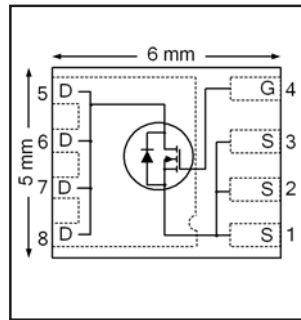


HEXFET® Power MOSFET

$V_{DS}$	<b>75</b>	<b>V</b>
$R_{DS(on) \max}$ (@ $V_{GS} = 10V$ )	<b>8.5</b>	<b>m<math>\Omega</math></b>
$Q_g$ (typical)	<b>48</b>	<b>nC</b>
$R_G$ (typical)	<b>0.6</b>	<b><math>\Omega</math></b>
$I_D$ (@ $T_{c(Bottom)} = 25^\circ C$ )	<b>75</b>	<b>A</b>



**Applications**

- Secondary Side Synchronous Rectification
- Inverters for DC Motors
- DC-DC Brick Applications
- Boost Converters

**Features and Benefits**

**Features**

Low $R_{DS(on)}$ (< 8.5m $\Omega$ )
Low Thermal Resistance to PCB (< 1.2 $^\circ C/W$ )
Low Profile (<0.9 mm)
Industry-Standard Pinout
Compatible with Existing Surface Mount Techniques
RoHS Compliant Containing no Lead, no Bromide and no Halogen
MSL1, Industrial Qualification

results in  
⇒

**Benefits**

Lower Conduction Losses
Enables better thermal dissipation
Increased Power Density
Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRFH7107TRPBF	PQFN 5mm x 6mm	Tape and Reel	4000	
IRFH7107TR2PBF	PQFN 5mm x 6mm	Tape and Reel	400	EOL notice #259

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	75	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	
$I_D$ @ $T_A = 25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	14	A
$I_D$ @ $T_A = 70^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	11	
$I_D$ @ $T_{C(Bottom)} = 25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	75	
$I_D$ @ $T_{C(Bottom)} = 100^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	47	
$I_{DM}$	Pulsed Drain Current ①	300	
$P_D$ @ $T_A = 25^\circ C$	Power Dissipation ⑤	3.6	W
$P_D$ @ $T_{C(Bottom)} = 25^\circ C$	Power Dissipation ⑤	104	
	Linear Derating Factor ⑤	0.029	W/ $^\circ C$
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

Notes ① through ⑤ are on page 9

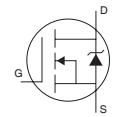
**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
B <sub>V</sub> DSS	Drain-to-Source Breakdown Voltage	75	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔB <sub>V</sub> DSS/ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.09	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1.0mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	6.9	8.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 45A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 100μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	-8.7	—	mV/°C	
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	20	μA	V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
g <sub>fs</sub>	Forward Transconductance	68	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 45A
Q <sub>g</sub>	Total Gate Charge	—	48	72	nC	V <sub>DS</sub> = 38V V <sub>GS</sub> = 10V I <sub>D</sub> = 45A
Q <sub>gs1</sub>	Pre-V <sub>th</sub> Gate-to-Source Charge	—	10	—		
Q <sub>gs2</sub>	Post-V <sub>th</sub> Gate-to-Source Charge	—	4.0	—		
Q <sub>gd</sub>	Gate-to-Drain Charge	—	15	—		
Q <sub>godr</sub>	Gate Charge Overdrive	—	19	—		
Q <sub>sw</sub>	Switch Charge (Q <sub>gs2</sub> + Q <sub>gd</sub> )	—	19	—		
Q <sub>oss</sub>	Output Charge	—	19	—	nC	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V
R <sub>G</sub>	Gate Resistance	—	0.6	—	Ω	
t <sub>d(on)</sub>	Turn-On Delay Time	—	9.1	—	ns	V <sub>DD</sub> = 38V, V <sub>GS</sub> = 10V I <sub>D</sub> = 45A R <sub>G</sub> = 1.8Ω
t <sub>r</sub>	Rise Time	—	12	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	20	—		
t <sub>f</sub>	Fall Time	—	6.5	—		
C <sub>iss</sub>	Input Capacitance	—	3110	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	365	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	165	—		

**Avalanche Characteristics**

	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	106	mJ
I <sub>AR</sub>	Avalanche Current ①	—	45	A

**Diode Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	75	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	300		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 45A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	28	42	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 45A, V <sub>DD</sub> = 38V di/dt = 500A/μs ③
Q <sub>rr</sub>	Reverse Recovery Charge	—	160	240	nC	
t <sub>on</sub>	Forward Turn-On Time	Time is dominated by parasitic inductance				

**Thermal Resistance**

	Parameter	Typ.	Max.	Units
R <sub>θJC</sub> (Bottom)	Junction-to-Case ④	—	1.2	°C/W
R <sub>θJC</sub> (Top)	Junction-to-Case ④	—	30	
R <sub>θJA</sub>	Junction-to-Ambient ⑤	—	35	
R <sub>θJA</sub> (<10s)	Junction-to-Ambient ⑤	—	22	

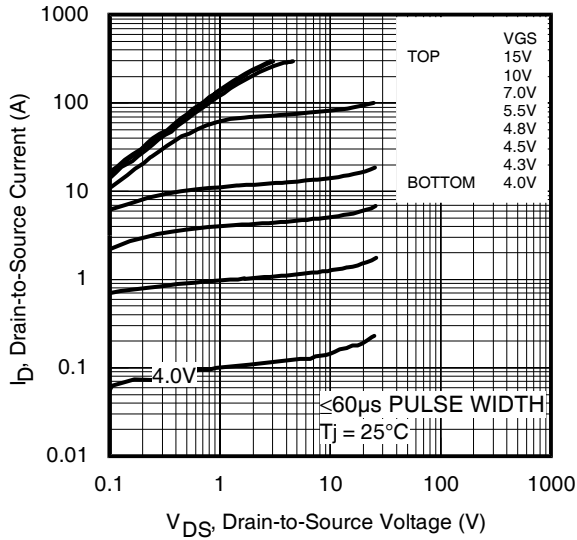


Fig 1. Typical Output Characteristics

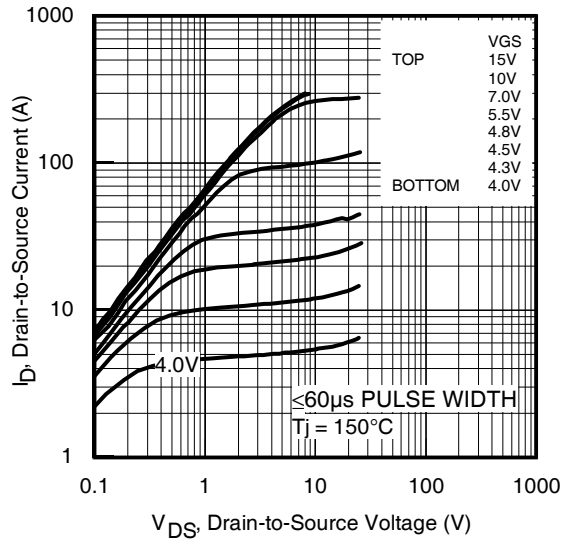


Fig 2. Typical Output Characteristics

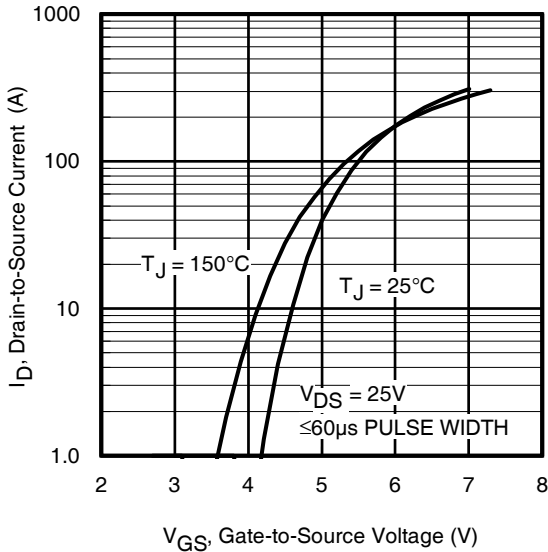


Fig 3. Typical Transfer Characteristics

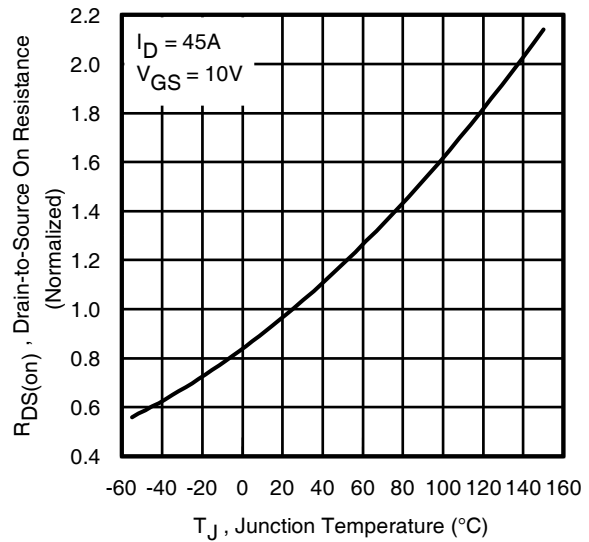


Fig 4. Normalized On-Resistance vs. Temperature

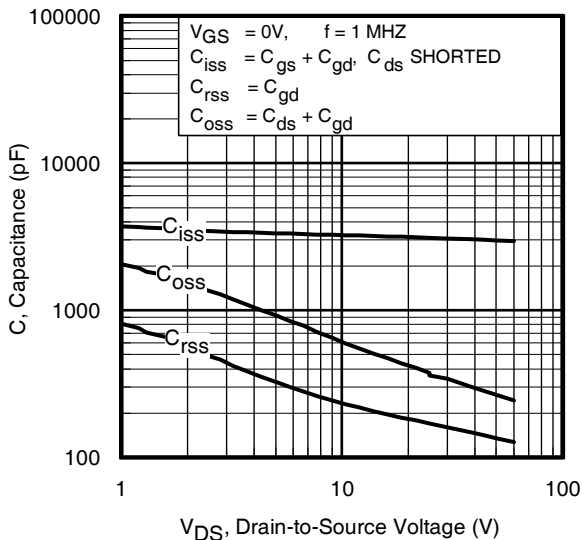


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

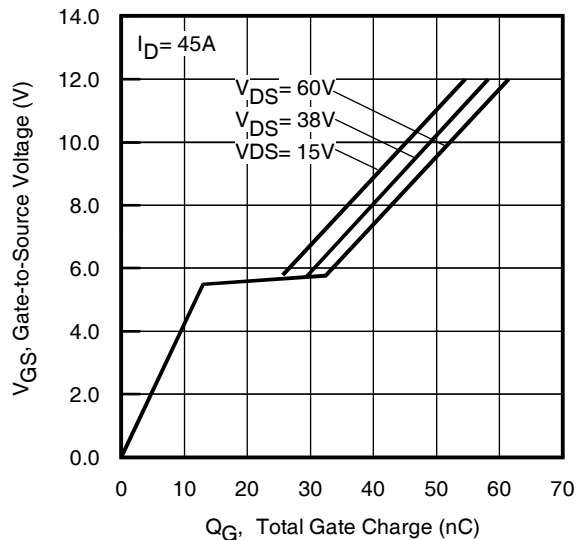
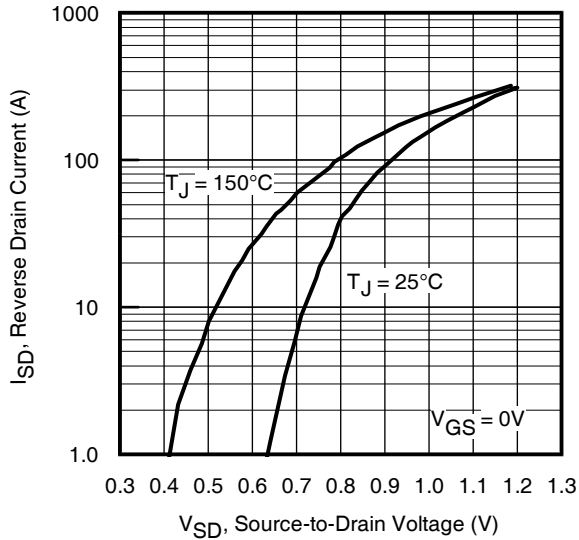
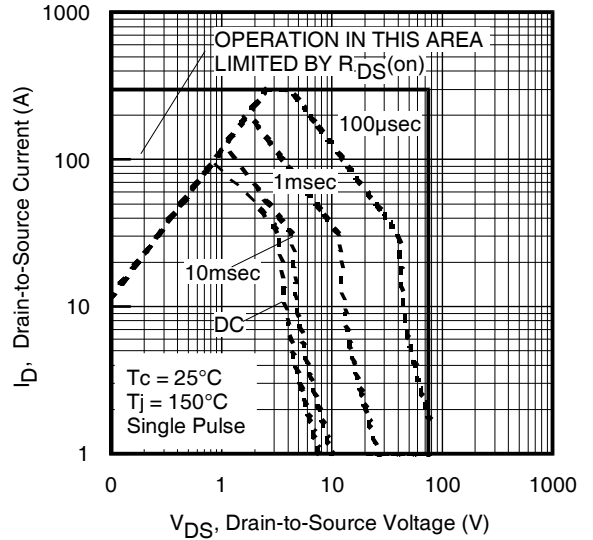


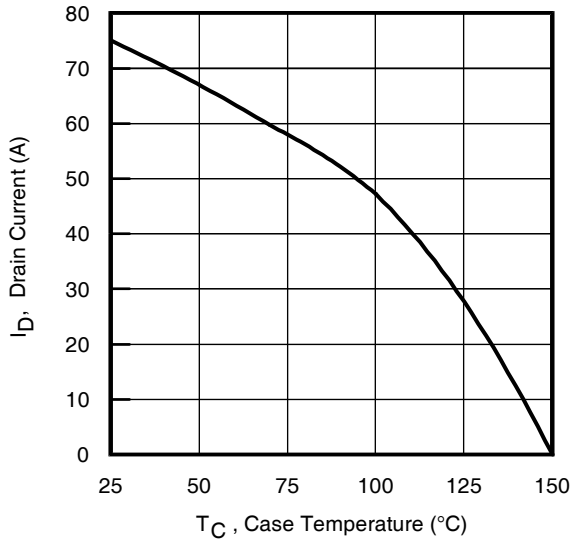
Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage



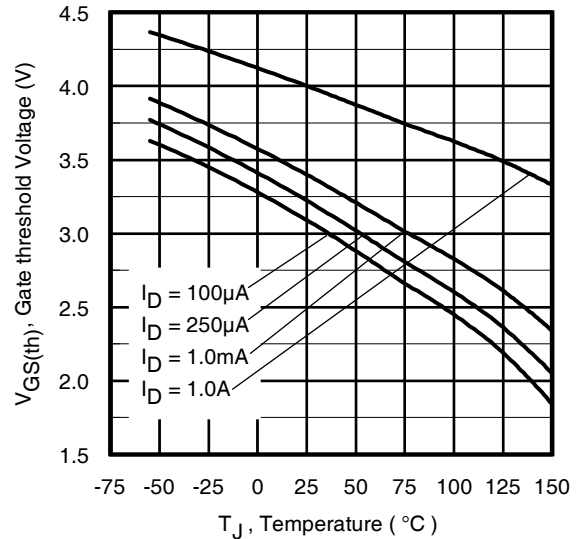
**Fig 7.** Typical Source-Drain Diode Forward Voltage



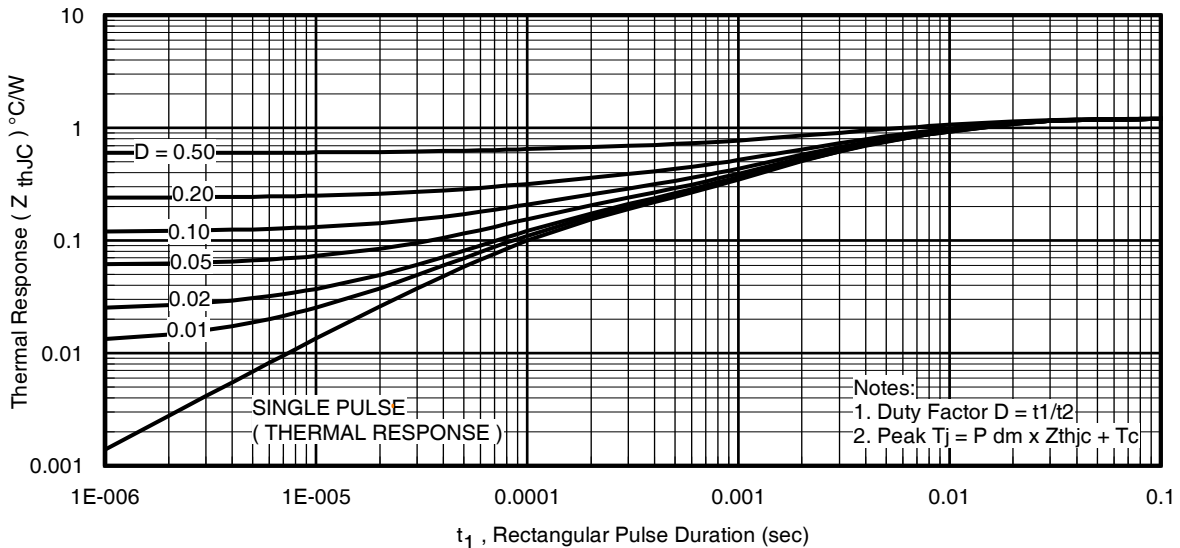
**Fig 8.** Maximum Safe Operating Area



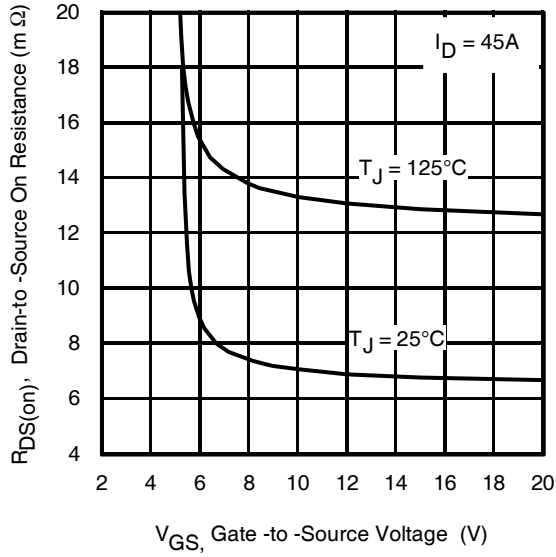
**Fig 9.** Maximum Drain Current vs. Case (Bottom) Temperature



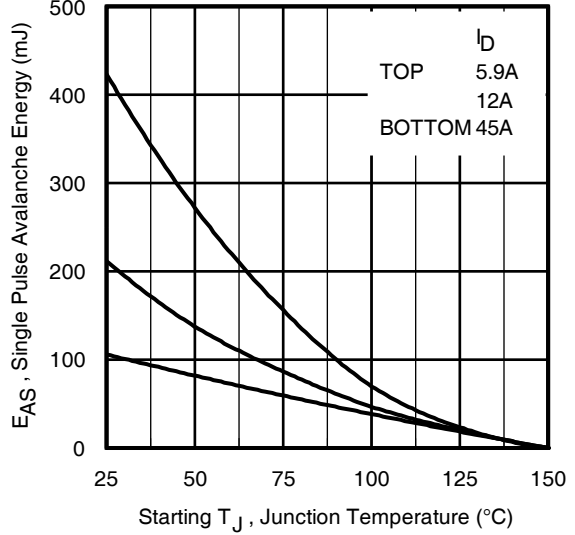
**Fig 10.** Threshold Voltage vs. Temperature



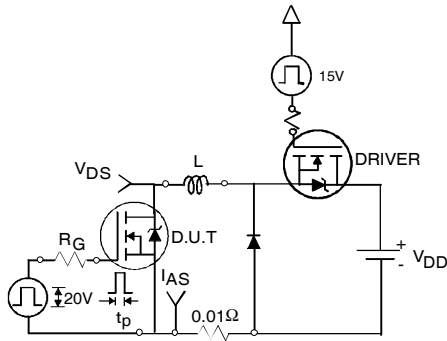
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case (Bottom)



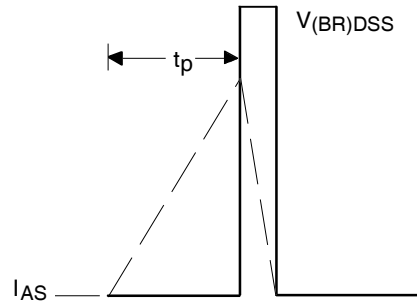
**Fig 12.** On-Resistance vs. Gate Voltage



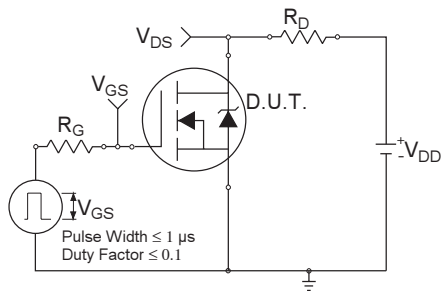
**Fig 13.** Maximum Avalanche Energy vs. Drain Current



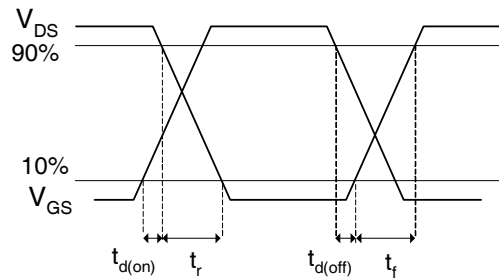
**Fig 14a.** Unclamped Inductive Test Circuit



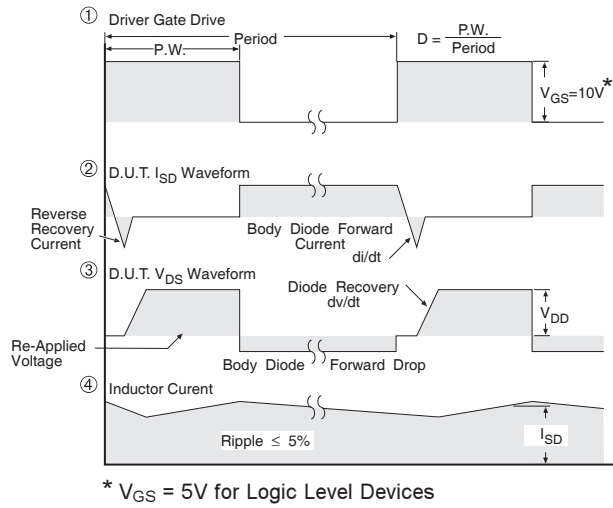
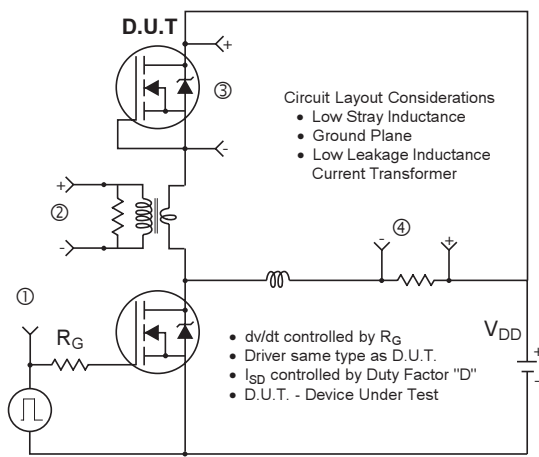
**Fig 14b.** Unclamped Inductive Waveforms



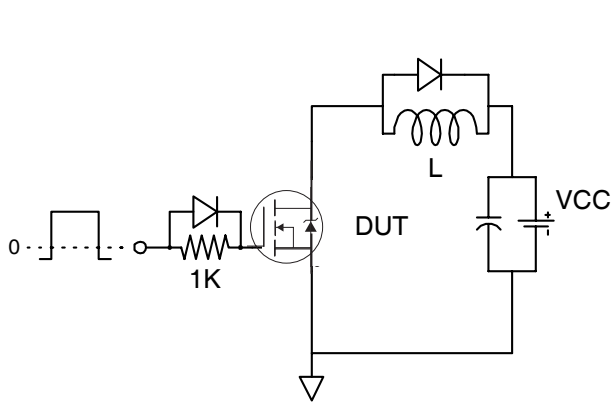
**Fig 15a.** Switching Time Test Circuit



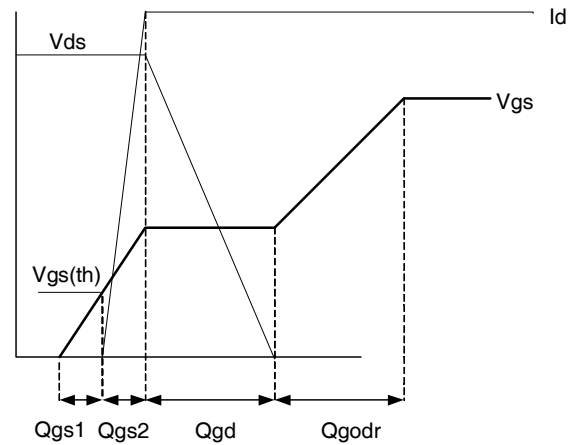
**Fig 15b.** Switching Time Waveforms



**Fig 16. Peak Diode Recovery  $dv/dt$  Test Circuit for N-Channel HEXFET<sup>®</sup> Power MOSFETs**

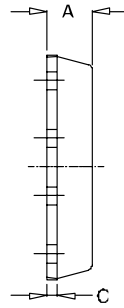


**Fig 17. Gate Charge Test Circuit**

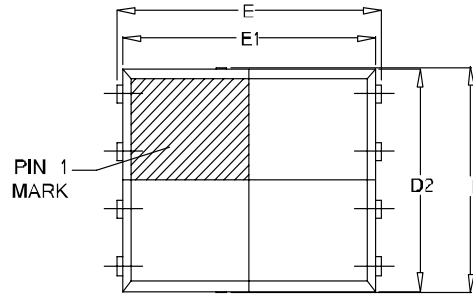


**Fig 18. Gate Charge Waveform**

## PQFN 5x6 Outline "E" Package Details

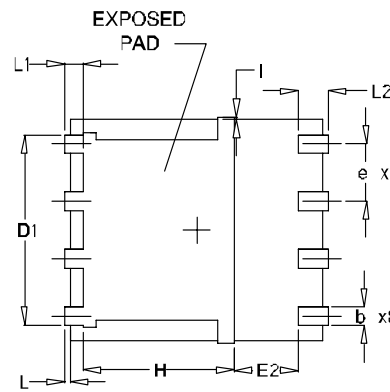


SIDEVIEW



TOP VIEW

SYMBOL	OUTLINE PQFN 5X6E		
	MIN.	NOM.	MAX.
A	0.90	1.03	1.17
b	0.33	0.41	0.48
C	0.20	0.25	0.35
D	4.80	4.98	5.15
D1	3.91	4.11	4.31
D2	4.80	4.90	5.00
E	5.90	6.02	6.15
E1	5.65	5.75	5.85
E2	1.10	—	—
e	1.27 BSC		
L	0.05	0.15	0.25
L1	0.38	0.44	0.50
L2	0.51	0.68	0.86
H	3.32	3.45	3.58
I	—	—	0.18



BOTTOM VIEW

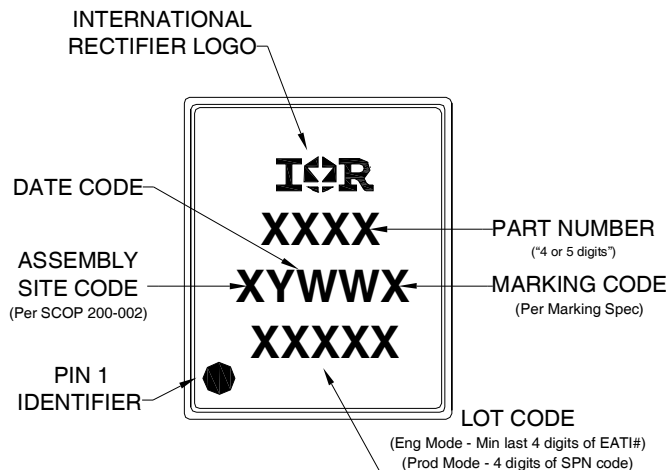
For more information on board mounting, including footprint and stencil recommendation, please refer to application note AN-1136:

<http://www.irf.com/technical-info/appnotes/an-1136.pdf>

For more information on package inspection techniques, please refer to application note AN-1154:

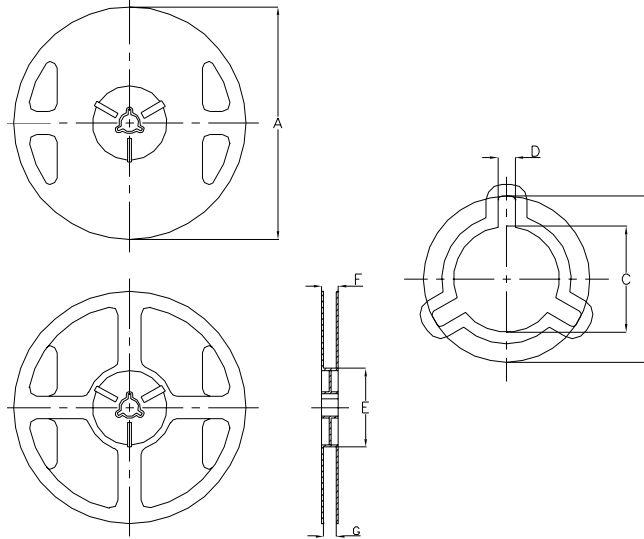
<http://www.irf.com/technical-info/appnotes/an-1154.pdf>

## PQFN 5x6 Outline "E" Part Marking



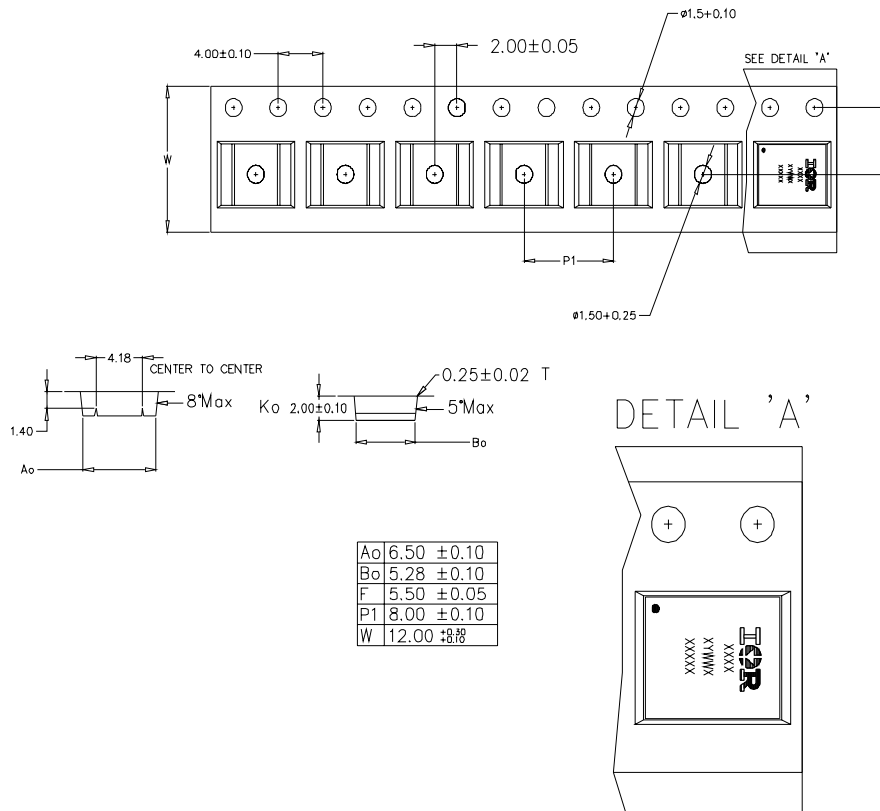
Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

# PQFN 5x6 Outline "E" Tape and Reel



NOTE: Controlling dimensions in mm Std reel quantity is 4000 parts.

REEL DIMENSIONS								
CODE	STANDARD OPTION (QTY 4000)				TR1 OPTION (QTY 400)			
	METRIC		IMPERIAL		METRIC		IMPERIAL	
A	329.5	330.5	12.972	13.011	177.5	178.5	6.988	7.028
B	20.9	21.5	0.823	0.846	20.9	21.5	0.823	0.846
C	12.8	13.5	0.504	0.532	13.2	13.8	0.520	0.543
D	1.7	2.3	0.067	0.091	1.9	2.3	0.075	0.091
E	97	99	3.819	3.898	65	66	2.350	2.598
F	Ref	17.4			Ref	12		
G	13	14.5	0.512	0.571	13	14.5	0.512	0.571





**Qualification information<sup>†</sup>**

Qualification level	Industrial <sup>††</sup> (per JEDEC JES D47F <sup>†††</sup> guidelines )	
Moisture Sensitivity Level	PQFN 5mm x 6mm	MSL1 (per JEDEC J-STD-020D <sup>†††</sup> )
RoHS compliant	Yes	

† Qualification standards can be found at International Rectifier's web site  
<http://www.irf.com/product-info/reliability>

†† Higher qualification ratings may be available should the user have such requirements.  
 Please contact your International Rectifier sales representative for further information:  
<http://www.irf.com/whoto-call/salesrep/>

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

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.11\text{mH}$ ,  $R_G = 50\Omega$ ,  $I_{AS} = 45\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④  $R_\theta$  is measured at  $T_J$  of approximately  $90^\circ\text{C}$ .
- ⑤ When mounted on 1 inch square 2 oz copper pad on 1.5x1.5 in. board of FR-4 material.

**Revision History**

Date	Comment
1/20/2014	<ul style="list-style-type: none"> <li>• Updated ordering information to reflect the End-Of-Life (EOL) of the mini-reel option (EOL notice #259).</li> <li>• Updated data sheet with the new IR corporate template.</li> </ul>