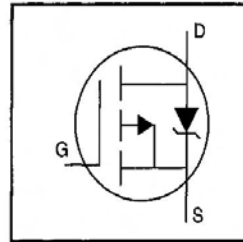


IRFD9220PbF

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- For Automatic Insertion
- End Stackable
- P-Channel
- Fast Switching
- Ease of Paralleling
- Lead-Free

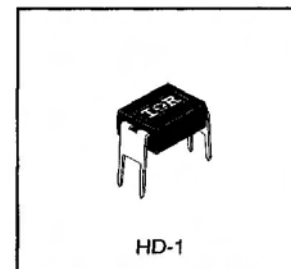


$V_{DSS} = -200V$
$R_{DS(on)} = 1.5\Omega$
$I_D = -0.56A$

Description

The HEXFET technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry and unique processing of the HEXFET design achieve very low on-state resistance combined with high transconductance and extreme device ruggedness.

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, $V_{GS} @ -10 V$	-0.56	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10 V$	-0.36	
I_{DM}	Pulsed Drain Current ①	-4.5	
$P_D @ T_C = 25^\circ C$	Power Dissipation	1.0	W
	Linear Derating Factor	0.0083	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	420	mJ
I_{AR}	Avalanche Current ①	-0.56	A
E_{AR}	Repetitive Avalanche Energy ①	0.10	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C
	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

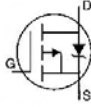
IRFD9220PbF

International
IR 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	-200	—	—	V	$V_{GS}=0V, I_D=-250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.22	—	V/°C	Reference to $25^\circ\text{C}, I_D=-1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	1.5	Ω	$V_{GS}=-10V, I_D=-0.34A$ 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	0.55	—	—	S	$V_{DS}=-50V, I_D=-0.35A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	-100	μA	$V_{DS}=-200V, V_{GS}=0V$
		—	—	-500		$V_{DS}=-160V, V_{GS}=0V, T_J=125^\circ\text{C}$
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	—	—	15	nC	$I_D=-2.1A$
Q_{gs}	Gate-to-Source Charge	—	—	3.2		$V_{DS}=-160V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	8.4		$V_{GS}=-10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	8.8	—	ns	$V_{DD}=-100V$
t_r	Rise Time	—	27	—		$I_D=-3.9A$
$t_{d(off)}$	Turn-Off Delay Time	—	7.3	—		$R_G=18\Omega$
t_f	Fall Time	—	19	—		$R_D=24\Omega$ 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	—	340	—	pF	$V_{GS}=0V$
C_{oss}	Output Capacitance	—	110	—		$V_{DS}=-25V$
C_{rss}	Reverse Transfer Capacitance	—	33	—		$f=1.0\text{MHz}$ See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-0.56	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-4.5		
V_{SD}	Diode Forward Voltage	—	—	-6.3	V	$T_J=25^\circ\text{C}, I_S=-0.56A, V_{GS}=0V$ ④
t_{rr}	Reverse Recovery Time	—	150	300	ns	$T_J=25^\circ\text{C}, I_F=-3.9A$
Q_{rr}	Reverse Recovery Charge	—	0.97	2.0	μC	$di/dt=100A/\mu s$ ④

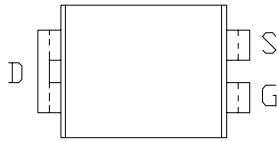
Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)
- ② $V_{DD}=-50V$, starting $T_J=25^\circ\text{C}$, $L=130\text{mH}$, $R_G=25\Omega$, $I_{AS}=-2.2A$ (See Figure 12)
- ③ $I_{SD}\leq 3.9A$, $di/dt\leq 95A/\mu s$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

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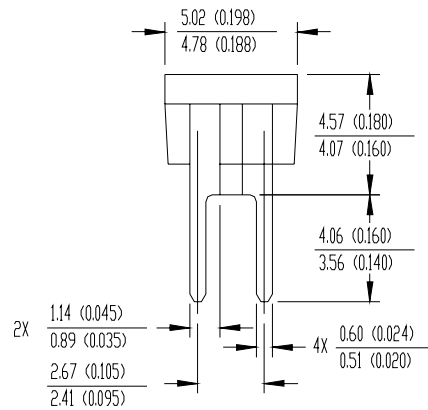
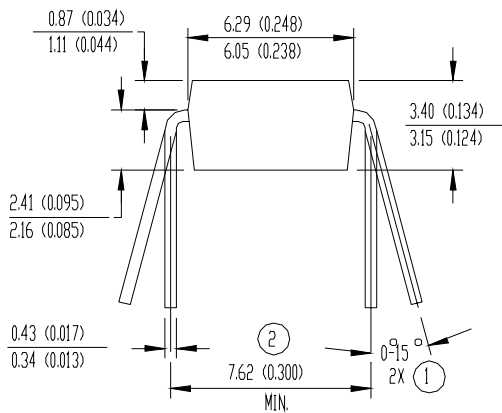
Hexdip Package Outline

Dimensions are shown in millimeters (inches)



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

