

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.3mΩ@10V	120A
	3.3mΩ@4.5V	



合肥矽普半导体

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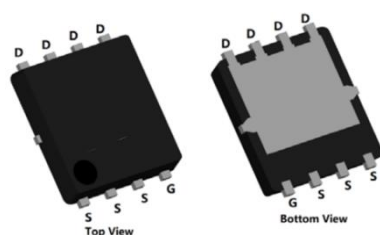
Feature

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

Applications

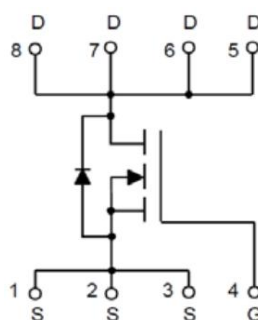
- Power switching application
- PWM Application
- DC-DC Converter

Package

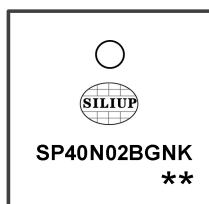


PDFN5X6-8L

Circuit diagram



Marking



SP40N02BGNK : Device Code
** : Week Code

Order Information

Device	Package	Unit/Tape
SP40N02BGNK	PDFN5X6-8L	5000

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

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (Tc=25°C)	Silicon Limit	I_D	135	A
Continuous Drain Current (Tc=25°C)	Package Limit	I_D	120	A
Continuous Drain Current (Tc=100°C)		I_D	80	A
Pulsed Drain Current		I_{DM}	480	A
Single Pulse Avalanche Energy ¹		E_{AS}	420	mJ
Power Dissipation (Tc=25°C)		P_D	85	W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	1.47	°C/W
Storage Temperature Range		T_{STG}	-55 to 150	°C
Operating Junction Temperature Range		T_J	-55 to 150	°C

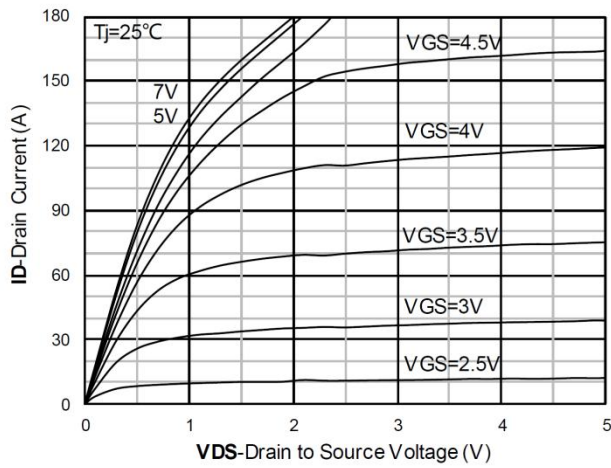
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	40	-	-	V
Drain Cut-Off Current	IDSS	VDS=32V , VGS=0V , TJ=25℃	-	-	1	uA
Gate Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	1.0	1.8	2.5	V
Drain-Source ON Resistance	RDS(ON)	VGS=10V , ID=20A	-	2.3	2.8	mΩ
		VGS=4.5V , ID=10A	-	3.3	4	
Dynamic Characteristics						
Input Capacitance	Ciss	VDS=20V , VGS=0V , f=1MHz	-	2868	-	pF
Output Capacitance	Coss		-	1006	-	
Reverse Transfer Capacitance	Crss		-	51	-	
Total Gate Charge	Qg	VDS=20V , VGS=10V , ID=85A	-	57	-	nC
Gate-Source Charge	Qgs		-	9.5	-	
Gate-Drain Charge	Qgd		-	11	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=20V, VGS=10V, RG=1.6Ω, ID=85A	-	10	-	nS
Rise Time	tr		-	3	-	
Turn-Off Delay Time	td(off)		-	35	-	
Fall Time	tf		-	4	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	VSD	Is = 1A, VGS = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	Is		-	-	120	A
Reverse Recovery Time	Trr	Is=50A, di/dt=100A/us, TJ=25℃	-	18	-	nS
Reverse Recovery Charge	Qrr		-	31	-	nC

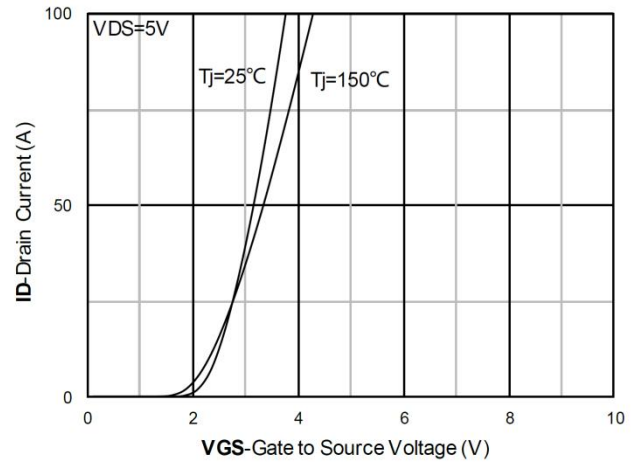
Note :

1. The test condition is $V_{DD}=20V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

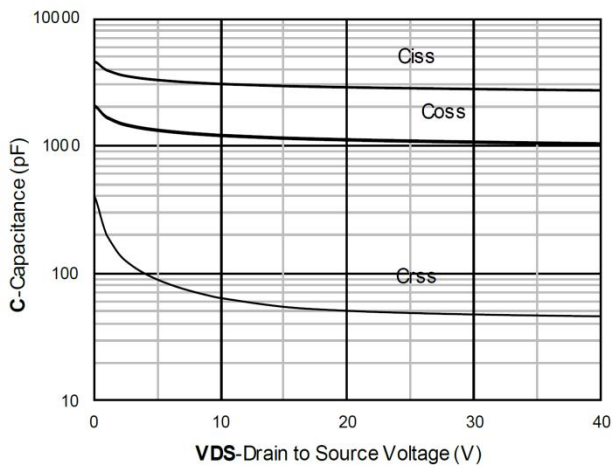
Typical Characteristics



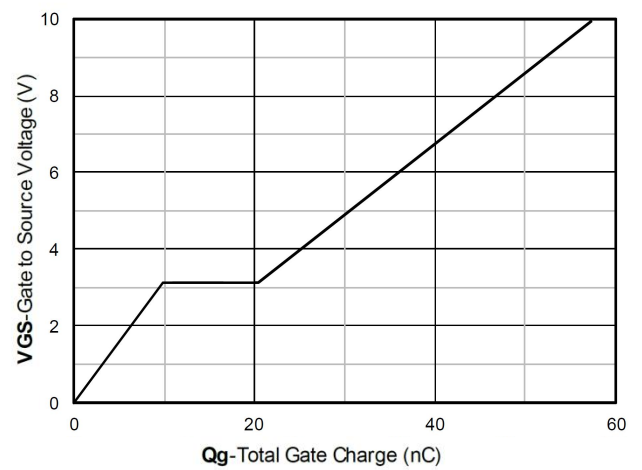
Output Characteristics



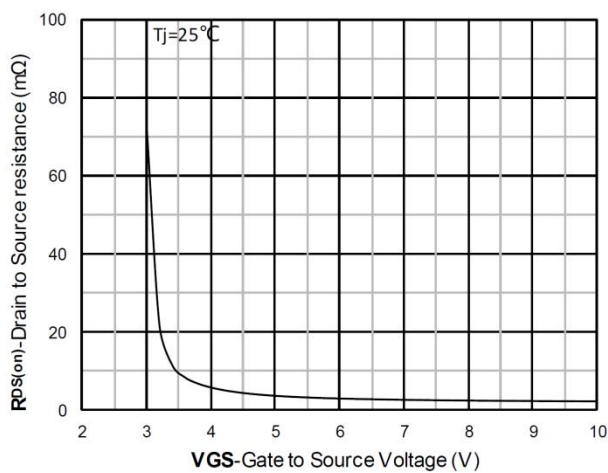
Transfer Characteristics



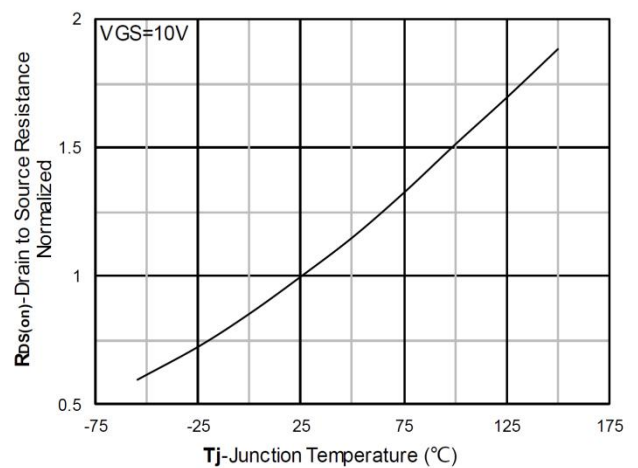
Capacitance Characteristics



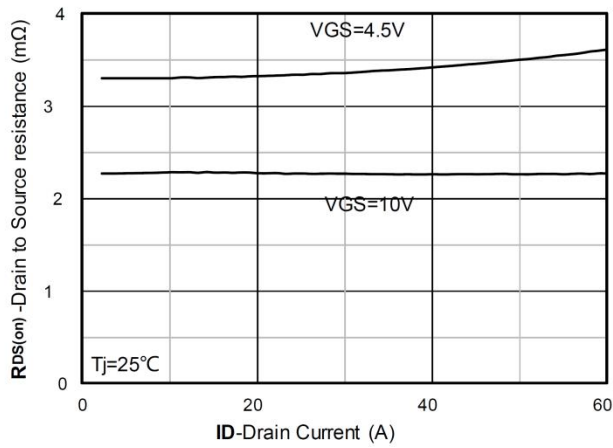
Gate Charge



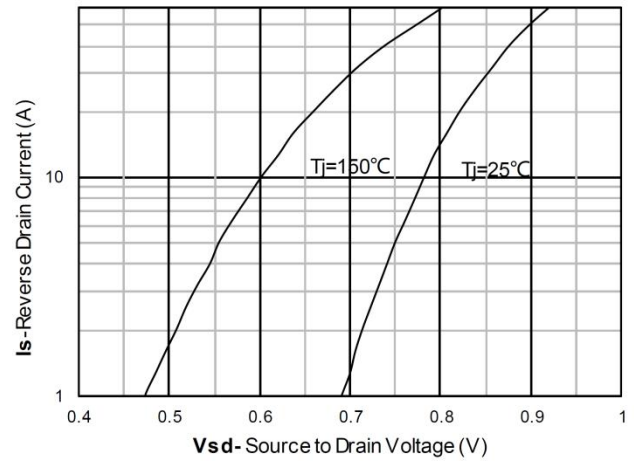
On-Resistance vs Gate to Source Voltage



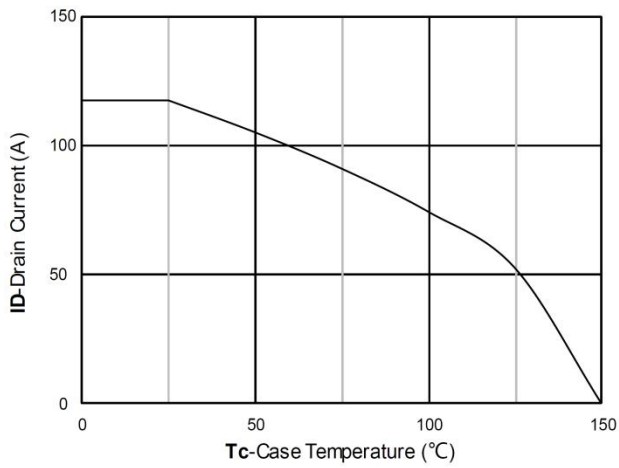
Normalized On-Resistance



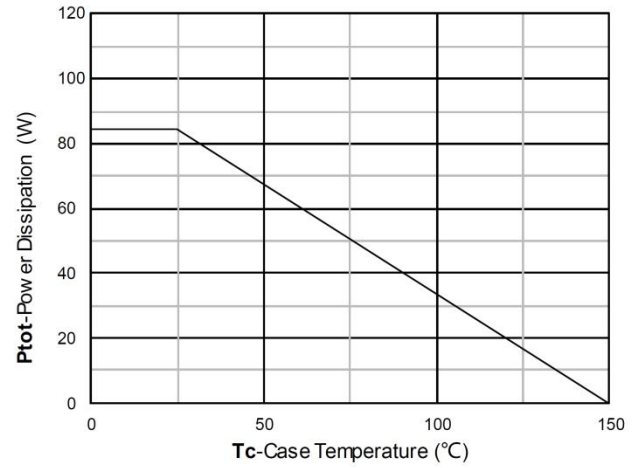
$R_{DS(on)}$ VS Drain Current



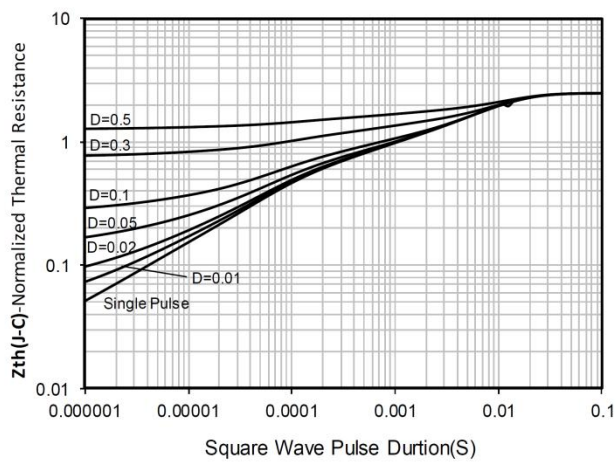
Forward characteristics of reverse diode



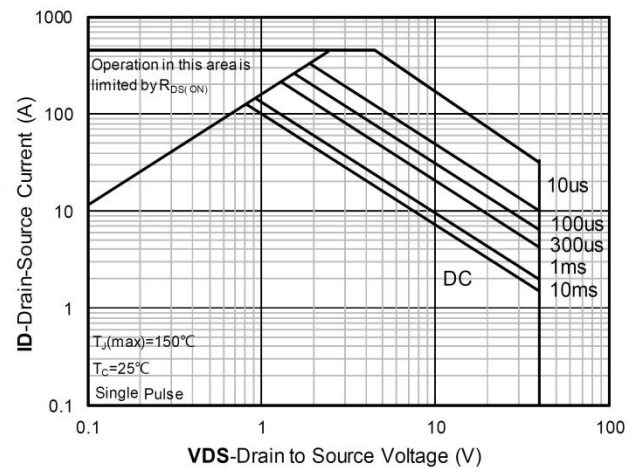
Current dissipation



Power dissipation

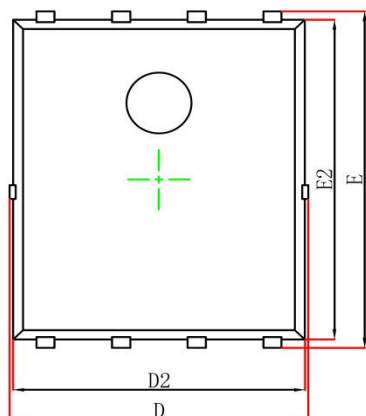


Maximum Transient Thermal Impedance

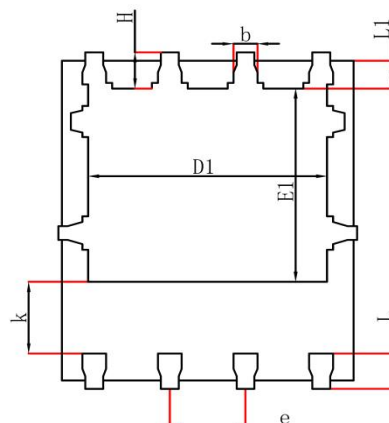


Safe Operation Area

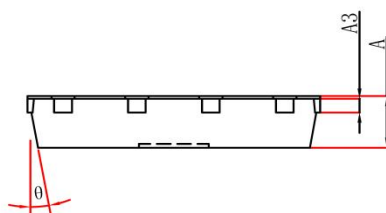
PDFN5X6-8L Package Information



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°