

Description

The SX70N04NF 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

$V_{DS} = 40V$ $I_D = 70A$

$R_{DS(ON)} < 7.0m\Omega$ @ $V_{GS}=10V$

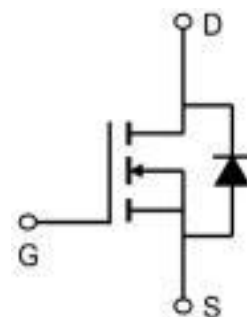
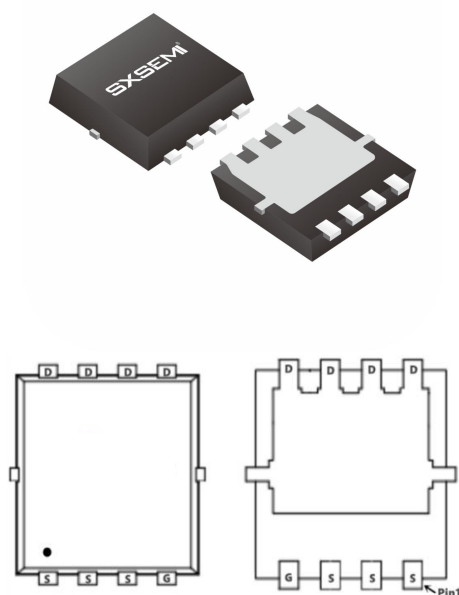
Application

BLDC

Boost driver

Brushless motor

PDFN5*6-8L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	70	A
$I_D @ T_c=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	39	A
IDM	Pulsed Drain Current ²	240	A
EAS	Single Pulse Avalanche Energy ³	181	mJ
IAS	Avalanche Current	20	A
$P_D @ T_c=25^\circ\text{C}$	Total Power Dissipation ⁴	46	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 (Steady State) ¹	25	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.7	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	40	47	-	V
VGS(th)	Gate Threshold Voltage	VDS= VGS, ID=250μA	1.2	1.7	2.5	V
ΔBVDSS/ΔTJ	BVDSS Temperature Coefficient	Reference to 25°C, ID=1mA	---	0.034	---	V/°C
RDS(on)	Static Drain-Source on-Resistance	VGS =10V, ID =30A	-	5.0	7.0	mΩ
		VGS =4.5V, ID =20A	-	8.2	10	
IDSS	Zero Gate Voltage Drain Current	VDS =40V, VGS = 0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS =0V, VGS = ±20V	-	-	±100	nA
Ciss	Input Capacitance	VDS = 20V, VGS =0V, f = 1.0MHz	-	2400	-	pF
Coss	Output Capacitance		-	192	-	pF
Crss	Reverse Transfer Capacitance		-	165	-	pF
Qg	Total Gate Charge	VDS =20V, ID =30A, VGS =10V	-	37	-	nC
Qgs	Gate-Source Charge		-	6	-	nC
Qgd	Gate-Drain("Miller") Charge		-	7	-	nC
td(on)	Turn-on Delay Time	V DD=20V, ID =30A, RL=1Ω, RGEN=3Ω, VGS =10V	-	12	-	ns
tr	Turn-on Rise Time		-	12	-	ns
td(off)	Turn-off Delay Time		-	38	-	ns
tf	Turn-off Fall Time		-	9	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
VSD	Drain to Source Diode Forward Voltage	VGS =0V, IS=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	TJ=25°C, IF=20A, dI/dt=100 A/μs	-	22	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	11	-	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 ≤ 300us , duty cycle ≤ 2%
- 3、 The EAS data shows Max. rating . The test condition is VDD=25V, VGS=10V, L=0.1mH, IAS=20A
- 4、 The power dissipation is limited by 150°C junction temperature
- 5 、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

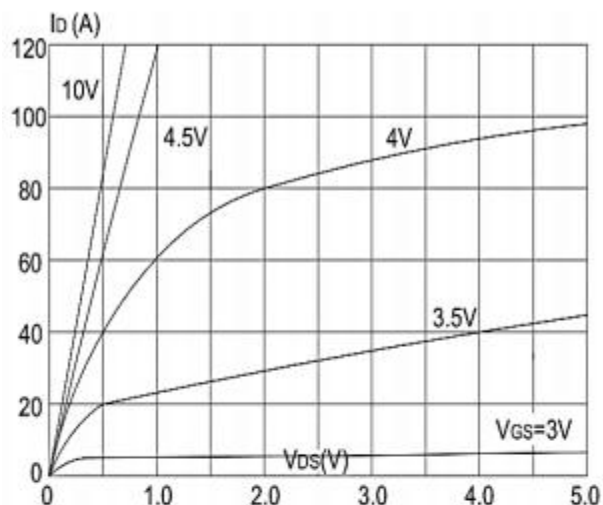


Figure1: Output Characteristics

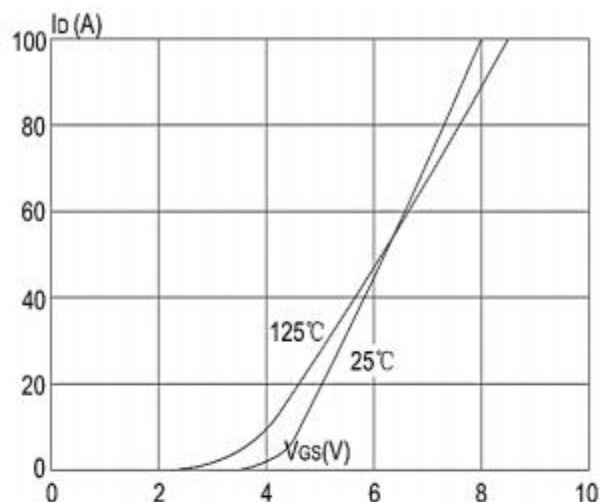


Figure 2: Typical Transfer Characteristics

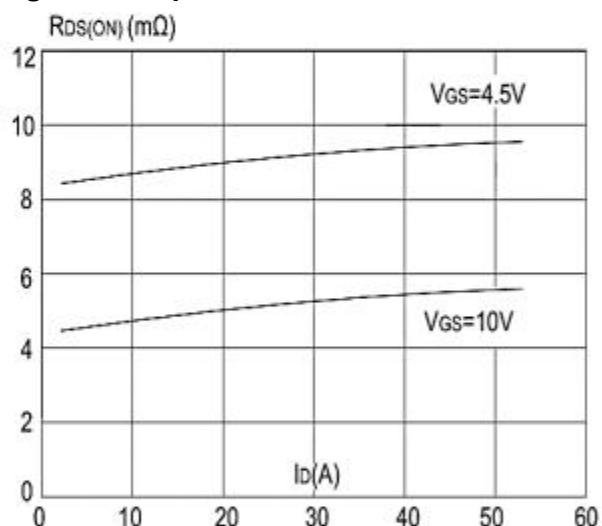


Figure 3: On-resistance vs. Drain Current

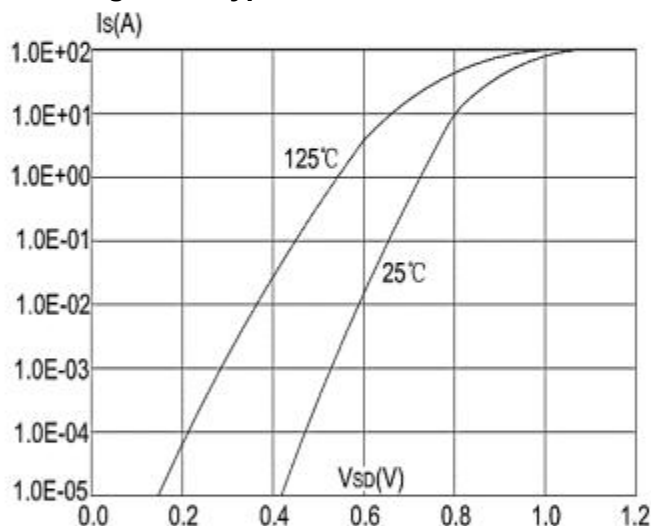


Figure 4: Body Diode Characteristics

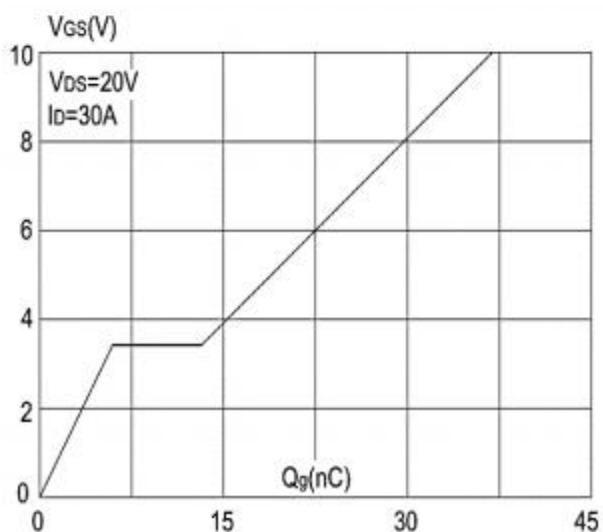


Figure 5: Gate Charge Characteristics

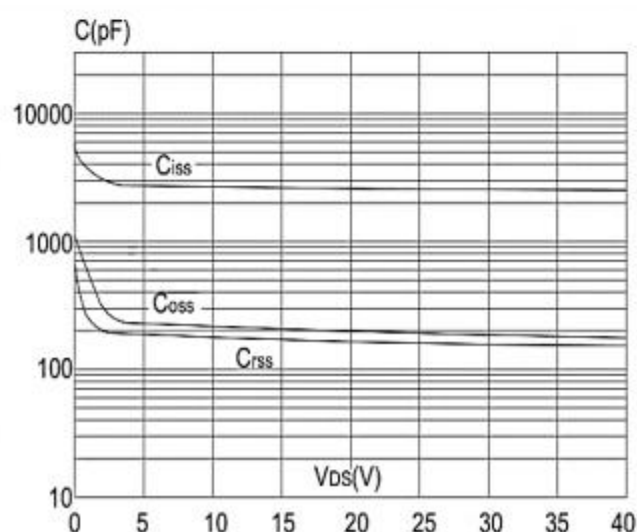


Figure 6: Capacitance Characteristics

Typical Characteristics

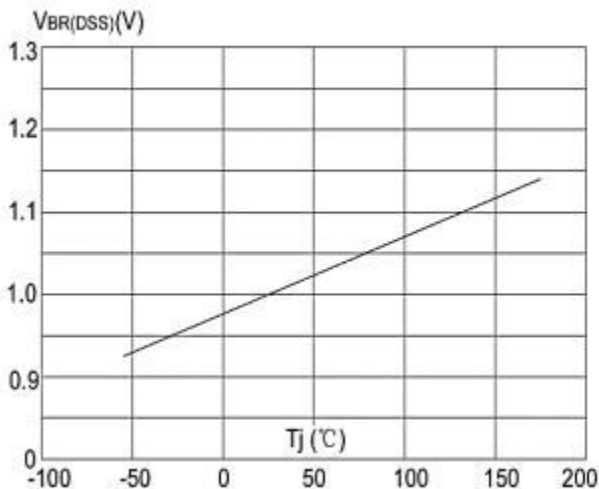


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

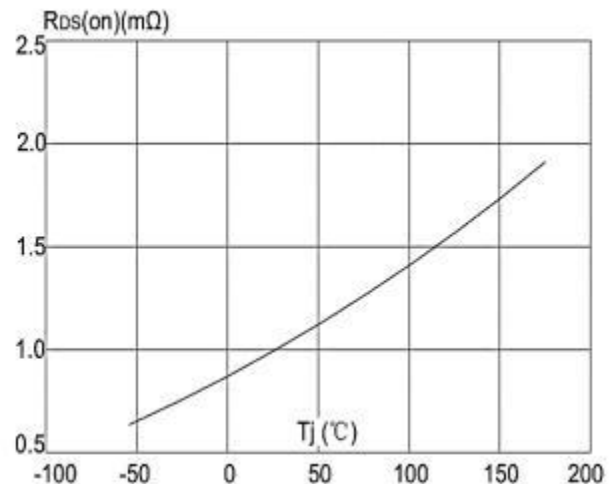


Figure 8: Normalized on Resistance vs. Junction Temperature

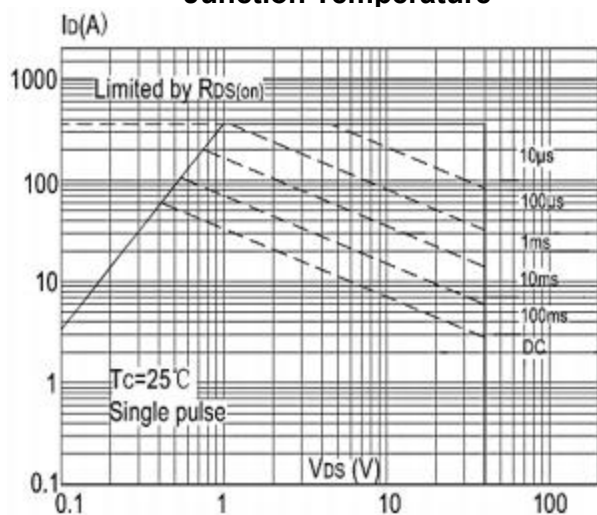


Figure 9: Maximum Safe Operating Area

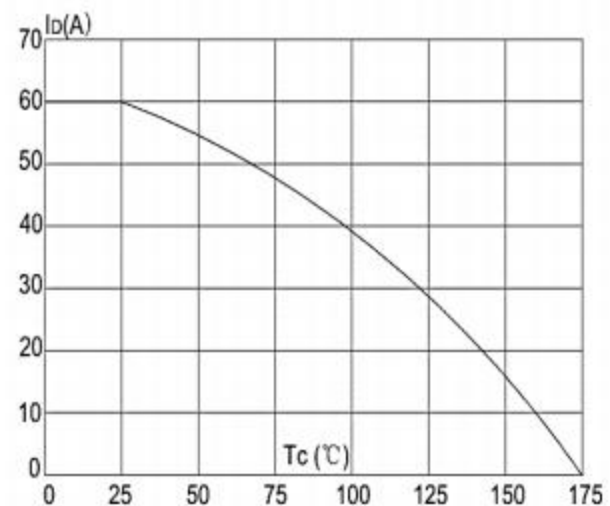


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

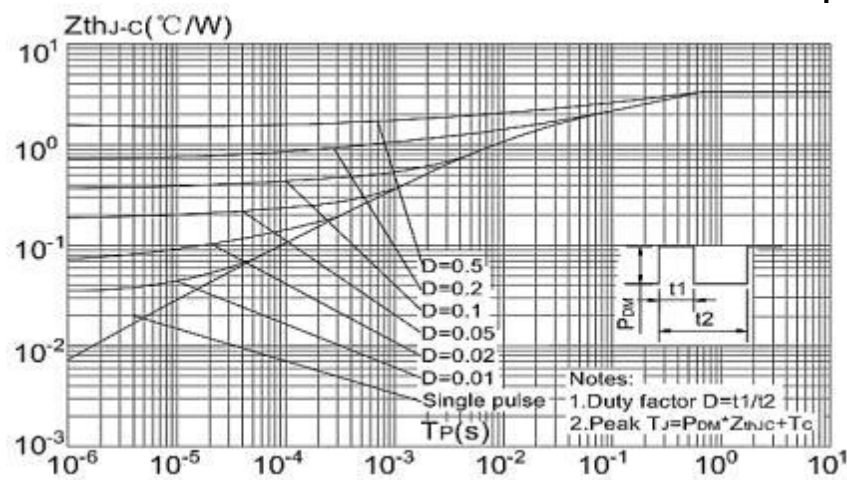
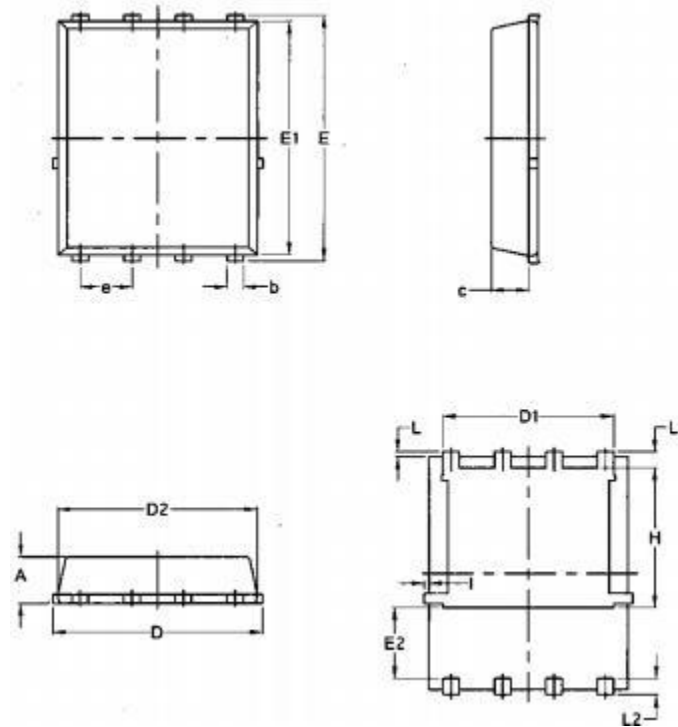


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

MOSFET 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