

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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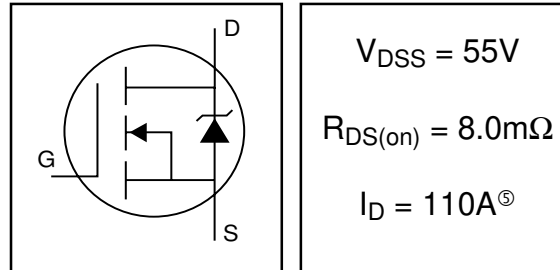
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IRF3205

HEXFET® Power MOSFET

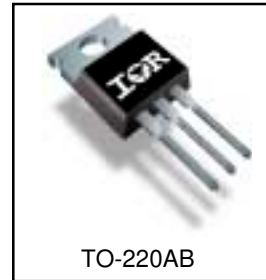
- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated



Description

Advanced HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low 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 and reliable 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.



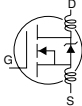
Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	110 Ⓢ	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	80	
I_{DM}	Pulsed Drain Current ①	390	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	200	W
	Linear Derating Factor	1.3	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
I_{AR}	Avalanche Current ①	62	A
E_{AR}	Repetitive Avalanche Energy ①	20	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds		
	Mounting torque, 6-32 or M3 screw	10 lbf·in (1.1N·m)	

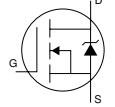
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.75	°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	55	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.057	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	8.0	mΩ	V _{GS} = 10V, I _D = 62A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	44	—	—	S	V _{DS} = 25V, I _D = 62A④
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	—	—	146	nC	I _D = 62A
Q _{gs}	Gate-to-Source Charge	—	—	35		V _{DS} = 44V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	54		V _{GS} = 10V, See Fig. 6 and 13
t _{d(on)}	Turn-On Delay Time	—	14	—	ns	V _{DD} = 28V
t _r	Rise Time	—	101	—		I _D = 62A
t _{d(off)}	Turn-Off Delay Time	—	50	—		R _G = 4.5Ω
t _f	Fall Time	—	65	—		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	—	3247	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	781	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	211	—		f = 1.0MHz, See Fig. 5
E _{AS}	Single Pulse Avalanche Energy②	—	1050⑥	264⑦	mJ	I _{AS} = 62A, L = 138μH

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	110	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode)①	—	—	390		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J = 25°C, I _S = 62A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	69	104	ns	T _J = 25°C, I _F = 62A
Q _{rr}	Reverse Recovery Charge	—	143	215	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 = 138μH
R_G = 25Ω, I_{AS} = 62A. (See Figure 12)
- ③ I_{SD} ≤ 62A, di/dt ≤ 207A/μs, V_{DD} ≤ V_{(BR)DSS},
T_J ≤ 175°C
- ④ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ⑤ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.
- ⑥ This is a typical value at device destruction and represents operation outside rated limits.
- ⑦ This is a calculated value limited to T_J = 175°C.

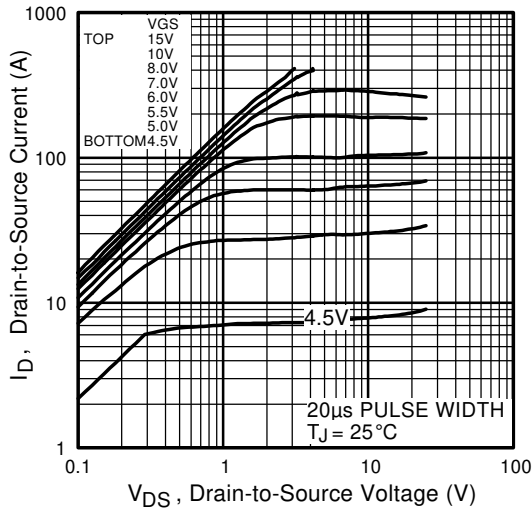


Fig 1. Typical Output Characteristics

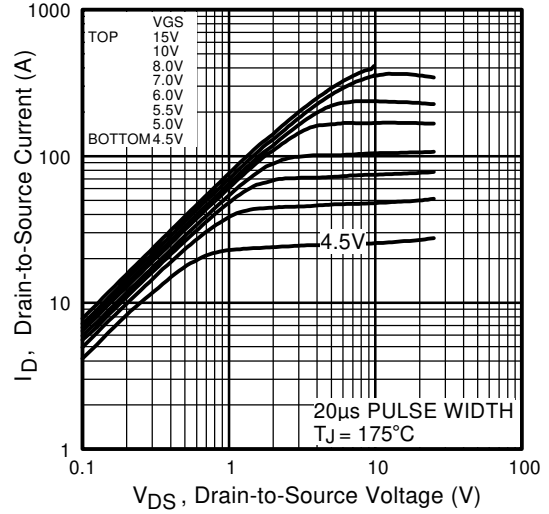


Fig 2. Typical Output Characteristics

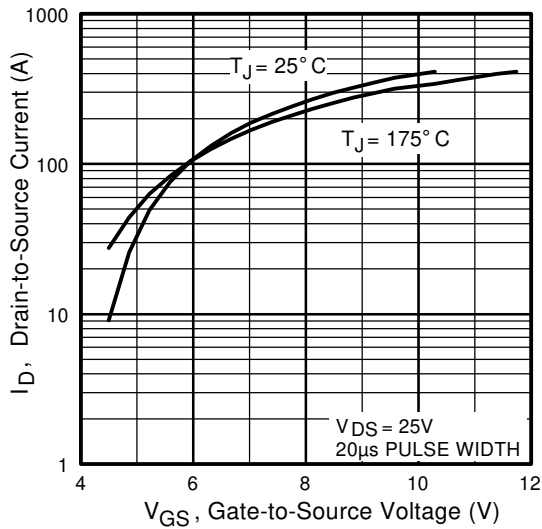


Fig 3. Typical Transfer Characteristics

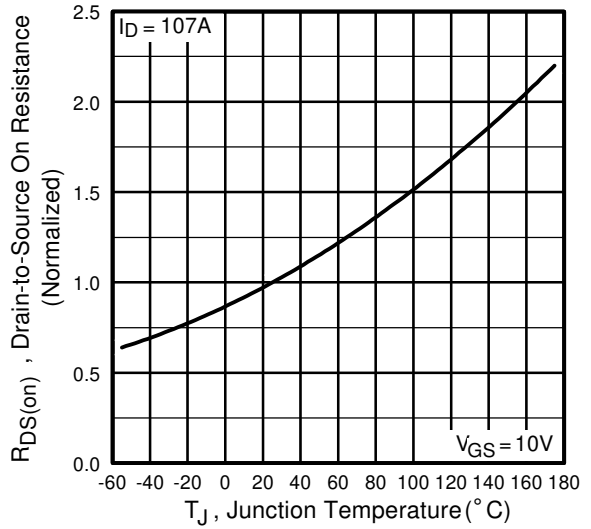


Fig 4. Normalized On-Resistance Vs. Temperature

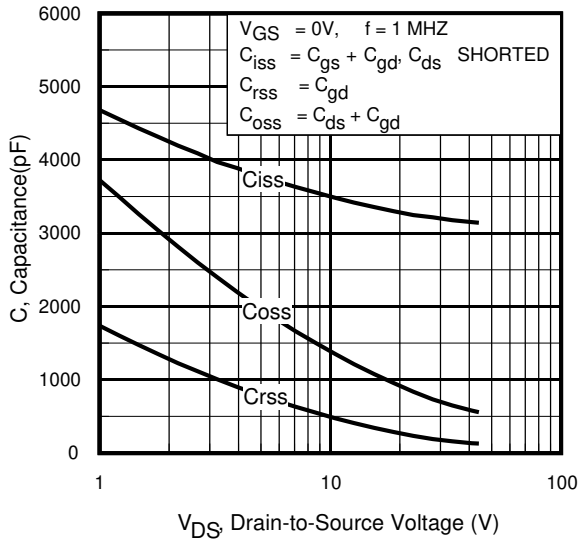


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

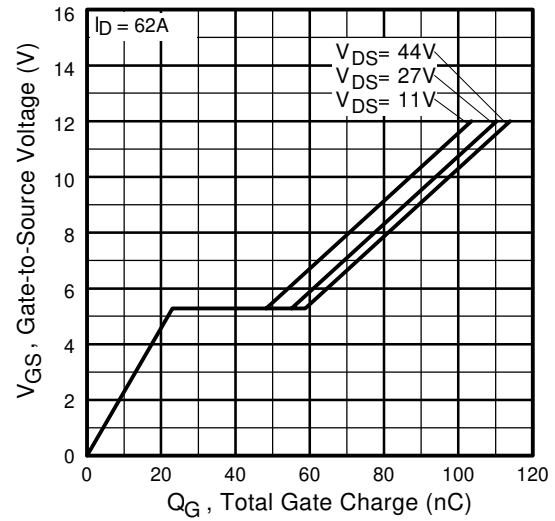


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

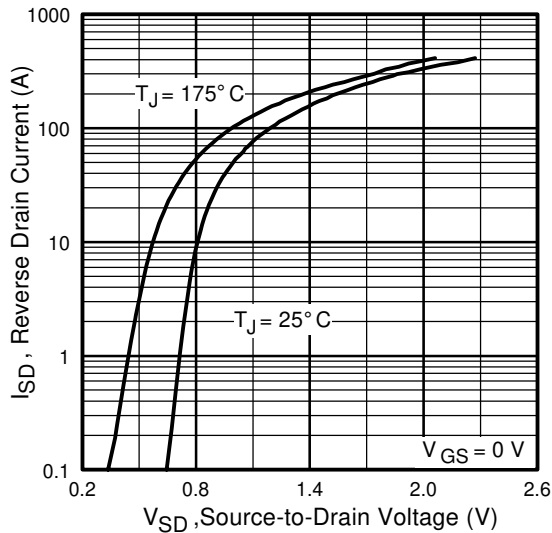


Fig 7. Typical Source-Drain Diode Forward Voltage

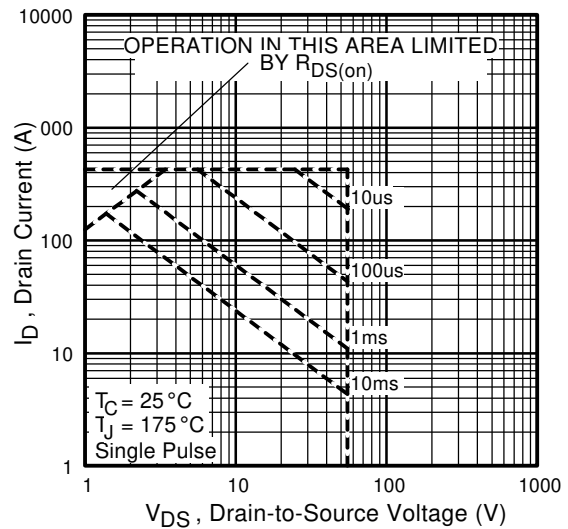


Fig 8. Maximum Safe Operating Area

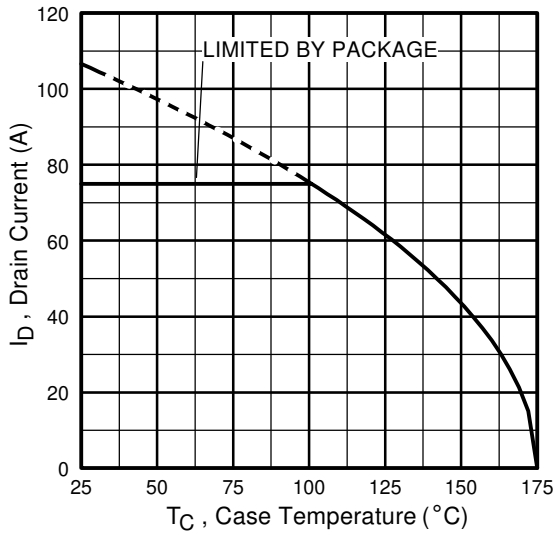


Fig 9. Maximum Drain Current Vs. Case Temperature

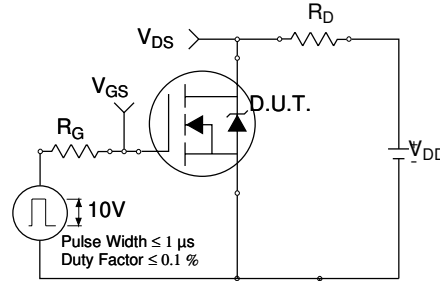


Fig 10a. Switching Time Test Circuit

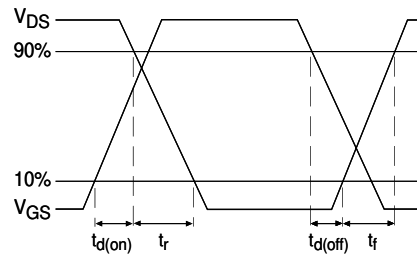


Fig 10b. Switching Time Waveforms

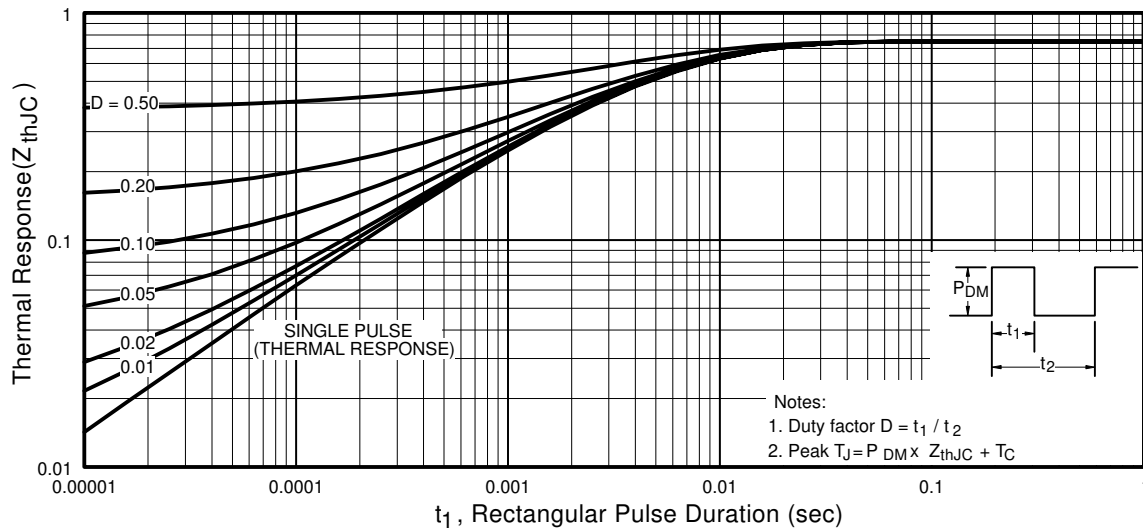


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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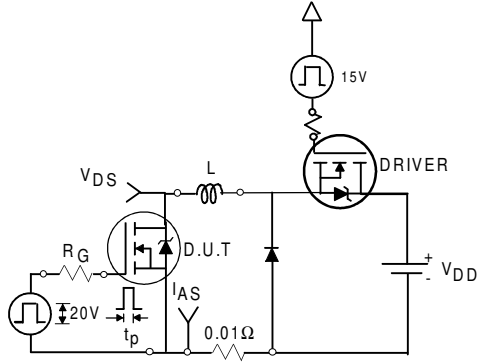


Fig 12a. Unclamped Inductive Test Circuit

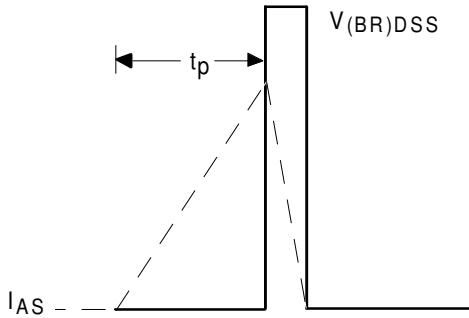


Fig 12b. Unclamped Inductive Waveforms

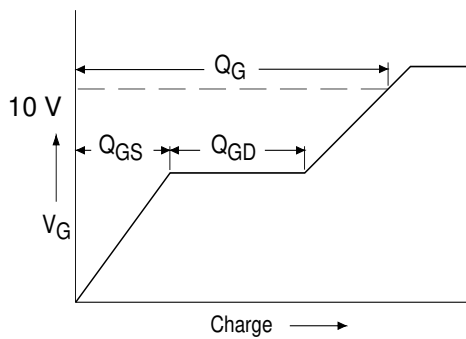


Fig 13a. Basic Gate Charge Waveform

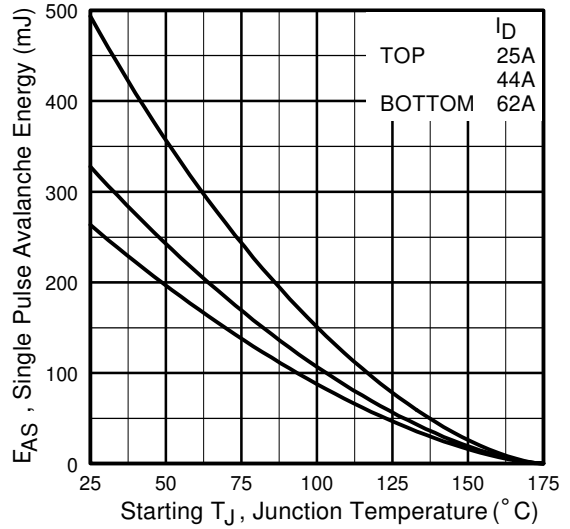


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

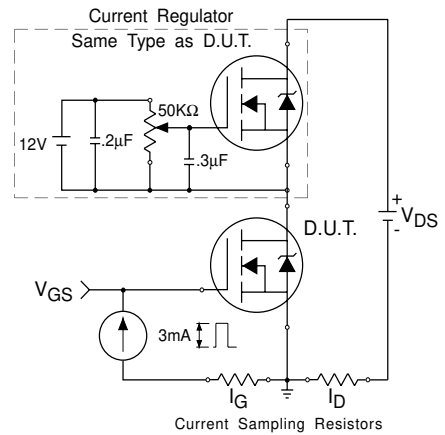
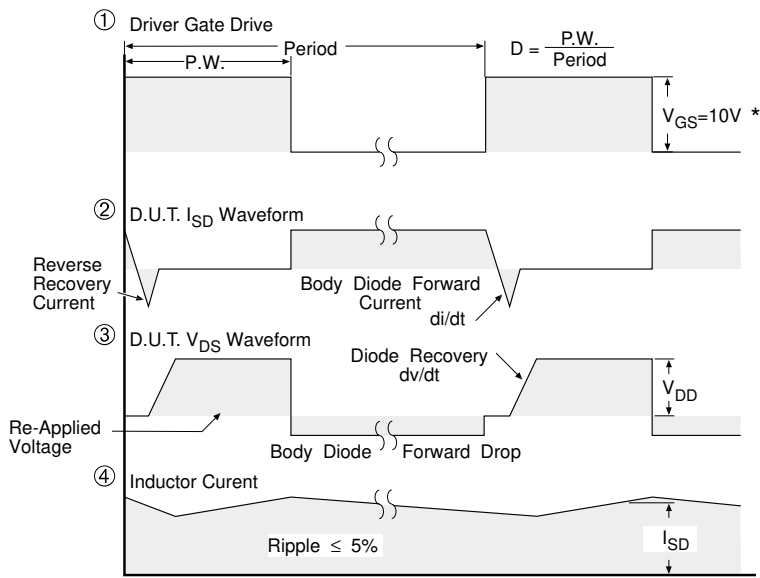
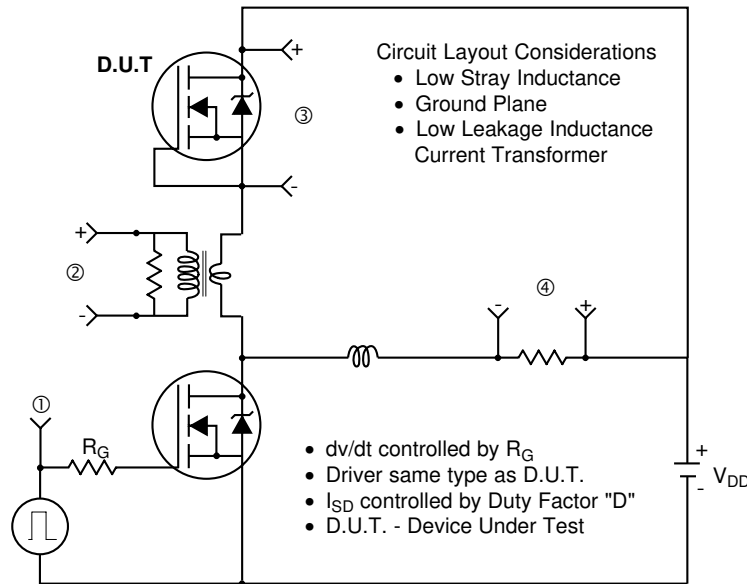


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



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

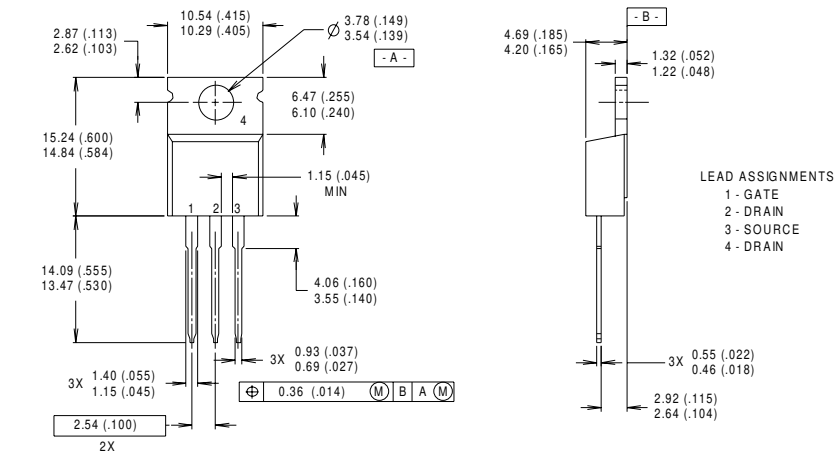
Fig 14. For N-Channel HEXFETS

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Package Outline

TO-220AB Outline

Dimensions are shown in millimeters (inches)

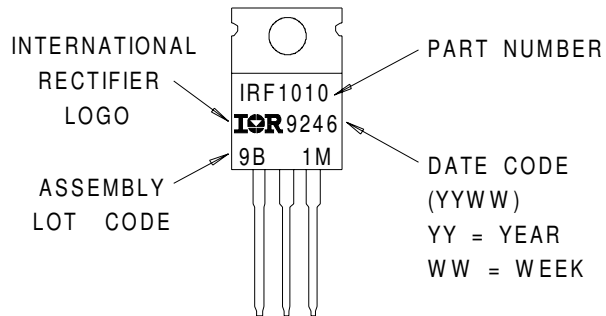


- NOTES:
 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
 2 CONTROLLING DIMENSION : INCH
 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.
 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

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