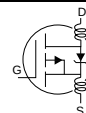


## Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

|                                 | Parameter                            | Min. | Typ.   | Max.  | Units               | Conditions                                                        |
|---------------------------------|--------------------------------------|------|--------|-------|---------------------|-------------------------------------------------------------------|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | -30  | —      | —     | V                   | $V_{GS} = 0V$ , $I_D = -250\mu A$                                 |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | -0.024 | —     | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}$ , $I_D = -1mA$                    |
| $R_{DS(ON)}$                    | Static Drain-to-Source On-Resistance | —    | —      | 0.070 | $\Omega$            | $V_{GS} = -10V$ , $I_D = -4.6A$ ③                                 |
|                                 |                                      | —    | —      | 0.130 |                     | $V_{GS} = -4.5V$ , $I_D = -2.0A$ ③                                |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | -1.0 | —      | -3.0  | V                   | $V_{DS} = V_{GS}$ , $I_D = -250\mu A$                             |
| $g_{fs}$                        | Forward Transconductance             | —    | 6.6    | —     | S                   | $V_{DS} = -15V$ , $I_D = -4.6A$ ③                                 |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —      | -1.0  | $\mu A$             | $V_{DS} = -24V$ , $V_{GS} = 0V$                                   |
|                                 |                                      | —    | —      | -5.0  |                     | $V_{DS} = -15V$ , $V_{GS} = 0V$ , $T_J = 70^\circ\text{C}$        |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —      | -100  | nA                  | $V_{GS} = -20V$                                                   |
|                                 | Gate-to-Source Reverse Leakage       | —    | —      | 100   |                     | $V_{GS} = 20V$                                                    |
| $Q_g$                           | Total Gate Charge                    | —    | 27     | 40    | nC                  | $I_D = -4.6A$                                                     |
| $Q_{gs}$                        | Gate-to-Source Charge                | —    | 5.2    | —     |                     | $V_{DS} = -15V$                                                   |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —    | 7.5    | —     |                     | $V_{GS} = -10V$ ③                                                 |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —    | 14     | 30    | ns                  | $V_{DD} = -15V$                                                   |
| $t_r$                           | Rise Time                            | —    | 21     | 60    |                     | $I_D = -1.0A$                                                     |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —    | 97     | 150   |                     | $R_G = 6.0\Omega$                                                 |
| $t_f$                           | Fall Time                            | —    | 71     | 100   |                     | $R_D = 10\Omega$ ③                                                |
| $L_D$                           | Internal Drain Inductance            | —    | 2.5    | —     | nH                  | Between lead, 6mm(0.25in.) from package and center of die contact |
| $L_S$                           | Internal Source Inductance           | —    | 4.0    | —     |                     |                                                                   |
| $C_{iss}$                       | Input Capacitance                    | —    | 870    | —     | pF                  | $V_{GS} = 0V$                                                     |
| $C_{oss}$                       | Output Capacitance                   | —    | 720    | —     |                     | $V_{DS} = -10V$                                                   |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —    | 220    | —     |                     | $f = 1.0MHz$                                                      |



## Source-Drain Ratings and Characteristics

|          | Parameter                              | Min.                                                                        | Typ. | Max. | Units | Conditions                                                     |
|----------|----------------------------------------|-----------------------------------------------------------------------------|------|------|-------|----------------------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —                                                                           | —    | -2.5 | A     | MOSFET symbol showing the integral reverse p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —                                                                           | —    | -15  |       |                                                                |
| $V_{SD}$ | Diode Forward Voltage                  | —                                                                           | —    | -1.2 | V     | $T_J = 25^\circ\text{C}$ , $I_S = -1.25A$ , $V_{GS} = 0V$ ③    |
| $t_{rr}$ | Reverse Recovery Time                  | —                                                                           | 70   | 100  | ns    | $T_J = 25^\circ\text{C}$ , $I_F = -4.6A$                       |
| $Q_{rr}$ | Reverse Recovery Charge                | —                                                                           | 100  | 180  | nC    | $di/dt = 100A/\mu s$ ③                                         |
| $t_{on}$ | Forward Turn-On Time                   | Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ ) |      |      |       |                                                                |

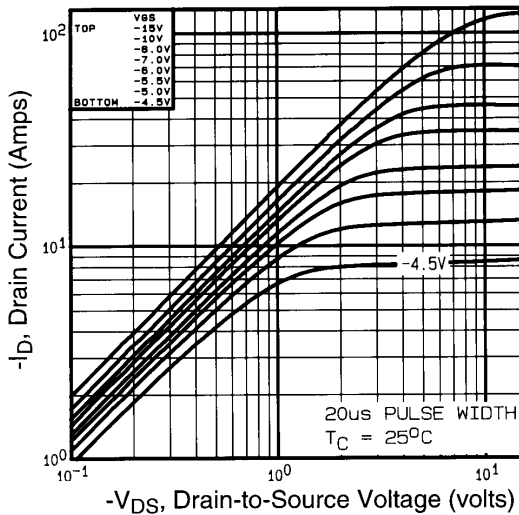
### Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

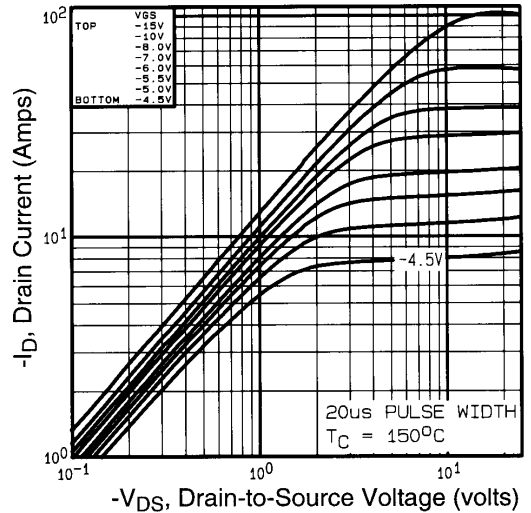
③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

②  $I_{SD} \leq -4.6A$ ,  $di/dt \leq 90A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$

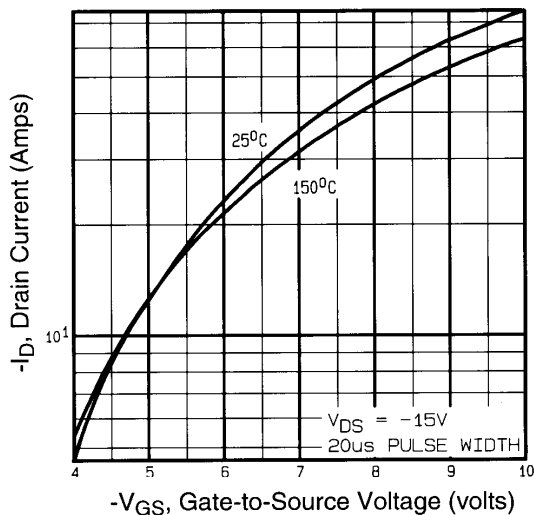
④ Surface mounted on FR-4 board,  $t \leq 10sec$ .



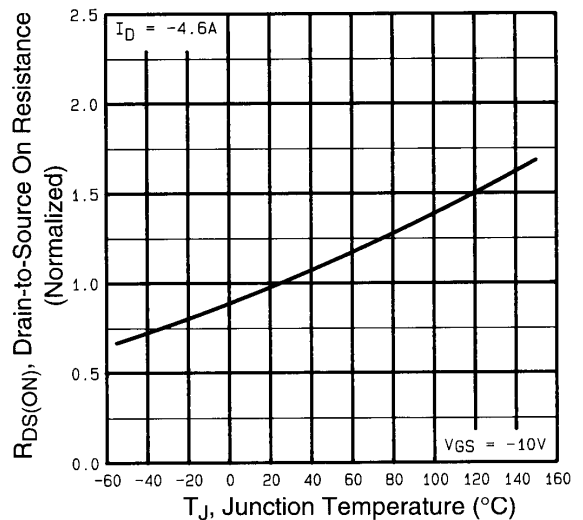
**Fig 1.** Typical Output Characteristics,



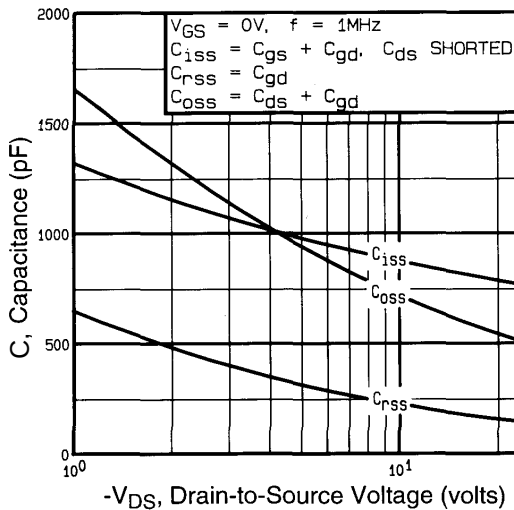
**Fig 2.** Typical Output Characteristics,



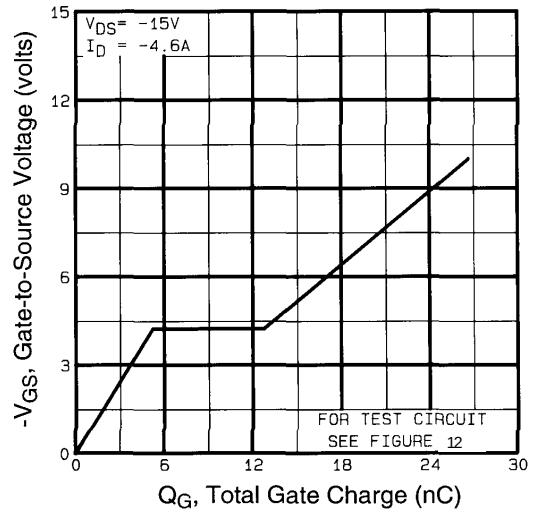
**Fig 3.** Typical Transfer Characteristics



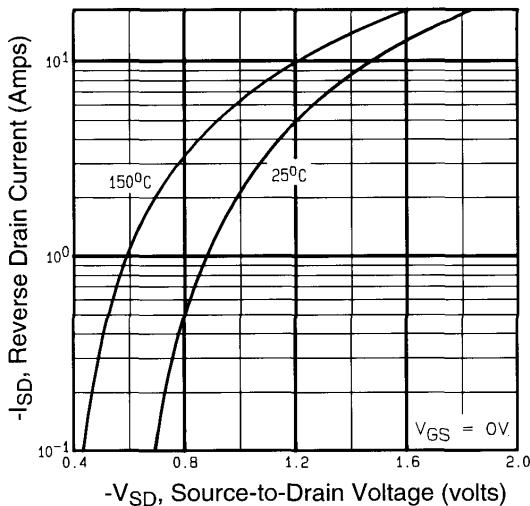
**Fig 4.** Normalized On-Resistance  
Vs. Temperature



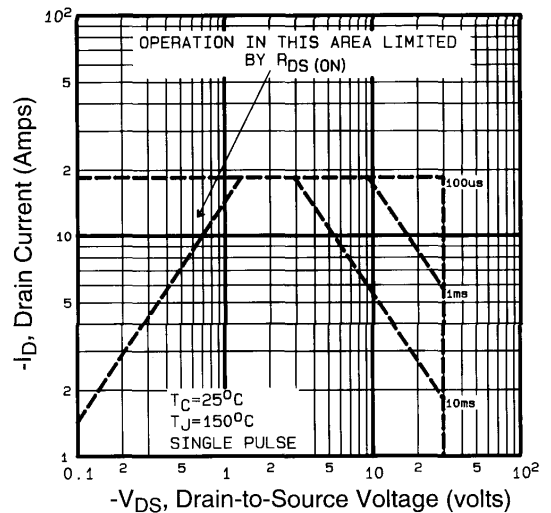
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



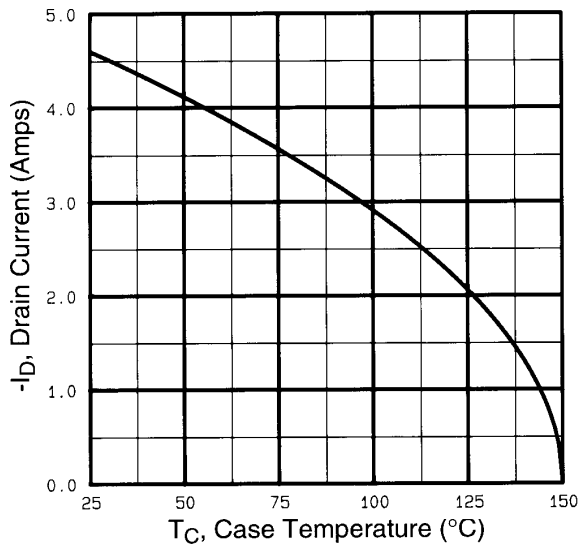
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



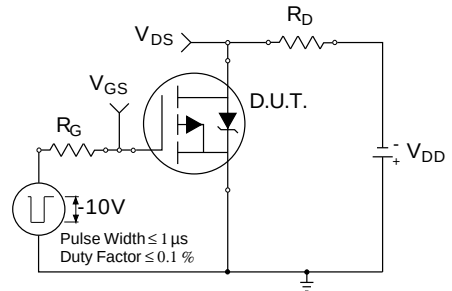
**Fig 7.** Typical Source-Drain Diode Forward Voltage



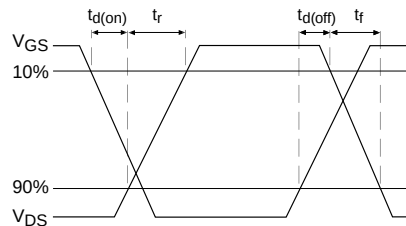
**Fig 8.** Maximum Safe Operating Area



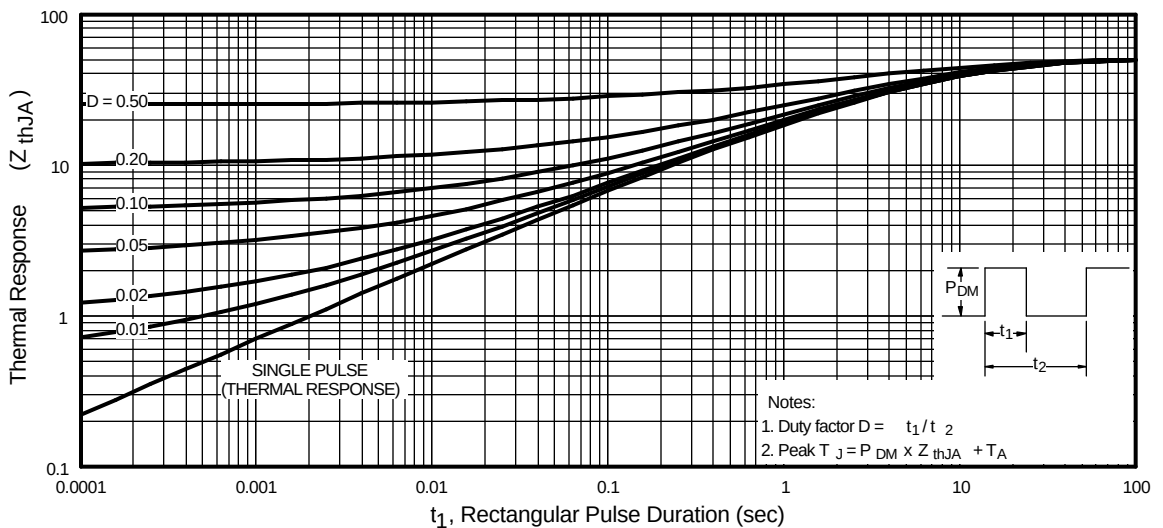
**Fig 9.** Maximum Drain Current Vs. Case Temperature



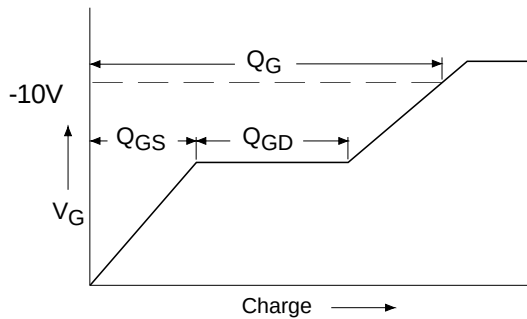
**Fig 10a.** Switching Time Test Circuit



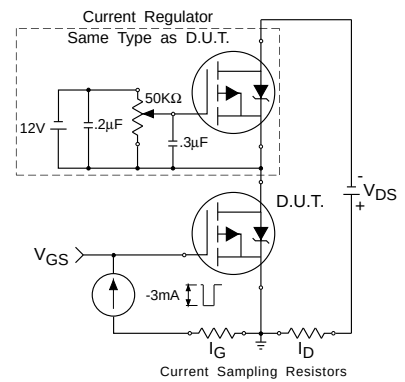
**Fig 10b.** Switching Time Waveforms



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

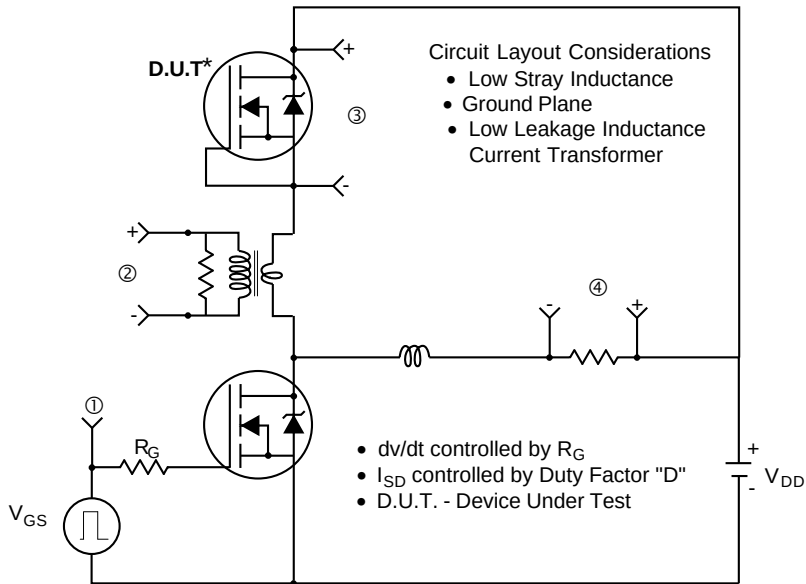


**Fig 12a.** Basic Gate Charge Waveform

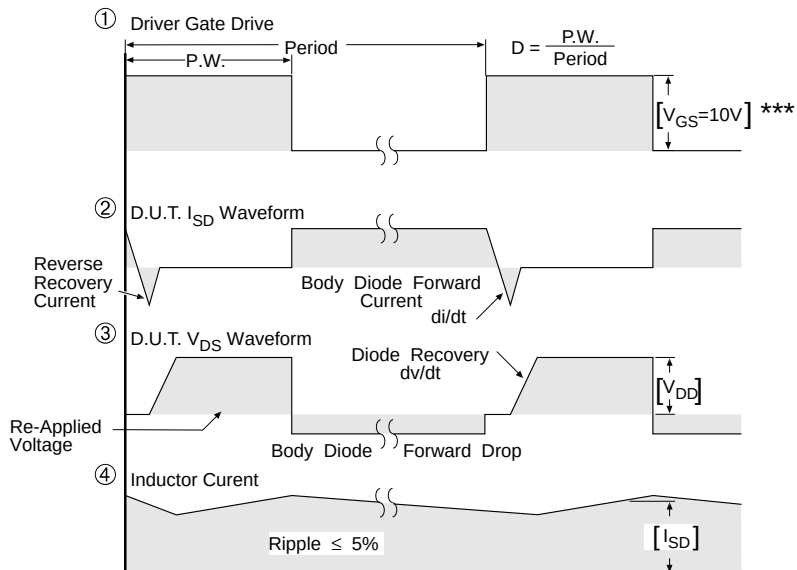


**Fig 12b.** Gate Charge Test Circuit

## Peak Diode Recovery $dv/dt$ Test Circuit



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

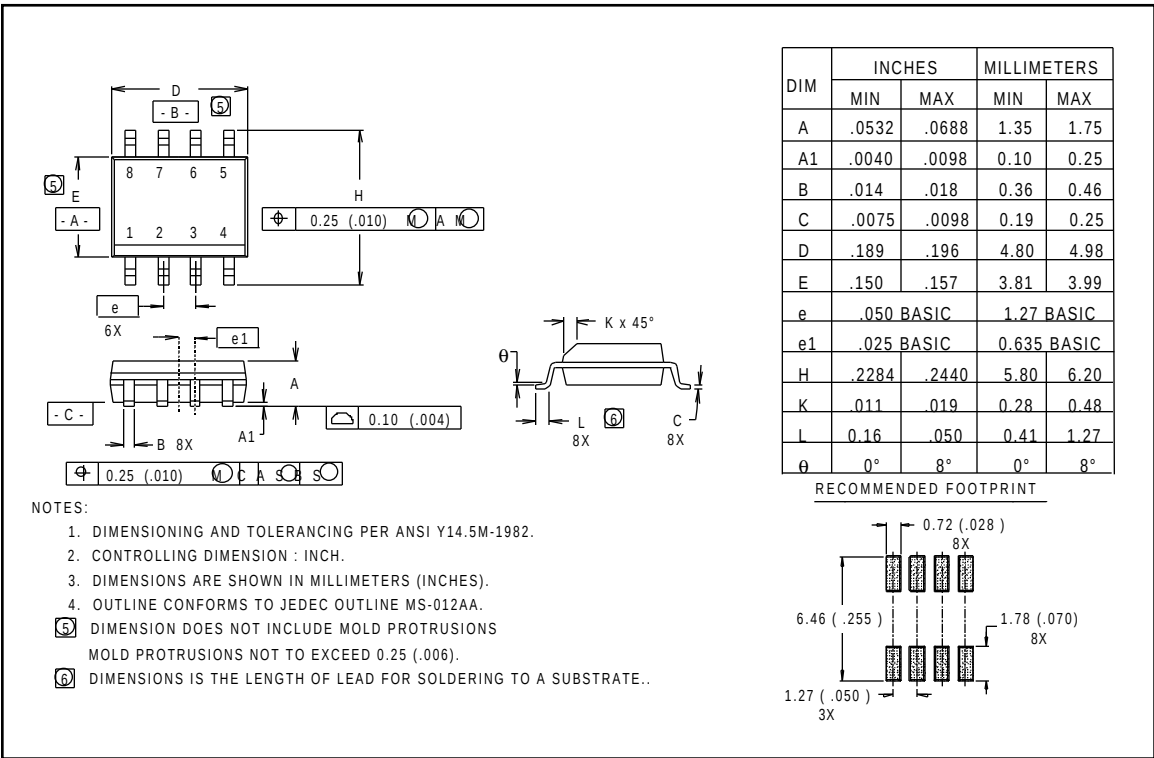


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 13.**For P-Channel HEXFETS

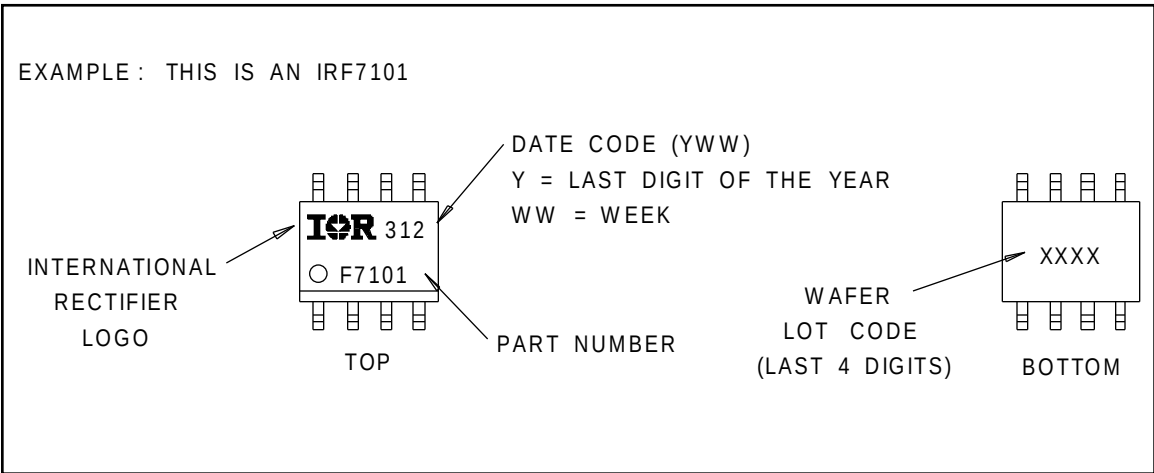
## Package Outline

### SO8 Outline



## Part Marking Information

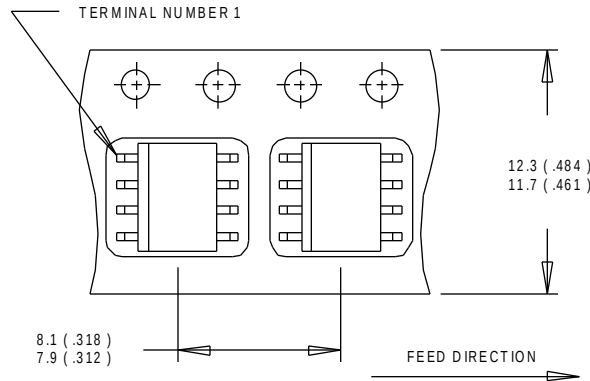
### SO8



## Tape & Reel Information

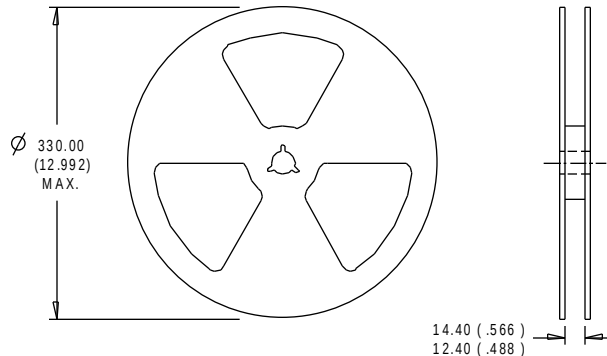
### SO8

Dimensions are shown in millimeters (inches)



#### 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.

International  
**IOR** Rectifier

**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331

**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

**IR CANADA:** 7321 Victoria Park Ave., Suite 201, Markham, Ontario L3R 2Z8, Tel: (905) 475 1897

**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

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

**IR FAR EAST:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

**IR SOUTHEAST ASIA:** 315 Outram Road, #10-02 Tan Boon Liat Building, Singapore 0316 Tel: 65 221 8371

<http://www.irf.com/> Data and specifications subject to change without notice.

8/97