

# IRF7379QPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dual N and P Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Automotive [Q101] Qualified
- Lead-Free

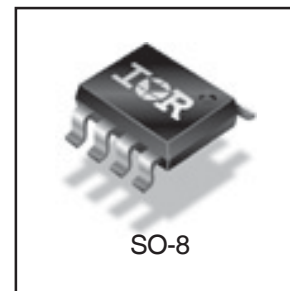
|          |                  |   |
|----------|------------------|---|
|          | N-CHANNEL MOSFET |   |
|          | P-CHANNEL MOSFET |   |
| S1       | 1                | 8 |
| G1       | 2                | 7 |
| S2       | 3                | 6 |
| G2       | 4                | 5 |
| Top View |                  |   |

|              | N-Ch   | P-Ch   |
|--------------|--------|--------|
| $V_{DS}$     | 30V    | -30V   |
| $R_{DS(on)}$ | 0.045Ω | 0.090Ω |

## Description

Specifically designed for Automotive applications, these HEXFET® Power MOSFET's in a Dual SO-8 package utilize the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of these Automotive qualified HEXFET Power MOSFET's are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These benefits combine to make this design an extremely efficient and reliable device for use in Automotive applications and a wide variety of other applications.

The efficient SO-8 package provides enhanced thermal characteristics and dual MOSFET die capability making it ideal in a variety of power applications. This dual, surface mount SO-8 can dramatically reduce board space and is also available in Tape & Reel.



## Absolute Maximum Ratings

|                                | Parameter                                       | Max.         |           | Units |
|--------------------------------|-------------------------------------------------|--------------|-----------|-------|
|                                |                                                 | N-Channel    | P-Channel |       |
| $V_{SD}$                       | Drain-to-Source Voltage                         | 30           | -30       | A     |
| $I_D @ T_A = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 5.8          | -4.3      |       |
| $I_D @ T_A = 70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 4.6          | -3.4      |       |
| $I_{DM}$                       | Pulsed Drain Current ①                          | 46           | -34       |       |
| $P_D @ T_A = 25^\circ\text{C}$ | Power Dissipation                               | 2.5          |           | W     |
|                                | Linear Derating Factor                          | 0.02         |           | W/°C  |
| $V_{GS}$                       | Gate-to-Source Voltage                          | $\pm 20$     |           | V     |
| $dv/dt$                        | Peak Diode Recovery $dv/dt$ ②                   | 5.0          | -5.0      | V/ns  |
| $T_J, T_{STG}$                 | Junction and Storage Temperature Range          | -55 to + 150 |           | °C    |

## Thermal Resistance Ratings

|                 | Parameter                    | Max. | Units |
|-----------------|------------------------------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient③ | 50   | °C/W  |

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# IRF7379QPbF

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

|                                        | Parameter                            |      | Min. | Typ.   | Max.  | Units | Conditions                                                                                     |
|----------------------------------------|--------------------------------------|------|------|--------|-------|-------|------------------------------------------------------------------------------------------------|
| V <sub>(BR)DSS</sub>                   | Drain-to-Source Breakdown Voltage    | N-Ch | 30   | —      | —     | V     | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                   |
|                                        |                                      | P-Ch | -30  | —      | —     |       | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                  |
| ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub> | Breakdown Voltage Temp. Coefficient  | N-Ch | —    | 0.032  | —     | V/°C  | Reference to 25°C, I <sub>D</sub> = 1mA                                                        |
|                                        |                                      | P-Ch | —    | -0.037 | —     |       | Reference to 25°C, I <sub>D</sub> = -1mA                                                       |
| R <sub>DS(ON)</sub>                    | Static Drain-to-Source On-Resistance | N-Ch | —    | 0.038  | 0.045 | Ω     | V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A ③                                                 |
|                                        |                                      |      | —    | 0.055  | 0.075 |       | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.9A ③                                                |
|                                        |                                      | P-Ch | —    | 0.070  | 0.090 |       | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.3A ③                                               |
|                                        |                                      |      | —    | 0.130  | 0.180 |       | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.7A ③                                              |
| V <sub>GS(th)</sub>                    | Gate Threshold Voltage               | N-Ch | 1.0  | —      | —     | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                     |
|                                        |                                      | P-Ch | -1.0 | —      | —     |       | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                    |
| g <sub>fs</sub>                        | Forward Transconductance             | N-Ch | 5.2  | —      | —     | S     | V <sub>DS</sub> = 15V, I <sub>D</sub> = 2.4A ③                                                 |
|                                        |                                      | P-Ch | 2.5  | —      | —     |       | V <sub>DS</sub> = -24V, I <sub>D</sub> = -1.8A ③                                               |
| I <sub>DSS</sub>                       | Drain-to-Source Leakage Current      | N-Ch | —    | —      | 1.0   | μA    | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                                    |
|                                        |                                      | P-Ch | —    | —      | -1.0  |       | V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V                                                   |
|                                        |                                      | N-Ch | —    | —      | 25    |       | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C                            |
|                                        |                                      | P-Ch | —    | —      | -25   |       | 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       | N-P  | —    | —      | ±100  |       | V <sub>GS</sub> = ±20V                                                                         |
| Q <sub>g</sub>                         | Total Gate Charge                    | N-Ch | —    | —      | 25    | nC    | N-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | —      | 25    |       | I <sub>D</sub> = 2.4A, V <sub>DS</sub> = 24V, V <sub>GS</sub> = 10V ③                          |
| Q <sub>gs</sub>                        | Gate-to-Source Charge                | N-Ch | —    | —      | 2.9   |       |                                                                                                |
|                                        |                                      | P-Ch | —    | —      | 2.9   |       |                                                                                                |
| Q <sub>gd</sub>                        | Gate-to-Drain ("Miller") Charge      | N-Ch | —    | —      | 7.9   |       | P-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | —      | 9.0   |       | I <sub>D</sub> = -1.8A, V <sub>DS</sub> = -24V, V <sub>GS</sub> = -10V ③                       |
| t <sub>d(on)</sub>                     | Turn-On Delay Time                   | N-Ch | —    | 6.8    | —     | ns    | N-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | 11     | —     |       | V <sub>DD</sub> = 15V, I <sub>D</sub> = 2.4A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 6.2Ω ③   |
| t <sub>r</sub>                         | Rise Time                            | N-Ch | —    | 21     | —     |       |                                                                                                |
|                                        |                                      | P-Ch | —    | 17     | —     |       |                                                                                                |
| t <sub>d(off)</sub>                    | Turn-Off Delay Time                  | N-Ch | —    | 22     | —     |       | P-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | 25     | —     |       | V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.8A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 8.2Ω ③ |
| t <sub>f</sub>                         | Fall Time                            | N-Ch | —    | 7.7    | —     |       |                                                                                                |
|                                        |                                      | P-Ch | —    | 18     | —     |       |                                                                                                |
| L <sub>D</sub>                         | Internal Drain Inductance            | N-P  | —    | 4.0    | —     | nH    | Between lead, 6mm (0.25in.) from package and center of die contact                             |
| L <sub>S</sub>                         | Internal Source Inductance           | N-P  | —    | 6.0    | —     |       |                                                                                                |
| C <sub>iss</sub>                       | Input Capacitance                    | N-Ch | —    | 520    | —     | pF    | N-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | 440    | —     |       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0MHz ③                                      |
| C <sub>oss</sub>                       | Output Capacitance                   | N-Ch | —    | 180    | —     |       |                                                                                                |
|                                        |                                      | P-Ch | —    | 200    | —     |       |                                                                                                |
| C <sub>rss</sub>                       | Reverse Transfer Capacitance         | N-Ch | —    | 72     | —     |       | P-Channel                                                                                      |
|                                        |                                      | P-Ch | —    | 93     | —     |       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1.0MHz                                       |

## Source-Drain Ratings and Characteristics

|                 | Parameter                              |      | Min. | Typ. | Max. | Units | Conditions                                                            |
|-----------------|----------------------------------------|------|------|------|------|-------|-----------------------------------------------------------------------|
| I <sub>S</sub>  | Continuous Source Current (Body Diode) | N-Ch | —    | —    | 3.1  | A     |                                                                       |
|                 |                                        | P-Ch | —    | —    | -3.1 |       |                                                                       |
| I <sub>SM</sub> | Pulsed Source Current (Body Diode) ①   | N-Ch | —    | —    | 46   |       |                                                                       |
|                 |                                        | P-Ch | —    | —    | -34  |       |                                                                       |
| V <sub>SD</sub> | Diode Forward Voltage                  | N-Ch | —    | —    | 1.0  | V     | T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.8A, V <sub>GS</sub> = 0V ③  |
|                 |                                        | P-Ch | —    | —    | -1.0 |       | 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                  | N-Ch | —    | 47   | 71   | ns    | N-Channel                                                             |
|                 |                                        | P-Ch | —    | 53   | 80   |       | T <sub>J</sub> = 25°C, I <sub>F</sub> = 2.4A, di/dt = 100A/μs ③       |
| Q <sub>rr</sub> | Reverse Recovery Charge                | N-Ch | —    | 56   | 84   | nC    | P-Channel                                                             |
|                 |                                        | P-Ch | —    | 66   | 99   |       | T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.8A, di/dt = -100A/μs ③     |

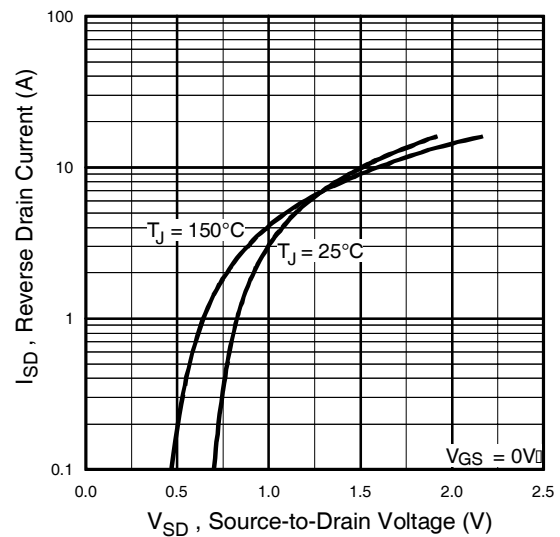
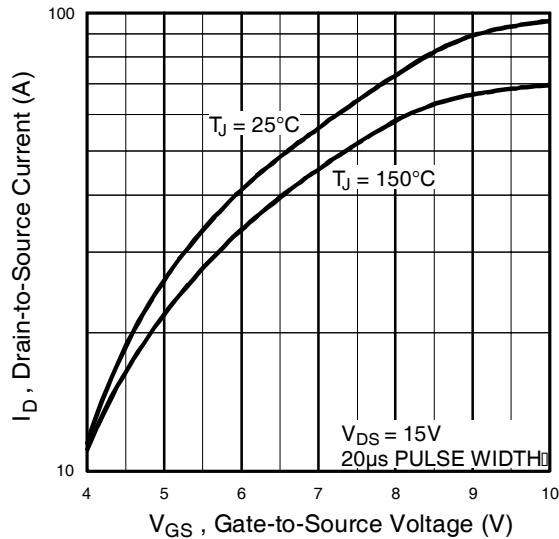
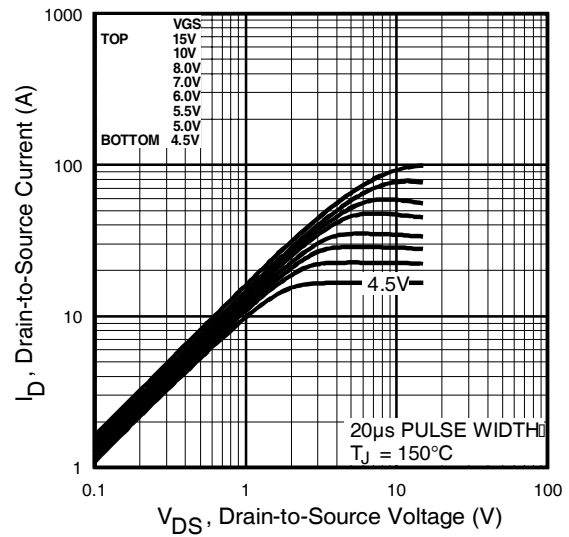
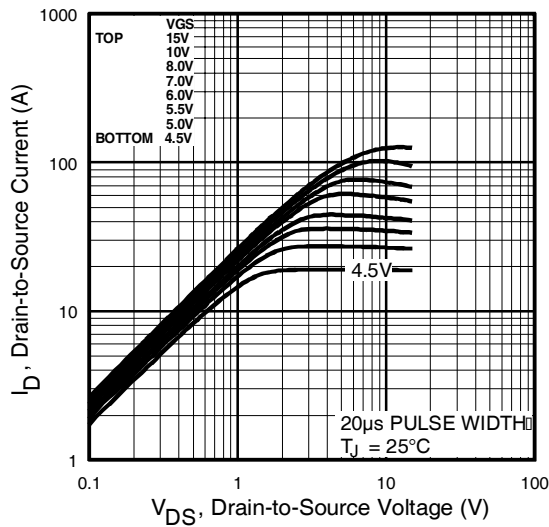
### Notes:

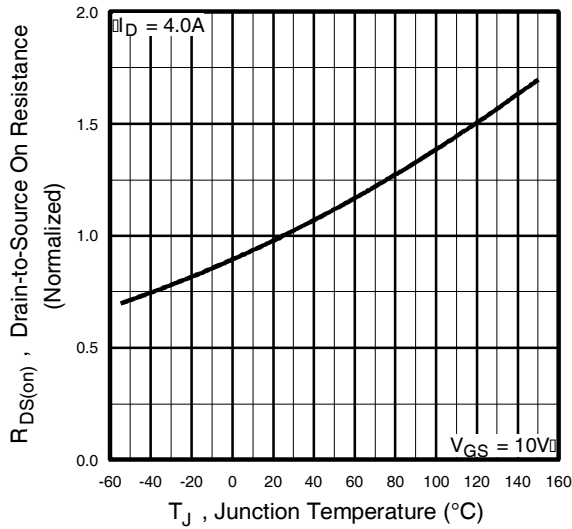
① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 10 )

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

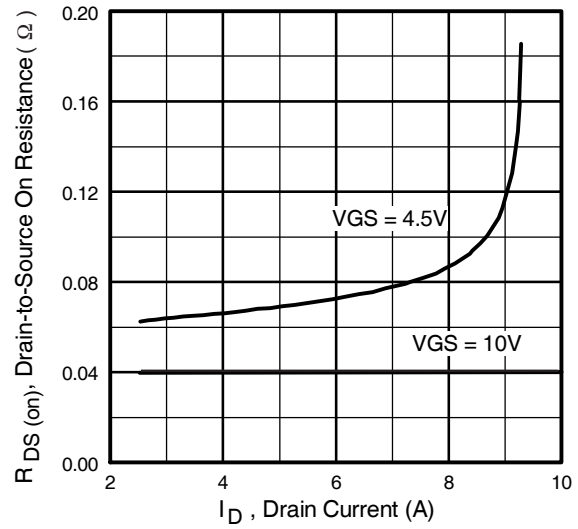
② N-Channel I<sub>SD</sub> ≤ 2.4A, di/dt ≤ 73A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C  
P-Channel I<sub>SD</sub> ≤ -1.8A, di/dt ≤ 90A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C

④ Surface mounted on FR-4 board, t ≤ 10sec.

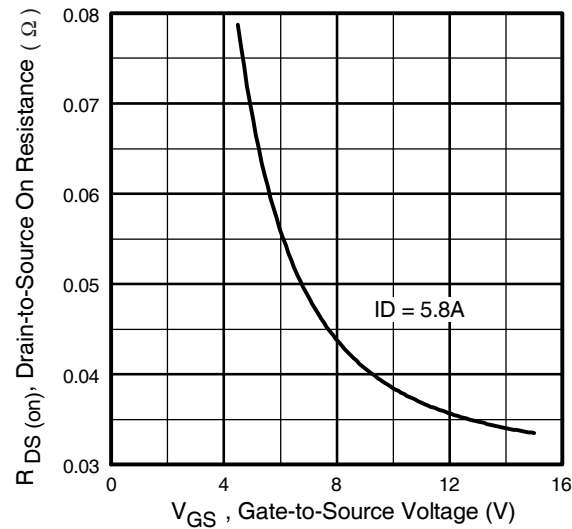




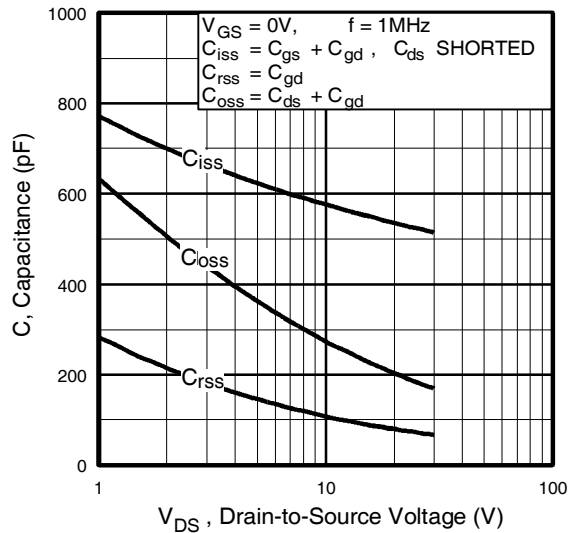
**Fig 5.** Normalized On-Resistance Vs. Temperature



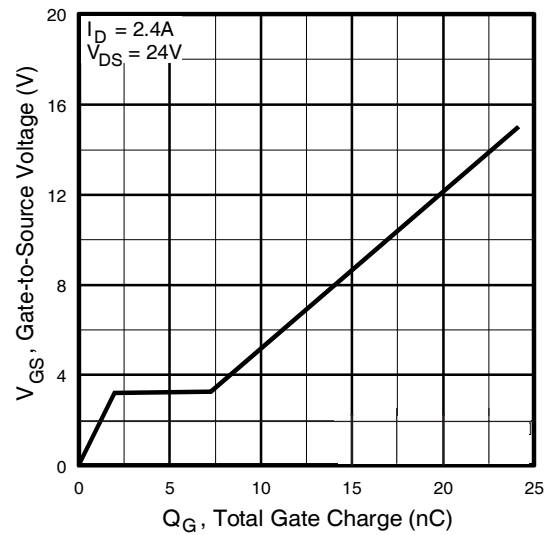
**Fig 6.** Typical On-Resistance Vs. Drain Current



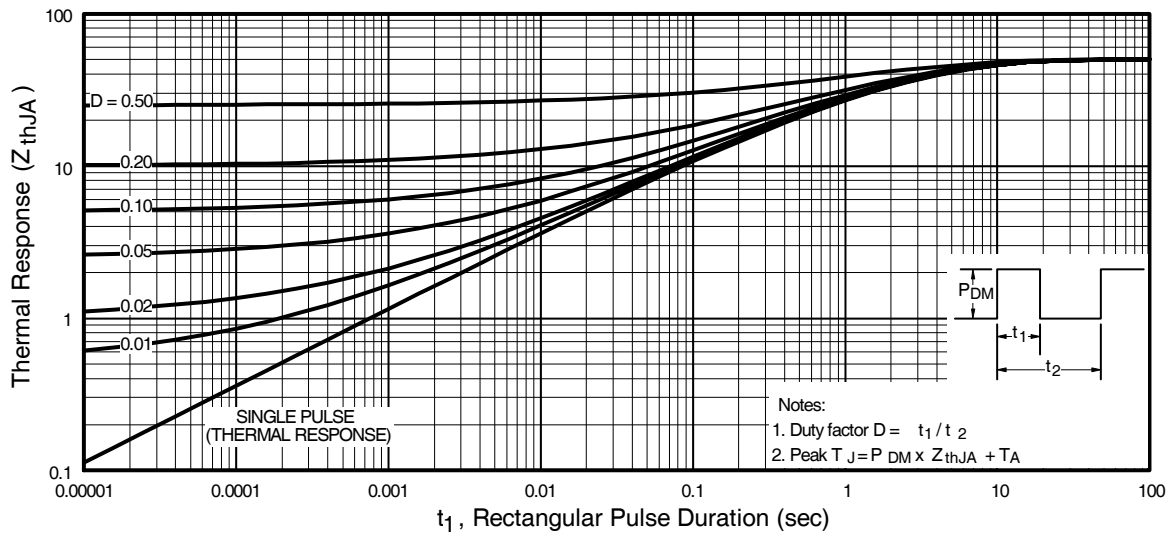
**Fig 7.** Typical On-Resistance Vs. Gate Voltage



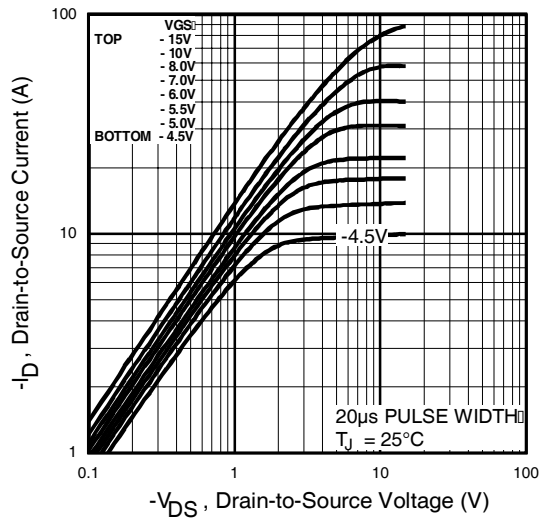
**Fig 8.** Typical Capacitance Vs. Drain-to-Source Voltage



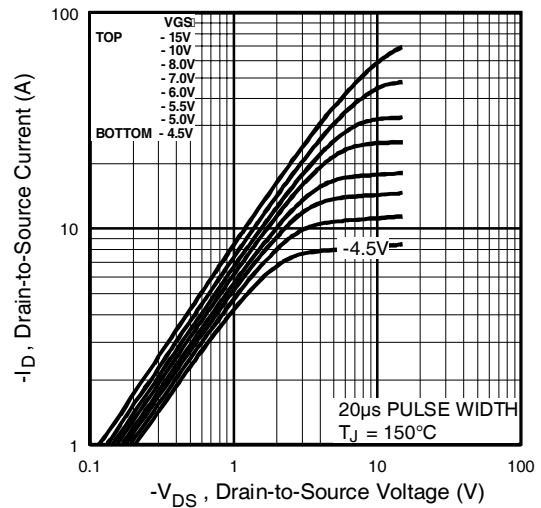
**Fig 9.** Typical Gate Charge Vs. Gate-to-Source Voltage



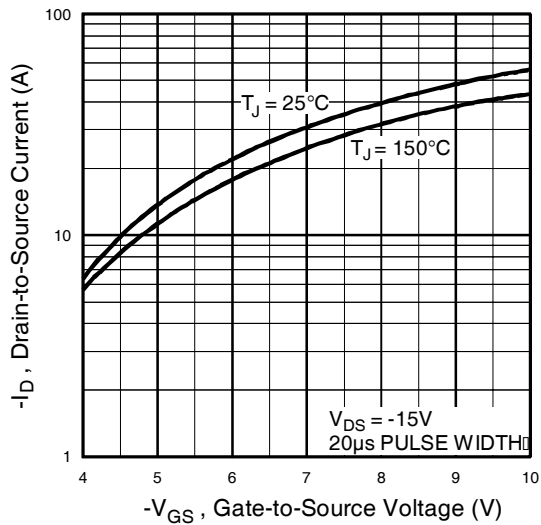
**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



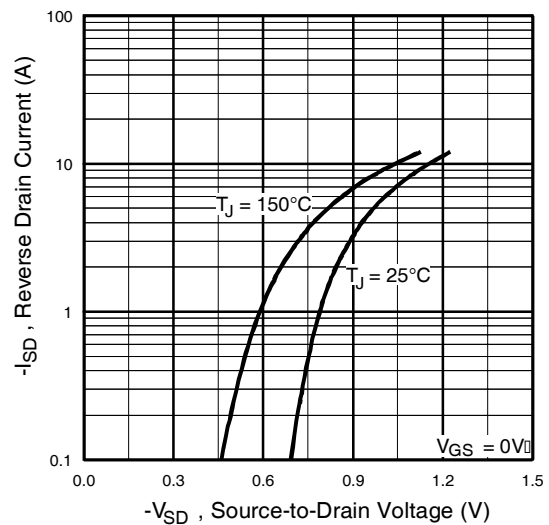
**Fig 11.** Typical Output Characteristics



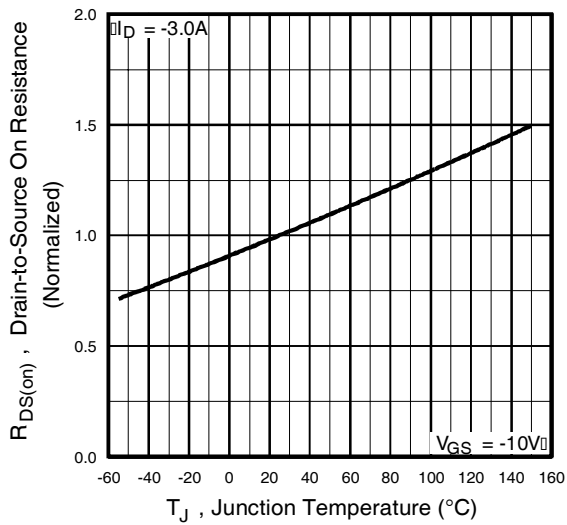
**Fig 12.** Typical Output Characteristics



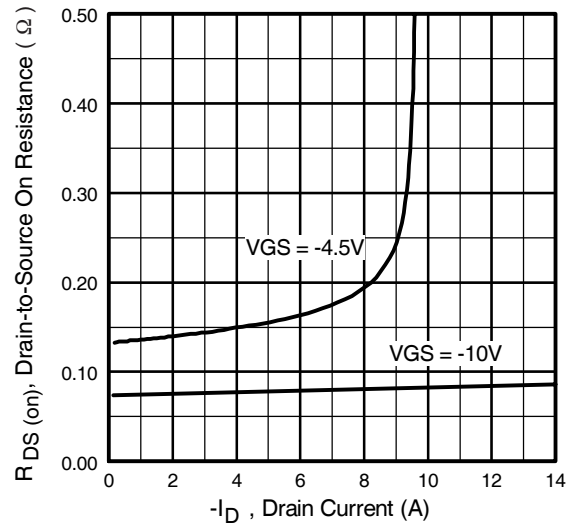
**Fig 13.** Typical Transfer Characteristics



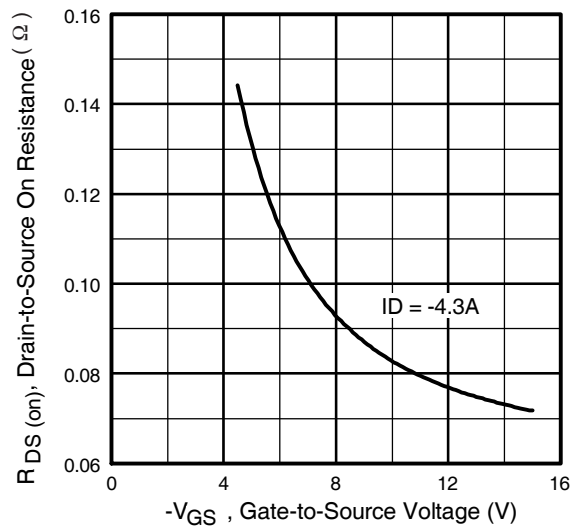
**Fig 14.** Typical Source-Drain Diode  
Forward Voltage



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



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

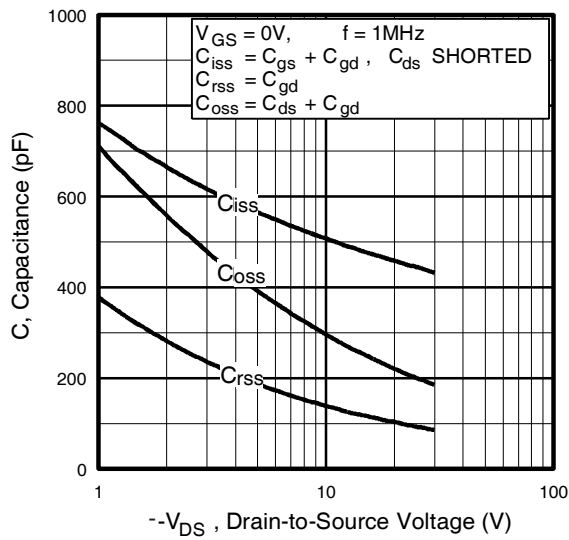


**Fig 17.** Typical On-Resistance Vs. Gate  
Voltage

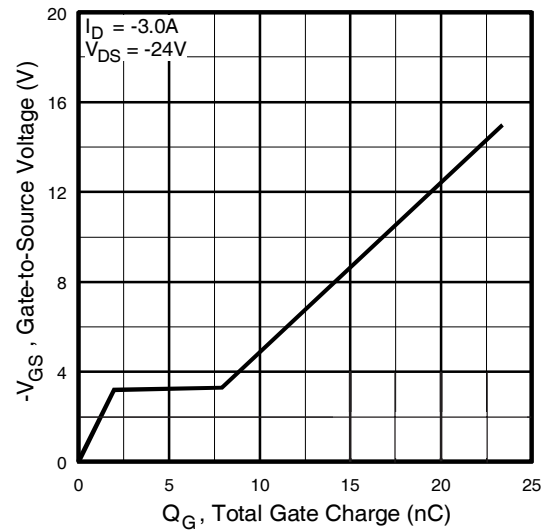
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P-Channel

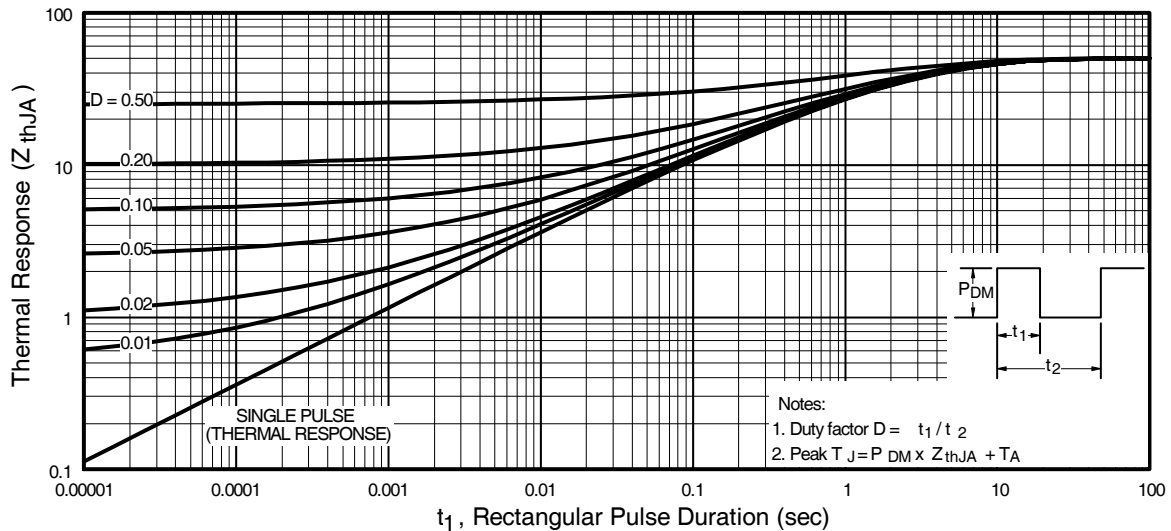
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IR Rectifier



**Fig 18.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 19.** Typical Gate Charge Vs. Gate-to-Source Voltage

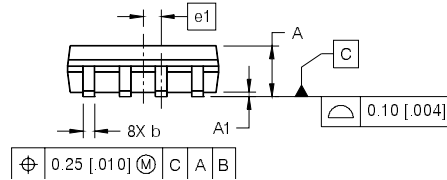
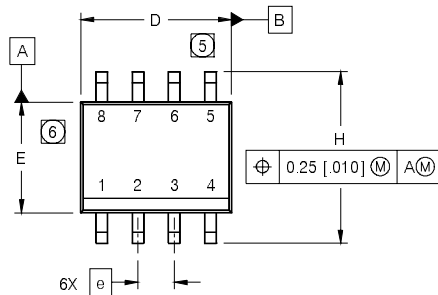


**Fig 20.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

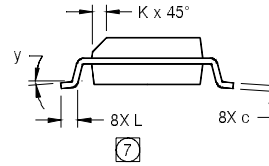


## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



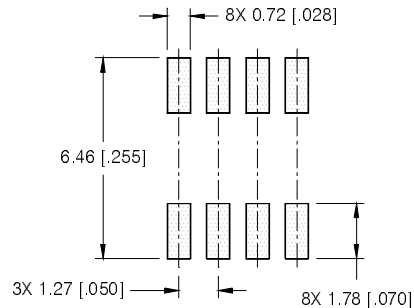
| DIM | INCHES     |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| A   | .0532      | .0688 | 1.35        | 1.75 |
| A1  | .0040      | .0098 | 0.10        | 0.25 |
| b   | .013       | .020  | 0.33        | 0.51 |
|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

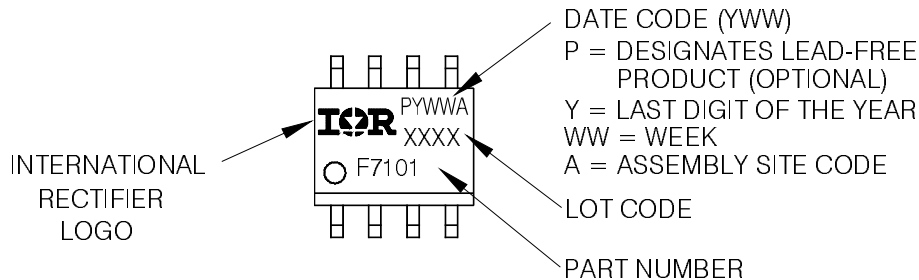
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

### FOOTPRINT



## SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



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

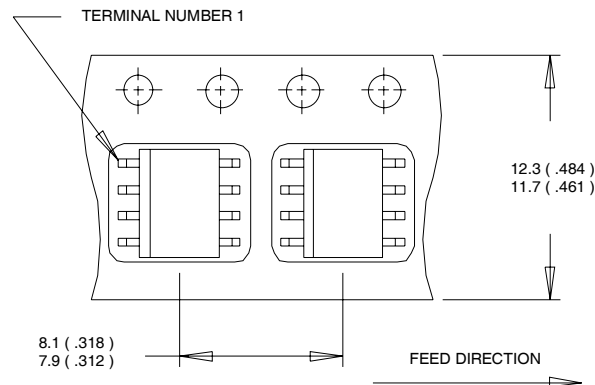
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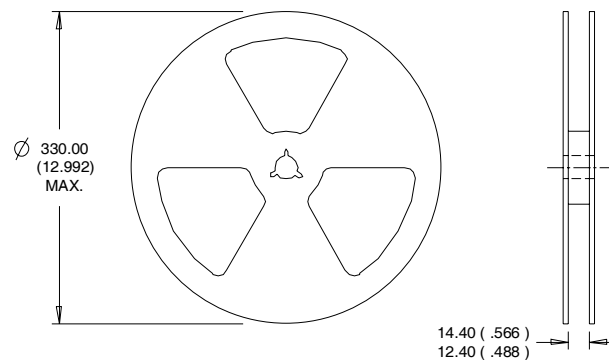
## SO-8 Tape and Reel

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/>

Data and specifications subject to change without notice.  
This product has been designed and qualified for the Automotive [Q101] market.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier

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TAC Fax: (310) 252-7903

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