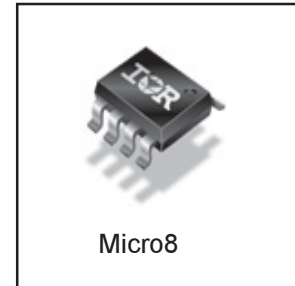
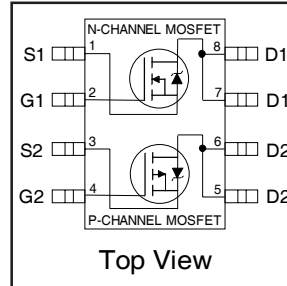


HEXFET® Power MOSFET

|   | N-CH | P-CH |          |
|---|------|------|----------|
| $V_{DS}$                                | 30   | -30  | V        |
| $R_{DS(on) max}$<br>(@ $V_{GS} = 10V$ ) | 0.11 | 0.2  | $\Omega$ |
| $Q_g$ (typical)                         | 7.8  | 7.5  | nC       |
| $I_D$<br>(@ $T_A = 25^\circ C$ )        | 2.7  | -2.0 | A        |



**Features**

|   |
|---|
| Industry-standard pinout Micro-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 |                       |
| IRF7509PbF-1     | Micro-8      | Tube/Bulk     | 95       | IRF7509PbF-1          |
|                  |              | Tape and Reel | 4000     | IRF7509TRPbF-1        |

**Absolute Maximum Ratings**

|                          | Parameter   | Max.                  |           | Units |
|--------------------------|---|-----------------------|-----------|-------|
|                          |   | N-Channel             | P-Channel |       |
| $V_{DS}$                 | Drain-Source Voltage                                | 30                    | -30       | V     |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS}$                  | 2.7                   | -2.0      | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS}$                  | 2.1                   | -1.6      |       |
| $I_{DM}$                 | Pulsed Drain Current <sup>①</sup>                   | 21                    | -16       |       |
| $P_D @ T_A = 25^\circ C$ | Maximum Power Dissipation <sup>④</sup>              | 1.25                  |           | W     |
| $P_D @ T_A = 70^\circ C$ | Maximum Power Dissipation <sup>④</sup>              | 0.8                   |           | W     |
|                          | Linear Derating Factor                              | 10                    |           | mW/°C |
| $V_{GS}$                 | Gate-to-Source Voltage                              | $\pm 20$              |           | V     |
| $V_{GSM}$                | Gate-to-Source Voltage Single Pulse $t_p < 10\mu S$ | 30                    |           | V     |
| $dv/dt$                  | Peak Diode Recovery $dv/dt$ <sup>②</sup>            | 5.0                   |           | V/ns  |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range              | -55 to + 150          |           | °C    |
|                          | Soldering Temperature, for 10 seconds               | 240 (1.6mm from case) |           |       |

**Thermal Resistance**

|                 | Parameter                                | Max. | Units |
|-----------------|--|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient <sup>④</sup> | 100  | °C/W  |

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

| Parameter                              | 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<br>V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA  |
| ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub> | Breakdown Voltage Temp. Coefficient  | —    | 0.059 | —     | V/°C  | Reference to 25°C, I <sub>D</sub> = 1mA<br>Reference to 25°C, I <sub>D</sub> = -1mA  |
| R <sub>DS(ON)</sub>                    | Static Drain-to-Source On-Resistance | —    | 0.09  | 0.110 | Ω     | V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.7A ④<br>V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.85A ④<br>V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.2A ④<br>V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.6A ④                                |
| V <sub>GS(th)</sub>                    | Gate Threshold Voltage               | 1.0  | —     | —     | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA<br>V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA  |
| g <sub>fs</sub>                        | Forward Transconductance             | —    | 1.9   | —     | S     | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.85A ④<br>V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.6A ④  |
| I <sub>DSS</sub>                       | Drain-to-Source Leakage Current      | —    | —     | 1.0   | μA    | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C<br>V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C |
| I <sub>GSS</sub>                       | Gate-to-Source Forward Leakage       | —    | —     | ±100  | —     | V <sub>GS</sub> = ± 20V  |
| Q <sub>g</sub>                         | Total Gate Charge                    | —    | 7.8   | 12    | —     | N-Channel<br>I <sub>D</sub> = 1.7A, V <sub>DS</sub> = 24V, V <sub>GS</sub> = 10V ④   |
| Q <sub>gs</sub>                        | Gate-to-Source Charge                | —    | 1.2   | 1.8   | nC    | P-Channel<br>I <sub>D</sub> = -1.2A, V <sub>DS</sub> = -24V, V <sub>GS</sub> = -10V ④  |
| Q <sub>gd</sub>                        | Gate-to-Drain ("Miller") Charge      | —    | 2.5   | 3.8   | —     |  |
| t <sub>d(on)</sub>                     | Turn-On Delay Time                   | —    | 4.7   | —     | —     | N-Channel<br>V <sub>DD</sub> = 15V, I <sub>D</sub> = 1.7A, R <sub>G</sub> = 6.1Ω,<br>R <sub>D</sub> = 8.7Ω ④   |
| t <sub>r</sub>                         | Rise Time                            | —    | 10    | —     | —     |  |
| t <sub>d(off)</sub>                    | Turn-Off Delay Time                  | —    | 12    | —     | —     | P-Channel<br>V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.2A, R <sub>G</sub> = 6.2Ω,<br>R <sub>D</sub> = 12Ω ④  |
| t <sub>f</sub>                         | Fall Time                            | —    | 5.3   | —     | —     |  |
| C <sub>iss</sub>                       | Input Capacitance                    | —    | 210   | —     | pF    | N-Channel<br>V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0MHz ③   |
| C <sub>oss</sub>                       | Output Capacitance                   | —    | 80    | —     | —     |  |
| C <sub>rss</sub>                       | Reverse Transfer Capacitance         | —    | 32    | —     | —     | P-Channel<br>V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1.0MHz ③  |

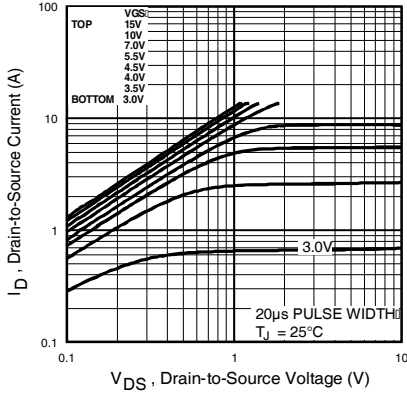
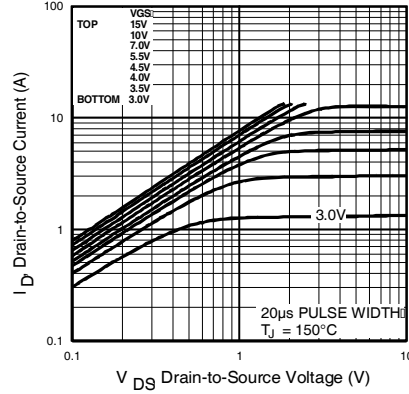
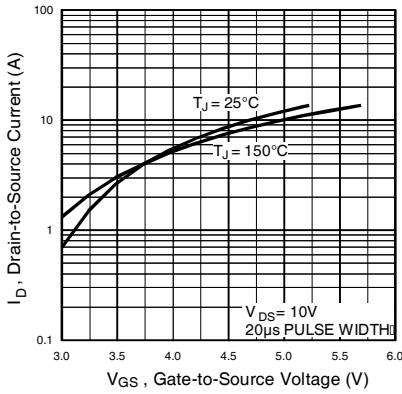
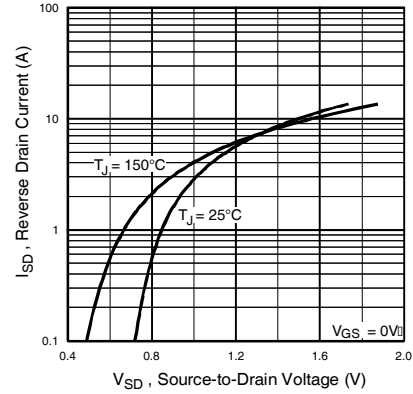
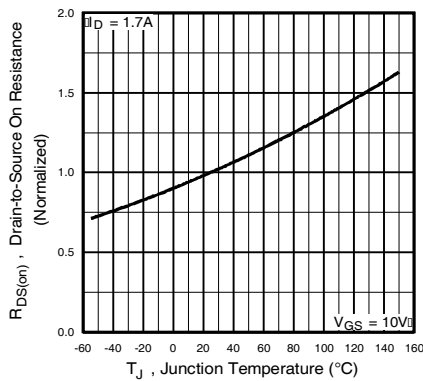
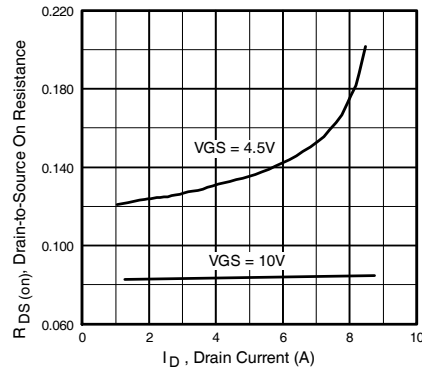
**Source-Drain Ratings and Characteristics**

| Parameter       | Parameter                              | Min. | Typ. | Max.  | Units | Conditions  |
|-----------------|--|------|------|-------|-------|---|
| I <sub>S</sub>  | Continuous Source Current (Body Diode) | —    | —    | 1.25  | A     |   |
| I <sub>SM</sub> | Pulsed Source Current (Body Diode) ①   | —    | —    | -1.25 | —     |   |
| V <sub>SD</sub> | Diode Forward Voltage                  | —    | —    | 1.2   | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V ③<br>T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.8A, V <sub>GS</sub> = 0V ③ |
| t <sub>rr</sub> | Reverse Recovery Time                  | —    | 40   | 60    | ns    | N-Channel<br>T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.7A, di/dt = 100A/μs ③  |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 48   | 72    | nC    | P-Channel<br>T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.2A, di/dt = -100A/μs ③  |

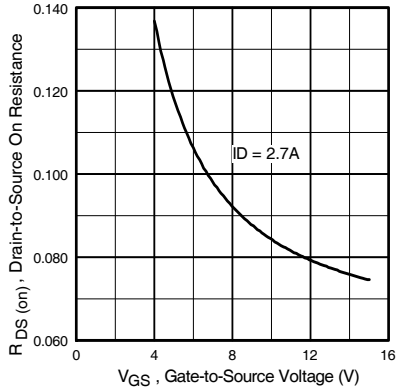
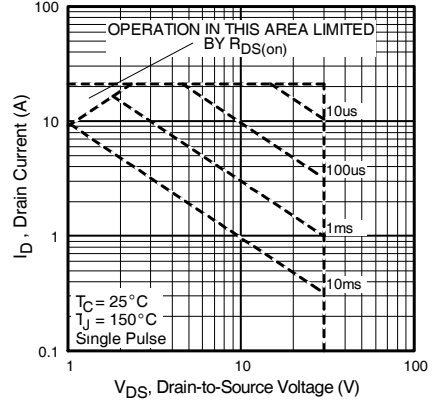
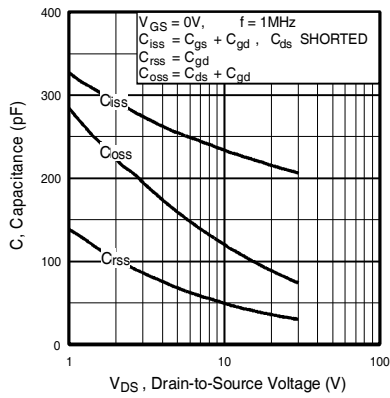
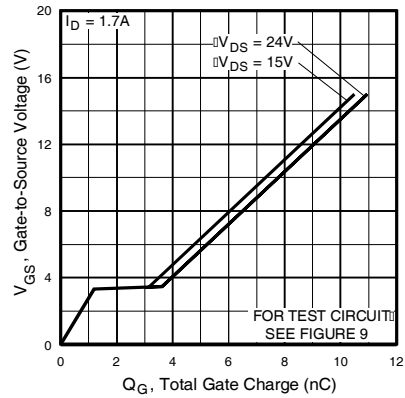
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 21 )
- ② N-Channel I<sub>SD</sub> ≤ 1.7A, di/dt ≤ 120A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C  
P-Channel I<sub>SD</sub> ≤ -1.2A, di/dt ≤ 160A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ④ Surface mounted on FR-4 board, t ≤ 10sec.

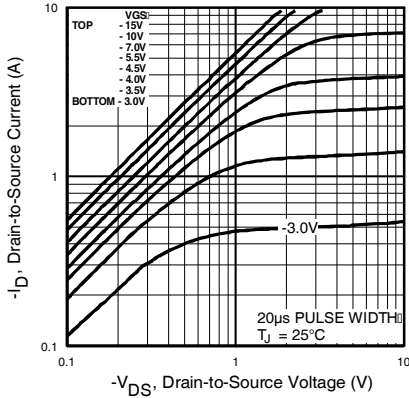
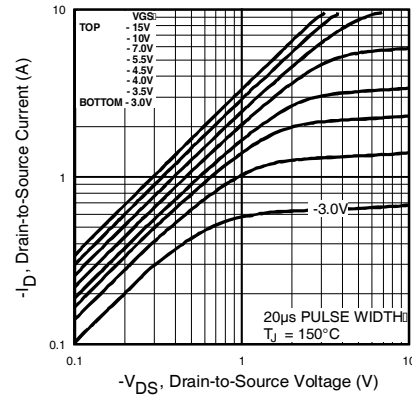
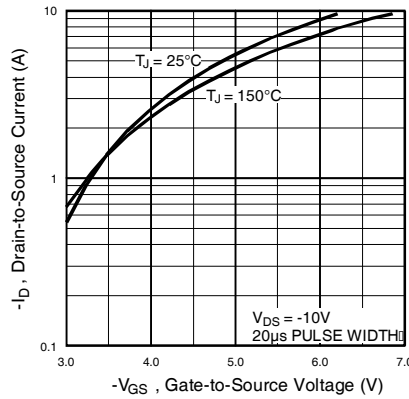
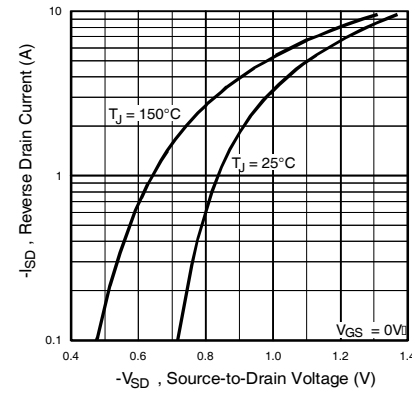
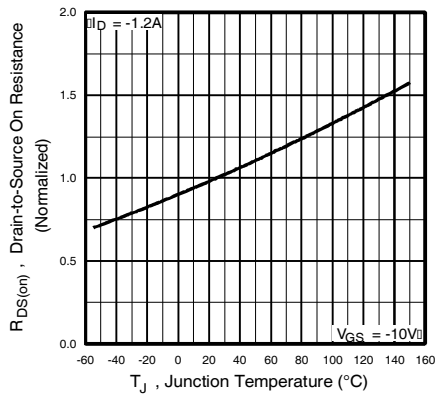
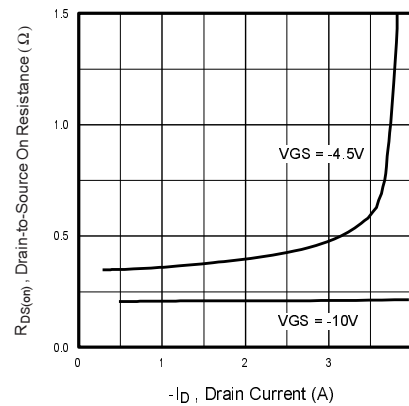
N - Channel


**Fig 1. Typical Output Characteristics**

**Fig 2. Typical Output Characteristics**

**Fig 3. Typical Transfer Characteristics**

**Fig 4. Typical Source-Drain Diode Forward Voltage**

**Fig 5. Normalized On-Resistance Vs. Temperature**

**Fig 6. Typical On-Resistance Vs. Drain Current**

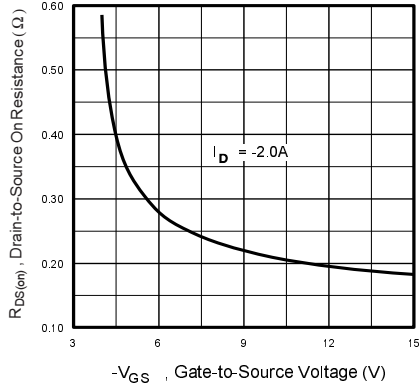
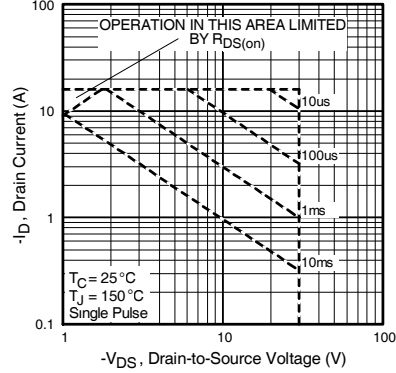
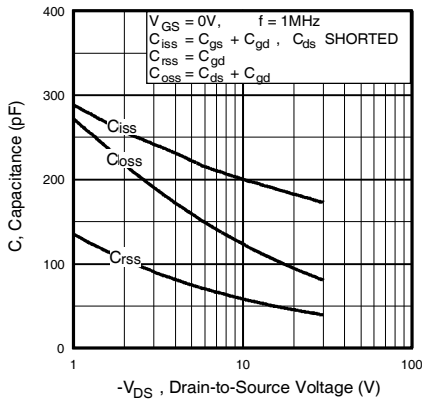
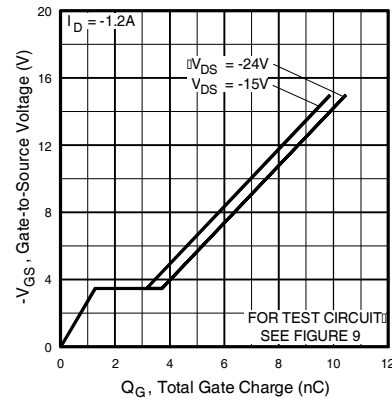
N - Channel


**Fig 7.** Typical On-Resistance Vs. Gate Voltage

**Fig 8.** Maximum Safe Operating Area

**Fig 9.** Typical Capacitance Vs. Drain-to-Source Voltage

**Fig 10.** Typical Gate Charge Vs. Gate-to-Source Voltage

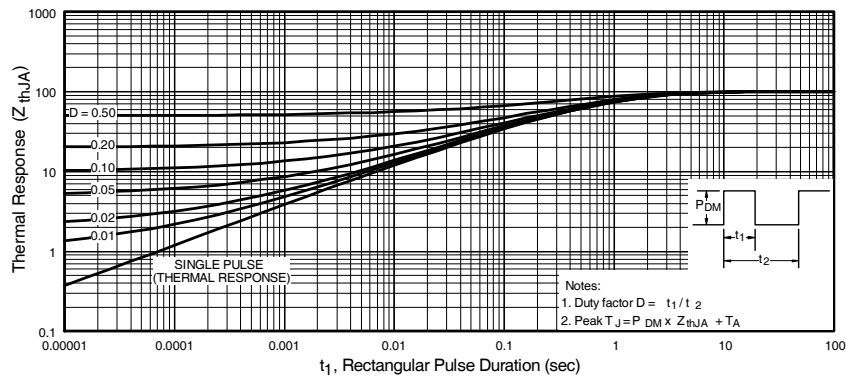
P - Channel


**Fig 11. Typical Output Characteristics**

**Fig 12. Typical Output Characteristics**

**Fig 13. Typical Transfer Characteristics**

**Fig 14. Typical Source-Drain Diode Forward Voltage**

**Fig 15. Normalized On-Resistance Vs. Temperature**

**Fig 16. Typical On-Resistance Vs. Drain Current**

P - Channel

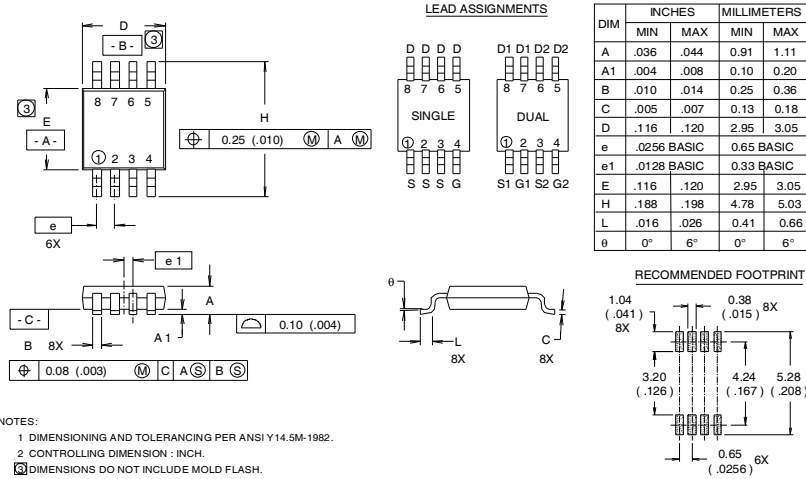

**Fig 17.** Typical On-Resistance Vs. Gate Voltage

**Fig 18.** Maximum Safe Operating Area

**Fig 19.** Typical Capacitance Vs. Drain-to-Source Voltage

**Fig 20.** Typical Gate Charge Vs. Gate-to-Source Voltage

N-P - Channel


**Fig 21.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

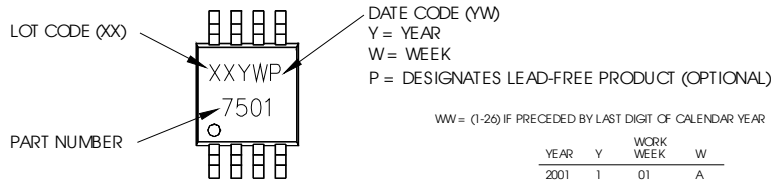
## Micro8 Package Outline

Dimensions are shown in millimeters (inches)



## Micro8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7501



WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

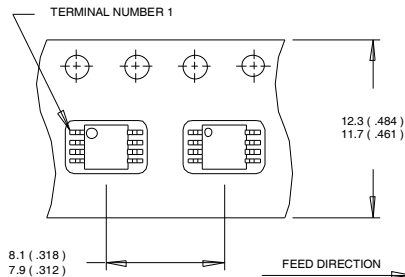
| YEAR | Y | WCRK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01        | A |
| 2002 | 2 | 02        | B |
| 2003 | 3 | 03        | C |
| 1994 | 4 | 04        | D |
| 1995 | 5 |           |   |
| 1996 | 6 |           |   |
| 1997 | 7 |           |   |
| 1998 | 8 |           |   |
| 1999 | 9 |           |   |
| 2000 | 0 | 24        | X |
|      |   | 25        | Y |
|      |   | 26        | Z |

WW = (27-52) IF PRECEDED BY A LETTER

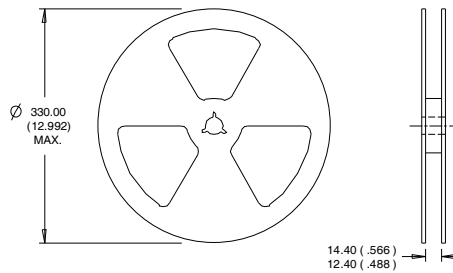
| YEAR | Y | WCRK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27        | A |
| 2002 | B | 28        | B |
| 2003 | C | 29        | C |
| 1994 | D | 30        | D |
| 1995 | E |           |   |
| 1996 | F |           |   |
| 1997 | G |           |   |
| 1998 | H |           |   |
| 1999 | J |           |   |
| 2000 | K | 50        | X |
|      |   | 51        | Y |
|      |   | 52        | Z |

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

## Micro8 Tape & Reel Information



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



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

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

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

|                            |  |   |
|----------------------------|--|---|
| Qualification level        | Industriid<br>(per JEDEC JESD47F <sup>††</sup> guidelines) |   |
| Moisture Sensitivity Level | Micro-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/>



单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)