

Description

The SX20N10D 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

$V_{DS} = 100V$ $I_D = 20A$

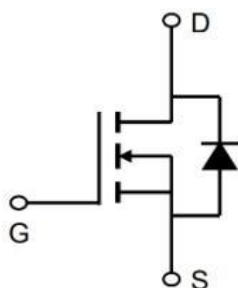
$R_{DS(ON)}$ Type: $65m\Omega$ @ $V_{GS}=10V$

Application

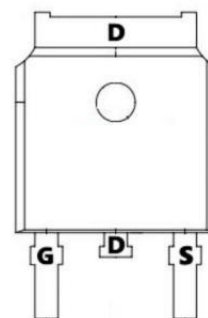
Lithium battery protection

Wireless impact

Mobile phone fast charging



TO-252-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Drain Current, $V_{GS} @ 10V$	20	A
$I_D @ T_C = 100^\circ C$	Drain Current, $V_{GS} @ 10V$	13	A
IDM	Pulsed Drain Current ¹	57.9	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	30	W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	2.7	W
EAS	Single Pulse Avalanche Energy ⁴	7	mJ
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction-ambient	55	$^\circ C/W$
$R_{\theta JC}$	Maximum Thermal Resistance, Junction-case	5.1	$^\circ C/W$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	100	107	-	V
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.85	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	VGS=10V, ID=5A	-	65	85	mΩ
		VGS=4.5V, ID=3A	-	75	100	mΩ
g fs	Forward Transconductance	V DS =5V , I D =5A		14		S
RG	Gate Resistance	VDS = 0V, VGS =0V,f=1MHz		3		Ω
Ciss	Input Capacitance	VDS=15V, VGS=0V, f=1.0MHz	-	1100	-	pF
Coss	Output Capacitance		-	55	-	pF
Crss	Reverse Transfer Capacitance		-	40	-	pF
Qg	Total Gate Charge	VDS=50V, ID=5A, VGS=10V	-	11.9	-	nC
Qgs	Gate-Source Charge		-	2.8	-	nC
Qgd	Gate-Drain("Miller") Charge		-	1.7	-	nC
td(on)	Turn-on Delay Time	VDS=30V, ID=5A, RG=1.8Ω, VGS=10V	-	3.8	-	ns
tr	Turn-on Rise Time		-	25.8	-	ns
td(off)	Turn-off Delay Time		-	16	-	ns
tf	Turn-off Fall Time		-	8.8	-	ns
IS	Continuous Source Current1,5	VG=VD=0V , Force Current	-	-	14.6	A
ISM	Pulsed Source Current2,5		-	-	25	A
VSD	Diode Forward Voltage2	VGS=0V, IS=10A	-	-	1.2	V

Notes:

1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z copper.

2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3、The EAS data shows Max. rating . The test condition is VDD =80V,VGS =10V,L=0.1mH,I AS =7A

4、The power dissipation is limited by 150°Cjunction temperature

5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation

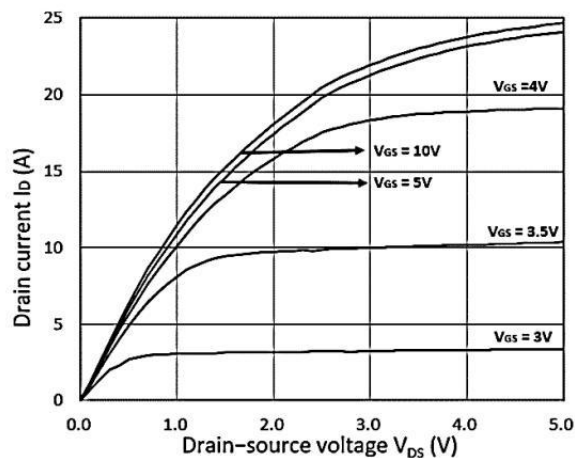


Figure 1. Output Characteristics

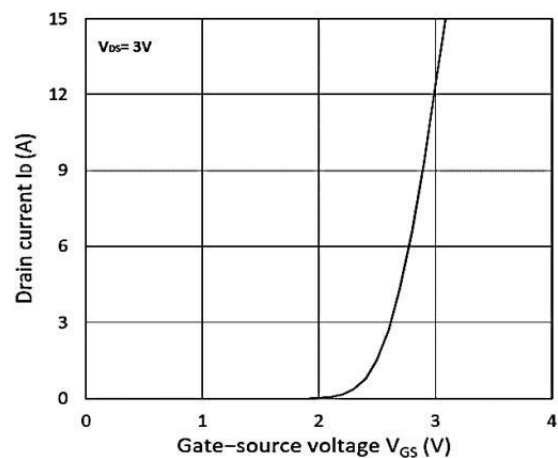


Figure 2. Transfer Characteristics

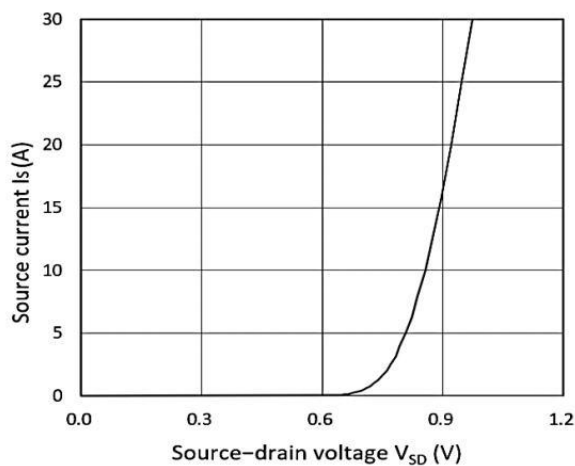


Figure 3. Forward Characteristics of Reverse

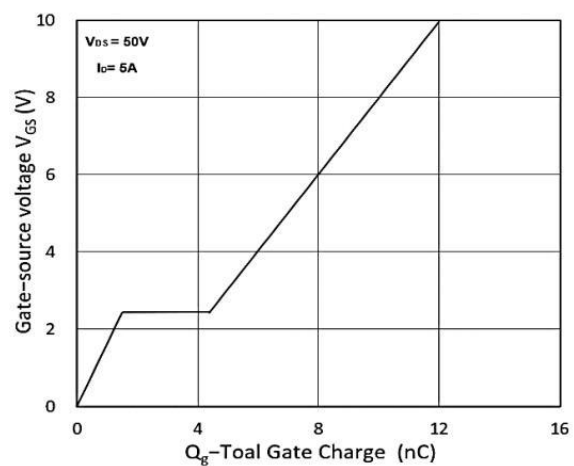


Figure 4. Gate Charge Characteristics

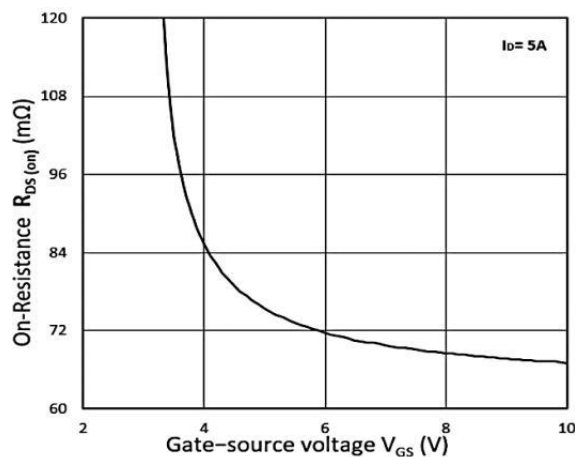


Figure 5. $R_{DS(on)}$ vs. V_{GS}

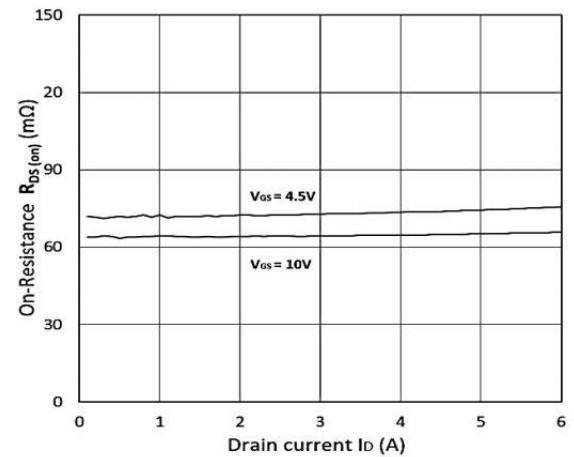


Figure 6. $R_{DS(on)}$ vs. I_D

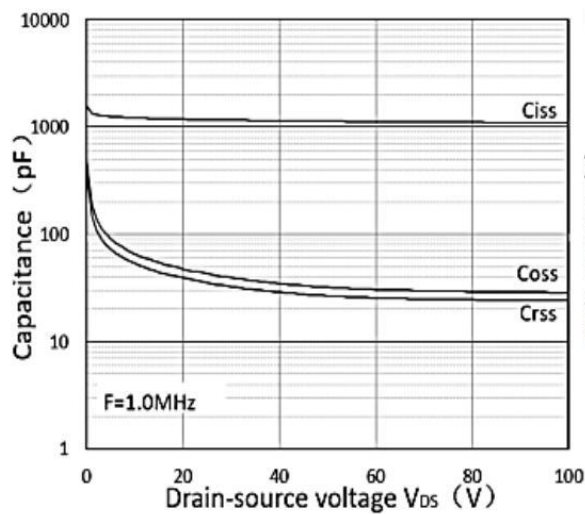


Figure 7. Capacitance Characteristics

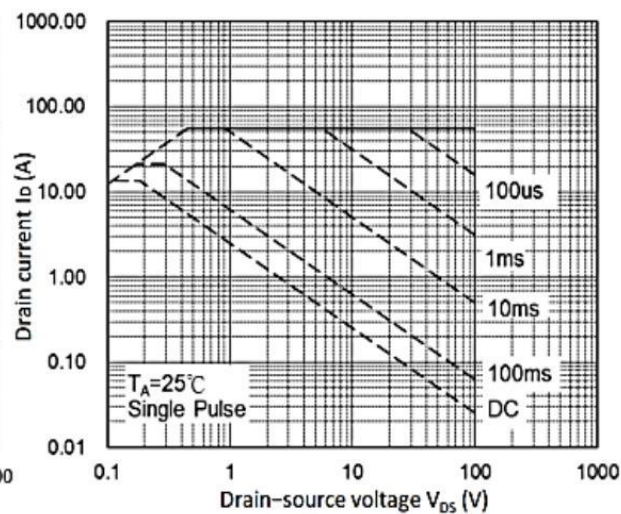


Figure 8. Safe Operating Area

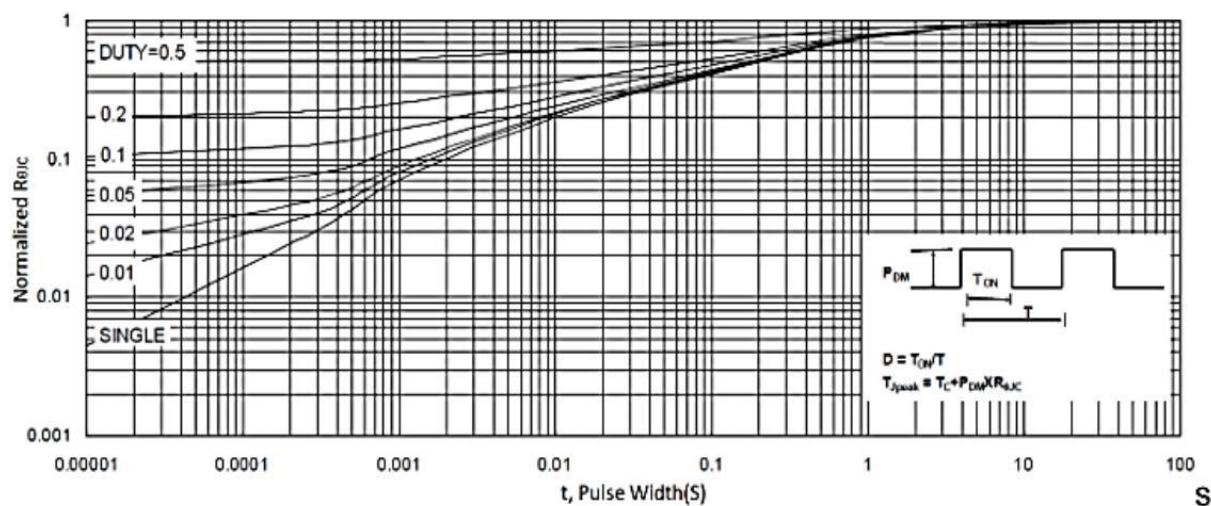


Figure 9. Normalized Maximum Transient Thermal Impedance

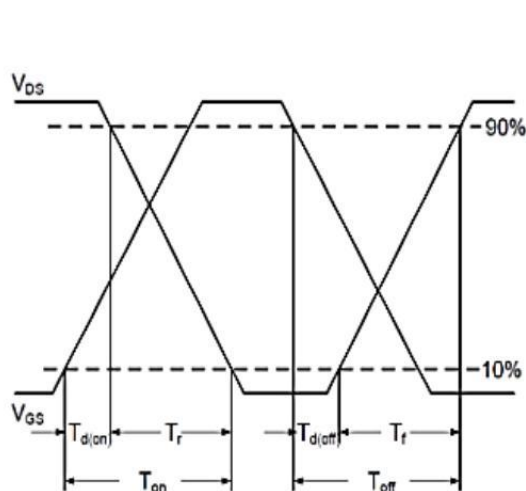


Figure 10. Switching Time Waveform

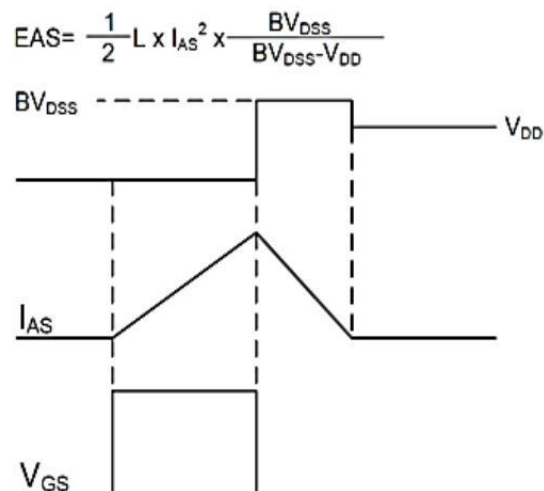
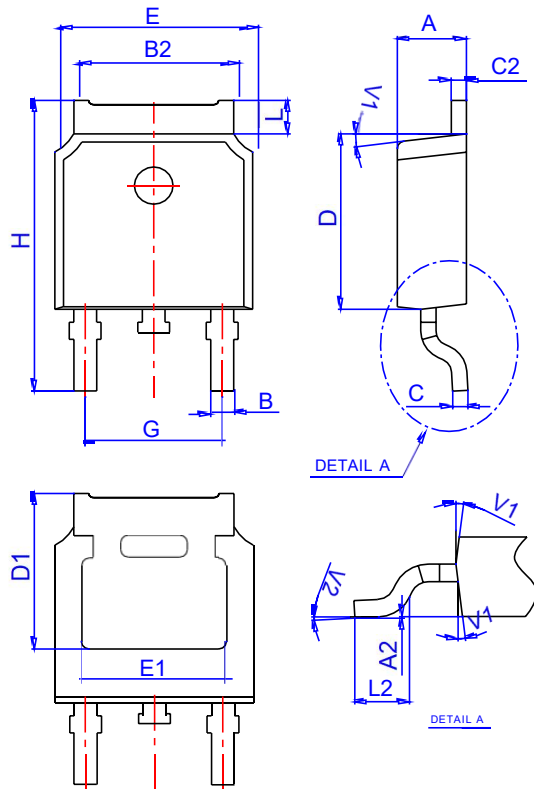


Figure 11. Unclamped Inductive Switching Waveform

Package Mechanical Data : TO-252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	TO-252-3L		2500