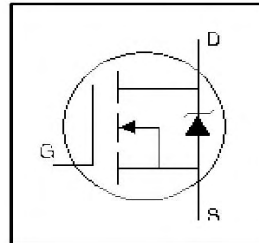


IRLI620GPbF

- Isolated Package
- High Voltage Isolation = 2.5KVRMS^②
- Sink to Lead Creepage Dist. 4.8mm
- Logic-Level Gate Drive
- $R_{DS(ON)}$ Specified at $V_{GS} = 4V$ & $5V$
- Fast Switching
- Ease of paralleling
- Lead-Free

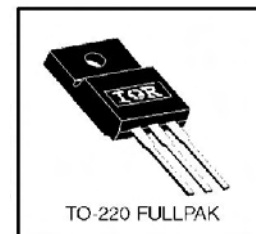


$V_{DSS} = 200V$
$R_{DS(on)} = 0.80\Omega$
$I_D = 4.0A$

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 Fullpak eliminates the need for additional insulating hardware in commercial-industrial applications. The moulding compound used provides a high isolation capability and a low thermal resistance between the tab and external heatsink. This isolation is equivalent to using a 100 micron mica barrier with standard TO-220 product. The Fullpak is mounted to a heatsink using a single clip or by a single screw fixing.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 5.0V$	4.0	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 5.0V$	2.6	
I_{DM}	Pulsed Drain Current ①	16	
$P_D @ T_C = 25^\circ C$	Power Dissipation	30	W
	Linear Derating Factor	0.24	W/°C
V_{GS}	Gate-to-Source Voltage	±10	V
E_{AS}	Single Pulse Avalanche Energy ②	62	mJ
I_{AR}	Avalanche Current ①	4.0	A
E_{AR}	Repetitive Avalanche Energy ①	3.0	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	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	—	—	4.1	°C/W
$R_{\theta JA}$	Junction-to-Ambient	—	—	65	

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 = 2.4A ①
		—	—	1.0	Ω	V _{GS} = 4.0V, I _D = 2.0A ②
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	μA	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	nA	V _{GS} = -10V
Q _g	Total Gate Charge	—	—	16	nC	I _D = 5.2A
Q _{gs}	Gate-to-Source Charge	—	—	2.7	nC	V _{DS} = 160V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	9.6	nC	V _{GS} = 10V, See Fig. 6 and 13 ③
t _{d(on)}	Turn-On Delay Time	—	4.2	—	ns	V _{DD} = 100V
t _r	Rise Time	—	31	—	ns	I _D = 5.2A
t _{d(off)}	Turn-Off Delay Time	—	18	—	ns	R _G = 9.0Ω
t _f	Fall Time	—	17	—	ns	R _D = 20Ω, 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	—	nH	
C _{iss}	Input Capacitance	—	360	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	91	—	pF	V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	27	—	pF	f = 1.0MHz, See Fig. 5



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	4.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	16	A	
V _{SD}	Diode Forward Voltage	—	—	1.8	V	T _J = 25°C, I _S = 4.0A, V _{GS} = 0V ②
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 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 I_{SD} ≤ 5.2A, di/dt ≤ 95A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C

③ t = 60s, f = 60Hz

④ V_{DD} = 25V, starting T_J = 25°C, L = 5.8mH, R_G = 25Ω, I_{AS} = 4.0A. (See Figure 12)

⑤ Pulse width ≤ 300μs; duty cycle ≤ 2%.

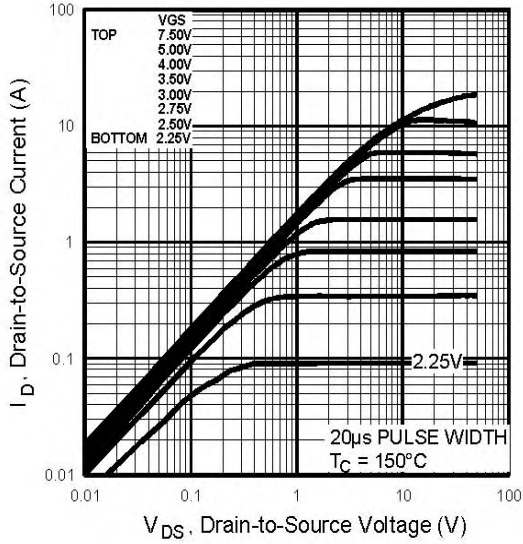


Fig 1. Typical Output Characteristics, $T_C = 25^\circ\text{C}$

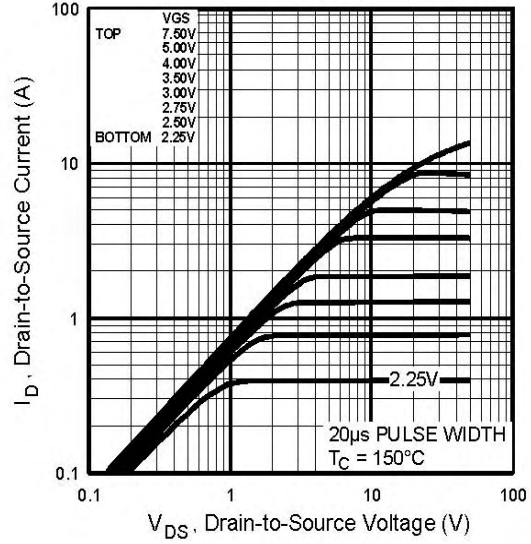


Fig 2. Typical Output Characteristics, $T_C = 150^\circ\text{C}$

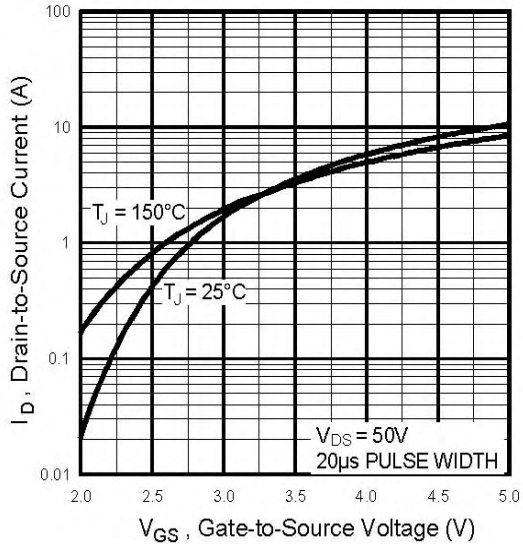


Fig 3. Typical Transfer Characteristics

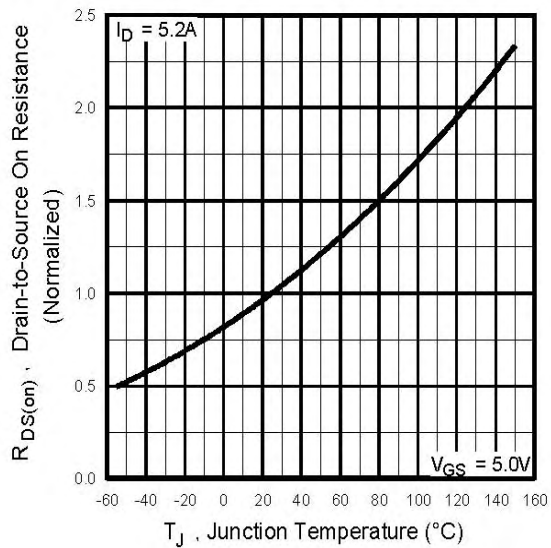


Fig 4. Normalized On-Resistance Vs. Temperature

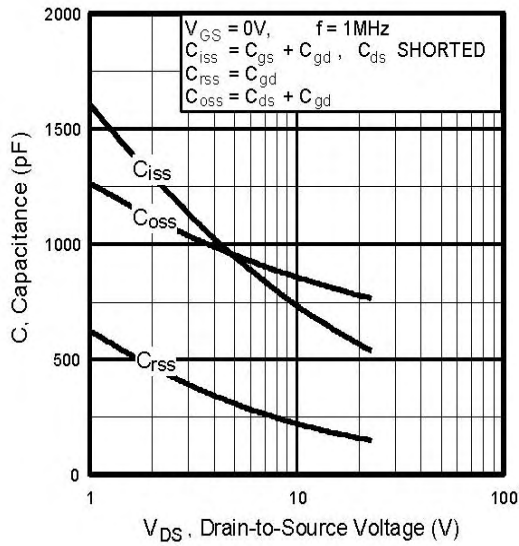


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

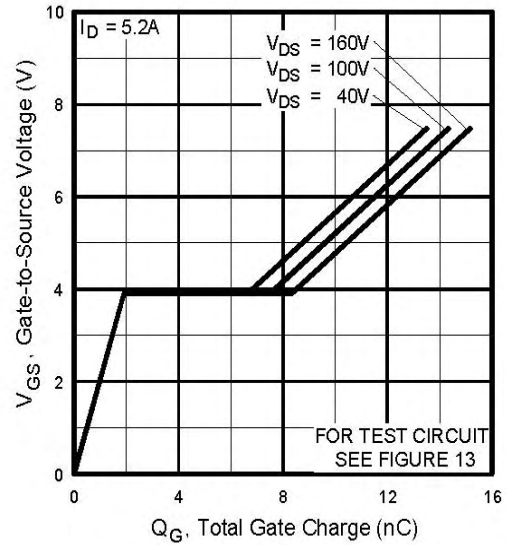


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

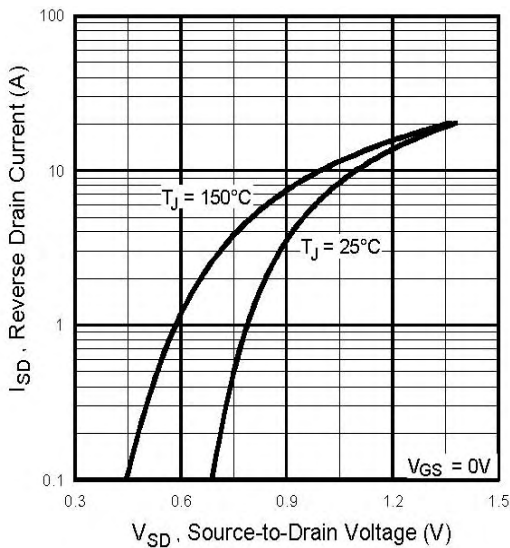


Fig 7. Typical Source-Drain Diode Forward Voltage

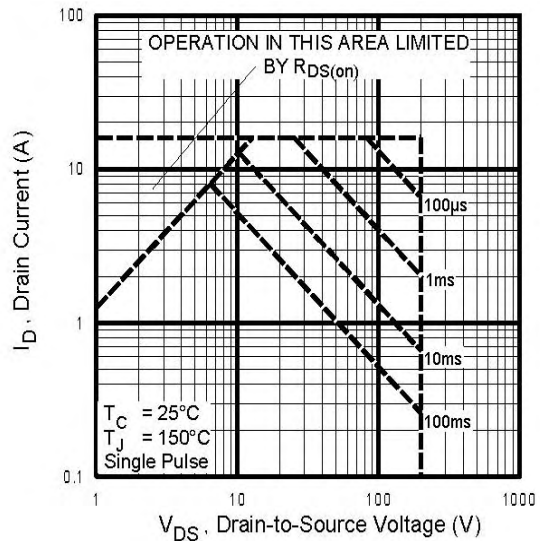


Fig 8. Maximum Safe Operating Area

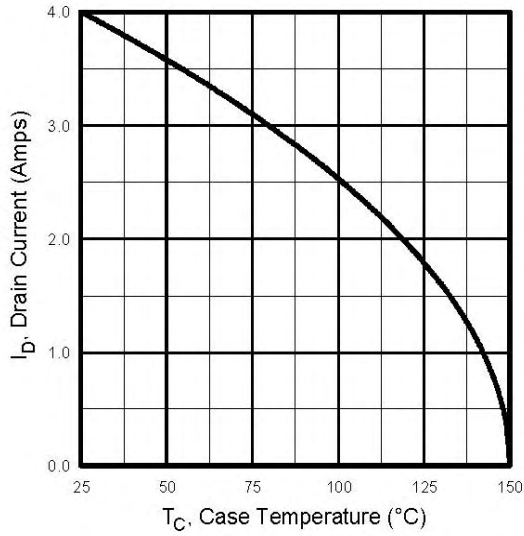


Fig 9. Maximum Drain Current Vs. Case Temperature

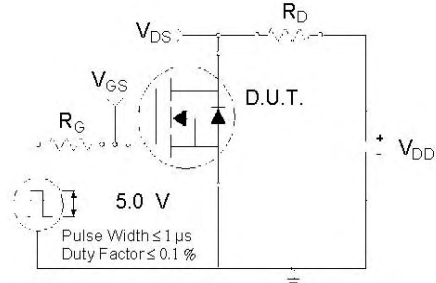


Fig 10a. Switching Time Test Circuit

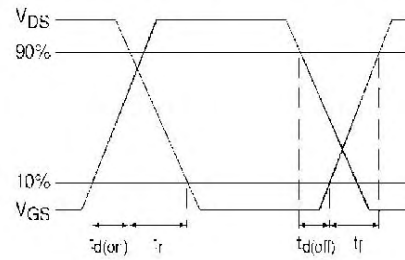


Fig 10b. Switching Time Waveforms

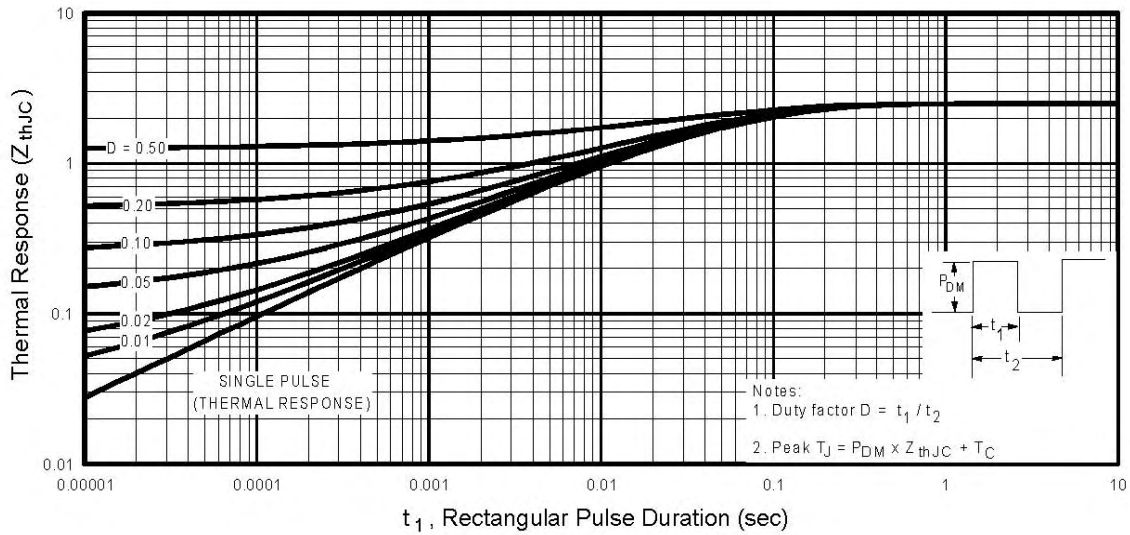


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

IRLI620GPbF

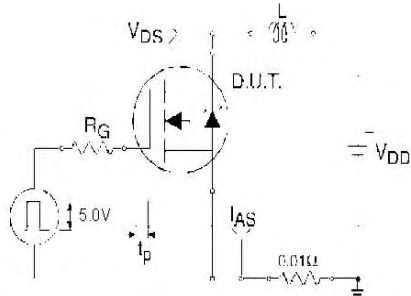


Fig 12a. Unclamped Inductive Test Circuit

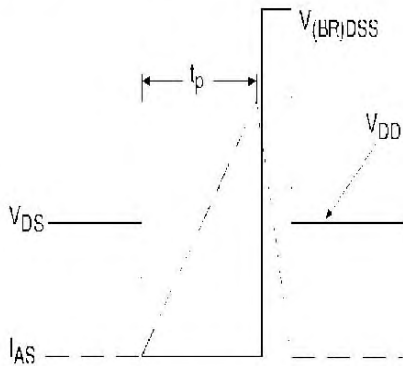


Fig 12b. Unclamped Inductive Waveforms

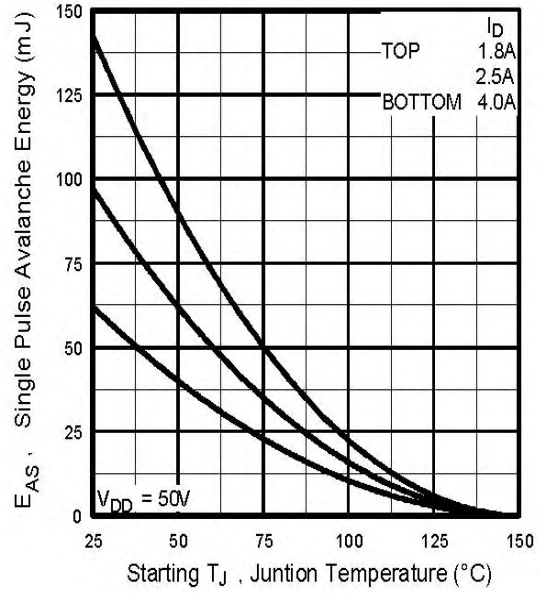


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

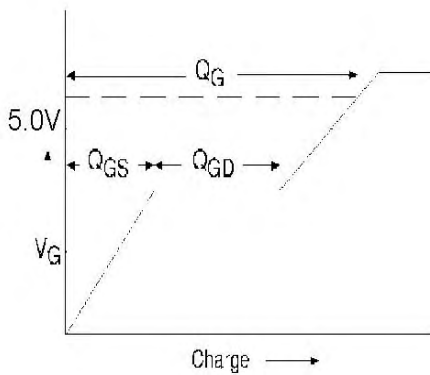


Fig 13a. Basic Gate Charge Waveform

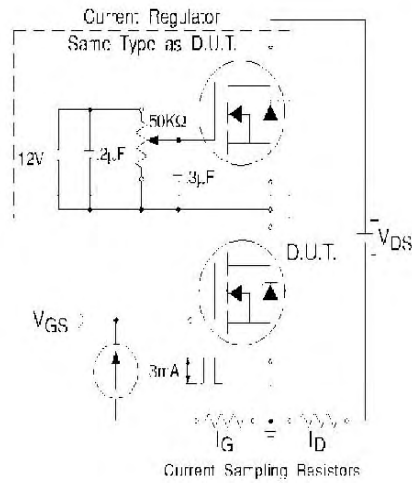


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit

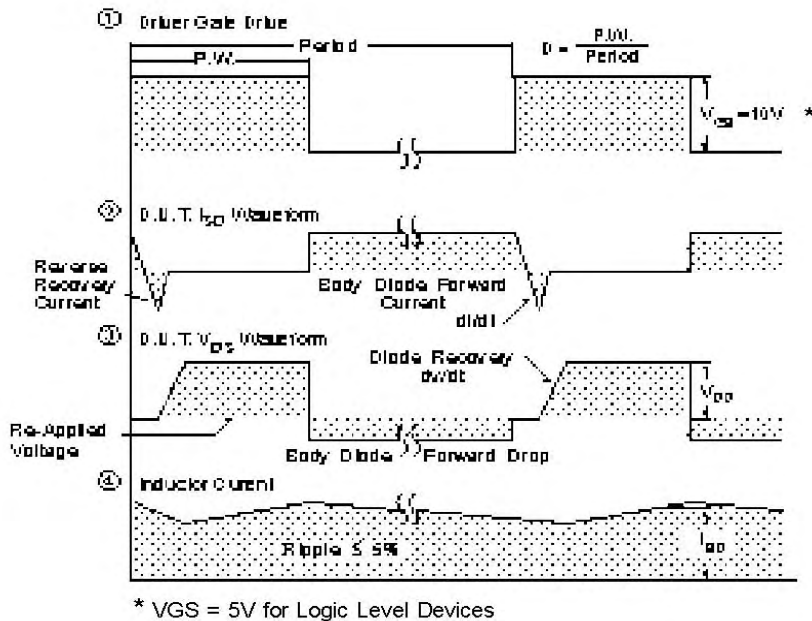
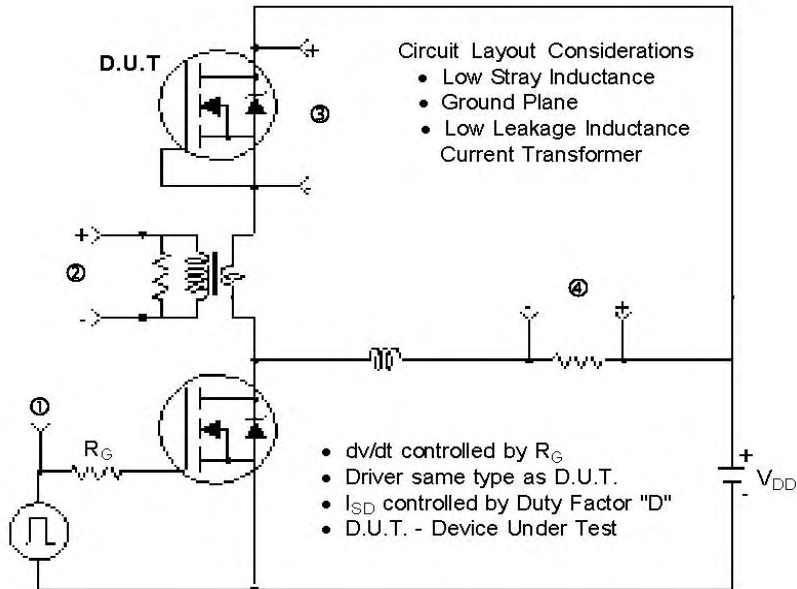


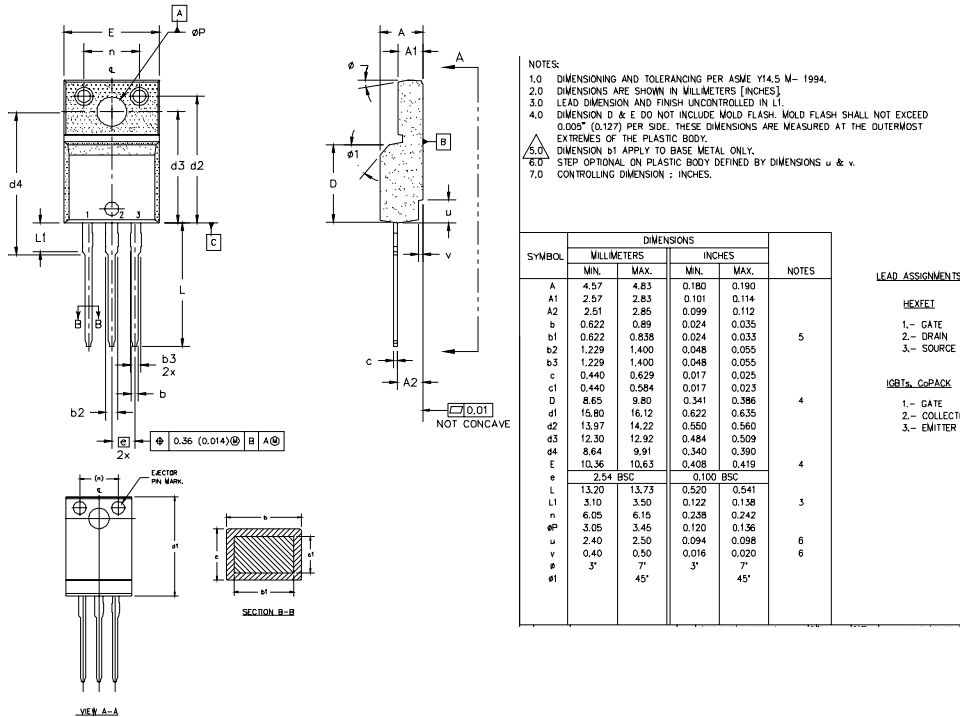
Fig 14. For N-Channel HEXFETS

IRLI620GPbF

TO-220 Full-Pak Package Outline

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IR Rectifier

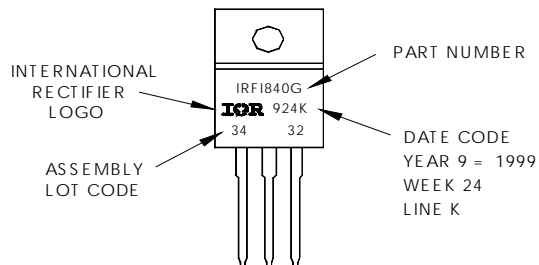
Dimensions are shown in millimeters (inches)



TO-220 Full-Pak Part Marking Information

EXAMPLE: THIS IS AN IRF1840G
 WITH ASSEMBLY
 LOT CODE 3432
 ASSEMBLED ON WW 24 1999
 IN THE ASSEMBLY LINE "K"

Note: "P" in assembly line position indicates "Lead-Free"



Data and specifications subject to change without notice.

International
IR Rectifier

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TAC Fax: (310) 252-7903

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