International
IOR Rectifier

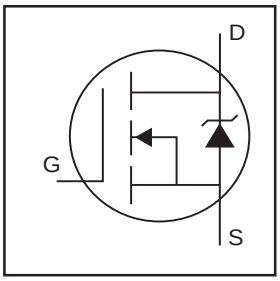
PD - 93803

PROVISIONAL

IRF1205

HEXFET® Power MOSFET

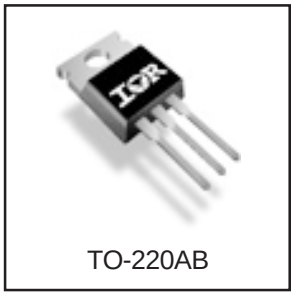
- Advanced Process Technology
- Dynamic dv/dt Rating
- 175 °C Operating Temprature
- Fast Switching
- Fully Avalanche Rated



V_{DSS} = 55V

$R_{DS(on)}$ = 0.027Ω

I_D = 41A⑤



TO-220AB

Description

Fifth Generation MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low 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 universely preferred for all commercial 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	41⑤	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	29⑤	
I_{DM}	Pulsed Drain Current ①	164	
P_D @T_C = 25°C	Power Dissipation	83	W
	Linear Derating Factor	0.56	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②	190	mJ
I_{AR}	Avalanche Current①	25	A
E_{AR}	Repetitive Avalanche Energy①	8.3	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	——	1.8	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	——	
$R_{\theta JA}$	Junction-to-Ambient	——	62	

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.05	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.027	Ω	V_{GS} = 10V, I_D = 25A ④⑥
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	13	—	—	S	V_{DS} = 25V, I_D = 25A
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	µA	V_{DS} = 55V, V_{GS} = 0V
		—	—	250		V_{DS} = 44V, 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	—	—	50	nC	I_D = 25A
Q_{gs}	Gate-to-Source Charge	—	—	10		V_{DS} = 44V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	21		V_{GS} = 10V ④⑥
$t_{d(on)}$	Turn-On Delay Time	—	9.9	—	ns	V_{DD} = 28V
t_r	Rise Time	—	44	—		I_D = 25A
$t_{d(off)}$	Turn-Off Delay Time	—	34	—		R_G = 9.1Ω
t_f	Fall Time	—	35	—		R_D = 1.1Ω ④⑥
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact⑥ ⑥
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	1200	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	390	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	140	—		f = 1.0MHz ⑥

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	41⑤	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①⑥	—	—	164		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S =25A, V_{GS} = 0V ④⑥
t_{rr}	Reverse Recovery Time	—	63	94	ns	T_J = 25°C, I_F = 25A
Q_{rr}	Reverse RecoveryCharge		140	210	nC	di/dt = 100A/µs ④ ⑥
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 V_{DD}=25V, Starting T_J = 25°C, L = 610µH R_G = 25Ω, I_{AS} = 25A

③ I_{SD} ≤25A, di/dt ≤ 220A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C

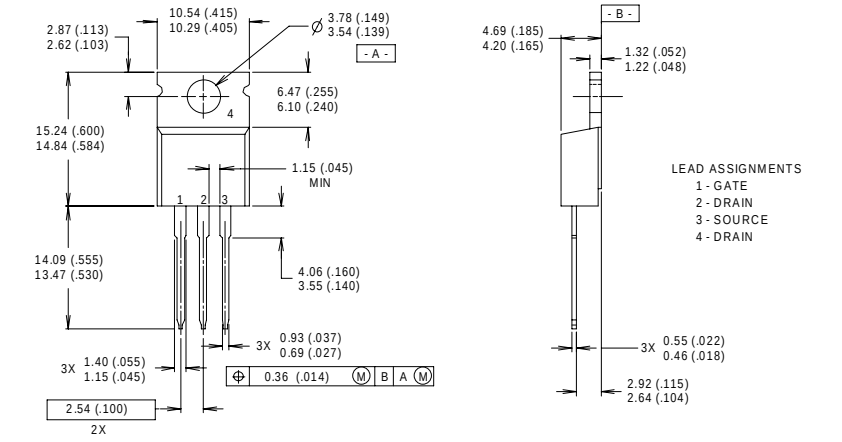
④ Pulse width ≤ 300µs; duty cycle ≤ 2%

⑤ Calculated continuous current based on maximum allowable junction temperature: Package limitation current = 20A

⑥ Use IRFR/U1205 Data and Test conditons.

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)

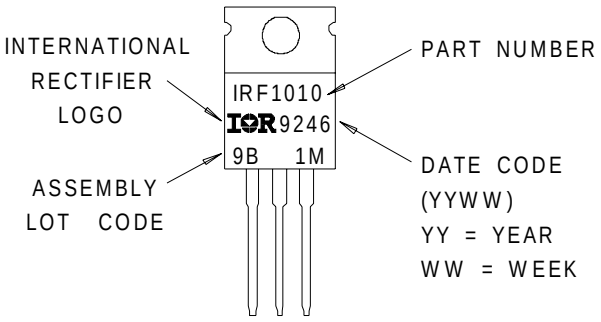


NOTES:

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
WITH ASSEMBLY
LOT CODE 9B1M



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Data and specifications subject to change without notice. 11/99