-20V P-Channel Enhancement Mode MOSFET

Description

The SX16P02S 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 =-16A

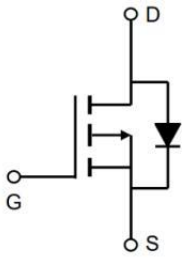
$R_{DS(ON)}$ < 20mΩ @ V_{GS}=-4.5V

Application

Battery protection

Load switch

Uninterruptible power supply



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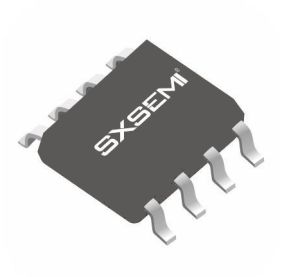
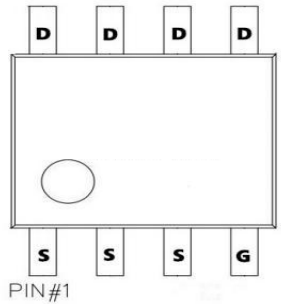




Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-16	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-8	A
IDM	Pulsed Drain Current[2]	-48	A
P_D@T_C=25℃	Total Power Dissipation[3]	2.5	W
P_D@T_C=70℃	Total Power Dissipation[3]	1.6	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	85	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	24	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V，I_D=-250uA	-20	-24	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃，I_D=-1mA	---	-0.012	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V，I_D=-20A	---	14	20	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-2.5V，I_D=-10A	---	22	28	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS}，I_D =-250uA	-0.5	-0.6	-1.2	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=-20V，V_{GS}=0V，T_J=25℃	---	---	1	uA
IGSS	Gate-Source Leakage Current	V_{GS}=±12V，V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-10V，V_{GS}=-4.5V，I_D=-6A	---	15.3	---	nC
Qgs	Gate-Source Charge		---	2.2	---	
Qgd	Gate-Drain Charge		---	4.4	---	
Td(on)	Turn-On Delay Time	V_{DD}=-10V，V_{GS}=-4.5V，R_G=3.3Ω，I_D=-10A	---	10	---	ns
T_r	Rise Time		---	31	---	
Td(off)	Turn-Off Delay Time		---	28	---	
T_f	Fall Time		---	8	---	
Ciss	Input Capacitance	V_{DS}=-10V，V_{GS}=0V，f=1MHz	---	2000	---	pF
Coss	Output Capacitance		---	242	---	
Crss	Reverse Transfer Capacitance		---	231	---	
IS	Continuous Source Current[1,4]	V_G=V_D=0V，Force Current	---	---	-20	A
ISM	Pulsed Source Current[2,4]		---	---	-48	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V，I_S=-1A，T_J=25℃	---	---	-1.2	V

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 ≦300us，duty cycle ≦2%

3、The power dissipation is limited by 150℃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

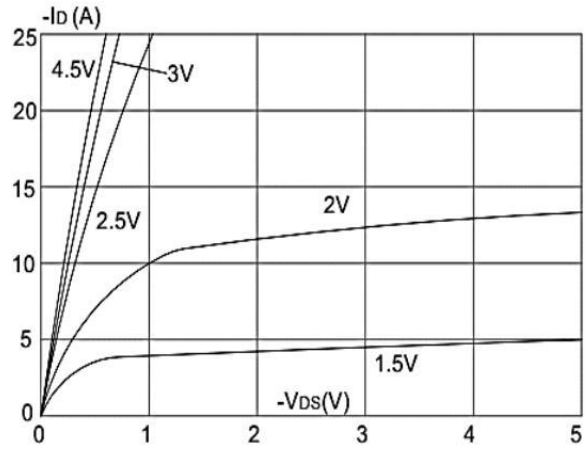


Figure1: Output Characteristics

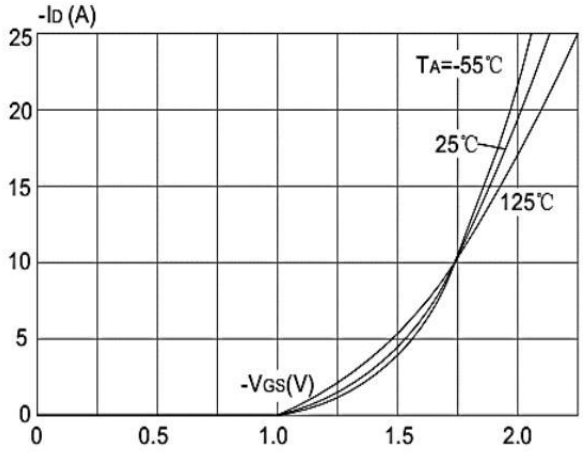


Figure 2: Typical Transfer Characteristics

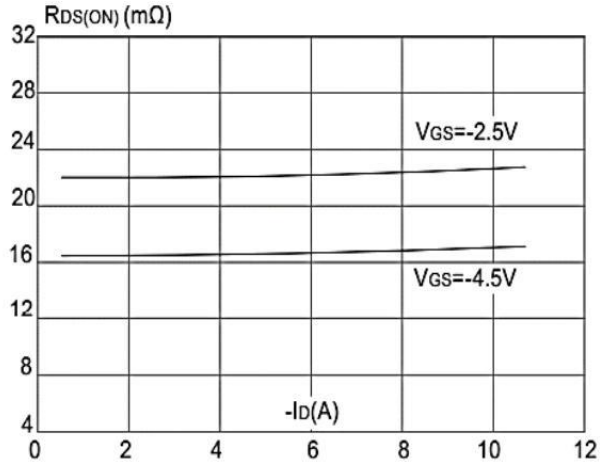


Figure 3:On-resistance vs. Drain Current

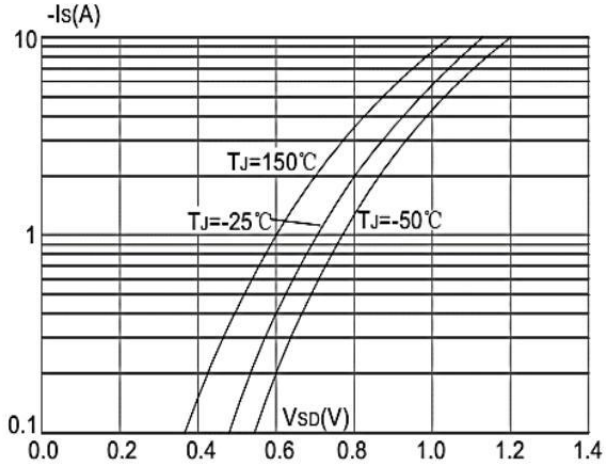


Figure 4: Body Diode Characteristics

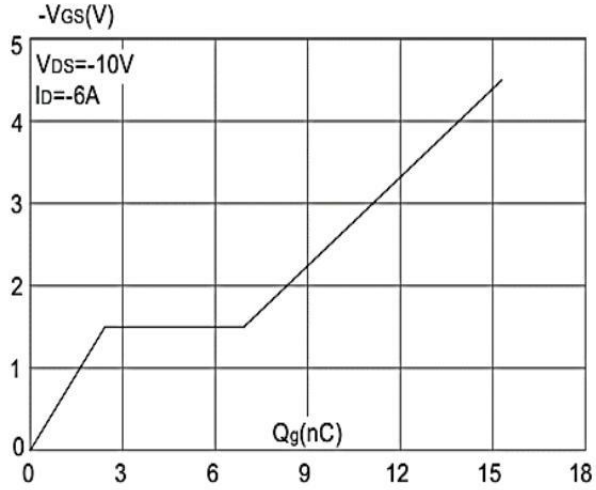


Figure 5: Gate Charge Characteristics

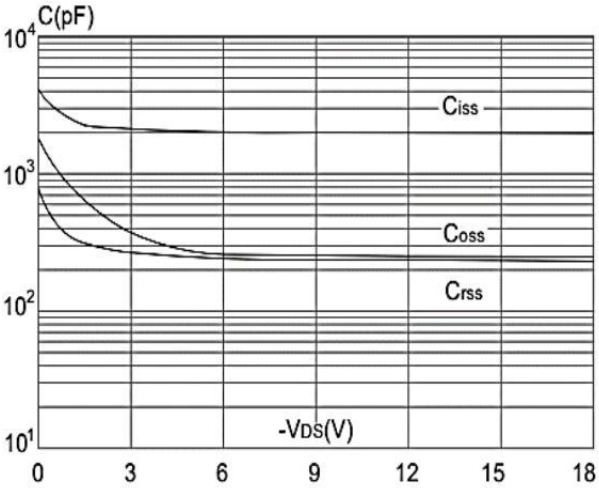


Figure 6: Capacitance Characteristics

Typical Characteristics

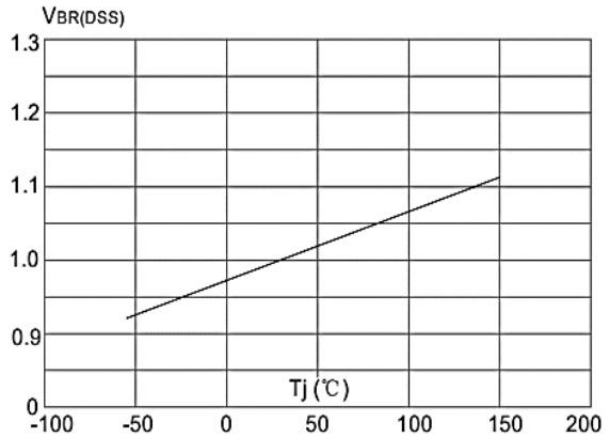


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

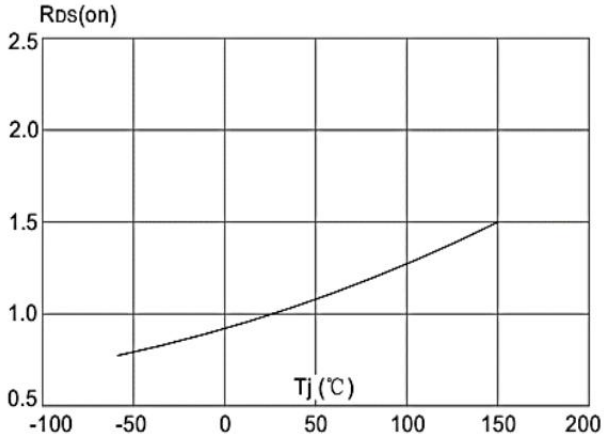


Figure 8: Normalized on Resistance vs. Junction Temperature

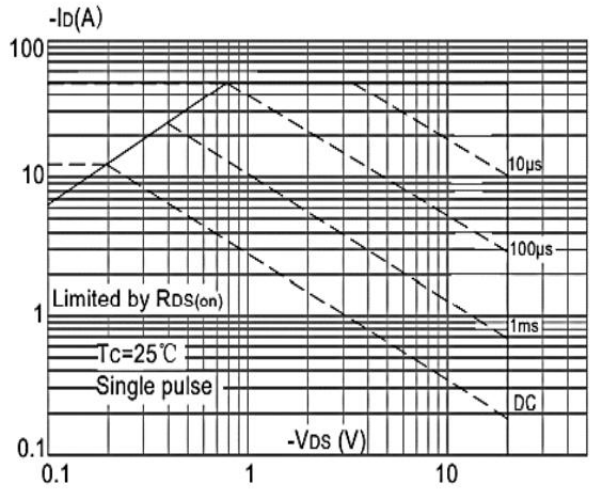


Figure 9: Maximum Safe Operating Area

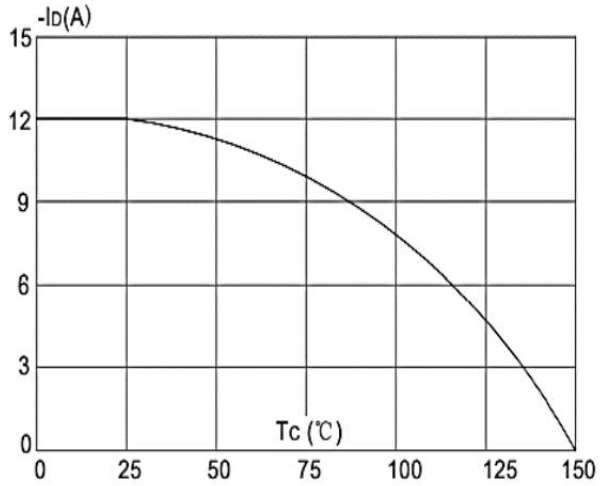


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

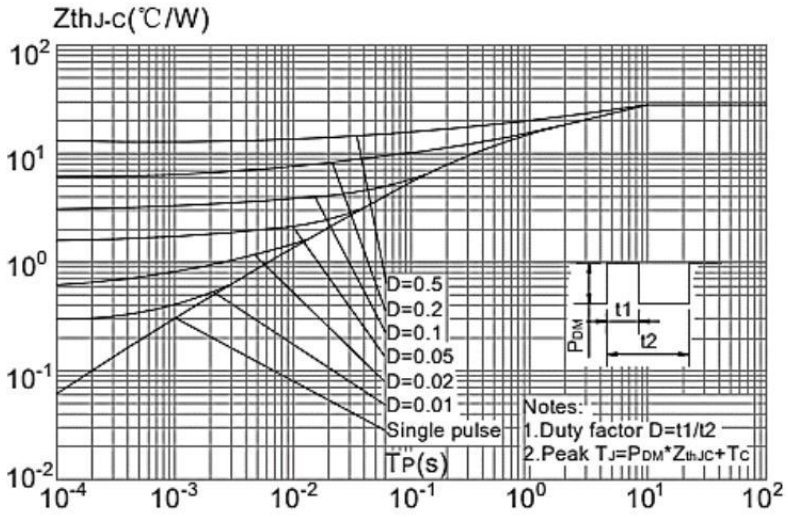
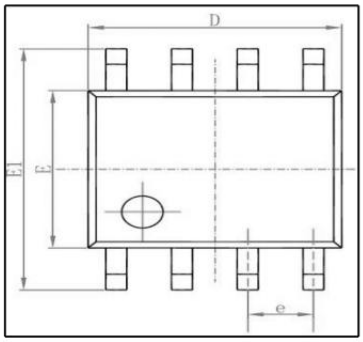
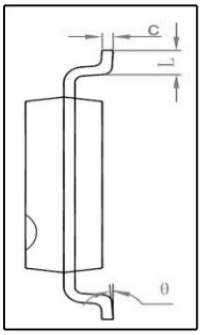
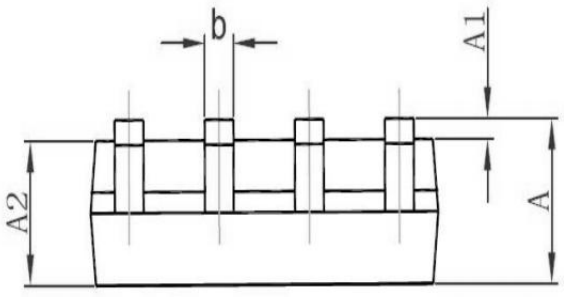


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

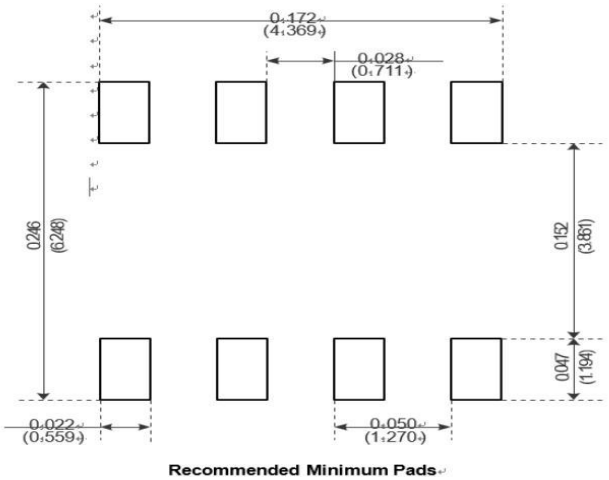
Package Mechanical Data-SOP-8







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOP-8		3000