Description

The XXW20P02S 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.

SOP-8

## General Features

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

$R_{DS(ON)}$ < 19mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply
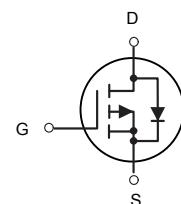
P-Channel MOSFET

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	$\pm$12	V
I_D@T_A=25℃	Drain Current[3], V_{GS} @ 10V	-20	A
I_D@T_A=70℃	Drain Current[3], V_{GS} @ 10V	-16	A
I_{DM}	Pulsed Drain Current[1]	-68	A
P_D@T_A=25℃	Total Power Dissipation	18	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	75	℃/W

## Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-20	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.012	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-4.5V , I$_D$=-10A	---	15	19	mΩ
		V$_{GS}$=-2.5V , I$_D$=-8A	---	19	23	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-0.4	-0.7	-1.0	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	2.94	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-15V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12 V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-10A	---	43	---	S
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-10V , V$_{GS}$=-4.5V , I$_D$=-10A	---	35	---	nC
Q$_{gs}$	Gate-Source Charge		---	5.0	---	
Q$_{gd}$	Gate-Drain Charge		---	10	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-10V , V$_{GS}$=-4.5V , R$_G$=3.3Ω, I$_D$=-10A	---	12.0	---	ns
T$_r$	Rise Time		---	40.0	---	
T$_{d(off)}$	Turn-Off Delay Time		---	30	---	
T$_f$	Fall Time		---	10	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	2800	---	pF
C$_{oss}$	Output Capacitance		---	690	---	
C$_{rss}$	Reverse Transfer Capacitance		---	590	---	

Diode Characteristics

| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,4]	V$_G$=V$_D$=0V , Force Current	---	---	-20.0	A
I$_{SM}$	Pulsed Source Current[2,4]		---	---	---	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time	IF=-10A , dI/dt=100A/μs , T$_J$ =25℃	---	27	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	17.8	---	nC

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
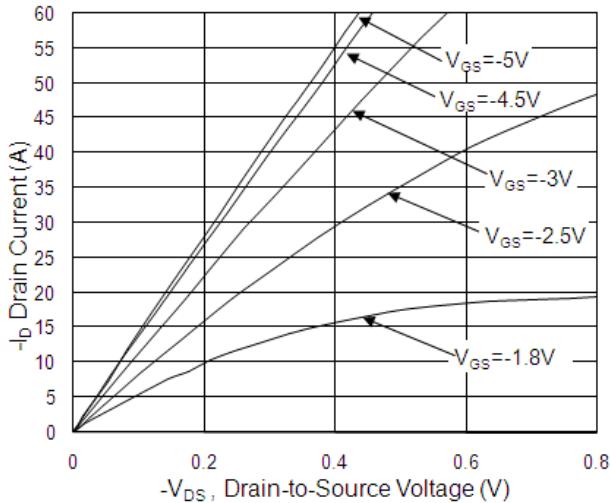
Fig.1 Typical Output Characteristics
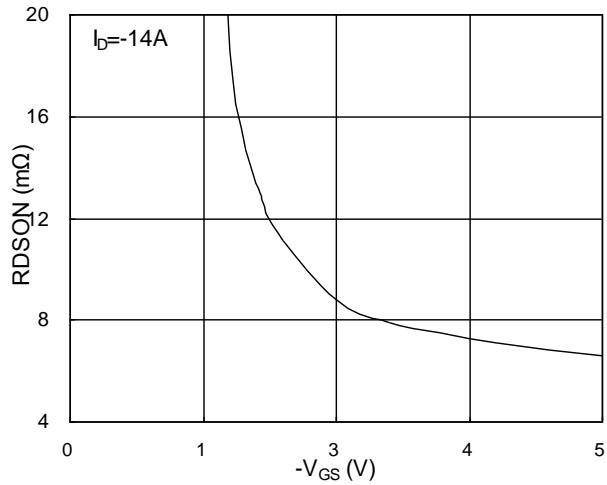
Fig.2 On-Resistance vs. G-S Voltage
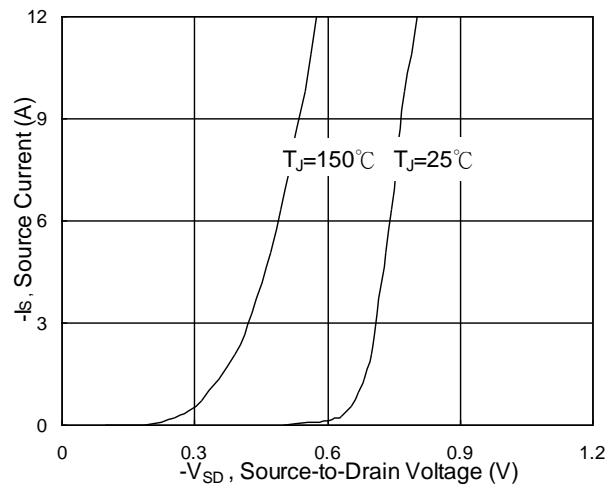
Fig.3 Forward Characteristics of Reverse
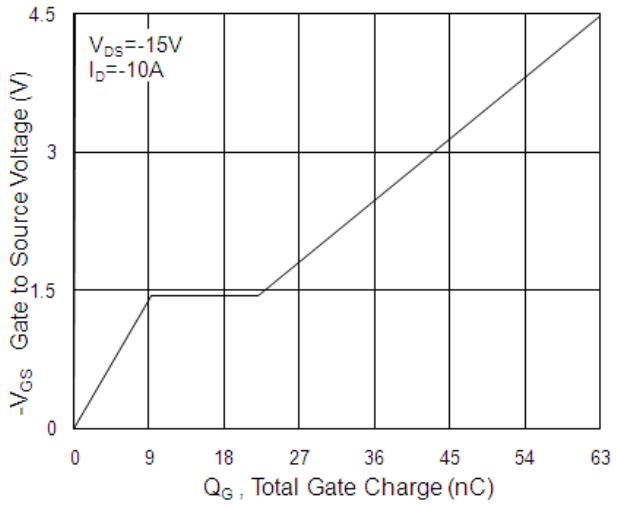
Fig.4 Gate-charge Characteristics
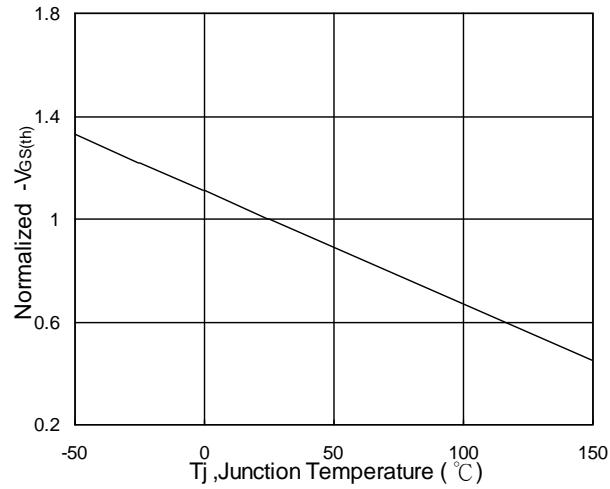
Fig.5 Normalized $V_{GS(th)}$ vs. T_J
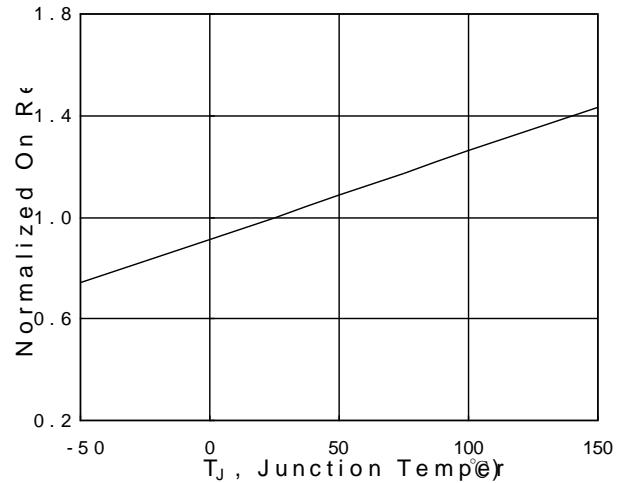
Fig.6 Normalized R_{DSON} vs. T_J
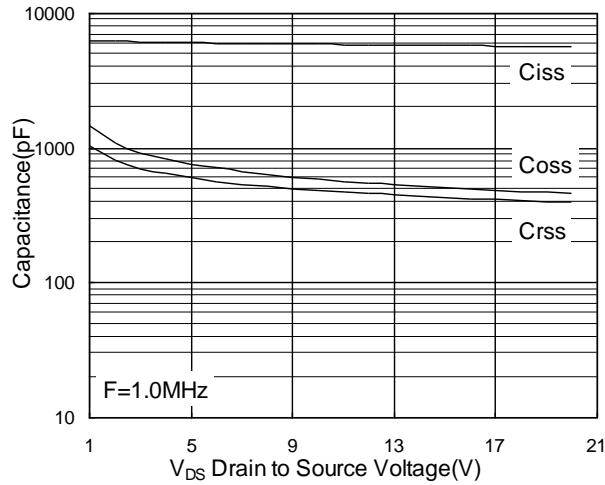
Fig.7 Capacitance
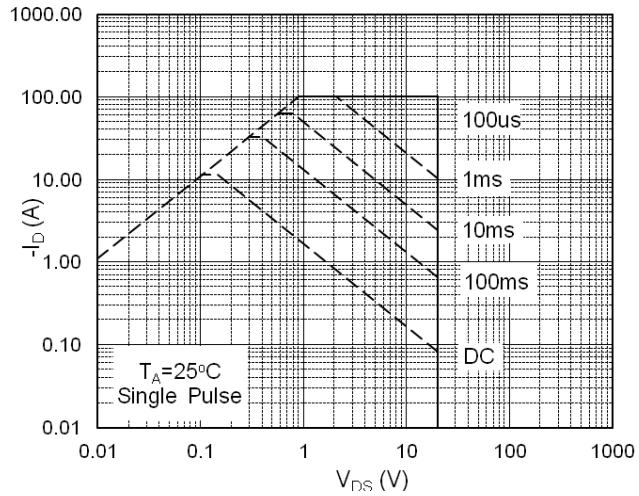
Fig.8 Safe Operating Area

$$D = T_{ON}/T$$

$$T_{J}peak = T_A + P_{DM} \times R_{\theta JA}$$
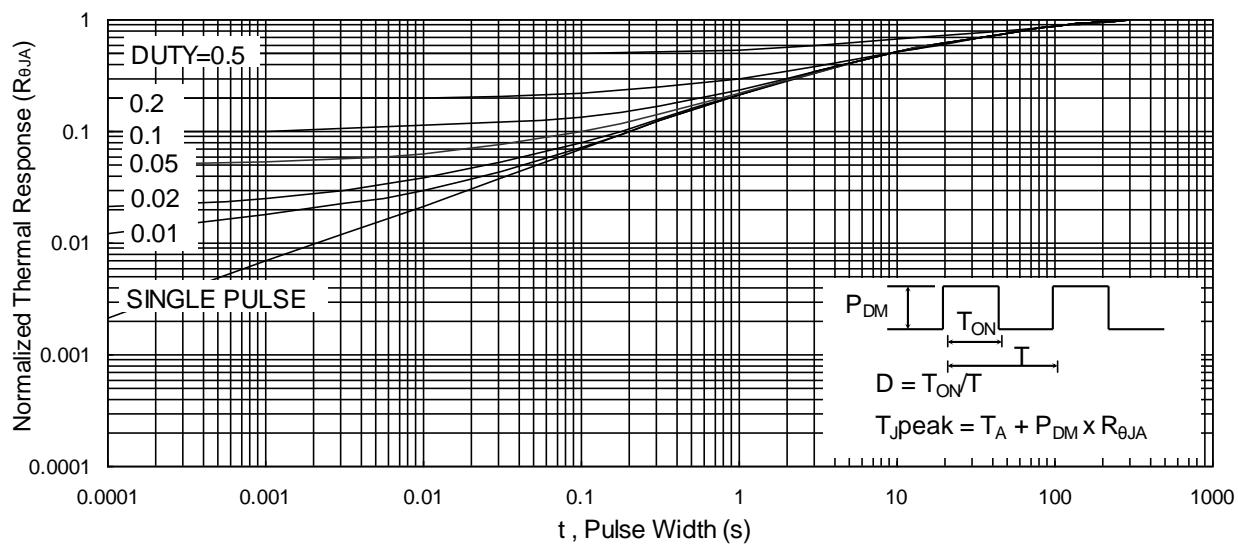
Fig.9 Normalized Maximum Transient Thermal Impedance
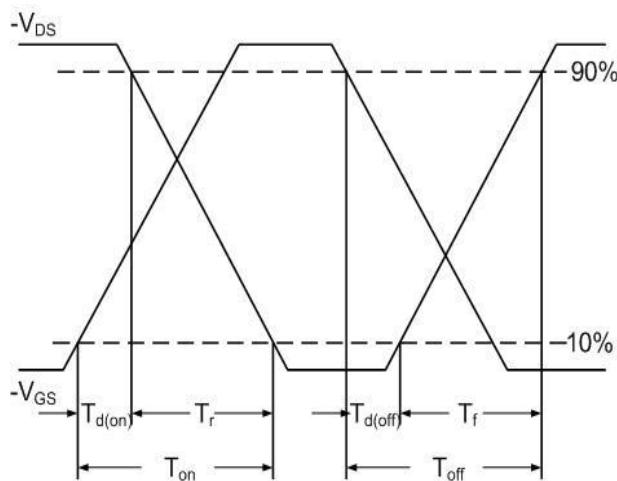
Fig.10 Switching Time Waveform
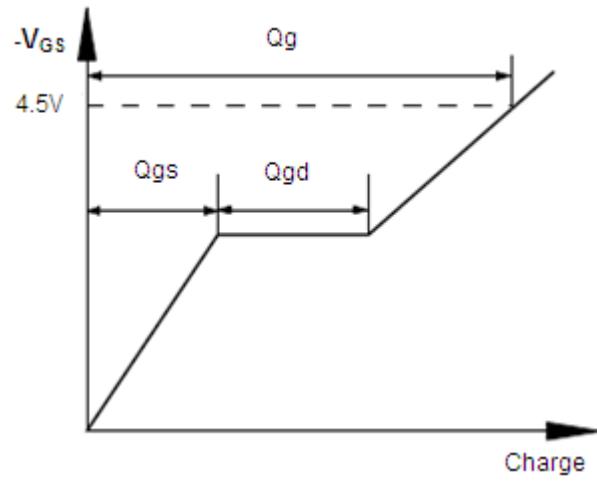
Fig.11 Gate Charge Waveform

SOP-8 Package Outline Dimensions
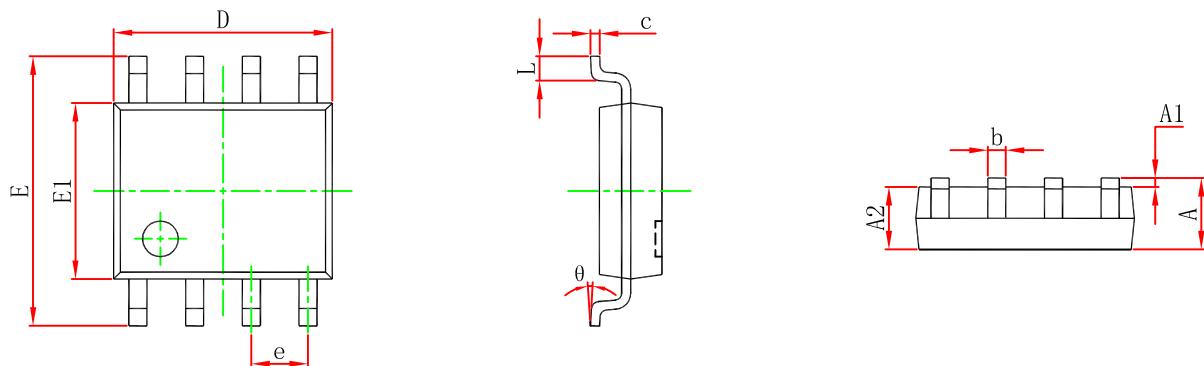
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°
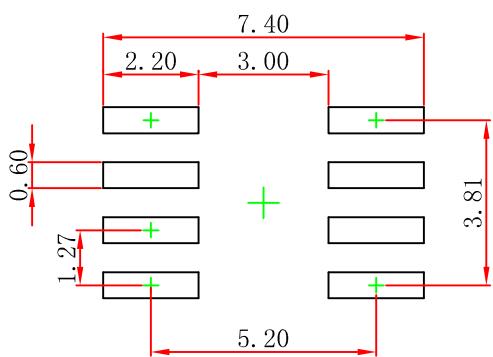
Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.