

# XP3N5R0H

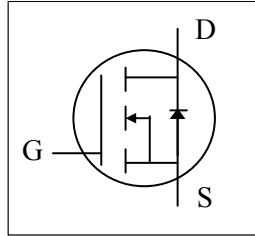
**Halogen-Free Product**

*N-CHANNEL ENHANCEMENT MODE*

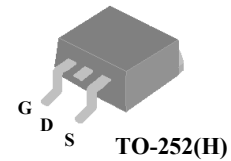
*POWER MOSFET*



- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



BV <sub>DSS</sub>	30V
R <sub>DS(ON)</sub>	5mΩ
I <sub>D</sub>	62A



## Description

XP3N5R0 series adopts innovative 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 TO-252 package is widely preferred for all commercial-industrial surface mount application using infrared reflow technique and suited for high current application due to the low connection resistance.

## Absolute Maximum Ratings@T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	+20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V	62	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	39.2	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	240	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	31.25	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	2	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>3</sup>	61.2	mJ
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Value	Units
R <sub>thj-c</sub>	Maximum Thermal Resistance, Junction-case	4	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>4</sup>	62.5	°C/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> =40A	-	-	5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	-	-	8.5	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> =40A	-	80	-	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	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =30A	-	23	36	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V	-	7.5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	10.5	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V	-	10	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =40A	-	70	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	32	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	12	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	2000	3200	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =15V	-	300	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	250	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.5	3	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> =40A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =40A, V <sub>GS</sub> =0V,	-	12	-	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.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
- 4.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

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

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT 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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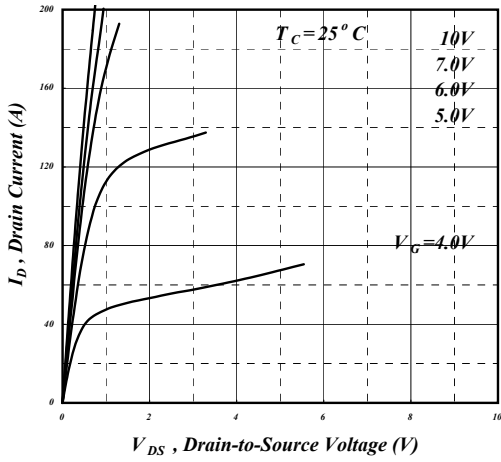


Fig 1. Typical Output Characteristics

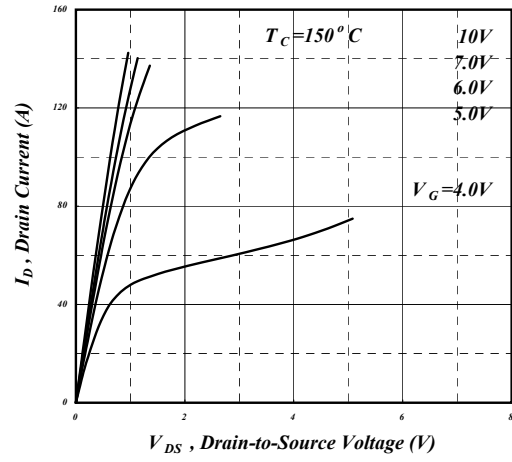


Fig 2. Typical Output Characteristics

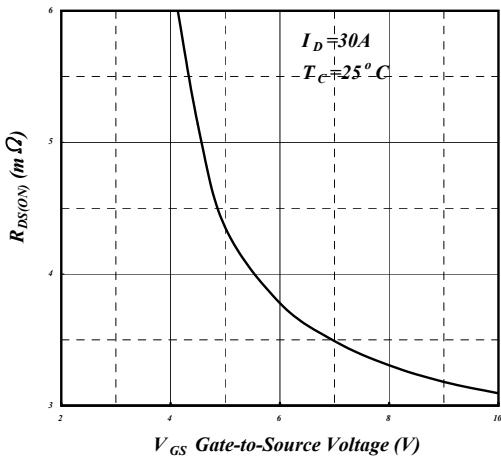


Fig 3. On-Resistance v.s. Gate Voltage

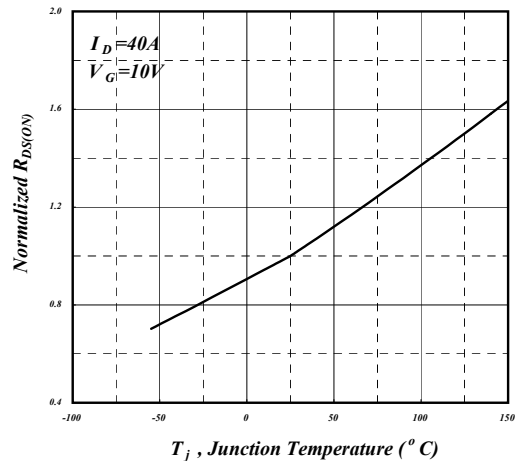


Fig 4. Normalized On-Resistance v.s. Junction Temperature

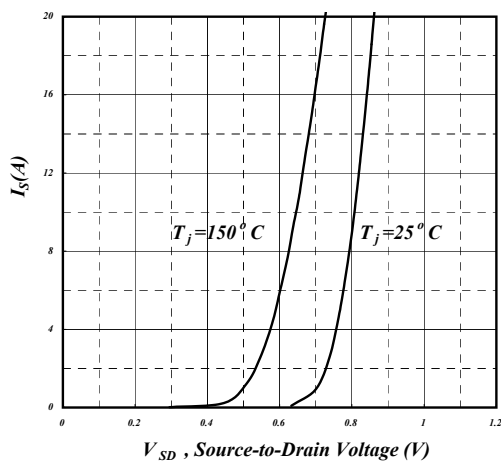


Fig 5. Forward Characteristic of Reverse Diode

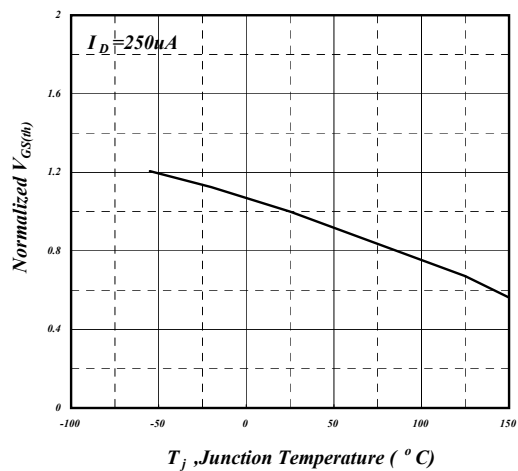


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

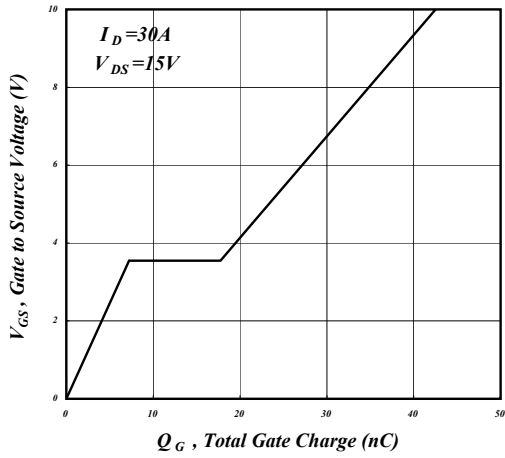


Fig 7. Gate Charge Characteristics

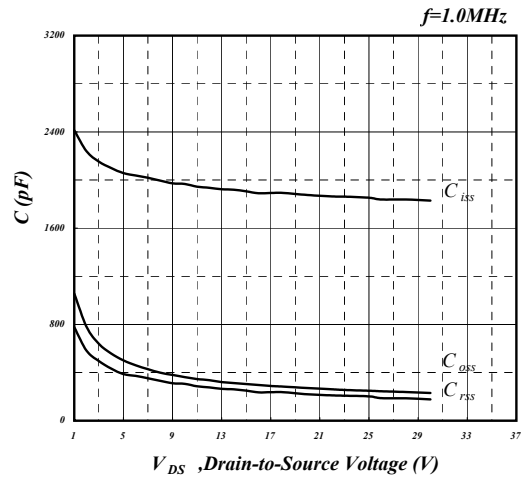


Fig 8. Typical Capacitance Characteristics

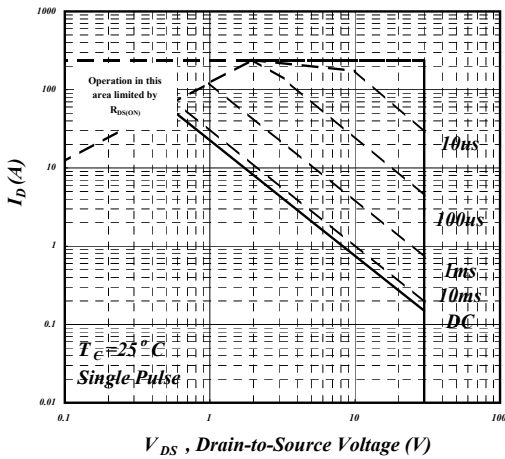


Fig 9. Maximum Safe Operating Area

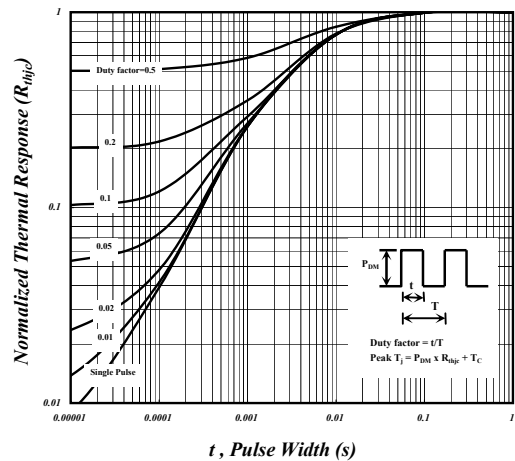


Fig 10. Effective Transient Thermal Impedance

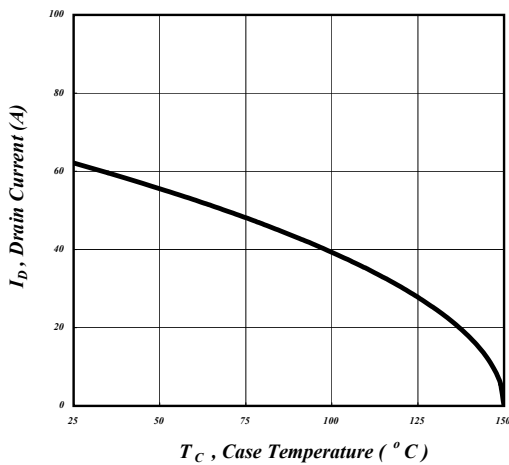


Fig 11. Drain Current v.s. Case Temperature

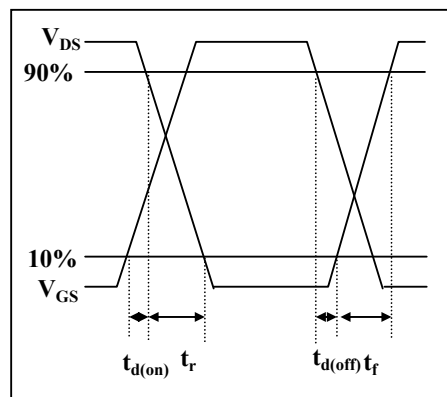


Fig 12. Switching Time Waveform

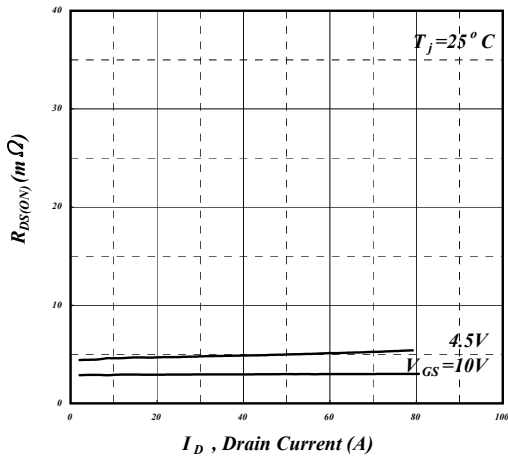


Fig 13. Typ. Drain-Source on State Resistance

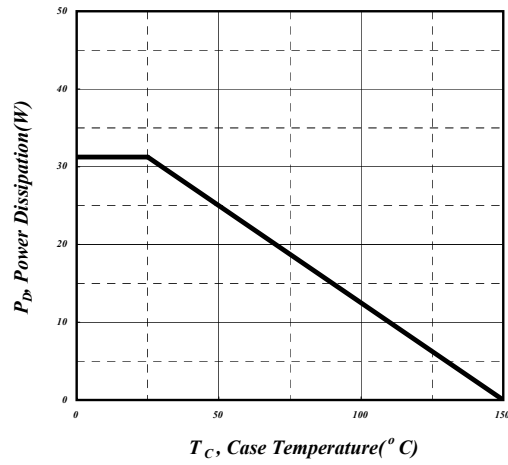


Fig 14. Total Power Dissipation

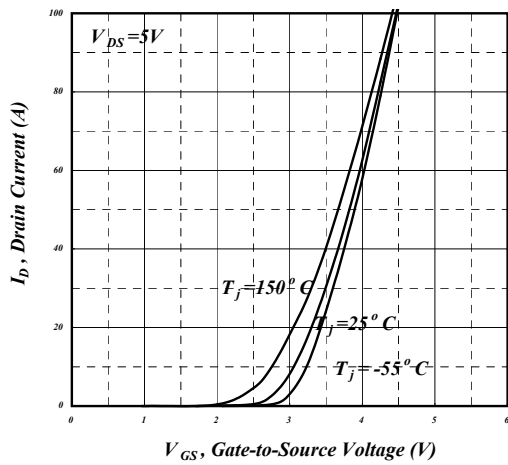


Fig 15. Transfer Characteristics