20V N-Channel Enhancement Mode MOSFET

Description

The SX120N02D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 20V I_D =120A

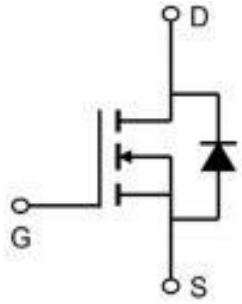
$R_{DS(ON)}$ < 3.0mΩ@ V_{GS}=4.5V

Application

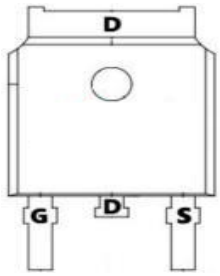
Battery protection

Load switch

Uninterruptible power supply



TO-252-3L



Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	20	V
VGSS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	120	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	69	A
IDM	Pulsed Drain Current note1	360	A
EAS	Single Pulsed Avalanche Energy note2	110	mJ
P_D	Power Dissipation	83	W
RθJA	Thermal Resistance Junction-ambient	62.5	℃/W
RθJC	Thermal Resistance, Junction to Case	1.85	℃/W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	℃

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20	22	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V	-	-	1	μA
IGSS	Gate to Body Leakage Current	V_{GS}= ±12V, V_{DS}=0V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.5	0.68	1.0	V
RDS(on)	Static Drain-Source On-Resistance note3	V_{GS}=4.5V, I_D=30A	-	2.1	3.5	mΩ
		V_{GS}=2.5V, I_D=20A		3.2	4.0	
C_{iss}	Input Capacitance	V_{DS}=10V, V_{GS}=0V, f=1.0MHz	-	4307	-	pF
Coss	Output Capacitance		-	501	-	pF
Crss	Reverse Transfer Capacitance		-	321	-	pF
Q_g	Total Gate Charge	V_{DS}=10V, I_D=30A, V_{GS}=4.5V	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	3.6	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	19	-	nC
td(on)	Turn-On Delay Time	V_{DS} =10V, I_D=30A, R_G=1.8Ω, V_{GS}=4.5V	-	9.7	-	ns
t_r	Turn-On Rise Time		-	37	-	ns
td(off)	Turn-Off Delay Time		-	63	-	ns
t_f	Turn-Off Fall Time		-	52	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_{SD}=30A, T_J=25℃	-	-	1.2	V
t_{rr}	Reverse Recovery Time	T_J=25°C, I_F=30A, di/dt =100A/μs	-	23	-	ns
Q_{rr}	Reverse Recovery Charge		-	10	-	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 .The EAS data shows Max. rating .

3、The EAS condition: T_J=25℃, V_{DD}=16V, V_G=4.5V, R_G=25Ω, L=0.1mH, I_{AS}=55A

4、The power dissipation is limited by 175℃junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

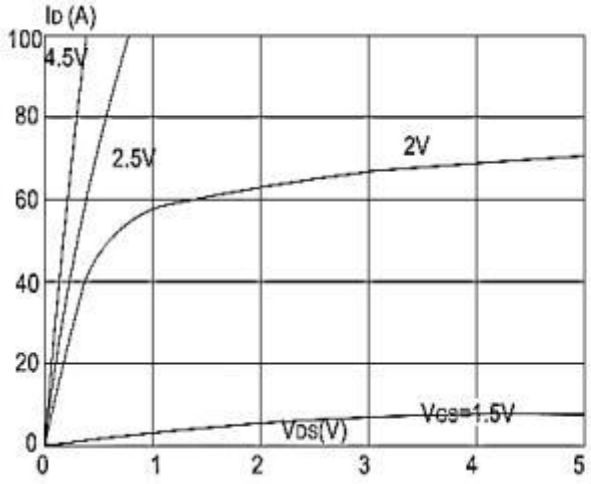


Figure1: Output Characteristics

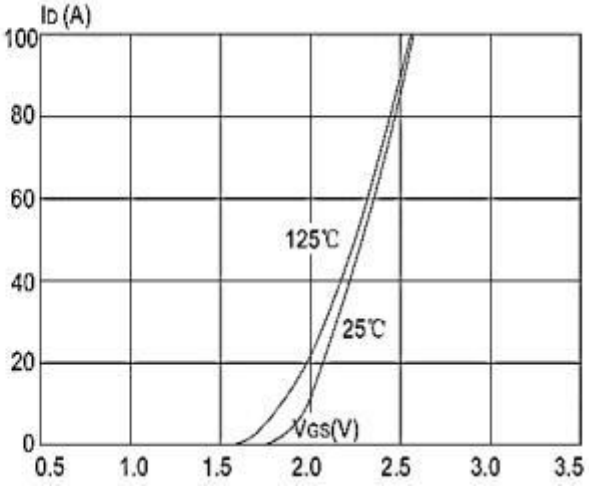


Figure 2: Typical Transfer Characteristics

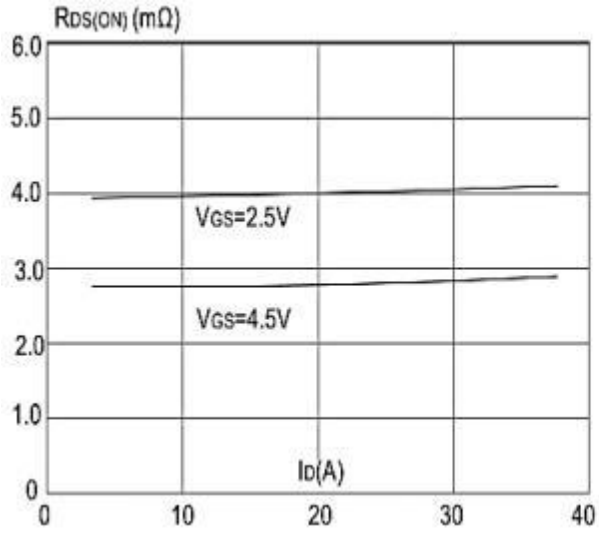


Figure 3:On-resistance vs. Drain Current

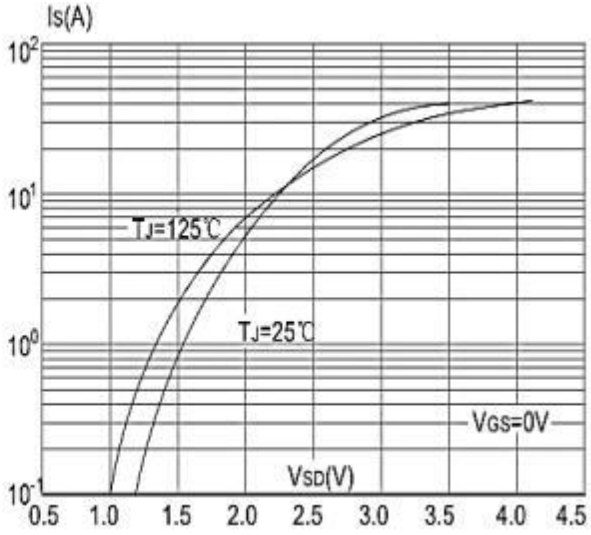
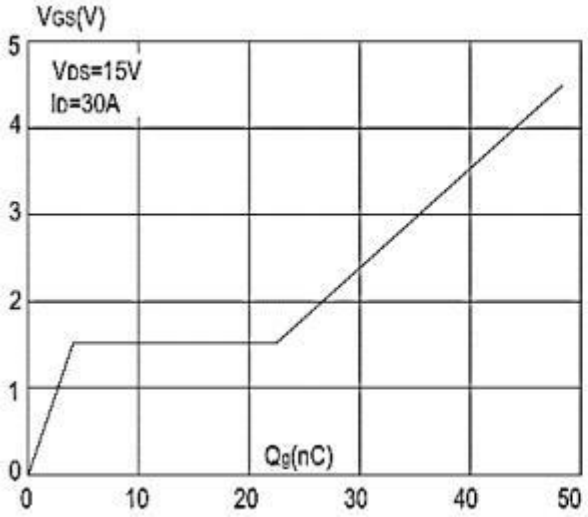
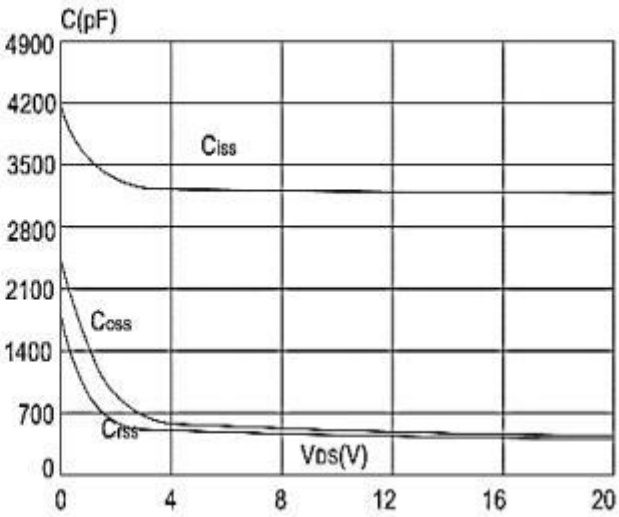


Figure 4: Body Diode Characteristics





Typical Characteristics

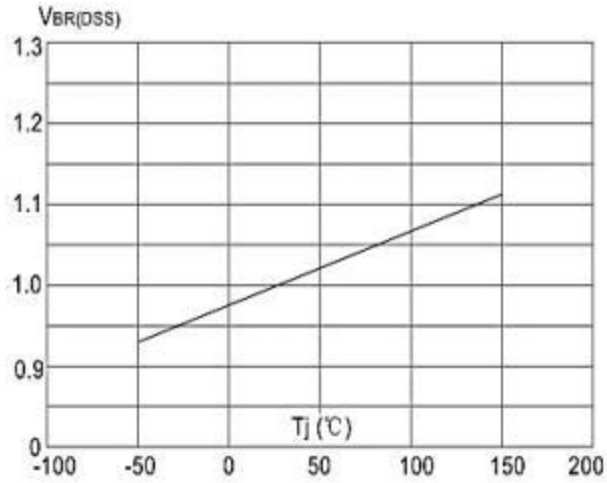


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

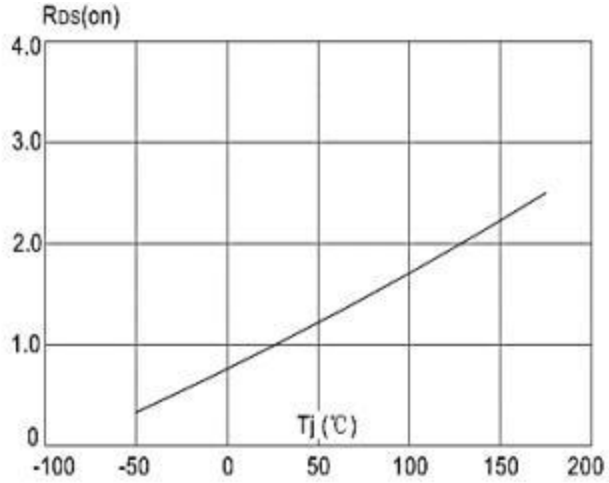


Figure 8: Normalized on Resistance vs. Junction Temperature

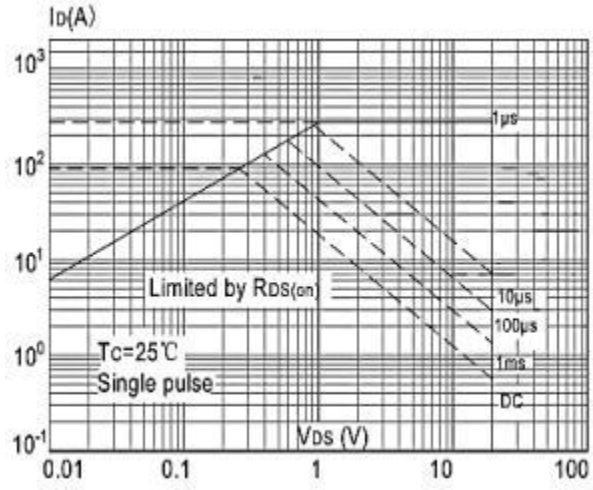


Figure 9: Maximum Safe Operating Area

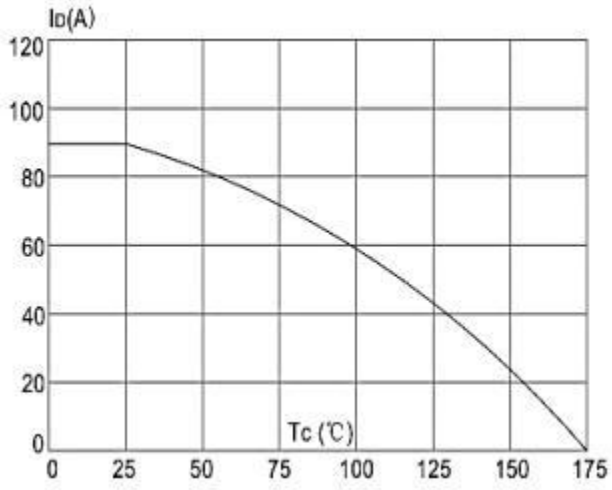


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

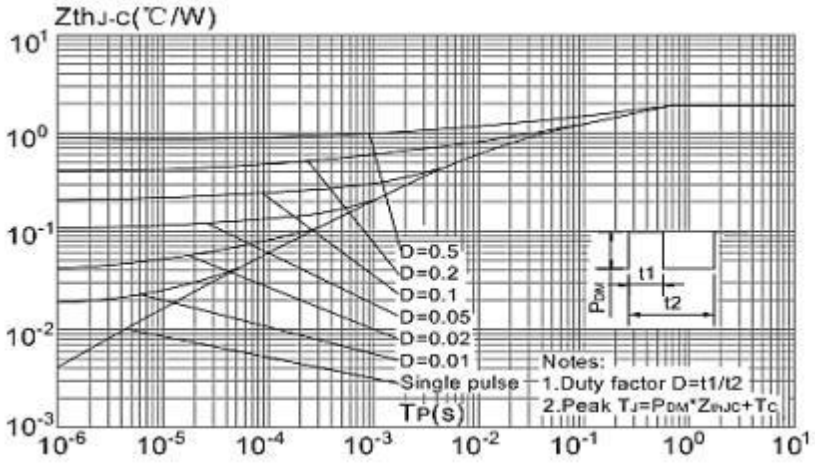
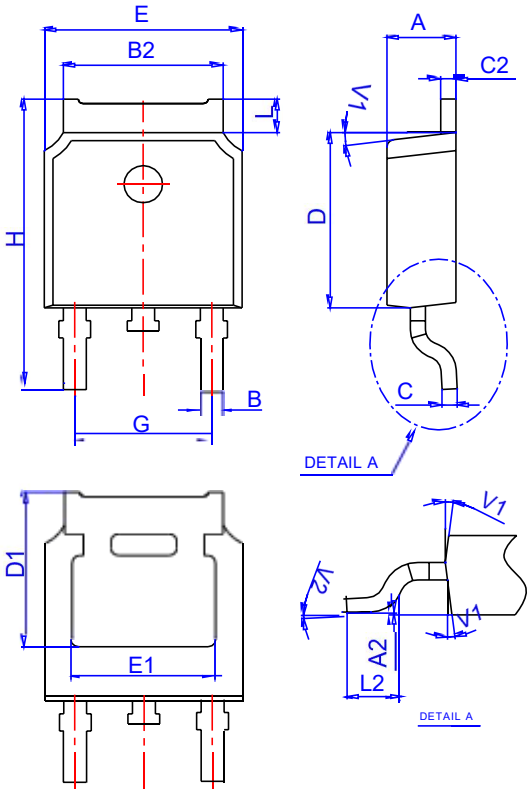


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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