

Description

The SX120N03D 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

$V_{DS} = 30V$ $I_D = 120A$

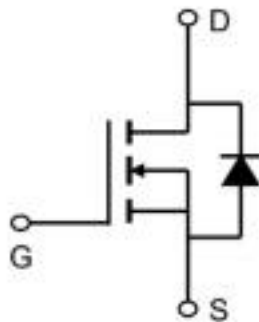
$R_{DS(ON)} < 4m\Omega$ $V_{GS}=10V$

Application

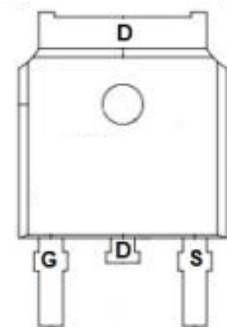
Battery protection

Load switch

Uninterruptible power supply



TO-252-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	120	A
$I_D@T_c=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	65	A
I_{DM}	Pulsed Drain Current ²	360	A
EAS	Single Pulse Avalanche Energy ³	144.7	mJ
I_{AS}	Avalanche Current	53.8	A
$P_D@T_c=25^\circ\text{C}$	Total Power Dissipation ⁴	43.4	W
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	1.67	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	75	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.88	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	$V_{GS}=10V, I_D=30A$	-	2.8	4	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	4.8	6.5	
Ciss	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1.0MHz$	-	2680	-	pF
Coss	Output Capacitance		-	393	-	pF
Crss	Reverse Transfer Capacitance		-	330	-	pF
Qg	Total Gate Charge	$V_{DS}=15V, I_D=30A, V_{GS}=10V$	-	30	-	nC
Qgs	Gate-Source Charge		-	7.2	-	nC
Qgd	Gate-Drain("Miller") Charge		-	10.4	-	nC
td(on)	Turn-on Delay Time	$V_{DS}=15V, I_D=30A, R_{GEN}=3\Omega, V_{GS}=10V$	-	23	-	ns
tr	Turn-on Rise Time		-	28	-	ns
td(off)	Turn-off Delay Time		-	74	-	ns
tf	Turn-off Fall Time		-	36	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	400	A
VSD	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s$	-	28	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	21	-	nC

Note :

- 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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=53.8A$
- 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

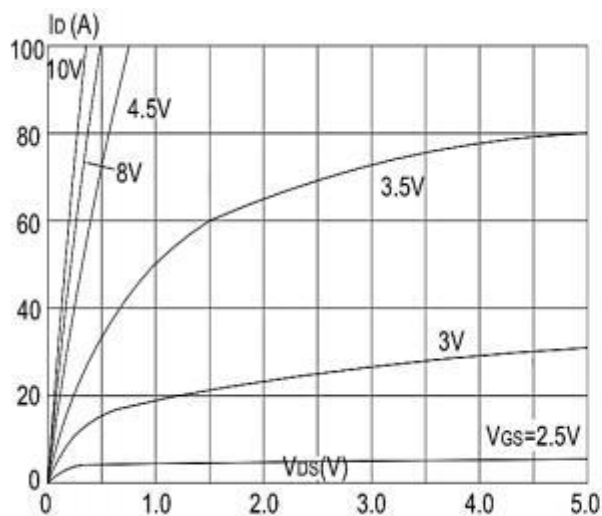


Figure1: Output Characteristics

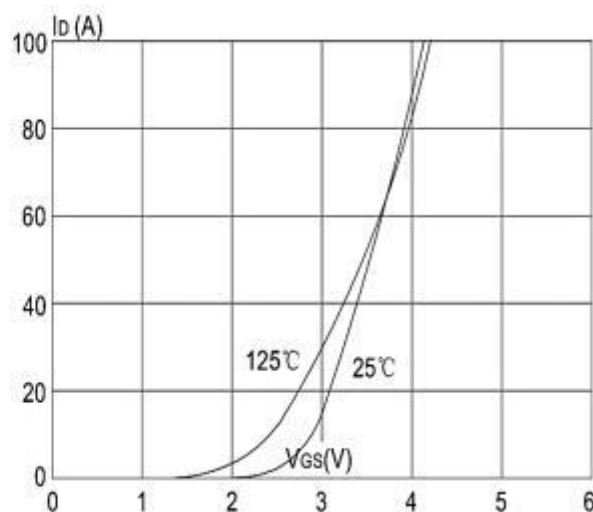


Figure 2: Typical Transfer Characteristics

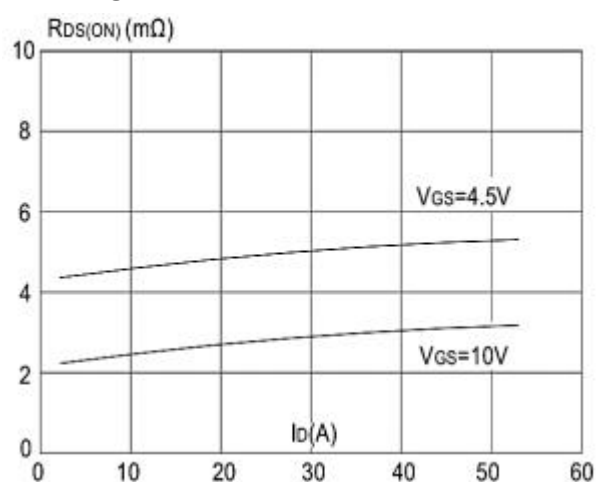


Figure 3: On-resistance vs. Drain Current

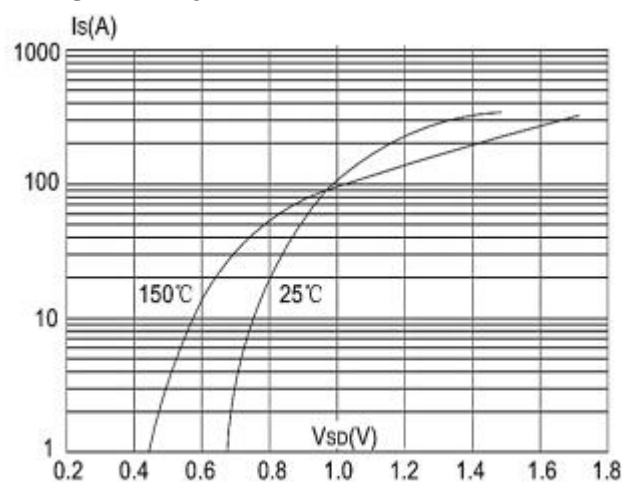


Figure 4: Body Diode Characteristics

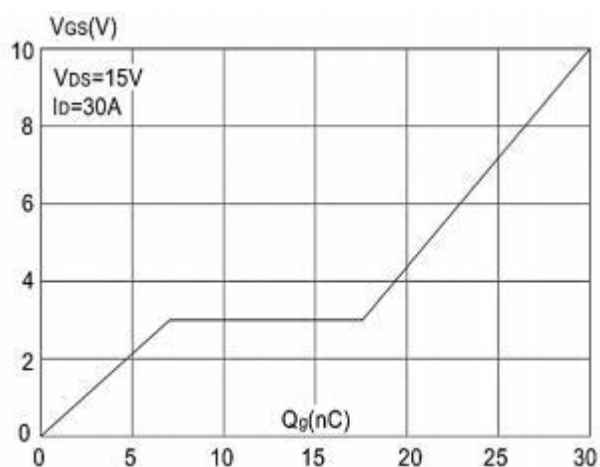


Figure 5: Gate Charge Characteristics

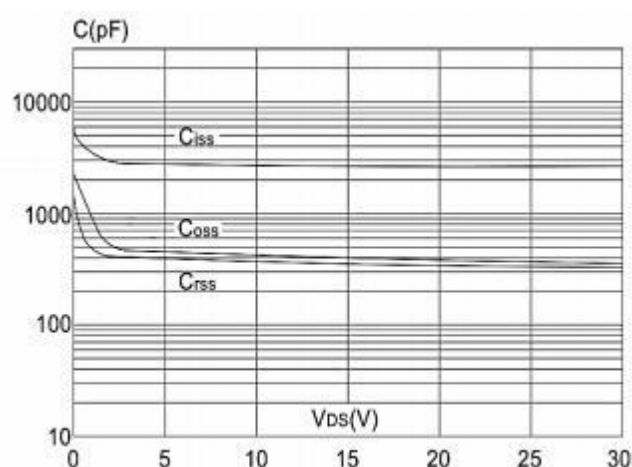


Figure 6: Capacitance Characteristics

Typical Characteristics

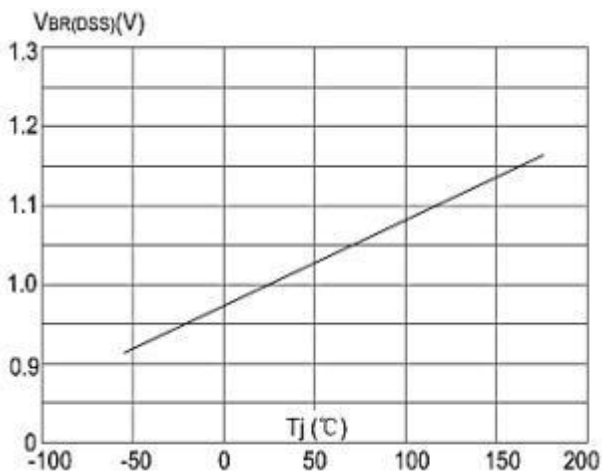


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

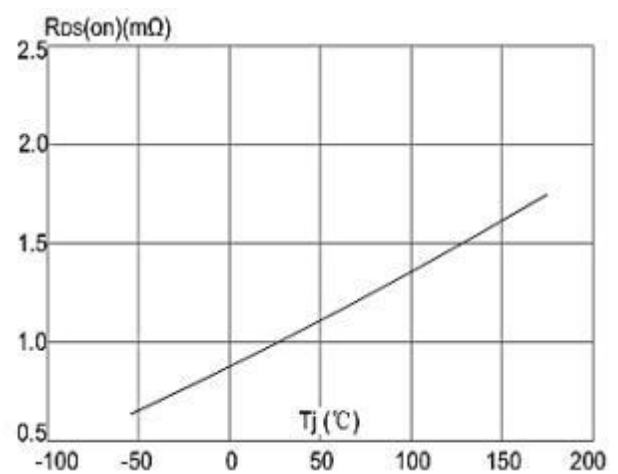


Figure 8: Normalized on Resistance vs. Junction Temperature

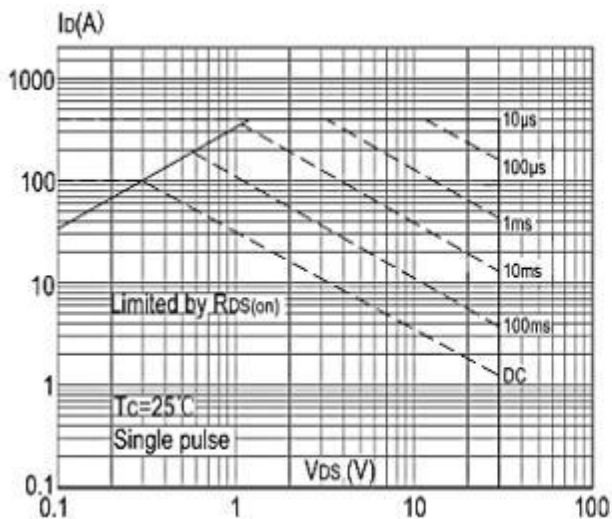


Figure 9: Maximum Safe Operating Area vs. Case Temperature

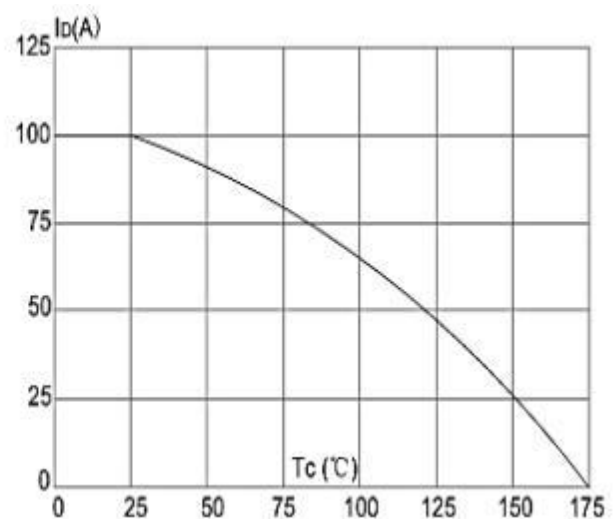


Figure 10: Maximum Continuous Drain Current

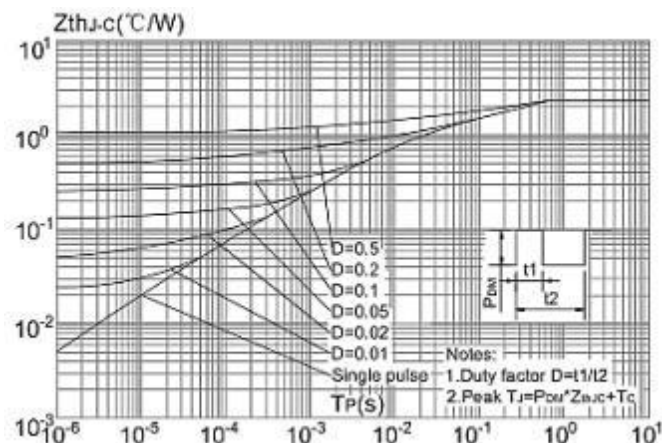
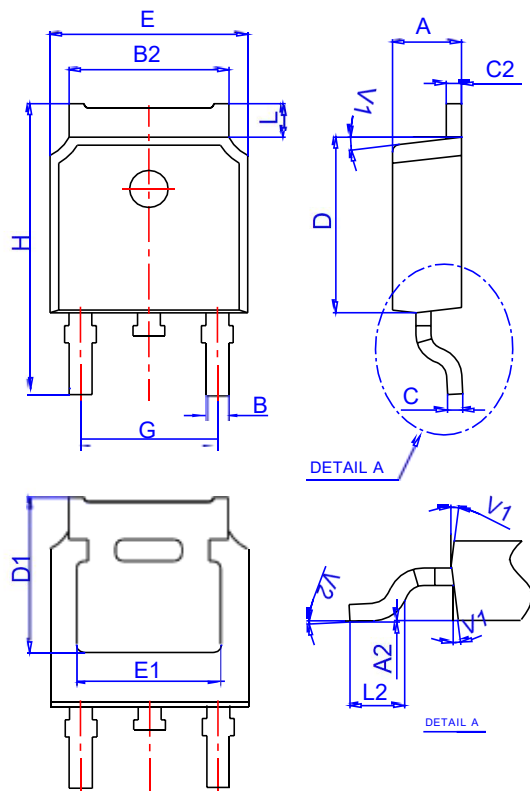


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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