

# XP9561GH-HF

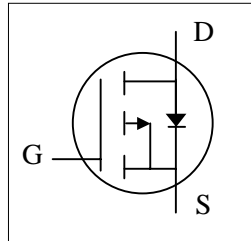
**Halogen-Free Product**



P-CHANNEL ENHANCEMENT MODE

POWER MOSFET

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

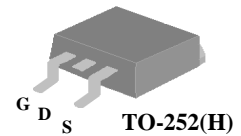


$BV_{DSS}$	-40V
$R_{DS(ON)}$	16m $\Omega$
$I_D$	-45A

## Description

XP9561 series are 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 @ $T_j=25^\circ\text{C}$ (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	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance Junction-ambient	110	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=+20V, V_{DS}=0V$	-	-	$\pm 100$	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.

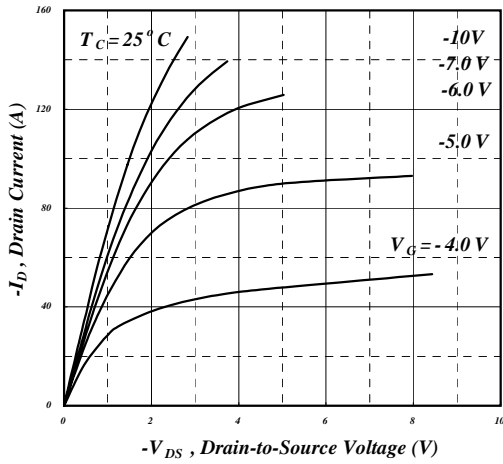
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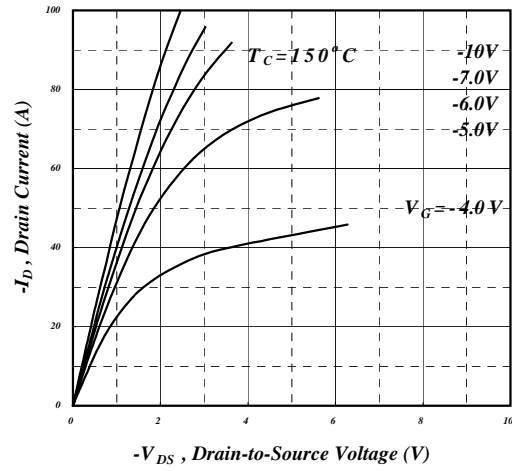
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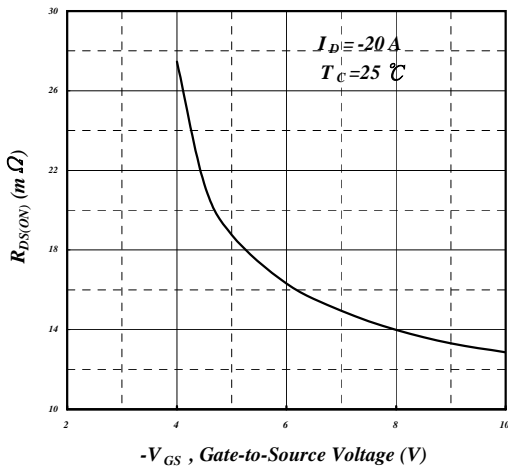
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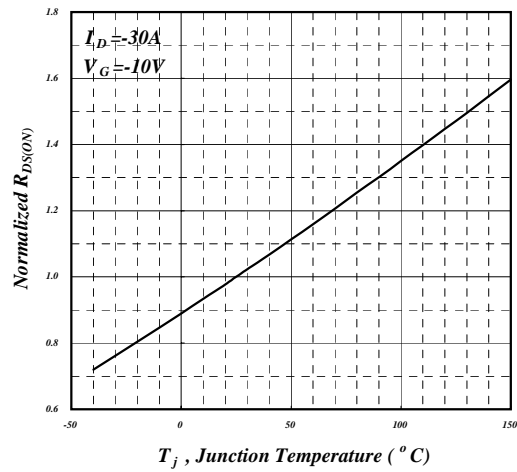
**Fig 1. Typical Output Characteristics**



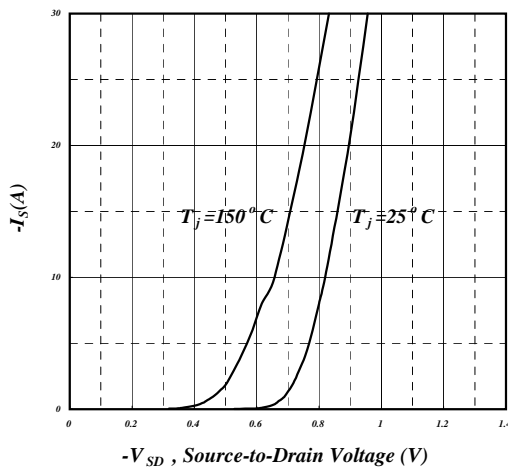
**Fig 2. Typical Output Characteristics**



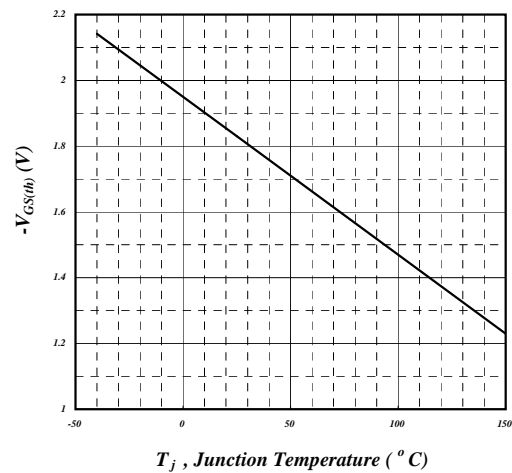
**Fig 3. On-Resistance v.s. Gate Voltage**



**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**

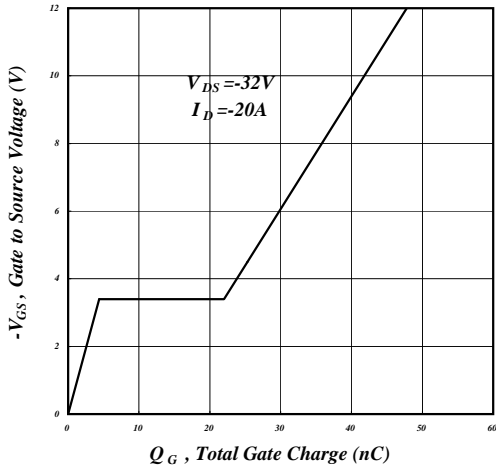


Fig 7. Gate Charge Characteristics

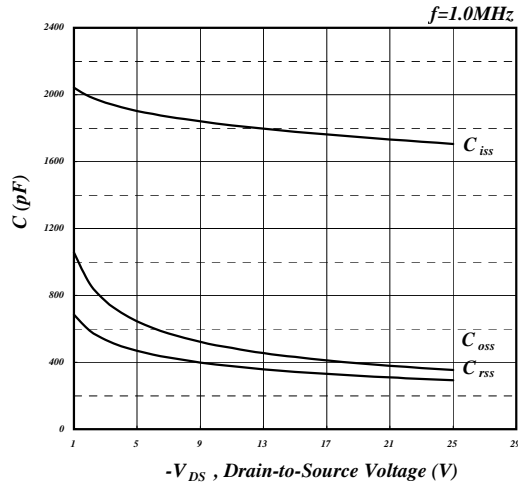


Fig 8. Typical Capacitance Characteristics

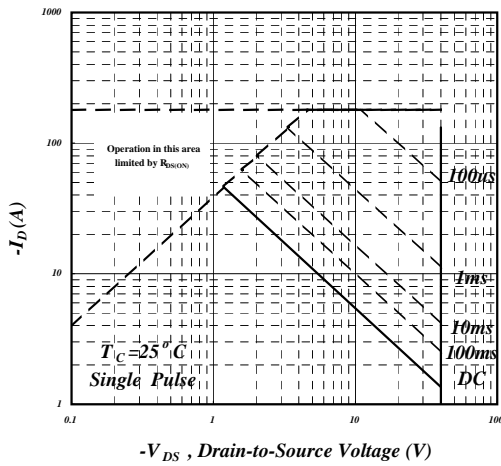


Fig 9. Maximum Safe Operating Area

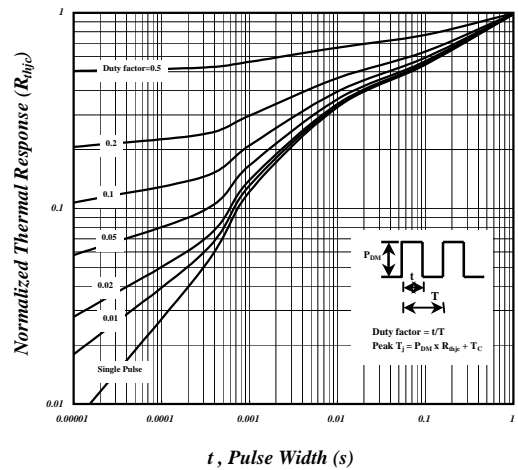


Fig 10. Effective Transient Thermal Impedance

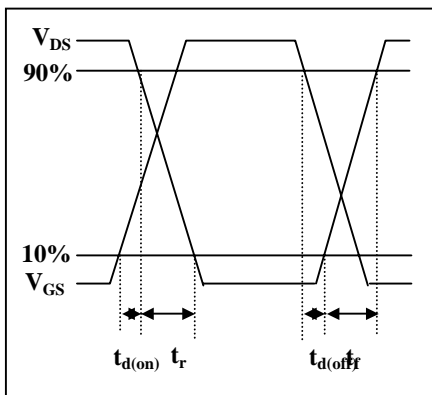


Fig 11. Switching Time Waveform

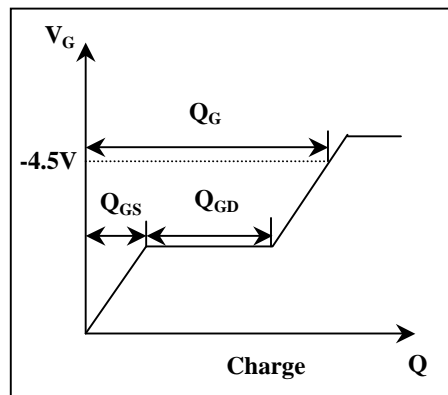
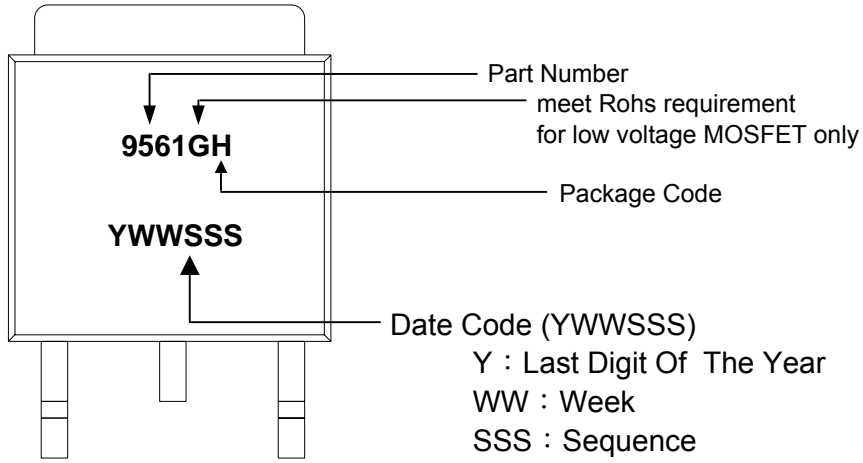


Fig 12. Gate Charge Waveform

## MARKING INFORMATION

TO-252



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