

Description

The SX20N15D 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

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

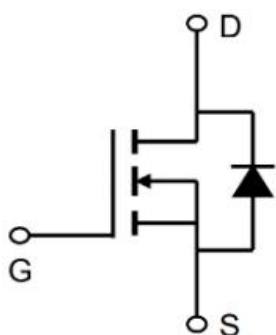
$R_{DS(ON)} < 185m\Omega$ @ $V_{GS}=10V$

Application

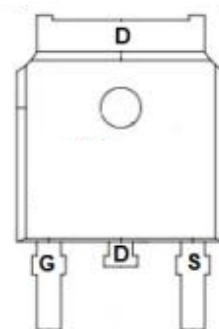
DC/DC Converter

LED Backlighting

Power Management Switches



TO-252-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	20	A
$I_D @ T_c=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	13	A
I_{DM}	Pulsed Drain Current	60	A
E_{AS}	Single Pulse Avalanche Energy	116	mJ
I_{AS}	Avalanche Current	18	A
$P_D @ T_c=25^\circ C$	Total Power Dissipation ⁴	72.6	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	1.72	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62.5	$^\circ C/W$

Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	150	165	-	V
IGSS	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current T _J =25°C	V _{DS} = 150V, V _{GS} = 0V	-	-	1	μA
IDSS	Zero Gate Voltage DrainCurrent T _J =100°C		-	-	100	μA
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.8	2.5	V
RDS(on)	Drain-Source On-Resistance ⁴	V _{GS} = 10V, I _D = 4A	-	130	185	mΩ
Ciss	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz	-	1235	-	pF
Coss	Output Capacitance		-	53	-	
Crss	Reverse Transfer Capacitance		-	37	-	
R _g	Gate Resistance	f = 1MHz	-	1.0	-	Ω
Q _g	Total Gate Charge	V _{GS} = 10V, V _{DS} = 75V, I _D = 4A	-	16	-	nC
Q _{gs}	Gate-Source Charge		-	4.7	-	
Q _{gd}	Gate-Drain Charge		-	5.8	-	
td(on)	Turn-On Delay Time	V _{GS} = 10V, V _{DD} = 75V R _G = 3Ω, I _D = 4A	-	6	-	ns
t _r	Rise Time		-	8	-	
td(off)	Turn-Off Delay Time		-	17	-	
t _f	Fall Time		-	12.5	-	
VSD	Diode Forward Voltage ⁴	I _S = 2A, V _{GS} = 0V	-	-	1.2	V
IS	Continuous Source Current T _A =25°C		-	-	20	A

Notes:

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is V_{DD}=50V, V_{GS}=10V, L=0.3mH, I_{AS}=10A
- 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

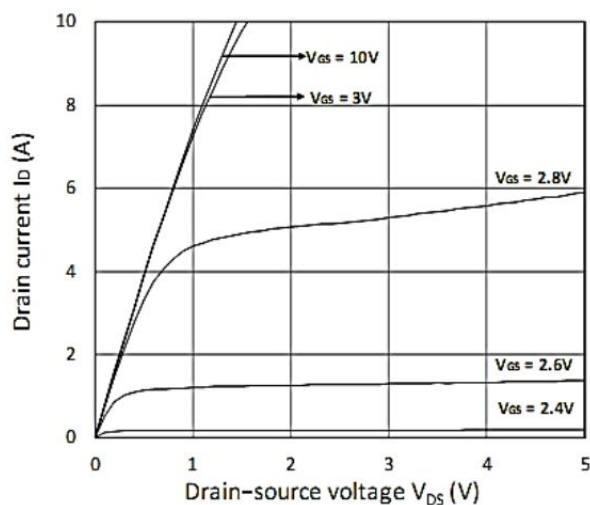


Figure 1. Output Characteristics

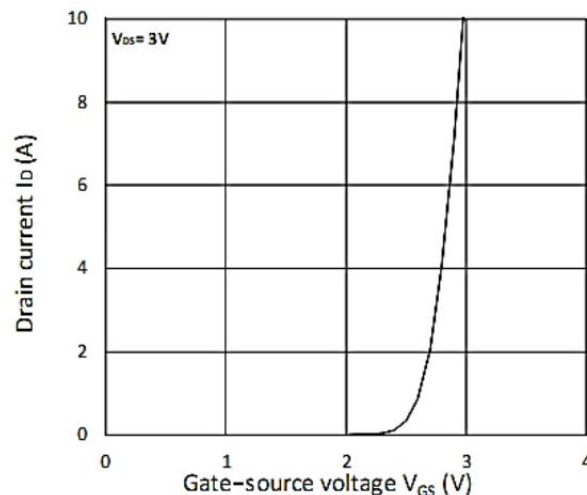


Figure 2. Transfer Characteristics

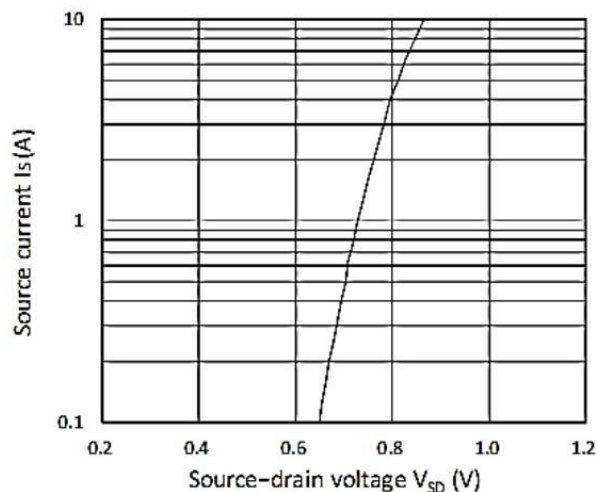


Figure 3. Forward Characteristics of Reverse

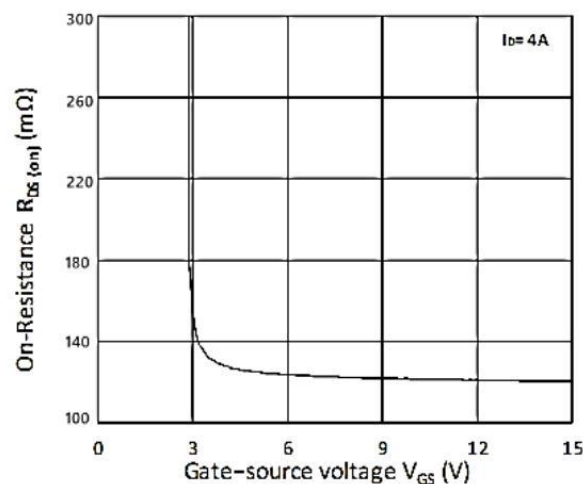


Figure 4. R_DS(ON) vs. V_GS

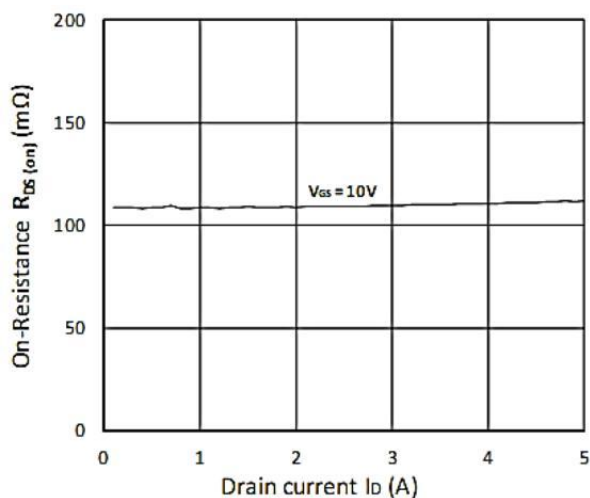


Figure 5. R_DS(ON) vs. I_D

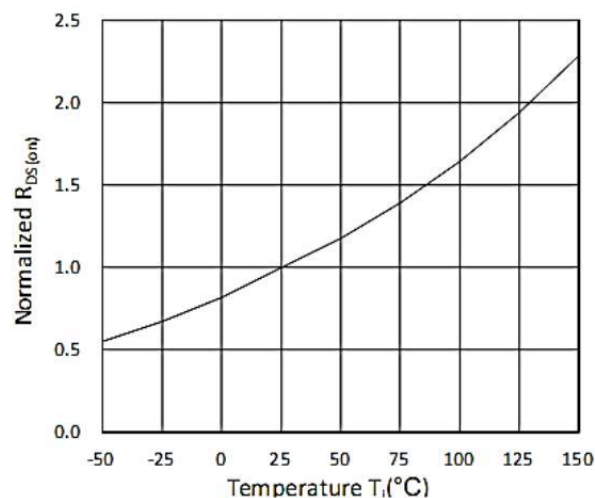


Figure 6. Normalized R_DS(on) vs. Temperature

Typical Characteristics

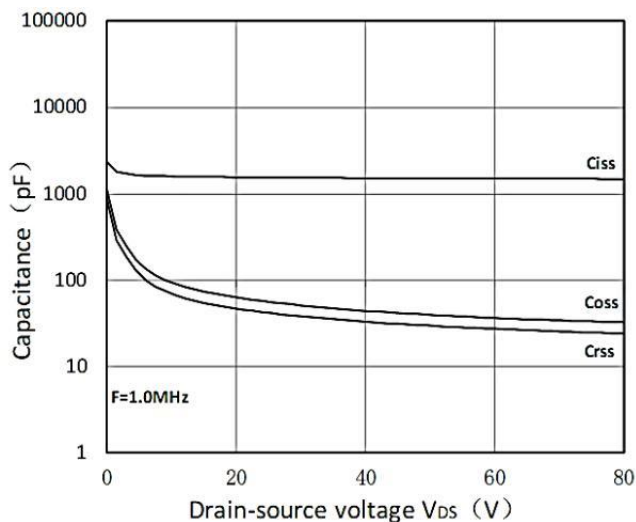


Figure 7. Capacitance Characteristics

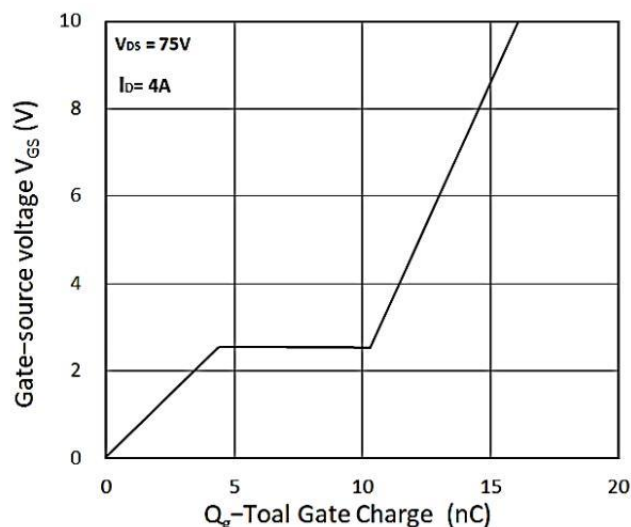


Figure 8. Gate Charge Characteristics

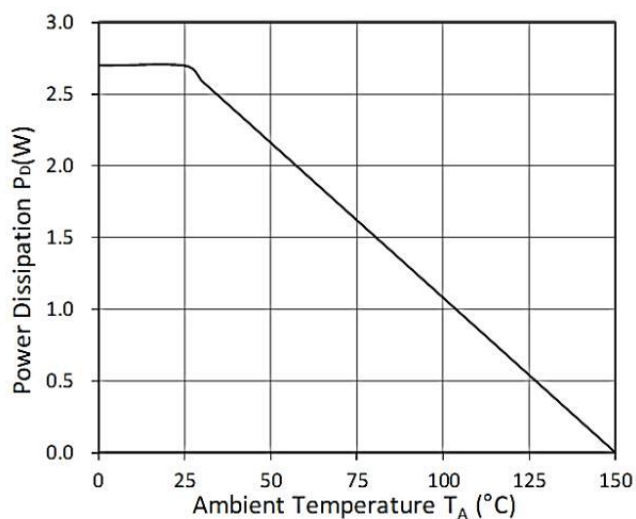


Figure 9. Power Dissipation

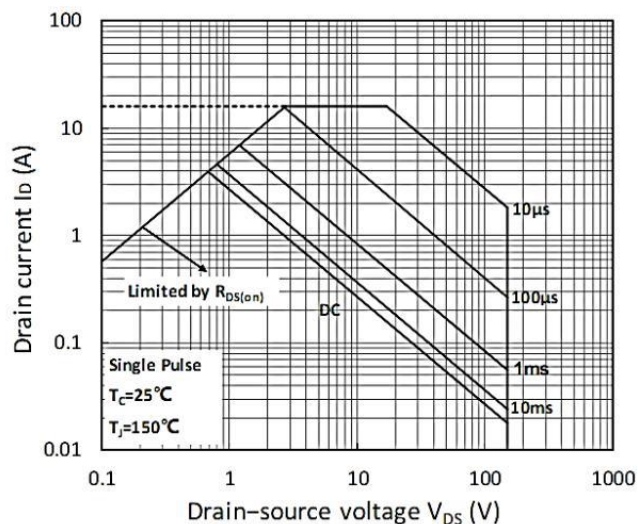


Figure 10. Safe Operating Area

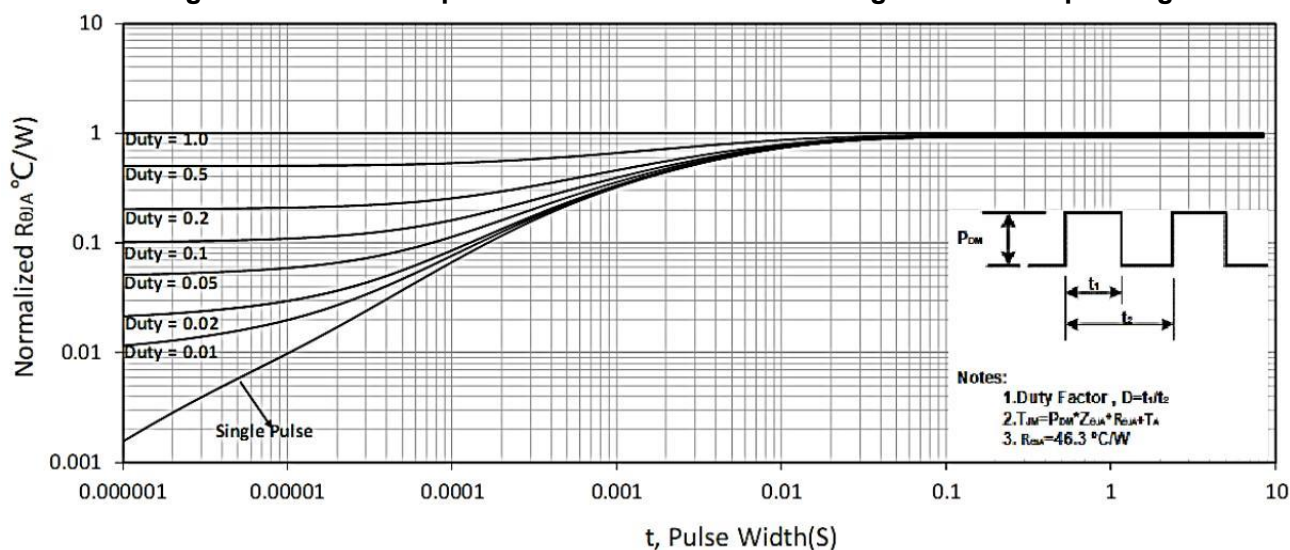
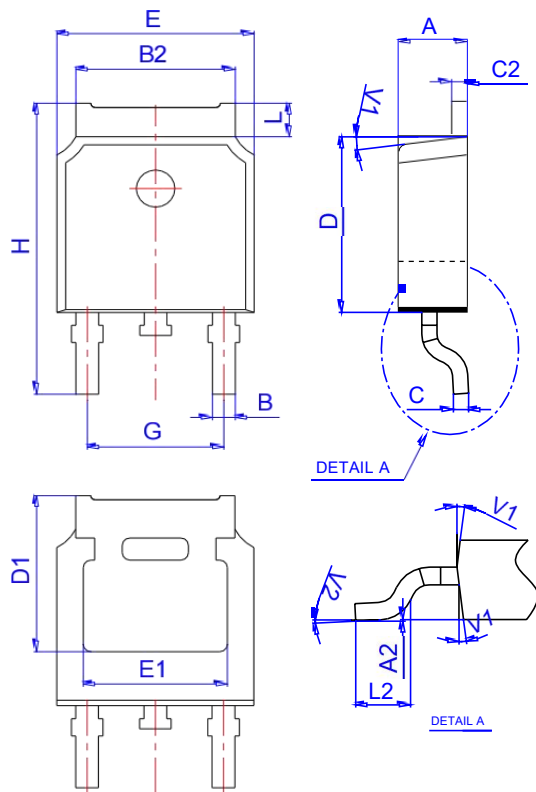


Figure 11 Normalized Maximum Transient Thermal Impedance

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