

Description

The SX90N02D 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

$V_{DS} = 20V$ $I_D = 90A$

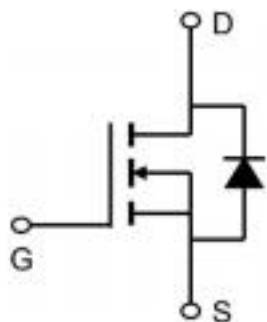
$R_{DS(ON)} < 3.5m\Omega @ V_{GS}=4.5V$

Application

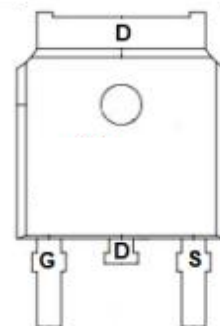
Battery protection

Load switch

Uninterruptible power supply



TO-252-3L



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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	20	V
VGSS	Gate-Source Voltage	± 12	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D @ T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	59	A
IDM	Pulsed Drain Current ^{note1}	360	A
EAS	Single Pulsed Avalanche Energy ^{note2}	110	mJ
P _D	Power Dissipation	81	W
R _{θJC}	Thermal Resistance, Junction to Case	1.85	$^\circ C/W$
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

Electrical Characteristics (T_c=25°C 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	-	2.8	3.5	mΩ
		V _{GS} =2.5V, I _D =20A		4	6	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	3200	-	pF
C _{oss}	Output Capacitance		-	460	-	pF
Crss	Reverse Transfer Capacitance		-	445	-	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		-	-	90	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°C	-	-	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 inch² 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°C, V_{DD}=15V, V_G=4.5V, R_G=25Ω, L=0.5mH, I_{AS}=21A
- 4、The power dissipation is limited by 175°C 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

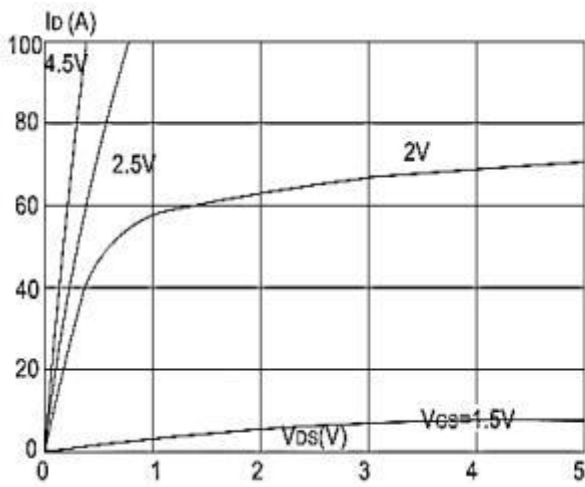


Figure1: Output Characteristics

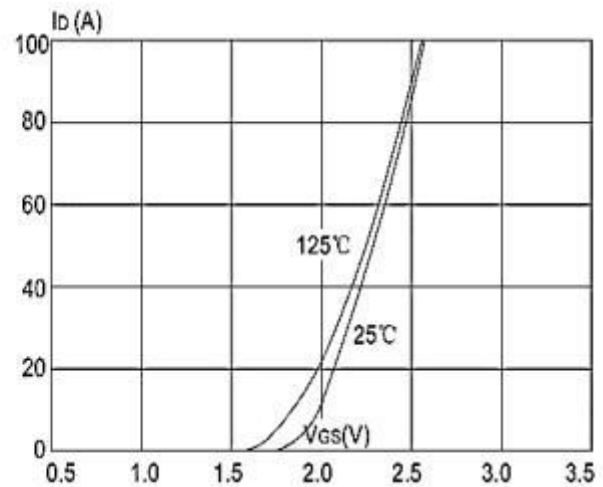


Figure 2: Typical Transfer Characteristics

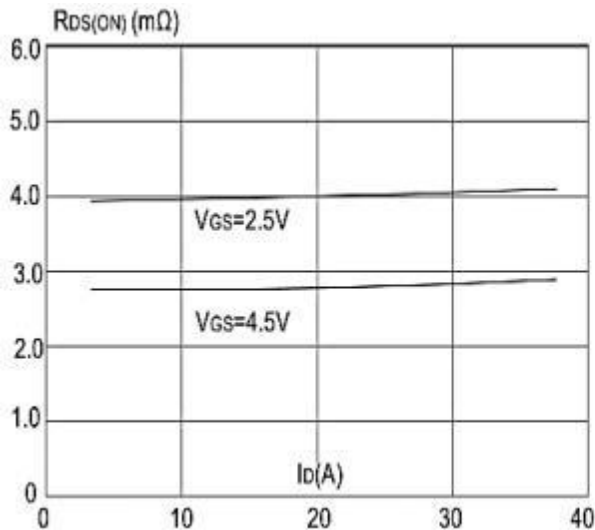


Figure 3: On-resistance vs. Drain Current

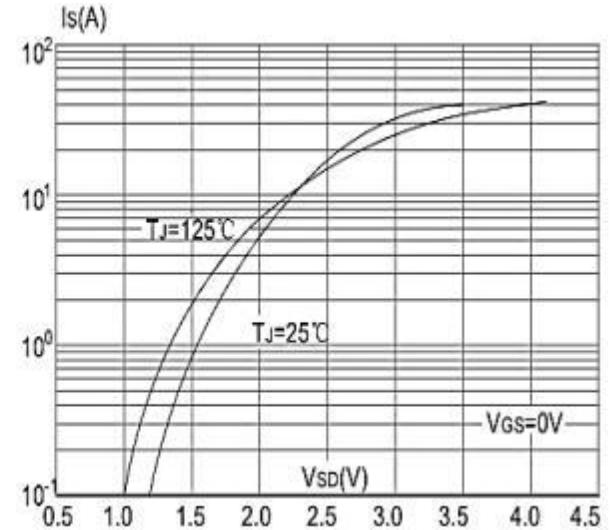
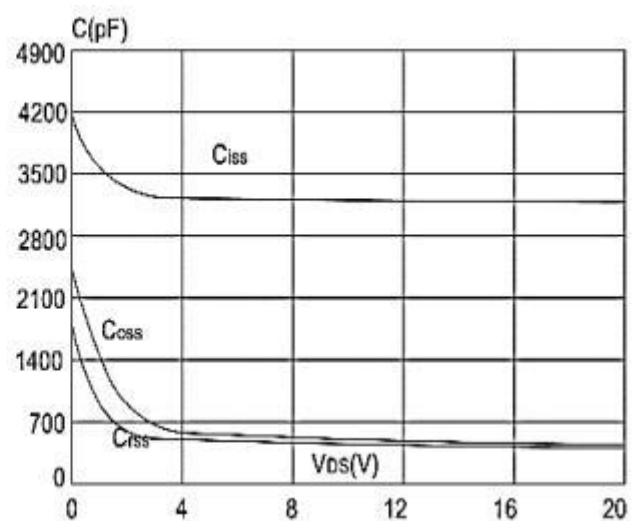
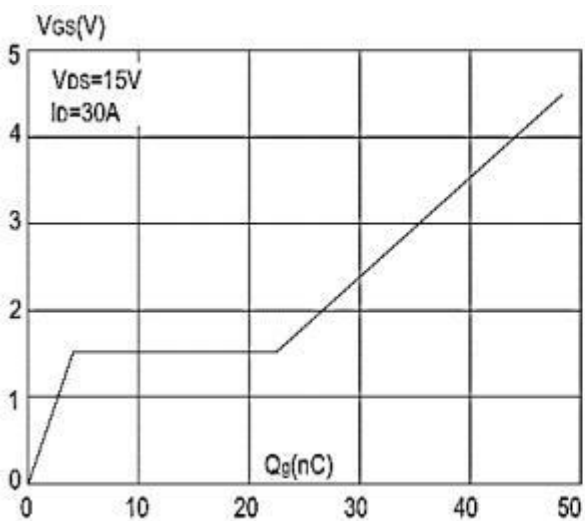


Figure 4: Body Diode Characteristics



Typical Characteristics

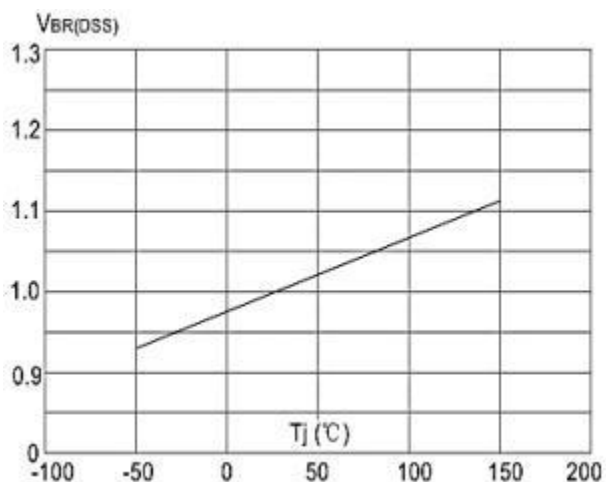


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

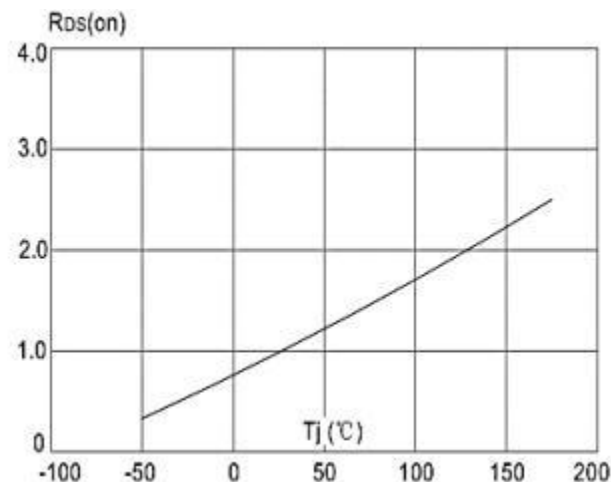


Figure 8: Normalized on Resistance vs. Junction Temperature

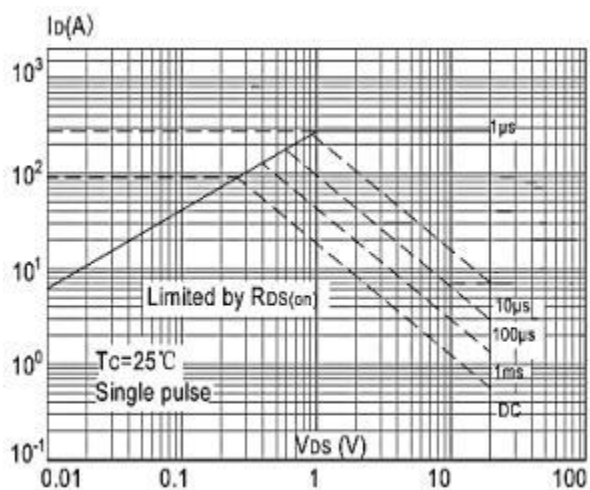


Figure 9: Maximum Safe Operating Area

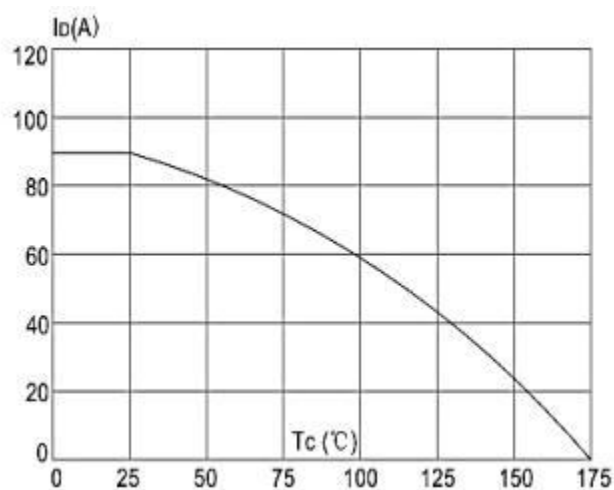


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

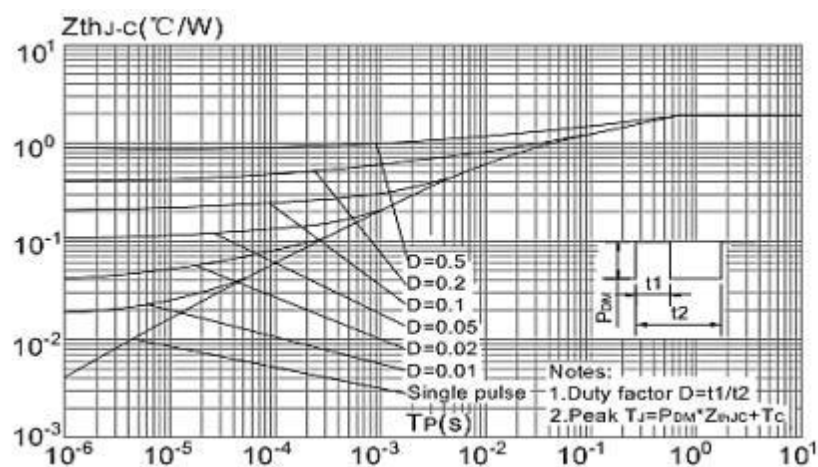
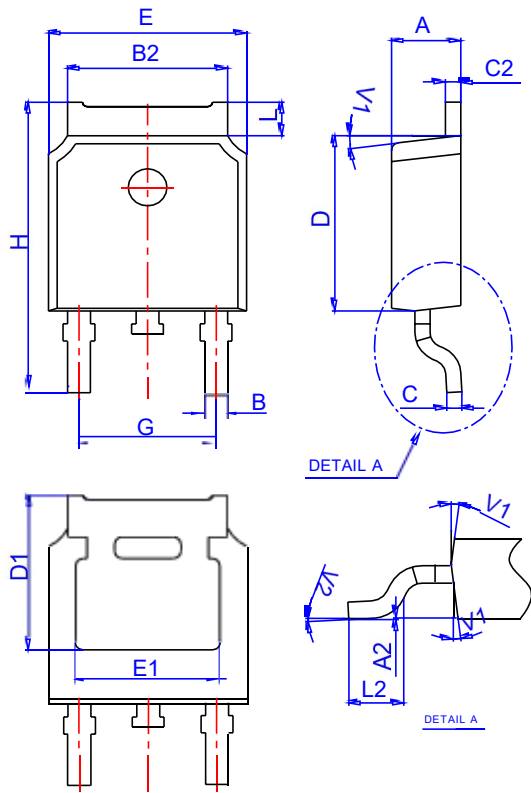


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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