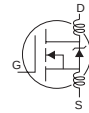


IRF1010N

International
IR Rectifier

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	—	0.058	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	11	mΩ	V _{GS} = 10V, I _D = 43A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	32	—	—	S	V _{DS} = 25V, I _D = 43A④
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	—	—	120	nC	I _D = 43A
Q _{gs}	Gate-to-Source Charge	—	—	19		V _{DS} = 44V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	41		V _{GS} = 10V, See Fig. 6 and 13
t _{d(on)}	Turn-On Delay Time	—	13	—	ns	V _{DD} = 28V
t _r	Rise Time	—	76	—		I _D = 43A
t _{d(off)}	Turn-Off Delay Time	—	39	—		R _G = 3.6Ω
t _f	Fall Time	—	48	—		V _{GS} = 10V, 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	—	3210	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	690	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	140	—		f = 1.0MHz, See Fig. 5
E _{AS}	Single Pulse Avalanche Energy②	—	1030⑤	250⑥		I _{AS} = 4.3A, L = 270μH

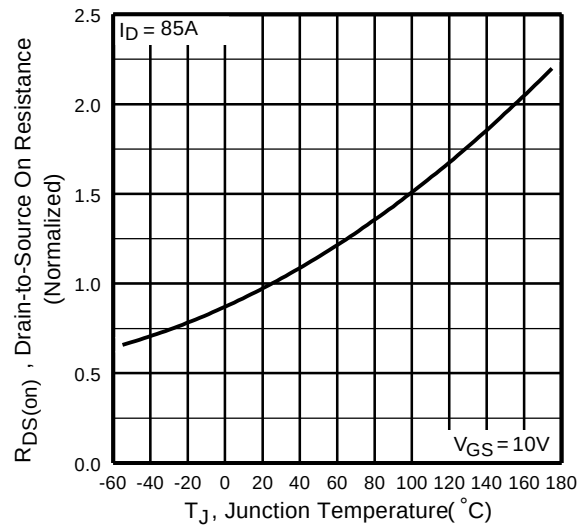
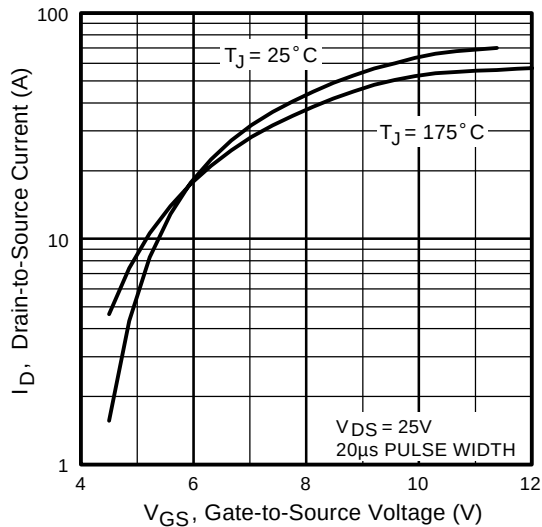
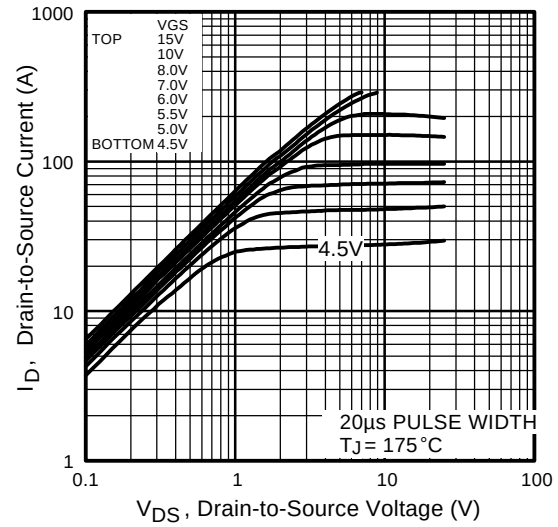
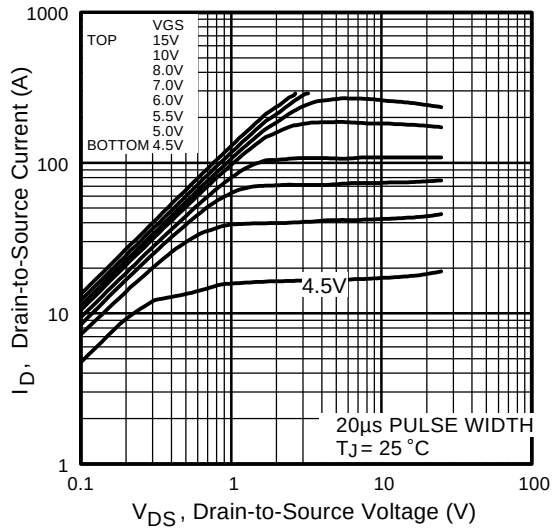


Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	85⑦	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode)①	—	—	290		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J = 25°C, I _S = 43A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	69	100	ns	T _J = 25°C, I _F = 43A
Q _{rr}	Reverse Recovery Charge	—	220	230	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)
- ② Starting T_J = 25°C, L = 270μH
R_G = 25Ω, I_{AS} = 43A, V_{GS}=10V (See Figure 12)
- ③ I_{SD} ≤ 43A, di/dt ≤ 210A/μs, V_{DD} ≤ V_{(BR)DSS},
T_J ≤ 175°C
- ④ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ⑤ This is a typical value at device destruction and represents operation outside rated limits.
- ⑥ This is a calculated value limited to T_J = 175°C .
- ⑦ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.



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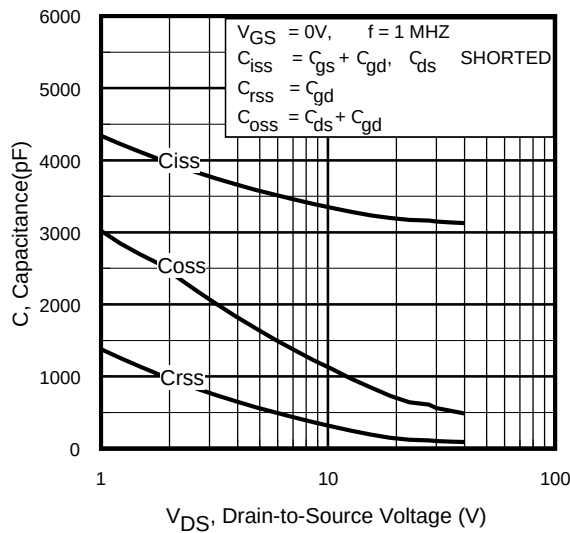


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

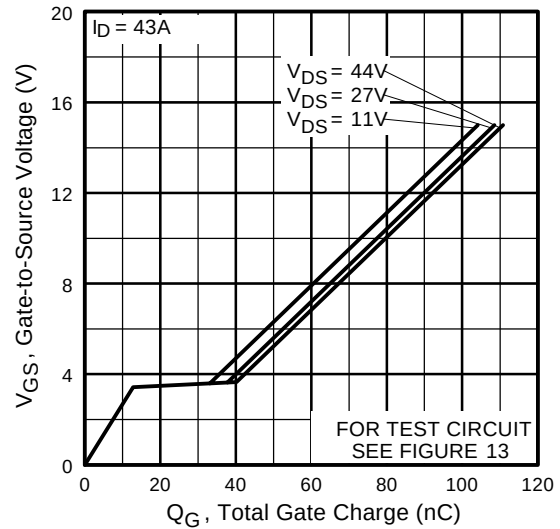


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

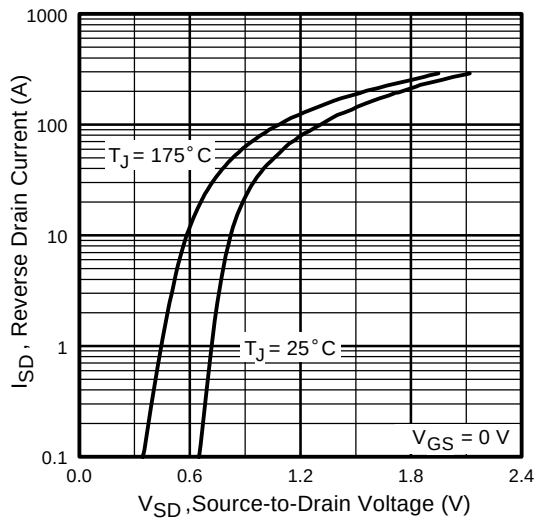


Fig 7. Typical Source-Drain Diode Forward Voltage

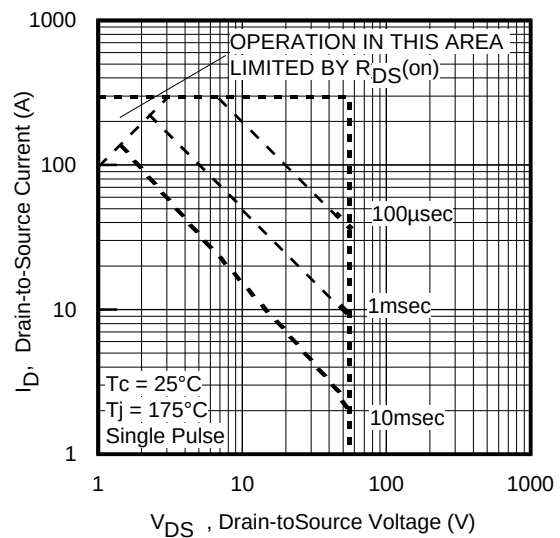


Fig 8. Maximum Safe Operating Area

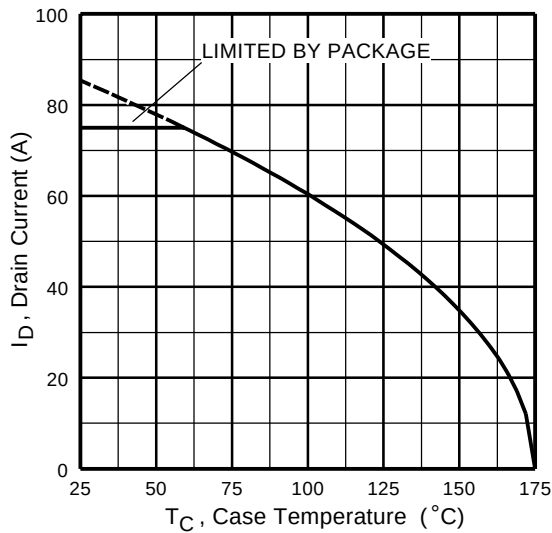


Fig 9. Maximum Drain Current Vs. Case Temperature

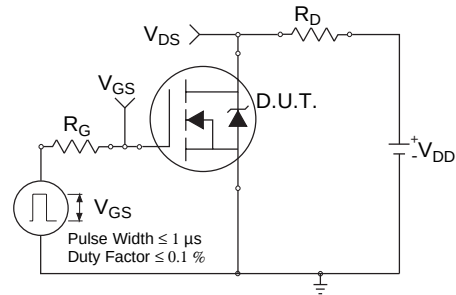


Fig 10a. Switching Time Test Circuit

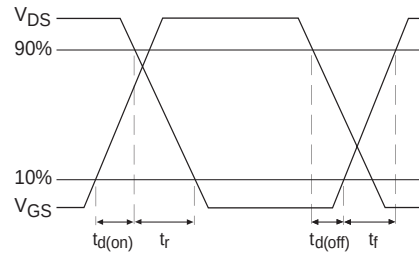


Fig 10b. Switching Time Waveforms

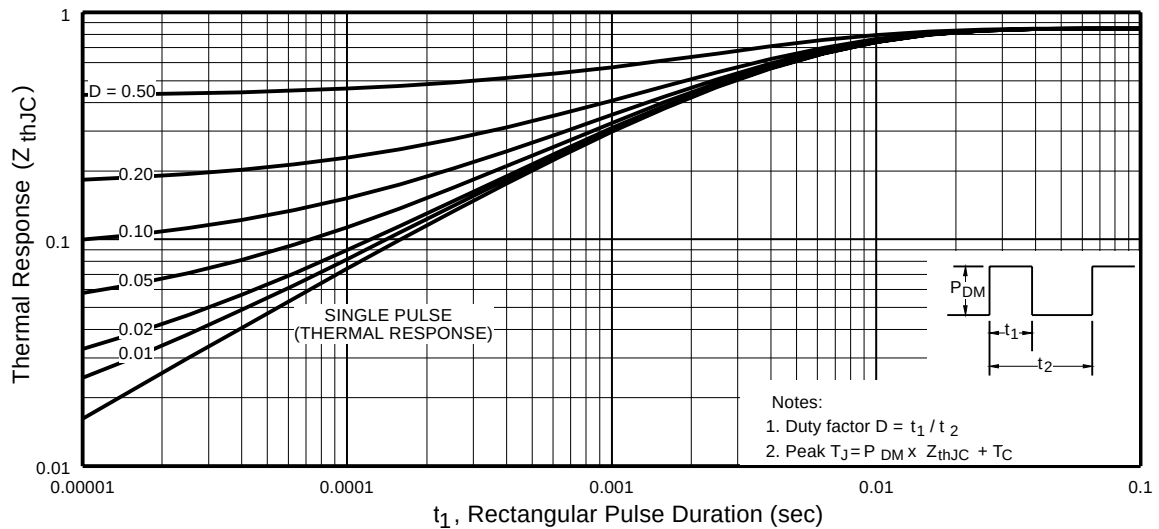


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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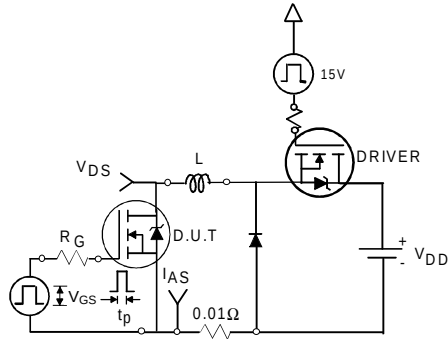


Fig 12a. Unclamped Inductive Test Circuit

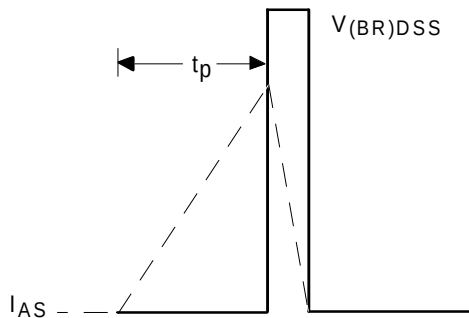


Fig 12b. Unclamped Inductive Waveforms

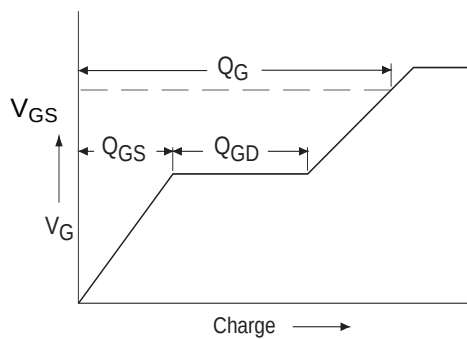


Fig 13a. Basic Gate Charge Waveform

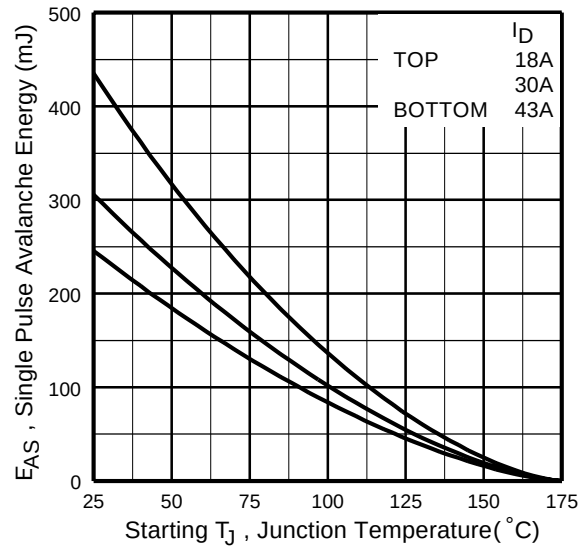


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

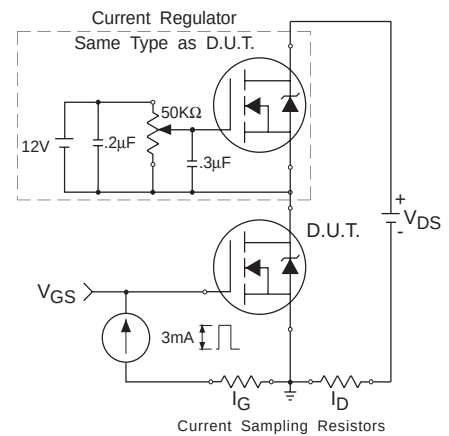
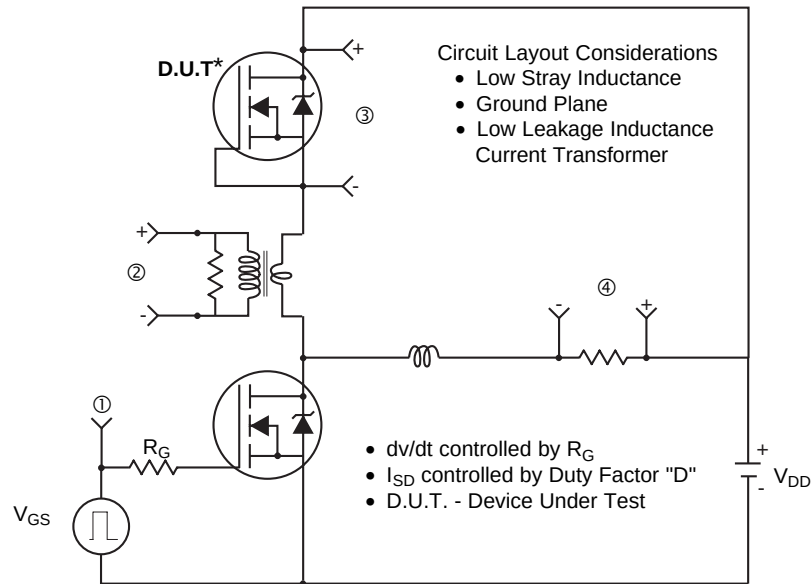
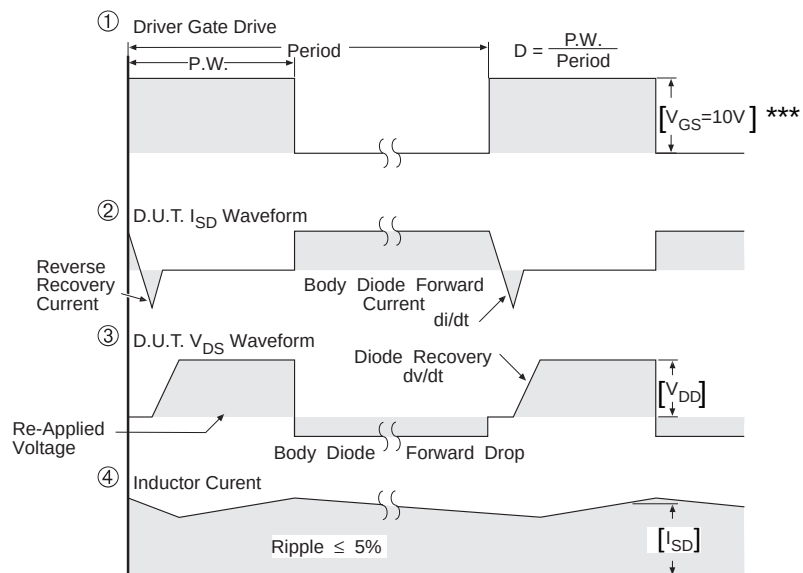


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



* Reverse Polarity of D.U.T for P-Channel



*** $V_{GS} = 5.0V$ for Logic Level and 3V Drive Devices

Fig 14. For N-channel HEXFET® power MOSFETs

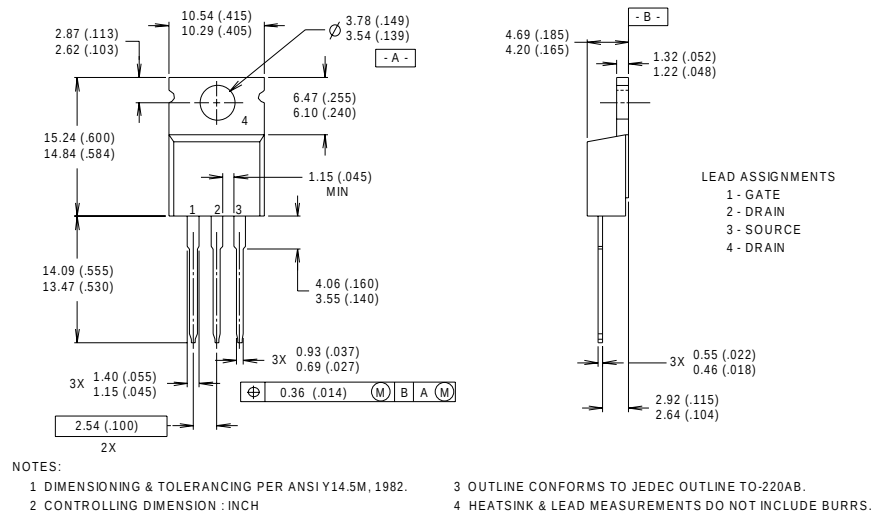
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Package Outline

TO-220AB

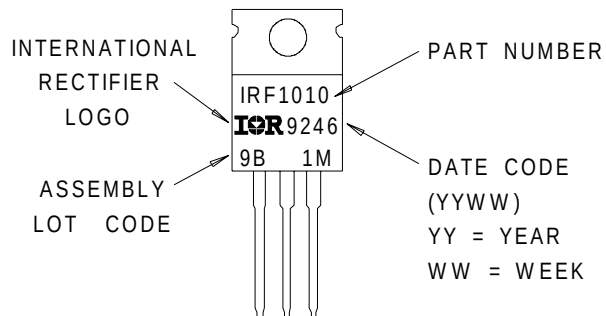
Dimensions are shown in millimeters (inches)



Part Marking Information

TO-220AB

EXAMPLE : THIS IS AN IRF1010
WITH ASSEMBLY
LOT CODE 9B1M



Data and specifications subject to change without notice.
This product has been designed and qualified for the automotive [Q101] market.
Qualification Standards can be found on IR's Web site.

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TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information. 3/01

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Note: For the most current drawings please refer to the IR website at:
<http://www.irf.com/package/>