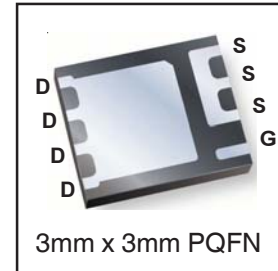
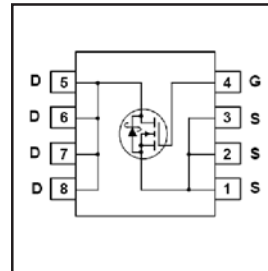


HEXFET® Power MOSFET

V_{DS}	30	V
$R_{DS(on) \text{ max}}$ (@ $V_{GS} = 10V$)	12.4	mΩ
Q_g (typical)	5.4	nC
I_D (@ $T_A = 25^\circ C$)	12	A



Applications

- Synchronous Buck Converter for Computer Processor Power
- Isolated DC to DC Converters for Network and Telecom
- Buck Converters for Set-Top Boxes
- System/load switch

Features

Industry-standard pinout PQFN 3mm x 3mm Package
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1, Industrial qualification



Benefits

Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFH3707PbF-1	PQFN 3mm x 3mm	Tape and Reel	4000	IRFH3707TRPbF-1

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	12	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	9.4	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	29	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Package Limited)	18	
I_{DM}	Pulsed Drain Current ①	96	
$P_D @ T_A = 25^\circ C$	Power Dissipation ⑤	2.8	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ⑤	1.8	
	Linear Derating Factor ⑤	0.02	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ④	—	7.5	°C/W
$R_{\theta JA}$	Junction-to-Ambient ⑤⑥	—	45	
$R_{\theta JA}$	Junction-to-Ambient ($t < 10s$) ⑥	—	31	

Notes ① through ⑥ are on page 10

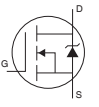
Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	9.4	12.4	mΩ	$V_{GS} = 10V, I_D = 12A$ ③
		—	14.5	17.9		$V_{GS} = 4.5V, I_D = 9.4A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.8	2.35	V	$V_{DS} = V_{GS}, I_D = 25\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-6.2	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
g_{fs}	Forward Transconductance	17	—	—	S	$V_{DS} = 15V, I_D = 9.4A$
Q_g	Total Gate Charge	—	5.4	8.1	nC	$V_{DS} = 15V$ $V_{GS} = 4.5V$ $I_D = 9.4A$ See Fig.17 & 18
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	1.1	—		
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	0.7	—		
Q_{gd}	Gate-to-Drain Charge	—	2.2	—		
Q_{godr}	Gate Charge Overdrive	—	1.5	—		
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)	—	2.9	—		
Q_{oss}	Output Charge	—	3.8	—	nC	$V_{DS} = 16V, V_{GS} = 0V$
R_G	Gate Resistance	—	2.0	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	9.0	—	ns	$V_{DD} = 15V, V_{GS} = 4.5V$ $I_D = 9.4A$ $R_G = 1.3\Omega$ See Fig.15
t_r	Rise Time	—	11	—		
$t_{d(off)}$	Turn-Off Delay Time	—	9.9	—		
t_f	Fall Time	—	5.6	—		
C_{iss}	Input Capacitance	—	755	—	pF	$V_{GS} = 0V$ $V_{DS} = 15V$ $f = 1.0MHz$
C_{oss}	Output Capacitance	—	171	—		
C_{rss}	Reverse Transfer Capacitance	—	83	—		

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	13	mJ
I_{AR}	Avalanche Current ①	—	9.4	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	96		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 9.4A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	20	30	ns	$T_J = 25^\circ\text{C}, I_F = 9.4A, V_{DD} = 15V$
Q_{rr}	Reverse Recovery Charge	—	27	41	nC	$di/dt = 200A/\mu s$ ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

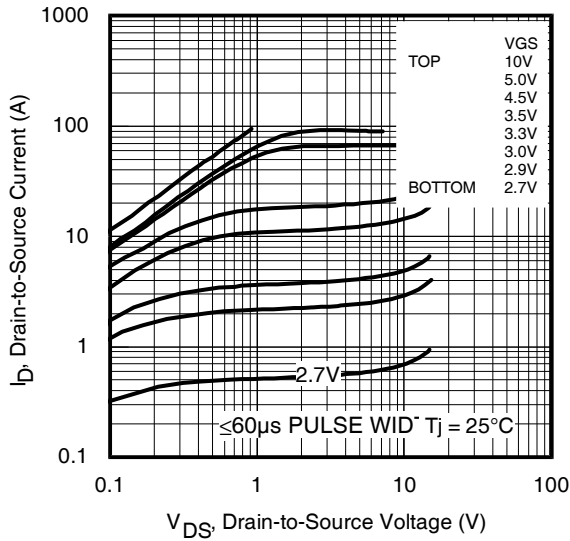


Fig 1. Typical Output Characteristics

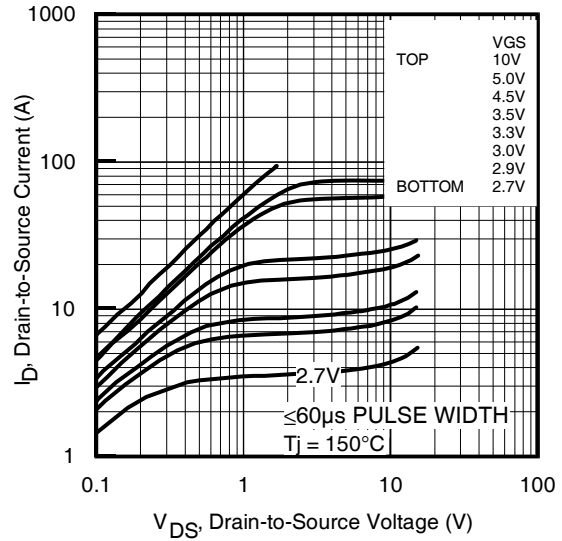


Fig 2. Typical Output Characteristics

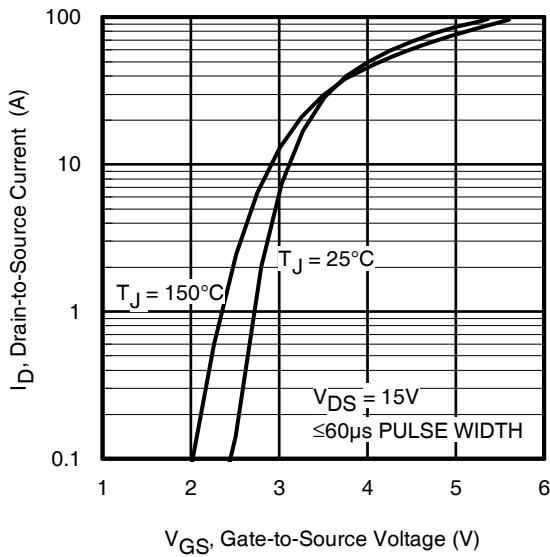


Fig 3. Typical Transfer Characteristics

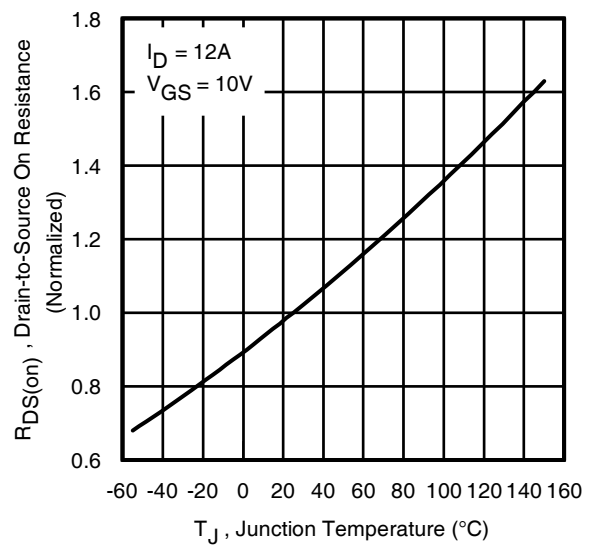


Fig 4. Normalized On-Resistance Vs. Temperature

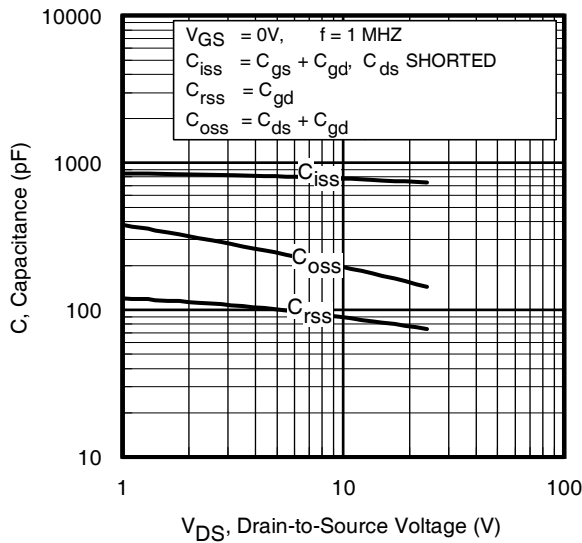


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

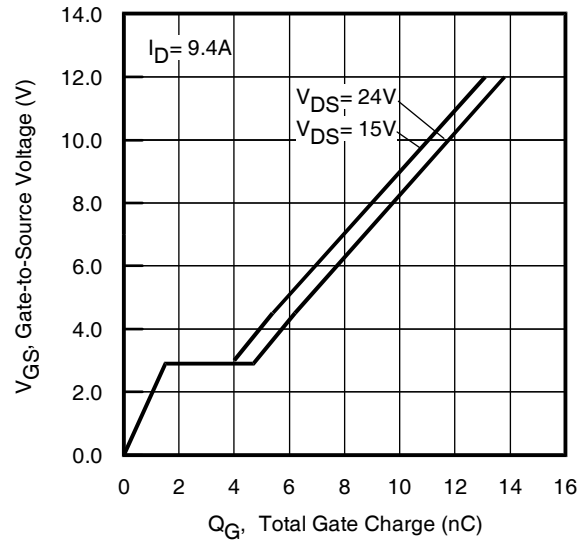


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

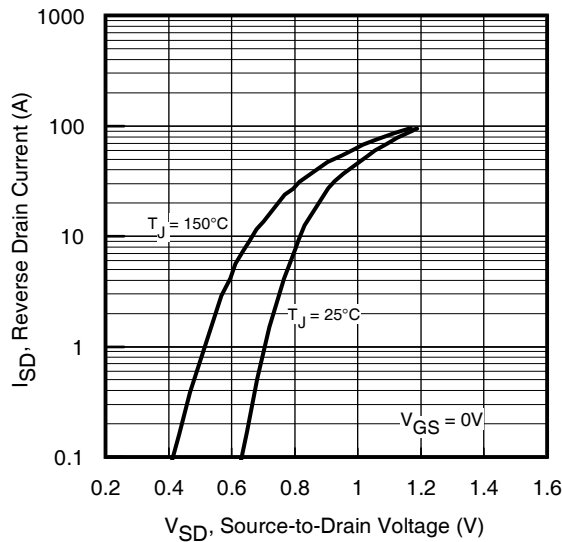


Fig 7. Typical Source-Drain Diode Forward Voltage

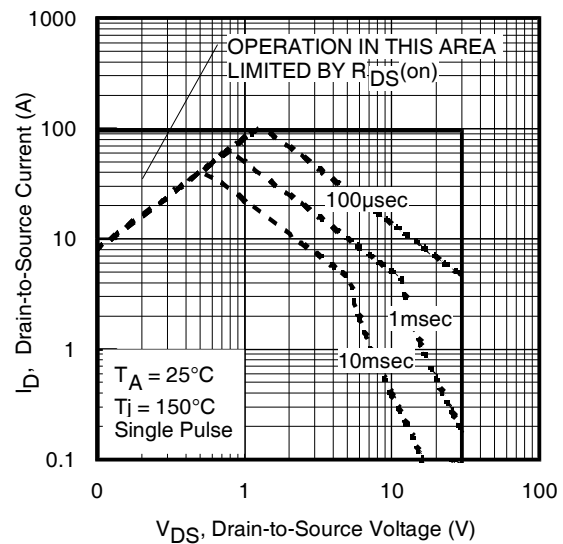


Fig 8. Maximum Safe Operating Area

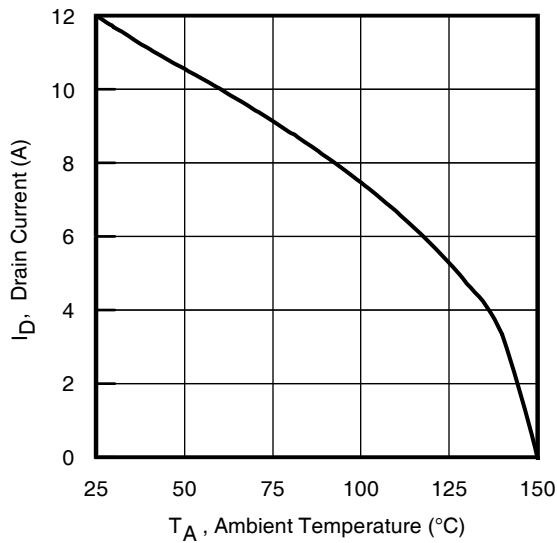


Fig 9. Maximum Drain Current Vs. Ambient Temperature

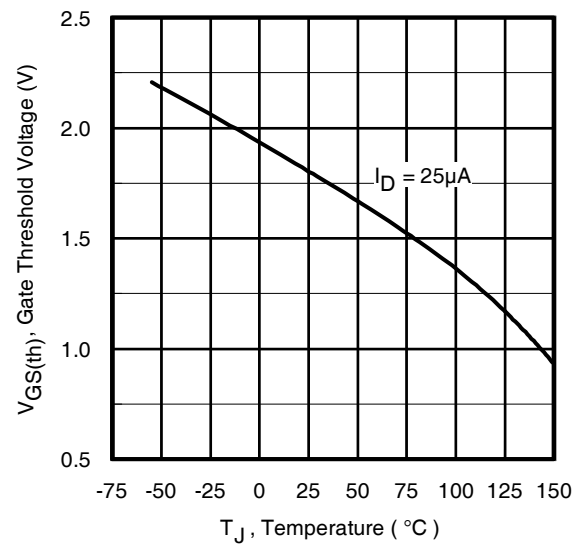


Fig 10. Threshold Voltage Vs. Temperature

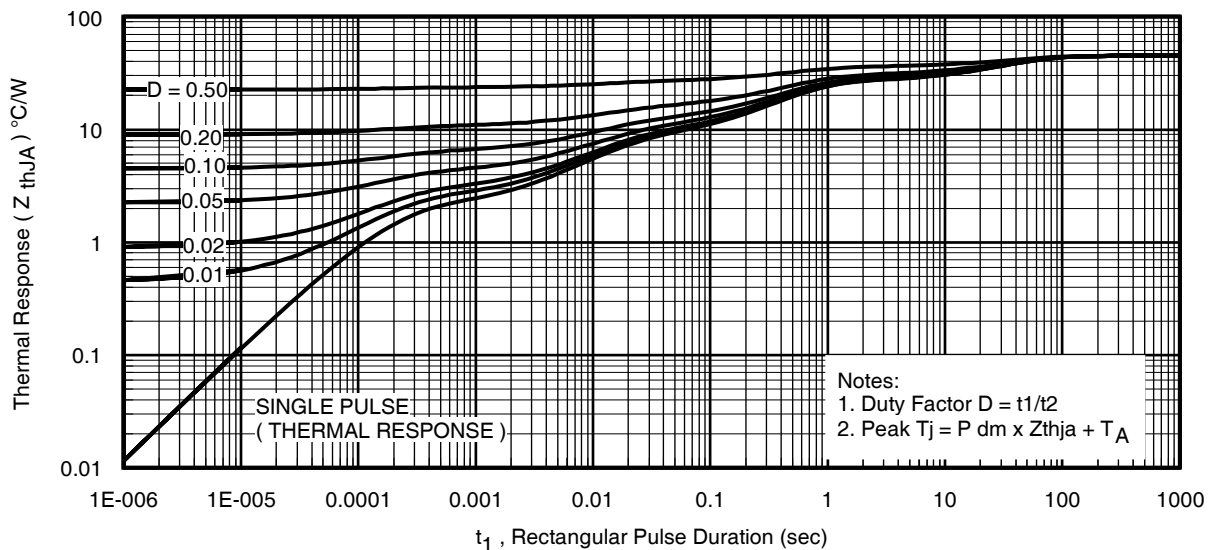
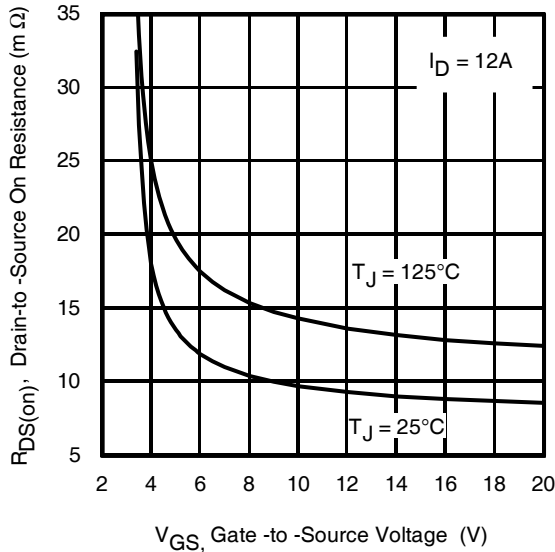
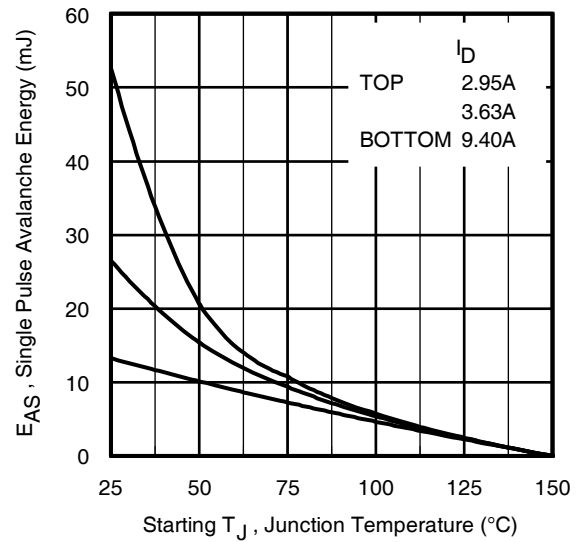
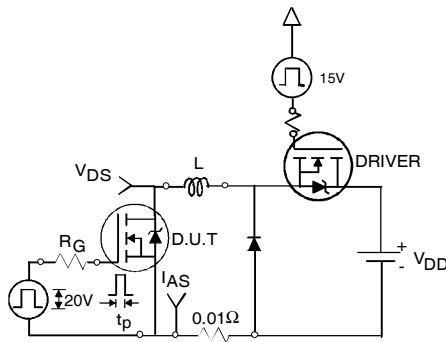
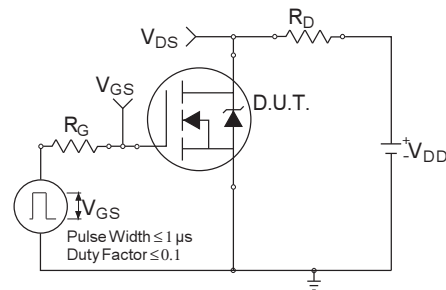
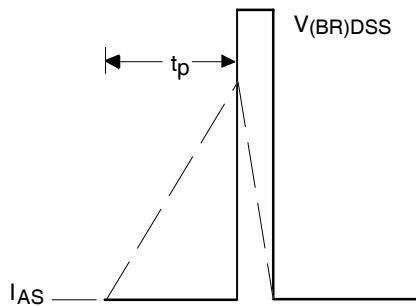
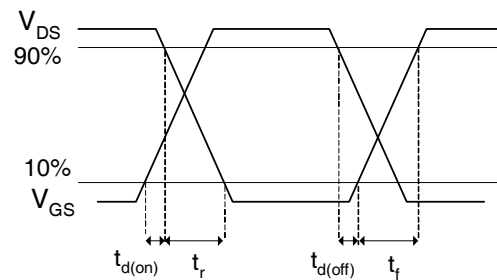


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient


Fig 12. On-Resistance vs. Gate Voltage

Fig 13. Maximum Avalanche Energy vs. Drain Current

Fig 14a. Unclamped Inductive Test Circuit

Fig 15a. Switching Time Test Circuit

Fig 14b. Unclamped Inductive Waveforms

Fig 15b. Switching Time Waveforms

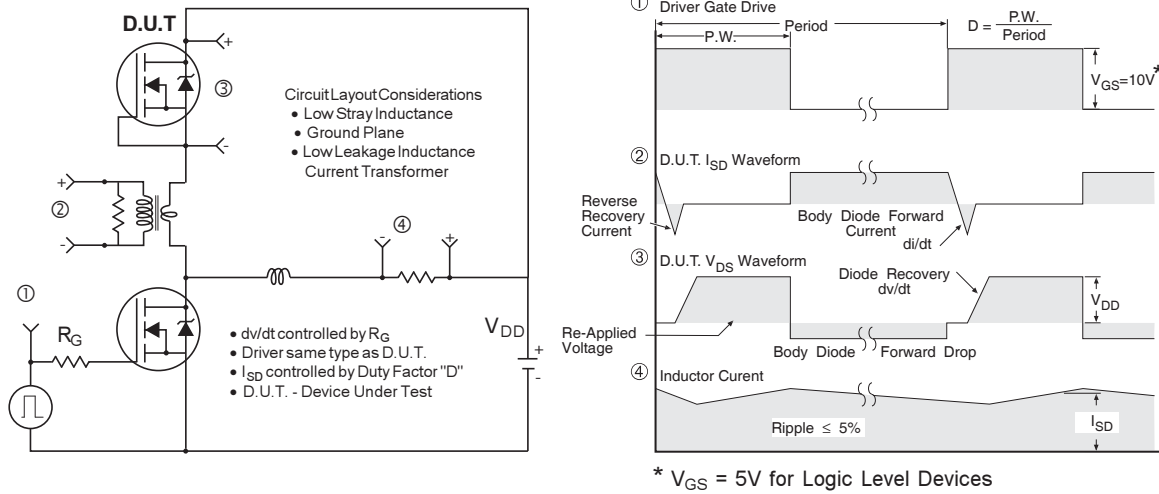


Fig 16. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

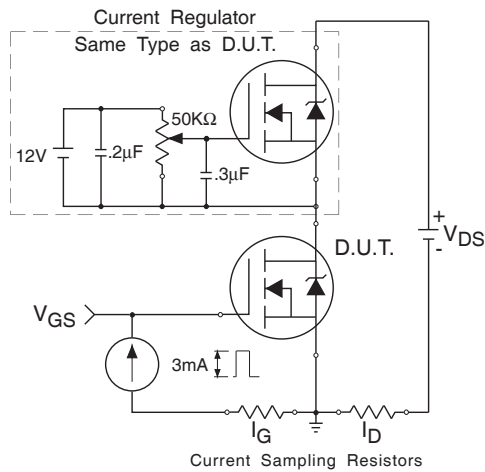


Fig 17. Gate Charge Test Circuit

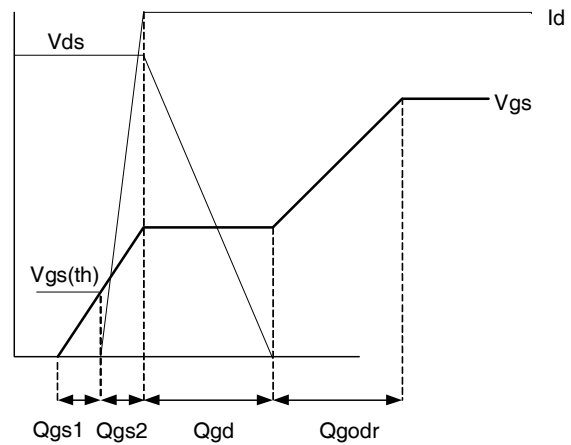
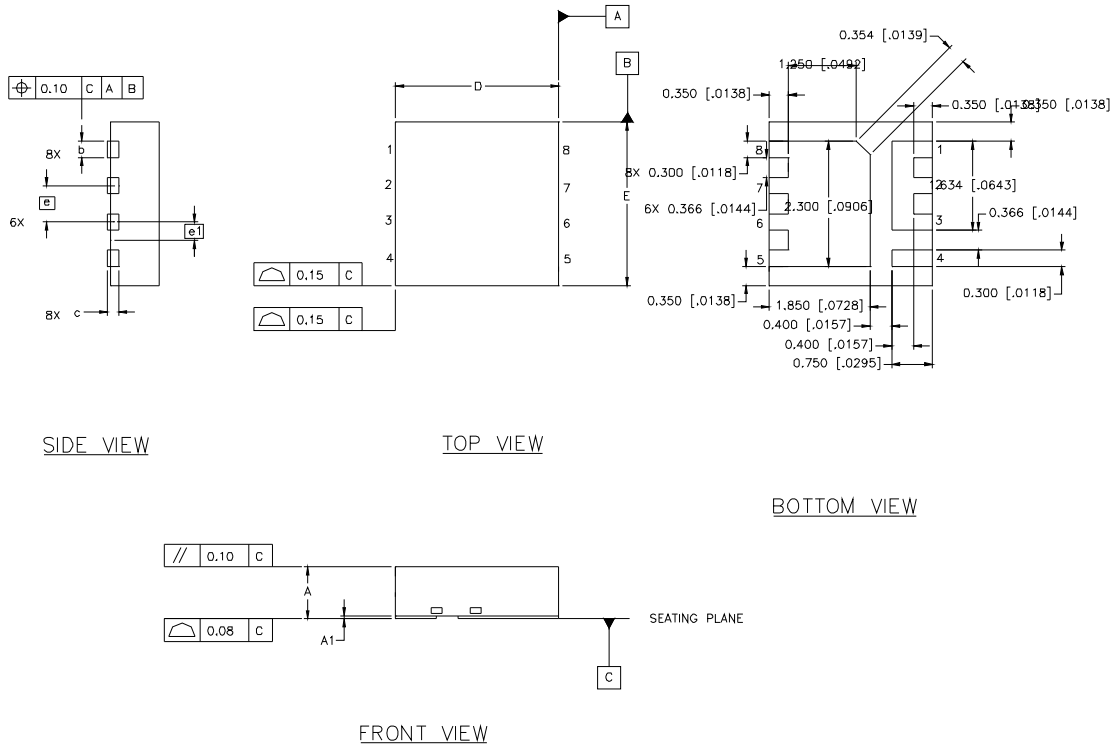


Fig 18. Gate Charge Waveform

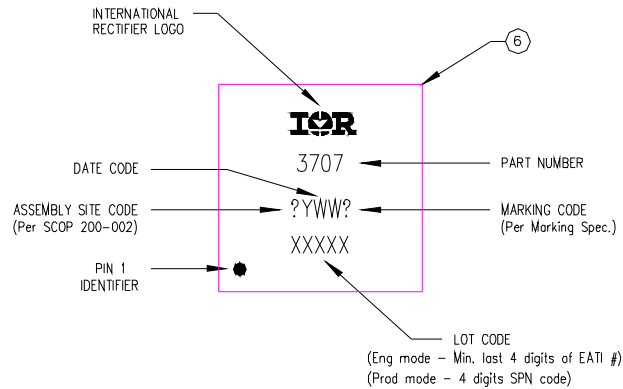
PQFN Package Details



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0315	.0394	0.800	1.000
A1	.0000	.0020	0.000	0.050
b	.0098	.0138	0.250	0.350
c	.0080 REF.		0.203 REF.	
D	.1181 BASIC		3.000 BASIC	
E	.1181 BASIC		3.000 BASIC	
e	.0262 BASIC		0.666 BASIC	
e1	.0131 BASIC		0.333 BASIC	

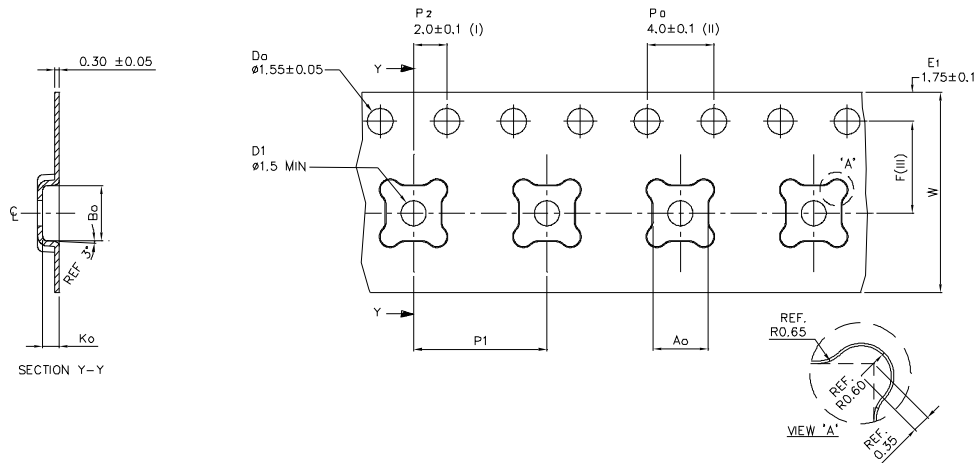
Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

PQFN Part Marking



TOP MARKING (LASER)

PQFN Tape and Reel



A ₀	3.30 +/− 0.1
B ₀	3.30 +/− 0.1
K ₀	1.00 +/− 0.1
F	5.50 +/− 0.1
P ₁	8.00 +/− 0.1
W	12.00 +/− 0.3

- (i) Measured from centreline of sprocket hole to centreline of pocket.
 - (ii) Cumulative tolerance of 10 sprocket holes is ± 0.20.
 - (iii) Measured from centreline of sprocket hole to centreline of pocket.
 - (iv) Other material available.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

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 3mm x 3mm	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 $T_J = 25^{\circ}\text{C}$, $L = 0.297\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 9.4\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ R_{thjc} is guaranteed by design.
- ⑤ When mounted on 1 inch square 2 oz copper pad on 1.5x1.5 in. board of FR-4 material.
- ⑥ Refer to [application note #AN-994](#).

International
 Rectifier

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