

# International IR Rectifier

PD - 93883B

## SMPS MOSFET

## IRF7467

### Applications

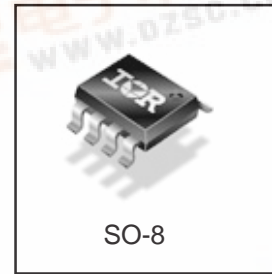
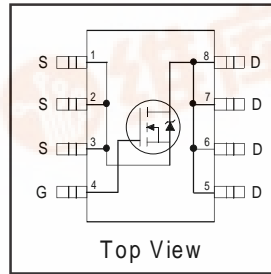
- High Frequency DC-DC Isolated Converters with Synchronous Rectification for Telecom and Industrial use
- High Frequency Buck Converters for Computer Processor Power

HEXFET® Power MOSFET

| $V_{DSS}$ | $R_{DS(on) \max}$ | $I_D$ |
|-----------|-------------------|-------|
| 30V       | 12mΩ              | 11A   |

### Benefits

- Ultra-Low Gate Impedance
- Very Low  $R_{DS(on)}$  at 4.5V  $V_{GS}$
- Fully Characterized Avalanche Voltage and Current



### Absolute Maximum Ratings

| Symbol                         | Parameter                                       | Max.         | Units |
|--------------------------------|---|--------------|-------|
| $V_{DS}$                       | Drain-Source Voltage                            | 30           | V     |
| $V_{GS}$                       | Gate-to-Source Voltage                          | ± 12         | V     |
| $I_D @ T_A = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 11           | A     |
| $I_D @ T_A = 70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 9.0          |       |
| $I_{DM}$                       | Pulsed Drain Current <sup>①</sup>               | 90           |       |
| $P_D @ T_A = 25^\circ\text{C}$ | Maximum Power Dissipation                       | 2.5          | W     |
| $P_D @ T_A = 70^\circ\text{C}$ | Maximum Power Dissipation                       | 1.6          | W     |
|                                | Linear Derating Factor                          | 0.02         | W/°C  |
| $T_J, T_{STG}$                 | Junction and Storage Temperature Range          | -55 to + 150 | °C    |

### Thermal Resistance

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

Notes ① through ④ are on page 8  
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# IRF7467

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**IR** Rectifier

## Static @ T<sub>J</sub> = 25°C (unless otherwise specified)

|                                      | Parameter                            | Min. | Typ.  | Max. | Units | Conditions  |
|--------------------------------------|--------------------------------------|------|-------|------|-------|---|
| V <sub>(BR)DSS</sub>                 | Drain-to-Source Breakdown Voltage    | 30   | —     | —    | V     | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                        |
| ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub> | Breakdown Voltage Temp. Coefficient  | —    | 0.029 | —    | V/°C  | Reference to 25°C, I <sub>D</sub> = 1mA                             |
| R <sub>DS(on)</sub>                  | Static Drain-to-Source On-Resistance | —    | 9.4   | 12   | mΩ    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 11A ③                       |
|                                      |                                      | —    | 10.6  | 13.5 |       | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 9.0A ③                     |
|                                      |                                      | —    | 17    | 35   |       | V <sub>GS</sub> = 2.8V, I <sub>D</sub> = 5.5A ③                     |
| V <sub>GS(th)</sub>                  | Gate Threshold Voltage               | 0.6  | —     | 2.0  | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA          |
| I <sub>DSS</sub>                     | Drain-to-Source Leakage Current      | —    | —     | 20   | μA    | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V                         |
|                                      |                                      | —    | —     | 100  |       | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C |
| I <sub>GSS</sub>                     | Gate-to-Source Forward Leakage       | —    | —     | 200  | nA    | V <sub>GS</sub> = 12V   |
|                                      | Gate-to-Source Reverse Leakage       | —    | —     | -200 |       | V <sub>GS</sub> = -12V  |

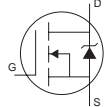
## Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)

| Symbol              | Parameter                       | Min. | Typ. | Max. | Units | Conditions                                   |
|---------------------|---------------------------------|------|------|------|-------|--|
| g <sub>fs</sub>     | Forward Transconductance        | 28   | —    | —    | S     | V <sub>DS</sub> = 16V, I <sub>D</sub> = 9.0A |
| Q <sub>g</sub>      | Total Gate Charge               | —    | 21   | 32   | nC    | I <sub>D</sub> = 9.0A                        |
| Q <sub>gs</sub>     | Gate-to-Source Charge           | —    | 6.7  | 10   |       | V <sub>DS</sub> = 15V                        |
| Q <sub>gd</sub>     | Gate-to-Drain ("Miller") Charge | —    | 5.8  | 8.7  |       | V <sub>GS</sub> = 4.5V ③                     |
| Q <sub>oss</sub>    | Output Gate Charge              | —    | 21   | 29   |       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V  |
| t <sub>d(on)</sub>  | Turn-On Delay Time              | —    | 7.8  | —    | ns    | V <sub>DD</sub> = 15V,                       |
| t <sub>r</sub>      | Rise Time                       | —    | 2.5  | —    |       | I <sub>D</sub> = 9.0A                        |
| t <sub>d(off)</sub> | Turn-Off Delay Time             | —    | 19   | —    |       | R <sub>G</sub> = 1.8Ω                        |
| t <sub>f</sub>      | Fall Time                       | —    | 4.0  | —    |       | V <sub>GS</sub> = 4.5V ③                     |
| C <sub>iss</sub>    | Input Capacitance               | —    | 2530 | —    | pF    | V <sub>GS</sub> = 0V                         |
| C <sub>oss</sub>    | Output Capacitance              | —    | 706  | —    |       | V <sub>DS</sub> = 15V                        |
| C <sub>rss</sub>    | Reverse Transfer Capacitance    | —    | 46   | —    |       | f = 1.0MHz                                   |

## Avalanche Characteristics

|                 | Parameter                      | Typ. | Max. | Units |
|-----------------|--------------------------------|------|------|-------|
| E <sub>AS</sub> | Single Pulse Avalanche Energy② | —    | 223  | mJ    |
| I <sub>AR</sub> | Avalanche Current①             | —    | 11   | A     |

## Diode Characteristics

| Symbol          | Parameter                              | Min. | Typ. | Max. | Units | Conditions   |
|-----------------|--|------|------|------|-------|--|
| I <sub>S</sub>  | Continuous Source Current (Body Diode) | —    | —    | 2.3  | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I <sub>SM</sub> | Pulsed Source Current (Body Diode) ①   | —    | —    | 90   |       |  |
| V <sub>SD</sub> | Diode Forward Voltage                  | —    | 0.79 | 1.3  | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = 9.0A, V <sub>GS</sub> = 0V ③   |
|                 |  | —    | 0.65 | —    |       | T <sub>J</sub> = 125°C, I <sub>S</sub> = 9.0A, V <sub>GS</sub> = 0V  |
| t <sub>rr</sub> | Reverse Recovery Time                  | —    | 40   | 60   | ns    | T <sub>J</sub> = 25°C, I <sub>F</sub> = 9.0A, V <sub>R</sub> = 15V   |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 56   | 84   | nC    | di/dt = 100A/μs ③  |
| t <sub>rr</sub> | Reverse Recovery Time                  | —    | 43   | 65   | ns    | T <sub>J</sub> = 125°C, I <sub>F</sub> = 9.0A, V <sub>R</sub> = 15V  |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 64   | 96   | nC    | di/dt = 100A/μs ③  |

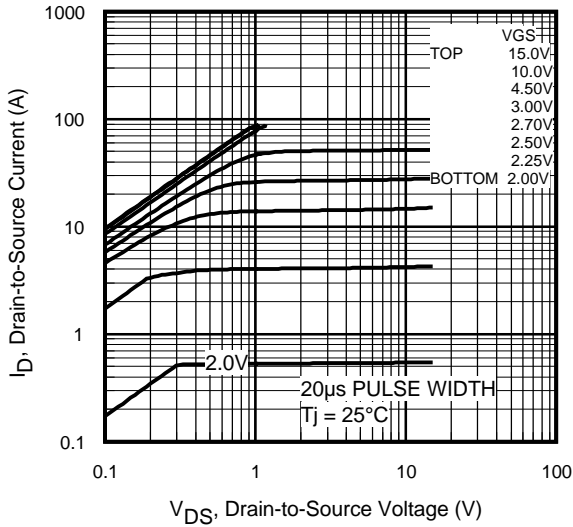


Fig 1. Typical Output Characteristics

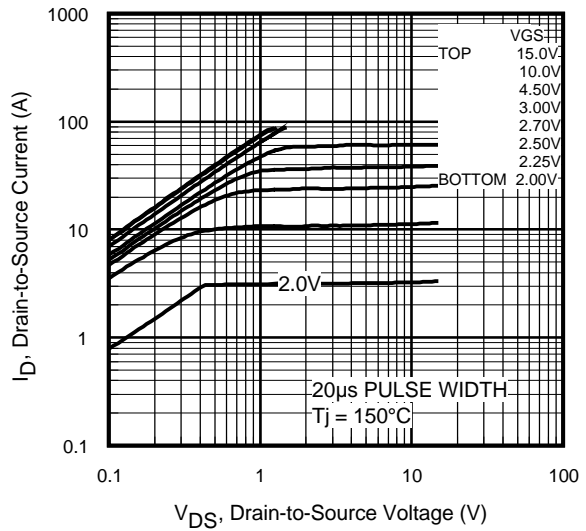


Fig 2. Typical Output Characteristics

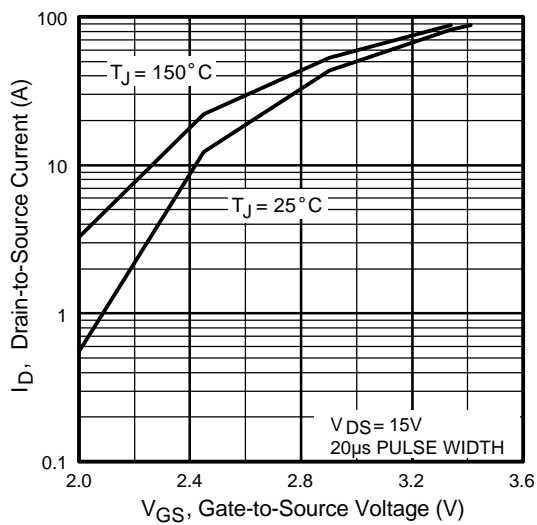


Fig 3. Typical Transfer Characteristics

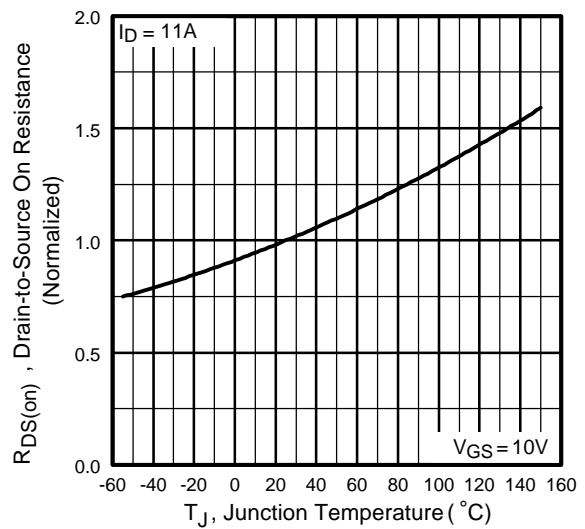
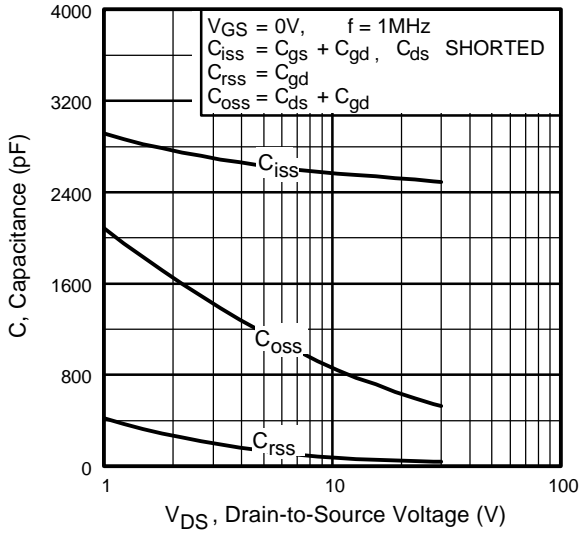
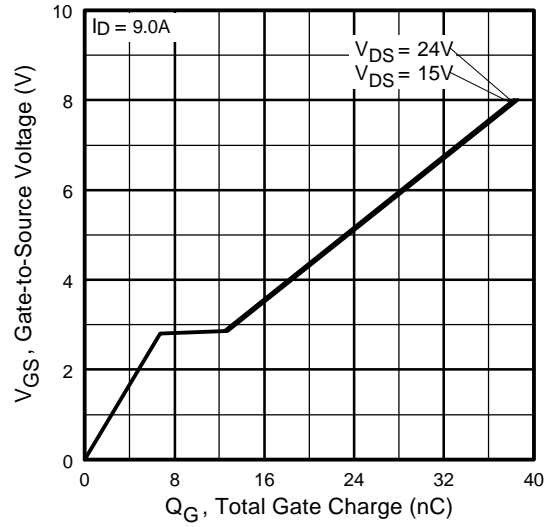


Fig 4. Normalized On-Resistance Vs. Temperature

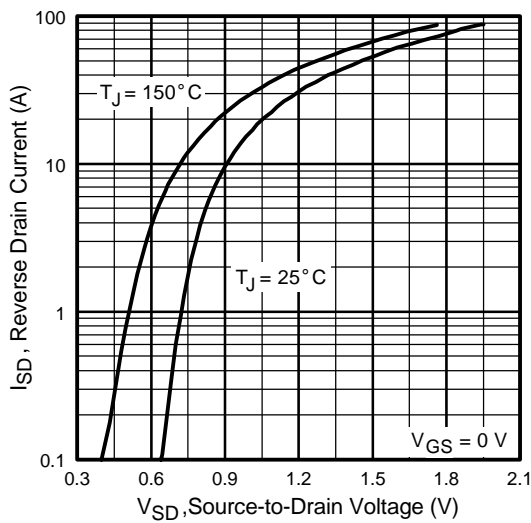
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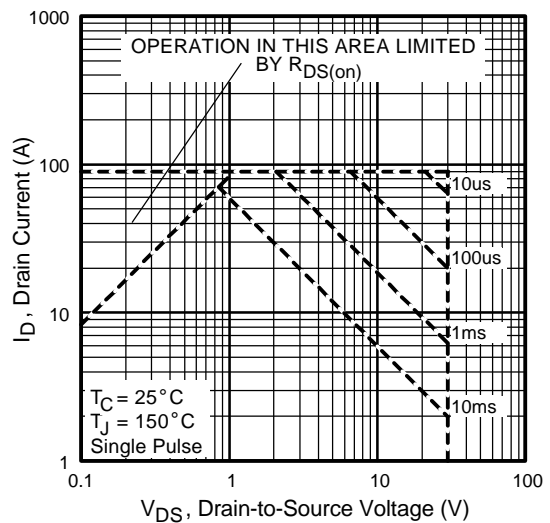
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



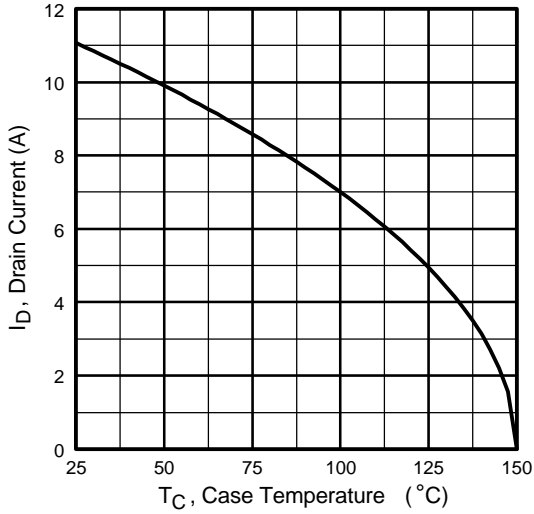
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



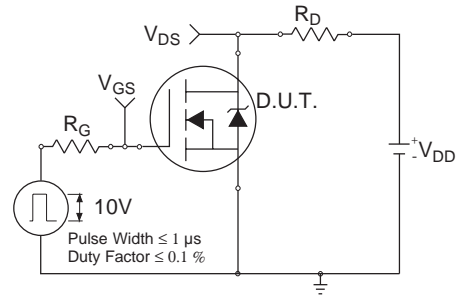
**Fig 7.** Typical Source-Drain Diode Forward Voltage



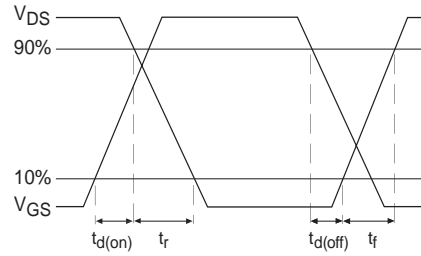
**Fig 8.** Maximum Safe Operating Area



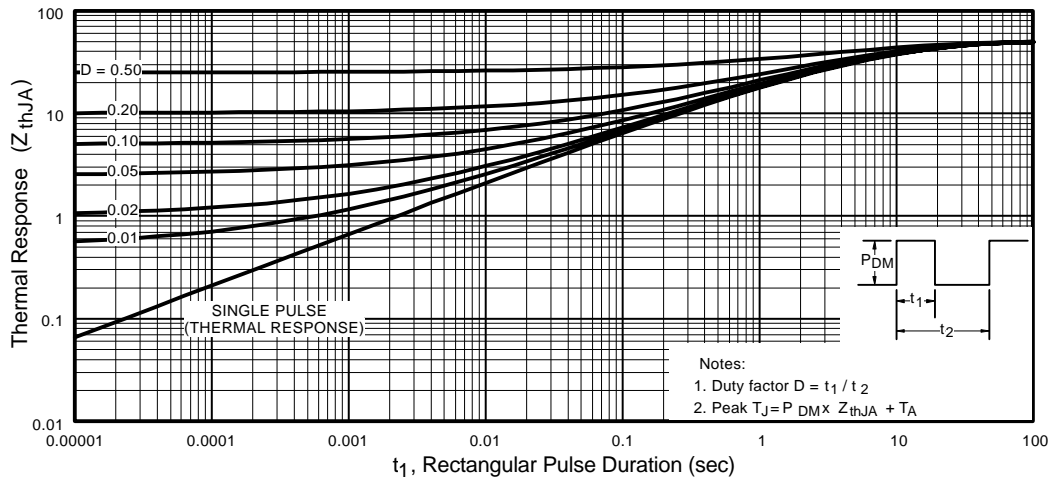
**Fig 9.** Maximum Drain Current Vs. Case Temperature



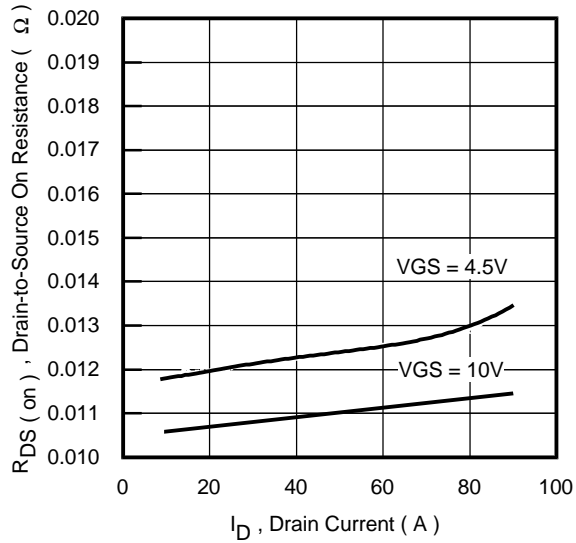
**Fig 10a.** Switching Time Test Circuit



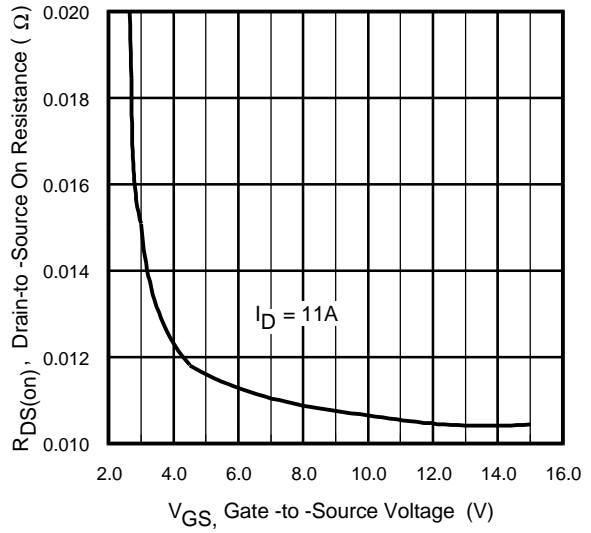
**Fig 10b.** Switching Time Waveforms



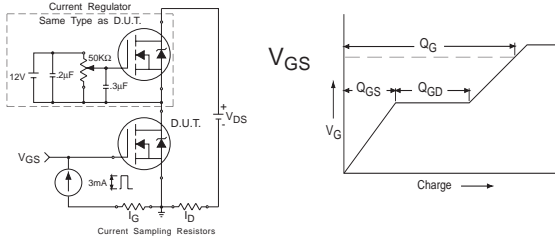
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



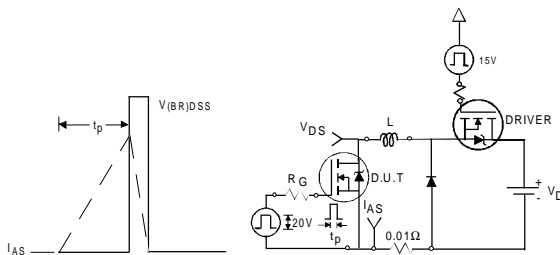
**Fig 12.** On-Resistance Vs. Drain Current



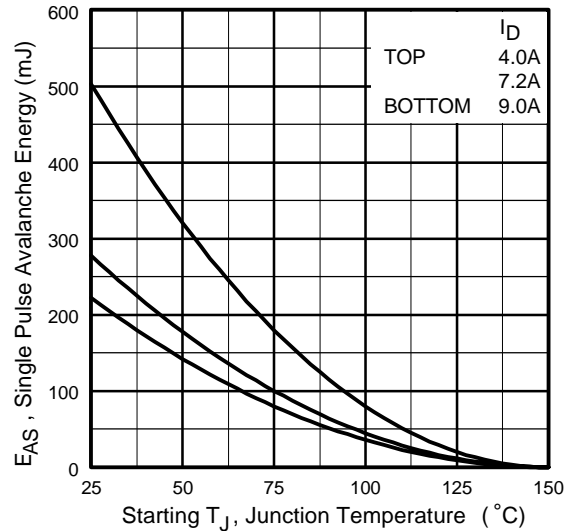
**Fig 13.** On-Resistance Vs. Gate Voltage



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

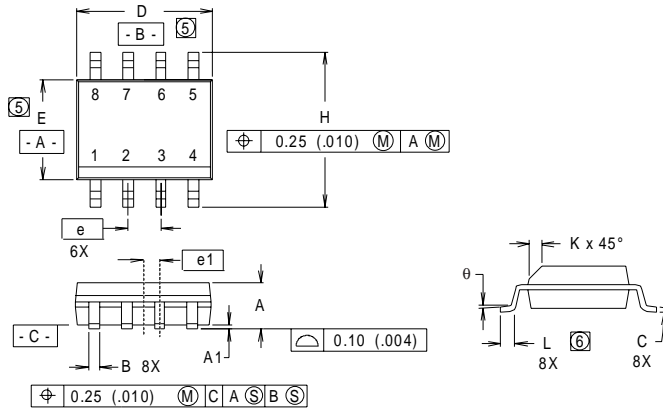


**Fig 15a&b.** Unclamped Inductive Test circuit and Waveforms



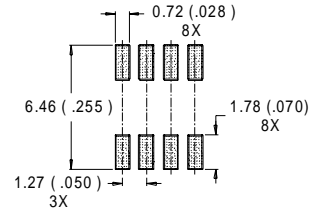
**Fig 15c.** Maximum Avalanche Energy Vs. Drain Current

### SO-8 Package Details



| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| B   | .014       | .018  | 0.36        | 0.46 |
| C   | .0075      | .0098 | 0.19        | 0.25 |
| D   | .189       | .196  | 4.80        | 4.98 |
| E   | .150       | .157  | 3.81        | 3.99 |
| e   | .050 BASIC |       | 1.27 BASIC  |      |
| e1  | .025 BASIC |       | 0.635 BASIC |      |
| H   | .2284      | .2440 | 5.80        | 6.20 |
| K   | .011       | .019  | 0.28        | 0.48 |
| L   | 0.16       | .050  | 0.41        | 1.27 |
| θ   | 0°         | 8°    | 0°          | 8°   |

RECOMMENDED FOOTPRINT

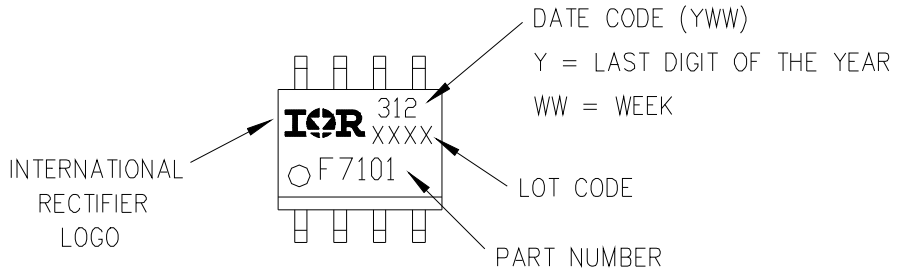


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
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 0.25 (.006).
- (6) DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

### SO-8 Part Marking

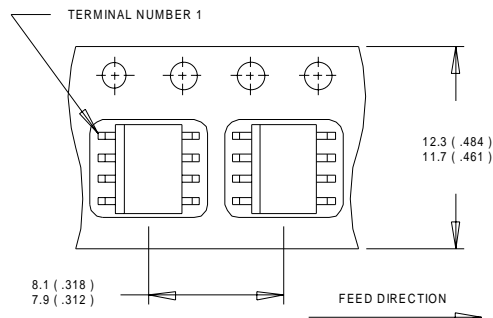
EXAMPLE: THIS IS AN IRF7101



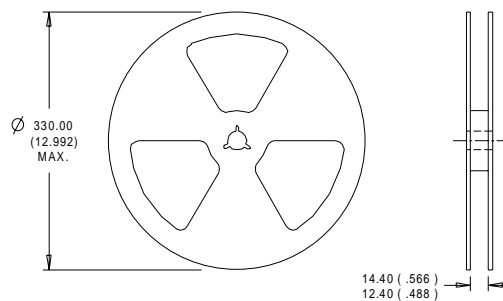
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## SO-8 Tape and Reel



- 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  $T_J = 25^\circ\text{C}$ ,  $L = 5.5\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 9.0\text{A}$ .
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board,  $t < 10\text{ sec}$

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

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**IR** Rectifier

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