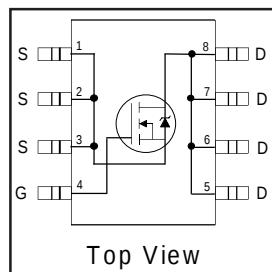


# IRF7607

HEXFET® Power MOSFET

- Trench Technology
- Ultra Low On-Resistance
- N-Channel MOSFET
- Very Small SOIC Package
- Low Profile (<1.1mm)
- Available in Tape & Reel

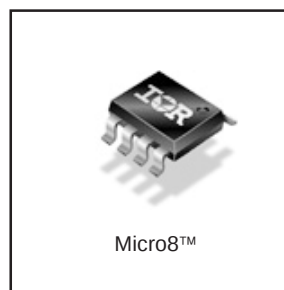


|                            |
|----------------------------|
| $V_{DS} = 20V$             |
| $R_{DS(on)} = 0.030\Omega$ |

## Description

New trench HEXFET® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The new Micro8™ package has half the footprint area of the standard SO-8. This makes the Micro8 an ideal package for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro8 will allow it to fit easily into extremely thin application environments such as portable electronics and PCMCIA cards.



## Absolute Maximum Ratings

|                          | Parameter                                 | Max.         | Units |
|--------------------------|-------------------------------------------|--------------|-------|
| $V_{DS}$                 | Drain- Source Voltage                     | 20           | V     |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ | 6.5          | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ | 5.2          |       |
| $I_{DM}$                 | Pulsed Drain Current ①                    | 50           |       |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation                         | 1.8          | W     |
| $P_D @ T_A = 70^\circ C$ | Power Dissipation                         | 1.2          |       |
|                          | Linear Derating Factor                    | 0.014        | W/°C  |
| $V_{GS}$                 | Gate-to-Source Voltage                    | $\pm 12$     | V     |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range    | -55 to + 150 | °C    |

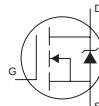
## Thermal Resistance

|                 | Parameter                    | Max. | Units |
|-----------------|------------------------------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient③ | 70   | °C/W  |

**Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

|                                 | Parameter                            | Min. | Typ.  | Max.  | Units               | Conditions                                                |
|---------------------------------|--------------------------------------|------|-------|-------|---------------------|-----------------------------------------------------------|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | 20   | —     | —     | V                   | $V_{GS} = 0V$ , $I_D = 250\mu A$                          |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.016 | —     | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}$ , $I_D = 1mA$             |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —    | —     | 0.030 | $\Omega$            | $V_{GS} = 4.5V$ , $I_D = 6.5A$ ②                          |
|                                 |                                      | —    | —     | 0.045 |                     | $V_{GS} = 2.5V$ , $I_D = 5.2A$ ②                          |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | 0.60 | —     | 1.0   | V                   | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                      |
| $g_{fs}$                        | Forward Transconductance             | 13   | —     | —     | S                   | $V_{DS} = 10V$ , $I_D = 6.5A$                             |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —     | 1.0   | $\mu A$             | $V_{DS} = 16V$ , $V_{GS} = 0V$                            |
|                                 |                                      | —    | —     | 25    |                     | $V_{DS} = 16V$ , $V_{GS} = 0V$ , $T_J = 70^\circ\text{C}$ |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —     | -100  | nA                  | $V_{GS} = -12V$                                           |
|                                 | Gate-to-Source Reverse Leakage       | —    | —     | 100   |                     | $V_{GS} = 12V$                                            |
| $Q_g$                           | Total Gate Charge                    | —    | 15    | 22    | nC                  | $I_D = 6.5A$                                              |
| $Q_{gs}$                        | Gate-to-Source Charge                | —    | 2.2   | 3.3   |                     | $V_{DS} = 10V$                                            |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —    | 3.5   | 5.3   |                     | $V_{GS} = 5.0V$ ②                                         |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —    | 8.5   | —     | ns                  | $V_{DD} = 10V$                                            |
| $t_r$                           | Rise Time                            | —    | 11    | —     |                     | $I_D = 1.0A$                                              |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —    | 36    | —     |                     | $R_G = 6.0\Omega$                                         |
| $t_f$                           | Fall Time                            | —    | 16    | —     |                     | $R_D = 10\Omega$ ②                                        |
| $C_{iss}$                       | Input Capacitance                    | —    | 1310  | —     | pF                  | $V_{GS} = 0V$                                             |
| $C_{oss}$                       | Output Capacitance                   | —    | 150   | —     |                     | $V_{DS} = 15V$                                            |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —    | 36    | —     |                     | $f = 1.0MHz$                                              |

**Source-Drain Ratings and Characteristics**

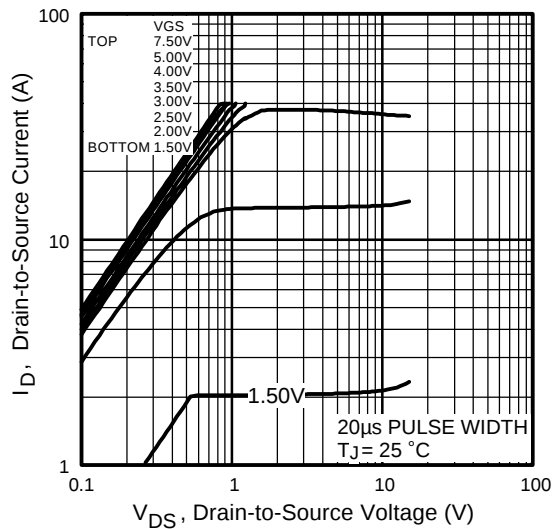
|          | Parameter                              | Min. | Typ. | Max. | Units | Conditions                                                                                                                                           |
|----------|----------------------------------------|------|------|------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —    | —    | 1.8  | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —    | —    | 50   |       |                                                                                                                                                      |
| $V_{SD}$ | Diode Forward Voltage                  | —    | —    | 1.2  | V     | $T_J = 25^\circ\text{C}$ , $I_S = 1.7A$ , $V_{GS} = 0V$ ②                                                                                            |
| $t_{rr}$ | Reverse Recovery Time                  | —    | 19   | 29   | ns    | $T_J = 25^\circ\text{C}$ , $I_F = 1.7A$                                                                                                              |
| $Q_{rr}$ | Reverse Recovery Charge                | —    | 13   | 20   | nC    | $di/dt = 100A/\mu s$ ②                                                                                                                               |

**Notes:**

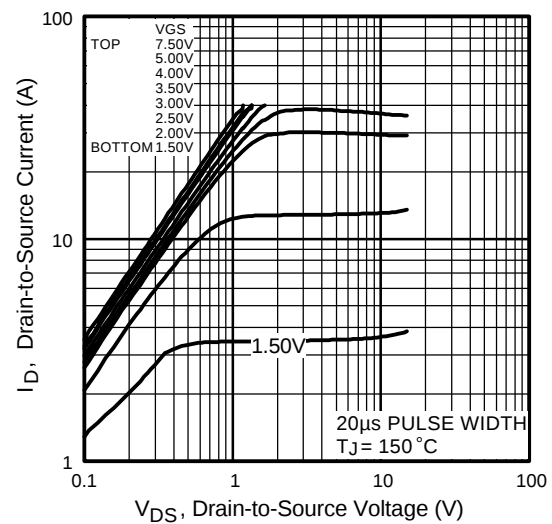
① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

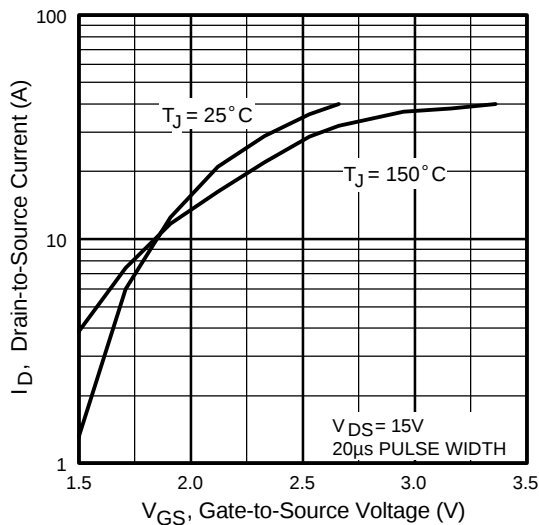
③ Surface mounted on FR-4 board,  $t \leq 5sec$ .



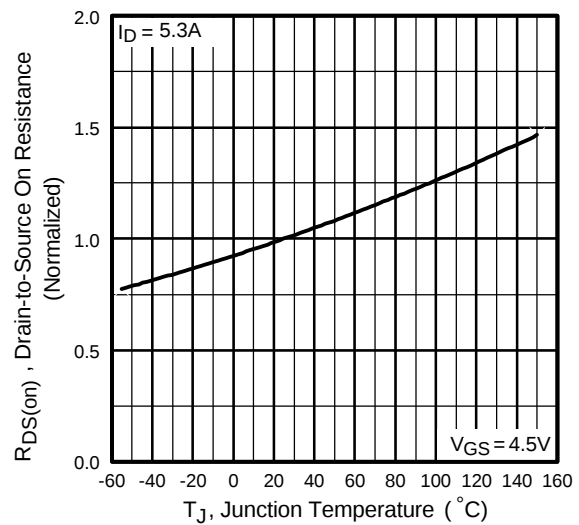
**Fig 1.** Typical Output Characteristics



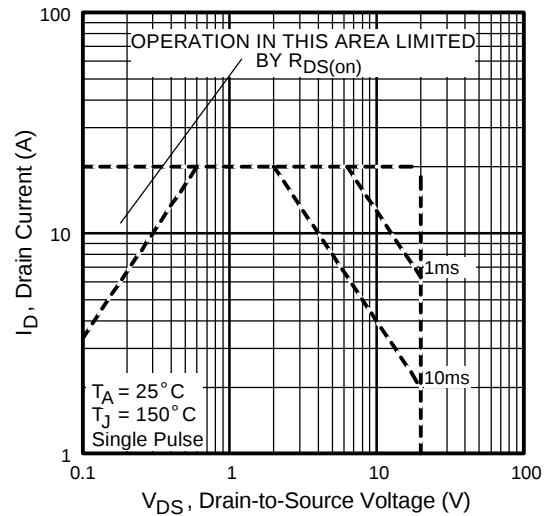
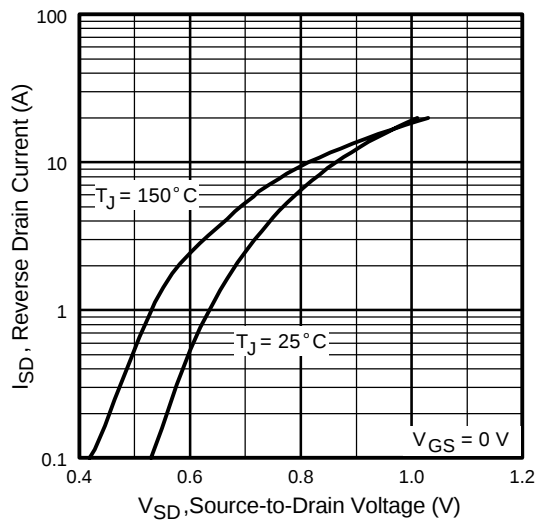
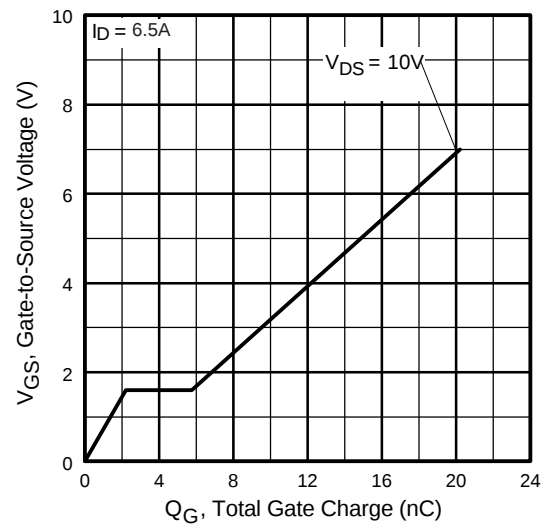
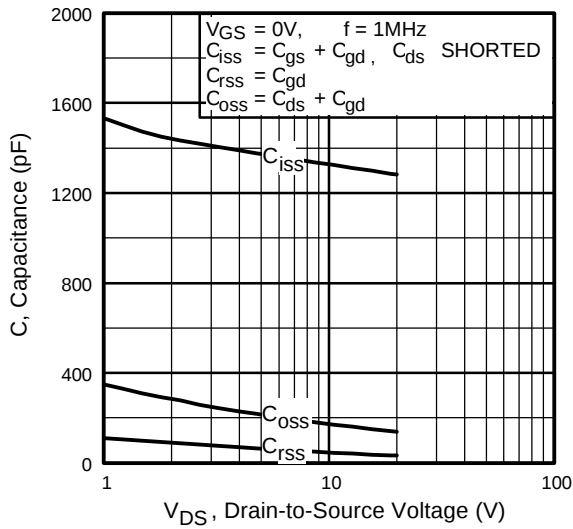
**Fig 2.** Typical Output Characteristics

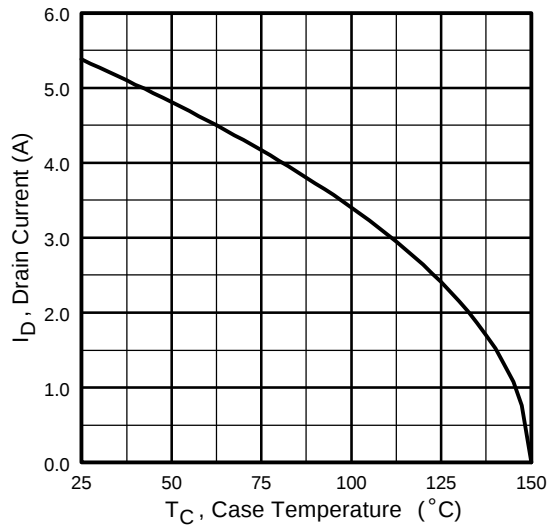


**Fig 3.** Typical Transfer Characteristics

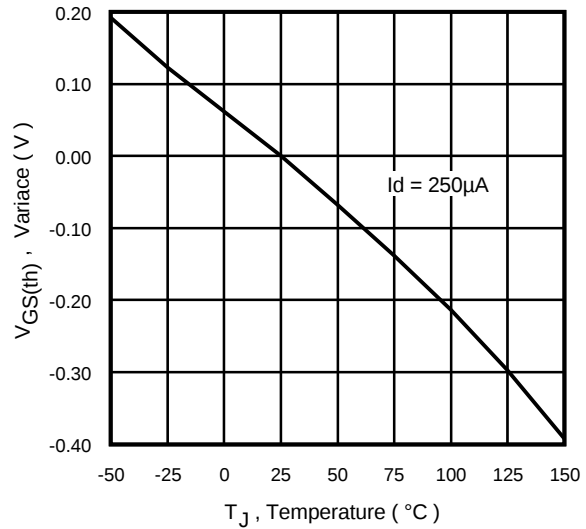


**Fig 4.** Normalized On-Resistance Vs. Temperature

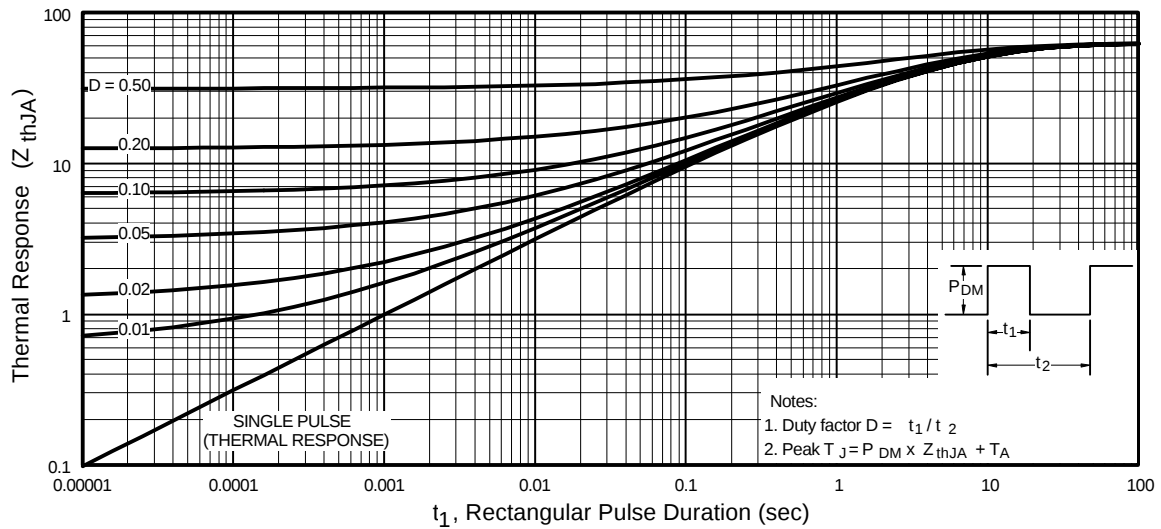




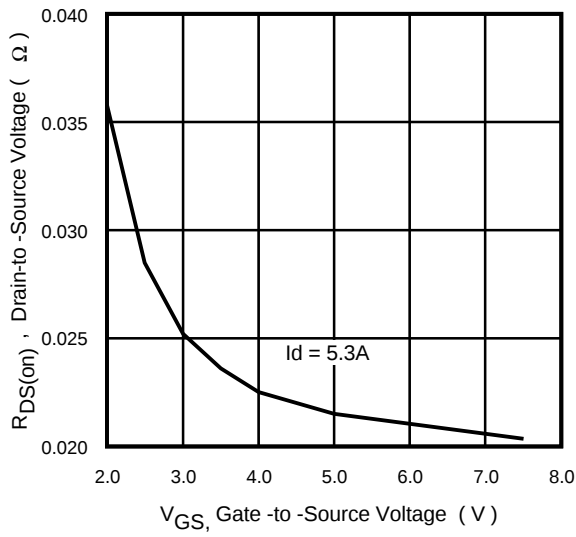
**Fig 9.** Maximum Drain Current Vs. Case Temperature



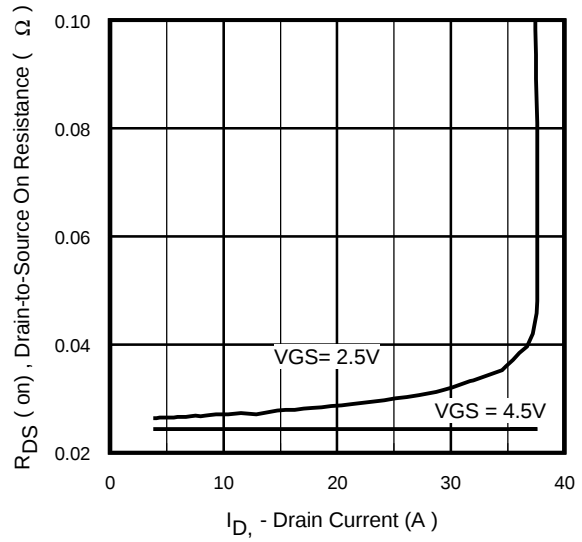
**Fig 10.** Typical  $V_{GS(th)}$  Variance Vs. Junction Temperature



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



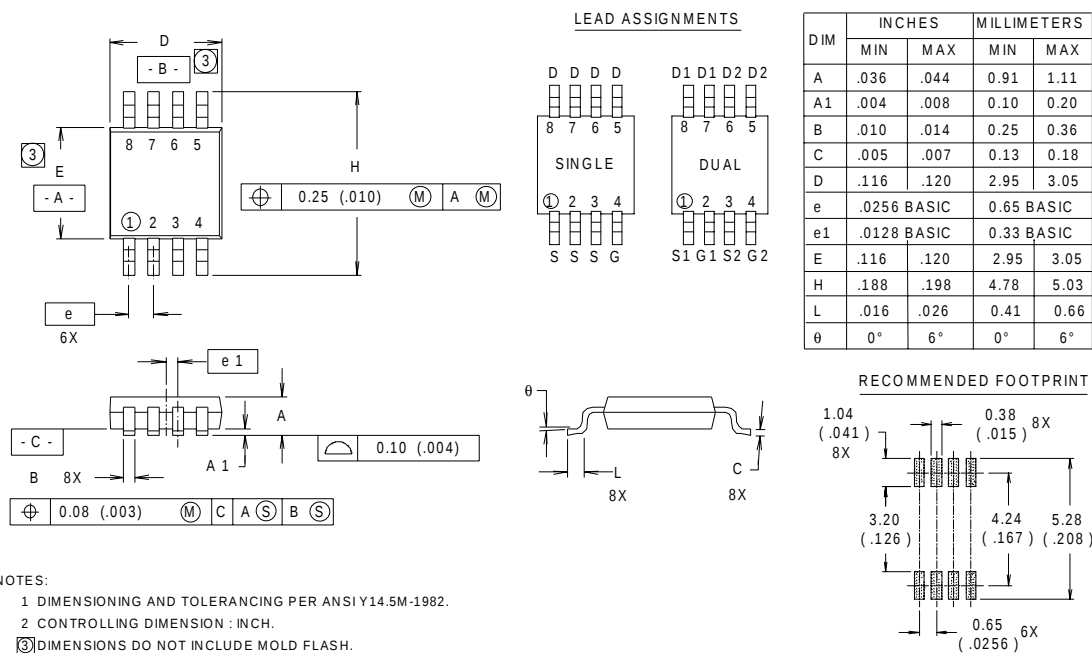
**Fig 12.** Typical On-Resistance Vs. Gate Voltage



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

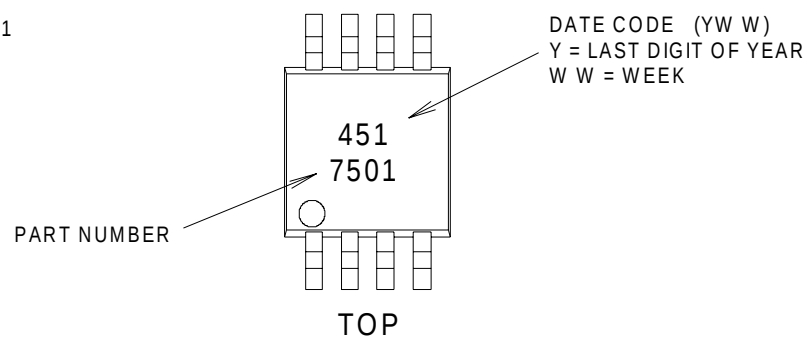
## Micro8™ Package Outline

Dimensions are shown in millimeters (inches)



## Micro8™ Part Marking Information

EXAMPLE : THIS IS AN IRF7501



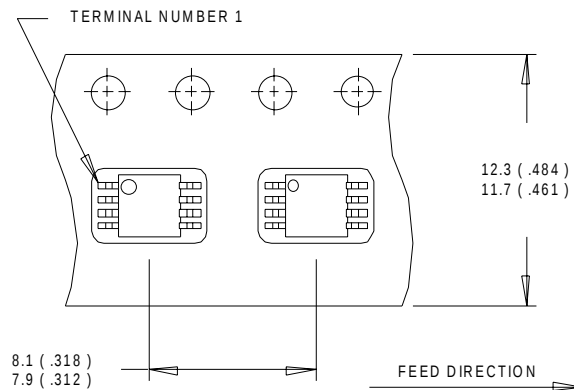
# IRF7607

PROVISIONAL

International  
**IR** Rectifier

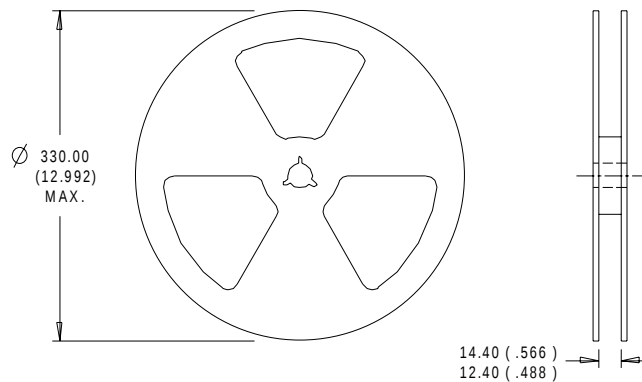
## Micro8™ Tape & Reel Information

Dimensions are shown in millimeters (inches)



### NOTES:

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



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International  
**IR** Rectifier

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**IR CANADA:** 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

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**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

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*Data and specifications subject to change without notice.* 1/2000

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