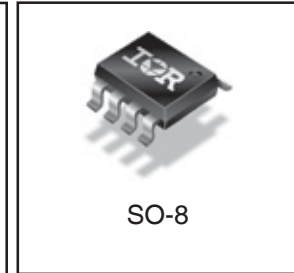
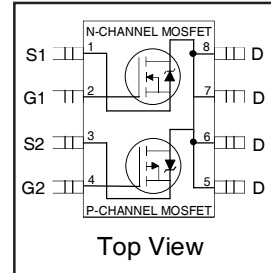


HEXFET® Power MOSFET

|   | N-CH  | P-CH  |          |
|---|-------|-------|----------|
| $V_{DS}$                                | 30    | -30   | V        |
| $R_{DS(on) max}$<br>(@ $V_{GS} = 10V$ ) | 0.029 | 0.058 | $\Omega$ |
| $Q_g$ (typical)                         | 22    | 23    | nC       |
| $I_D$<br>(@ $T_A = 25^\circ C$ )        | 7.3   | -5.3  | A        |



**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 |                       |
| IRF7389PbF-1     | SO-8         | Tube/Bulk     | 95       | IRF7389PbF-1          |
|                  |              | Tape and Reel | 4000     | IRF7389TRPbF-1        |

**Absolute Maximum Ratings (  $T_A = 25^\circ C$  Unless Otherwise Noted)**

|  | Symbol         | Maximum            |           | Units |   |
|--|----------------|--------------------|-----------|-------|---|
|  |                | N-Channel          | P-Channel |       |   |
| Drain-Source Voltage                         | $V_{DS}$       | 30                 | -30       | V     |   |
| Gate-Source Voltage                          | $V_{GS}$       | $\pm 20$           |           |       |   |
| Continuous Drain Current <sup>Ⓢ</sup>        | $I_D$          | $T_A = 25^\circ C$ | 7.3       | -5.3  | A |
|  |                | $T_A = 70^\circ C$ | 5.9       | -4.2  |   |
| Pulsed Drain Current                         | $I_{DM}$       | 30                 | -30       |       |   |
| Continuous Source Current (Diode Conduction) | $I_S$          | 2.5                | -2.5      |       |   |
| Maximum Power Dissipation <sup>Ⓢ</sup>       | $P_D$          | $T_A = 25^\circ C$ | 2.5       |       | W |
|  |                | $T_A = 70^\circ C$ | 1.6       |       |   |
| Single Pulse Avalanche Energy                | $E_{AS}$       | 82                 | 140       | mJ    |   |
| Avalanche Current                            | $I_{AR}$       | 4.0                | -2.8      | A     |   |
| Repetitive Avalanche Energy                  | $E_{AR}$       | 0.20               |           | mJ    |   |
| Peak Diode Recovery $dv/dt$ <sup>Ⓢ</sup>     | $dv/dt$        | 3.8                | -2.2      | V/ ns |   |
| Junction and Storage Temperature Range       | $T_J, T_{STG}$ | -55 to + 150 °C    |           |       |   |

**Thermal Resistance Ratings**

| Parameter                                | Symbol          | Limit | Units        |
|--|-----------------|-------|--------------|
| Maximum Junction-to-Ambient <sup>Ⓢ</sup> | $R_{\theta JA}$ | 50    | $^\circ C/W$ |

**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  |
|  |                                      | -30  | —     | —     |       | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA   |
| ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub> | Breakdown Voltage Temp. Coefficient  | —    | 0.022 | —     | V/°C  | Reference to 25°C, I <sub>D</sub> = 1mA   |
|  |                                      | —    | 0.022 | —     |       | Reference to 25°C, I <sub>D</sub> = -1mA  |
| R <sub>DS(ON)</sub>                    | Static Drain-to-Source On-Resistance | —    | 0.023 | 0.029 | Ω     | V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A ④  |
|  |                                      | —    | 0.032 | 0.046 |       | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.7A ④   |
|  |                                      | —    | 0.042 | 0.058 |       | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.9A ④  |
|  |                                      | —    | 0.076 | 0.098 |       | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.6A 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                                  |
|  |                                      | -1.0 | —     | —     |       | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                 |
| g <sub>fs</sub>                        | Forward Transconductance             | —    | 14    | —     | S     | V <sub>DS</sub> = 15V, I <sub>D</sub> = 5.8A ④  |
|  |                                      | —    | 7.7   | —     |       | V <sub>DS</sub> = -15V, I <sub>D</sub> = -4.9A ④  |
| I <sub>DSS</sub>                       | Drain-to-Source Leakage Current      | —    | —     | 1.0   | μA    | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V   |
|  |                                      | —    | —     | -1.0  |       | V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V  |
|  |                                      | —    | —     | 25    |       | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C                          |
|  |                                      | —    | —     | -25   |       | V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55°C                         |
| I <sub>GSS</sub>                       | Gate-to-Source Forward Leakage       | —    | —     | ±100  | nA    | V <sub>GS</sub> = ±20V  |
| Q <sub>g</sub>                         | Total Gate Charge                    | —    | 22    | 33    | nC    | N-Channel   |
|  |                                      | —    | 23    | 34    |       | I <sub>D</sub> = 5.8A, V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V ④                       |
| Q <sub>gs</sub>                        | Gate-to-Source Charge                | —    | 2.6   | 3.9   |       |   |
|  |                                      | —    | 3.8   | 5.7   |       |   |
| Q <sub>gd</sub>                        | Gate-to-Drain ("Miller") Charge      | —    | 6.4   | 9.6   |       | P-Channel   |
|  |                                      | —    | 5.9   | 8.9   |       | I <sub>D</sub> = -4.9A, V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V                      |
| t <sub>d(on)</sub>                     | Turn-On Delay Time                   | —    | 8.1   | 12    | ns    | N-Channel   |
|  |                                      | —    | 13    | 19    |       | V <sub>DD</sub> = 15V, I <sub>D</sub> = 1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 15Ω ④ |
| t <sub>r</sub>                         | Rise Time                            | —    | 8.9   | 13    |       |   |
|  |                                      | —    | 13    | 20    |       |   |
| t <sub>d(off)</sub>                    | Turn-Off Delay Time                  | —    | 26    | 39    |       | P-Channel   |
|  |                                      | —    | 34    | 51    |       | V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.0A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 15Ω |
| t <sub>f</sub>                         | Fall Time                            | —    | 17    | 26    |       |   |
|  |                                      | —    | 32    | 48    |       |   |
| C <sub>iss</sub>                       | Input Capacitance                    | —    | 650   | —     | pF    | N-Channel   |
|  |                                      | —    | 710   | —     |       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0MHz                                     |
| C <sub>oss</sub>                       | Output Capacitance                   | —    | 320   | —     |       |   |
|  |                                      | —    | 380   | —     |       | P-Channel   |
| C <sub>rss</sub>                       | Reverse Transfer Capacitance         | —    | 130   | —     |       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1.0MHz                                    |
|  |                                      | —    | 180   | —     |       |   |

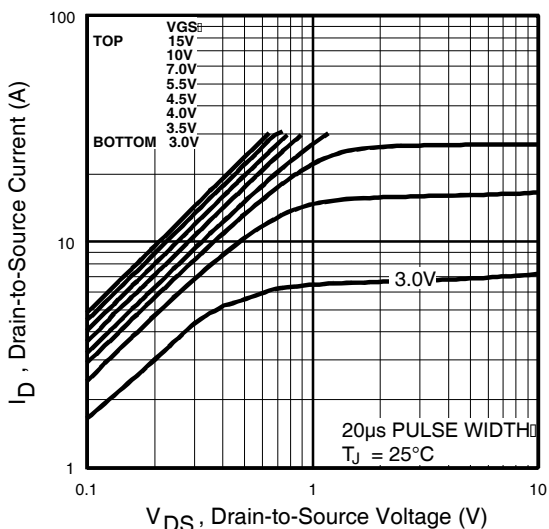
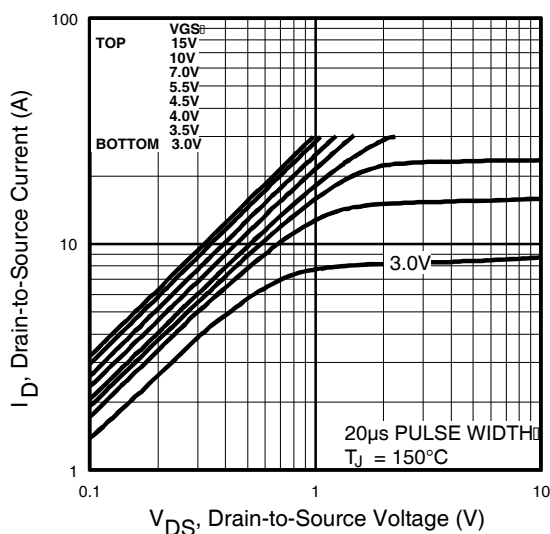
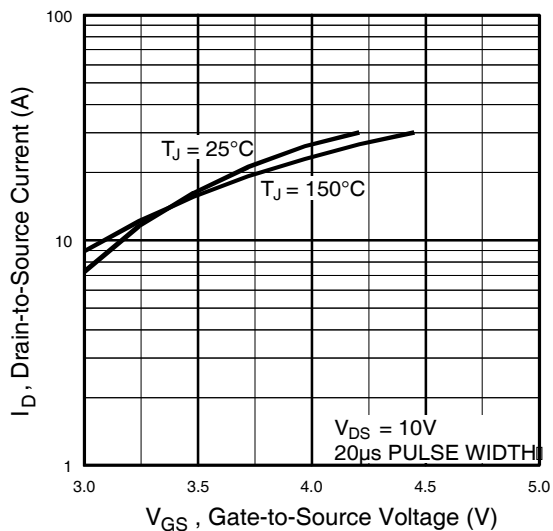
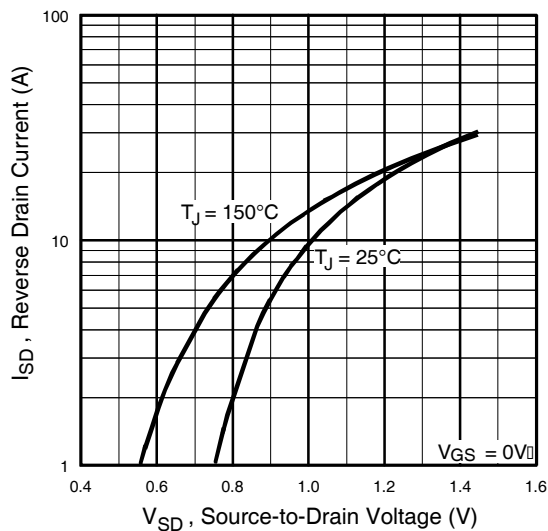
**Source-Drain Ratings and Characteristics**

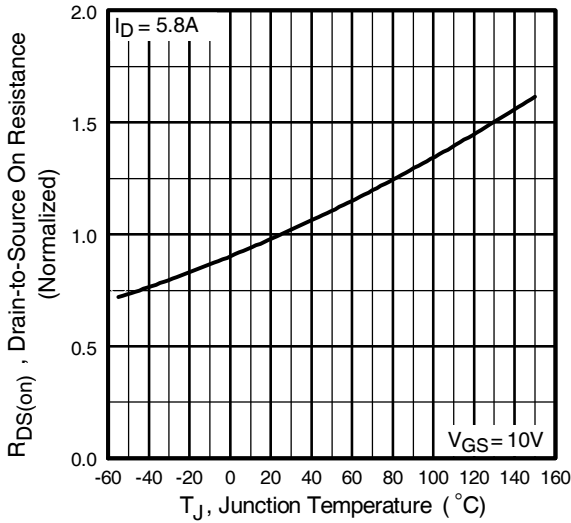
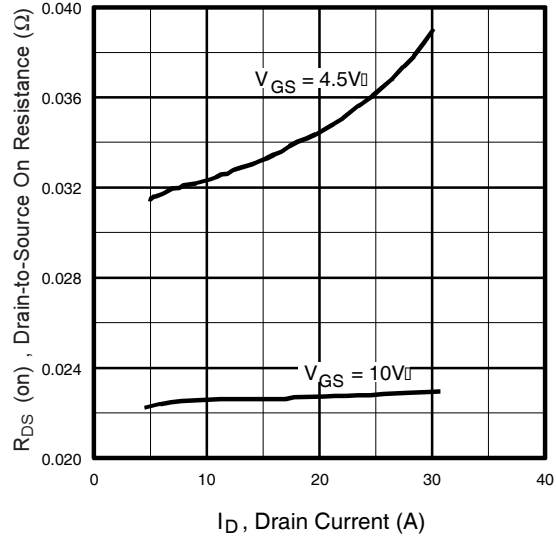
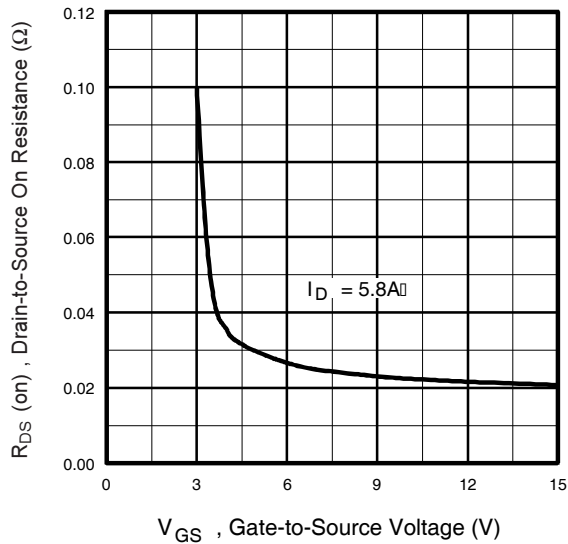
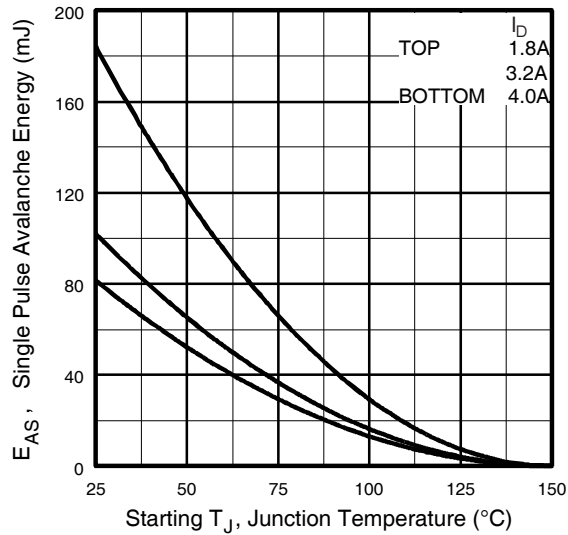
| Parameter       | Parameter                              | Min. | Typ.  | Max. | Units | Conditions  |
|-----------------|--|------|-------|------|-------|---|
| I <sub>S</sub>  | Continuous Source Current (Body Diode) | —    | —     | 2.5  | A     |   |
|                 |  | —    | —     | -2.5 |       |   |
| I <sub>SM</sub> | Pulsed Source Current (Body Diode) ①   | —    | —     | 30   |       |   |
|                 |  | —    | —     | -30  |       |   |
| V <sub>SD</sub> | Diode Forward Voltage                  | —    | 0.78  | 1.0  | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V ③  |
|                 |  | —    | -0.78 | -1.0 |       | T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V ③ |
| t <sub>rr</sub> | Reverse Recovery Time                  | —    | 45    | 68   | ns    | N-Channel   |
|                 |  | —    | 44    | 66   |       | T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.7A, di/dt = 100A/μs ④       |
| Q <sub>rr</sub> | Reverse Recovery Charge                | —    | 58    | 87   | nC    | P-Channel   |
|                 |  | —    | 42    | 63   |       | T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.7A, di/dt = 100A/μs        |

**Notes:**

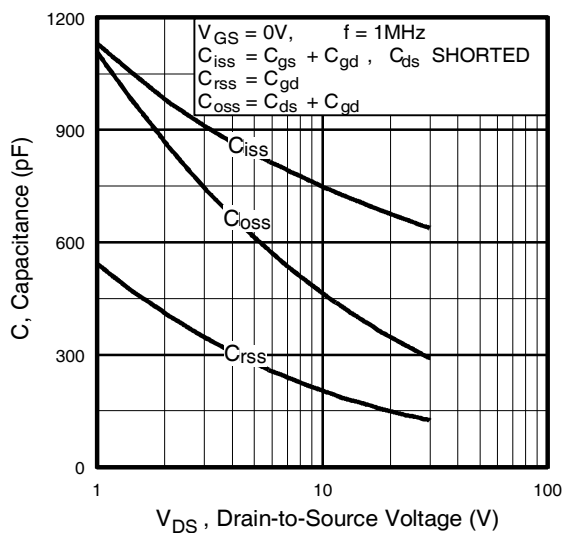
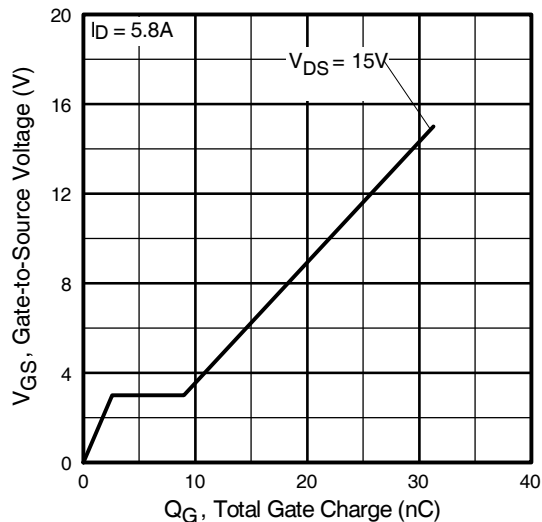
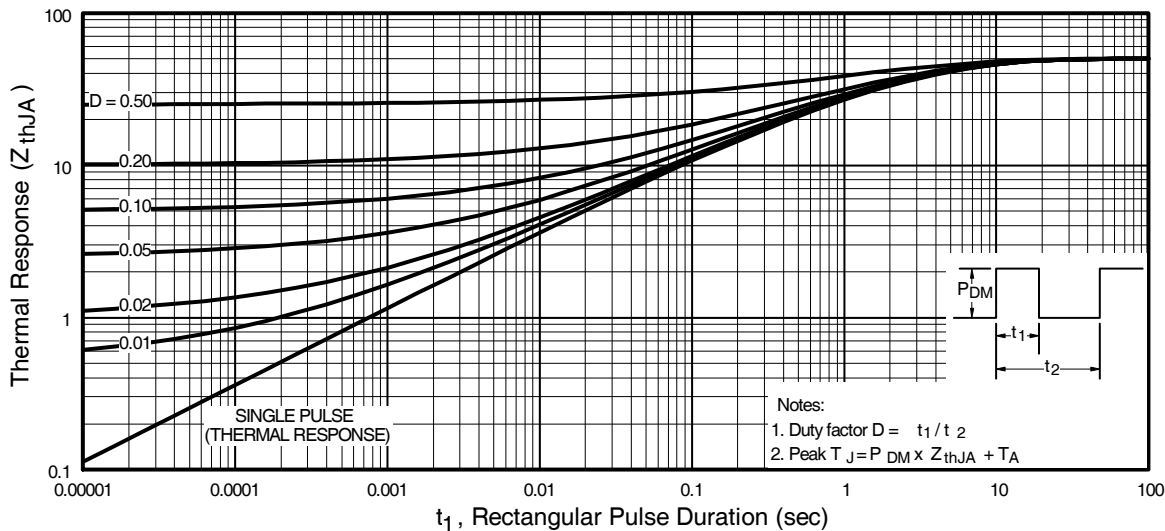
- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 22 )
- ② N-Channel I<sub>SD</sub> ≤ 4.0A, di/dt ≤ 74A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- P-Channel I<sub>SD</sub> ≤ -2.8A, di/dt ≤ 150A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ N-Channel Starting T<sub>J</sub> = 25°C, L = 10mH R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 4.0A. (See Figure 12)
- P-Channel Starting T<sub>J</sub> = 25°C, L = 35mH R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -2.8A.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ Surface mounted on FR-4 board, t ≤ 10sec.

## N-Channel

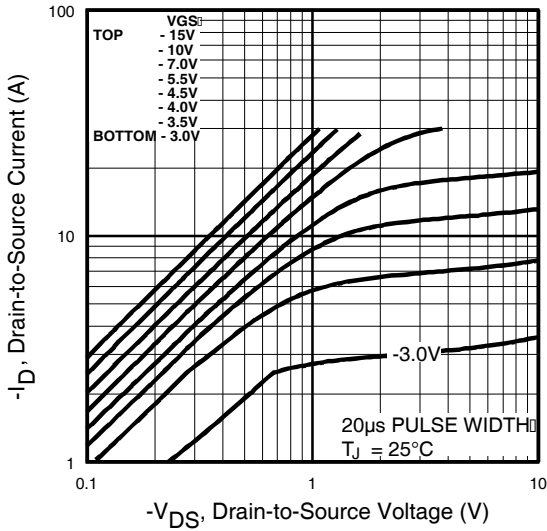
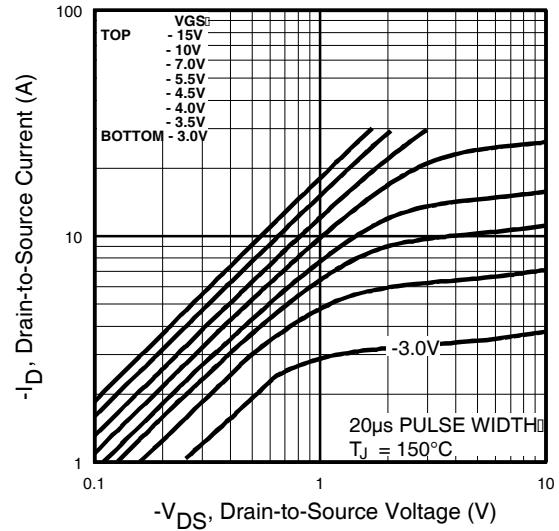
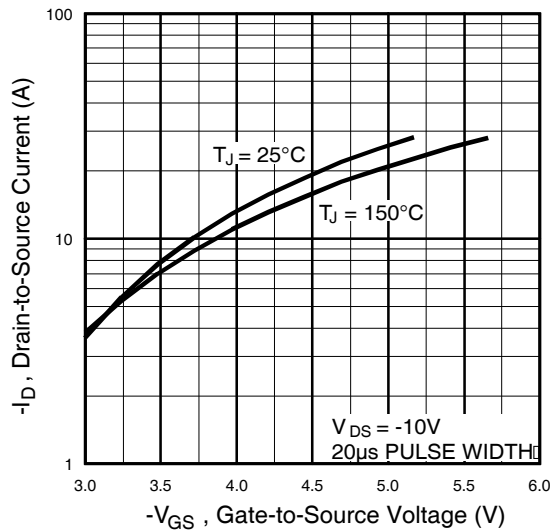
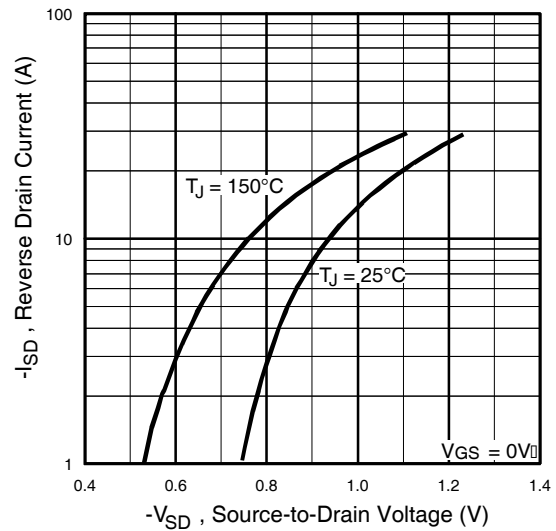

**Fig 1.** Typical Output Characteristics

**Fig 2.** Typical Output Characteristics

**Fig 3.** Typical Transfer Characteristics

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

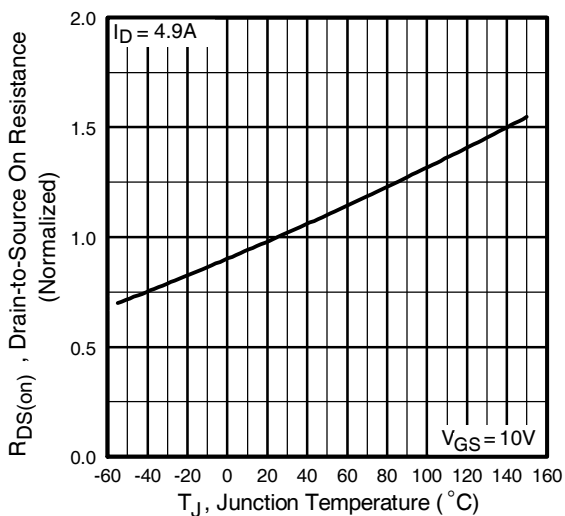
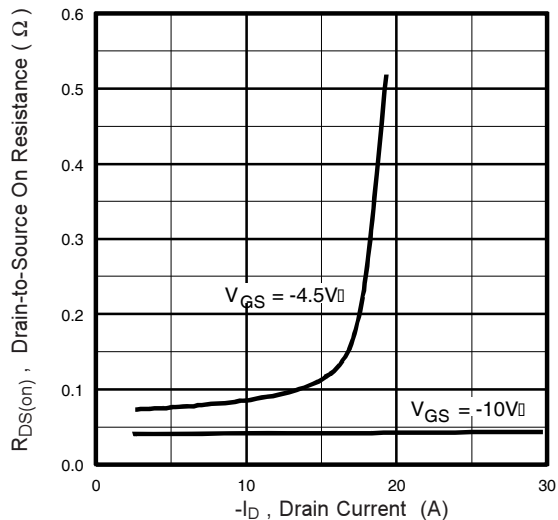
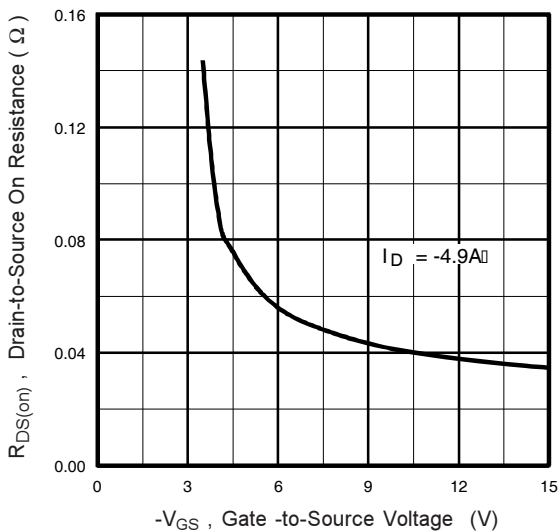
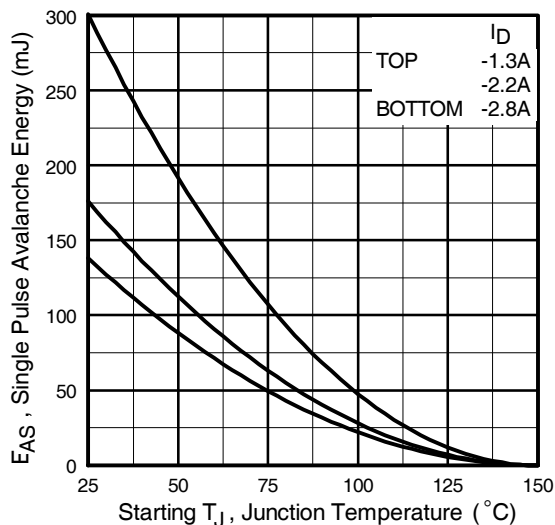
**N-Channel**

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

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

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

**Fig 8. Maximum Avalanche Energy Vs. Drain Current**

## N-Channel

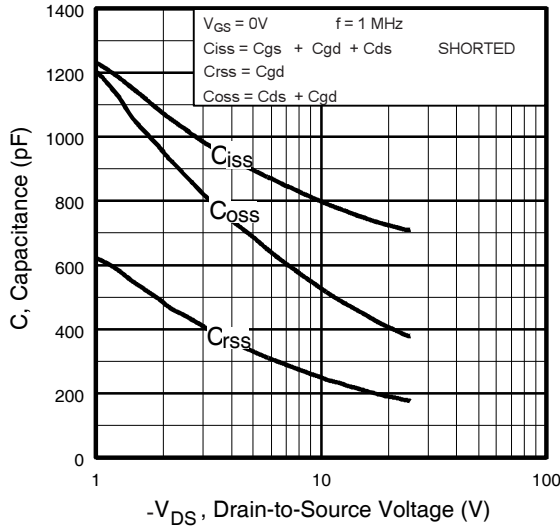
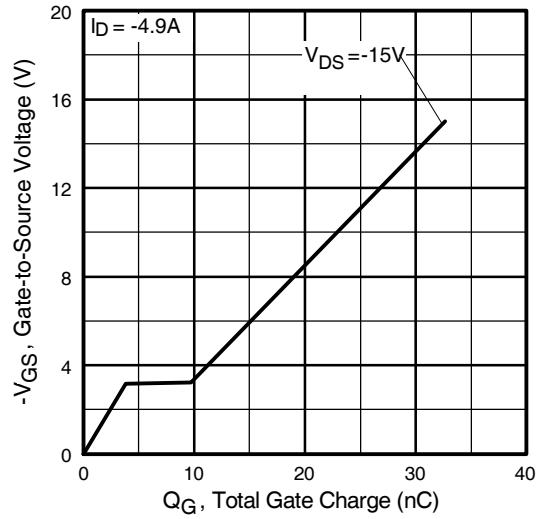
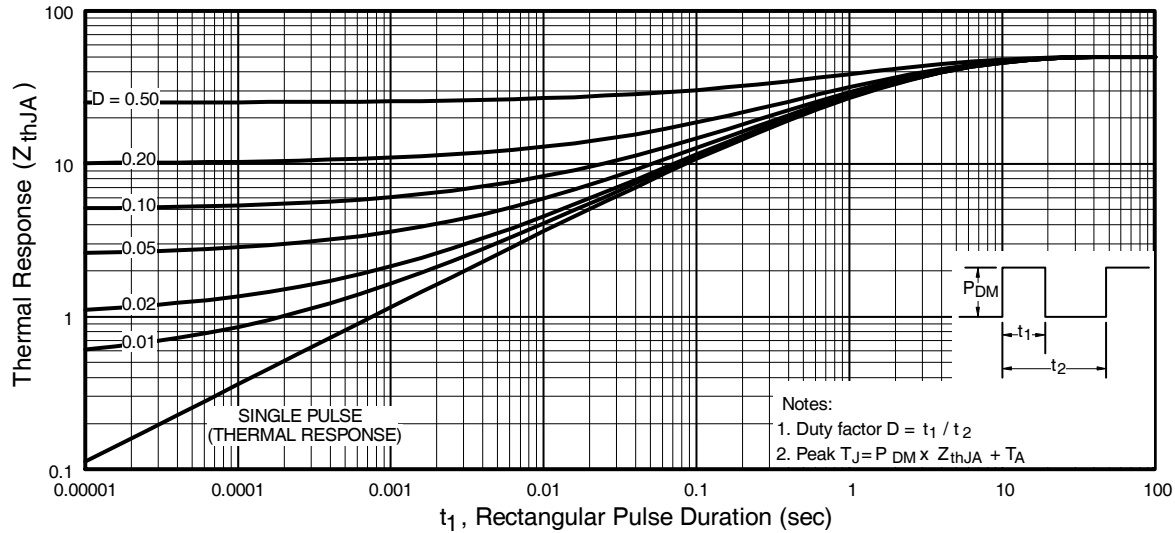

**Fig 9.** Typical Capacitance Vs. Drain-to-Source Voltage

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

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

## P-Channel


**Fig 12. Typical Output Characteristics**

**Fig 13. Typical Output Characteristics**

**Fig 14. Typical Transfer Characteristics**

**Fig 15. Typical Source-Drain Diode Forward Voltage**

**P-Channel**

**Fig 16.** Normalized On-Resistance Vs. Temperature

**Fig 17.** Typical On-Resistance Vs. Drain Current

**Fig 18.** Typical On-Resistance Vs. Gate Voltage

**Fig 19.** Maximum Avalanche Energy Vs. Drain Current

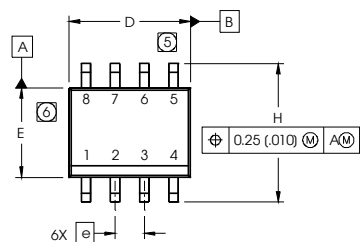
## P-Channel


**Fig 20.** Typical Capacitance Vs. Drain-to-Source Voltage

**Fig 21.** Typical Gate Charge Vs. Gate-to-Source Voltage

**Fig 22.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

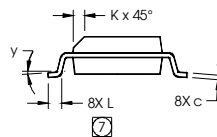
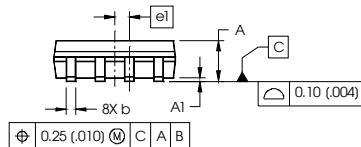


## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



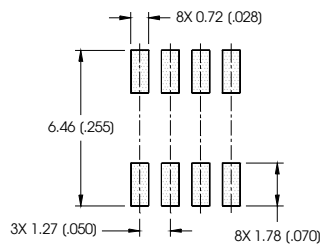
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
|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

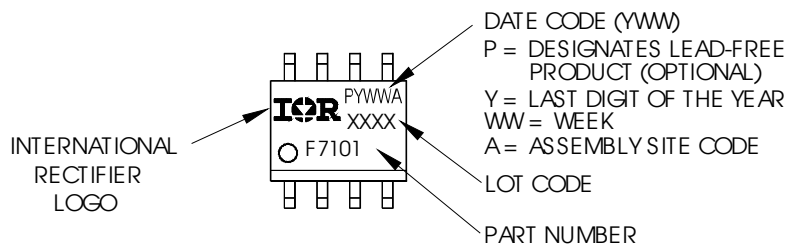
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT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

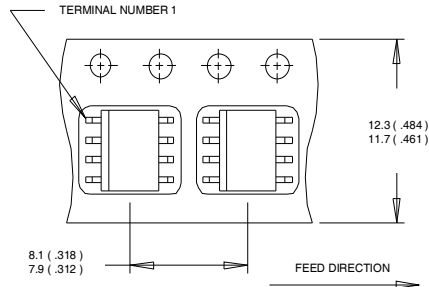
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



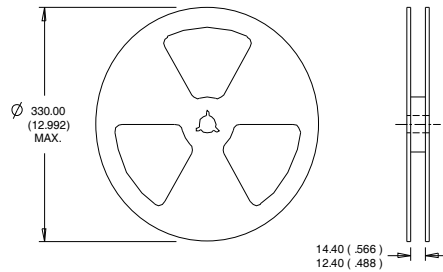
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

## SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



- 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.

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 | 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/>

单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)