

Description

The SX20P02D 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

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

$R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -4.5V$

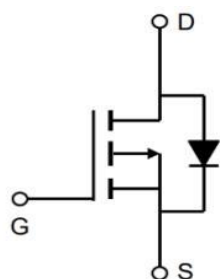
Application

Battery

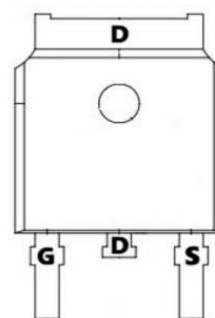
protection Load

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	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_c=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-20	A
$I_D @ T_c=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-12	A
I_{DM}	Pulsed Drain Current ²	-60	A
$P_D @ T_c=25^\circ\text{C}$	Total Power Dissipation ³	39	W
$P_D @ T_c=70^\circ\text{C}$	Total Power Dissipation ³	20	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	65	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	36	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	3.2	$^\circ\text{C/W}$

Electrical Characteristics (TA=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
RDS(on)	Static Drain-Source on-Resistance note2	$V_{GS}=-4.5V, I_D=-5A$	-	15	18	mΩ
RDS(on)	Static Drain-Source on-Resistance note2	$V_{GS}=-2.5V, I_D=-3A$	-	17	25	
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V,$	-	-	-1	μA
IGSS	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	±100	nA
Ciss	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V,$ $f=1.0MHz$	-	2700	-	pF
Coss	Output Capacitance		-	680	-	pF
Crss	Reverse Transfer Capacitance		-	590	-	pF
Qg	Total Gate Charge	$V_{DS}=-15V, I_D=-8A,$ $V_{GS}=-4.5V$	-	35	-	nC
Qgs	Gate-Source Charge		-	5	-	nC
Qgd	Gate-Drain("Miller") Charge		-	10	-	nC
td(on)	Turn-on Delay Time	$V_{DD}=-10V, I_D=-4A,$ $V_{GS}=-4.5V,$ $R_{GEN}=2.5\Omega$	-	11	-	ns
tr	Turn-on Rise Time		-	35	-	ns
td(off)	Turn-off Delay Time		-	30	-	ns
tf	Turn-off Fall Time		-	10	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-8	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-32	A
VSD	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-8A$	-	-0.8	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycles≤2%

Typical Characteristics

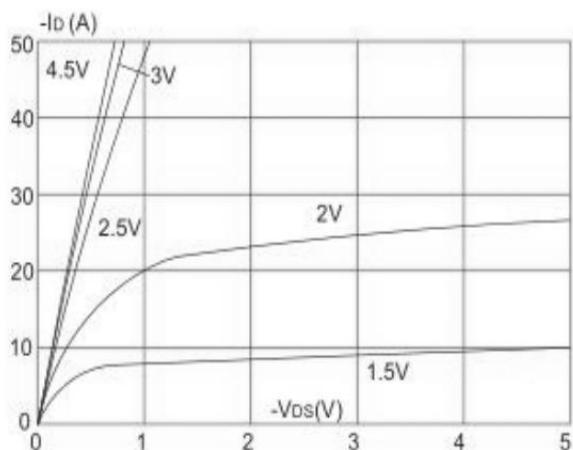


Figure1: Output Characteristics

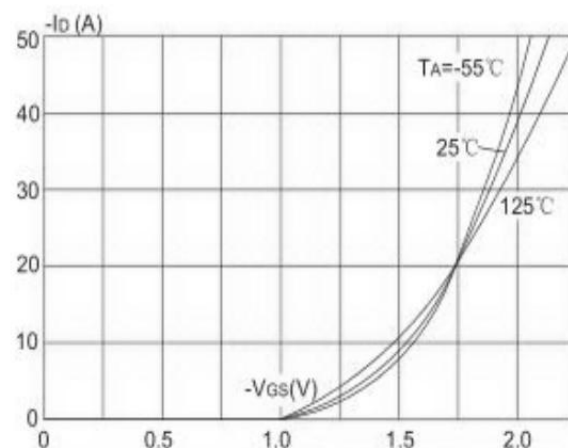


Figure 2: Typical Transfer Characteristics

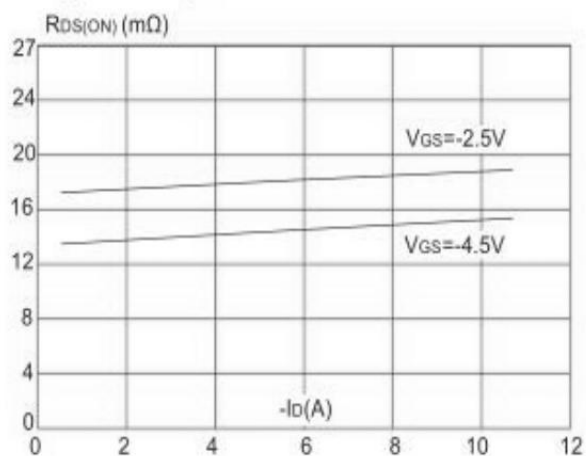


Figure 3: On-resistance vs. Drain Current

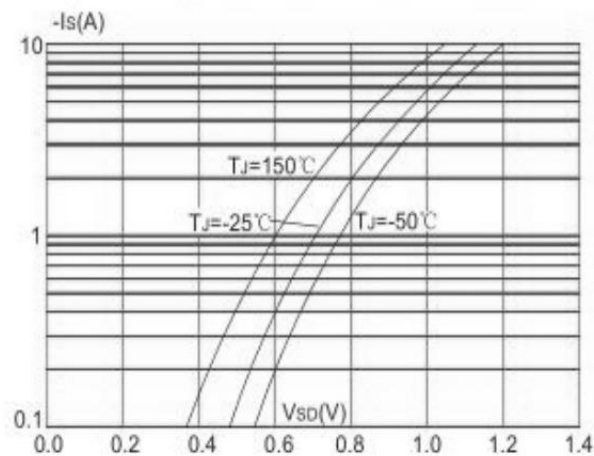


Figure 4: Body Diode Characteristics

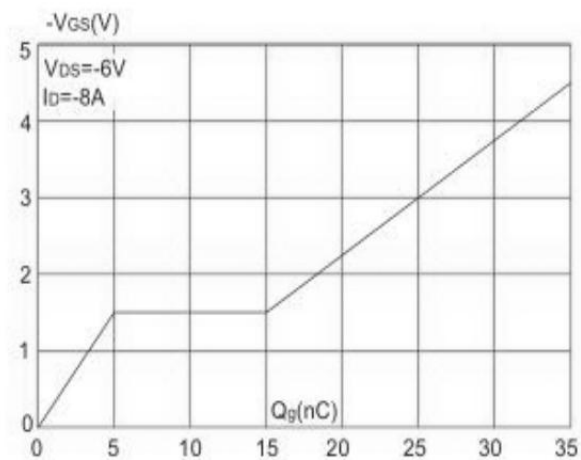


Figure 5: Gate Charge Characteristics

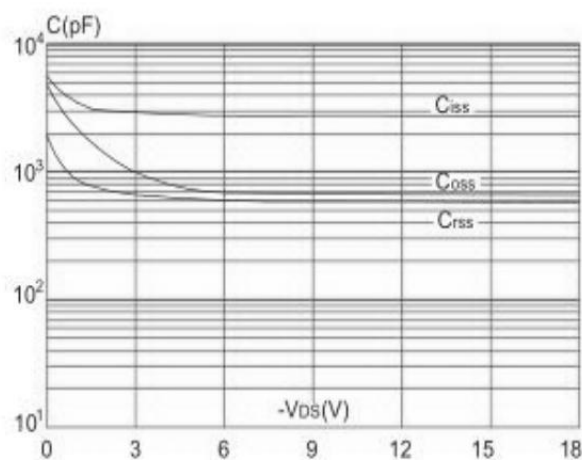


Figure 6: Capacitance Characteristics

Typical Characteristics

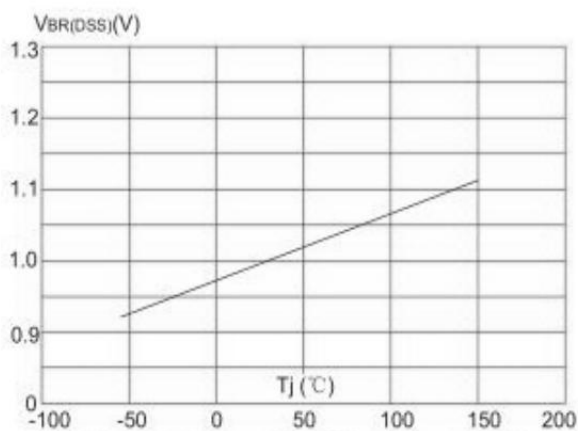


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

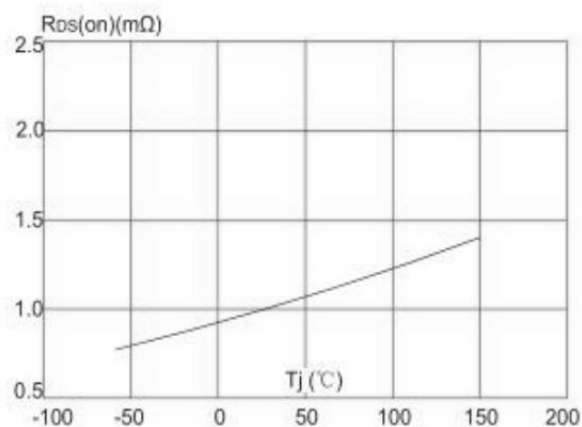


Figure 8: Normalized on Resistance vs. Junction Temperature

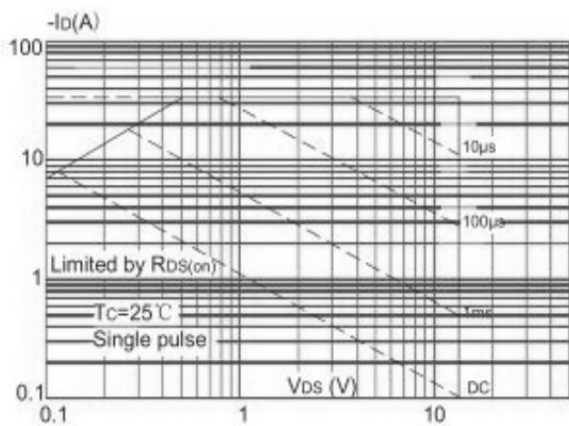


Figure 9: Maximum Safe Operating Area

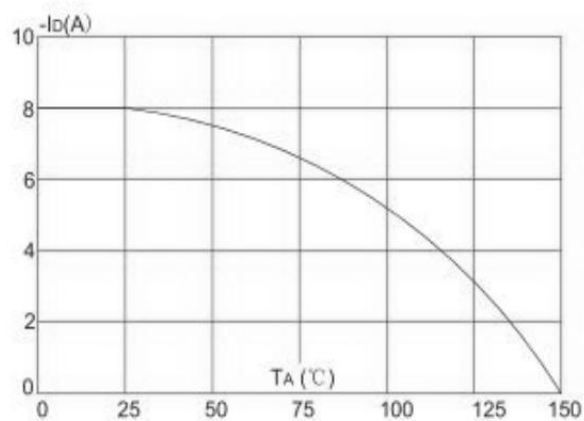


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

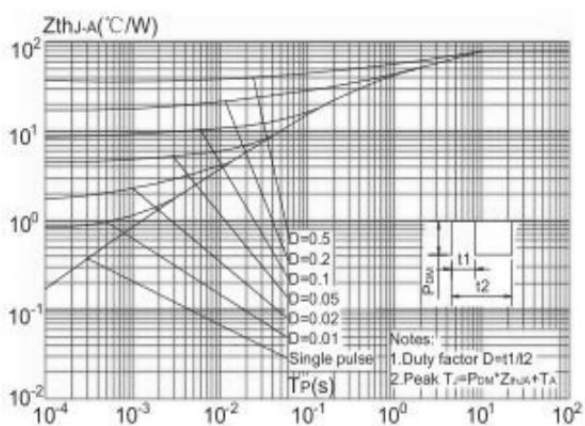
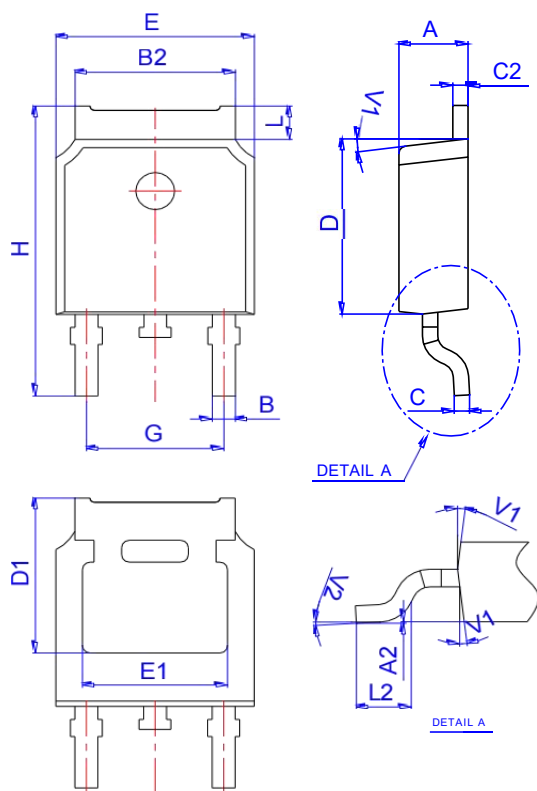


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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