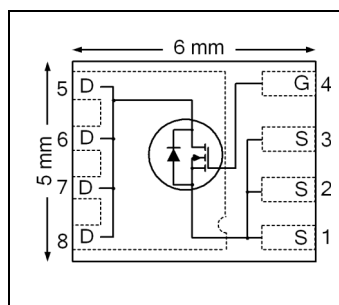


HEXFET® Power MOSFET

V_{DSS}	100	V
R_{DS(on)} max (@ V _{GS} = 10V)	16.4	mΩ
Q_g (typical)	13	nC
R_g (typical)	2.1	Ω
I_D (@T _{C (Bottom)} = 25°C)	35	A



PQFN 5X6 mm

Applications

- Primary Switch for High Frequency 48V/60V Telecom DC-DC Power Supplies
- Secondary Side Synchronous Rectifier

Features

Low R _{DS(ON)} (< 16.4mΩ)
Low Thermal Resistance to PCB (<3.2°C/W)
100% R _g Tested
Low Profile (<1.05 mm)
Industry-Standard Pinout
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1

results in
⇒

Benefits

Lower Conduction Losses
Increased Power Density
Increased Reliability
Increased Power Density
Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFH7194PbF	PQFN 5mm x 6 mm	Tape and Reel	4000	IRFH7194TRPbF

Absolute Maximum Ratings

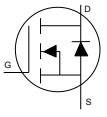
	Parameter	Max.	Units
V _{GS}	Gate-to-Source Voltage	± 20	V
I _D @ T _A = 25°C	Continuous Drain Current, V _{GS} @ 10V	11	A
I _D @ T _{C(Bottom)} = 25°C	Continuous Drain Current, V _{GS} @ 10V	35	
I _D @ T _{C(Bottom)} = 100°C	Continuous Drain Current, V _{GS} @ 10V	22	
I _{DM}	Pulsed Drain Current ①	140	
P _D @ T _A = 25°C	Power Dissipation	3.6	W
P _D @ T _{C(Bottom)} = 25°C	Power Dissipation	39	
	Linear Derating Factor	0.03	W/°C
T _J	Operating Junction and	-55 to + 150	°C
T _{STG}	Storage Temperature Range		

Notes ① through ⑤ are on page 8

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	78	—	mV/°C	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	13.7	16.4	mΩ	$V_{GS} = 10V, I_D = 21A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	3.6	V	$V_{DS} = V_{GS}, I_D = 50\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-5.2	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 80V, V_{GS} = 0V$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100	nA	$V_{GS} = -20V$
g_{fs}	Forward Transconductance	45	—	—	S	$V_{DS} = 25V, I_D = 21A$
Q_g	Total Gate Charge	—	13	19	nC	$V_{DS} = 50V$ $V_{GS} = 10V$ $I_D = 21A$
Q_{gs1}	Pre-V _{th} Gate-to-Source Charge	—	1.8	—	nC	
Q_{gs2}	Post-V _{th} Gate-to-Source Charge	—	0.9	—	nC	
Q_{gd}	Gate-to-Drain Charge	—	4.3	—	nC	
Q_{godr}	Gate Charge Overdrive	—	6.0	—	nC	
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)	—	5.2	—	nC	
Q_{oss}	Output Charge	—	40	—	nC	$V_{DS} = 50V, V_{GS} = 0V$
R_G	Gate Resistance	—	2.1	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	2.7	—	ns	$V_{DD} = 50V, V_{GS} = 10V$ $I_D = 21A$ $R_G = 1.0\Omega$
t_r	Rise Time	—	3.3	—	ns	
$t_{d(off)}$	Turn-Off Delay Time	—	8.0	—	ns	
t_f	Fall Time	—	2.5	—	ns	
C_{iss}	Input Capacitance	—	733	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	374	—	pF	$V_{DS} = 50V$
C_{rss}	Reverse Transfer Capacitance	—	11	—	pF	$f = 1.0MHz$

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	35	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	140	A	
V_{SD}	Diode Forward Voltage	—	0.8	1.3	V	$T_J = 25^\circ\text{C}, I_S = 21A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	30	45	ns	$T_J = 25^\circ\text{C}, I_F = 21A, V_{DD} = 50V$ $di/dt = 100A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge	—	26	39	nC	

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS} (Thermally limited)	Single Pulse Avalanche Energy ②	—	220	mJ
I_{AR}	Avalanche Current ①	—	12	A

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ④	—	3.2	°C/W
$R_{\theta JC}$ (Top)	Junction-to-Case ④	—	22	
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	35	
$R_{\theta JA}$ (<10s)	Junction-to-Ambient ⑤	—	20	

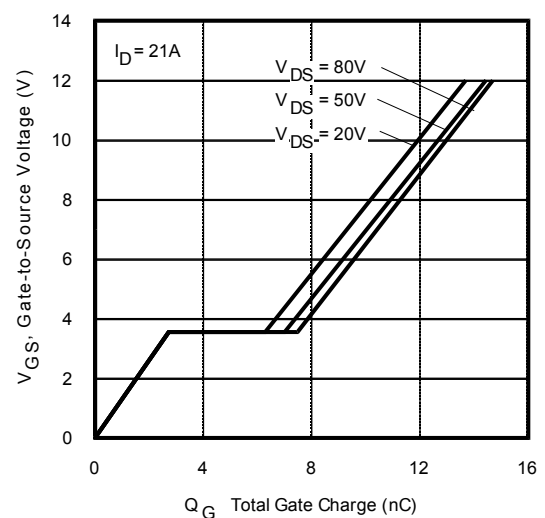
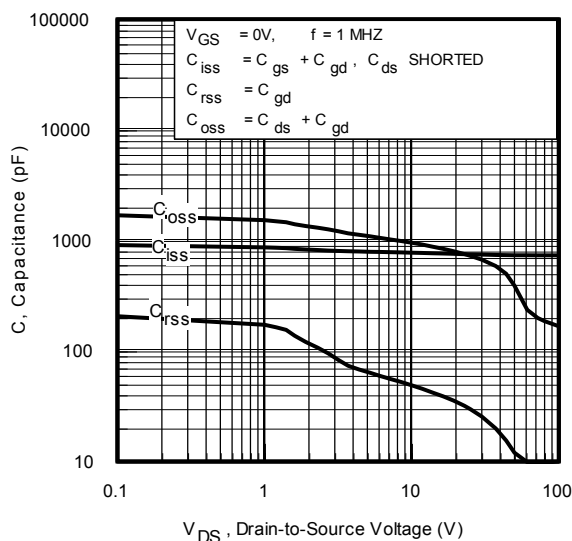
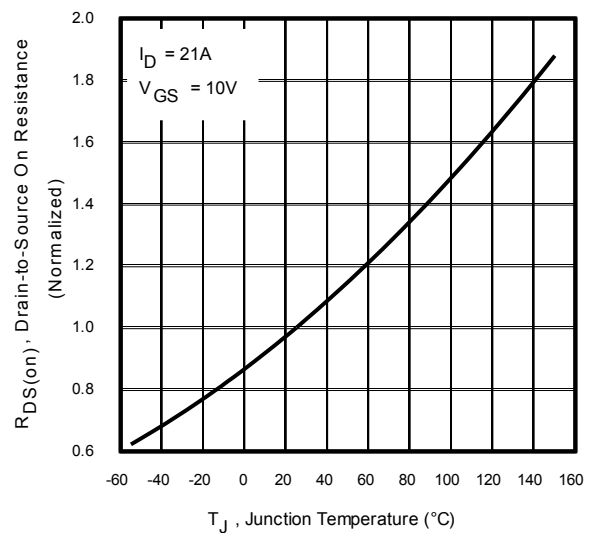
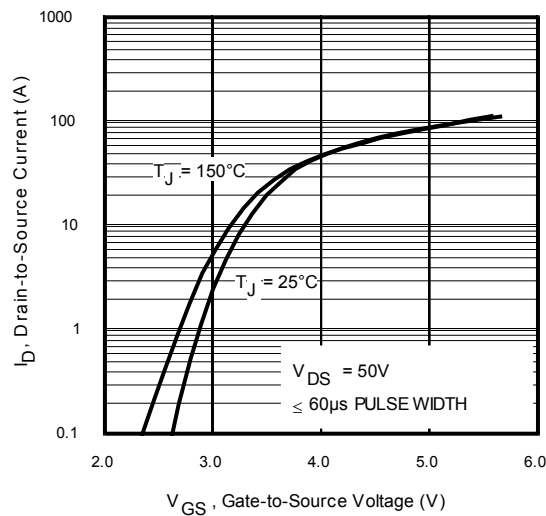
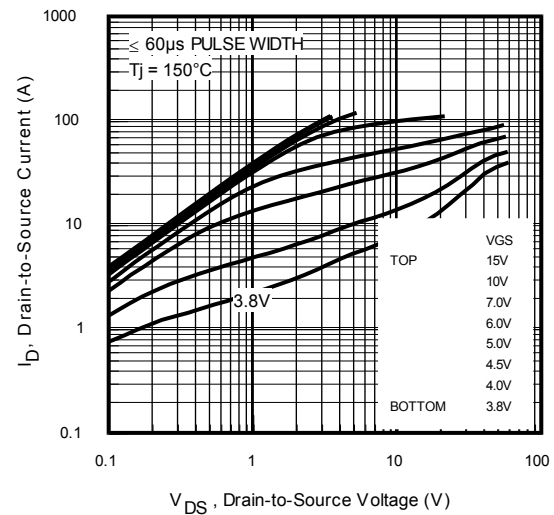
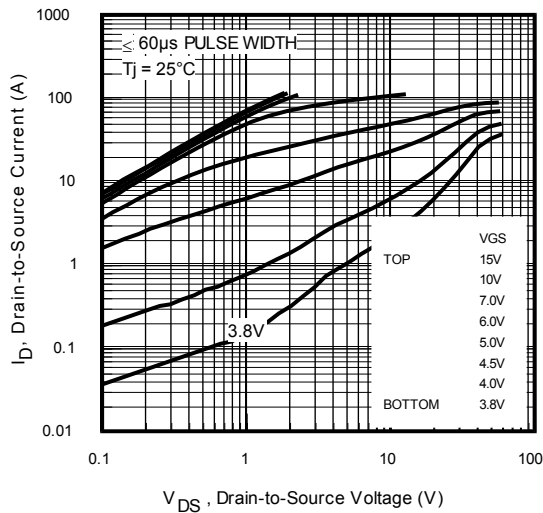
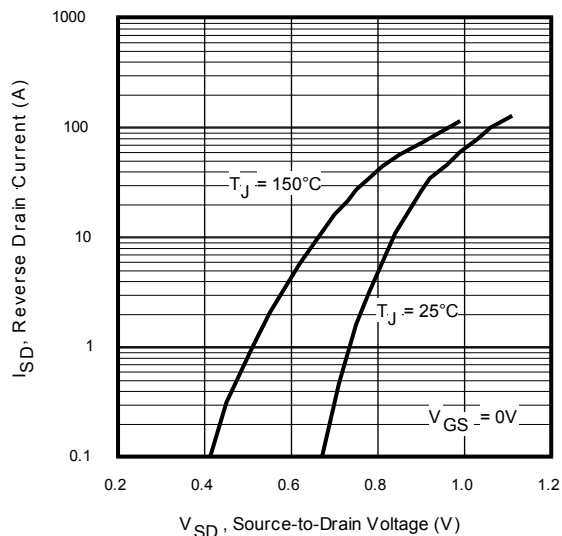
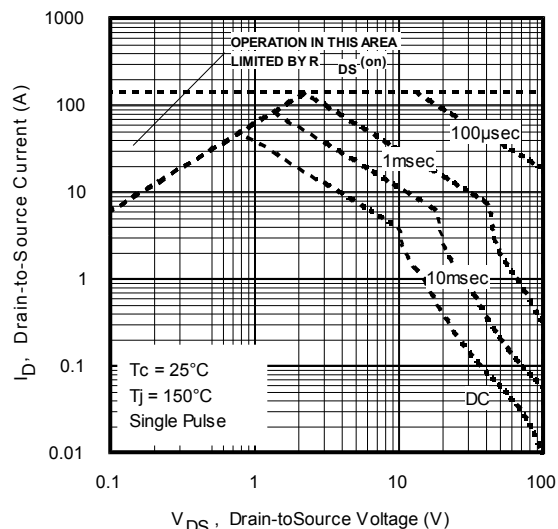
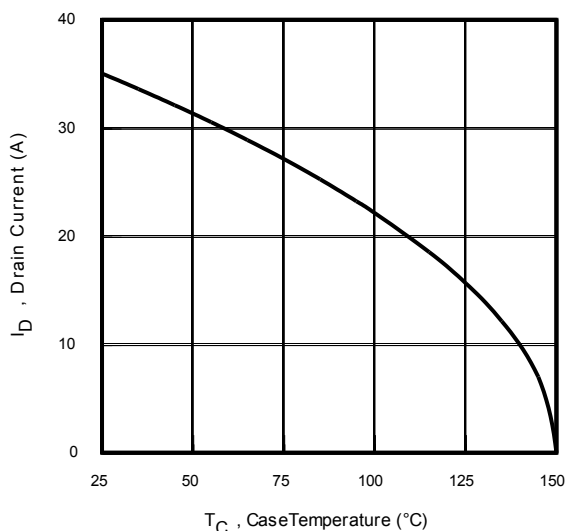
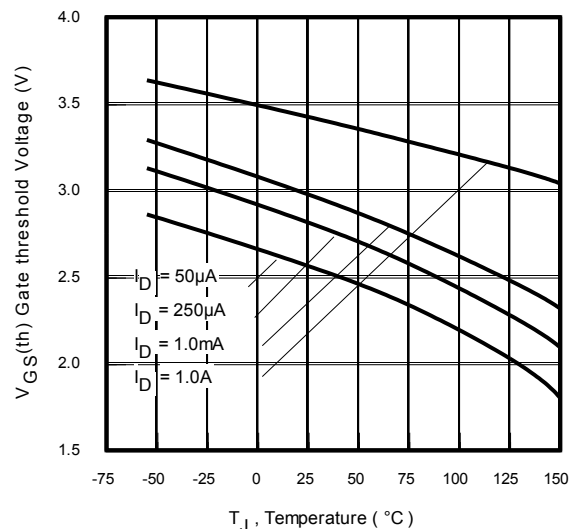
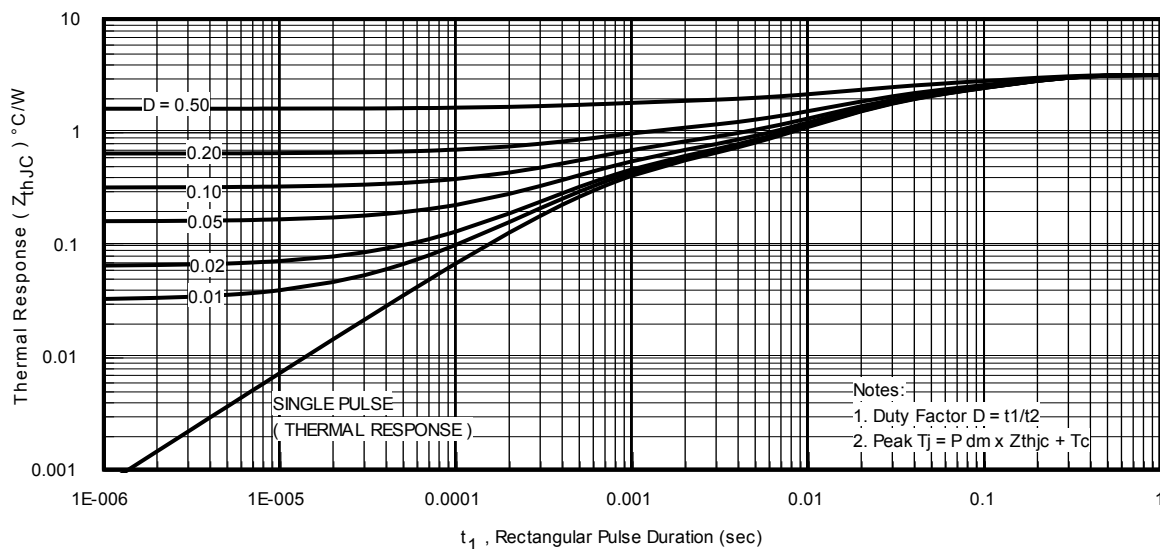
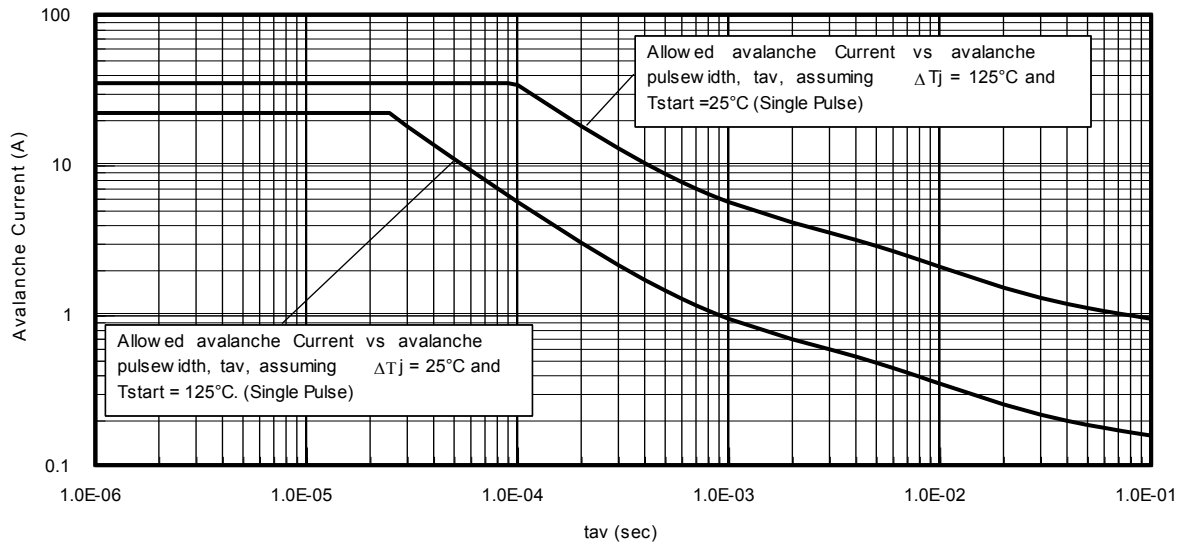
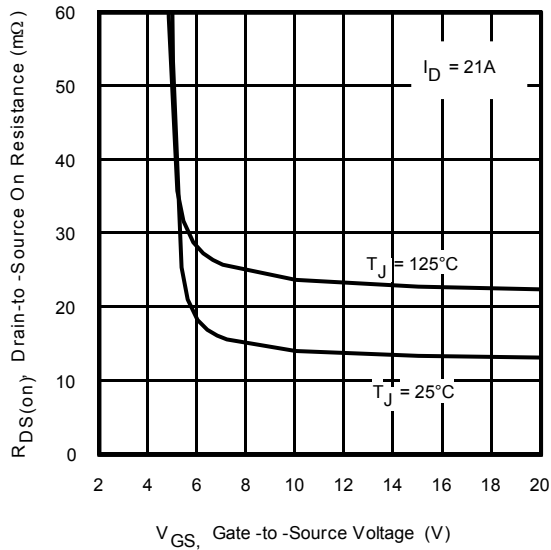
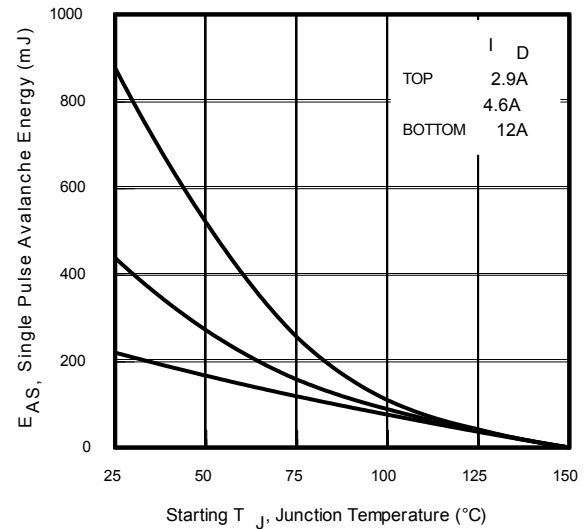
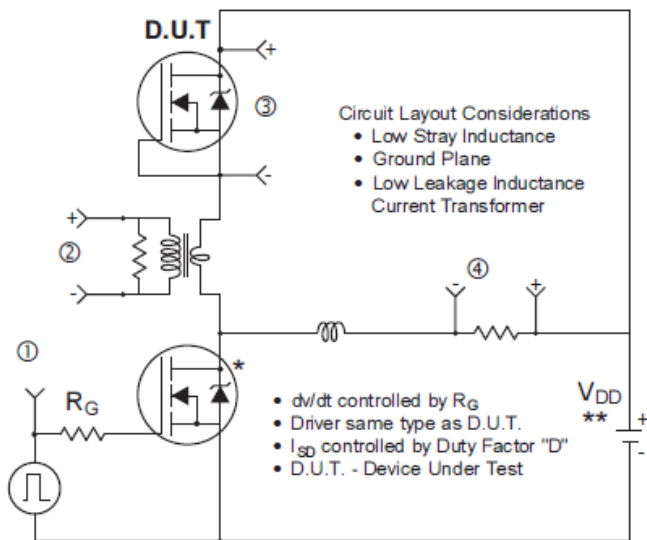


Fig 5. **Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage


Fig 7. Typical Source-Drain Diode Forward Voltage

Fig 8. Maximum Safe Operating Area

Fig 9. Maximum Drain Current vs. Case Temperature

Fig 10. Threshold Voltage vs. Temperature

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

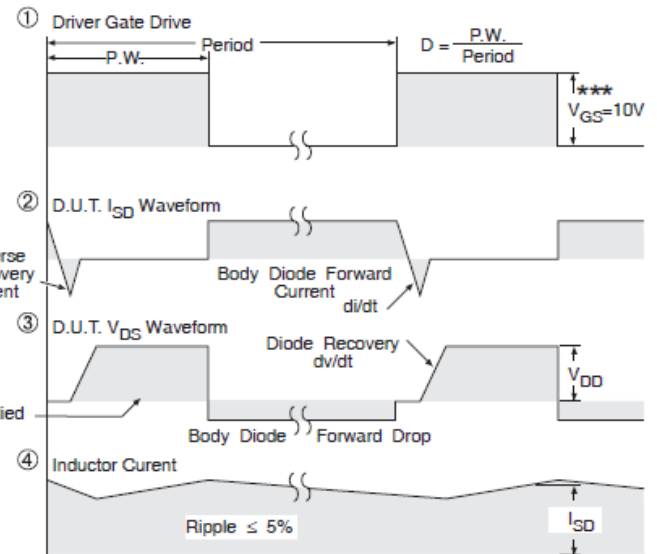

Fig 12. Typical Avalanche Current vs. Pulse Width

Fig 13. On-Resistance vs. Gate Voltage

Fig 14. Maximum Avalanche Energy vs. Drain Current



* Use P-Channel Driver for P-Channel Measurements

** Reverse Polarity for P-Channel

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



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

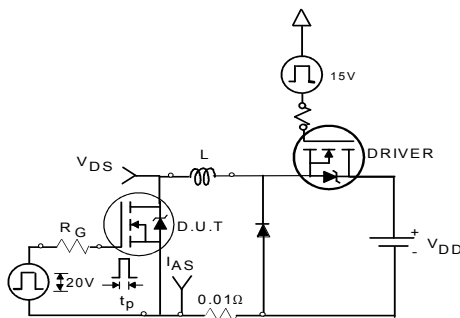


Fig 16a. Unclamped Inductive Test Circuit

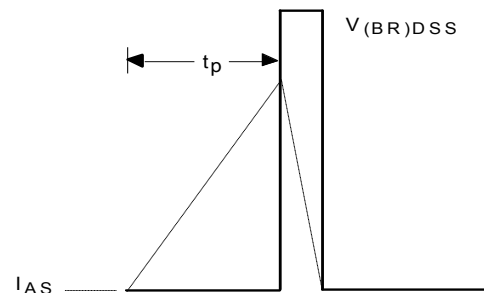


Fig 16b. Unclamped Inductive Waveforms

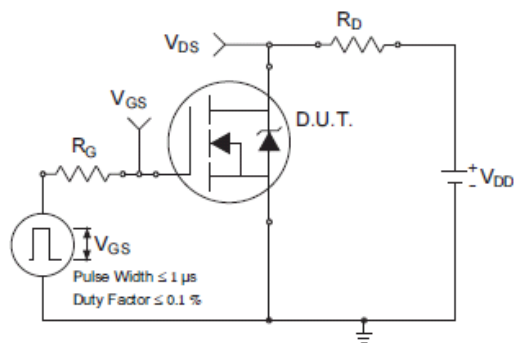


Fig 17a. Switching Time Test Circuit

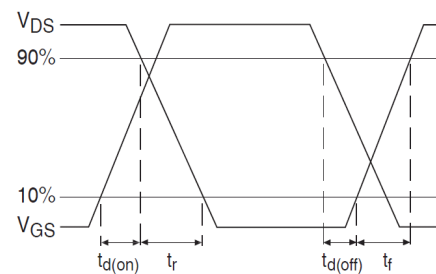


Fig 17b. Switching Time Waveforms

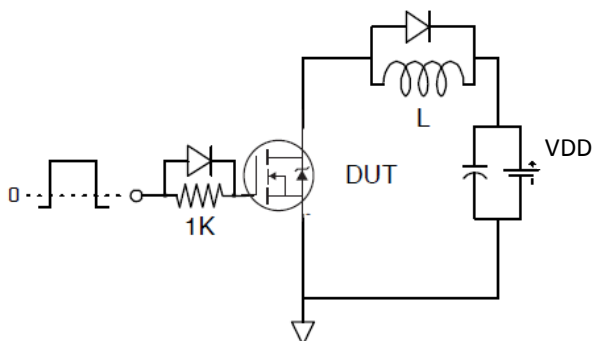


Fig 18. Gate Charge Test Circuit

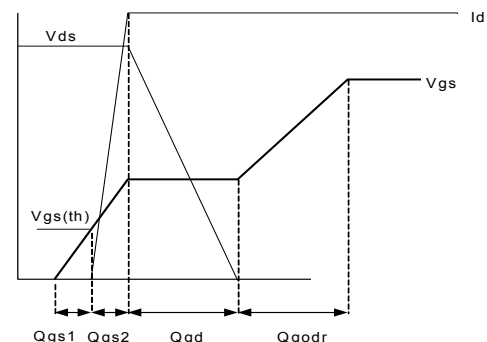
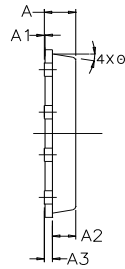
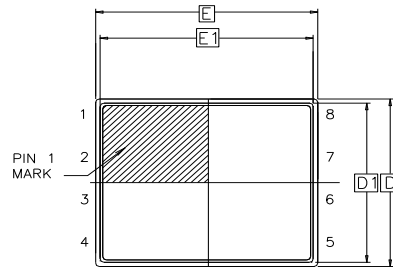


Fig 19. Gate Charge Waveform

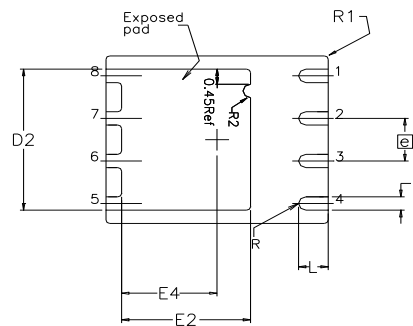
PQFN 5x6 Outline "B" Package Details


SIDE VIEW



TOP VIEW

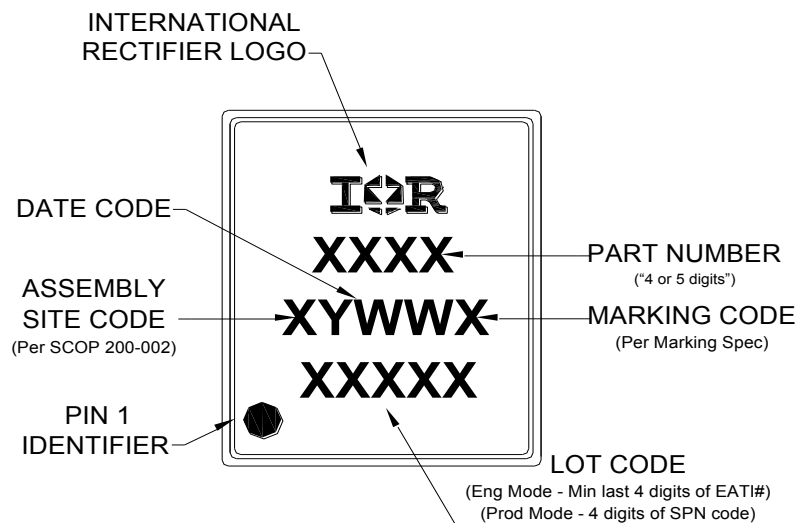
DIM SYMBOL	MIN	NOM	MAX
A	0.800	0.830	1.05
A1	0.000	0.020	0.050
A2	0.580	0.630	0.680
A3		0.254 REF	
Ø	0*	10*	12*
b	0.350	0.400	0.470
D	4.850	5.000	5.150
D1	4.675	4.750	5.000
D2	3.700	4.210	4.300
e		1.270 BSC	
E	5.850	6.000	6.150
E1	5.675	5.750	6.000
E2	3.380	3.480	3.760
E4	2.480	2.580	2.680
L	0.550	0.800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



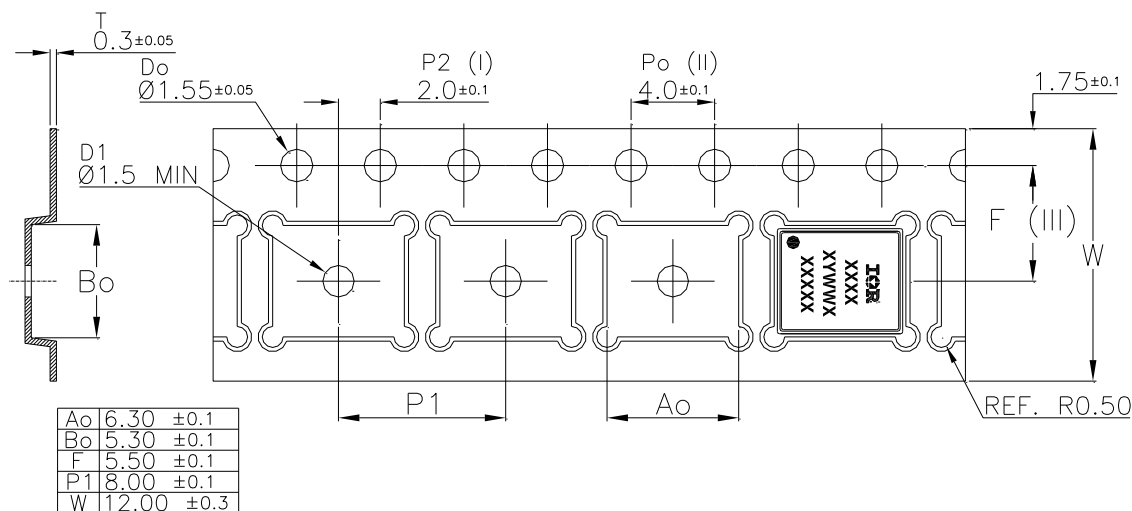
BOTTOM VIEW

For 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 "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


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

Qualification Information[†]

Qualification Level	Industrial (per JEDEC JESD47F ^{††} guidelines)	
Moisture Sensitivity Level	PQFN 5mm x 6mm	MSL1 (per JEDEC J-STD-020D ^{††})
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 $T_J = 25^\circ\text{C}$, $L = 3.0\text{mH}$, $R_G = 50\Omega$, $I_{AS} = 12\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ R_θ is measured at T_J of approximately 90°C .
- ⑤ When mounted on 1 inch square PCB (FR-4). Please refer to AN-994 for more details:
<http://www.irf.com/technical-info/appnotes/an-994.pdf>

International
 Rectifier

IR WORLD HEADQUARTERS: 101 N. Sepulveda Blvd., El Segundo, California 90245, USA

To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>

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