20V Dual N-Channel Fast Switching MOSFET

RoHS COMPLIANT

Description

The XPX2002RD uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

V_{DS} =20V,I_D =46A

$R_{DS(ON)}$ =4.5mΩ @ V_{GS}=4.5V

$R_{DS(ON)}$ =6.0mΩ @ V_{GS}=2.5V

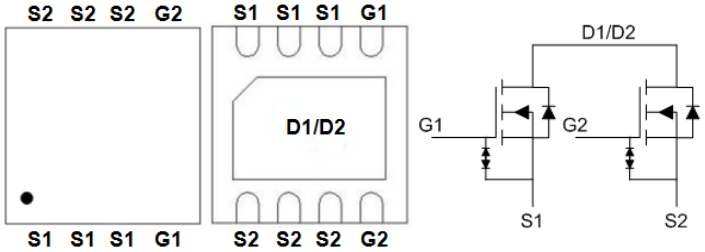
General Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Secondary side synchronous rectifier
- High side switch in POL DC/DC converter

- **Pin Configurations**



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
XPX2002RD	XPX2002RD	DFN 3x3-8	-	-	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	46	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	38	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	44	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	40	A
I_{DM}	Pulsed Drain Current[2]	96	A
EAS	Single Pulse Avalanche Energy[3]	26	mJ
I_{AS}	Avalanche Current	46	A
P_D@T_C=25℃	Total Power Dissipation[4]	17	W
P_D@T_A=25℃	Total Power Dissipation[4]	3.2	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	88	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	8.3	℃/W

- **Electrical Characteristics** @T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250μA	0.3	0.77	1	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±10V, V_{DS}=0V	--	--	±10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 3A	--	4.5	5.5	mΩ
	$R_{DS(on)}$	V_{GS} = 4.0V, I_D = 3A	--	4.9	6.0	mΩ
	$R_{DS(on)}$	V_{GS} = 3.8V, I_D = 3A	--	5.0	6.2	mΩ
	$R_{DS(on)}$	V_{GS} = 3.1V, I_D = 3A	--	5.4	6.5	mΩ
	$R_{DS(on)}$	V_{GS} = 2.5V, I_D = 3A	--	6.0	7.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}= 5V, I_D= 12A	--	60	--	S
Diode Forward Voltage	V_{SD}	I_{SD}= 1A , V_{GS}=0V	--	--	1.2	V
Diode Forward Current	I_S	T_C =25°C	--	--	23	A
Switching						
Total Gate Charge	Q_g	V_{DS}=16V,I_D=3A, V_{GS}=4.5V	--	13	--	nC
Gate-Source Charge	Q_{gs}		--	2.8	--	nC
Gate-Drain Charge	Q_{gd}		--	6.6	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=16V , I_D=3A V_{GEN}=4.5V, R_G=6Ω	--	28	--	ns
Turn-on Rise Time	t_r		--	56	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	103	--	ns
Turn-Off Fall Time	t_f		--	34	--	ns
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V, f=1.0MHz	--	1818	--	pF
Output Capacitance	C_{oss}		--	335	--	pF
Reverse Transfer Capacitance	C_{rss}		--	250	--	pF

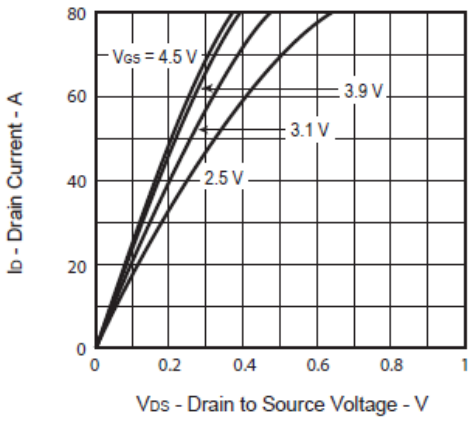
A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

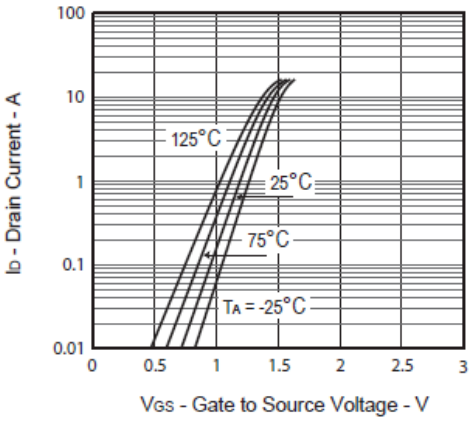
C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

- **Typical Performance Characteristics（(TJ = 25 °C, unless otherwise noted)）**

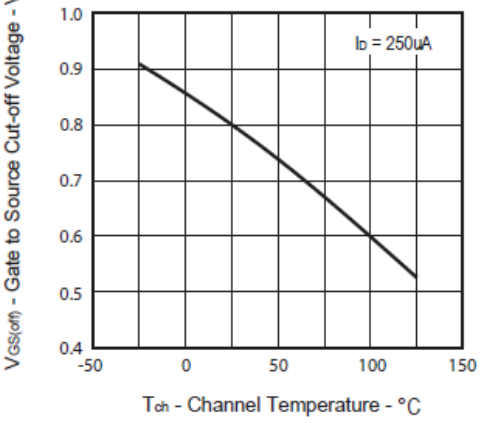
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



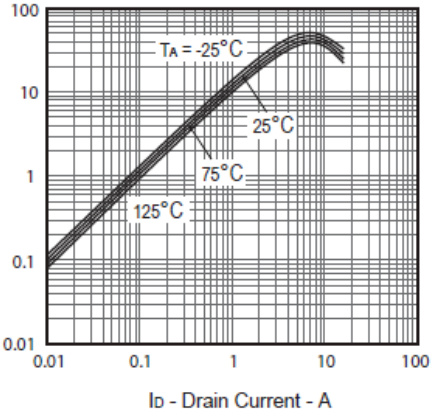
FORWARD TRANSFER CHARACTERISTICS



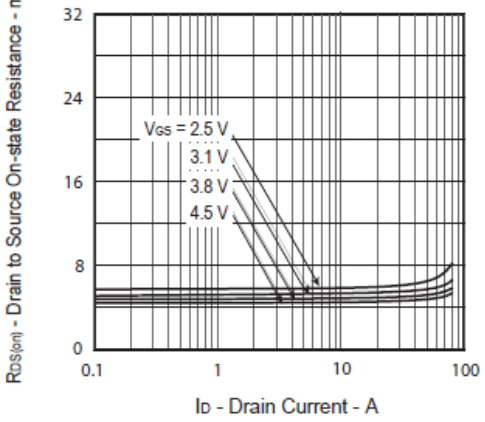
GATEBTO SOURE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



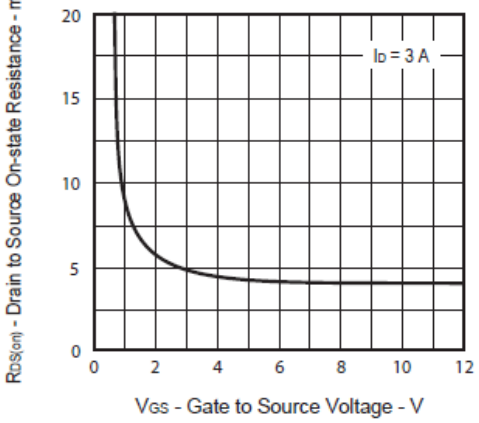
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



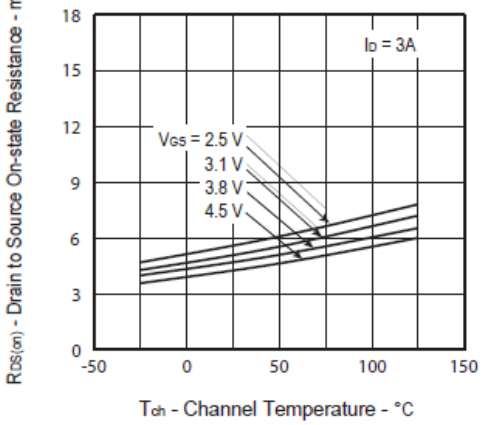
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



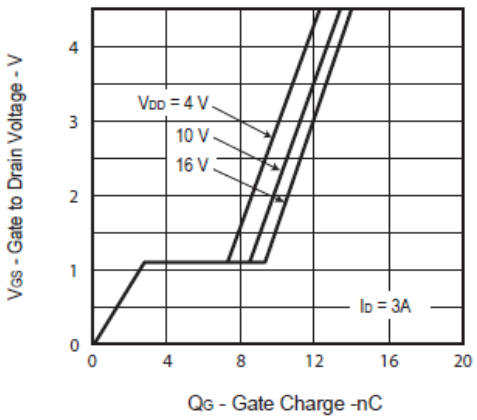
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



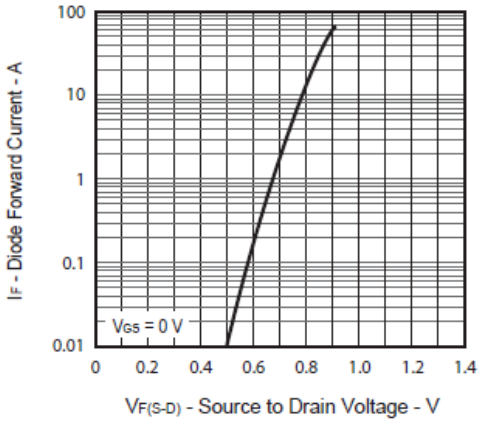
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



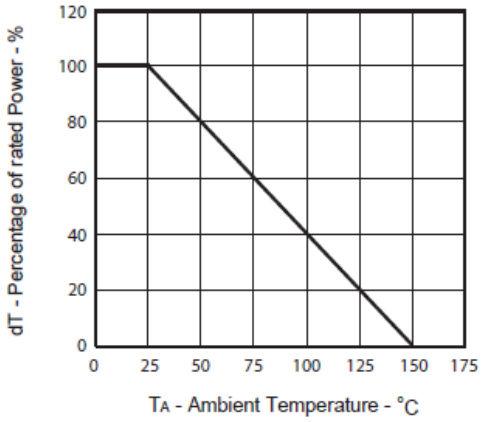
DYNAMIC INPUT CHARACTERISTICS



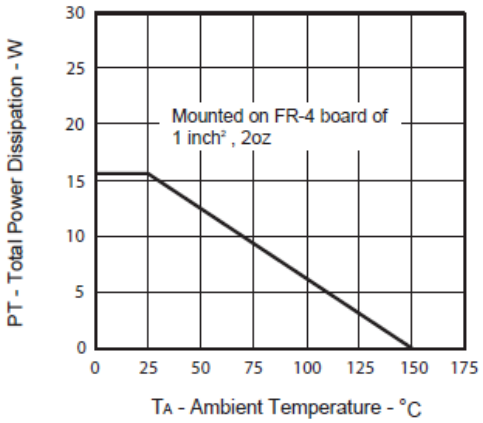
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



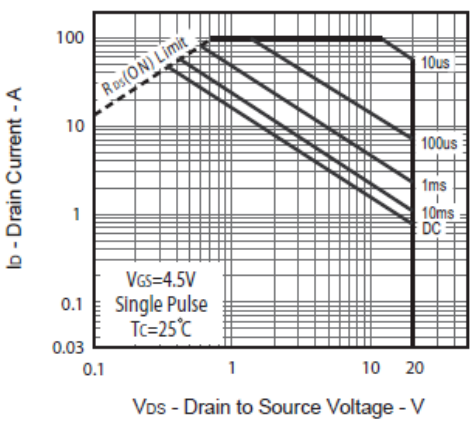
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA

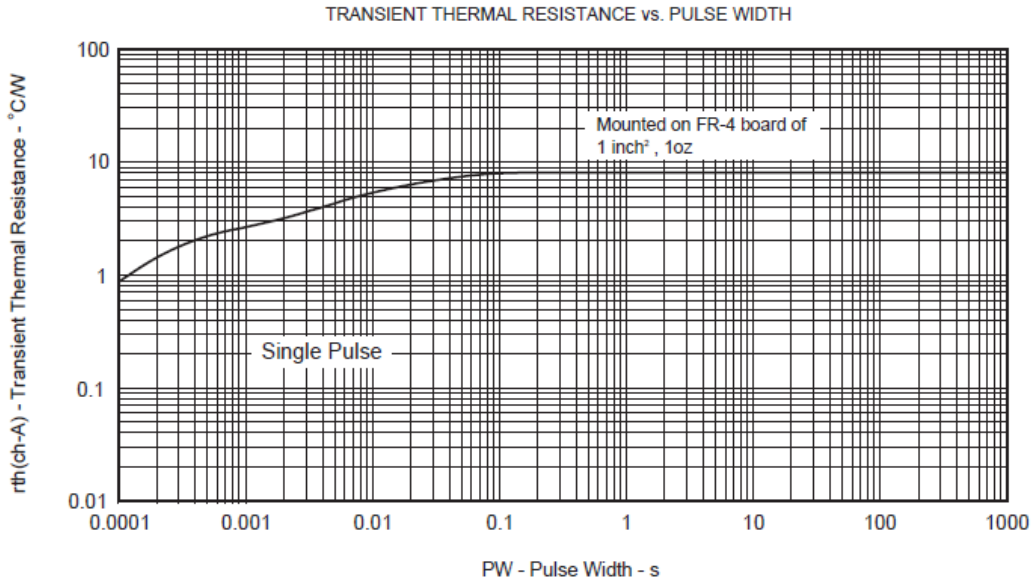


TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

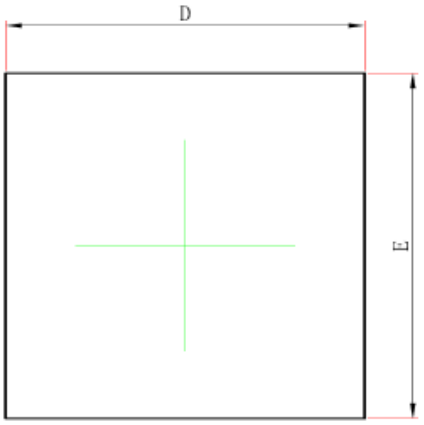


FORWARD BIAS SAFE OPERATING AREA

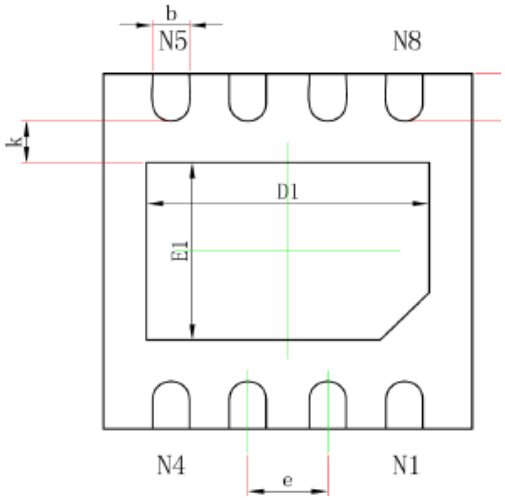


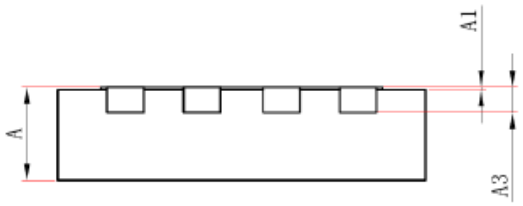

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH
rth(ch-A) - Transient Thermal Resistance - °C/W
100
10
1
0.1
0.01
Mounted on FR-4 board of
1 inch², 1oz
Single Pulse
0.0001
0.001
0.01
0.1
1
10
100
1000
PW - Pulse Width - s

- **Package Information**

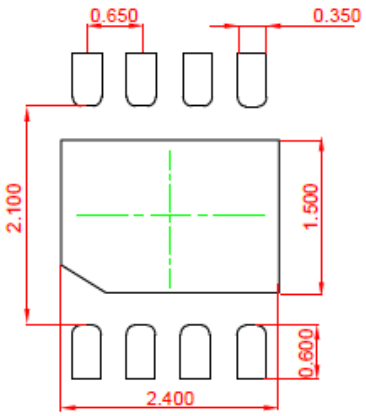


TOP VIEW





SIDE VIEW



BOTTOM VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	2.200	2.400	0.087	0.094
E1	1.400	1.600	0.055	0.063
b	0.250	0.350	0.010	0.014
k	0.200MIN		0.008MIN	
e	0.650TYP.		0.026TYP.	
L	0.324	0.476	0.013	0.019

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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