Description

The SX140N04NF 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 =140A

$R_{DS(ON)}$ < 2.8mΩ @ V_{GS}=10V

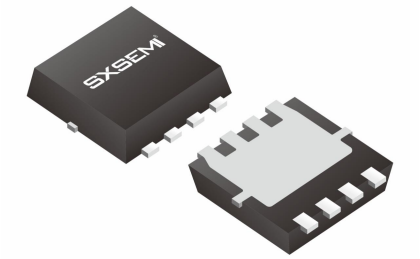
Application

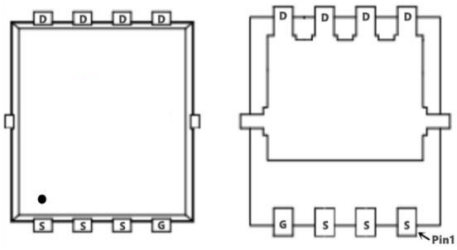
Battery protection

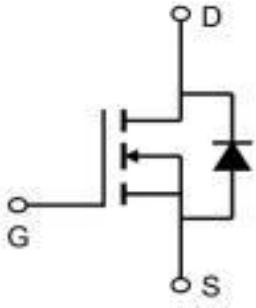
Load switch

Uninterruptible power supply

PDFN5*6-8L







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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	140	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	102	A
I_{DM}	Pulsed Drain Current[2]	576	A
EAS	Single Pulse Avalanche Energy[3]	576	mJ
I_{AS}	Avalanche Current	40	A
P_D@T_C=25℃	Total Power Dissipation[4]	57	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	25	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	1.3	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	44		V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=40V, 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	1.0	1.8	2.5	V
gFS	Forward Transconductance	V_{DS}=5V, I_D=20A		38		S
RDS(ON)	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		2.2	2.8	mΩ
		V_{GS}=4.5V, I_D=20A		3.5	4.5	mΩ
Ciss	Input Capacitance	V_{DS}=20V,V_{GS}=0V, f=1.0MHz		6460		pF
Coss	Output Capacitance			455		pF
Crss	Reverse Transfer Capacitance			276		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		0.67		Ω
td(on)	Turn-on Delay Time	V_{GS}=10V, V_{DS}=20V, RL=1Ω, RGEN=3Ω		18		nS
tr	Turn-on Rise Time			4.4		nS
td(off)	Turn-Off Delay Time			67		nS
t_f	Turn-Off Fall Time			9.5		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=20V, I_D=20A		112		nC
Qgs	Gate-Source Charge			16.7		nC
Qgd	Gate-Drain Charge			26.5		nC
ISD	Source-Drain Current (Body Diode)				144	A
VSD	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=20A			1.2	V
trr	Reverse Recovery Time	I_F=20A, dI/dt=500A/ s		6		ns
Qrr	Reverse Recovery Charge	I_F=20A, dI/dt=500A/ s		14		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 V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=20A

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

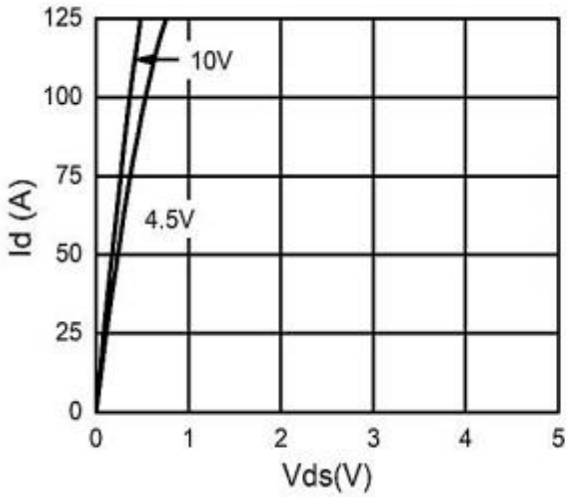


Figure 1. Output Characteristics

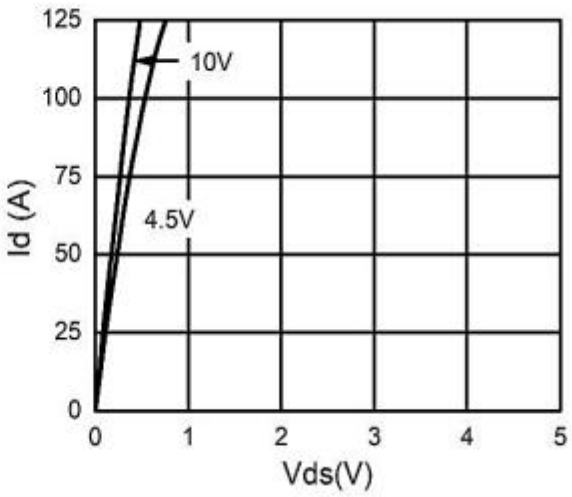


Figure 2. Transfer Characteristics

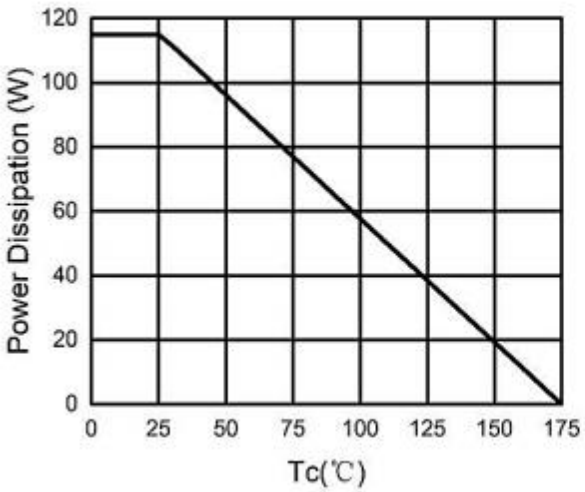


Figure 3. Power Dissipation

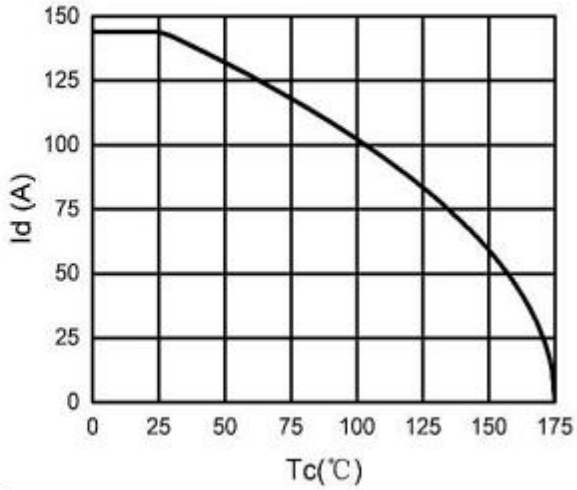


Figure 4. Drain Current

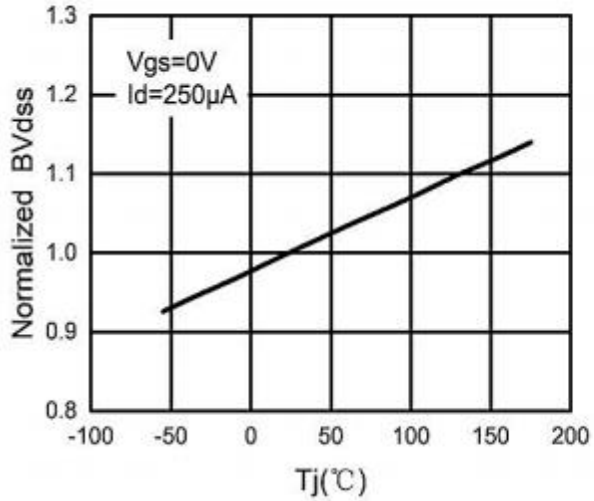


Figure 5. BV_{DSS} vs Junction Temperature

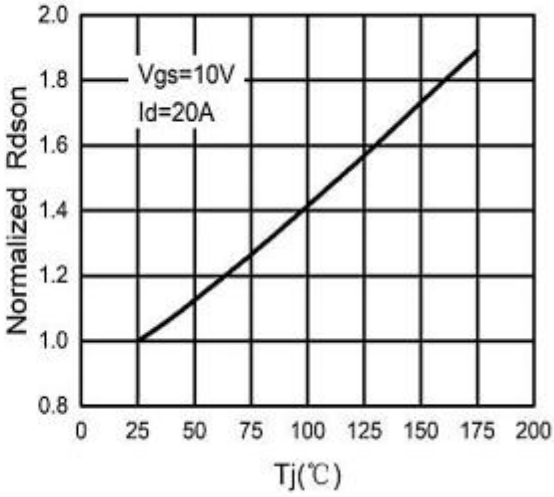


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

Typical Characteristics

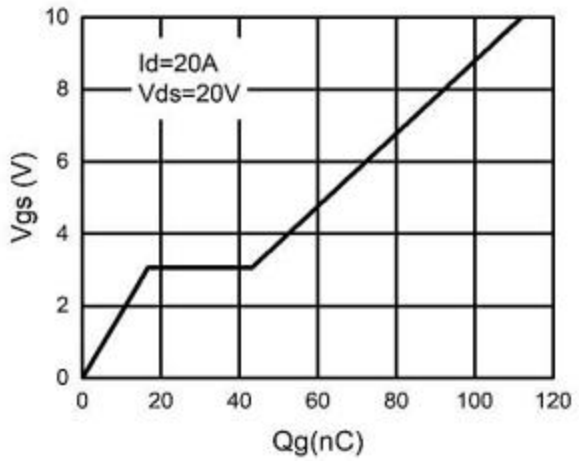


Figure 7. Gate Charge Waveforms

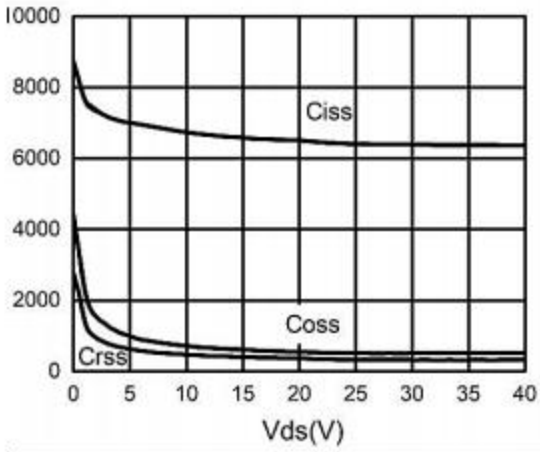


Figure 8. Capacitance

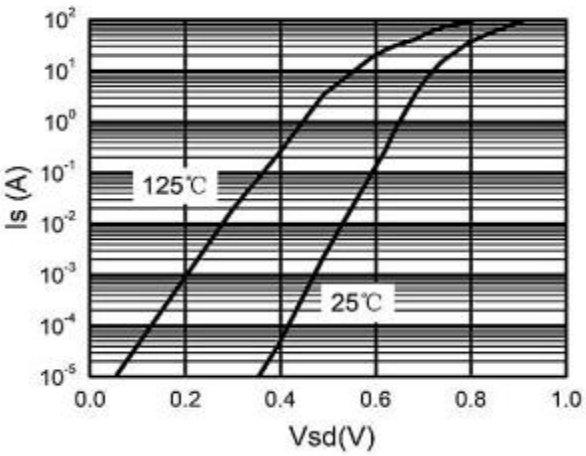


Figure 9. Body-Diode Characteristics

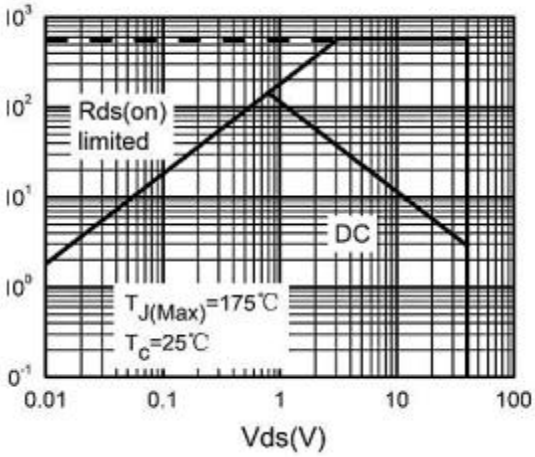


Figure 10. Maximum Safe Operating Area

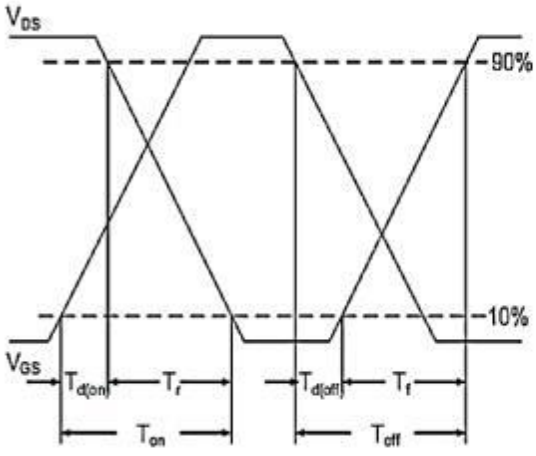


Figure 11.Switching Time Waveform

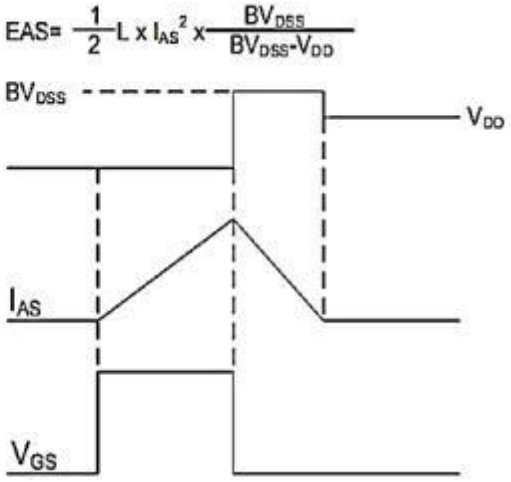
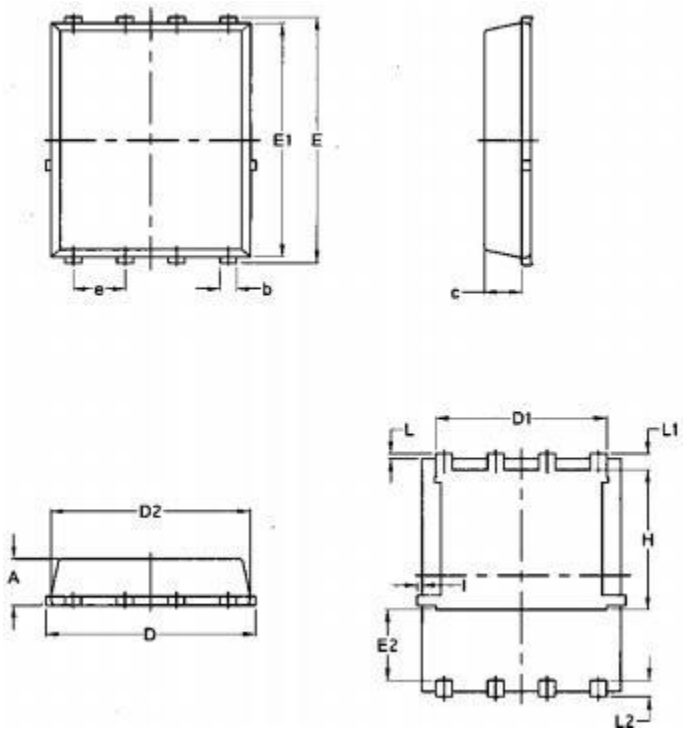


Figure 12. Unclamped Inductinve Wwitching wave

Package Mechanical Data-PDFN5*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

Package Marking and Ordering Information

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