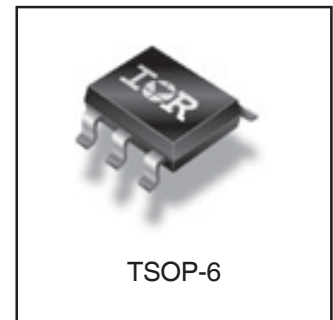
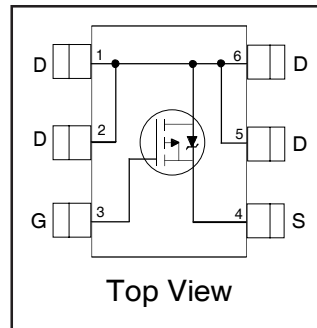


# IRFTS9342PbF

HEXFET® Power MOSFET

|  |             |           |
|--|-------------|-----------|
| $V_{DS}$                                   | <b>-30</b>  | <b>V</b>  |
| $V_{GS\ max}$                              | <b>±20</b>  | <b>V</b>  |
| $R_{DS(on)\ max}$<br>(@ $V_{GS} = -10V$ )  | <b>40</b>   | <b>mΩ</b> |
| $R_{DS(on)\ max}$<br>(@ $V_{GS} = -4.5V$ ) | <b>66</b>   | <b>mΩ</b> |
| $Q_g\ typ$                                 | <b>12</b>   | <b>nC</b> |
| $I_D$<br>(@ $T_A = 25^\circ C$ )           | <b>-5.8</b> | <b>A</b>  |



## Applications

- Battery operated DC motor inverter MOSFET
- System/Load Switch

## Features and Benefits

### Features

|  |
|--|
| Industry-Standard TSOP-6 Package                             |
| RoHS Compliant Containing no Lead, no Bromide and no Halogen |
| MSL1, Consumer Qualification                                 |

results in  
⇒

### Benefits

|                            |
|----------------------------|
| Multi-Vendor Compatibility |
| Environmentally Friendlier |
| Increased Reliability      |

| Orderable part number | Package Type | Standard Pack |          | Note |
|-----------------------|--------------|---------------|----------|------|
|                       |              | Form          | Quantity |      |
| IRFTS9342TRPbF        | TSOP-6       | Tape and Reel | 3000     |      |

## Absolute Maximum Ratings

|                          | Parameter                                 | Max.         | Units |
|--------------------------|---|--------------|-------|
| $V_{DS}$                 | Drain-to-Source Voltage                   | -30          | V     |
| $V_{GS}$                 | Gate-to-Source Voltage                    | ±20          |       |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ | -5.8         | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ | -4.6         |       |
| $I_{DM}$                 | Pulsed Drain Current ①                    | -46          |       |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation                         | 2.0          | W     |
| $P_D @ T_A = 70^\circ C$ | Power Dissipation                         | 1.3          |       |
|                          | Linear Derating Factor                    | 0.02         | W/°C  |
| $T_J$                    | Operating Junction and                    | -55 to + 150 | °C    |
| $T_{STG}$                | Storage Temperature Range                 |              |       |

Notes ① through ④ 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  | —    | 19   | —    | mV/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D = -1\text{mA}$                   |
| $R_{DS(on)}$                 | Static Drain-to-Source On-Resistance | —    | 32   | 40   | m $\Omega$           | $V_{GS} = -10V, I_D = -5.8A$ ③                                       |
|                              |                                      | —    | 53   | 66   |                      | $V_{GS} = -4.5V, I_D = -4.6A$ ③                                      |
| $V_{GS(th)}$                 | Gate Threshold Voltage               | -1.3 | —    | -2.4 | V                    | $V_{DS} = V_{GS}, I_D = -25\mu A$                                    |
| $\Delta V_{GS(th)}$          | Gate Threshold Voltage Coefficient   | —    | -5.5 | —    | mV/ $^\circ\text{C}$ |  |
| $I_{DSS}$                    | Drain-to-Source Leakage Current      | —    | —    | -1.0 | $\mu A$              | $V_{DS} = -24V, V_{GS} = 0V$   |
|                              |                                      | —    | —    | -150 |                      | $V_{DS} = -24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$                |
| $I_{GSS}$                    | Gate-to-Source Forward Leakage       | —    | —    | -100 | nA                   | $V_{GS} = -20V$  |
|                              | Gate-to-Source Reverse Leakage       | —    | —    | 100  |                      | $V_{GS} = 20V$   |
| $g_{fs}$                     | Forward Transconductance             | 6.8  | —    | —    | S                    | $V_{DS} = -10V, I_D = -4.6A$   |
| $Q_g$                        | Total Gate Charge                    | —    | 12   | —    | nC                   | $V_{DS} = -15V$  |
| $Q_{gs}$                     | Gate-to-Source Charge                | —    | 1.8  | —    |                      | $V_{GS} = -10V$  |
| $Q_{gd}$                     | Gate-to-Drain Charge                 | —    | 3.1  | —    |                      | $I_D = -4.6A$  |
| $R_G$                        | Gate Resistance                      | —    | 17   | —    | $\Omega$             |  |
| $t_{d(on)}$                  | Turn-On Delay Time                   | —    | 4.6  | —    | ns                   | $V_{DD} = -15V, V_{GS} = -10V$<br>$I_D = -4.6A$<br>$R_G = 6.8\Omega$ |
| $t_r$                        | Rise Time                            | —    | 13   | —    |                      |  |
| $t_{d(off)}$                 | Turn-Off Delay Time                  | —    | 45   | —    |                      |  |
| $t_f$                        | Fall Time                            | —    | 28   | —    |                      |  |
| $C_{iss}$                    | Input Capacitance                    | —    | 595  | —    | pF                   | $V_{GS} = 0V$  |
| $C_{oss}$                    | Output Capacitance                   | —    | 133  | —    |                      | $V_{DS} = -25V$  |
| $C_{riss}$                   | Reverse Transfer Capacitance         | —    | 85   | —    |                      | $f = 1.0\text{KHz}$  |

## Diode Characteristics

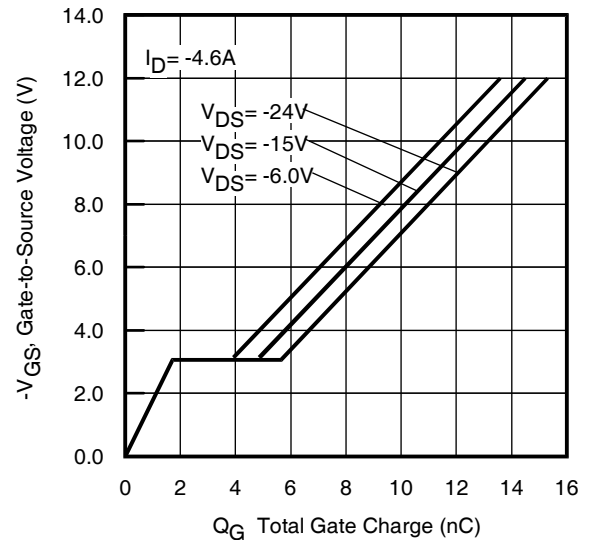
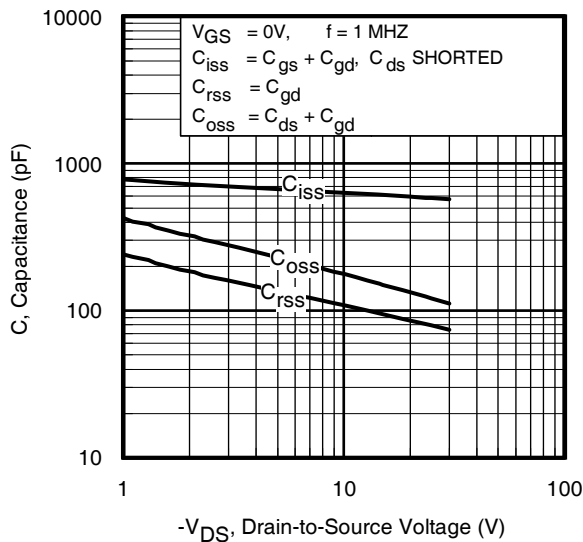
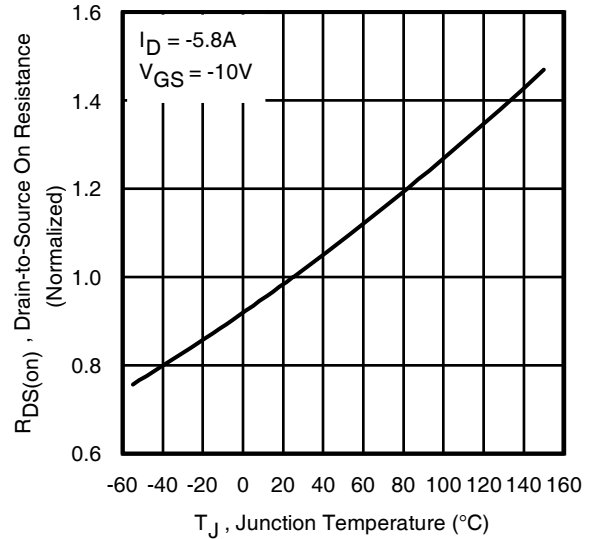
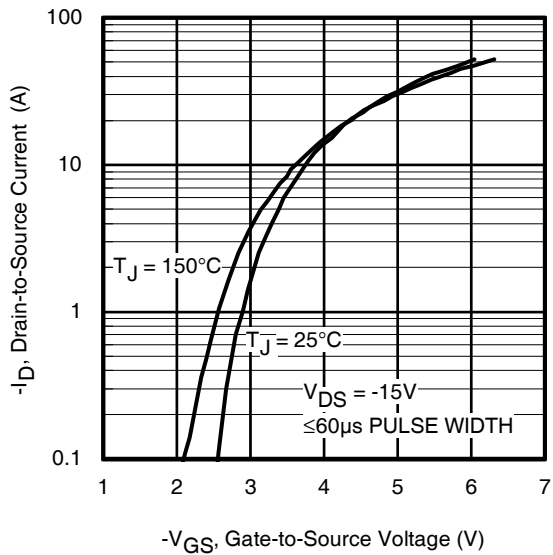
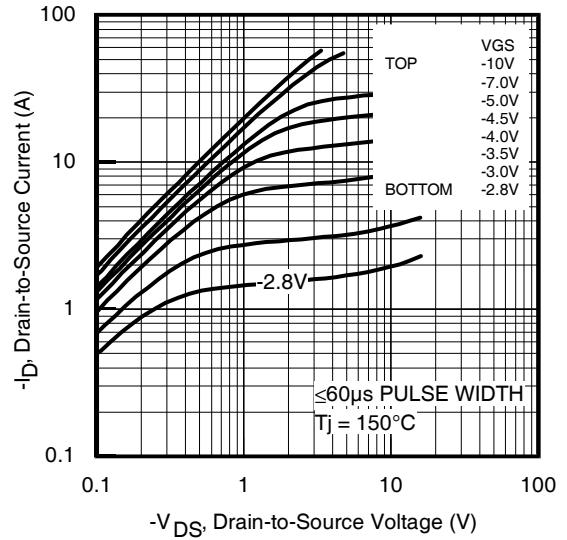
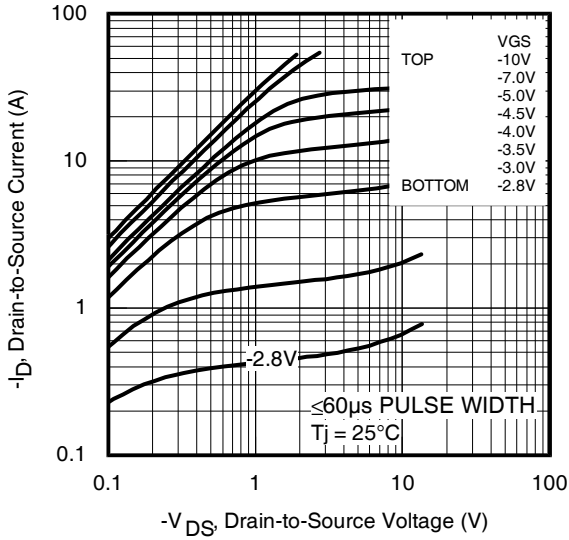
|          | Parameter                                 | Min.                                      | Typ. | Max. | Units | Conditions  |
|----------|---|---|------|------|-------|---|
| $I_S$    | Continuous Source Current<br>(Body Diode) | —   | —    | -2.0 | A     | MOSFET symbol<br>showing the<br>integral reverse<br>p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current<br>(Body Diode) ①   | —   | —    | -46  |       |   |
| $V_{SD}$ | Diode Forward Voltage                     | —   | —    | -1.2 | V     | $T_J = 25^\circ\text{C}, I_S = -4.6A, V_{GS} = 0V$ ③                    |
| $t_{rr}$ | Reverse Recovery Time                     | —   | 20   | 30   | ns    | $T_J = 25^\circ\text{C}, I_F = -4.6A, V_{DD} = -24V$                    |
| $Q_{rr}$ | Reverse Recovery Charge                   | —   | 11   | 17   | nC    | $di/dt = 100A/\mu s$ ③  |
| $t_{on}$ | Forward Turn-On Time                      | Time is dominated by parasitic inductance |      |      |       |   |

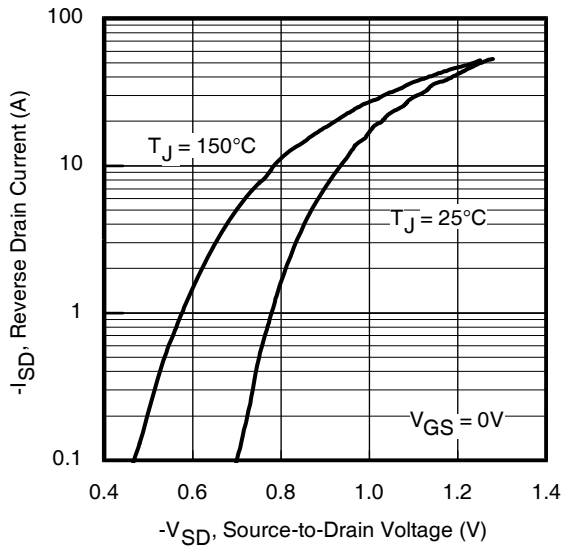
## Thermal Resistance

|                 | Parameter             | Typ. | Max. | Units              |
|-----------------|-----------------------|------|------|--------------------|
| $R_{\theta JA}$ | Junction-to-Ambient ③ | —    | 62.5 | $^\circ\text{C/W}$ |

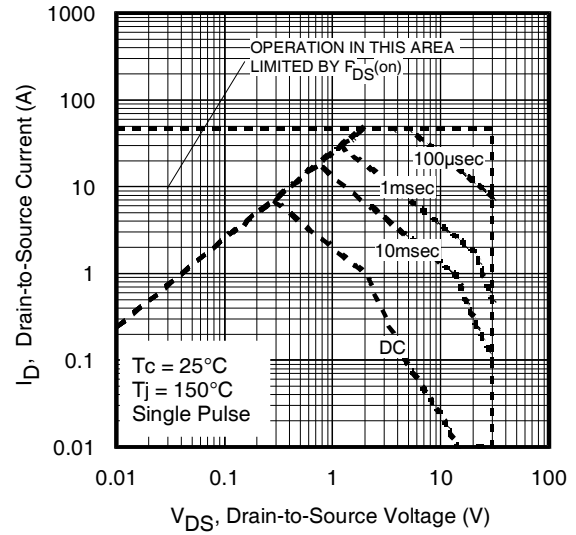
### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ When mounted on 1 inch square copper board.

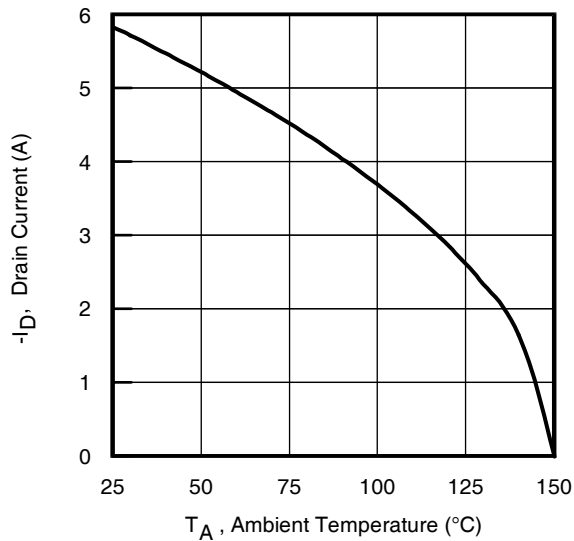




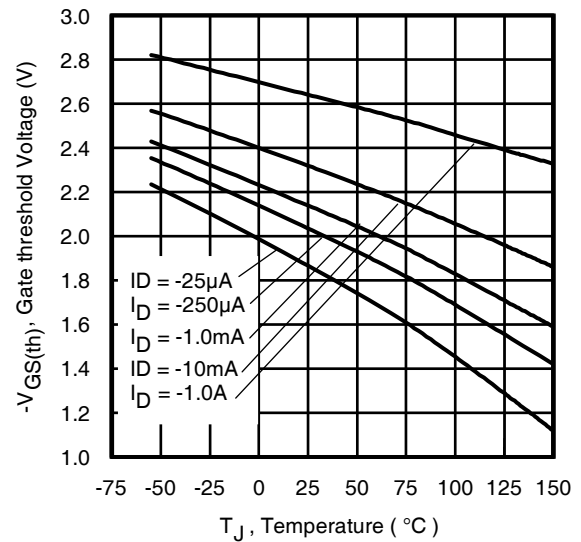
**Fig 7.** Typical Source-Drain Diode Forward Voltage



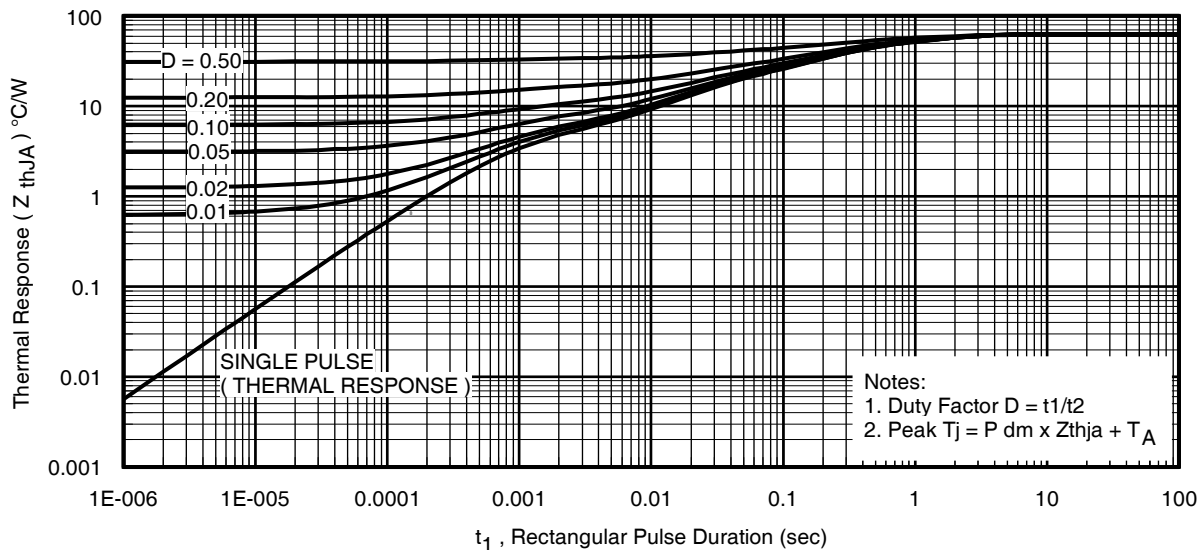
**Fig 8.** Maximum Safe Operating Area



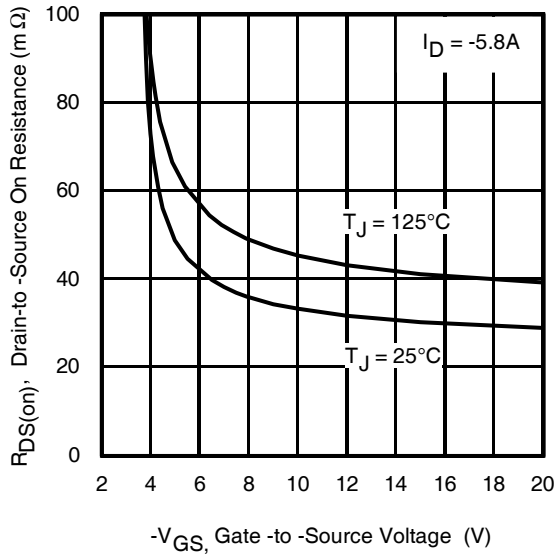
**Fig 9.** Maximum Drain Current vs. Case Temperature



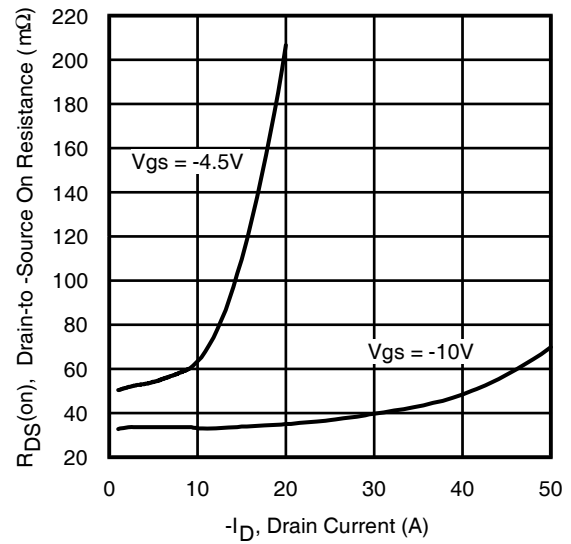
**Fig 10.** Threshold Voltage vs. Temperature



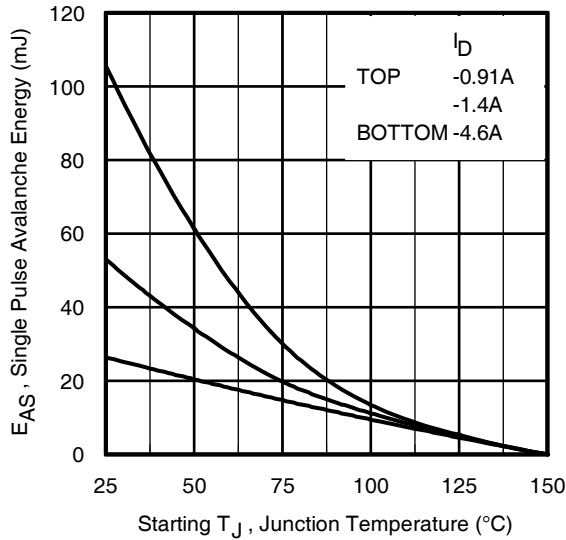
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



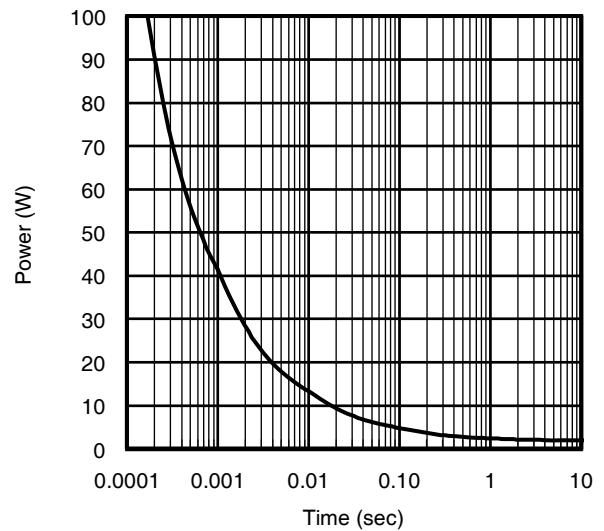
**Fig 12.** On-Resistance vs. Gate Voltage



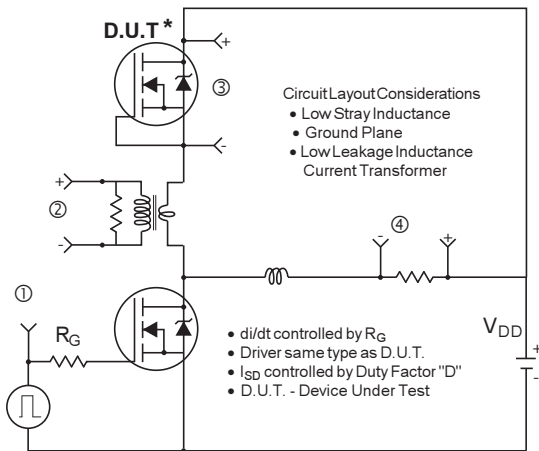
**Fig 13.** Typical On-Resistance vs. Drain Current



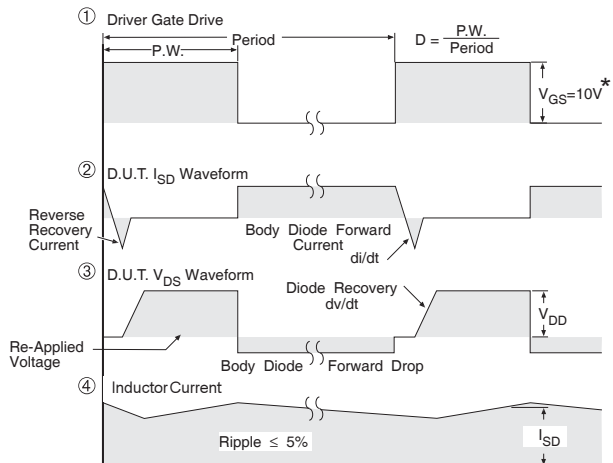
**Fig 14.** Maximum Avalanche Energy vs. Drain Current



**Fig 15.** Typical Power vs. Time

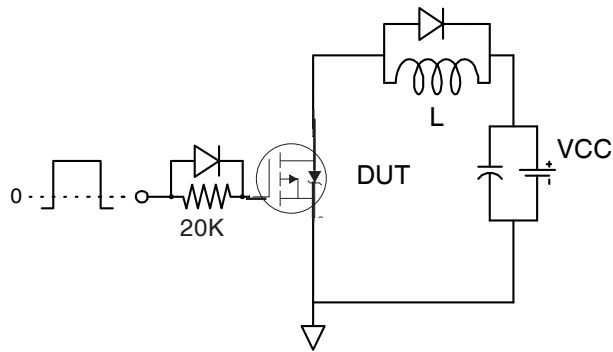


\* Reverse Polarity of D.U.T. for P-Channel

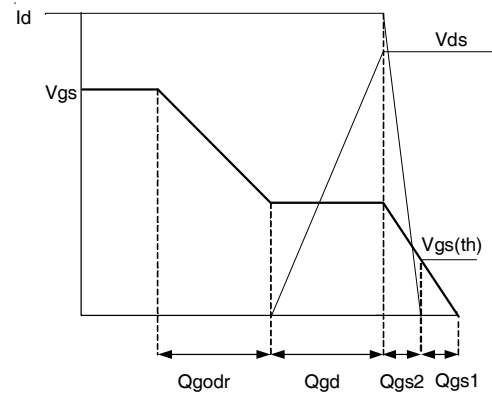


\*  $V_{GS} = 5V$  for Logic Level Devices

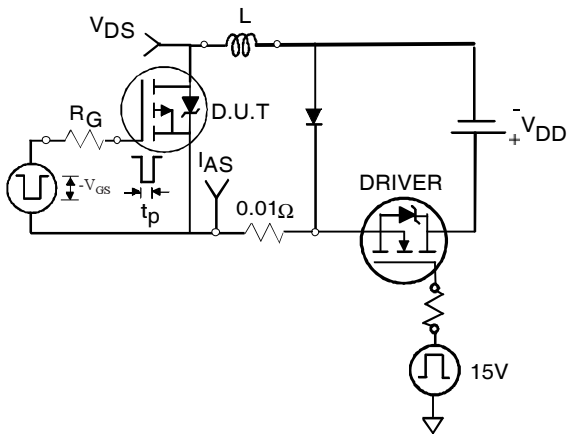
**Fig 16.** Diode Reverse Recovery Test Circuit for P-Channel HEXFET® Power MOSFETs



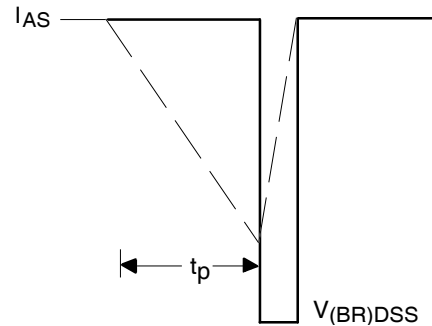
**Fig 17a.** Gate Charge Test Circuit



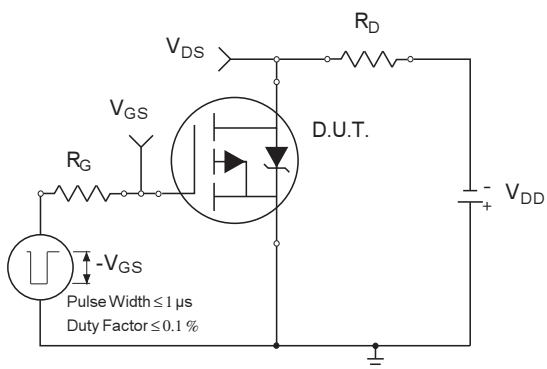
**Fig 17b.** Gate Charge Waveform



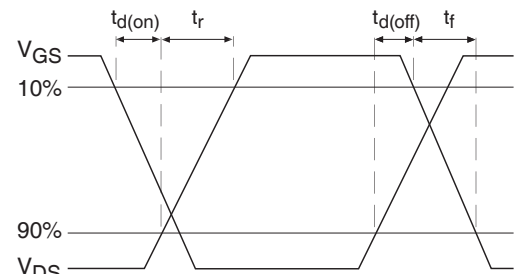
**Fig 18a.** Unclamped Inductive Test Circuit



**Fig 18b.** Unclamped Inductive Waveforms

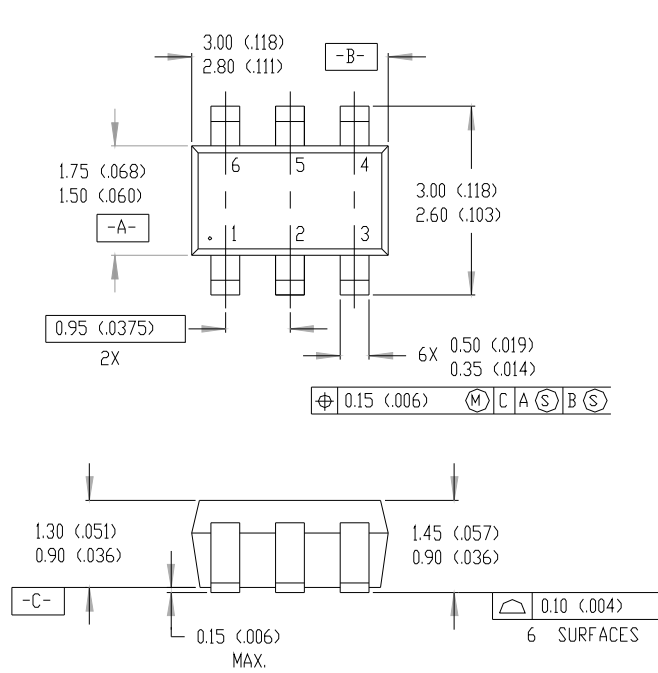


**Fig 19a.** Switching Time Test Circuit

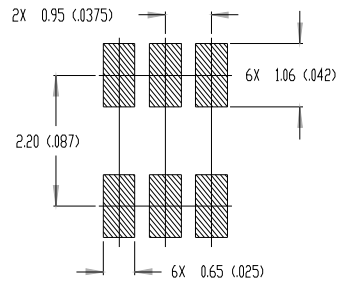


**Fig 19b.** Switching Time Waveforms

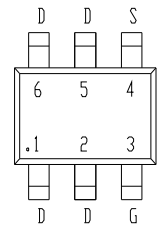
## TSOP-6 Package Outline



### MINIMUM RECOMMENDED FOOTPRINT

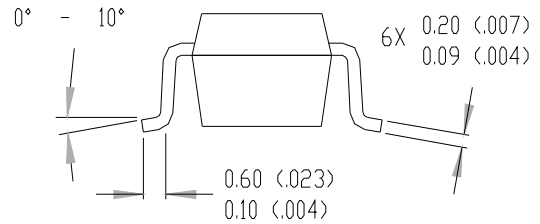


### LEAD ASSIGNMENTS

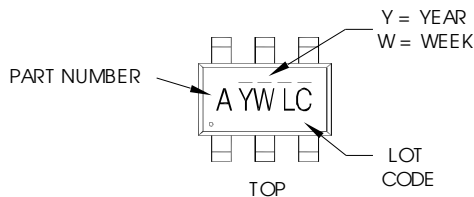


### NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).



## TSOP-6 Part Marking Information



### PART NUMBER CODE REFERENCE:

|              |                    |
|--------------|--------------------|
| A = SI3443DV | O = IRLTS6342TRPBF |
| B = IRF5800  | P = IRFTS8342TRPBF |
| C = IRF5850  | R = IRFTS9342TRPBF |
| D = IRF5851  | S = Not applicable |
| E = IRF5852  | T = IRLTS2242TRPBF |
| F = IRF5801  |                    |
| G = IRF5803  |                    |
| H = IRF5804  |                    |
| I = IRF5805  |                    |
| J = IRF5806  |                    |
| K = IRF5810  |                    |
| N = IRF5802  |                    |

Note: A line above the work week (as shown here) indicates Lead-Free.

### DATE CODE MARKING INSTRUCTIONS

WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

| YEAR | Y    | WORK WEEK | W |
|------|------|-----------|---|
| 2011 | 2001 | 01        | A |
| 2012 | 2002 | 02        | B |
| 2013 | 2003 | 03        | C |
| 2014 | 2004 | 04        | D |
| 2015 | 2005 | 05        |   |
| 2016 | 2006 | 06        |   |
| 2017 | 2007 | 07        |   |
| 2018 | 2008 | 08        |   |
| 2019 | 2009 | 09        |   |
| 2020 | 2010 | 24        | X |
|      |      | 25        | Y |
|      |      | 26        | Z |

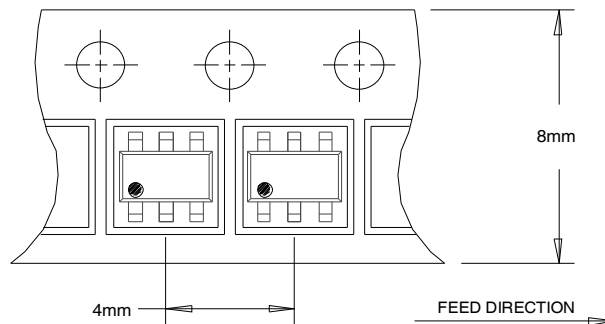
WW = (27-52) IF PRECEDED BY A LETTER

| YEAR | Y    | WORK WEEK | W |
|------|------|-----------|---|
| 2011 | 2001 | A 27      | A |
| 2012 | 2002 | B 28      | B |
| 2013 | 2003 | C 29      | C |
| 2014 | 2004 | D 30      | D |
| 2015 | 2005 | E         |   |
| 2016 | 2006 | F         |   |
| 2017 | 2007 | G         |   |
| 2018 | 2008 | H         |   |
| 2019 | 2009 | J         |   |
| 2020 | 2010 | K 50      | X |
|      |      | 51        | Y |
|      |      | 52        | Z |

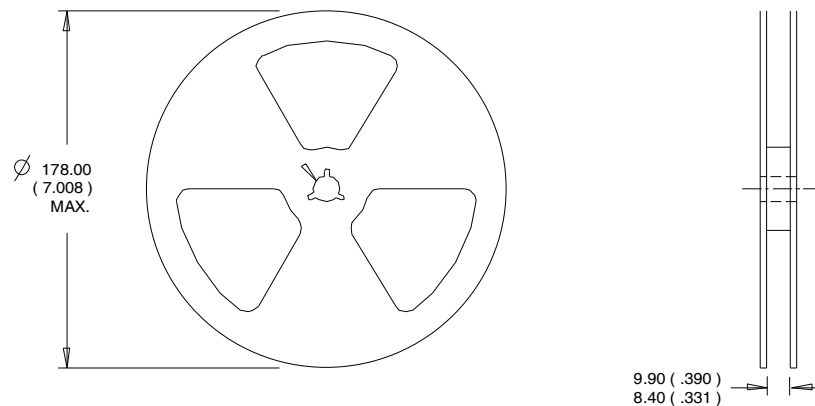
Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

# IRFTS9342PbF

## TSOP-6 Tape and Reel Information



NOTES :  
1. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES:  
1. CONTROLLING DIMENSION : MILLIMETER.  
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

### Qualification information<sup>†</sup>

|                            |   |  |
|----------------------------|---|--|
| Qualification level        | Consumer <sup>††</sup><br>(per JEDEC JESD47F <sup>†††</sup> guidelines) |  |
| Moisture Sensitivity Level | TSOP-6  | MSL1<br>(per IPC/JEDEC J-STD-020D <sup>†††</sup> ) |
| RoHS compliant             | Yes   |  |

<sup>†</sup> Qualification standards can be found at International Rectifier's web site

<http://www.irf.com/product-info/reliability>

<sup>††</sup> 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/>

<sup>†††</sup> Applicable version of JEDEC standard at the time of product release.

Data and specifications subject to change without notice.

International  
**IR** Rectifier

IR WORLD HEADQUARTERS: 101 N. Sepulveda Blvd., El Segundo, California 90245, USA Tel: (310) 252-7105

TAC Fax: (310) 252-7903

Visit us at [www.irf.com](http://www.irf.com) for sales contact information. 02/2012