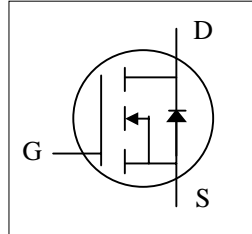
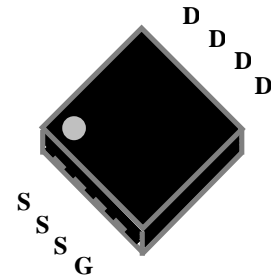


- ▼ Simple Drive Requirement
- ▼ Small Size & Low  $R_{DS(ON)}$
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	30V
$R_{DS(ON)}$	9.5m $\Omega$



PMPAK<sup>®</sup> 3 x 3

## Description

XP3N9R5A series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The PMPAK<sup>®</sup> 3 x 3 package is special for voltage conversion application using standard infrared reflow technique with the backside heat sink to achieve the good thermal performance.

## Absolute Maximum Ratings @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	38.7	A
$I_D @ T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	15	A
$I_D @ T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}^3$	12	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	100	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	3.57	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>4</sup>	16.2	mJ
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	5.5	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	35	$^\circ\text{C}/\text{W}$

**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =9.5A	-	-	9.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =9A	-	-	17	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.3	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =9.5A	-	36	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±0.1	uA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =9.5A	-	18	28.8	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V	-	3	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	4.5	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V	-	7	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =9.5A	-	27	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3Ω	-	19	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	5	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	800	1280	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =15V	-	150	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	115	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	2.5	5	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =3A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =9.5A, V <sub>GS</sub> =0V,	-	11	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	4	-	nC

**Notes:**

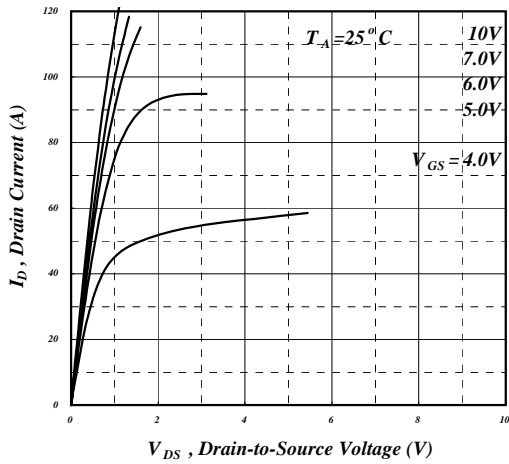
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> 2oz copper pad of FR4 board, t ≤10sec; 160°C/W when mounted on min. copper pad.
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=30V , L=0.1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

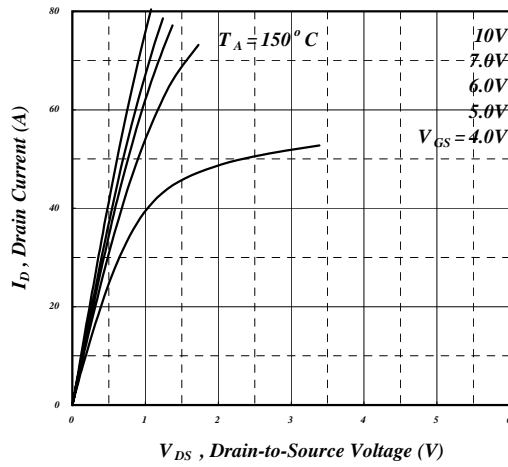
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT, AUTOMOTIVE OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

XSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

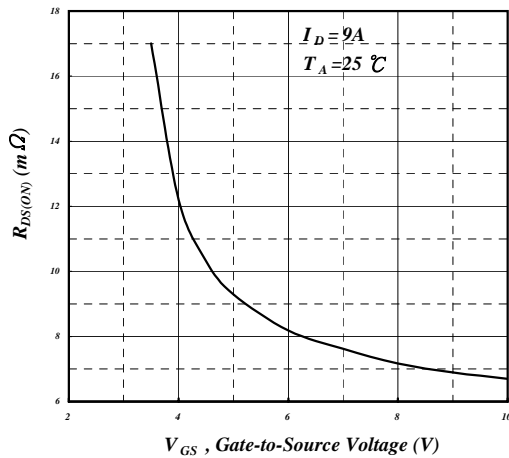
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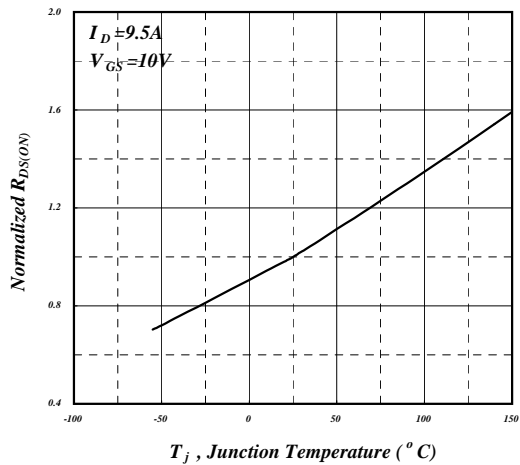
**Fig 1. Typical Output Characteristics**



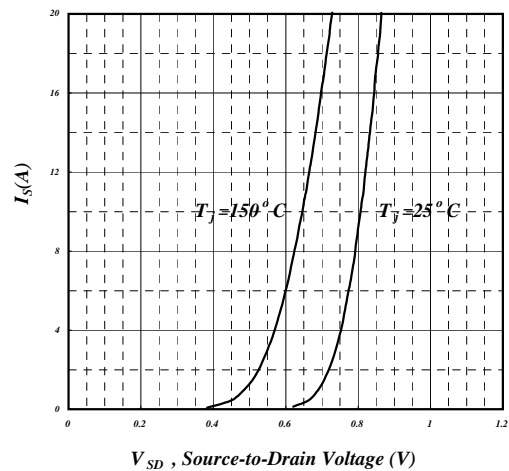
**Fig 2. Typical Output Characteristics**



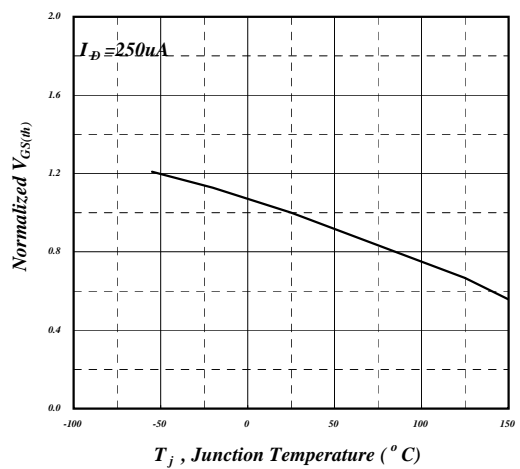
**Fig 3. On-Resistance v.s. Gate Voltage**



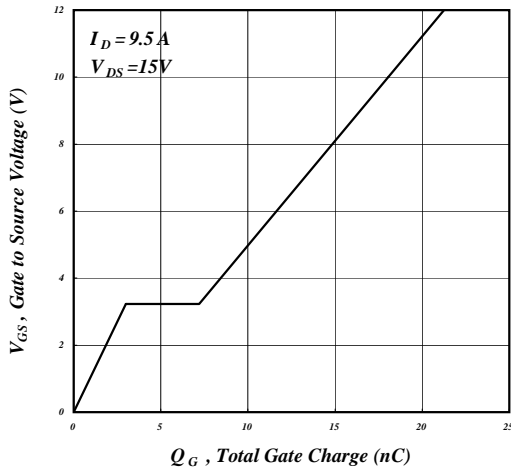
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



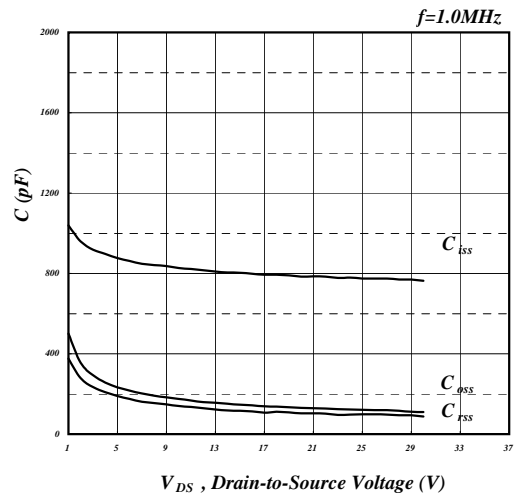
**Fig 5. Forward Characteristic of Reverse Diode**



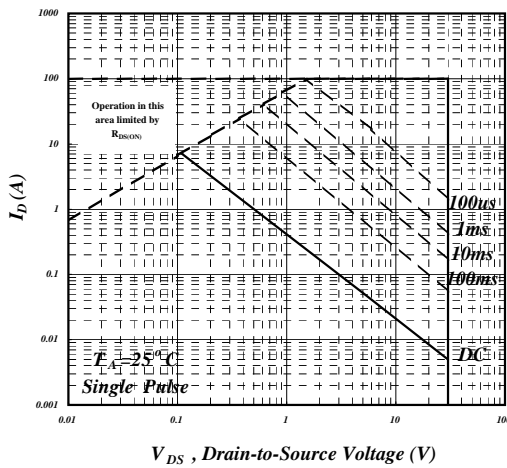
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



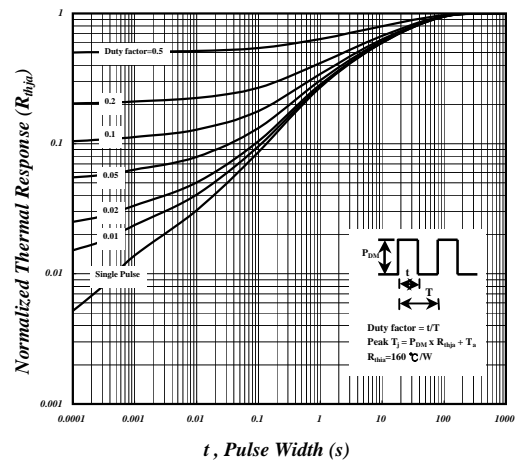
**Fig 7. Gate Charge Characteristics**



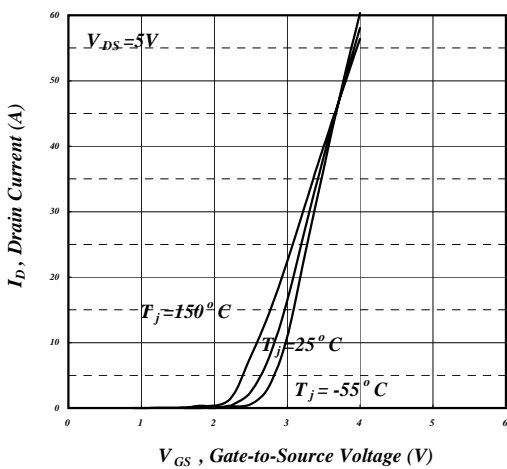
**Fig 8. Typical Capacitance Characteristics**



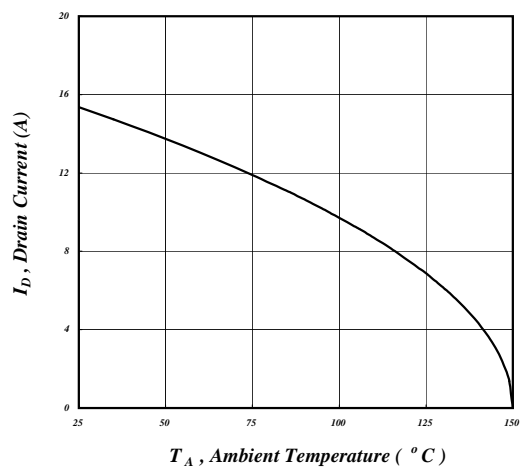
**Fig 9. Maximum Safe Operating Area**



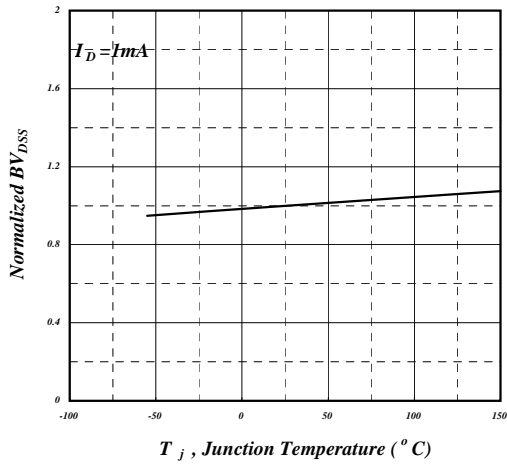
**Fig 10. Effective Transient Thermal Impedance**



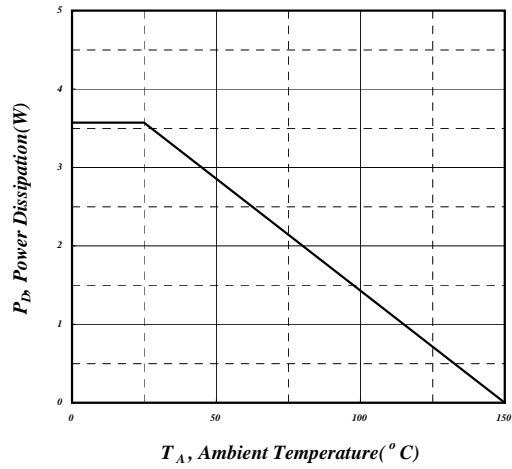
**Fig 11. Transfer Characteristics**



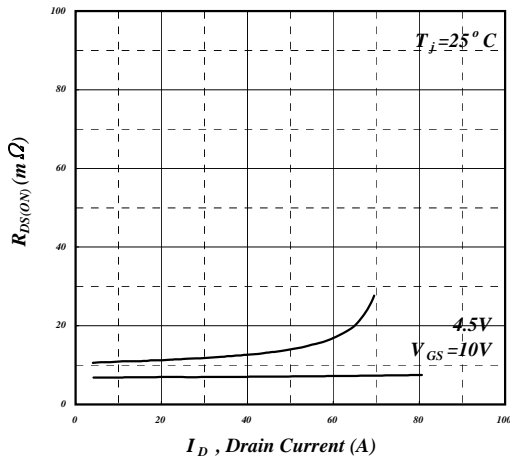
**Fig 12. Drain Current v.s. Ambient Temperature**



**Fig 13. Normalized  $BV_{DSS}$  v.s. Junction Temperature**



**Fig 14. Total Power Dissipation**



**Fig 15. Typ. Drain-Source on State Resistance**

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**MARKING INFORMATION**

