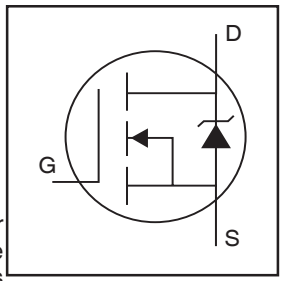
International
IOR Rectifier

PD - 94789

IRFZ34EPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Lead-Free



V_{DSS} = 60V

$R_{DS(on)}$ = 0.042Ω

I_D = 28A

TO-220AB

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

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

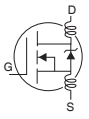
	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	28	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	20	
I_{DM}	Pulsed Drain Current ①	112	
P_D @T_C = 25°C	Power Dissipation	68	W
	Linear Derating Factor	0.46	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②	97	mJ
I_{AR}	Avalanche Current ①	17	A
E_{AR}	Repetitive Avalanche Energy ①	6.8	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 + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	2.2	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	62	

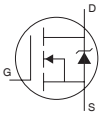
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	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	—	0.056	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.042	Ω	V_{GS} = 10V, I_D = 17A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D = 250µA
gfs	Forward Transconductance	7.6	—	—	S	V_{DS} = 25V, I_D = 17A
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	—	—	30		I_D = 17A
Q_{gs}	Gate-to-Source Charge	—	—	6.7	nC	V_{DS} = 48V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	12		V_{GS} = 10V, See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	5.1	—		V_{DD} = 30V
t_r	Rise Time	—	30	—		I_D = 17A
$t_{d(off)}$	Turn-Off Delay Time	—	22	—	ns	R_G = 13Ω
t_f	Fall Time	—	30	—		R_D = 1.8Ω, See Fig. 10 ④
L_D	Internal Drain Inductance	—	4.5	—		Between lead,
					nH	6mm (0.25in.)
L_S	Internal Source Inductance	—	7.5	—		from package
						and center of die contact
C_{iss}	Input Capacitance	—	680	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	220	—	pF	V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	80	—		f = 1.0MHz, See Fig. 5



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current	—	—	28		MOSFET symbol
	(Body Diode)				A	showing the
I_{SM}	Pulsed Source Current	—	—	100		integral reverse
	(Body Diode) ①					p-n junction diode.
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 17A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	63	95	ns	T_J = 25°C, I_F = 17A
Q_{rr}	Reverse Recovery Charge	—	130	200	nC	di/dt = 100A/µs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				



Notes:

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

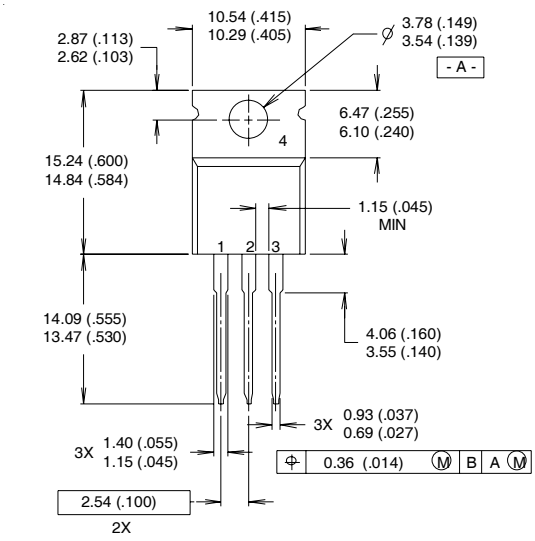
② Starting T_J = 25°C, L = 670µH, R_G = 25Ω, I_{AS} = 17A. (See Figure 12).

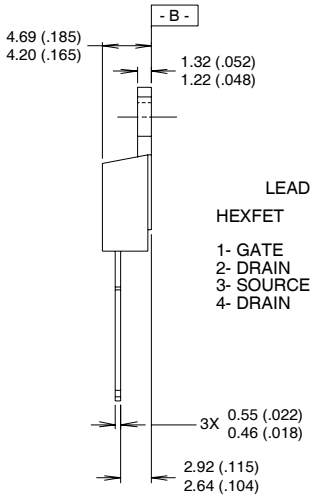
③ I_{SD} ≤ 17A, di/dt ≤ 200A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C.

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

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)





LEAD ASSIGNMENTS

HEXFET	IGBTs, CoPACK
1- GATE	1- GATE
2- DRAIN	2- COLLECTOR
3- SOURCE	3- EMITTER
4- DRAIN	4- COLLECTOR

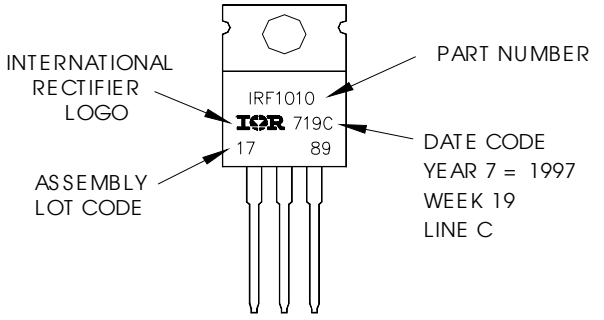
NOTES:

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"



Data and specifications subject to change without notice.