Description

The SX50N04S uses advanced 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 =50A

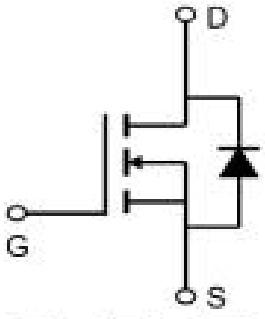
$R_{DS(ON)}$ < 3.5mΩ @ V_{GS}=10V

Application

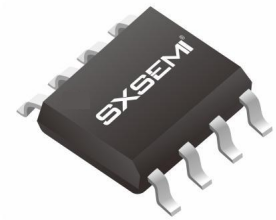
BMS

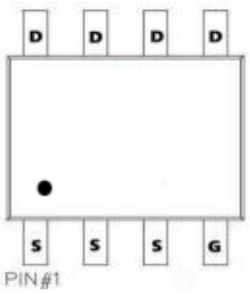
BLDC

UPS



SOP-8L





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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	40	V
VGSS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ 10V1	50	A
ID@TC=100℃	Continuous Drain Current, VGS @ 10V1	30	A
IDM	Pulsed Drain Current	300	A
EAS	Single Pulsed Avalanche Energy	525	mJ
PD@TC=25℃	Power Dissipation	130	W
RθJA	Thermal Resistance Junction-Ambient [1]	35	°C/W
RθJC	Thermal Resistance, Junction to Case	1.5	℃/W
TJ	Operating Junction Temperature Range	-55 to 150	°C
TSTG	Storage Temperature Range	-55 to 150	°C

N-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	47	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS}=10V, I_D=30A	-	2.5	3.5	mΩ
		V_{GS}=4.5V, I_D=20A	-	3.8	5.0	
Ciss	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	3162	-	pF
Coss	Output Capacitance		-	1099	-	pF
Crss	Reverse Transfer Capacitance		-	157	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=75A, V_{GS}=10V	-	95	-	nC
Qgs	Gate-Source Charge		-	15	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	11	-	nC
td(on)	Turn-on Delay Time	V_{DD}=20V, I_D=75A, R_G=1.6Ω, V_{GS}=10V	-	12.5	-	ns
tr	Turn-on Rise Time		-	7	-	ns
td(off)	Turn-off Delay Time		-	50	-	ns
t_f	Turn-off Fall Time		-	8.5	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	140	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	560	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	T_J=25℃, I_F=I_S,dI/dt=100A/μs	-	31	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	110	-	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 VDD =32V,VGS =10V,L=0.1mH,IAS =35A

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

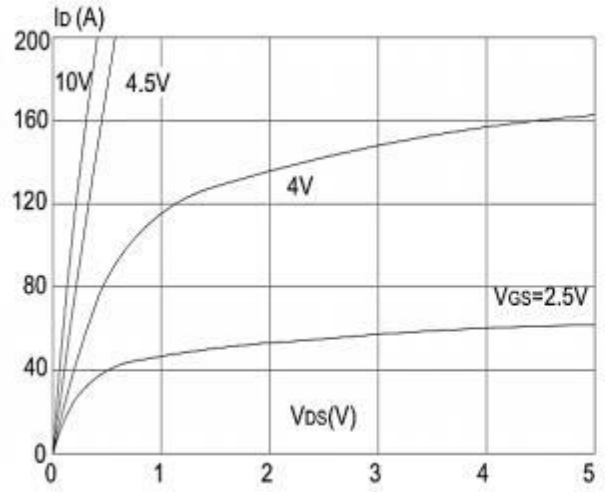


Figure1: Output Characteristics

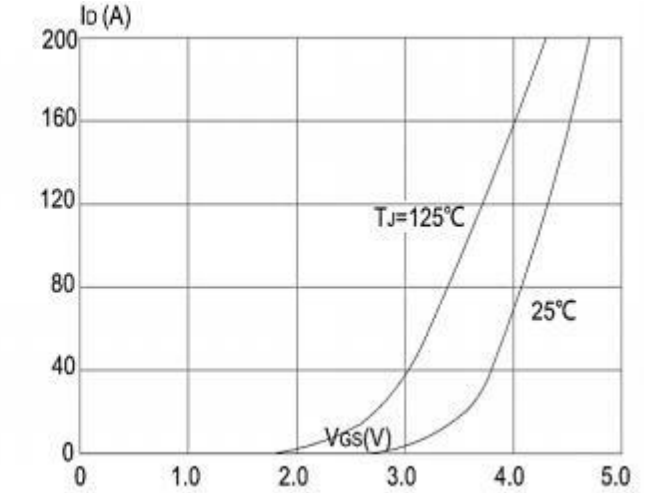


Figure 2: Typical Transfer Characteristics

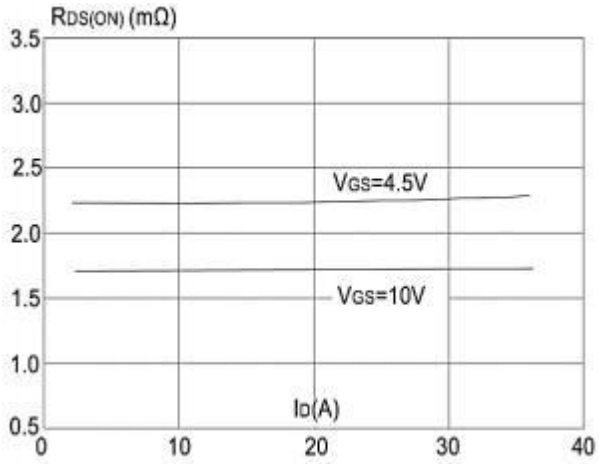


Figure 3:On-resistance vs. Drain Current

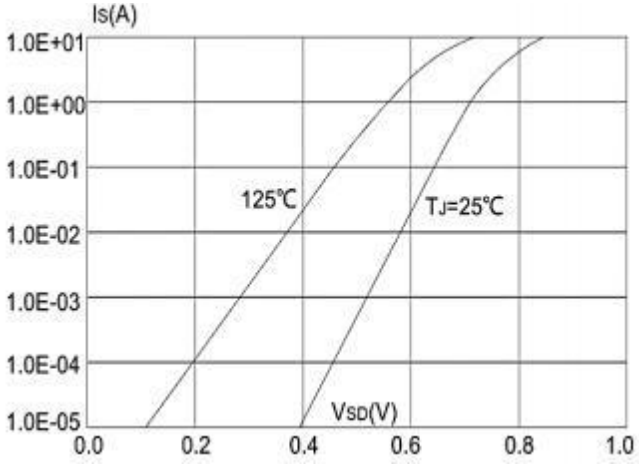


Figure 4: Body Diode Characteristics

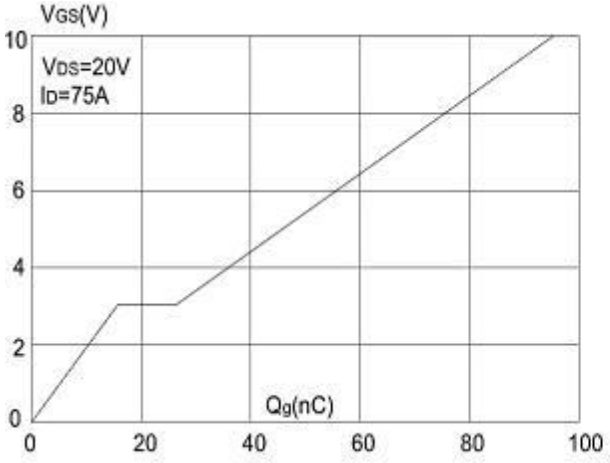


Figure 5: Gate Charge Characteristics

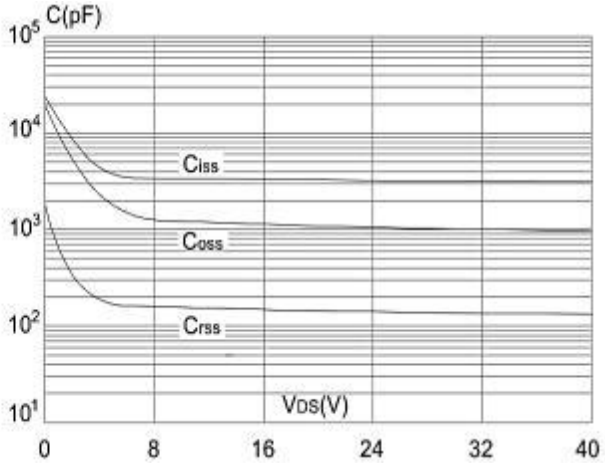


Figure 6: Capacitance Characteristics

Typical Characteristics

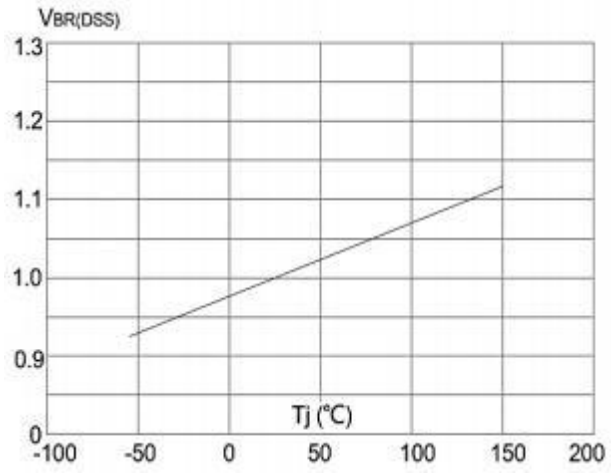


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

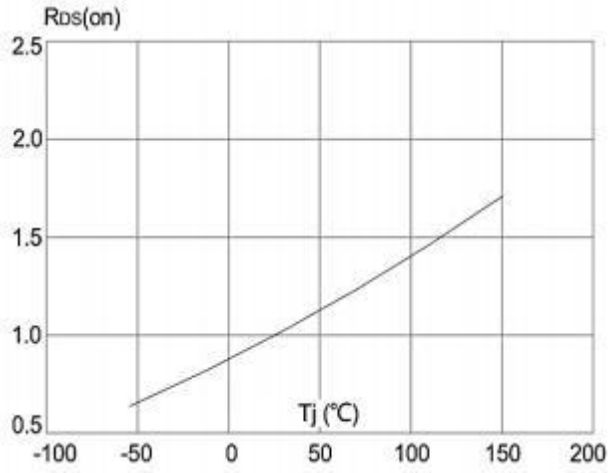


Figure 8: Normalized on Resistance vs Junction Temperature

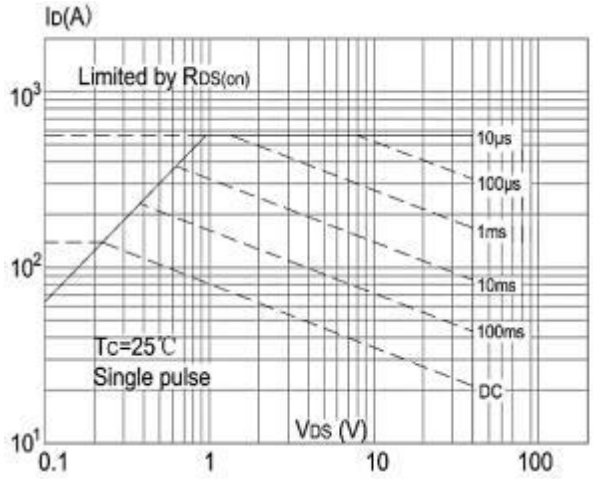


Figure 9: Maximum Safe Operating Area

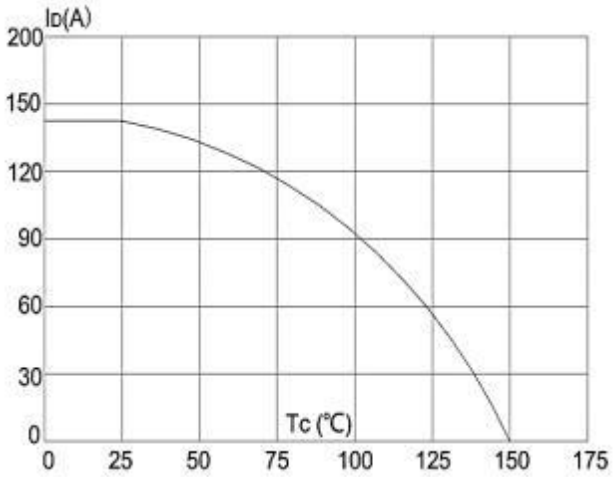


Figure 10: Maximum Continuous Drain Currentvs. Case Temperature

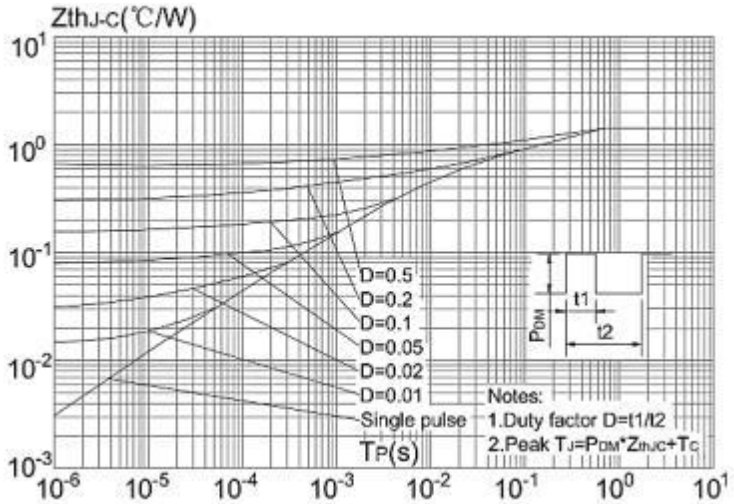
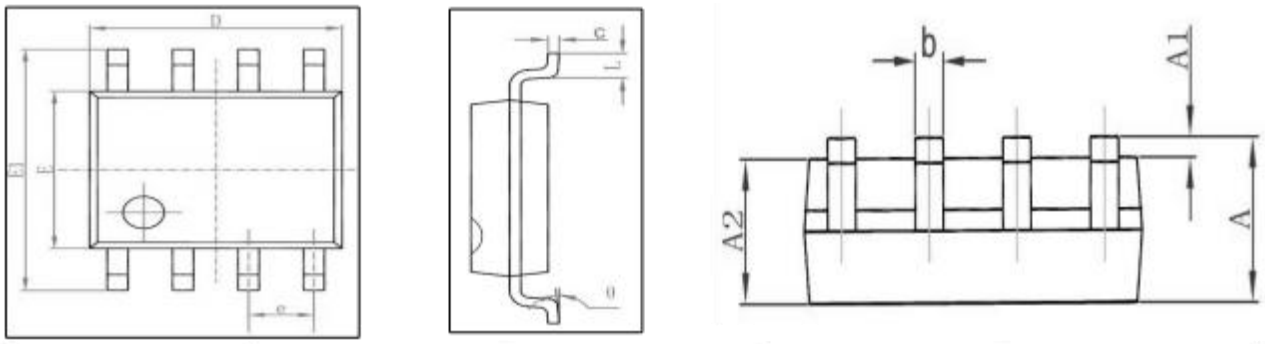
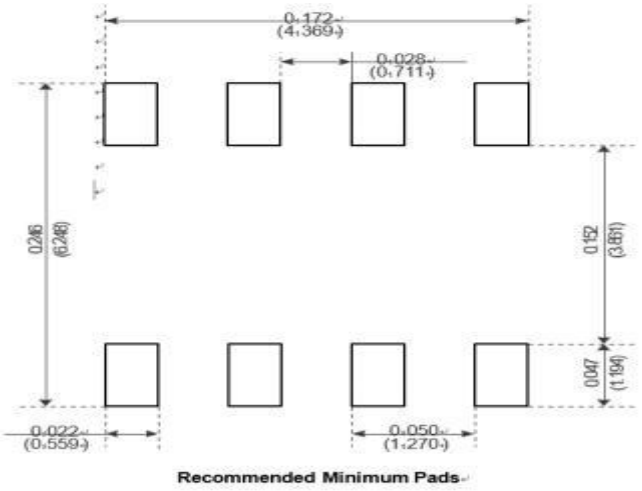


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas

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