

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	130mΩ@-4.5V	-1.6A
	180mΩ@-2.5V	



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Feature

- High power and current handing capability
- Surface mount package

Application

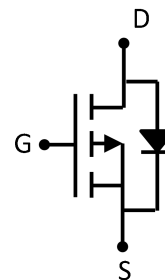
- Battery Switch
- DC/DC Converter

Package

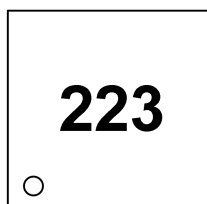


PDFN1212-3L

Circuit diagram



Marking



223

:Device Code

Order Information

Device	Package	Unit/Tape
SP2231ND	PDFN1212-3L	5000

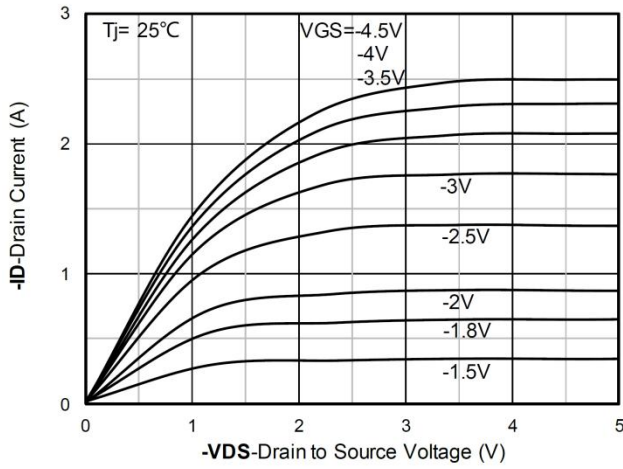
Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	-1.6	A
Pulse Drain Current Tested	I_{DM}	-6.4	A
Power Dissipation	P_D	1.4	W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	89.3	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

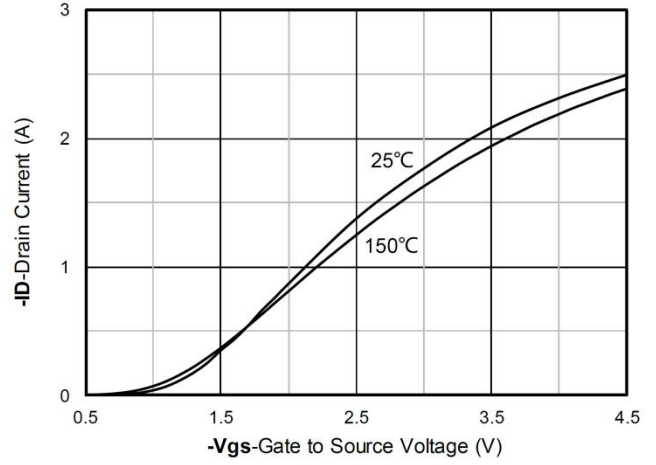
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250μA	-20	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-16V , VGS=0V	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±12V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VDS=VGS , ID=-250μA	-0.4	-0.65	-1.0	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-4.5V , ID=-1A	-	130	180	mΩ
		VGS=-2.5V , ID=-500mA	-	180	270	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-10V , VGS=0V , f=1MHz	-	270	-	pF
Output Capacitance	Coss		-	55	-	
Reverse Transfer Capacitance	Crss		-	30	-	
Total Gate Charge	Qg	VDS=-10V , VGS=-4.5V , ID=-2A	-	2.7	-	nC
Gate-Source Charge	Qgs		-	0.46	-	
Gate-Drain Charge	Qgd		-	0.7	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=-10V VGS=-4.5V , RG=3Ω , RL=5Ω	-	10	-	nS
Turn-On Rise Time	tr		-	5	-	
Turn-Off Delay Time	td(off)		-	21	-	
Turn-Off Fall Time	tf		-	7	-	
Source-Drain Diode characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V

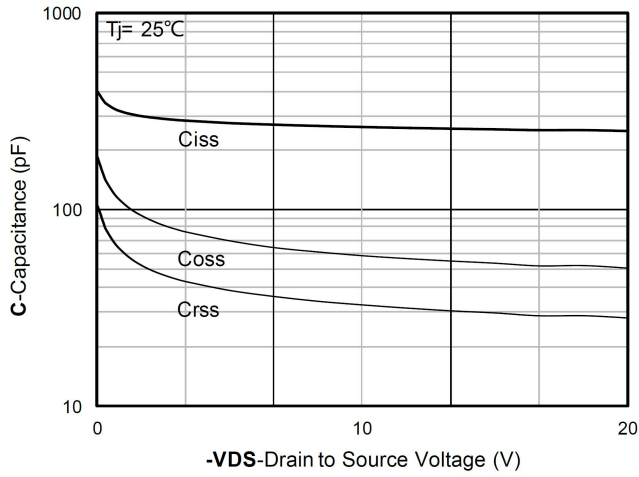
Typical Characteristics



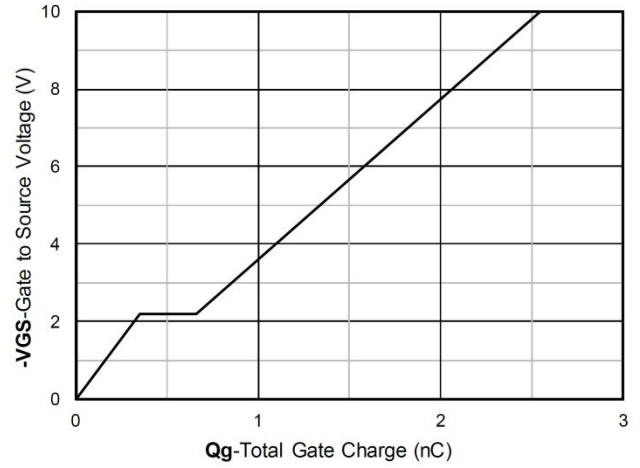
Output Characteristics



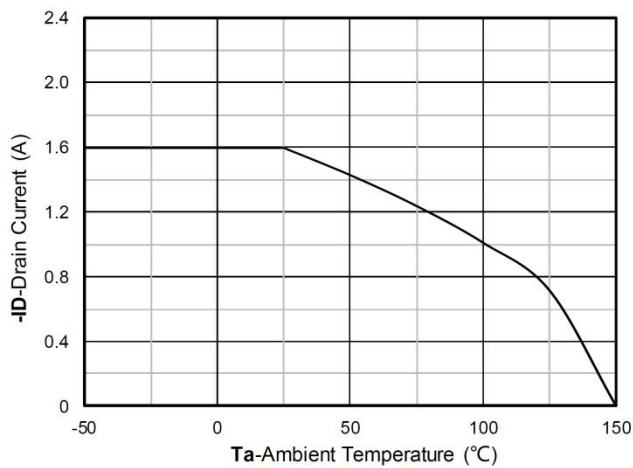
Transfer Characteristics



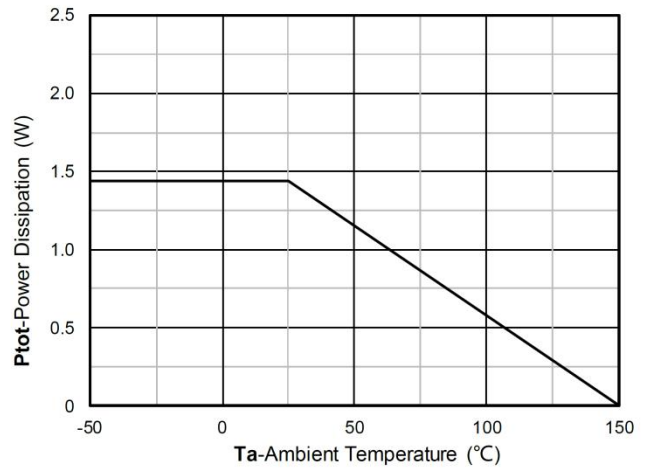
Capacitance Characteristics



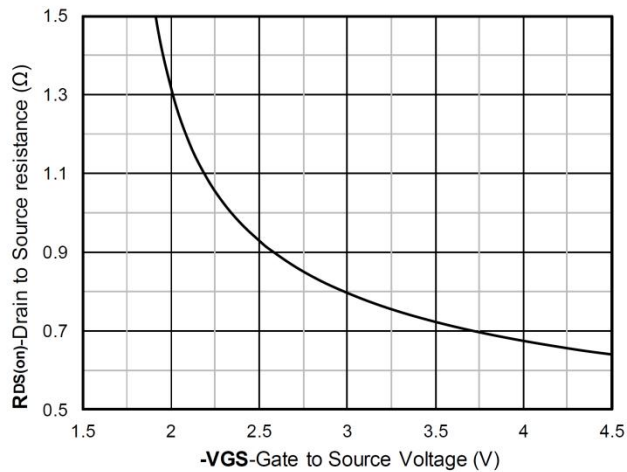
Gate Charge



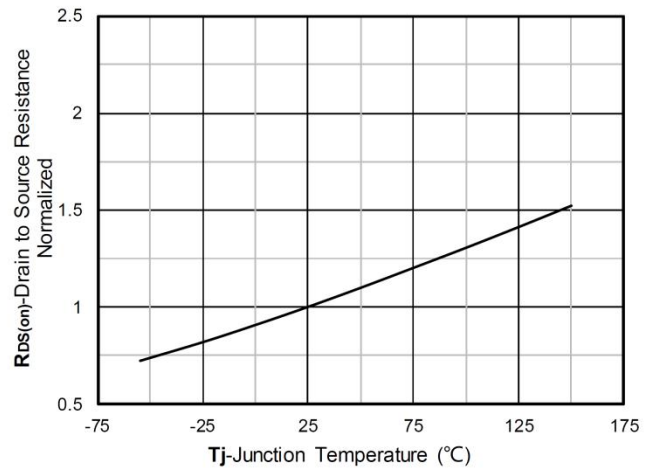
Current dissipation



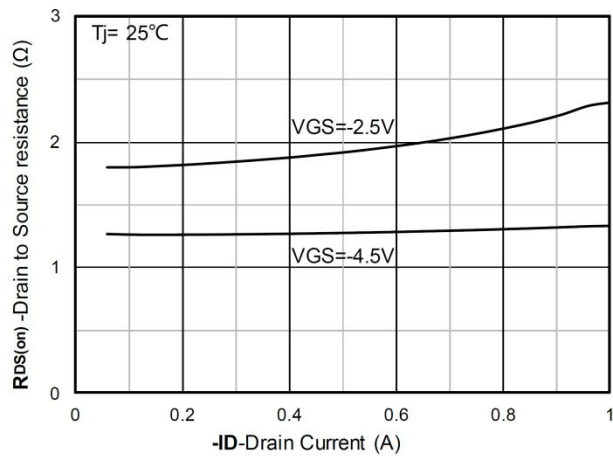
Power dissipation



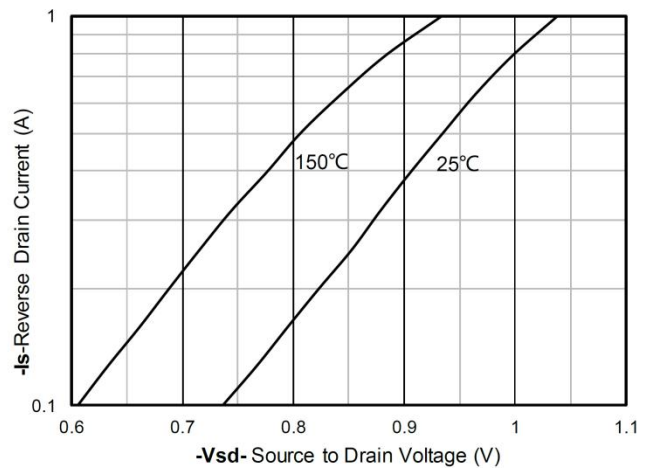
On-Resistance vs Gate to Source Voltage



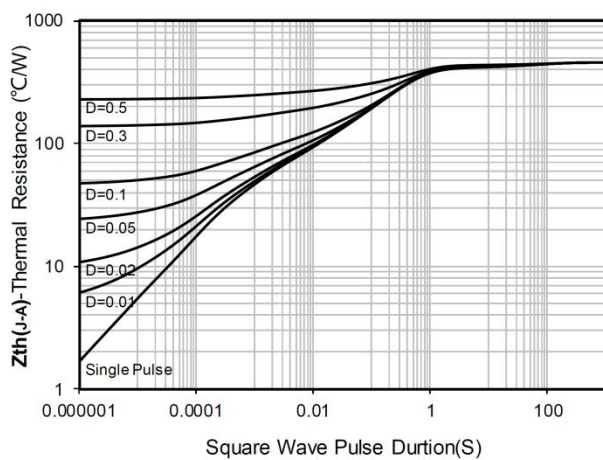
Normalized On-Resistance



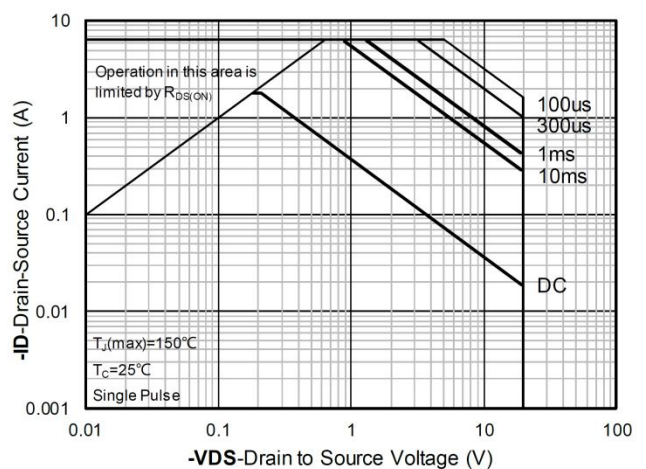
RDS(on) VS Drain Current



Forward characteristics of reverse diode

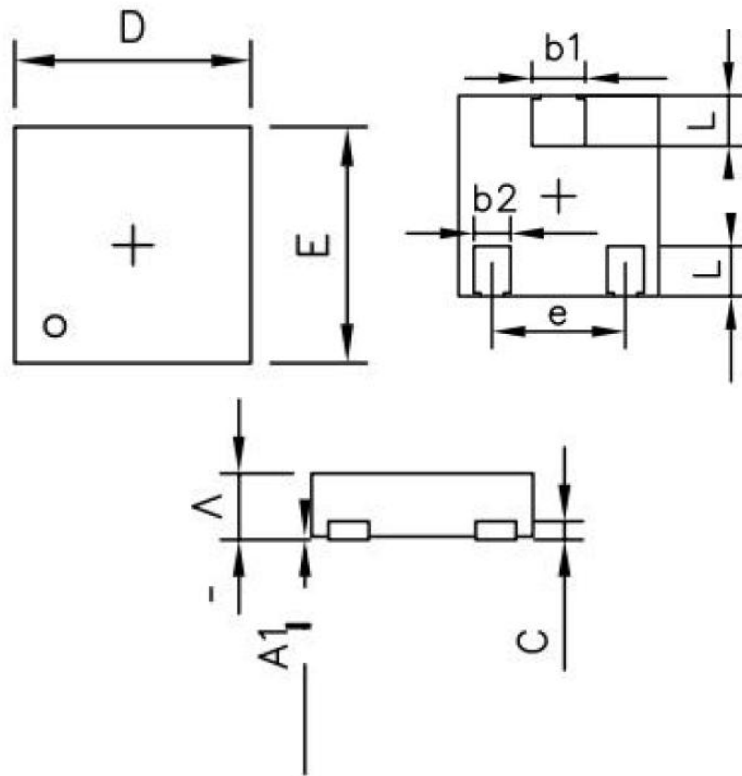


Maximum Transient Thermal Impedance



Safe Operation Area

PDFN1212-3L Package Information



PDFN1212-3L POD				
Symbol	Dimension	Min(mm)	TYP(mm)	Max (mm)
A		0.45	0.50	0.55
A1		0.00	0.03	0.05
C		0.152		
b1		0.27	0.32	0.37
L		0.25	0.30	0.35
D		1.15	1.20	1.25
e		0.80		
E		1.15	1.20	1.25
b2		0.17	0.22	0.27

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