

Product Summary

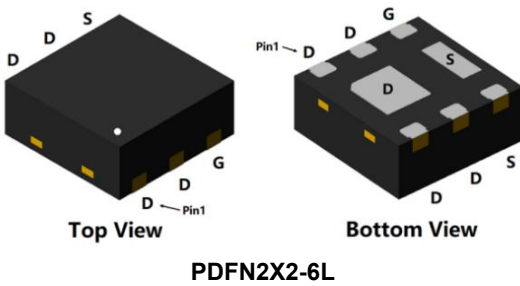
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	12mΩ@10V	10A
	16mΩ@4.5V	



Feature

- Low On-Resistance
- Low Input Capacitance

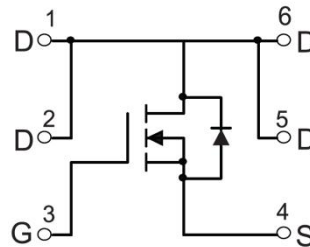
Package



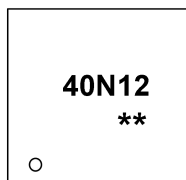
Application

- Power Management Functions
- DC-DC Converters

Circuit diagram



Marking



40N12 :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP40N12NQ	PDFN2X2-6L	3000

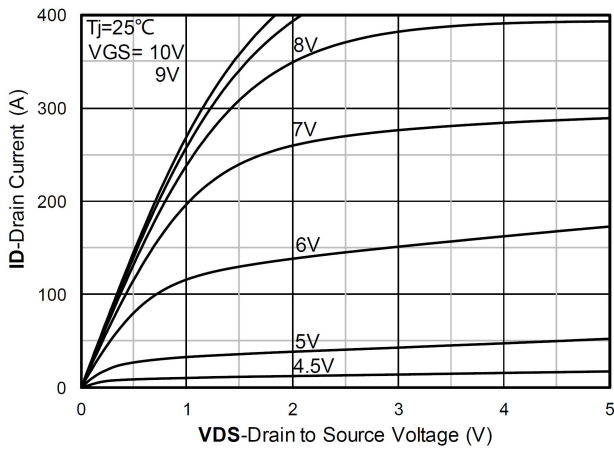
Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	10	A
Pulsed Drain Current	I_{DM}	40	A
Power Dissipation	P_D	2.4	W
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	52	$^{\circ}C/W$
Operating Junction Temperature Range	T_{STG}	-55 ~ +150	$^{\circ}C$
Storage Temperature Range	T_J	-55 ~ +150	$^{\circ}C$

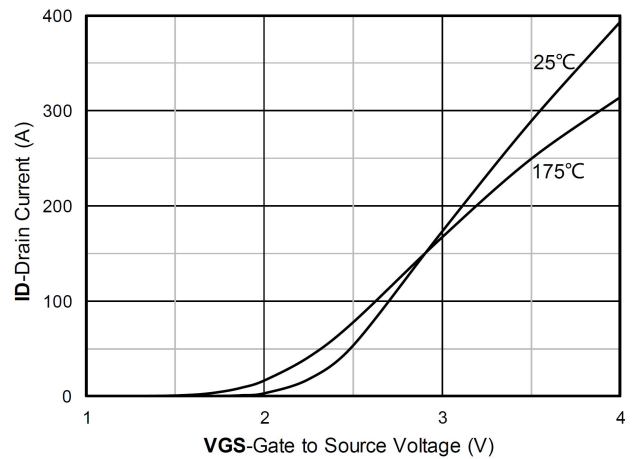
Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V, T_J=25^{\circ}C$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8A$	-	12	15	m Ω
		$V_{GS}=4.5V, I_D=4A$	-	16	22	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	-	1013	-	pF
Output Capacitance	C_{oss}		-	109	-	
Reverse Transfer Capacitance	C_{rss}		-	96	-	
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=4.5V, I_D=8A$	-	22.9	-	nC
Gate-Source Charge	Q_{gs}		-	3.5	-	
Gate-Drain Charge	Q_{gd}		-	5.3	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=15V, V_{GS}=10V, R_G=1.5\Omega, I_D=8A$	-	5.5	-	nS
Rise Time	T_r		-	14	-	
Turn-Off Delay Time	$T_{d(off)}$		-	24	-	
Fall Time	T_f		-	12	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}C$	-	-	1.2	V

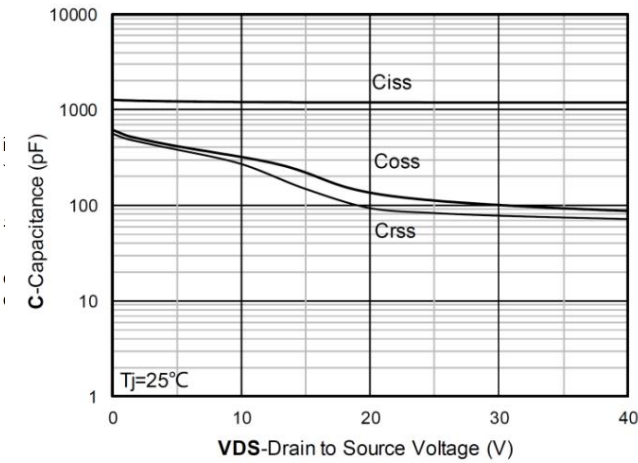
Typical Characteristics



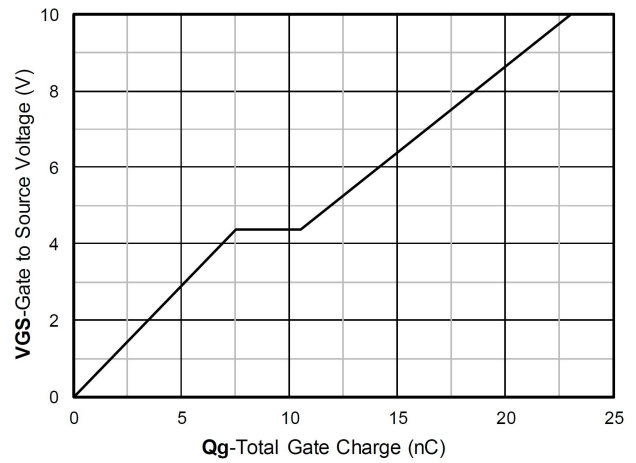
Output Characteristics



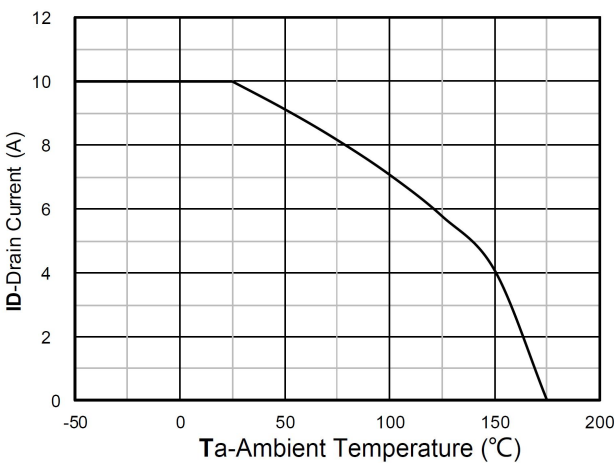
Transfer Characteristics



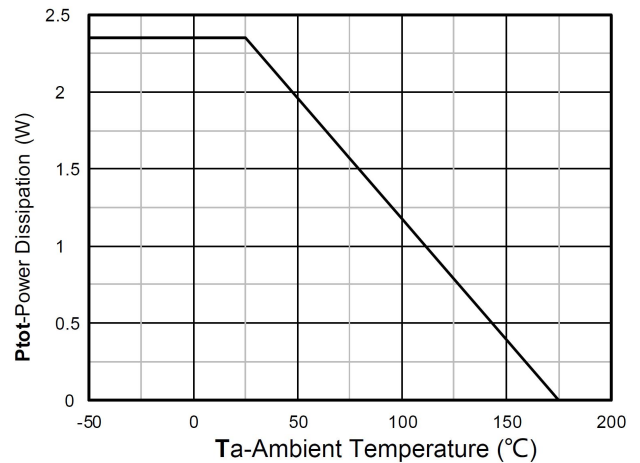
Capacitance Characteristics



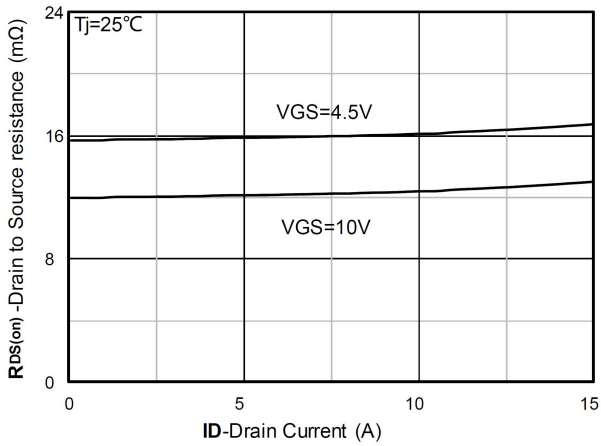
Gate Charge



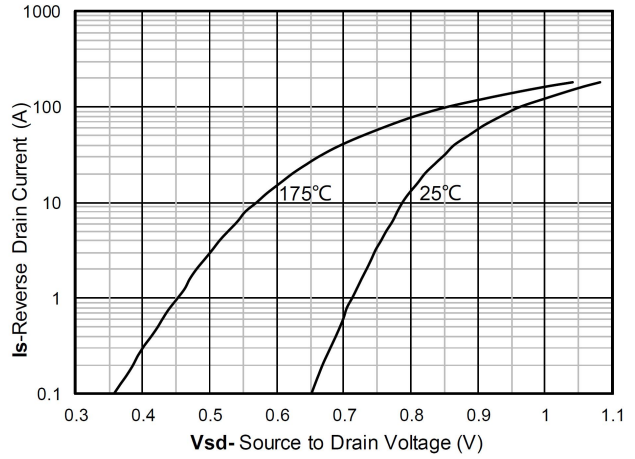
Current dissipation



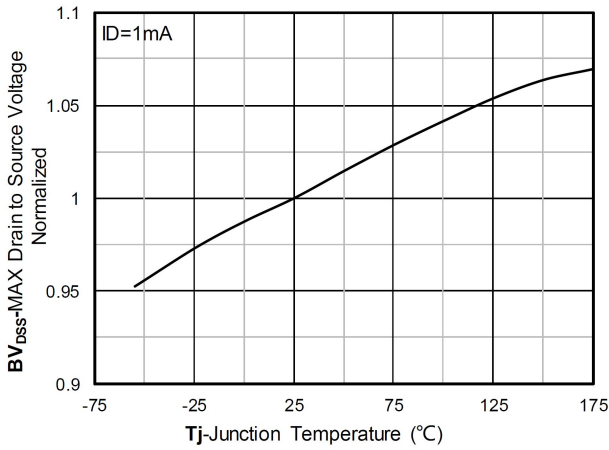
Power dissipation



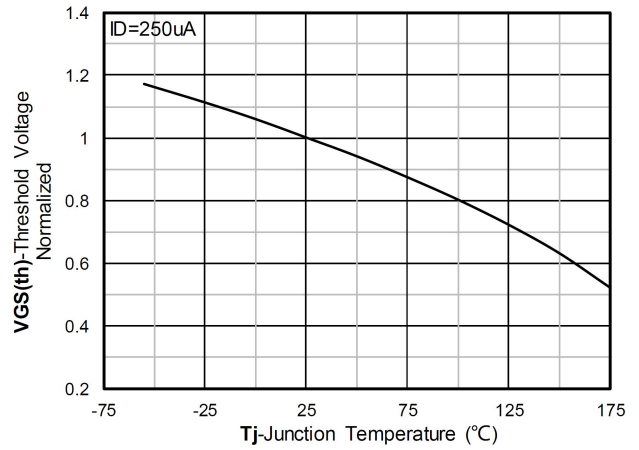
RDS(on) VS Drain Current



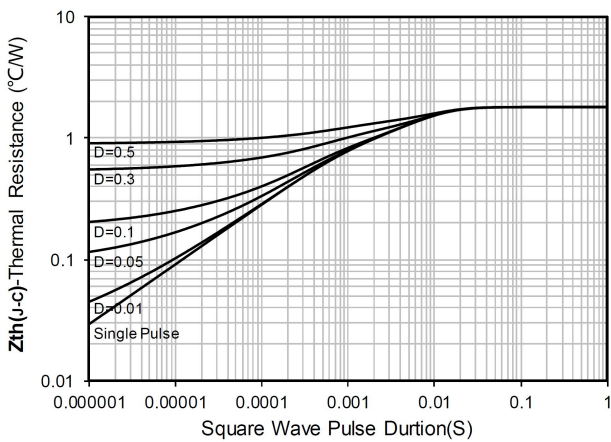
Forward characteristics of reverse diode



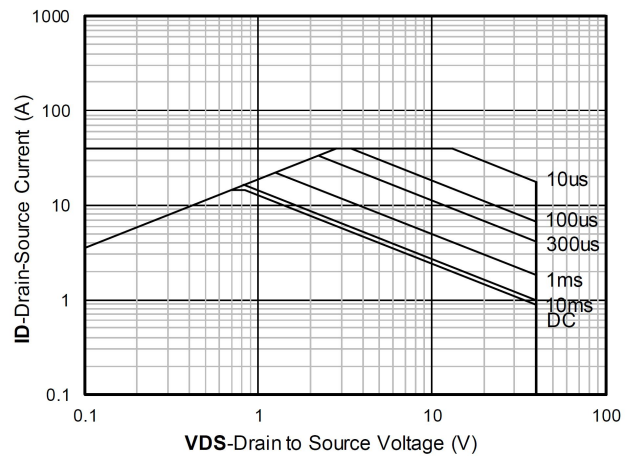
Normalized breakdown voltage



Normalized Threshold voltage

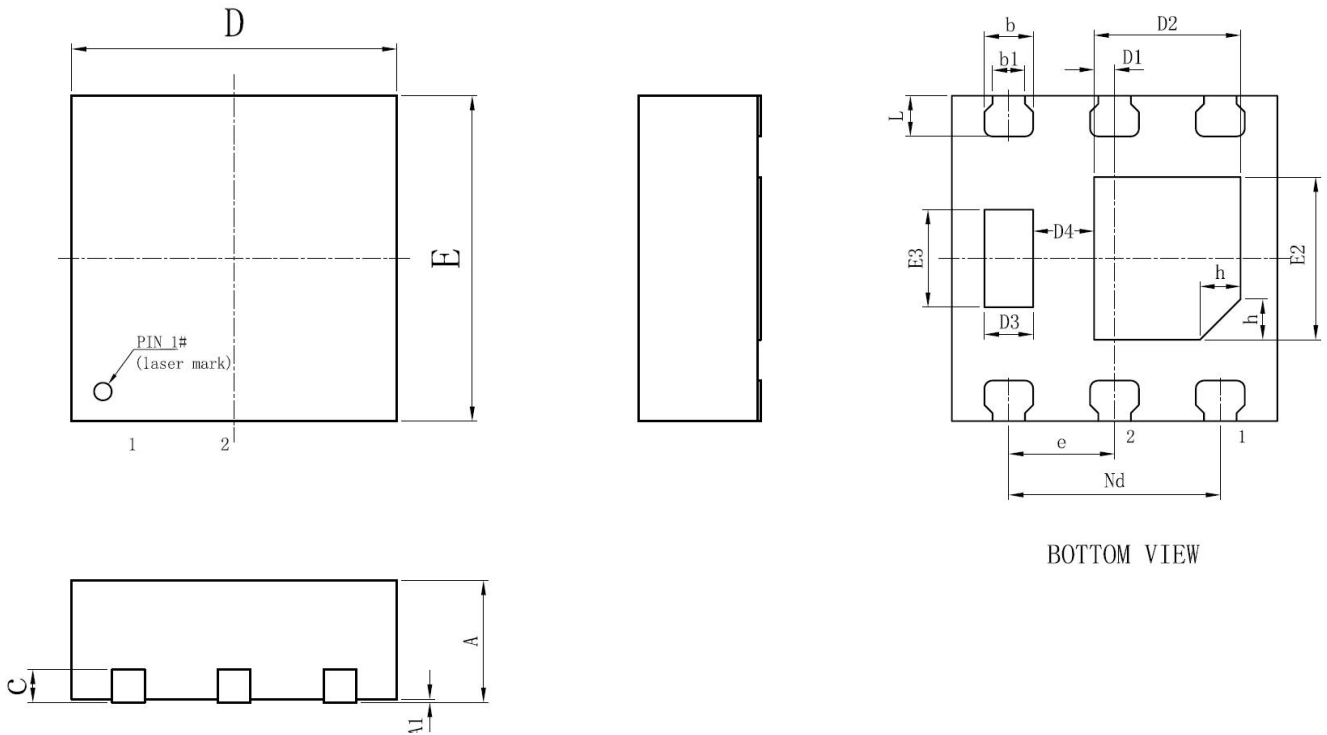


Maximum Transient Thermal Impedance



Safe Operation Area

PDFN2X2-6L Package Information



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	