

Description

The SX50N03DF 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

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

$R_{DS(ON)} < 12m\Omega$ @ $V_{GS}=10V$

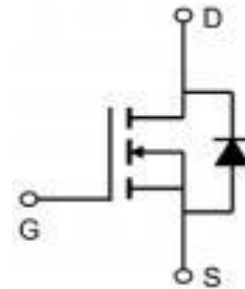
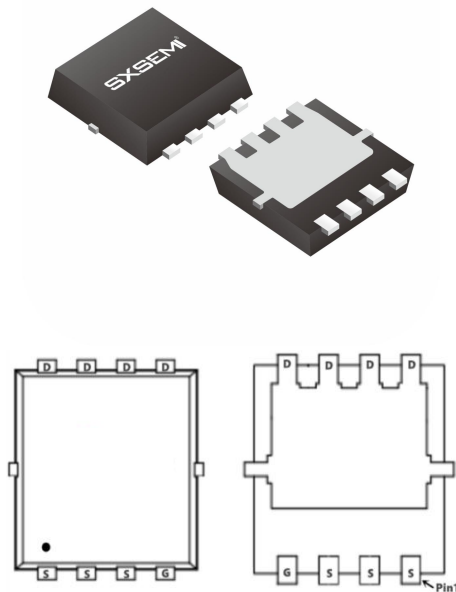
Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

PDFN3*3-8L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	50	A
$I_D @ T_c=100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	23	A
IDM	Pulsed Drain Current ²	75	A
EAS	Single Pulse Avalanche Energy ³	24.2	mJ
IAS	Avalanche Current	22	A
$P_D @ T_c=25^\circ\text{C}$	Total Power Dissipation ⁴	26	W
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	1.67	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	75	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.8	$^\circ\text{C/W}$

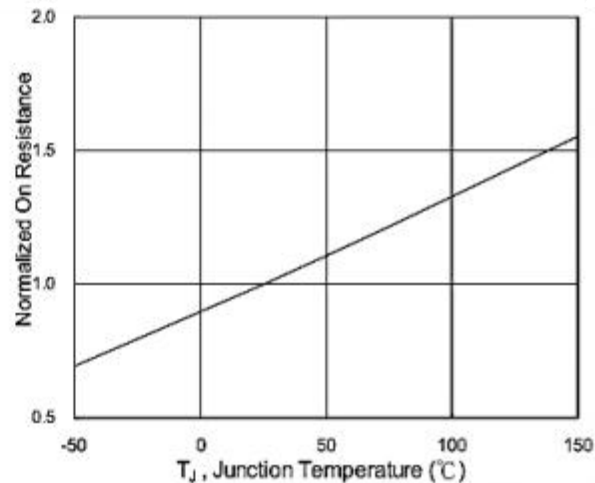
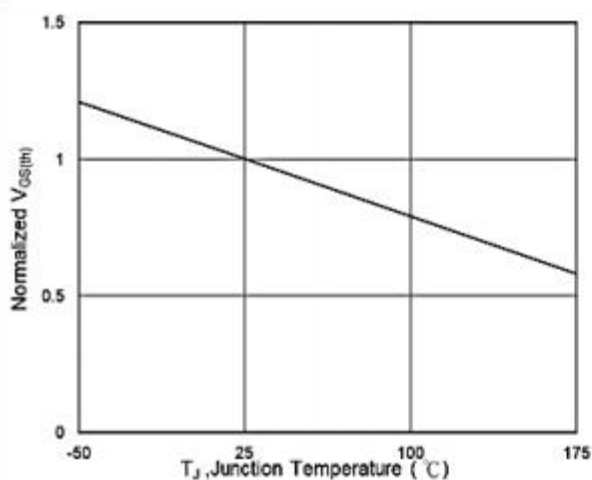
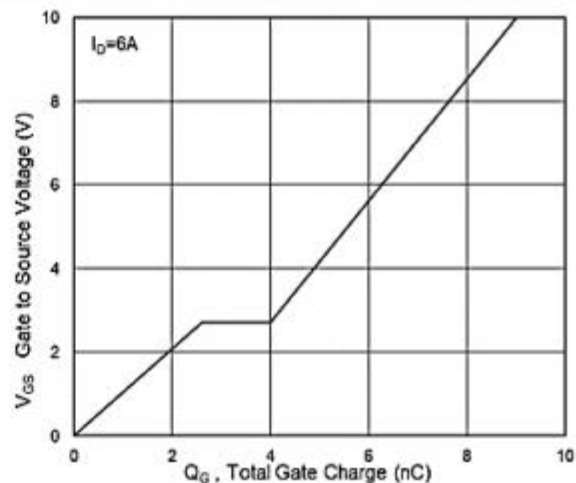
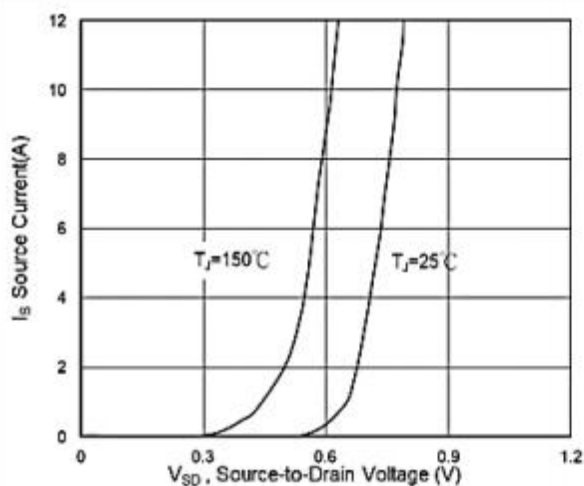
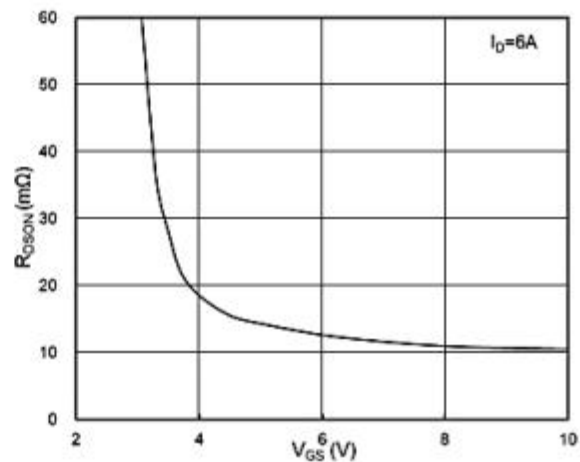
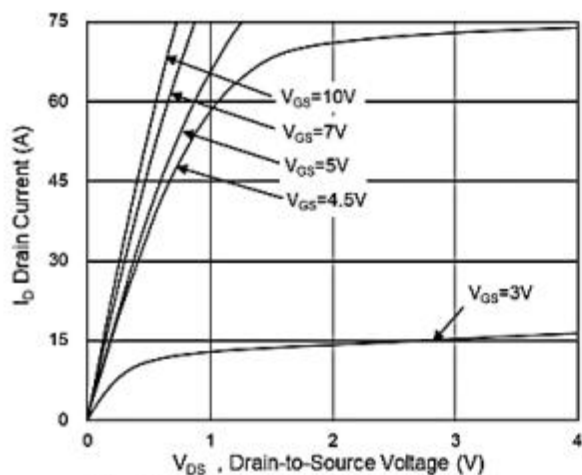
Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =6A	---	10.5	12	mΩ
		V _{GS} =4.5V , I _D =5A	---	15.5	19	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
I _{DSS}	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	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =12A	---	32	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.1	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V , V _{GS} =4.5V , I _D =6A	---	4.2	---	nC
Q _{gs}	Gate-Source Charge		---	2.6	---	
Q _{gd}	Gate-Drain Charge		---	1.4	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V , V _{GS} =10V , R _G =1.5Ω I _D =1A	---	13.1	---	ns
T _r	Rise Time		---	6.3	---	
T _{d(off)}	Turn-Off Delay Time		---	21	---	
T _f	Fall Time		---	7	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	870	---	pF
C _{oss}	Output Capacitance		---	135	---	
C _{rss}	Reverse Transfer Capacitance		---	87	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	37	A
V _{SD}	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 inch² 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 175°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



Typical Characteristics

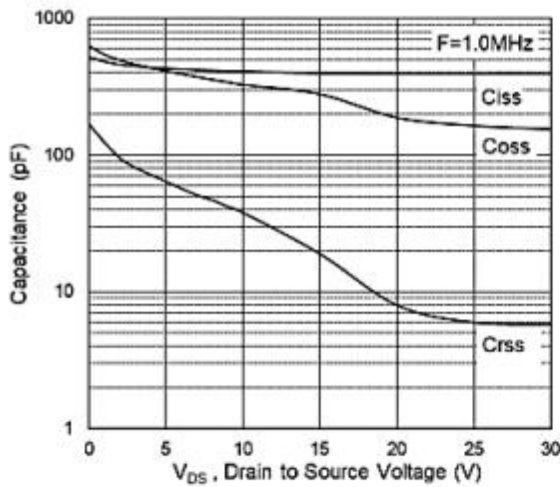


Fig.7 Capacitance

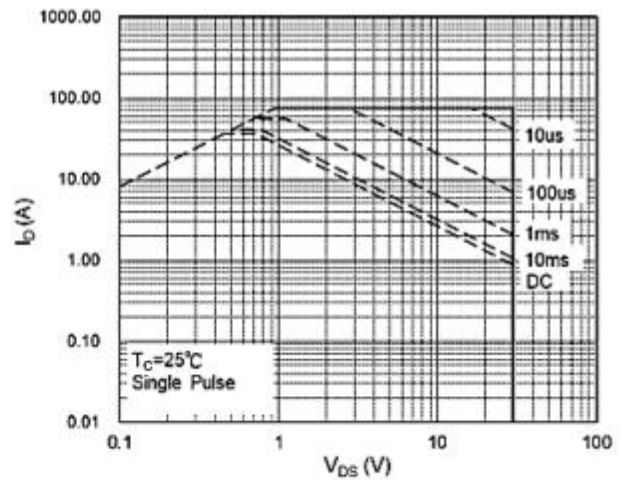


Fig.8 Safe Operating Area

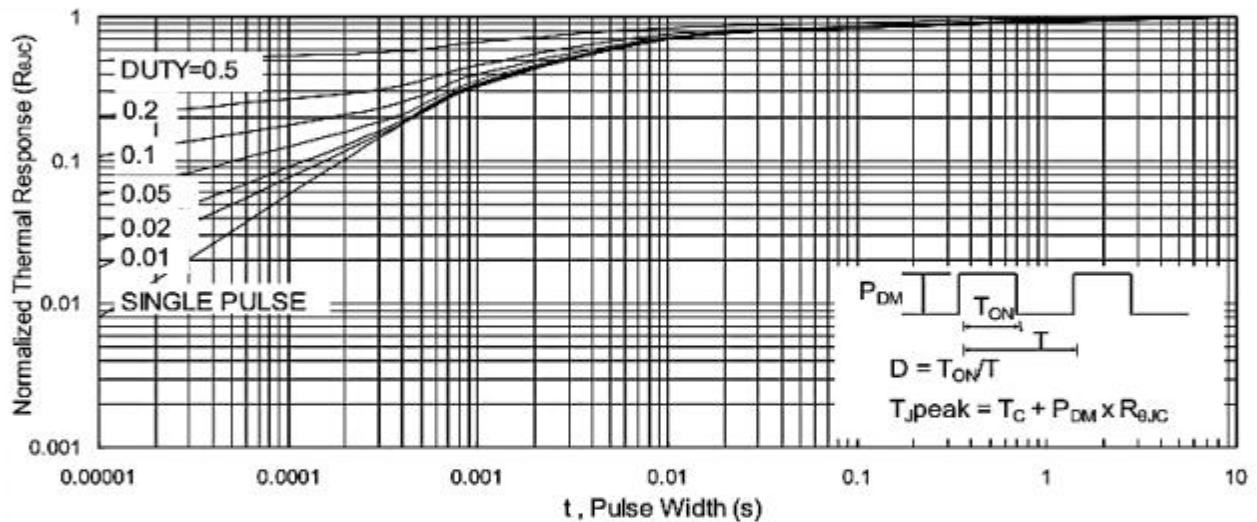


Fig.9 Normalized Maximum Transient Thermal Impedance

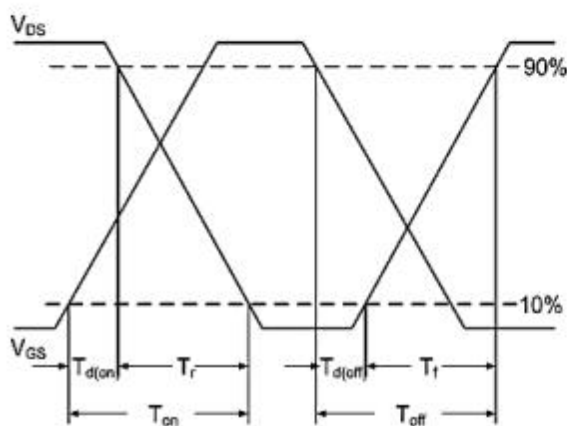


Fig.10 Switching Time Waveform

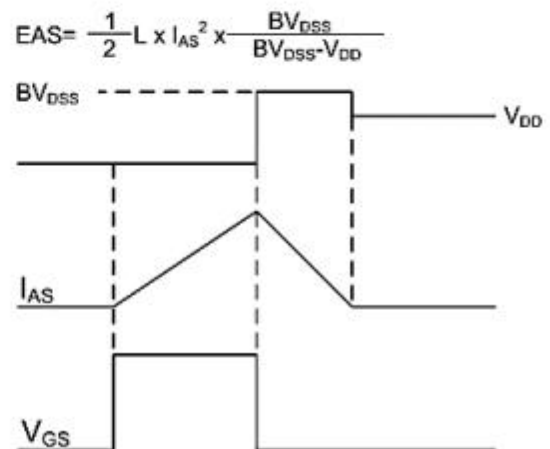
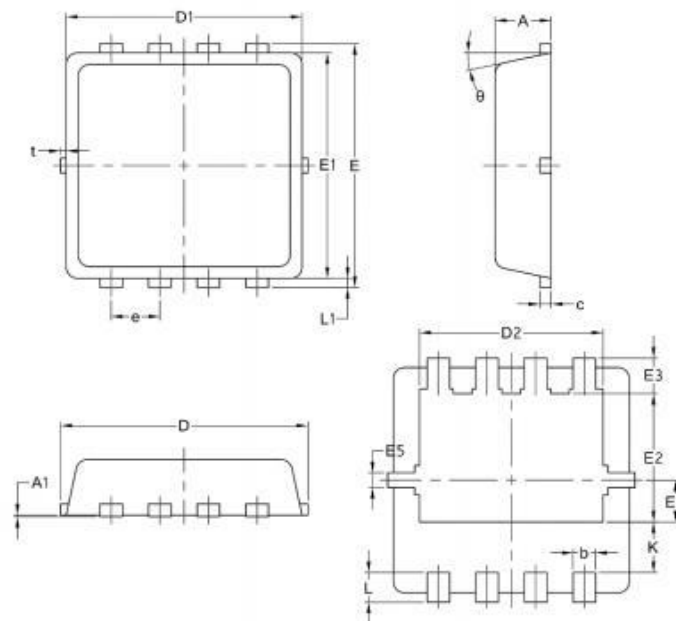


Fig.11 Unclamped Inductive Waveform

Package Mechanical Data-PDFN3*3-8L-JQ Single



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	PDFN3*3-8L		5000