Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	5mΩ@10V	45A
	8mΩ@4.5V	

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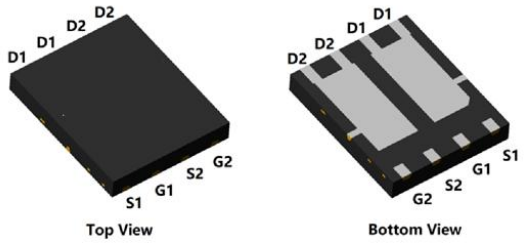
Feature

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

Applications

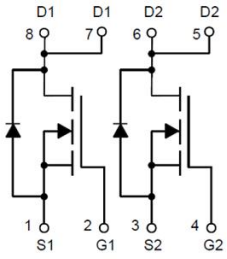
- DC-DC Converters.
- Motor Control.

Package



PDFN5X6-8L

Circuit diagram



Marking

SP40N05GDNK **:Device Code**
****** **:Week Code**

Order Information

Device	Package	Unit/Tape
SP40N05GDNK	PDFN5X6-8L	5000

Absolute maximum ratings (Ta=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current(Tc=25°C)	I_D	45	A
Continuous Drain Current(Tc=100°C)	I_D	30	A
Pulse Drain Current	I_{DM}	180	A
Power Dissipation(Tc=25°C)	P_D	92	W
Single pulsed avalanche energy[1]	E_{AS}	110	mJ
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.35	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

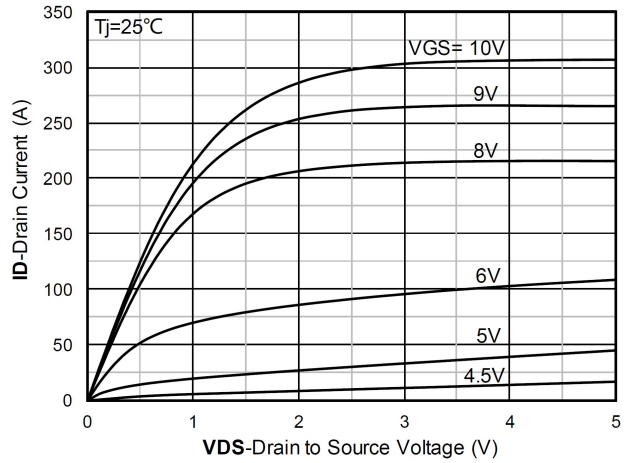
Electrical characteristics (Ta=25℃, unless otherwise noted)

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	I_{DSS}	VDS=32V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	1	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=15A	-	5.0	6.3	mΩ
		VGS=4.5V , ID=10A	-	8.0	10.5	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=20V , VGS=0V , f=1MHz	-	885	-	pF
Output Capacitance	C_{oss}		-	478	-	
Reverse Transfer Capacitance	C_{rss}		-	12.1	-	
Total Gate Charge	Q_g	VDS=20V , VGS=10V , ID=20A	-	35	-	nC
Gate-Source Charge	Q_{gs}		-	6.4	-	
Gate-Drain Charge	Q_{gd}		-	3.5	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=20V , VGS=10V , RG=1.6Ω, ID=20A	-	8	-	nS
Rise Time	T_r		-	5	-	
Turn-Off Delay Time	$T_{d(off)}$		-	24	-	
Fall Time	T_f		-	3.5	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	55	A
Reverse Recovery Time	T_{rr}	IS=10A, di/dt=300A/us, TJ=25℃	-	14	-	nS
Reverse Recovery Charge	Q_{rr}		-	16	-	nC

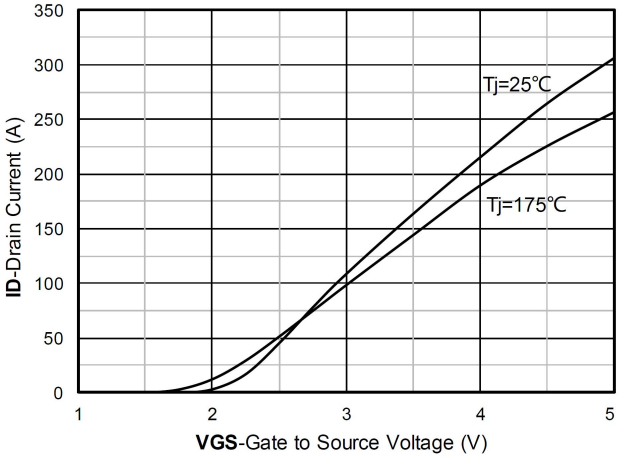
Note :

1. The test condition is VDD=20V,VGS=10V,L=0.5mH,RG=25Ω

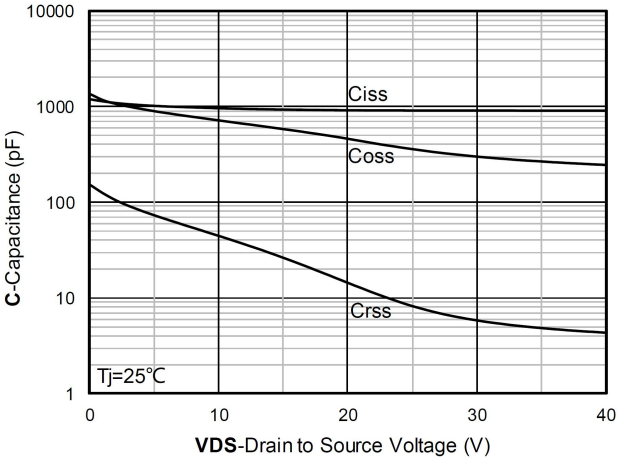
Typical Characteristics



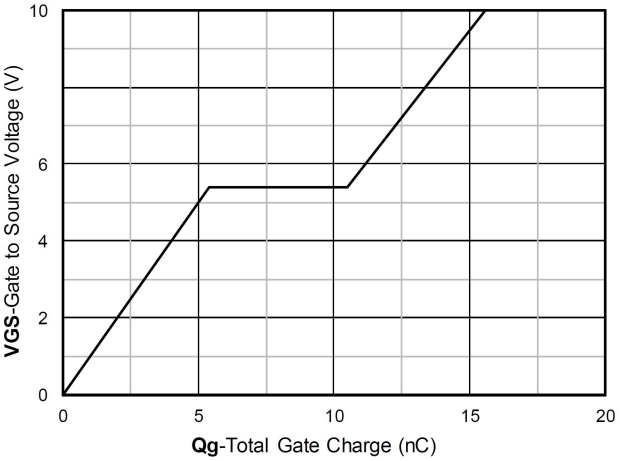
Output Characteristics



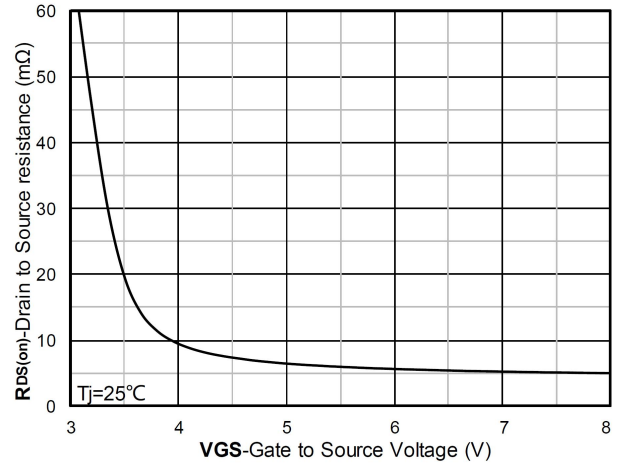
Transfer Characteristics



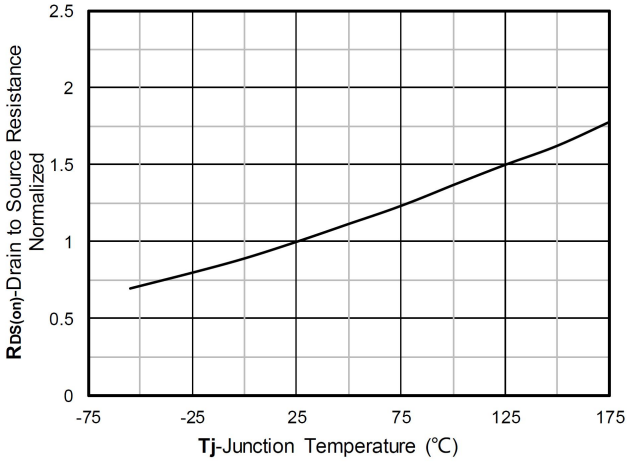
Capacitance Characteristics



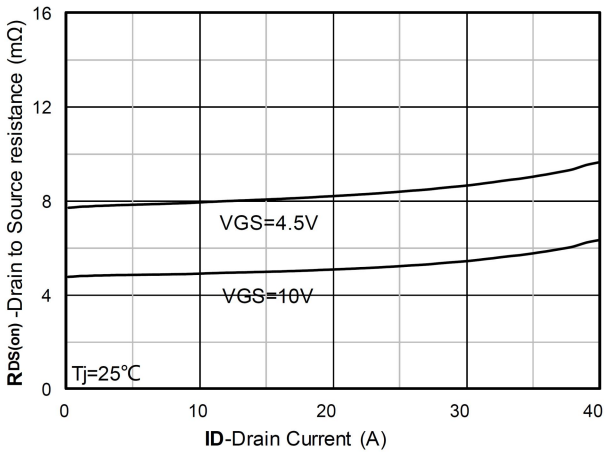
Gate Charge



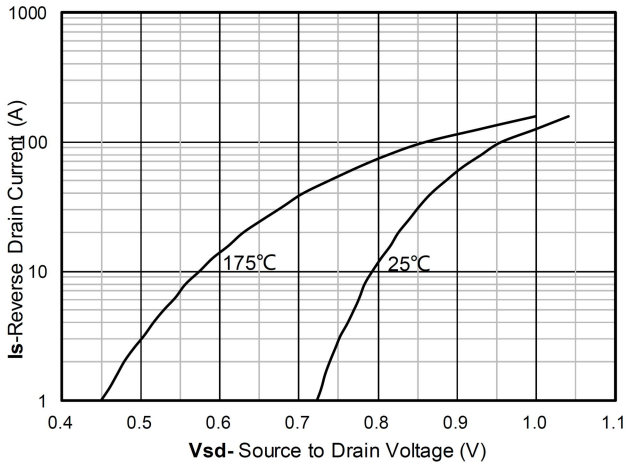
On-Resistance vs Gate to Source Voltage



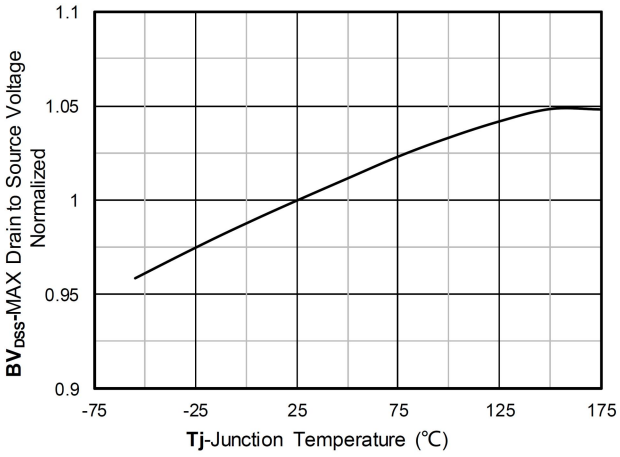
Normalized On-Resistance



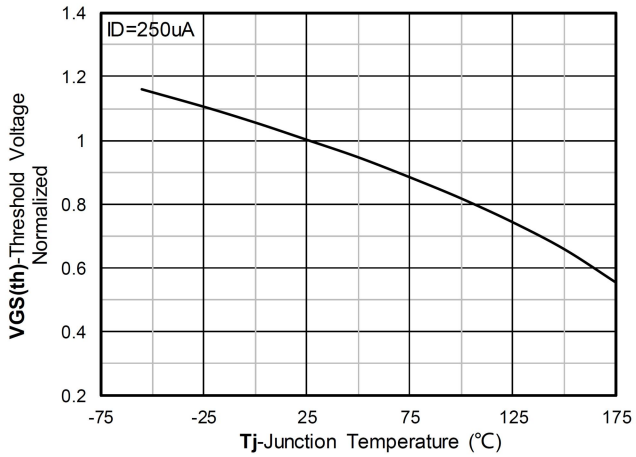
RDS(on) VS Drain Current



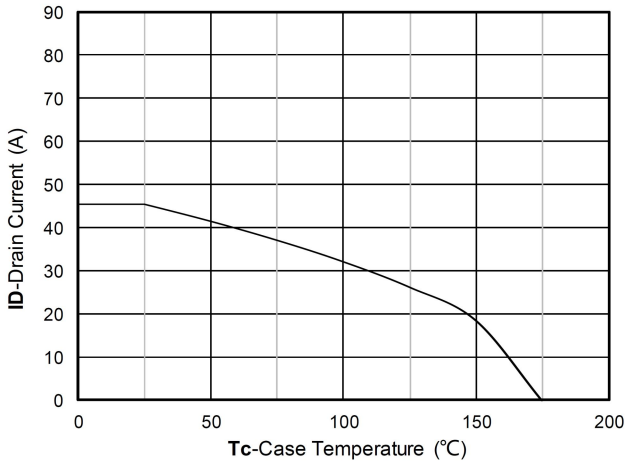
Forward characteristics of reverse diode



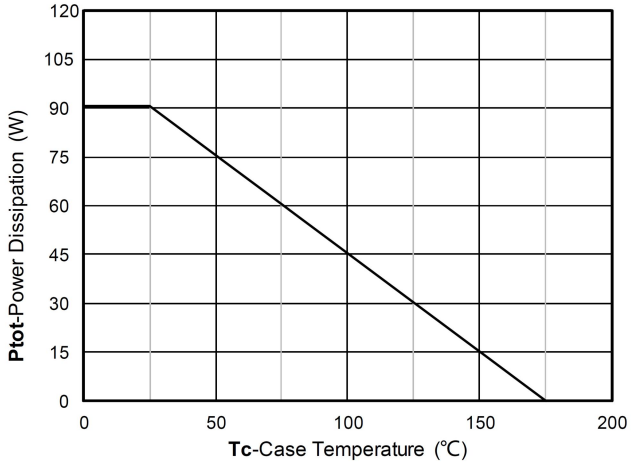
Normalized breakdown voltage



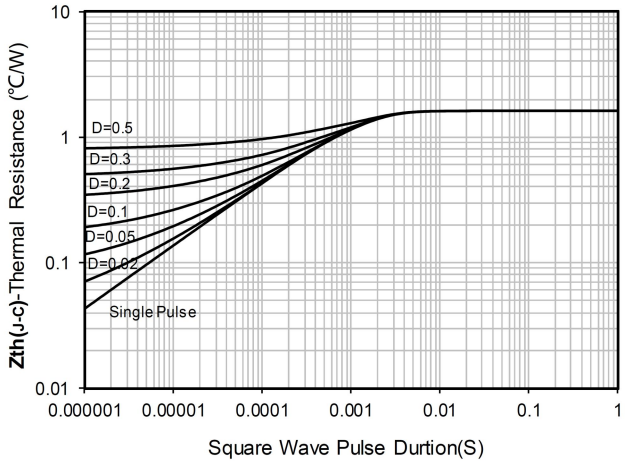
Normalized Threshold voltage



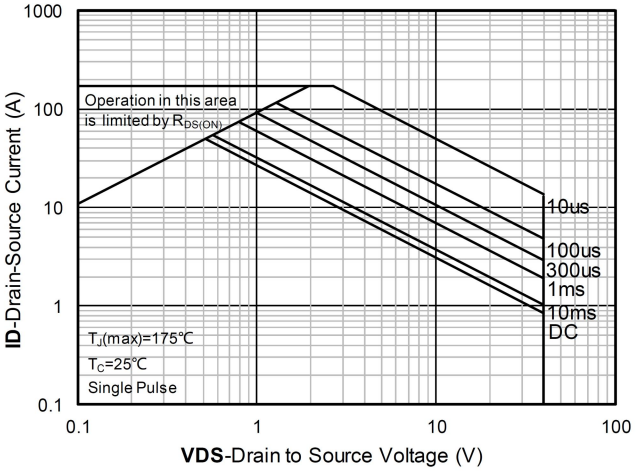
Current dissipation



Power dissipation

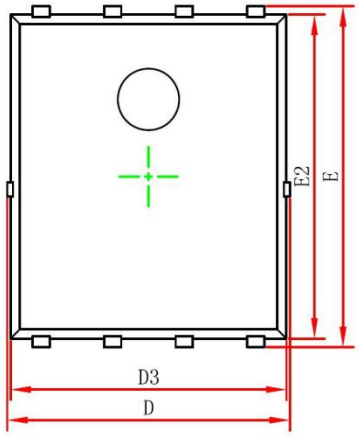


Maximum Transient Thermal Impedance

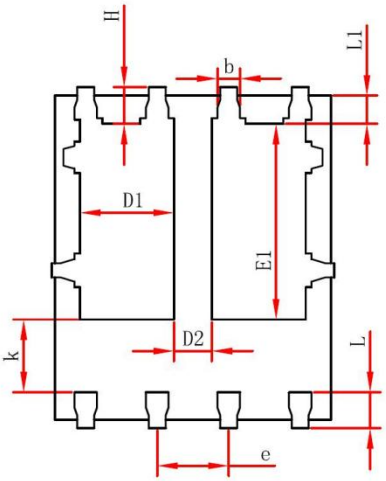


Safe Operation Area

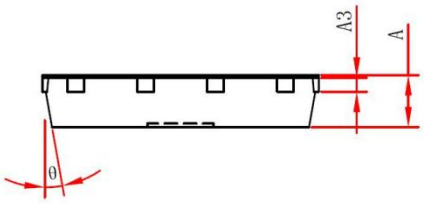
PDFN5X6-8L Package Information



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	0.254 REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	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°