30V N-Channel Enhancement Mode Power MOSFET

RoHS COMPLIANT

Description

The XPX3N1U9RD 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} =30V,I_D =120A

$R_{DS(ON)}$=1.9mΩ (typ) @ V_{GS}=10V

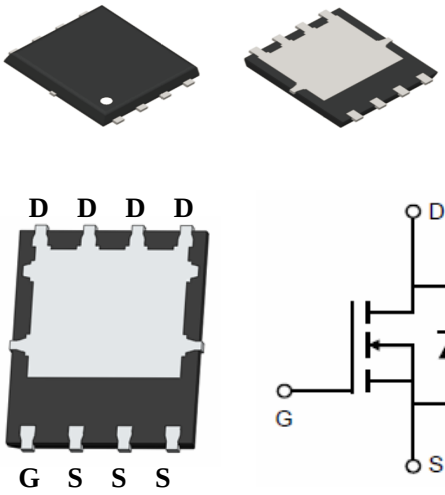
$R_{DS(ON)}$=2.2mΩ (typ) @ V_{GS}=4.5V

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

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
XPX3N1U9RD	XPX3N1U9RD	DFN5X6-8L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	120	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	85	A
Pulsed Drain Current	I_{DM}	420	A
Maximum Power Dissipation	P_D	75	W
Derating factor		0.65	W/℃
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	1.87	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	35	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.7	1.1	1.7	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	1.9	2.2	mΩ
		V_{GS}=4.5V, I_D=15A		2.2	2.9	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=20A	35	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	6869	-	PF
Output Capacitance	C_{oss}		-	974	-	PF
Reverse Transfer Capacitance	C_{rss}		-	740	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=15Ω V_{GS}=10V,R_G=2.5Ω	-	25	-	nS
Turn-on Rise Time	t_r		-	26	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	98	-	nS
Turn-Off Fall Time	t_f		-	40	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=20A, V_{GS}=10V	-	142		nC
Gate-Source Charge	Q_{gs}		-	21		nC
Gate-Drain Charge	Q_{gd}		-	33		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	110	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 20A di/dt = 100A/μs(Note3)	-	20	-	nS
Reverse Recovery Charge	Qrr		-	55	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics (Curves)

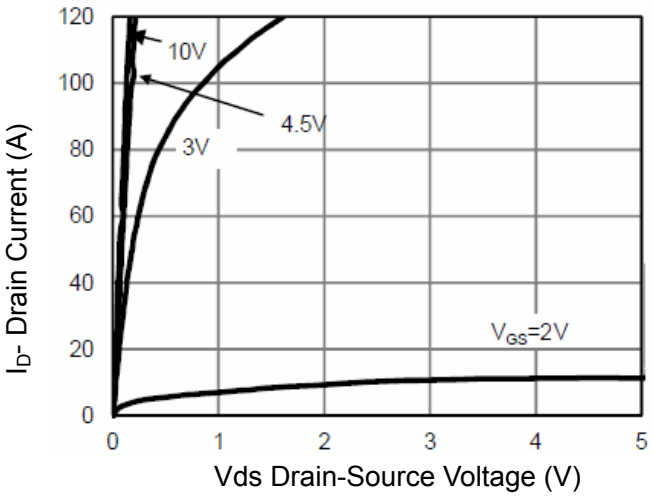


Figure 1 Output Characteristics

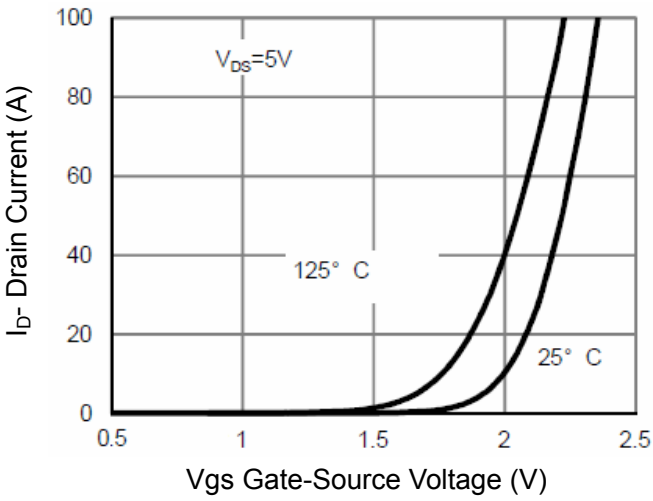


Figure 2 Transfer Characteristics

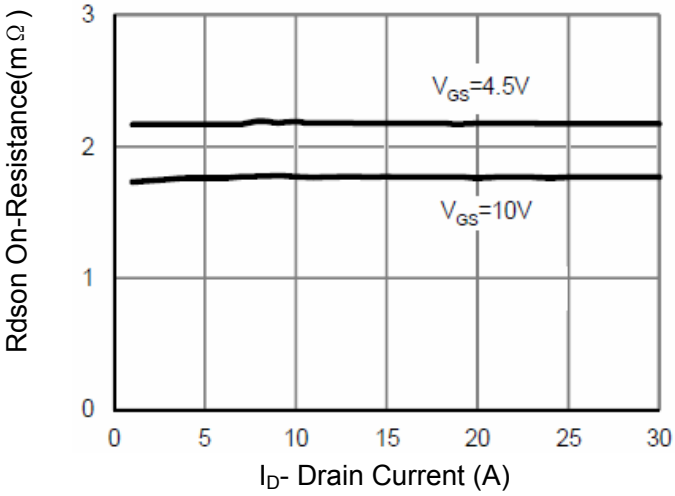


Figure 3 Rdson- Drain Current

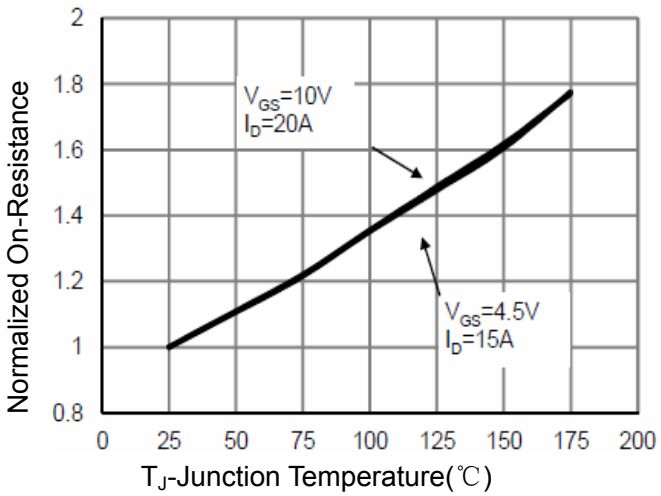


Figure 4 Rdson-JunctionTemperature

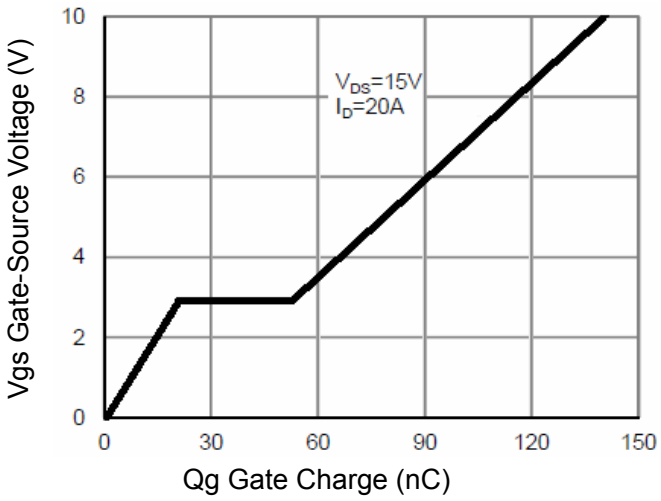


Figure 5 Gate Charge

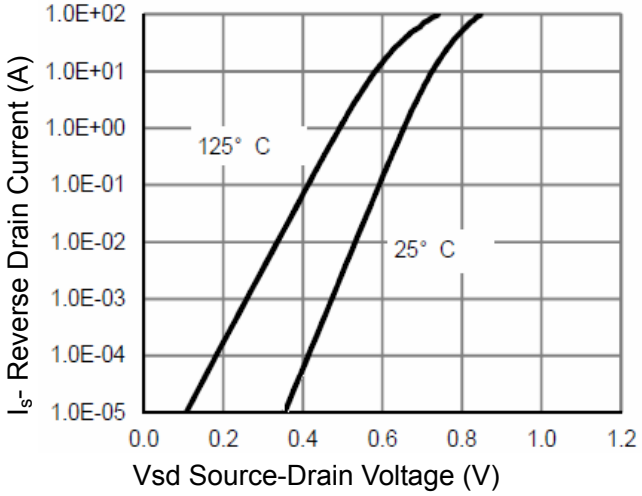


Figure 6 Source- Drain Diode Forward

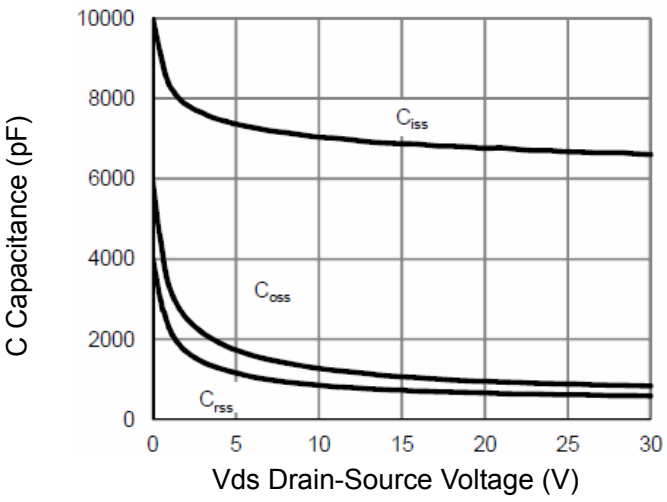


Figure 7 Capacitance vs Vds

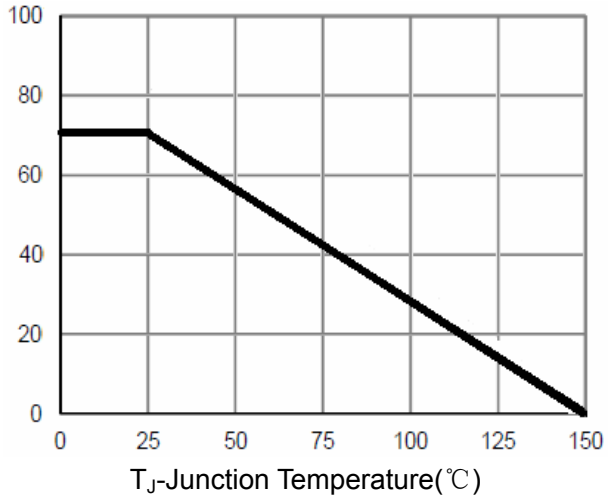


Figure 9 BV_{DSS} vs Junction Temperature

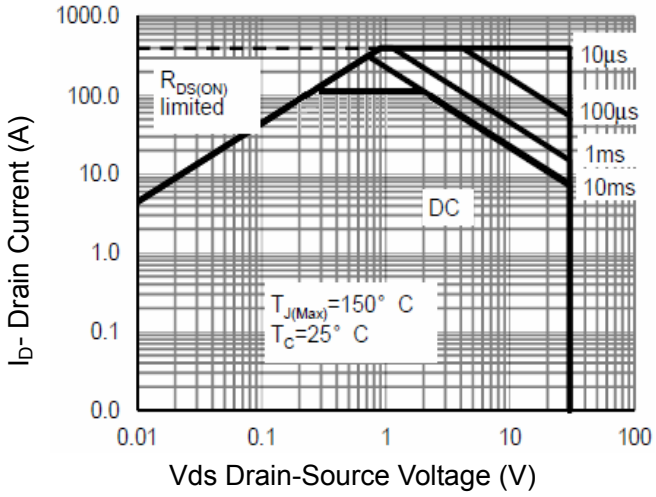


Figure 8 Safe Operation Area

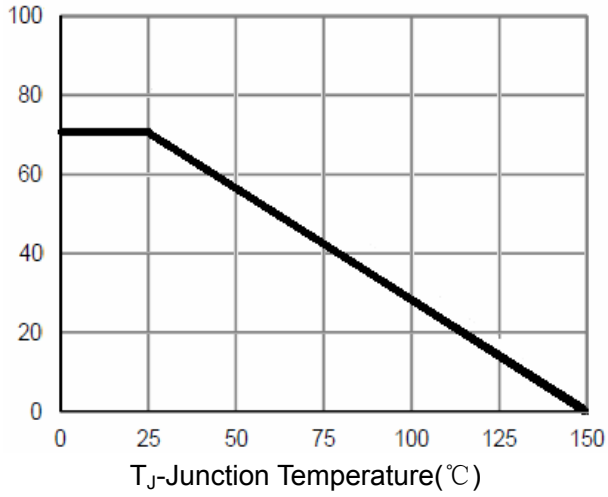


Figure 10 $V_{GS(th)}$ vs Junction Temperature

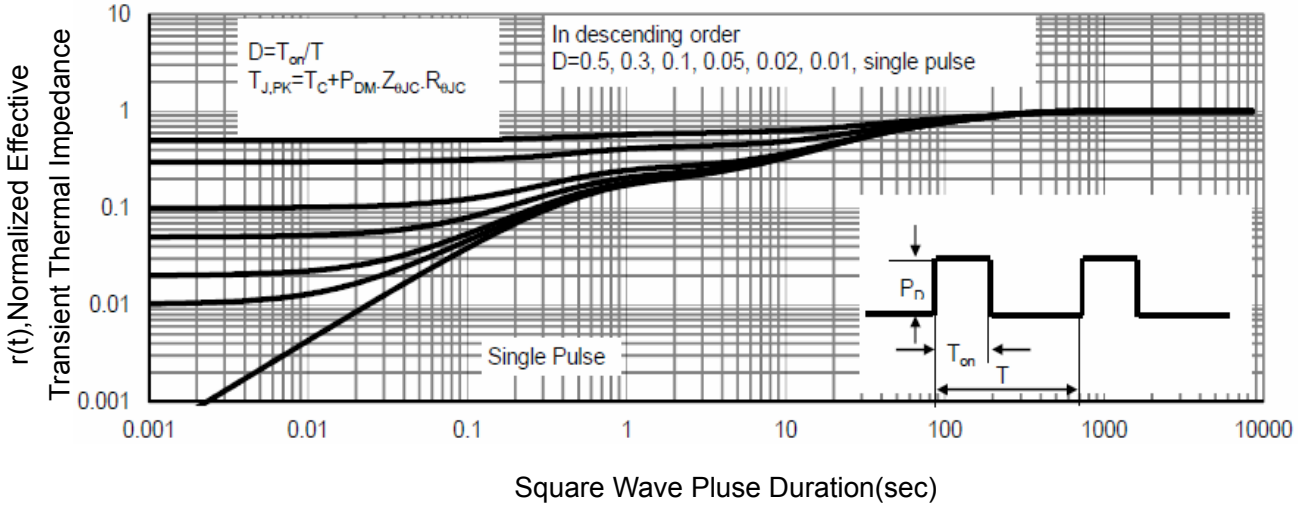
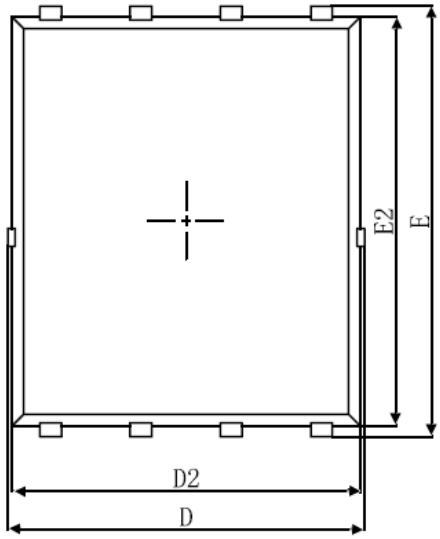
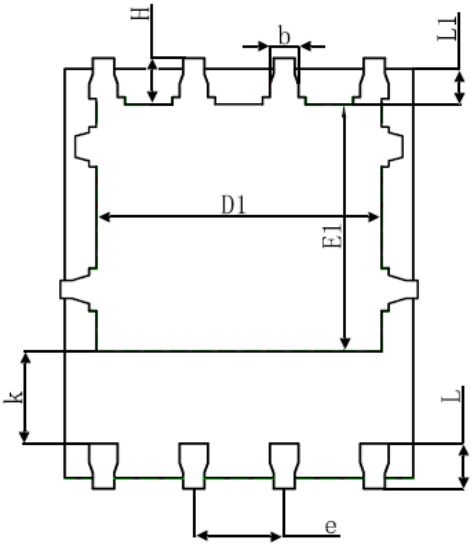


Figure 11 Normalized Maximum Transient Thermal Impedance

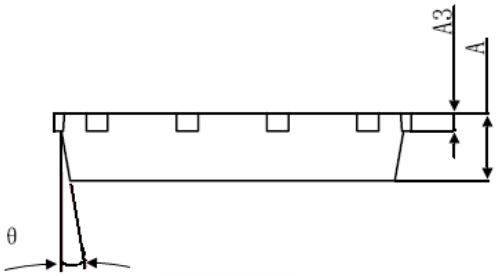
DFN5X6-8L Package Information



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°

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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