

Description

The SX20N15S uses advanced 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

$V_{DS} = 150V$ $I_D = 20A$

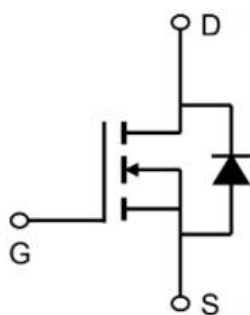
$R_{DS(ON)} < 60m\Omega$ @ $V_{GS}=10V$

Application

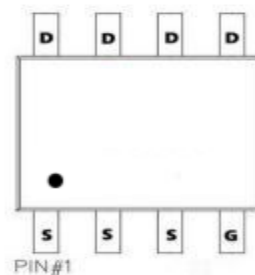
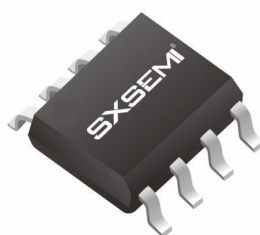
Battery protection

Load switch

Uninterruptible power supply



SOP-8



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@TC=25^\circ\text{C}}$	Continuous Drain Current ¹	20	A
$I_{D@TC=100^\circ\text{C}}$	Continuous Drain Current ¹	16	A
$I_{D@TA=25^\circ\text{C}}$	Continuous Drain Current ¹	4.5	A
$I_{D@TA=70^\circ\text{C}}$	Continuous Drain Current ¹	3.8	A
I_{DM}	Pulsed Drain Current ²	60	A
$PD@TC=25^\circ\text{C}$	Total Power Dissipation ³	72.6	W
$PD@TA=25^\circ\text{C}$	Total Power Dissipation ³	2.7	W
TSTG	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	46	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	150	165	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =20A	---	43	60	mΩ
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V , I _D =10A	---	60	70	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.8	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =120V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =120V , 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 =10A	---	25	---	S
Q _g	Total Gate Charge	V _{DS} =75V , V _{GS} =10V , I _D =10A	---	23	---	nC
Q _{gs}	Gate-Source Charge		---	5.8	---	
Q _{gd}	Gate-Drain Charge		---	4.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =75V , V _{GS} =10V , R _G =3.3Ω I _D =10A	---	16.2	---	ns
T _r	Rise Time		---	18.6	---	
T _{d(off)}	Turn-Off Delay Time		---	28.5	---	
T _f	Fall Time		---	6.5	---	
C _{iss}	Input Capacitance	V _{DS} =75V , V _{GS} =0V , f=1MHz	---	1190	---	pF
C _{oss}	Output Capacitance		---	73	---	
C _{rss}	Reverse Transfer Capacitance		---	4	---	
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V , Force Current	---	---	20	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =10A , dI/dt=100A/μs , T _J =25°C	---	45	---	nS
Q _{rr}	Reverse Recovery Charge		---	138	---	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

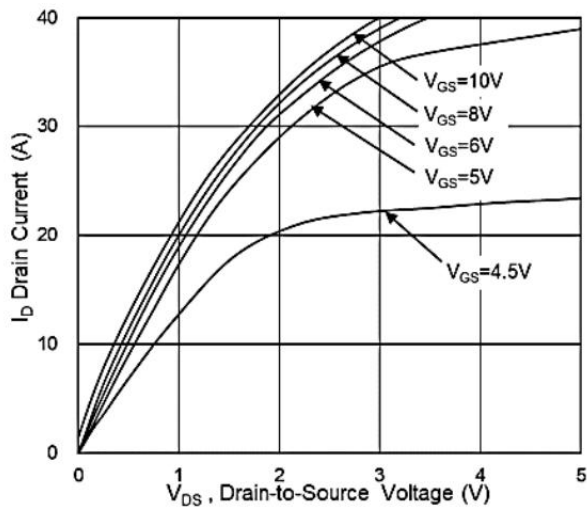


Fig.1 Typical Output Characteristics

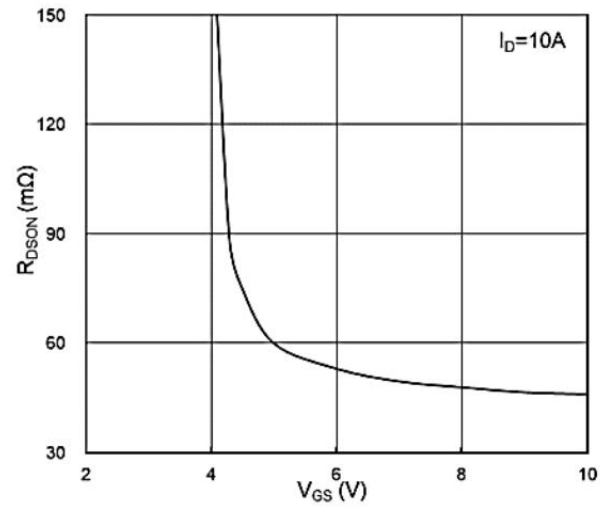


Fig.2 On-Resistance vs G-S Voltage

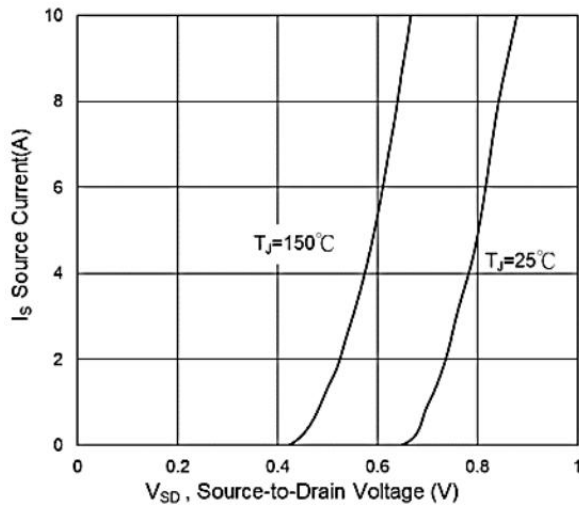


Fig.3 Source Drain Forward Characteristics

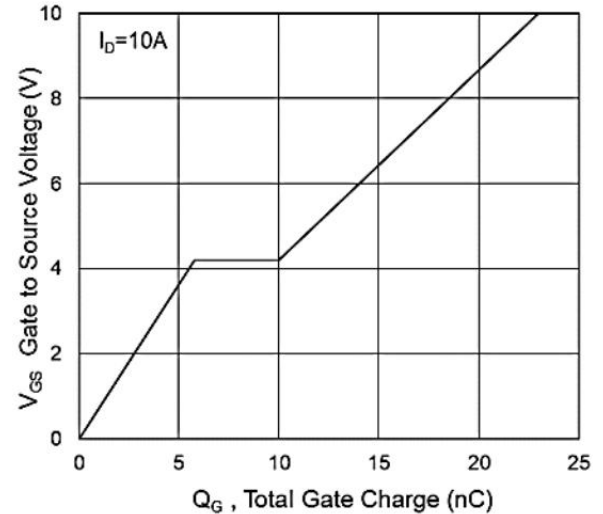


Fig.4 Gate-Charge Characteristics

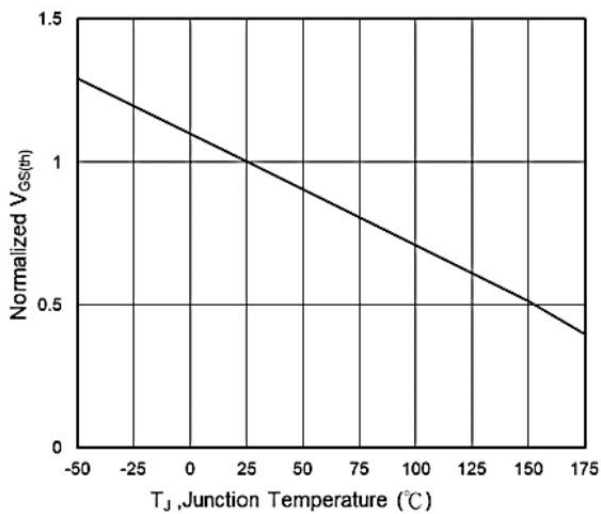


Fig.5 Normalized $V_{GS(th)}$ vs T_J

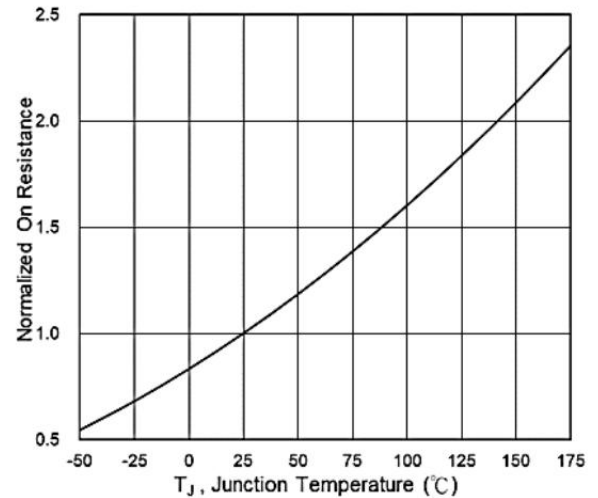


Fig.6 Normalized $R_{DS(on)}$ vs T_J

Typical Characteristics

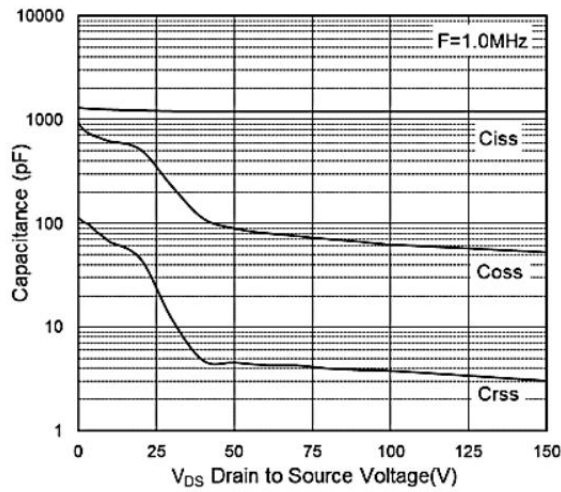


Fig.7 Capacitance

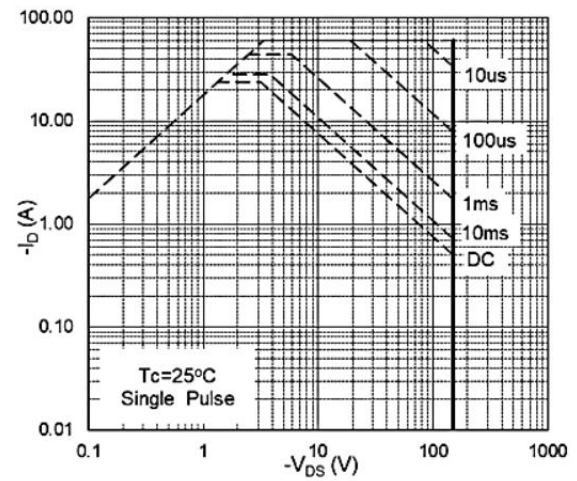


Fig.8 Safe Operating Area

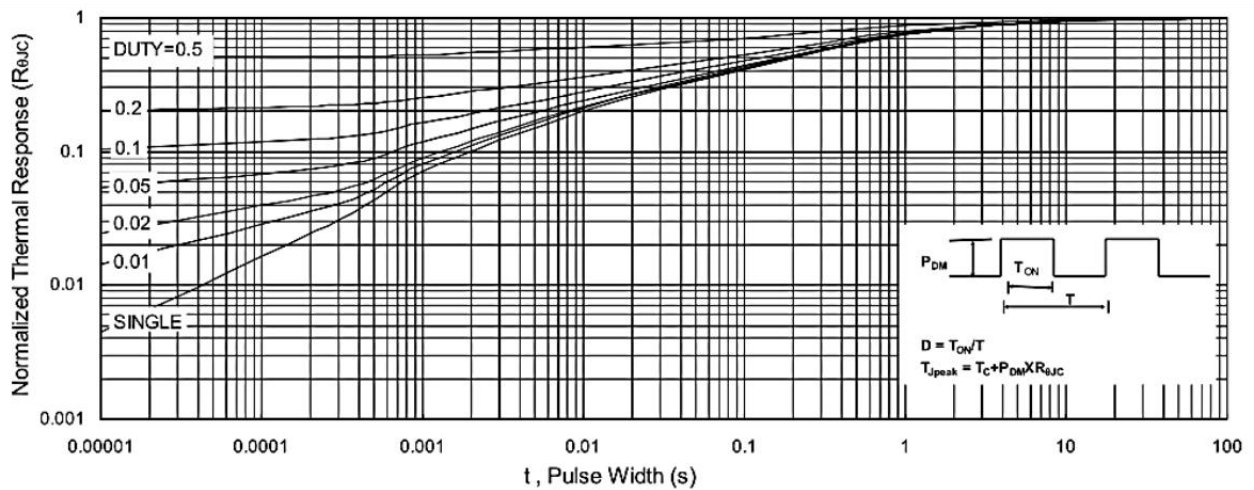


Fig.9 Normalized Maximum Transient Thermal Impedance

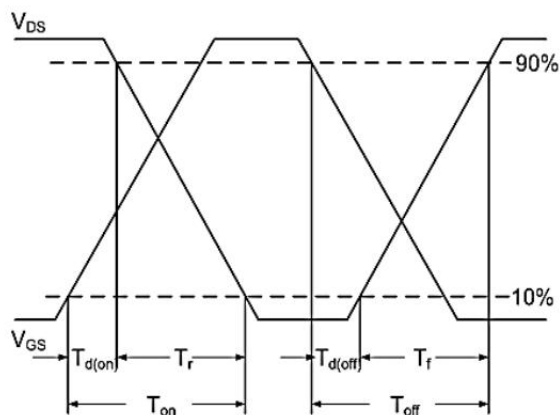


Fig.10 Switching Time Waveform

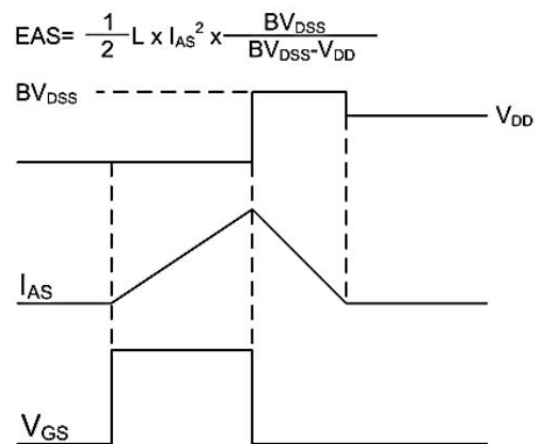
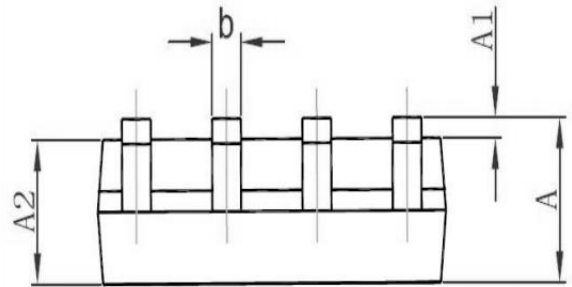
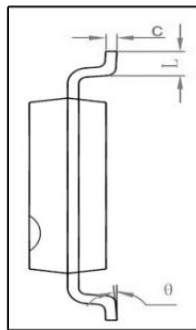
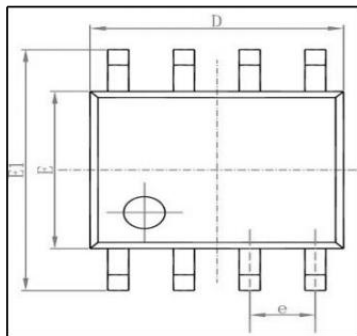
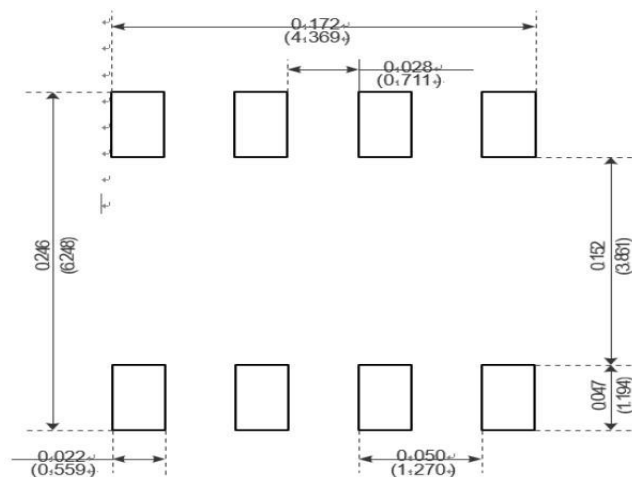


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOP-8		3000