Semiconductor
XINPUXIN

XSW P-Channel Enhancement Mode Power MOSFET

Description

The XPX7409RX uses advanced trench technology to provide excellent $R_{DS(ON)}$, This device is suitable for use as a load switch or power management.

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- Power management
- Load switch

V_{DS} = -30V, I_D = -52A

$R_{DS(ON)}$ =6.7mΩ @ V_{GS}=-10V

$R_{DS(ON)}$ =9.5mΩ @ V_{GS}=-4.5V
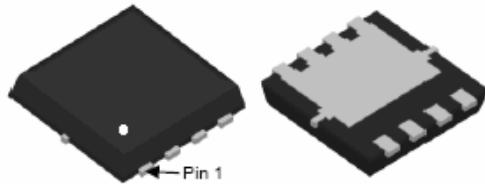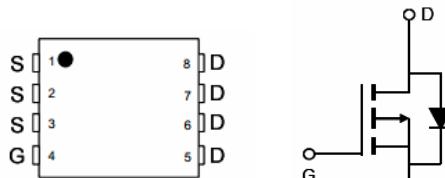
Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
7409	XPX7409RX	DFN3.3X3.3-8L			

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous	I_D	-52	A
Drain Current-Pulsed [Note 1]	I_{DM}	-80	A
Maximum Power Dissipation	P_D	40	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case[Note 2]	$R_{\theta JC}$	3.13	℃/W

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Electrical Characteristics (T_A=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	-	-	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	-1.3	-1.8	-2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	6.7	9	mΩ
	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-20A	-	9.5	17	
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-20A	-	25	-	S
Dynamic Characteristics [Note4]						
Input Capacitance	C_{Iss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	2060	2893	PF
Output Capacitance	C_{oss}		-	370	-	PF
Reverse Transfer Capacitance	C_{rss}		-	295	-	PF
Switching Characteristics [Note 4]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, ID=-20A, V_{GS}=-10V,R_{GEN}=3Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	9.4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	24	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-20A,V_{GS}=-10V	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	nC
Gate-Drain Charge	Q_{gd}		-	9.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V_{SD}	V_{GS}=0V,I_S=-28A	-	-	-1.2	V

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

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Typical Operating Characteristics

Power Dissipation

P_{tot} - Power (W) vs T_j - Junction Temperature (°C)

$T_C=25^{\circ}C$

Drain Current

$-I_D$ - Drain Current (A) vs T_j - Junction Temperature (°C)

$T_C=25^{\circ}C, V_G=-10V$

Safe Operation Area

$-I_D$ - Drain Current (A) vs $-V_{DS}$ - Drain - Source Voltage (V)

Rds(on) Limit

100µs

1ms

10ms

DC

$T_C=25^{\circ}C$
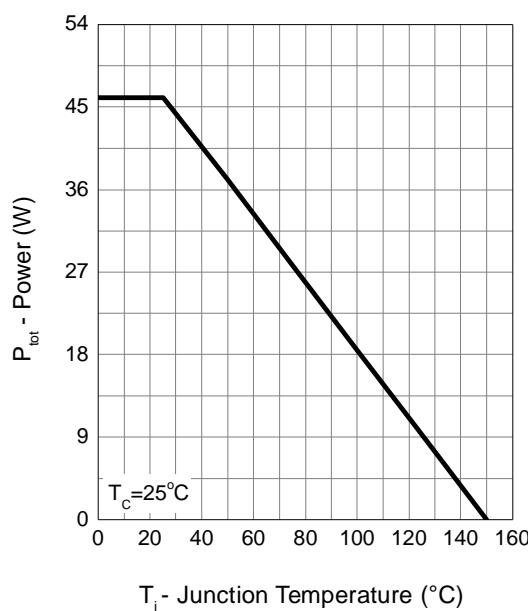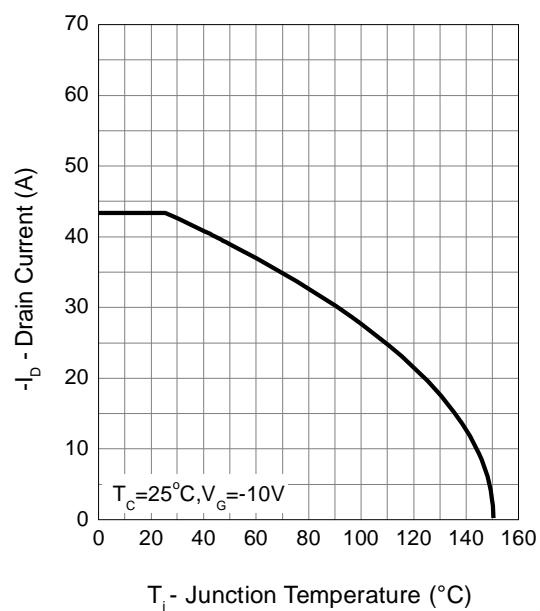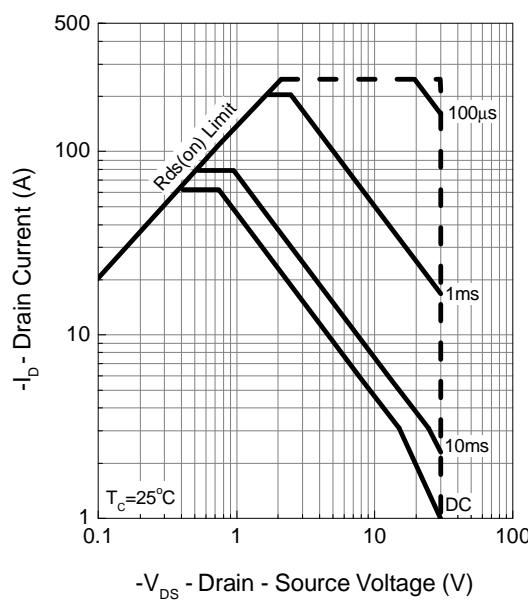
Thermal Transient Impedance

Normalized Transient Thermal Resistance vs Square Wave Pulse Duration (sec)

Duty = 0.5

0.2

0.1

0.05

0.02

0.01

Single Pulse

R :2.7°C/W

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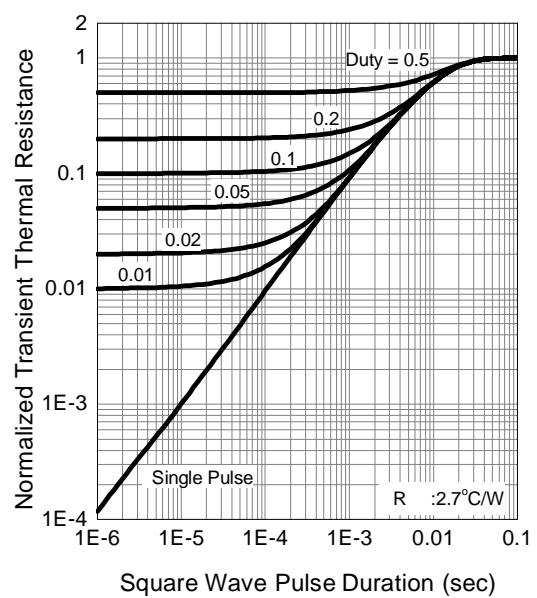
## Typical Operating Characteristics (Cont.)

Output Characteristics
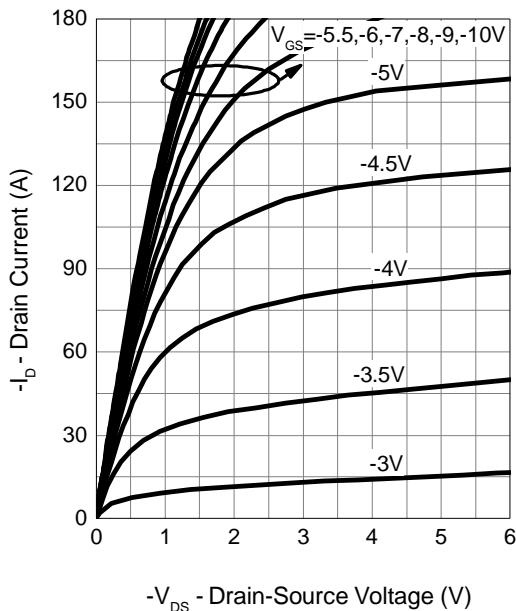
Drain-Source On Resistance
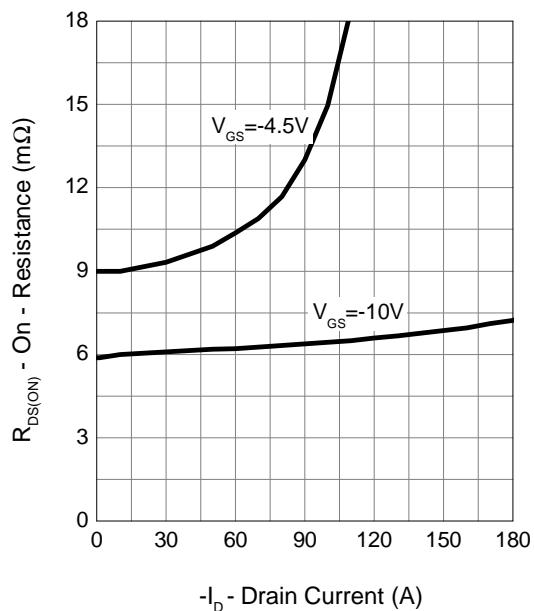

Gate-Source On Resistance
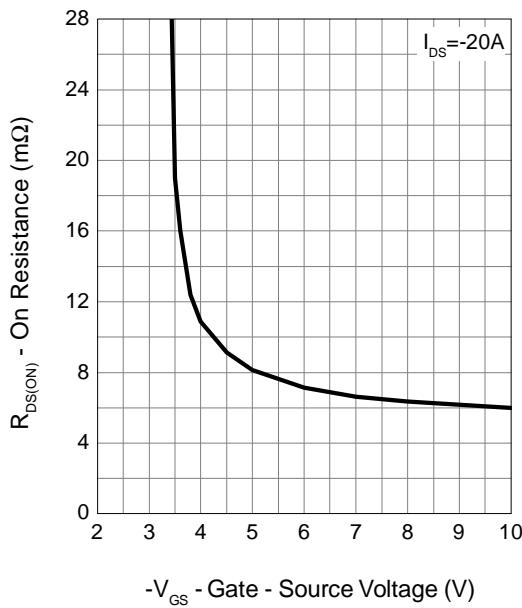

Gate Threshold Voltage
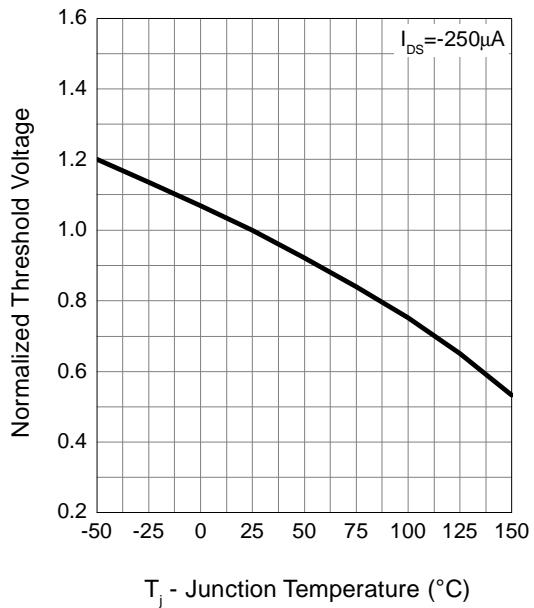
Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

V_{GS} =-10V
I_{DS} =-20A

Normalized On Resistance

R_{ON} @ T_j =25°C: 6mΩ

T_j - Junction Temperature (°C)
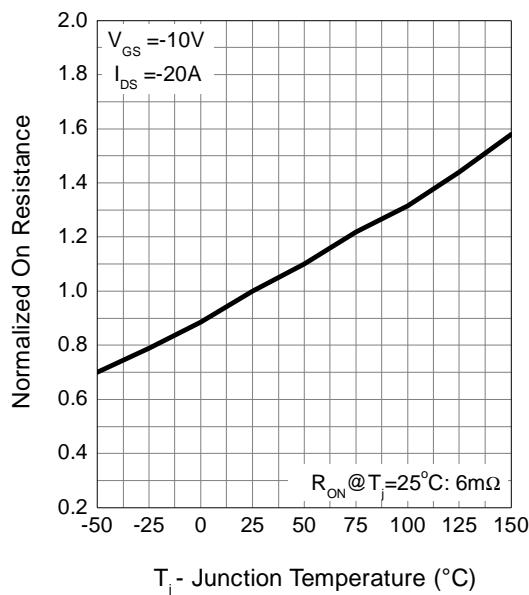
Source-Drain Diode Forward

-I_s - Source Current (A)

T_j =150°C

T_j =25°C

-V_{SD} - Source - Drain Voltage (V)

C - Capacitance (pF)

Ciss

Coss

Crss

-V_{DS} - Drain - Source Voltage (V)

I_{DS} =-20A

-V_{GS} - Gate - source Voltage (V)

Q_G - Gate Charge (nC)
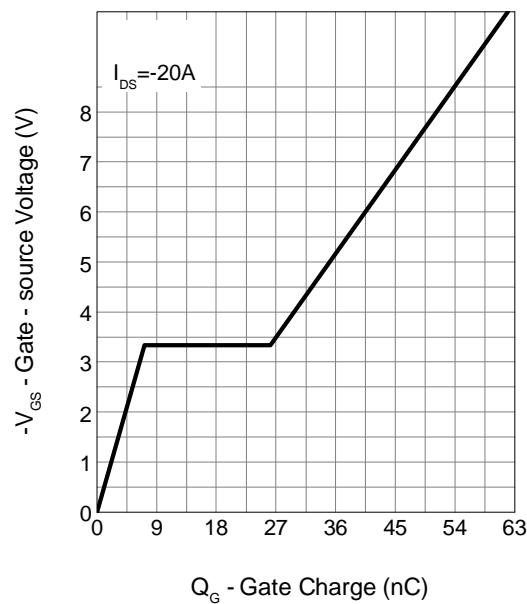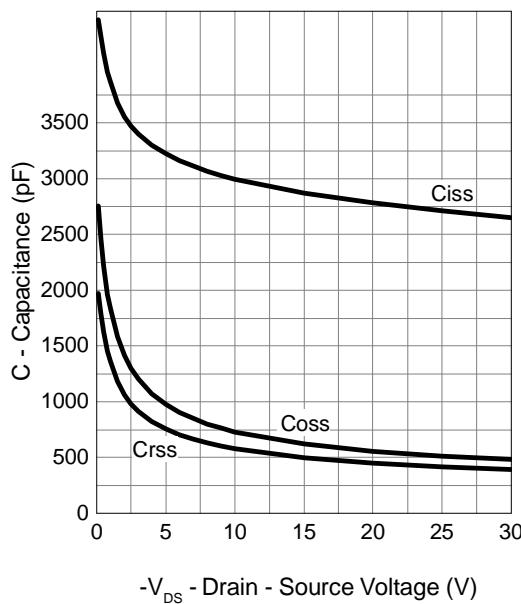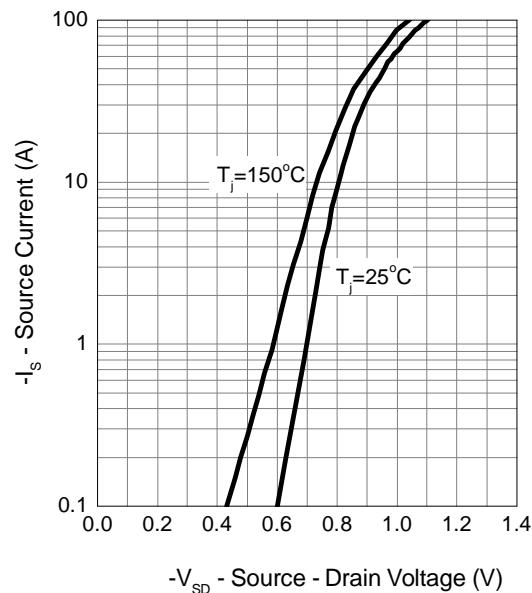
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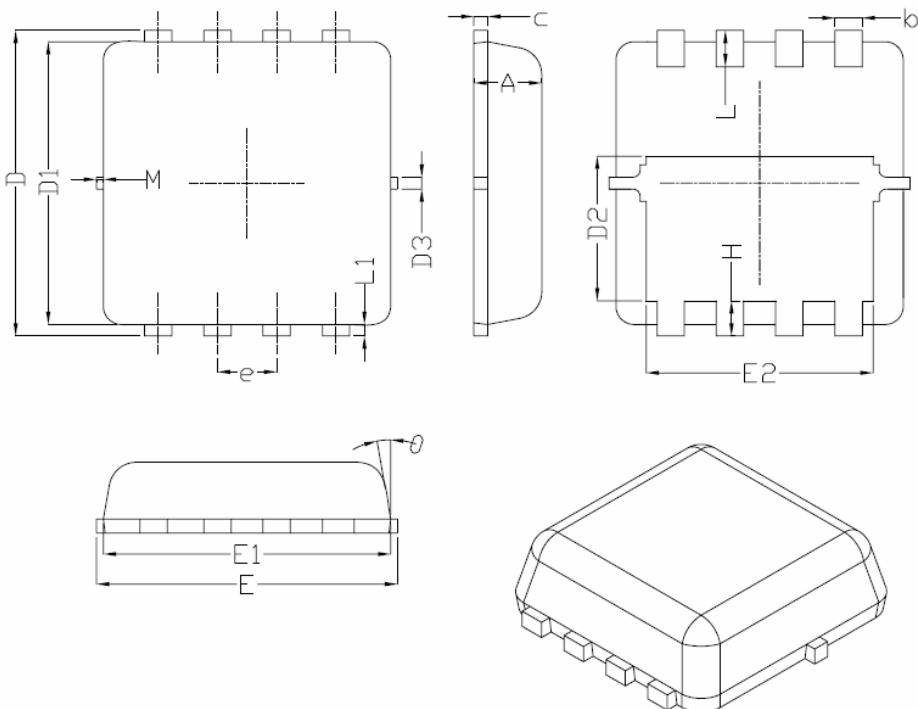
Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°