

Description

The SX5P04MI 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

$V_{DS} = -40V$ $I_D = -5.0A$

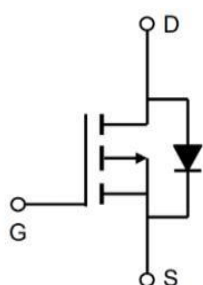
$R_{DS(ON)} < 72m\Omega$ @ $V_{GS} = -10V$

Application

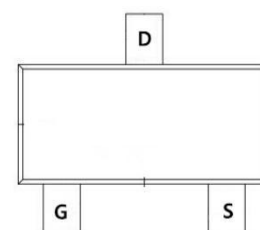
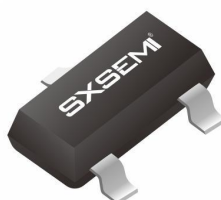
Battery protection

Load switch

Uninterruptible power supply



SOT23-3L



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

Symbol	Parameter	Steady State	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-5.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-3.0	A
I_{DM}	Pulsed Drain Current ²	-16.1	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	1.32	W
$P_D @ T_A = 70^\circ C$	Total Power Dissipation ³	0.84	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 (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-40	-46	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.018	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V , I _D =-3A	---	65	72	mΩ
		V _{GS} =-2.5V , I _D =-2A	---	89	100	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.5	-2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	2.5	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-24V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-24V , V _{GS} =0V , T _J =55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V , I _D =-3A	---	5.8	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-32V , V _{GS} =-4.5V , I _D =-3A	---	6.4	---	nC
Q _{gs}	Gate-Source Charge		---	2.1	---	
Q _{gd}	Gate-Drain Charge		---	2.5	---	
Td(on)	Turn-On Delay Time	V _{DD} =-20V , V _{GS} =-4.5V , R _G =3.3Ω , I _D =-3A	---	4.2	---	ns
T _r	Rise Time		---	23	---	
Td(off)	Turn-Off Delay Time		---	26.8	---	
T _f	Fall Time		---	20.6	---	
Ciss	Input Capacitance	V _{DS} =-15V , V _{GS} =0V , f=1MHz	---	620	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	53	---	
IS	Continuous Source Current ^{1,4}	V _G =V _D =0V , Force Current	---	---	-5.2	A
ISM	Pulsed Source Current ^{2,4}		---	---	-16.1	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1	V

Note :

- 1、The data tested by surface mounted on a 1 inch FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 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

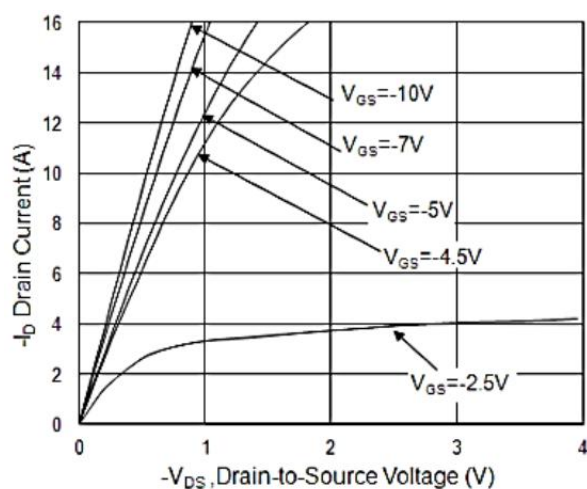


Fig.1 Typical Output Characteristics

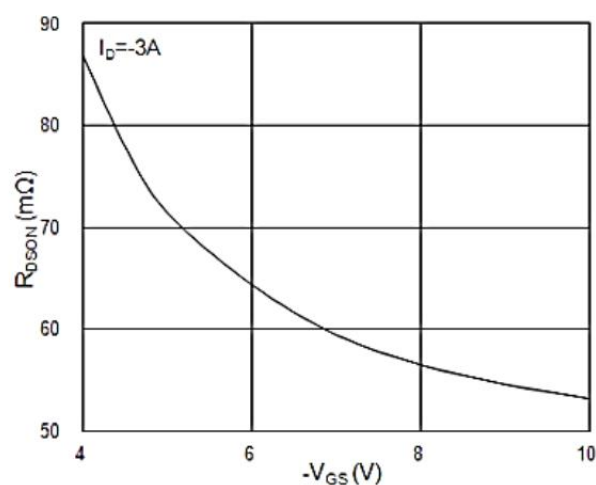


Fig.2 On-Resistance vs. G-S Voltage

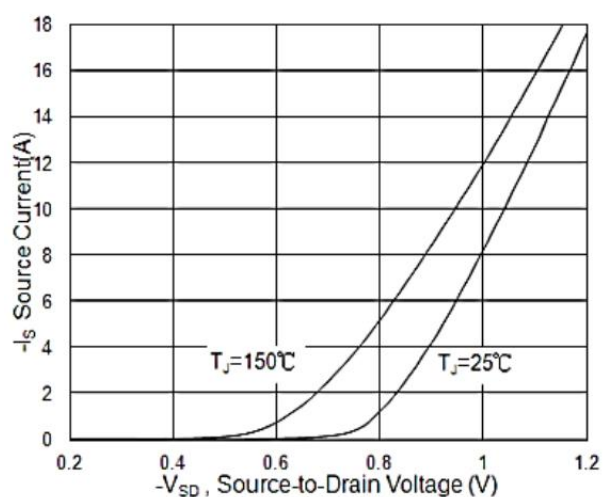


Fig.3 Forward Characteristics Of Reverse

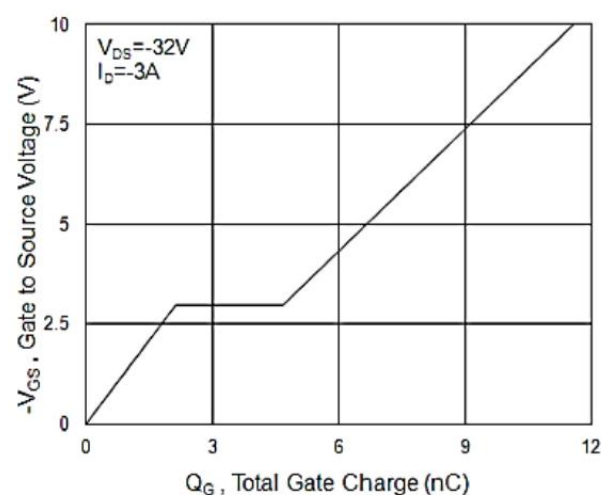


Fig.4 Gate-Charge Characteristics

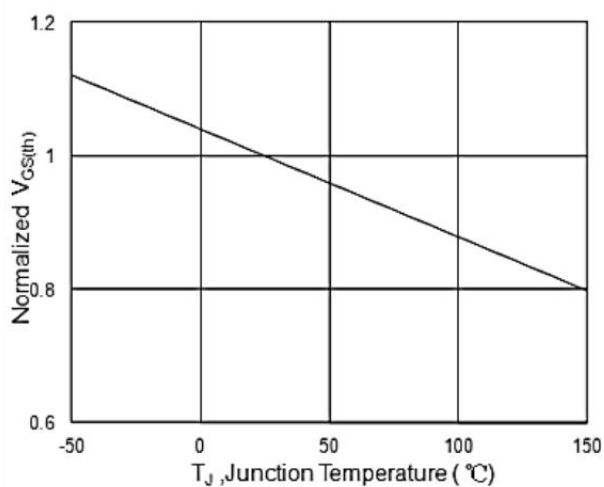


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

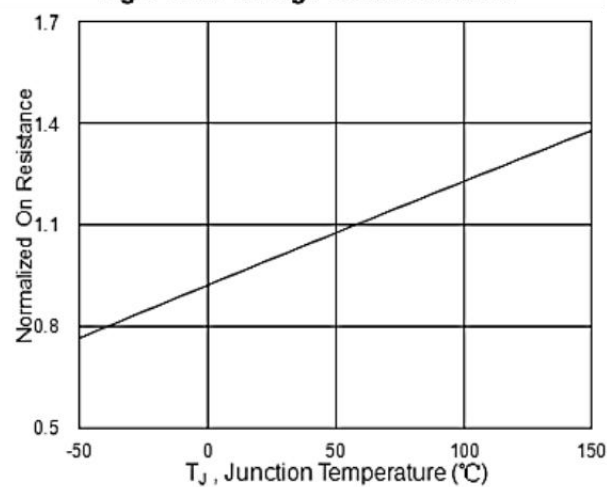
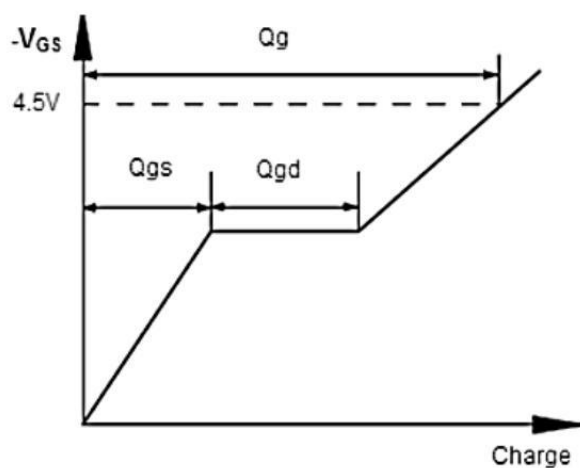
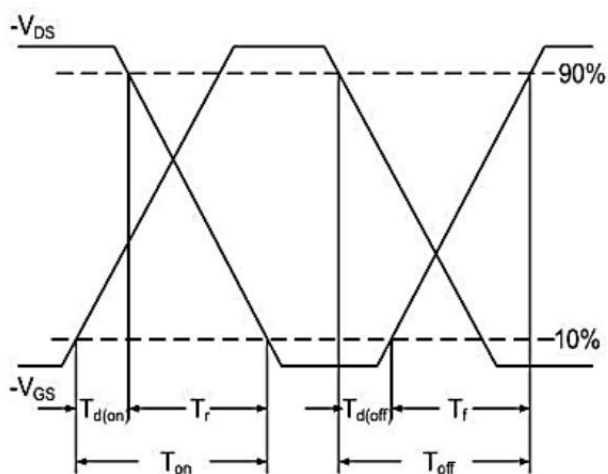
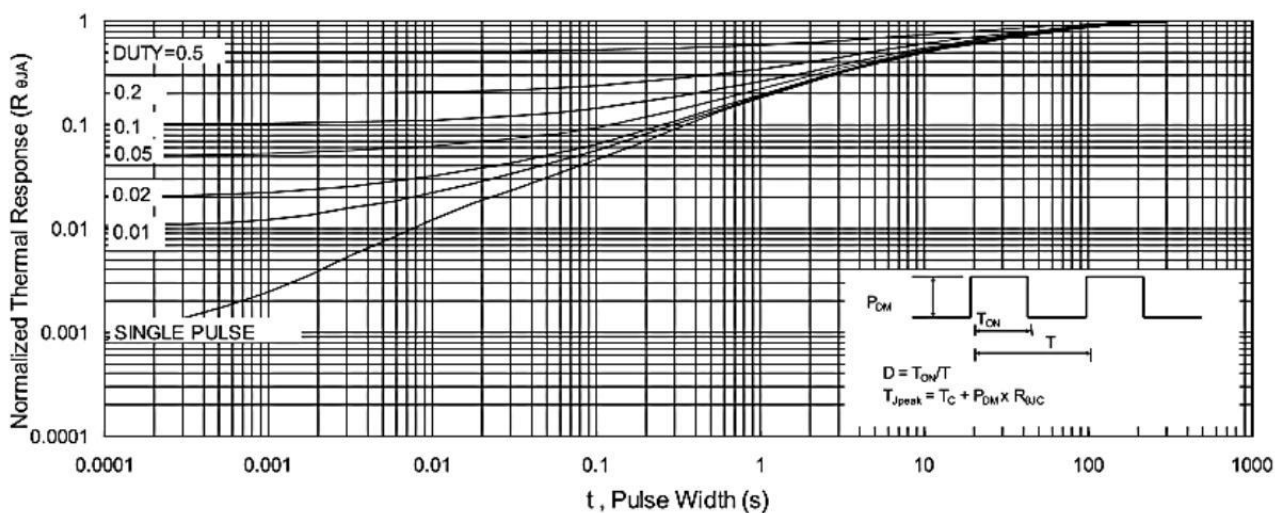
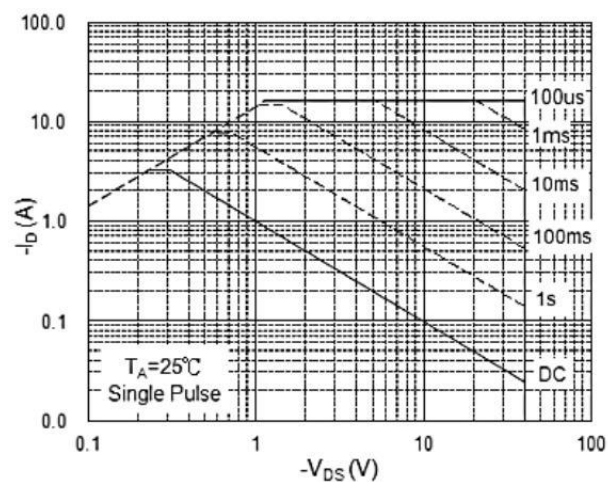
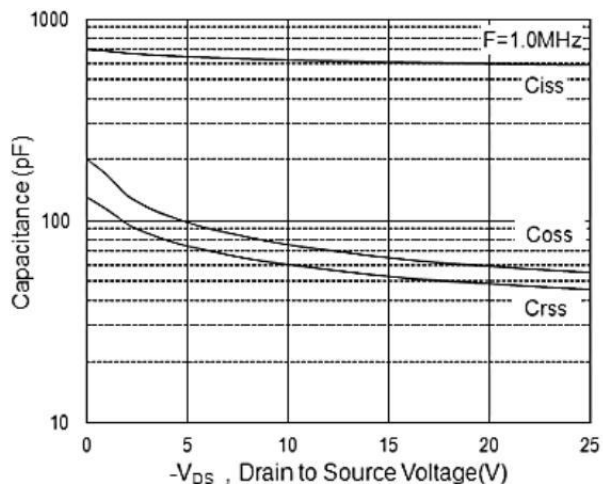
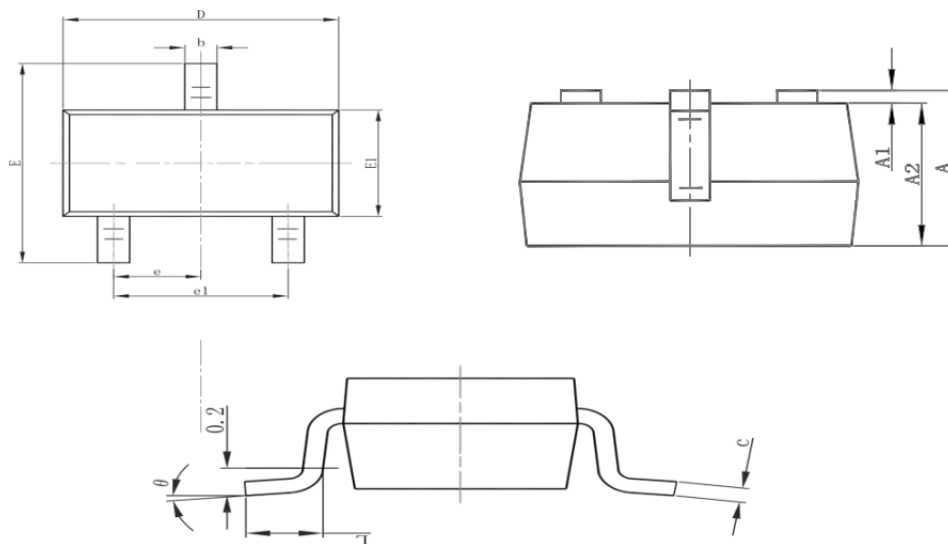


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics



Package Mechanical Data:SOT23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23-3L		3000