

Description

The SX20N02BF 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

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

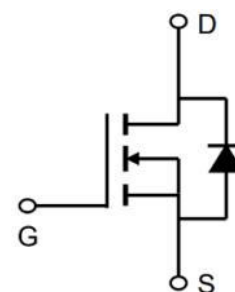
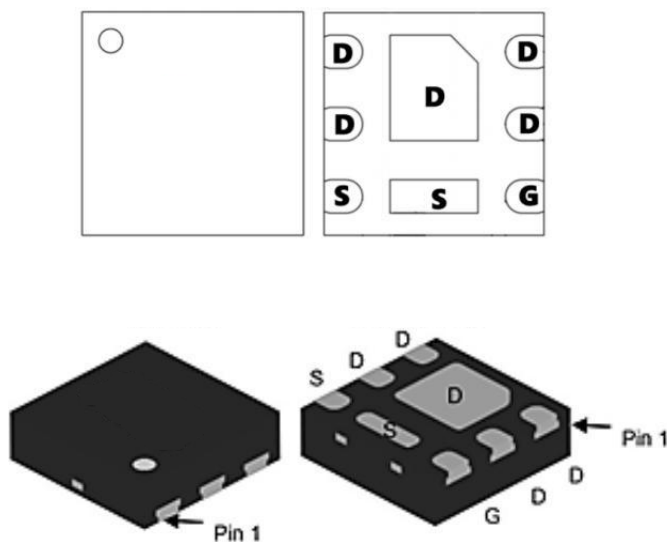
$R_{DS(ON)} < 15m\Omega @ V_{GS}=4.5V$

Application

solar road lights

Load switch

Uninterruptible power supply



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	13	A
I_{DM}	Pulsed Drain Current ²	50	A
EAS	Single Pulse Avalanche Energy ³	8.1	mJ
I_{AS}	Avalanche Current	12.7	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation ⁴	20.8	W
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	2	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	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	6	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	22		V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.018	---	V/ $^{\circ}\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.50	0.65	1.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=7.6A$		11	15	m Ω
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=2.5V, I_D=3.5A$		15.5	20	
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=1.8V, I_D=2.5A$		20.5	35	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$			1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$			± 100	nA
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		888		pF
C_{oss}	Output Capacitance			133		
C_{rss}	Reverse Transfer Capacitance			117		
Q_g	Total Gate Charge	$V_{GS}=4.5V, V_{DS}=10V, I_D=6.8A$		11.05		nC
Q_{gs}	Gate-Source Charge			1.73		
Q_{gd}	Gate-Drain Charge			3.1		
$t_{D(on)}$	Turn-on Delay Time	$V_{GS}=4.5V, V_{DS}=10V, I_D=6.8A, R_{GEN}=3\Omega$		7		ns
t_r	Turn-on Rise Time			46		
$t_{D(off)}$	Turn-off Delay Time			30		
t_f	Turn-off fall Time			52		
V_{SD}	Diode Forward Voltage	$I_S=7.6A, V_{GS}=0V$			1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

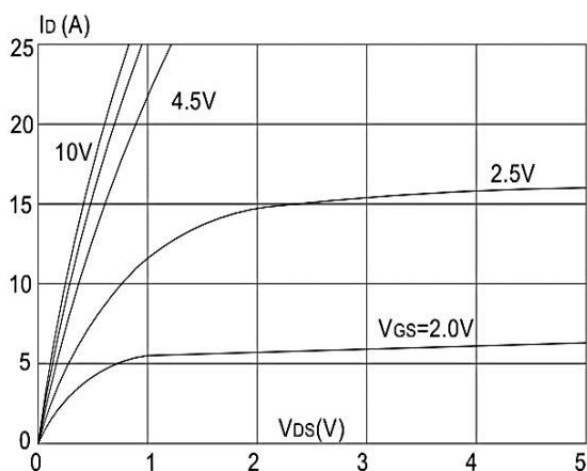


Figure1: Output Characteristics

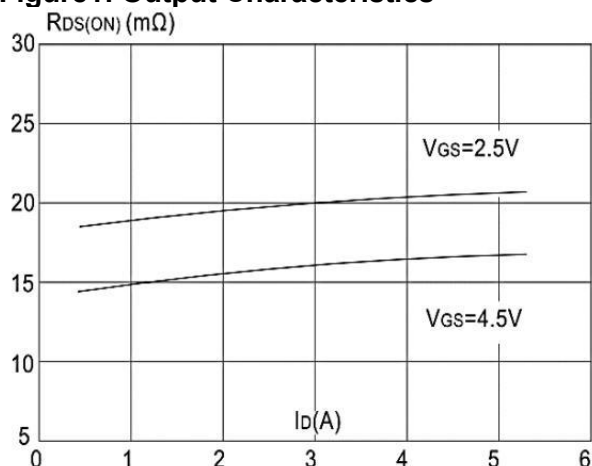


Figure 3: On-resistance vs. Drain Current

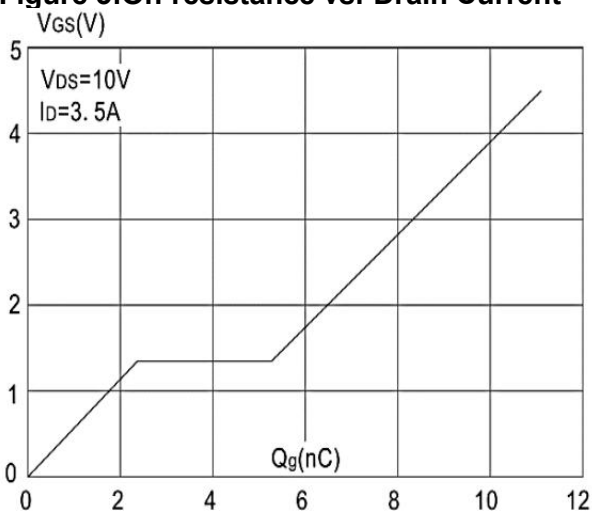


Figure 5: Gate Charge Characteristics

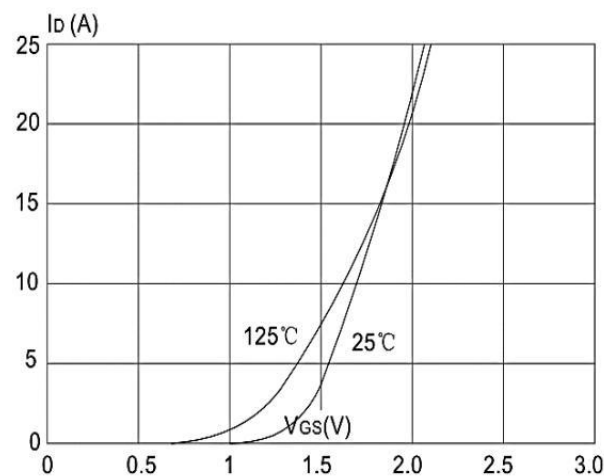


Figure 2 : Typical Transfer Characteristics

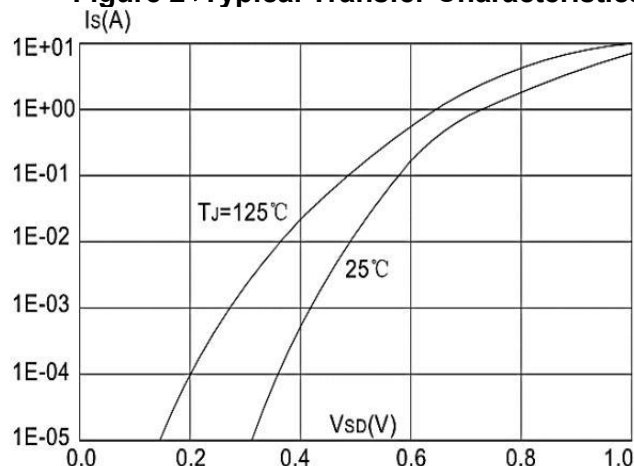


Figure 4: Body Diode Characteristics

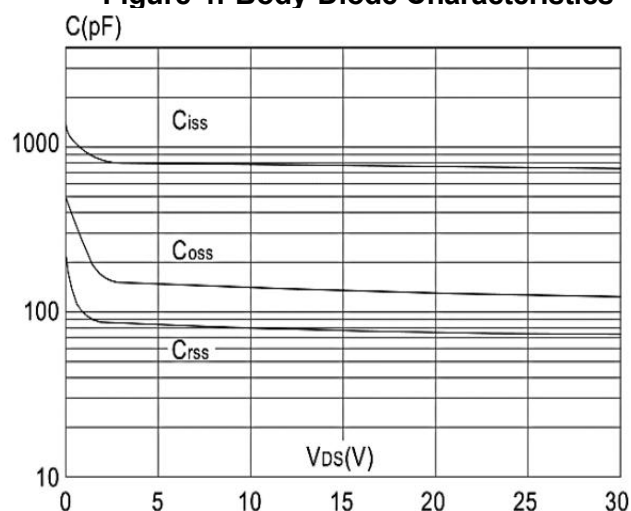


Figure 6: Capacitance Characteristics

Typical Characteristics

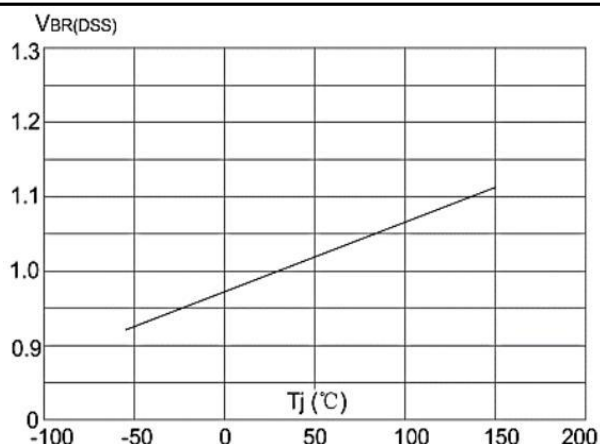


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

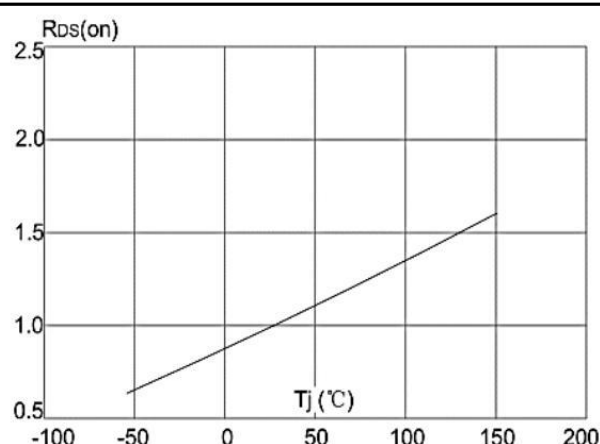


Figure 8: Normalized on Resistance vs. Junction Temperature

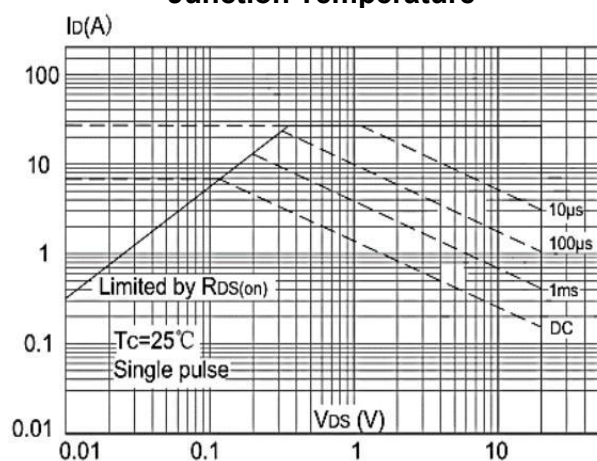


Figure 9: Maximum Safe Operating Area vs. Case Temperature

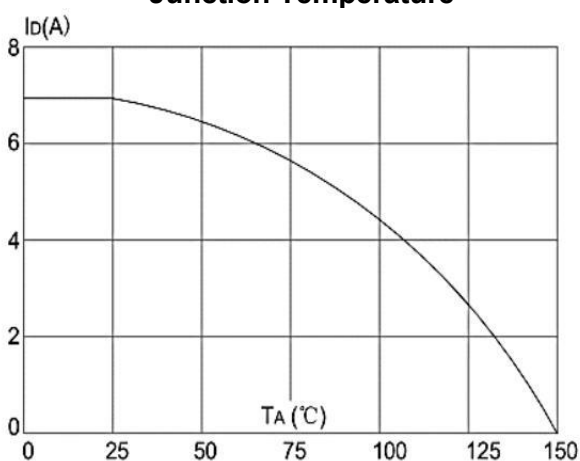


Figure 10: Maximum Continuous Drain Current

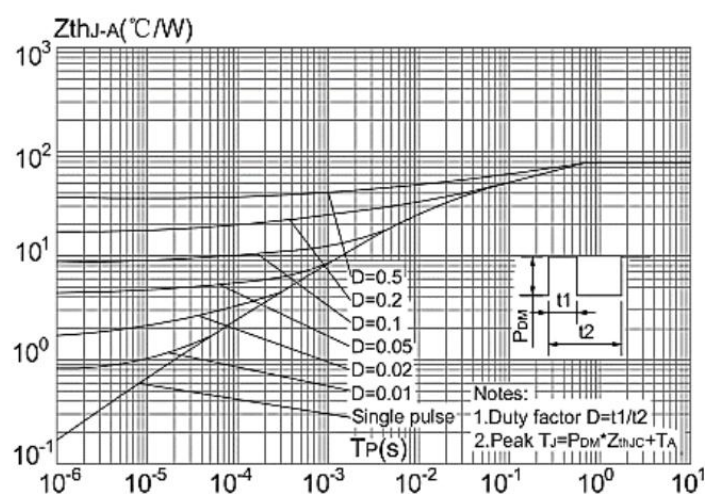
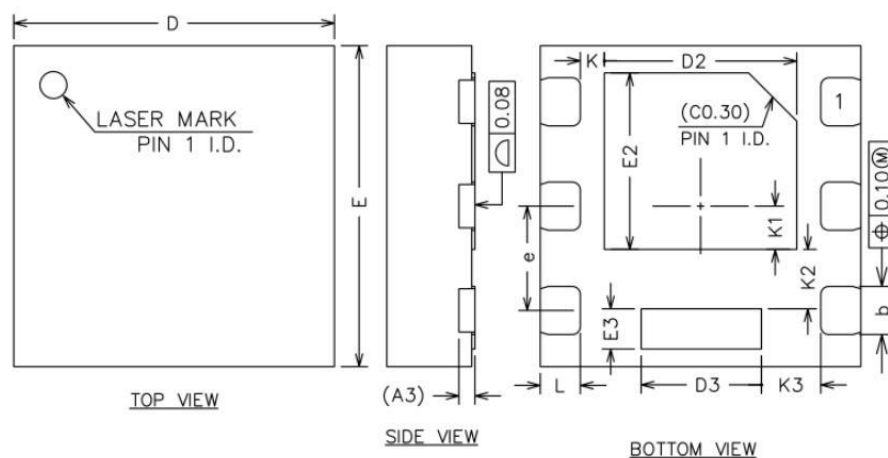


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P Package Mechanical Data : QFN2*2-6L


Symbol			
	Min	Nom	Max
A	0.50	--	0.54
A1	0.00	0.02	0.05
A3	0.10REF		
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	1.10	1.20	1.30
E2	1.00	1.10	1.20
D3	0.65	0.75	0.85
E3	0.15	0.25	0.35
e	0.55	0.65	0.75
K	0.05	--	--
K1	0.17	--	--
K2	0.27	--	--
K3	0.28	--	--
L	0.20	0.25	0.30

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	QFN2*2-6L		3000