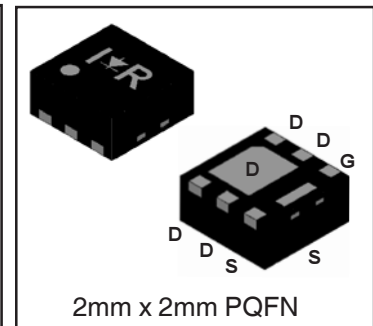
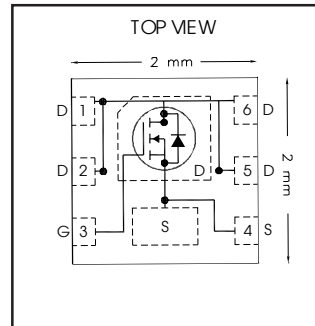


| | | |
|--|-------------|-----------|
| V_{DS} | 30 | V |
| V_{GS} | ±12 | V |
| $R_{DS(on) max}$ (@ $V_{GS} = 4.5V$) | 15.5 | mΩ |
| Q_g (typical) | 11 | nC |
| I_D (@ $T_{C(Bottom)} = 25°C$) | 12 Ⓣ | A |



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 | |
| $I_D @ T_A = 25°C$ | 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, $V_{GS} @ 10V$ | 19Ⓣ | |
| $I_D @ T_{C(Bottom)} = 70°C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 15Ⓣ | |
| $I_D @ T_{C(Bottom)} = 25°C$ | Continuous Drain Current, $V_{GS} @ 10V$ (Wirebond Limited) | 12Ⓣ | |
| 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 ⑤ are on page 2

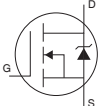
Static @ T_J = 25°C (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-------------------------------------|--------------------------------------|------|------|------|-------|---|
| BV _{DSS} | Drain-to-Source Breakdown Voltage | 30 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| ΔBV _{DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 22 | — | mV/°C | Reference to 25°C, I _D = 1mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | 12.0 | 15.5 | mΩ | 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 = 10μA |
| ΔV _{GS(th)} | Gate Threshold Voltage Coefficient | — | -4.2 | — | mV/°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°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 = 1.8Ω |
| 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 = 1.0MHz |

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

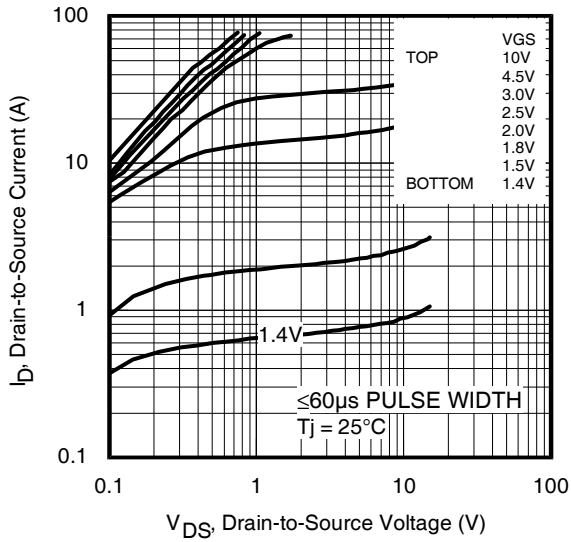
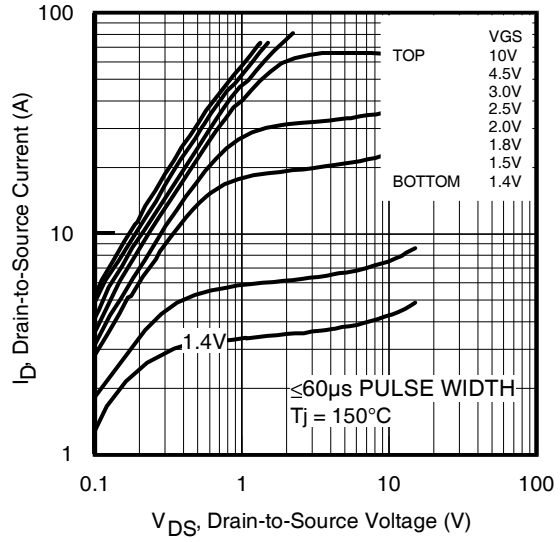
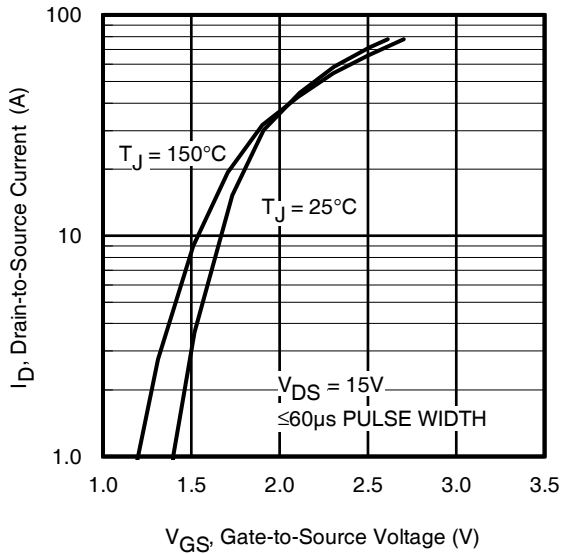
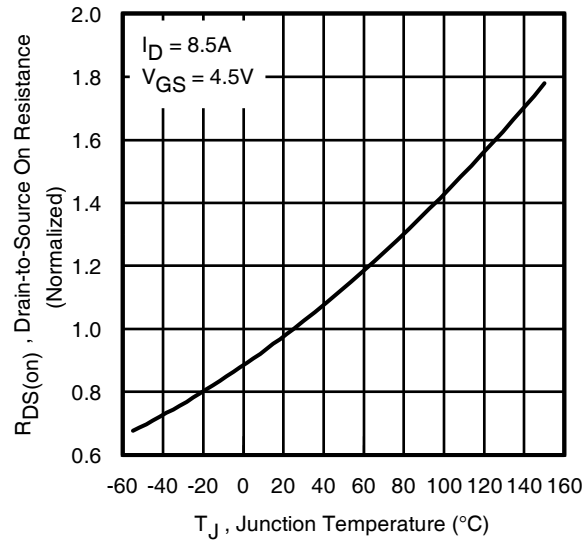
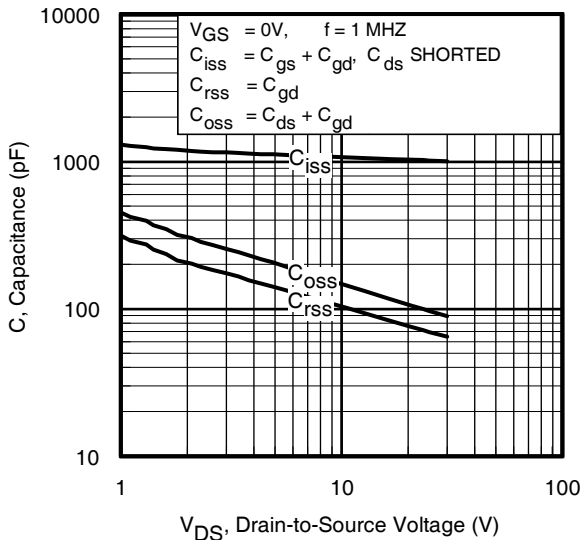
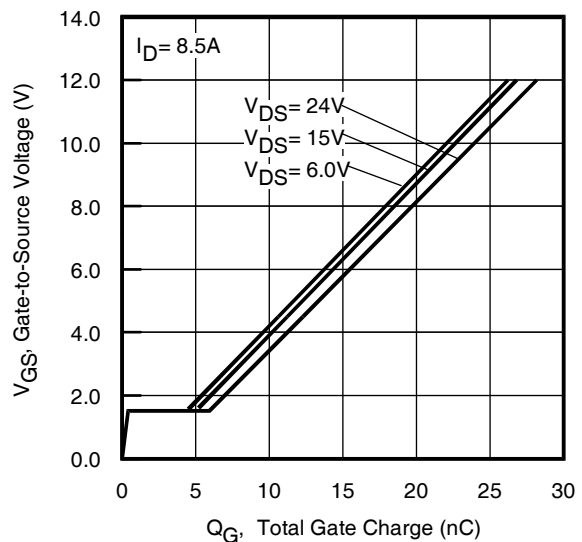
| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|---|------|-----------------|-------|--|
| I _S | Continuous Source Current (Body Diode) | — | — | 12 ^⑦ | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) ① | — | — | 76 | | |
| V _{SD} | Diode Forward Voltage | — | — | 1.2 | V | T _J = 25°C, I _S = 8.5A, V _{GS} = 0V ③ |
| t _{rr} | Reverse Recovery Time | — | 11 | 17 | ns | T _J = 25°C, I _F = 8.5A, V _{DD} = 15V |
| Q _{rr} | Reverse Recovery Charge | — | 13 | 20 | nC | di/dt = 300 A/μs ③ |
| t _{on} | Forward Turn-On Time | Time is dominated by parasitic Inductance | | | | |

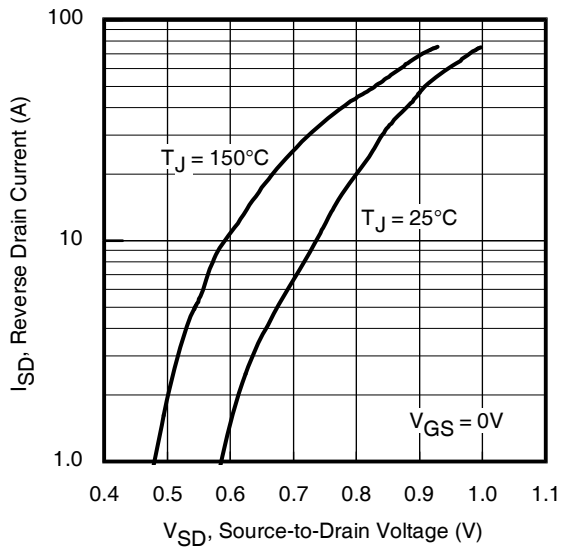
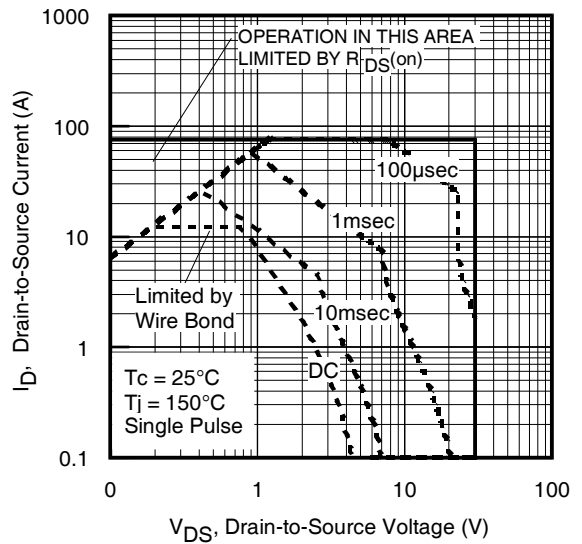
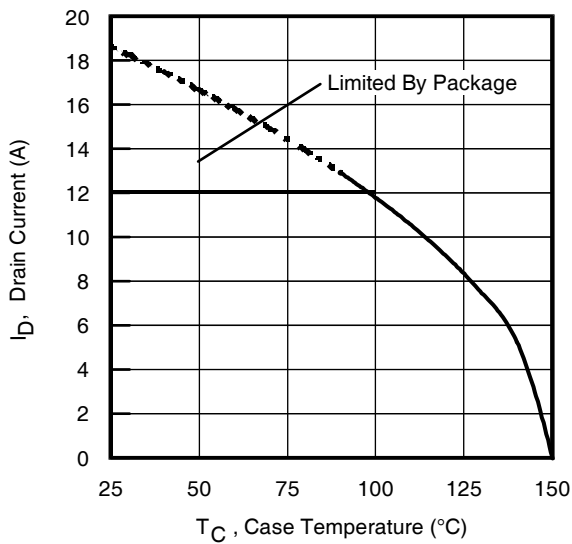
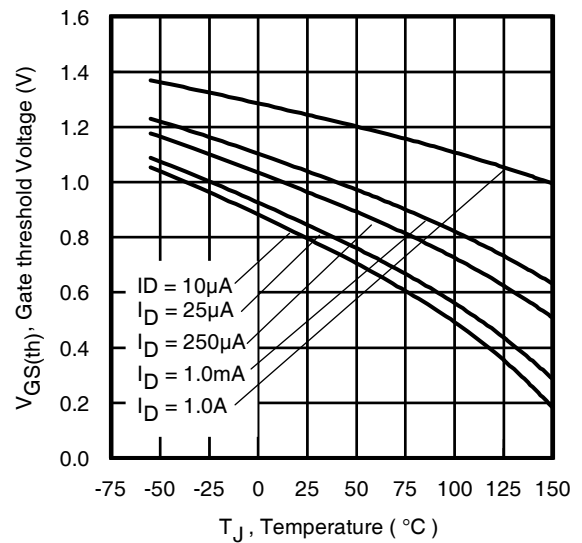
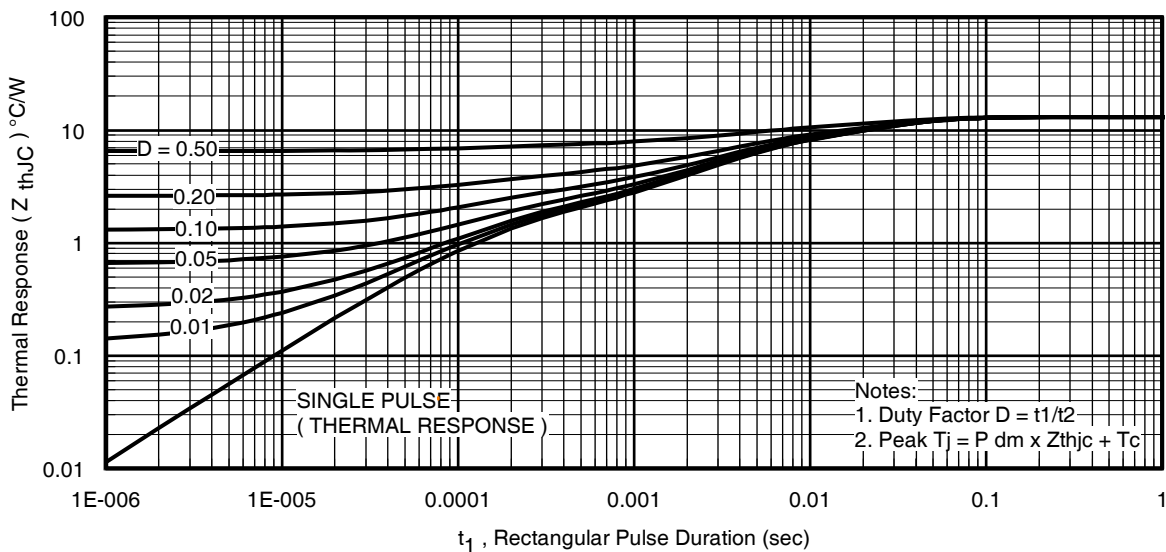
Thermal Resistance

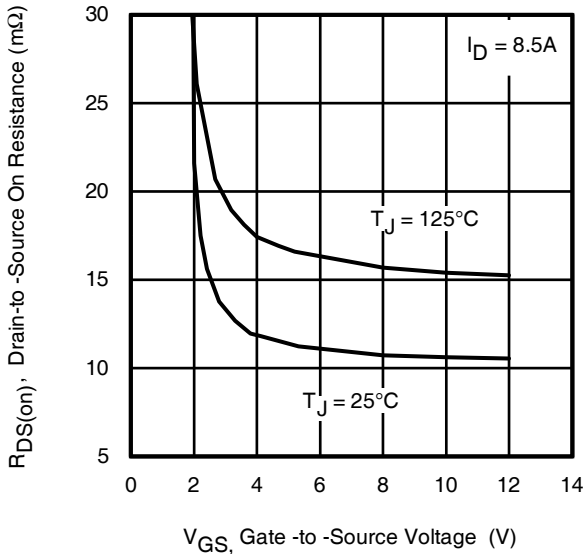
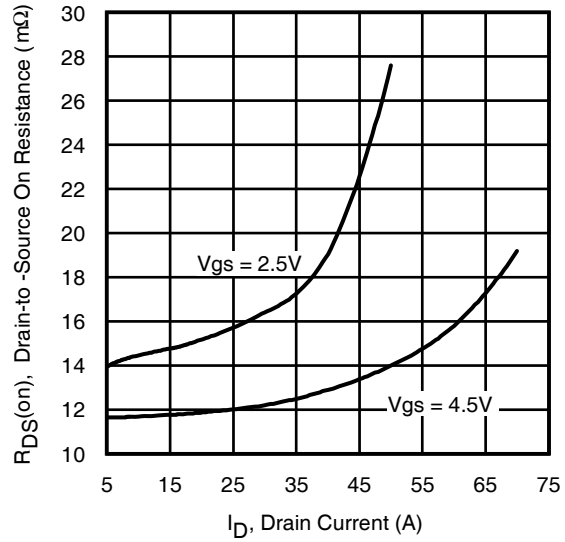
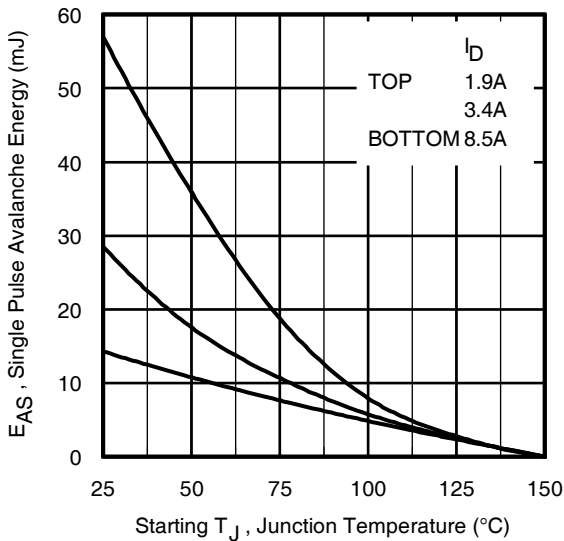
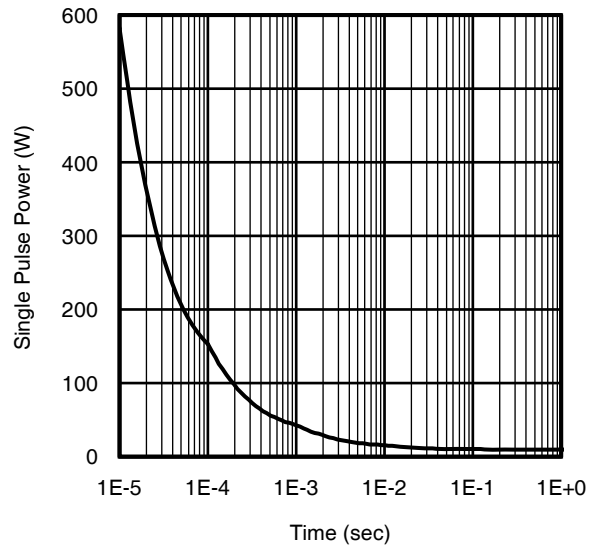
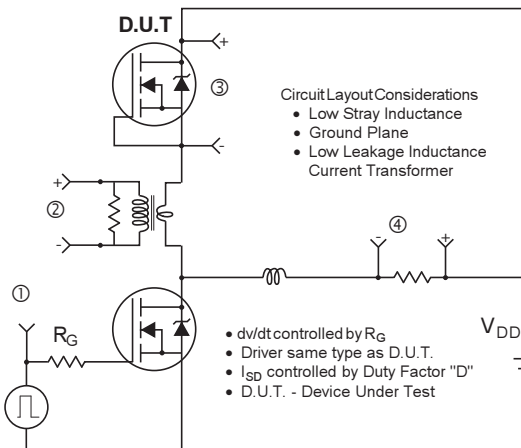
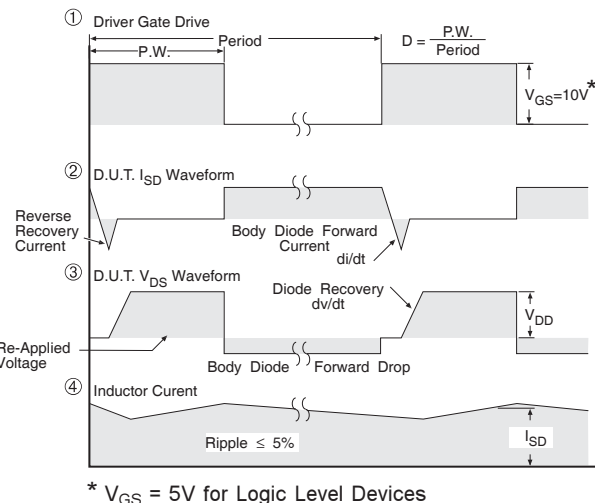
| | Parameter | Typ. | Max. | Units |
|---------------------------|------------------------------|------|------|-------|
| R _{θJC} (Bottom) | Junction-to-Case ⑤ | — | 13 | °C/W |
| R _{θJC} (Top) | Junction-to-Case ⑤ | — | 90 | |
| R _{θJA} | Junction-to-Ambient ④ | — | 60 | |
| R _{θJA} | Junction-to-Ambient (<10s) ④ | — | 42 | |

Notes:

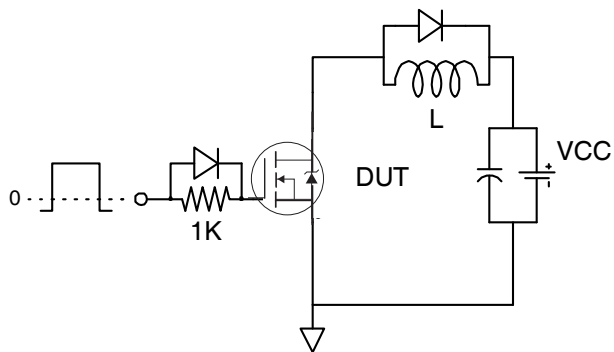
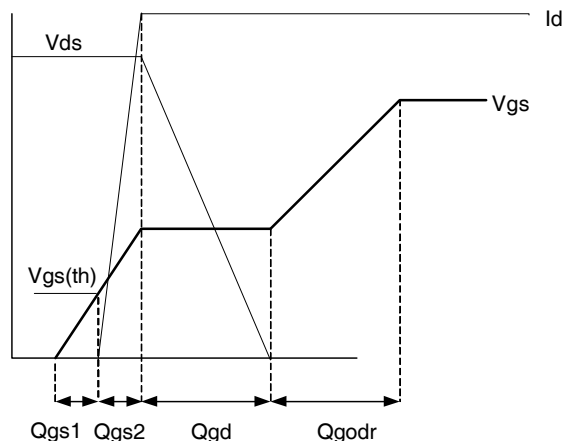
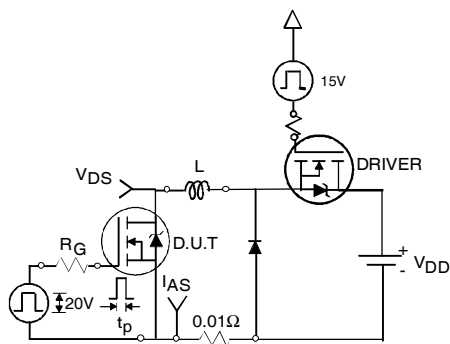
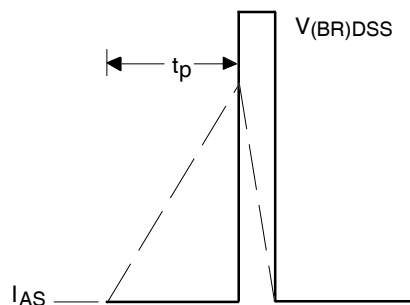
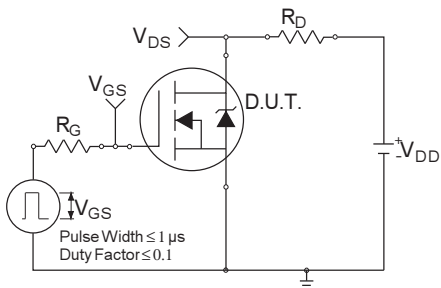
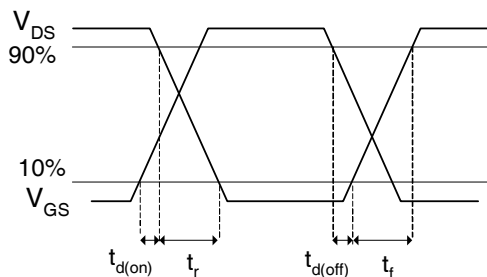
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting T_J = 25°C, L = 0.39mH, R_G = 50Ω, I_{AS} = 8.5A.
- ③ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ④ R_θ is measured at T_J of approximately 90°C.
- ⑤ When mounted on 1 inch square 2 oz copper pad on 1.5x1.5 in. board of FR-4 material.
- ⑥ Calculated continuous current based on maximum allowable junction temperature.
- 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

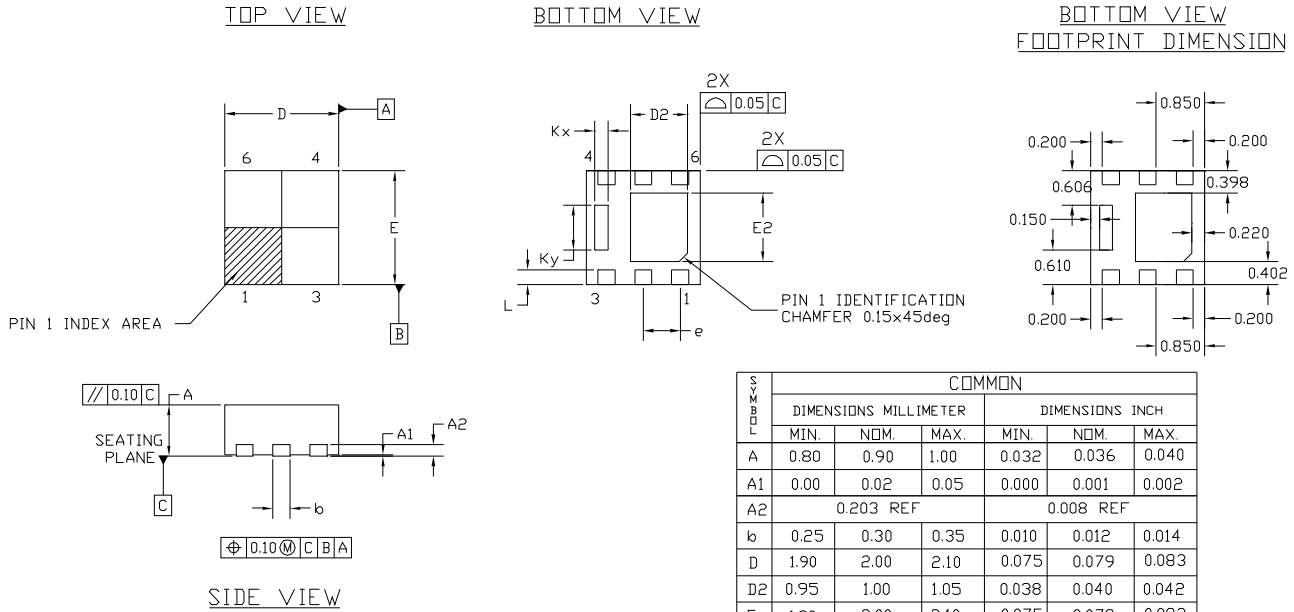

Fig 7. Typical Source-Drain Diode Forward Voltage

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



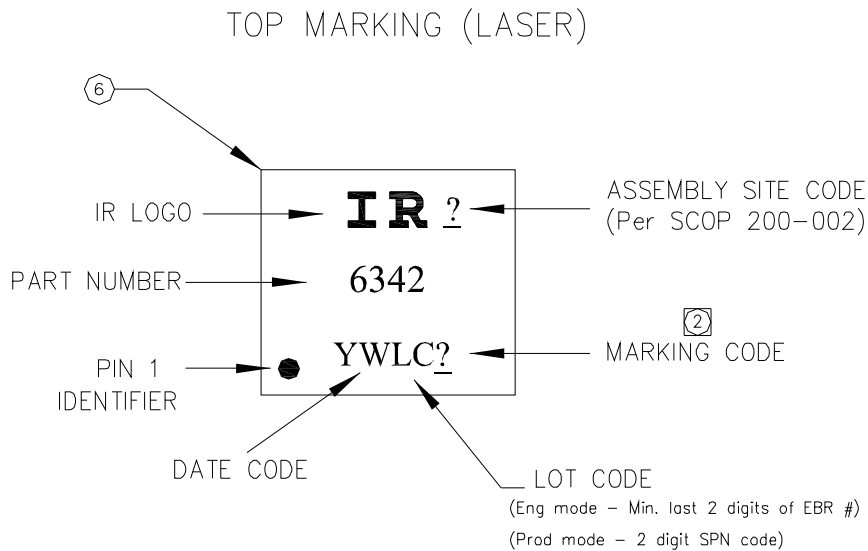
| SYMBOL | COMMON | | | | | |
|--------|-----------------------|------|------|-----------------|-------|-------|
| | DIMENSIONS MILLIMETER | | | DIMENSIONS INCH | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.80 | 0.90 | 1.00 | 0.032 | 0.036 | 0.040 |
| A1 | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| A2 | 0.203 REF | | | 0.008 REF | | |
| b | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| D | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| D2 | 0.95 | 1.00 | 1.05 | 0.038 | 0.040 | 0.042 |
| E | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E2 | 1.15 | 1.20 | 1.25 | 0.046 | 0.048 | 0.050 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.20 | 0.25 | 0.30 | 0.008 | 0.010 | 0.012 |
| Kx | 0.23 REF | | | 0.010 REF | | |
| Ky | 0.785 REF | | | 0.031 REF | | |

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

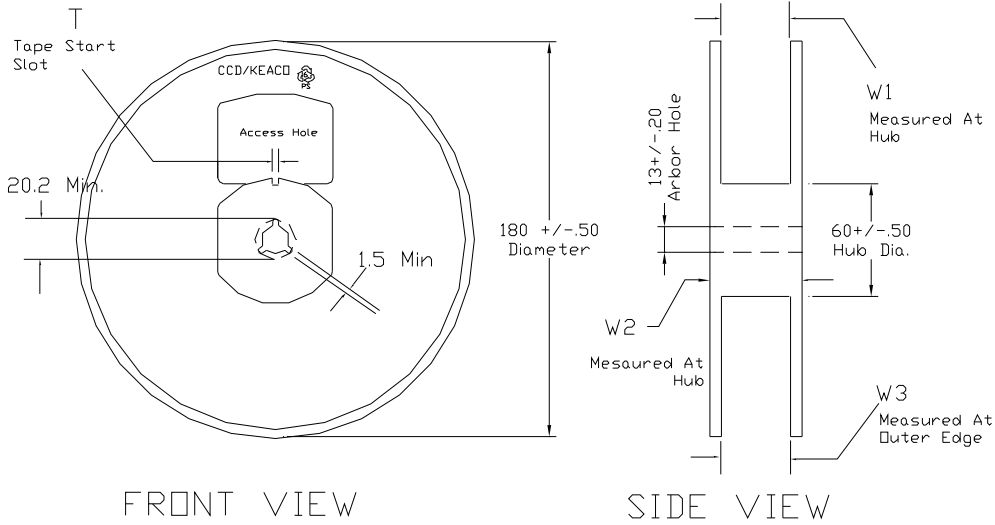
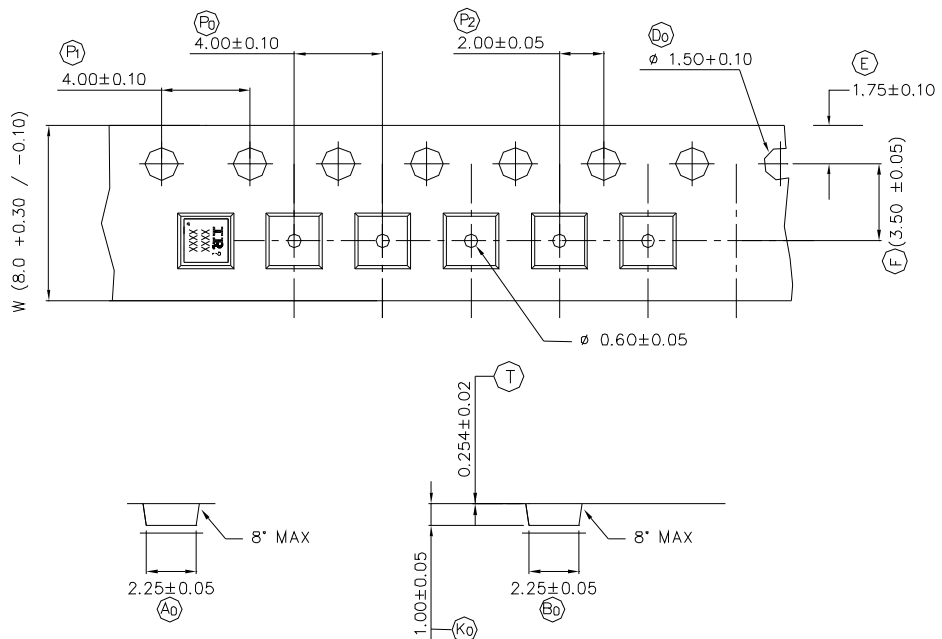


TABLE 1: REEL DETAILS

| 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.



NOTE: The Surface Resistivity is $10^4 - 10^8$ 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 | 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>

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

Revision History

| Date | Comments |
|------------|---|
| 12/17/2013 | <ul style="list-style-type: none"> 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 |

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