

Description

The SX6P05SI 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.

General Features

$V_{DS} = -60V$ $I_D = -6.8A$

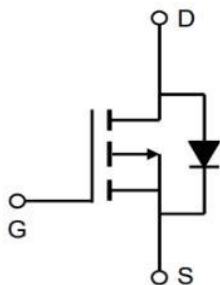
$R_{DS(ON)} < 125m\Omega$ @ $V_{GS} = -10V$

Application

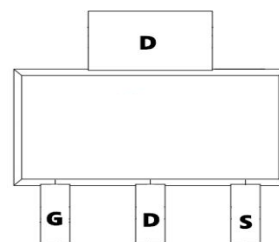
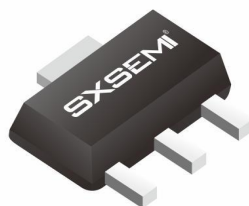
Battery protection

Load switch

Uninterruptible power supply



SOT-89-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-55	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-6.8	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-4.4	A
IDM	Pulsed Drain Current ²	-16	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	1	W
TSTG	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	80	$^\circ C/W$

Electrical Characteristics (TC=25 °C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-55	-58	---	V
$\Delta BVDSS/\Delta T_J$	BV _{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.021	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-1.5A$	---	110	125	mΩ
		$V_{GS}=-4.5V$, $I_D=-1A$	---	125	155	mΩ
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	1.6	-2.5	V
$\Delta V_{GS(th)}$	V _{GS(th)} Temperature Coefficient		---	4.08	---	mV/°C
IDSS	Drain-Source Leakage Current	$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=25^\circ C$	---	---	1	uA
IDSS		$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=55^\circ C$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	±100	nA
gfs	Forward Transconductance	$V_{DS}=-5V$, $I_D=-1.5A$	---	5.9	---	S
Qg	Total Gate Charge (-4.5V)	$V_{DS}=-20V$, $V_{GS}=-4.5V$, $I_D=-1.5A$	---	4.6	---	nC
Qgs	Gate-Source Charge		---	1.4	---	nC
Qgd	Gate-Drain Charge		---	1.62	---	nC
Td(on)	Turn-On Delay Time	$V_{DS}=-15V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-1A$	---	17.4	---	ns
Tr	Rise Time		---	5.4	---	ns
Td(off)	Turn-Off Delay Time		---	37.2	---	ns
Tf	Fall Time		---	2.4	---	ns
Ciss	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1MHz$	---	531	---	pF
Coss	Output Capacitance		---	59	---	pF
Crss	Reverse Transfer Capacitance		---	38	---	pF
IS	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-1.7	A
ISM	Pulsed Source Current ^{2,4}		---	---	-7	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ C$	---	---	-1.2	V

Note :

1、The data tested by surface mounted on a 1 inch 2 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

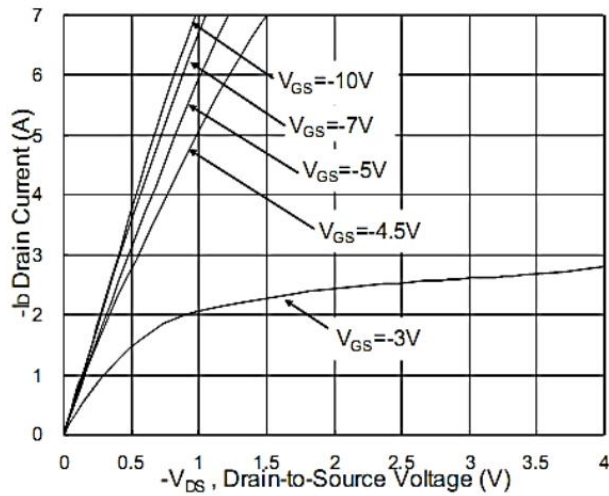


Fig.1 Typical Output Characteristics

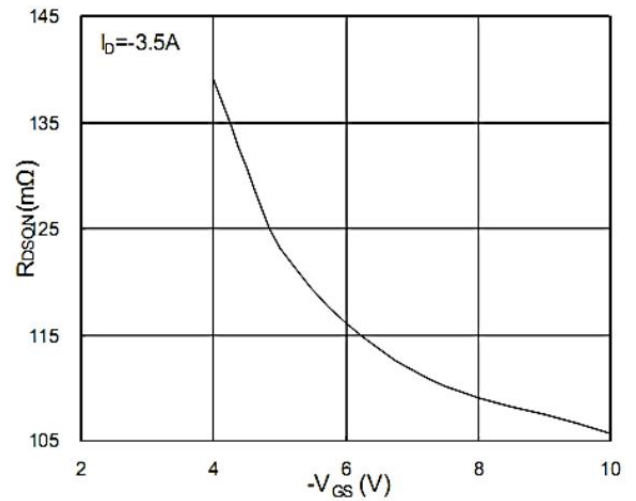


Fig.2 On-Resistance v.s Gate-Source

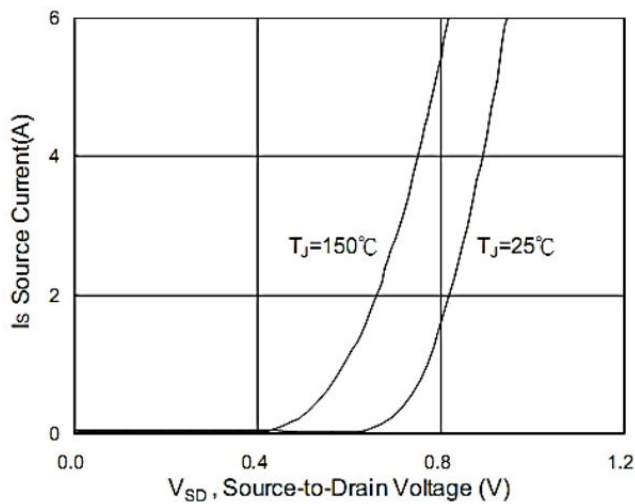


Fig.3 Forward Characteristics Of Reverse

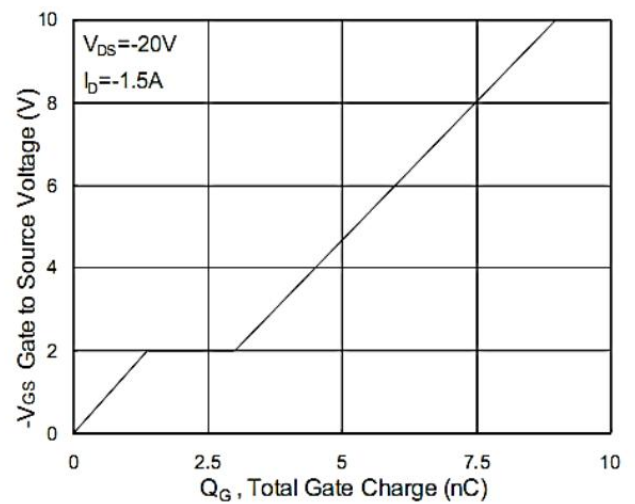


Fig.4 Gate-Charge Characteristics

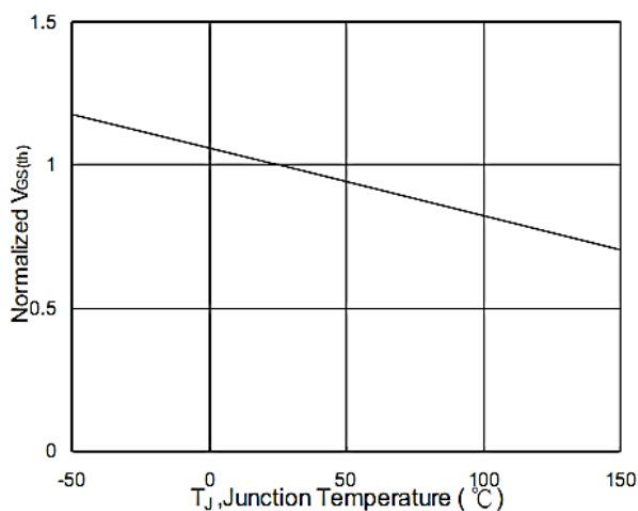


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

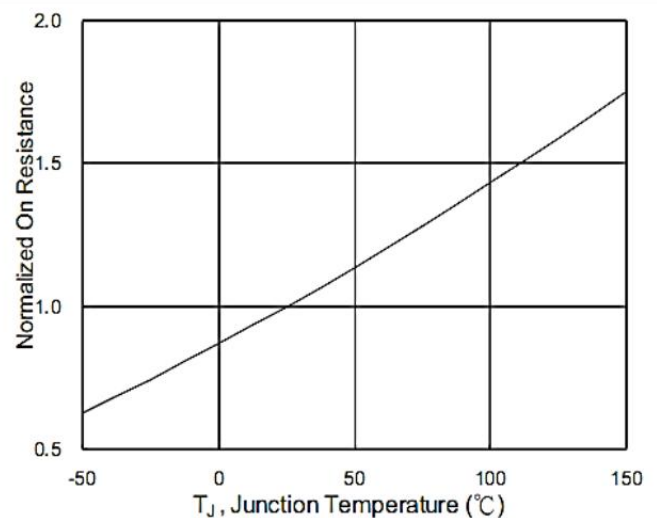


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

Typical Characteristics

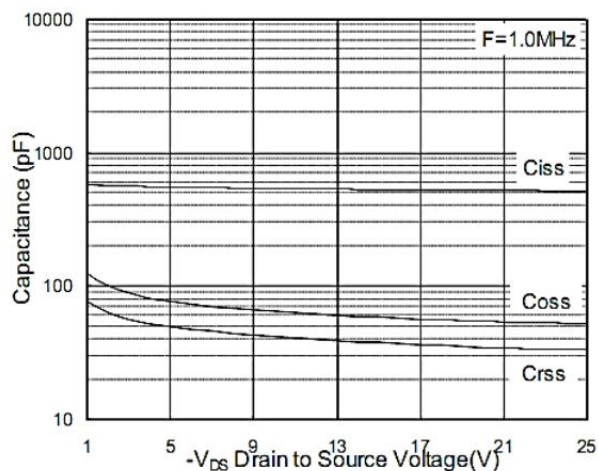


Fig.7 Capacitance

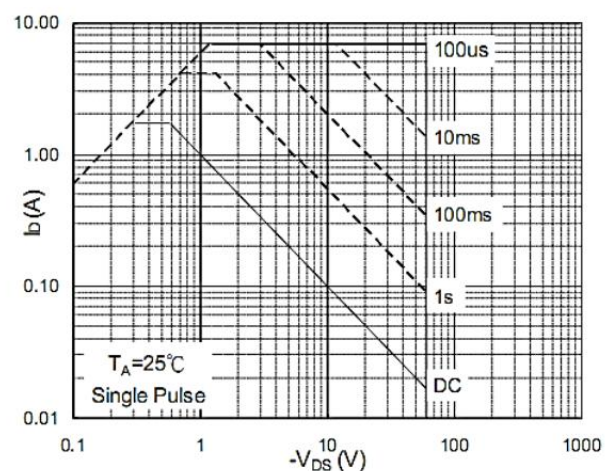


Fig.8 Safe Operating Area

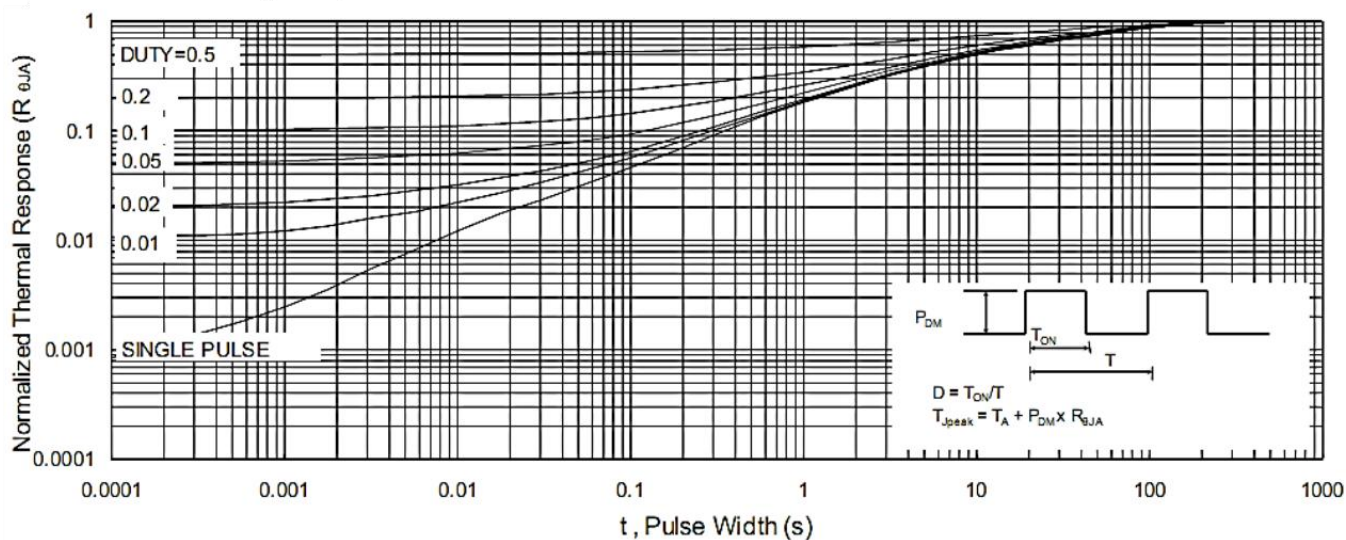


Fig.9 Normalized Maximum Transient Thermal Impedance

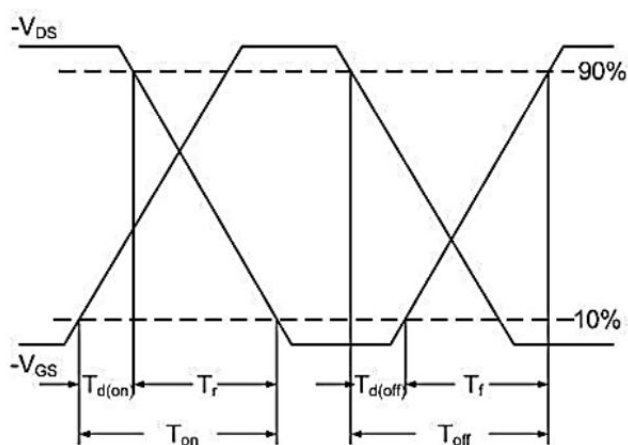


Fig.10 Switching time waveform

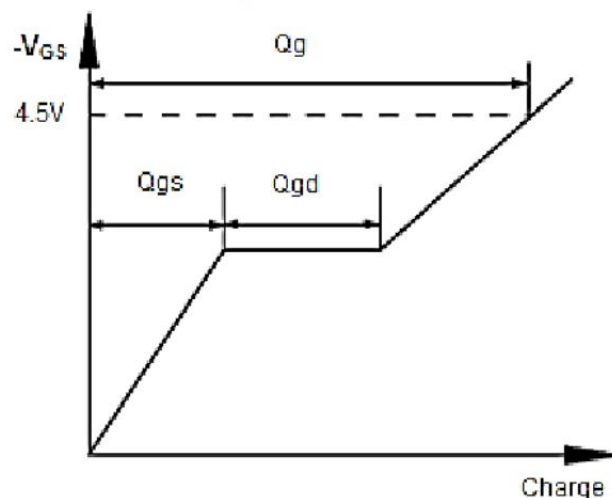
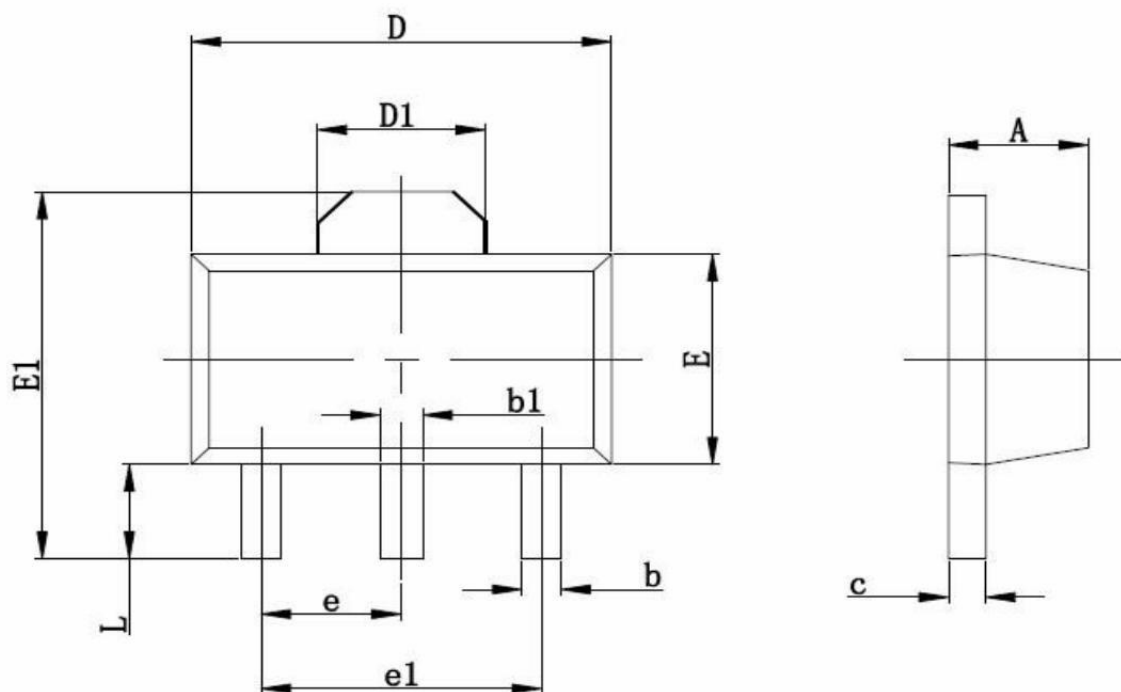


Fig.11 Gate Charge waveform

Package Mechanical Data:SOT89-3L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT89-3L		3000