

International Rectifier

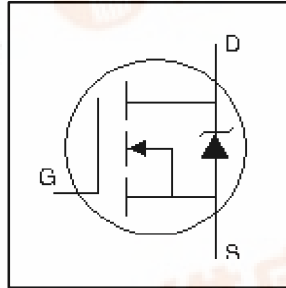
PRELIMINARY

PD - 9.1275

IRL2310

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Logic-Level Gate Drive
- $R_{DS(on)}$ Specified at $V_{GS} = 4.5V$ & $10V$
- $175^{\circ}C$ Operating Temperature

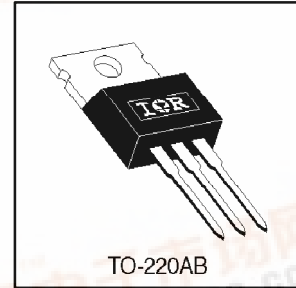


$V_{DSS} = 100V$
$R_{DS(on)} = 0.040\Omega$
$I_D = 40A$

Description

Fourth 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 for which HEXFET Power MOSFETs are well known, provides the designer with an extremely efficient device for use in a wide variety of application.

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, $V_{GS} @ 5.0V$	40	A
$I_D @ T_C = 100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 5.0V$	29	
I_{DM}	Pulsed Drain Current ①	160	
$P_D @ T_C = 25^{\circ}C$	Power Dissipation	170	W
	Linear Derating Factor	1.1	W/ $^{\circ}C$
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	500	mJ
I_{AR}	Avalanche Current ①	24	A
E_{AR}	Repetitive Avalanche Energy ①	17	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.5	V/ns
T_J	Operating Junction and	-55 to +175	$^{\circ}C$
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	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	0.90	$^{\circ}C/W$
$R_{\theta CS}$	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	100	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.11	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(ON)}	Static Drain-to-Source On-Resistance	—	—	0.040	Ω	V _{GS} = 10V, I _D = 24A ④
		—	—	0.050		V _{GS} = 4.5V, I _D = 20A ④
V _{GS(th)}	Gate Threshold Voltage	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	18	—	—	S	V _{DS} = 50V, I _D = 24A
I _{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V _{DS} = 100V, V _{GS} = 0V
		—	—	250		V _{DS} = 80V, 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	—	—	160	nC	I _D = 24A
Q _{gs}	Gate-to-Source Charge	—	—	13		V _{DS} = 80V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	45		V _{GS} = 10V, See Fig. 6 and 13 ④
t _{d(on)}	Turn-On Delay Time	—	6.6	—	ns	V _{DD} = 50V
t _r	Rise Time	—	38	—		I _D = 24A
t _{d(off)}	Turn-Off Delay Time	—	140	—		R _G = 5.0Ω
t _f	Fall Time	—	84	—		R _D = 2.0Ω, See Fig. 10 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	—	3200	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	610	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	140	—		f = 1.0MHz, See Fig. 5

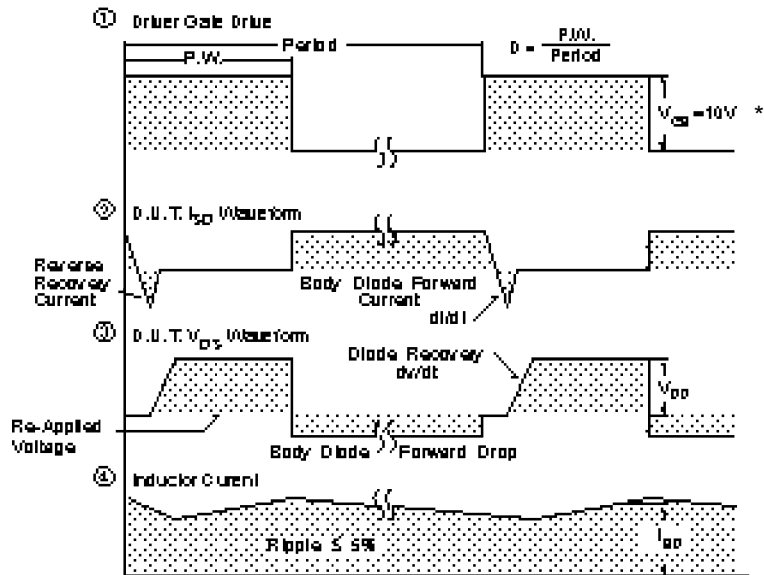
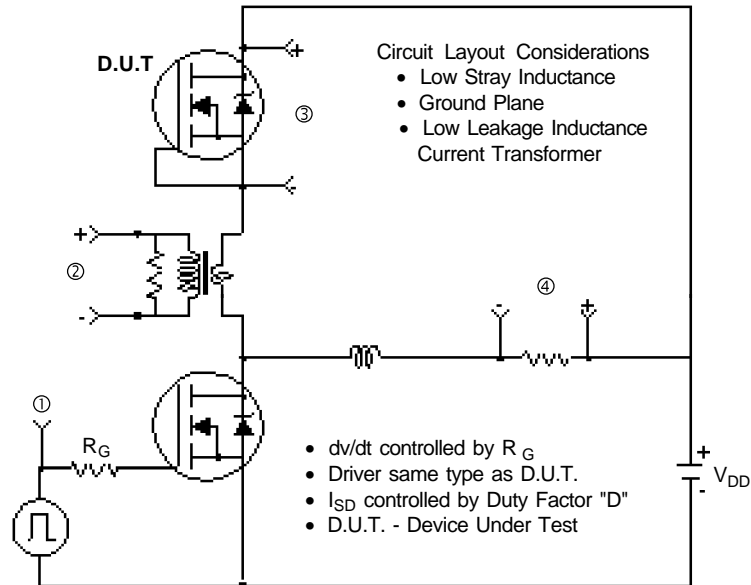
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	40	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	160		
V _{SD}	Diode Forward Voltage	—	—	1.6	V	T _J = 25°C, I _S = 24A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	180	270	ns	T _J = 25°C, I _F = 24A
Q _{rr}	Reverse Recovery Charge	—	0.98	1.5	μC	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. (See fig. 11)
- ② V_{DD} = 25V, starting T_J = 25°C, L = 540μH
R_G = 25Ω, I_{AS} = 24A. (See Figure 12)
- ③ I_{SD} ≤ 24A, di/dt ≤ 170A/μs, V_{DD} ≤ V_{(BR)DSS},
T_J ≤ 175°C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

Peak Diode Recovery dv/dt Test Circuit



* $V_{GS} = 5V$ for Logic Level Devices

Fig 14. For N-Channel HEXFETS

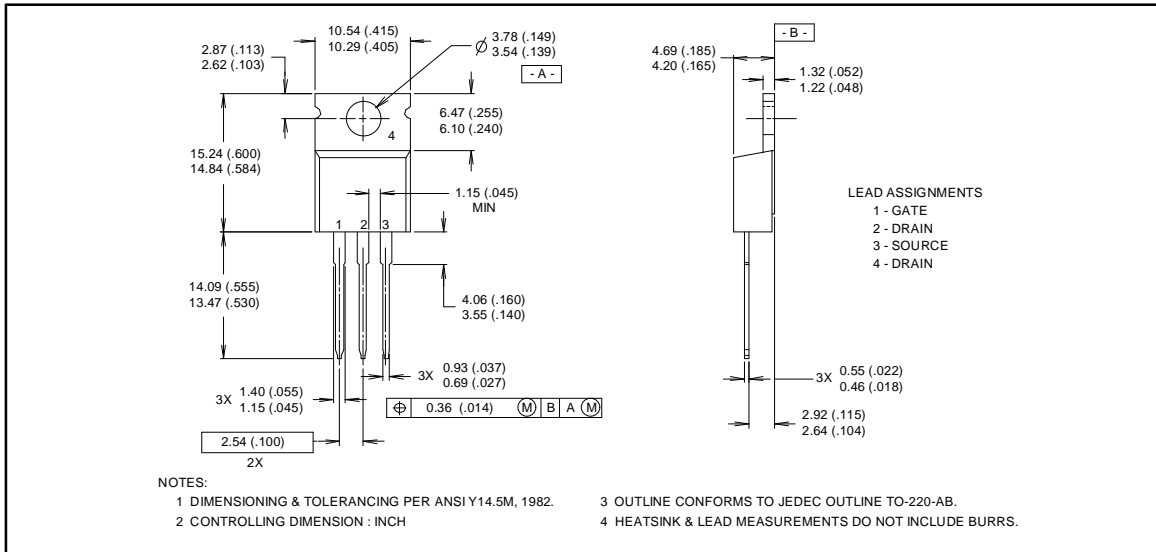
IRFL2310



Package Outline

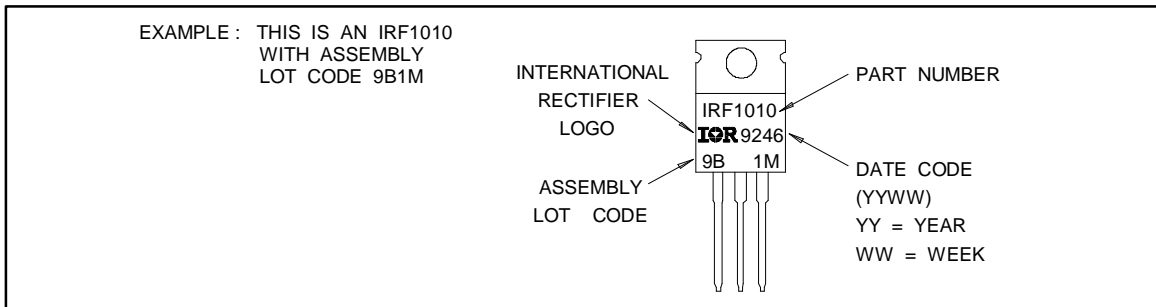
TO-220AB Outline

Dimensions are shown in millimeters (inches)



Part Marking Information

TO-220AB



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Data and specifications subject to change without notice.