

# XP6NA6R5H

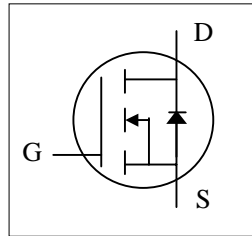
**Halogen-Free Product**

*N-CHANNEL ENHANCEMENT MODE*

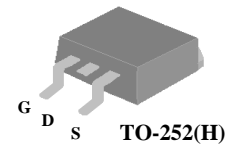
*POWER MOSFET*



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



BV <sub>DSS</sub>	60V
R <sub>DS(ON)</sub>	6.5mΩ
I <sub>D</sub>	66A



## Description

XP6NA6R5 series are 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 applications 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	60	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	66	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	41.8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	200	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	50	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation	2	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>4</sup>	80	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	2.5	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	62.5	°C/W

**Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=30A$	-	-	6.5	$m\Omega$
		$V_{GS}=6V, I_D=20A$	-	-	11	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=30A$	-	54	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 0.1$	$\mu A$
$Q_g$	Total Gate Charge <sup>5</sup>	$I_D=30A$	-	35	56	nC
$Q_{gs}$	Gate-Source Charge <sup>5</sup>	$V_{DS}=30V$	-	11	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge <sup>5</sup>	$V_{GS}=10V$	-	10	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>5</sup>	$V_{DS}=30V$	-	13	-	ns
$t_r$	Rise Time <sup>5</sup>	$I_D=30A$	-	56	-	ns
$t_{d(off)}$	Turn-off Delay Time <sup>5</sup>	$R_G=10\Omega$	-	33	-	ns
$t_f$	Fall Time <sup>5</sup>	$V_{GS}=10V$	-	68	-	ns
$C_{iss}$	Input Capacitance <sup>5</sup>	$V_{GS}=0V$	-	1860	2976	pF
$C_{oss}$	Output Capacitance <sup>5</sup>	$V_{DS}=50V$	-	315	-	pF
$C_{riss}$	Reverse Transfer Capacitance <sup>5</sup>	$f=1.0\text{MHz}$	-	20	-	pF
$R_g$	Gate Resistance	$f=1.0\text{MHz}$	-	1.2	2.4	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=30A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time <sup>5</sup>	$I_S=30A, V_{GS}=0V,$	-	30	-	ns
$Q_{rr}$	Reverse Recovery Charge <sup>5</sup>	$di/dt=100A/\mu s$	-	20	-	nC

**Notes:**

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board
4. Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=30V$ ,  $L=0.1\text{mH}$ ,  $R_G=25\Omega$ ,  $V_{GS}=10V$
5. Guaranteed by design.

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.

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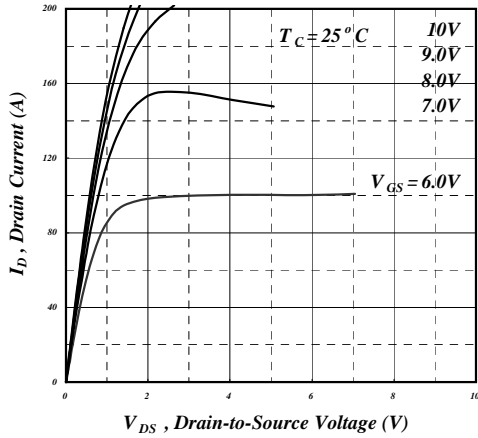


Fig 1. Typical Output Characteristics

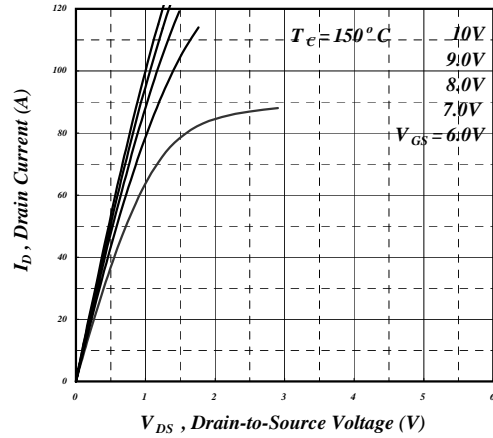


Fig 2. Typical Output Characteristics

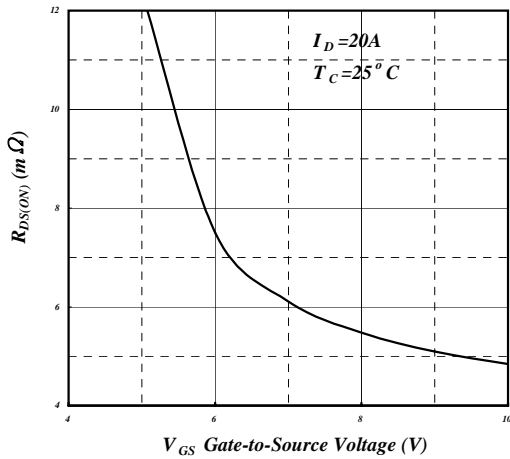


Fig 3. On-Resistance v.s. Gate Voltage

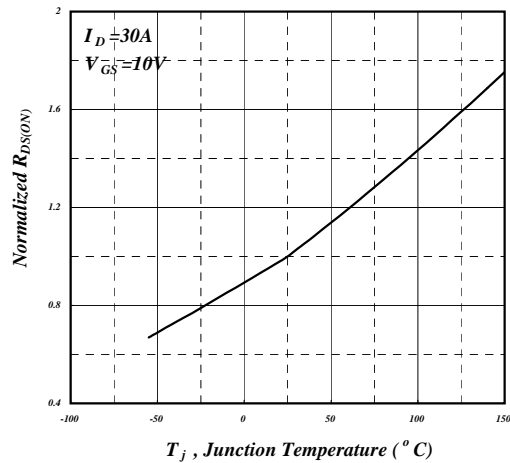


Fig 4. Normalized On-Resistance v.s. Junction Temperature

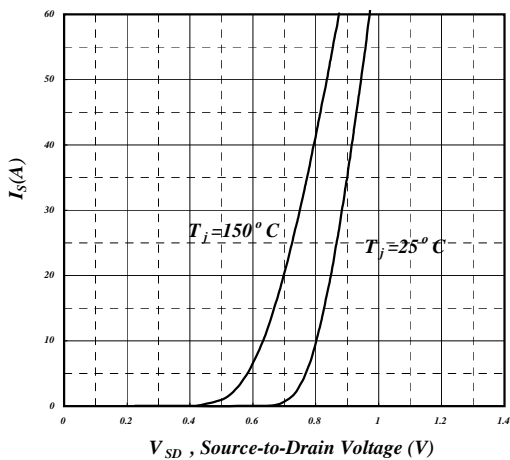


Fig 5. Forward Characteristic of Reverse Diode

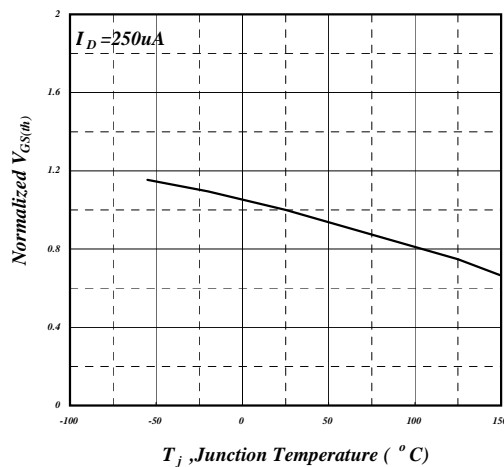


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

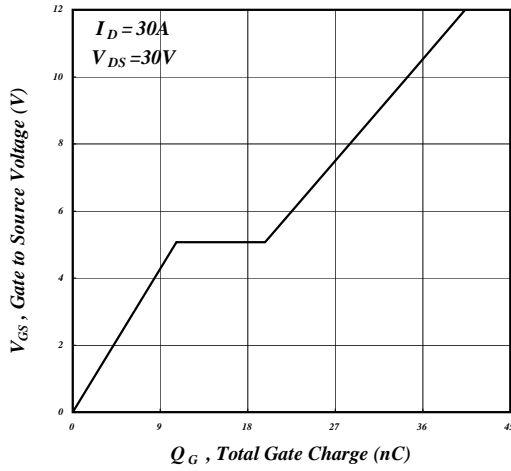


Fig 7. Gate Charge Characteristics

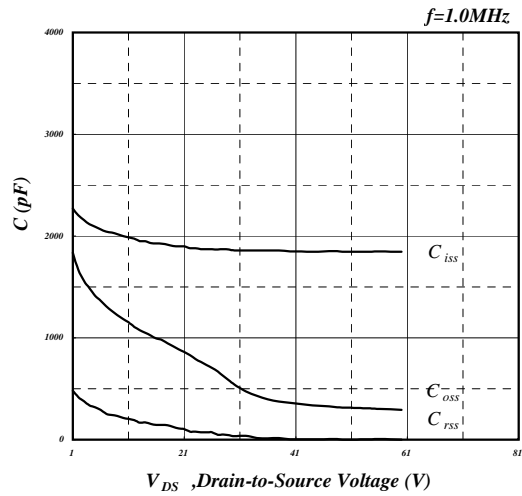


Fig 8. Typical Capacitance Characteristics

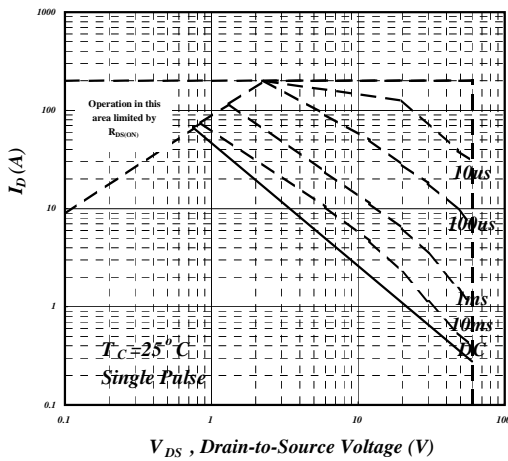


Fig 9. Maximum Safe Operating Area

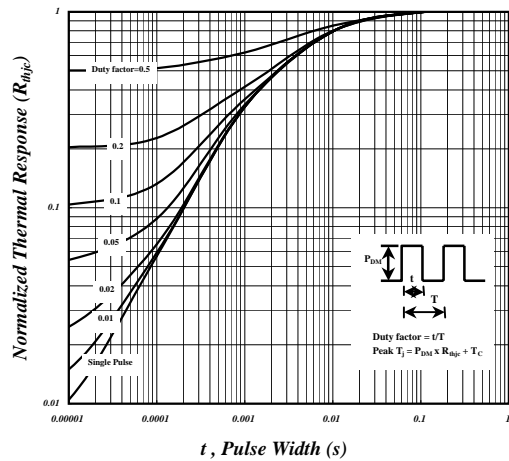


Fig 10. Effective Transient Thermal Impedance

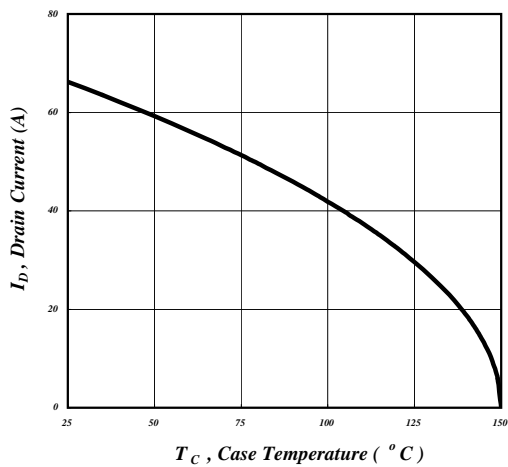


Fig 11. Drain Current v.s. Case Temperature

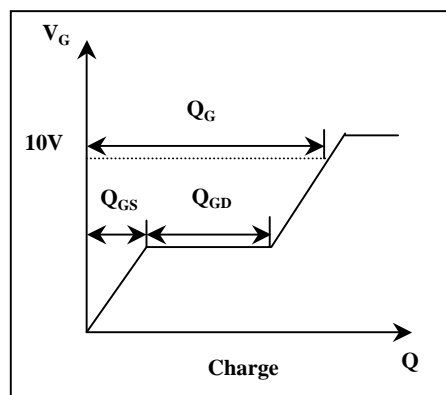
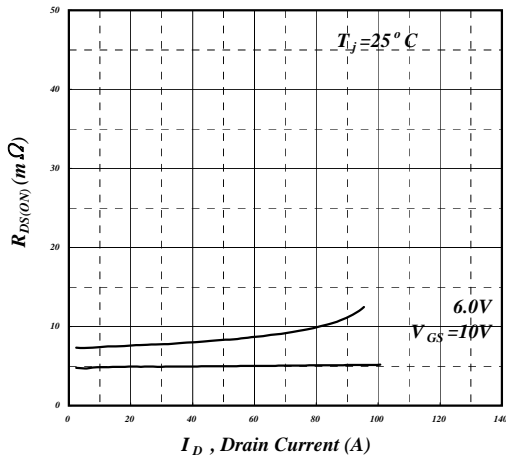
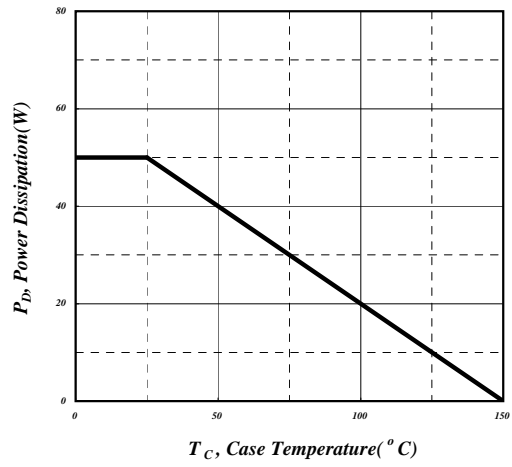


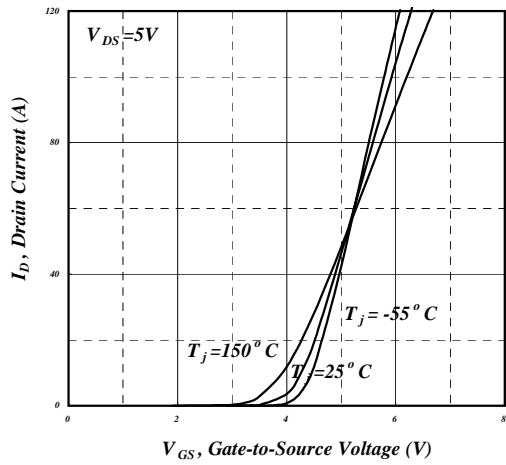
Fig 12. Gate Charge Waveform



**Fig 13. Typ. Drain-Source on State Resistance**



**Fig 14. Total Power Dissipation**



**Fig 15. Transfer Characteristics**

## MARKING INFORMATION

