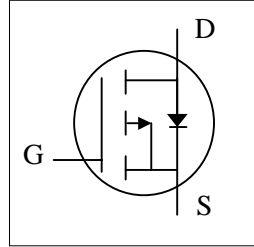


- ▼ Low Gate Charge
- ▼ Fast Switching Characteristic
- ▼ Simple Drive Requirement
- ▼ RoHS Compliant & Halogen-Free

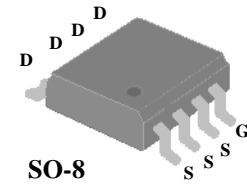


$BV_{DSS}$	-30V
$R_{DS(ON)}$	20m $\Omega$
$I_D^3$	-9.3A

## Description

XP3P020 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 SO-8 package is widely preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.



## 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
$I_D @ T_A=25^\circ\text{C}$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	-9.3	A
$I_D @ T_A=70^\circ\text{C}$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	-7.4	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-40	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	2.5	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-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	50	$^\circ\text{C}/\text{W}$

**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 <sup>2</sup>	$V_{GS}=-10V, I_D=-9A$	-	-	20	m $\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	-	-	36	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=-5V, I_D=-9A$	-	18	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V$	-	-	-10	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge	$I_D=-5A$	-	12	19.2	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=-15V$	-	4.5	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	4	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=-15V$	-	11	-	ns
$t_r$	Rise Time	$I_D=-1A$	-	7	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	43	-	ns
$t_f$	Fall Time	$V_{GS}=-10V$	-	20	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	1300	2080	pF
$C_{oss}$	Output Capacitance	$V_{DS}=-15V$	-	190	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	135	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=-2.1A, V_{GS}=0V$	-	-	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=-9A, V_{GS}=0V,$	-	12	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=-100A/\mu s$	-	5	-	nC

**Notes:**

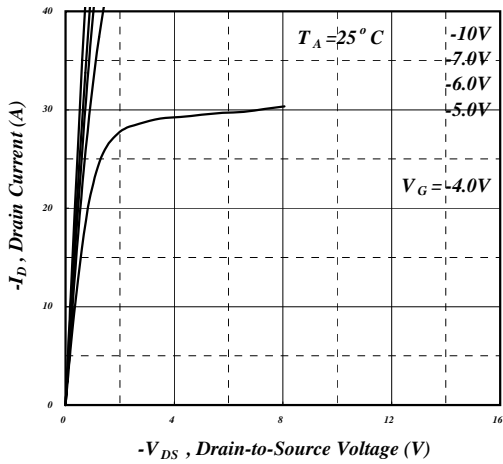
1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board,  $t \leq 10s$ ; 125 °C/W when mounted on Min. copper pad.
4. Starting  $T_j=25^{\circ}\text{C}$ ,  $V_{DD}=-30V$ ,  $L=0.1\text{mH}$ ,  $R_G=25\Omega$

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

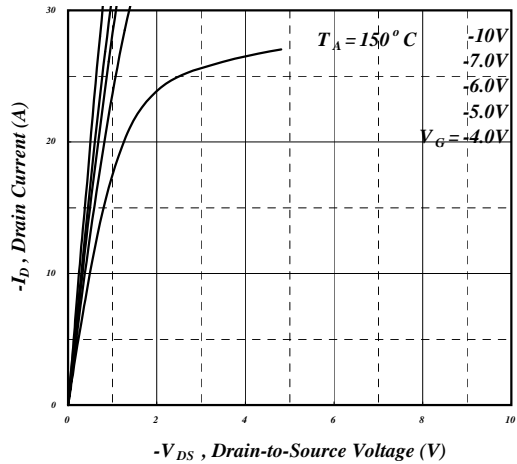
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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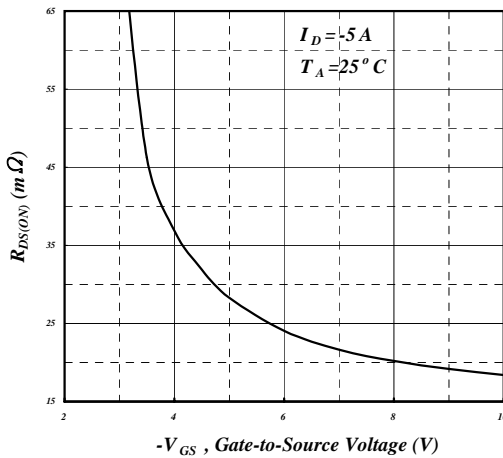
XSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.



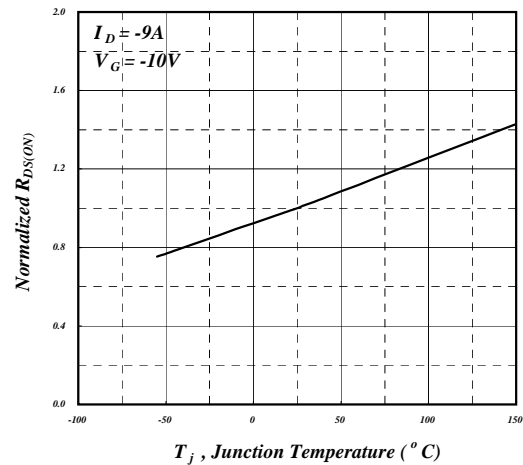
**Fig 1. Typical Output Characteristics**



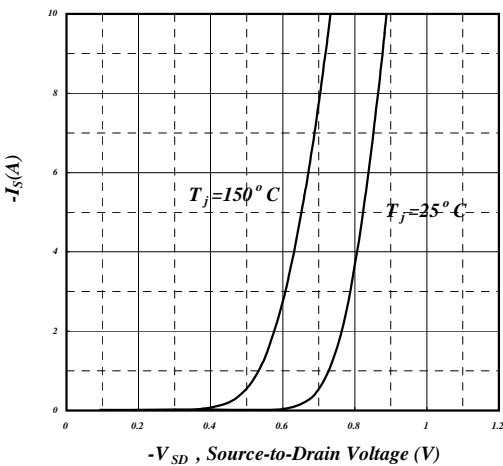
**Fig 2. Typical Output Characteristics**



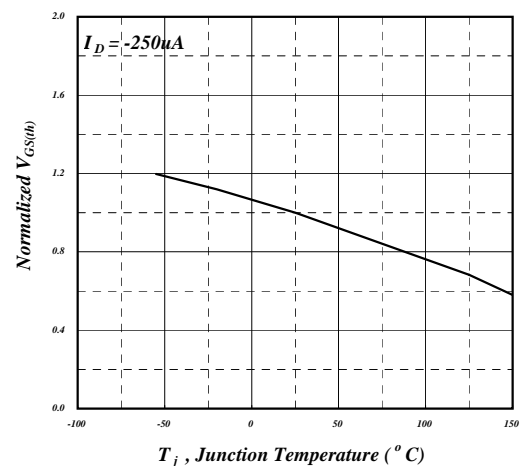
**Fig 3. On-Resistance v.s. Gate Voltage**



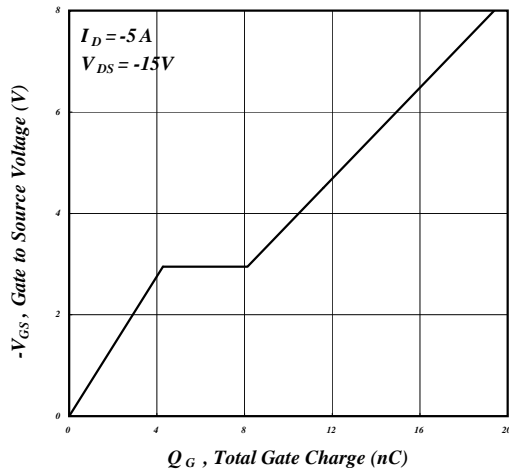
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



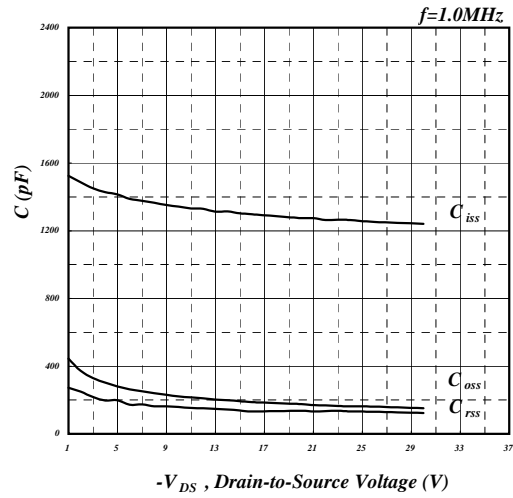
**Fig 5. Forward Characteristic of Reverse Diode**



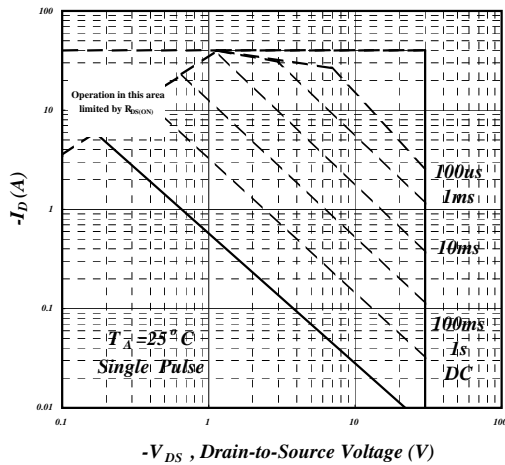
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



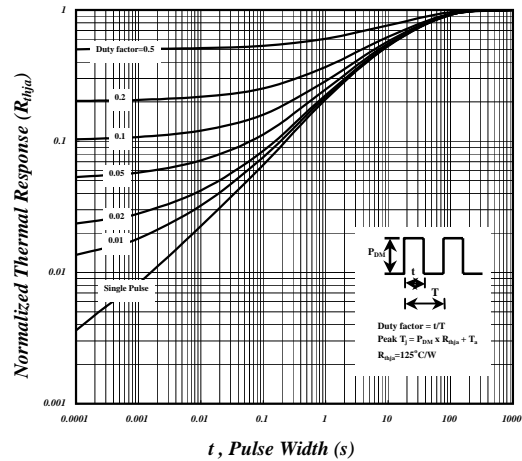
**Fig 7. Gate Charge Characteristics**



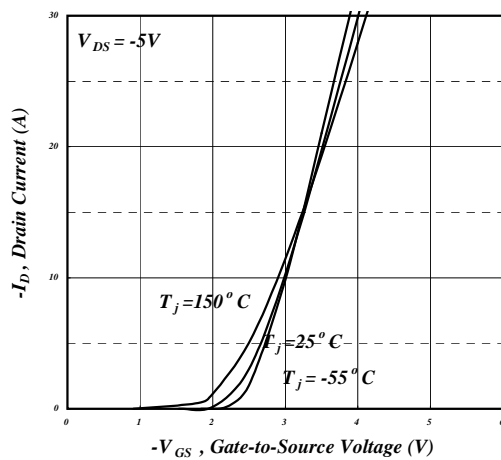
**Fig 8. Typical Capacitance Characteristics**



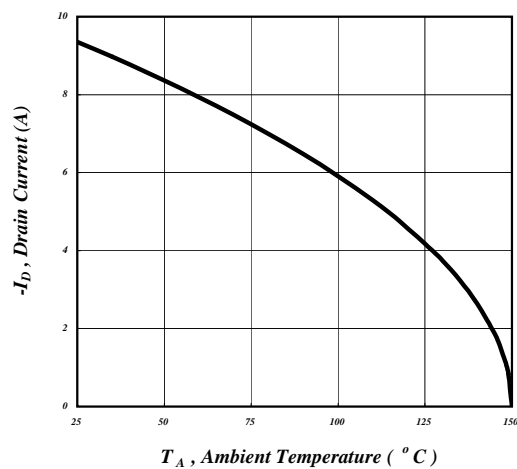
**Fig 9. Maximum Safe Operating Area**



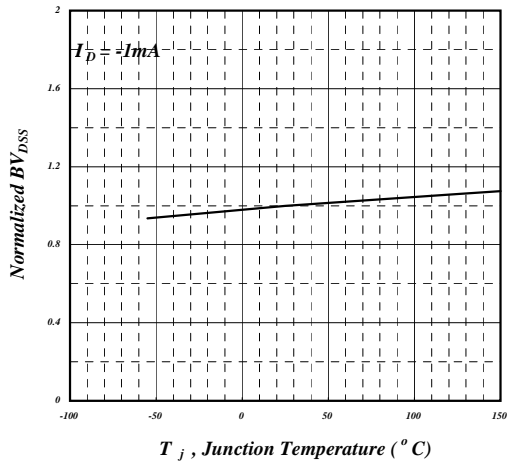
**Fig 10. Effective Transient Thermal Impedance**



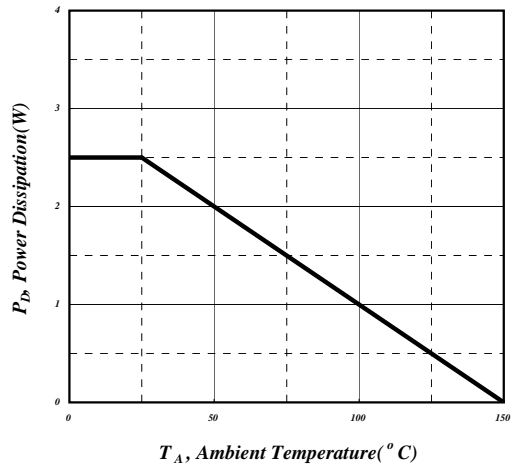
**Fig 11. Transfer Characteristics**



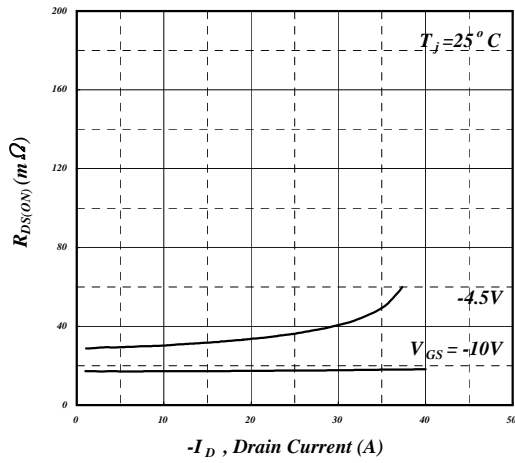
**Fig 12. Drain Current v.s. Ambient Temperature**



**Fig 13. Normalized BV<sub>DSS</sub> v.s. Junction Temperature**



**Fig 14. Total Power Dissipation**



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

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**MARKING INFORMATION**

