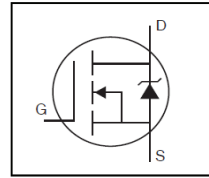


- Logic –Level Gate Drive
- Advanced Process Technology
- Ultra Low On-Resistance
- Isolated Package
- High Voltage Isolation = 2.5KVRMS ⑤
- Sink to Lead Creepage Dist. = 4.8mm
- Fully Avalanche Rated
- Lead-Free

HEXFET® Power MOSFET



<b>V<sub>DSS</sub></b>	<b>100V</b>
<b>R<sub>DS(on)</sub></b>	<b>0.026Ω</b>
<b>I<sub>D</sub></b>	<b>31A</b>



TO-220 Full-Pak

<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

### Description

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

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRLI2910PbF	TO-220 Full-Pak	Tube	50	IRLI2910PbF

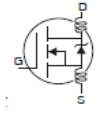
### Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
I <sub>D</sub> @ T <sub>C</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	31	A
I <sub>D</sub> @ T <sub>C</sub> = 100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	22	
I <sub>DM</sub>	Pulsed Drain Current ①⑥	190	
P <sub>D</sub> @T <sub>C</sub> = 25°C	Maximum Power Dissipation	63	W
	Linear Derating Factor	0.42	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 16	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (Thermally Limited) ②⑥	520	mJ
I <sub>AR</sub>	Avalanche Current ①⑥	29	A
E <sub>AR</sub>	Repetitive Avalanche Energy ①	6.3	mJ
dv/dt	Peak Diode Recovery dv/dt③⑥	5.0	V/ns
T <sub>J</sub>	Operating Junction and	-55 to + 175	°C
T <sub>STG</sub>	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

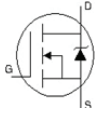
### Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R <sub>θJC</sub>	Junction-to-Case	—	2.4	°C/W
R <sub>θJA</sub>	Junction-to-Ambient	—	65	

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

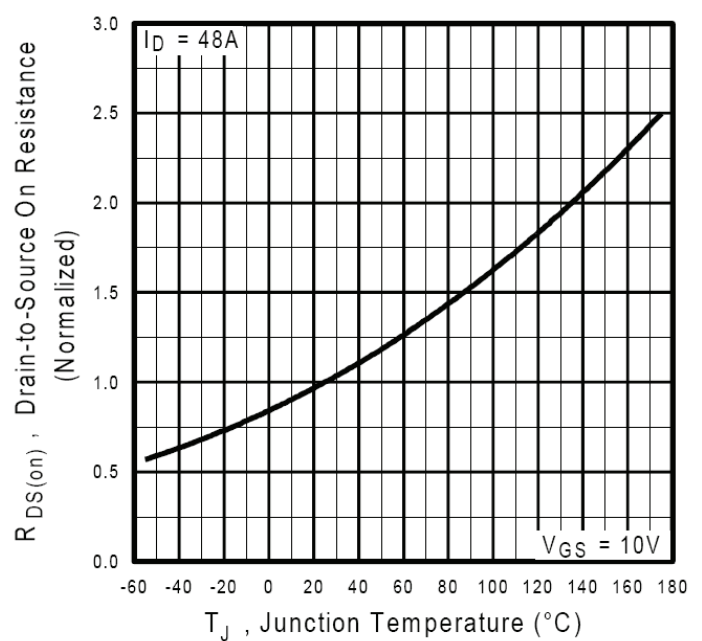
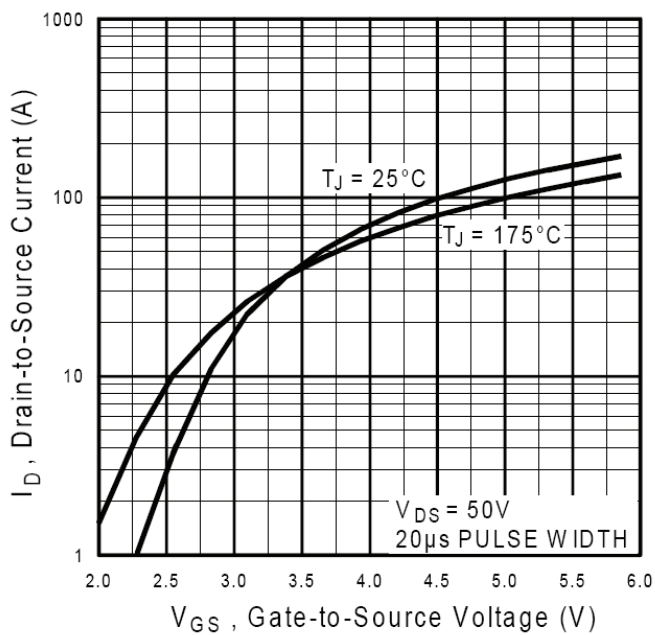
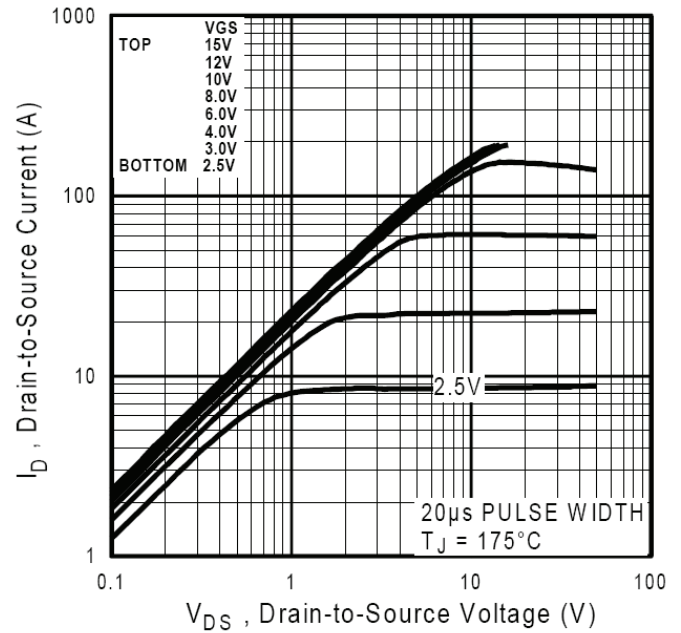
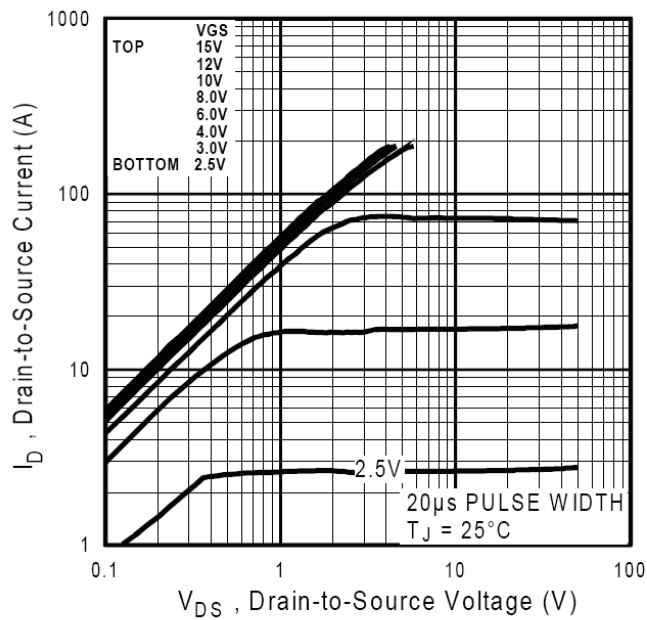
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.12	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = 1mA$ ⑥
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.026	$\Omega$	$V_{GS} = 10V, I_D = 16A$
		—	—	0.030		$V_{GS} = 5.0V, I_D = 16A$
		—	—	0.040		$V_{GS} = 4.0V, I_D = 14A$
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Trans conductance	28	—	—	S	$V_{DS} = 50V, I_D = 29A$ ⑥
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -16V$
$Q_g$	Total Gate Charge	—	—	140	nC	$I_D = 29A$
$Q_{gs}$	Gate-to-Source Charge	—	—	20		$V_{DS} = 80V$
$Q_{gd}$	Gate-to-Drain Charge	—	—	81		$V_{GS} = 5.0V$ , See Fig. 6 and 13 ④ ⑥
$t_{d(on)}$	Turn-On Delay Time	—	11	—		$V_{DD} = 50V$
$t_r$	Rise Time	—	100	—	ns	$I_D = 29A$
$t_{d(off)}$	Turn-Off Delay Time	—	49	—		$R_G = 1.4\Omega, V_{GS} = 5.0V$
$t_f$	Fall Time	—	55	—		$R_D = 1.7\Omega$ , See Fig. 10 ④ ⑥
$L_D$	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	—	3700	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	630	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	330	—		$f = 1.0MHz$ , See Fig. 5 ⑥
$C$	Drain to Sink Capacitance	—	12	—		$f = 1.0MHz$

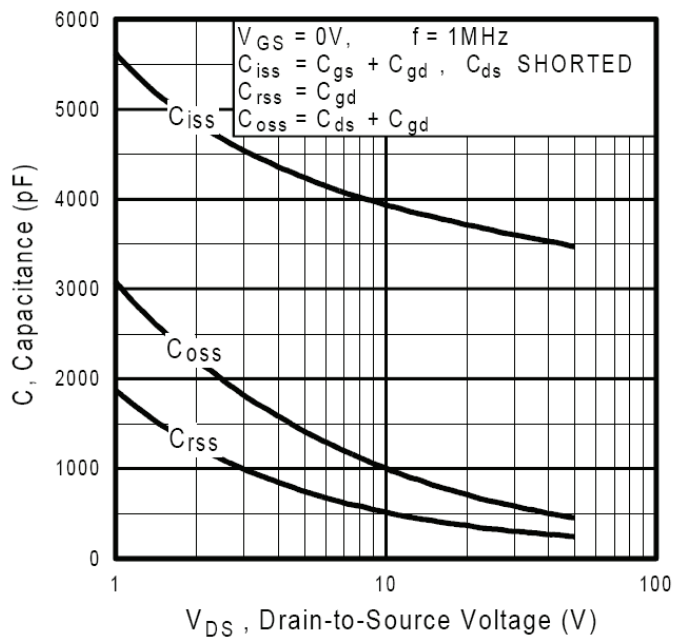
**Source-Drain Ratings and Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	31	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ① ⑥	—	—	190		
$V_{SD}$	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 16A, V_{GS} = 0V$ ④
$t_{rr}$	Reverse Recovery Time	—	240	350	ns	$T_J = 25^\circ\text{C}, I_F = 29A$
$Q_{rr}$	Reverse Recovery Charge	—	1.8	2.7	$\mu C$	$di/dt = 100A/\mu s$ ④ ⑥

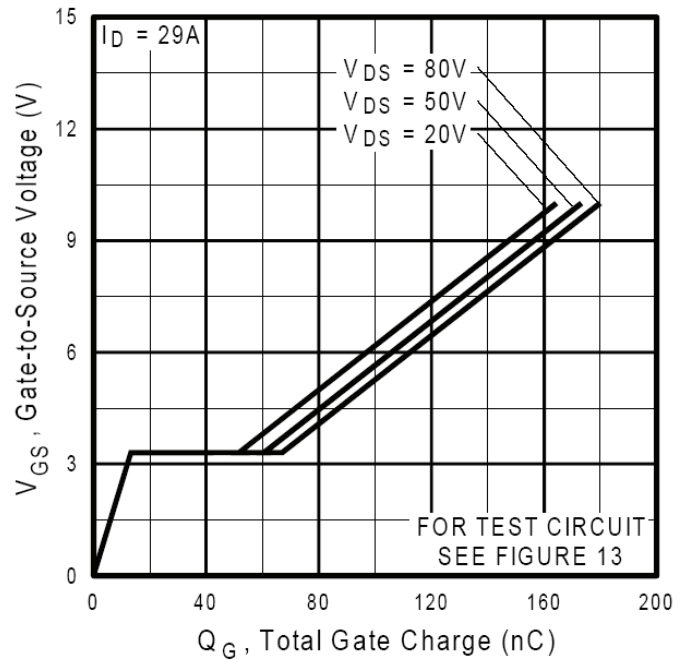
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ②  $V_{DD} = 25V$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 1.2mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 29A$  (See fig. 12)
- ③  $I_{SD} \leq 29A$ ,  $di/dt \leq 490A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 175^\circ\text{C}$ .
- ④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ⑤  $t = 60s$ ,  $f = 60Hz$
- ⑥ Uses IRL2910 data and test conditions.

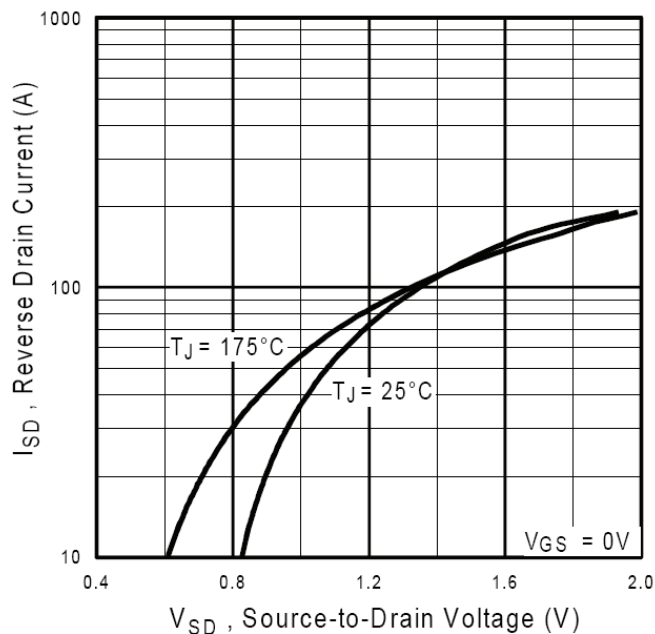




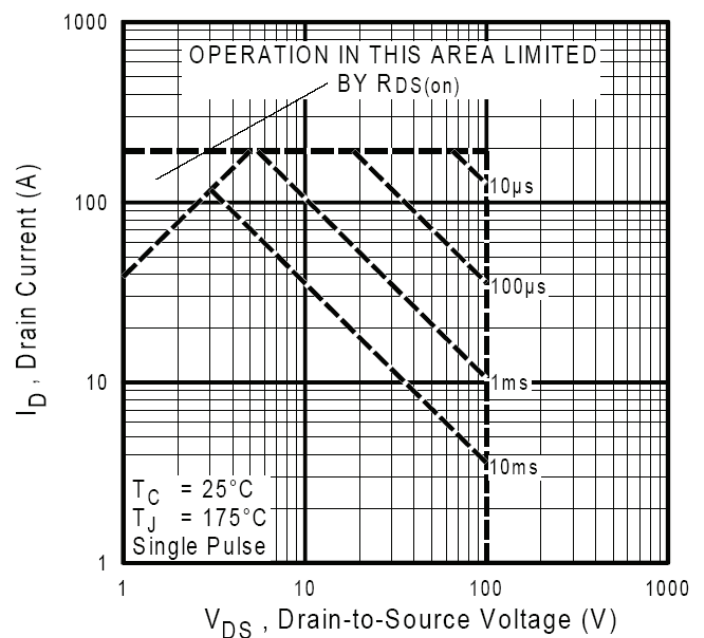
**Fig 5.** Typical Capacitance vs.  
Drain-to-Source Voltage



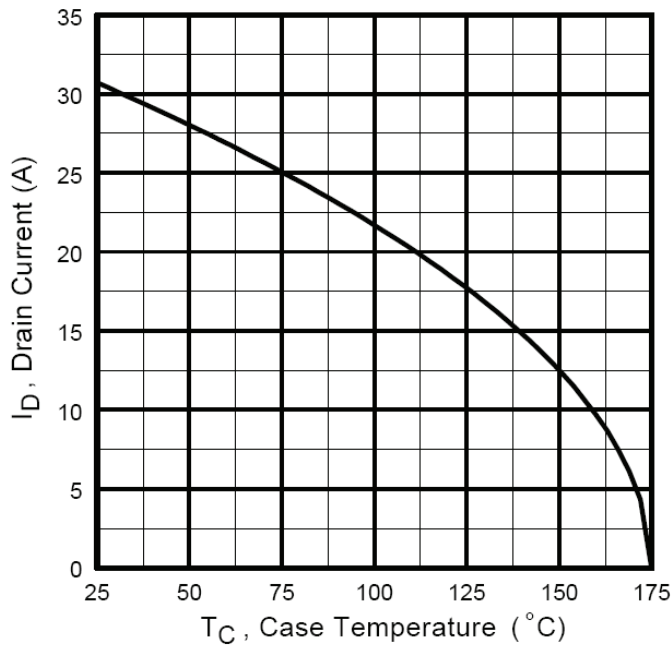
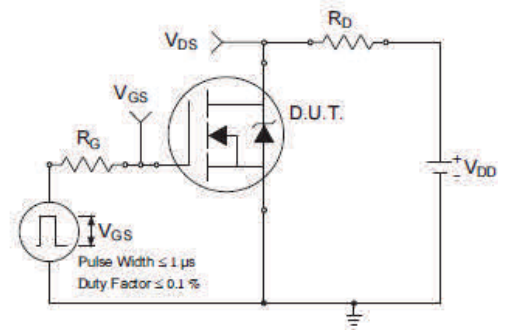
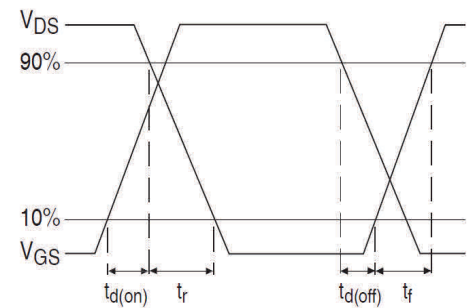
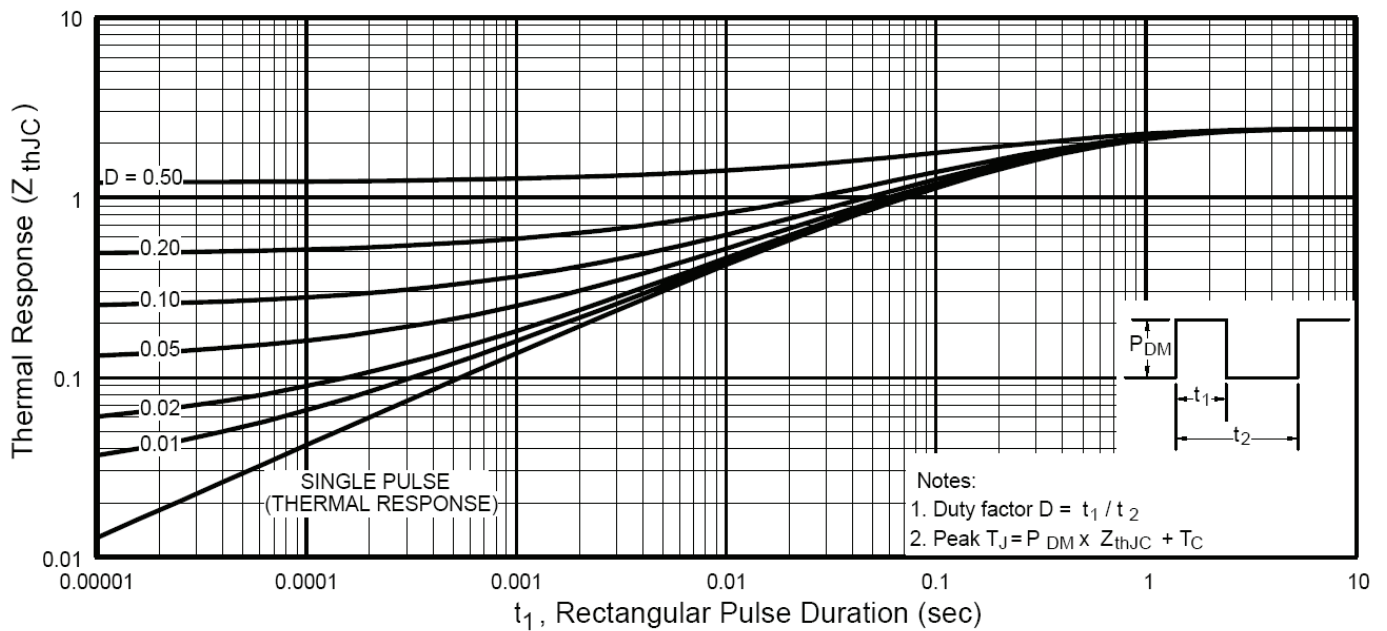
**Fig 6.** Typical Gate Charge vs.  
Gate-to-Source Voltage

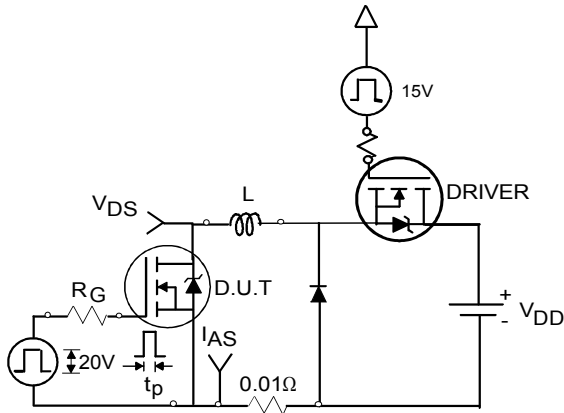
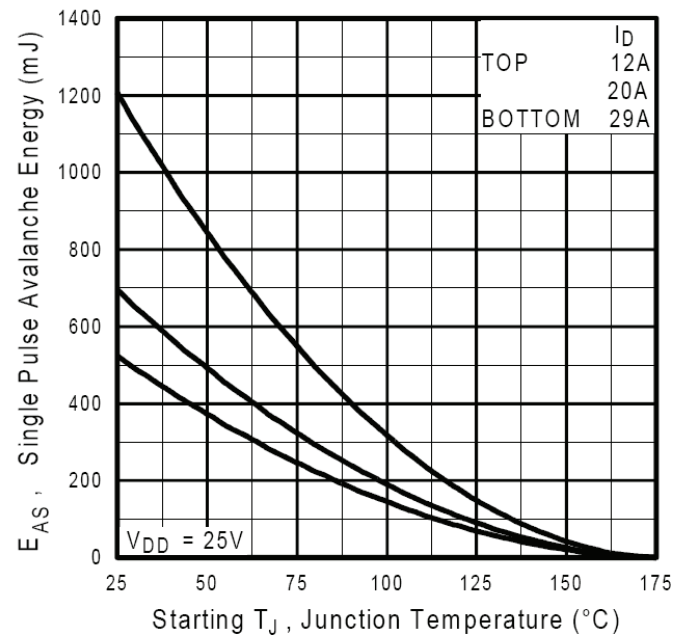
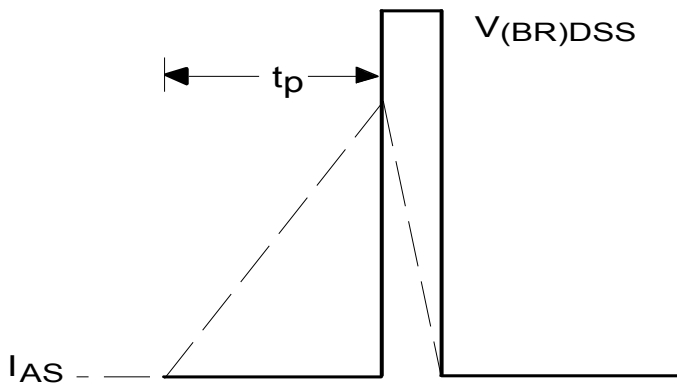
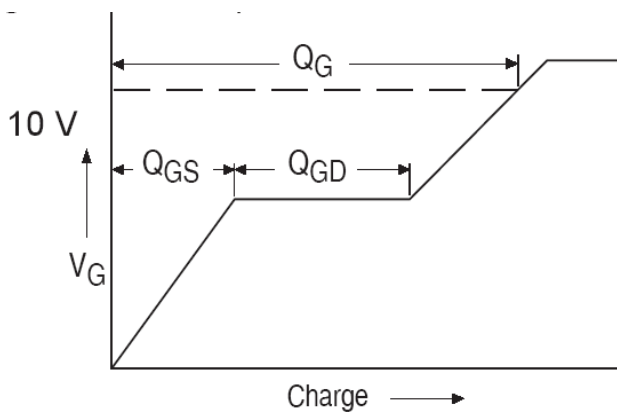
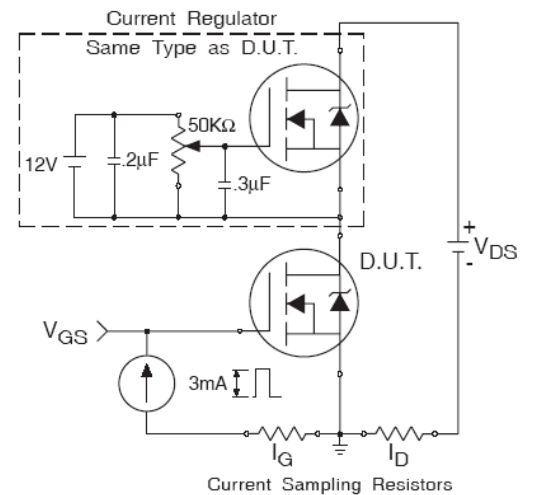


**Fig. 7** Typical Source-to-Drain Diode  
Forward Voltage

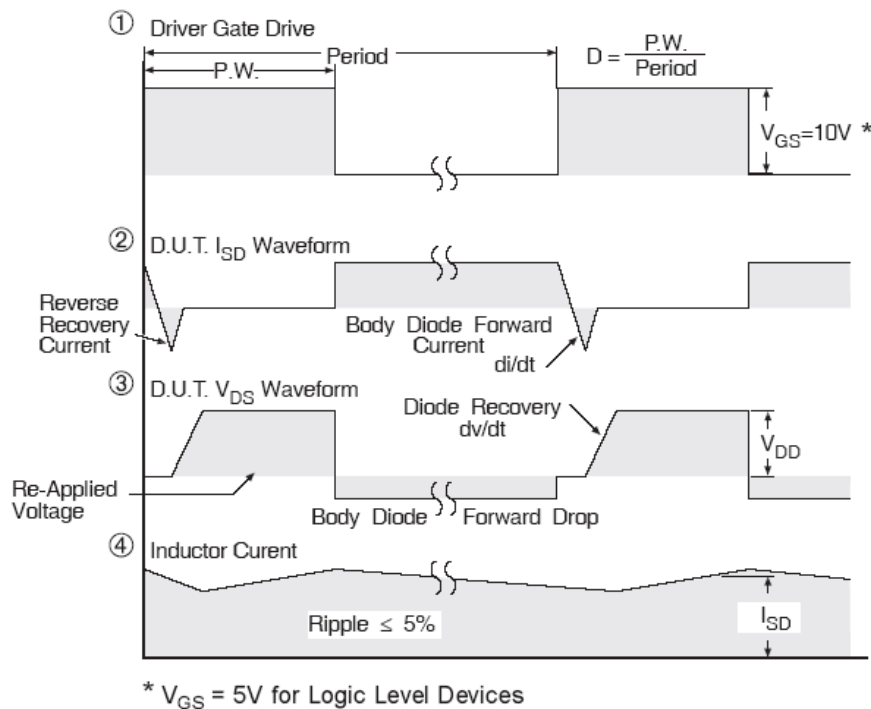
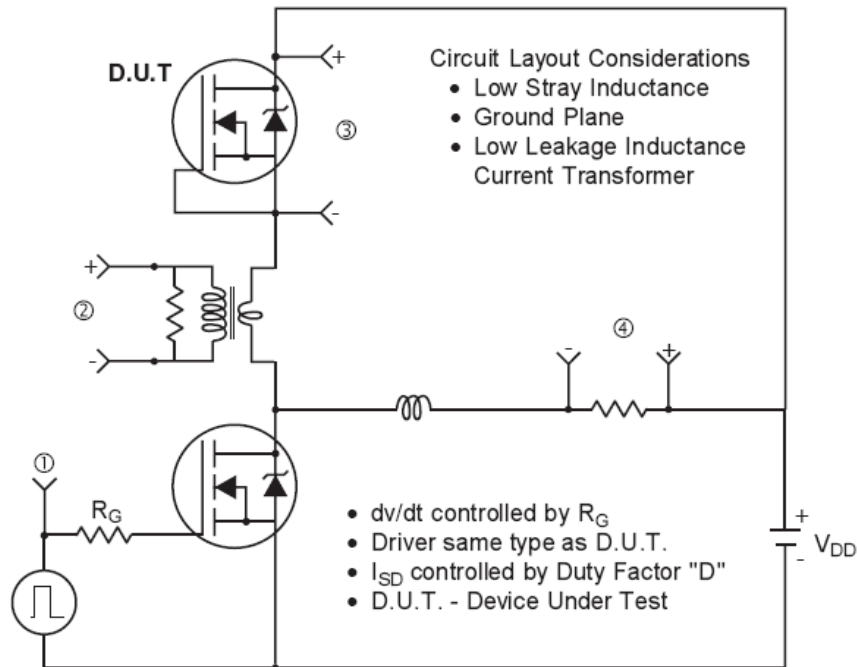


**Fig 8.** Maximum Safe Operating Area

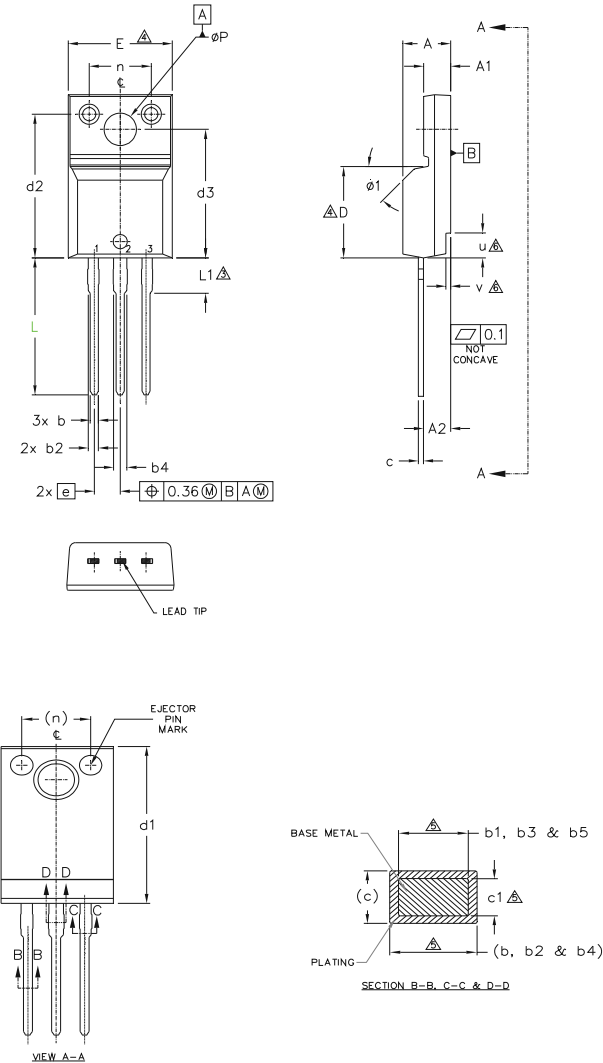

**Fig 9.** Maximum Drain Current vs. Case Temperature

**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 12c.** Maximum Avalanche Energy vs. Drain Current

**Fig 12b.** Unclamped Inductive Waveforms

**Fig 13a.** Gate Charge Waveform

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

# Peak Diode Recovery dv/dt Test Circuit



**Fig 14.** Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

**TO-220 Full-Pak Package Outline (Dimensions are shown in millimeters (inches))**

**NOTES:**

- 1.0 DIMENSIONING AND TOLERANCING AS PER ASME Y14.5 M- 1994.
- 2.0 DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
- 3.0 LEAD DIMENSION AND FINISH UNCONTROLLED IN L1.
- 4.0 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTER MOST EXTREMES OF THE PLASTIC BODY.
- 5.0 DIMENSION b1, b3, b5 & c1 APPLY TO BASE METAL ONLY.
- 6.0 STEP OPTIONAL ON PLASTIC BODY DEFINED BY DIMENSIONS u & v.
- 7.0 CONTROLLING DIMENSION : INCHES.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.57	4.83	.180	.190	5
A1	2.57	2.82	.101	.111	
A2	2.51	2.92	.099	.115	
b	0.61	0.94	.024	.037	
b1	0.61	0.89	.024	.035	
b2	0.76	1.27	.030	.050	
b3	0.76	1.22	.030	.048	
b4	1.02	1.52	.040	.060	
b5	1.02	1.47	.040	.058	
c	0.33	0.63	.013	.025	
c1	0.33	0.58	.013	.023	5
D	8.66	9.80	.341	.386	4
d1	15.80	16.13	.622	.635	3
d2	13.97	14.22	.550	.560	
d3	12.29	12.93	.484	.509	
E	9.63	10.74	.379	.423	4
e	2.54 BSC		.100 BSC		3
L	13.21	13.72	.520	.540	
L1	3.10	3.68	.122	.145	
n	6.05	6.60	.238	.260	6
øP	3.05	3.45	.120	.136	
u	2.39	2.49	.094	.098	6
v	0.41	0.51	.016	.020	
ø1	—	45°	—	45°	

**LEAD ASSIGNMENTS**
**HEXFET**

- 1.— GATE
- 2.— DRAIN
- 3.— SOURCE

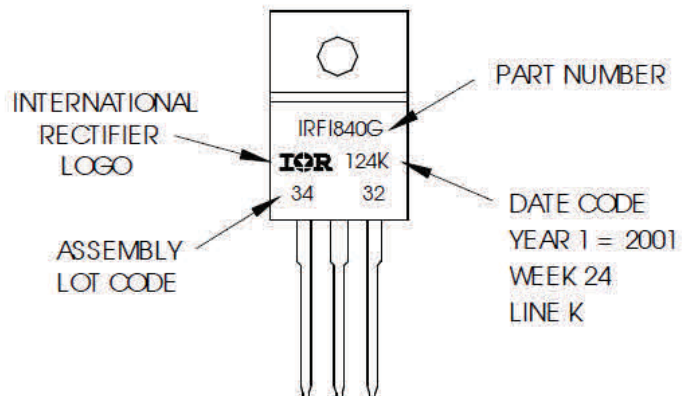
**IGBTs, CoPACK**

- 1.— GATE
- 2.— COLLECTOR
- 3.— EMITTER

**TO-220 Full-Pak Part Marking Information**

EXAMPLE: THIS IS AN IRFI840G  
WITH ASSEMBLY  
LOT CODE 3432  
ASSEMBLED ON WW 24, 2001  
IN THE ASSEMBLY LINE "K"

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



TO-220AB Full-Pak packages are not recommended for Surface Mount Application.

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



## Qualification Information

Qualification Level	Industrial (per JEDEC JESD47F) †	
Moisture Sensitivity Level	TO-220 Full-Pak	N/A
RoHS Compliant	Yes	

† Applicable version of JEDEC standard at the time of product release.

## Revision History

Date	Comments
04/27/2017	<ul style="list-style-type: none"> <li>Changed datasheet with Infineon logo - all pages.</li> <li>Corrected Package Outline on page 8.</li> <li>Added disclaimer on last page.</li> </ul>
08/22/17	<ul style="list-style-type: none"> <li>Updated typo for Vgsth max value from 4.0V to 2.0V-page2</li> </ul>

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