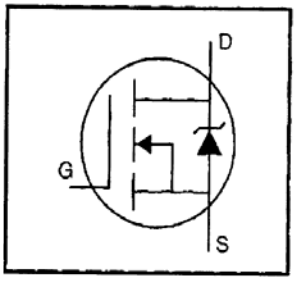
PD- 95933A

International
IOR Rectifier

IRFD024PbF

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- For Automatic Insertion
- End Stackable
- 175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Lead-Free



V_{DSS} = 60V

$R_{DS(on)}$ = 0.10Ω

I_D = 2.5A

HD-1

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_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	2.5	A
I_D @ T_A = 100°C	Continuous Drain Current, V_{GS} @ 10V	1.8	
I_{DM}	Pulsed Drain Current ①	20	
P_D @T_A = 25°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	91	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10sec		

Thermal Resistance

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

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	60	—	—	V	V_{GS}=0V, I_D= 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.061	—	V/°C	Reference to 25°C, I_D= 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.10	Ω	V_{GS}=10V, I_D=1.5A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS}=V_{GS}, I_D= 250µA
g_{fs}	Forward Transconductance	0.90	—	—	S	V_{DS}=25V, I_D=1.5A ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	µA	V_{DS}=60V, V_{GS}=0V
		—	—	250		V_{DS}=48V, V_{GS}=0V, T_J=150°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	—	—	25	nC	I_D=17A
Q_{gs}	Gate-to-Source Charge	—	—	5.8		V_{DS}=48V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	11		V_{GS}=10V See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	13	—	ns	V_{DD}=30V
t_r	Rise Time	—	58	—		I_D=17A
$t_{d(off)}$	Turn-Off Delay Time	—	25	—		R_G=18Ω
t_f	Fall Time	—	42	—		R_D=1.7Ω 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	—	640	—	pF	V_{GS}=0V
C_{oss}	Output Capacitance	—	360	—		V_{DS}= 25V
C_{rss}	Reverse Transfer Capacitance	—	79	—		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)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	20		
V_{SD}	Diode Forward Voltage	—	—	1.5	V	T_J=25°C, I_S=2.5A, V_{GS}=0V ④
t_{rr}	Reverse Recovery Time	—	88	180	ns	T_J=25°C, I_F=17A
Q_{rr}	Reverse Recovery Charge	—	0.29	0.64	µC	di/dt=100A/µs 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°C, L=16mH R_G=25Ω, I_{AS}=2.5A (See Figure 12)

③ I_{SD}≤17A, di/dt≤140A/µs, V_{DD}≤$V_{(BR)DSS}$, T_J≤175°C

④ Pulse width ≤ 300 µs; duty cycle ≤2%.

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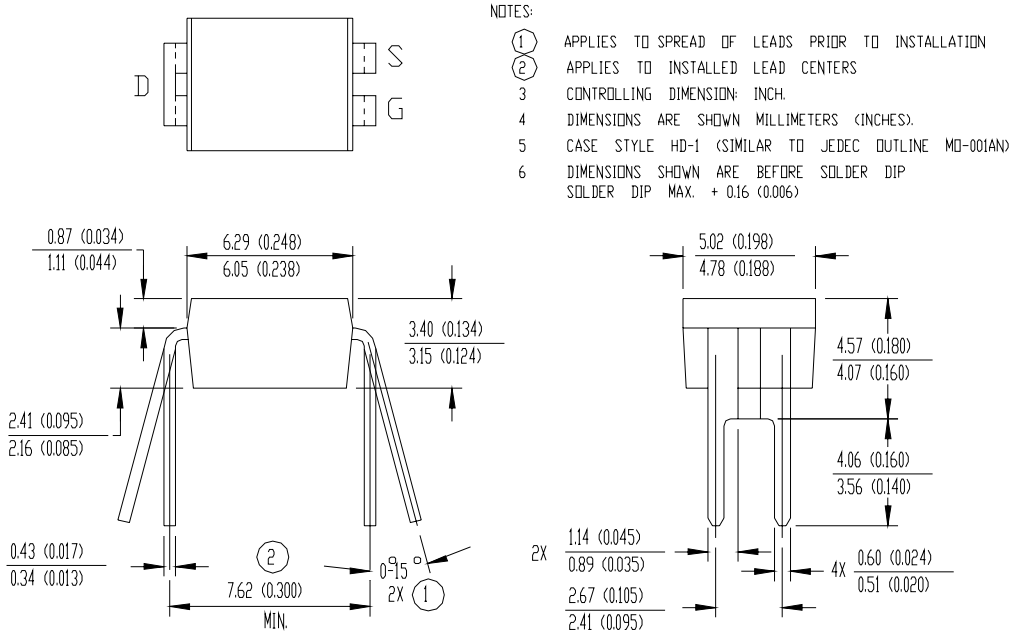
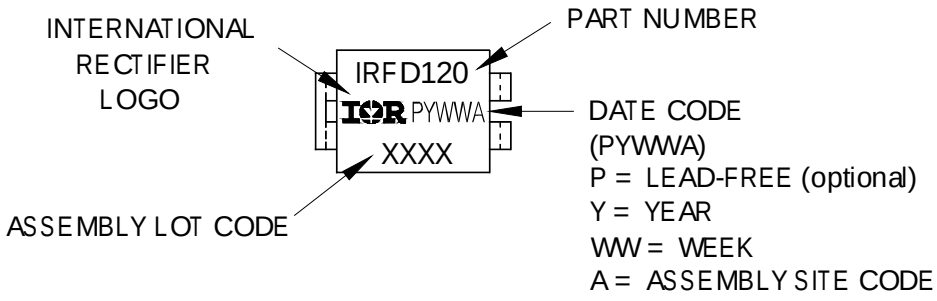
Hexdip Package Outline

Dimensions are shown in millimeters (inches)



Hexdip Part Marking Information

EXAMPLE: THIS IS AN IRFD120



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