

Description

The SX40P04DF 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

$V_{DS} = -40V$ $I_D = -40A$

$R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -10V$

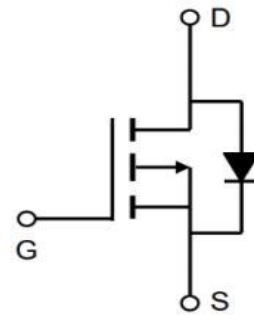
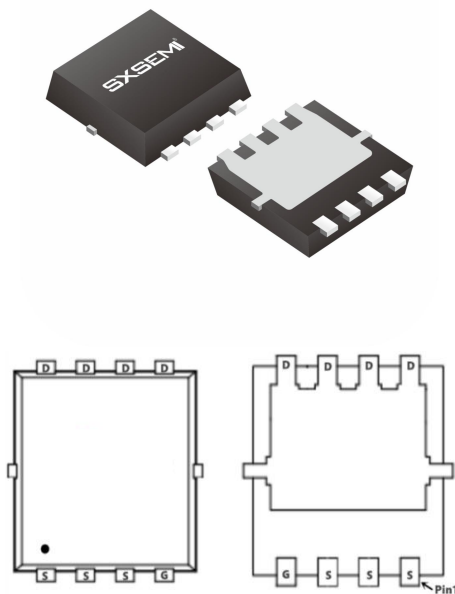
Application

Battery protection

Load switch

Uninterruptible power supply

PDFN3*3-8L



Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-40	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-23	A
I_{DM}	Pulsed Drain Current ²	-120	A
EAS	Single Pulse Avalanche Energy ³	125	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	25	W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	16	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	85	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	5	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-40	-44	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.023	---	V/°C
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-30A	---	15	18	mΩ
		V _{GS} =-4.5V, I _D =-20A	---	18	25	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.6	-2.5	V
$\Delta V_{GS(th)}$	V _{GS(th)} Temperature Coefficient		---	4.74	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-40V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-40V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-20V, V _{GS} =-4.5V, I _D =-12A	---	25	---	nC
Q _{gs}	Gate-Source Charge		---	11	---	
Q _{gd}	Gate-Drain Charge		---	9.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, R _L =15Ω I _D =-1A, V _{GEN} =-10V, R _G =6Ω	---	48	---	ns
T _r	Rise Time		---	24	---	
T _{d(off)}	Turn-Off Delay Time		---	88	---	
T _f	Fall Time		---	9.6	---	
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	2760	---	pF
C _{oss}	Output Capacitance		---	260	---	
C _{rss}	Reverse Transfer Capacitance		---	85	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-40	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	-90	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.3	V

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 ≤ 300us, duty cycle ≤ 2%
- 3、The EAS data shows Max. rating. The test condition is V_{DD}=-32V, V_{GS}=-10V, L=0.1mH, I_{AS}=-30A
- 4、The power dissipation is limited by 150°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

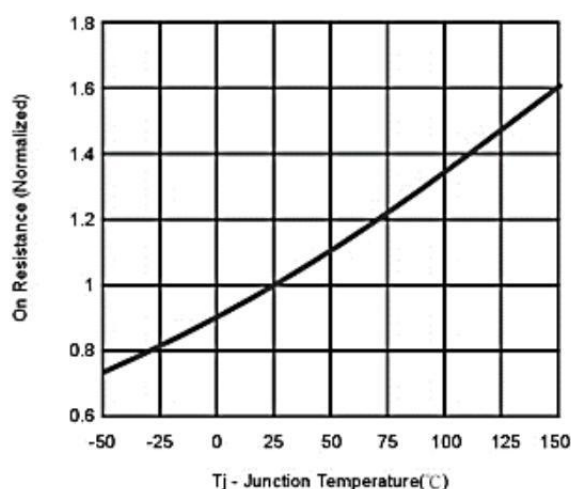


Fig. 1 On Resistance Vs Junction Temperature

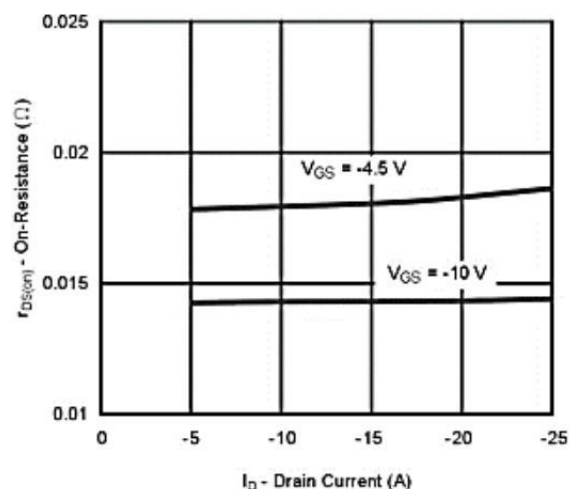


Fig.2 On-Resistance Vs. Drain Current

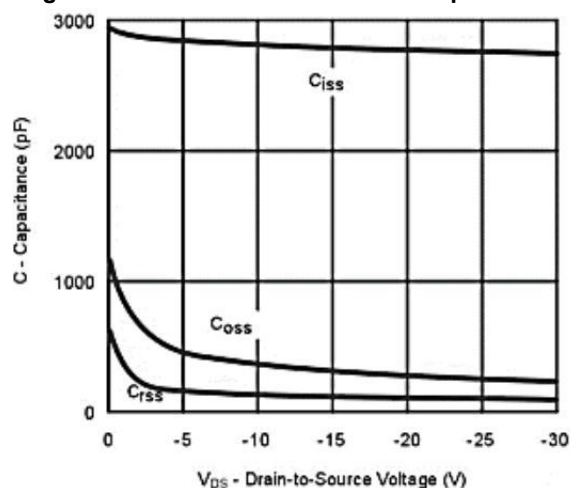


Fig.3 Capacitance

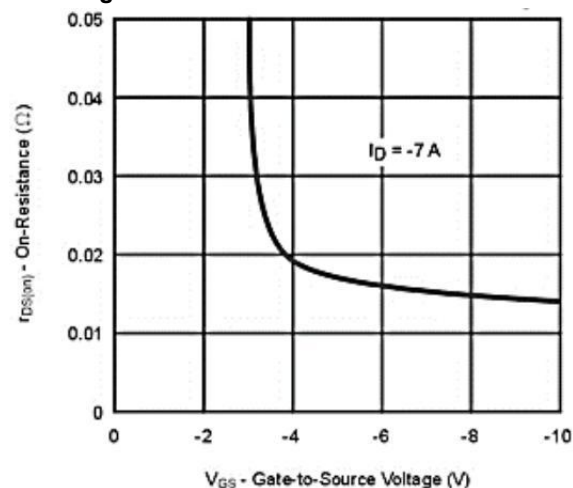


Fig.4 On-Resistance Vs. Gate-to-Source Voltage

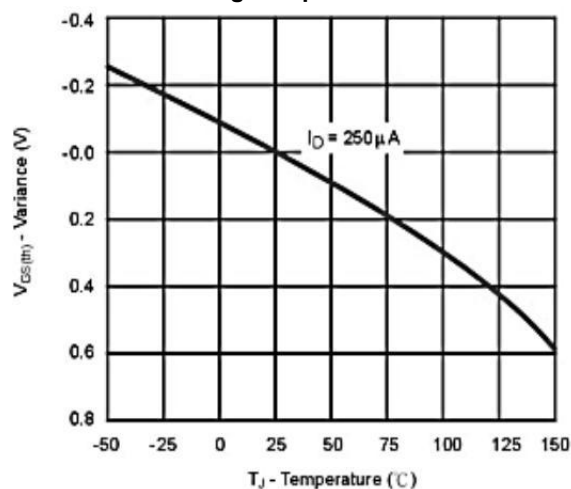


Fig.5 Threshold Voltage

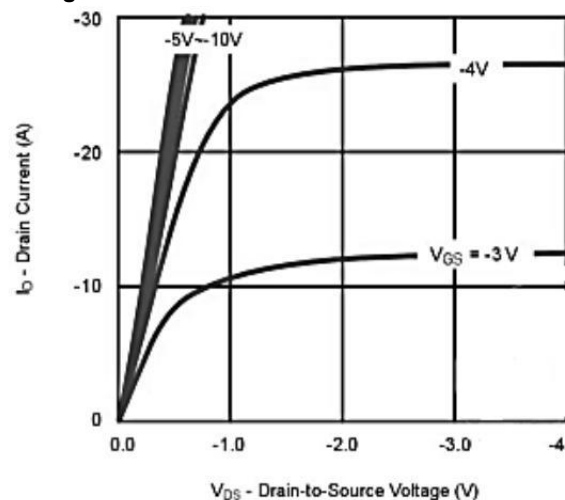
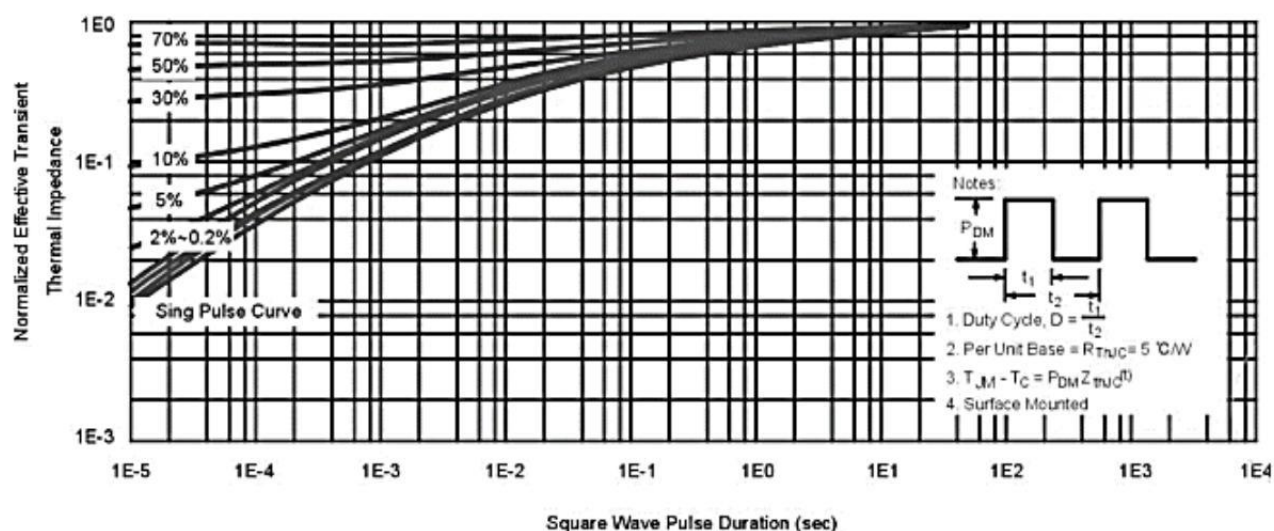
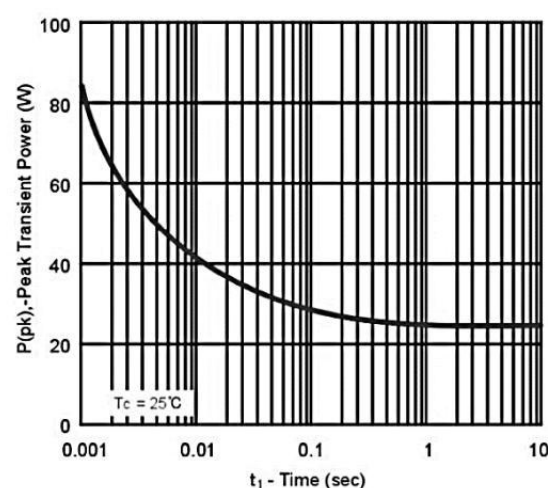
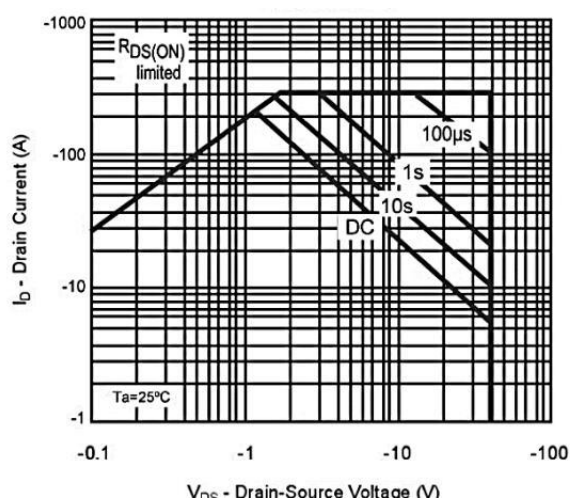
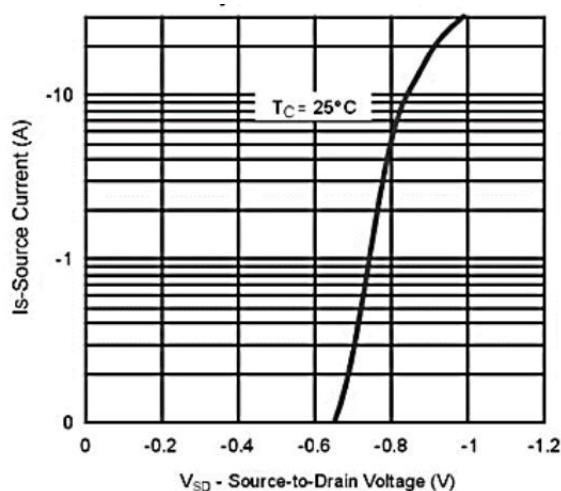
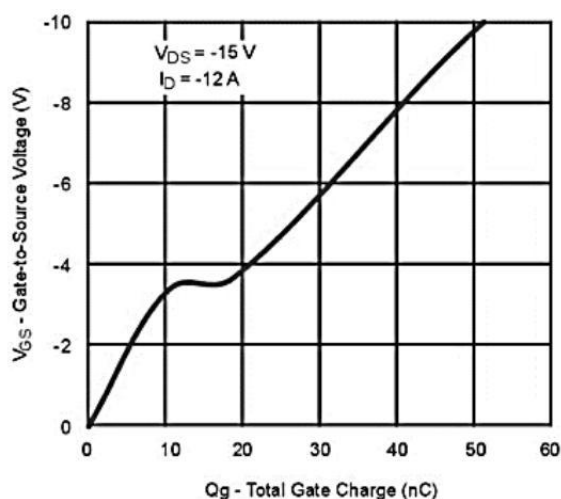
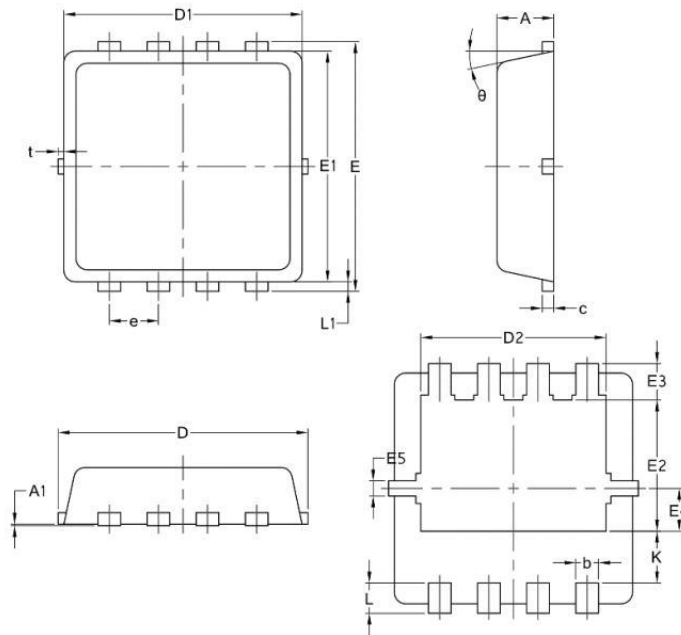


Fig.6 On-Region Characteristics

Typical Characteristics



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