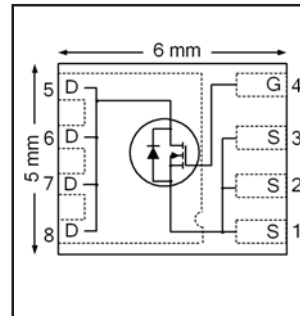


### HEXFET® Power MOSFET

$V_{DS}$	<b>25</b>	<b>V</b>
$R_{DS(on) max}$ (@ $V_{GS} = 10V$ )	<b>1.05</b>	<b>mΩ</b>
$Q_g$ (typical)	<b>52</b>	<b>nC</b>
$R_G$ (typical)	<b>1.3</b>	<b>Ω</b>
$I_D$ (@ $T_{C(Bottom)} = 25^\circ C$ )	<b>100</b> ⑥	<b>A</b>



### Applications

- OR-ing MOSFET for 12V (typical) Bus in-Rush Current
- Battery Operated DC Motor Inverter MOSFET

### Features and Benefits

#### Features

Low RDSon (<1.05 mΩ)
Low Thermal Resistance to PCB (<0.8°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
Enable better thermal dissipation
Increased Power Density
Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendly
Increased Reliability

Base part number	Package Type	Standard Pack		Orderable part number
		Form	Quantity	
IRFH8202PbF	PQFN 5mm x 6mm	Tape and Reel	4000	IRFH8202TRPbF

### Absolute Maximum Ratings

	Parameter	Max.	Units
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	47	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	30	
$I_D @ T_{C(Bottom)} = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	100 ⑥	
$I_D @ T_{C(Bottom)} = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	100 ⑥	
$I_{DM}$	Pulsed Drain Current ①	400	W
$P_D @ T_A = 25^\circ C$	Power Dissipation ⑤	3.6	
$P_D @ T_{C(Bottom)} = 25^\circ C$	Power Dissipation ⑤	160	
	Linear Derating Factor ⑤	0.029	W/°C
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		

Notes ① through ⑥ are on page 8

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

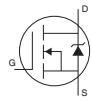
	Parameter	Min.	Typ.	Max.	Units	Conditions
BV <sub>DSS</sub>	Drain-to-Source Breakdown Voltage	25	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	0.90	1.05	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 50A ③
		—	1.40	1.85		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 50A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.35	1.80	2.35	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 150μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	-6.3	—	mV/°C	
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	5.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
		—	—	150		V <sub>DS</sub> = 20V, 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	181	—	—	S	V <sub>DS</sub> = 13V, I <sub>D</sub> = 50A
Q <sub>g</sub>	Total Gate Charge	—	110	—	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 13V, I <sub>D</sub> = 50A
Q <sub>g</sub>	Total Gate Charge	—	52	78	nC	V <sub>DS</sub> = 13V V <sub>GS</sub> = 4.5V I <sub>D</sub> = 50A
Q <sub>gs1</sub>	Pre-V <sub>th</sub> Gate-to-Source Charge	—	13	—		
Q <sub>gs2</sub>	Post-V <sub>th</sub> Gate-to-Source Charge	—	7.8	—		
Q <sub>gd</sub>	Gate-to-Drain Charge	—	17	—		
Q <sub>godr</sub>	Gate Charge Overdrive	—	15	—		
Q <sub>sw</sub>	Switch Charge (Q <sub>gs2</sub> + Q <sub>gd</sub> )	—	25	—		
Q <sub>oss</sub>	Output Charge	—	36	—	nC	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V
R <sub>G</sub>	Gate Resistance	—	1.3	2.6	Ω	
t <sub>d(on)</sub>	Turn-On Delay Time	—	28	—	ns	V <sub>DD</sub> = 13V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 50A R <sub>G</sub> = 1.8Ω
t <sub>r</sub>	Rise Time	—	46	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	30	—		
t <sub>f</sub>	Fall Time	—	19	—		
C <sub>iss</sub>	Input Capacitance	—	7174	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 13V f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	1758	—		
C <sub>riss</sub>	Reverse Transfer Capacitance	—	828	—		

**Avalanche Characteristics**

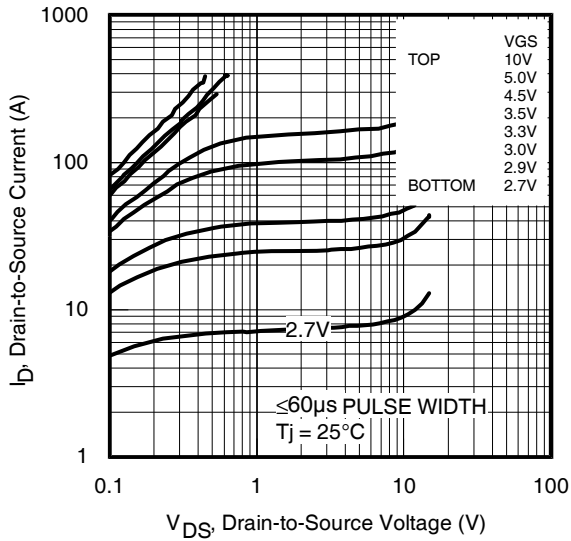
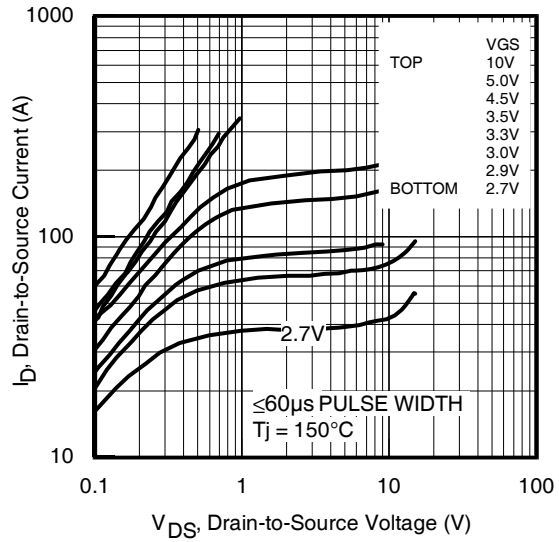
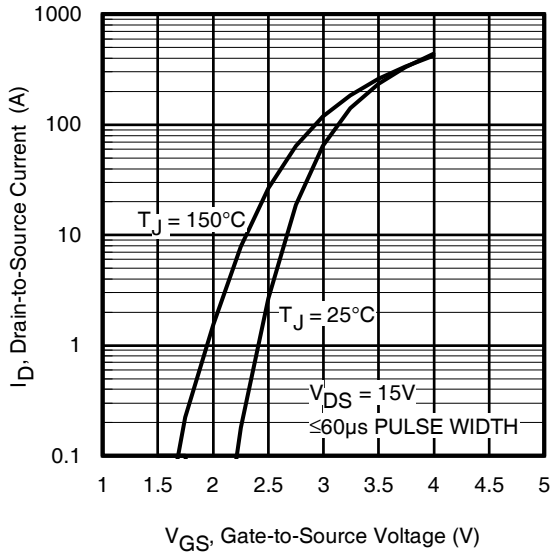
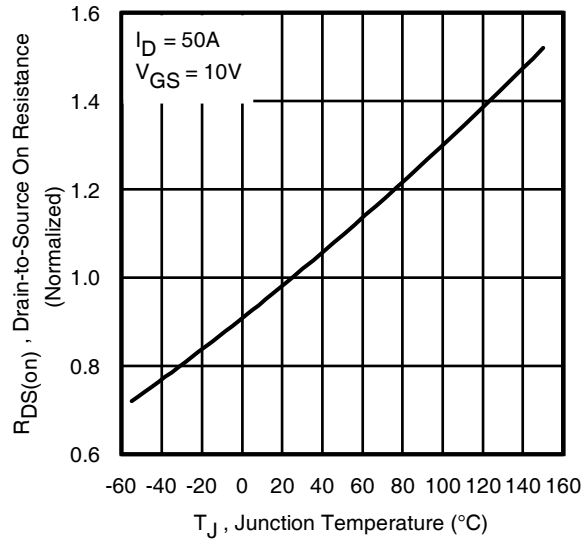
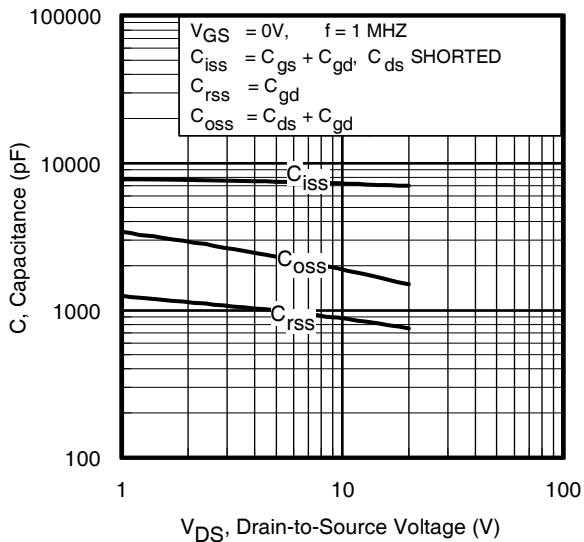
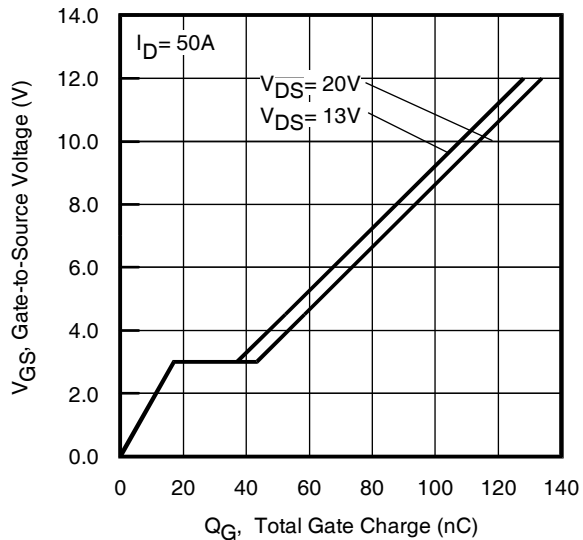
	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	468	mJ
I <sub>AR</sub>	Avalanche Current ①	—	50	A

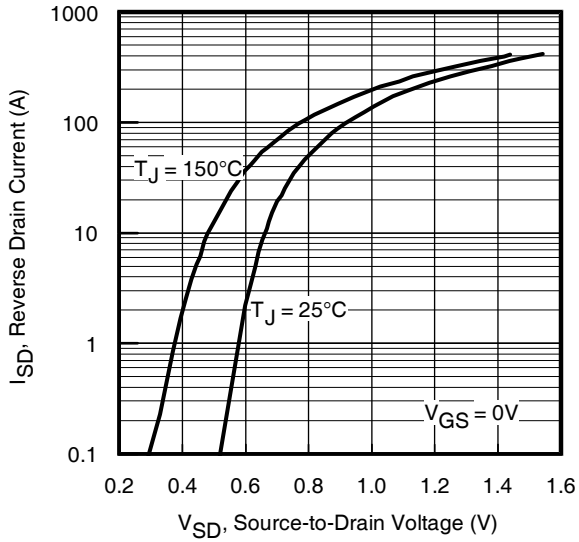
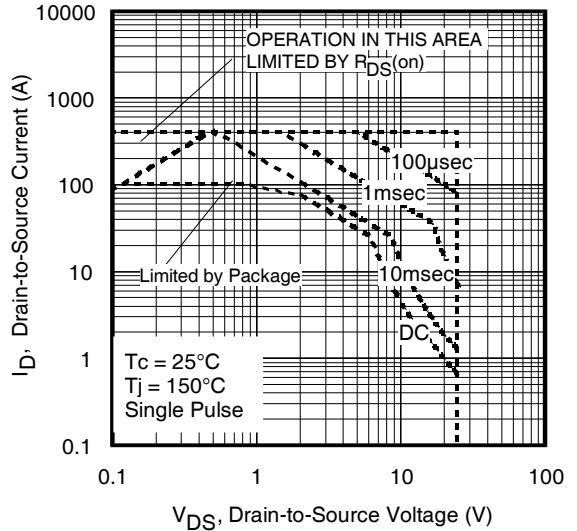
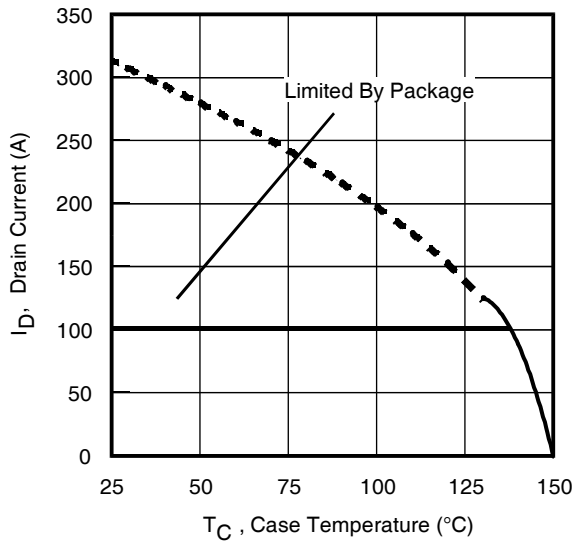
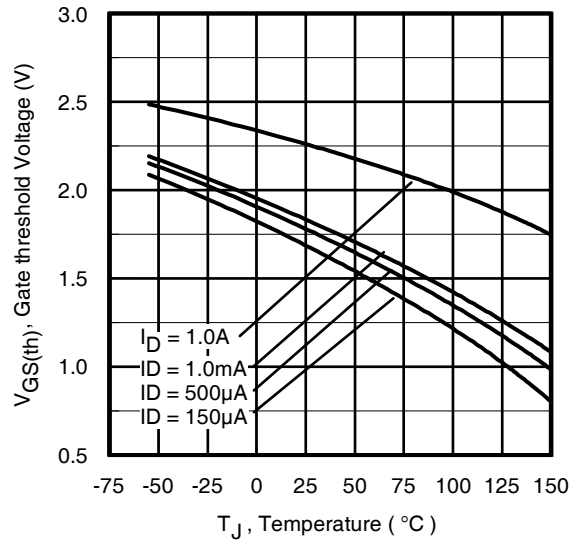
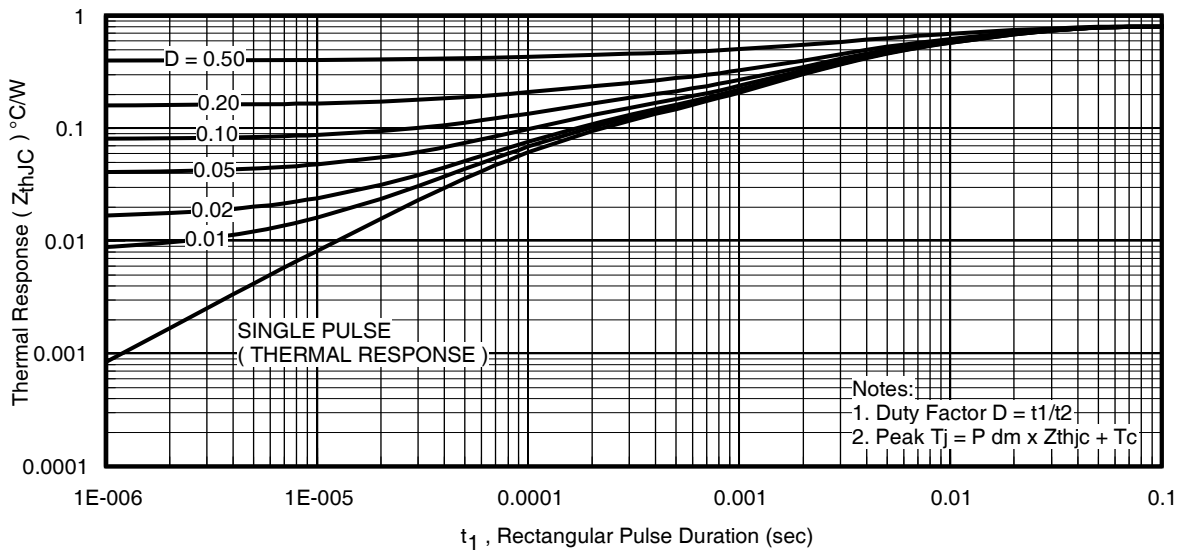
**Diode Characteristics**

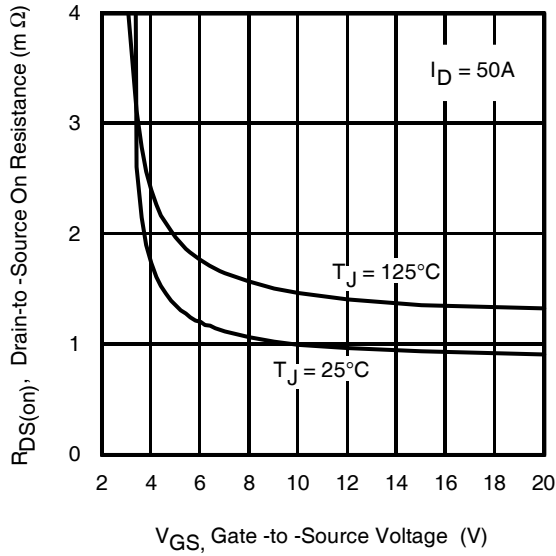
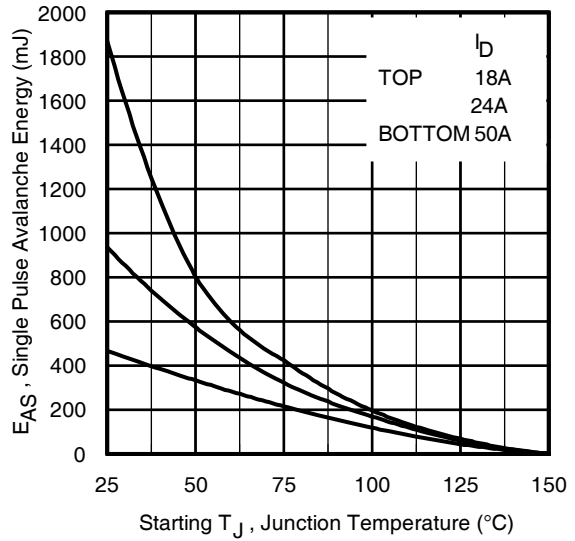
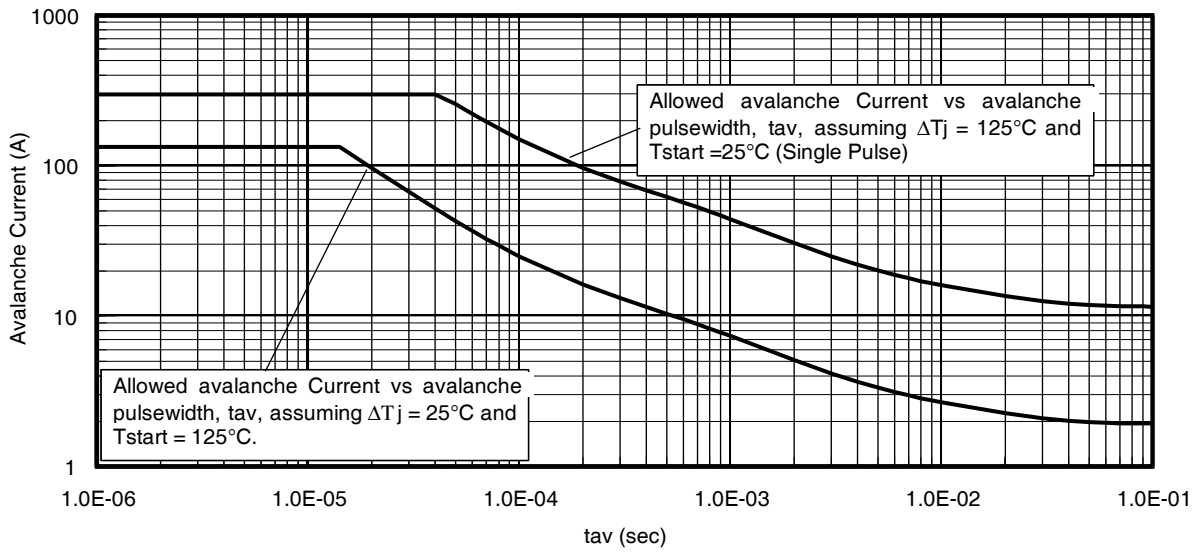
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	100 ⑥	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	400		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 50A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	37	56	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 50A, V <sub>DD</sub> = 13V
Q <sub>rr</sub>	Reverse Recovery Charge	—	68	102	nC	di/dt = 200A/μs ③

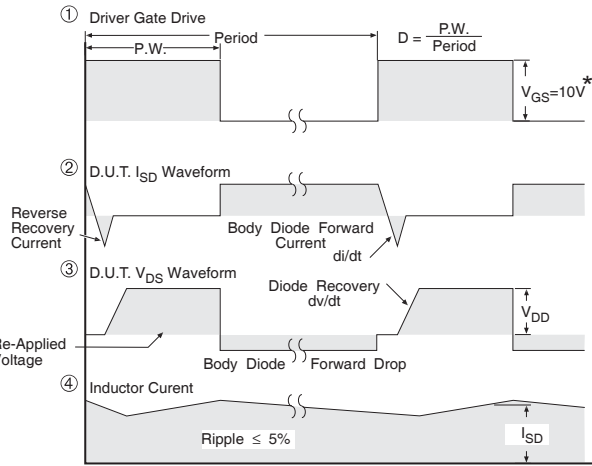
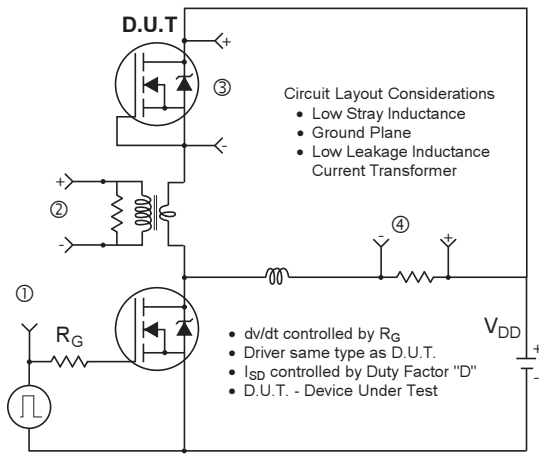

**Thermal Resistance**

	Parameter	Typ.	Max.	Units
R <sub>θJC</sub> (Bottom)	Junction-to-Case ④	0.5	0.8	°C/W
R <sub>θJC</sub> (Top)	Junction-to-Case ④	—	15	
R <sub>θJA</sub>	Junction-to-Ambient ⑤	—	35	
R <sub>θJA</sub> (<10s)	Junction-to-Ambient ⑤	—	21	


**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**

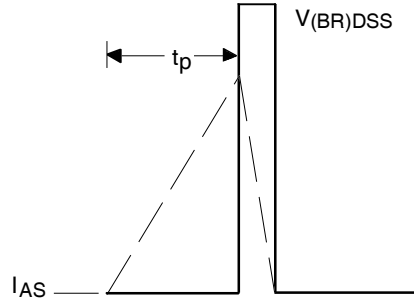
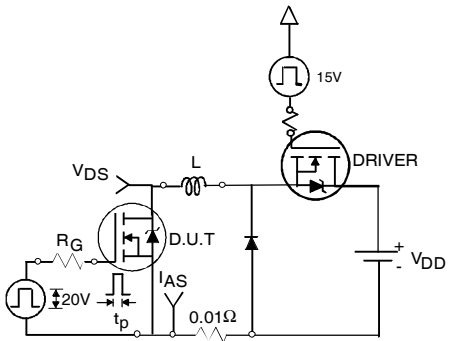

**Fig 7.** Typical Source-Drain Diode Forward Voltage

**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 14.** Typical Avalanche Current vs. Pulsewidth



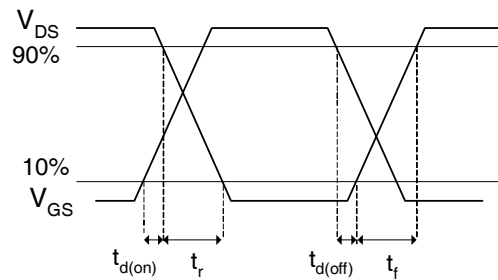
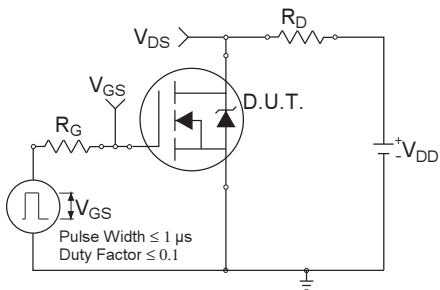
\*  $V_{GS} = 5V$  for Logic Level Devices

**Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETS**



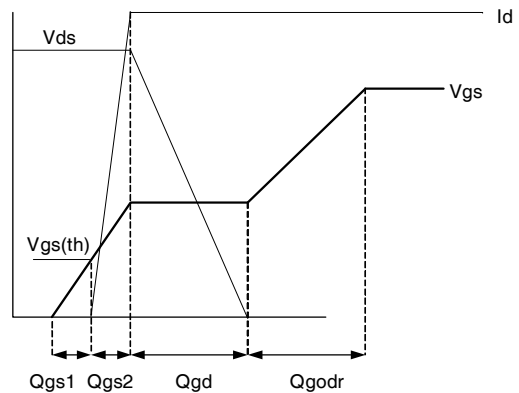
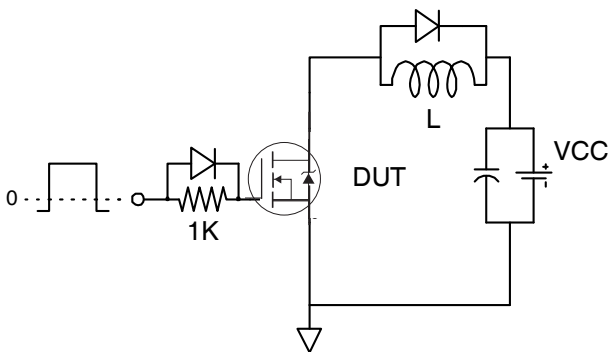
**Fig 16a. Unclamped Inductive Test Circuit**

**Fig 16b. Unclamped Inductive Waveforms**



**Fig 17a. Switching Time Test Circuit**

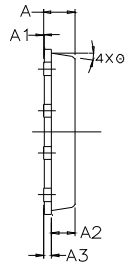
**Fig 17b. Switching Time Waveforms**



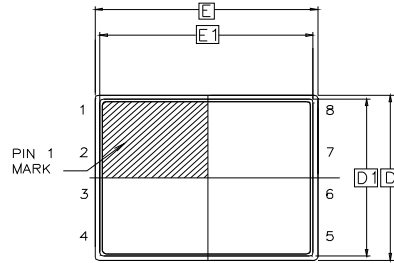
**Fig 18a. Gate Charge Test Circuit**

**Fig 18b. Gate Charge Waveform**

## PQFN 5x6 Outline "B" Package Details

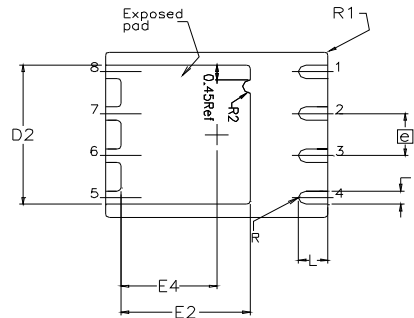


SIDE VIEW



TOP VIEW

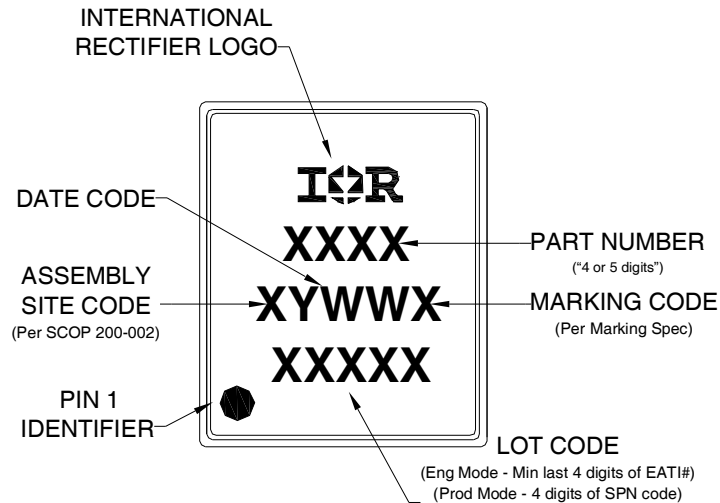
DIM SYMBOL	MIN	NOM	MAX
A	0.800	0.830	1.05
A1	0.000	0.020	0.050
A2	0.580	0.630	0.680
A3		0.254 REF	
Ø	0°	10°	12°
b	0.350	0.400	0.470
D	4.850	5.000	5.150
D1	4.675	4.750	5.000
D2	3.700	4.210	4.300
e		1.270 BSC	
E	5.850	6.000	6.150
E1	5.675	5.750	6.000
E2	3.380	3.480	3.760
E4	2.480	2.580	2.680
L	0.550	0.800	0.900
R		0.200 REF	
R1		0.100 REF	
R2	0.150	0.200	0.250



BOTTOM VIEW

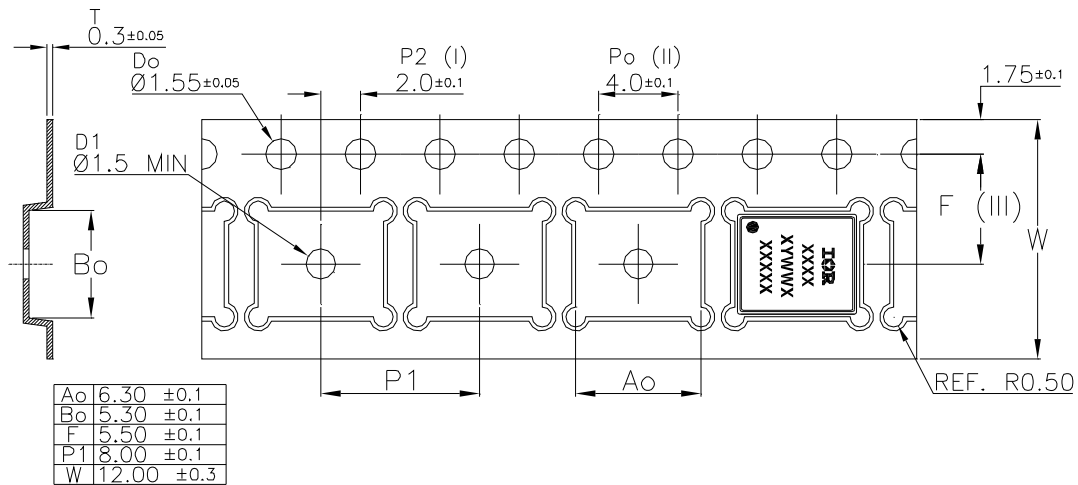
For footprint and stencil design recommendations, please refer to application note AN-1154 at <http://www.irf.com/technical-info/appnotes/an-1154.pdf>

## PQFN 5x6 Outline "B" Part Marking



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

## PQFN 5x6 Outline "B" Tape and Reel



### Qualification information<sup>†</sup>

Qualification level	Industrial (per JEDEC JESD47F 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>

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

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.37\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 50\text{A}$ .
- 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.  
<http://www.irf.com/technical-info/appnotes/an-994.pdf>
- ⑥ Calculated continuous current based on maximum allowable junction temperature. Package is limited to 100A by production test capability

### Revision History

Date	Comments
8/1/2013	Added "Strong/RFET™" above part number on page1

International  
 Rectifier

**IR WORLD HEADQUARTERS:** 101N Sepulveda Blvd, El Segundo, California 90245, USA  
 To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>  
 Visit us at [www.irf.com](http://www.irf.com) for sales contact information.