100 N-Channel Enhancement Mode Power MOSFET

Description

The XPX1002RD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 100V,
I_D = 90A
$R_{DS(ON)}$ @V_{GS}= 10V, TYP 3.8mΩ
$R_{DS(ON)}$ @V_{GS}= 6.0V, TYP 4.4mΩ
$R_{DS(ON)}$ @V_{GS}= 4.5V, TYP 5.3mΩ

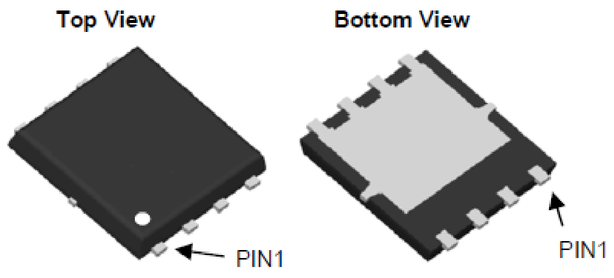
Application

Battery protection

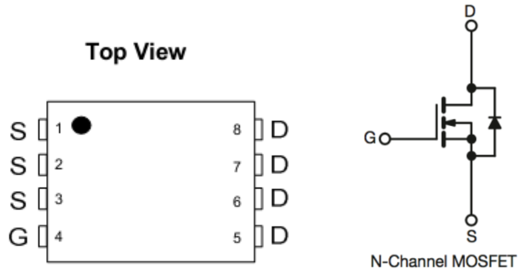
Load switch

Uninterruptible power supply

- **Pin Configurations**



DFN5*6-8L



- **Absolute Maximum Ratings** @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous) *AC	T_C=25℃	I_D	90	A
	T_C=70°C		71.8	
Drain Current (Pulse) *B		I_{DM}	200	A
Power Dissipation	T_C=25℃	P_D	83	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

- **Thermal Resistance Ratings**

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	t ≤ 10 s	R_{thJA}	15	20	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1	1.5	

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

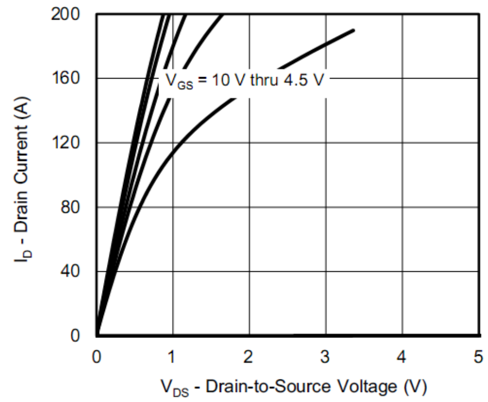
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250μA	1	2	3	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	--	3.8	5	mΩ
	$R_{DS(on)}$	V_{GS} = 6.0V, I_D = 20A	--	4.4	5.7	mΩ
	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 20A	--	5.3	7	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}= 1A , V_{GS}=0V	--	0.7	1.2	V
Diode Forward Current *AC	Is	T_C =25°C	--	--	90	A
Switching						
Total Gate Charge	Q_g	V_{DS} = 50V, I_D = 20A, V_{GS} = 10V	--	74.8	--	nC
Gate-Source Charge	Q_{gs}		--	16	--	nC
Gate-Drain Charge	Q_{gd}		--	19	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DS} =50V, V_{GEN}=10V, I_D=20A, R_g=4.5Ω, R_L=2.5Ω	--	12.5	--	ns
Turn-on Rise Time	t_r		--	24.2	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	56.5	--	ns
Turn-Off Fall Time	t_f		--	31.5	--	ns
Reverse Recovery Time	Trr	V_{DD} = 80V, I_{SD}=20A dISD/dt = 100A /us	--	70.5	--	ns
Reverse Recovery Charge	Qrr		--	111	--	nC
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, f=1.0MHz	--	3448	--	pF
Output Capacitance	C_{oss}		--	589	--	pF
Reverse Transfer Capacitance	C_{rss}		--	37	--	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.

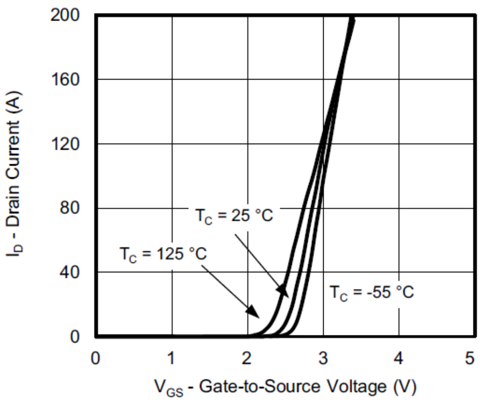
B: Repetitive rating, pulse width limited by junction temperature.

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

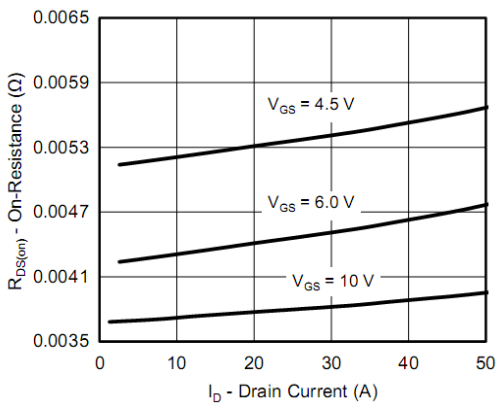
- **Typical Performance Characteristics（(TJ = 25 °C, unless otherwise noted)）**



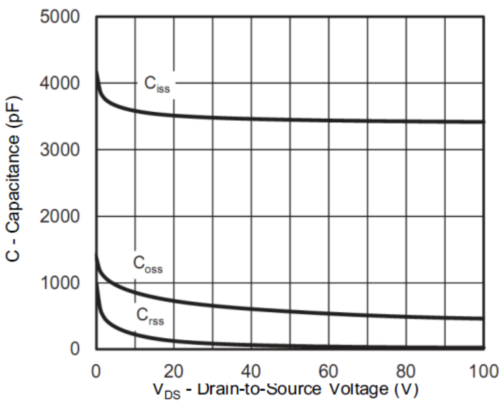
Output Characteristics



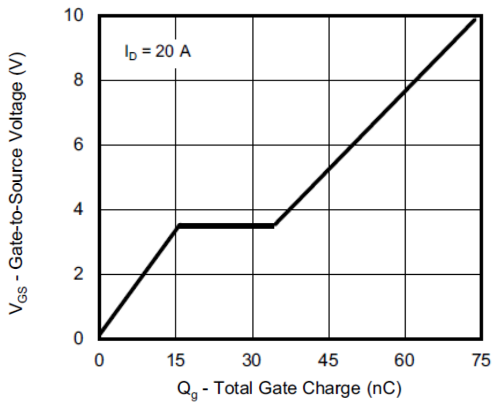
Transfer Characteristics



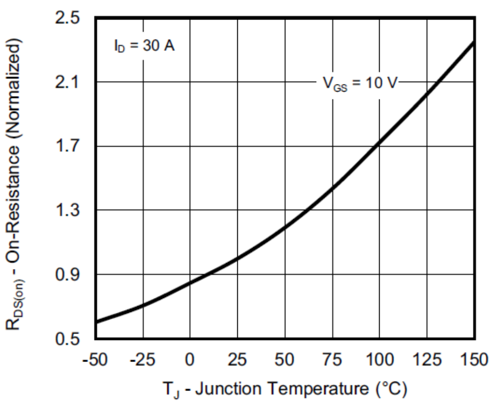
On-Resistance vs. Drain Current and Gate Voltage



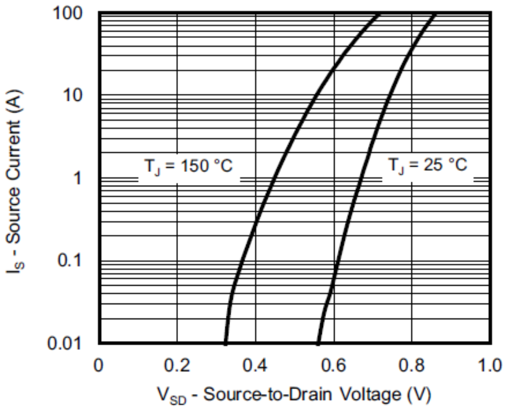
Capacitance



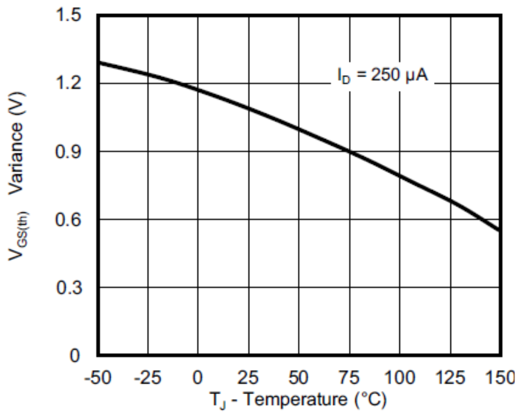
Gate Charge



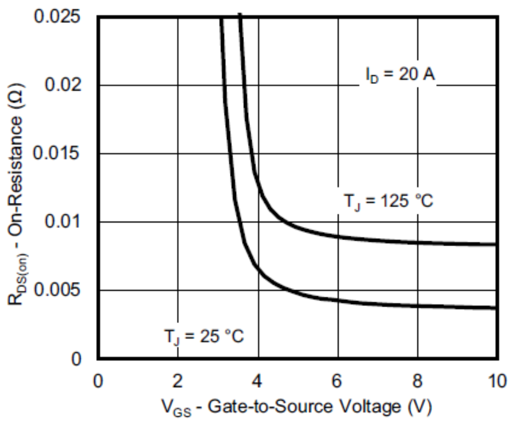
On-Resistance vs. Junction Temperature



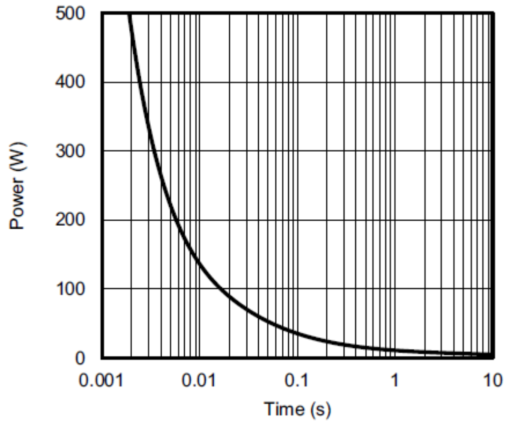
Source-Drain Diode Forward Voltage



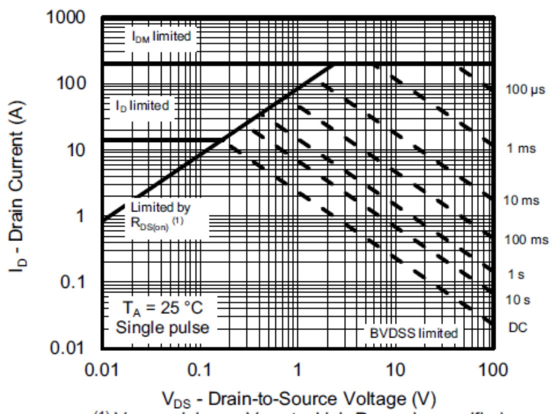
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

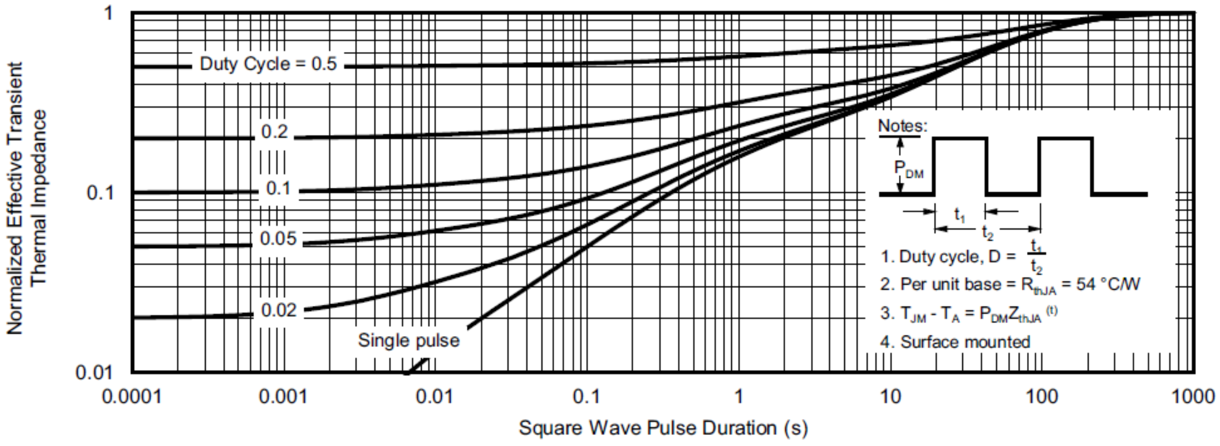


Single Pulse Power, Junction-to-Ambient

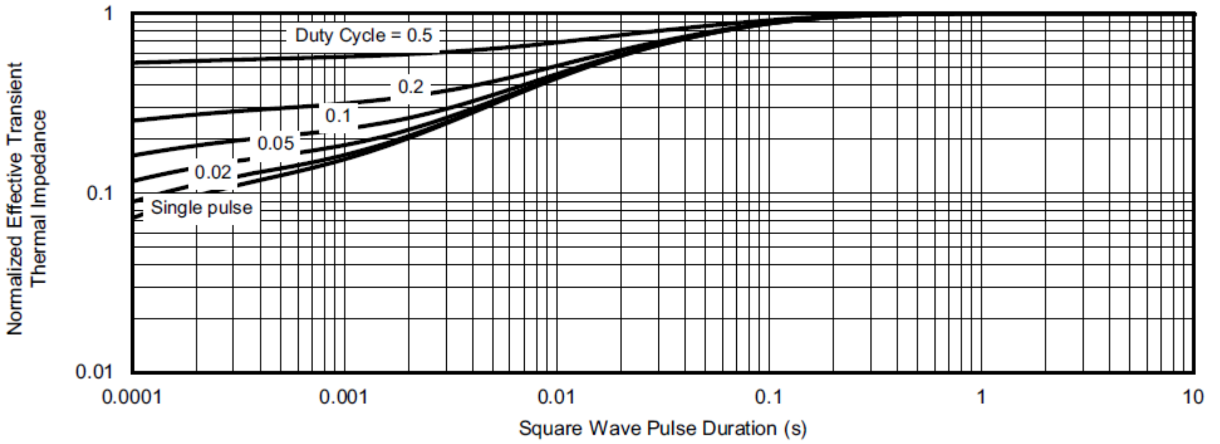


(1) V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

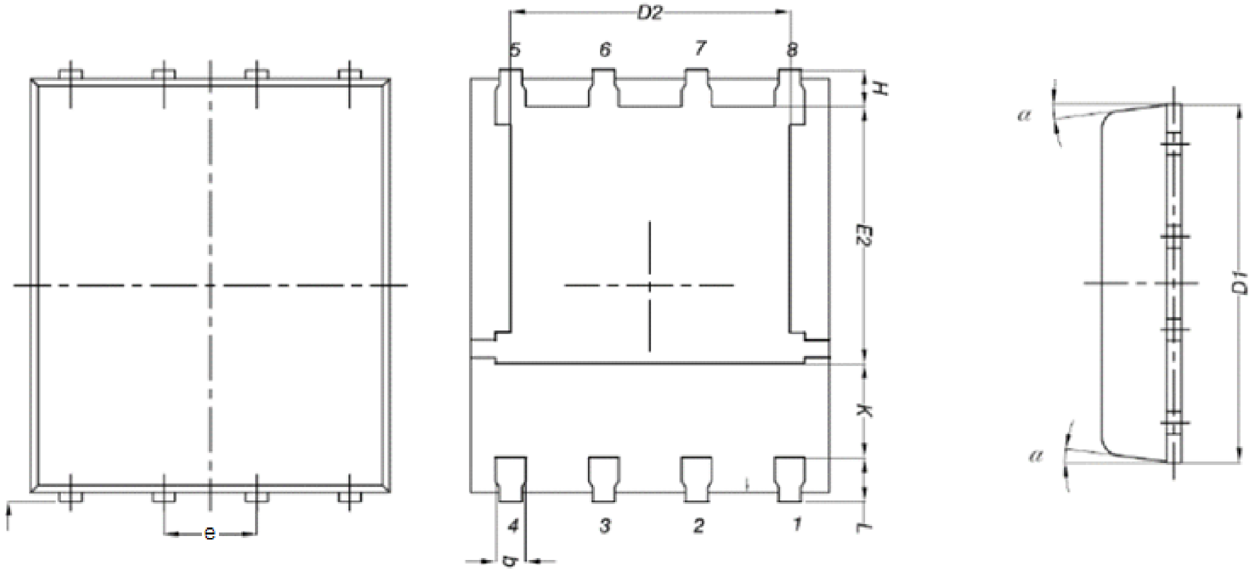


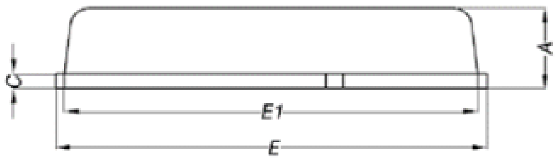
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

- **Package Information**





DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.8	--	1.1
b	0.2	--	0.51
C	0.15	--	0.35
D1	4.8	--	5.3
D2	3.61	--	4.15
E	5.85	--	6.3
E1	5.45	--	6
E2	3.3	--	4.2
e	--	1.27	--
H	0.41	--	0.71
K	1.1	--	1.5
L	0.45	--	0.74
a	0°	--	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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