

IRL3202PbF

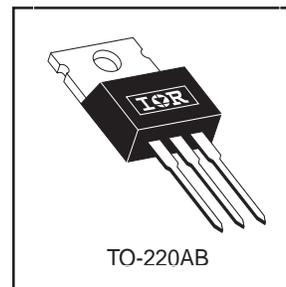
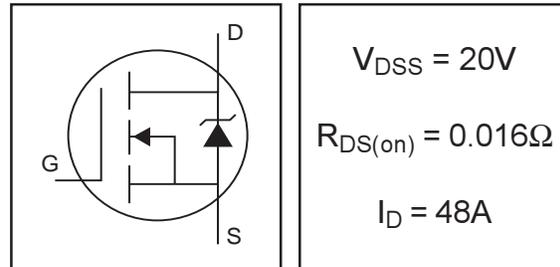
HEXFET® Power MOSFET

- Advanced Process Technology
- Optimized for 4.5V-7.0V Gate Drive
- Ideal for CPU Core DC-DC Converters
- Fast Switching
- Lead-Free

Description

These HEXFET Power MOSFETs were designed specifically to meet the demands of CPU core DC-DC converters in the PC environment. Advanced processing techniques combined with an optimized gate oxide design results in a die sized specifically to offer maximum efficiency at minimum cost.

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.



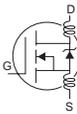
Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}$	48	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}$	30	
I_{DM}	Pulsed Drain Current $\text{\textcircled{D}}$	190	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	69	W
	Linear Derating Factor	0.56	W/°C
V_{GS}	Gate-to-Source Voltage	± 10	V
V_{GSM}	Gate-to-Source Voltage (Start Up Transient, $t_p = 100\mu\text{s}$)	14	V
E_{AS}	Single Pulse Avalanche Energy $\text{\textcircled{A}}$	270	mJ
I_{AR}	Avalanche Current $\text{\textcircled{A}}$	29	A
E_{AR}	Repetitive Avalanche Energy $\text{\textcircled{A}}$	6.9	mJ
dv/dt	Peak Diode Recovery dv/dt $\text{\textcircled{D}}$	5.0	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 (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	1.8	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	---	
$R_{\theta JA}$	Junction-to-Ambient	---	62	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.029	—	V/°C	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.019	Ω	$V_{GS} = 4.5V, I_D = 29A$ ④
		—	—	0.016		$V_{GS} = 7.0V, I_D = 29A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	0.70	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	28	—	—	S	$V_{DS} = 16V, I_D = 29A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 20V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 10V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 10V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -10V$
Q_g	Total Gate Charge	—	—	43	nC	$I_D = 29A$
Q_{gs}	Gate-to-Source Charge	—	—	12		$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	13		$V_{GS} = 4.5V$, See Fig. 6 ④
$t_{d(on)}$	Turn-On Delay Time	—	9.8	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	100	—		$I_D = 29A$
$t_{d(off)}$	Turn-Off Delay Time	—	63	—		$R_G = 9.5\Omega, V_{GS} = 4.5V$
t_f	Fall Time	—	82	—		$R_D = 0.3\Omega$, ④
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	2000	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	800	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	290	—		$f = 1.0\text{MHz}$, See Fig. 5

Source-Drain Ratings and Characteristics

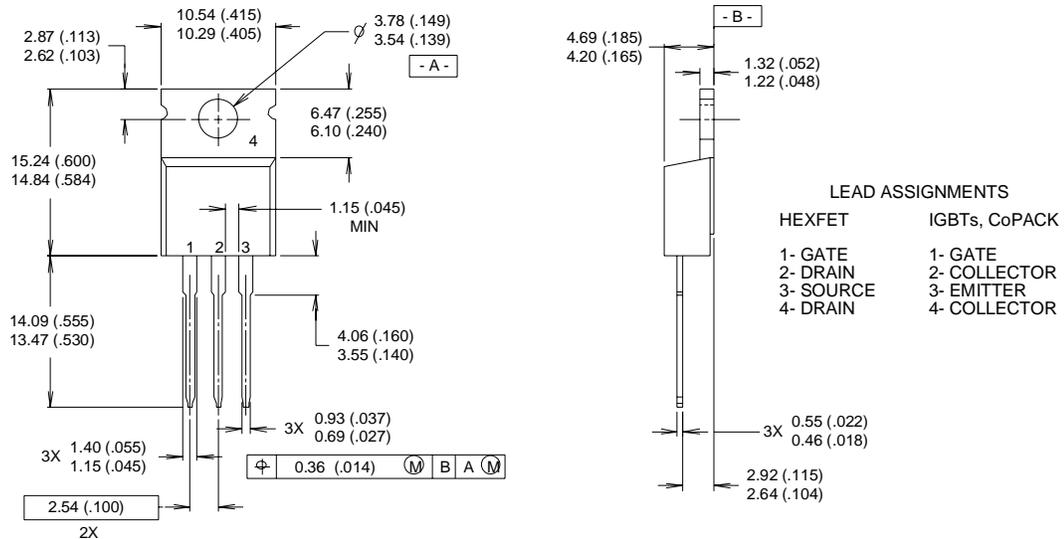
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	48	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	190		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 29A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	68	100	ns	$T_J = 25^\circ\text{C}, I_F = 29A$
Q_{rr}	Reverse Recovery Charge	—	130	190	nC	$di/dt = 100A/\mu s$ 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.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.64\text{mH}$
 $R_G = 25\Omega, I_{AS} = 29A$.
- ③ $I_{SD} \leq 29A, di/dt \leq 63A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)

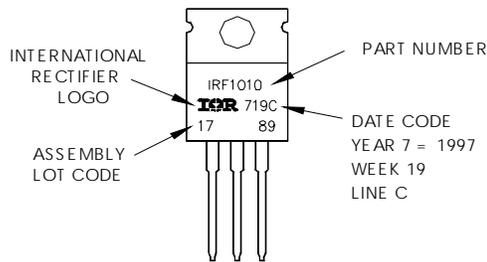


NOTES:

- 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"



Data and specifications subject to change without notice.