

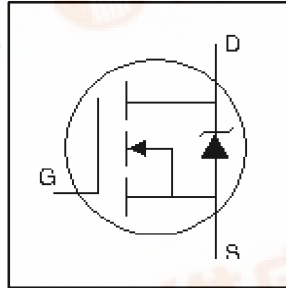
International Rectifier

PD -9.1217

IRL620

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Logic-Level Gate Drive
- $R_{DS(ON)}$ Specified at $V_{GS} = 4V$ & $5V$
- Fast Switching
- Ease of paralleling
- Simple Drive Requirements



$$V_{DSS} = 200V$$

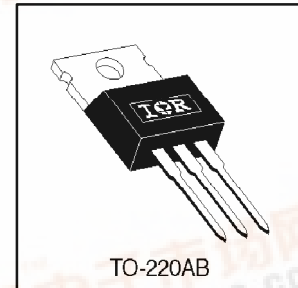
$$R_{DS(on)} = 0.80\Omega$$

$$I_D = 5.2A$$

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

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	5.2	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, V_{GS} @ 5.0V	3.3	
I_{DM}	Pulsed Drain Current ①	21	
P_D @ $T_C = 25^\circ C$	Power Dissipation	50	W
	Linear Derating Factor	0.40	W/°C
V_{GS}	Gate-to-Source Voltage	± 10	V
E_{AS}	Single Pulse Avalanche Energy ②	125	mJ
I_{AR}	Avalanche Current ①	5.2	A
E_{AR}	Repetitive Avalanche Energy ①	5.0	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
T_J	Operating Junction and Storage Temperature Range	-55 to + 150	°C
T_{STG}			
	Mounting torque, 6-32 or M3 screw.	10 lbf•in (1.1N•m)	

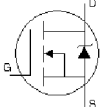
Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	2.5	°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	200	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.27	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(ON)}	Static Drain-to-Source On-Resistance	—	—	0.80	Ω	V _{GS} = 5.0V, I _D = 3.1A ④
		—	—	1.0		V _{GS} = 4.0V, I _D = 2.6A ④
V _{GS(th)}	Gate Threshold Voltage	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	1.2	—	—	S	V _{DS} = 50V, I _D = 3.1A
I _{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V _{DS} = 200V, V _{GS} = 0V
		—	—	250		V _{DS} = 160V, V _{GS} = 0V, T _J = 125°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	—	—	16	nC	I _D = 5.2A
Q _{gs}	Gate-to-Source Charge	—	—	2.7		V _{DS} = 160V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	9.6		V _{GS} = 5.0V, See Fig. 6 and 13 ④
t _{d(on)}	Turn-On Delay Time	—	4.2	—	ns	V _{DD} = 100V
t _r	Rise Time	—	31	—		I _D = 9.0A
t _{d(off)}	Turn-Off Delay Time	—	18	—		R _G = 6.0Ω
t _f	Fall Time	—	17	—		R _D = 11Ω, 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	—	360	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	91	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	27	—		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	5.2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	21		
V _{SD}	Diode Forward Voltage	—	—	1.8	V	T _J = 25°C, I _S = 5.2A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	180	270	ns	T _J = 25°C, I _F = 5.2A
Q _{rr}	Reverse Recovery Charge	—	1.1	1.7	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} = 50V, starting T_J = 25°C, L = 6.9mH
R_G = 25Ω, I_{AS} = 5.2A. (See Figure 12)
- ③ I_{SD} ≤ 5.2A, di/dt ≤ 120A/μs, V_{DD} ≤ V_{(BR)DSS},
T_J ≤ 150°C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

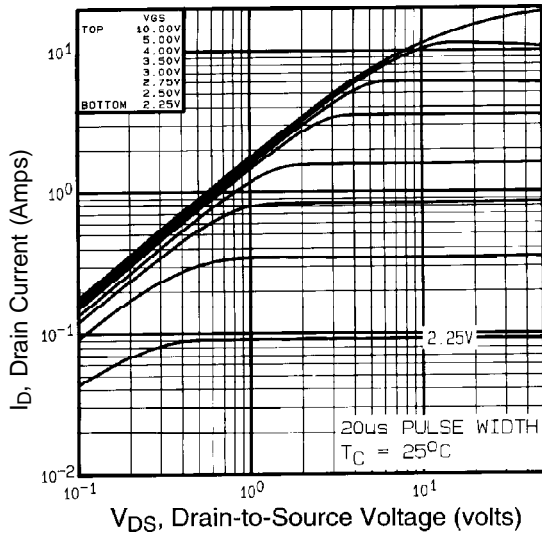


Fig 1. Typical Output Characteristics,
 $T_C = 25^\circ\text{C}$

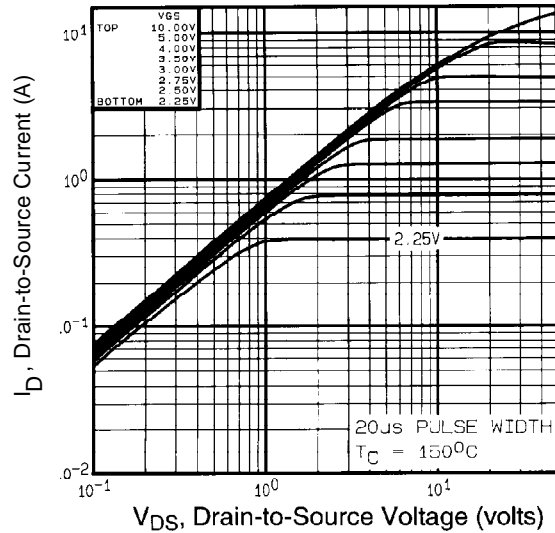


Fig 2. Typical Output Characteristics,
 $T_C = 150^\circ\text{C}$

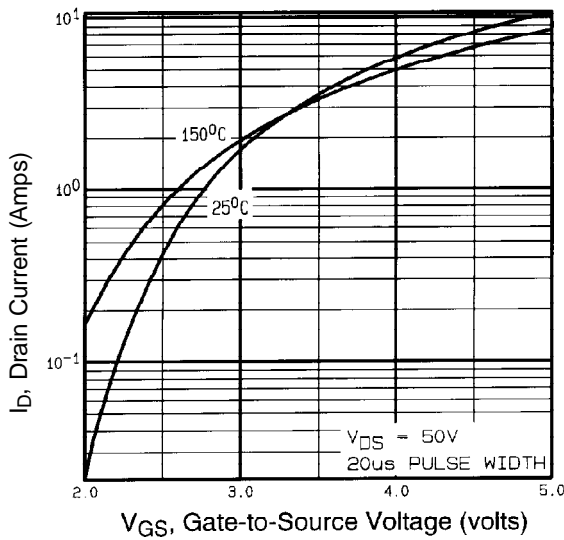


Fig 3. Typical Transfer Characteristics

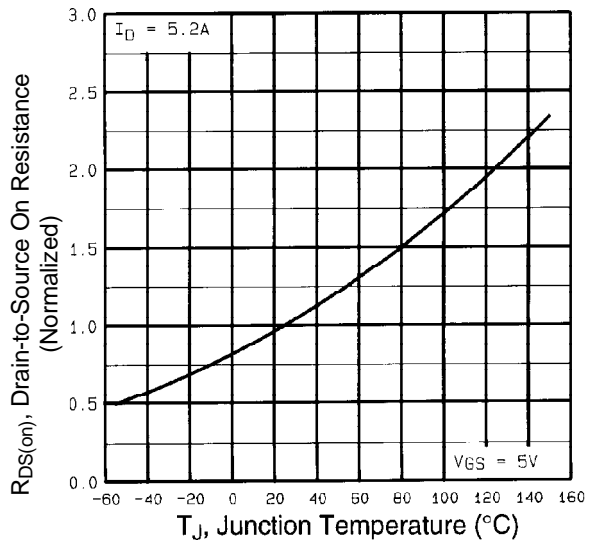


Fig 4. Normalized On-Resistance
Vs. Temperature

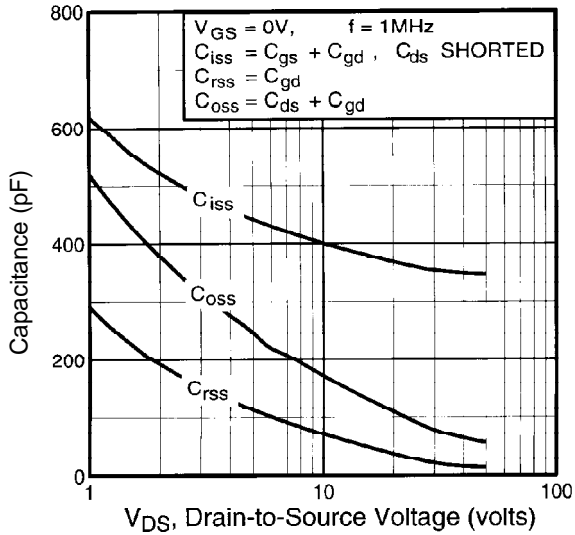


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

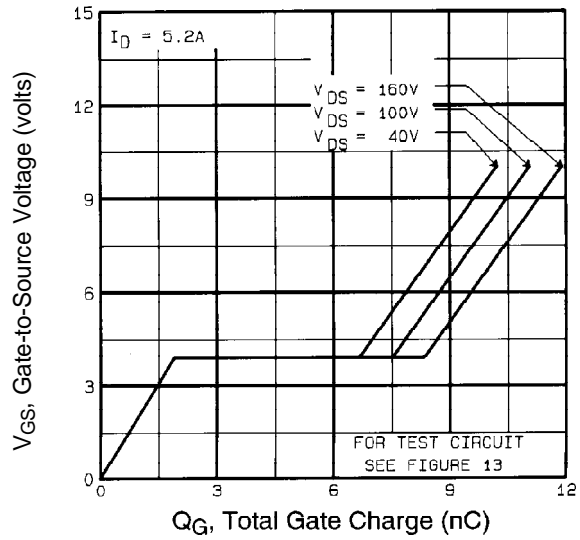


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

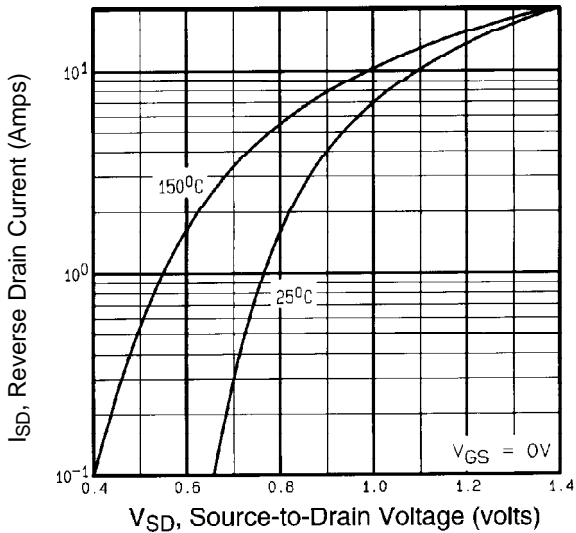


Fig 7. Typical Source-Drain Diode Forward Voltage

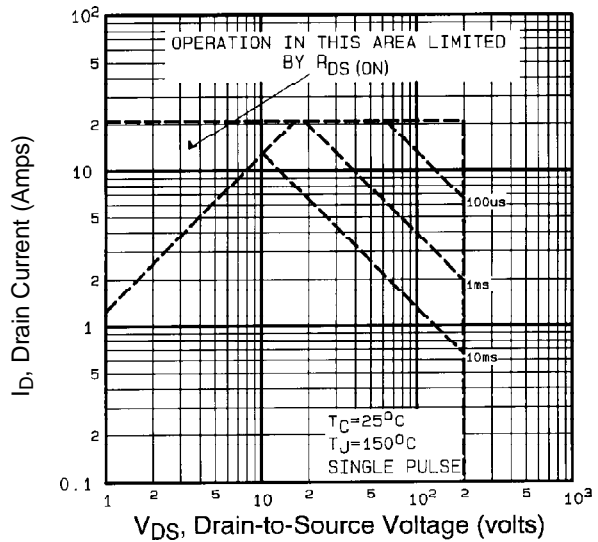


Fig 8. Maximum Safe Operating Area

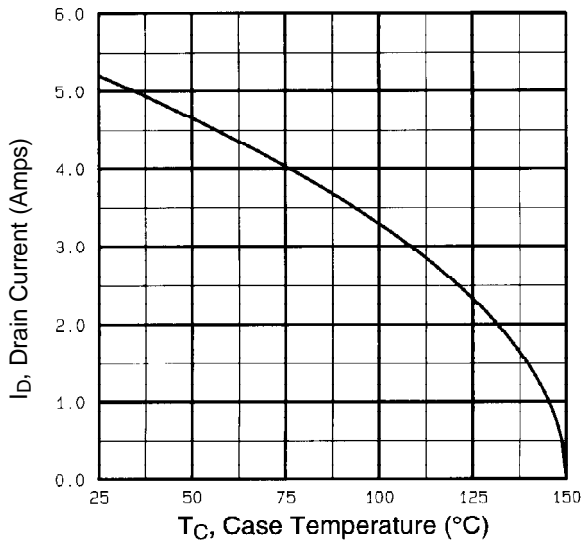


Fig 9. Maximum Drain Current Vs. Case Temperature

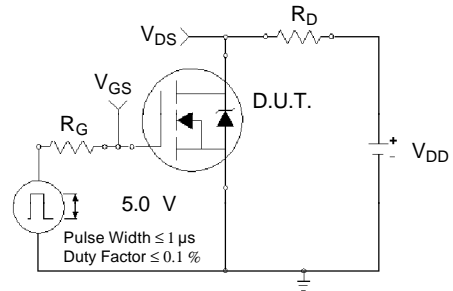


Fig 10a. Switching Time Test Circuit

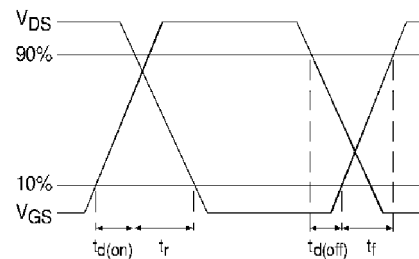


Fig 10b. Switching Time Waveforms

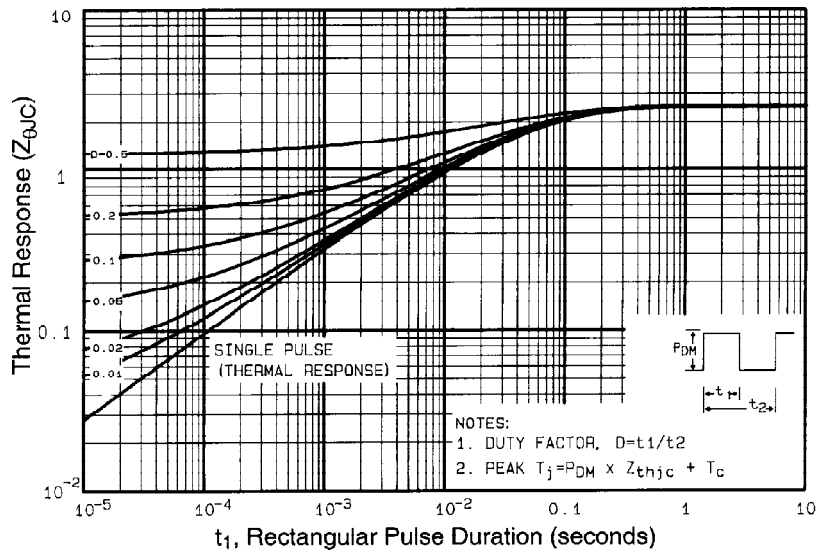


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

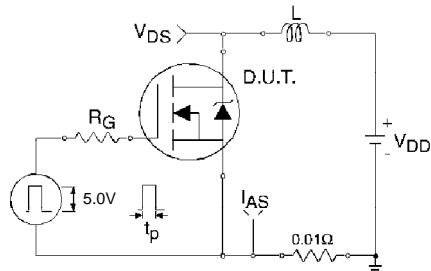


Fig 12a. Unclamped Inductive Test Circuit

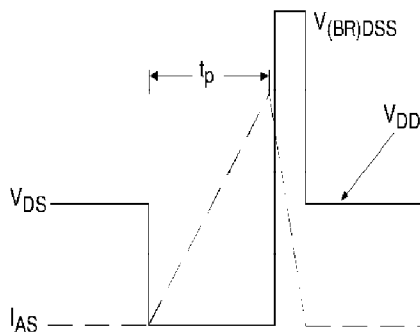


Fig 12b. Unclamped Inductive Waveforms

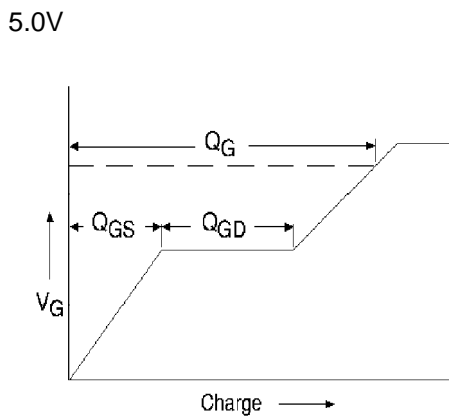


Fig 13a. Basic Gate Charge Waveform

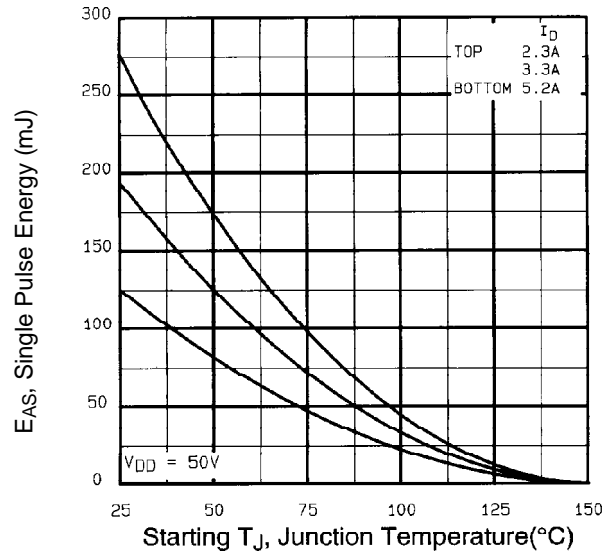


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

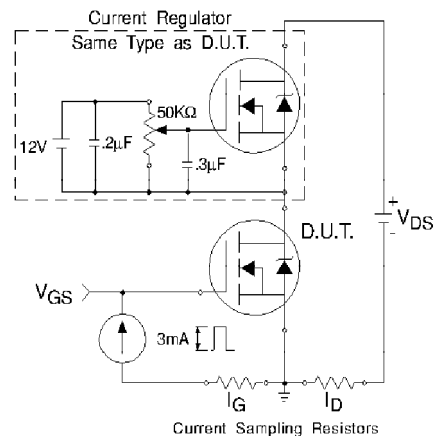
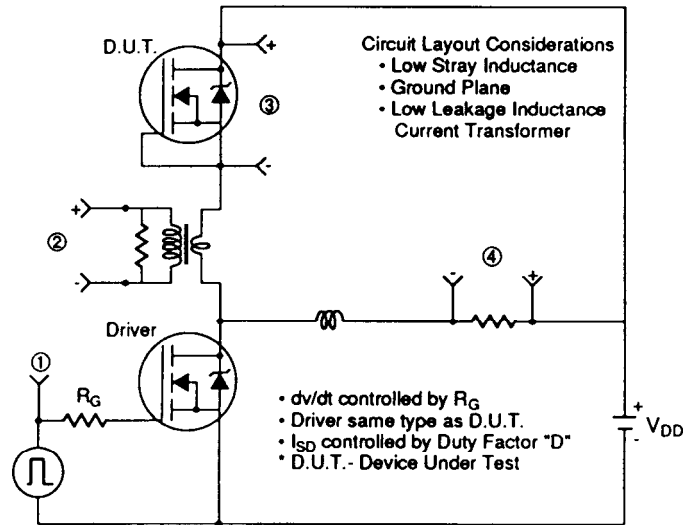


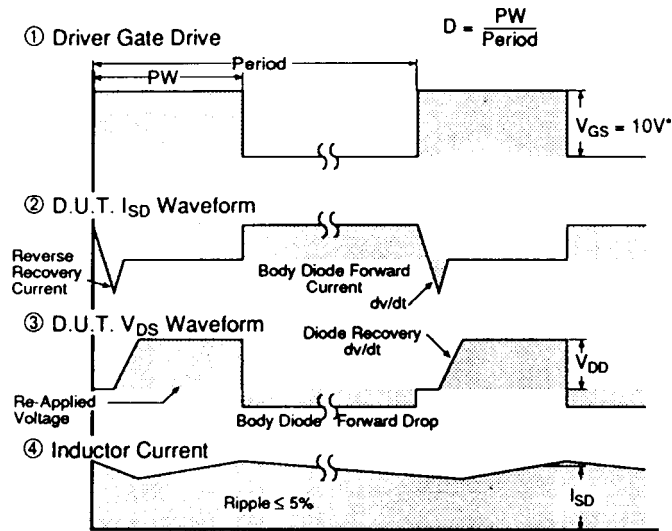
Fig 13b. Gate Charge Test Circuit

dv/dt Test Circuit

Fig 14. For N-Channel HEXFETs



Peak Diode Recovery Test Circuit

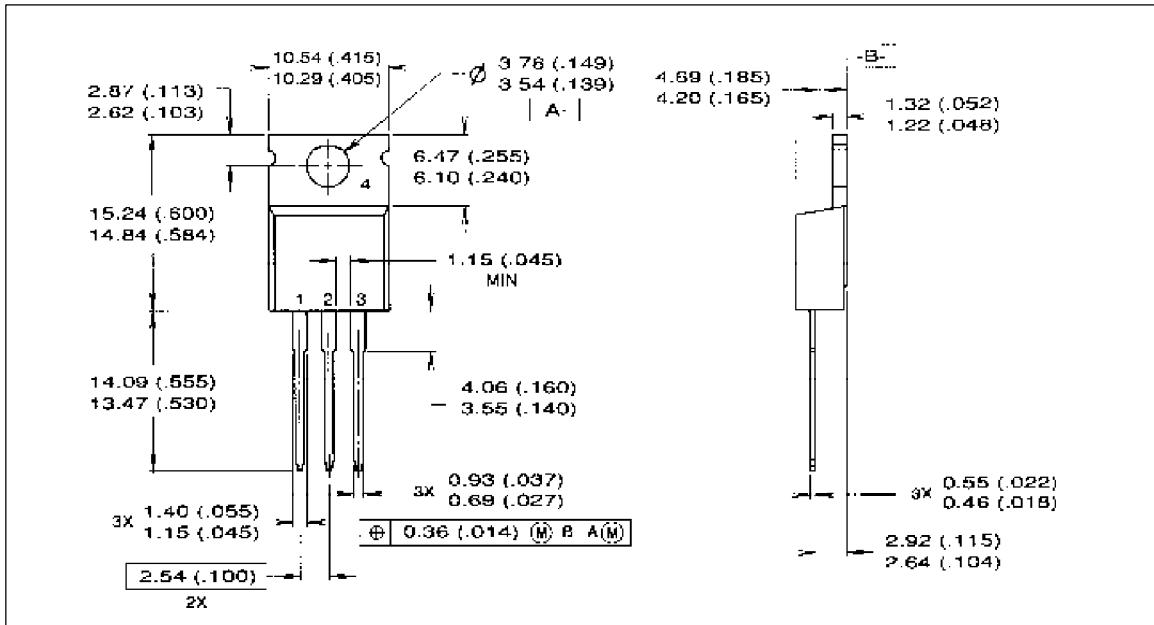


* $V_{GS} = 5V$ for Logic Level Devices

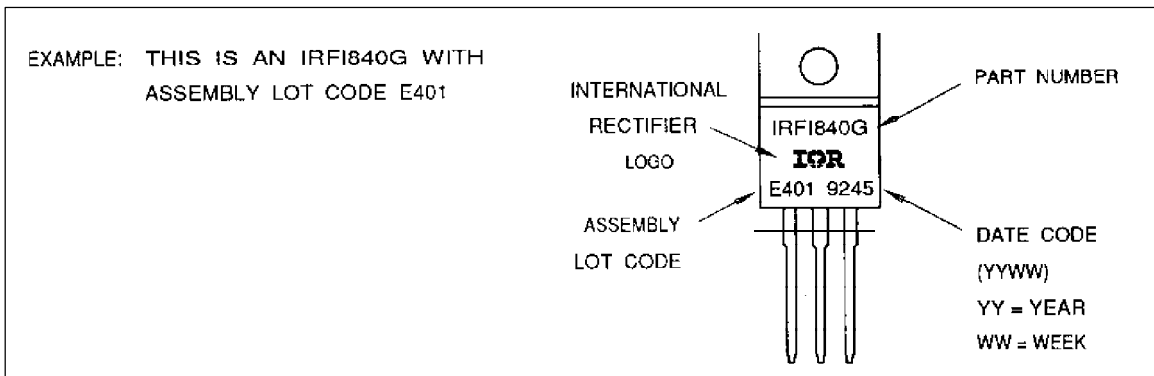
IRL620



Package Outline - TO-220AB



Part Marking Information - TO-220AB



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Data and specifications subject to change without notice.