

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	13mΩ@-4.5V	-13A
	16mΩ@-2.5V	



合肥矽普半导体

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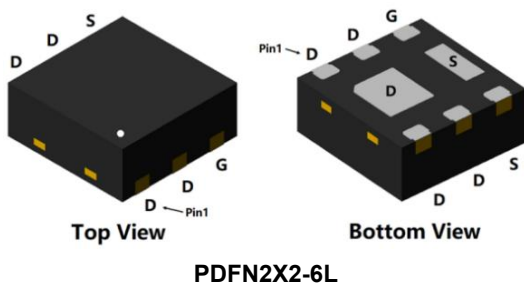
Feature

- Low On-Resistance
- Low Input Capacitance

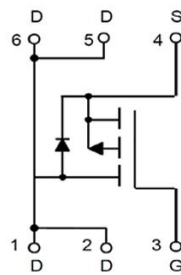
Application

- Power Management Functions
- DC-DC Converters

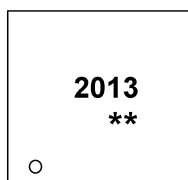
Package



Circuit diagram



Marking



2013
**

:Device Code
:Week Code

Order Information

Device	Package	Unit/Tape
SP2013NQ	PDFN2X2-6L	3000

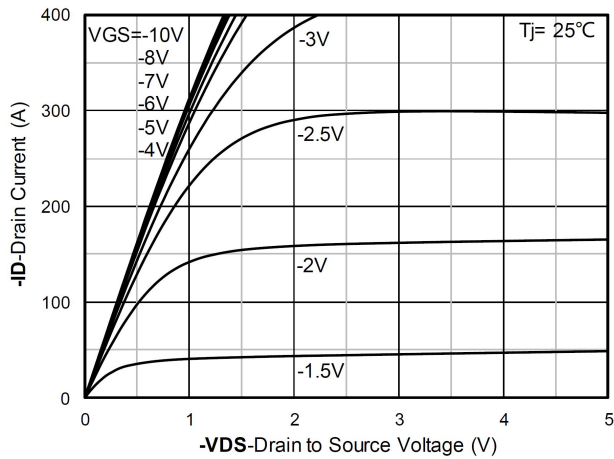
Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-13	A
Pulsed Drain Current	I_{DM}	-52	A
Power Dissipation	P_D	3	W
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	41	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature Range	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature Range	T_J	-55 ~ +150	$^{\circ}\text{C}$

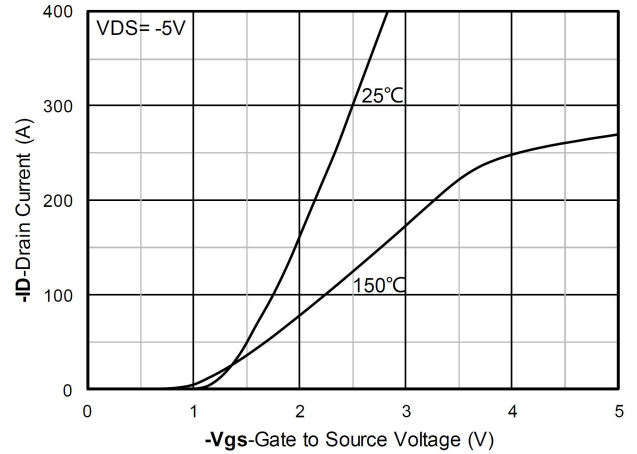
Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250uA	-20	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-16V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±12V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =-250uA	-0.4	-0.7	-1.0	V
Static Drain-Source On-Resistance	RDS(on)	VGS =-4.5V, ID =-5A	-	13	17	mΩ
		VGS =-2.5V, ID =-4A	-	16	22	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-6V , VGS=0V , f=1MHz	-	1515	-	pF
Output Capacitance	Coss		-	204	-	
Reverse Transfer Capacitance	Crss		-	174	-	
Total Gate Charge	Qg	VDS=-6V , VGS=-4.5V , ID=-5A	-	14	-	nC
Gate-Source Charge	Qgs		-	2.3	-	
Gate-Drain Charge	Qgd		-	3.6	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=-6V VGS=-4.5V , RG=1Ω, ID=-4A	-	26	-	nS
Rise Time	Tr		-	24	-	
Turn-Off Delay Time	Td(off)		-	45	-	
Fall Time	Tf		-	20	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V

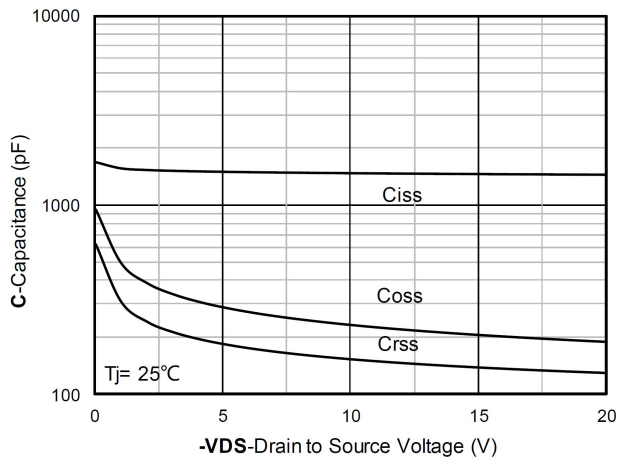
Typical Characteristics



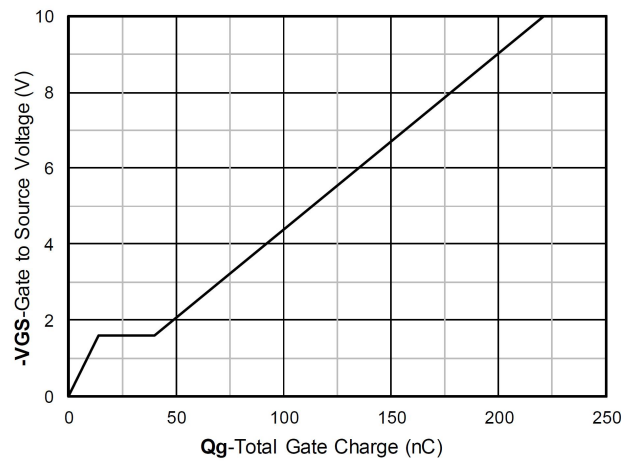
Output Characteristics



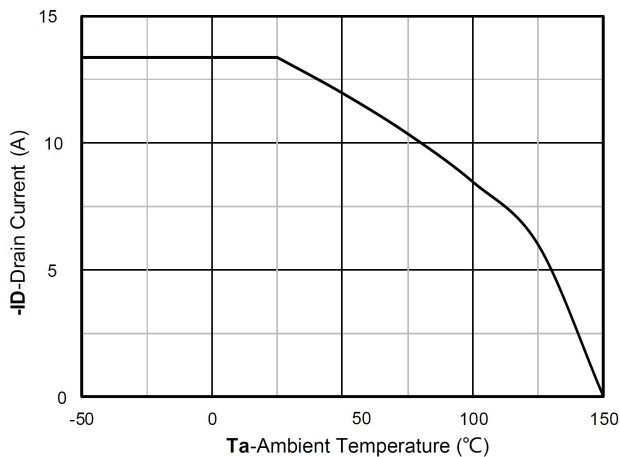
Transfer Characteristics



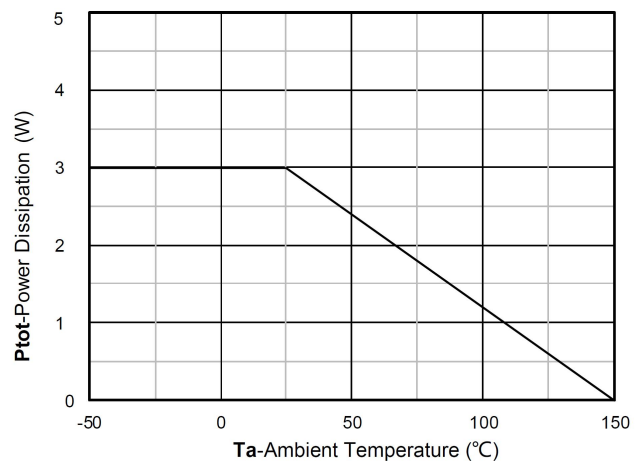
Capacitance Characteristics



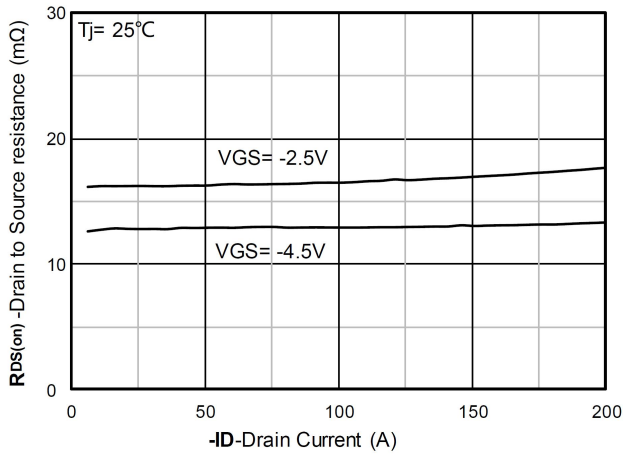
Gate Charge



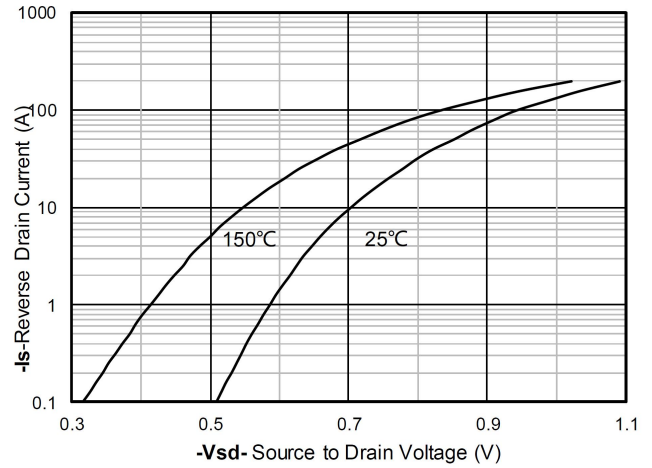
Current dissipation



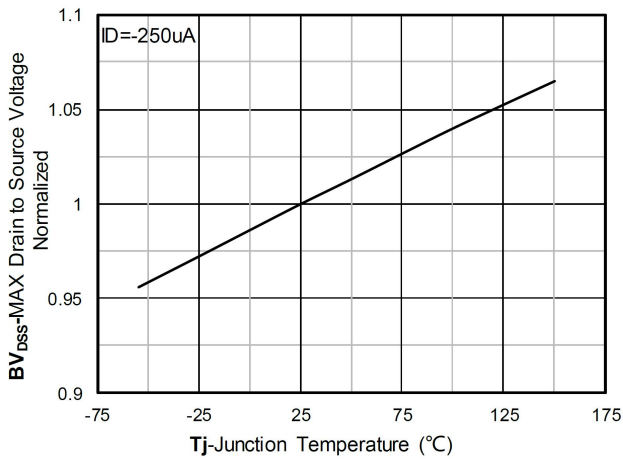
Power dissipation



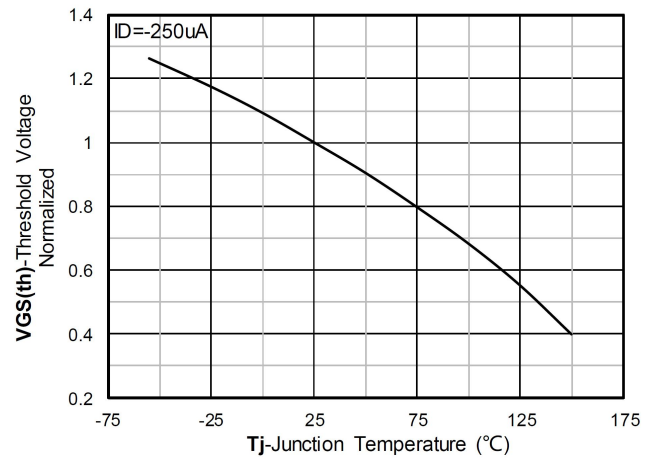
$R_{DS(on)}$ VS Drain Current



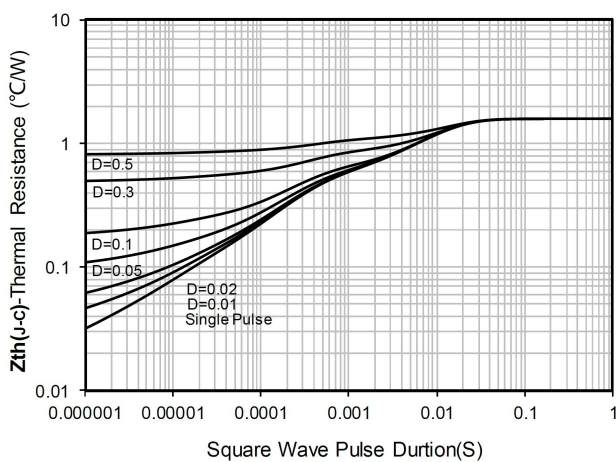
Forward characteristics of reverse diode



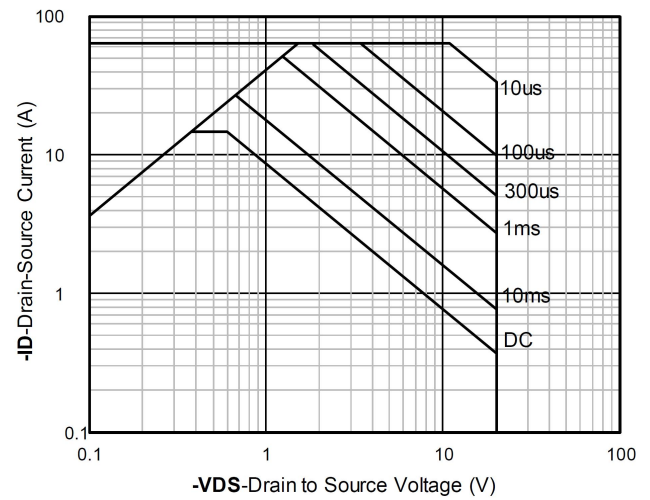
Normalized breakdown voltage



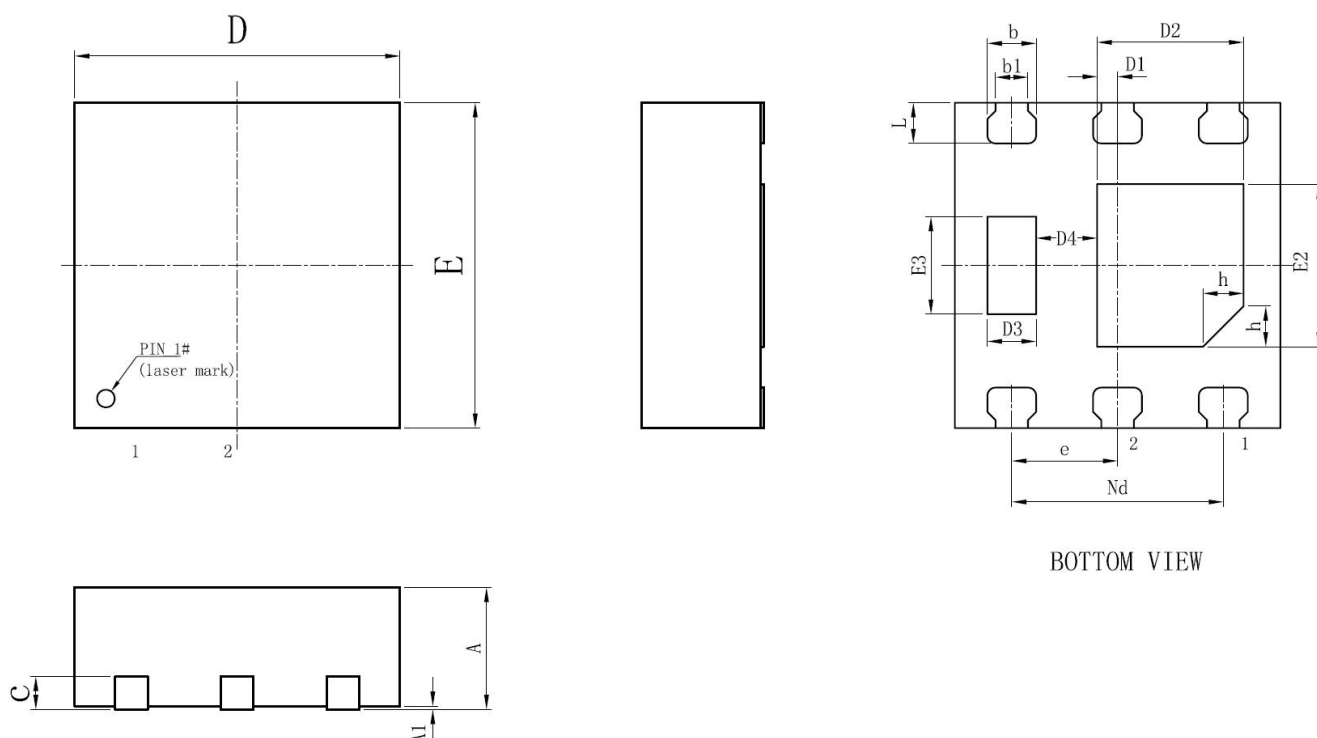
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

PDFN2X2-6L Package Information


BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.70	0.75	0.80
A1		0.02	0.05
b	0.25	0.30	0.35
b1	0.20REF		
c	0.203REF		
D	1.90	2.00	2.10
D1	0.08	0.125	0.18
D2	0.85	0.90	0.95
D3	0.25	0.30	0.35
D4	0.33	0.375	0.43
e	0.65BSC		
Nd	1.30BSC		
E	1.90	2.00	2.10
E2	0.95	1.00	1.05
E3	0.55	0.60	0.65
L	0.20	0.25	0.30
h	0.25REF		