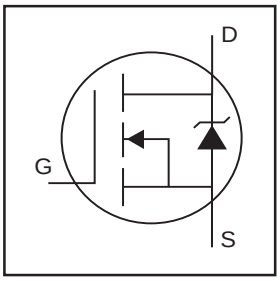
International
IOR Rectifier

PD- 95658

IRL3102PbF

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



V_{DSS} = 20V

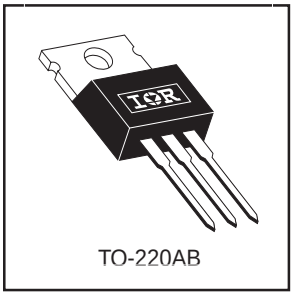
$R_{DS(on)}$ = 0.013Ω

I_D = 61A

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.



TO-220AB

Absolute Maximum Ratings

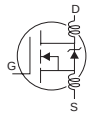
	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	61	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 4.5V	39	
I_{DM}	Pulsed Drain Current ①	240	
P_D @T_C = 25°C	Power Dissipation	89	W
	Linear Derating Factor	0.71	W/°C
V_{GS}	Gate-to-Source Voltage	± 10	V
V_{GSM}	Gate-to-Source Voltage (Start Up Transient, tp = 100µs)	14	V
E_{AS}	Single Pulse Avalanche Energy②	220	mJ
I_{AR}	Avalanche Current①	35	A
E_{AR}	Repetitive Avalanche Energy①	8.9	mJ
dv/dt	Peak Diode Recovery dv/dt ③	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 srew	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	–––	1.4	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	–––	
$R_{\theta JA}$	Junction-to-Ambient	–––	62	

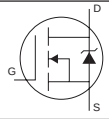
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	–––	–––	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	0.016	–––	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	–––	0.015	Ω	V_{GS} = 4.5V, I_D = 37A ④
		–––	–––	0.013		V_{GS} = 7.0V, I_D = 37A ④
$V_{GS(th)}$	Gate Threshold Voltage	0.70	–––	–––	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	36	–––	–––	S	V_{DS} = 16V, I_D = 35A
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°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	–––	–––	58	nC	I_D = 35A
Q_{gs}	Gate-to-Source Charge	–––	–––	14		V_{DS} = 16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	–––	21		V_{GS} = 4.5V, See Fig. 6 ④
$t_{d(on)}$	Turn-On Delay Time	–––	10	–––	ns	V_{DD} = 10V
t_r	Rise Time	–––	130	–––		I_D = 35A
$t_{d(off)}$	Turn-Off Delay Time	–––	80	–––		R_G = 9.0Ω, V_{GS} = 4.5V
t_f	Fall Time	–––	110	–––		R_D = 0.28Ω, 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	–––	2500	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	1000	–––		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	–––	360	–––		f = 1.0MHz, See Fig. 5



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	61	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	240		
V_{SD}	Diode Forward Voltage	–––	–––	1.3	V	T_J = 25°C, I_S = 37A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	59	88	ns	T_J = 25°C, I_F = 35A
Q_{rr}	Reverse Recovery Charge	–––	110	160	nC	di/dt = 100A/µs 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.

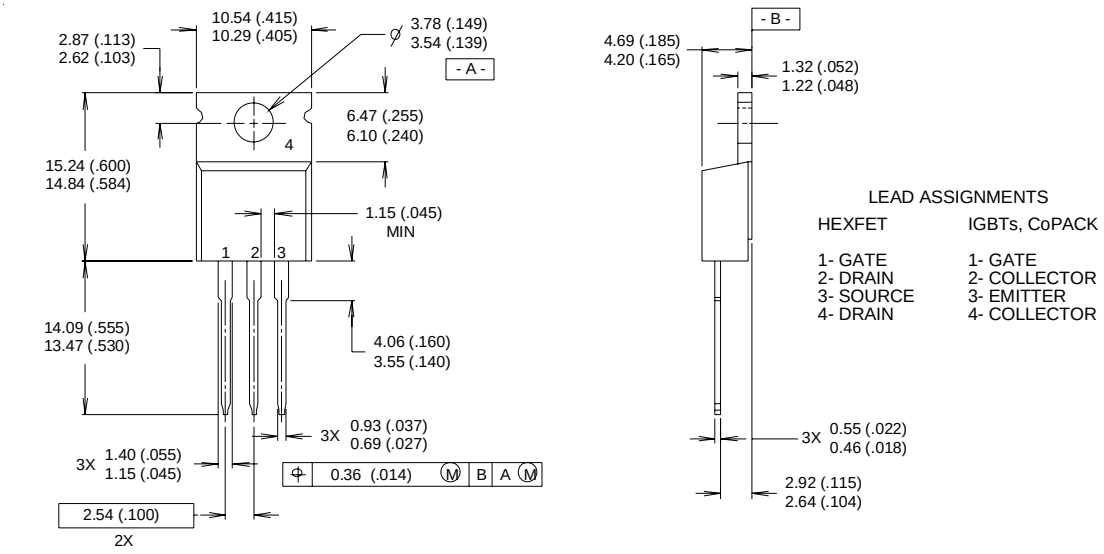
② Starting T_J = 25°C, L = 0.36mH R_G = 25Ω, I_{AS} = 35A.

③ I_{SD} ≤ 35A, di/dt ≤ 100A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°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

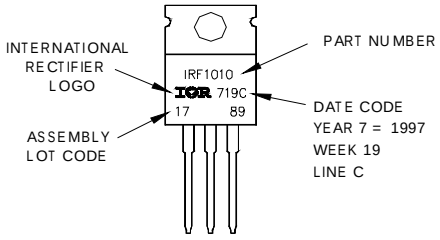
NOTES:

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.