

XP3N9R5AH

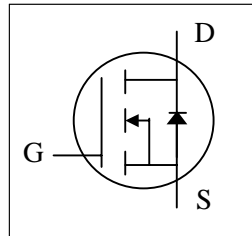
Halogen-Free Product

N-CHANNEL ENHANCEMENT MODE

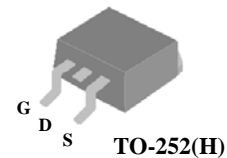
POWER MOSFET



- ▼ 100% R_g & UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



BV _{DSS}	30V
R _{DS(ON)}	9.5mΩ
I _D	38.5A



Description

XP3N9R5A 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_j=25°C (unless otherwise specified)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	+20	V
I _D @T _C =25°C	Drain Current, V _{GS} @ 10V	38.5	A
I _D @T _C =100°C	Drain Current, V _{GS} @ 10V	24.4	A
I _{DM}	Pulsed Drain Current ¹	120	A
P _D @T _C =25°C	Total Power Dissipation	22.7	W
P _D @T _A =25°C	Total Power Dissipation ⁴	2	W
E _{AS}	Single Pulse Avalanche Energy ³	20	mJ
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Units
R _{thj-c}	Maximum Thermal Resistance, Junction-case	5.5	°C/W
R _{thj-a}	Maximum Thermal Resistance, Junction-ambient (PCB mount) ⁴	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	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	-	-	9.5	m Ω
		$V_{GS}=4.5V, I_D=12A$	-	-	17.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	-	3	V
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	-	44	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	-	-	10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 0.1	μA
Q_g	Total Gate Charge	$I_D=12A$	-	9	14.4	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=15V$	-	3	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	4.5	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V$	-	7	-	ns
t_r	Rise Time	$I_D=20A$	-	46	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	18	-	ns
t_f	Fall Time	$V_{GS}=10V$	-	5	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	800	1280	pF
C_{oss}	Output Capacitance	$V_{DS}=15V$	-	150	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	115	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	2.5	5	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=20A, V_{GS}=0V$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$I_S=20A, V_{GS}=0V,$	-	9	-	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	2.5	-	nC

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Starting $T_j=25^{\circ}\text{C}$, $V_{DD}=30V$, $L=0.1\text{mH}$, $R_G=25\Omega$, $V_{GS}=10V$
4. Surface mounted on 1 in² 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, AUTOMOTIVE OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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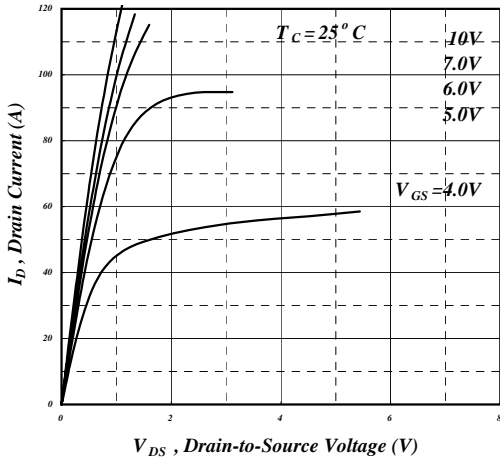


Fig 1. Typical Output Characteristics

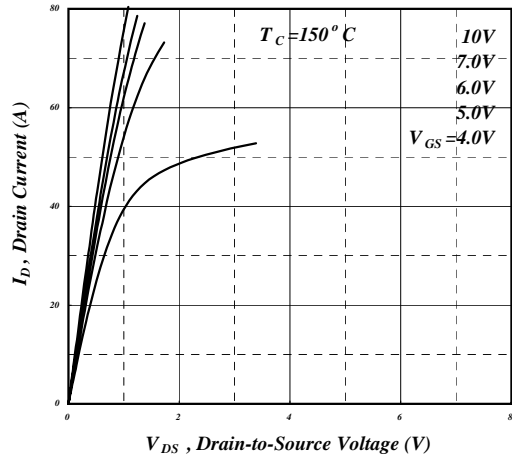


Fig 2. Typical Output Characteristics

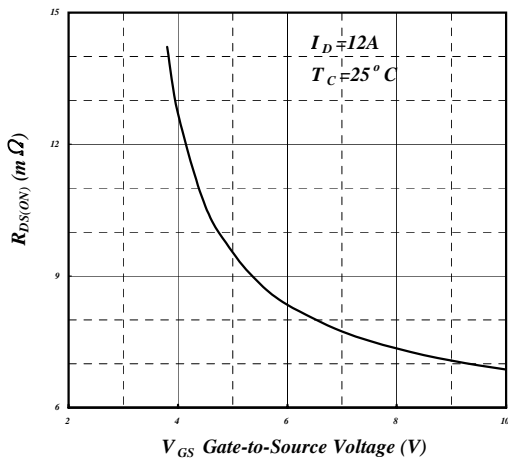


Fig 3. On-Resistance v.s. Gate Voltage

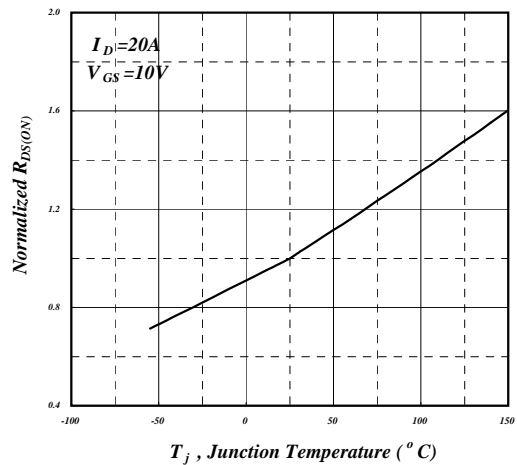


Fig 4. Normalized On-Resistance v.s. Junction Temperature

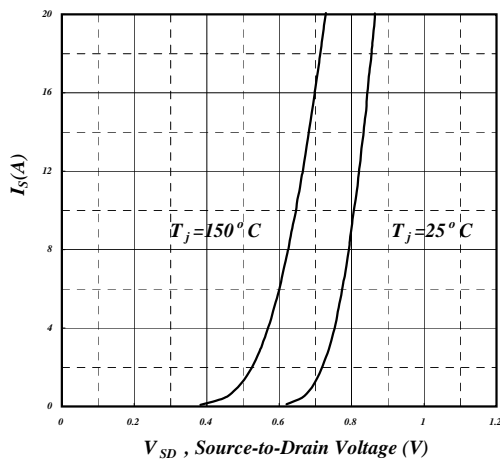


Fig 5. Forward Characteristic of Reverse Diode

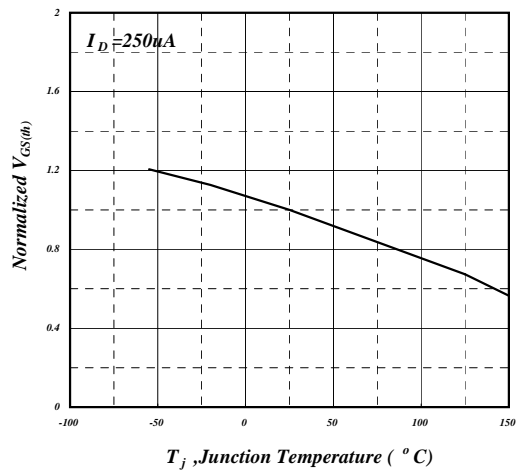


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

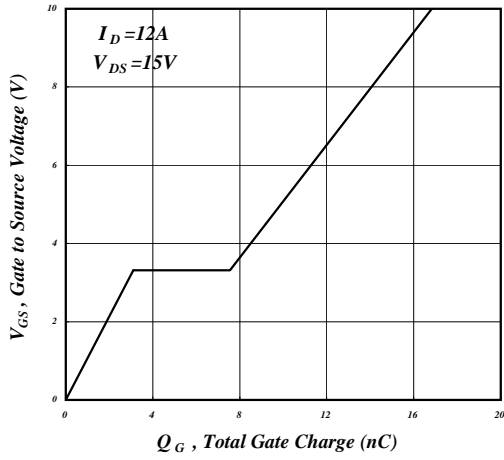


Fig 7. Gate Charge Characteristics

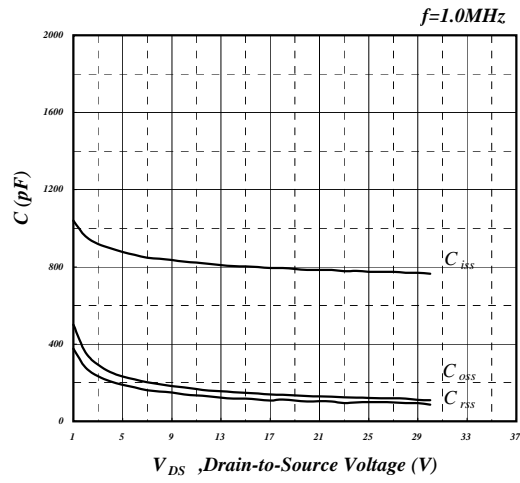


Fig 8. Typical Capacitance Characteristics

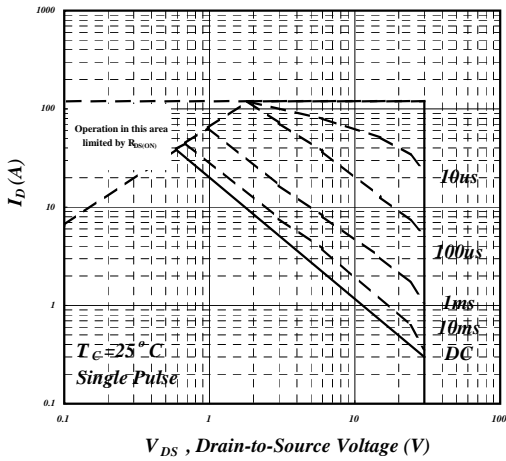


Fig 9. Maximum Safe Operating Area

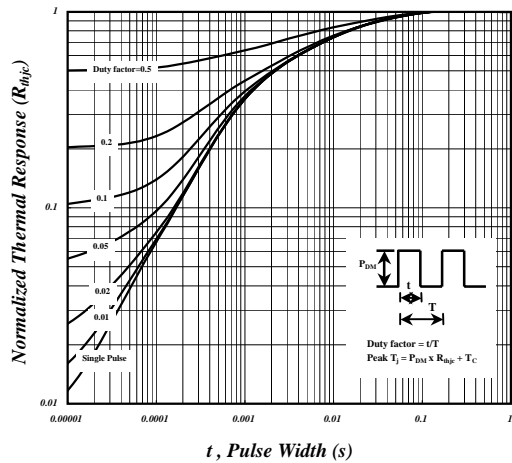


Fig 10. Effective Transient Thermal Impedance

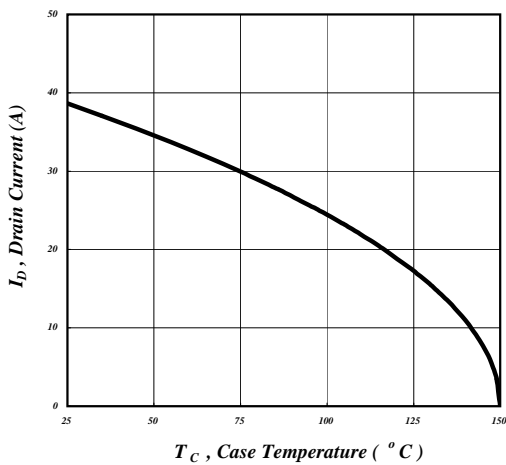


Fig 11. Drain Current v.s. Case Temperature

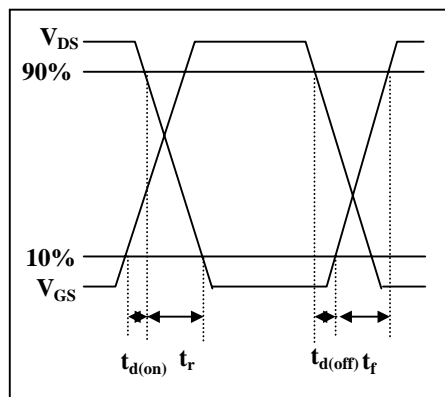


Fig 12. Switching Time Waveform

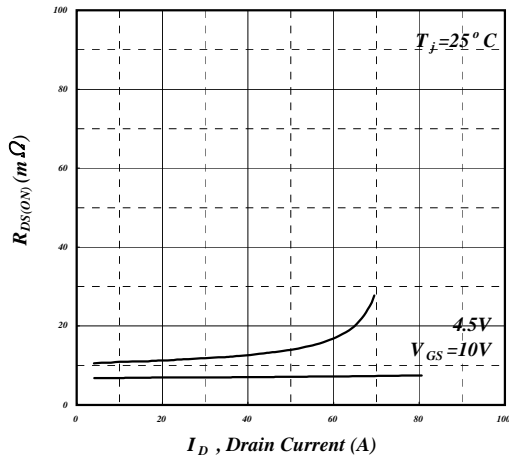


Fig 13. Typ. Drain-Source on State Resistance

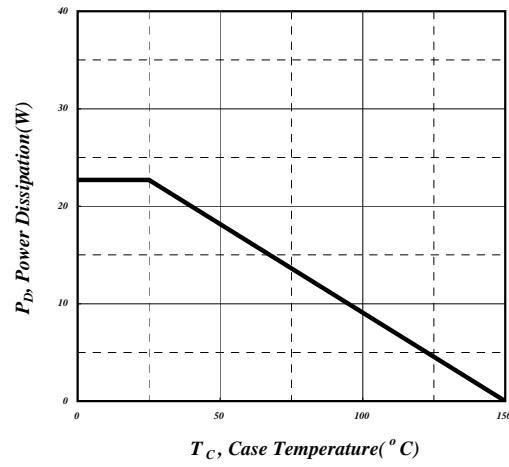


Fig 14. Total Power Dissipation

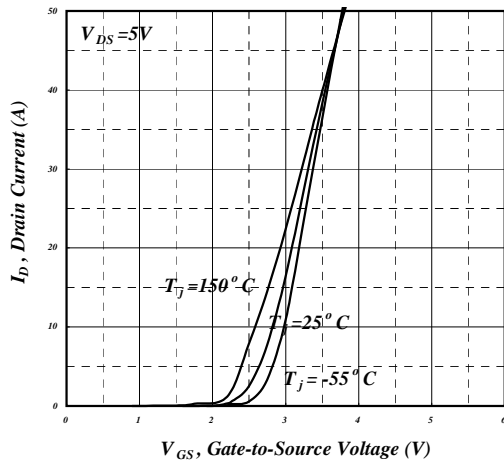


Fig 15. Transfer Characteristics