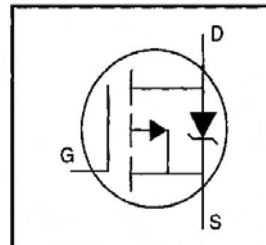


IRFD9120PbF

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- For Automatic Insertion
- End Stackable
- P-Channel
- 175°C Operating Temperature
- Fast Switching
- Lead-Free



$$V_{DSS} = -100V$$

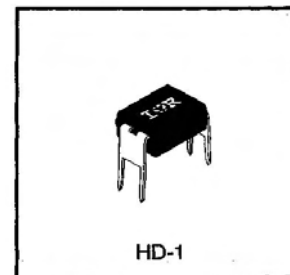
$$R_{DS(on)} = 0.60\Omega$$

$$I_D = -1.0A$$

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The 4-pin DIP package is a low cost machine-insertable case style which can be stacked in multiple combinations on standard 0.1 inch pin centers. The dual drain serves as a thermal link to the mounting surface for power dissipation levels up to 1 watt.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10 V$	-1.0	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10 V$	-0.70	
I_{DM}	Pulsed Drain Current ①	-8.0	
$P_D @ T_C = 25^\circ C$	Power Dissipation	1.3	W
	Linear Derating Factor	0.0083	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	140	mJ
I_{AR}	Avalanche Current ①	-1.0	A
E_{AR}	Repetitive Avalanche Energy ①	0.13	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.5	V/ns
T_J	Operating Junction and	-55 to +175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient	—	—	120	°C/W

IRFD9120PbF

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Rectifier

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-100	—	—	V	$V_{GS}=0V$, $I_D=-250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.10	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D=-1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.60	Ω	$V_{GS}=-10V$, $I_D=-0.60A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS}=V_{GS}$, $I_D=-250\mu A$
g_{fs}	Forward Transconductance	0.71	—	—	S	$V_{DS}=-50V$, $I_D=-0.60A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	-100	μA	$V_{DS}=-100V$, $V_{GS}=0V$
		—	—	-500		$V_{DS}=-80V$, $V_{GS}=0V$, $T_J=150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS}=-20V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS}=20V$
Q_g	Total Gate Charge	—	—	18	nC	$I_D=-6.8A$
Q_{gs}	Gate-to-Source Charge	—	—	3.0		$V_{DS}=-80V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	9.0		$V_{GS}=-10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	9.6	—	ns	$V_{DD}=-50V$
t_r	Rise Time	—	29	—		$I_D=-6.8A$
$t_{d(off)}$	Turn-Off Delay Time	—	21	—		$R_G=18\Omega$
t_f	Fall Time	—	25	—		$R_D=7.1\Omega$ See Figure 10 ④
L_D	Internal Drain Inductance	—	4.0	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	6.0	—		
C_{iss}	Input Capacitance	—	390	—	pF	$V_{GS}=0V$
C_{oss}	Output Capacitance	—	170	—		$V_{DS}=-25V$
C_{rss}	Reverse Transfer Capacitance	—	45	—		$f=1.0MHz$ See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-1.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-8.0		
V_{SD}	Diode Forward Voltage	—	—	-6.3	V	$T_J=25^\circ\text{C}$, $I_S=-1.0A$, $V_{GS}=0V$ ④
t_{rr}	Reverse Recovery Time	—	98	200	ns	$T_J=25^\circ\text{C}$, $I_F=-6.8A$
Q_{rr}	Reverse Recovery Charge	—	0.33	0.66	μC	$di/dt=100A/\mu s$ ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)

② $V_{DD}=-25V$, starting $T_J=25^\circ\text{C}$, $L=52mH$, $R_G=25\Omega$, $I_{AS}=-2.0A$ (See Figure 12)

③ $I_{SD}\leq 6.8A$, $di/dt\leq 110A/\mu s$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 175^\circ\text{C}$

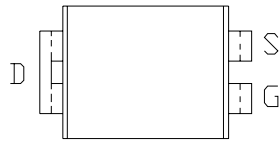
④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

IRFD9120PbF

Hexdip Package Outline

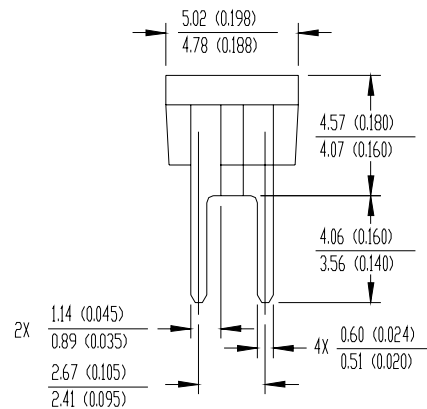
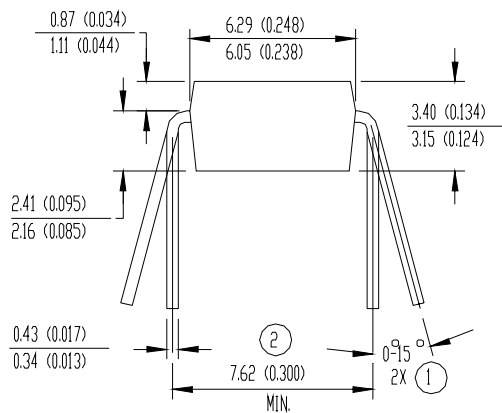
Dimensions are shown in millimeters (inches)

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IOR Rectifier



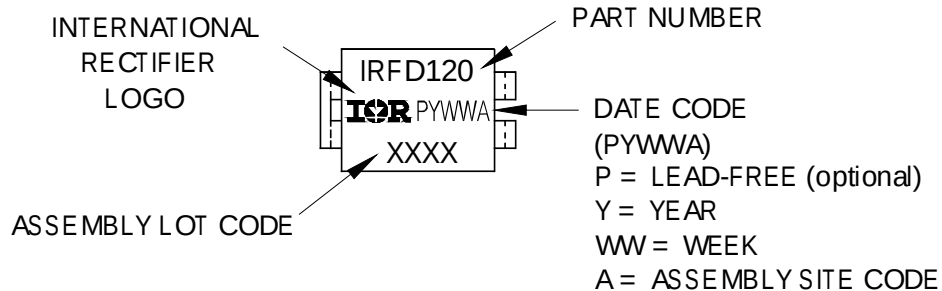
NOTES:

- ① APPLIES TO SPREAD OF LEADS PRIOR TO INSTALLATION
- ② APPLIES TO INSTALLED LEAD CENTERS
- 3 CONTROLLING DIMENSION: INCH.
- 4 DIMENSIONS ARE SHOWN MILLIMETERS (INCHES).
- 5 CASE STYLE HD-1 (SIMILAR TO JEDEC OUTLINE MO-001AN)
- 6 DIMENSIONS SHOWN ARE BEFORE SOLDER DIP
SOLDER DIP MAX. + 0.16 (0.006)



Hexdip Part Marking Information

EXAMPLE: THIS IS AN IRFD120



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