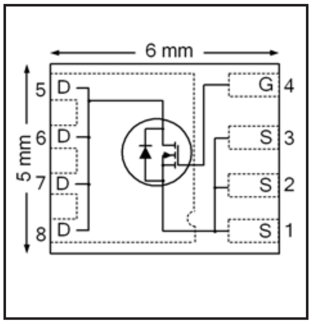
PD - 97493C

International
IOR Rectifier

IRFH6200PbF

HEXFET® Power MOSFET

V_{DS}	20	V
$R_{DS(on)}$ max (@V_{GS} = 4.5V)	1.20	mΩ
Q_g (typical)	155	nC
R_G (typical)	1.3	Ω
I_D (@T_{mb} = 25°C)	100⑥	A



PQFN 5X6 mm

Applications

- Charge and discharge switch for battery application
- Load switch for 12V (typical) bus

Features and Benefits

Features		Benefits
Low R_{DSon} (≤ 1.20mΩ)		Lower Conduction Losses
Low Thermal Resistance to PCB (≤ 0.8°C/W)		Enable better thermal dissipation
Low Profile (≤ 0.9 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

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRFH6200TRPBF	PQFN 5mm x 6mm	Tape and Reel	4000	
IRFH6200TR2PBF	PQFN 5mm x 6mm	Tape and Reel	400	

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	20	V
V_{GS}	Gate-to-Source Voltage	±12	
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	45	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	36	
I_D @ T_{mb} = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	100⑥	
I_D @ T_{mb} = 100°C	Continuous Drain Current, V_{GS} @ 4.5V	100⑥	
I_{DM}	Pulsed Drain Current ①	400	
P_D @T_A = 25°C	Power Dissipation ⑤	3.6	W
P_D @T_{mb} = 25°C	Power Dissipation ⑤	156	
	Linear Derating Factor ⑤	0.029	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Notes ① through ⑥ are on page 8

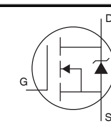
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	20	—	—	V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	6.4	—	mV/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.80	1.20	mΩ	V_{GS} = 4.5V, I_D = 50A ③
		—	1.10	1.50		V_{GS} = 2.5V, I_D = 50A ③
$V_{GS(th)}$	Gate Threshold Voltage	0.5	0.8	1.1	V	V_{DS} = V_{GS}, I_D = 150μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-6.6	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	V_{DS} = 16V, V_{GS} = 0V
		—	—	150		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -12V
gfs	Forward Transconductance	260	—	—	S	V_{DS} = 10V, I_D = 50A
Q_g	Total Gate Charge	—	155	230	nC	V_{DS} = 10V
Q_{gs}	Gate-to-Source Charge	—	22	—		V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	—	53	—		I_D = 50A (See Fig.17 & 18)
R_G	Gate Resistance	—	1.3	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	V_{DD} = 10V, V_{GS} = 4.5V
t_r	Rise Time	—	74	—		I_D = 50A
$t_{d(off)}$	Turn-Off Delay Time	—	140	—		R_G=1.0Ω
t_f	Fall Time	—	160	—		See Fig.15
C_{iss}	Input Capacitance	—	10890	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	2890	—		V_{DS} = 10V
C_{rss}	Reverse Transfer Capacitance	—	2180	—		f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	780	mJ
I_{AR}	Avalanche Current ①	—	30	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	100	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	400		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	T_J = 25°C, I_S = 50A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	86	130	ns	T_J = 25°C, I_F = 50A, V_{DD} = 10V
Q_{rr}	Reverse Recovery Charge	—	350	525	nC	di/dt = 260A/μs ③
t_{on}	Forward Turn-On Time	Time is dominated by parasitic Inductance				

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC\text{-}mb}$	Junction-to-Mounting Base	0.5	0.8	°C/W
$R_{\theta JC}$ (Top)	Junction-to-Case ④	—	15	
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	35	
$R_{\theta JA}$ (<10s)	Junction-to-Ambient ⑤	—	22	

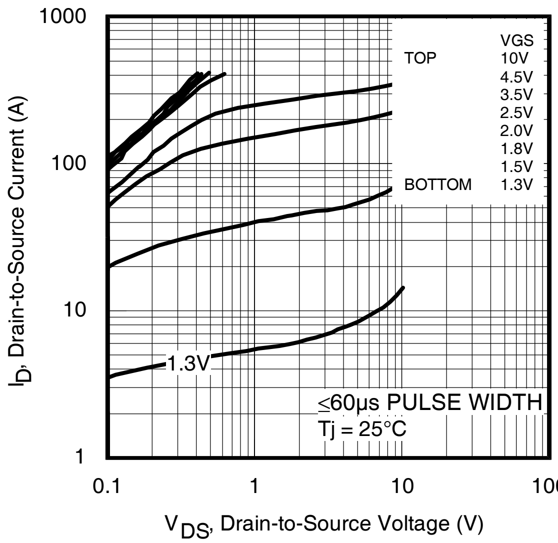


Fig 1. Typical Output Characteristics

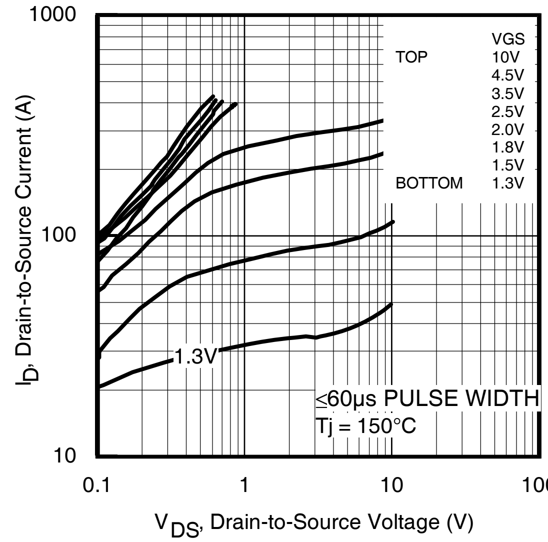


Fig 2. Typical Output Characteristics

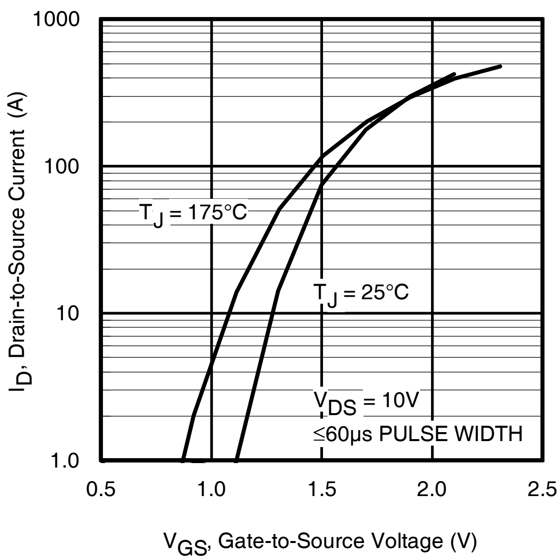


Fig 3. Typical Transfer Characteristics

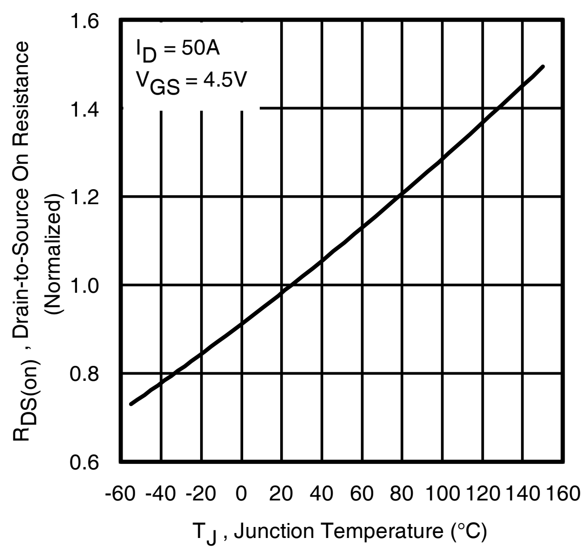


Fig 4. Normalized On-Resistance vs. Temperature

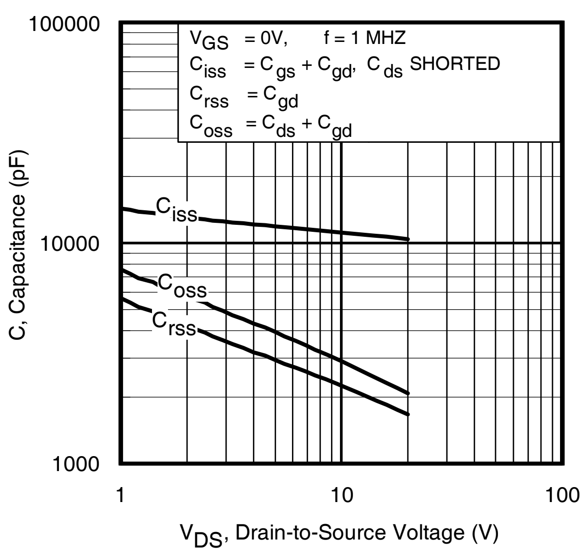


Fig 5. Typical Capacitance vs.Drain-to-Source Voltage

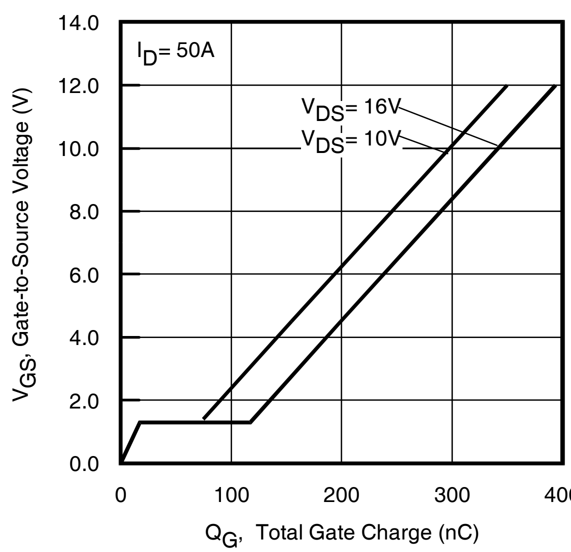


Fig 6. Typical Gate Charge vs.Gate-to-Source Voltage

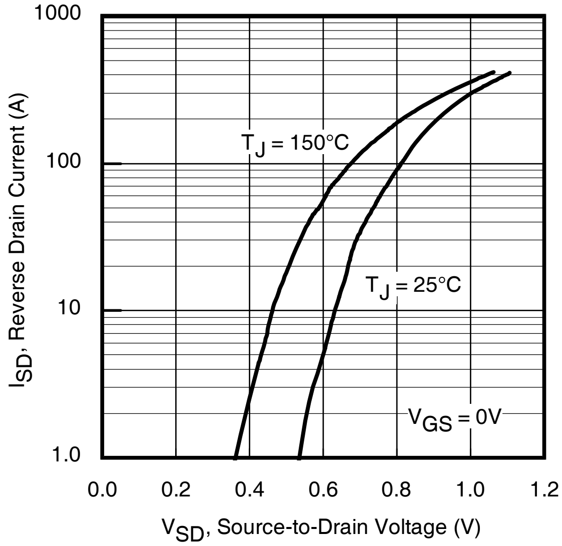


Fig 7. Typical Source-Drain Diode Forward Voltage

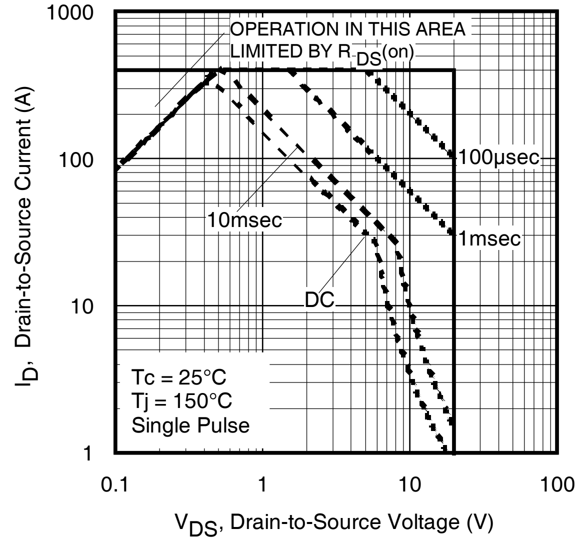


Fig 8. Maximum Safe Operating Area

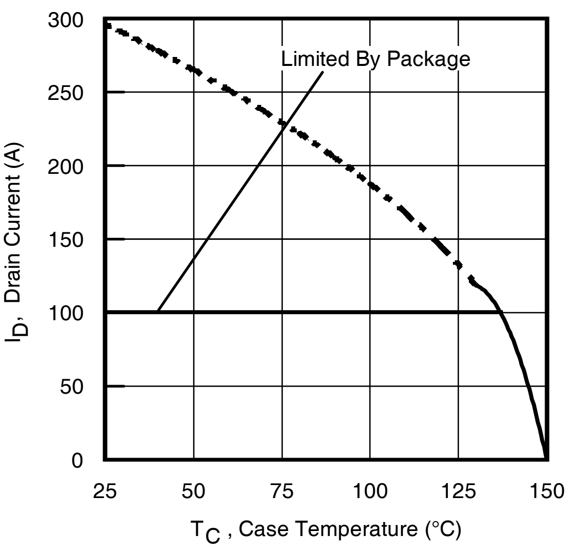


Fig 9. Maximum Drain Current vs. Case Temperature

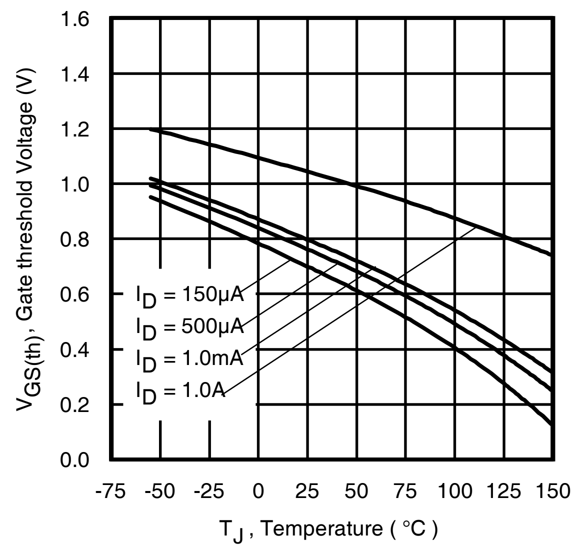


Fig 10. Threshold Voltage vs. Temperature

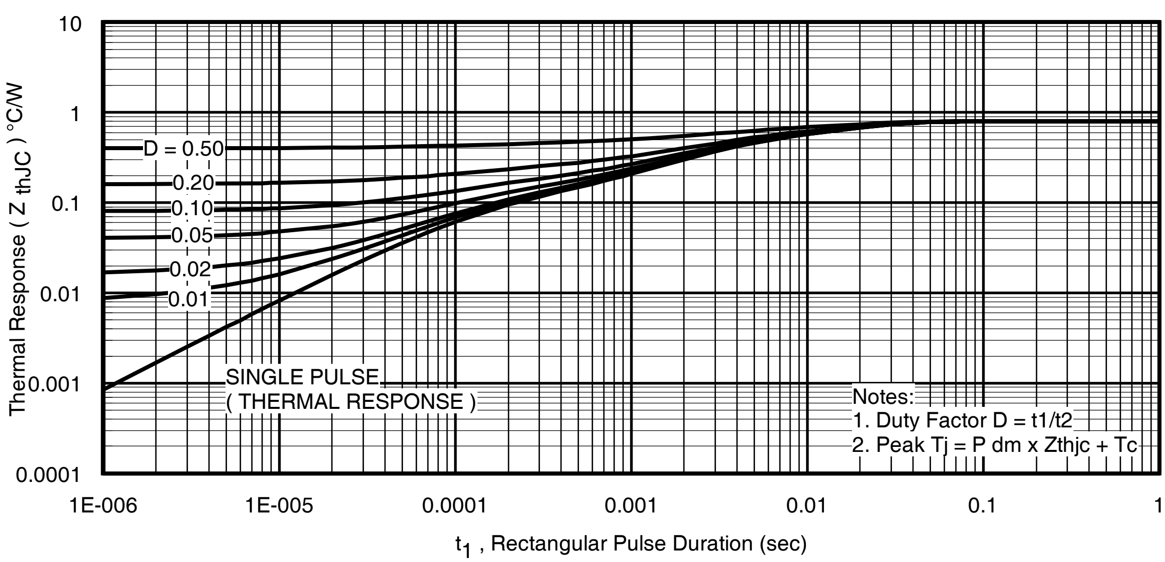


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Mounting Base

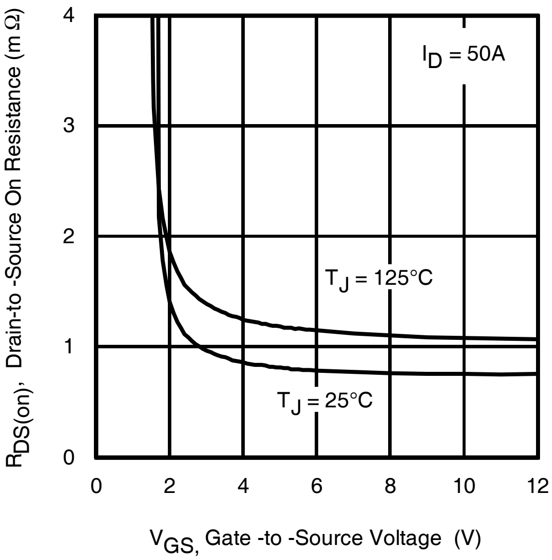


Fig 12. On-Resistance vs. Gate Voltage

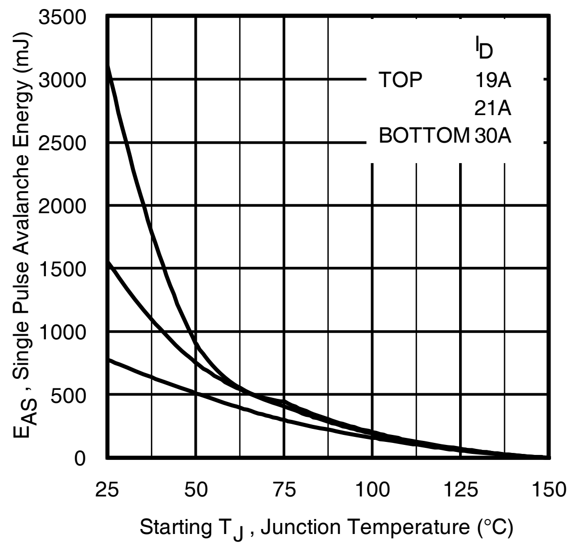


Fig 13. Maximum Avalanche Energy vs. Drain Current

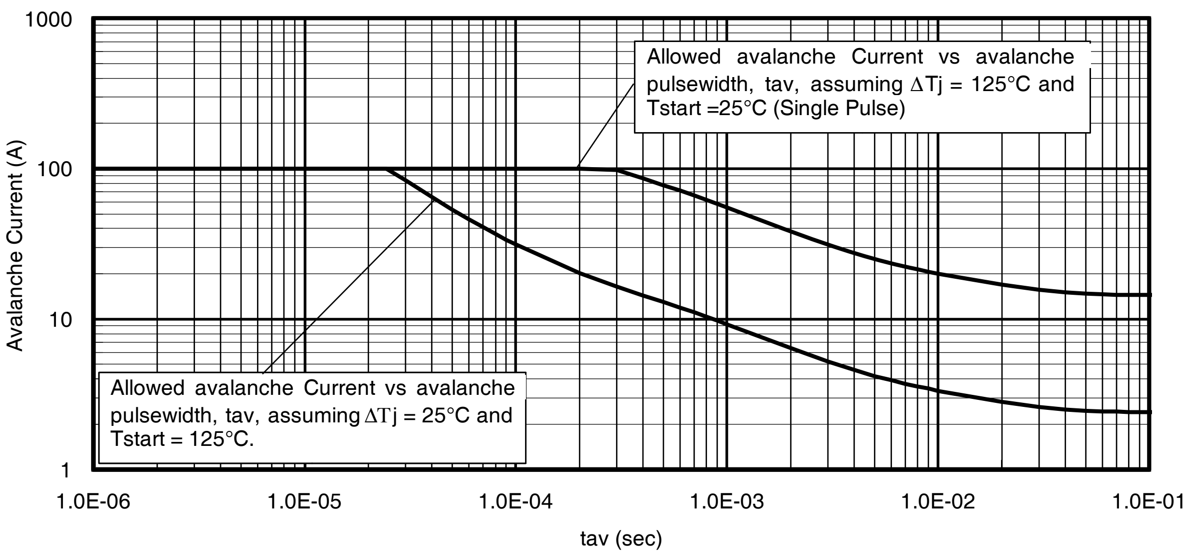


Fig 14. Typical Avalanche Current vs. Pulsewidth

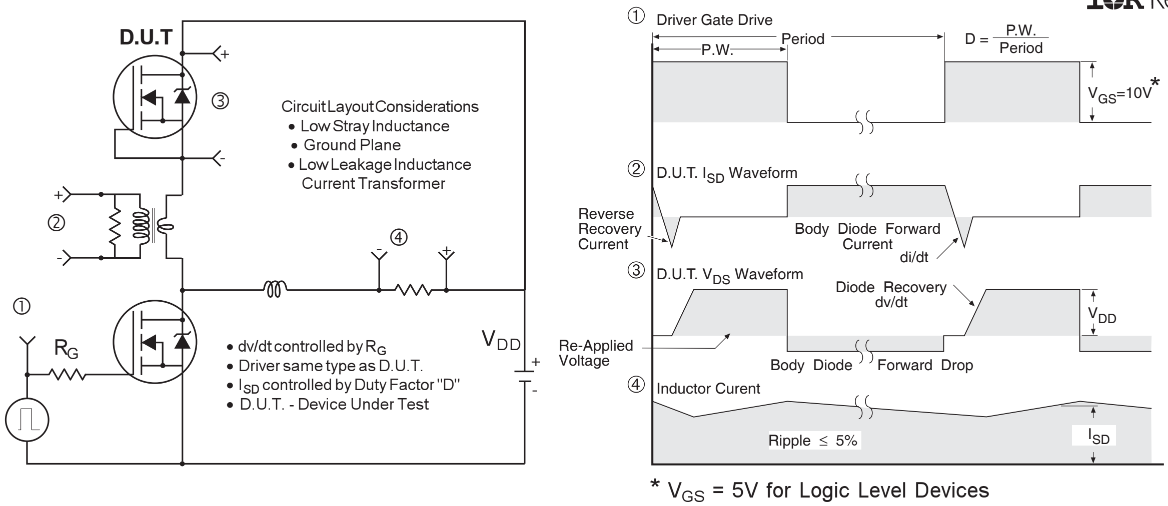


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

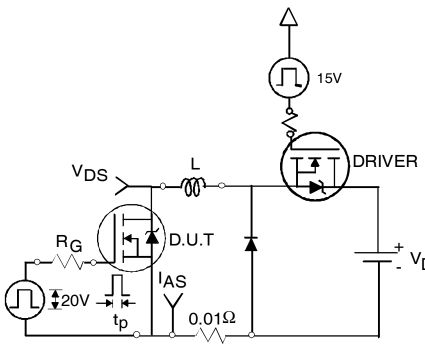


Fig 16a. Unclamped Inductive Test Circuit

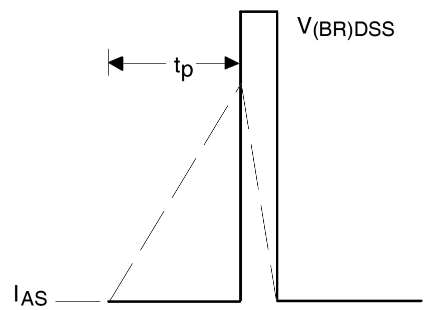


Fig 16b. Unclamped Inductive Waveforms

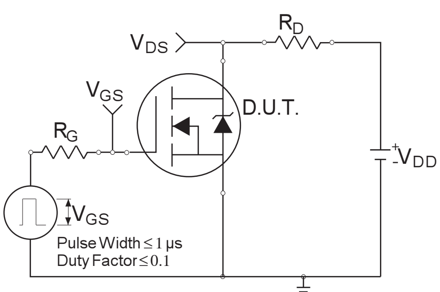


Fig 17a. Switching Time Test Circuit

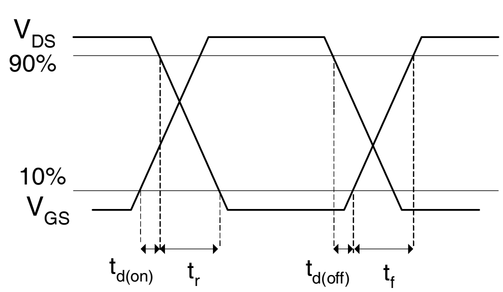


Fig 17b. Switching Time Waveforms

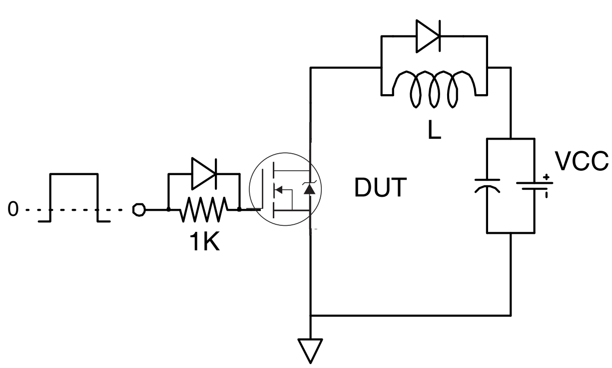


Fig 18a. Gate Charge Test Circuit

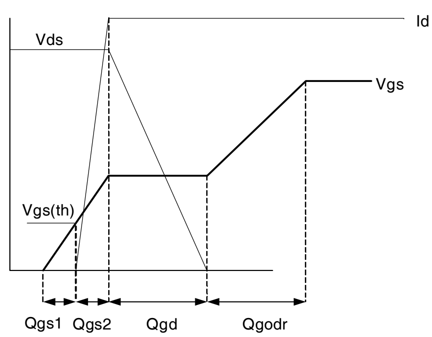
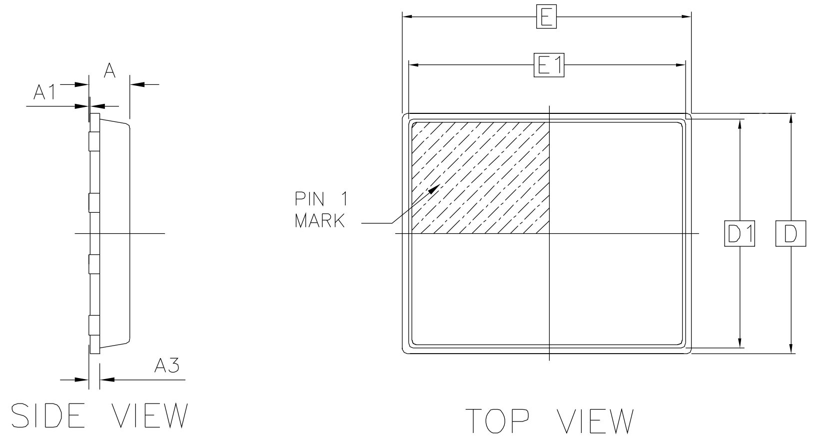
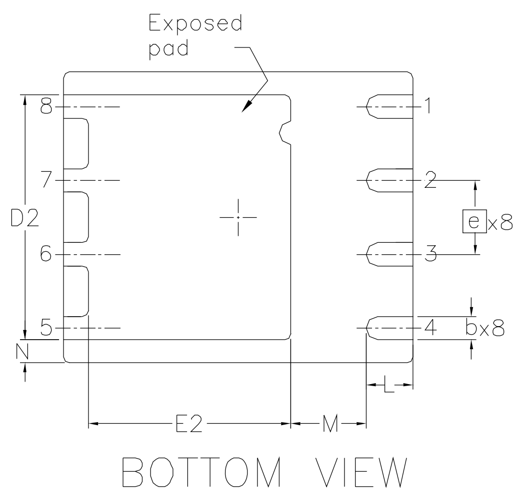


Fig 18b. Gate Charge Waveform

PQFN 5x6 Outline "B" Package Details

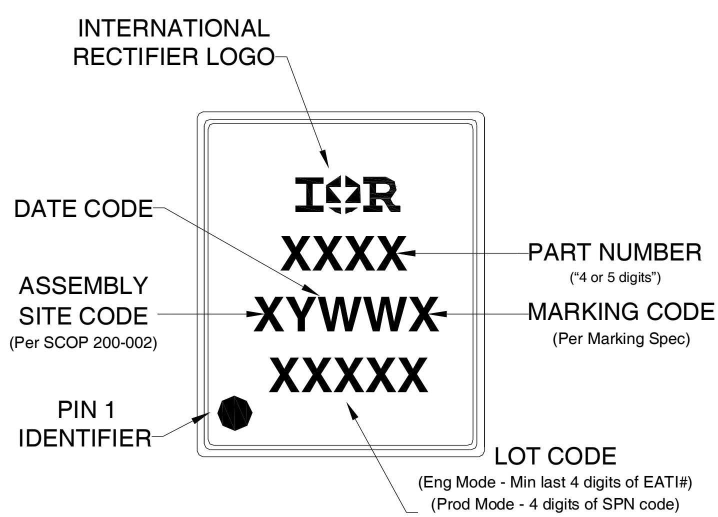


OUTLINE PQFN 5x6B			
SYMBOL \ DIM	MIN	NOM	MAX
A	0.80	0.83	0.90
A1	0	0.020	0.05
A3		0.20 REF	
b	0.35	0.40	0.47
D		5.00 BSC	
D1		4.75 BSC	
D2	4.10	4.21	4.30
e		1.27 BSC	
E		6.00 BSC	
E1		5.75 BSC	
E2	3.38	3.48	3.58
L	0.70	0.80	0.90
M		1.30 REF	
N		0.40 REF	



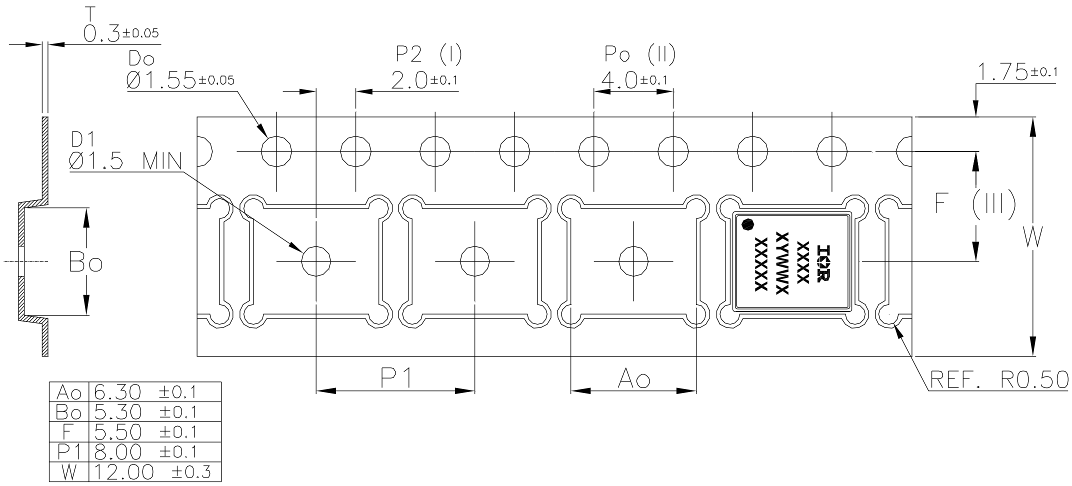
For more information on board mounting, including footprint and stencil recommendation, please refer to application note AN-1136:
http://www.irf.com/technical-info/appnotes/an-1136.pdf
For more information on package inspection techniques, please refer to application note AN-1154:
http://www.irf.com/technical-info/appnotes/an-1154.pdf

PQFN 5x6 Outline "B" Part Marking



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

PQFN 5x6 Outline "B" Tape and Reel



Qualification information†

Qualification level	Industrial†† (per JEDEC JESD47F ††† guidelines)	
Moisture Sensitivity Level	PQFN 5mm x 6mm	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 = 1.7mH, R_G = 25Ω, I_{AS} = 30A.
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. Package is limited to 100A by production test capability.

Data and specifications subject to change without notice.

International Rectifier

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