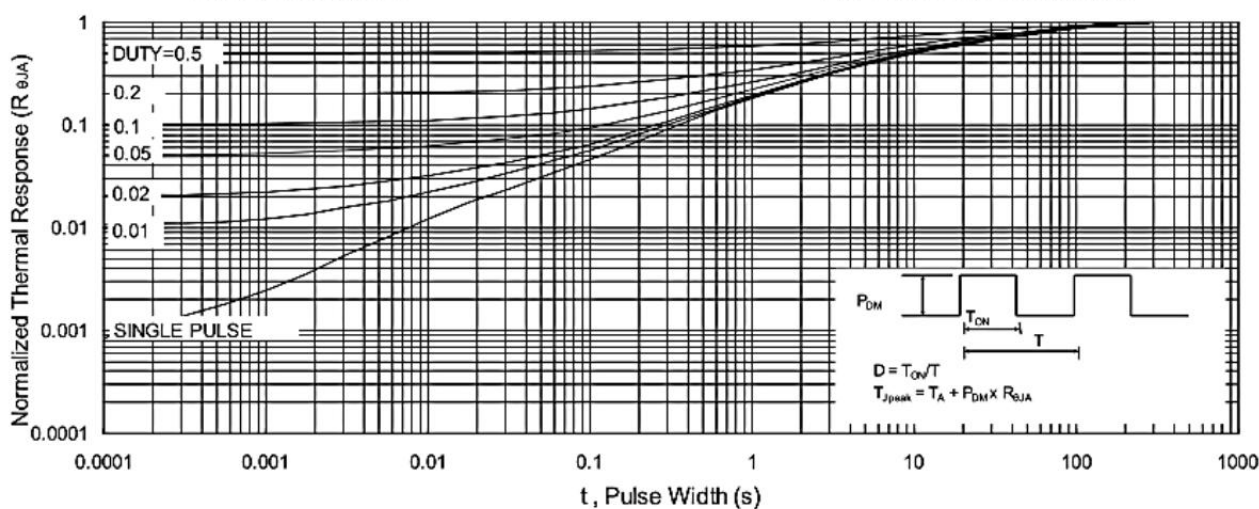


Fig.9 Normalized Maximum Transient Thermal Impedance

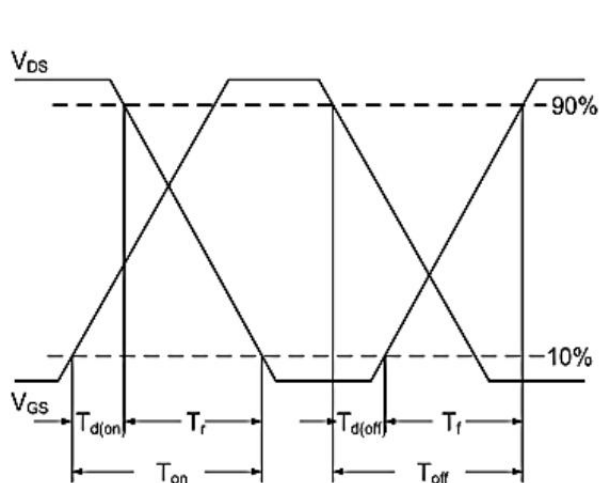


Fig.10 Switching Time Waveform

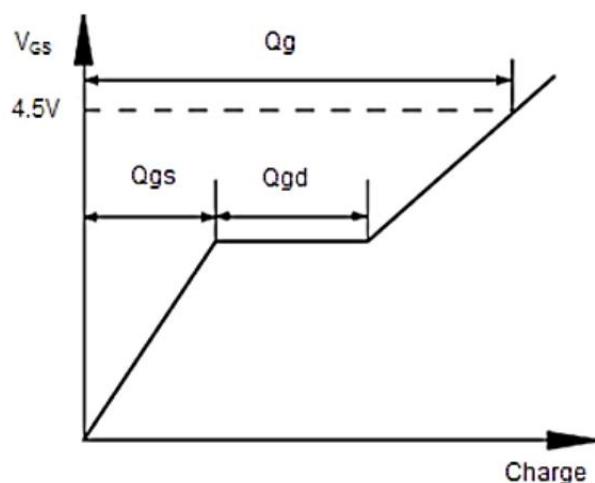
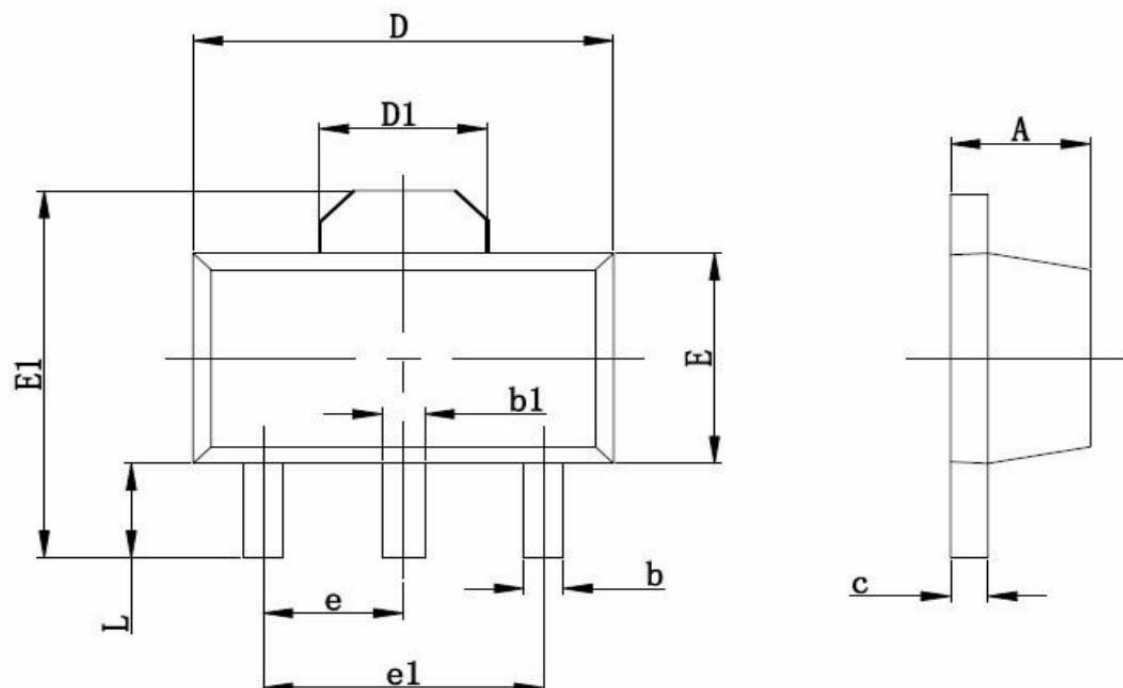


Fig.11 Gate Charge Waveform

Package Mechanical Data:SOT89-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT-89-3L		3000