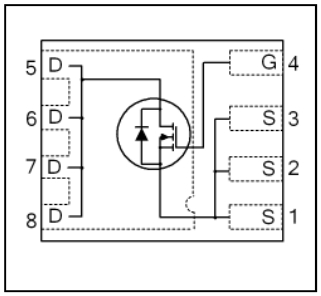
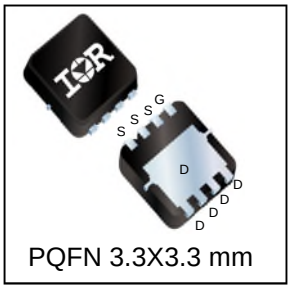
IRFHM3911TRPbF

HEXFET® Power MOSFET

V_{DSS}	100	V
$R_{DS(on)}$ max (@V_{GS} = 10V)	115	mΩ
Qg (typical)	17	nC
I_D (@$T_{C\ (Bottom)}$ = 25°C)	11⑥	A





PQFN 3.3X3.3 mm

Applications

- POE+ Power Sourcing Equipment Switch

Features		Benefits
Large Safe Operating Area (SOA)		Increased Ruggedness
Low Thermal Resistance to PCB		Enable better thermal dissipation
Low Profile (<1.05mm)		Increased Power Density
Industry-Standard Pinout	results in	Multi-Vendor Compatibility
Compatible with Existing Surface Mount Techniques	⇒	Easier Manufacturing
RoHS Compliant, Halogen-Free		Environmentally Friendlier
MSL1, Industrial Qualification		Increased Reliability

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFHM3911PbF	PQFN 3.3mm x 3.3mm	Tape and Reel	4000	IRFHM3911TRPbF

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	3.2	A
I_D @ $T_{C(Bottom)}$ = 25°C	Continuous Drain Current, V_{GS} @ 10V	11⑥	
I_D @ $T_{C(Bottom)}$ = 100°C	Continuous Drain Current, V_{GS} @ 10V	6.6	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Source Bonding Technology Limited)	20⑦	
I_{DM}	Pulsed Drain Current ①	36	
P_D @T_A = 25°C	Power Dissipation ⑤	2.8	W
P_D @$T_{C(Bottom)}$ = 25°C	Power Dissipation	29	
	Linear Derating Factor	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

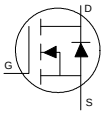
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	100	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	111	—	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	92	115	mΩ	V_{GS} = 10V, I_D = 6.3A ③
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D = 35µA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-7.6	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	µA	V_{DS} = 100V, V_{GS} = 0V
		—	—	250		V_{DS} = 80V, 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	20	—	—	S	V_{DS} = 25V, I_D = 6.3A
Q_g	Total Gate Charge	—	17	26	nC	V_{DS} = 50V V_{GS} = 10V I_D = 6.3A
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	2.5	—		
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	1.4	—		
Q_{gd}	Gate-to-Drain Charge	—	5.4	—		
Q_{godr}	Gate Charge Overdrive	—	7.7	—		
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	6.8	—		
Q_{oss}	Output Charge	—	5.9	—	nC	V_{DS} = 16V, V_{GS} = 0V
R_G	Gate Resistance	—	3.8	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	5.0	—	ns	V_{DD} = 50V, V_{GS} = 10V I_D = 6.3A R_G=1.8Ω
t_r	Rise Time	—	5.8	—		
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		
t_f	Fall Time	—	5.1	—		
C_{iss}	Input Capacitance	—	760	—	pF	V_{GS} = 0V V_{DS} = 50V f = 1.0MHz
C_{oss}	Output Capacitance	—	73	—		
C_{rss}	Reverse Transfer Capacitance	—	13	—		

Avalanche Characteristics

	Parameter	Typ.	Max.
E_{AS}	Single Pulse Avalanche Energy ②	—	41
I_{AR}	Avalanche Current ①	—	6.3

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	11	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	36		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 6.3A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	47	71	ns	T_J = 25°C, I_F = 6.3A, V_{DD} = 50V
Q_{rr}	Reverse Recovery Charge	—	381	571	nC	di/dt = 500A/µs ③

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ④	—	4.3	°C/W
$R_{\theta JC}$ (Top)	Junction-to-Case ④	—	40	
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	45	
$R_{\theta JA}$ (<10s)	Junction-to-Ambient ⑤	—	31	

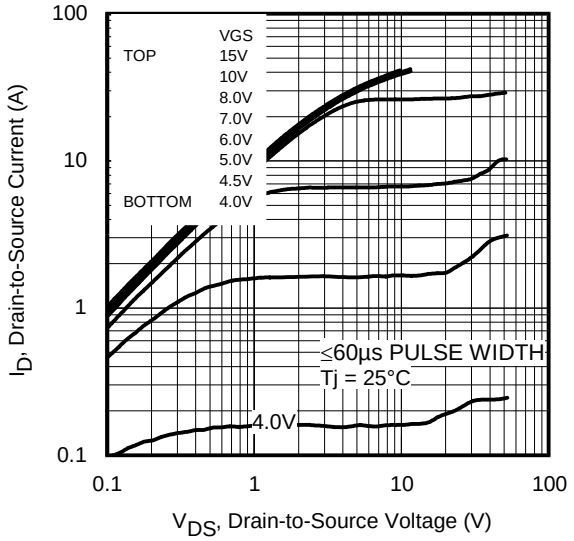


Fig 1. Typical Output Characteristics

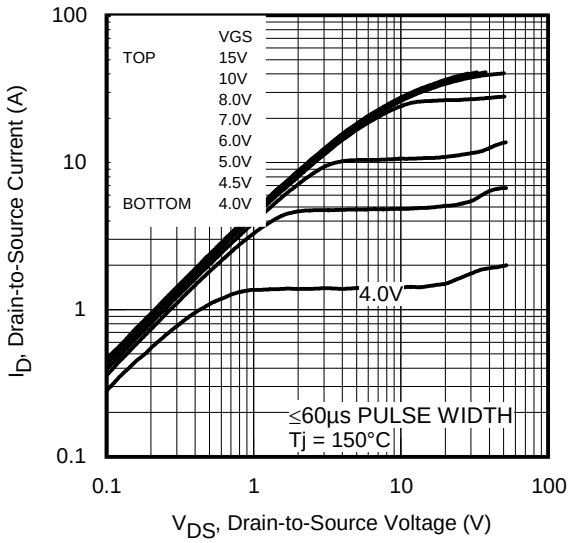


Fig 2. Typical Output Characteristics

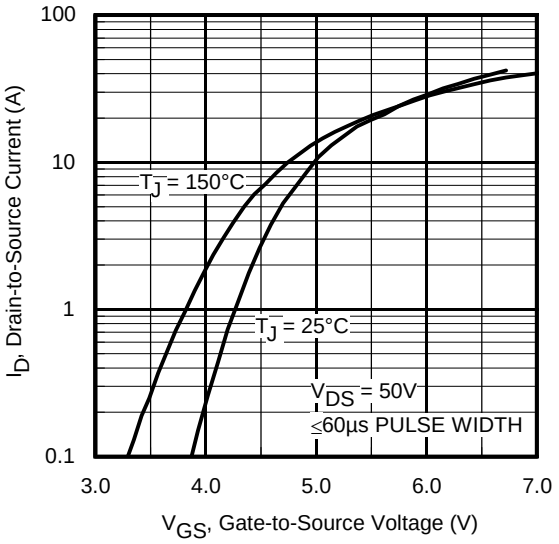


Fig 3. Typical Transfer Characteristics

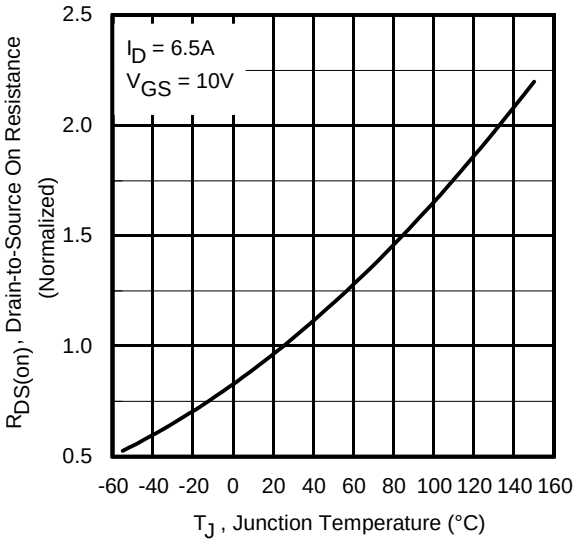


Fig 4. Normalized On-Resistance vs. Temperature

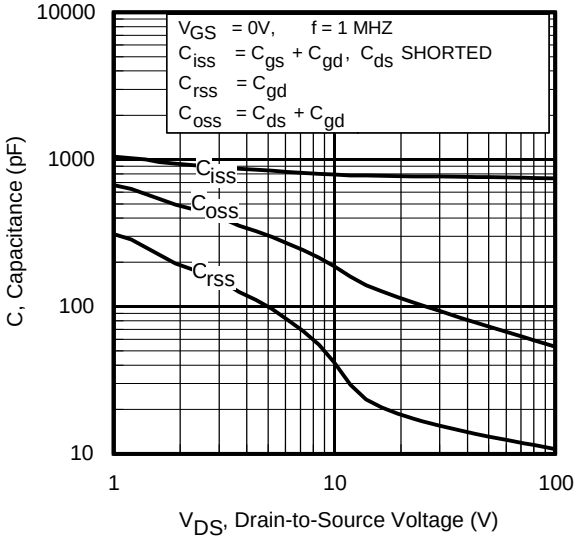


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

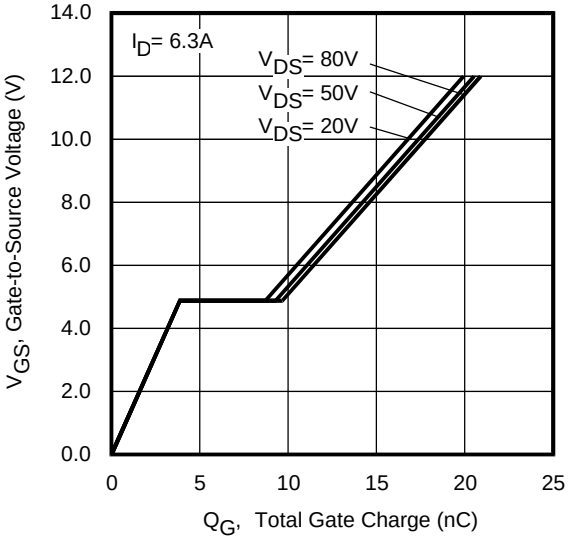


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

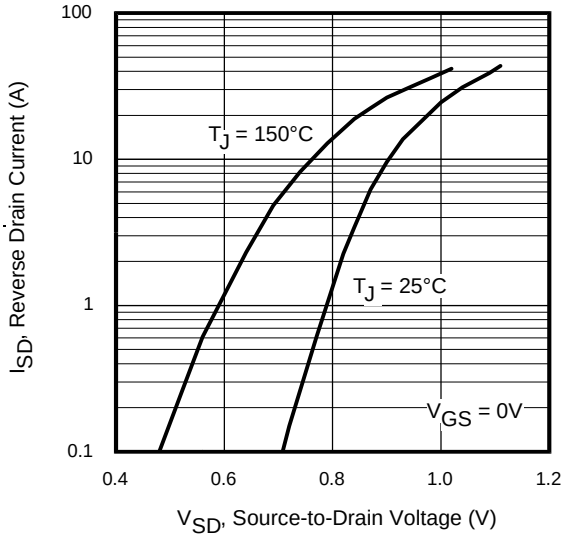


Fig 7. Typical Source-Drain Diode Forward Voltage

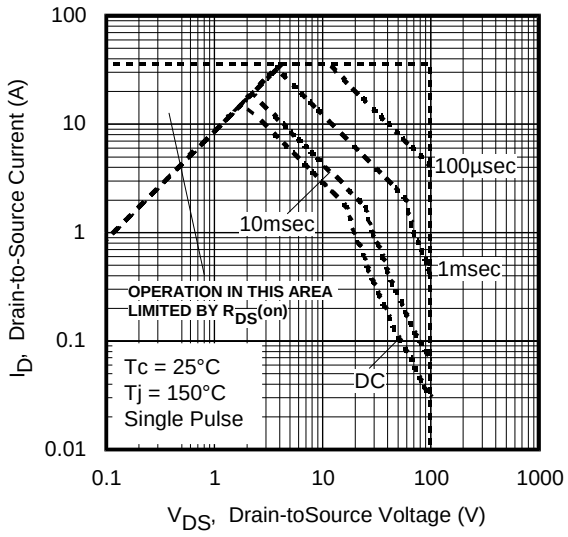


Fig 8. Maximum Safe Operating Area

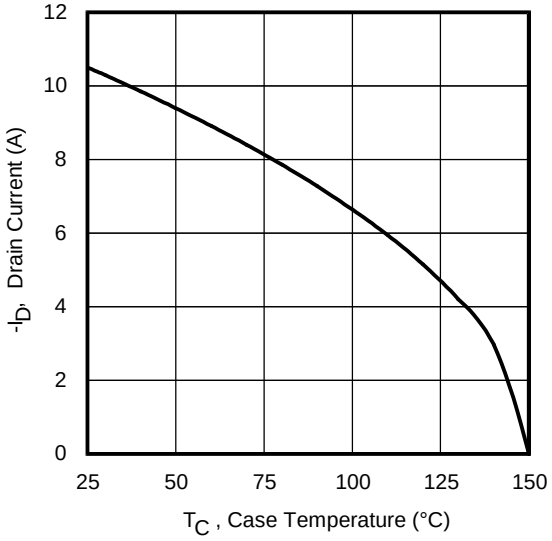


Fig 9. Maximum Drain Current vs. Case Temperature

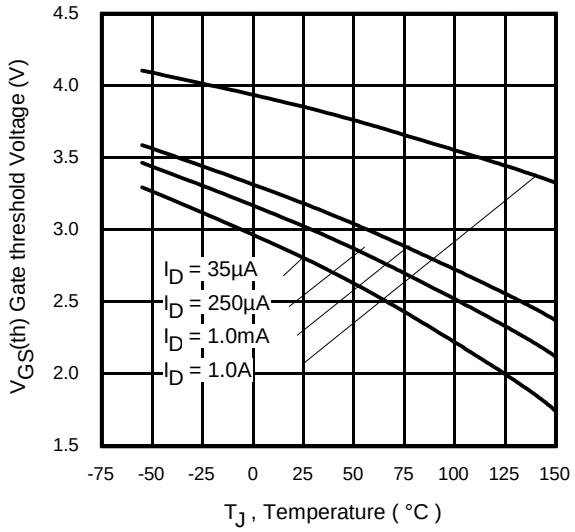


Fig 10. Drain-to-Source Breakdown Voltage

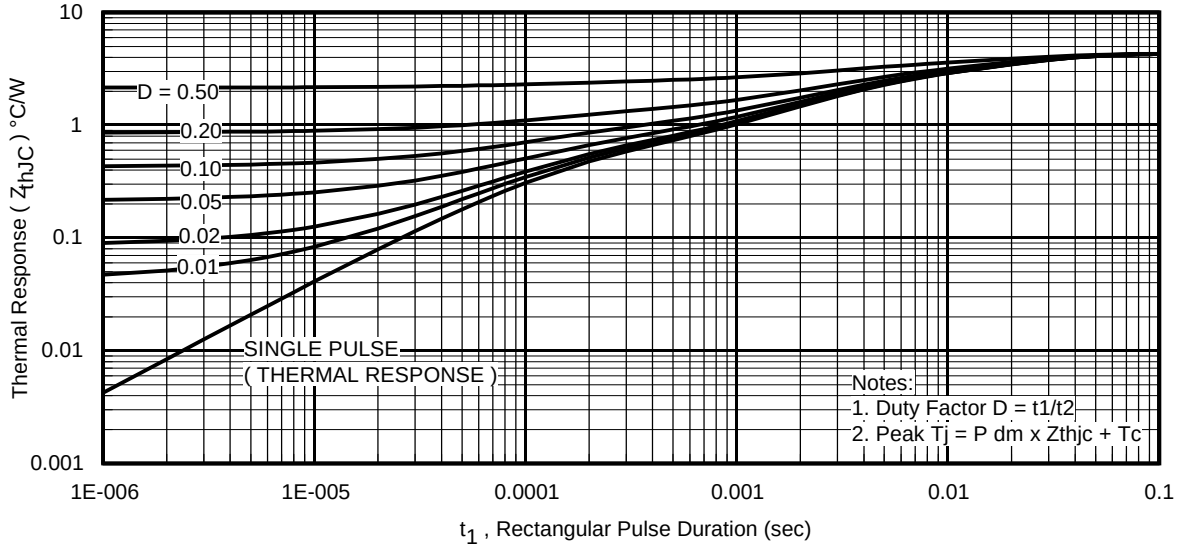


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

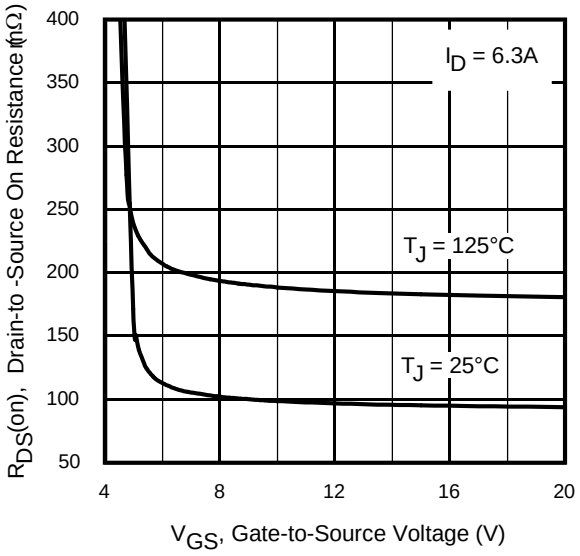


Fig 12. On– Resistance vs. Gate Voltage

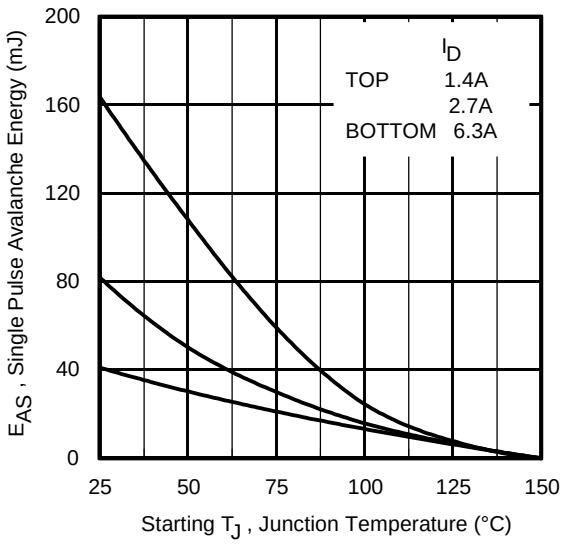


Fig 13. Maximum Avalanche Energy vs. Drain Current

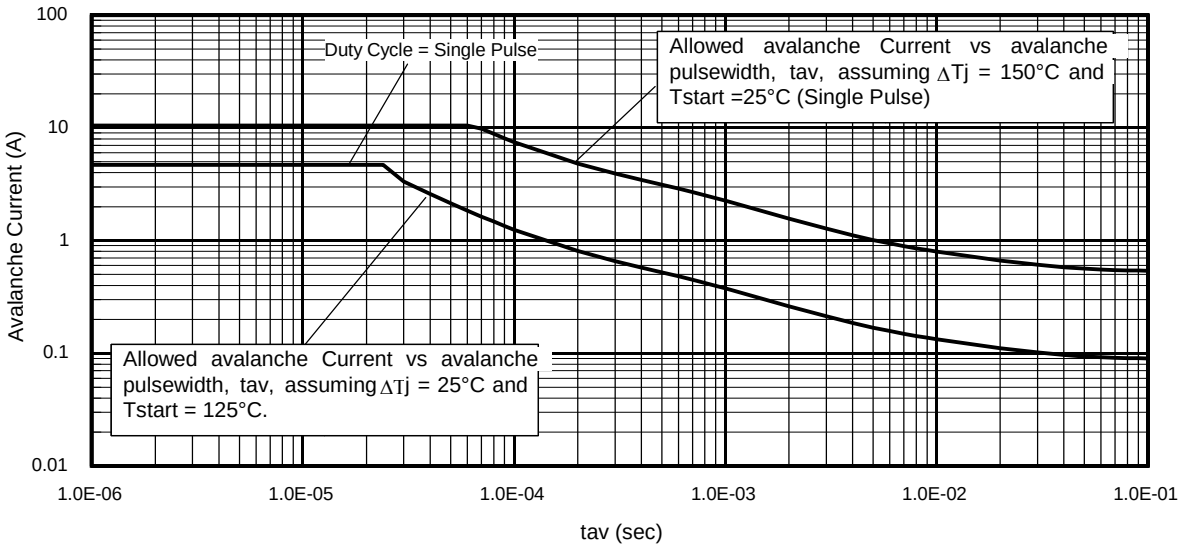


Fig 14. Typical Avalanche Current vs. Pulsewidth

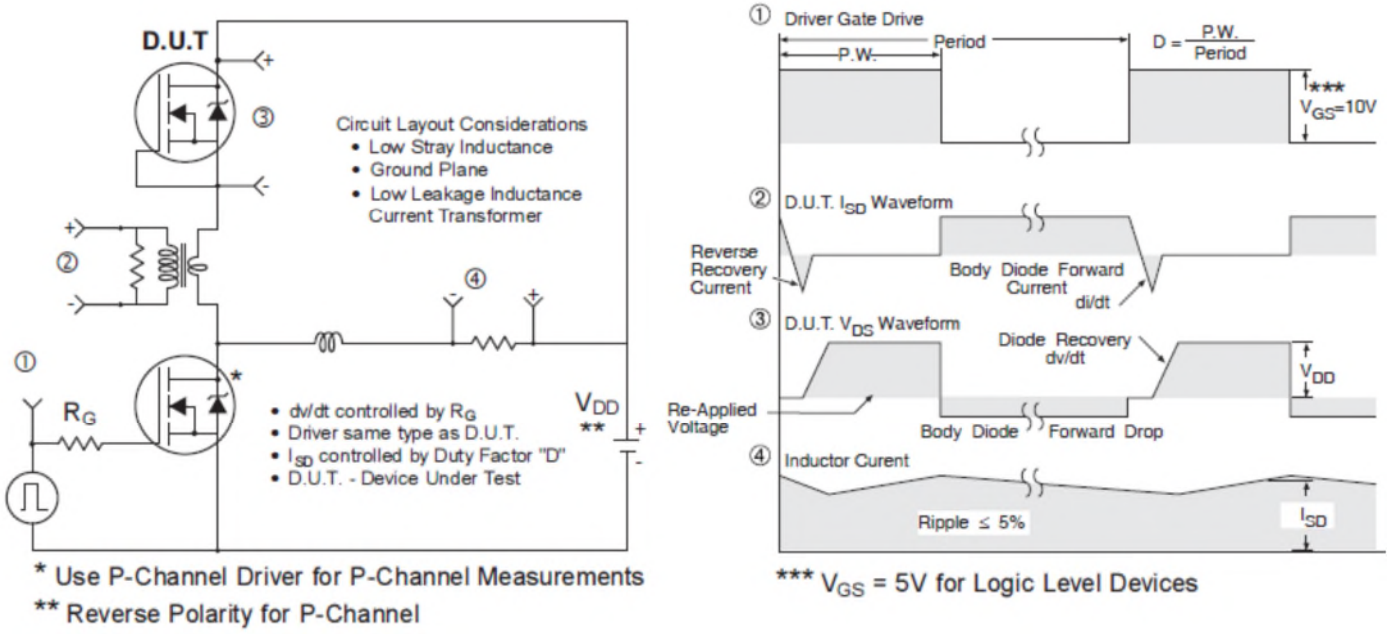


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

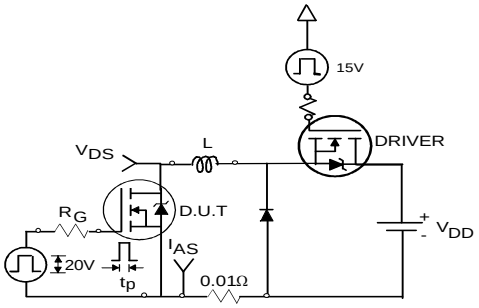


Fig 16a. Unclamped Inductive Test Circuit

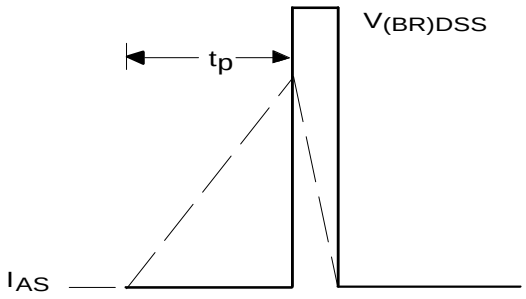


Fig 16b. Unclamped Inductive Waveforms

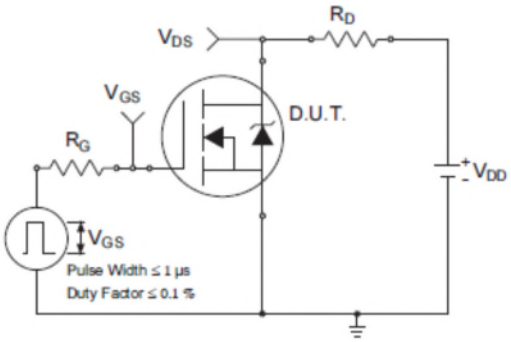


Fig 17a. Switching Time Test Circuit

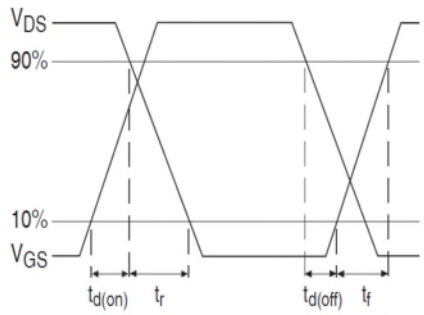


Fig 17b. Switching Time Waveforms

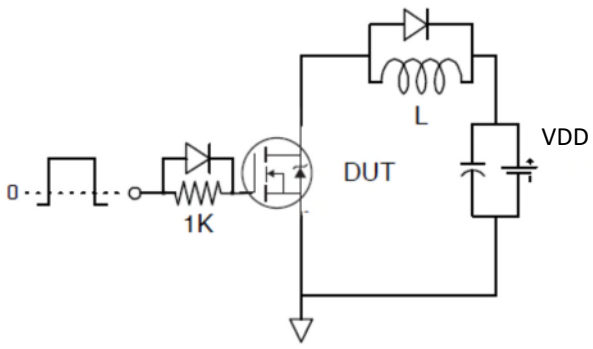


Fig 18. Gate Charge Test Circuit

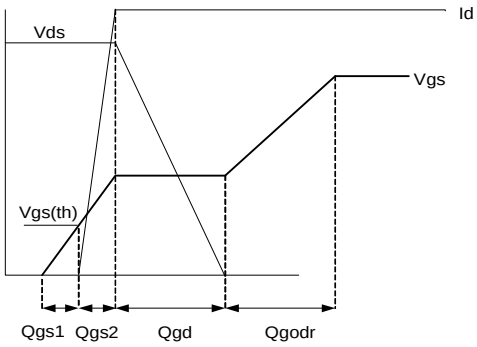
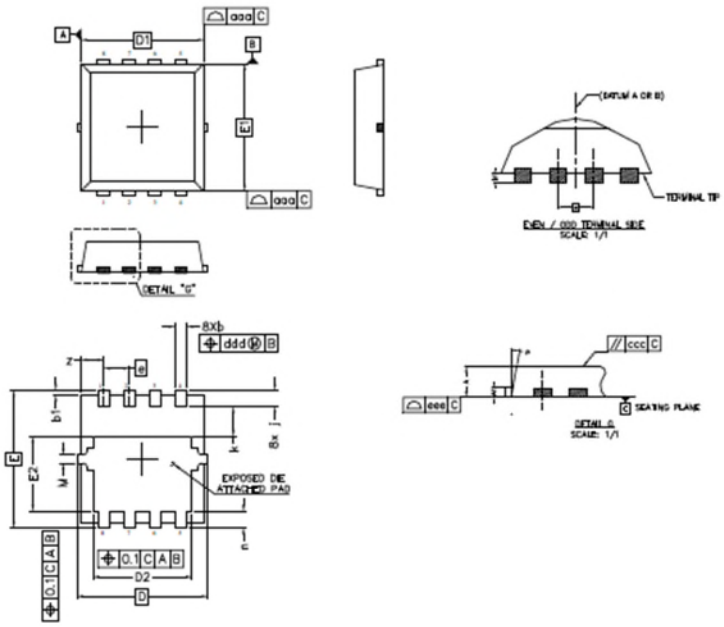


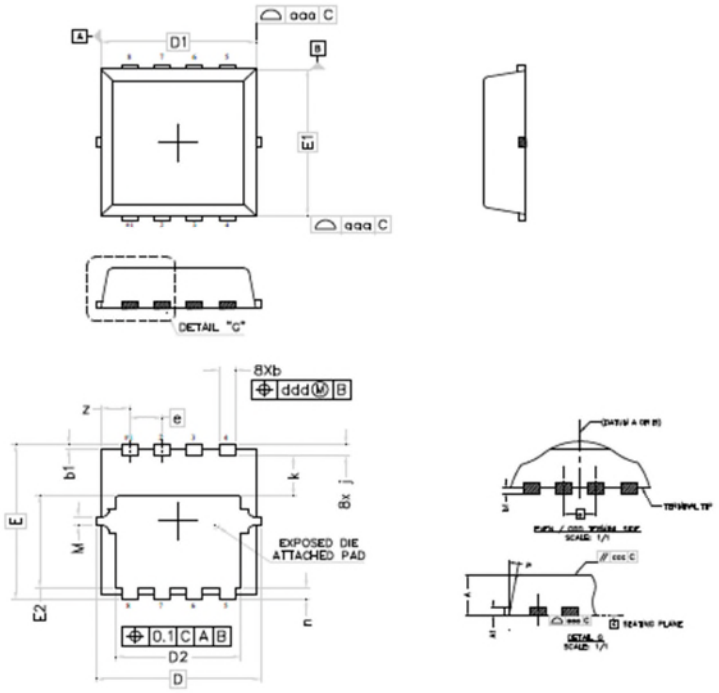
Fig 19. Gate Charge Waveform

PQFN 3.3 x 3.3 Outline “C” Package Details



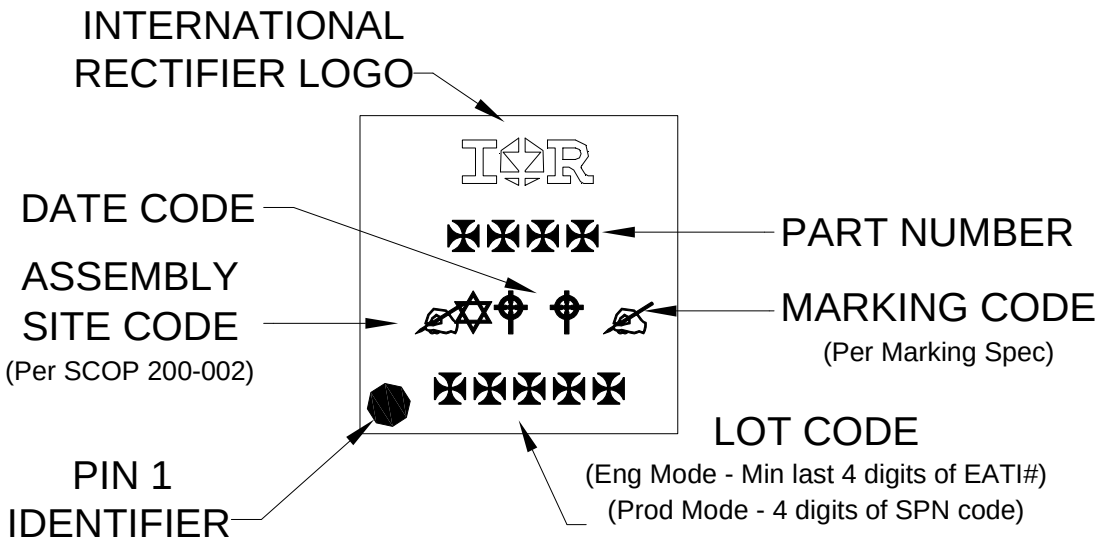
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.80	.0276	.0315
A1	0.10	0.25	.0039	.0098
b	0.25	0.35	.0098	.0138
b1	0.05	0.15	.0020	.0059
D	3.00	3.40	.1181	.1339
D1	3.00	3.20	.1181	.1260
D2	2.39	2.59	.0941	.1020
E	3.25	3.45	.1280	.1358
E1	3.00	3.20	.1181	.1260
E2	1.78	1.98	.0701	.0780
e	0.65 BSC		.0255 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



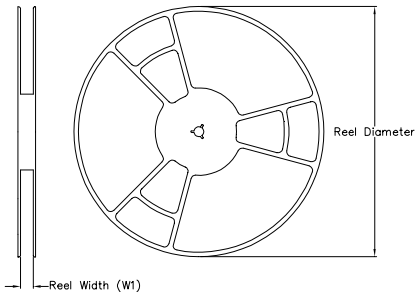
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	0.90	.0315	.0354
A1	0.12	0.22	.0047	.0086
b	0.22	0.42	.0087	.0165
b1	0.05	0.15	.0020	.0059
D	3.30 BSC		.1299 BSC	
D1	3.10 BSC		.1220 BSC	
D2	2.29	2.69	.0902	.1059
E	3.30 BSC		.1299 BSC	
E1	3.10 BSC		.1220 BSC	
E2	1.85	2.05	.0728	.0807
e	0.65 BSC		.0255 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°

PQFN 3.3 x 3.3 Part Marking

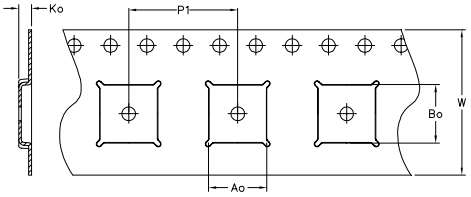


PQFN 3.3 x 3.3 Tape and Reel

REEL DIMENSIONS

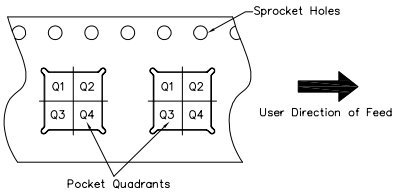


TAPE DIMENSIONS



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

Qualification Information†

Qualification Level	Industrial (per JEDEC JESD47F†† guidelines)	
Moisture Sensitivity Level	PQFN 3.3mm x 3.3mm	MSL1 (per JEDEC J-STD-020D†)
RoHS Compliant	Yes	

† 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 = 2.06mH, R_G = 50Ω, I_{AS} = 6.3A.

③ Pulse width ≤ 400µs; duty cycle ≤ 2%.

④ R_θ is measured at TJ of approximately 90°C.

⑤ When mounted on 1 inch square PCB (FR-4). Please refer to AN-994 for more details

⑥ Calculated continuous current based on maximum allowable junction temperature.

⑦ Current is limited to 20A by source bonding technology.

Revision History

Date	Rev.	Comments
6/5/2014	2.1	• Updated schematic on page 1 • Updated tape and reel on page 8
7/1/2014	2.2	• Remove “SAWN” package outline on page 7.
2/23/2016	2.3	• Updated datasheet with corporate template • Updated package outline to reflect the PCN # (241-PCN30-Public) for “Option C” and “Option G” on page 7.
08/12/2025	2.4	• Update datasheet to Infineon format • Updated Part marking –page 7 • Added disclaimer on last page.

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

We Listen to Your Comments Any information within this document that you feel is wrong, unclear or missing at all? Your feedback will help us to continuously improve the quality of this document. Please send your proposal (including a reference to this document) to: **erratum@infineon.com**

Published by
Infineon Technologies AG
81726 München, Germany

Important notice
The products which may also include samples and may be comprised of hardware or software or both ("Product") are sold or provided and delivered by Infineon Technologies AG and its affiliates ("Infineon") subject to the terms and conditions of the frame supply contract or other written agreement(s) executed by a customer and Infineon or, in the absence of the foregoing, the applicable Sales Conditions of Infineon. General terms and conditions of a customer or deviations from applicable Sales Conditions of Infineon shall only be binding for Infineon if and to the extent Infineon has given its express written consent.

For the avoidance of doubt, Infineon disclaims all warranties of non-infringement of third-party rights and implied warranties such as warranties of fitness for a specific use/purpose or merchantability.

Infineon shall not be responsible for any information with respect to samples, the application or customer's specific use of any Product or for any examples or typical values given in this document.

The data contained in this document is exclusively intended for technically qualified and skilled customer representatives. It is the responsibility of the customer to evaluate the suitability of the Product for the intended application and the customer's specific use and to verify all relevant technical data contained in this document in the intended application and the customer's specific use. The customer is responsible for properly designing, programming, and testing the functionality and safety of the intended application, as well as complying with any legal requirements related to its use.

Unless otherwise explicitly approved by Infineon, Products may not be used in any application where a failure of the Product or any consequences of the use thereof can reasonably be expected to result in personal injury. However, the foregoing shall not prevent the customer from using any Product in such fields of use that Infineon has explicitly designed and sold it for, provided that the overall responsibility for the application lies with the customer.

If the Product includes security features:
Because no computing device can be absolutely secure, and despite security measures implemented in the Product, Infineon does not guarantee that the Product will be free from intrusion, data theft or loss, or other breaches ("Security Breaches"), and Infineon shall have no liability arising out of any Security Breaches.

If this document includes or references software:
The software is owned by Infineon under the intellectual property laws and treaties of the United States, Germany, and other countries worldwide. All rights reserved. Therefore, you may use the software only as provided in the software license agreement accompanying the software. If no software license agreement applies, Infineon hereby grants you a personal, non-exclusive, non-transferable license (without the right to sublicense) under its intellectual property rights in the software (a) for software provided in source code form, to modify and reproduce the software solely for use with Infineon hardware products, only internally within your organization, and (b) to distribute the software in binary code form externally to end users, solely for use on Infineon hardware products. Any other use, reproduction, modification, translation, or compilation of the software is prohibited.

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.infineon.com).