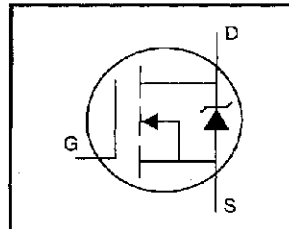


# IRFIBC30GPbF

## 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



$$V_{DSS} = 600V$$

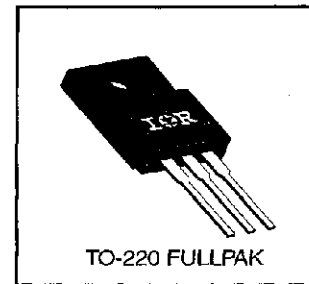
$$R_{DS(on)} = 2.2\Omega$$

$$I_D = 2.5A$$

### 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, $V_{GS} @ 10 V$	2.5	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	1.6	
$I_{DM}$	Pulsed Drain Current ①	10	
$P_D @ T_C = 25^\circ C$	Power Dissipation	35	W
	Linear Derating Factor	0.28	W/°C
$V_{GS}$	Gate-to-Source Voltage	±20	V
$E_{AS}$	Single Pulse Avalanche Energy ②	250	mJ
$I_{AR}$	Avalanche Current ①	2.5	A
$E_{AR}$	Repetitive Avalanche Energy ①	3.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.0	V/ns
$T_J$	Operating Junction and Storage Temperature Range	-55 to +150	°C
$T_{STG}$			
	Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.1 N•m)	

### Thermal Resistance

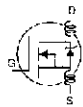
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	3.6	°C/W
$R_{\theta JA}$	Junction-to-Ambient	—	—	65	

7/29/04

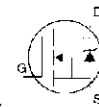
# IRFIBC30GPbF

International  
IR Rectifier

## Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	600	—	—	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.62	—	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	2.2	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =1.5A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
g <sub>fs</sub>	Forward Transconductance	2.2	—	—	S	V <sub>DS</sub> =50V, I <sub>D</sub> =1.5A ④
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	100	μA	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V
		—	—	500	μA	V <sub>DS</sub> =480V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> =20V
	Gate-to-Source Reverse Leakage	—	—	-100	nA	V <sub>GS</sub> =-20V
Q <sub>g</sub>	Total Gate Charge	—	—	31	nC	I <sub>D</sub> =3.6A
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	4.6	nC	V <sub>DS</sub> =360V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	—	17	nC	V <sub>GS</sub> =10V See Fig. 6 and 13 ⑤
t <sub>d(on)</sub>	Turn-On Delay Time	—	11	—	ns	V <sub>DD</sub> =300V I <sub>D</sub> =3.6A R <sub>G</sub> =12Ω R <sub>D</sub> =82Ω See Figure 10 ⑥
t <sub>r</sub>	Rise Time	—	13	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	35	—		
t <sub>f</sub>	Fall Time	—	14	—		
L <sub>D</sub>	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact 
L <sub>S</sub>	Internal Source Inductance	—	7.5	—		
C <sub>iss</sub>	Input Capacitance	—	660	—	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz See Figure 5
C <sub>oss</sub>	Output Capacitance	—	86	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	19	—		
C	Drain to Sink Capacitance	—	12	—		

## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	10		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.6	V	T <sub>J</sub> =25°C, I <sub>S</sub> =2.5A, V <sub>GS</sub> =0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	400	810	ns	T <sub>J</sub> =25°C, I <sub>F</sub> =3.6A
Q <sub>rr</sub>	Reverse Recovery Charge	—	2.1	4.2	μC	di/dt=100A/μs ④
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

### Notes:

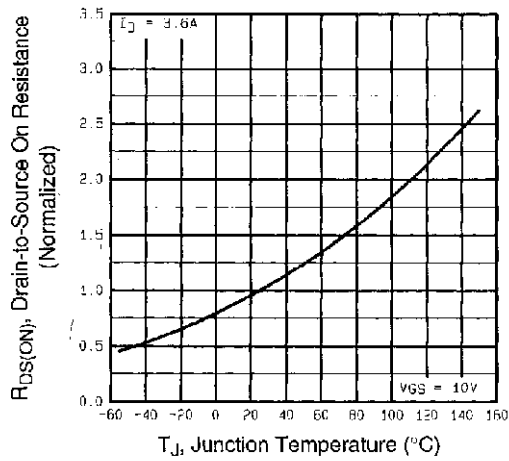
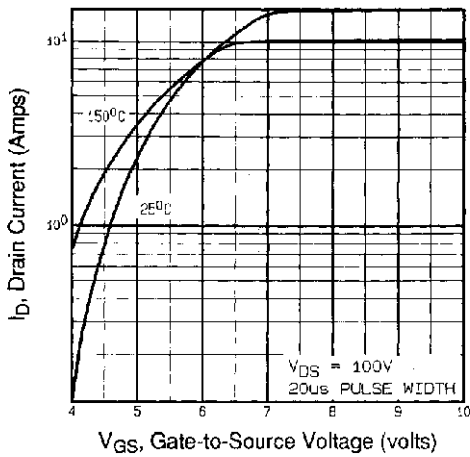
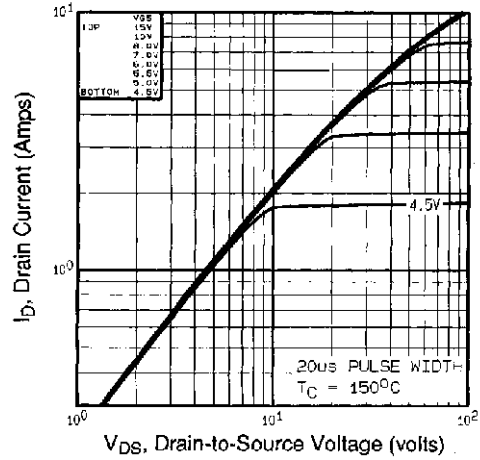
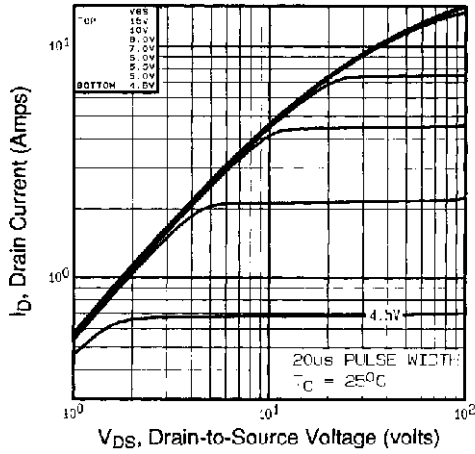
① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)

③ I<sub>SD</sub>≤3.6A, di/dt≤60A/μs, V<sub>DD</sub>≤V<sub>(BR)DSS</sub>, T<sub>J</sub>≤150°C

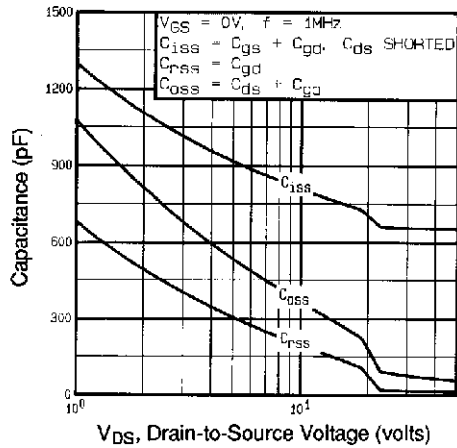
⑤ t=60s, f=60Hz

② V<sub>DD</sub>=50V, starting T<sub>J</sub>=25°C, L=73mH  
R<sub>G</sub>=25Ω, I<sub>AS</sub>=2.5A (See Figure 12)

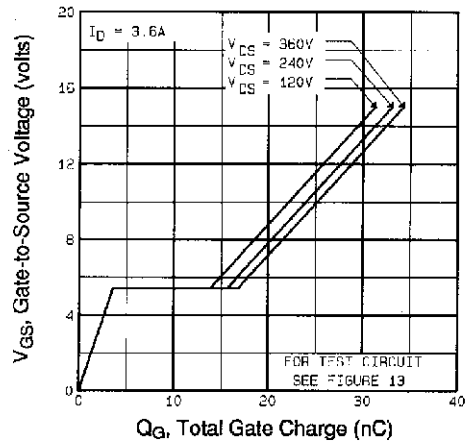
④ Pulse width ≤300 μs; duty cycle ≤2%.



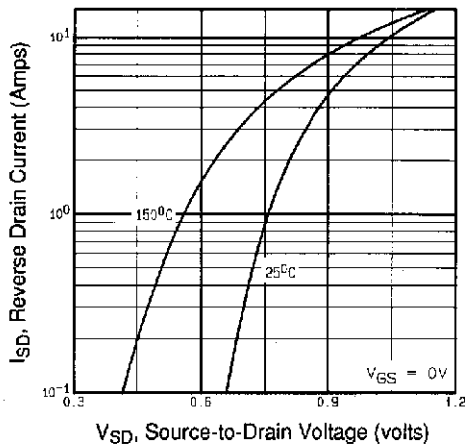
# IRFIBC30GPbF



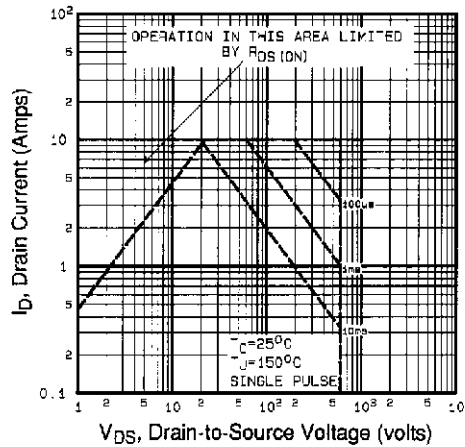
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



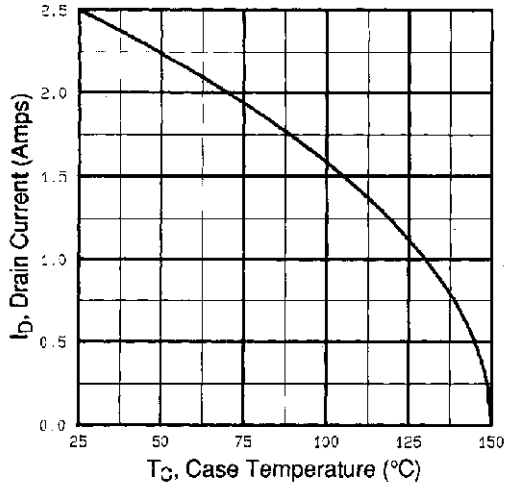
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



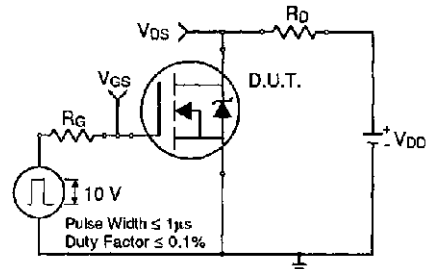
**Fig 7.** Typical Source-Drain Diode Forward Voltage



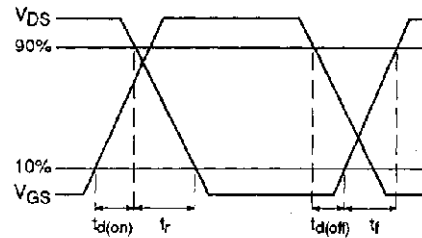
**Fig 8.** Maximum Safe Operating Area



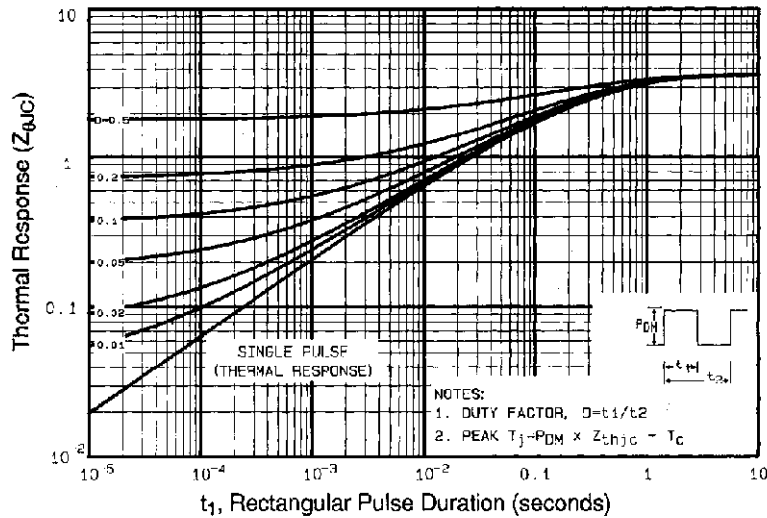
**Fig 9.** Maximum Drain Current Vs. Case Temperature



**Fig 10a.** Switching Time Test Circuit

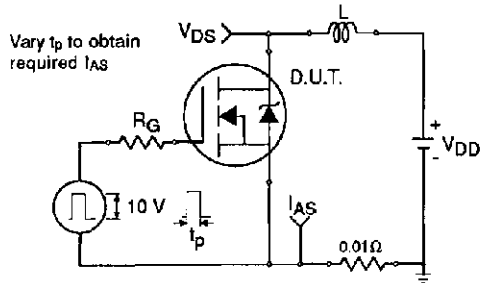


**Fig 10b.** Switching Time Waveforms

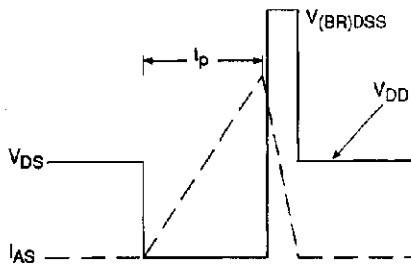


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

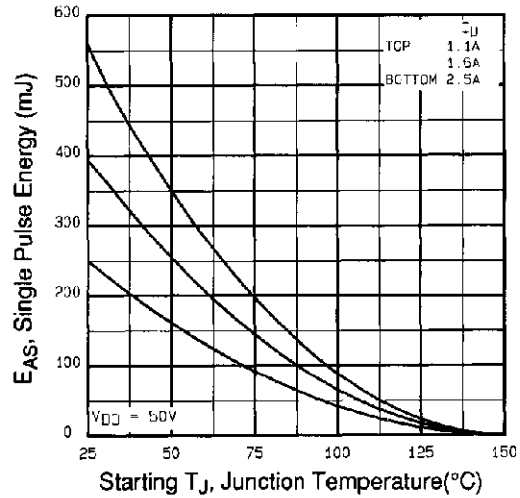
# IRFIBC30GPbF



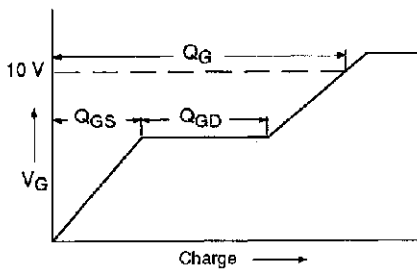
**Fig 12a.** Unclamped Inductive Test Circuit



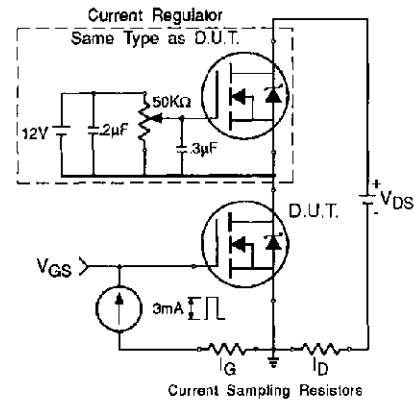
**Fig 12b.** Unclamped Inductive Waveforms



**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current

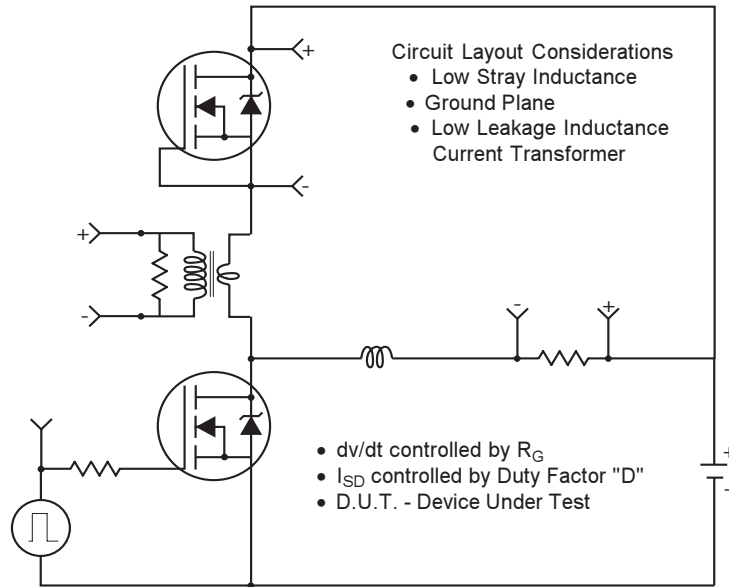


**Fig 13a.** Basic Gate Charge Waveform



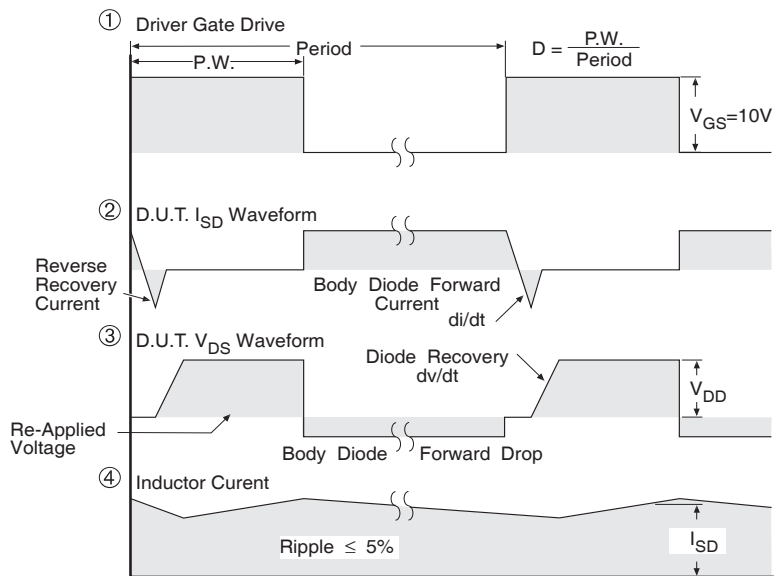
**Fig 13b.** Gate Charge Test Circuit

## Peak Diode Recovery dv/dt Test Circuit



\* Reverse Polarity for P-Channel

\*\* Use P-Channel Driver for P-Channel Measurements



\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig. 14** For N and P Channel HEXFETS







## Notice

The products described herein were acquired by Vishay Intertechnology, Inc., as part of its acquisition of International Rectifier's Power Control Systems (PCS) business, which closed in April 2007. Specifications of the products displayed herein are pending review by Vishay and are subject to the terms and conditions shown below.

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.

International Rectifier®, IR®, the IR logo, HEXFET®, HEXSense®, HEXDIP®, DOL®, INTERO®, and POWIRTRAIN® are registered trademarks of International Rectifier Corporation in the U.S. and other countries. All other product names noted herein may be trademarks of their respective owners.