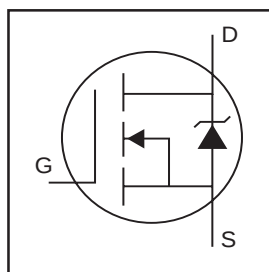


IRFP064VPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Optimized for SMPS Applications
- Lead-Free

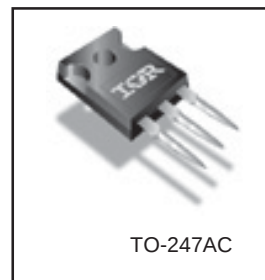


$V_{DS} = 60V$
 $R_{DS(on)} = 5.5m\Omega$
 $I_D = 130A\text{⑦}$

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-247 package is preferred for commercial-industrial applications where higher power levels preclude the use of TO-220 devices. The TO-247 is similar but superior to the earlier TO-218 package because of its isolated mounting hole.



TO-247AC

Absolute Maximum Ratings

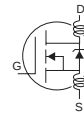
	Parameter	Max.	Units
I_D @ $T_C = 25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	130⑦	A
I_D @ $T_C = 100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	95	
I_{DM}	Pulsed Drain Current ①	520	
P_D @ $T_C = 25^\circ C$	Power Dissipation	250	W
	Linear Derating Factor	1.7	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
I_{AR}	Avalanche Current①	130	A
E_{AR}	Repetitive Avalanche Energy①	25	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.7	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	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	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.60	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	40	

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	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.067	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	5.5	m Ω	$V_{GS} = 10V, I_D = 78A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	88	—	—	S	$V_{DS} = 25V, I_D = 78A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 60V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 48V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
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	—	—	260	nC	$I_D = 130A$
Q_{gs}	Gate-to-Source Charge	—	—	68		$V_{DS} = 48V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	94		$V_{GS} = 10V$, See Fig. 6 and 13
$t_{d(on)}$	Turn-On Delay Time	—	26	—	ns	$V_{DD} = 30V$
t_r	Rise Time	—	200	—		$I_D = 130A$
$t_{d(off)}$	Turn-Off Delay Time	—	100	—		$R_G = 4.3\Omega$
t_f	Fall Time	—	150	—		$V_{GS} = 10V$, See Fig. 10 ④
L_D	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	13	—		
C_{iss}	Input Capacitance	—	6760	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	1330	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	290	—		$f = 1.0\text{MHz}$, See Fig. 5
E_{AS}	Single Pulse Avalanche Energy②	—	1880③	310⑥		$I_{AS} = 130A, L = 37\mu H$



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	130⑦	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)①	—	—	520		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 130A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	94	140	ns	$T_J = 25^\circ\text{C}, I_F = 130A$
Q_{rr}	Reverse Recovery Charge	—	360	540	nC	$di/dt = 100A/\mu s$ 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 $T_J = 25^\circ\text{C}$, $L = 260\mu H$
 $R_G = 25\Omega$, $I_{AS} = 50A$. (See Figure 12)
- ③ $I_{SD} \leq 130A$, $di/dt \leq 230A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ⑤ This is a typical value at device destruction and represents operation outside rated limits.
- ⑥ This is a calculated value limited to $T_J = 175^\circ\text{C}$.
- ⑦ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 90A.

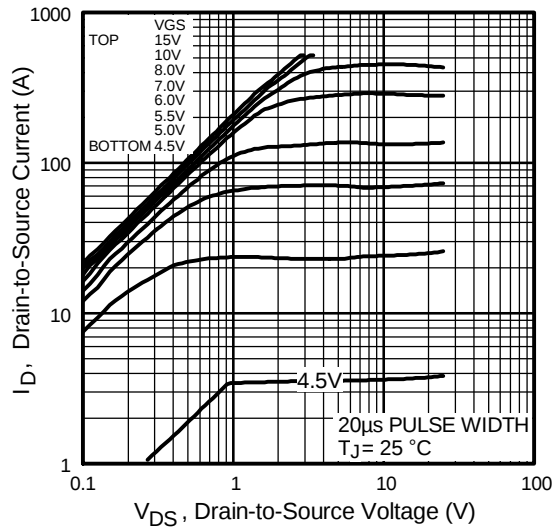


Fig 1. Typical Output Characteristics

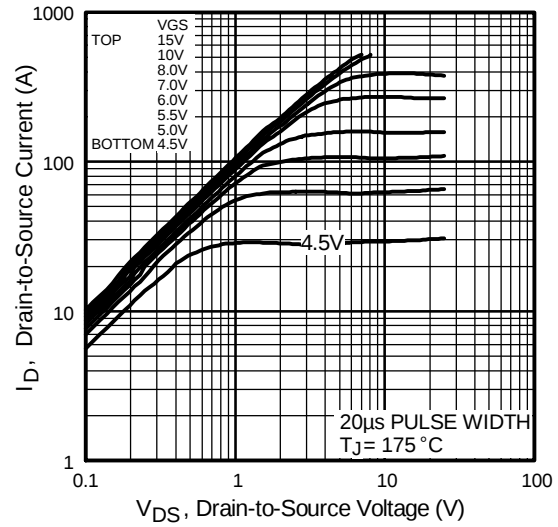


Fig 2. Typical Output Characteristics

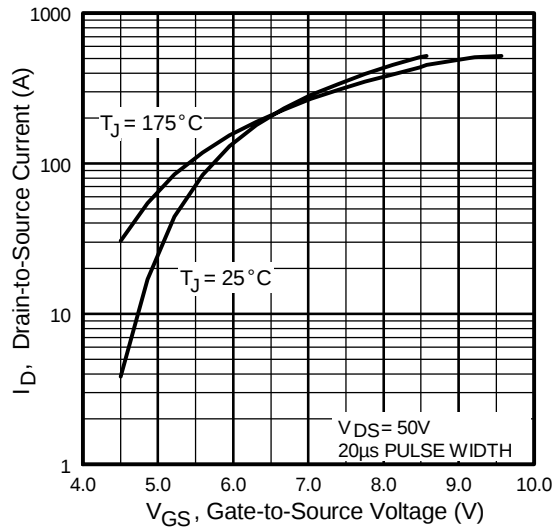


Fig 3. Typical Transfer Characteristics

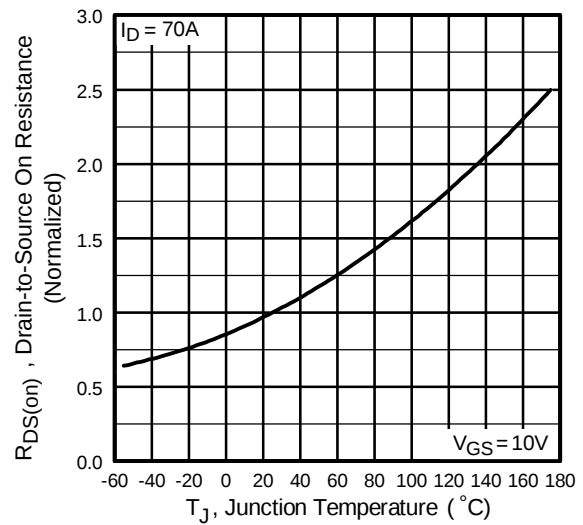


Fig 4. Normalized On-Resistance Vs. Temperature

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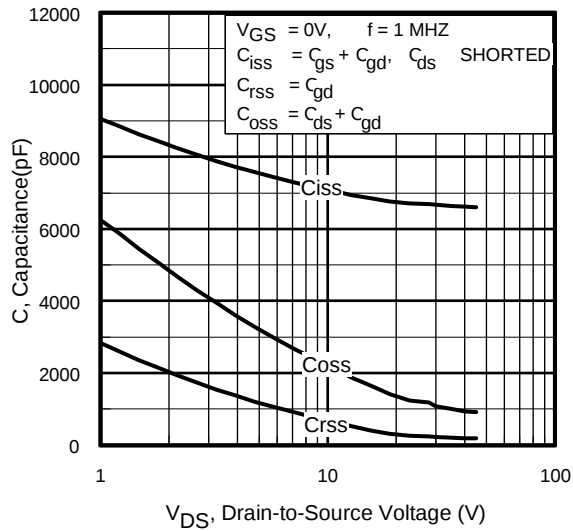


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

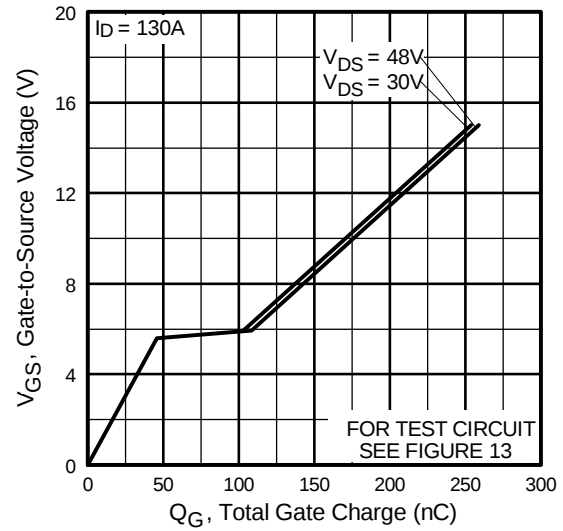


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

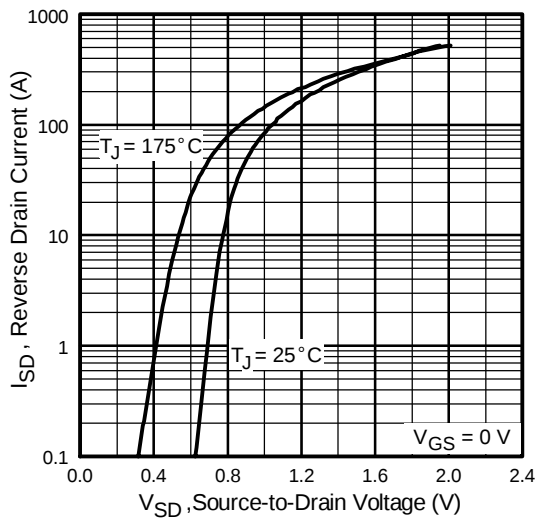


Fig 7. Typical Source-Drain Diode Forward Voltage

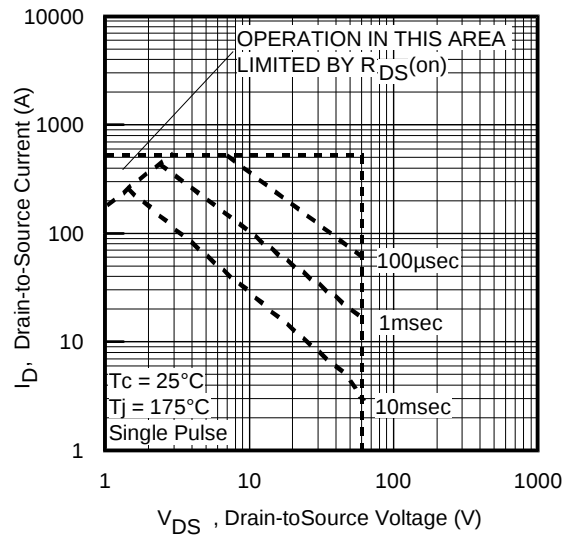


Fig 8. Maximum Safe Operating Area

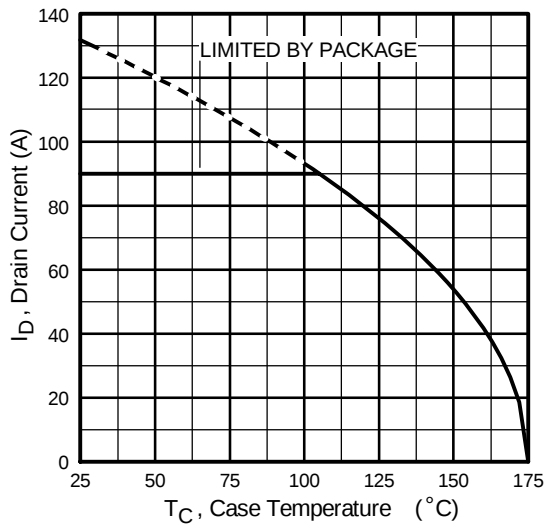


Fig 9. Maximum Drain Current Vs. Case Temperature

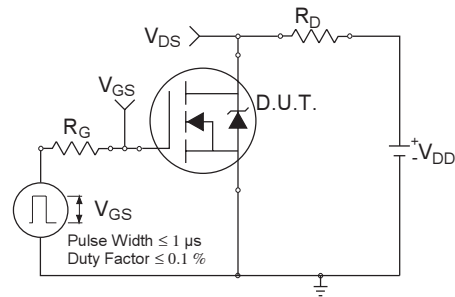


Fig 10a. Switching Time Test Circuit

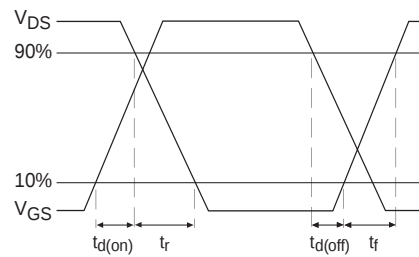


Fig 10b. Switching Time Waveforms

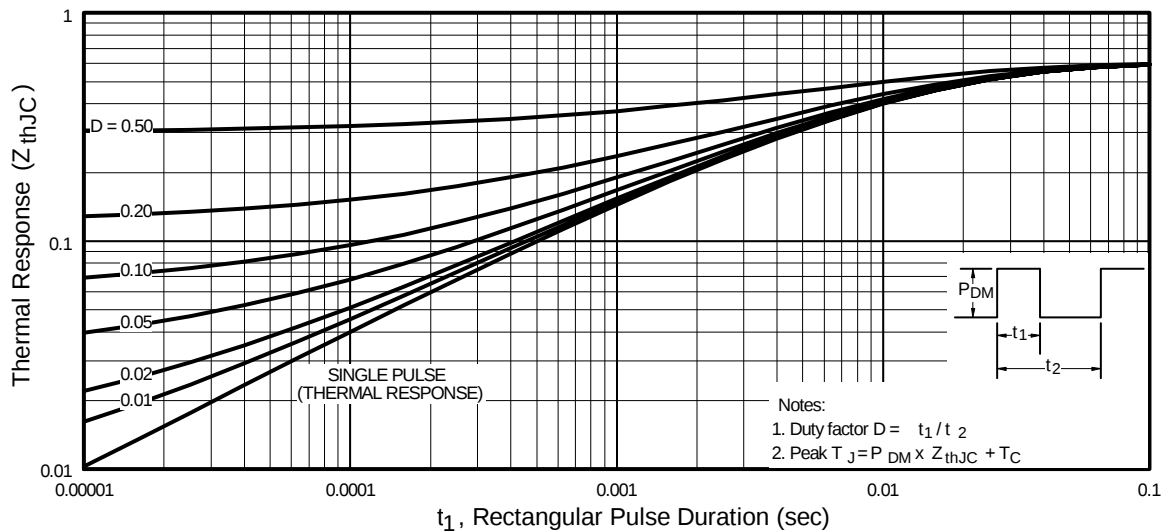


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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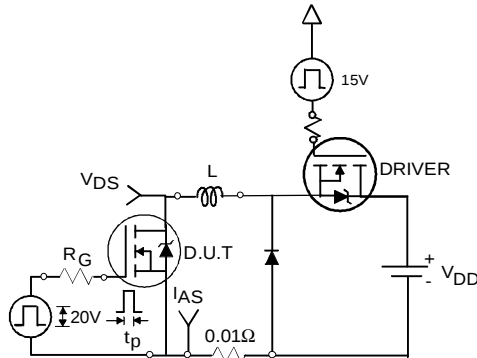


Fig 12a. Unclamped Inductive Test Circuit

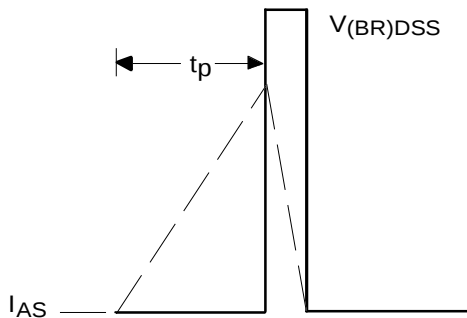


Fig 12b. Unclamped Inductive Waveforms

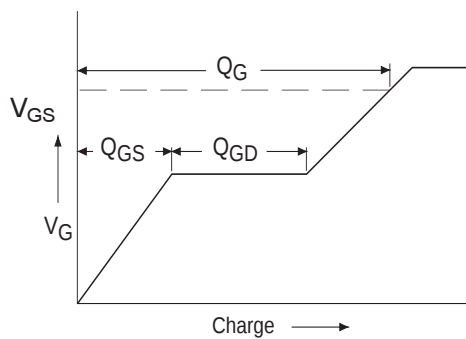


Fig 13a. Basic Gate Charge Waveform

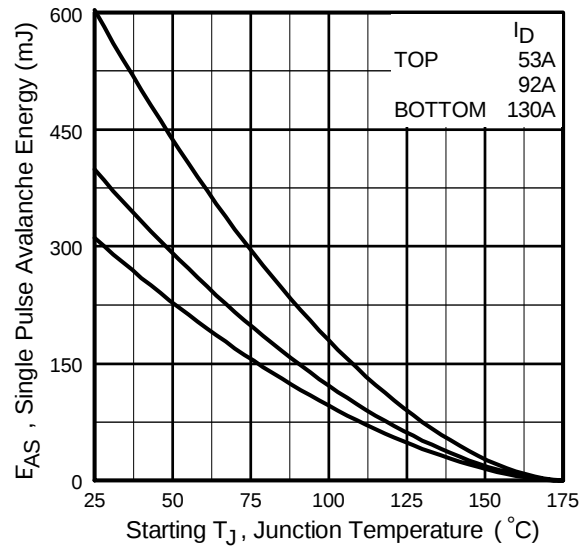


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

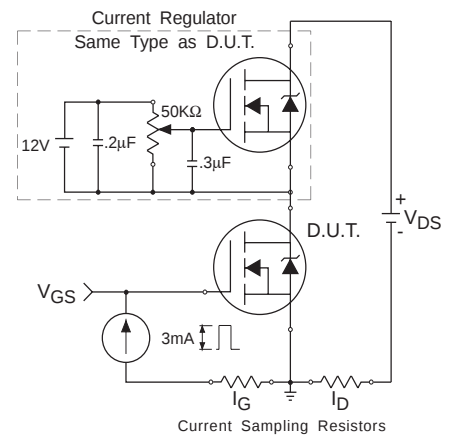
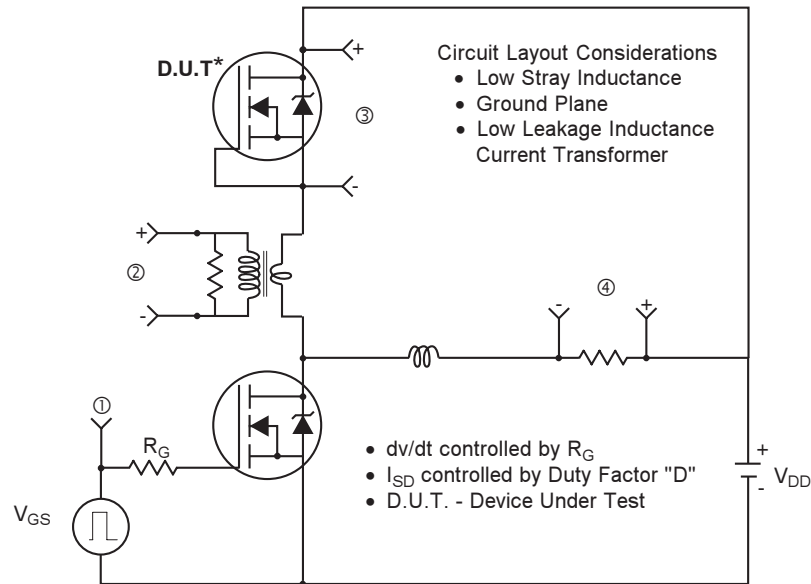
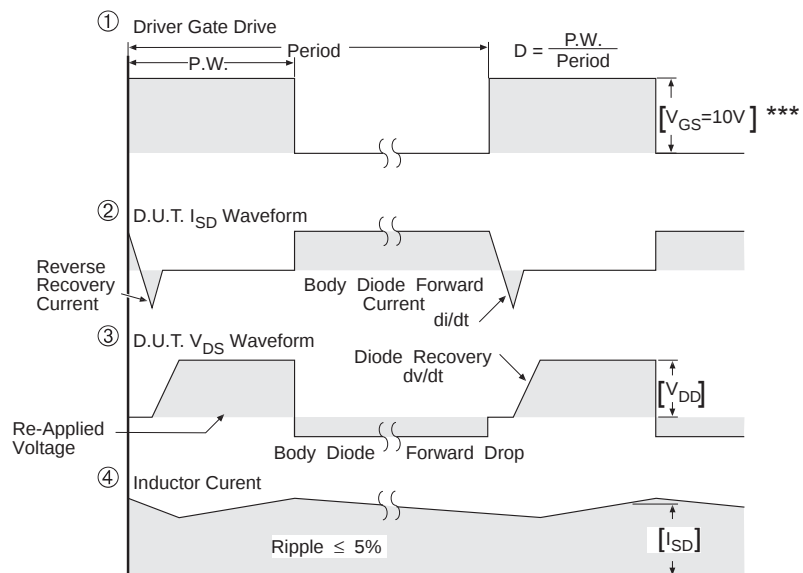


Fig 13b. Gate Charge Test Circuit

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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Dimensions are shown in millimeters (inches)



Diagram of an IRFP30 MOSFET package. The package is a TO-18 style with three pins. The top surface is labeled with the International Rectifier logo (IR), the part number IRFP30, the date code 035H, and the assembly lot code 56 57. The labels are as follows:

- INTERNATIONAL RECTIFIER LOGO (points to the IR logo)
- PART NUMBER (points to IRFP30)
- DATE CODE (points to 035H)
- ASSEMBLY LOT CODE (points to 56 57)

Additional information provided in the diagram:

- YEAR 0 = 2000
- WEEK 35
- LINE H

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