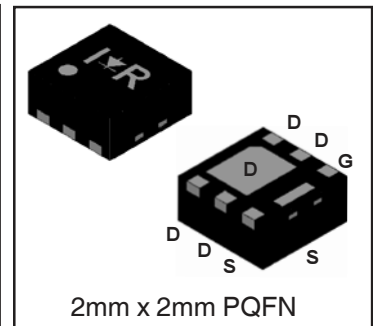
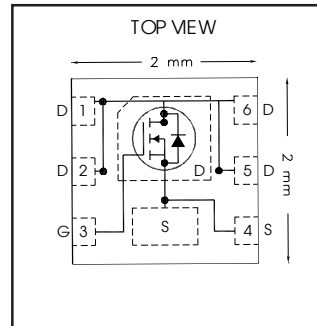


HEXFET® Power MOSFET

V_{DS}	30	V
V_{GS}	±12	V
$R_{DS(on)}$ max (@ $V_{GS} = 4.5V$)	15.5	mΩ
Q_g (typical)	11	nC
I_D (@ $T_{C(Bottom)} = 25°C$)	12⑦	A



Applications

- Charge and discharge switch for battery application
- System/Load Switch

Features and Benefits

Features

Low $R_{DS(on)}$ ($\leq 15.5m\Omega$)
Low Thermal Resistance to PCB ($\leq 13°C/W$)
Low Profile (≤ 0.9 mm)
Compatible with Existing Surface Mount Techniques
RoHS Compliant Containing no Lead, no Bromide and no Halogen
MSL1, Industrial Qualification

results in

Resulting Benefits

Lower Conduction Losses
Enable better thermal dissipation
Increased Power Density
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRLHS6342TRPbF	PQFN 2mm x 2mm	Tape and Reel	4000	
IRLHS6342TR2PbF	PQFN 2mm x 2mm	Tape and Reel	400	EOL notice # 259

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	±12	V
I_D @ $T_A = 25°C$	Continuous Drain Current, V_{GS} @ 10V	8.7	A
I_D @ $T_A = 70°C$	Continuous Drain Current, V_{GS} @ 10V	6.9	
I_D @ $T_{C(Bottom)} = 25°C$	Continuous Drain Current, V_{GS} @ 10V	19⑦	
I_D @ $T_{C(Bottom)} = 70°C$	Continuous Drain Current, V_{GS} @ 10V	15⑦	
I_D @ $T_{C(Bottom)} = 25°C$	Continuous Drain Current, V_{GS} @ 10V (Wirebond Limited)	12⑦	
I_{DM}	Pulsed Drain Current ①	76	
P_D @ $T_A = 25°C$	Power Dissipation ⑤	2.1	W
P_D @ $T_A = 70°C$	Power Dissipation ⑤	1.3	
	Linear Derating Factor ⑤	0.02	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Notes ① through ⑦ are on page 2

Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

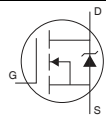
	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	22	—	mV/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	12.0	15.5	m Ω	$V_{GS} = 4.5V, I_D = 8.5A$ ③
		—	15.0	19.5		$V_{GS} = 2.5V, I_D = 8.5A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	0.5	—	1.1	V	$V_{DS} = V_{GS}, I_D = 10\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-4.2	—	mV/ $^\circ\text{C}$	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -12V$
g_{fs}	Forward Transconductance	39	—	—	S	$V_{DS} = 10V, I_D = 8.5A$
Q_g	Total Gate Charge	—	11	—	nC	$V_{DS} = 15V$
Q_{gs}	Gate-to-Source Charge	—	0.5	—		$V_{GS} = 4.5V$
Q_{gd}	Gate-to-Drain Charge	—	4.6	—		$I_D = 8.5A$ (See Fig. 6 & 17)
R_G	Gate Resistance	—	2.1	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	4.9	—	ns	$V_{DD} = 15V, V_{GS} = 4.5V$
t_r	Rise Time	—	13	—		$I_D = 8.5A$
$t_{d(off)}$	Turn-Off Delay Time	—	19	—		$R_G = 1.8\Omega$
t_f	Fall Time	—	13	—		See Fig. 18
C_{iss}	Input Capacitance	—	1019	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	97	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	70	—		$f = 1.0\text{MHz}$

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	14	mJ
I_{AR}	Avalanche Current ①	—	8.5	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	12 ⑦	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	76		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 8.5A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	11	17	ns	$T_J = 25^\circ\text{C}, I_F = 8.5A, V_{DD} = 15V$
Q_{rr}	Reverse Recovery Charge	—	13	20	nC	$di/dt = 300\text{A}/\mu s$ ③
t_{on}	Forward Turn-On Time	Time is dominated by parasitic Inductance				


Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (Bottom)	Junction-to-Case ⑤	—	13	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$ (Top)	Junction-to-Case ⑤	—	90	
$R_{\theta JA}$	Junction-to-Ambient ④	—	60	
$R_{\theta JA}$	Junction-to-Ambient (<10s) ④	—	42	

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.39\text{mH}$, $R_G = 50\Omega$, $I_{AS} = 8.5A$.
- ③ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- 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 Package is limited to 12A by die-source to lead-frame bonding technology

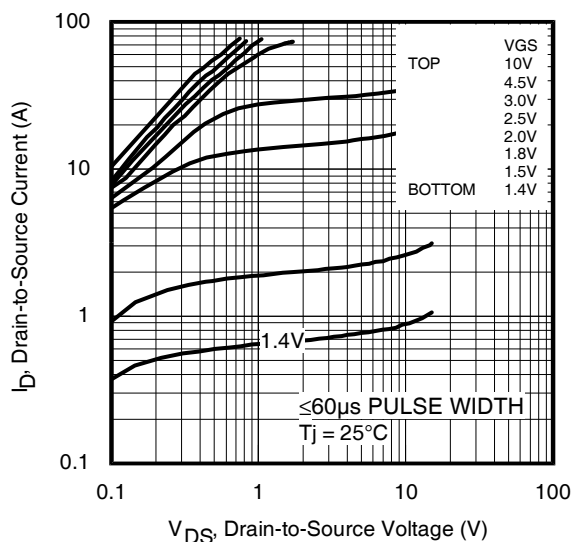


Fig 1. Typical Output Characteristics

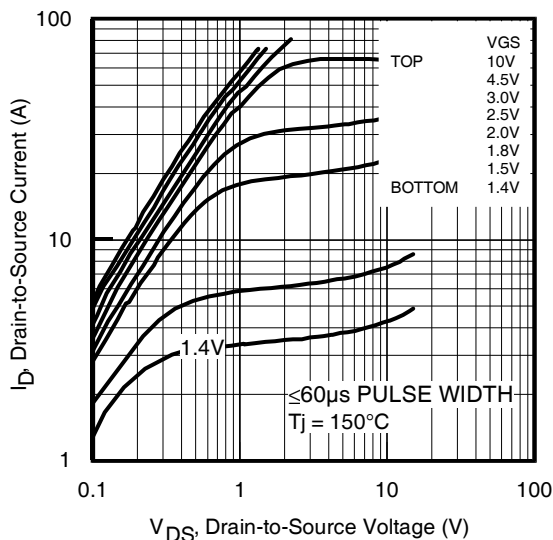


Fig 2. Typical Output Characteristics

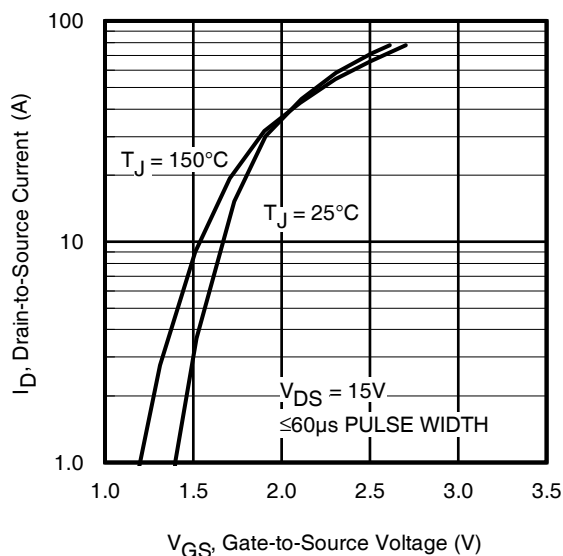


Fig 3. Typical Transfer Characteristics

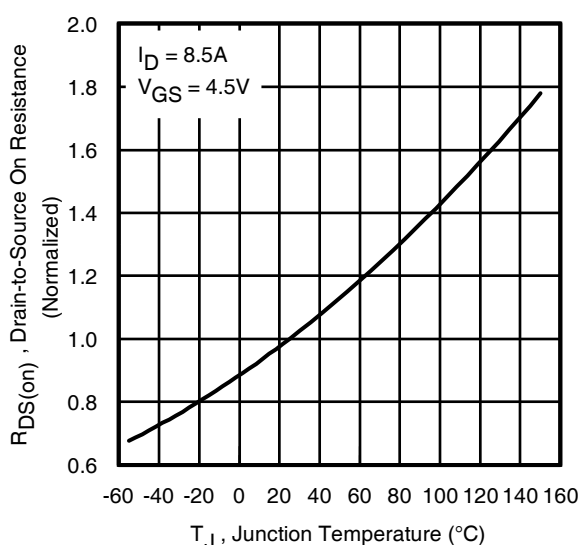


Fig 4. Normalized On-Resistance vs. Temperature

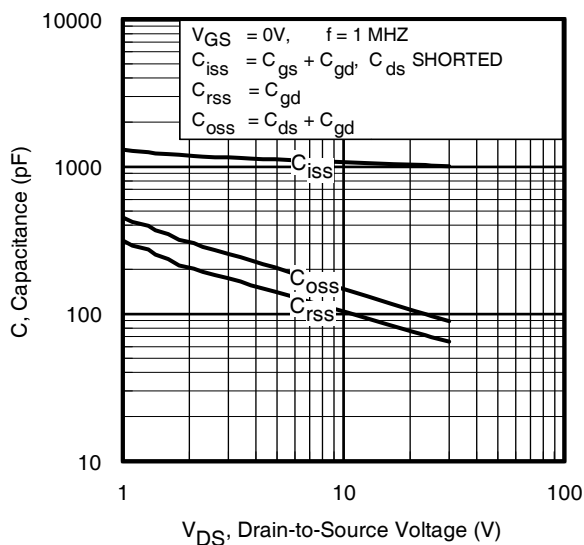


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

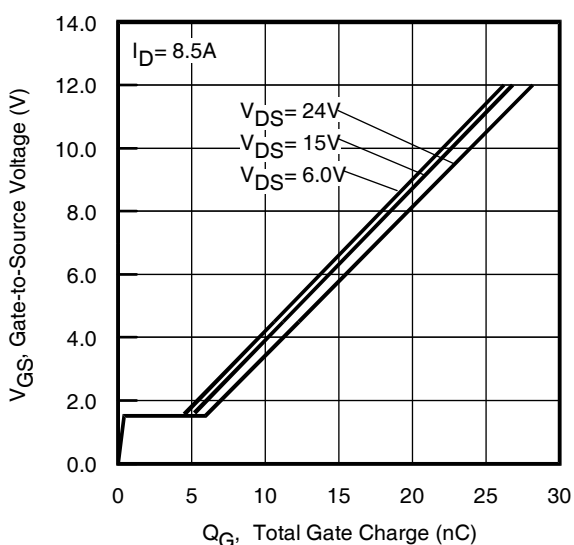


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

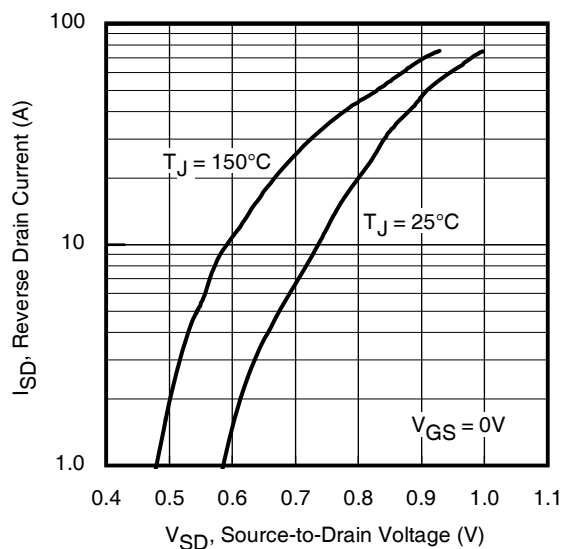


Fig 7. Typical Source-Drain Diode Forward Voltage

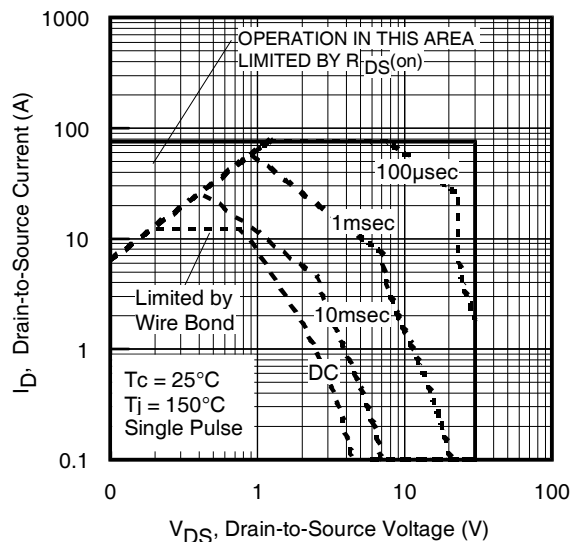


Fig 8. Maximum Safe Operating Area

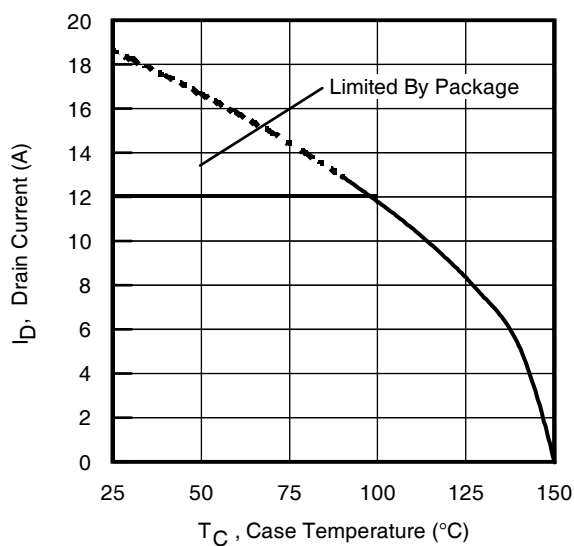


Fig 9. Maximum Drain Current vs. Case (Bottom) Temperature

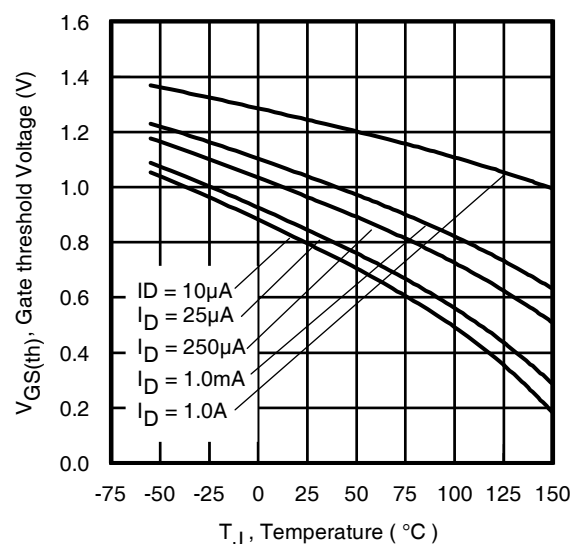


Fig 10. Threshold Voltage vs. Temperature

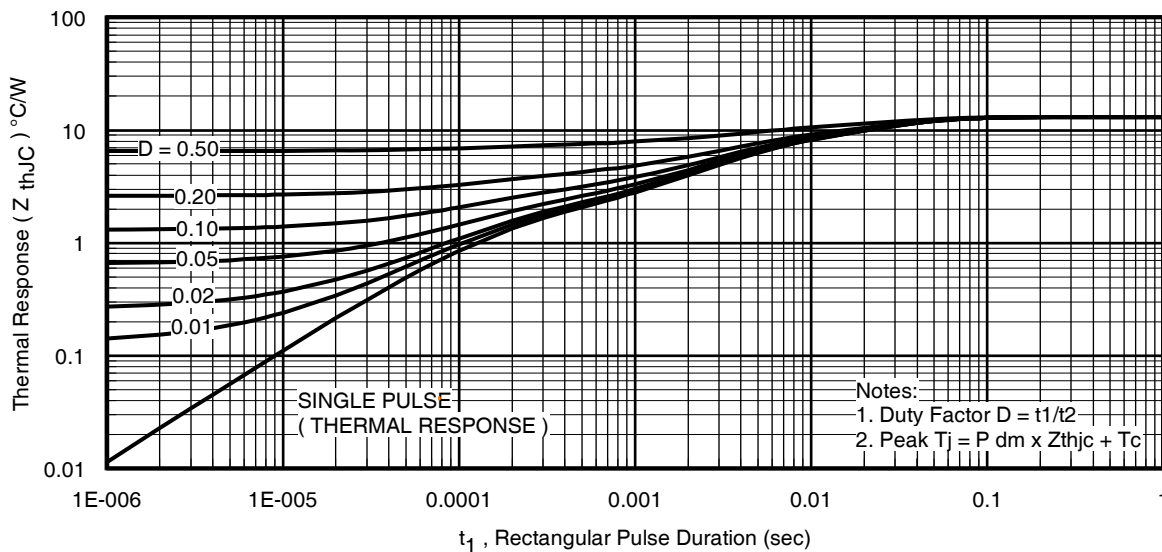


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case (Bottom)

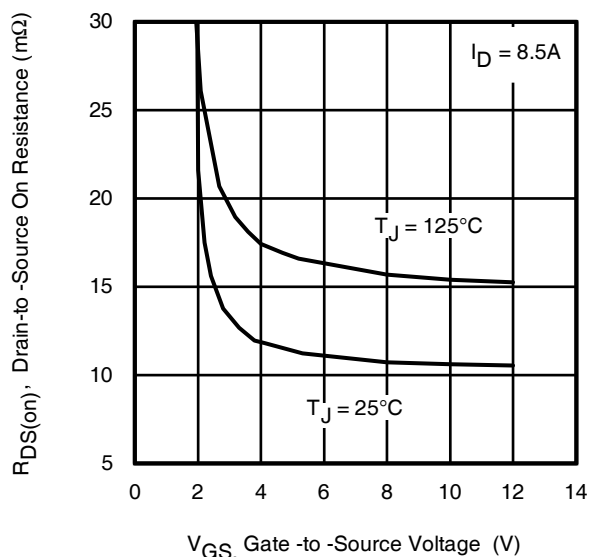


Fig 12. On-Resistance vs. Gate Voltage

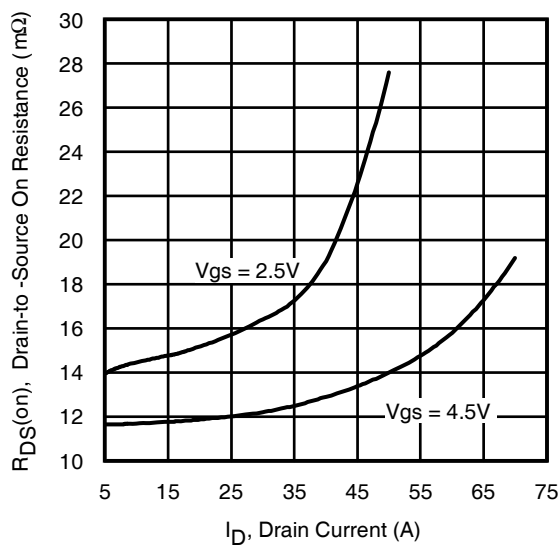


Fig 13. Typical On-Resistance vs. Drain Current

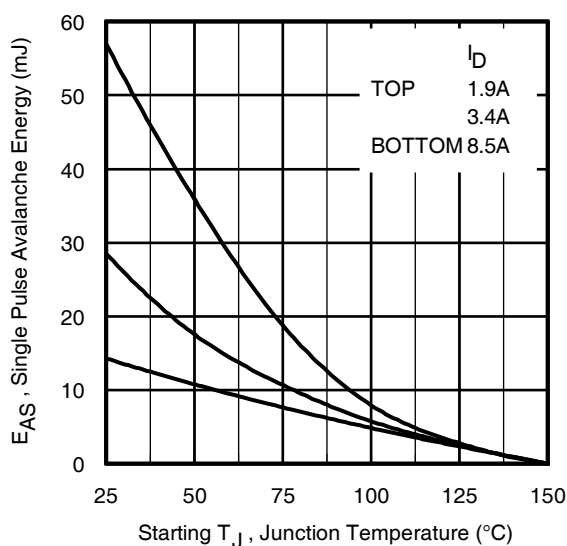


Fig 14. Maximum Avalanche Energy vs. Drain Current

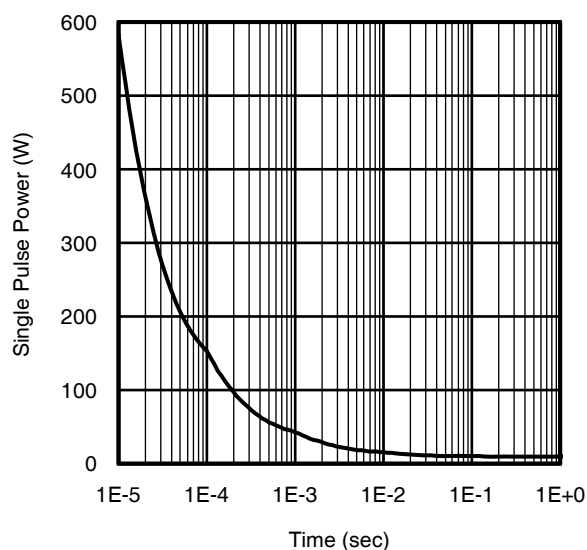
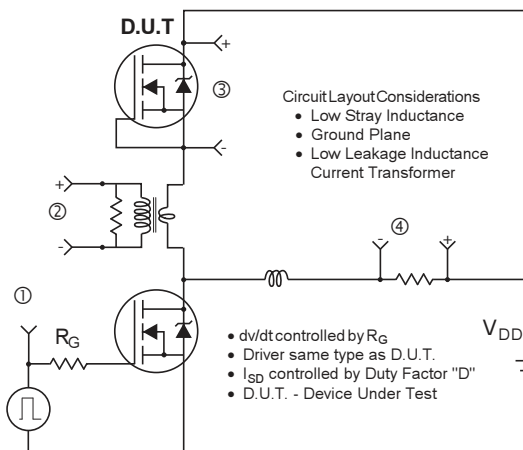
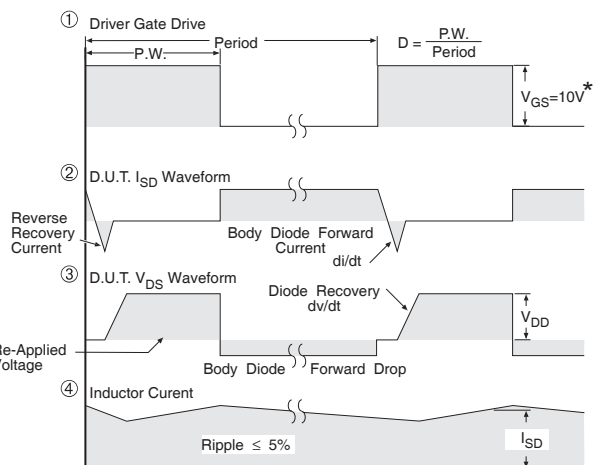
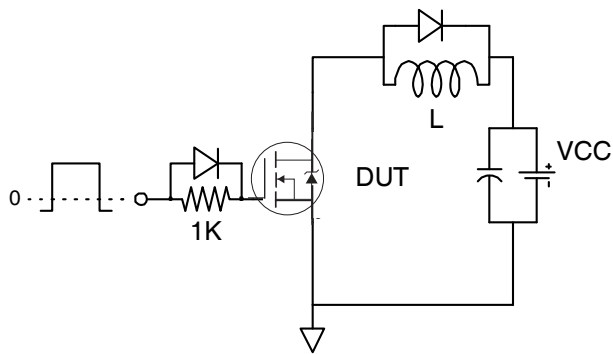
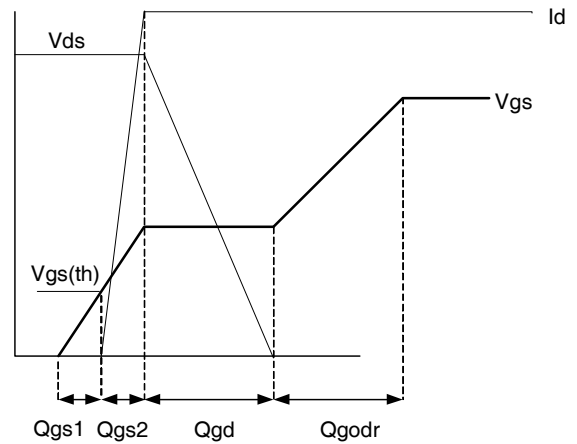
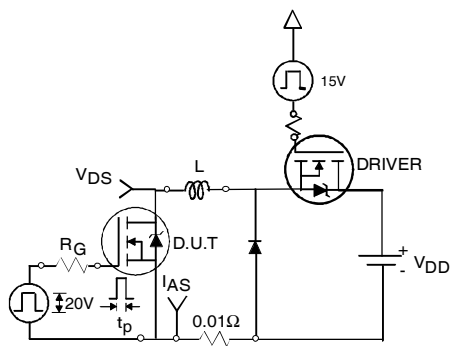
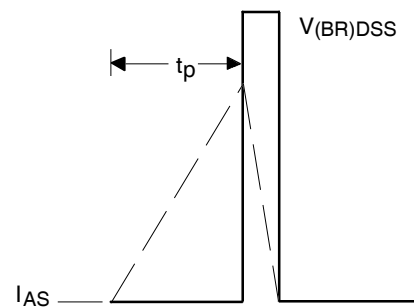
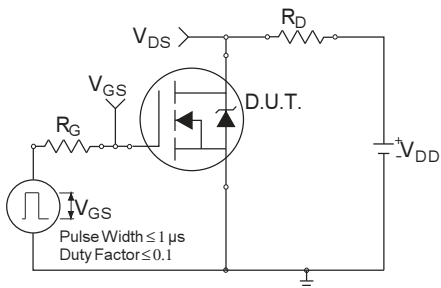
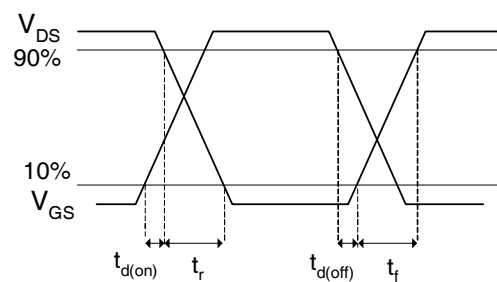


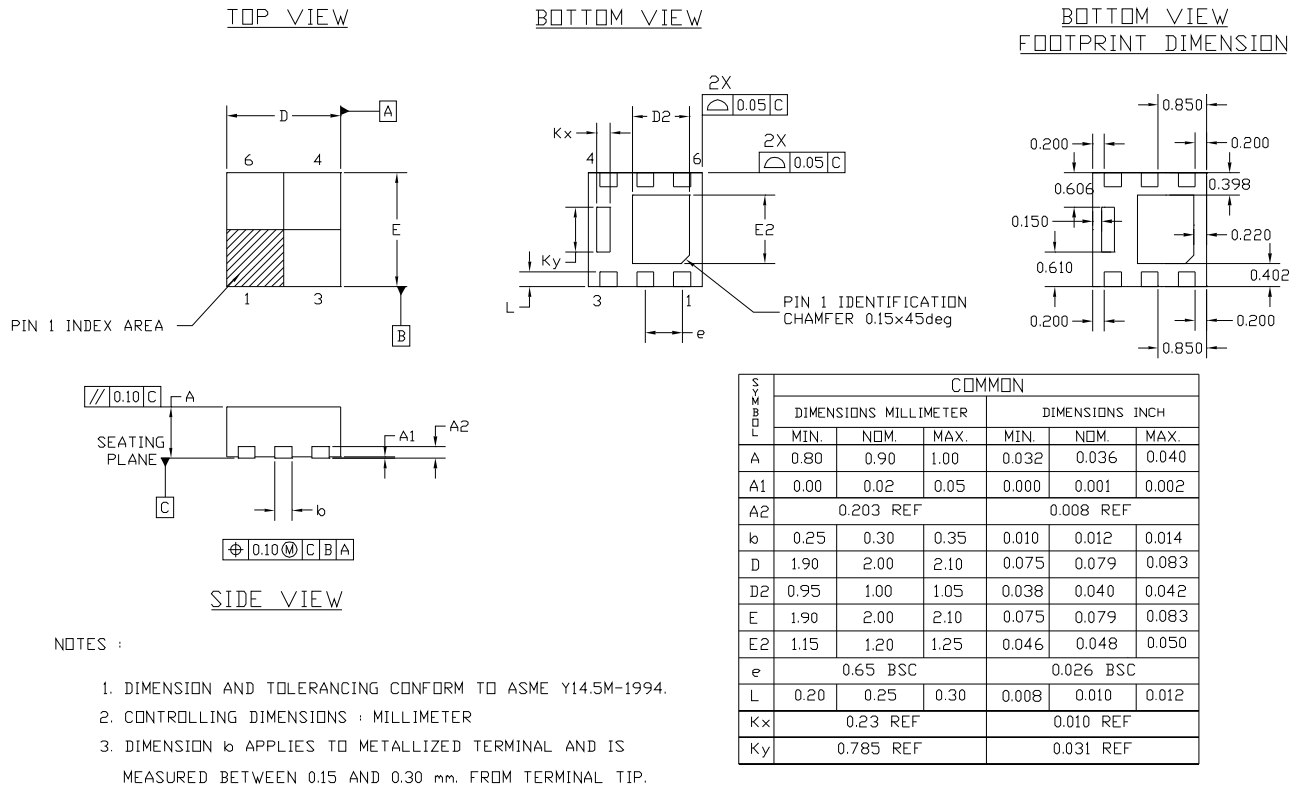
Fig 15. Typical Power vs. Time


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


* $V_{GS} = 5V$ for Logic Level Devices

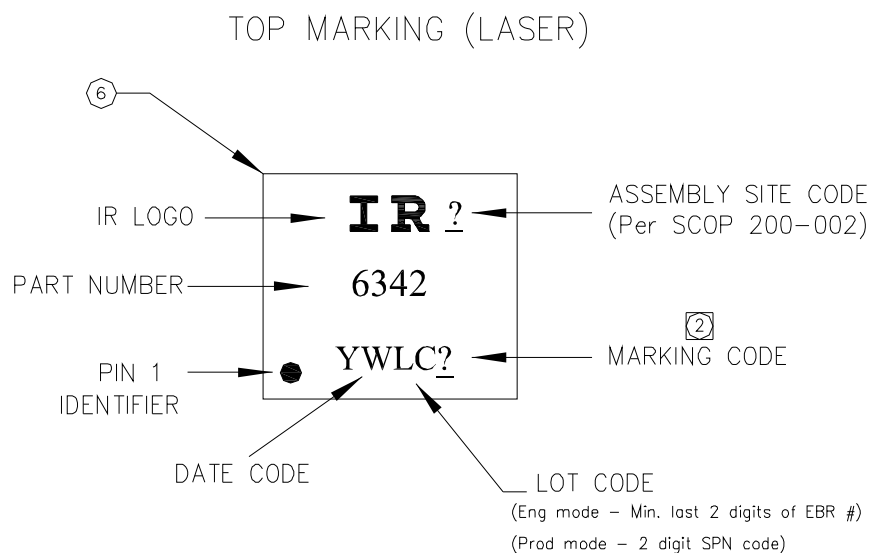

Fig 17a. Gate Charge Test Circuit

Fig 17b. Gate Charge Waveform

Fig 18a. Unclamped Inductive Test Circuit

Fig 18b. Unclamped Inductive Waveforms

Fig 19a. Switching Time Test Circuit

Fig 19b. Switching Time Waveforms

PQFN 2x2 Outline Package Details



For footprint and stencil design recommendations, please refer to application note AN-1154 at <http://www.irf.com/technical-info/appnotes/an-1154.pdf>

PQFN 2x2 Outline Part Marking



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

PQFN 2x2 Outline Tape and Reel

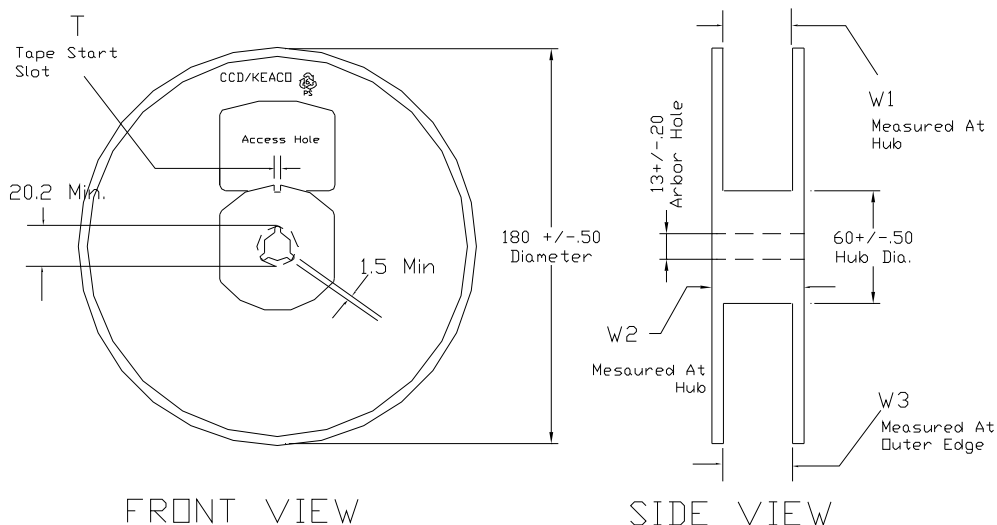
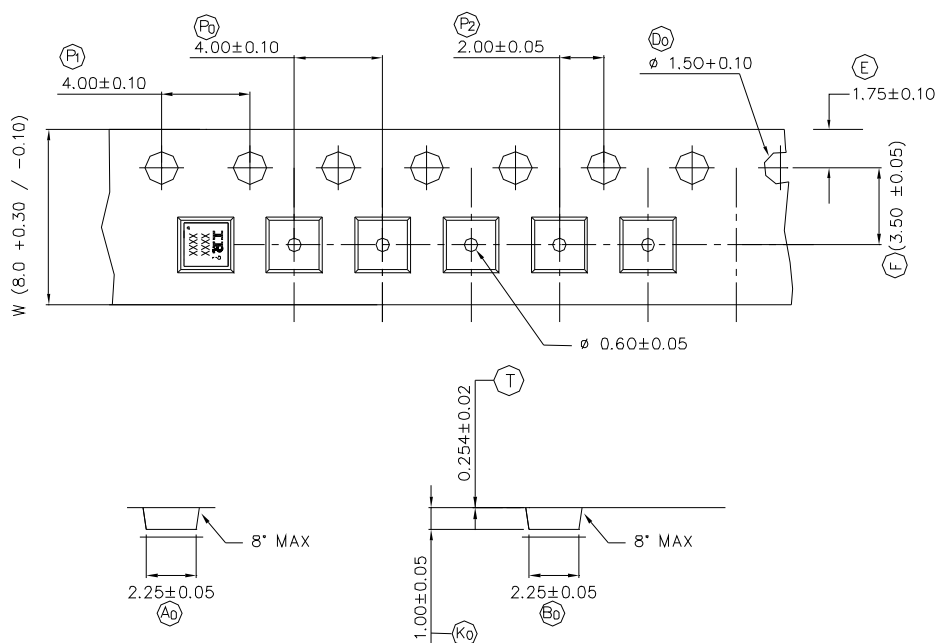


TABLE 1: REEL DETAILS

TAPE WIDTH	T	W1	W2	W3	PART NO
8 MM	3 ± 0.50	8.4 ^{+1.5} _{-0.0}	14.4 Max	7.90 Min 10.9 Max	91586-1
12 MM	5 ± 0.50	12.4 ^{+2.0} _{-0.0}	18.4 Max	11.9 Min 15.4 Max	91586-2

Note: Surface resistivity is $\geq 1 \times 10^5$ but $< 1 \times 10^{12}$ ohm/sq.



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

Qualification information[†]

Qualification level	Industrial [†] (per JEDEC JESD47F ^{††} guidelines)	
Moisture Sensitivity Level	PQFN 2mm x 2mm	MSL 1 (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>

^{††} Applicable version of JEDEC standard at the time of product release.

Revision History

Date	Comments
12/17/2013	- Updated ordering information to reflect the End-Of-life (EOL) of the mini-reel option (EOL notice #259) - Updated Qual level from "Consumer" to "Industrial" on page 1, 9 - Updated data sheet with new IR corporate template

International
 Rectifier

IR WORLD HEADQUARTERS: 101 N. Sepulveda Blvd., El Segundo, California 90245, USA
To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>

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