

Description

The SX4N20SI 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

$V_{DS} = 200V$ $I_D = 4.5A$

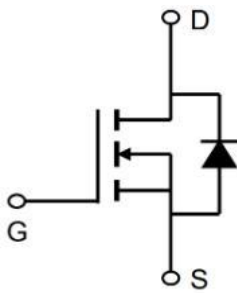
$R_{DS(ON)} < 600m\Omega @ V_{GS}=10V$

Application

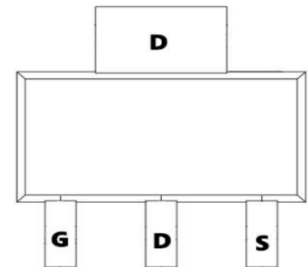
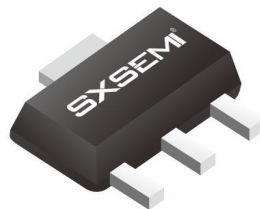
Automotive lighting

Load switch

Uninterruptible power supply



SOT-89-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Drain Current, $V_{GS} @ 10V$	4.5	A
$I_D @ T_C=100^\circ C$	Drain Current, $V_{GS} @ 10V$	2.25	A
IDM	Pulsed Drain Current ¹	10	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation	2	W
$P_D @ T_A=25^\circ C$	Total Power Dissipation ³	1.1	W
TSTG	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Maximum Thermal Resistance, Junction-ambient	125	°C/W
$R_{\theta JC}$	Maximum Thermal Resistance, Junction-case	3.9	°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	200	230	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =1A	---	500	600	mΩ
		V _{GS} =4.5V , I _D =1A	---	680	850	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	2	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =200V , V _{GS} =0V , T _J =25°C	---	---	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =1A	---	10	---	S
Q _g	Total Gate Charge (10V)	V _{DS} =160V , V _{GS} =10V , I _D =1A	---	15		nC
Q _{gs}	Gate-Source Charge		---	3.0		
Q _{gd}	Gate-Drain Charge		---	5.2		
T _{d(on)}	Turn-On Delay Time	V _{DD} =100V , V _{GS} =10V , R _G =3 , I _D =1A	---	22		ns
T _r	Rise Time		---	34		
T _{d(off)}	Turn-Off Delay Time		---	45		
T _f	Fall Time		---	11		
C _{iss}	Input Capacitance	V _{DS} =25V , V _{GS} =0V , F=1MHz	---	900		pF
C _{oss}	Output Capacitance		---	130		
C _{rss}	Reverse Transfer Capacitance		---	4.6		
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	1	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =1A , di/dt=100A/μs , T _J =25°C	---	85	---	nS
Q _{rr}	Reverse Recovery Charge		---	257	---	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 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

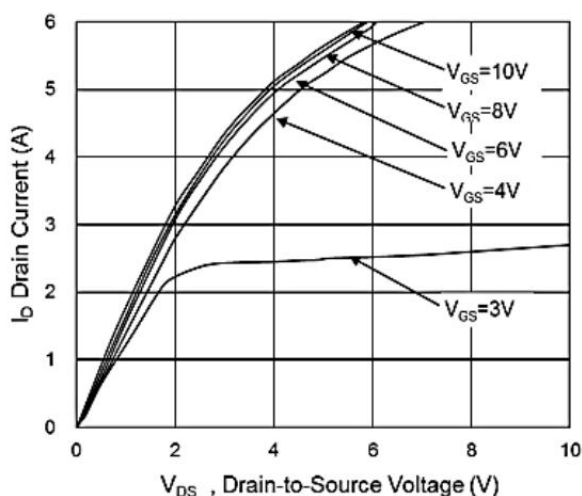


Fig.1 Typical Output Characteristics

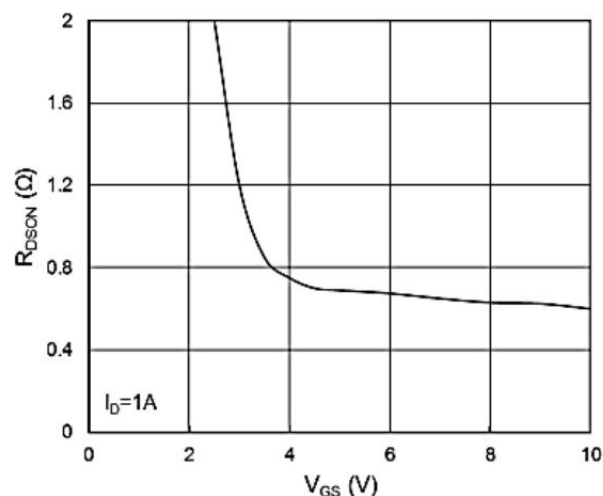


Fig.2 On-Resistance vs. G-S Voltage

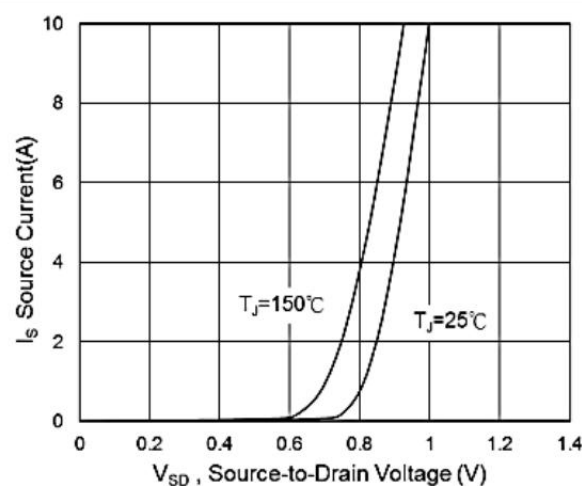


Fig.3 Forward Characteristics of Reverse

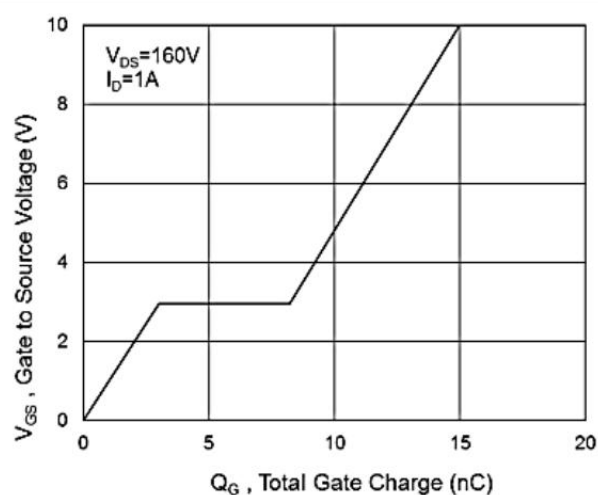


Fig.4 Gate-Charge Characteristics

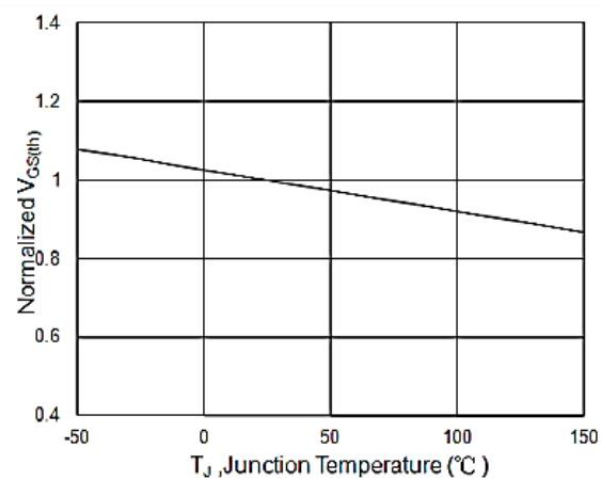


Fig.5 $V_{GS(th)}$ vs. T_J

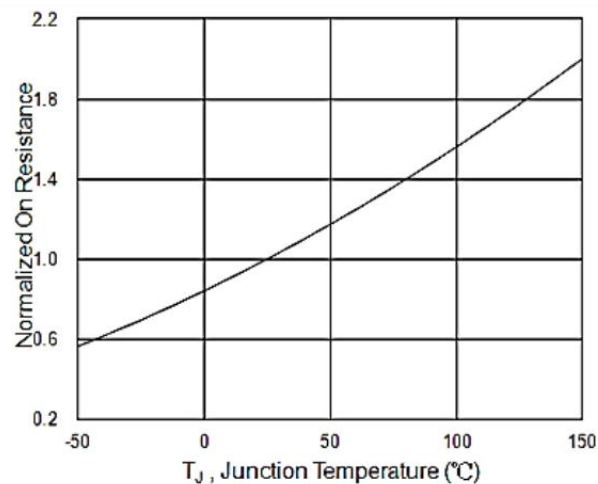
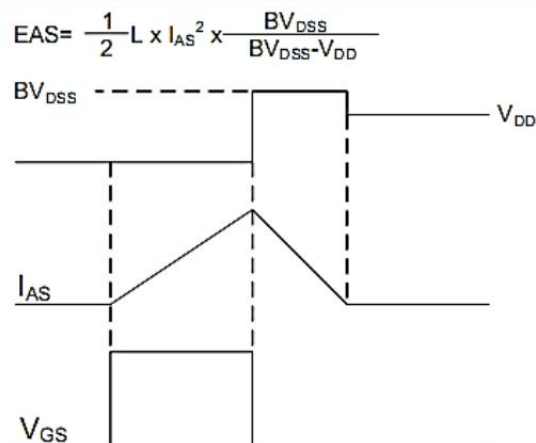
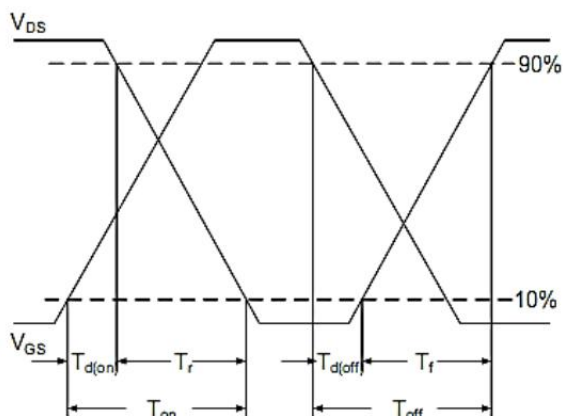
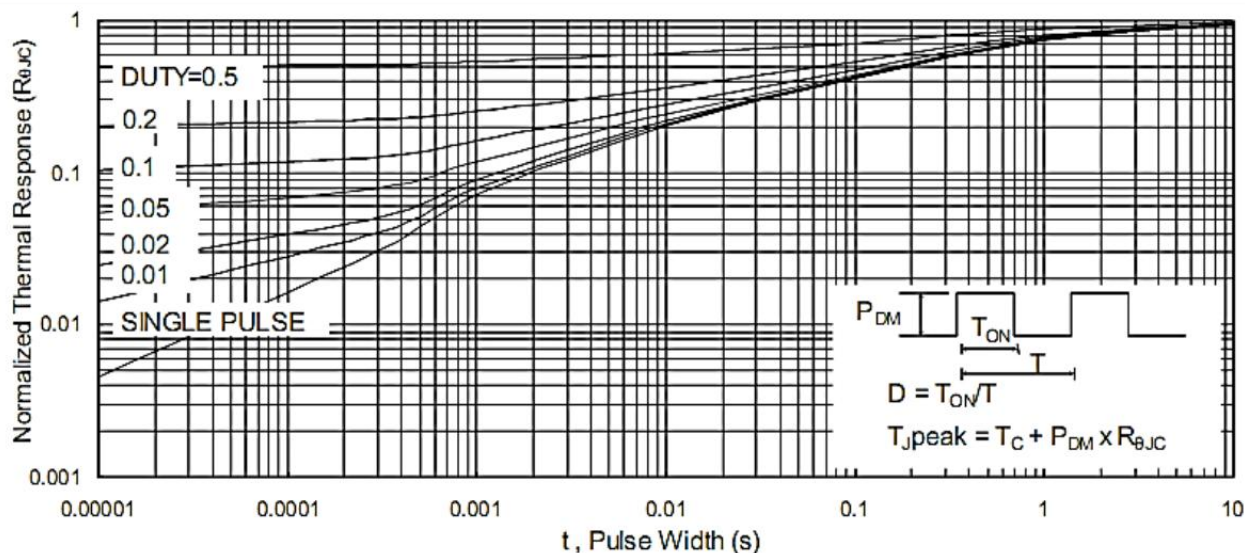
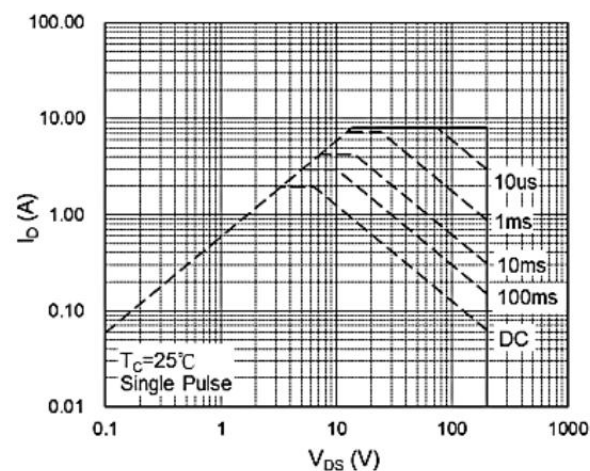
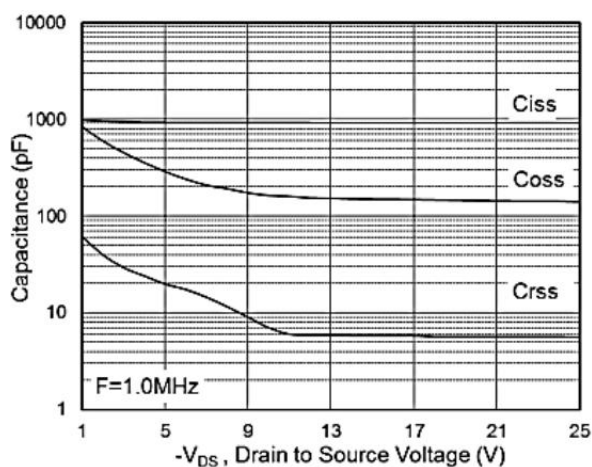


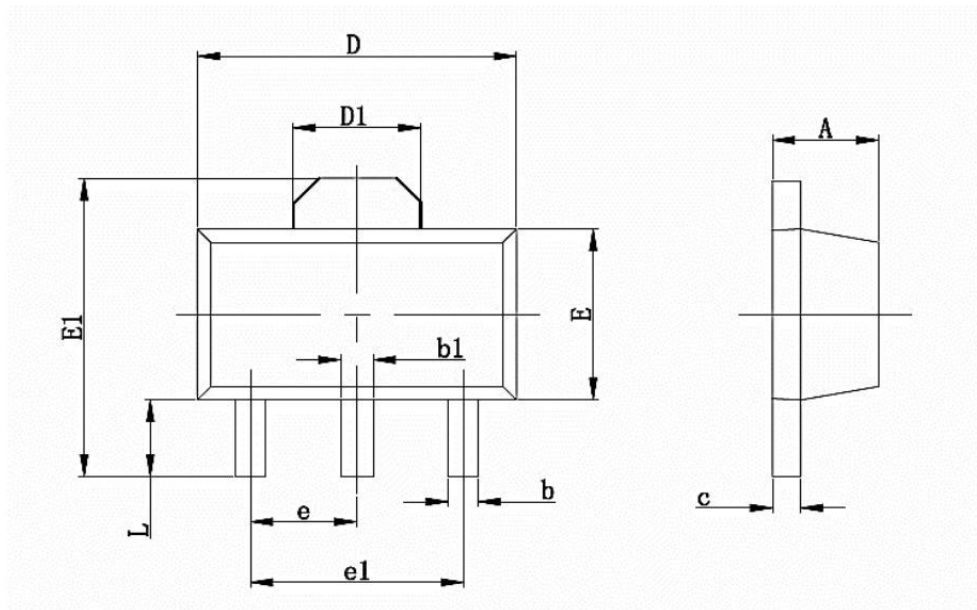
Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics



$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

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	SOT89-3L		3000