

# IRF7809AV

International  
**IR** Rectifier

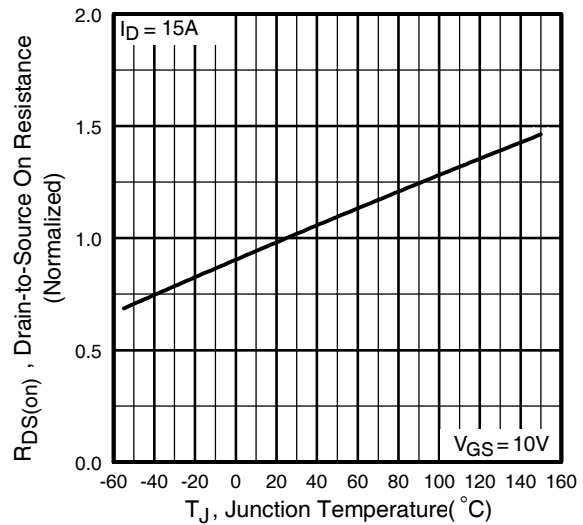
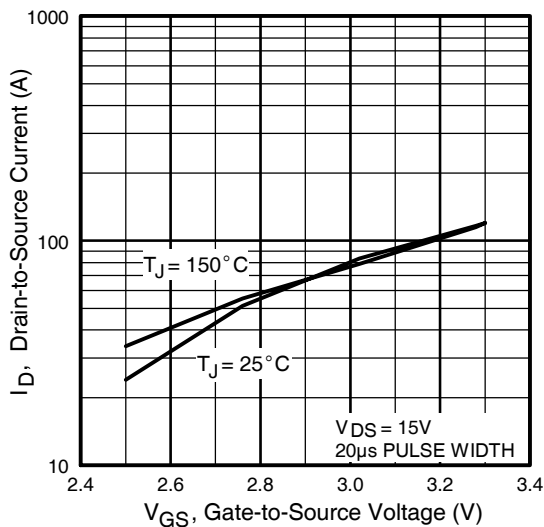
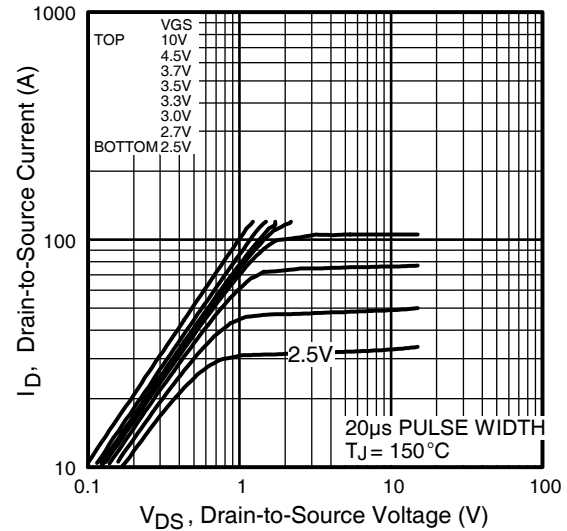
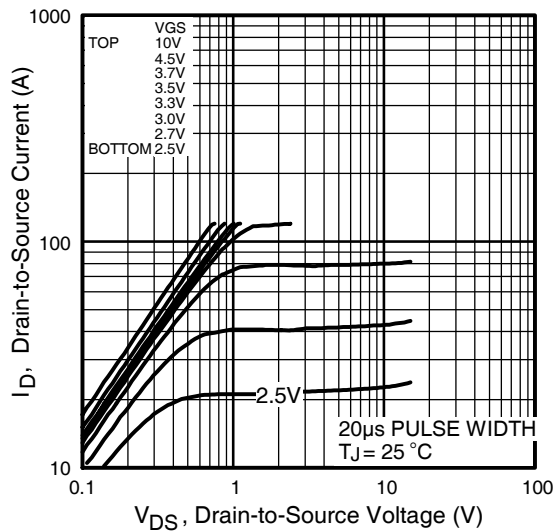
## Electrical Characteristics

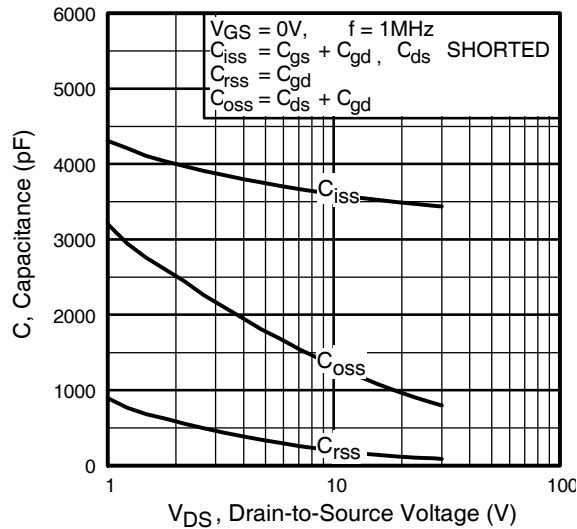
| Parameter                         |              | Min | Typ  | Max       | Units     | Conditions                                         |
|-----------------------------------|--------------|-----|------|-----------|-----------|----------------------------------------------------|
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$   | 30  | —    | —         | V         | $V_{GS} = 0V, I_D = 250\mu A$                      |
| Static Drain-Source on Resistance | $R_{DS(on)}$ |     | 7.0  | 9.0       | $m\Omega$ | $V_{GS} = 4.5V, I_D = 15A$ ②                       |
| Gate Threshold Voltage            | $V_{GS(th)}$ | 1.0 |      |           | V         | $V_{DS} = V_{GS}, I_D = 250\mu A$                  |
| Drain-Source Leakage Current      | $I_{DSS}$    |     |      | 30        | $\mu A$   | $V_{DS} = 24V, V_{GS} = 0$                         |
|                                   |              |     |      | 150       |           | $V_{DS} = 24V, V_{GS} = 0,$<br>$T_J = 100^\circ C$ |
| Gate-Source Leakage Current*      | $I_{GSS}$    |     |      | $\pm 100$ | nA        | $V_{GS} = \pm 12V$                                 |
| Total Gate Chg Cont FET           | $Q_G$        |     | 41   | 62        | nC        | $V_{GS}=5V, I_D=15A, V_{DS}=20V$                   |
| Total Gate Chg Sync FET           | $Q_G$        |     | 36   | 54        |           | $V_{GS} = 5V, V_{DS} < 100mV$                      |
| Pre-Vth Gate-Source Charge        | $Q_{GS1}$    |     | 7.0  |           |           | $V_{DS} = 20V, I_D = 15A$                          |
| Post-Vth Gate-Source Charge       | $Q_{GS2}$    |     | 2.3  |           |           |                                                    |
| Gate to Drain Charge              | $Q_{GD}$     |     | 12   |           |           | $I_D=15A, V_{DS}=16V$                              |
| Switch Chg( $Q_{gs2} + Q_{gd}$ )  | $Q_{sw}$     |     | 14   | 21        |           |                                                    |
| Output Charge*                    | $Q_{oss}$    |     | 30   | 45        |           | $V_{DS} = 16V, V_{GS} = 0$                         |
| Gate Resistance                   | $R_G$        |     | 1.5  | 3.0       | $\Omega$  |                                                    |
| Turn-on Delay Time                | $t_{d(on)}$  |     | 14   |           | ns        | $V_{DD} = 16V, I_D = 15A$                          |
| Rise Time                         | $t_r$        |     | 36   |           |           | $V_{GS} = 5V$                                      |
| Turn-off Delay Time               | $t_{d(off)}$ |     | 96   |           |           | Clamped Inductive Load                             |
| Fall Time                         | $t_f$        |     | 10   |           |           |                                                    |
| Input Capacitance                 | $C_{iss}$    | —   | 3780 | —         | pF        | $V_{DS} = 16V, V_{GS} = 0$                         |
| Output Capacitance                | $C_{oss}$    | —   | 1060 | —         |           |                                                    |
| Reverse Transfer Capacitance      | $C_{rss}$    | —   | 130  | —         |           |                                                    |

## Source-Drain Rating & Characteristics

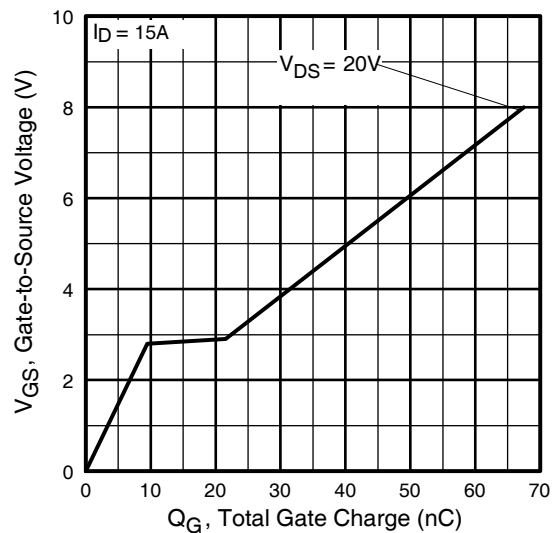
| Parameter                                         |             | Min | Typ | Max | Units | Conditions                                                                       |
|---------------------------------------------------|-------------|-----|-----|-----|-------|----------------------------------------------------------------------------------|
| Diode Forward Voltage*                            | $V_{SD}$    |     |     | 1.3 | V     | $I_S = 15A$ ②, $V_{GS} = 0V$                                                     |
| Reverse Recovery Charge④                          | $Q_{rr}$    |     | 120 |     | nC    | $di/dt \sim 700A/\mu s$<br>$V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$                |
| Reverse Recovery Charge (with Parallel Schottky)④ | $Q_{rr(s)}$ |     | 150 |     | nC    | $di/dt = 700A/\mu s$<br>(with 10BQ040)<br>$V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$ |

- 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,  $t < 10$  sec.
  - ④ Typ = measured -  $Q_{oss}$
  - ⑤ Typical values measured at  $V_{GS} = 4.5V, I_F = 15A$ .

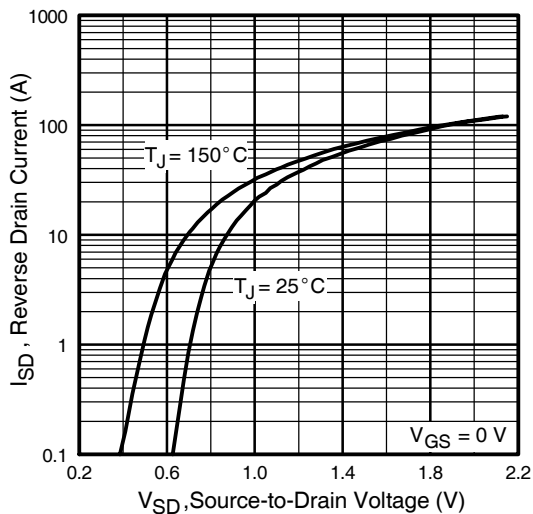




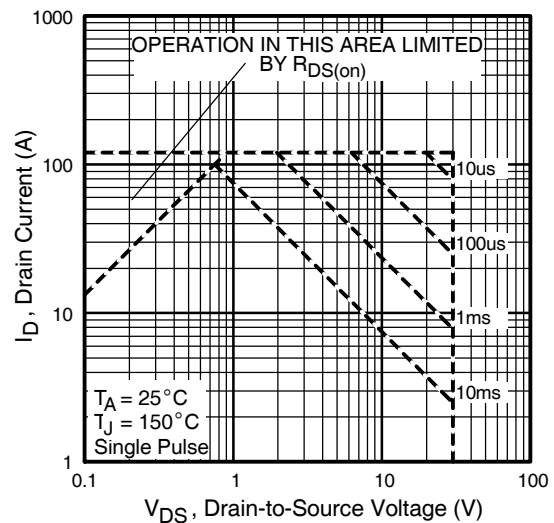
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



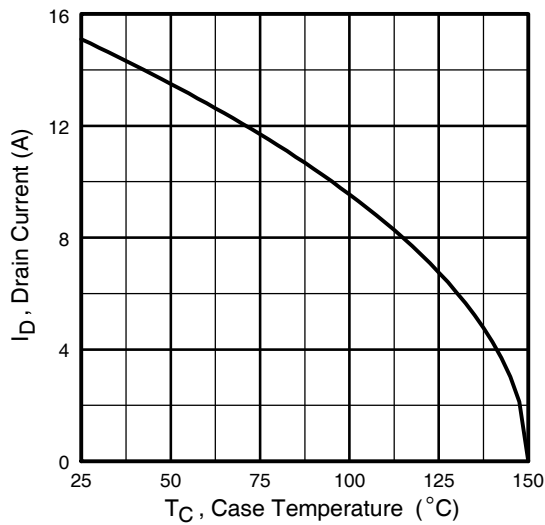
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



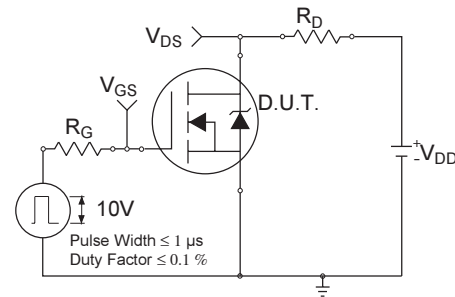
**Fig 7.** Typical Source-Drain Diode Forward Voltage



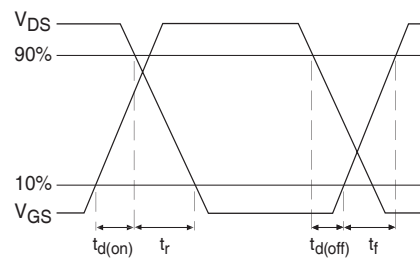
**Fig 8.** Maximum Safe Operating Area



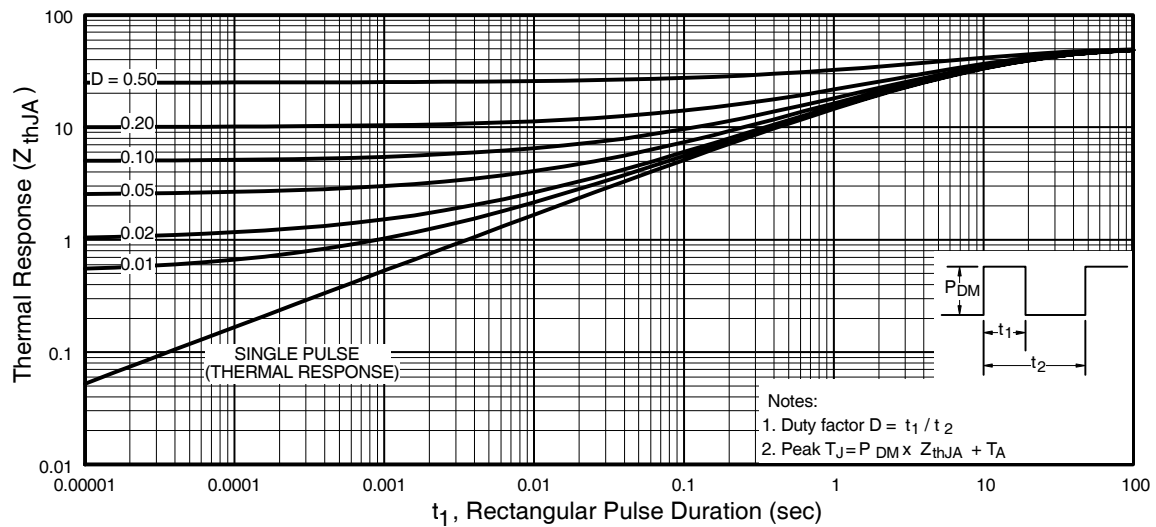
**Fig 9.** Maximum Drain Current Vs. Case Temperature



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



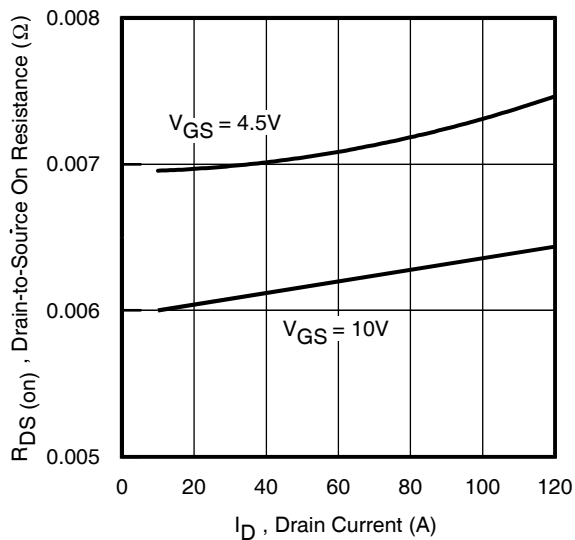
**Fig 10b.** Switching Time Waveforms



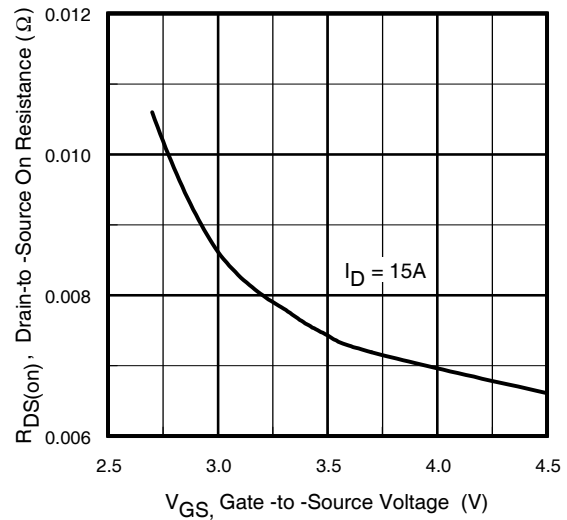
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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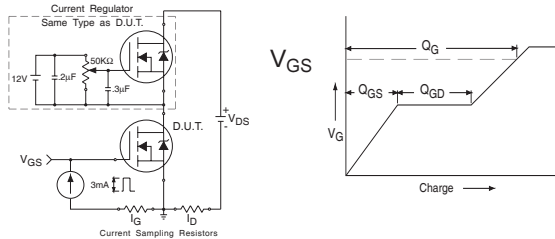
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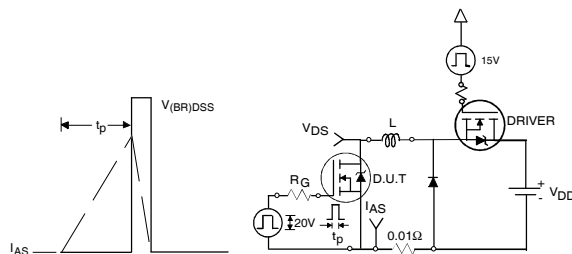
**Fig 12.** On-Resistance Vs. Drain Current



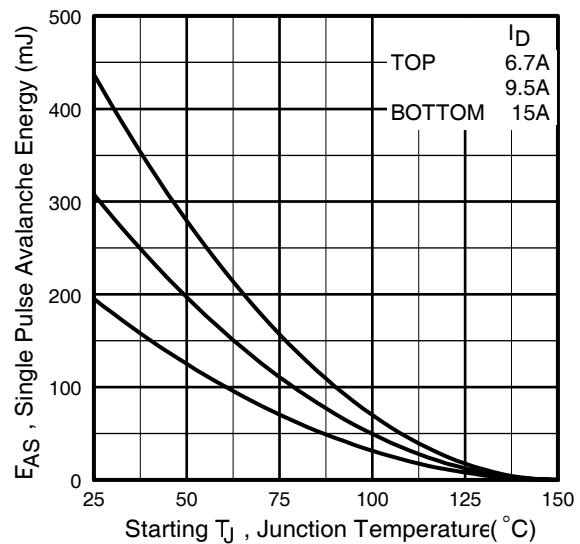
**Fig 13.** On-Resistance Vs. Gate Voltage



**Fig 13a&b.** Basic Gate Charge Test Circuit and Waveform



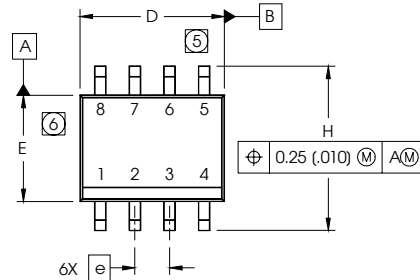
**Fig 14a&b.** Unclamped Inductive Test circuit and Waveforms



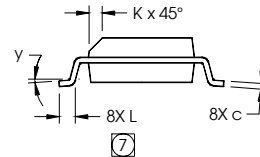
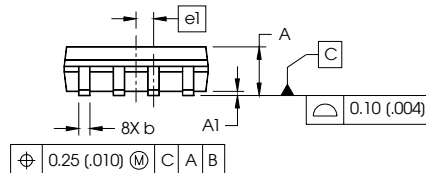
**Fig 14c.** Maximum Avalanche Energy Vs. Drain Current

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## SO-8 Package Details



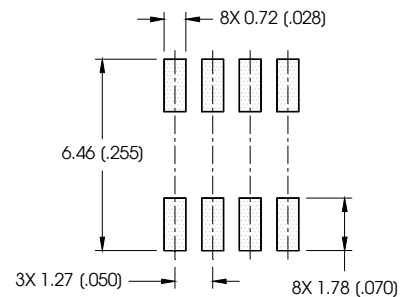
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
| 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:

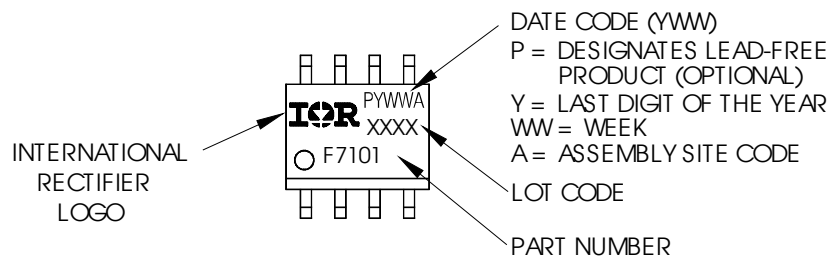
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE 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

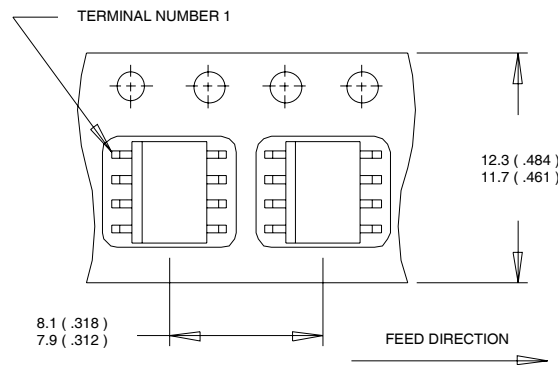
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



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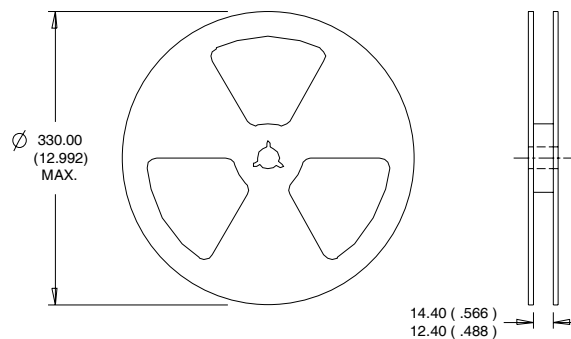
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## SO-8 Tape and Reel



### 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.

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