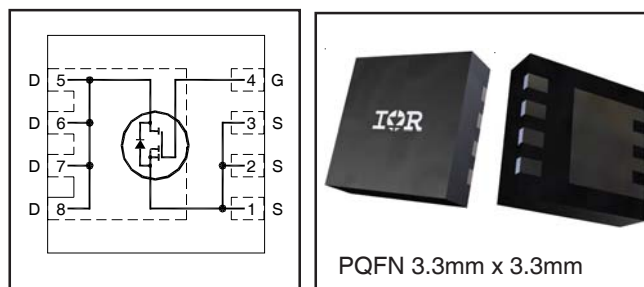


IRFHM831PbF

HEXFET® Power MOSFET

V_{DS}	30	V
R_{DS(on)} max (@ V _{GS} = 10V)	7.8	mΩ
Q_g (typical)	7.3	nC
R_G (typical)	0.5	Ω
I_D (@ T _{C(Bottom)} = 25°C)	40^⑥	A



Applications

- Control MOSFET for Buck Converters

Features and Benefits

Features

Low Charge (typical 7.3nC)
Low Thermal Resistance to PCB (<4.7°C/W)
100% R _g tested
Low Profile (<1.0mm)
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 Switching Losses
Enable Better Thermal Dissipation
Increased Reliability
Increased Power Density
Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRFHM831TRPBF	PQFN 3.3mm x 3.3mm	Tape and Reel	4000	
IRFHM831TR2PBF	PQFN 3.3mm x 3.3mm	Tape and Reel	400	

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°C	Continuous Drain Current, V _{GS} @ 10V	14	A
I _D @ T _A = 70°C	Continuous Drain Current, V _{GS} @ 10V	11	
I _D @ T _{C(Bottom)} = 25°C	Continuous Drain Current, V _{GS} @ 10V	40 ^⑥	
I _D @ T _{C(Bottom)} = 100°C	Continuous Drain Current, V _{GS} @ 10V	28	
I _{DM}	Pulsed Drain Current ①	96	W
P _D @ T _A = 25°C	Power Dissipation ⑤	2.5	
P _D @ T _{C(Bottom)} = 25°C	Power Dissipation ⑤	27	
	Linear Derating Factor ⑤	0.02	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 @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.02	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	6.6	7.8	mΩ	V _{GS} = 10V, I _D = 12A ③
		—	10.7	12.6		V _{GS} = 4.5V, I _D = 12A ③
V _{GS(th)}	Gate Threshold Voltage	1.35	1.8	2.35	V	V _{DS} = V _{GS} , I _D = 25μA
ΔV _{GS(th)}	Gate Threshold Voltage Coefficient	—	-6.8	—	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°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	82	—	—	S	V _{DS} = 15V, I _D = 12A
Q _g	Total Gate Charge	—	16	—	nC	V _{GS} = 10V, V _{DS} = 15V, I _D = 12A
Q _g	Total Gate Charge	—	7.3	11	nC	V _{DS} = 15V V _{GS} = 4.5V I _D = 12A See Fig.17 & 18
Q _{gs1}	Pre-V _{th} Gate-to-Source Charge	—	1.7	—		
Q _{gs2}	Post-V _{th} Gate-to-Source Charge	—	0.9	—		
Q _{gd}	Gate-to-Drain Charge	—	2.5	—		
Q _{godr}	Gate Charge Overdrive	—	2.2	—		
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})	—	3.4	—	nC	V _{DS} = 16V, V _{GS} = 0V
Q _{oss}	Output Charge	—	5.1	—		
R _G	Gate Resistance	—	0.5	—	Ω	
t _{d(on)}	Turn-On Delay Time	—	6.9	—	ns	V _{DD} = 15V, V _{GS} = 4.5V I _D = 12A R _G =1.8Ω See Fig.15
t _r	Rise Time	—	12	—		
t _{d(off)}	Turn-Off Delay Time	—	6.2	—		
t _f	Fall Time	—	4.7	—		
C _{iss}	Input Capacitance	—	1050	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	190	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	80	—		f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	50	mJ
I_{AR}	Avalanche Current ①	—	12	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	40⑥	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	$T_J = 25^\circ\text{C}, I_S = 12A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	15	22	ns	$T_J = 25^\circ\text{C}, I_F = 12A, V_{DD} = 15V$
Q_{rr}	Reverse Recovery Charge	—	16	24	nC	$di/dt = 300A/\mu s$ ③
t_{on}	Forward Turn-On Time	Time is dominated by parasitic Inductance				

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ④	—	4.7	$^\circ\text{C/W}$
$R_{\theta JC}$ (Top)	Junction-to-Case ④	—	44	
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	50	
$R_{\theta JA} (<10s)$	Junction-to-Ambient ⑤	—	32	

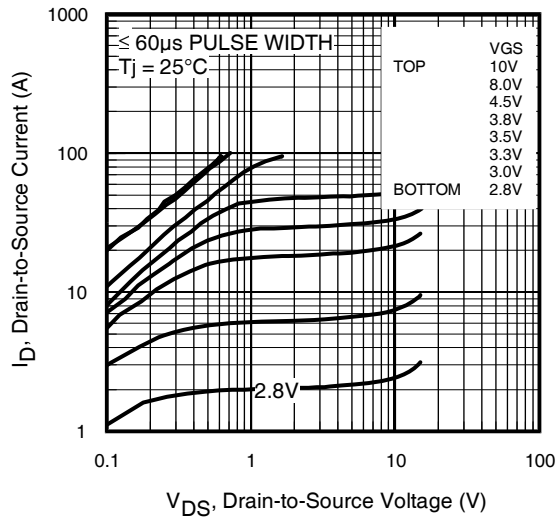


Fig 1. Typical Output Characteristics

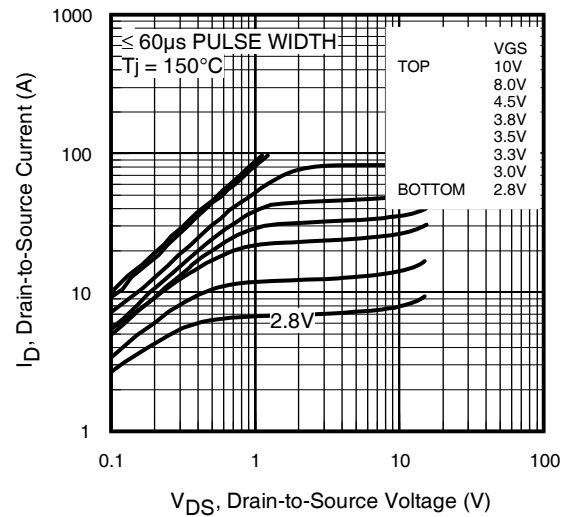


Fig 2. Typical Output Characteristics

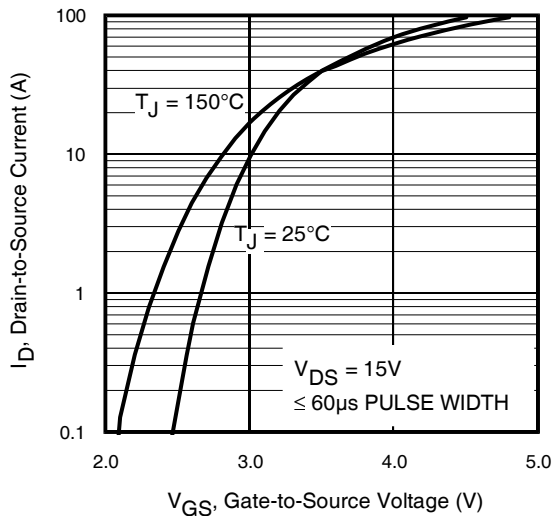


Fig 3. Typical Transfer Characteristics

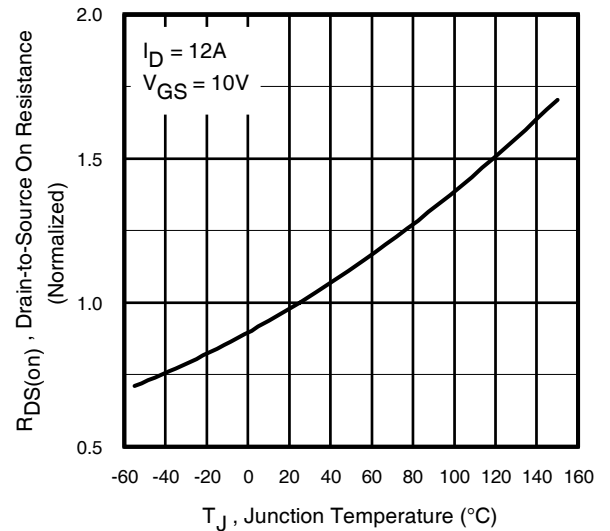


Fig 4. Normalized On-Resistance Vs. Temperature

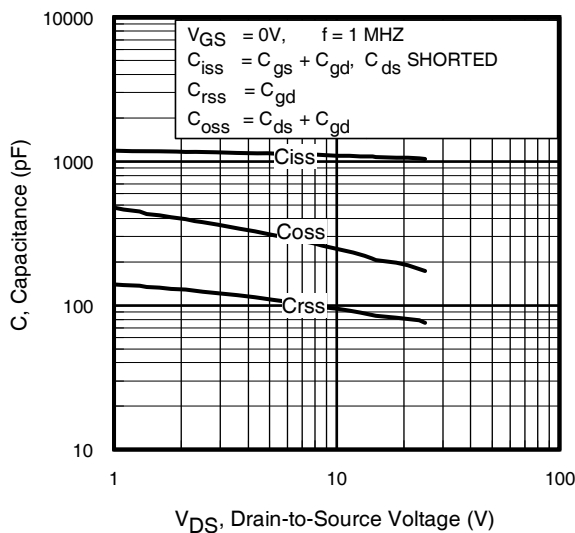


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage
www.irf.com

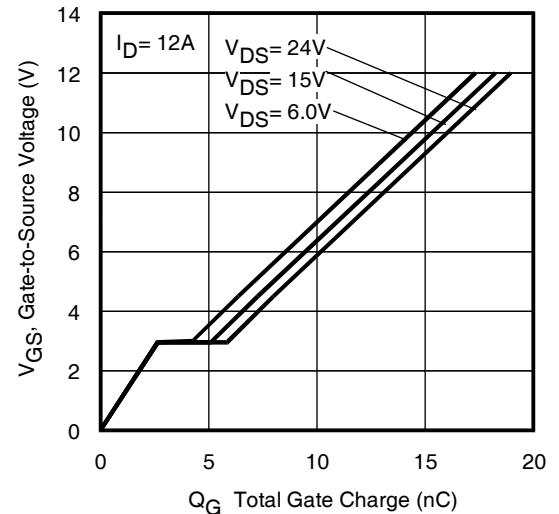
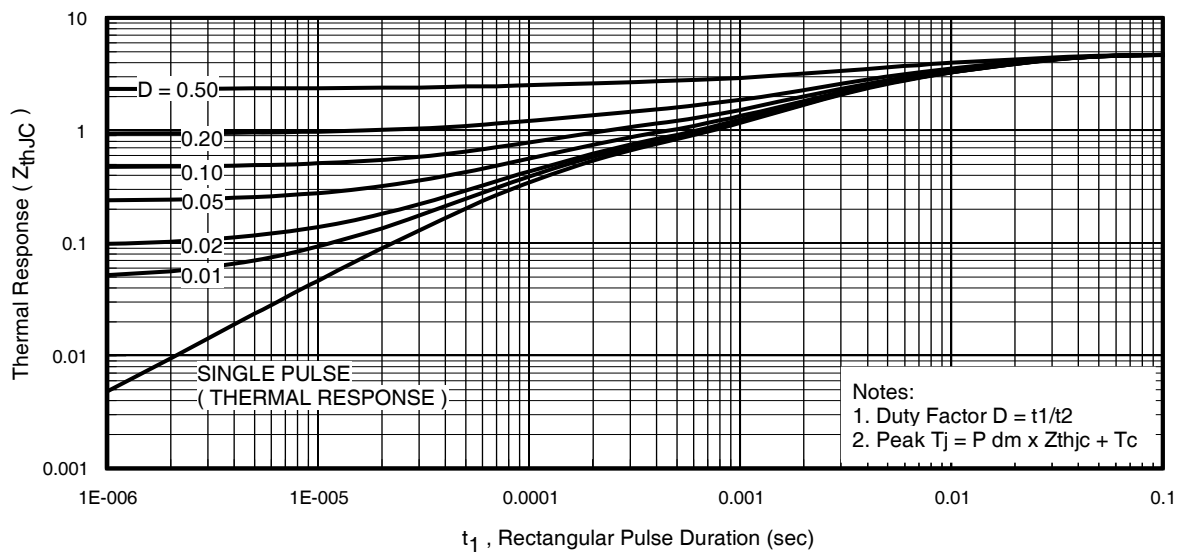
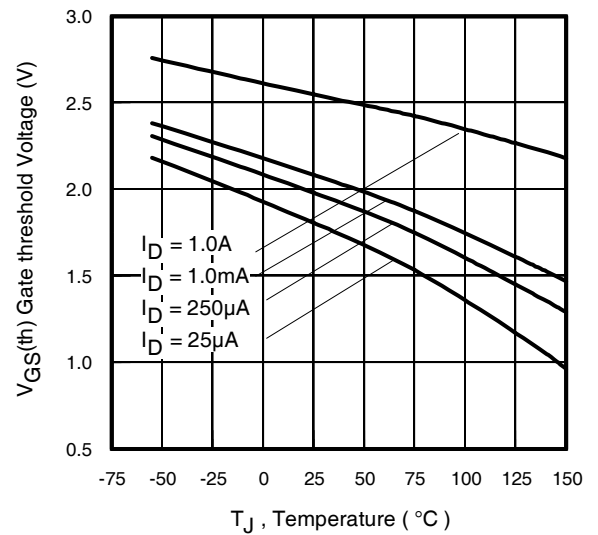
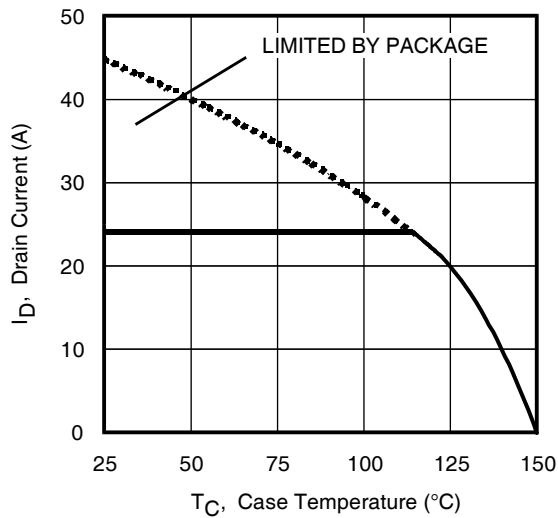
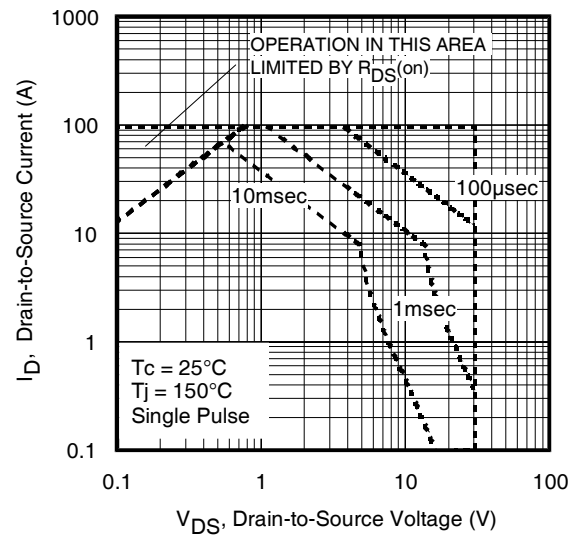
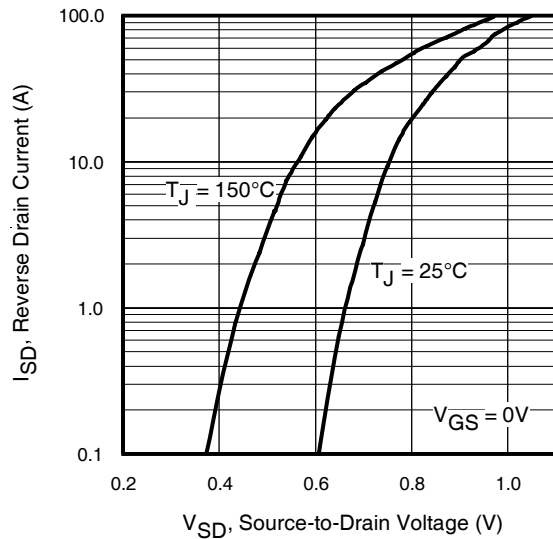


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage



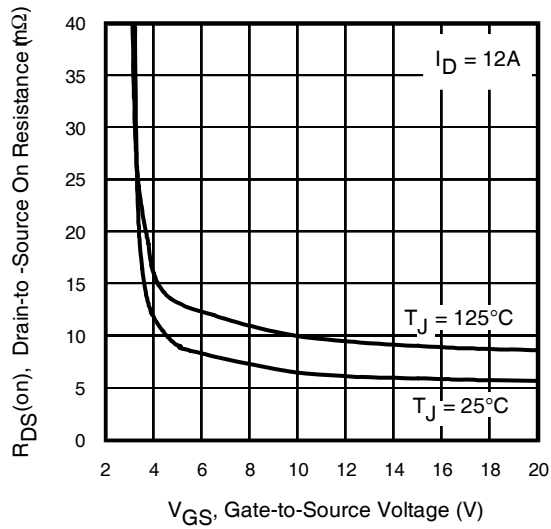


Fig 12. On-Resistance vs. Gate Voltage

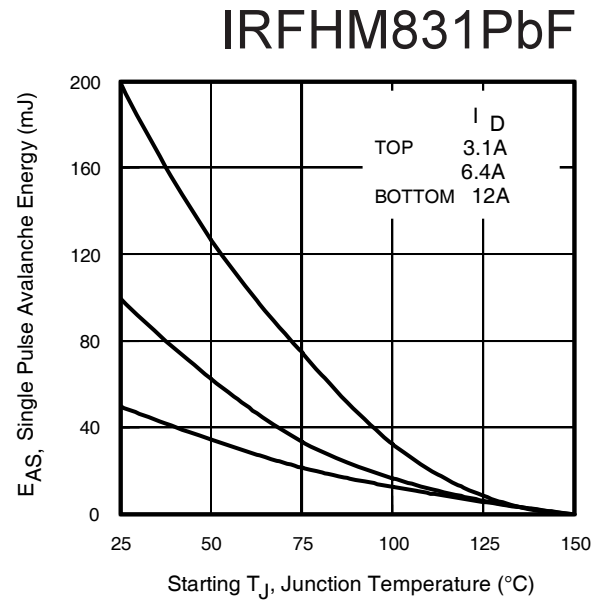


Fig 13. Maximum Avalanche Energy vs. Drain Current

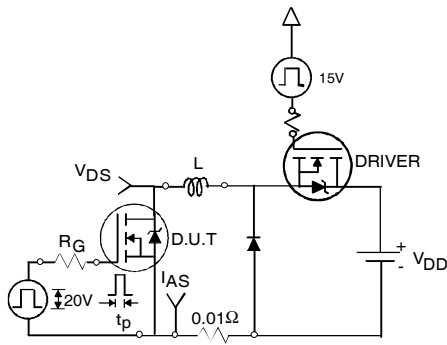


Fig 14a. Unclamped Inductive Test Circuit

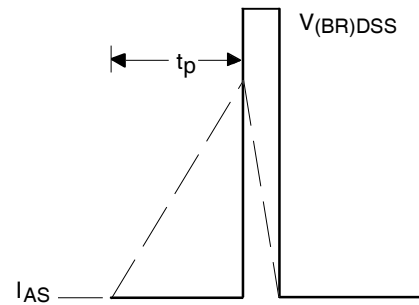


Fig 14b. Unclamped Inductive Waveforms

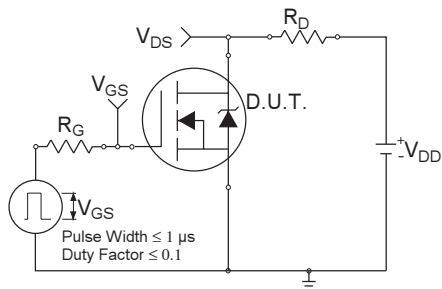


Fig 15a. Switching Time Test Circuit

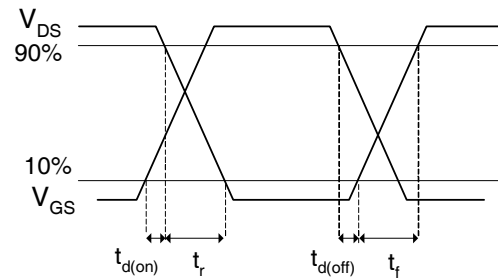


Fig 15b. Switching Time Waveforms

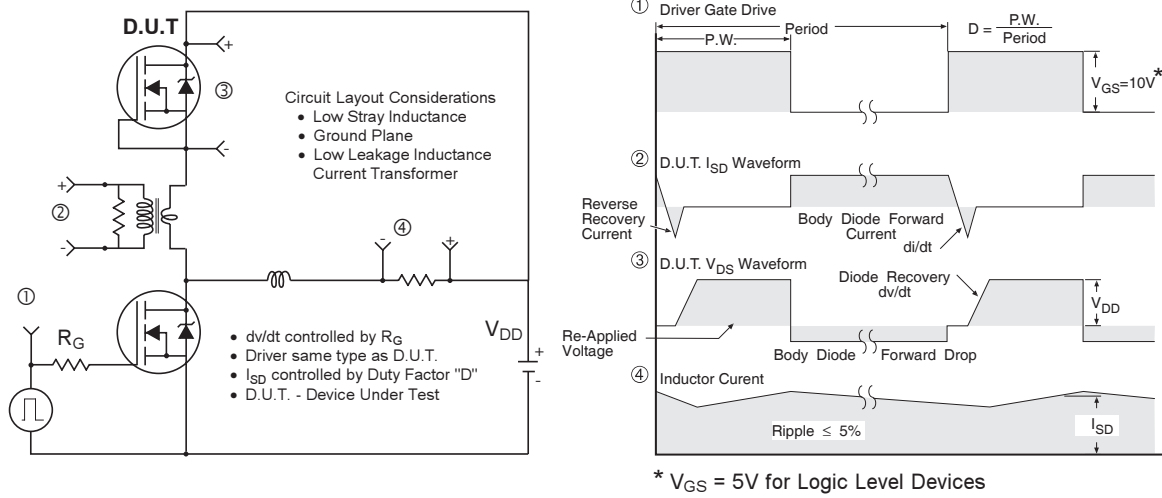


Fig 16. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

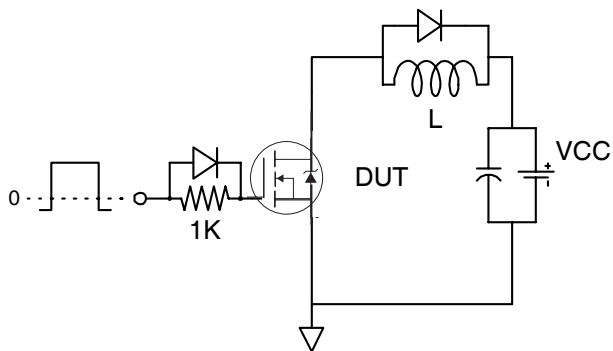


Fig 17. Gate Charge Test Circuit

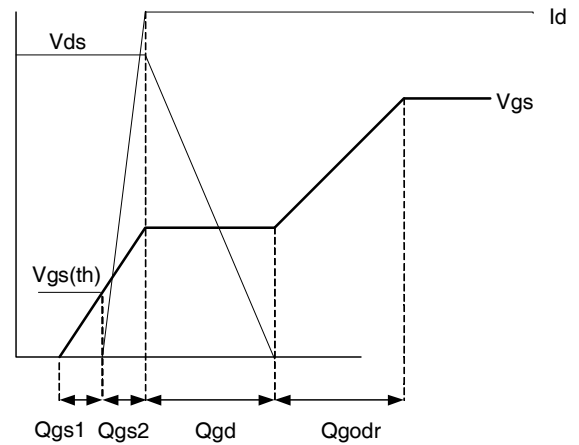
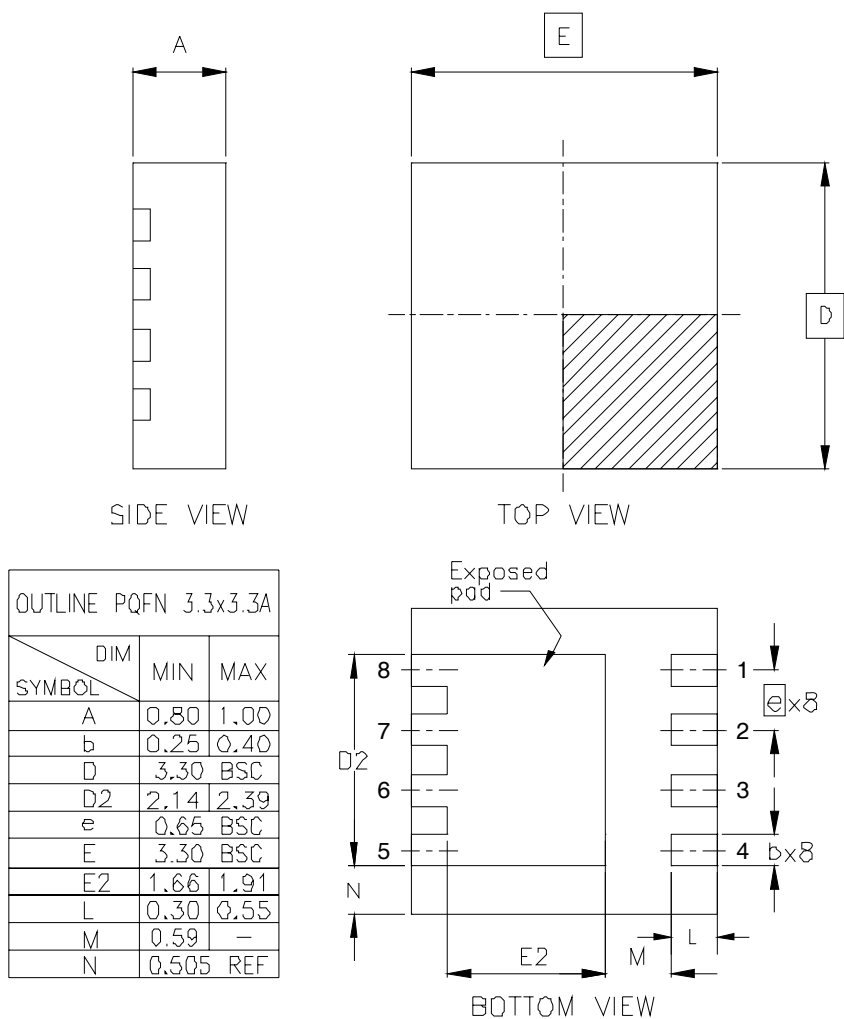


Fig 18. Gate Charge Waveform

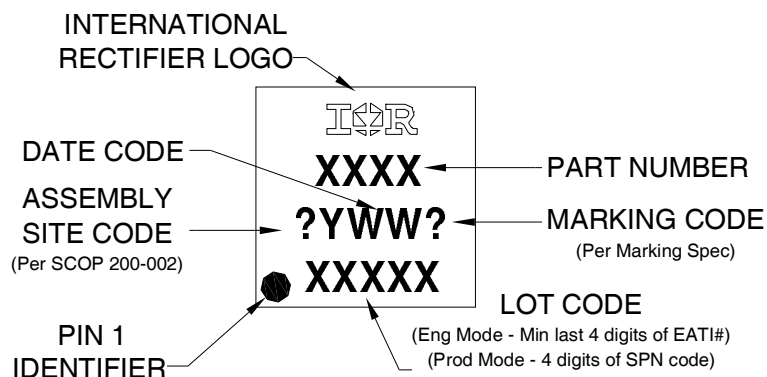
PQFN 3.3x3.3 Outline Package Details



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

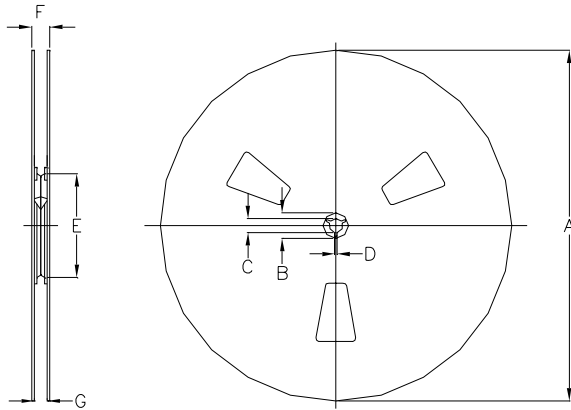
PQFN 3.3x3.3 Part Marking

3.3x3.3 PQFN PART MARKING DETAIL



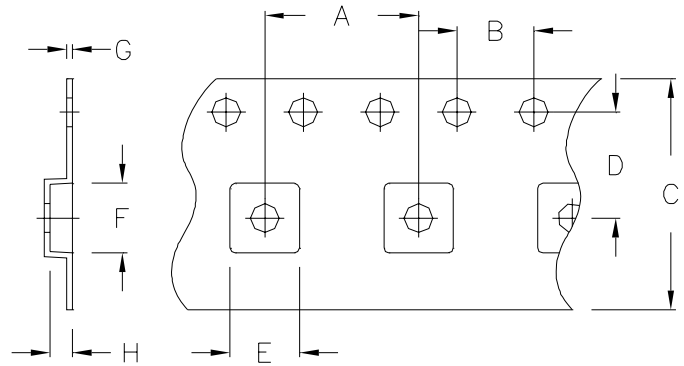
Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>
www.irf.com

PQFN 3.3x3.3 Tape and Reel



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

REEL DIMENSIONS				
STANDARD OPTION (QTY 4000)				
	METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX
A	326.0	330.25	12.835	13.002
B	20.2	20.45	0.795	0.805
C	12.8	13.50	0.504	0.531
D	1.5	2.5	0.059	0.098
E	102.0 REF		4.016 REF	
F	17.8	18.3	0.701	0.720
G	12.4	12.9	0.488	0.508



DIMENSIONS				
	METRIC		IMPERIAL	
CODE	MIN	MAX	MIN	MAX
A	7.90	8.10	0.311	0.319
B	3.90	4.10	0.154	0.161
C	11.70	12.30	0.461	0.484
D	5.45	5.55	0.215	0.219
E	3.50	3.70	0.138	0.146
F	3.50	3.70	0.138	0.146
G	0.25	0.35	0.010	0.014
H	1.10	1.30	0.043	0.051

Qualification Information[†]

Qualification level	Industrial ^{††} (per JEDEC JESD47F ^{†††} guidelines)	
Moisture Sensitivity Level	PQFN 3.3mm x 3.3mm	MSL 1 (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>

^{††} 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 $T_J = 25^\circ\text{C}$, $L = 0.69\text{mH}$, $R_G = 50\Omega$, $I_{AS} = 12\text{A}$.
- 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 2 oz copper pad on 1.5x1.5 in. board of FR-4 material.
- ⑥ Calculated continuous current based on maximum allowable junction temperature. Package is limited to 40A by production test capability.

Data and specifications subject to change without notice.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105

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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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