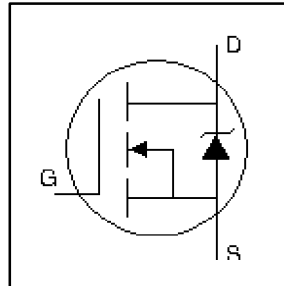


### HEXFET® Power MOSFET

- 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



$$V_{DSS} = 200V$$

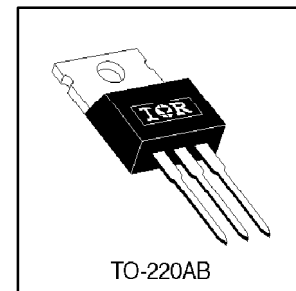
$$R_{DS(on)} = 0.80\Omega$$

$$I_D = 5.2A$$

### 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	$\pm 10$	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	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds		
	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 @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

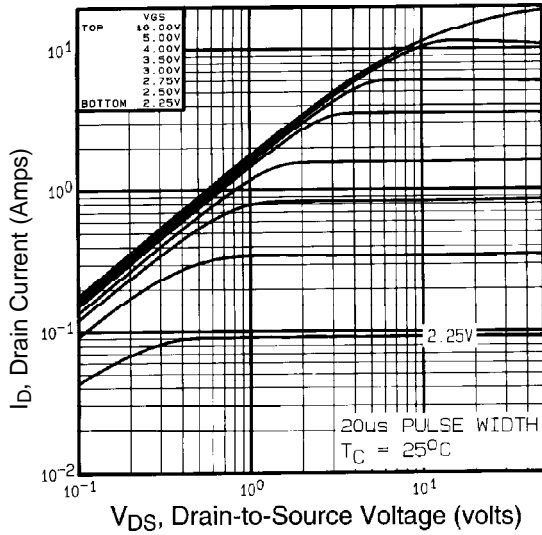
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	200	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.27	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	—	—	0.80	$\Omega$	$V_{GS} = 5.0V, I_D = 3.1A$ ④
		—	—	1.0		$V_{GS} = 4.0V, I_D = 2.6A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	1.2	—	—	S	$V_{DS} = 50V, I_D = 3.1A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS} = 200V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 160V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	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	—		$R_G = 6.0\Omega$
$t_f$	Fall Time	—	17	—		$R_D = 11\Omega$ , 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	—		$f = 1.0\text{MHz}$ , See Fig. 5

## Source-Drain Ratings and Characteristics

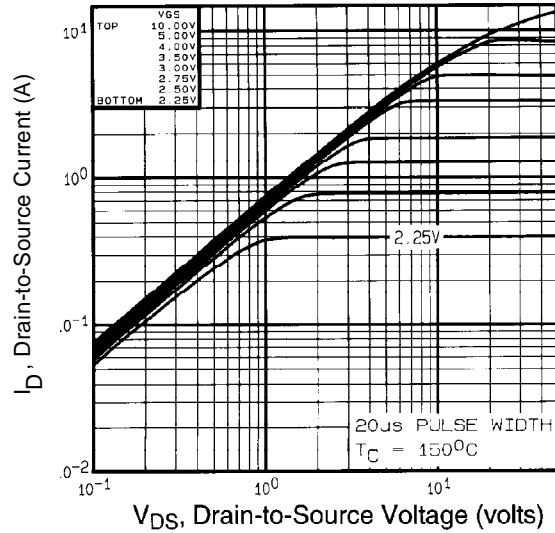
	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	5.2	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	21		
$V_{SD}$	Diode Forward Voltage	—	—	1.8	V	$T_J = 25^\circ\text{C}, I_S = 5.2A, V_{GS} = 0V$ ②
$t_{rr}$	Reverse Recovery Time	—	180	270	ns	$T_J = 25^\circ\text{C}, I_F = 5.2A$
$Q_{rr}$	Reverse Recovery Charge	—	1.1	1.7	$\mu C$	$di/dt = 100A/\mu s$ ③
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ )				

### Notes:

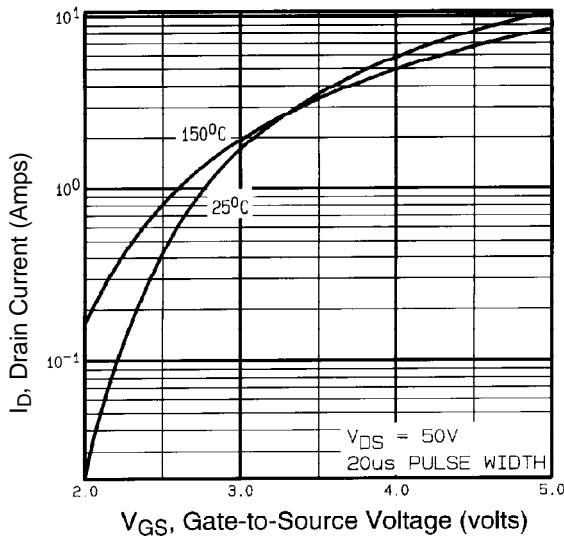
- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ②  $V_{DD} = 50V$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 6.9\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 5.2A$ . (See Figure 12)
- ③  $I_{SD} \leq 5.2A$ ,  $di/dt \leq 120A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$
- ④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .



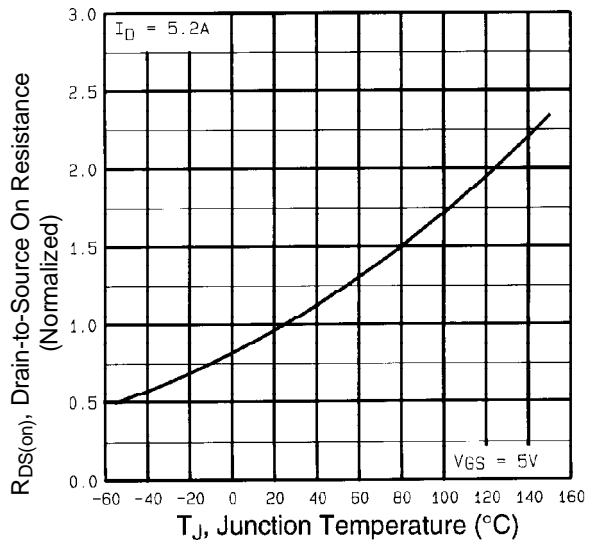
**Fig 1.** Typical Output Characteristics,  
 $T_C = 25^\circ\text{C}$



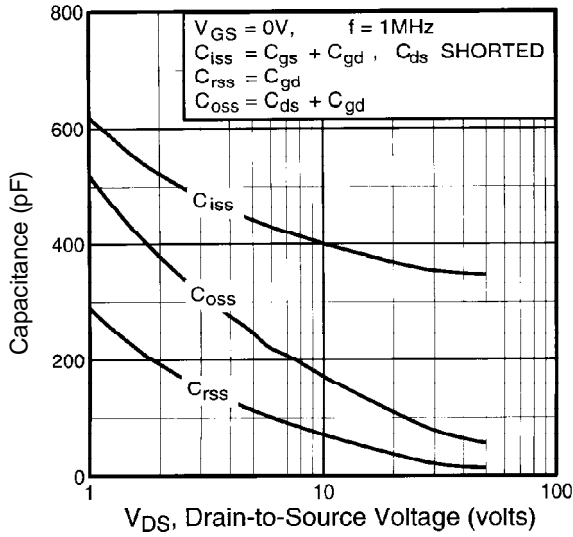
**Fig 2.** Typical Output Characteristics,  
 $T_C = 150^\circ\text{C}$



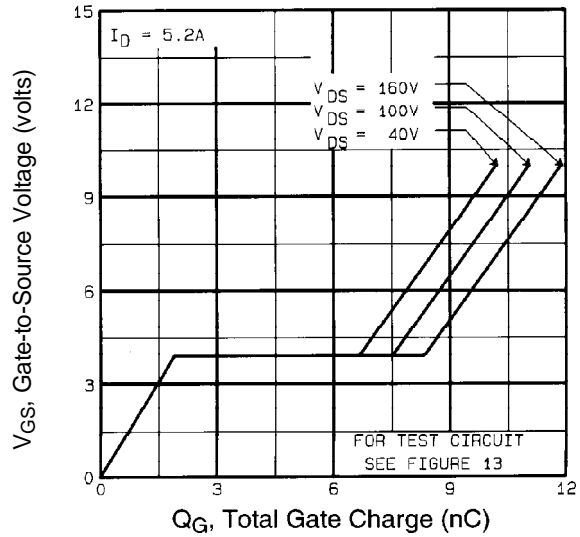
**Fig 3.** Typical Transfer Characteristics



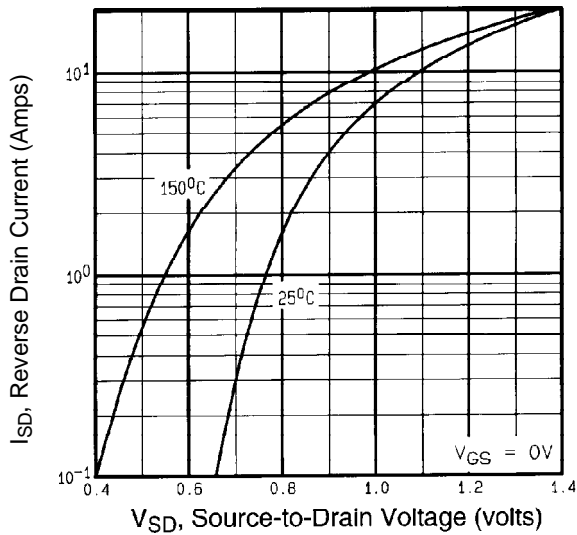
**Fig 4.** Normalized On-Resistance  
Vs. Temperature



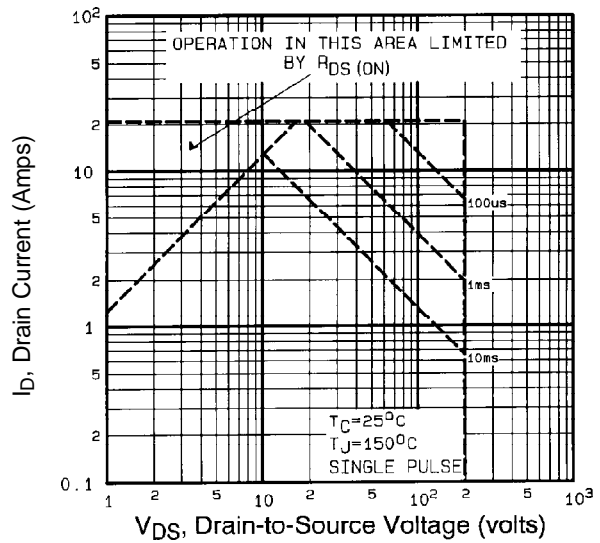
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



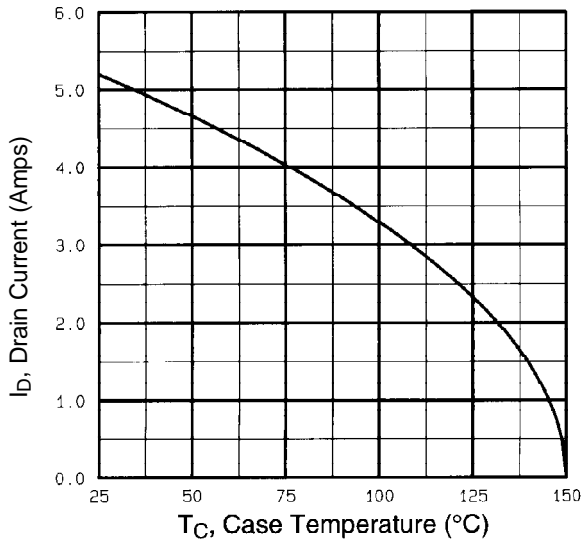
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



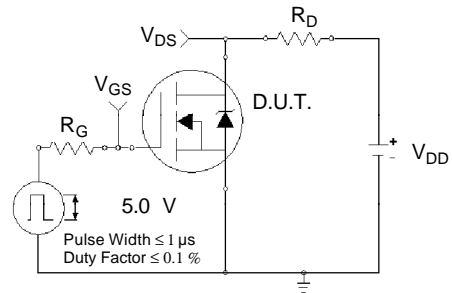
**Fig 7.** Typical Source-Drain Diode Forward Voltage



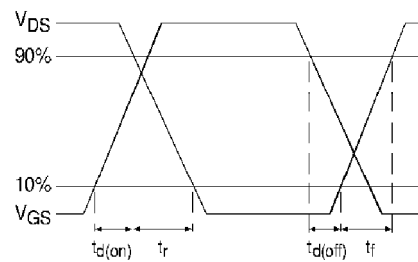
**Fig 8.** Maximum Safe Operating Area



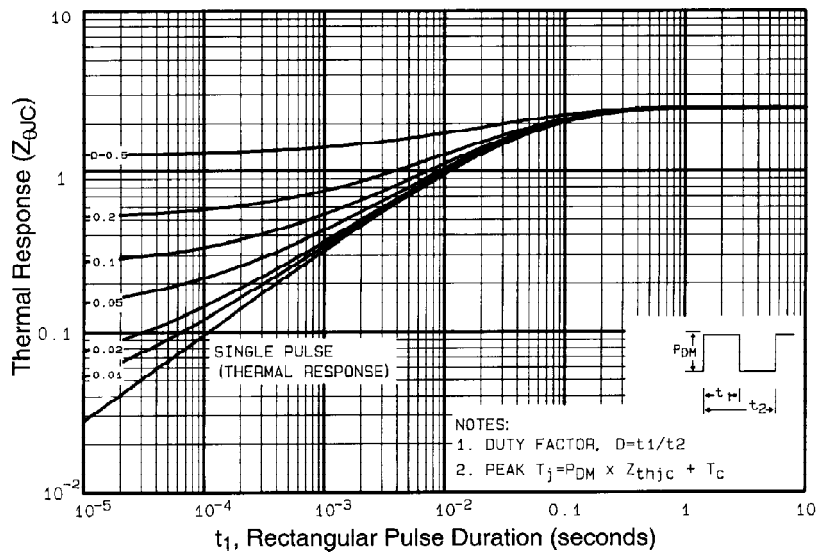
**Fig 9.** Maximum Drain Current Vs. Case Temperature



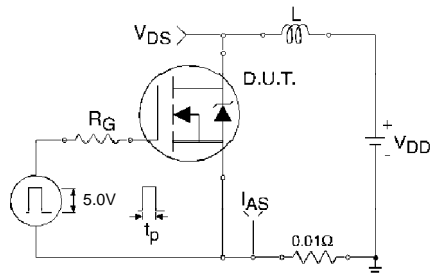
**Fig 10a.** Switching Time Test Circuit



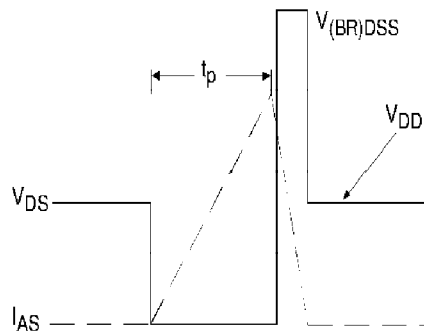
**Fig 10b.** Switching Time Waveforms



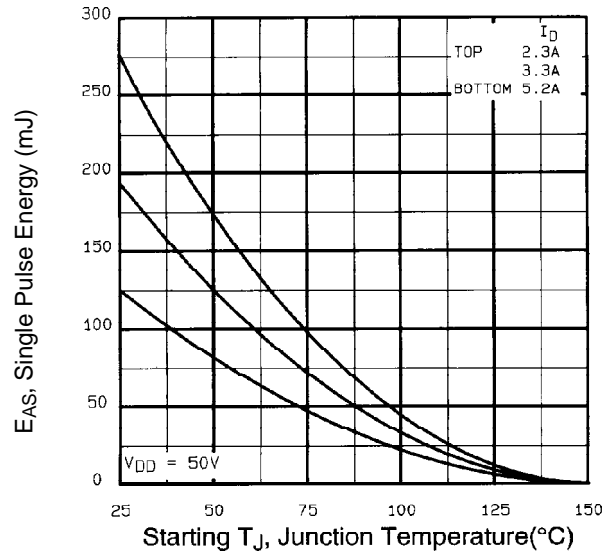
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



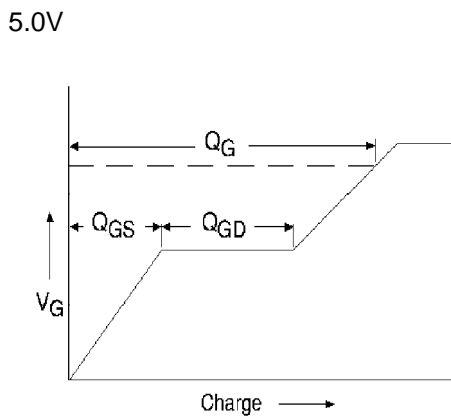
**Fig 12a.** Unclamped Inductive Test Circuit



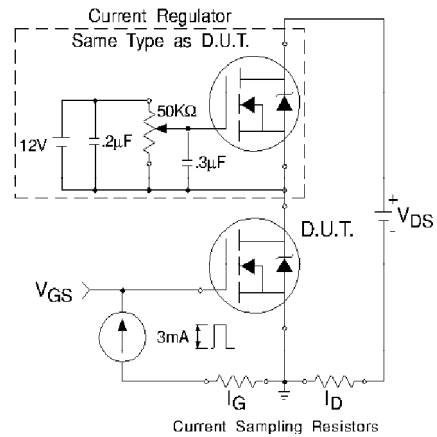
**Fig 12b.** Unclamped Inductive Waveforms



**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current



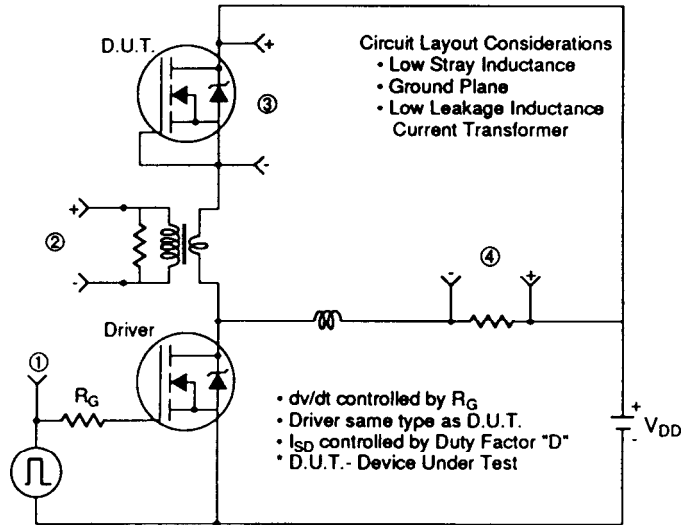
**Fig 13a.** Basic Gate Charge Waveform



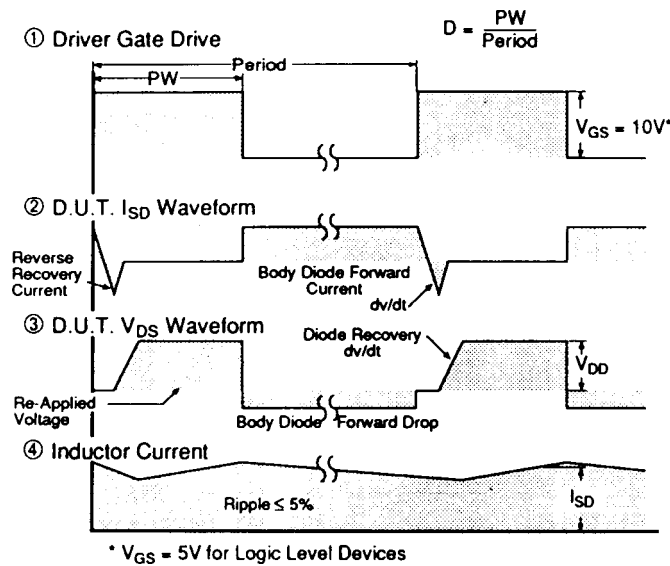
**Fig 13b.** Gate Charge Test Circuit

dv/dt Test Circuit

Fig 14. For N-Channel HEXFETs



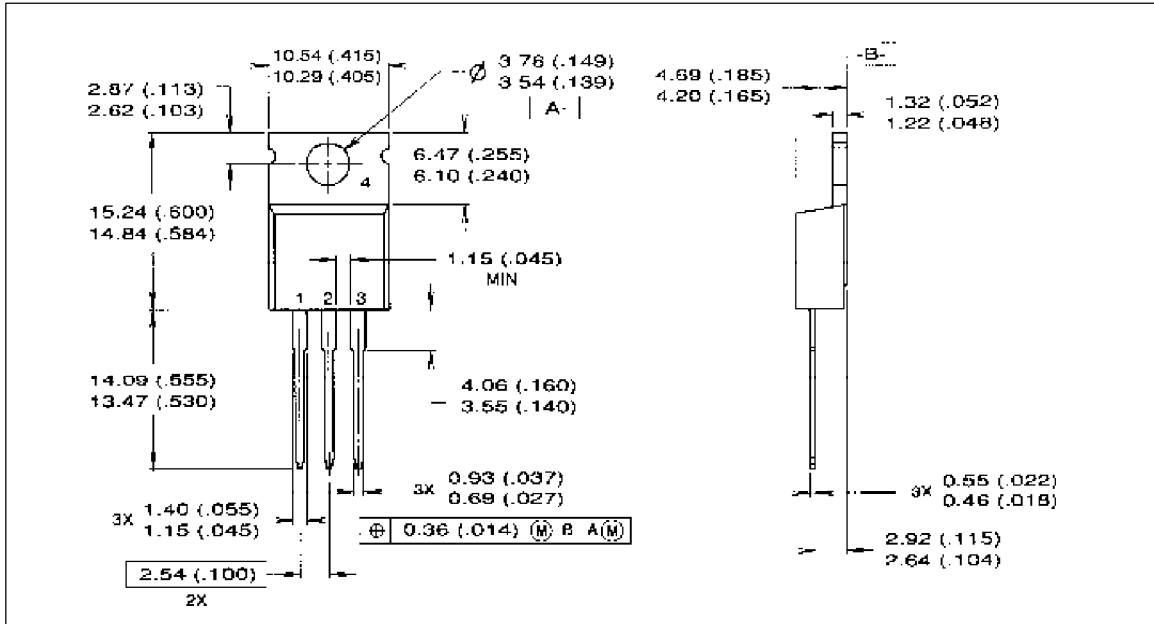
Peak Diode Recovery Test Circuit



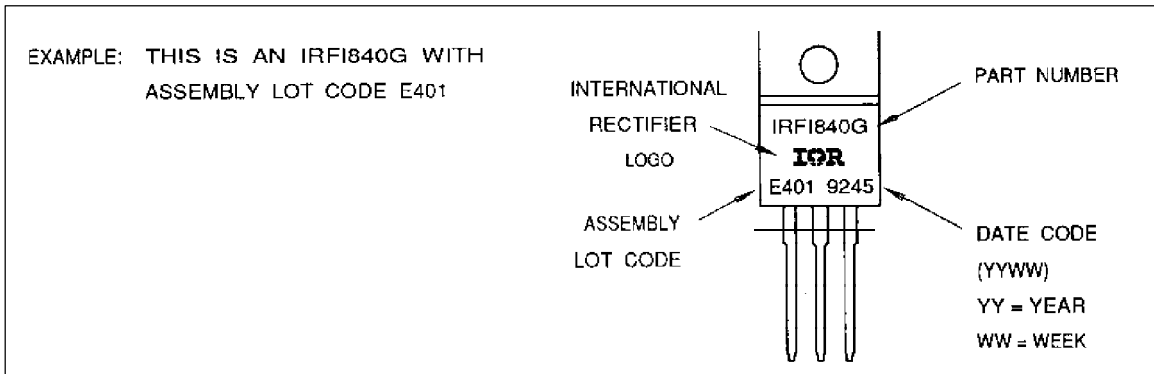
# IRL620



## Package Outline - TO-220AB



## Part Marking Information - TO-220AB



**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331  
**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: (44) 0883 713215  
**IR CANADA:** 7321 Victoria Park Ave., Suite 201, Markham, Ontario L3R 3L1, Tel: (905) 475 1897 **IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: 6172 37066 **IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: (39) 1145 10111 **IR FAR EAST:** K&H Bldg., 2F, 3-30-4 Nishi-Ikeburo 3-Chome, Toshima-Ki, Tokyo 171 Tel: (03)3983 0641 **IR SOUTHEAST ASIA:** 315 Outram Road, #10-02 Tan Boon Liat Building, 0316 Tel: 65 221 8371

*Data and specifications subject to change without notice.*



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

**[LittleDiode.com](http://LittleDiode.com)**

Looking forward to providing you with the best possible service.