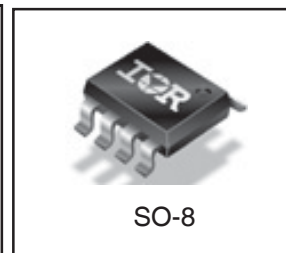
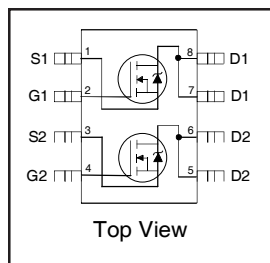


HEXFET® Power MOSFET

|                                           |             |           |
|-------------------------------------------|-------------|-----------|
| $V_{DS}$                                  | <b>50</b>   | <b>V</b>  |
| $R_{DS(on) \max}$<br>(@ $V_{GS} = 10V$ )  | <b>0.13</b> | $\Omega$  |
| $R_{DS(on) \max}$<br>(@ $V_{GS} = 4.5V$ ) | <b>0.20</b> | $\Omega$  |
| $Q_g$ (typical)                           | <b>12</b>   | <b>nC</b> |
| $I_D$<br>(@ $T_A = 25^\circ C$ )          | <b>3.0</b>  | <b>A</b>  |



**Features**

|                                                   |
|---------------------------------------------------|
| Industry-standard pinout SO-8 Package             |
| Compatible with Existing Surface Mount Techniques |
| RoHS Compliant, Halogen-Free                      |
| MSL1, Industrial qualification                    |



**Benefits**

|                            |
|----------------------------|
| Multi-Vendor Compatibility |
| Easier Manufacturing       |
| Environmentally Friendlier |
| Increased Reliability      |

| Base Part Number | Package Type | Standard Pack |          | Orderable Part Number |
|------------------|--------------|---------------|----------|-----------------------|
|                  |              | Form          | Quantity |                       |
| IRF7103PbF-1     | SO-8         | Tube/Bulk     | 95       | IRF7103PbF-1          |
|                  |              | Tape and Reel | 4000     | IRF7103TRPbF-1        |

**Absolute Maximum Ratings**

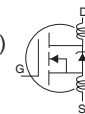
|                          | Parameter                                | Max.         | Units |
|--------------------------|------------------------------------------|--------------|-------|
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 3.0          | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 2.3          |       |
| $I_{DM}$                 | Pulsed Drain Current ①                   | 10           |       |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation                        | 2.0          | W     |
|                          | Linear Derating Factor                   | 0.016        | W/°C  |
| $V_{GS}$                 | Gate-to-Source Voltage                   | ± 20         | V     |
| $dv/dt$                  | Peak Diode Recovery $dv/dt$ ②            | 4.5          | V/nS  |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range   | -55 to + 150 | °C    |

**Thermal Resistance Ratings**

|                 | Parameter                     | Min. | Typ. | Max. | Units |
|-----------------|-------------------------------|------|------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient ④ | —    | —    | 62.5 | °C/W  |

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

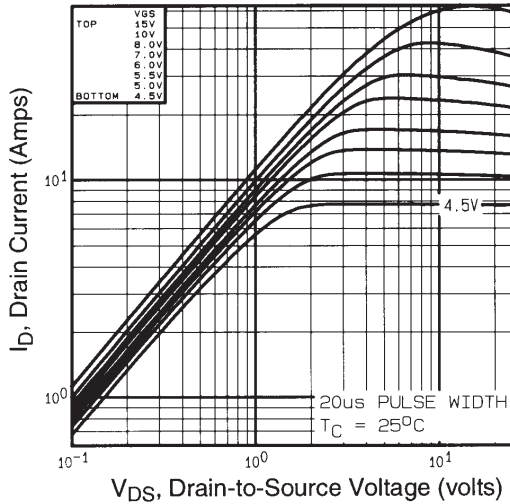
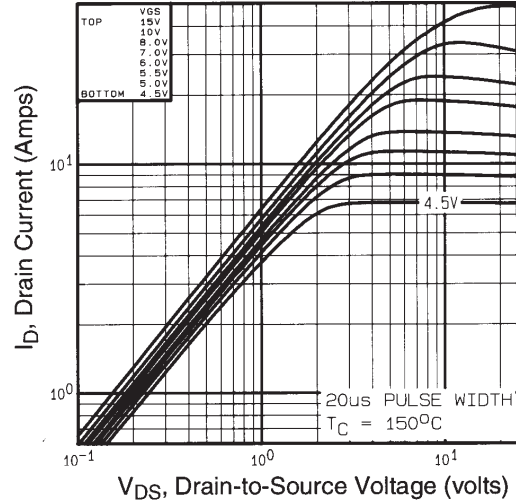
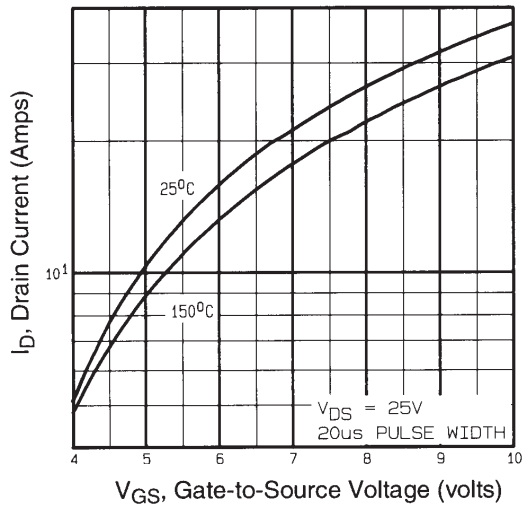
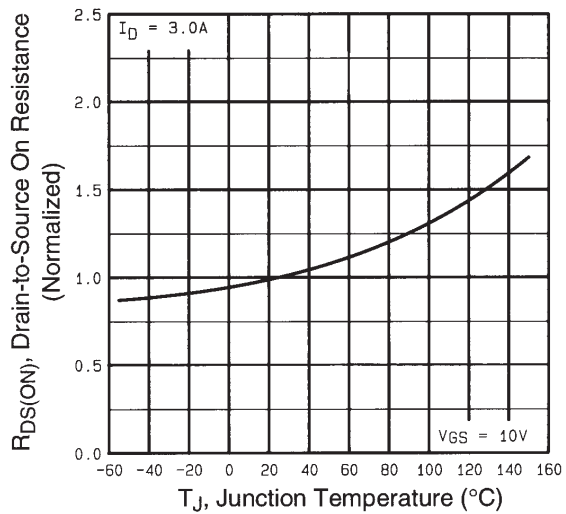
|                                 | Parameter                            | Min. | Typ.  | Max. | Units    | Conditions                                                                |
|---------------------------------|--------------------------------------|------|-------|------|----------|---------------------------------------------------------------------------|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | 50   | —     | —    | V        | $V_{GS} = 0V, I_D = 250\mu A$                                             |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.049 | —    | V/°C     | Reference to $25^\circ\text{C}$ , $I_D = 1mA$                             |
| $R_{DS(ON)}$                    | Static Drain-to-Source On-Resistance | —    | 0.11  | 0.13 | $\Omega$ | $V_{GS} = 10V, I_D = 3.0A$ ③                                              |
|                                 |                                      | —    | 0.16  | 0.20 |          | $V_{GS} = 4.5V, I_D = 1.5A$ 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             | —    | 3.8   | —    | S        | $V_{DS} = 15V, I_D = 3.0A$ ③                                              |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —     | 2.0  | $\mu A$  | $V_{DS} = 40V, V_{GS} = 0V$                                               |
|                                 |                                      | —    | —     | 25   |          | $V_{DS} = 40V, V_{GS} = 0V, T_J = 55^\circ\text{C}$                       |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —     | 100  | nA       | $V_{GS} = 20V$                                                            |
|                                 | Gate-to-Source Reverse Leakage       | —    | —     | -100 |          | $V_{GS} = -20V$                                                           |
| $Q_g$                           | Total Gate Charge                    | —    | 12    | 30   | nC       | $I_D = 2.0A$                                                              |
| $Q_{gs}$                        | Gate-to-Source Charge                | —    | 1.2   | —    |          | $V_{DS} = 25V$                                                            |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —    | 3.5   | —    |          | $V_{GS} = 10V$ ③                                                          |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —    | 9.0   | 20   | ns       | $V_{DD} = 25V$<br>$I_D = 1.0A$<br>$R_G = 6.0\Omega$<br>$R_D = 25\Omega$ ③ |
| $t_r$                           | Rise Time                            | —    | 8.0   | 20   |          |                                                                           |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —    | 45    | 70   |          |                                                                           |
| $t_f$                           | Fall Time                            | —    | 25    | 50   |          |                                                                           |
| $L_D$                           | Internal Drain Inductance            | —    | 4.0   | —    | nH       | Between lead, 6mm (0.25in.) from package and center of die contact        |
| $L_S$                           | Internal Source Inductance           | —    | 6.0   | —    |          |                                                                           |
| $C_{iss}$                       | Input Capacitance                    | —    | 290   | —    | pF       | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1.0MHz$                           |
| $C_{oss}$                       | Output Capacitance                   | —    | 140   | —    |          |                                                                           |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —    | 37    | —    |          |                                                                           |

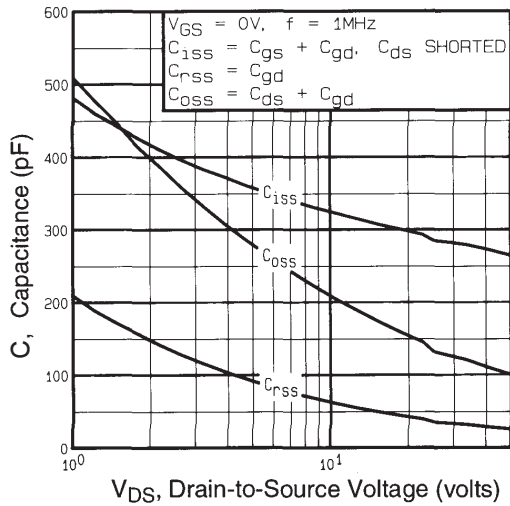

**Source-Drain Ratings and Characteristics**

|          | Parameter                              | Min.                                                                        | Typ. | Max. | Units | Conditions                                                     |
|----------|----------------------------------------|-----------------------------------------------------------------------------|------|------|-------|----------------------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —                                                                           | —    | 2.0  | A     | MOSFET symbol showing the integral reverse p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —                                                                           | —    | 12   |       |                                                                |
| $V_{SD}$ | Diode Forward Voltage                  | —                                                                           | —    | 1.2  | V     | $T_J = 25^\circ\text{C}, I_S = 1.5A, V_{GS} = 0V$ ③            |
| $t_{rr}$ | Reverse Recovery Time                  | —                                                                           | 70   | 100  | ns    | $T_J = 25^\circ\text{C}, I_F = 1.5A$                           |
| $Q_{rr}$ | Reverse Recovery Charge                | —                                                                           | 110  | 170  | nC    | $di/dt = 100A/\mu s$ ③                                         |
| $t_{on}$ | Forward Turn-On Time                   | Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ ) |      |      |       |                                                                |

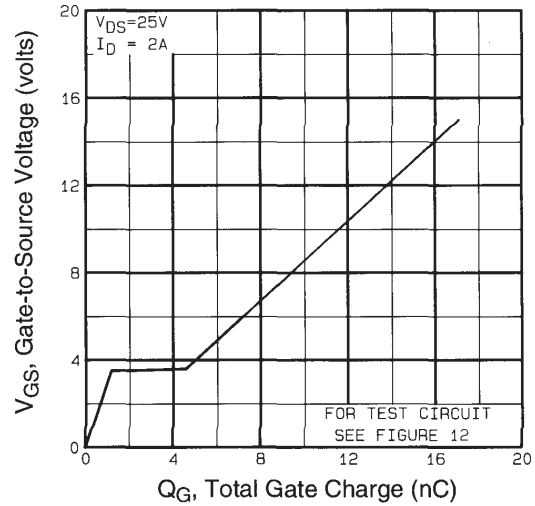
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ②  $I_{SD} \leq 1.8A$ ,  $di/dt \leq 90A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ④ Surface mounted on FR-4 board,  $t \leq 10sec$ .

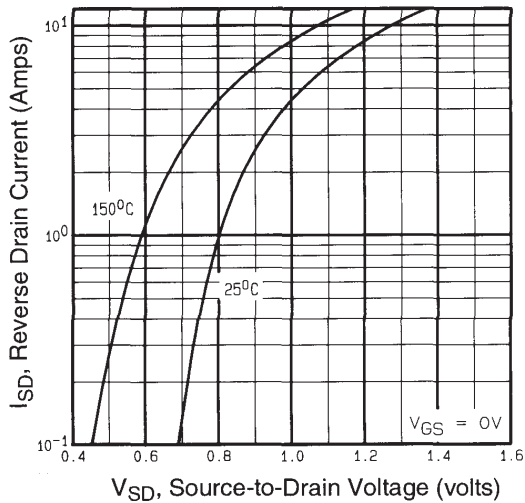

**Fig 1.** Typical Output Characteristics,

**Fig 2.** Typical Output Characteristics,

**Fig 3.** Typical Transfer Characteristics

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



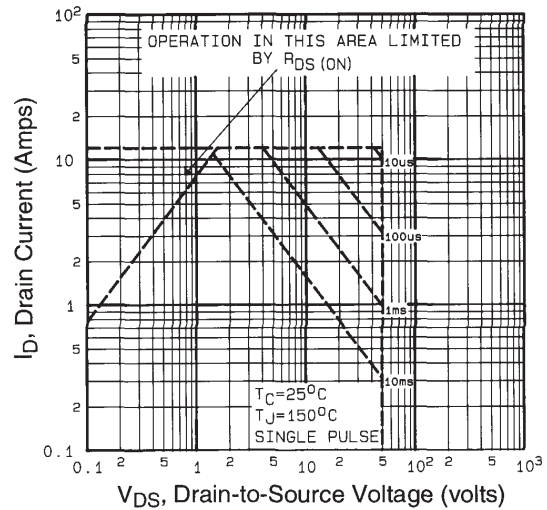
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



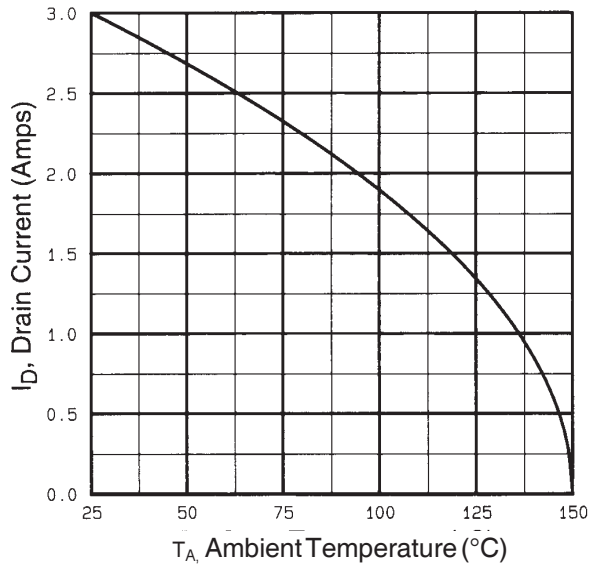
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



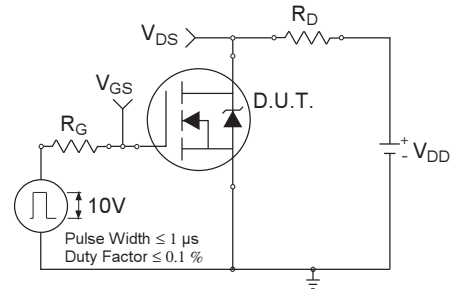
**Fig 7.** Typical Source-Drain Diode Forward Voltage



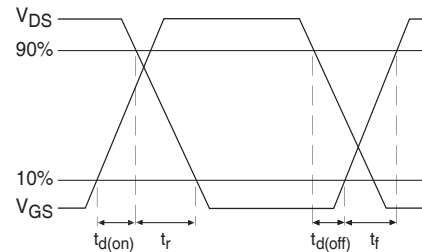
**Fig 8.** Maximum Safe Operating Area



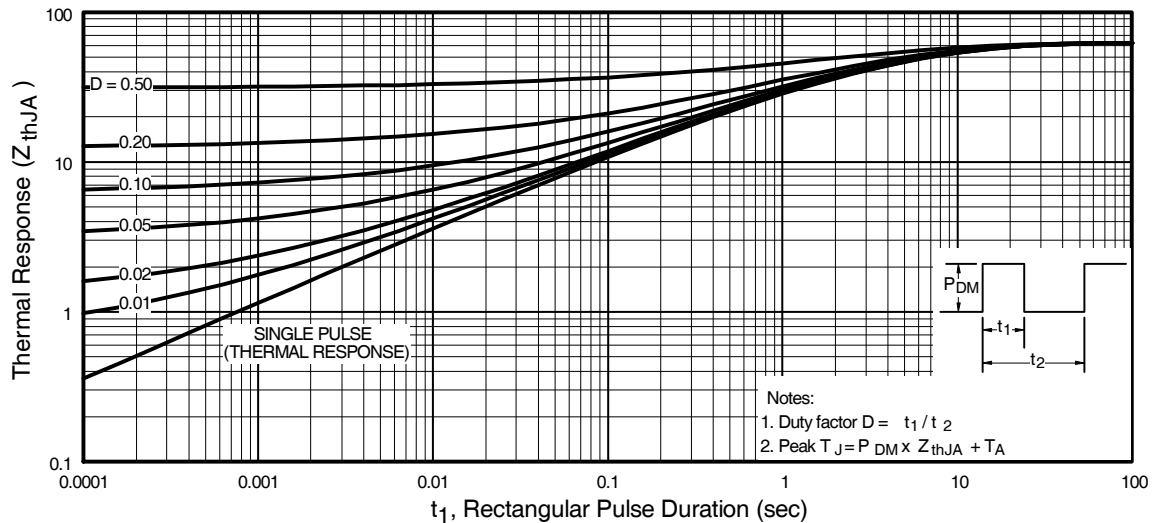
**Fig 9.** Maximum Drain Current Vs. Ambient Temperature



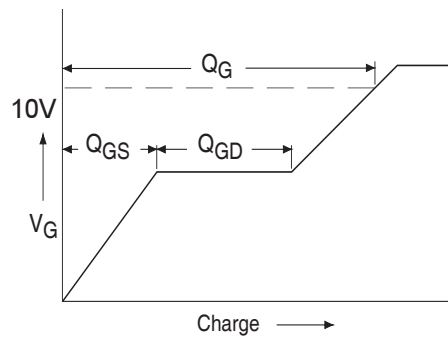
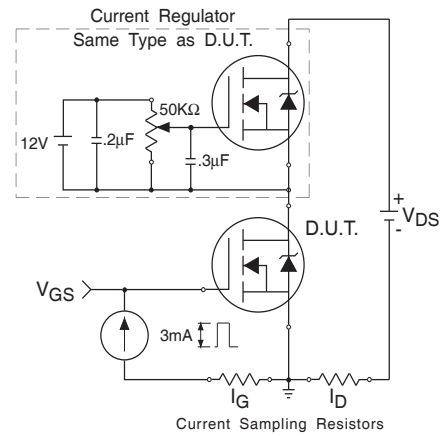
**Fig 10a.** Switching Time Test Circuit



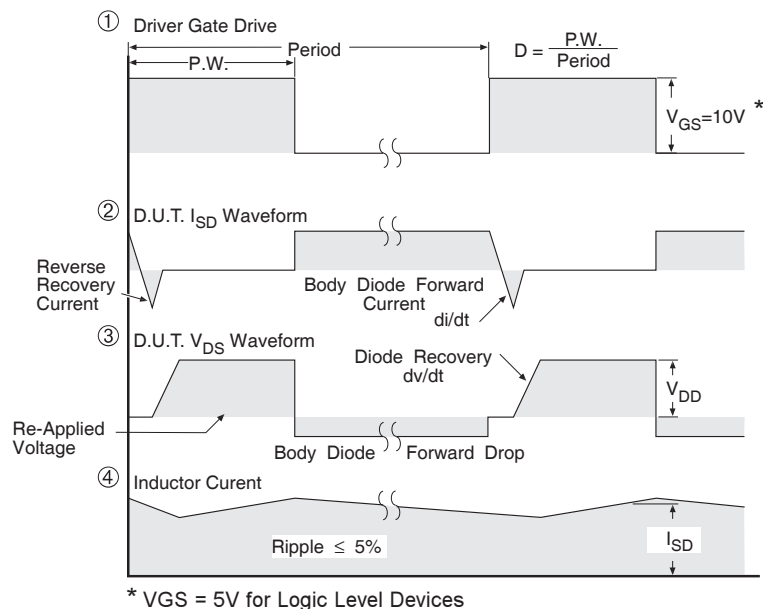
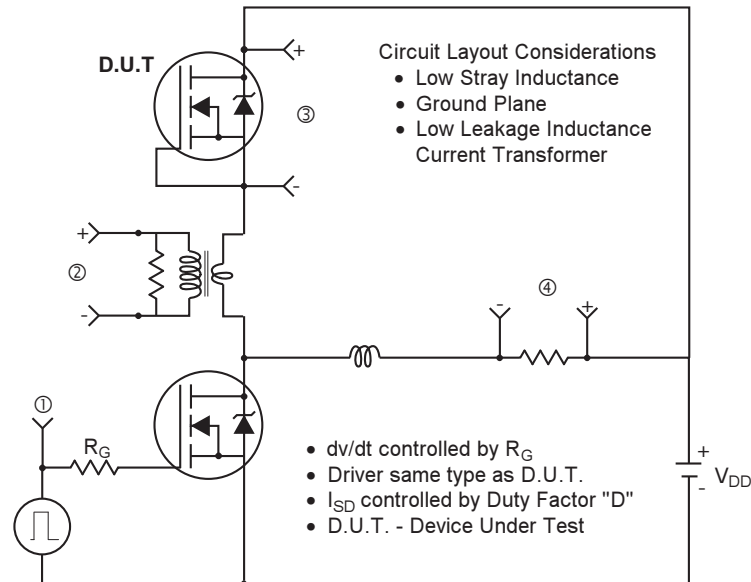
**Fig 10b.** Switching Time Waveforms



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


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

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

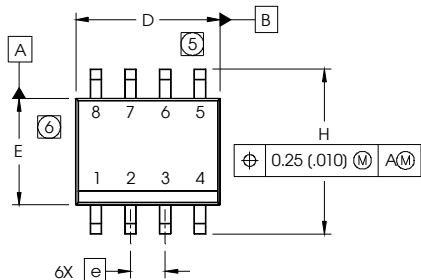
### Peak Diode Recovery dv/dt Test Circuit



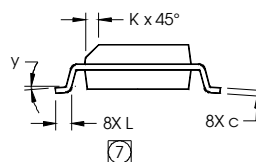
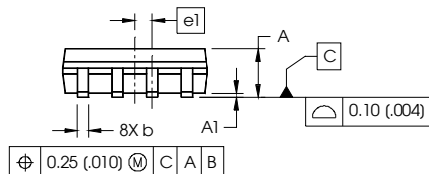
**Fig 13. For N-Channel HEXFETS**

## SO-8 Package Outline (MOSFET & Fetky)

Dimensions are shown in millimeters (inches)



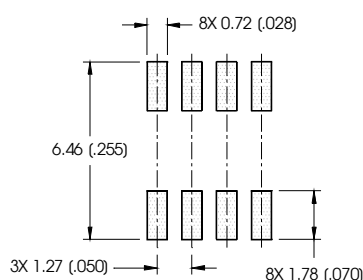
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
|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

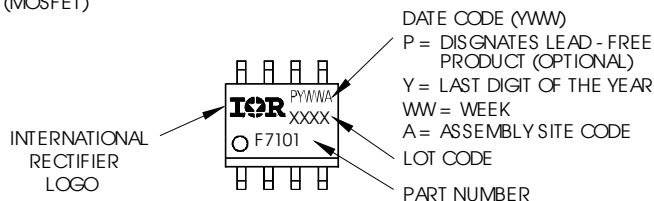
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE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

### FOOTPRINT



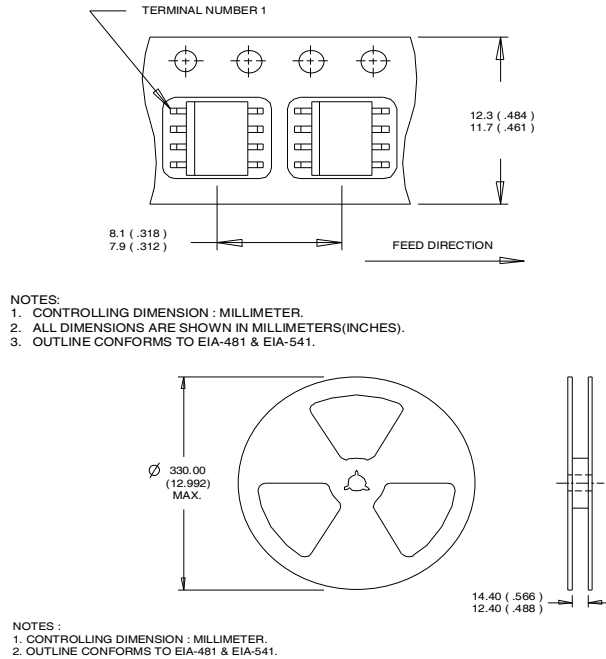
## SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

## SO-8 Tape and Reel (Dimensions are shown in millimeters (inches))



Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

### Qualification information<sup>†</sup>

|                            |                                                            |                                               |
|----------------------------|------------------------------------------------------------|-----------------------------------------------|
| Qualification level        | Industrial<br>(per JEDEC JESD47F <sup>††</sup> guidelines) |                                               |
| Moisture Sensitivity Level | SO-8                                                       | MSL1<br>(per JEDEC J-STD-020D <sup>††</sup> ) |
| RoHS compliant             | Yes                                                        |                                               |

<sup>†</sup> Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

<sup>††</sup> Applicable version of JEDEC standard at the time of product release

International  
 Rectifier

**IR WORLD HEADQUARTERS:** 101 N. Sepulveda Blvd., El Segundo, California 90245, USA  
To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Infineon:](#)

[IRF7103TRPBFXTMA1](#)