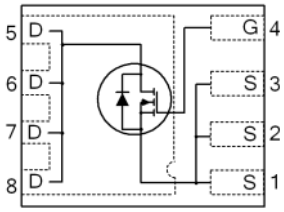
V_{DSS}	30	V
$R_{DS(on)}$ max (@ V_{GS} = 10V)	3.8	mΩ
Qg (typical)	15	nC
Rg (typical)	2.5	Ω
I_D ($@T_{C\ (Bottom)}$ = 25°C)	77	A



PQFN 3.3 x 3.3 mm

Applications

- Battery Operated DC Motor Inverter MOSFET

Features		Benefits
Low R_{DSon} (< 3.8mΩ)		Lower Conduction Losses
Low Thermal Resistance to PCB (< 3.4°C/W)		Enable better thermal dissipation
100% Rg tested		Increased Reliability
Low Profile (< 1.0 mm)	results in	Increased Power Density
Industry-Standard Pinout	⇒	Multi-Vendor Compatibility
Compatible with Existing Surface Mount Techniques		Easier Manufacturing
RoHS Compliant Containing no Lead, no Bromide and no Halogen		Environmentally Friendlier
MSL1, Industrial Qualification		Increased Reliability

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRFHM830TRPbF	PQFN 3.3mm x 3.3mm	Tape and Reel	4000	
~~IRFHM830TR2PBF~~	~~PQFN 3.3mm x 3.3mm~~	~~Tape and Reel~~	~~400~~	EOL notice # 259

Absolute Maximum Ratings

Symbol	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	21	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	17	
I_D @ $T_{C(Bottom)}$ = 25°C	Continuous Drain Current, V_{GS} @ 10V ⑥	77	
I_D @ $T_{C(Bottom)}$ = 100°C	Continuous Drain Current, V_{GS} @ 10V ⑥	49	
I_{DM}	Pulsed Drain Current ①	308	
P_D @T_A = 25°C	Power Dissipation ⑤	2.7	W
P_D @$T_{C(Bottom)}$ = 25°C	Power Dissipation ⑤	37	
	Linear Derating Factor ⑤	0.022	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Notes ① through ⑥ are on page 9

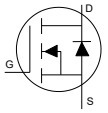
Static @ T_J = 25°C (unless otherwise specified)

Symbol	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	—	0.02	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	3.0	3.8	mΩ	V_{GS} = 10V, I_D = 20A ③
		—	4.8	6.0		V_{GS} = 4.5V, I_D = 20A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.8	2.35	V	V_{DS} = V_{GS}, I_D = 50µA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-6.3	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	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	52	—	—	S	V_{DS} = 15V, I_D = 20A
Q_g	Total Gate Charge	—	31	—	nC	V_{GS} = 10V, V_{DS} = 15V, I_D = 20A
Q_g	Total Gate Charge	—	15	23		V_{DS} = 15V V_{GS} = 4.5V I_D = 20A See Fig.17 & 18
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	3.8	—		
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	2.0	—		
Q_{gd}	Gate-to-Drain Charge	—	5.0	—		
Q_{godr}	Gate Charge Overdrive	—	4.2	—		
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	7.0	—		
Q_{oss}	Output Charge	—	9.7	—	nC	V_{DS} = 16V, V_{GS} = 0V
R_G	Gate Resistance	—	2.5	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	V_{DD} = 15V, V_{GS} = 4.5V I_D = 20A R_G= 1.8Ω See Fig.15
t_r	Rise Time	—	25	—		
$t_{d(off)}$	Turn-Off Delay Time	—	13	—		
t_f	Fall Time	—	9.2	—		
C_{iss}	Input Capacitance	—	2155	—	pF	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz
C_{oss}	Output Capacitance	—	350	—		
C_{rss}	Reverse Transfer Capacitance	—	160	—		

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
$E_{AS\ (Thermally\ limited)}$	Single Pulse Avalanche Energy ②	—	82	mJ
I_{AR}	Avalanche Current ①	—	20	A

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	37	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	308		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 20A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	17	26	ns	T_J = 25°C, I_F = 20A, V_{DD} = 15V
Q_{rr}	Reverse Recovery Charge	—	23	35	nC	di/dt = 300A/µs ③

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ④	—	3.4	°C/W
$R_{\theta JC}$ (Top)	Junction-to-Case ④	—	37	
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	46	
$R_{\theta JA}$ (<10s)	Junction-to-Ambient ⑤	—	31	

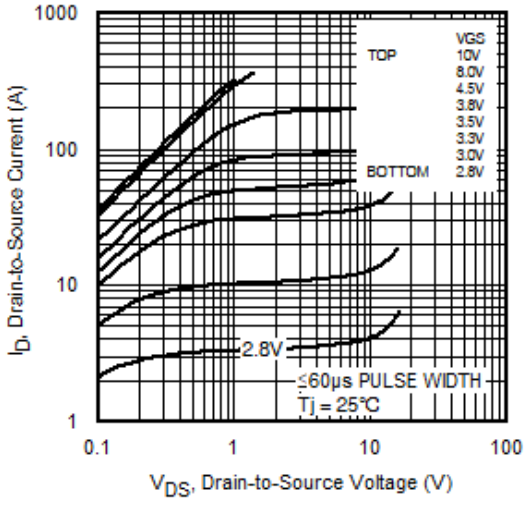


Fig 1. Typical Output Characteristics

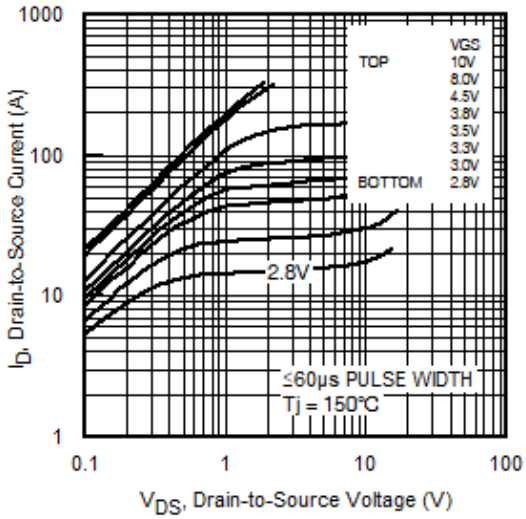


Fig 2. Typical Output Characteristics

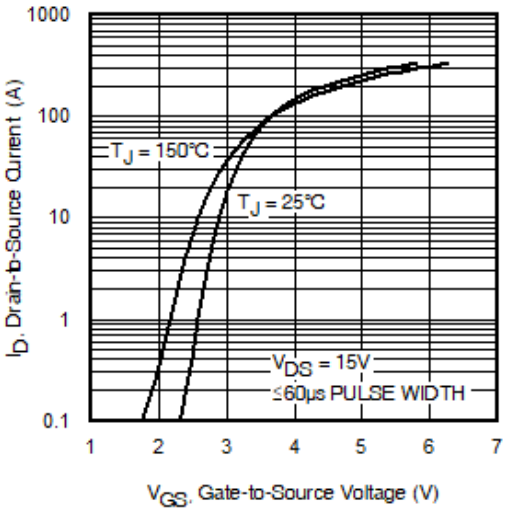


Fig 3. Typical Transfer Characteristics

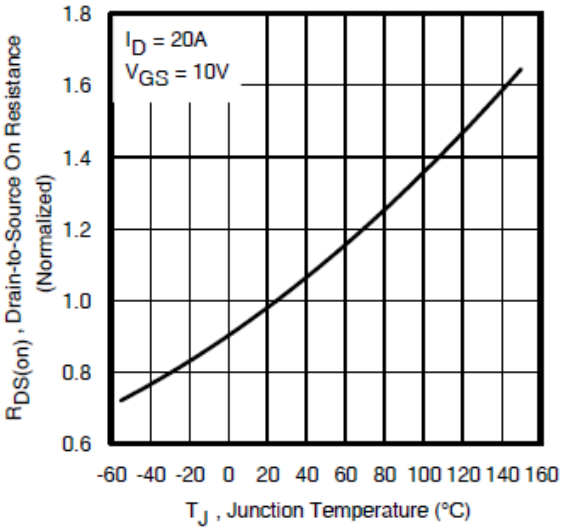


Fig 4. Normalized On-Resistance vs. Temperature

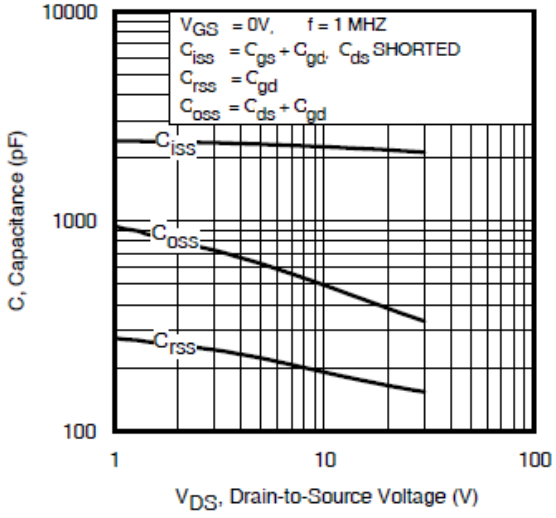


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

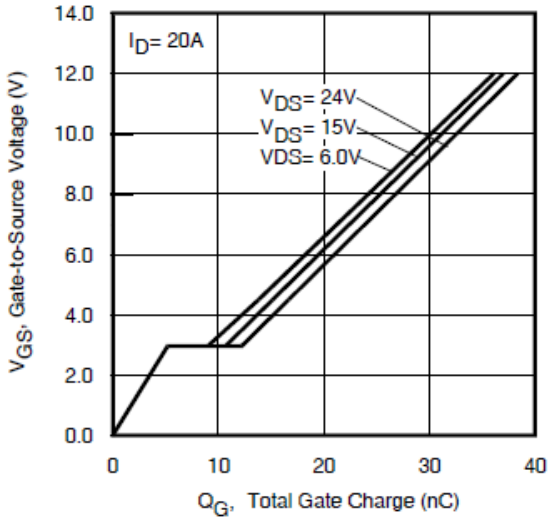


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

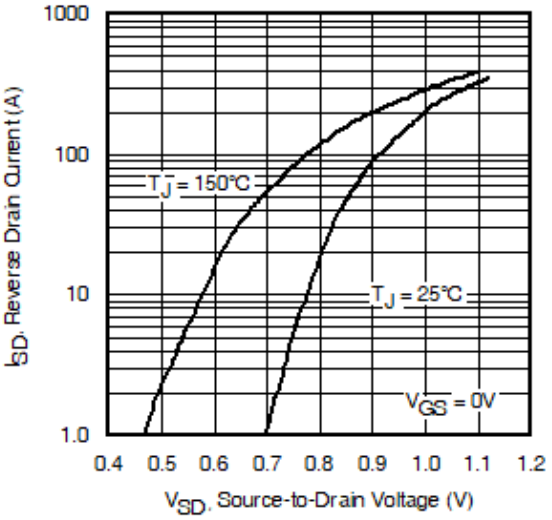


Fig 7. Typical Source-Drain Diode Forward Voltage

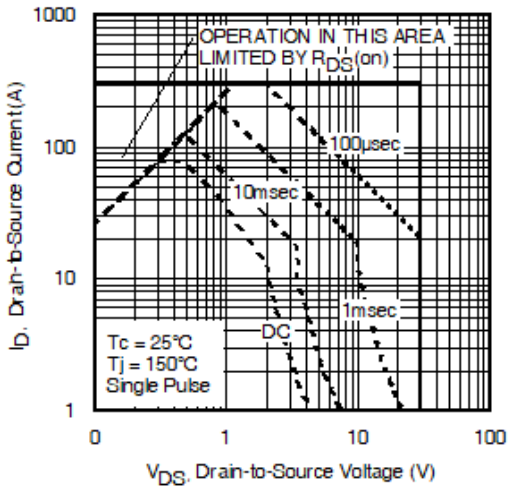


Fig 8. Maximum Safe Operating Area

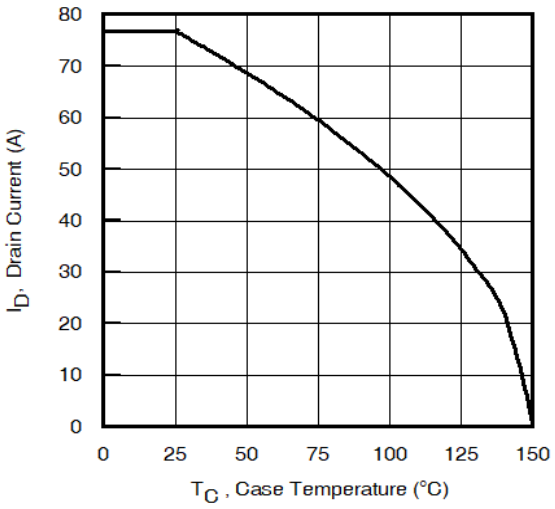


Fig 9. Maximum Drain Current vs. Case Temperature

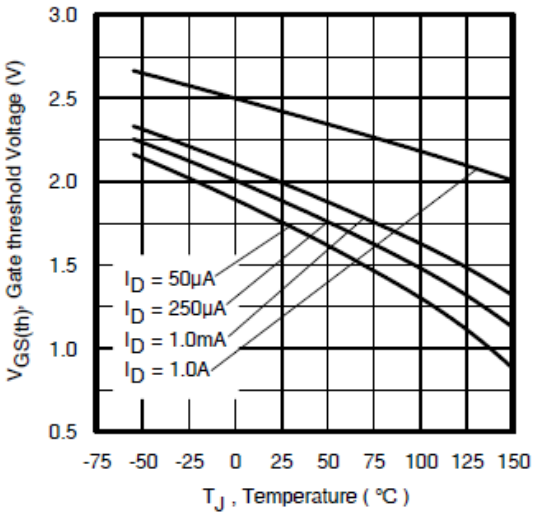


Fig 10. Threshold Voltage Vs. Temperature

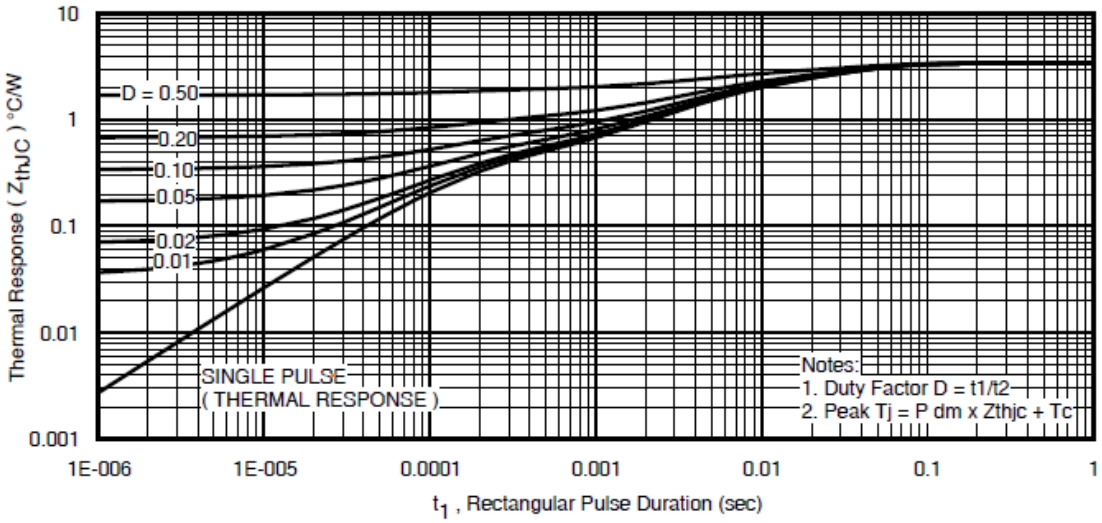


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

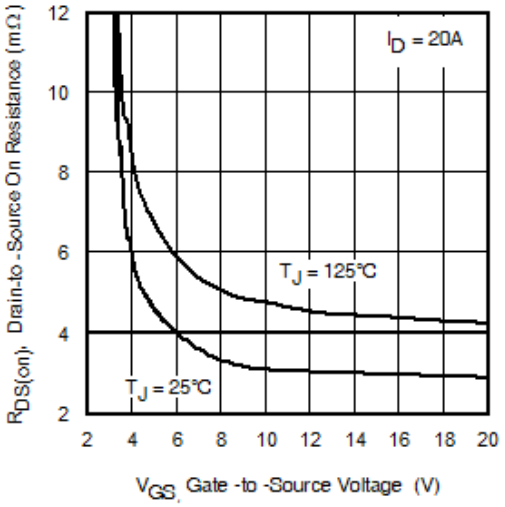


Fig 12. On– Resistance vs. Gate Voltage

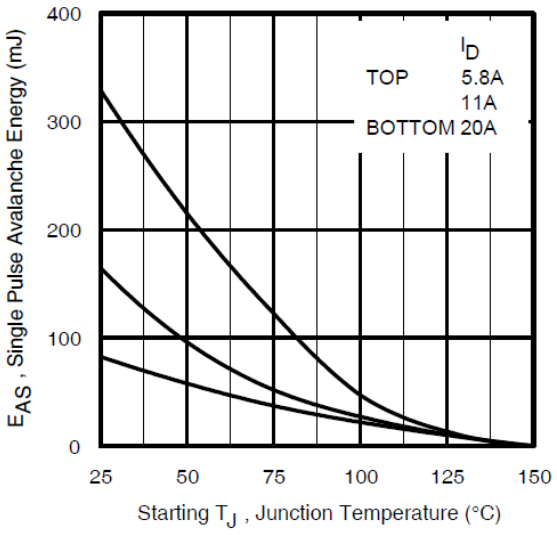


Fig 13. Maximum Avalanche Energy vs. Drain Current

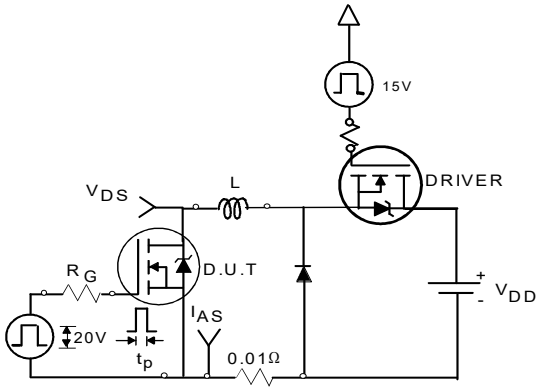


Fig 14a. Unclamped Inductive Test Circuit

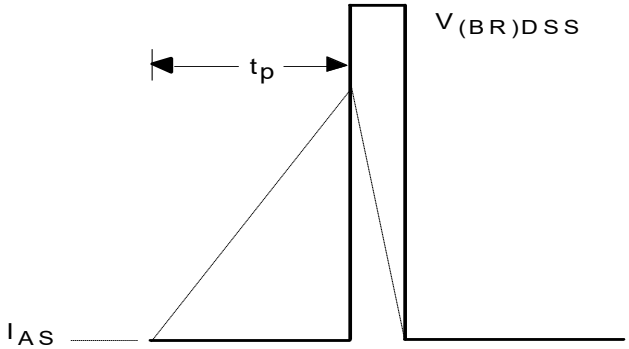


Fig 14b. Unclamped Inductive Waveforms

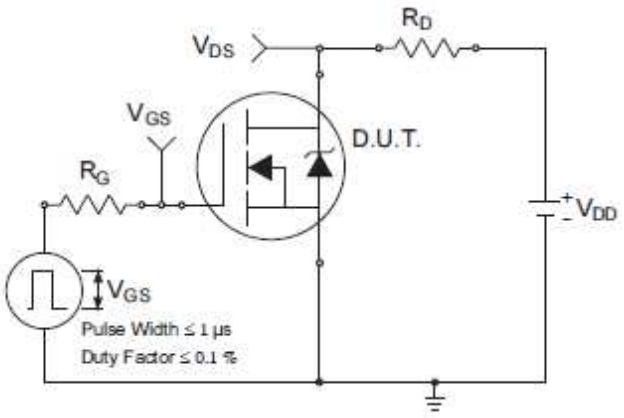


Fig 15a. Switching Time Test Circuit

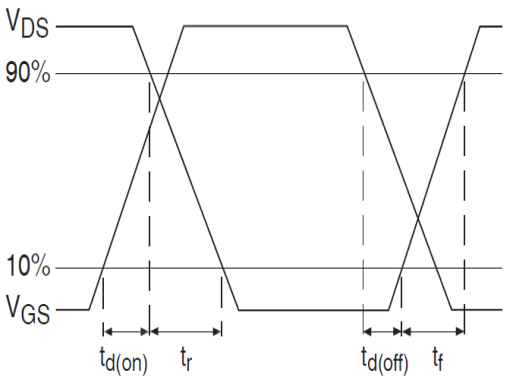


Fig 15b. Switching Time Waveforms

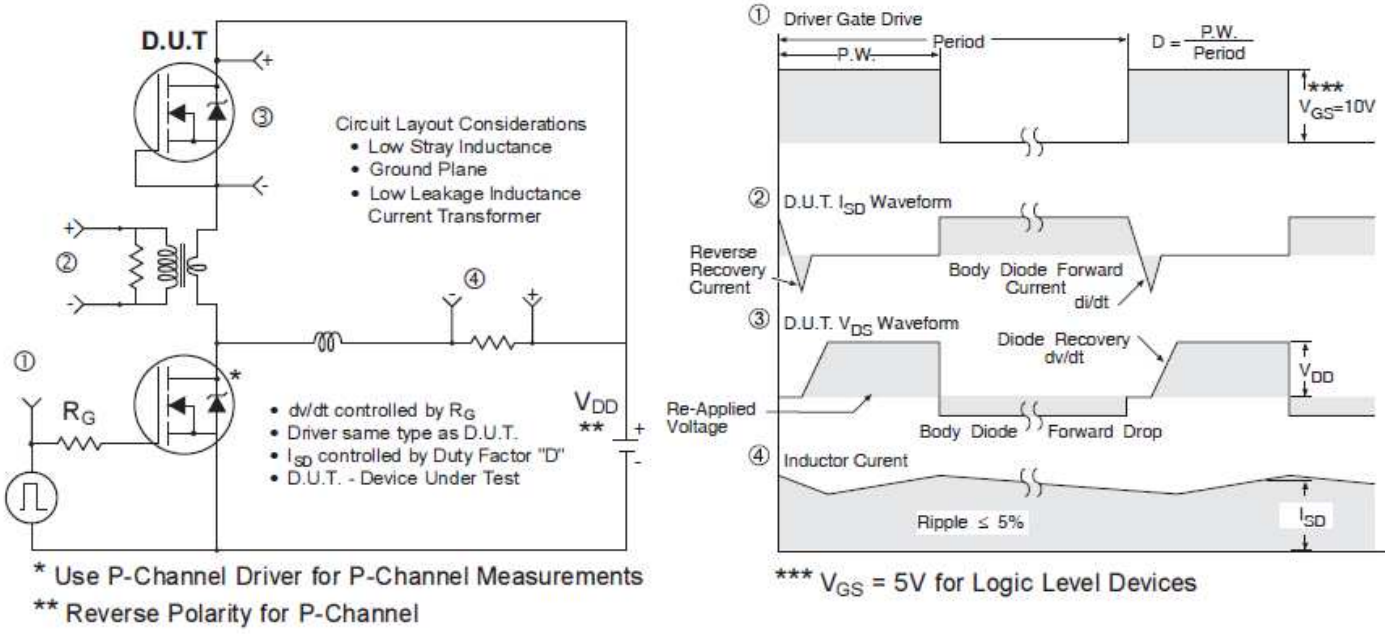


Fig 16. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

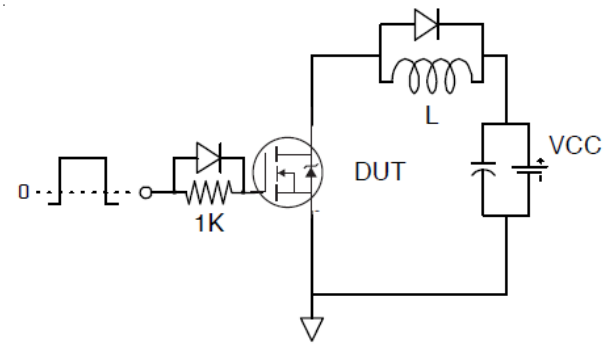


Fig 17. Gate Charge Test Circuit

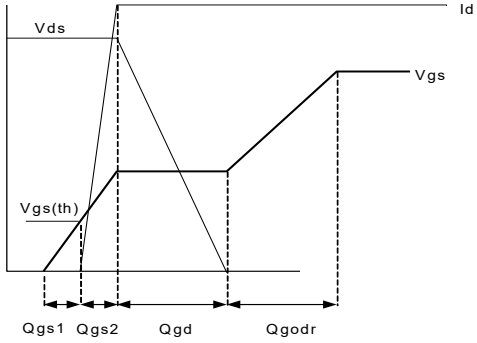
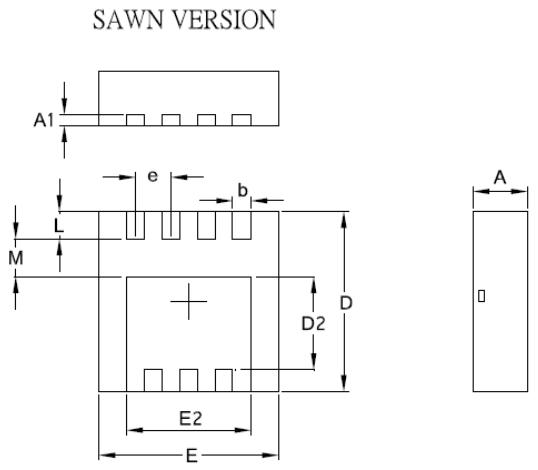


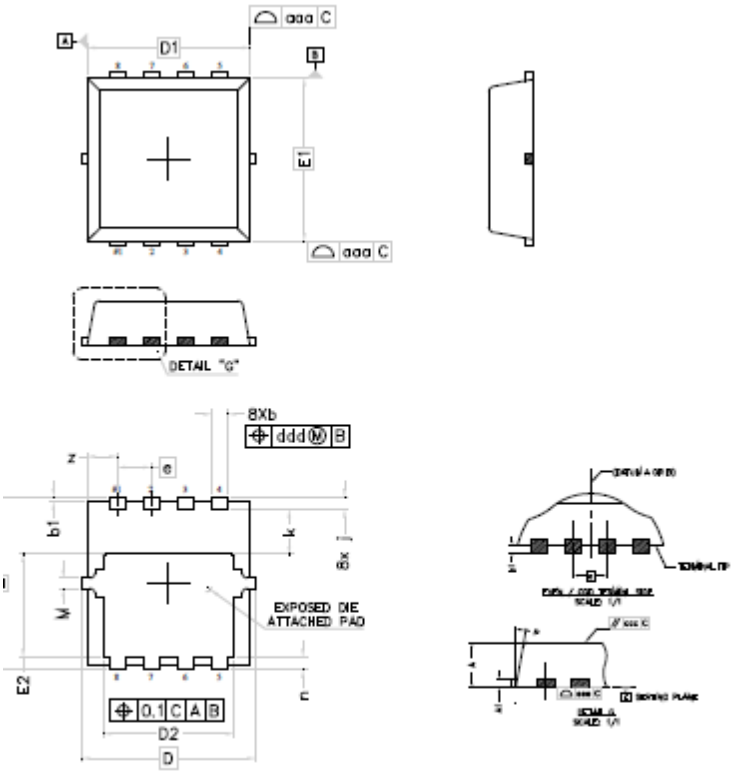
Fig 18. Gate Charge Waveform

PQFN 3.3 x 3.3 Outline “B” 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

PQFN 3.3 x 3.3 Outline “G” Package Details

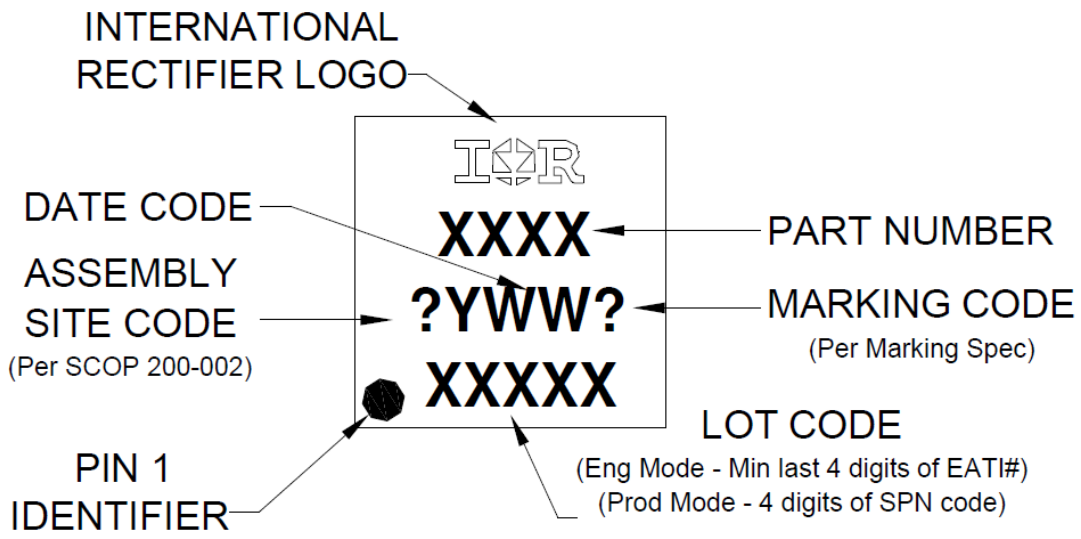


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	0.90	.0315	.0354
A1	0.12	0.22	.0047	.0086
b	0.22	0.42	.0087	.0165
b1	0.05	0.15	.0020	.0059
D	3.30 BSC		.1299 BSC	
D1	3.10 BSC		.1220 BSC	
D2	2.29	2.69	.0902	.1059
E	3.30 BSC		.1299 BSC	
E1	3.10 BSC		.1220 BSC	
E2	1.85	2.05	.0728	.0807
e	0.65 BSC		.0255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

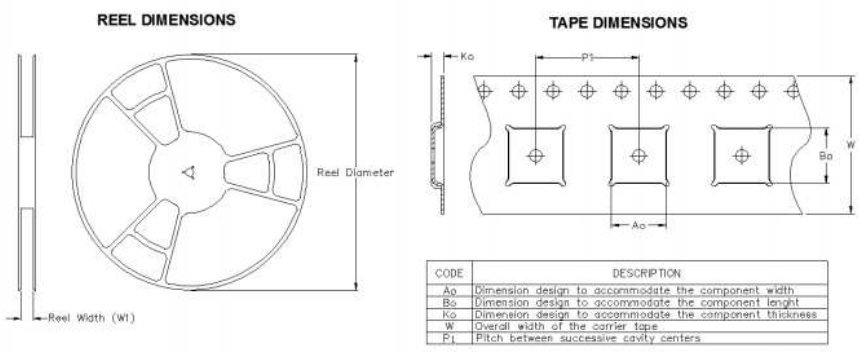
Note: For the most current drawing please refer to website at http://www.irf.com/packaging

PQFN 3.3 x 3.3 Part Marking



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

PQFN 3.3 x 3.3 Tape and Reel



Note : All dimension are in nominal

Package Type	Reel Diameter (inch)	QTY	Reel Width W1 (mm)	Ao (mm)	Bo (mm)	Ko (mm)	P1 (mm)	W (mm)	Pin 1 Quadrant
3.3x3.3	13	4000	12.4	3.60	3.60	1.20	8.00	12	Q1

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

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 = 0.41mH, R_G = 50Ω, I_{AS} = 12A.
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:
http://www.irf.com/technical-info/appnotes/an-994.pdf
⑥ Rating refers to the product only with datasheet specified absolute maximum values, maintaining case temperature at 25°C. For higher case temperature please refer to Diagram 9. De-rating will be required based on the actual environmental conditions.

Revision History

Date	Rev.	Comments
12/16/2013	2.1	• Updated ordering information to reflect the End-Of-Life (EOL) of the mini-reel option (EOL notice #259). • Updated data sheet with the new IR corporate template.
06/06/2014	2.2	• Updated schematic on page1 • Updated part marking on page 7. • Updated Tape and Reel on page 8.
09/25/2015	2.3	• Updated package outline to reflect the PCN # (67-PCN90-Public-R2) for “option B” and added package outline for “option G” on page 7 • Updated "IFX" logo on all pages.
03/17/2021	2.4	• Updated datasheet based on IFX template. • Updated Datasheet based on new current rating and application note : App-AN_1912_PL51_2001_180356 • Removed “HEXFET® Power MOSFET” added “IR MOSFET™ “-page1

Edition 2016-04-16
Published by
Infineon Technologies AG
81726 Munich, Germany

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Document reference
ifx1

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