

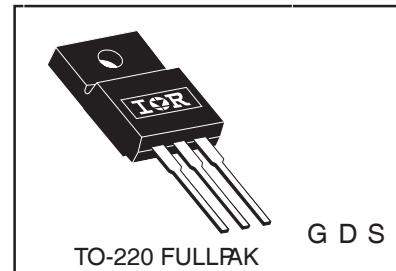
**Applications**

- Switch Mode Power Supply ( SMPS )
- Uninterruptable Power Supply
- High speed power switching
- High Voltage Isolation = 2.5KVRMS<sup>⑦</sup>
- Lead-Free

**Benefits**

- Low Gate Charge Qg results in Simple Drive Requirement
- Improved Gate, Avalanche and dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Effective Coss specified ( See AN 1001)

V <sub>DSS</sub>	R <sub>d(on)</sub> max	I <sub>D</sub>
500V	0.52Ω	6.6A



**Absolute Maximum Ratings**

	Parameter	Max.	Units
I <sub>D</sub> @ T <sub>C</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	6.6	A
I <sub>D</sub> @ T <sub>C</sub> = 100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	4.2	
I <sub>DM</sub>	Pulsed Drain Current ①⑥	44	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Power Dissipation	60	W
	Linear Derating Factor	0.48	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③⑥	6.9	V/ns
T <sub>J</sub> T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	
	Mounting torque, 6-32 or M3 screw	10 lbf·in (1.1N·m)	

**Applicable Off Line SMPS Topologies:**

- Two Transistor Forward
- Half & Full Bridge Convertors
- Power Factor Correction Boost

Notes ① through ⑦ are on page 8

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# IRFIB7N50APbF

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**Static @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	500	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.61	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ ⑥
$R_{DS(\text{on})}$	Static Drain-to-Source On-Resistance	—	—	0.52	$\Omega$	$V_{GS} = 10V, I_D = 4.0\text{A}$ ④
$V_{GS(\text{th})}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu\text{A}$	$V_{DS} = 500V, V_{GS} = 0V$
				250		
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	$\text{nA}$	$V_{GS} = 30V$
				-100		

**Dynamic @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
$g_{fs}$	Forward Transconductance	6.1	—	—	S	$V_{DS} = 50V, I_D = 6.6\text{A}$ ⑥
$Q_g$	Total Gate Charge	—	—	52	nC	$I_D = 11\text{A}$
$Q_{gs}$	Gate-to-Source Charge	—	—	13		$V_{DS} = 400V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	18		$V_{GS} = 10V$ , See Fig. 6 and 13 ④⑥
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	$V_{DD} = 250V$
$t_r$	Rise Time	—	35	—		$I_D = 11\text{A}$
$t_{d(off)}$	Turn-Off Delay Time	—	32	—		$R_G = 9.1\Omega$
$t_f$	Fall Time	—	28	—		$R_D = 22\Omega$ , See Fig. 10 ④⑥
$C_{iss}$	Input Capacitance	—	1423	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	208	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	8.1	—		$f = 1.0\text{MHz}$ , See Fig. 5⑥
$C_{oss}$	Output Capacitance⑥	—	2000	—		$V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$
$C_{oss}$	Output Capacitance⑥	—	55	—		$V_{GS} = 0V, V_{DS} = 400V, f = 1.0\text{MHz}$
$C_{oss \text{ eff.}}$	Effective Output Capacitance	—	97	—		$V_{GS} = 0V, V_{DS} = 0V \text{ to } 400V$ ⑤⑥

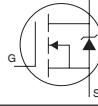
## Avalanche Characteristics

	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy②⑥	—	275	mJ
$I_{AR}$	Avalanche Current①⑥	—	11	A
$E_{AR}$	Repetitive Avalanche Energy①	—	6.0	mJ

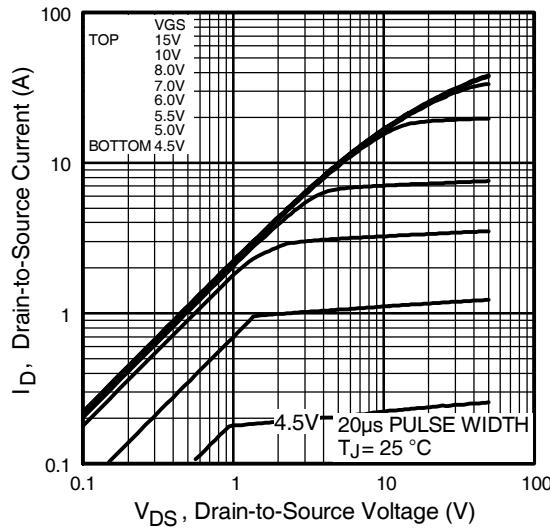
## Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta\text{JC}}$	Junction-to-Case	—	2.1	$^\circ\text{C/W}$
$R_{\theta\text{JA}}$	Junction-to-Ambient	—	65	

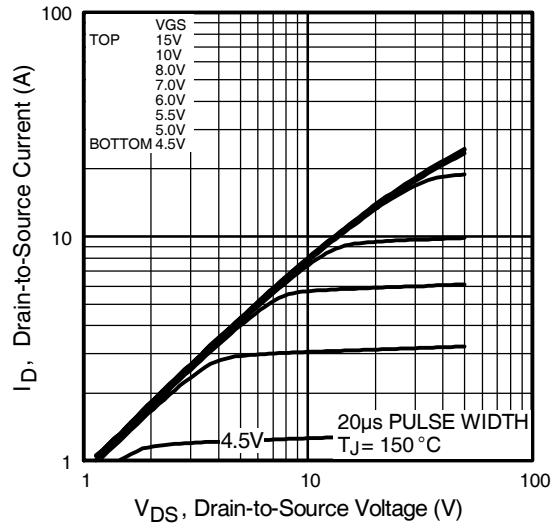
## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	6.6	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①⑥	—	—	44		
$V_{SD}$	Diode Forward Voltage	—	—	1.5	V	$T_J = 25^\circ\text{C}, I_S = 11\text{A}, V_{GS} = 0V$ ④
$t_{rr}$	Reverse Recovery Time	—	510	770	ns	$T_J = 25^\circ\text{C}, I_F = 11\text{A}$
$Q_{rr}$	Reverse Recovery Charge	—	3.4	5.1	$\mu\text{C}$	$dI/dt = 100\text{A}/\mu\text{s}$ ④⑥
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S+L_D$ )				

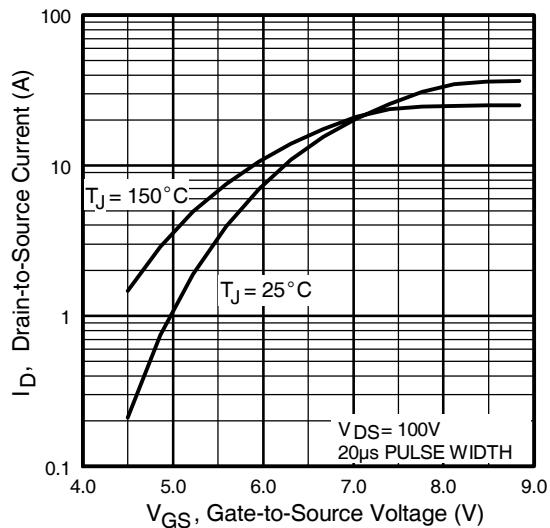
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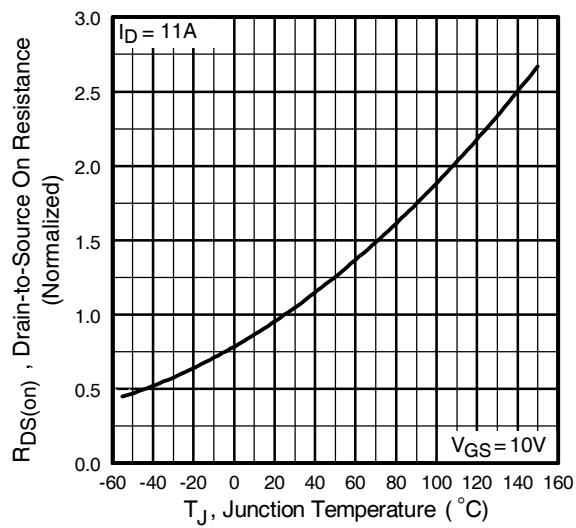
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



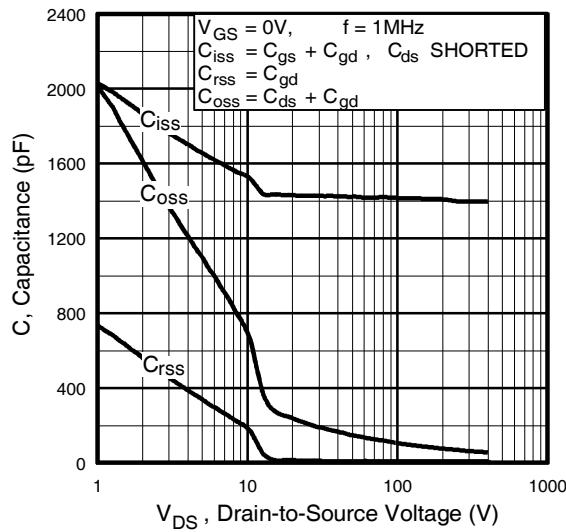
**Fig 3.** Typical Transfer Characteristics



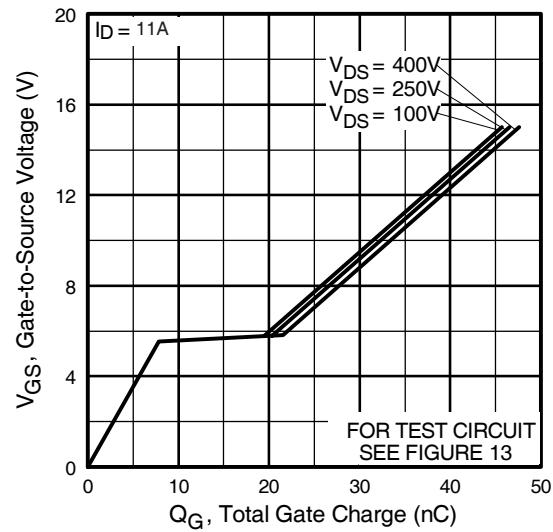
**Fig 4.** Normalized On-Resistance  
Vs. Temperature

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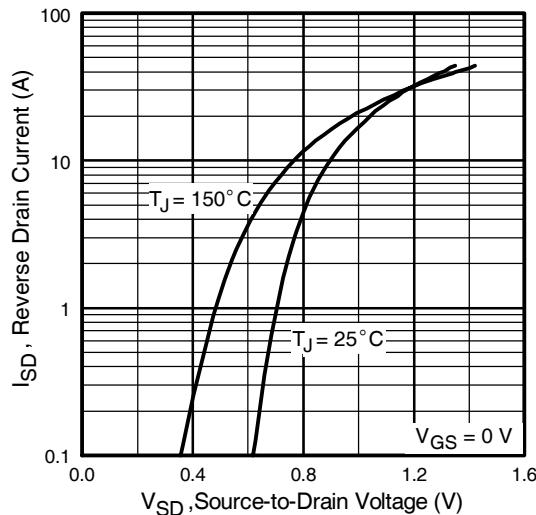
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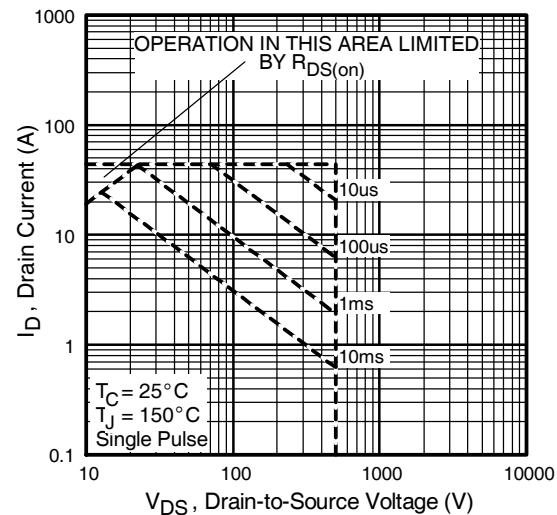
**Fig 5.** Typical Capacitance Vs.  
Drain-to-Source Voltage



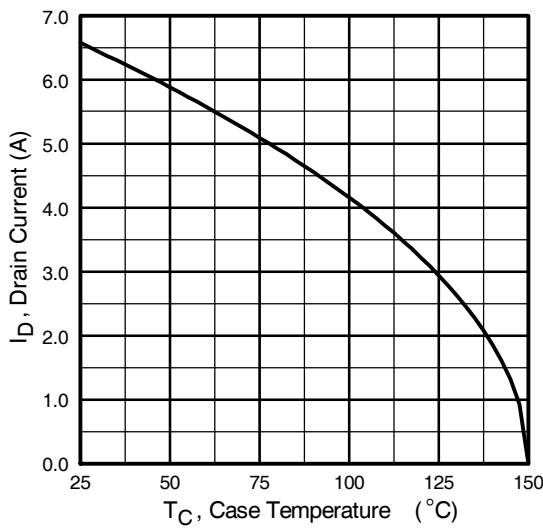
**Fig 6.** Typical Gate Charge Vs.  
Gate-to-Source Voltage



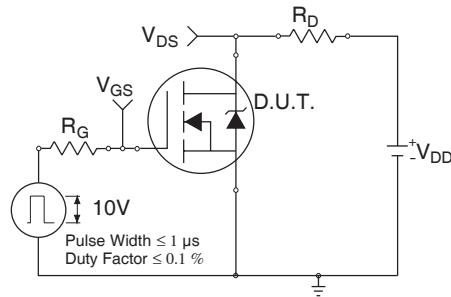
**Fig 7.** Typical Source-Drain Diode  
Forward Voltage



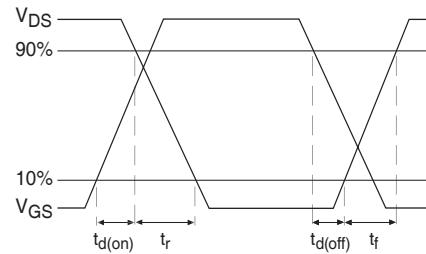
**Fig 8.** Maximum Safe Operating Area



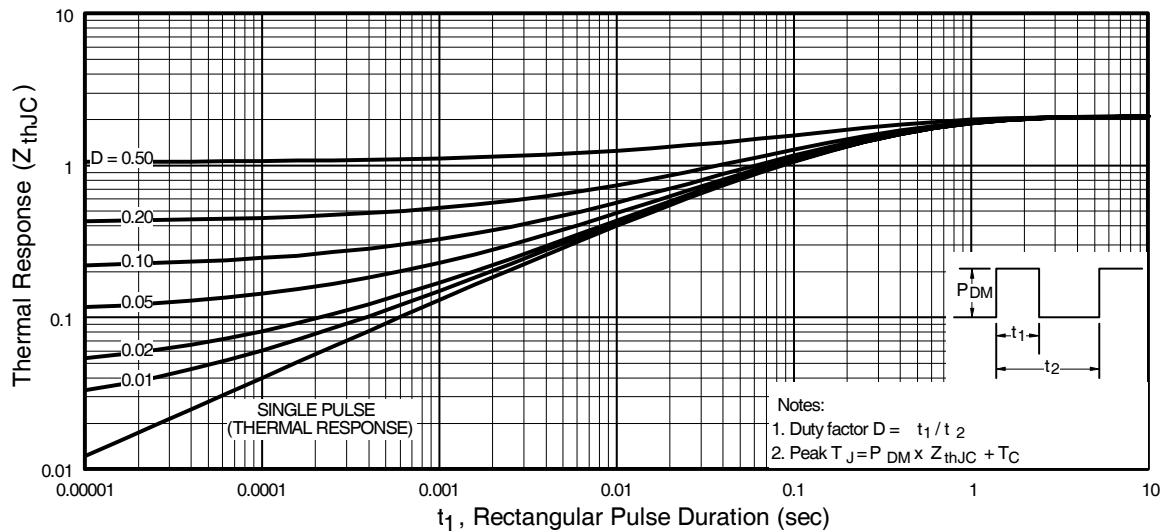
**Fig 9.** Maximum Drain Current Vs.  
Case Temperature



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



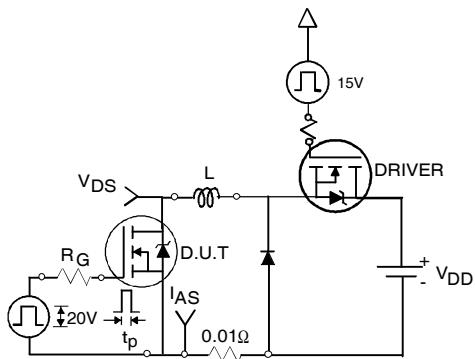
**Fig 10b.** Switching Time Waveforms



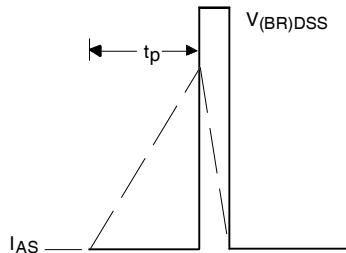
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

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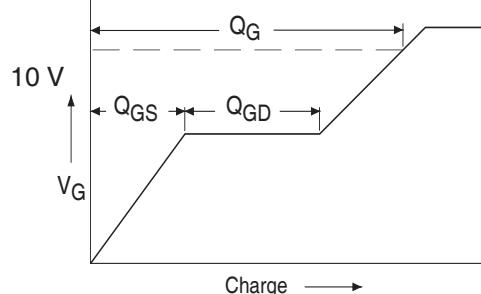
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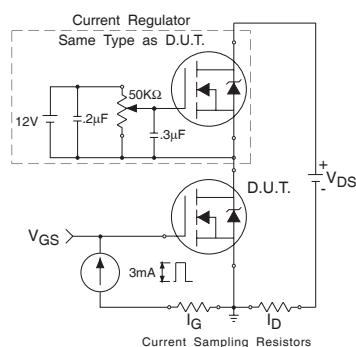
**Fig 12a.** Unclamped Inductive Test Circuit



**Fig 12b.** Unclamped Inductive Waveforms

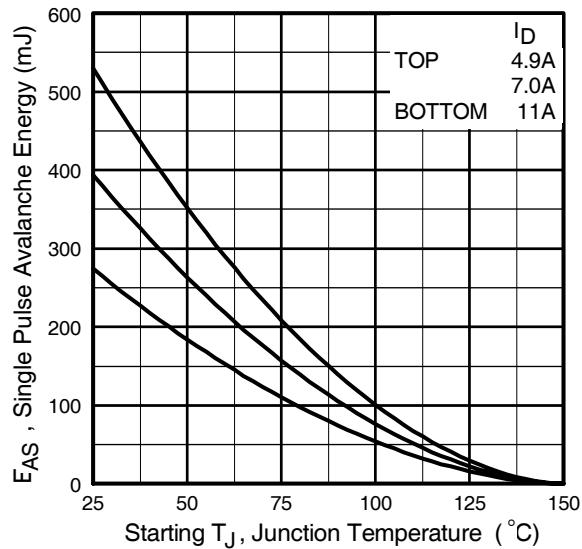


**Fig 13a.** Basic Gate Charge Waveform

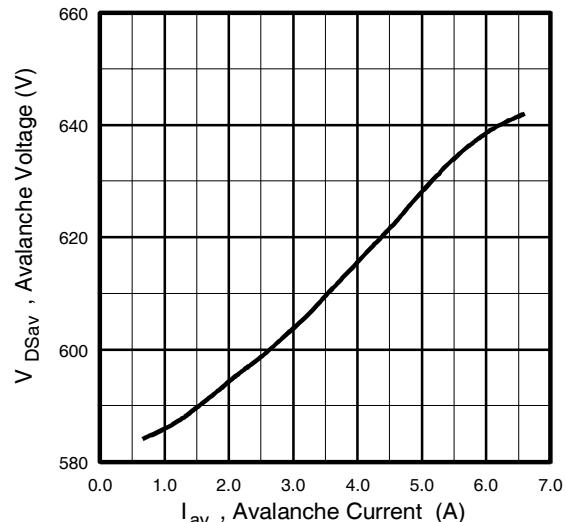


**Fig 13b.** Gate Charge Test Circuit

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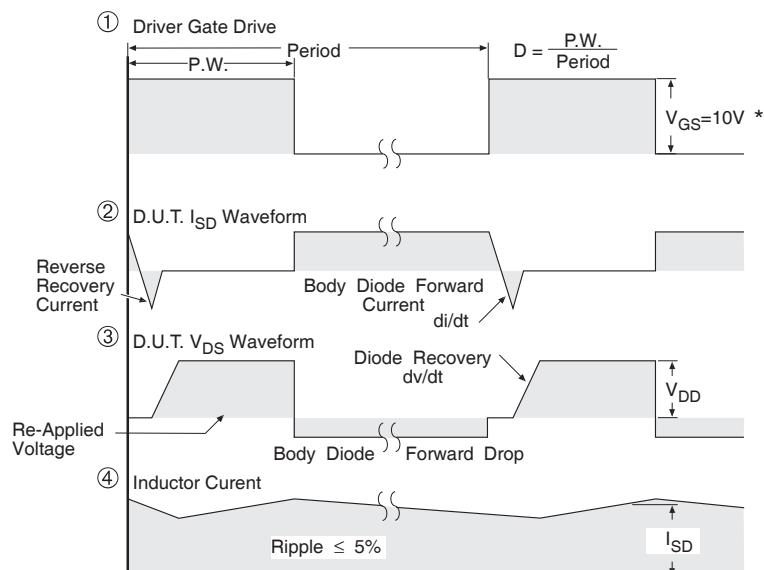
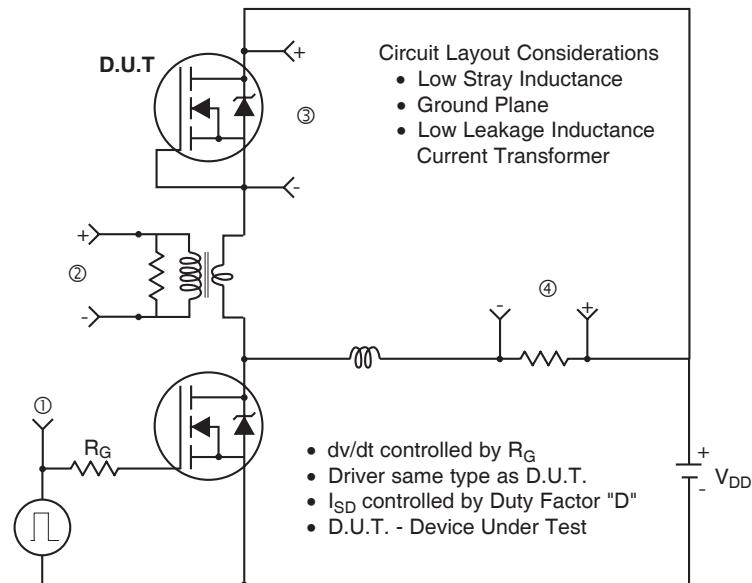
**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current



**Fig 12d.** Typical Drain-to-Source Voltage Vs. Avalanche Current

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## Peak Diode Recovery dv/dt Test Circuit



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

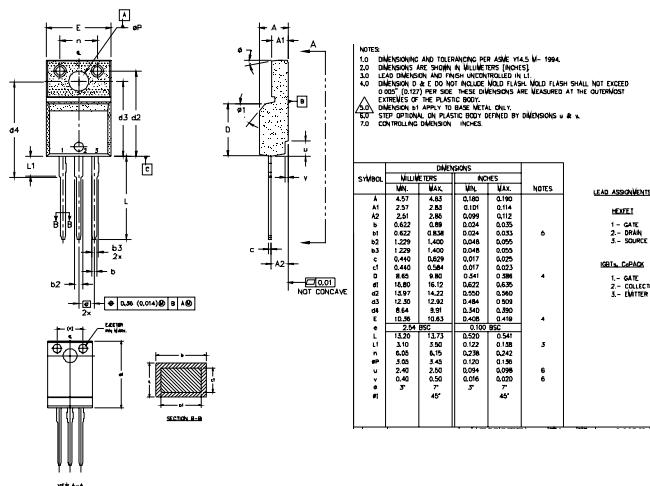
**Fig 14.** For N-Channel HEXFETs

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## TO-220 Full-Pak Package Outline

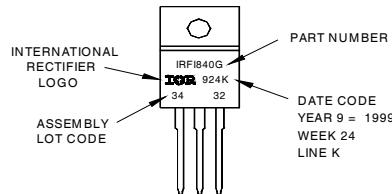
Dimensions are shown in millimeters (inches)



## TO-220 Full-Pak Part Marking Information

EXAMPLE: THIS IS AN IRFI840G  
WITH ASSEMBLY  
LOT CODE 3432  
ASSEMBLED ON WW 24 1999  
IN THE ASSEMBLY LINE "K"

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



### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 4.5\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 11\text{A}$ . (See Figure 12)
- ③  $I_{SD} \leq 11\text{A}$ ,  $\text{di}/\text{dt} \leq 140\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(\text{BR})DSS}$ ,  
 $T_J \leq 150^\circ\text{C}$
- ④ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ⑤  $C_{oss,\text{eff}}$  is a fixed capacitance that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$
- ⑥ Uses IRFB11N50A data and test conditions
- ⑦  $t=60\text{s}, f=60\text{Hz}$

Data and specifications subject to change without notice.

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**IR** Rectifier

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- Подбор аналогов;
- Консультации по применению компонента;
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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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Факс: 8 (812) 320-02-42

Электронная почта: [org@eplast1.ru](mailto:org@eplast1.ru)

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