

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	4.5mΩ@10V	48A
	6.2mΩ@4.5V	



合肥矽普半导体

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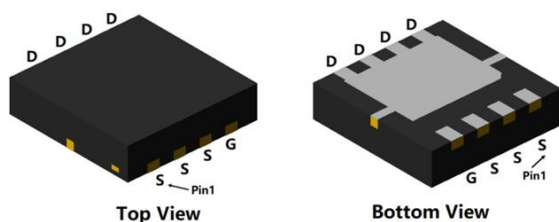
Feature

- Fast switching speed
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

Applications

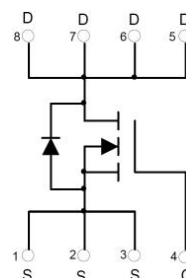
- DC-DC Converters
- Motor Control
- Portable equipment application

Package

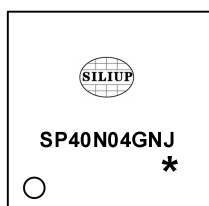


PDFN3X3-8L

Circuit diagram



Marking



SP40N04GNJ :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP40N04GNJ	PDFN3X3-8L	5000

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	48	A
Continuous Drain Current (Tc=100°C)	I_D	32	A
Pulse Drain Current Tested	I_{DM}	192	A
Single pulsed avalanche energy ¹	E_{AS}	110	mJ
Power Dissipation (Tc=25°C)	P_D	48	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	2.6	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

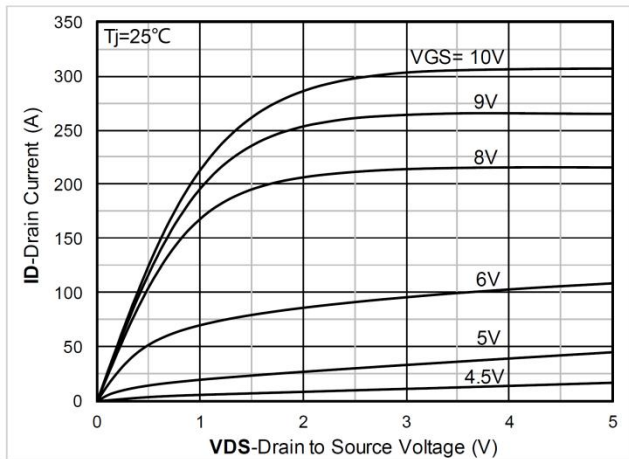
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	40	-	-	V
Drain-Source Leakage Current	IDSS	VDS=24V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS =10V, ID =20A	-	4.5	5.3	mΩ
		VGS =4.5V, ID =10A	-	6.2	8.0	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=20V , VGS=0V , f=1MHz	-	885	-	pF
Output Capacitance	Coss		-	478	-	
Reverse Transfer Capacitance	Crss		-	12.1	-	
Total Gate Charge	Qg	VDS=20V , VGS=10V , ID=30A	-	35	-	nC
Gate-Source Charge	Qgs		-	6.4	-	
Gate-Drain Charge	Qgd		-	3.5	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=20 VGS=10V , RG=3Ω, ID=30A	-	8	-	nS
Rise Time	Tr		-	5	-	
Turn-Off Delay Time	Td(off)		-	24	-	
Fall Time	Tf		-	3.5	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Diode Continuous Current	IS		-	-	48	A
Reverse recover time	Trr	IS=20A, di/dt=100A/us, Tj=25℃	-	14	-	nS
Reverse recovery charge	Qrr		-	16	-	nC

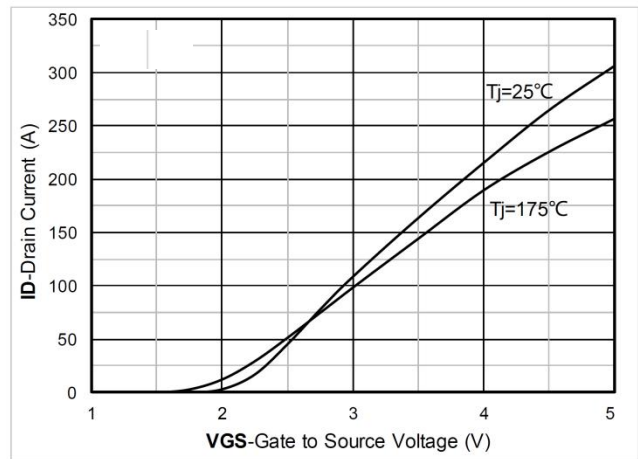
Note:

- The EAS Test condition is $V_{DD}=20V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

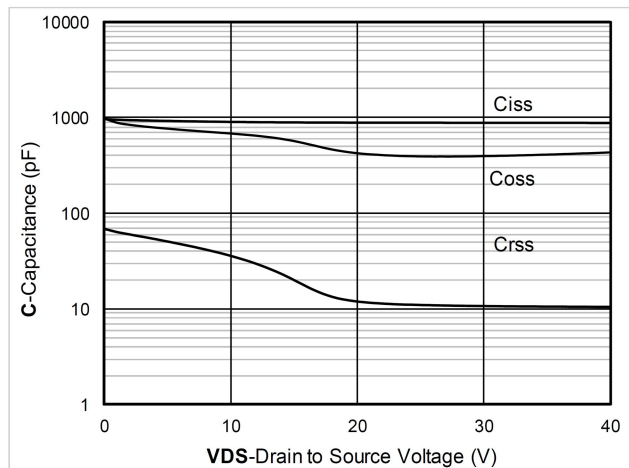
Typical Characteristics



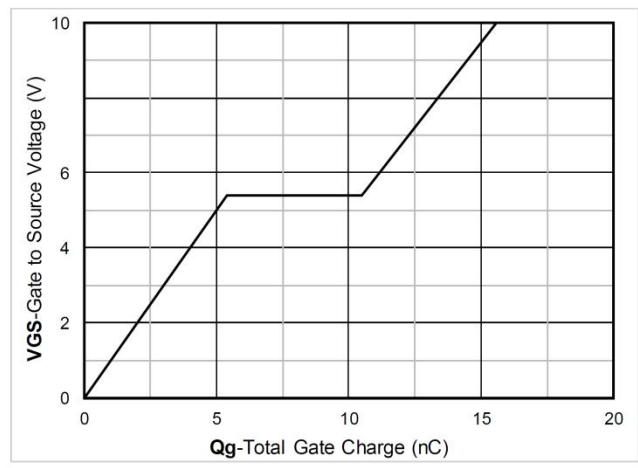
Output Characteristics



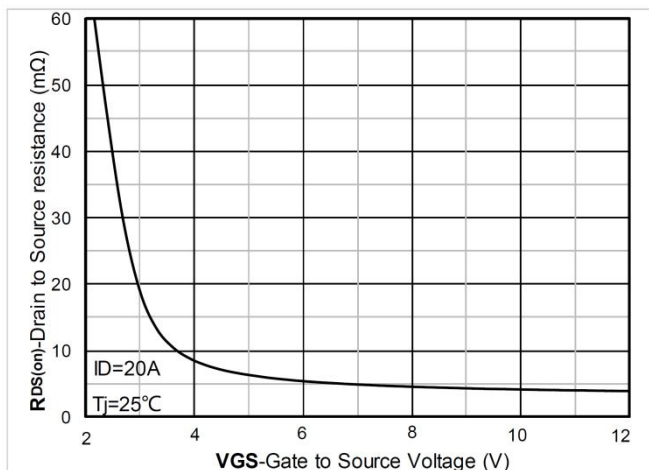
Transfer Characteristics



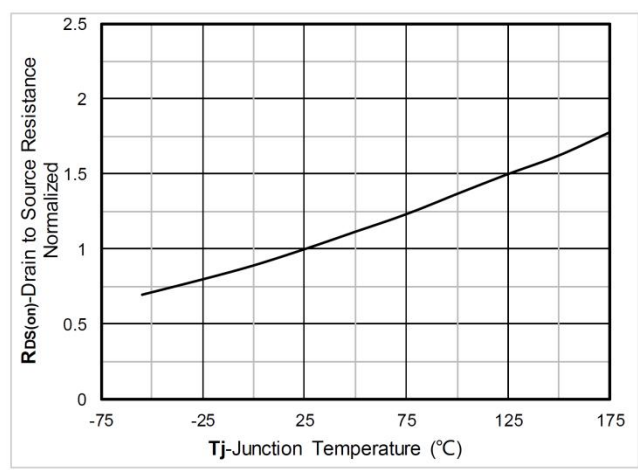
Capacitance Characteristics



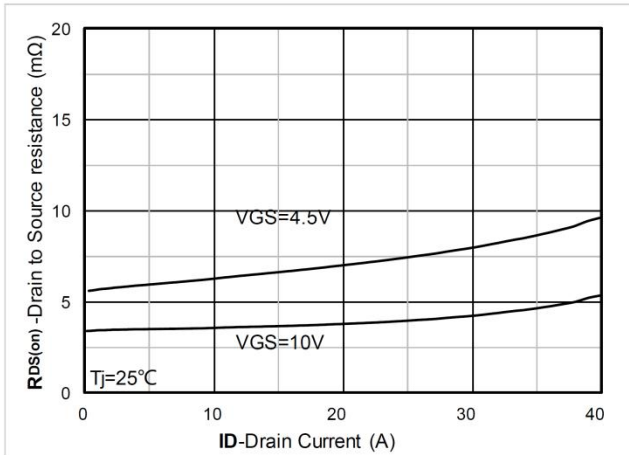
Gate Charge



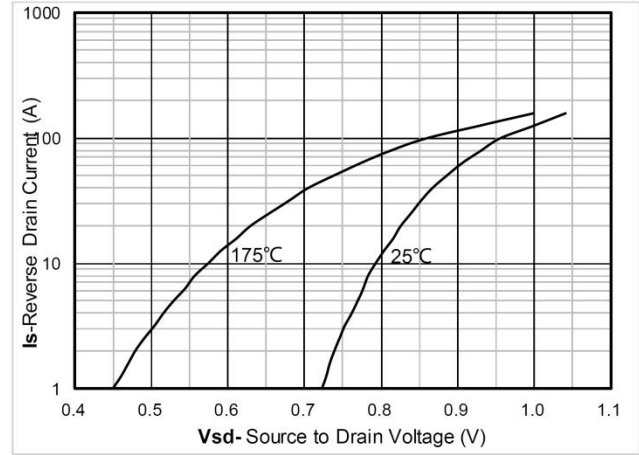
On-Resistance vs Gate to Source Voltage



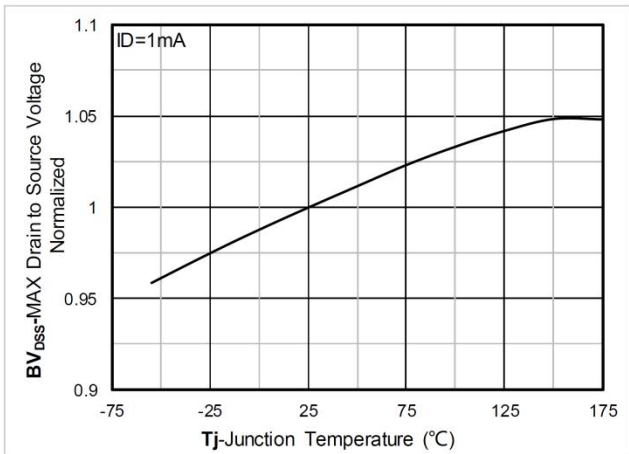
Normalized On-Resistance



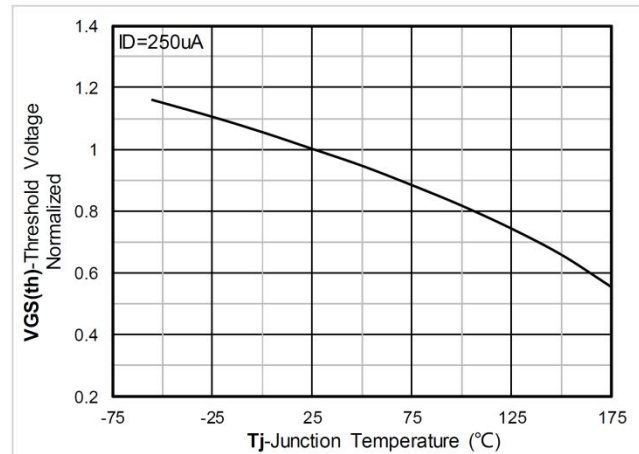
RDS(on) VS Drain Current



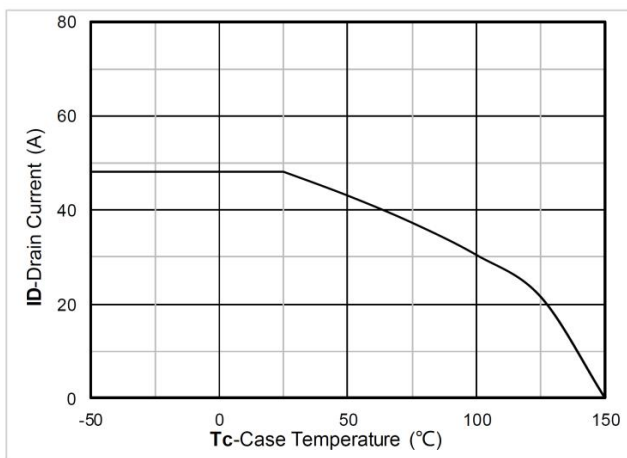
Forward characteristics of reverse diode



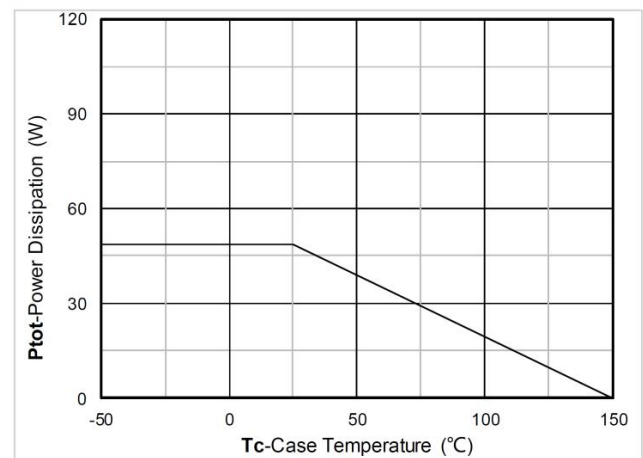
Normalized breakdown voltage



Normalized Threshold voltage



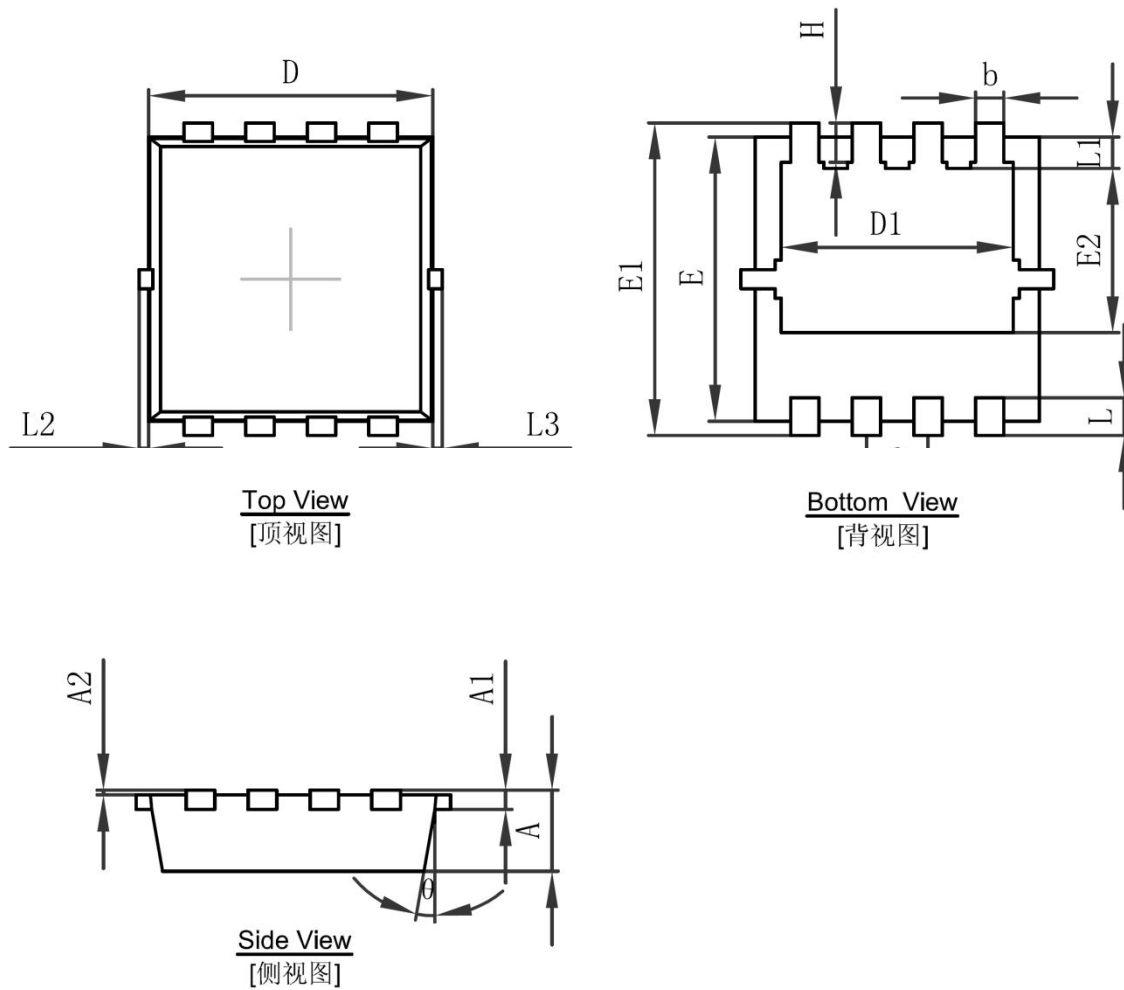
Current dissipation



Power dissipation



PDFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°