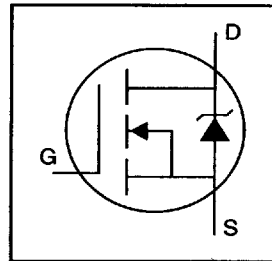


HEXFET® Power MOSFET

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

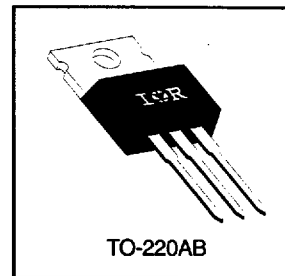


$V_{DSS} = 55V$
$R_{DS(on)} = 0.040\Omega$
$I_D = 26A$

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
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	26	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	18	
I_{DM}	Pulsed Drain Current ①	100	
$P_D @ T_C = 25^\circ C$	Power Dissipation	56	W
	Linear Derating Factor	0.37	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	65	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.6	V/ns
T_J	Operating Junction and	-55 to + 175	°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

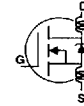
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	2.7	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	62	

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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
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.052	—	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 = 16A ^④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	6.5	—	—	S	V _{DS} = 25V, I _D = 16A
I _{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V _{DS} = 55V, V _{GS} = 0V
		—	—	250	μA	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	nA	V _{GS} = -20V
Q _g	Total Gate Charge	—	—	34	nC	I _D = 16A
Q _{gs}	Gate-to-Source Charge	—	—	6.8	nC	V _{DS} = 44V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	14	nC	V _{GS} = 10V, See Fig. 6 and 13 ^④
t _{d(on)}	Turn-On Delay Time	—	7.0	—	ns	V _{DD} = 28V I _D = 16A R _G = 18Ω R _D = 1.8Ω, See Fig. 10 ^④
t _r	Rise Time	—	49	—		
t _{d(off)}	Turn-Off Delay Time	—	31	—		
t _f	Fall Time	—	40	—		
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	—	700	—	pF	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz, See Fig. 5
C _{oss}	Output Capacitance	—	240	—		
C _{rss}	Reverse Transfer Capacitance	—	100	—		



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	26	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ^①	—	—	100		
V _{SD}	Diode Forward Voltage	—	—	1.6	V	T _J = 25°C, I _S = 16A, V _{GS} = 0V ^④
t _{rr}	Reverse Recovery Time	—	57	86	ns	T _J = 25°C, I _F = 16A
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 L _S +L _D)				

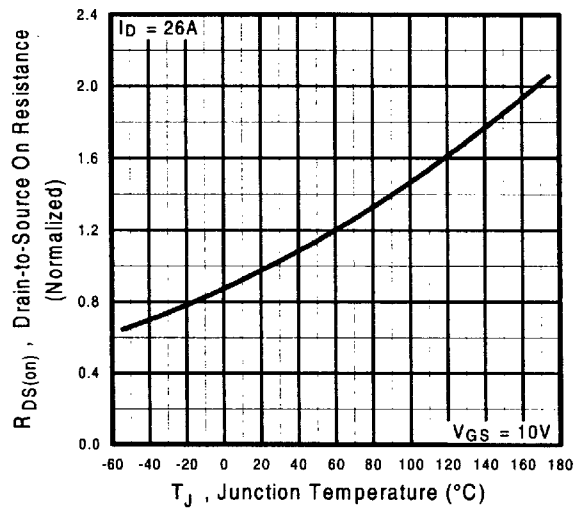
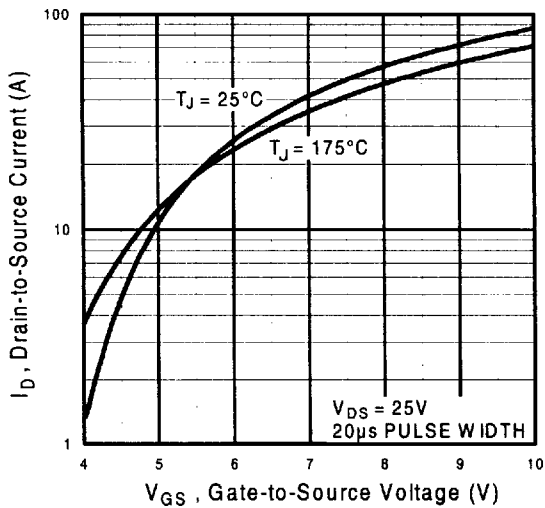
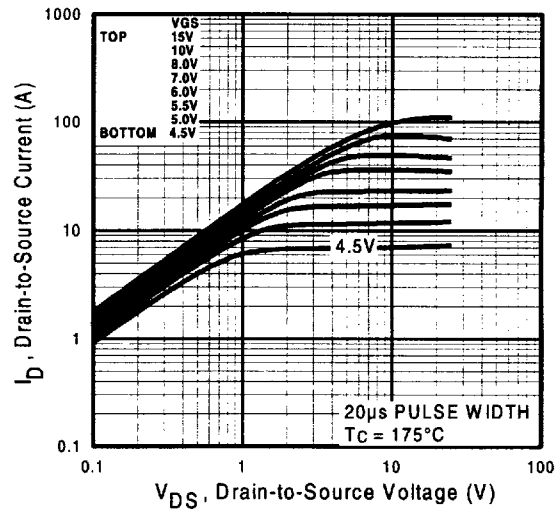
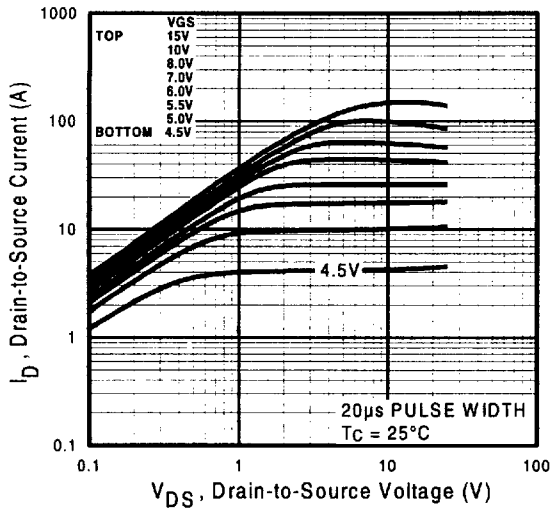
Notes:

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

③ I_{SD} ≤ 16 A, di/dt ≤ 420A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 175°C

② V_{DD} = 25V, starting T_J = 25°C, L = 410μH
R_G = 25Ω, I_{AS} = 16A. (See Figure 12)

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



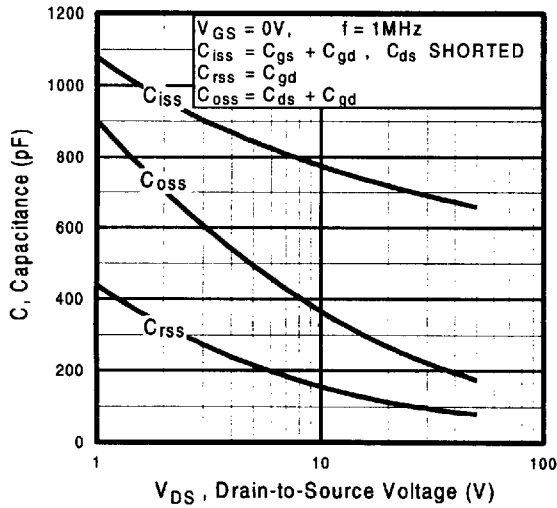


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

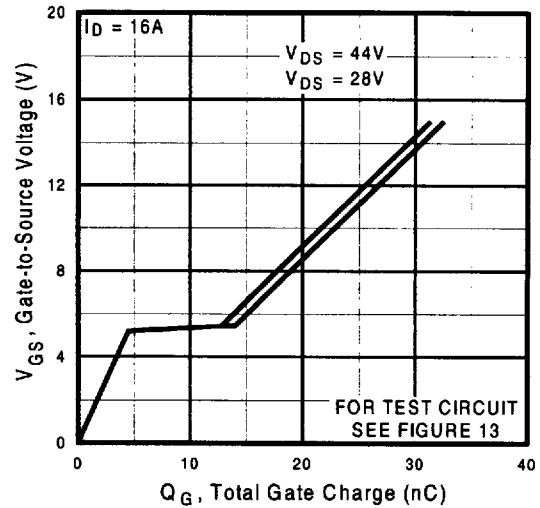


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

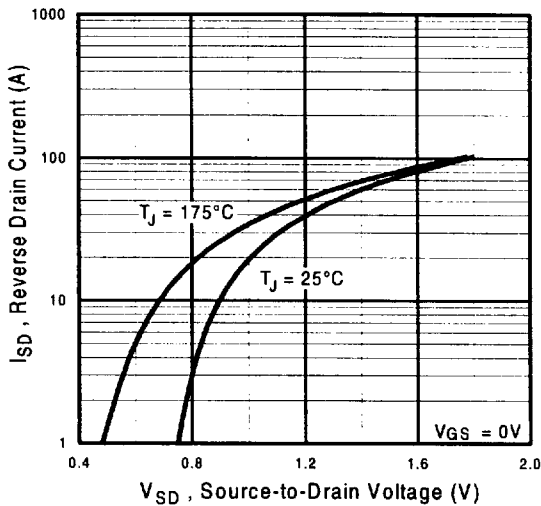


Fig 7. Typical Source-Drain Diode Forward Voltage

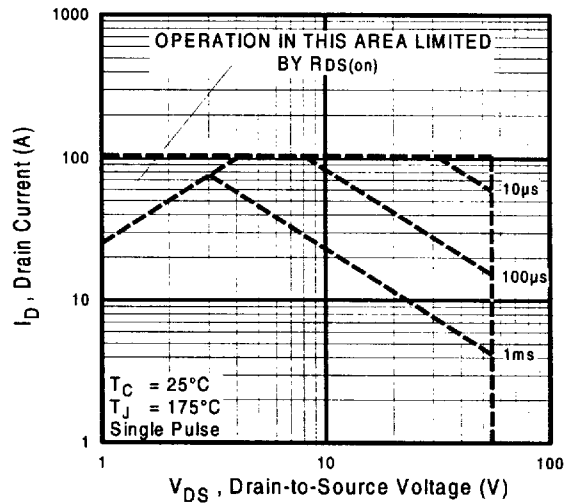


Fig 8. Maximum Safe Operating Area

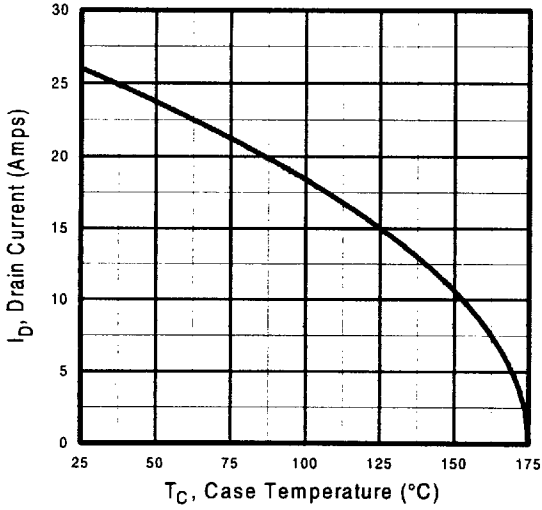


Fig 9. Maximum Drain Current Vs. Case Temperature

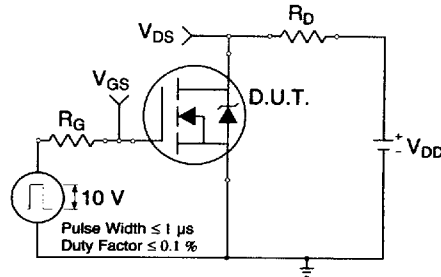


Fig 10a. Switching Time Test Circuit

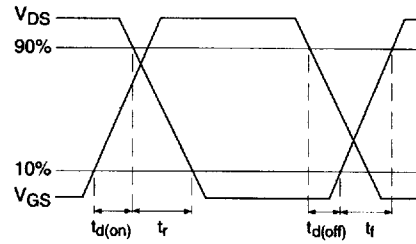


Fig 10b. Switching Time Waveforms

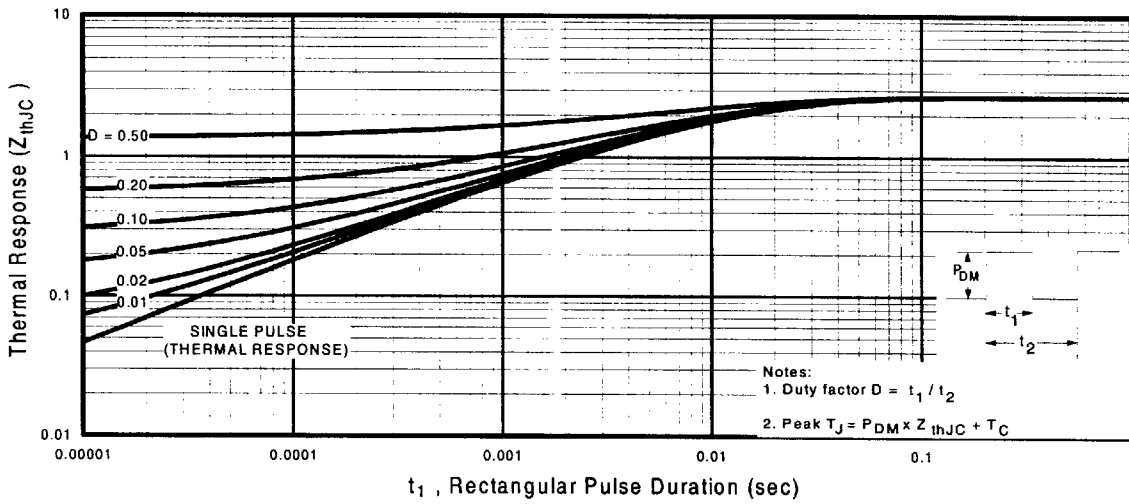


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

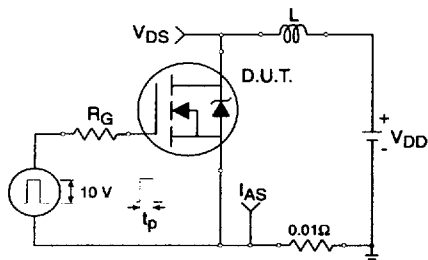


Fig 12a. Unclamped Inductive Test Circuit

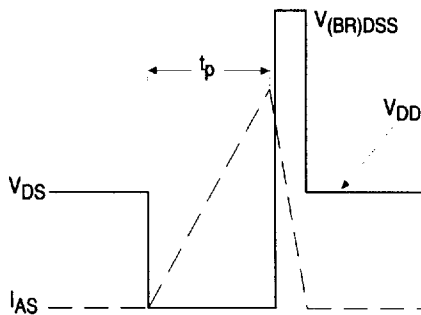


Fig 12b. Unclamped Inductive Waveforms

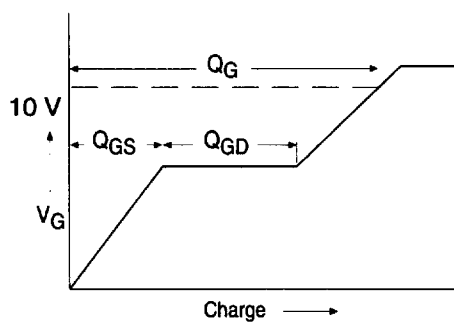


Fig 13a. Basic Gate Charge Waveform

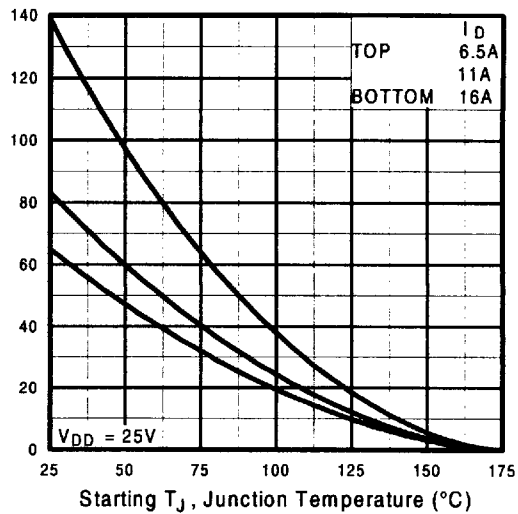


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

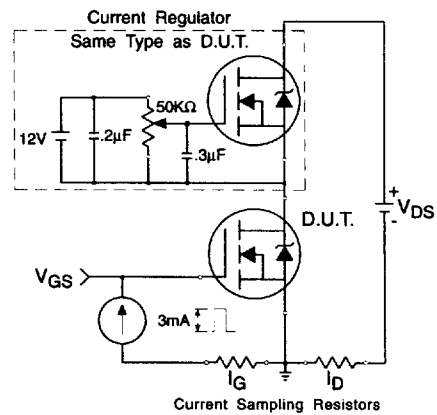
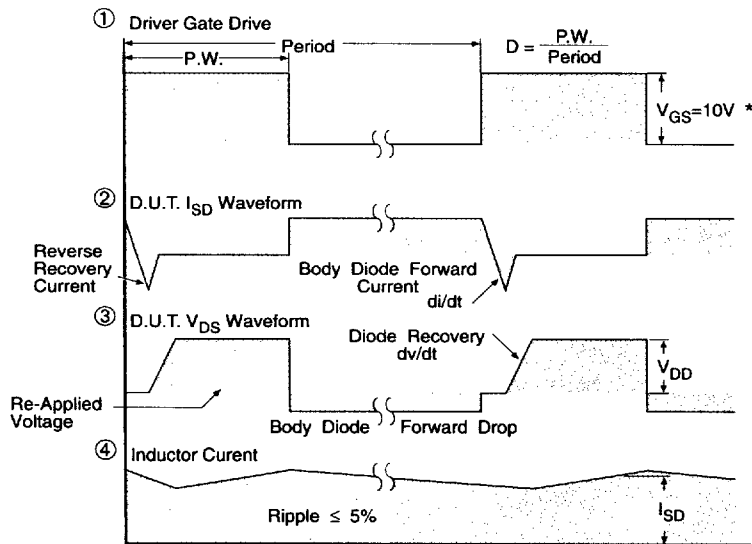
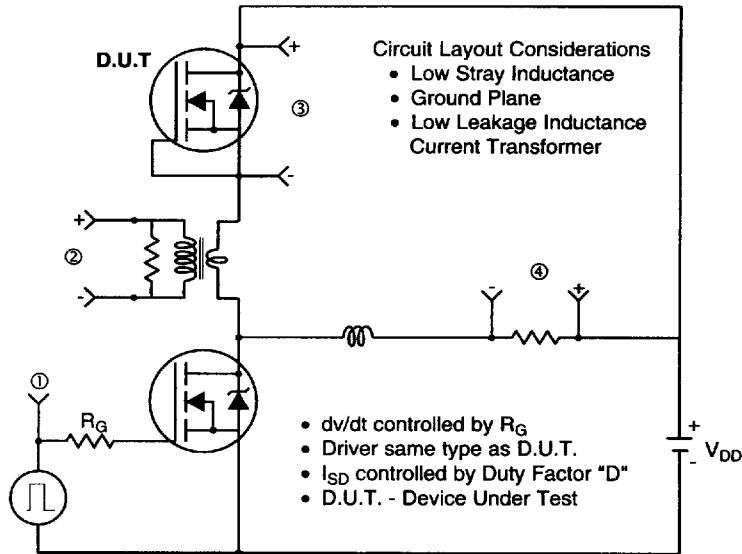


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



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

Fig 14. For N-Channel HEXFETS

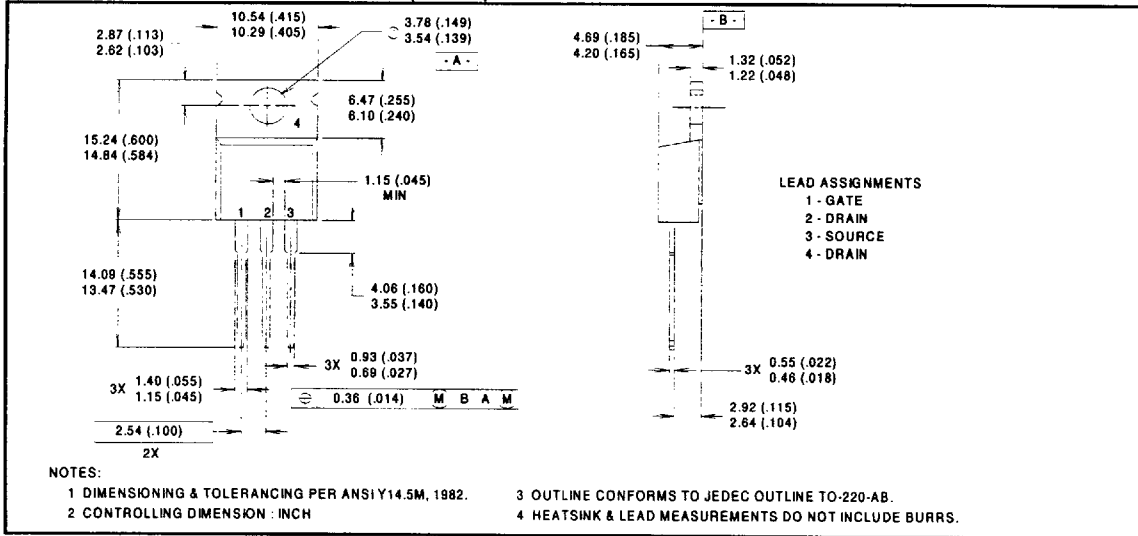
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Package Outline

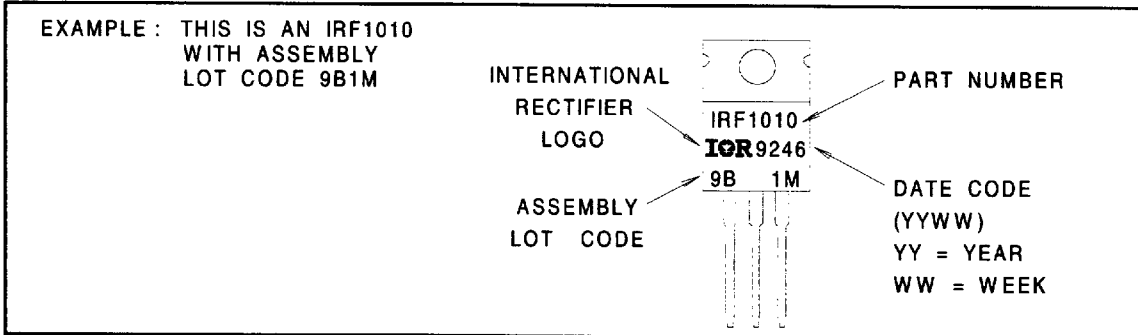
TO-220AB Outline

Dimensions are shown in millimeters (inches)



Part Marking Information

TO-220AB



International
IOR Rectifier

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IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

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