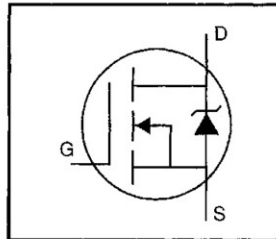


IRFBE30PbF

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Lead-Free



$$V_{DSS} = 800V$$

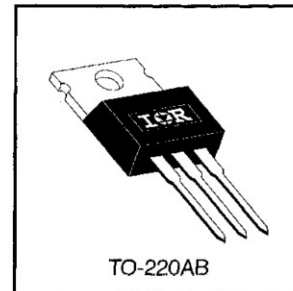
$$R_{DS(on)} = 3.0\Omega$$

$$I_D = 4.1A$$

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 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	4.1	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	2.6	
I_{DM}	Pulsed Drain Current ①	16	
P_D @ $T_C = 25^\circ C$	Power Dissipation	125	W
	Linear Derating Factor	1.0	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	260	mJ
I_{AR}	Avalanche Current ①	4.1	A
E_{AR}	Repetitive Avalanche Energy ①	13	mJ
dv/dt	Peak Diode Recovery dv/dt ③	2.0	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)	
	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	—	—	1.0	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	62	

IRFBE30PbF

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	800	—	—	V	$V_{GS}=0V$, $I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.90	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D=1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	3.0	Ω	$V_{GS}=10V$, $I_D=2.5A$ 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	2.5	—	—	S	$V_{DS}=100V$, $I_D=2.5A$ 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	—	—	78	nC	$I_D=4.1A$
Q_{gs}	Gate-to-Source Charge	—	—	9.6		$V_{DS}=400V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	45		$V_{GS}=10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD}=400V$
t_r	Rise Time	—	33	—		$I_D=4.1A$
$t_{d(off)}$	Turn-Off Delay Time	—	82	—		$R_G=12\Omega$
t_f	Fall Time	—	30	—		$R_D=95\Omega$ 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	—	1300	—	pF	$V_{GS}=0V$
C_{oss}	Output Capacitance	—	310	—		$V_{DS}=25V$
C_{rss}	Reverse Transfer Capacitance	—	190	—		$f=1.0\text{MHz}$ See Figure 5

Source-Drain Ratings and Characteristics

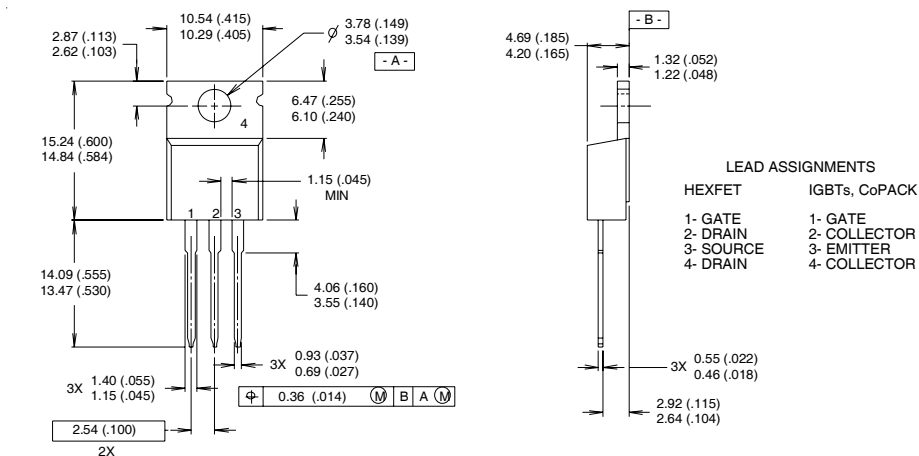
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	4.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	16		
V_{SD}	Diode Forward Voltage	—	—	1.8	V	$T_J=25^\circ\text{C}$, $I_S=4.1A$, $V_{GS}=0V$ ④
t_{rr}	Reverse Recovery Time	—	480	720	ns	$T_J=25^\circ\text{C}$, $I_F=4.1A$
Q_{rr}	Reverse Recovery Charge	—	1.8	2.7	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 $V_{DD}=50V$, starting $T_J=25^\circ\text{C}$, $L=29\text{mH}$, $R_G=25\Omega$, $I_{AS}=4.1A$ (See Figure 12)
- ③ $I_{SD}\leq 4.1A$, $di/dt\leq 100A/\mu s$, $V_{DD}\leq 600$, $T_J\leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH
- 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.
- 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

TO-220AB Part Marking Information

EXAMPLE: THIS IS AN IRF1010

LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"

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

