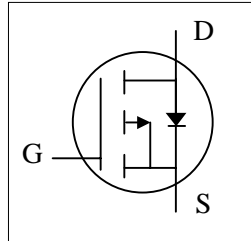


- ▼ Lower On-resistance
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

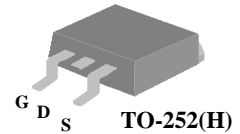


$BV_{DSS}$	-40V
$R_{DS(ON)}$	16m $\Omega$
$I_D$	-45A

### Description

XP9561 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 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 @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-40	V
$V_{GS}$	Gate-Source Voltage	+20	V
$I_D@T_C=25^\circ\text{C}$	Drain Current, $V_{GS}$ @ 10V	-45	A
$I_D@T_C=100^\circ\text{C}$	Drain Current, $V_{GS}$ @ 10V	-29	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-180	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	54.3	W
$T_{STG}$	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	Units
Rthj-c	Maximum Thermal Resistance Junction-case	2.3	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	62.5	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-30A$	-	-	16	m $\Omega$
		$V_{GS}=-4.5V, I_D=-20A$	-	-	28	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=-10V, I_D=-20A$	-	33	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V$	-	-	-10	$\mu A$
	Drain-Source Leakage Current ( $T_j=125^{\circ}\text{C}$ )	$V_{DS}=-32V, V_{GS}=0V$	-	-	-250	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=+20V, V_{DS}=0V$	-	-	+100	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=-20A$	-	25	40	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=-32V$	-	4.4	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	18	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=-20V$	-	9	-	ns
$t_r$	Rise Time	$I_D=-20A$	-	46	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	46	-	ns
$t_f$	Fall Time	$V_{GS}=-10V$	-	95	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	1700	2720	pF
$C_{oss}$	Output Capacitance	$V_{DS}=-25V$	-	360	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	290	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=-20A, V_{GS}=0V$	-	-	-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=-20A, V_{GS}=0V,$	-	31	-	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=-100A/\mu s$	-	26	-	nC

**Notes:**

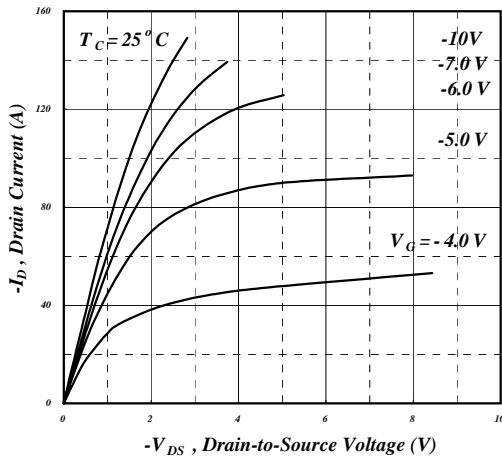
1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

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

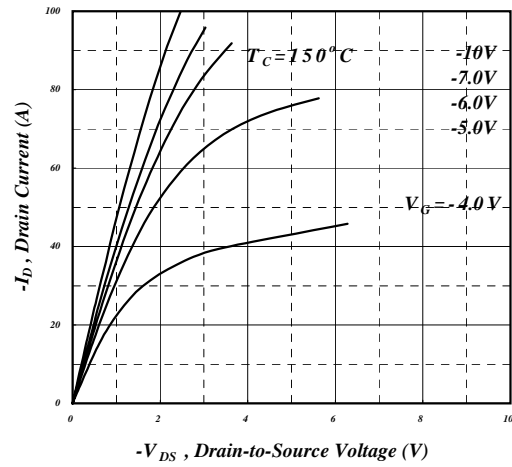
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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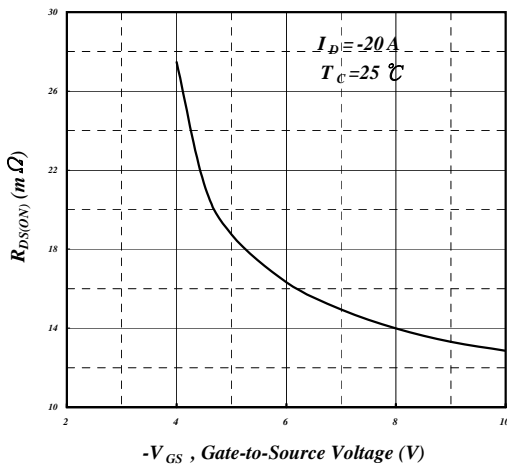
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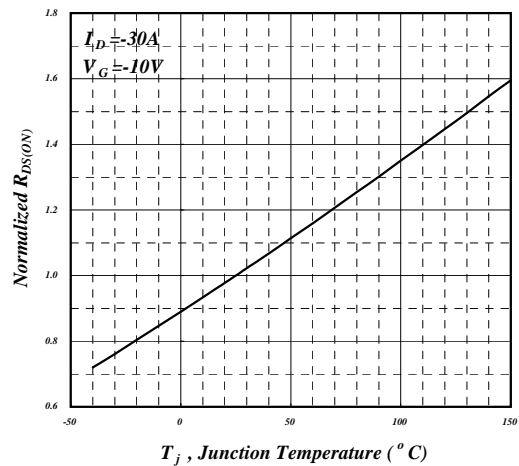
**Fig 1. Typical Output Characteristics**



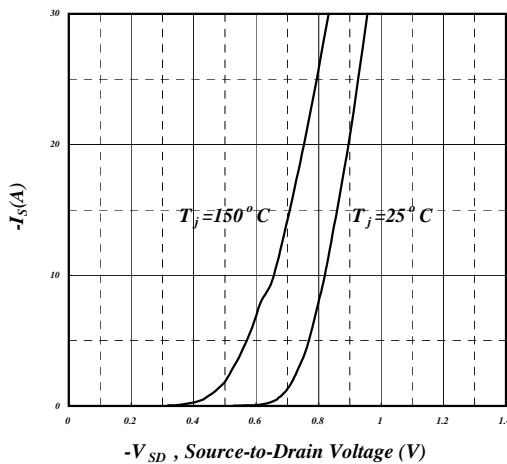
**Fig 2. Typical Output Characteristics**



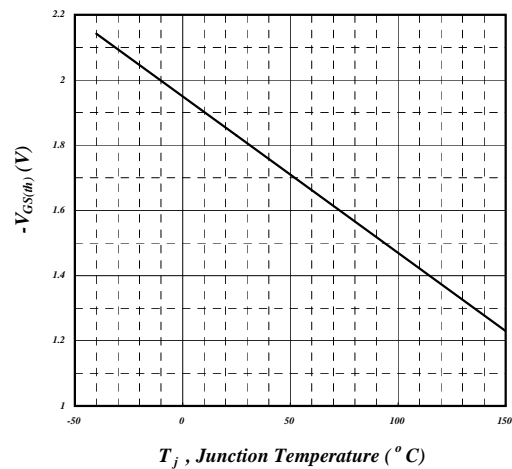
**Fig 3. On-Resistance v.s. Gate Voltage**



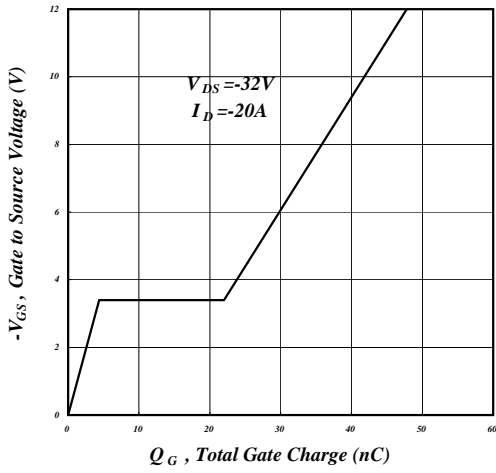
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



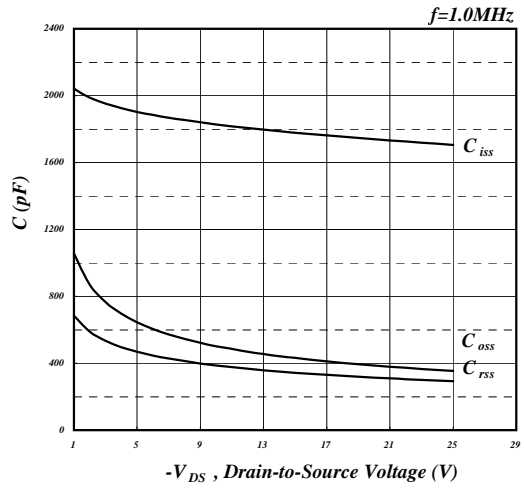
**Fig 5. Forward Characteristic of Reverse Diode**



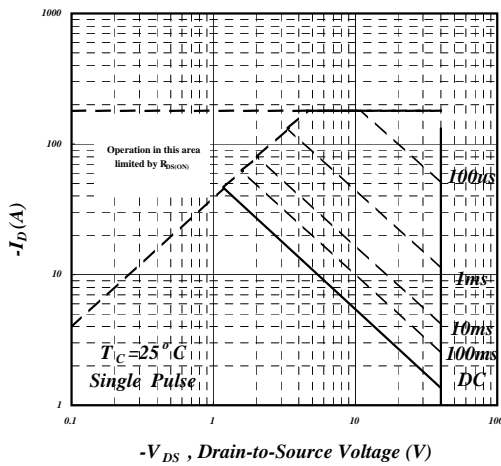
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



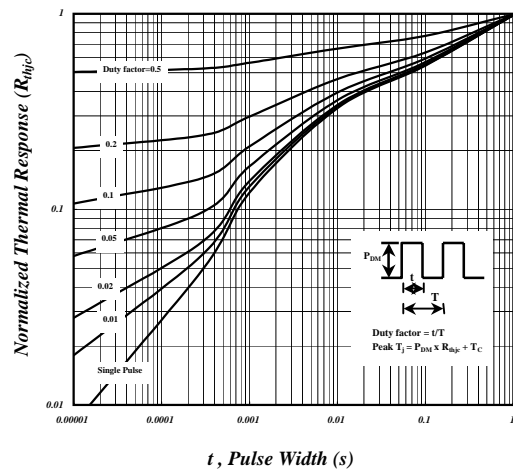
**Fig 7. Gate Charge Characteristics**



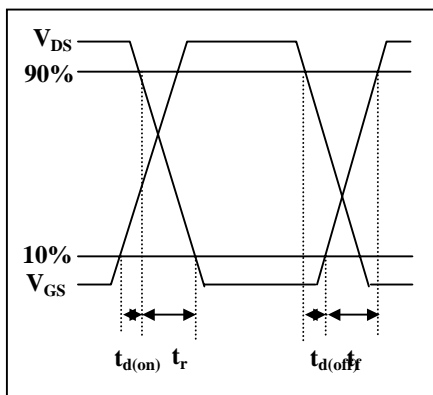
**Fig 8. Typical Capacitance Characteristics**



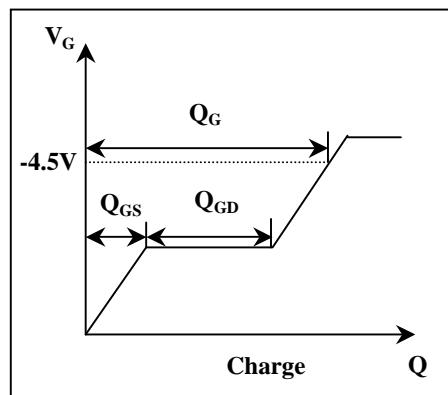
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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**MARKING INFORMATION**

TO-252

