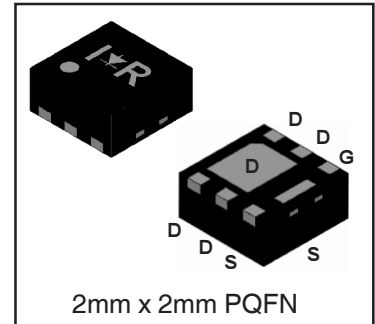
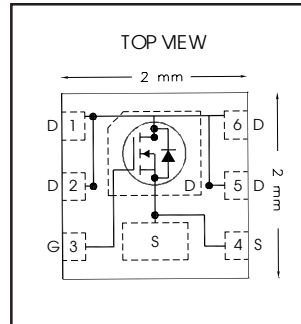


IRFHS8242PbF

HEXFET® Power MOSFET

| | | |
|--|--------------|-----------|
| V_{DS} | 25 | V |
| $V_{GS\ max}$ | ±20 | V |
| $R_{DS(on)\ max}$ (@ $V_{GS} = 10V$) | 13.0 | mΩ |
| Q_g (typical) (@ $V_{GS} = 4.5V$) | 4.3 | nC |
| I_D (@ $T_{c(Bottom)} = 25°C$) | 8.5 ② | A |



Applications

- System/Load Switch

Features and Benefits

Features

| |
|--|
| Low R_{DSon} ($\leq 13.0m\Omega$) |
| Low Thermal Resistance to PCB ($\leq 13°C/W$) |
| Low Profile ($\leq 1.0\ mm$) |
| Compatible with Existing Surface Mount Techniques |
| RoHS Compliant Containing no Lead, no Bromide and no Halogen |
| MSL1, Consumer 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 | |
| IRFHS8242TRPBF | PQFN 2mm x 2mm | Tape and Reel | 4000 | |
| IRFHS8242TR2PBF | PQFN 2mm x 2mm | Tape and Reel | 400 | |

Absolute Maximum Ratings

| | Parameter | Max. | Units |
|------------------------------|--|--------------|-------|
| V_{DS} | Drain-to-Source Voltage | 25 | V |
| V_{GS} | Gate-to-Source Voltage | ±20 | |
| $I_D @ T_A = 25°C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 9.9② | A |
| $I_D @ T_A = 70°C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 8.0 | |
| $I_D @ T_{c(Bottom)} = 25°C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 21③ | |
| $I_D @ T_{c(Bottom)} = 70°C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 17③ | |
| $I_D @ T_{c(Bottom)} = 25°C$ | Continuous Drain Current, $V_{GS} @ 10V$ (Package Limited) | 8.5② | |
| I_{DM} | Pulsed Drain Current ① | 84 | |
| $P_D @ T_A = 25°C$ | Power Dissipation ④ | 2.1 | W |
| $P_D @ T_A = 70°C$ | Power Dissipation ④ | 1.3 | |
| | Linear Derating Factor ④ | 0.02 | W/°C |
| T_J | Operating Junction and | -55 to + 150 | °C |
| T_{STG} | Storage Temperature Range | | |

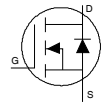
Notes ① through ⑥ are on page 2

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

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|------------------------------|--------------------------------------|------|------|------|-------|--|
| BV_{DSS} | Drain-to-Source Breakdown Voltage | 25 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| $\Delta BV_{DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 18 | — | mV/°C | Reference to 25°C , $I_D = 1mA$ |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | 10.0 | 13.0 | mΩ | $V_{GS} = 10V, I_D = 8.5A$ ② |
| | | — | 17.0 | 21.0 | | $V_{GS} = 4.5V, I_D = 6.8A$ ③ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 1.35 | 1.8 | 2.35 | V | $V_{DS} = V_{GS}, I_D = 25\mu A$ |
| $\Delta V_{GS(th)}$ | Gate Threshold Voltage Coefficient | — | -6.8 | — | mV/°C | |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | 1.0 | μA | $V_{DS} = 20V, V_{GS} = 0V$ |
| | | — | — | 150 | | $V_{DS} = 20V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | $V_{GS} = 20V$ |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | $V_{GS} = -20V$ |
| g_{fs} | Forward Transconductance | 19 | — | — | S | $V_{DS} = 10V, I_D = 8.5A$ ② |
| Q_g | Total Gate Charge ⑥ | — | 4.3 | — | nC | $V_{GS} = 4.5V, V_{DS} = 13V, I_D = 8.5A$ ② |
| Q_g | Total Gate Charge ⑥ | — | 10.4 | — | nC | $V_{DS} = 13V$ |
| Q_{gs} | Gate-to-Source Charge ⑥ | — | 1.8 | — | | $V_{GS} = 10V$ |
| Q_{gd} | Gate-to-Drain Charge ⑥ | — | 1.6 | — | | $I_D = 8.5A$ ② (See Fig. 6 & 16) |
| R_G | Gate Resistance | — | 1.9 | — | Ω | |
| $t_{d(on)}$ | Turn-On Delay Time | — | 6.5 | — | ns | $V_{DD} = 13V, V_{GS} = 4.5V$ ③ |
| t_r | Rise Time | — | 19 | — | | $I_D = 8.5A$ ② |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 5.4 | — | | $R_G = 1.8\Omega$ |
| t_f | Fall Time | — | 5.3 | — | | See Fig.17 |
| C_{iss} | Input Capacitance | — | 653 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output Capacitance | — | 171 | — | | $V_{DS} = 10V$ |
| C_{riss} | Reverse Transfer Capacitance | — | 78 | — | | $f = 1.0MHz$ |

Diode Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|---|---|------|-------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | 8.5 ② | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | 84 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.0 | V | $T_J = 25^\circ\text{C}, I_S = 8.5A$ ②, $V_{GS} = 0V$ ③ |
| t_{rr} | Reverse Recovery Time | — | 11 | 17 | ns | $T_J = 25^\circ\text{C}, I_F = 8.5A$ ②, $V_{DD} = 13V$ |
| Q_{rr} | Reverse Recovery Charge | — | 11 | 17 | nC | $di/dt = 280 A/\mu s$ 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 | °C/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 Current limited by package.
- ③ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board
- ⑤ R_{θ} is measured at T_J of approximately 90°C .
- ⑥ For DESIGN AID ONLY, not subject to production testing.

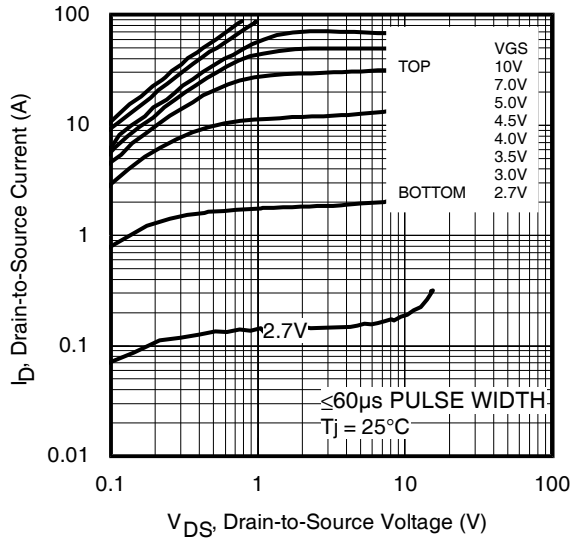


Fig 1. Typical Output Characteristics

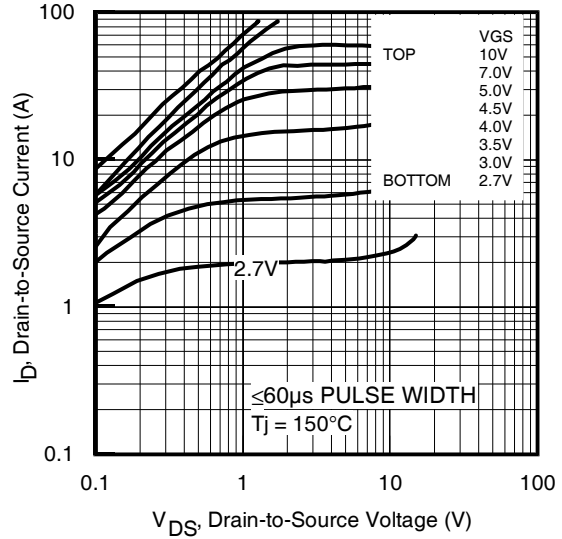


Fig 2. Typical Output Characteristics

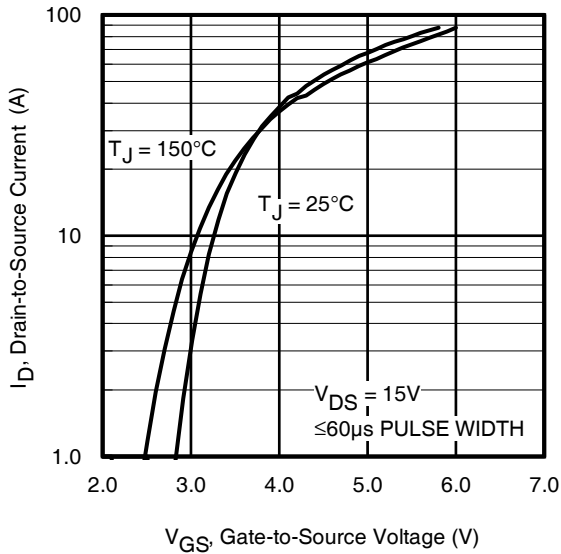


Fig 3. Typical Transfer Characteristics

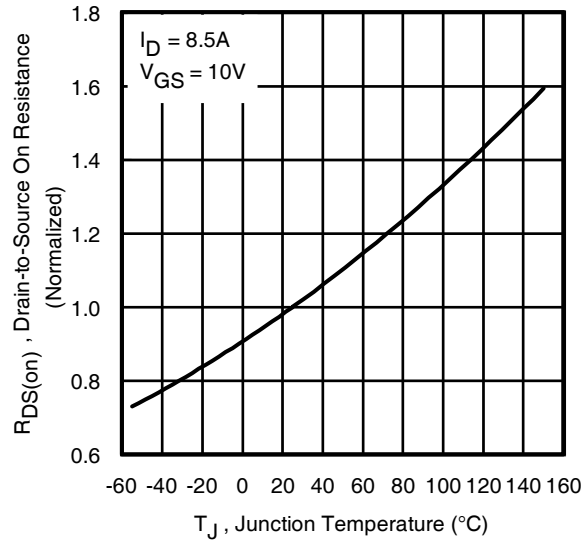


Fig 4. Normalized On-Resistance vs. Temperature

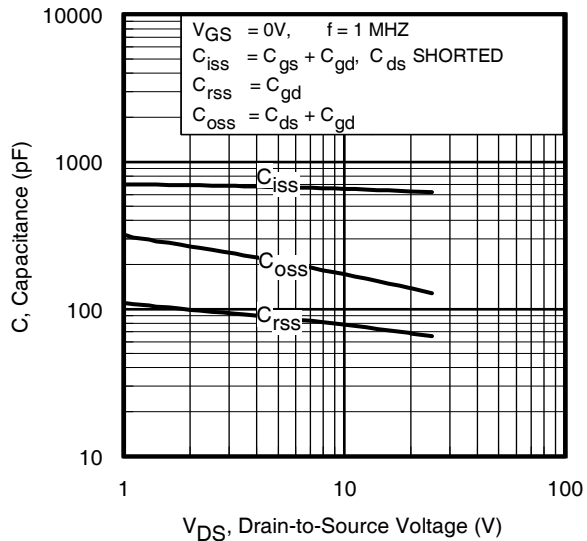


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage
www.irf.com

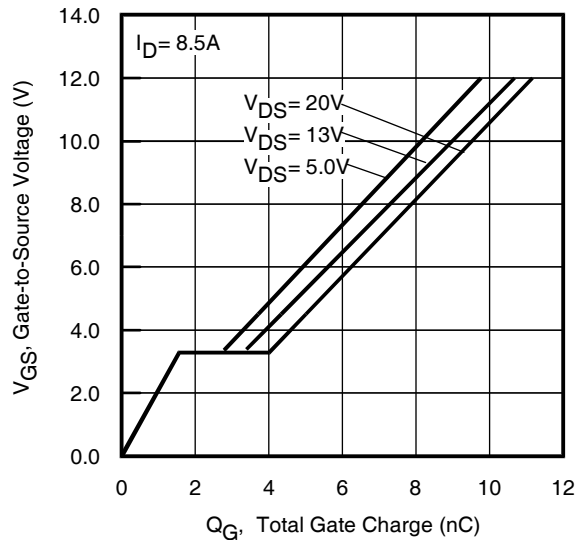


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

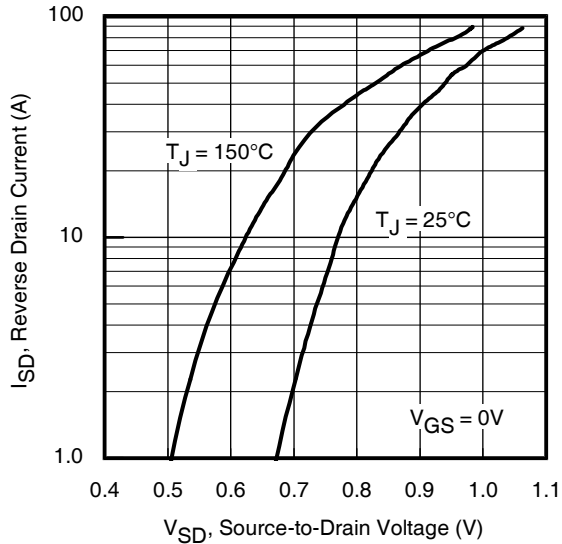


Fig 7. Typical Source-Drain Diode Forward Voltage

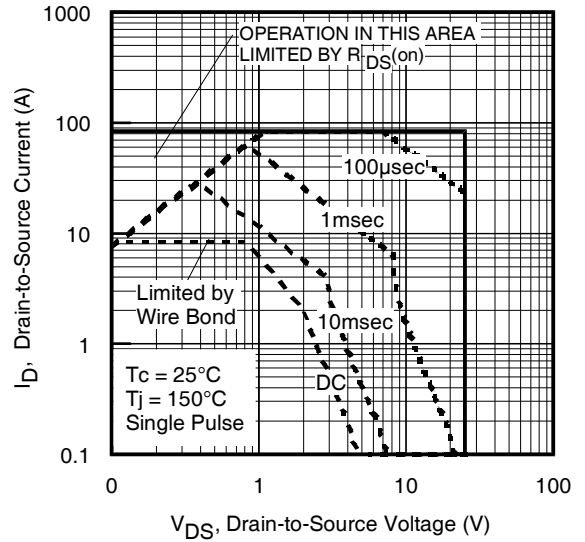


Fig 8. Maximum Safe Operating Area

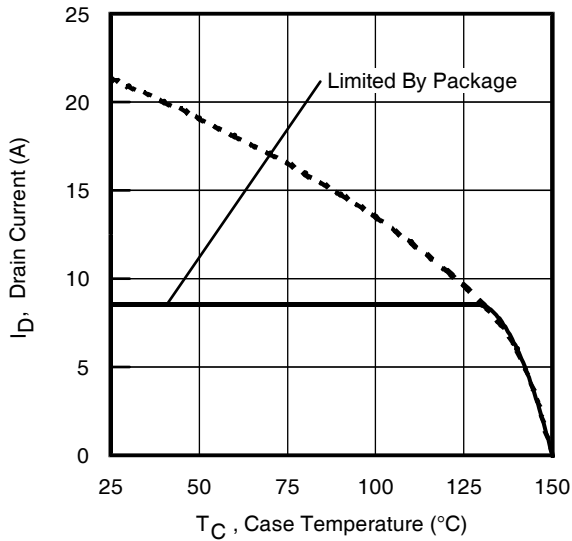


Fig 9. Maximum Drain Current vs. Case (Bottom) Temperature

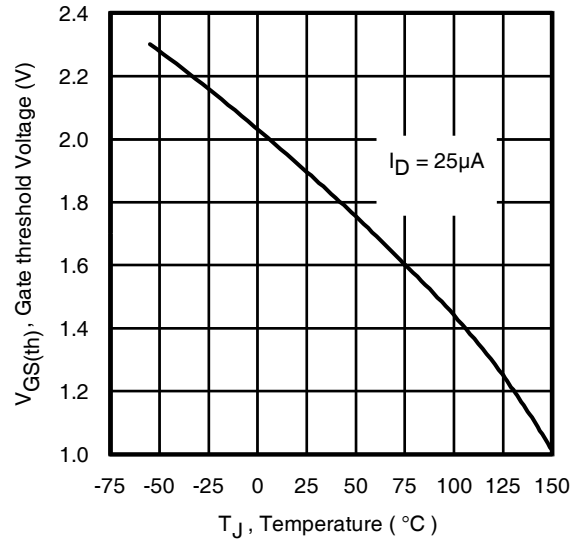


Fig 10. Threshold Voltage vs. Temperature

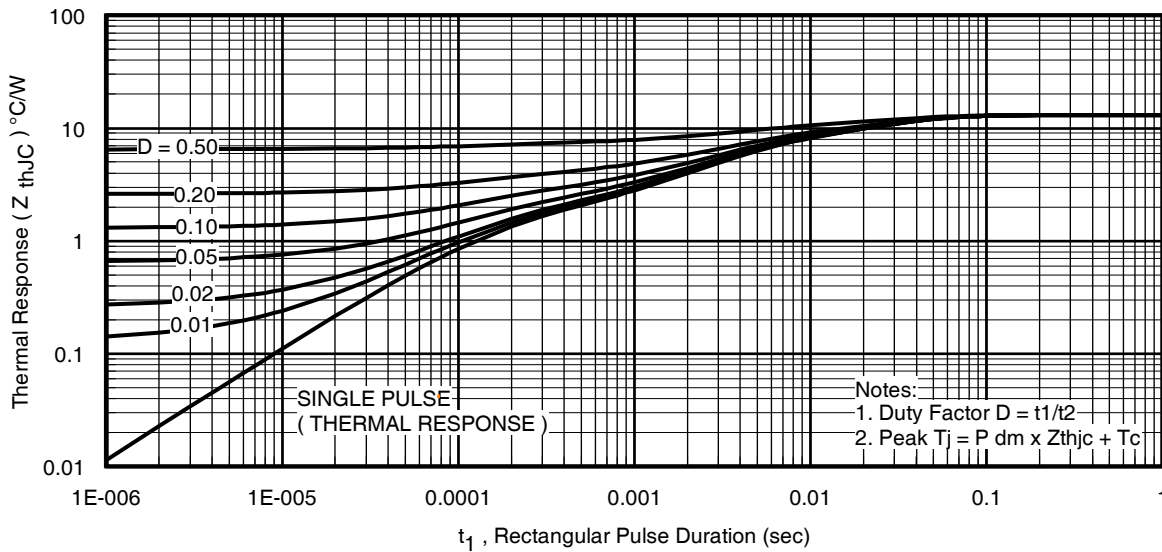


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case (Bottom)

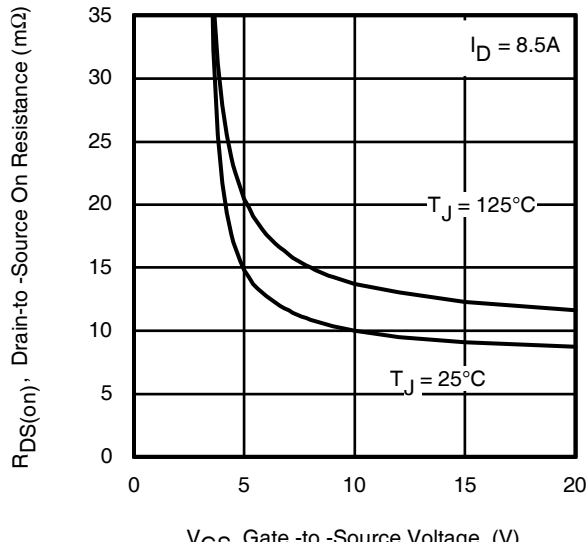


Fig 12. On-Resistance vs. Gate Voltage

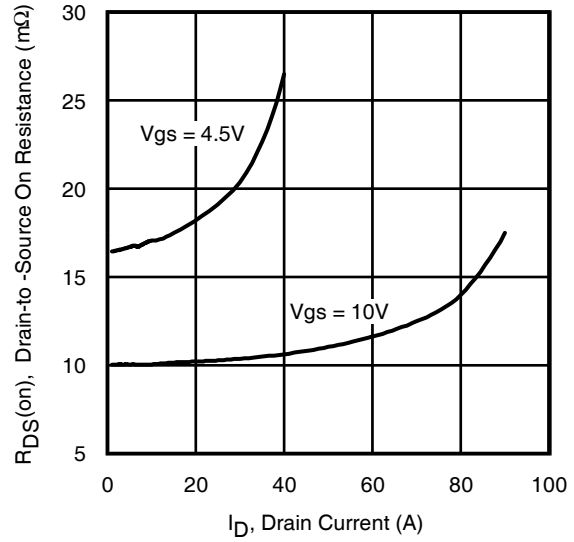


Fig 13. Typical On-Resistance vs. Drain Current

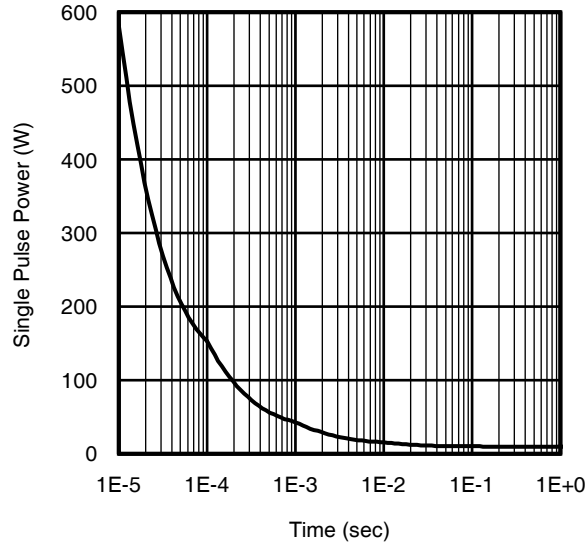


Fig 14. Typical Power vs. Time

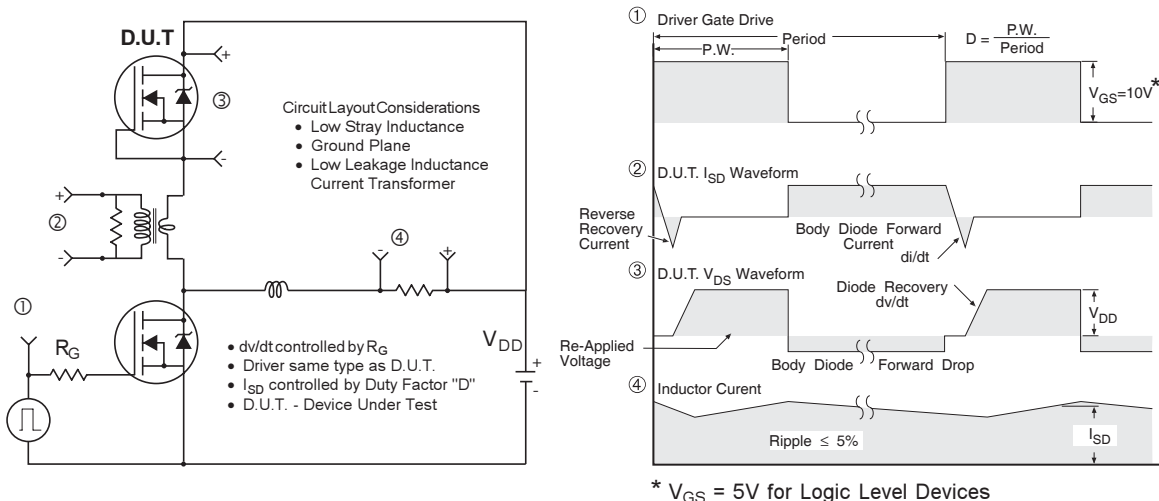


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET[®] Power MOSFETs

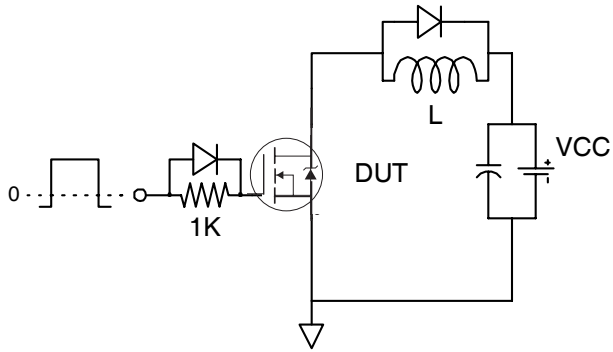


Fig 16a. Gate Charge Test Circuit

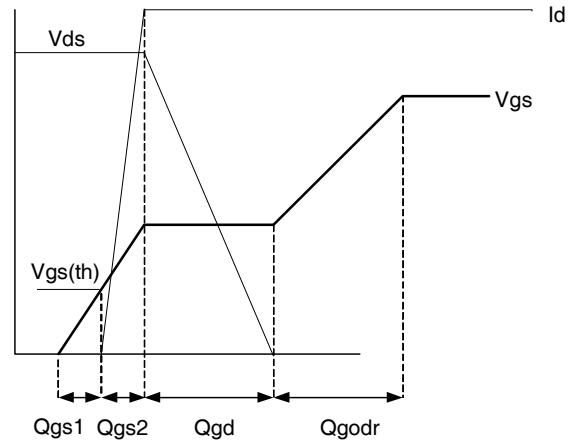


Fig 16b. Gate Charge Waveform

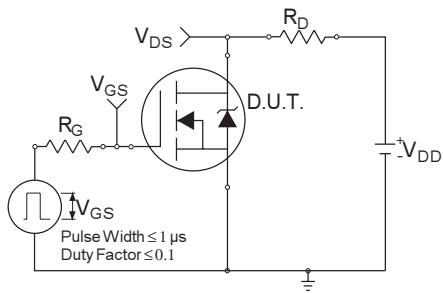


Fig 17a. Switching Time Test Circuit

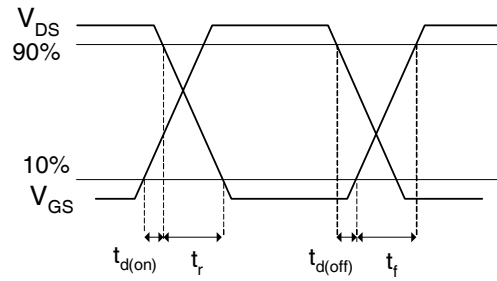
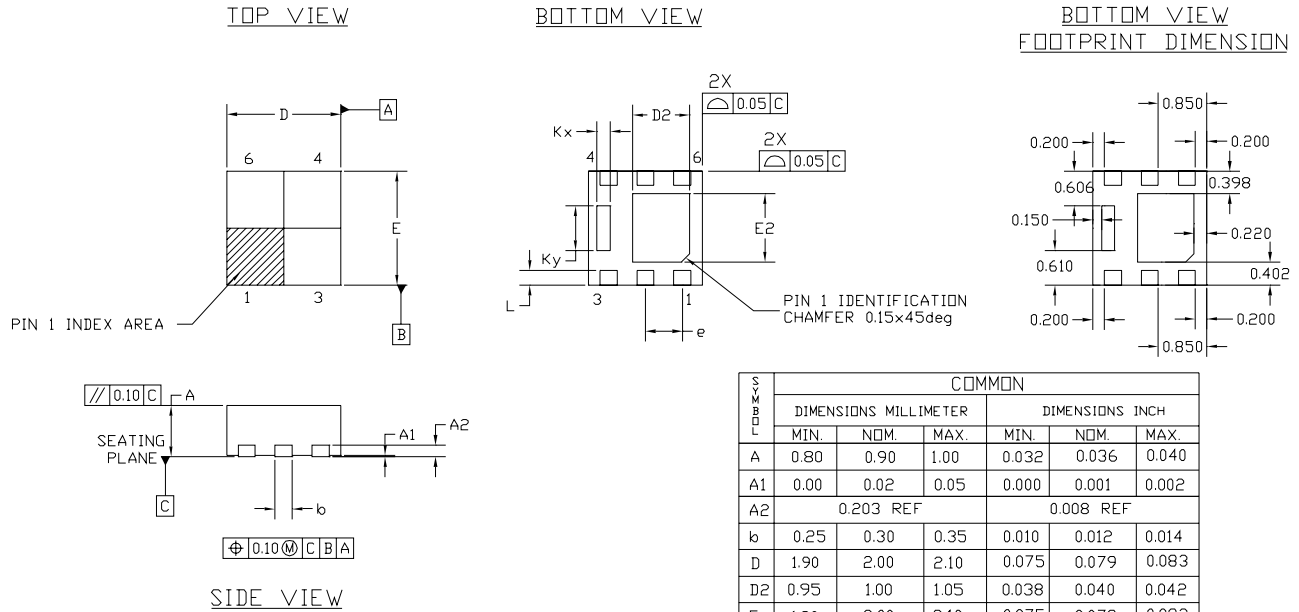


Fig 17b. Switching Time Waveforms

PQFN 2x2 Outline Package Details

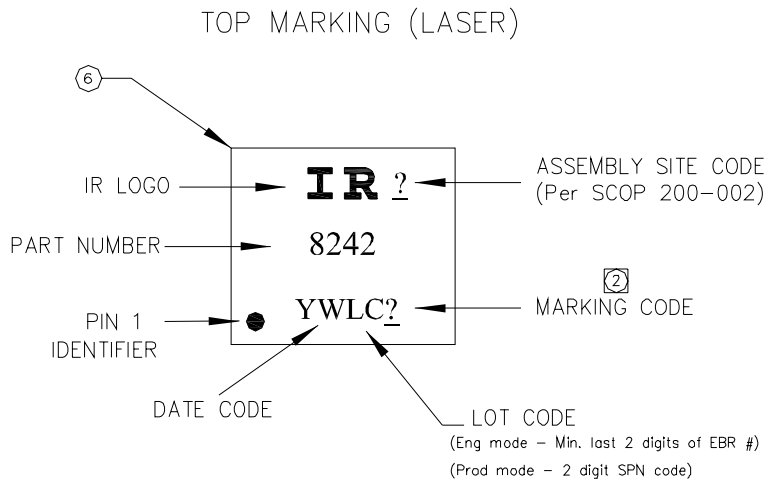


NOTES :

1. DIMENSION AND TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. CONTROLLING DIMENSIONS : MILLIMETER
3. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm. FROM TERMINAL TIP.

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

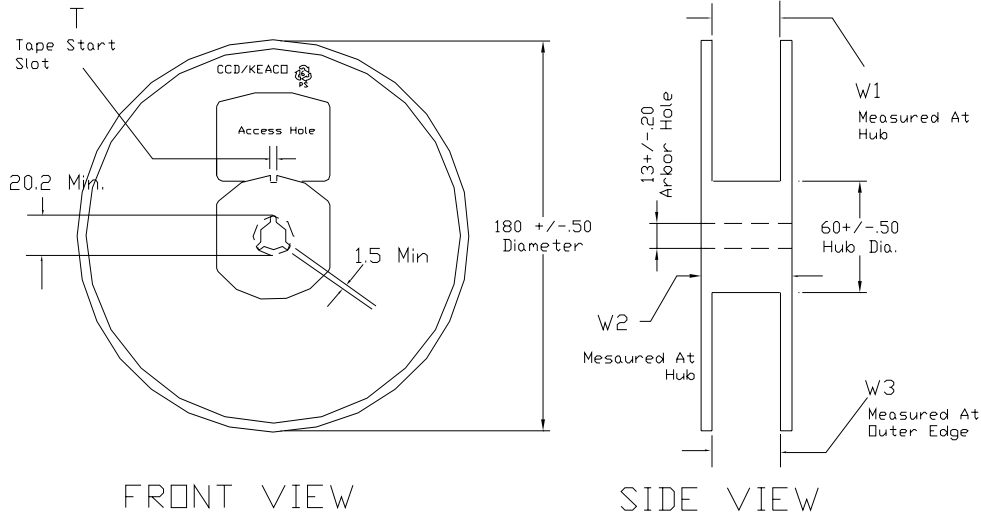
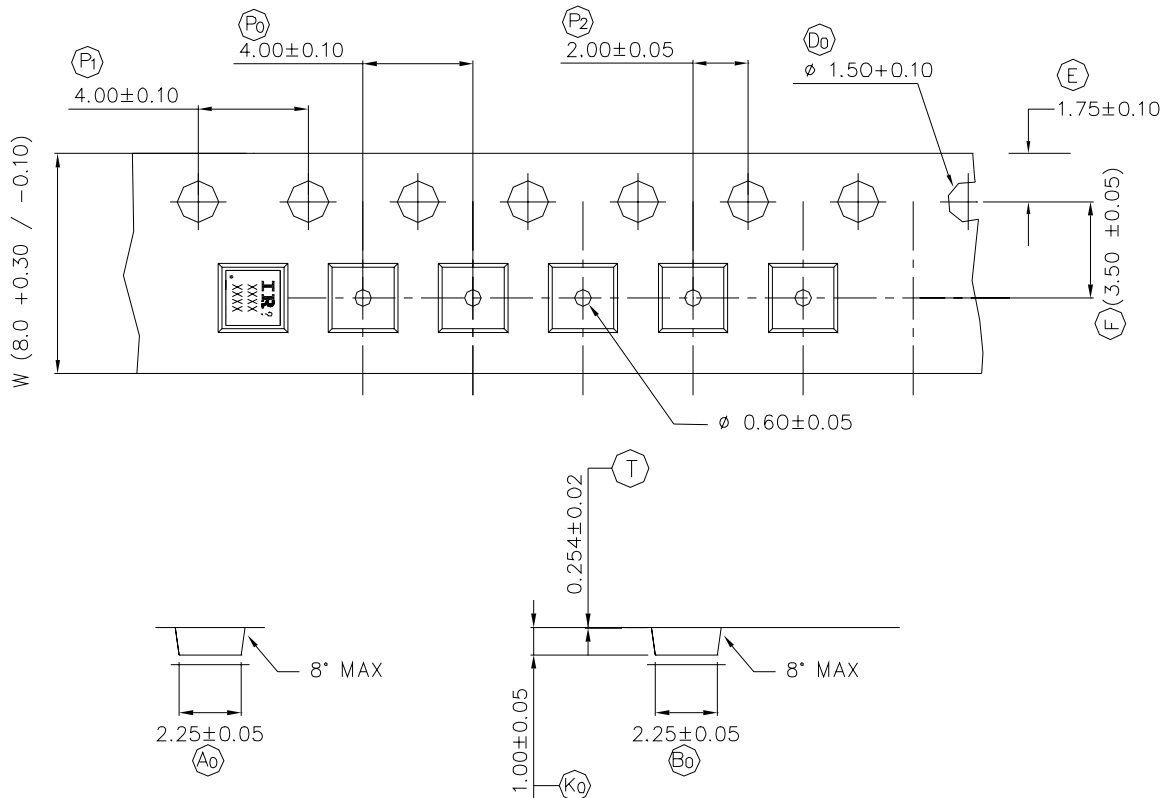


TABLE 1: REEL DETAILS

| 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.



Qualification information[†]

| | | |
|----------------------------|--|---|
| Qualification level | Consumer ^{††} (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>

†† 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.

Data and specifications subject to change without notice.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
 TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information.11/2010