

## -100V P-Channel Enhancement Mode MOSFET



### Description

The XPX100U9AS uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a

Battery protection or in other Switching application.

### Application

Battery protection

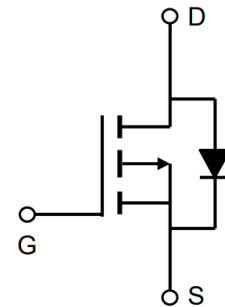
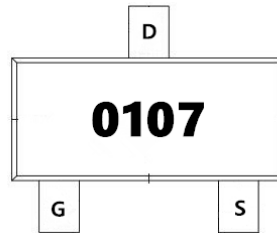
Load switch

Uninterruptible power supply

### General Features

$V_{DS} = -100V$   $I_D = -0.9 A$

$R_{DS(ON)} < 0.65\Omega$  @  $V_{GS}=10V$



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
XSW0107T	SOT23	0107	3000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-0.9	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-0.7	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-1.8	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation <sup>3</sup>	1	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 <sup>1</sup>	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	80	$^\circ C/W$

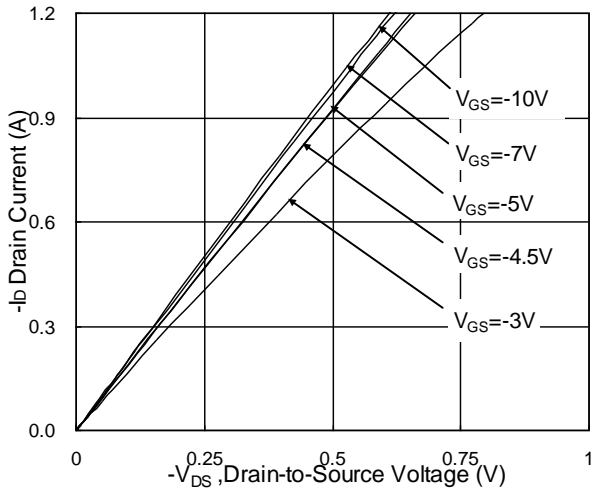
### Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	---	-0.0624	---	$V/^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-0.8A$	---	0.52	0.65	$\Omega$
		$V_{GS}=-4.5V, I_D=-0.4A$	---	0.56	0.7	
VGS(th)	Gate Threshold Voltage		-1.0	-1.5	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	$V_{GS}=V_{DS}, I_D=-250\mu A$	---	4.5	---	$\text{mV}/^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=-80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	10	$\mu A$
		$V_{DS}=-80V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	100	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-0.8A$	---	3	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	16	32	$\Omega$
Qg	Total Gate Charge (-4.5V)		---	4.5	---	nC
Qgs	Gate-Source Charge	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-0.5A$	---	1.14	---	
Qgd	Gate-Drain Charge		---	1.5	---	
Td(on)	Turn-On Delay Time	$V_{DD}=-50V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-0.5A$	---	13.6	---	ns
Tr	Rise Time		---	6.8	---	
Td(off)	Turn-Off Delay Time		---	34	---	
Tf	Fall Time		---	3	---	
Ciss	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	553	---	pF
Coss	Output Capacitance		---	29	---	
Crss	Reverse Transfer Capacitance		---	20	---	
IS	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	-0.9	A
ISM	Pulsed Source Current <sup>2,4</sup>		---	---	-1.8	A
VSD	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

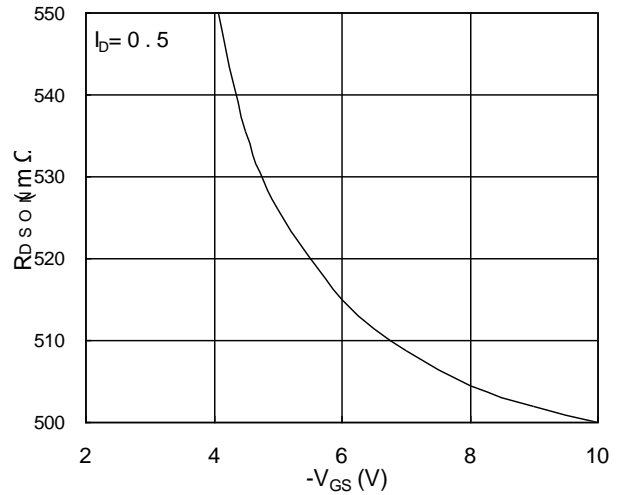
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup>FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The power dissipation is limited by  $150^\circ\text{C}$  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.

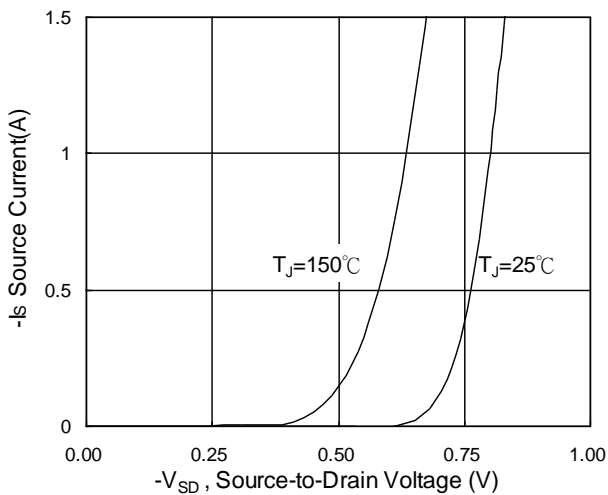
### Typical Characteristics



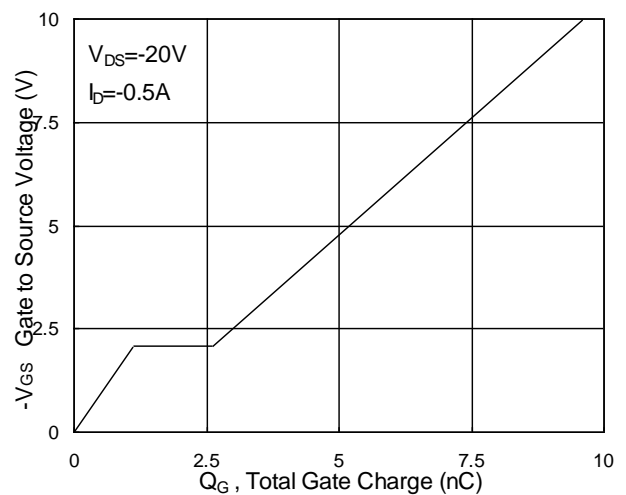
**Fig.1 Typical Output Characteristics**



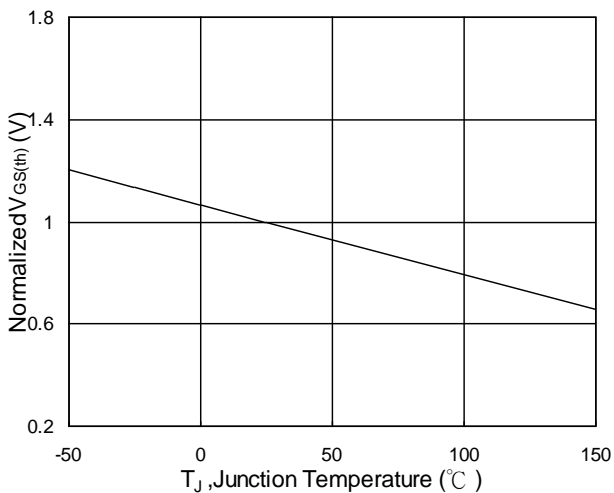
**Fig.2 On-Resistance vs. Gate-Source**



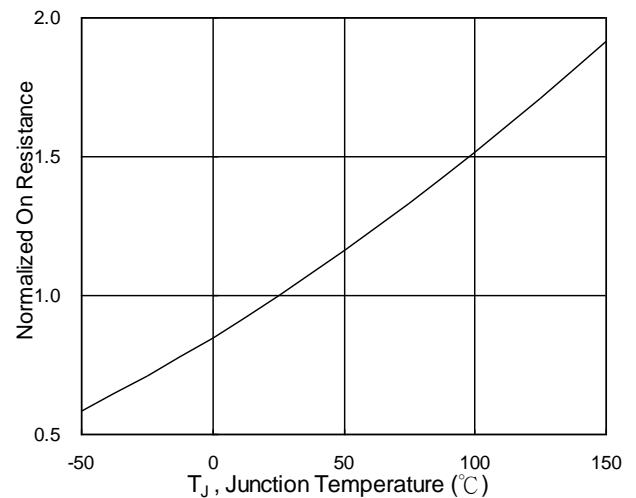
**Fig.3 Forward Characteristics Of Reverse**



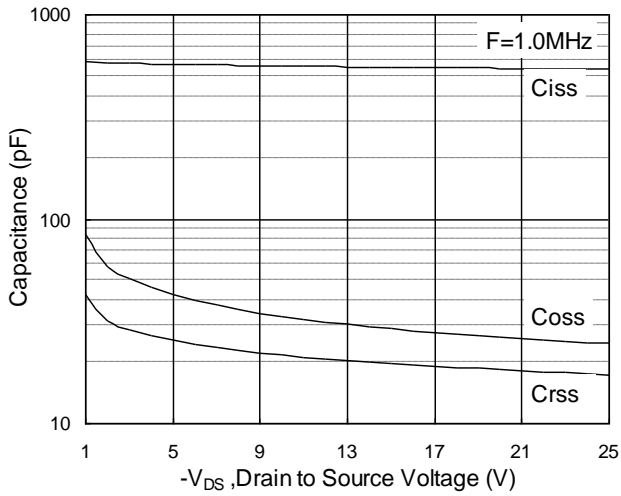
**Fig.4 Gate-Charge Characteristics**



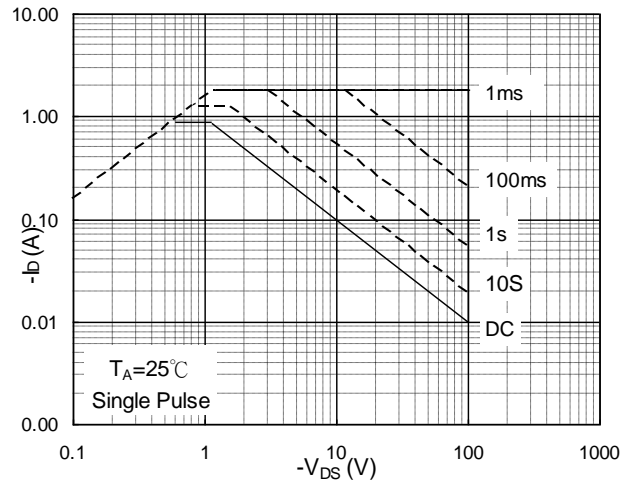
**Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>**



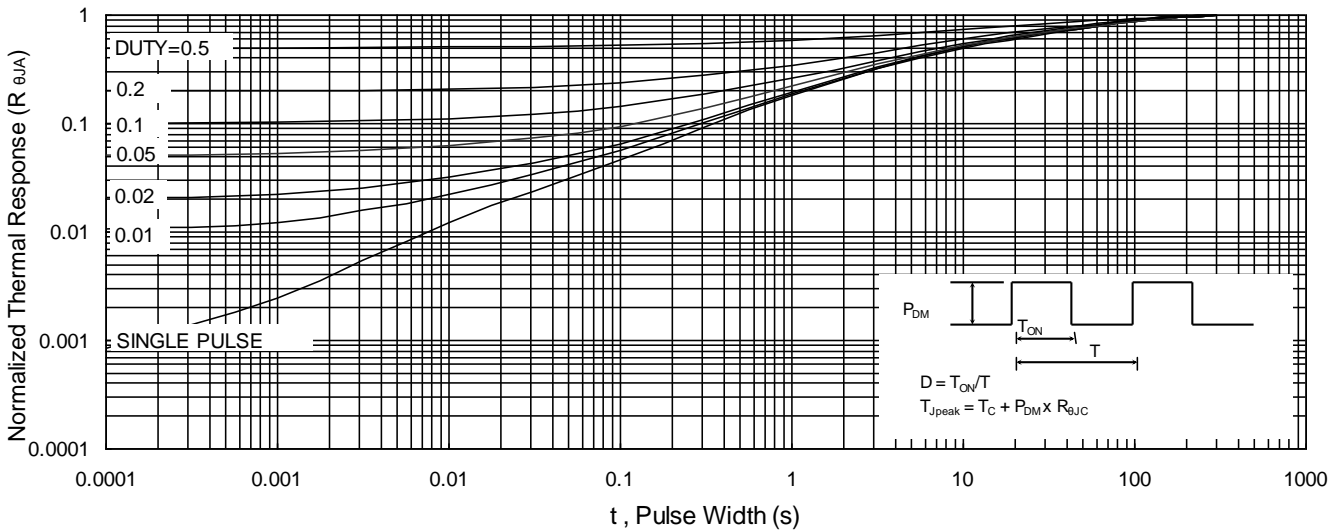
**Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**



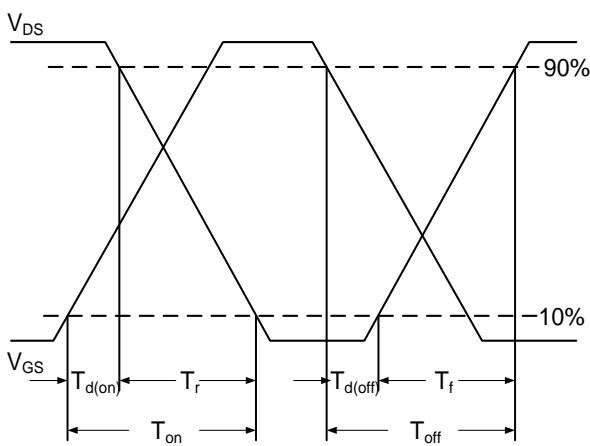
**Fig.7 Capacitance**



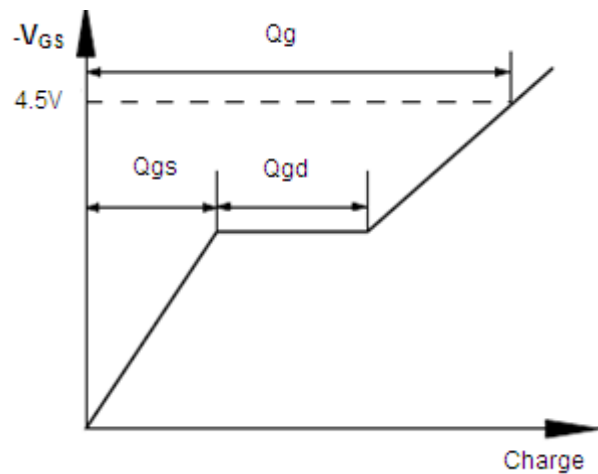
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**

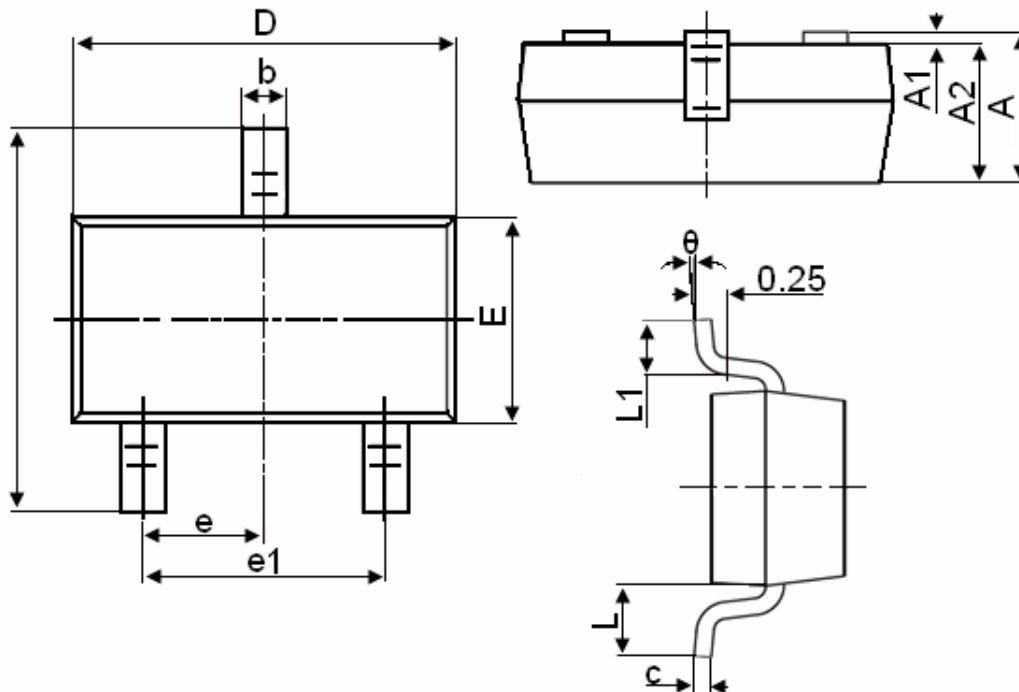


**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

### SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°