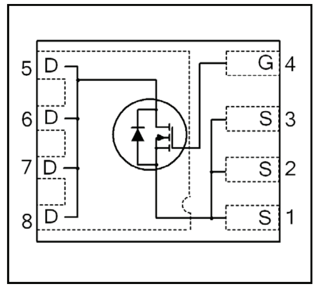
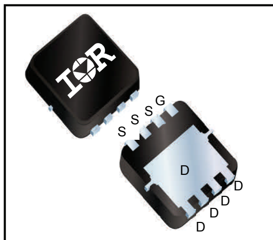
IRFHM8326PbF

HEXFET® Power MOSFET

V_{DSS}	**30**	**V**
V_{GS} max	**±20**	**V**
$R_{DS(on)}$ max (@ V_{GS} = 10V)	**4.7**	**mΩ**
(@ V_{GS} = 4.5V)	**6.7**	
Qg (typical)	**20**	**nC**
I_D (@$T_{C\ (Bottom)}$ = 25°C)	**70⑥**	**A**





PQFN 3.3X3.3 mm

Applications
- Charge and Discharge Switch for Notebook PC Battery Application
- System/Load Switch
- Synchronous MOSFET for Buck Converters

Features		Benefits
Low Thermal Resistance to PCB (<3.4°C/W)		Enable better thermal dissipation
Low Profile (<1.05 mm)		Increased Power Density
Industry-Standard Pinout	results in	Multi-Vendor Compatibility
Compatible with Existing Surface Mount Techniques	⇒	Easier Manufacturing
RoHS Compliant Containing no Lead, no Bromide and no Halogen		Environmentally Friendlier
MSL1, Consumer Qualification		Increased Reliability

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFHM8326PbF	PQFN 3.3 mm x 3.3 mm	Tape and Reel	4000	IRFHM8326TRPbF

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	19	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	15	
I_D @ $T_{C(Bottom)}$ = 25°C	Continuous Drain Current, V_{GS} @ 10V	70⑥	
I_D @ $T_{C(Bottom)}$ = 100°C	Continuous Drain Current, V_{GS} @ 10V	44⑥	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Source Bonding Technology Limited)	25⑦	
I_{DM}	Pulsed Drain Current ①	278	
P_D @T_A = 25°C	Power Dissipation ⑤	2.8	W
P_D @$T_{C(Bottom)}$ = 25°C	Power Dissipation ⑤	37	
	Linear Derating Factor ⑤	0.023	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Notes ① through ⑦ are on page 9

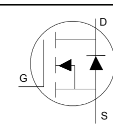
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30	——	——	V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	22	——	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	3.8	4.7	mΩ	V_{GS} = 10V, I_D = 20A ③
		——	5.2	6.7		V_{GS} = 4.5V, I_D = 20A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.2	1.7	2.2	V	V_{DS} = V_{GS}, I_D = 50μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	——	-10	——	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
gfs	Forward Transconductance	70	——	——	S	V_{DS} = 10V, I_D = 20A
Q_g	Total Gate Charge	——	39	——	nC	V_{GS} = 10V, V_{DS} = 15V, I_D = 20A
Q_g	Total Gate Charge	——	20	30	nC	V_{DS} = 15V
Q_{gs1}	Pre-Vth Gate-to-Source Charge	——	4.8	——		V_{GS} = 4.5V
Q_{gs2}	Post-Vth Gate-to-Source Charge	——	2.6	——		I_D = 20A
Q_{gd}	Gate-to-Drain Charge	——	6.5	——		
Q_{godr}	Gate Charge Overdrive	——	6.1	——		
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	——	9.1	——		
Q_{oss}	Output Charge	——	11	——	nC	V_{DS} = 16V, V_{GS} = 0V
R_G	Gate Resistance	——	1.9	——	Ω	
$t_{d(on)}$	Turn-On Delay Time	——	12	——	ns	V_{DD} = 15V, V_{GS} = 4.5V
t_r	Rise Time	——	35	——		I_D = 20A
$t_{d(off)}$	Turn-Off Delay Time	——	18	——		R_G=1.8Ω
t_f	Fall Time	——	12	——		
C_{iss}	Input Capacitance	——	2496	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	524	——		V_{DS} = 10V
C_{rss}	Reverse Transfer Capacitance	——	273	——		f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.
E_{AS}	Single Pulse Avalanche Energy ②	——	58
I_{AR}	Avalanche Current ①	——	20

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	25⑦	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	278		
V_{SD}	Diode Forward Voltage	——	——	1.0	V	T_J = 25°C, I_S = 20A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	——	15	23	ns	T_J = 25°C, I_F = 20A, V_{DD} = 15V
Q_{rr}	Reverse Recovery Charge	——	14	21	nC	di/dt = 300A/μs ③

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ④	——	3.4	°C/W
$R_{\theta JC}$ (Top)	Junction-to-Case ④	——	41	
$R_{\theta JA}$	Junction-to-Ambient ⑤	——	44	
$R_{\theta JA}$ (<10s)	Junction-to-Ambient ⑤	——	31	

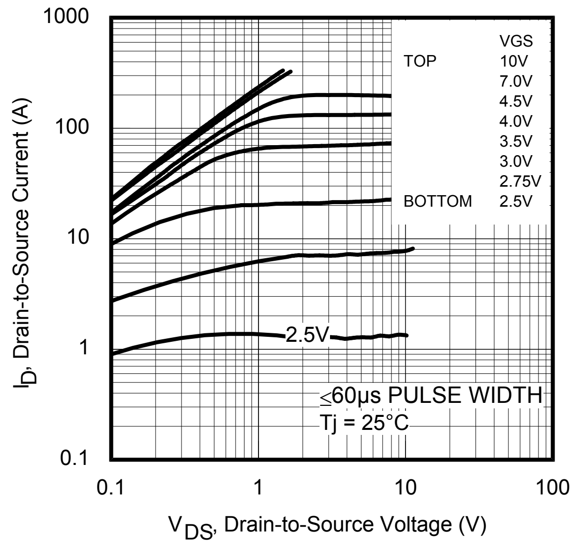


Fig 1. Typical Output Characteristics

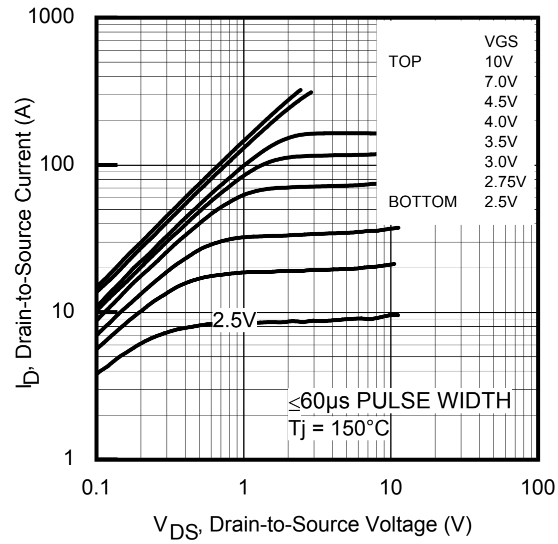


Fig 2. Typical Output Characteristics

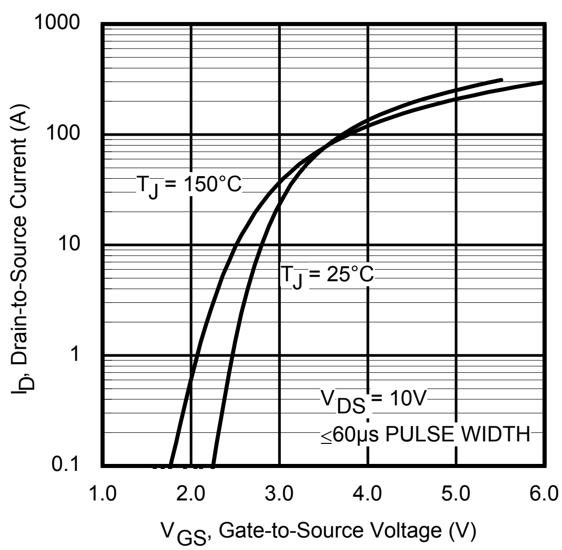


Fig 3. Typical Transfer Characteristics

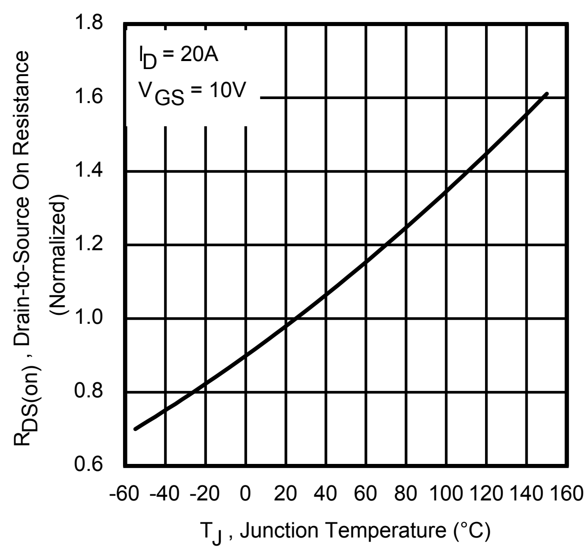


Fig 4. Normalized On-Resistance vs. Temperature

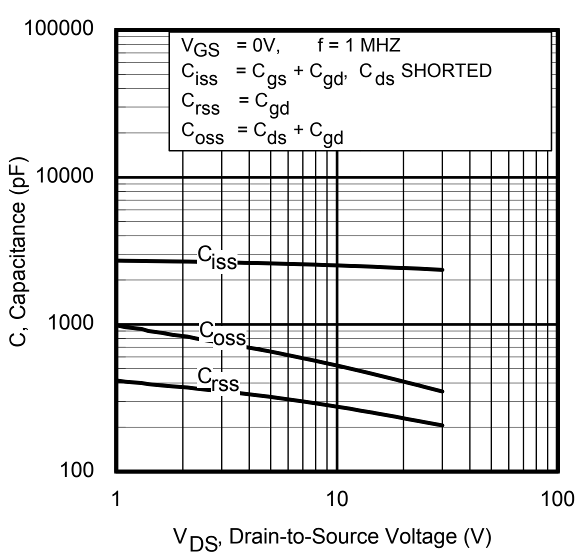


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

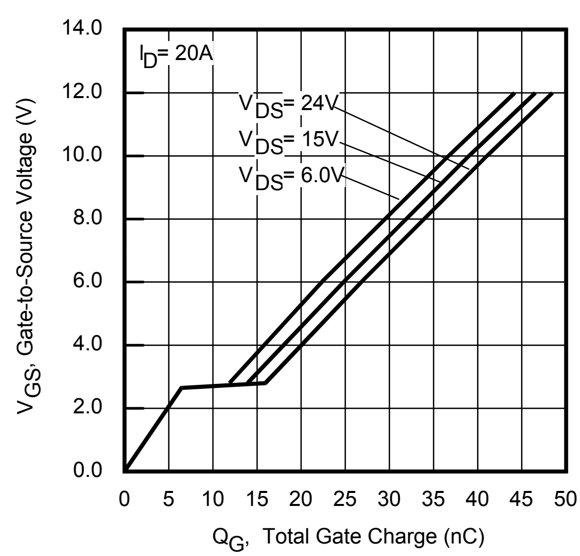


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

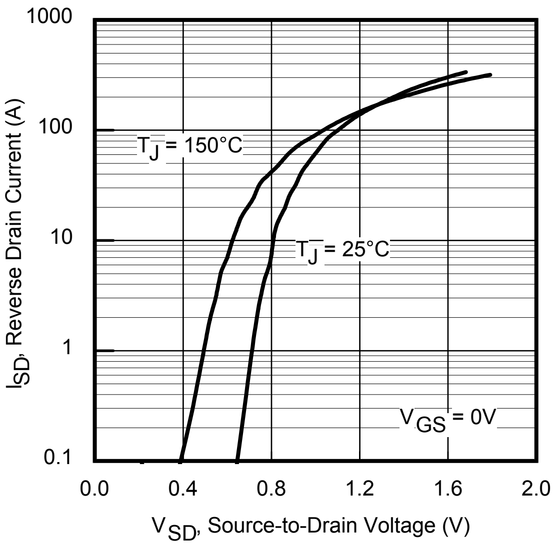


Fig 7. Typical Source-Drain Diode Forward Voltage

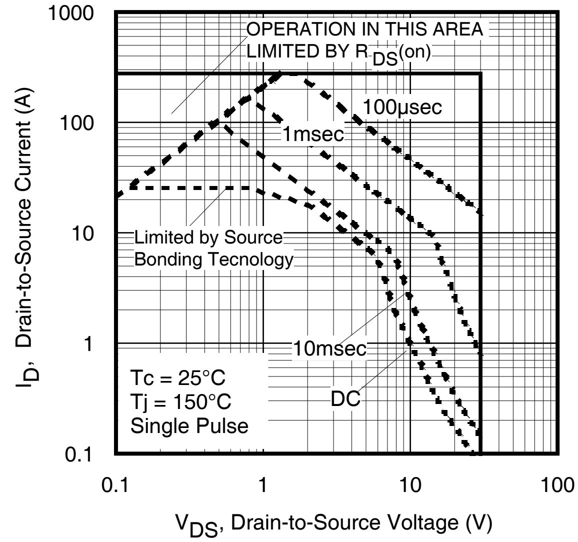


Fig 8. Maximum Safe Operating Area

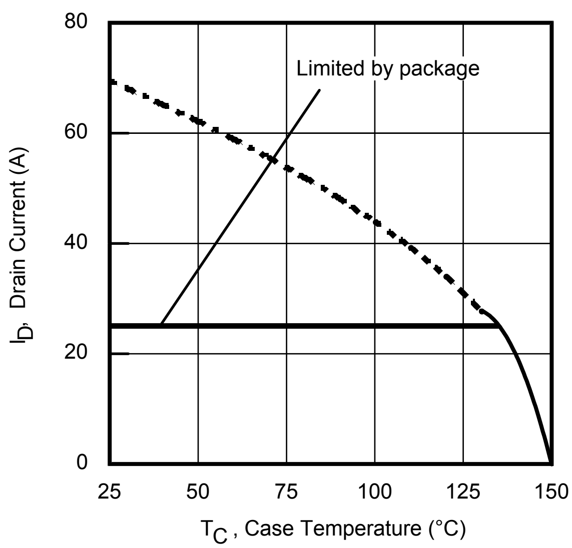


Fig 9. Maximum Drain Current vs. Case Temperature

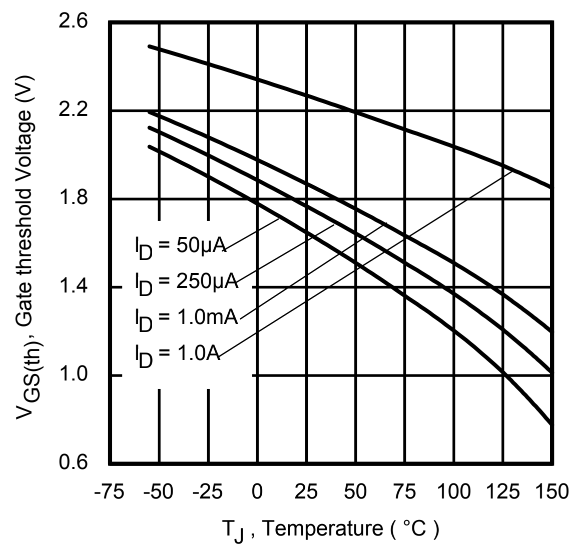


Fig 10. Drain-to–Source Breakdown Voltage

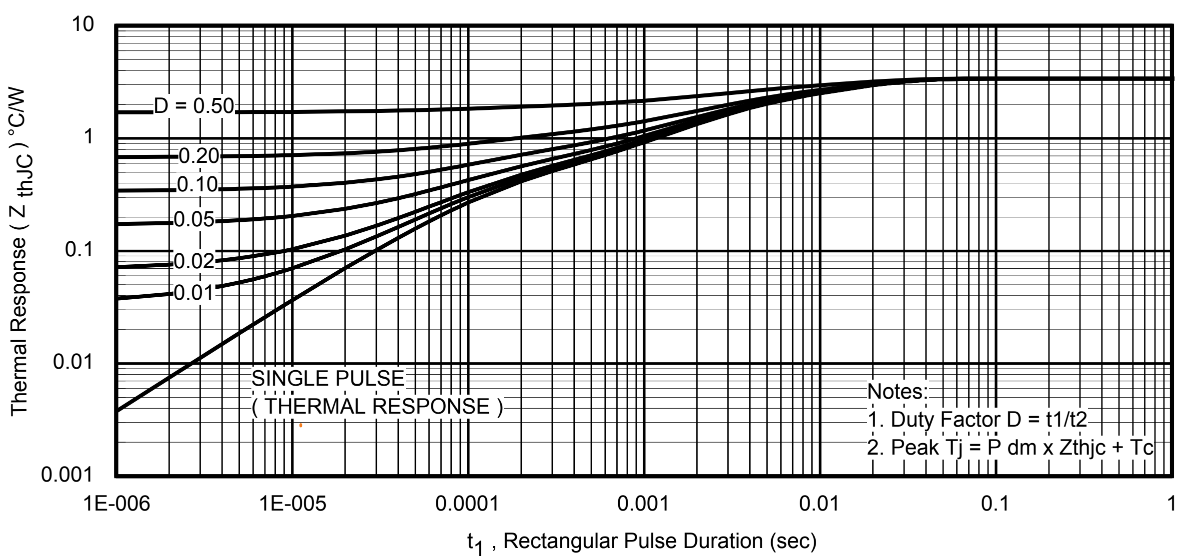


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

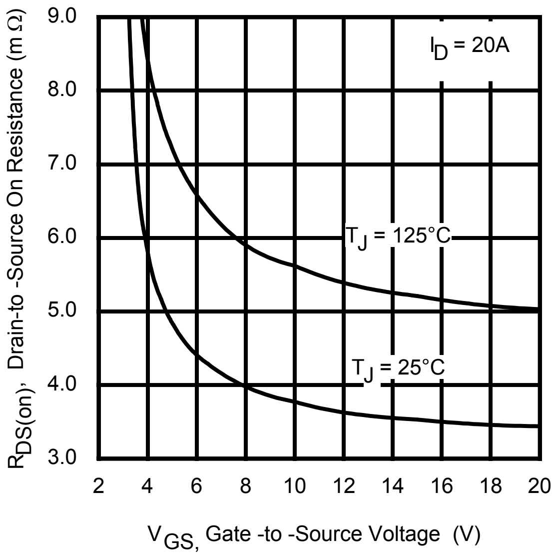


Fig 12. On– Resistance vs. Gate Voltage

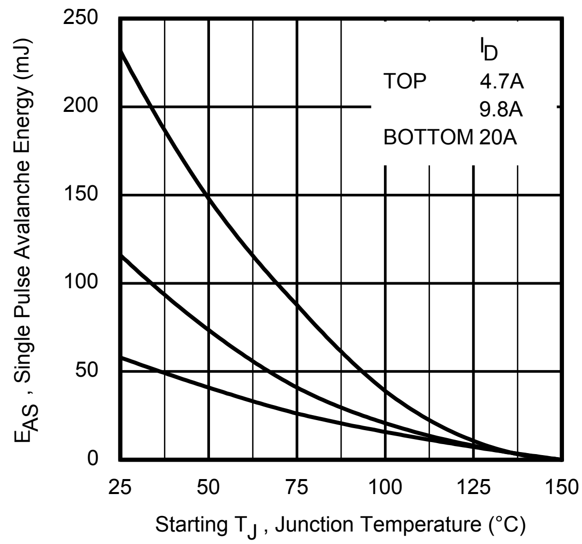


Fig 13. Maximum Avalanche Energy vs. Drain Current

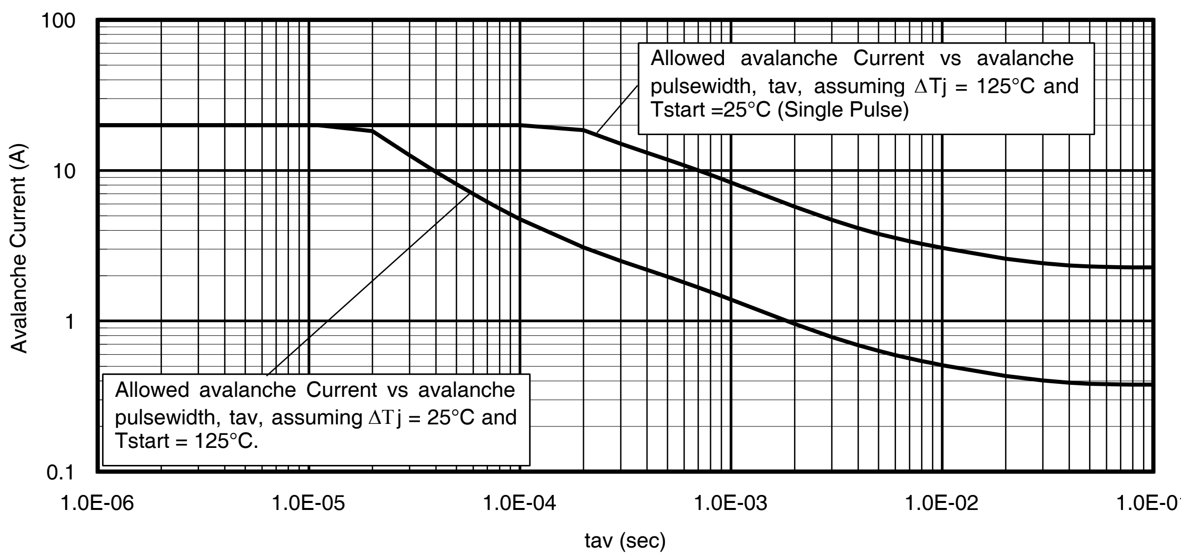


Fig 14. Typical Avalanche Current vs. Pulsewidth

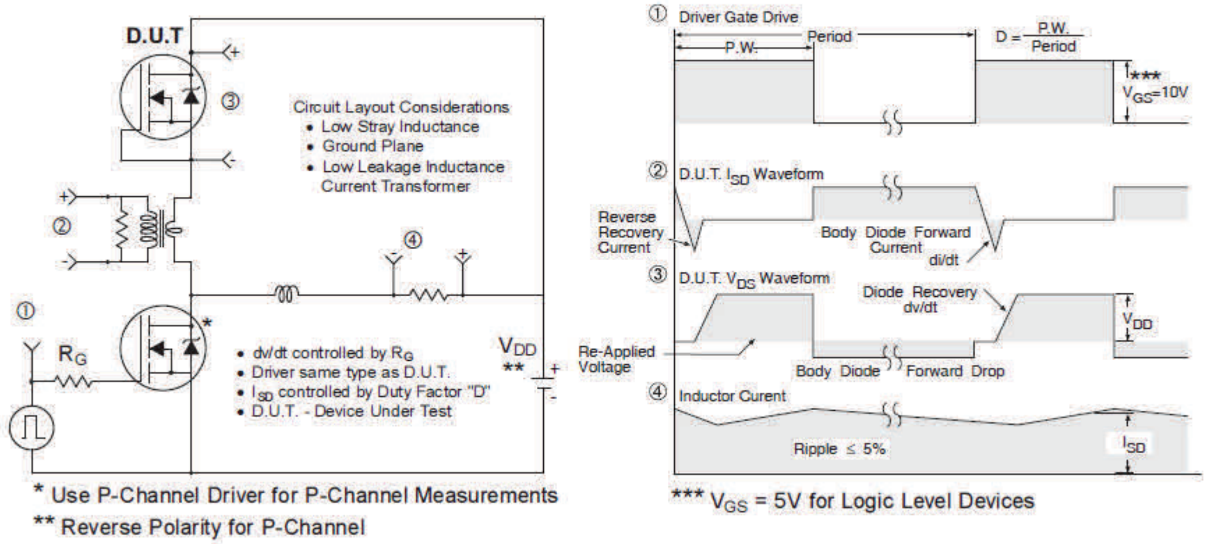


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

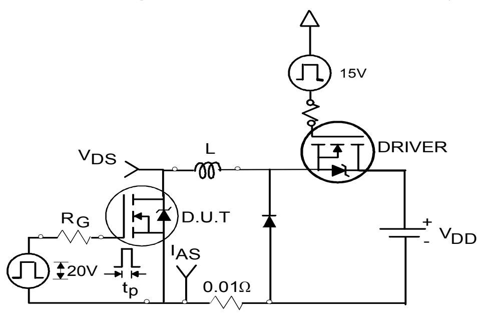


Fig 16a. Unclamped Inductive Test Circuit

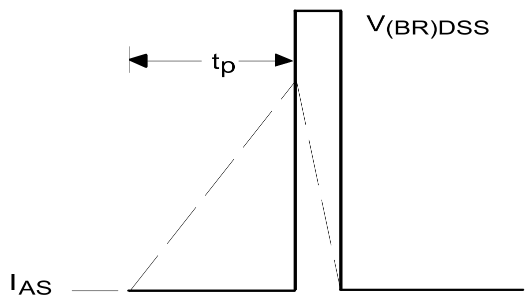


Fig 16b. Unclamped Inductive Waveforms

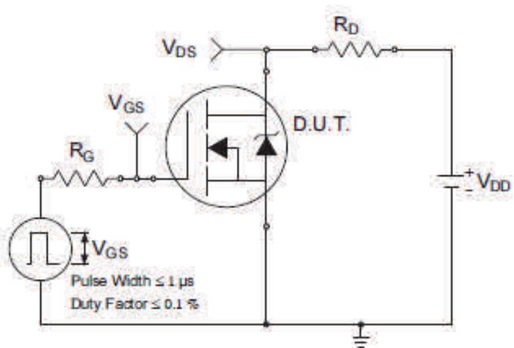


Fig 17a. Switching Time Test Circuit

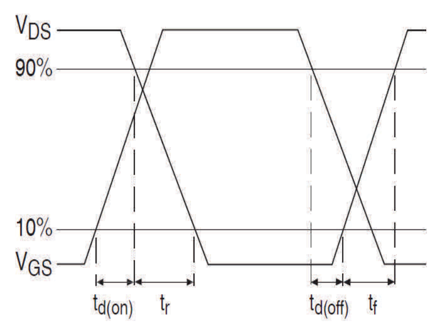


Fig 17b. Switching Time Waveforms

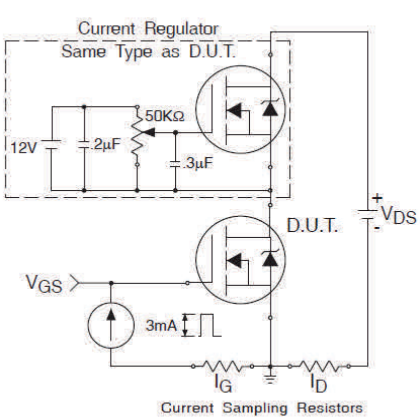


Fig 18a. Gate Charge Test Circuit

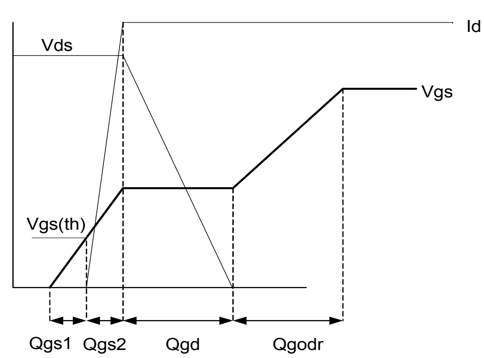
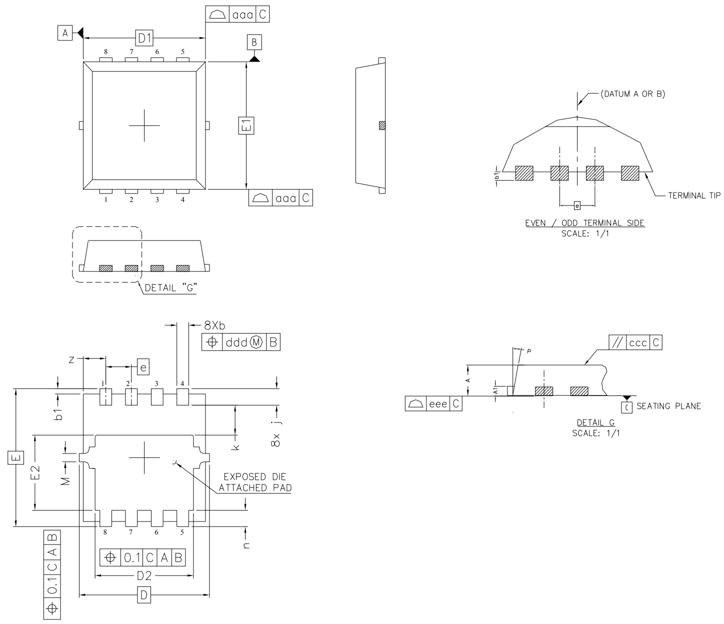


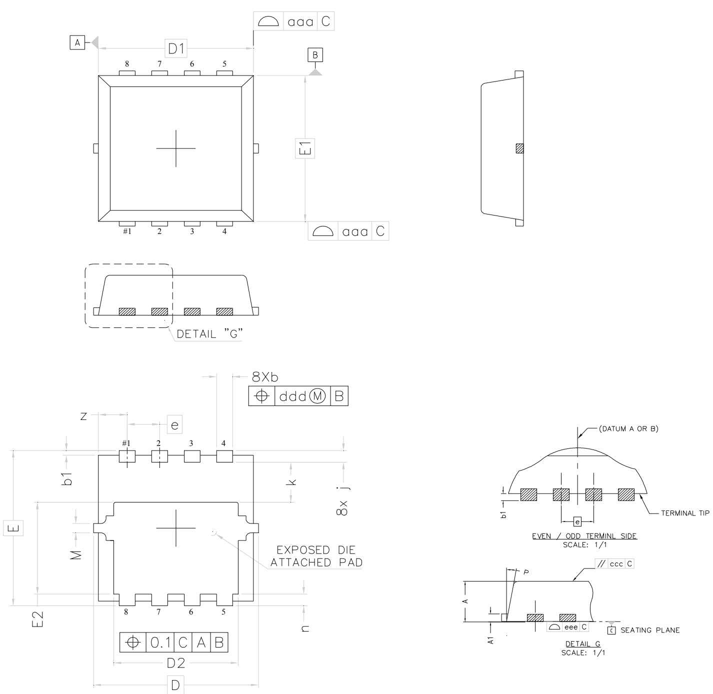
Fig 18b. Gate Charge Waveform

PQFN 3.3 x 3.3 Outline "C" Package Details



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.80	.0276	.0315
A1	0.10	0.25	.0039	.0098
b	0.25	0.35	.0098	.0138
b1	0.05	0.15	.0020	.0059
D	3.20	3.40	.1260	.1339
D1	3.00	3.20	.1181	.1260
D2	2.39	2.59	.0941	.1020
E	3.25	3.45	.1280	.1358
E1	3.00	3.20	.1181	.1260
E2	1.78	1.98	.0701	.0780
e	0.65 BSC		.0255 BSC	
j	0.30	0.50	.0118	.0197
k	0.59	0.79	.0232	.0311
n	0.30	0.50	.0118	.0197
M	0.03	0.23	.0012	.0091
P	10°	12°	10°	12°
z	0.50	0.70	.0197	.0276

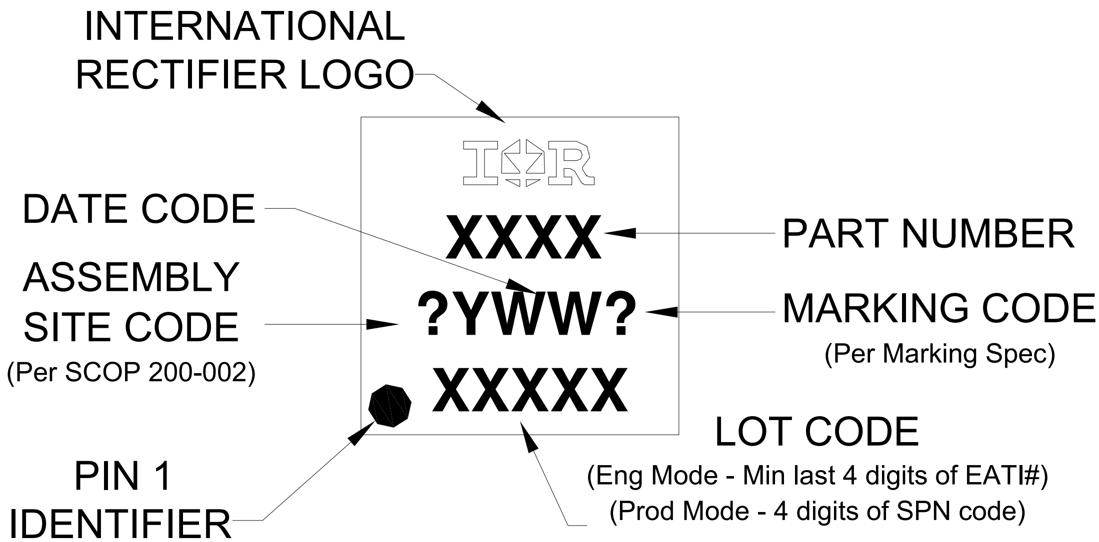
PQFN 3.3 x 3.3 Outline "G" Package Details



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	0.90	.0315	.0354
A1	0.12	0.22	.0047	.0086
b	0.22	0.42	.0087	.0165
b1	0.05	0.15	.0020	.0059
D	3.30 BSC		.1299 BSC	
D1	3.10 BSC		.1220 BSC	
D2	2.29	2.69	.0902	.1059
E	3.30 BSC		.1299 BSC	
E1	3.10 BSC		.1220 BSC	
E2	1.85	2.05	.0728	.0807
e	0.65 BSC		.0255 BSC	
j	0.15	0.35	.0059	.0137
k	0.75	0.95	.0295	.0374
n	0.15	0.35	.0059	.0137
M	NOM. 0.20		NOM. .0078	
P	9°	11°	9°	11°

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

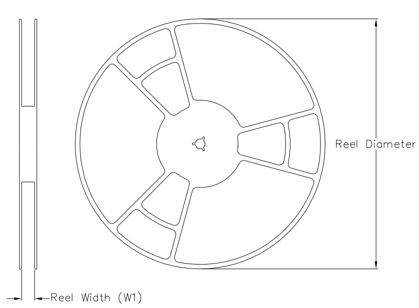
PQFN 3.3mm x 3.3mm Outline Part Marking



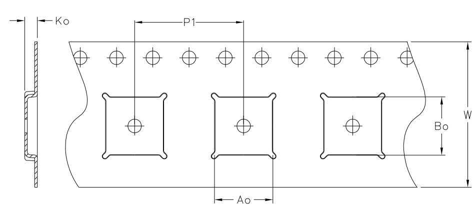
Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

PQFN 3.3mm x 3.3mm Outline Tape and Reel

REEL DIMENSIONS

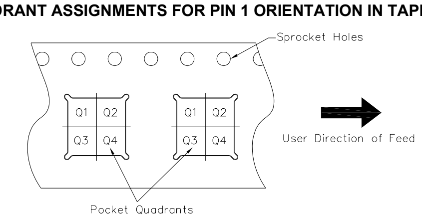


TAPE DIMENSIONS



CODE	DIMENSION (MM)		DIMENSION (INCH)	
	MIN	MAX	MIN	MAX
Ao	3.50	3.70	.138	.146
Bo	3.50	3.70	.138	.146
Ko	1.10	1.30	.043	.051
P_1	7.90	8.10	.311	.319
W	11.80	12.20	.465	.480
W_1	12.30	12.50	.484	.492
Qty	4000			
Reel Diameter	13 Inches			

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



CODE	DESCRIPTION
Ao	Dimension design to accommodate the component width
Bo	Dimension design to accommodate the component lenght
Ko	Dimension design to accommodate the component thickness
W	Overall width of the carrier tape
P_1	Pitch between successive cavity centers

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 Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 0.29mH, R_G = 50Ω, I_{AS} = 20A.

③ Pulse width ≤ 400µs; duty cycle ≤ 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.

⑦ Current is limited to 25A by source bonding technology.

Revision History

Date	Comments
6/6/2014	• Updated schematic on page 1 • Updated package outline and part marking on page 7 • Updated tape and reel on page 8
6/30/2014	• Remove "SAWN" package outline on page 7.
2/23/2016	• Updated datasheet with corporate template • Updated package outline to reflect the PCN # (241-PCN30-Public) for "Option C" and "Option G" on page 7.

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