

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	4.5mΩ@10V	65A
	6.2mΩ@4.5V	



合肥矽普半导体

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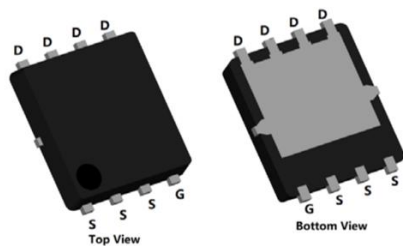
Feature

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

Applications

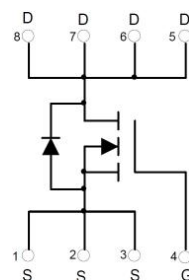
- DC-DC Converters
- Motor Control
- Portable equipment application

Package



PDFN5X6-8L

Circuit diagram



Marking



SP40N04GNK :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP40N04GNK	PDFN5X6-8L	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	65	A
Continuous Drain Current(Tc=100°C)	I_D	44	A
Pulse Drain Current Tested	I_{DM}	260	A
Single pulsed avalanche energy ¹	E_{AS}	110	mJ
Power Dissipation(Tc=25°C)	P_D	65	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.92	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

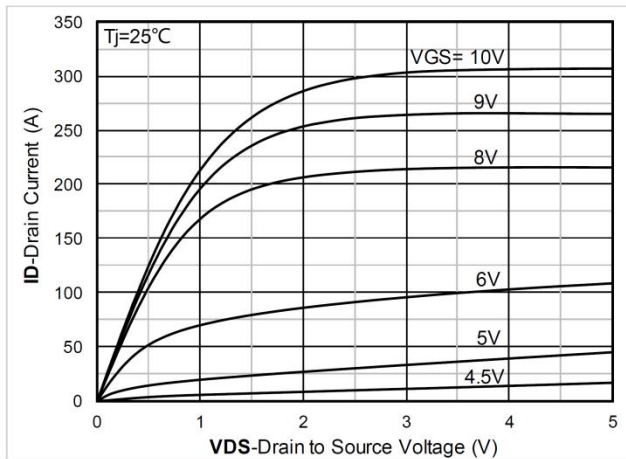
Electrical characteristics (Ta=25°C, unless otherwise noted)

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=32V , 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		-	-	65	A
Reverse recover time	Trr	Is=20A, di/dt=100A/us, Tj=25℃	-	14	-	nS
Reverse recovery charge	Qrr		-	16	-	nC

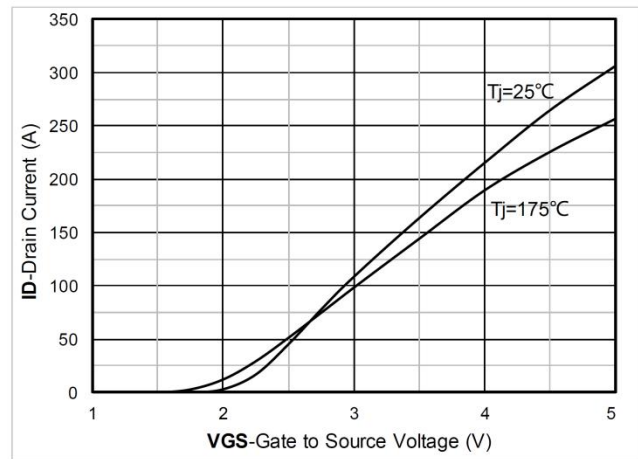
Note:

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

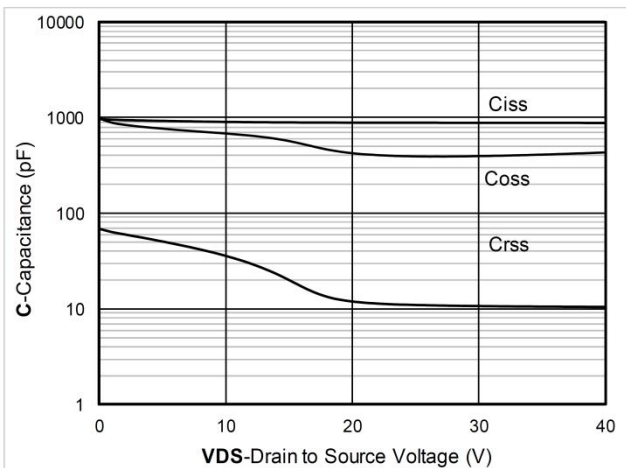
Typical Characteristics



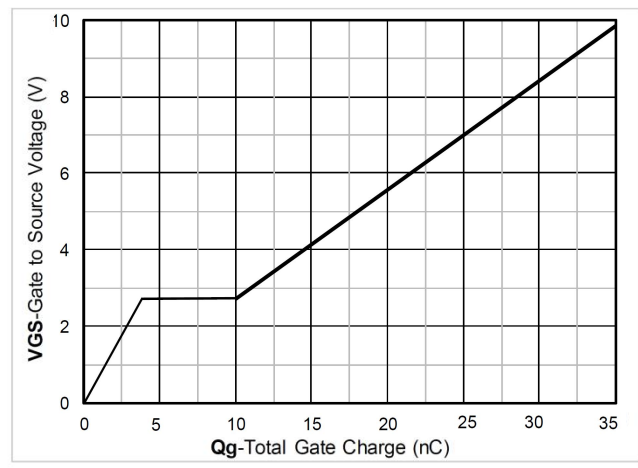
Output Characteristics



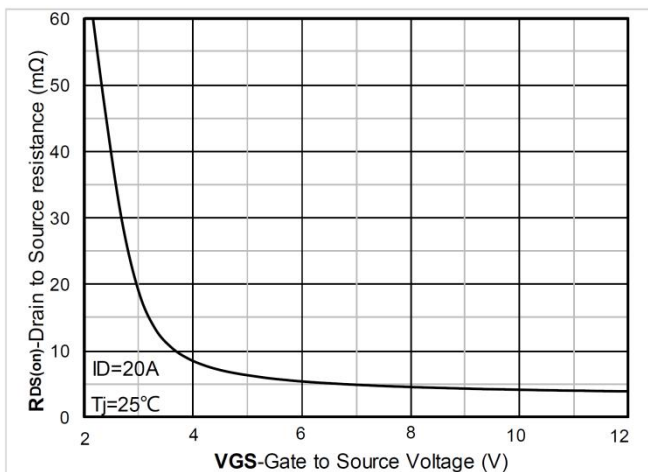
Transfer Characteristics



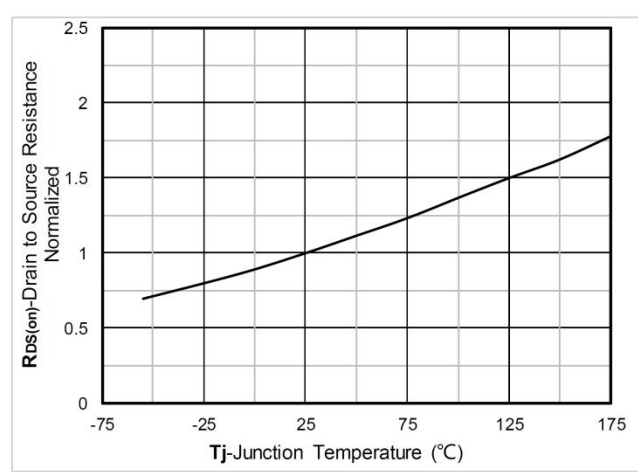
Capacitance Characteristics



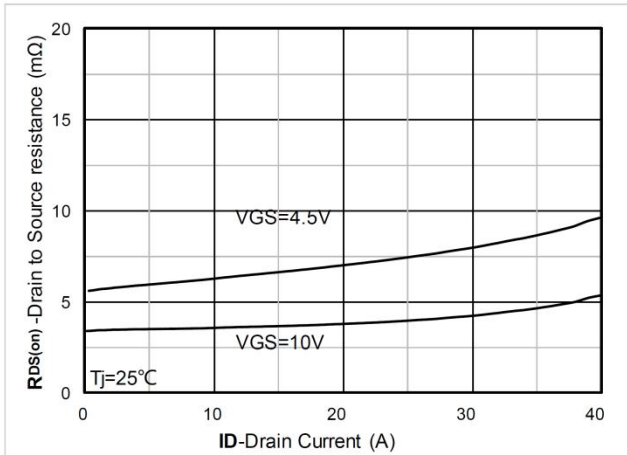
Gate Charge



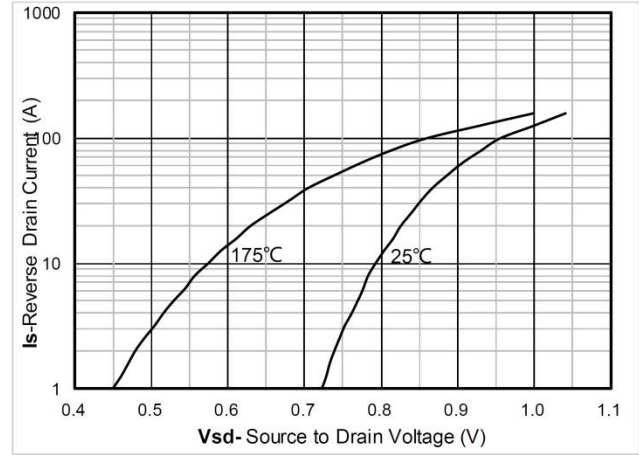
On-Resistance vs Gate to Source Voltage



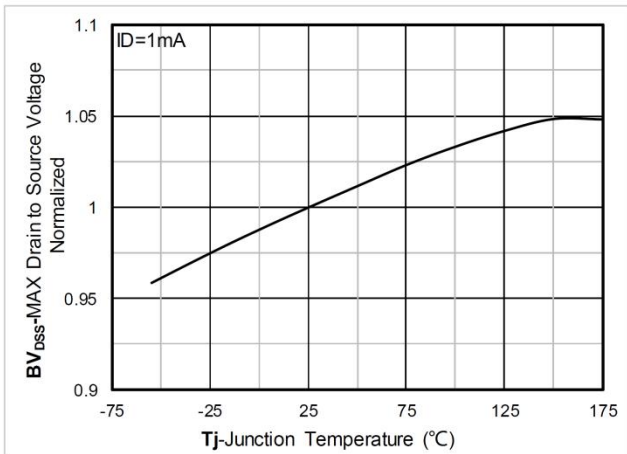
Normalized On-Resistance



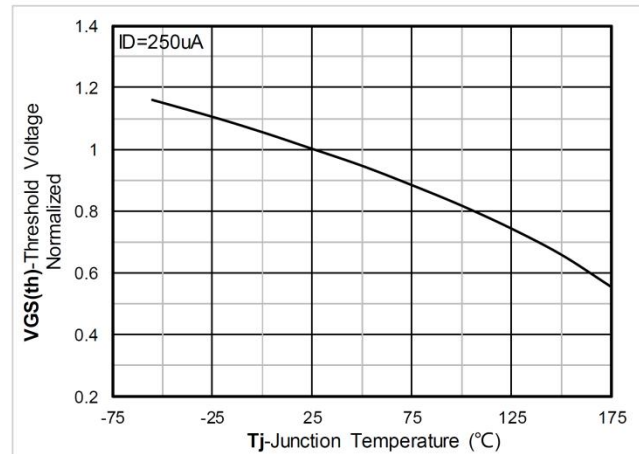
RDS(on) VS Drain Current



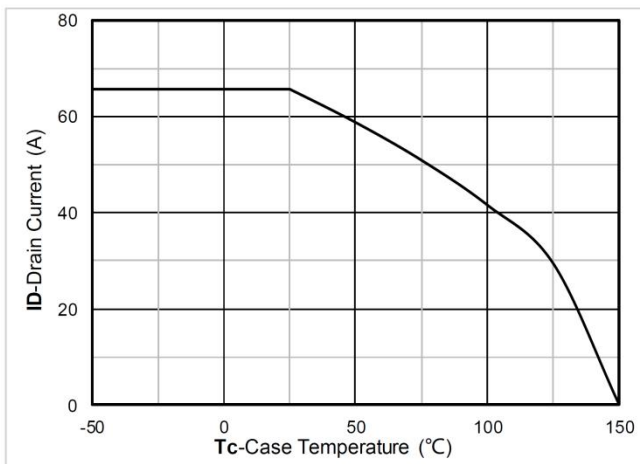
Forward characteristics of reverse diode



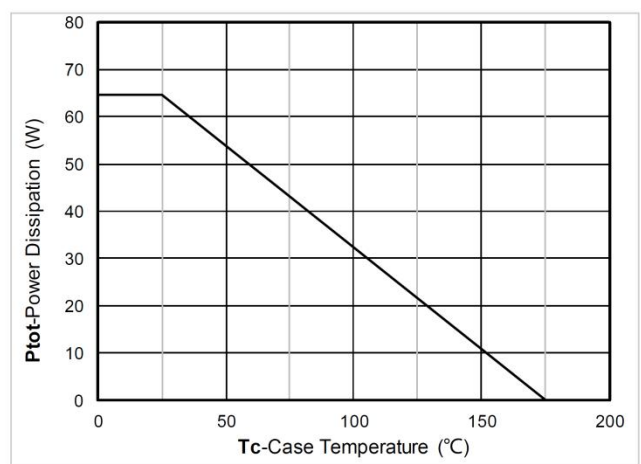
Normalized breakdown voltage



Normalized Threshold voltage



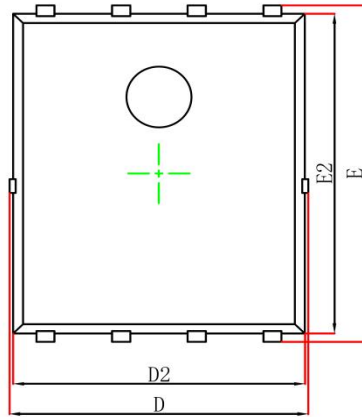
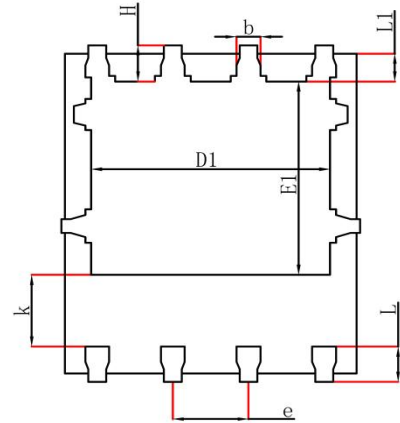
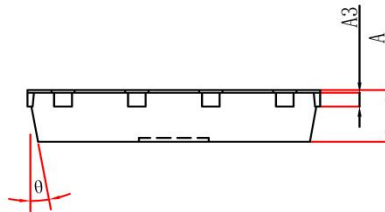
Current dissipation



Power dissipation



PDFN5X6-8L Package Information

Top View
[顶视图]Bottom View
[背视图]Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°