

Description

The SX40P02DF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -20V$ $I_D = -40A$

$R_{DS(ON)} < 12m\Omega$ @ $V_{GS} = -4.5V$

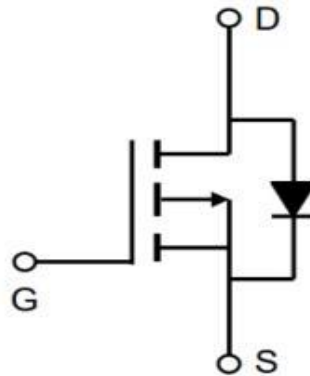
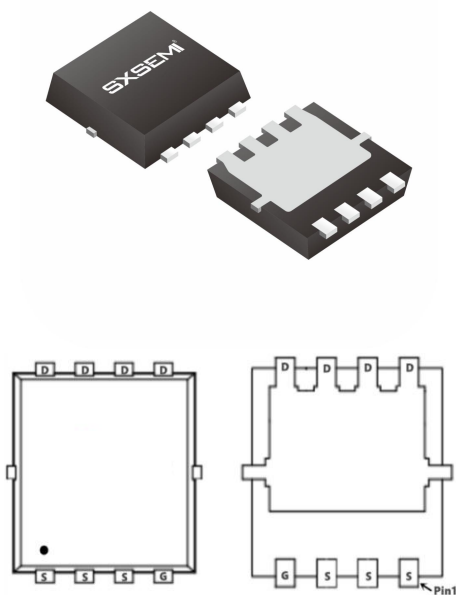
Application

Battery protection

Load switch

Uninterruptible power supply

PDFN3*3-8L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_c = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-40	A
$I_D @ T_c = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-20	A
IDM	Pulsed Drain Current ²	-160	A
$P_D @ T_c = 25^\circ C$	Total Power Dissipation ³	60	W
$P_D @ T_c = 70^\circ C$	Total Power Dissipation ³	30	W
TSTG	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	83	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	52	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.5	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-20	-22	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.012	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V , I _D =-10A	---	8	12	mΩ
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-2.5V , I _D =-5.0A	---	11	16	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.4	-0.65	-1.0	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	2.94	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-20V , V _{GS} =0V , T _J =25°C	---	---	1	uA
IGSS	Gate-Source Leakage Current	V _{GS} =±12V , V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-10V , I _D =-10A	12	---	---	S
Qg	Total Gate Charge (-4.5V)	V _{DS} =-10V , V _{GS} =-4.5V , I _D =-10A	---	63	---	nC
Qgs	Gate-Source Charge		---	9.1	---	
Qgd	Gate-Drain Charge		---	13	---	
Td(on)	Turn-On Delay Time	V _{DD} =-10V , V _{GS} =-4.5V , R _G =6.0Ω , I _D =-1A	---	10	---	ns
T _r	Rise Time		---	15	---	
Td(off)	Turn-Off Delay Time		---	110	---	
T _f	Fall Time		---	70	---	
Ciss	Input Capacitance	V _{DS} =-15V , V _{GS} =0V , f=1MHz	---	1600	---	pF
Coss	Output Capacitance		---	350	---	
Crss	Reverse Transfer Capacitance		---	300	---	
IS	Continuous Source Current ^{1,4}	V _G =V _D =0V , Force Current	---	---	-50	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =-15A , T _J =25°C	---	---	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z 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=-16V,VGS=-10V,L=0.1mH,IAS=12A
- 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

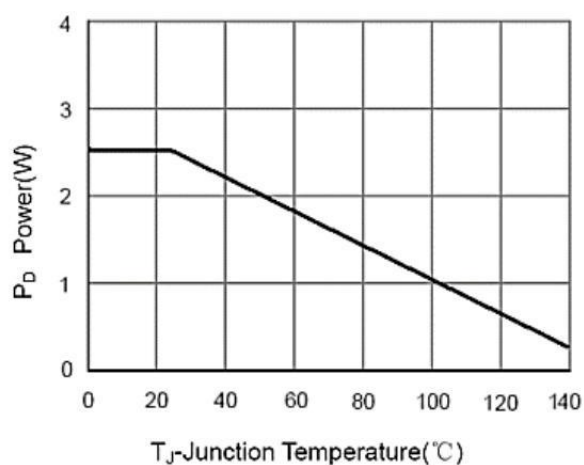


Figure 1 : Power Dissipation

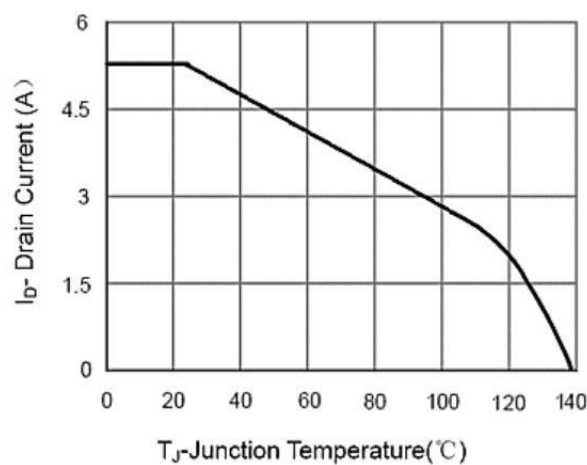


Figure 2 : Drain Current

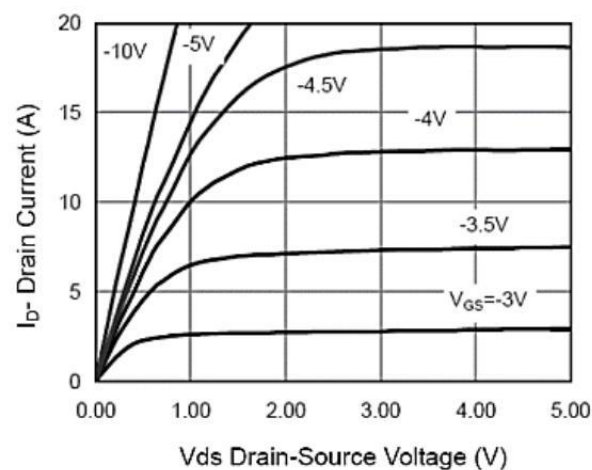


Figure 3: Output Characteristics

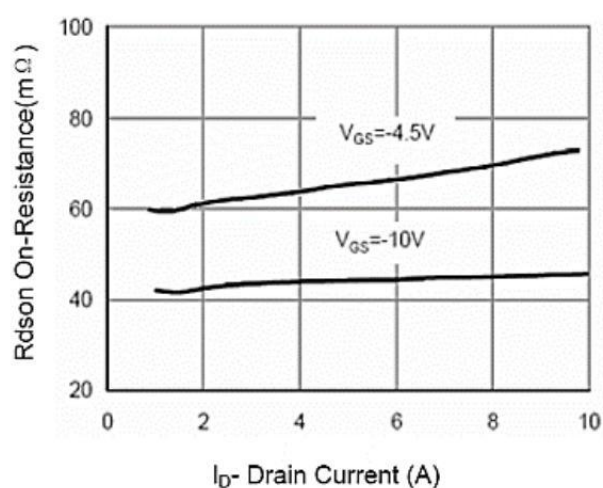


Figure 4 : Drain-Source On-Resistance

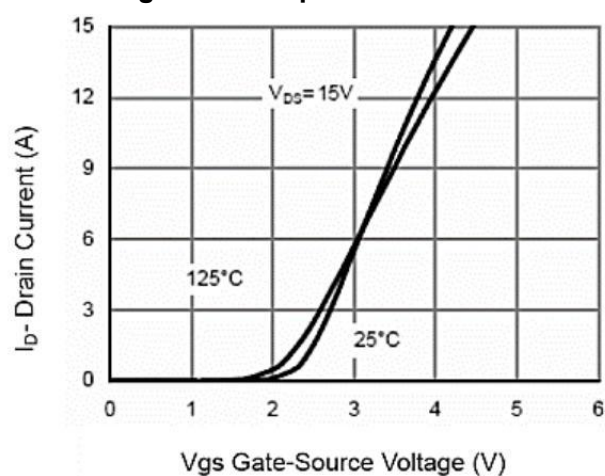


Figure 5 : Transfer Characteristics

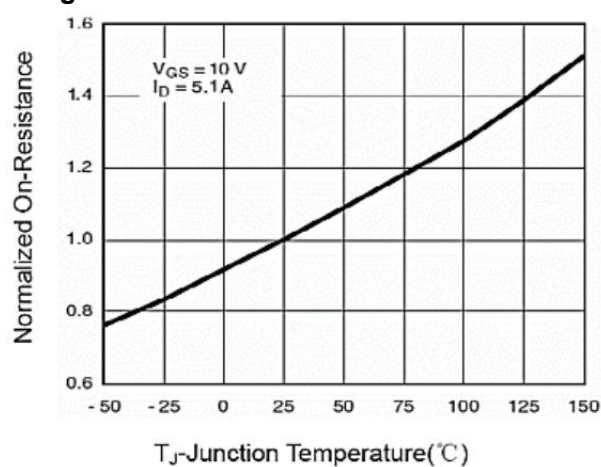


Figure 6 : Drain-Source On-Resistance

Typical Characteristics

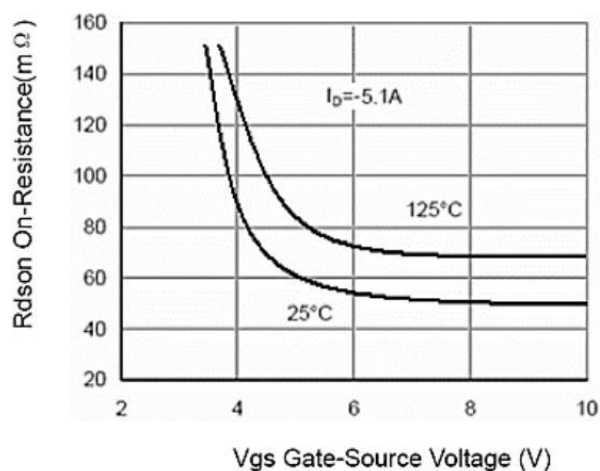


Figure 7 : Rdson vs Vgs

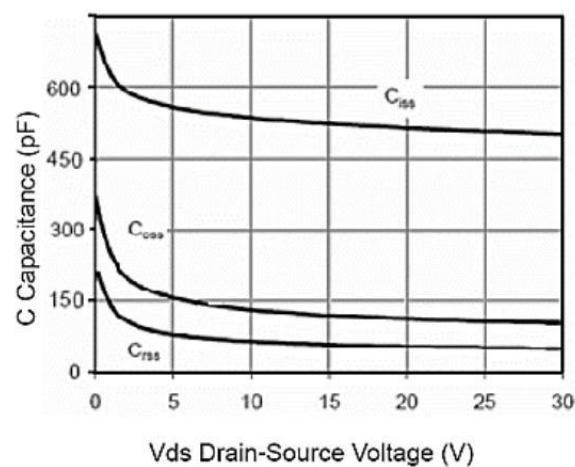


Figure 8 : Capacitance vs Vds

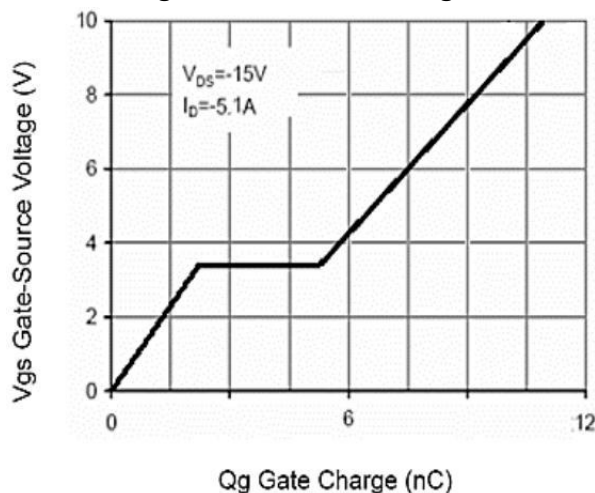


Figure 9 : Gate Charge

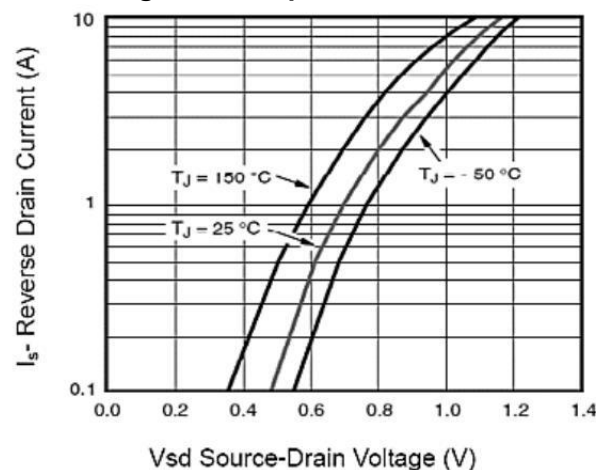


Figure 10: Source-Drain Diode Forward

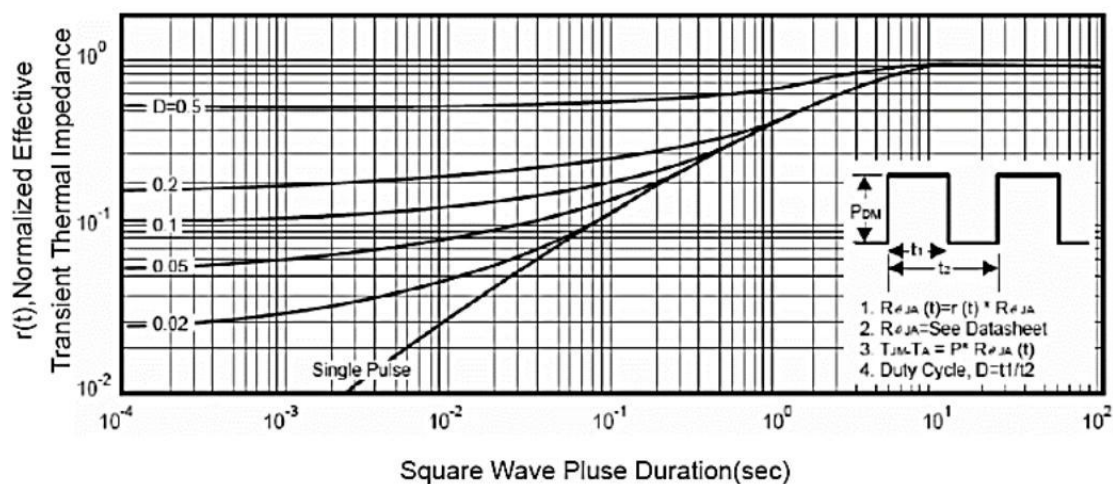
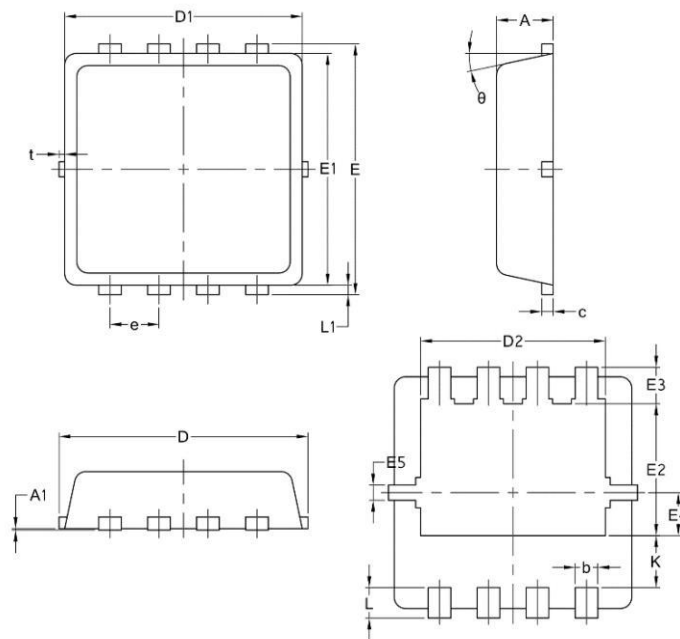


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-DFN3*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