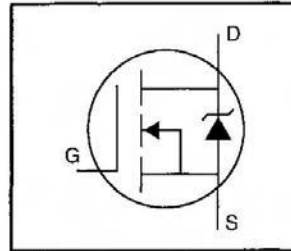


IRFIBE20GPbF

HEXFET® Power MOSFET

- Isolated Package
- High Voltage Isolation= 2.5KVRMS ⑤
- Sink to Lead Creepage Dist.= 4.8mm
- Dynamic dv/dt Rating
- Low Thermal Resistance
- Lead-Free



$$V_{DSS} = 800V$$

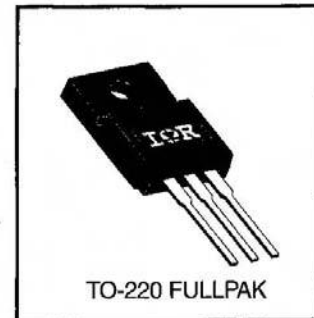
$$R_{DS(on)} = 6.5\Omega$$

$$I_D = 1.4A$$

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 TO-220 Fullpak eliminates the need for additional insulating hardware in commercial-industrial applications. The moulding compound used provides a high isolation capability and a low thermal resistance between the tab and external heatsink. This isolation is equivalent to using a 100 micron mica barrier with standard TO-220 product. The Fullpak is mounted to a heatsink using a single clip or by a single screw fixing.



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_C = 25^\circ C$	Continuous Drain Current, V_{GS} @ 10 V	1.4	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, V_{GS} @ 10 V	0.86	
I_{DM}	Pulsed Drain Current ①	5.6	
P_D @ $T_C = 25^\circ C$	Power Dissipation	30	W
	Linear Derating Factor	0.24	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	180	mJ
I_{AR}	Avalanche Current ①	1.4	A
E_{AR}	Repetitive Avalanche Energy ①	3.0	mJ
dv/dt	Peak Diode Recovery dv/dt ③	2.0	V/ns
T_J	Operating Junction and	-55 to +150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.1 N•m)	

Thermal Resistance

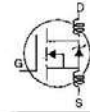
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	4.1	°C/W
$R_{\theta JA}$	Junction-to-Ambient	—	—	65	

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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	800	—	—	V	$V_{GS}=0V$, $I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.98	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D=1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	6.5	Ω	$V_{GS}=10V$, $I_D=0.84A$ 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	1.0	—	—	S	$V_{DS}=10V$, $I_D=0.84A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	100	μA	$V_{DS}=800V$, $V_{GS}=0V$
		—	—	500		$V_{DS}=640V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$
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	—	—	38	nC	$I_D=1.8A$
Q_{gs}	Gate-to-Source Charge	—	—	5.0		$V_{DS}=400V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	21		$V_{GS}=10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	8.2	—	ns	$V_{DD}=400V$
t_r	Rise Time	—	17	—		$I_D=1.8A$
$t_{d(off)}$	Turn-Off Delay Time	—	58	—		$R_G=18\Omega$
t_f	Fall Time	—	27	—		$R_D=230\Omega$ See Figure 10 ④
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	530	—	pF	$V_{GS}=0V$
C_{oss}	Output Capacitance	—	150	—		$V_{DS}=25V$
C_{rss}	Reverse Transfer Capacitance	—	90	—		$f=1.0\text{MHz}$ See Figure 5
C	Drain to Sink Capacitance	—	12	—	pF	$f=1.0\text{MHz}$



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.4	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	5.6		
V_{SD}	Diode Forward Voltage	—	—	1.4	V	$T_J=25^\circ\text{C}$, $I_S=1.4A$, $V_{GS}=0V$ ④
t_{rr}	Reverse Recovery Time	—	380	570	ns	$T_J=25^\circ\text{C}$, $I_F=1.8A$
Q_{rr}	Reverse Recovery Charge	—	0.94	1.4	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)

③ $I_{SD} \leq 1.8A$, $di/dt \leq 80A/\mu s$, $V_{DD} \leq 600$, $T_J \leq 150^\circ\text{C}$

⑤ $t=60s$, $f=60\text{Hz}$

② $V_{DD}=50V$, starting $T_J=25^\circ\text{C}$, $L=172\text{mH}$, $R_G=25\Omega$, $I_{AS}=1.4A$ (See Figure 12)

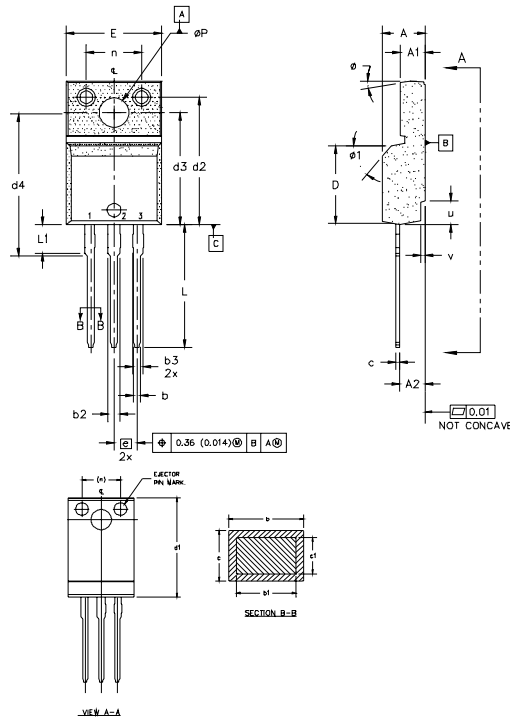
④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

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TO-220 Full-Pak Package Outline

Dimensions are shown in millimeters (inches)



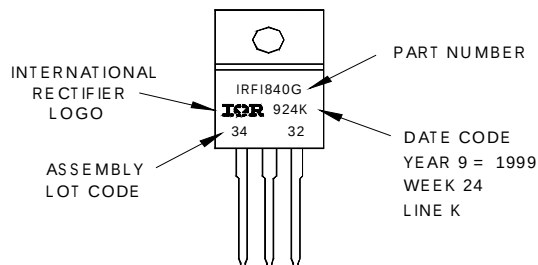
- NOTES:
- 1.0 DIMENSIONING AND TOLERANCING PER ASME Y14.5 M- 1994.
 - 2.0 DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
 - 3.0 LEAD DIMENSION AND FINISH UNCONTROLLED IN L1.
 - 4.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
 - 5.0 DIMENSION b1 APPLY TO BASE METAL ONLY.
 - 6.0 STEP OPTIONAL ON PLASTIC BODY DEFINED BY DIMENSIONS u & v.
 - 7.0 CONTROLLING DIMENSION : INCHES.

SYMBOL	DIMENSIONS				NOTES	LEAD ASSIGNMENTS
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	4.57	4.83	0.180	0.190		
A1	2.57	2.83	0.101	0.114		
A2	2.51	2.85	0.099	0.112		HEXFLET
b	0.622	0.89	0.024	0.035		1. - GATE
b1	0.622	0.838	0.024	0.033	5	2. - DRAIN
b2	1.229	1.400	0.048	0.055		3. - SOURCE
b3	1.229	1.400	0.048	0.055		
c	0.440	0.629	0.017	0.025		
d	0.440	0.584	0.017	0.023		IGBTs, CoPACK
d1	8.65	9.80	0.341	0.386	4	1. - GATE
d2	15.80	16.12	0.622	0.635		2. - COLLECTOR
d3	13.97	14.22	0.550	0.560		3. - EMITTER
d4	12.30	12.92	0.484	0.509		
d5	8.64	9.91	0.340	0.390		
E	10.36	10.63	0.408	0.419	4	
e	2.54 BSC		0.100 BSC			
L	13.20	13.73	0.520	0.541		
L1	3.10	3.50	0.122	0.138	3	
n	6.05	6.15	0.238	0.242		
np	3.05	3.46	0.120	0.136		
u	2.40	2.50	0.094	0.098	6	
v	0.40	0.50	0.016	0.020	6	
w	3"	7"	3"	7"		
x	45°	45°	45°	45°		

TO-220 Full-Pak Part Marking Information

EXAMPLE: THIS IS AN IRF1840G
WITH ASSEMBLY
LOT CODE 3432
ASSEMBLED ON WW 24 1999
IN THE ASSEMBLY LINE "K"

Note: "P" in assembly line
position indicates "Lead-Free"



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