

Description

The SX50H03NF2 uses advanced S X S E M I 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

$V_{DS} = 30V$ $I_D = 50A$

$R_{DS(ON)} < 6.0m\Omega$ @ $V_{GS}=10V$

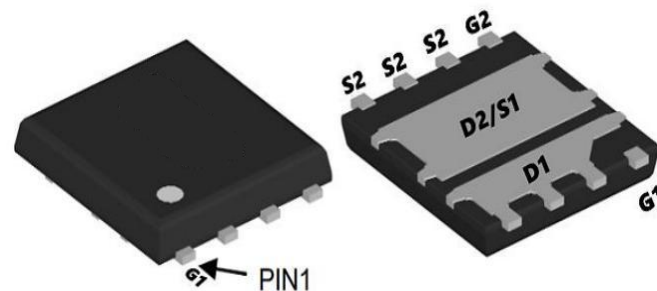
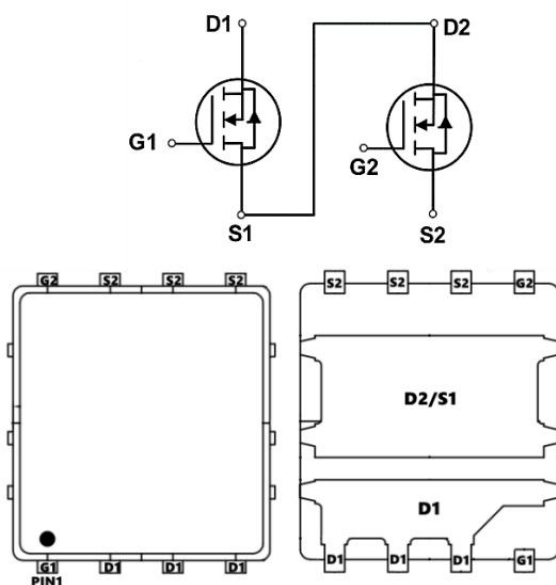
$C_{ISS} \approx 814PF$

Application

Buck And Boost

Wireless impact

Car charging



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	50	A
$I_D @ T_C=75^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	35	A
I_{DM}	Pulsed Drain Current ²	150	A
EAS	Single Pulse Avalanche Energy ³	28.8	mJ
I_{AS}	Avalanche Current	24	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	24	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 ¹	25	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	5.2	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=20A$	---	4.8	6.0	m Ω
		$V_{GS}=4.5V$, $I_D=15A$	---	6.9	9.0	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.6	2.5	V
IDSS	Drain-Source Leakage Current	$V_{DS}=24V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V$, $I_D=30A$	---	43	---	S
Rg	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1.7	---	Ω
Qg	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=15A$	---	8	---	nC
Qgs	Gate-Source Charge		---	2.4	---	
Qgd	Gate-Drain Charge		---	3.2	---	
Td(on)	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=15A$	---	7.1	---	ns
Tr	Rise Time		---	40	---	
Td(off)	Turn-Off Delay Time		---	15	---	
Tf	Fall Time		---	6	---	
Ciss	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	814	---	pF
Coss	Output Capacitance		---	498	---	
Crss	Reverse Transfer Capacitance		---	41	---	
Is	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	24	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1	V
trr	Reverse Recovery Time	$I_F=15A$, $di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	34	---	nS
Qrr	Reverse Recovery Charge		---	15	---	nC

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=24A$
- 4、The power dissipation is limited by 175°C 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

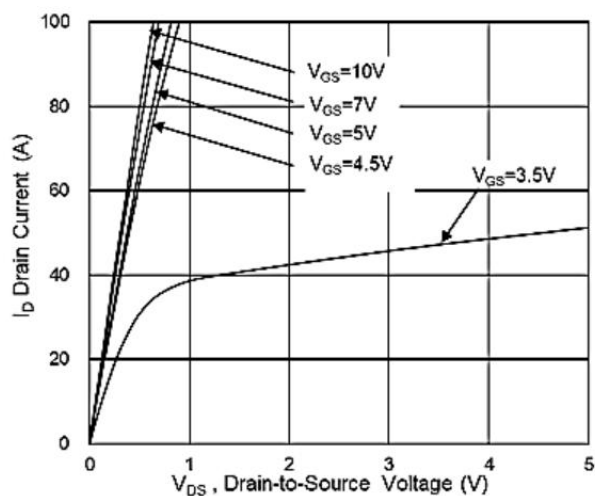


Fig.1 Typical Output Characteristics

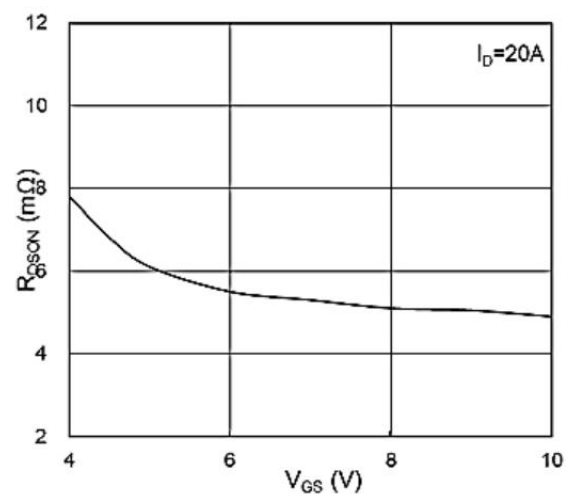


Fig.2 On-Resistance vs G-S Voltage

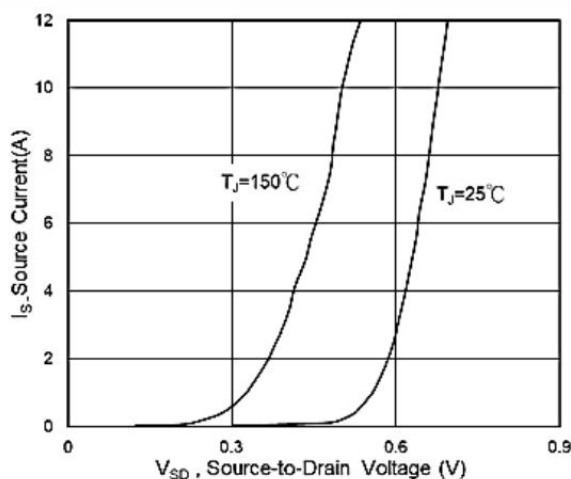


Fig.3 Source Drain Forward Characteristics

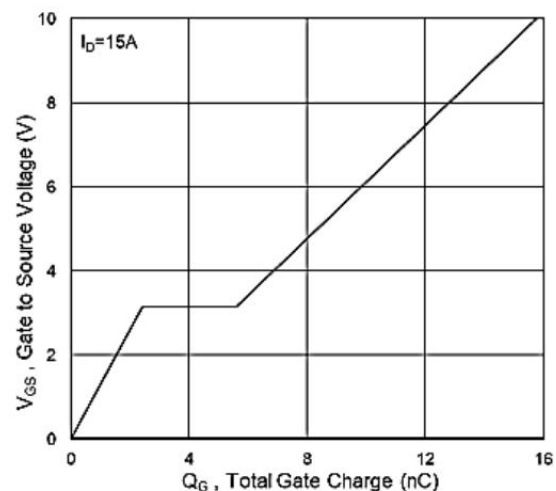


Fig.4 Gate-Charge Characteristics

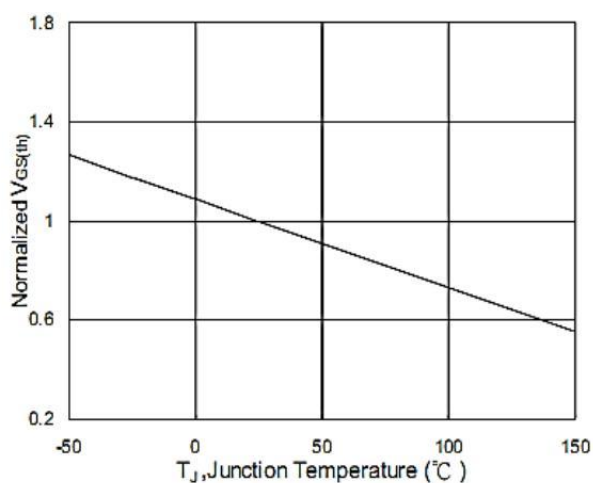


Fig.5 Normalized $V_{GS(th)}$ vs T_J

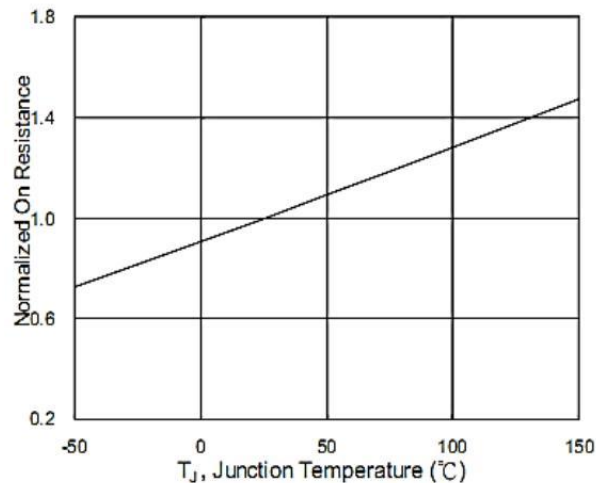


Fig.6 Normalized $R_{DS(on)}$ vs T_J

Typical Characteristics

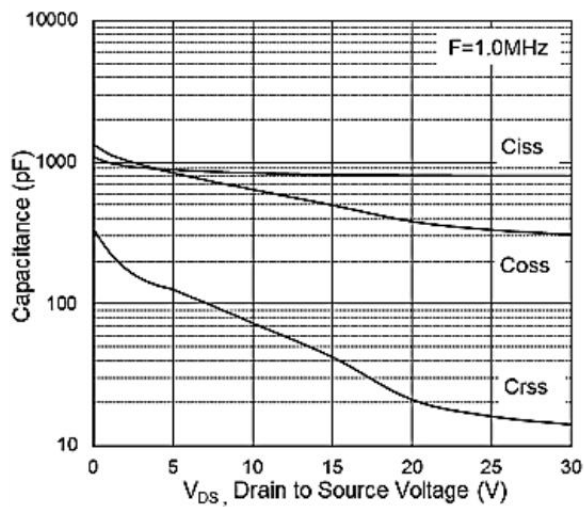


Fig.7 Capacitance

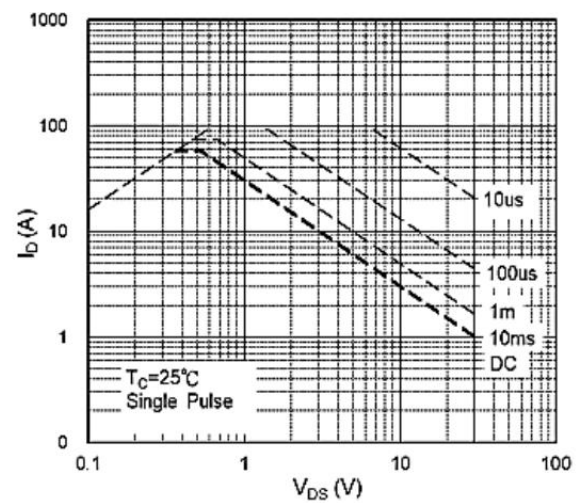


Fig.8 Safe Operating Area

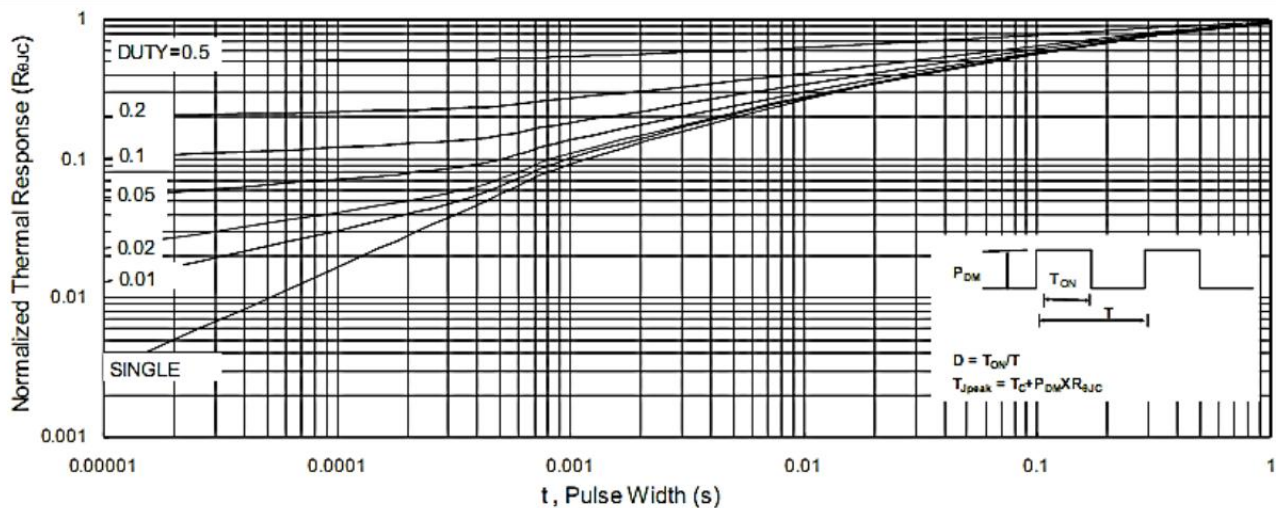


Fig.9 Normalized Maximum Transient Thermal Impedance

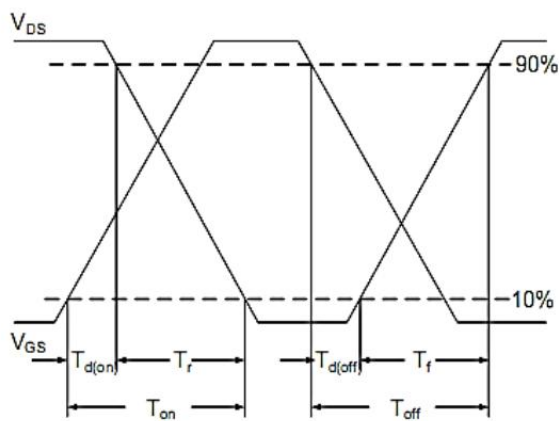


Fig.10 Switching Time Waveform

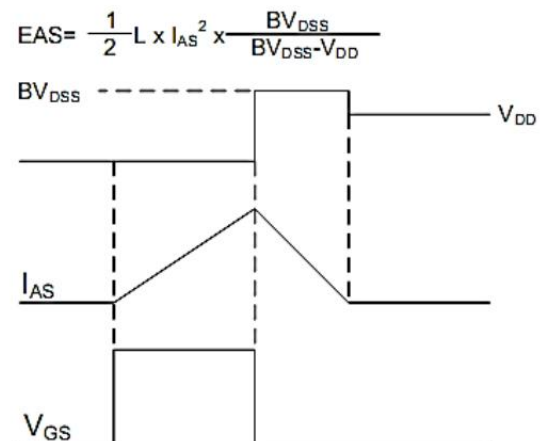
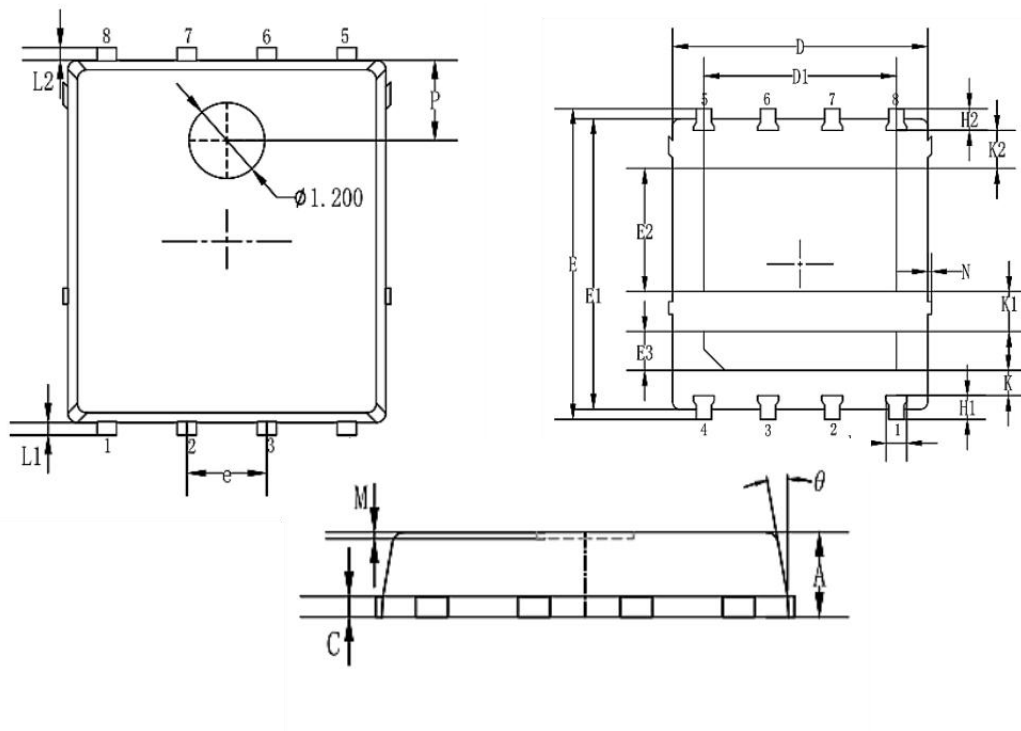


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-PDFN5*6-8L-JX Double2



Symbol	Common		
	mm		
	Mim	Non	Max
A	0.900	1.05	1.100
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.9	5.05	5.20
D1	3.71	3.81	3.91
E	6.0	6.15	6.30
E1	5.65	5.75	5.85
E2	2.34	2.44	2.54
E3	0.67	0.77	0.87
e	1.27BSC		
H1	0.37	0.47	0.57
H2	0.33	0.43	0.53
k	0.40	0.50	0.60
K1	0.69	0.79	0.89
K2	0.65	0.75	0.85
K1/2	0.20REF		
θ	8°	10°	12°
M	0.08REF		
N	0		0.15
p	1.28REF		

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	PDFN5*6-8L		5000