20V N-Channel Enhancement Mode MOSFET

Description

The XPX2N1U6RD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

V_{DS} =20V, I_D =120A

$R_{DS(ON)}$=1.6mΩ (typ) @ V_{GS}=4.5V

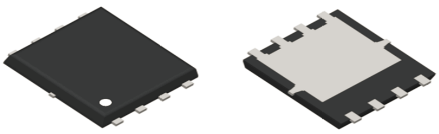
$R_{DS(ON)}$=1.9mΩ (typ) @ V_{GS}=2.5V

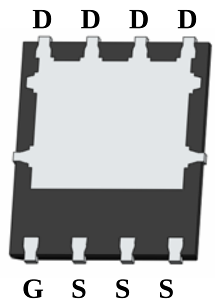
Application

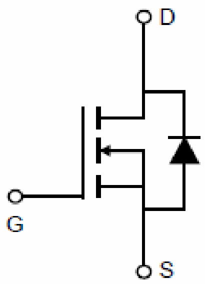
solar road lights

Load switch

Uninterruptible power supply







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
XPX2N1U6RD	PDFN5*6-8L	XPX2N1U6RD XXX YYYY	5000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current[1]	120	A
I_D@T_C=100℃	Continuous Drain Current[1]	58	A
IDM	Pulsed Drain Current[2]	280	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
IAS	Avalanche Current	40	A
P_D@T_C=25℃	Total Power Dissipation[4]	86	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-ambient [1](t≦10S)	20	℃/W
$R_{\theta}JA$	Thermal Resistance Junction-ambient [1](Steady State)	55	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-case [1]	1.6	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	23	---	V
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.7	1.0	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	1.6	2.0	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A		1.9	2.5	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=2.5V , I_D=20A	---	2.8	3.8	mΩ
IDSS	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±10V , V_{DS}=0V	---	---	±10	uA
Rg	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	77	---	nC
Qgs	Gate-Source Charge		---	8.7	---	
Qgd	Gate-Drain Charge		---	14	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3□, I_D=20A	---	10.2	---	ns
T_r	Rise Time		---	11.7	---	
Td(off)	Turn-Off Delay Time		---	56.4	---	
T_f	Fall Time		---	16.2	---	
Ciss	Input Capacitance	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	4307	---	pF
Coss	Output Capacitance		---	501	---	
Crss	Reverse Transfer Capacitance		---	321	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	50	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
trr	Reverse Recovery Time	IF=20A , di/dt=100A/μs , T_J=25℃	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	72	---	nC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3、The EAS data shows Max. rating . The test condition is VDD=16V,VGS=10V,L=0.1mH,IAS=39A

4、The power dissipation is limited by 175℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

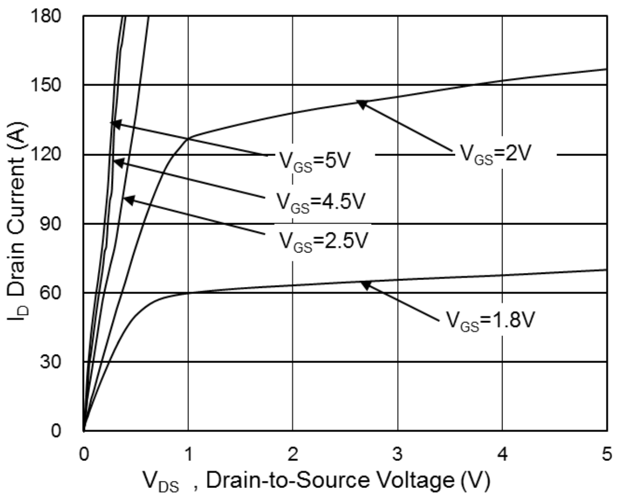


Fig.1 Typical Output Characteristics

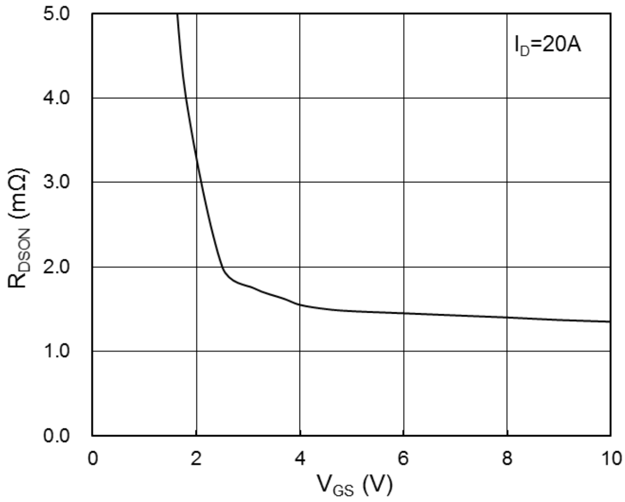


Fig.2 On-Resistance vs. Gate-Source Voltage

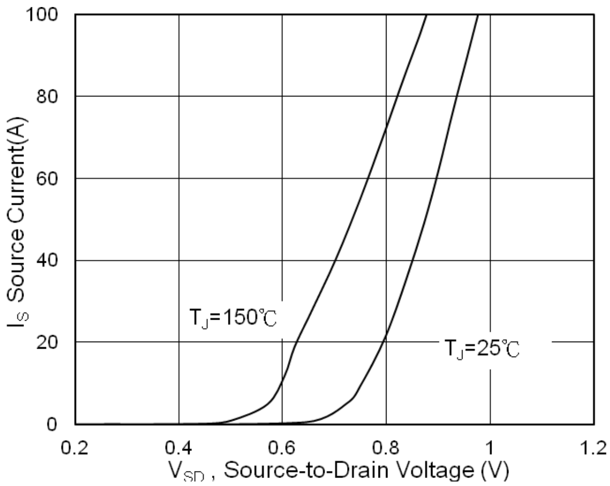


Fig.3 Forward Characteristics of Reverse

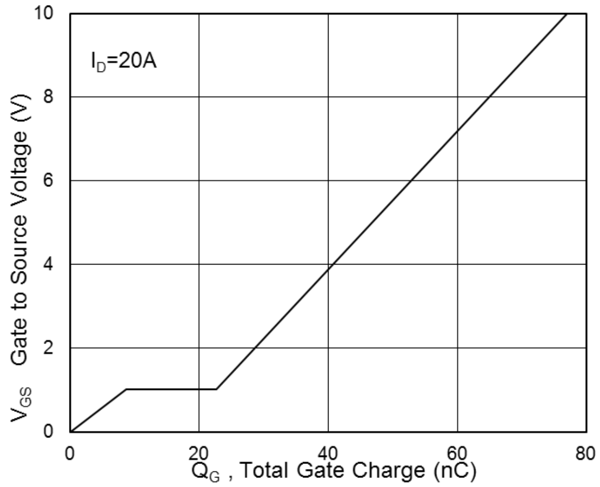


Fig.4 Gate-Charge Characteristics

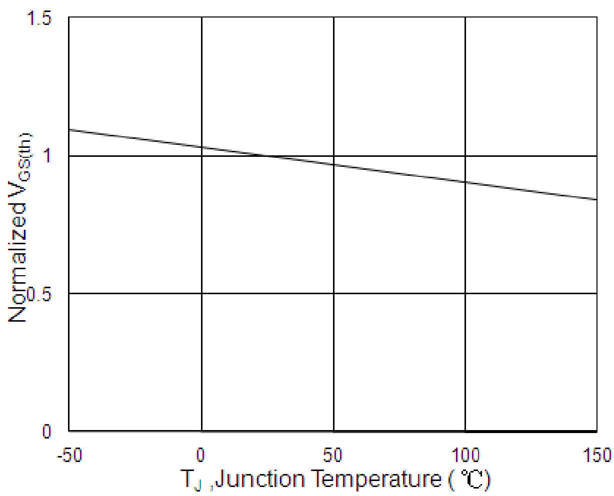


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

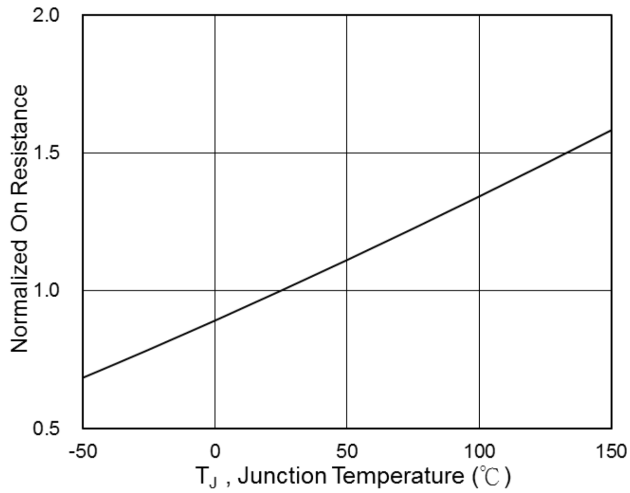


Fig.6 Normalized R_{DSON} vs. T_J

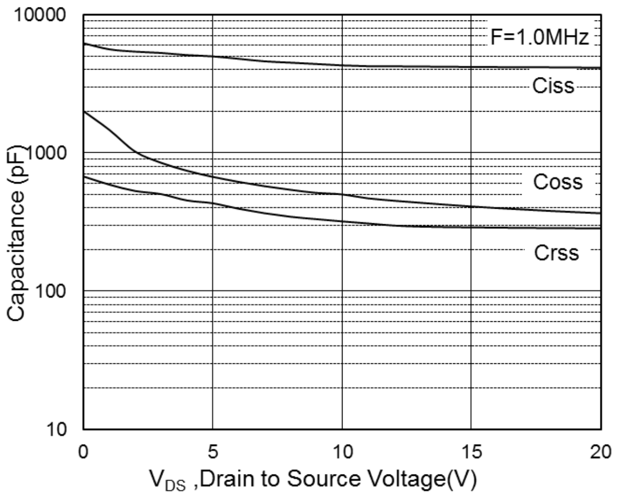


Fig.7 Capacitance

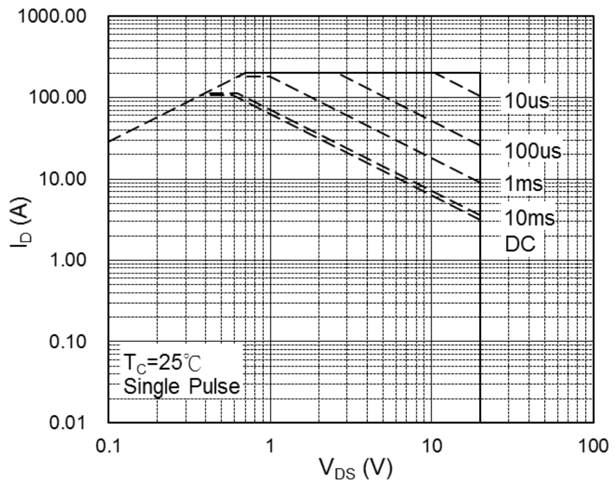


Fig.8 Safe Operating Area

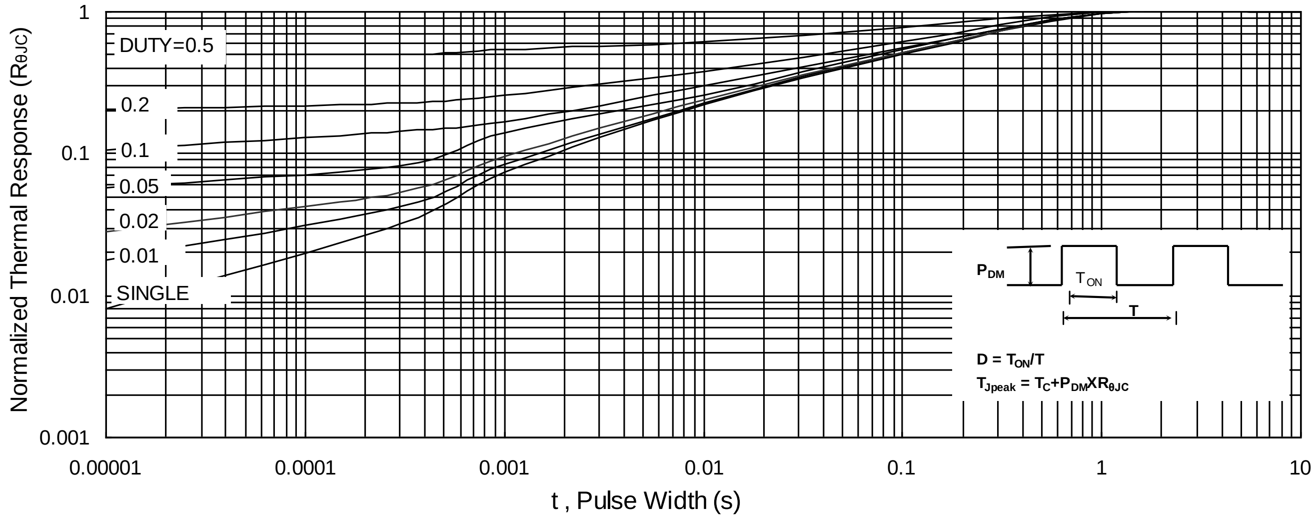


Fig.9 Normalized Maximum Transient Thermal Impedance

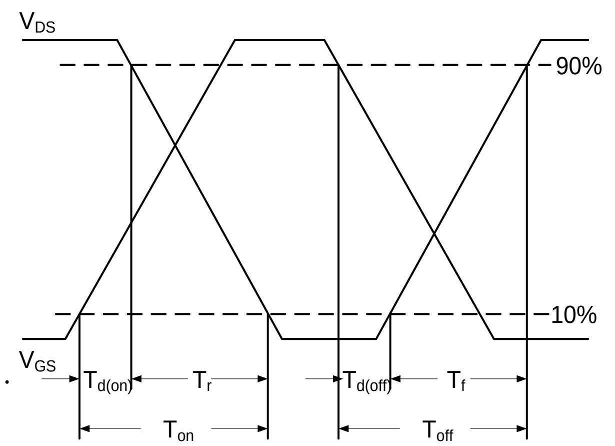


Fig.10 Switching Time Waveform

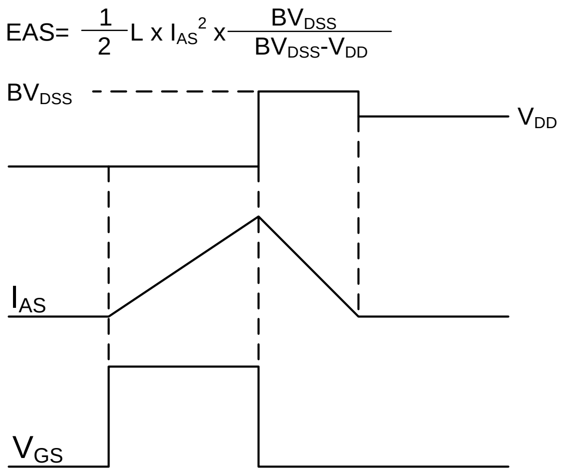
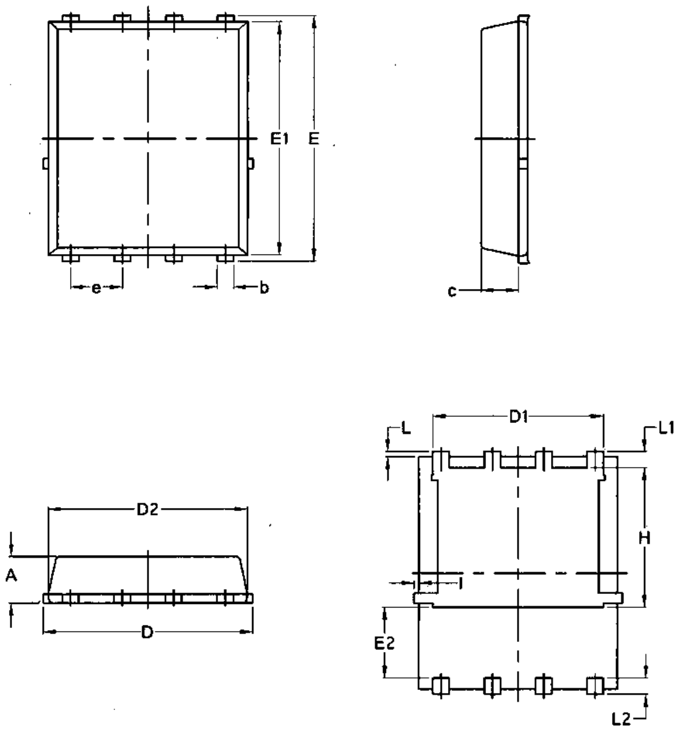


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-DFN5*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245℃±5℃	5sec±1sec
Pb-Free device	260℃+0/-5℃	5sec±1sec

This integrated circuit can be damaged by ESD UniverChip Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

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