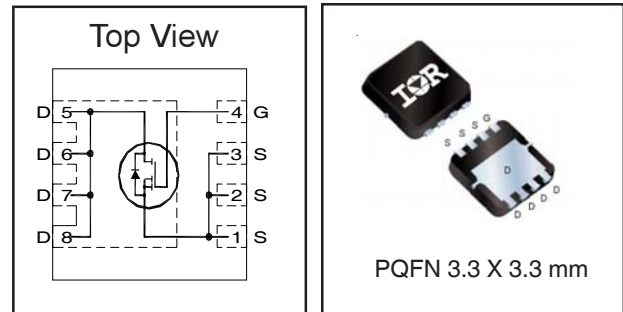


V_{DS}	30	V
$V_{GS\ max}$	± 20	V
$R_{DS(on)\ max}$ (@ $V_{GS} = 10V$)	9.0	mΩ
(@ $V_{GS} = 4.5V$)	13.5	
$Q_g\ typ.$	7.1	nC
I_D (@ $T_{c(Bottom)} = 25^\circ C$)	25 Ⓞ	A

HEXFET® Power MOSFET



Applications

- Control MOSFET for high frequency buck converters

Features

Low Thermal Resistance to PCB (< 4.5°C/W)
Low Profile (<1.2mm)
Industry-Standard Pinout
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1, Consumer Qualification

results in

⇒

Benefits

Enable better thermal dissipation
Increased Power Density
Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFHM8334PBF	PQFN 3.3mm x 3.3mm	Tape and Reel	4000	IRFHM8334TRPBF

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{GS}	Gate-to-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	13	A
$I_D @ T_{c(Bottom)} = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	43	
$I_D @ T_{c(Bottom)} = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	27	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ (Source Bonding Technology Limited)	25	
I_{DM}	Pulsed Drain Current	176	
$P_D @ T_A = 25^\circ C$	Power Dissipation Ⓞ	2.7	W
$P_D @ T_{c(Bottom)} = 25^\circ C$	Power Dissipation	28	
	Linear Derating Factor	0.021	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°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	—	21	—	mV/°C	Reference to 25°C, I _D = 1.0mA	
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	7.2	9.0	mΩ	V _{GS} = 10V, I _D = 20A ②	
		—	11.2	13.5		V _{GS} = 4.5V, I _D = 16A ②	
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	—	-6.6	—	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	44	—	—	S	V _{DS} = 10V, I _D = 20A	
Q _g	Total Gate Charge	—	15	—	nC	V _{GS} = 10V, V _{DS} = 15V, I _D = 20A	
Q _g	Total Gate Charge	—	7.1	11	nC	V _{DS} = 15V V _{GS} = 4.5V I _D = 20A	
	Q _{gs1}	Pre-V _{th} Gate-to-Source Charge	—	2.5			—
	Q _{gs2}	Post-V _{th} Gate-to-Source Charge	—	1.0			—
	Q _{gd}	Gate-to-Drain Charge	—	2.3			—
	Q _{godr}	Gate Charge Overdrive	—	1.3			—
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})	—	3.3	—	nC	V _{DS} = 16V, V _{GS} = 0V	
Q _{oss}	Output Charge	—	5.7	—	nC	V _{DS} = 16V, V _{GS} = 0V	
R _G	Gate Resistance	—	1.2	—	Ω		
t _{d(on)}	Turn-On Delay Time	—	8.3	—	ns	V _{DD} = 30V, V _{GS} = 4.5V I _D = 20A R _G = 1.8Ω	
t _r	Rise Time	—	14	—			
t _{d(off)}	Turn-Off Delay Time	—	7.0	—			
t _f	Fall Time	—	4.6	—			
C _{iss}	Input Capacitance	—	1180	—	pF	V _{GS} = 0V V _{DS} = 10V f = 1.0MHz	
C _{oss}	Output Capacitance	—	260	—			
C _{rss}	Reverse Transfer Capacitance	—	110	—			

Avalanche Characteristics

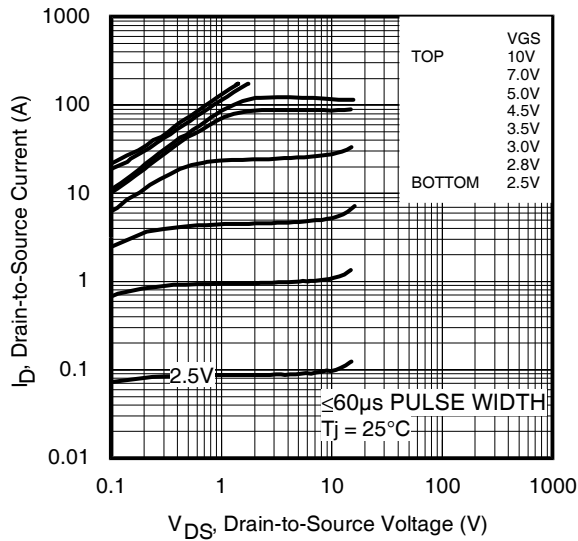
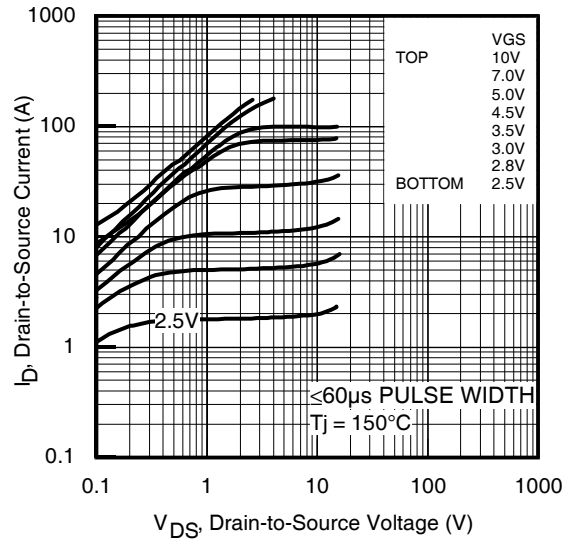
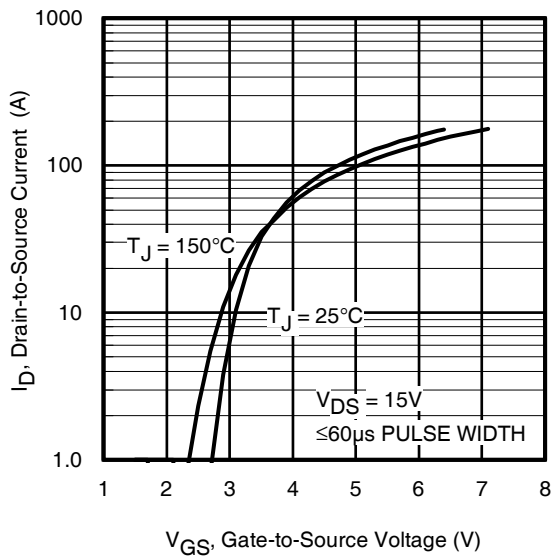
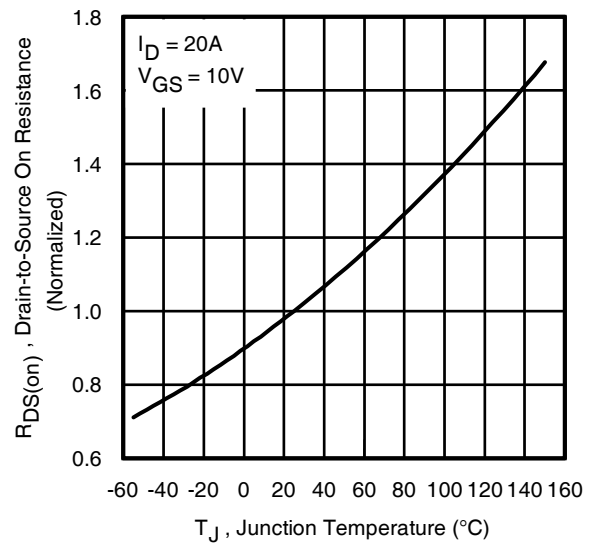
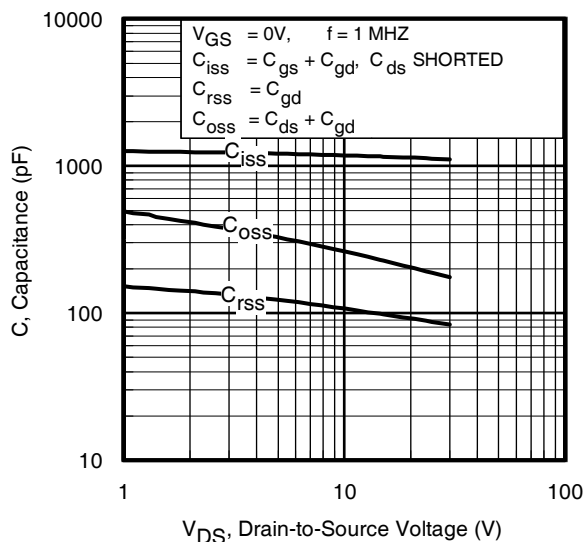
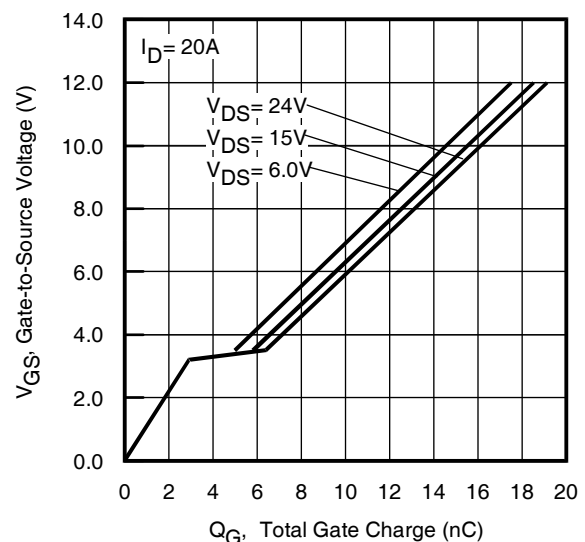
	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ①		35	mJ

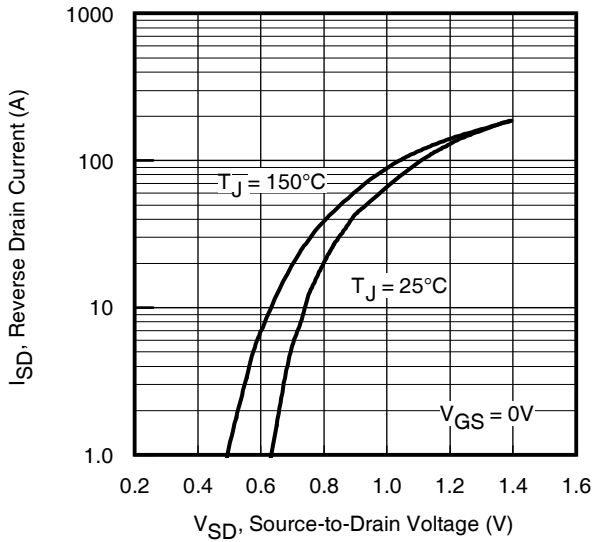
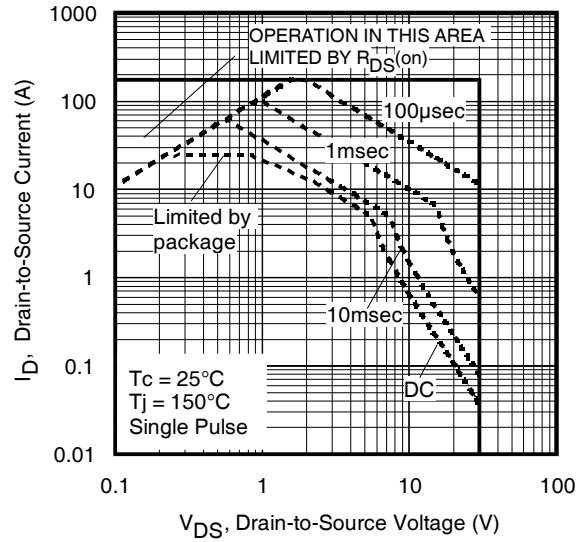
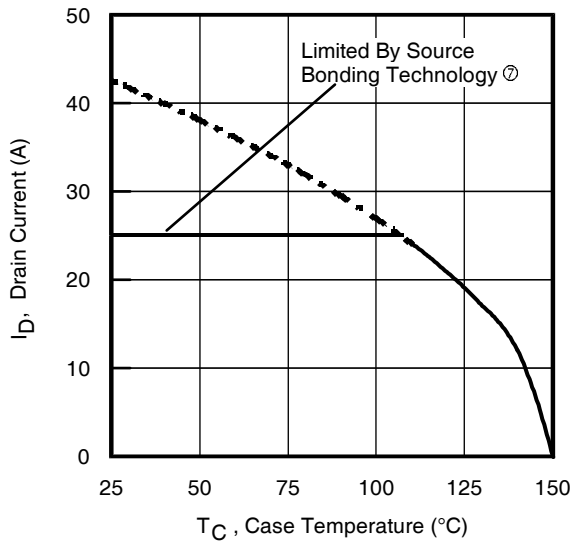
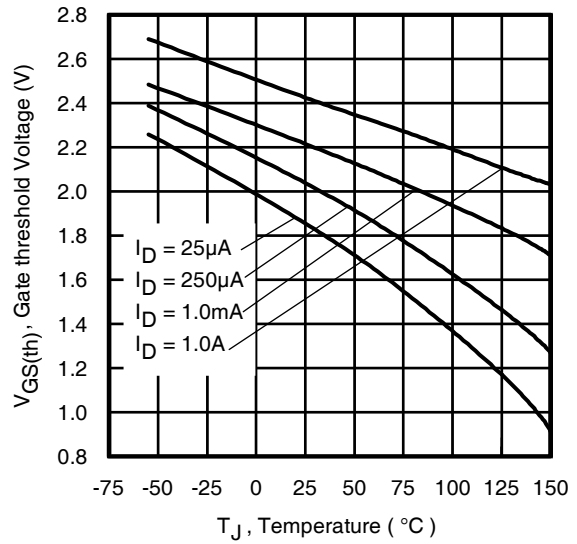
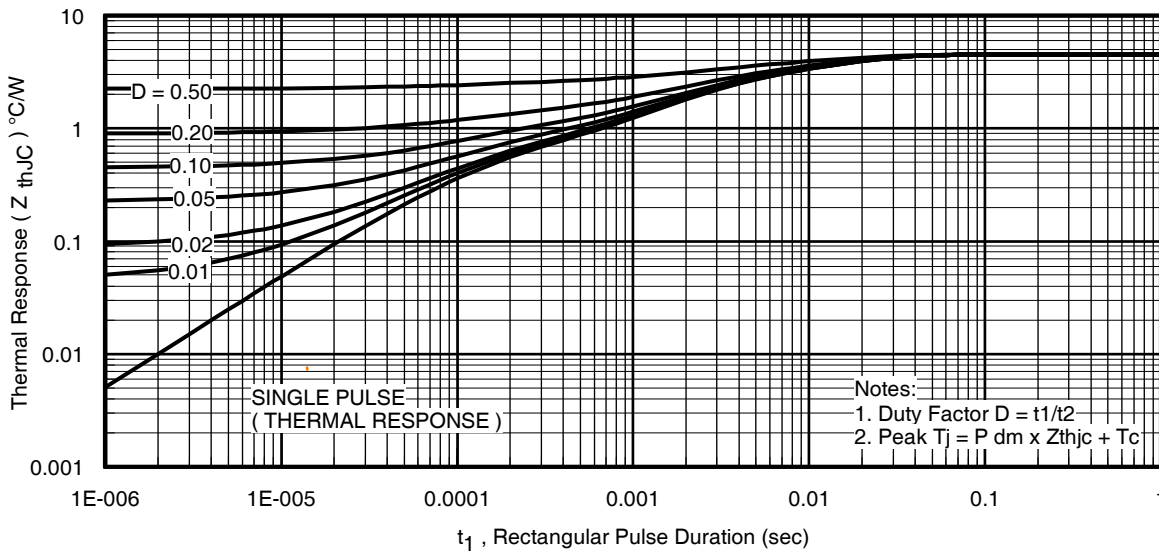
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	25⑥	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode)	—	—	176		
V _{SD}	Diode Forward Voltage	—	—	1.0	V	T _J = 25°C, I _S = 20A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time	—	13	20	ns	T _J = 25°C, I _F = 20A, V _{DD} = 15V
Q _{rr}	Reverse Recovery Charge	—	19	29	nC	di/dt = 380 A/μs ②

Thermal Resistance

	Parameter	Typ.	Max.	Units
R _{θJC} (Bottom)	Junction-to-Case ③	—	4.5	°C/W
R _{θJC} (Top)	Junction-to-Case ③	—	44	
R _{θJA}	Junction-to-Ambient ④	—	47	
R _{θJA} (<10s)	Junction-to-Ambient ④	—	30	


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)

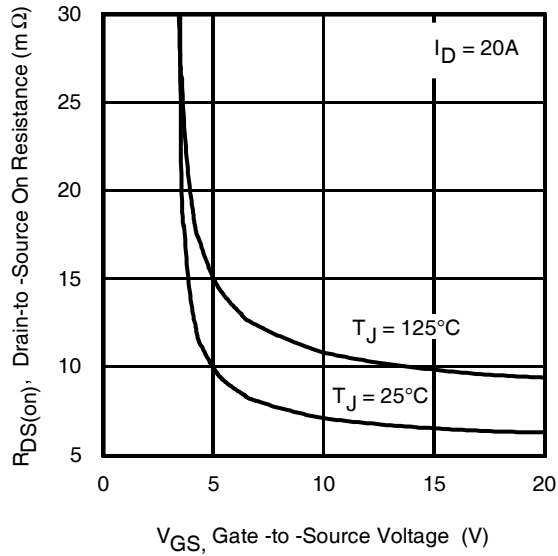
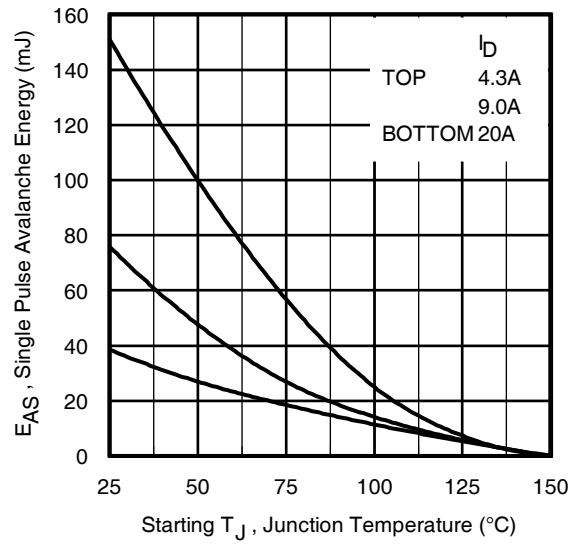
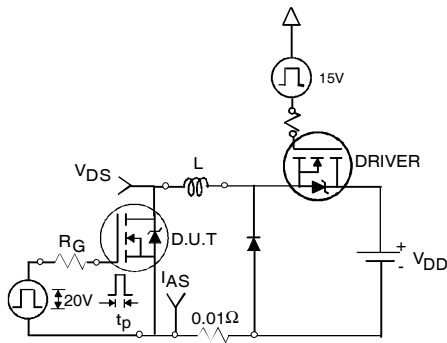
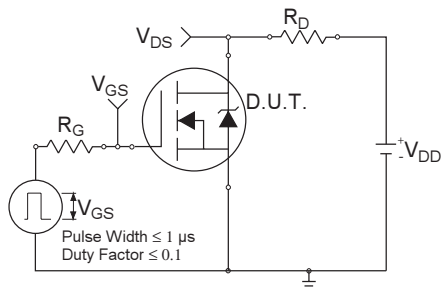
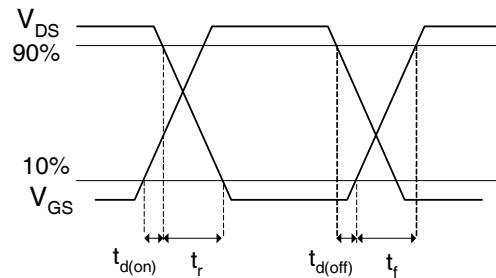

Fig 12. On-Resistance vs. Gate Voltage

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

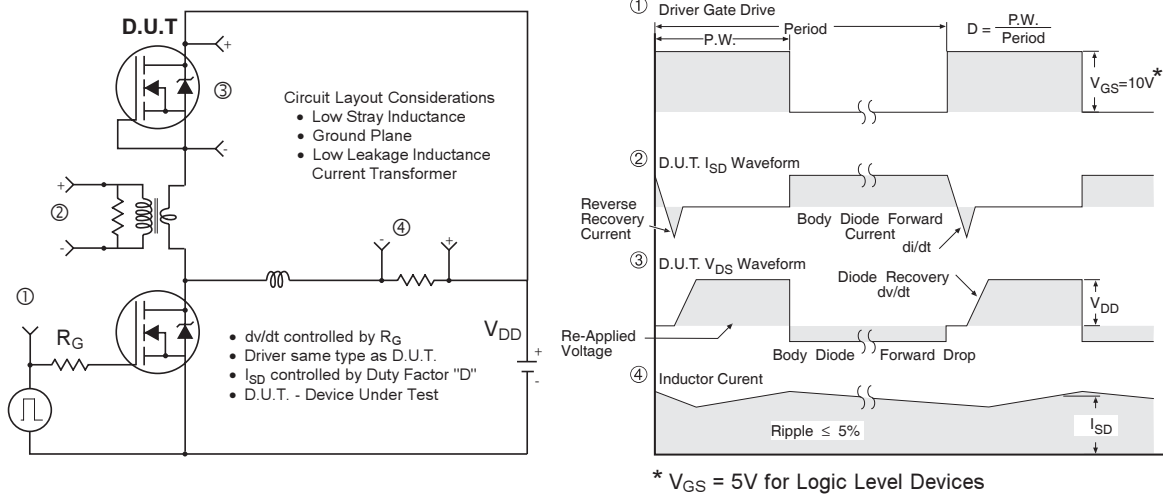


Fig 16. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

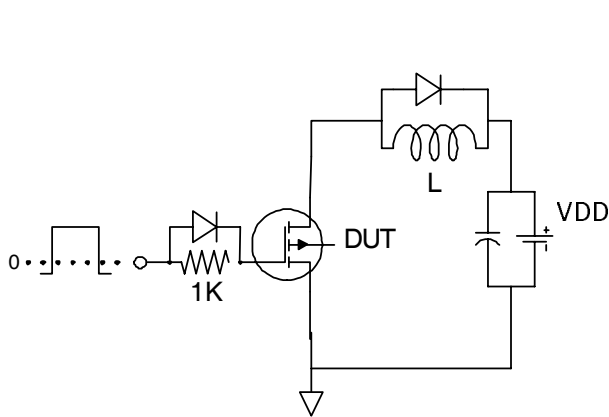


Fig 17. Gate Charge Test Circuit

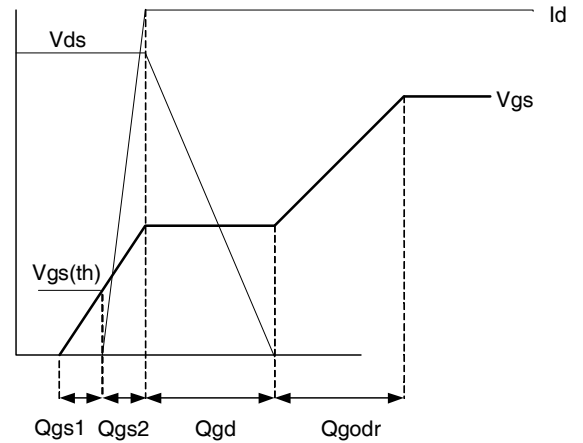
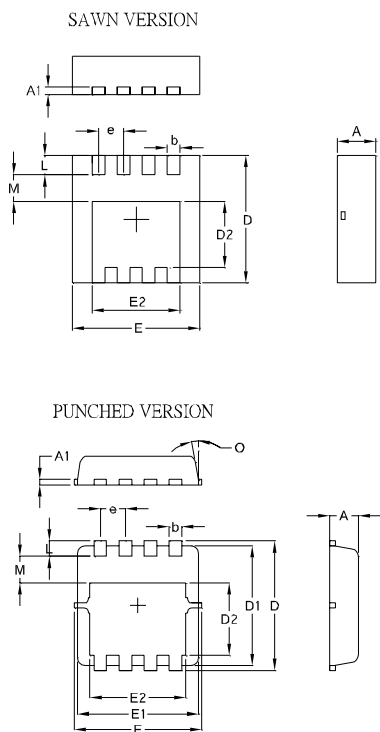


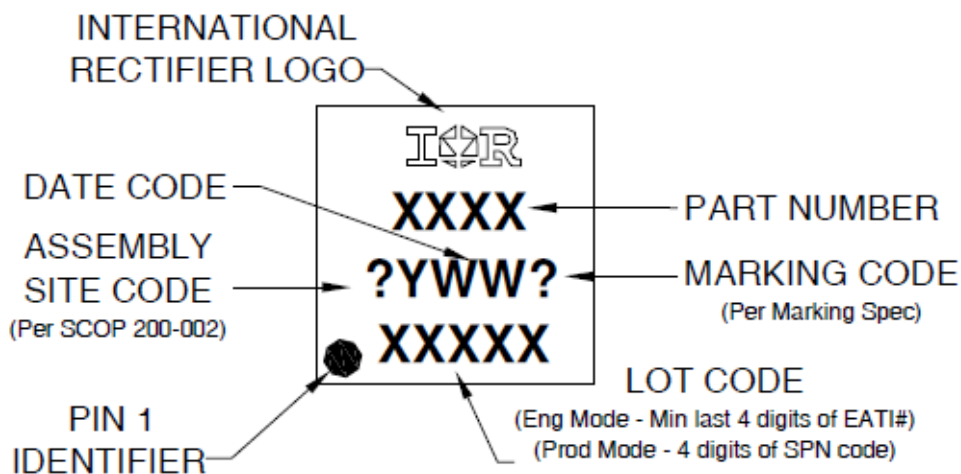
Fig 18. Gate Charge Waveform

PQFN 3.3mm x 3.3mm Outline Package Details


SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.05	0.0276	0.0413
A1	0.12	0.39	0.0047	0.0154
b	0.25	0.39	0.0098	0.0154
D	3.20	3.45	0.1260	0.1358
D1	3.00	3.20	0.1181	0.1417
D2	1.69	2.20	0.0665	0.0866
E	3.20	3.40	0.1260	0.1339
E1	3.00	3.20	0.1181	0.1417
E2	2.15	2.59	0.0846	0.1020
e	0.65	BSC	0.0256	BSC
L	0.15	0.55	0.0059	0.0217
M	0.59	—	0.0232	—
O	9Deg	12Deg	9Deg	12Deg

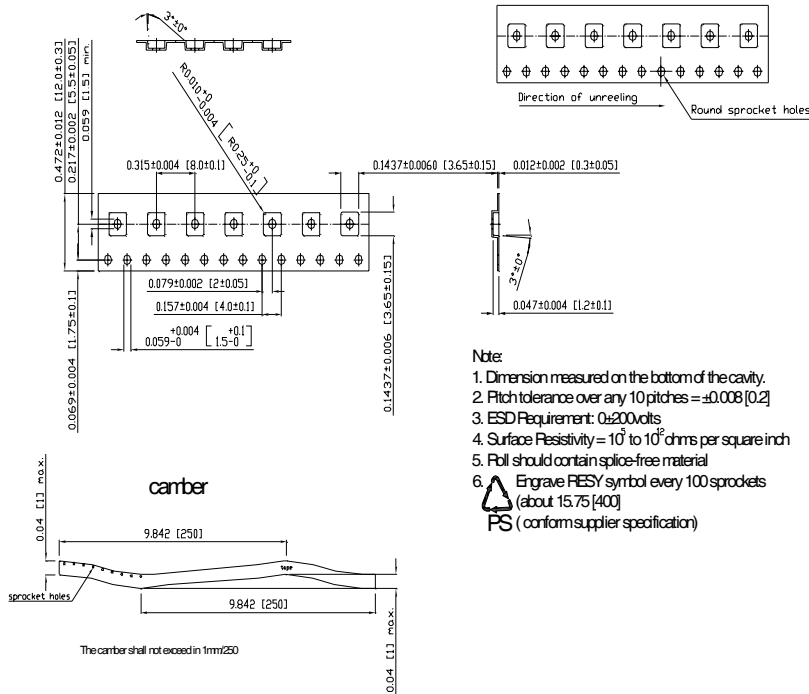
For more information on board mounting, including footprint and stencil recommendation, please refer to application note AN-1136: <http://www.irf.com/technical-info/appnotes/an-1136.pdf>

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 3.3mm x 3.3mm Outline Part Marking


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

PQFN 3.3mm x 3.3mm Outline Tape and Reel



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

Qualification information[†]

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

^{††} 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 Starting $T_J = 25^\circ\text{C}$, $L = 0.18\text{mH}$, $R_G = 50\Omega$, $I_{AS} = 20\text{A}$.
- ② Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ③ R_θ is measured at T_J of approximately 90°C .
- ④ 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>
- ⑤ Calculated continuous current based on maximum allowable junction temperature.
- ⑥ Current is limited to 25A by source bonding technology.