-30V P-Channel Enhancement Mode MOSFET

Description

The SX40P03S 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} = -30V I_D =-40A

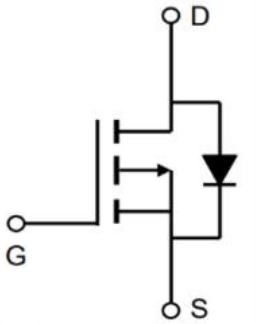
$R_{DS(ON)}$ <4.0mΩ @ V_{GS}=-10V

Application

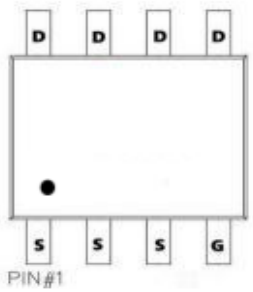
Lithium battery protection

Wireless impact

Mobile phone fast charging



SOP-8L



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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-30	V
VGS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ -10V1	-40	A
ID@TC=100℃	Continuous Drain Current, VGS @ -10V1	-31	A
IDM	Pulsed Drain Current2	-160	A
EAS	Single Pulse Avalanche Energy3	576	mJ
PD@TC=25℃	Total Power Dissipation4	150	W
TSTG	Storage Temperature Range	-55 to 150	℃
TJ	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction-Ambient 1	85	℃/W
RθJC	Thermal Resistance Junction-Case1	1.06	℃/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=-250μA	-30	-35		V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	μA
IGSS	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=-250μA	-1	-1.7	-2.5	V
RDS(ON)	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-20A		3.2	4.0	mΩ
		V_{GS}=-4.5V, I_D=-20A		4.5	6.0	mΩ
gFS	Forward Transconductance	V_{DS}=-5V, I_D=-20A		65		S
Ciss	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1.0MHz		7000		pF
Coss	Output Capacitance			820		pF
Crss	Reverse Transfer Capacitance			540		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		2.2		Ω
td(on)	Turn-on Delay Time	V_{GS}=-10V, V_{DS}=-15V, R_L=0.75Ω, R_{GEN}=3Ω		14		nS
t_r	Turn-on Rise Time			13		nS
td(off)	Turn-Off Delay Time			65		nS
t_f	Turn-Off Fall Time			37		nS
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-20A		130		nC
Qgs	Gate-Source Charge			12		nC
Qgd	Gate-Drain Charge			31		nC
ISD	Source-Drain Current (Body Diode)				-150	A
VSD	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=-20A			-1.3	V
trr	Reverse Recovery Time	I_F=-20A, di/dt=100A/μs		30		ns
Q_{rr}	Reverse Recovery Charge	I_F=-20A, di/dt=100A/μs		40		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 EAS data shows Max. rating . The test condition is TJ =25℃, VDD=-15V, VG=-10V, RG=25Ω, L=0.5mH, IAS=-30A

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as I D and I DM，in real applications，should be limited by total power dissipation.

Typical Characteristics

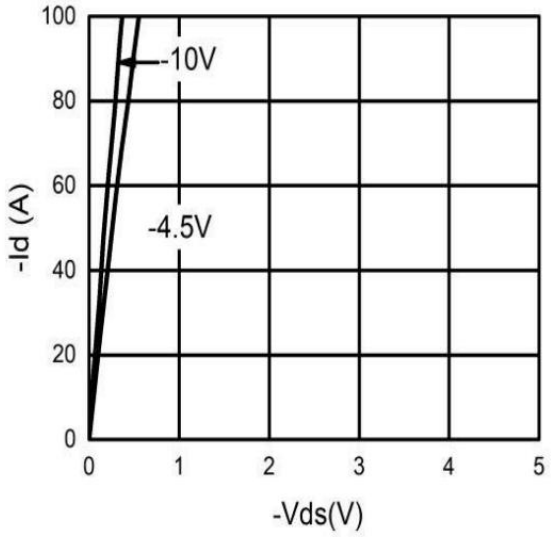


Figure 1. Output Characteristics

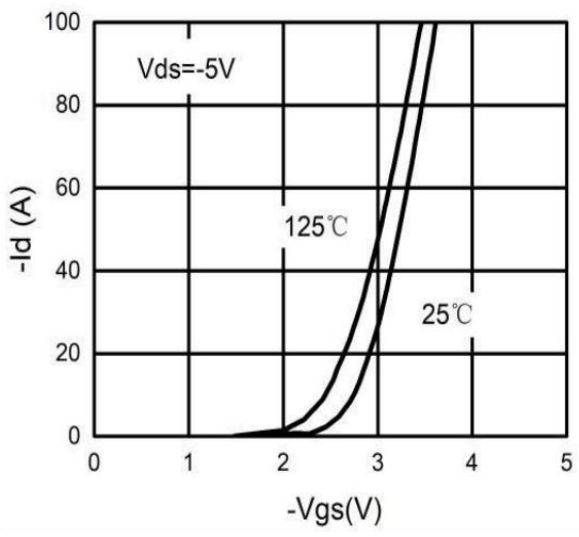


Figure 2. Transfer Characteristics

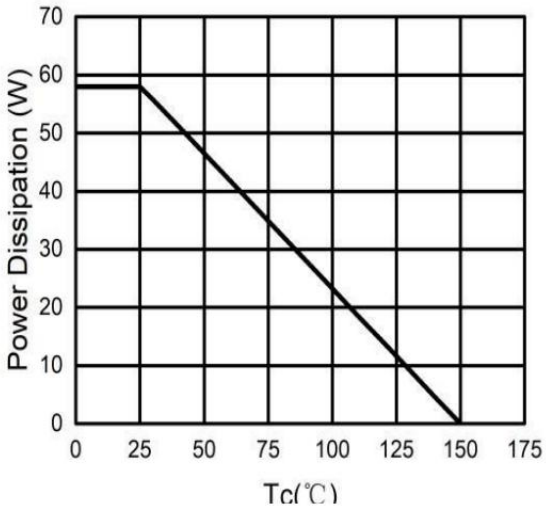


Figure 3. Power Dissipation

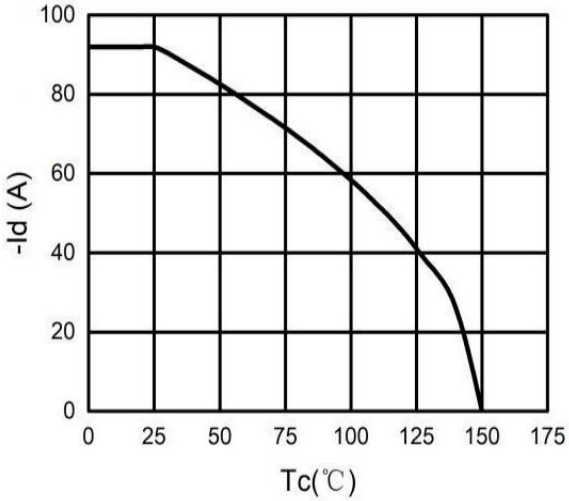


Figure 4. Drain Current

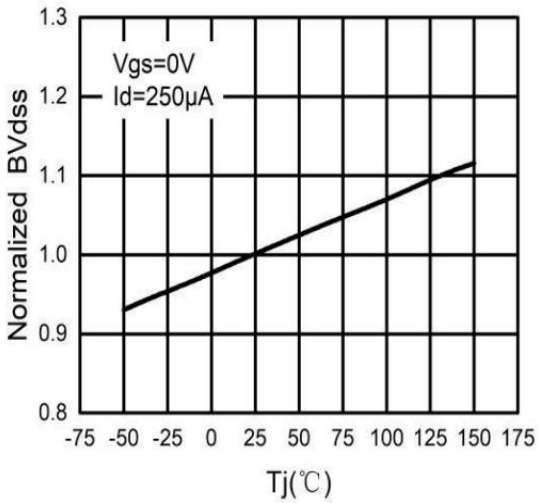


Figure 5. BV_{DSS} vs Junction Temperature

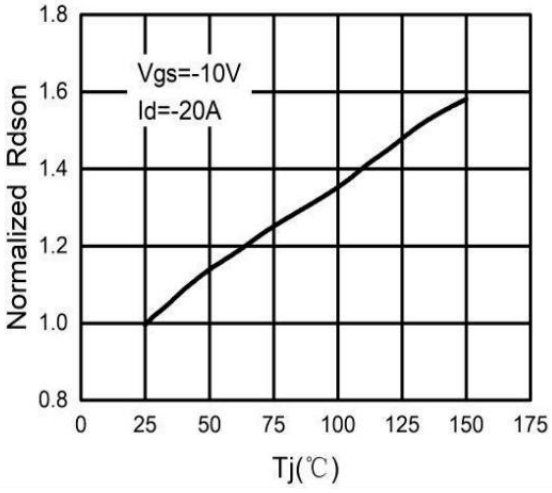


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

Typical Characteristics

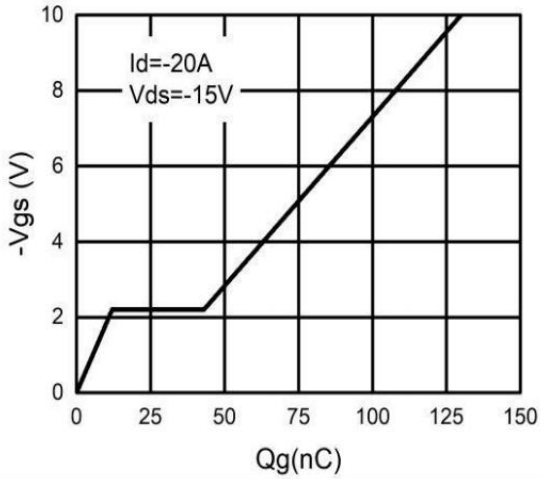


Figure 7. Gate Charge Waveforms

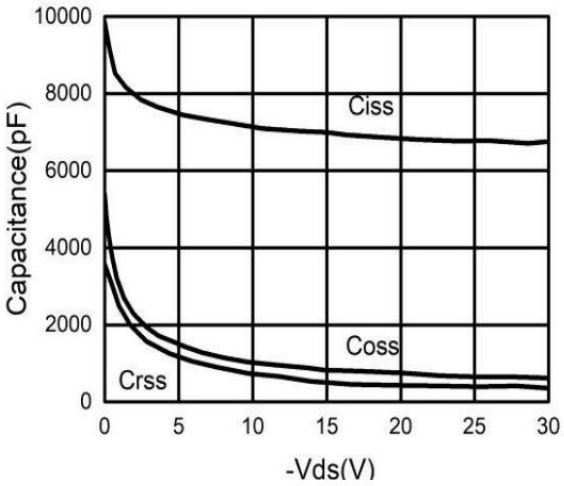


Figure 8. Capacitance

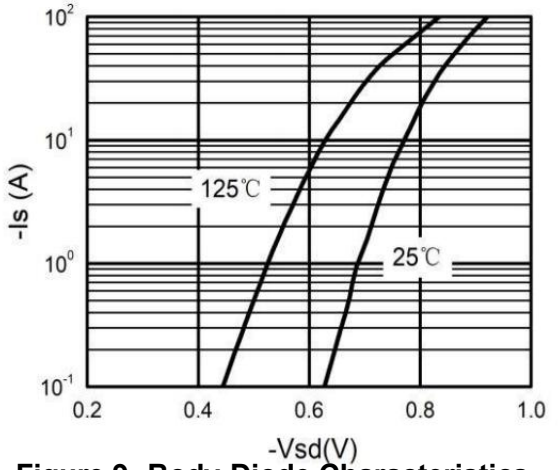


Figure 9. Body-Diode Characteristics

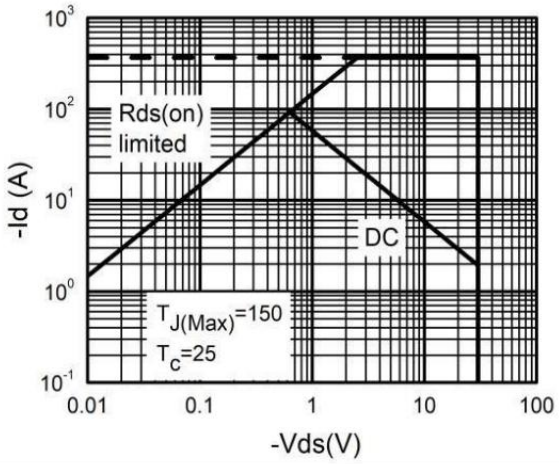


Figure 10. Maximum Safe Operating Area

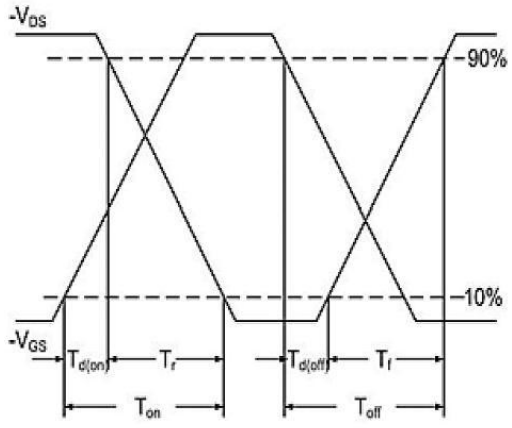


Figure.11 Switching Time Waveform

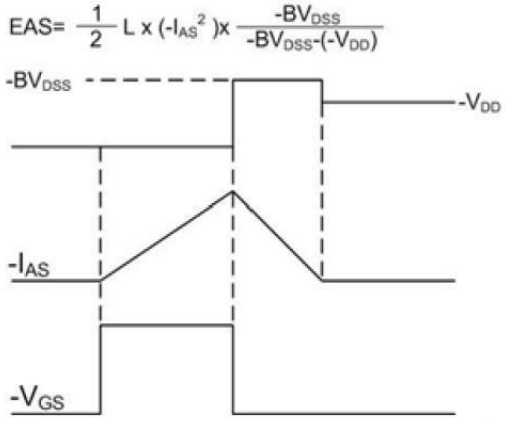
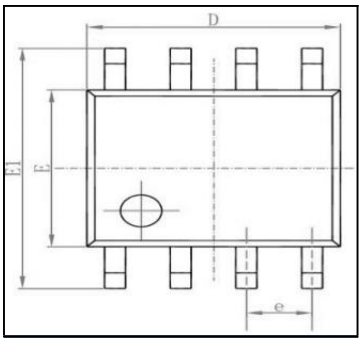
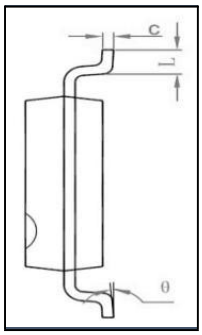
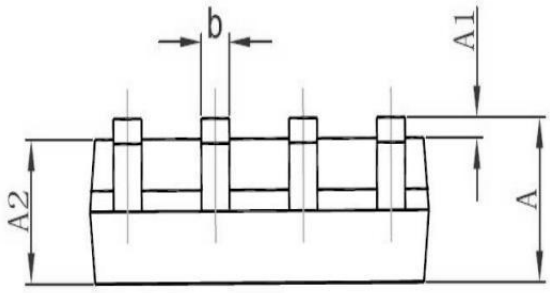


Figure.12 Unclamped Inductive Switching Waveform

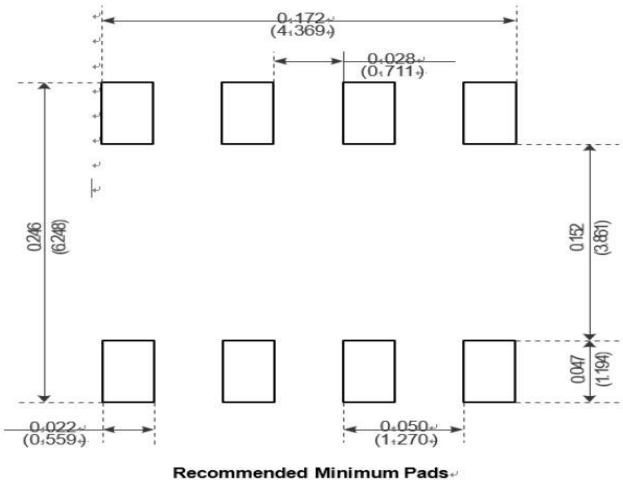
Package Mechanical Data-SOP-8L







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-8L		3000