

# XP10N3R8P

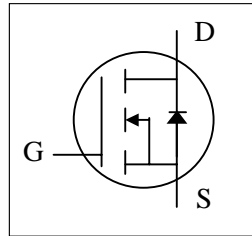
**Halogen-Free Product**

*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*



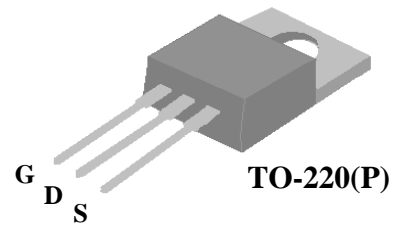
- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



BV <sub>DSS</sub>	100V
R <sub>DS(ON)</sub>	3.88mΩ

## Description

XP10N3R8 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-220 package is widely preferred for all commercial-industrial through hole applications. The low thermal resistance and low package cost contribute to the worldwide popular package.

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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	100	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 <sup>4</sup> (Silicon Limited)	132	A
I <sub>D</sub> @T <sub>C</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V <sup>4</sup> (Package Limited)	130	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	83.5	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	520	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	125	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>3</sup>	211	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	1	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient	62	°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	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=60A$	-	-	3.88	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=60A$	-	100	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=+20V, V_{DS}=0V$	-	-	+0.1	$\mu A$
$Q_g$	Total Gate Charge <sup>5</sup>	$I_D=60A$	-	85	136	nC
$Q_{gs}$	Gate-Source Charge <sup>5</sup>	$V_{DS}=50V$	-	21	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge <sup>5</sup>	$V_{GS}=10V$	-	35	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>5</sup>	$V_{DS}=50V$	-	20	-	ns
$t_r$	Rise Time <sup>5</sup>	$I_D=60A$	-	107	-	ns
$t_{d(off)}$	Turn-off Delay Time <sup>5</sup>	$R_G=6\Omega$	-	63	-	ns
$t_f$	Fall Time <sup>5</sup>	$V_{GS}=10V$	-	200	-	ns
$C_{iss}$	Input Capacitance <sup>5</sup>	$V_{GS}=0V$	-	4100	6560	pF
$C_{oss}$	Output Capacitance <sup>5</sup>	$V_{DS}=80V$	-	620	-	pF
$C_{rss}$	Reverse Transfer Capacitance <sup>5</sup>	$f=1.0\text{MHz}$	-	20	-	pF
$R_g$	Gate Resistance	$f=1.0\text{MHz}$	-	2	4	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=60A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time <sup>5</sup>	$I_S=60A, V_{GS}=0V,$	-	65	-	ns
$Q_{rr}$	Reverse Recovery Charge <sup>5</sup>	$di/dt=100A/\mu s$	-	100	-	nC

**Notes:**

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=50V$ ,  $L=0.1\text{mH}$ ,  $R_G=25\Omega$ ,  $V_{GS}=10V$
4. Package limitation current is 130A .
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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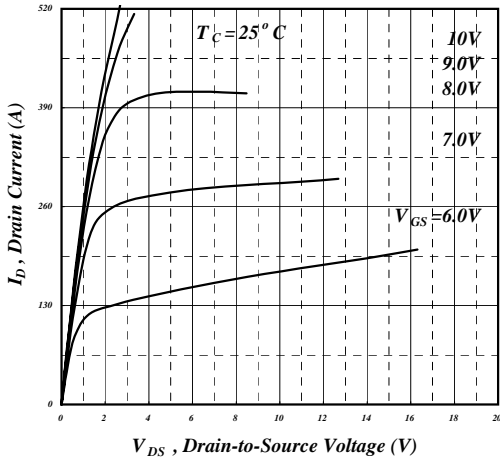


Fig 1. Typical Output Characteristics

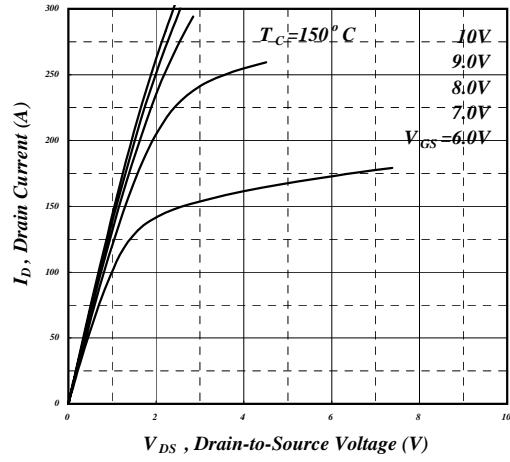


Fig 2. Typical Output Characteristics

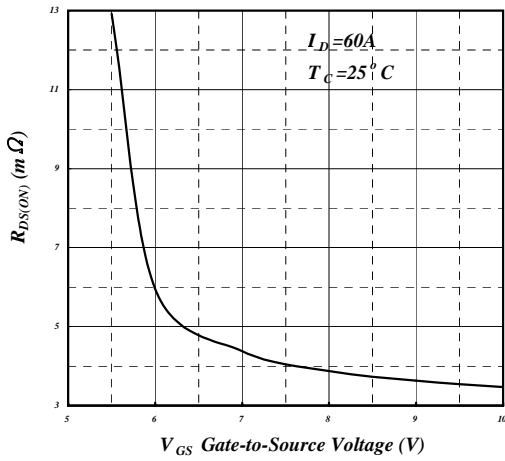


Fig 3. On-Resistance v.s. Gate Voltage

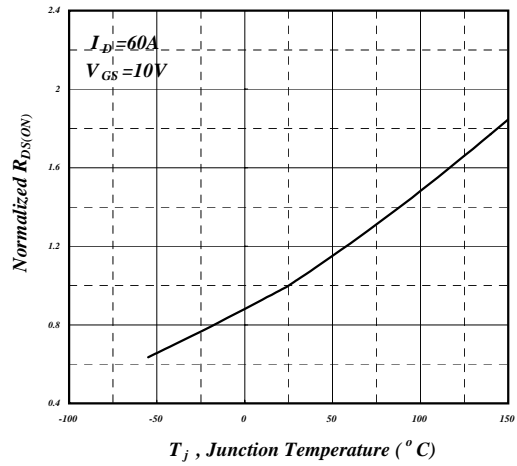


Fig 4. Normalized On-Resistance v.s. Junction Temperature

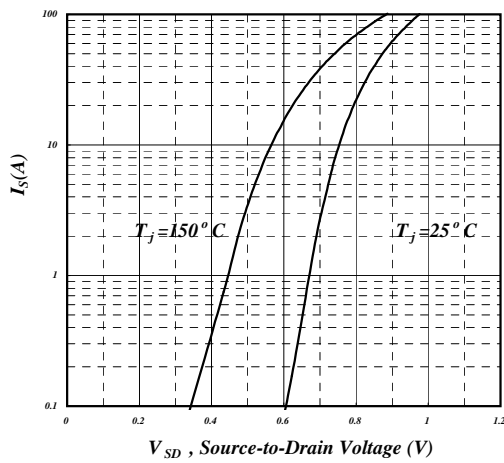


Fig 5. Forward Characteristic of Reverse Diode

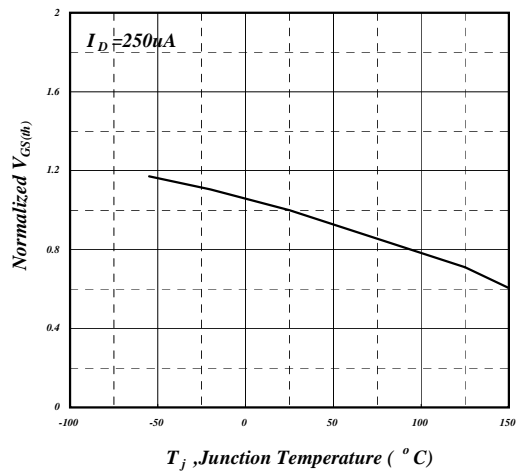


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

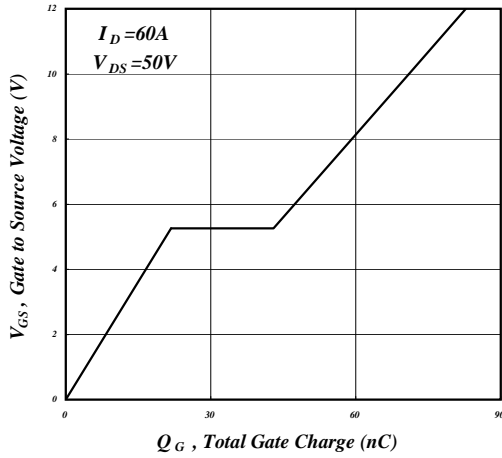


Fig 7. Gate Charge Characteristics

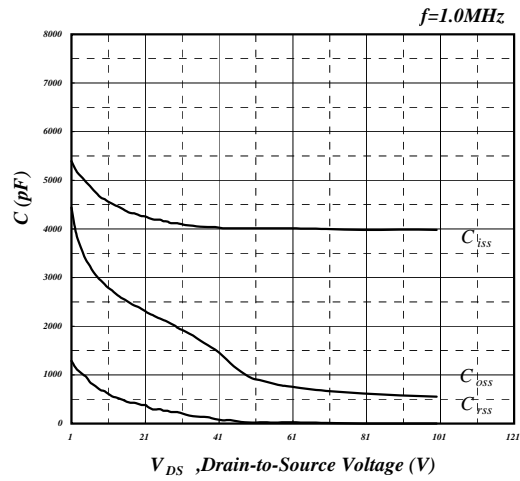


Fig 8. Typical Capacitance Characteristics

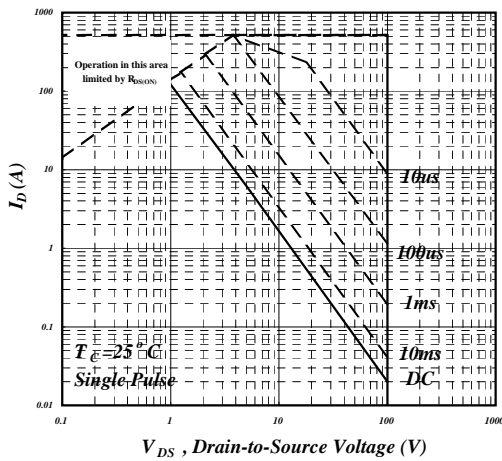


Fig 9. Maximum Safe Operating Area

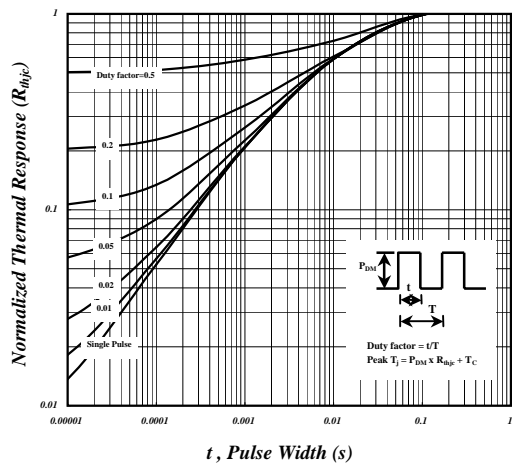


Fig 10. Effective Transient Thermal Impedance

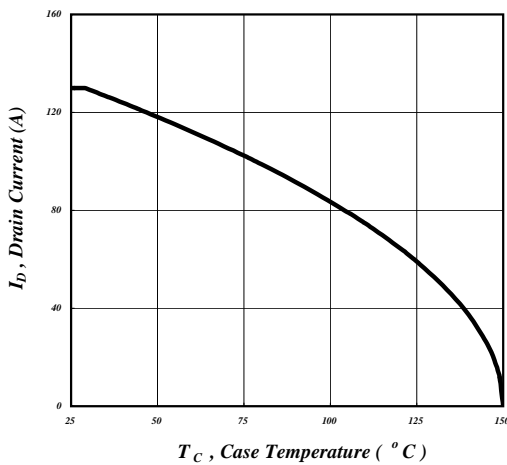


Fig 11. Drain Current v.s. Case Temperature

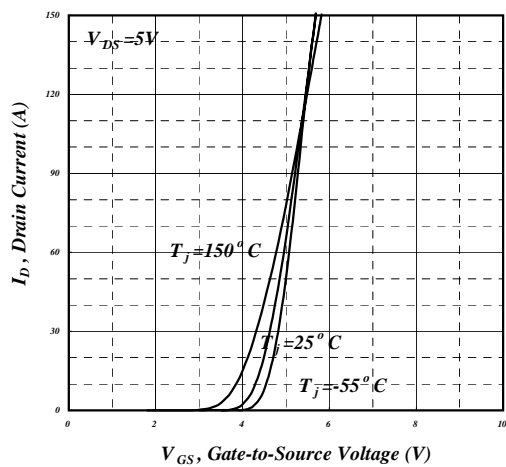
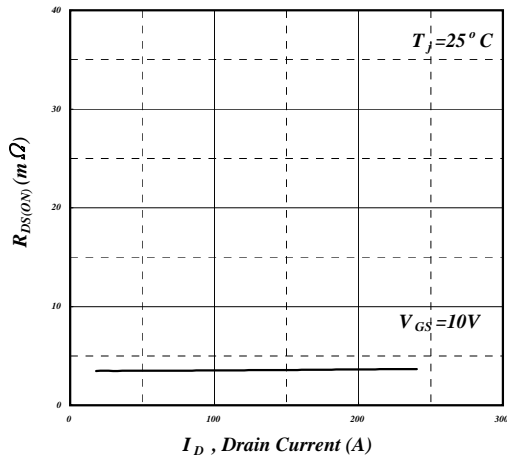
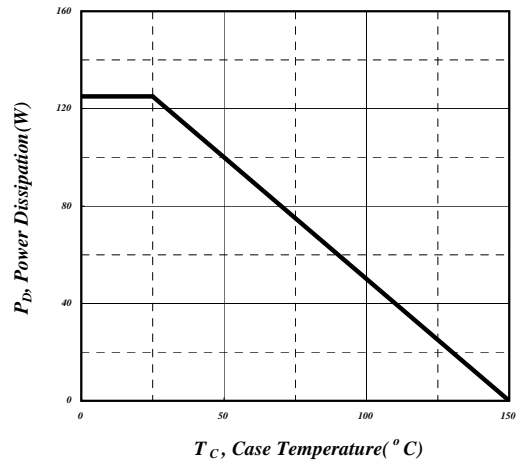


Fig 12. Transfer Characteristics



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



**Fig 14. Total Power Dissipation**