

# IRF7492PbF

HEXFET® Power MOSFET

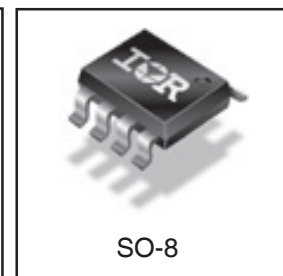
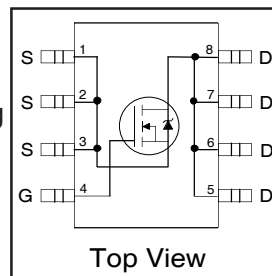
## Applications

- High frequency DC-DC converters
- Lead-Free

| $V_{DS}$ | $R_{DS(on)}$ max      | $I_D$ |
|----------|-----------------------|-------|
| 200V     | 79mΩ @ $V_{GS} = 10V$ | 3.7A  |

## Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective  $C_{OSS}$  to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



## Absolute Maximum Ratings

|                            | Parameter                                | Max.                   | Units |
|----------------------------|------------------------------------------|------------------------|-------|
| $V_{DS}$                   | Drain-Source Voltage                     | 200                    | V     |
| $V_{GS}$                   | Gate-to-Source Voltage                   | ± 20                   | V     |
| $I_D$ @ $T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS}$ @ 10V | 3.7                    | A     |
| $I_D$ @ $T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS}$ @ 10V | 3.0                    |       |
| $I_{DM}$                   | Pulsed Drain Current ①                   | 30                     |       |
| $P_D$ @ $T_A = 25^\circ C$ | Power Dissipation④                       | 2.5                    | W     |
|                            | Linear Derating Factor                   | 0.02                   | W/°C  |
| dv/dt                      | Peak Diode Recovery dv/dt ⑥              | 9.5                    | V/ns  |
| $T_J$                      | Operating Junction and                   | -55 to + 150           | °C    |
| $T_{STG}$                  | Storage Temperature Range                |                        |       |
|                            | Soldering Temperature, for 10 seconds    | 300 (1.6mm from case ) |       |

## Thermal Resistance

| Symbol          | Parameter              | Typ. | Max. | Units |
|-----------------|------------------------|------|------|-------|
| $R_{\theta JL}$ | Junction-to-Drain Lead | —    | 20   | °C/W  |
| $R_{\theta JA}$ | Junction-to-Ambient ④  | —    | 50   |       |

Notes ① through ⑥ are on page 8

www.irf.com

# IRF7492PbF

International  
IR Rectifier

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

|                                 | Parameter                            | Min. | Typ. | Max. | Units | Conditions                                             |
|---------------------------------|--------------------------------------|------|------|------|-------|--------------------------------------------------------|
| $BV_{(BR)DSS}$                  | Drain-to-Source Breakdown Voltage    | 200  | —    | —    | V     | $V_{GS} = 0V, I_D = 250\mu A$                          |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.20 | —    | V/°C  | Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$ ③ |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —    | 64   | 79   | mΩ    | $V_{GS} = 10V, I_D = 2.2A$ ③                           |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | 2.5  | —    | —    | V     | $V_{DS} = V_{GS}, I_D = 250\mu A$                      |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —    | 10   | μA    | $V_{DS} = 160V, V_{GS} = 0V$                           |
|                                 |                                      | —    | —    | 250  |       | $V_{DS} = 160V, V_{GS} = 0V, T_J = 125^\circ\text{C}$  |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —    | 100  | nA    | $V_{GS} = 20V$                                         |
|                                 | Gate-to-Source Reverse Leakage       | —    | —    | -100 |       | $V_{GS} = -20V$                                        |

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

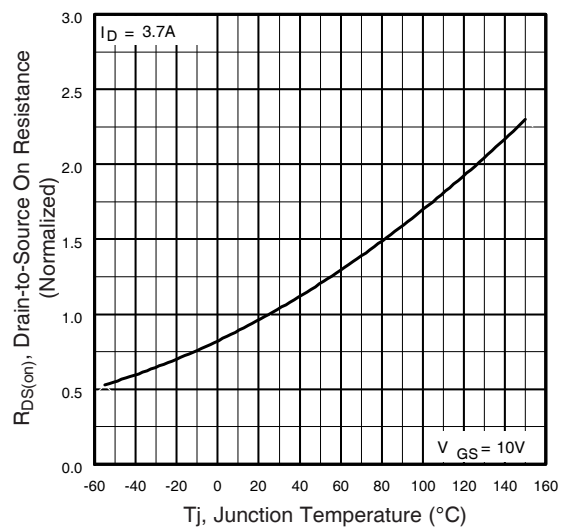
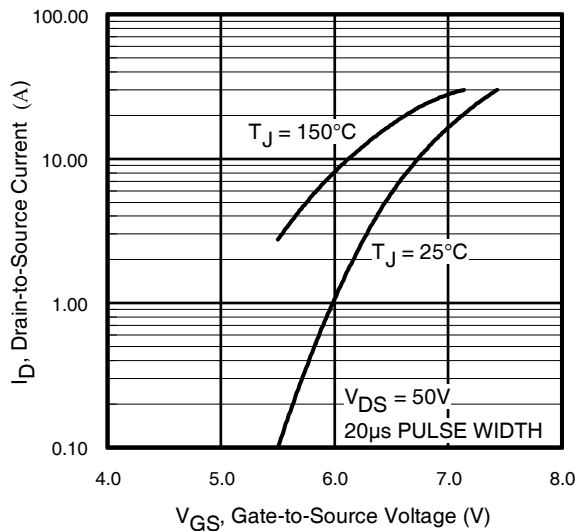
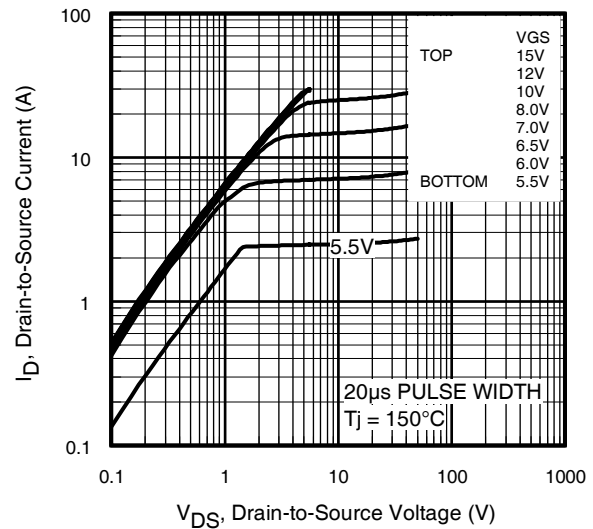
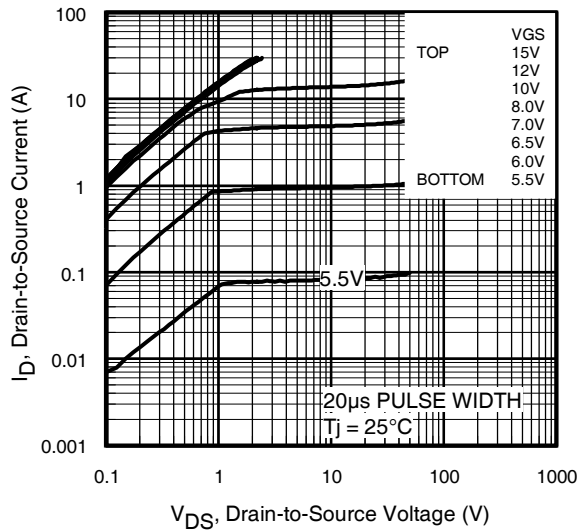
|                        | Parameter                       | Min. | Typ. | Max. | Units | Conditions                                      |
|------------------------|---------------------------------|------|------|------|-------|-------------------------------------------------|
| $g_{fs}$               | Forward Transconductance        | 7.9  | —    | —    | S     | $V_{DS} = 50V, I_D = 3.7A$                      |
| $Q_g$                  | Total Gate Charge               | —    | 39   | 59   | nC    | $I_D = 2.2A$                                    |
| $Q_{gs}$               | Gate-to-Source Charge           | —    | 9.2  | —    |       | $V_{DS} = 100V$<br>$V_{GS} = 10V$               |
| $Q_{gd}$               | Gate-to-Drain ("Miller") Charge | —    | 15   | —    | ns    | $V_{DD} = 100V$                                 |
| $t_{d(on)}$            | Turn-On Delay Time              | —    | 15   | —    |       | $I_D = 2.2A$                                    |
| $t_r$                  | Rise Time                       | —    | 13   | —    |       | $R_G = 6.5\Omega$                               |
| $t_{d(off)}$           | Turn-Off Delay Time             | —    | 27   | —    |       | $V_{GS} = 10V$ ③                                |
| $t_f$                  | Fall Time                       | —    | 14   | —    | pF    |                                                 |
| $C_{iss}$              | Input Capacitance               | —    | 1820 | —    |       | $V_{GS} = 0V$                                   |
| $C_{oss}$              | Output Capacitance              | —    | 190  | —    |       | $V_{DS} = 25V$                                  |
| $C_{rss}$              | Reverse Transfer Capacitance    | —    | 94   | —    |       | $f = 1.0\text{MHz}$                             |
| $C_{oss}$              | Output Capacitance              | —    | 780  | —    |       | $V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$ |
| $C_{oss}$              | Output Capacitance              | —    | 89   | —    |       | $V_{GS} = 0V, V_{DS} = 160V, f = 1.0\text{MHz}$ |
| $C_{oss \text{ eff.}}$ | Effective Output Capacitance    | —    | 150  | —    |       | $V_{GS} = 0V, V_{DS} = 0V \text{ to } 160V$ ③   |

## Avalanche Characteristics

|          | Parameter                      | Typ. | Max. | Units |
|----------|--------------------------------|------|------|-------|
| $E_{AS}$ | Single Pulse Avalanche Energy② | —    | 130  | mJ    |
| $I_{AR}$ | Avalanche Current①             | —    | 4.4  | A     |

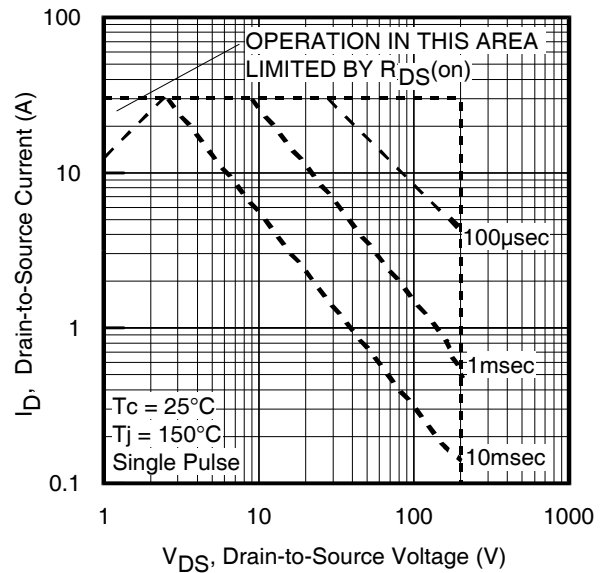
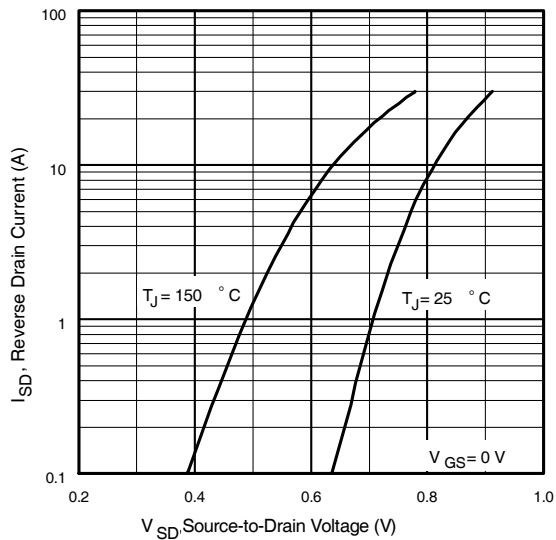
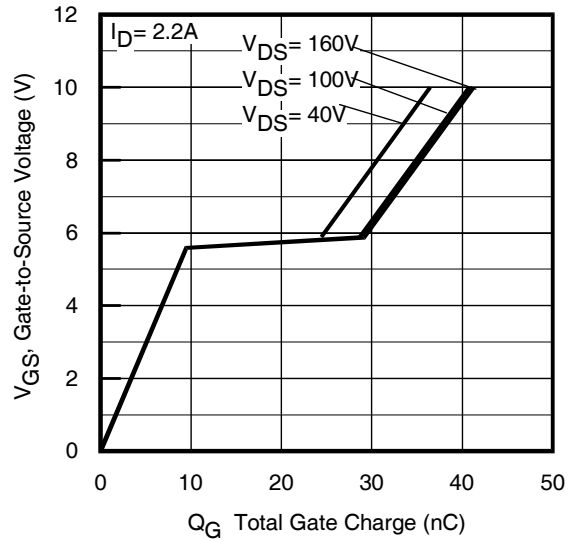
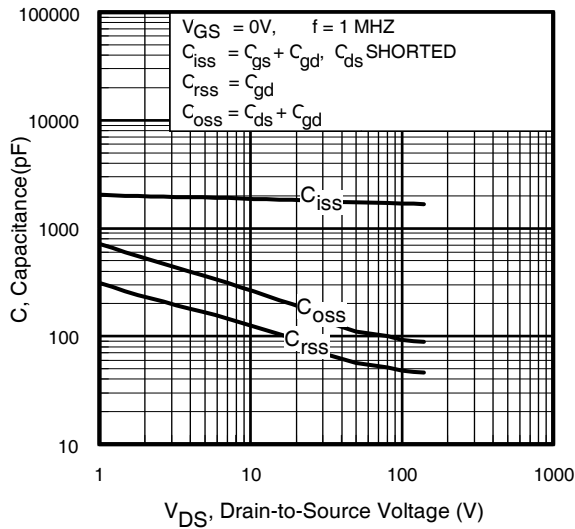
## Diode Characteristics

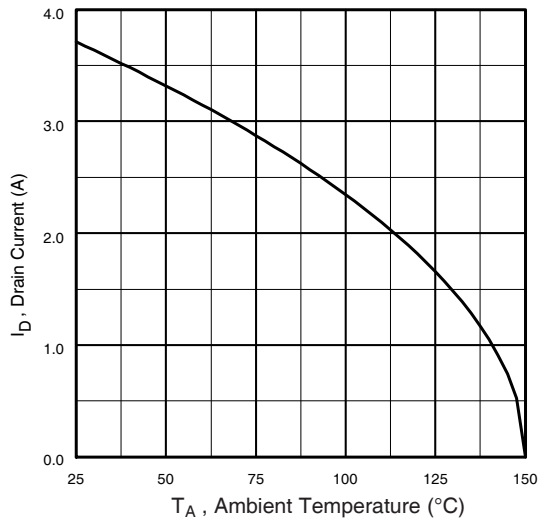
|          | Parameter                                 | Min. | Typ. | Max. | Units | Conditions                                                              |
|----------|-------------------------------------------|------|------|------|-------|-------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current<br>(Body Diode) | —    | —    | 2.3  | A     | MOSFET symbol<br>showing the<br>integral reverse<br>p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current<br>(Body Diode) ①   | —    | —    | 30   |       |                                                                         |
| $V_{SD}$ | Diode Forward Voltage                     | —    | —    | 1.3  | V     | $T_J = 25^\circ\text{C}, I_S = 2.2A, V_{GS} = 0V$ ③                     |
| $t_{rr}$ | Reverse Recovery Time                     | —    | 69   | 100  | ns    | $T_J = 25^\circ\text{C}, I_F = 2.2A$                                    |
| $Q_{rr}$ | Reverse Recovery Charge                   | —    | 200  | 310  | nC    | $di/dt = 100A/\mu s$ ③                                                  |



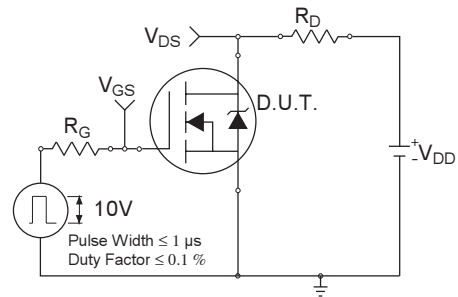
# IRF7492PbF

International  
**IR** Rectifier

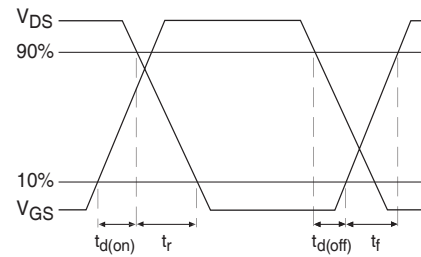




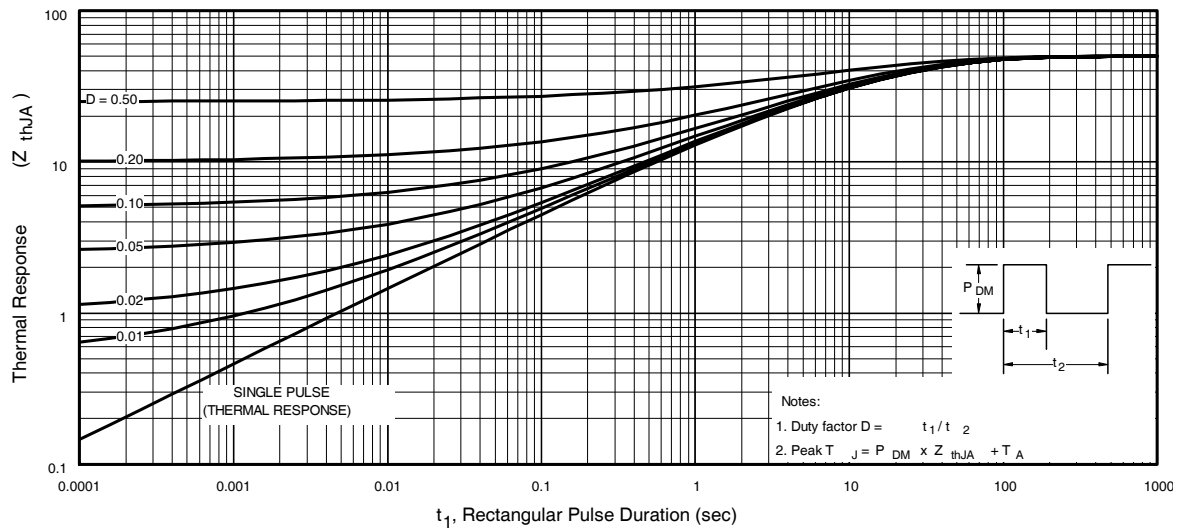
**Fig 9.** Maximum Drain Current Vs. Ambient Temperature



**Fig 10a.** Switching Time Test Circuit



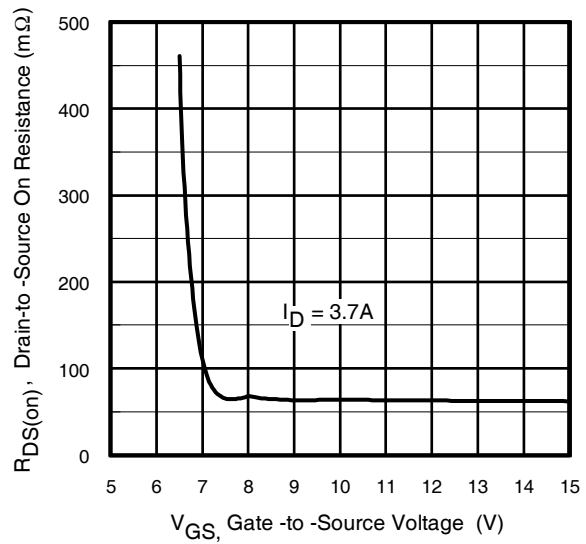
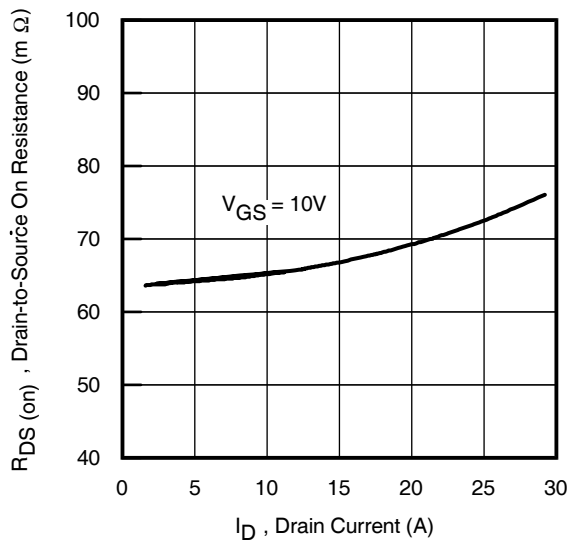
**Fig 10b.** Switching Time Waveforms



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

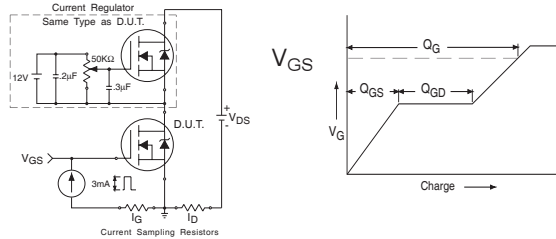
# IRF7492PbF

International  
**IR** Rectifier

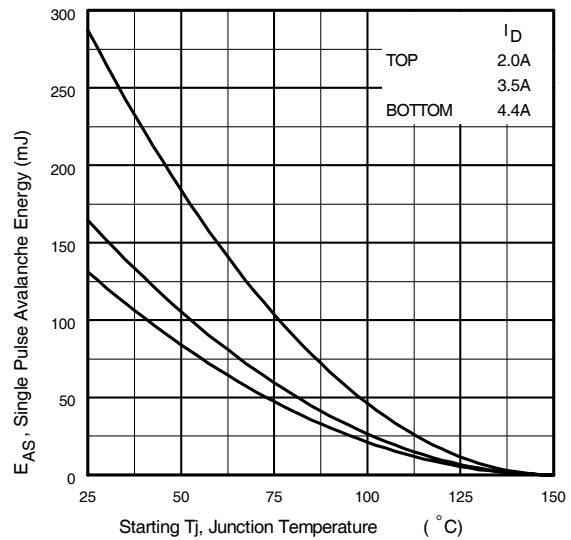


**Fig 12.** On-Resistance Vs. Drain Current

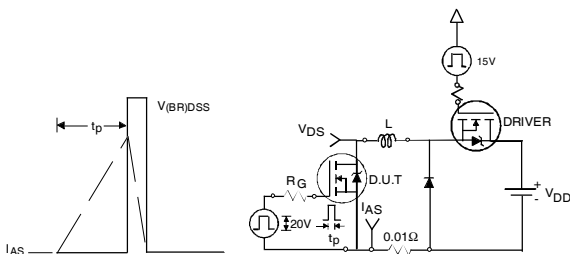
**Fig 13.** On-Resistance Vs. Gate Voltage



**Fig 14a&b.** Basic Gate Charge Test Circuit and Waveform



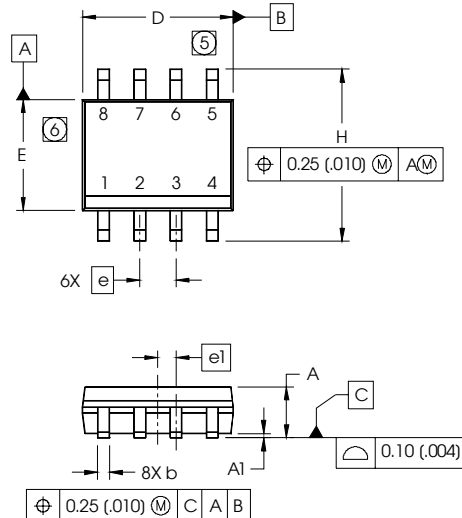
**Fig 15c.** Maximum Avalanche Energy Vs. Drain Current



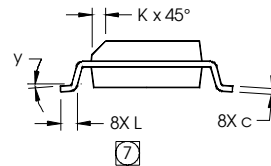
**Fig 15a&b.** Unclamped Inductive Test circuit and Waveforms

## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



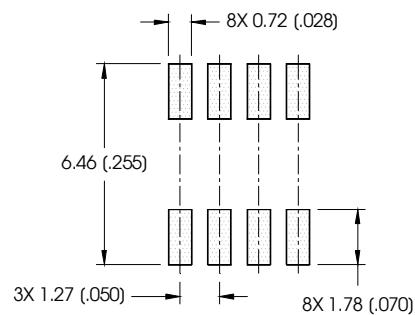
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| AI  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
| c   | .0075      | .0098 | 0.19        | 0.25 |
| D   | .189       | .1968 | 4.80        | 5.00 |
| E   | .1497      | .1574 | 3.80        | 4.00 |
| e   | .050 BASIC |       | 1.27 BASIC  |      |
| e1  | .025 BASIC |       | 0.635 BASIC |      |
| H   | .2284      | .2440 | 5.80        | 6.20 |
| K   | .0099      | .0196 | 0.25        | 0.50 |
| L   | .016       | .050  | 0.40        | 1.27 |
| y   | 0°         | 8°    | 0°          | 8°   |



### NOTES:

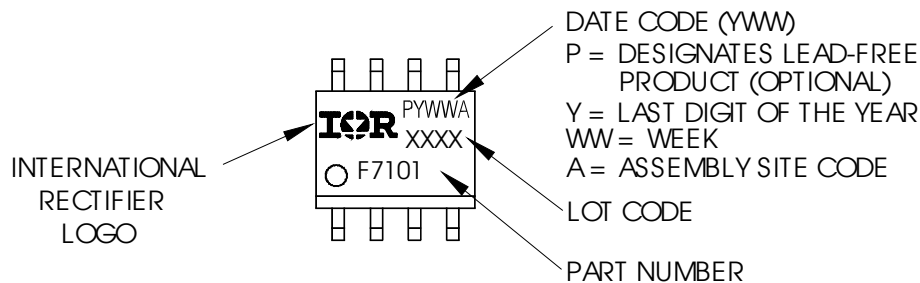
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- ⑦ DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

### FOOTPRINT



## SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

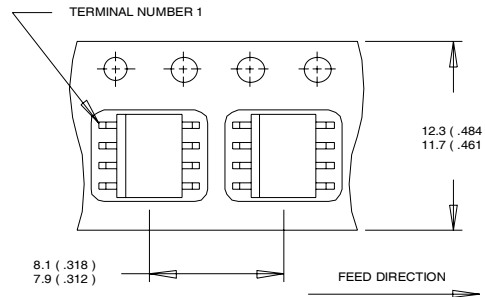


# IRF7492PbF

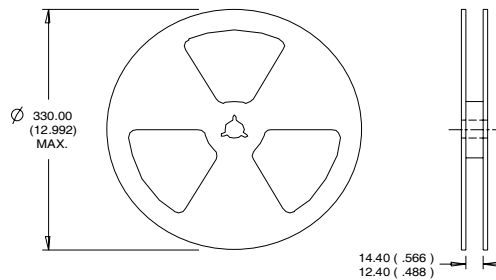
## SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)

International  
**IR** Rectifier



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
  2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
  3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



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

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 14\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 4.4\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board.
- ⑤  $C_{OSS}$  eff. is a fixed capacitance that gives the same charging time as  $C_{OSS}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$ .
- ⑥  $I_{SD} \leq 2.2\text{A}$ ,  $di/dt \leq 210\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  
 $T_J \leq 150^\circ\text{C}$ .

Data and specifications subject to change without notice.  
This product has been designed and qualified for the Consumer market.  
Qualifications Standards can be found on IR's Web site.

International  
**IR** 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](http://www.irf.com) for sales contact information.02/2007

[www.irf.com](http://www.irf.com)