International Rectifier

**AUTOMOTIVE MOSFET**

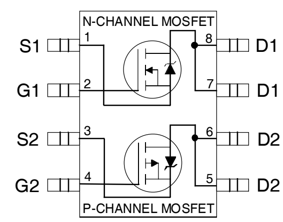
PD - 96366B

# AUIRF7379Q

HEXFET® Power MOSFET

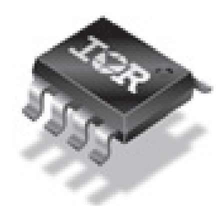
## Features

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



Top View

| | N-Ch | P-Ch |
|---|---|---|
| $V_{(BR)DSS}$ | 30V | -30V |
| $R_{DS(on)}$ typ. | 0.038Ω | 0.070Ω |
| max. | 0.045Ω | 0.090Ω |
| $I_D$ | 5.8A | -4.3A |


SO-8

| G | D | S |
|---|---|---|
| Gate | Drain | Source |

## Description

Specifically designed for Automotive applications, these HEXFET® Power MOSFET's in a Dual SO-8 package utilize the lastest 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

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only; and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied.Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature ($T_A$) is 25°C, unless otherwise specified.

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

### Thermal Resistance

| | Parameter | Typ. | Max. | Units |
|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-Ambient ④ | ––– | 50 | °C/W |

HEXFET® is a registered trademark of International Rectifier.
*Qualification standards can be found at http://www.irf.com/

## Static Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)

| | Parameter | | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | N-Ch | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| | | P-Ch | -30 | — | — | | $V_{GS}$ = 0V, $I_D$ = -250μA |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | N-Ch | — | 0.032 | — | V/°C | Reference to 25°C, $I_D$ = 1mA |
| | | P-Ch | — | -0.037 | — | | Reference to 25°C, $I_D$ = -1mA |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | N-Ch | — | 0.038 | 0.045 | Ω | $V_{GS}$ = 10V, $I_D$ = 5.8A ③ |
| | | | — | 0.055 | 0.075 | | $V_{GS}$ = 4.5V, $I_D$ = 4.9A ③ |
| | | P-Ch | — | 0.070 | 0.090 | | $V_{GS}$ = -10V, $I_D$ = -4.3A ③ |
| | | | — | 0.130 | 0.180 | | $V_{GS}$ = -4.5V, $I_D$ = -3.7A ③ |
| $V_{GS(th)}$ | Gate Threshold Voltage | N-Ch | 1.0 | — | 3.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| | | P-Ch | -1.0 | — | -3.0 | | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |
| gfs | Forward Transconductance | N-Ch | 5.2 | — | — | S | $V_{DS}$ = 15V, $I_D$ = 2.4A ③ |
| | | P-Ch | 2.5 | — | — | | $V_{DS}$ = -24V, $I_D$ = -1.8A ③ |
| $I_{DSS}$ | Drain-to-Source Leakage Current | N-Ch | — | — | 1.0 | μA | $V_{DS}$ = 24V, $V_{GS}$ = 0V |
| | | P-Ch | — | — | -1.0 | | $V_{DS}$ = -24V, $V_{GS}$ = 0V |
| | | N-Ch | — | — | 25 | | $V_{DS}$ = 24V, $V_{GS}$ = 0V, $T_J$ = 125°C |
| | | P-Ch | — | — | -25 | | $V_{DS}$ = -24V, $V_{GS}$ = 0V, $T_J$ = 125°C |
| $I_{GSS}$ | Gate-to-Source Forward Leakage | | — | — | ± 100 | nA | $V_{GS}$ = ± 20V |

## Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)

| | Parameter | | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge | N-Ch | — | — | 25 | nC | N-Channel |
| | | P-Ch | — | — | 25 | | $I_D$ = 2.4A $V_{DS}$ = 24V, $V_{GS}$ =10V |
| $Q_{gs}$ | Gate-to-Source Charge | N-Ch | — | — | 2.9 | | |
| | | P-Ch | — | — | 2.9 | | P-Channel ③ |
| $Q_{gd}$ | Gate-to-Drain ("Miller") Charge | N-Ch | — | — | 7.9 | | $I_D$ = -1.8A $V_{DS}$ = -24V, $V_{GS}$ =-10V |
| | | P-Ch | — | — | 9.0 | | |
| $t_{d(on)}$ | Turn-On Delay Time | N-Ch | — | 6.8 | — | ns | N-Channel |
| | | P-Ch | — | 11 | — | | $V_{DD}$ = 15V, ID=2.4A, RG = 6.0Ω |
| $t_r$ | Rise Time | N-Ch | — | 21 | — | | $R_D$ = 6.2Ω |
| | | P-Ch | — | 17 | — | | P-Channel ③ |
| $t_{d(off)}$ | Turn-Off Delay Time | N-Ch | — | 22 | — | | $V_{DD}$ = -15V, ID=-1.8A, RG = 6.0Ω |
| | | P-Ch | — | 25 | — | | $R_D$ = 8.2Ω |
| $t_f$ | Fall Time | N-Ch | — | 7.7 | — | | |
| | | P-Ch | — | 18 | — | | |
| $L_D$ | Internal Drain Inductance | N-P | — | 4.0 | — | nH | Between lead, 6mm (0.25in.) from package |
| $L_S$ | Internal Source Inductance | N-P | — | 6.0 | — | | and center of die contact |
| $C_{iss}$ | Input Capacitance | N-Ch | — | 520 | — | pF | N-Channel |
| | | P-Ch | — | 440 | | | VGS = 0V, $V_{DS}$ = 25V, f =1.0Mhz |
| $C_{oss}$ | Output Capacitance | N-Ch | — | 180 | — | | |
| | | P-Ch | — | 200 | | | P-Channel |
| $C_{rss}$ | Reverse Transfer Capacitance | N-Ch | — | 72 | — | | VGS = 0V, $V_{DS}$ = -25V, f =1.0Mhz |
| | | P-Ch | — | 93 | | | |

## Diode Characteristics

| | Parameter | | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | N-Ch | — | — | 3.1 | A | |
| | | P-Ch | — | — | -3.1 | | |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ① | N-Ch | — | — | 46 | | |
| | | P-Ch | — | — | -34 | | |
| $V_{SD}$ | Diode Forward Voltage | N-Ch | — | | 1.0 | V | $T_J$ = 25°C, $I_S$ = 1.8A, $V_{GS}$ = 0V ③ |
| | | P-Ch | — | | -1.0 | | $T_J$ = 25°C, $I_S$ = -1.8A, $V_{GS}$ = 0V ③ |
| $t_{rr}$ | Reverse Recovery Time | N-Ch | — | 47 | 71 | ns | N-Channel |
| | | P-Ch | — | 53 | 80 | | $T_J$ = 25°C, $I_F$ = 2.4A di/dt = 100A/μs |
| $Q_{rr}$ | Reverse Recovery Charge | N-Ch | — | 56 | 84 | nC | P-Channel ③ |
| | | P-Ch | — | 66 | 99 | | $T_J$ = 25°C, $I_F$ = -1.8A di/dt = 100A/μs |

Notes ① through ④ are on page 10

## Qualification Information†

| | | | |
|---|---|---|---|
| **Qualification Level** | | Automotive<br>(per AEC-Q101) †† | |
| | | Comments: This part number(s) passed Automotive qualification. IR's Industrial and Consumer qualification level is granted by extension of the higher Automotive level. | |
| **Moisture Sensitivity Level** | | SO-8 | MSL1 |
| **ESD** | Machine Model | N Ch: Class M2(+/- 150V )††† | P Ch: Class M2(+/- 150V )††† |
| | | (per AEC-Q101-002) | |
| | Human Body Model | N Ch : Class H1A(+/- 500V )††† | P Ch: Class H0(+/- 250V )††† |
| | | (per AEC-Q101-001) | |
| | Charged Device Model | N Ch: Class C5(+/- 2000V )††† | P Ch: Class C5(+/- 2000V )††† |
| | | (per AEC-Q101-005) | |
| **RoHS Compliant** | | Yes | |

† Qualification standards can be found at International Rectifier's web site: http//www.irf.com/

†† Exceptions (if any) to AEC-Q101 requirements are noted in the qualification report.

††† Highest passing voltage

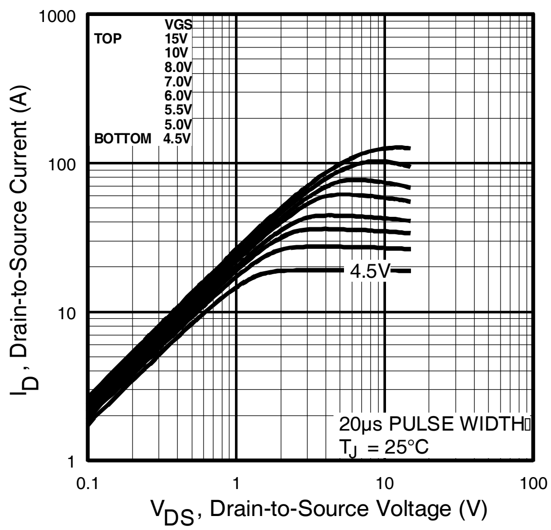



**Fig 1.** Typical Output Characteristics

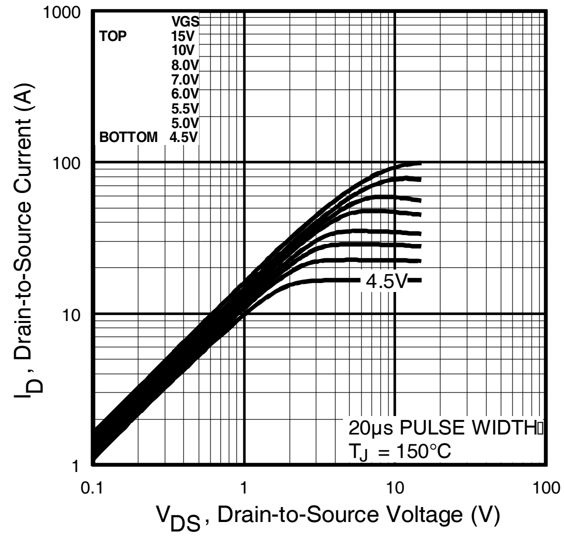



**Fig 2.** Typical Output Characteristics

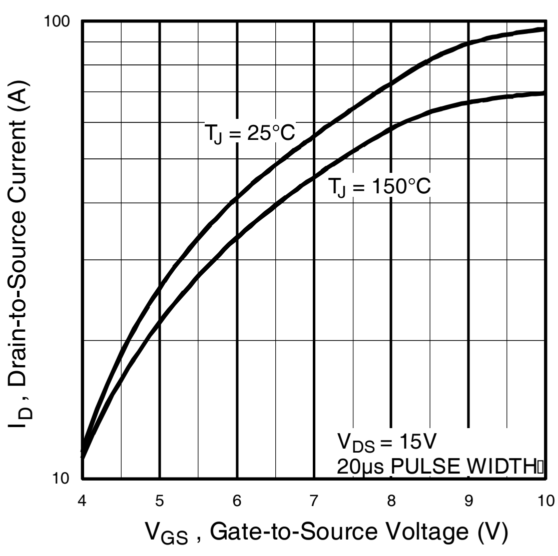



**Fig 3.** Typical Transfer Characteristics

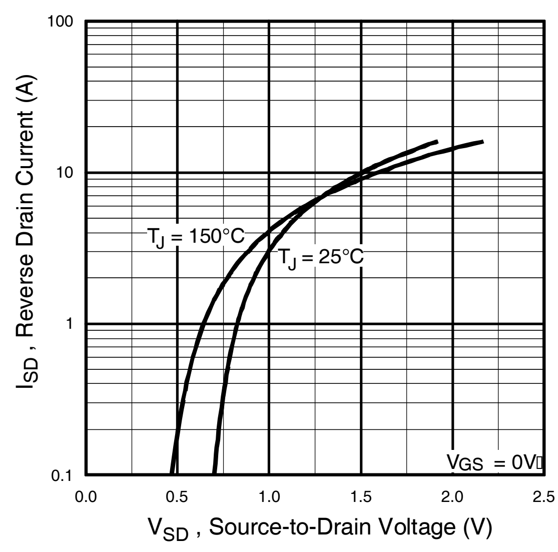



**Fig 4.** Typical Source-Drain Diode Forward Voltage

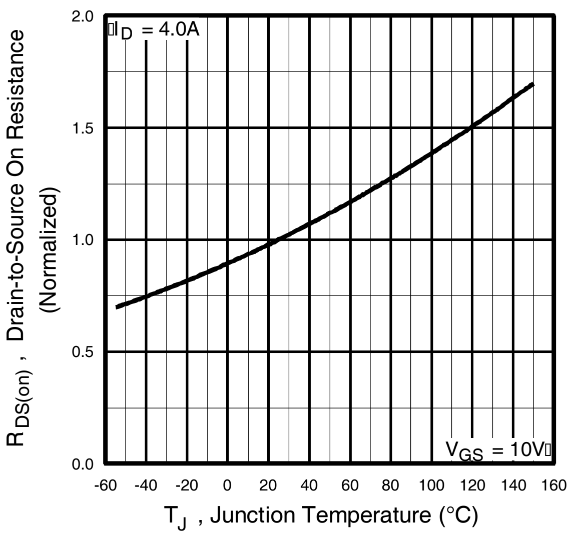



**Fig 5.** Normalized On-Resistance Vs. Temperature

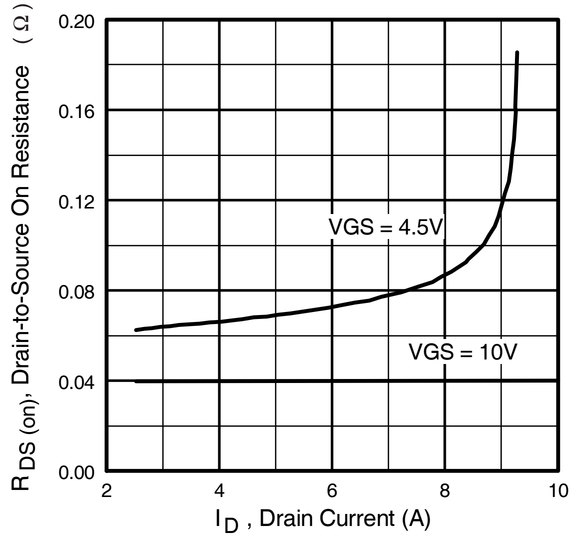



**Fig 6.** Typical On-Resistance Vs. Drain Current

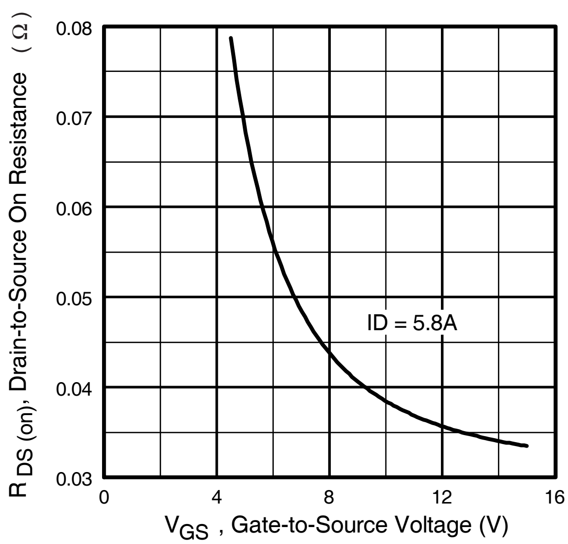



**Fig 7.** Typical On-Resistance Vs. Gate Voltage

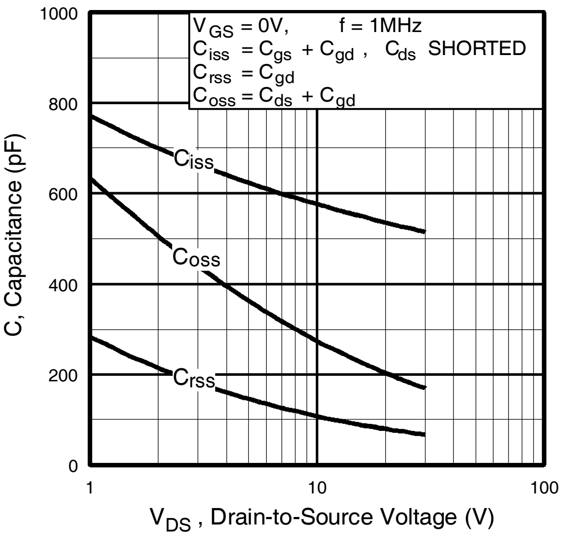



**Fig 8.** Typical Capacitance Vs. Drain-to-Source Voltage

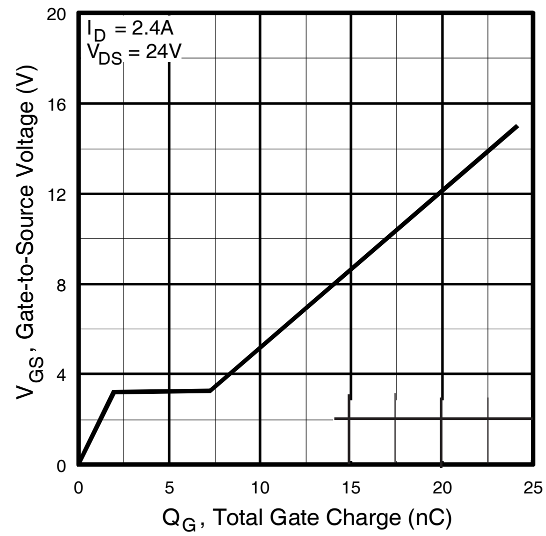



**Fig 9.** Typical Gate Charge Vs. Gate-to-Source Voltage

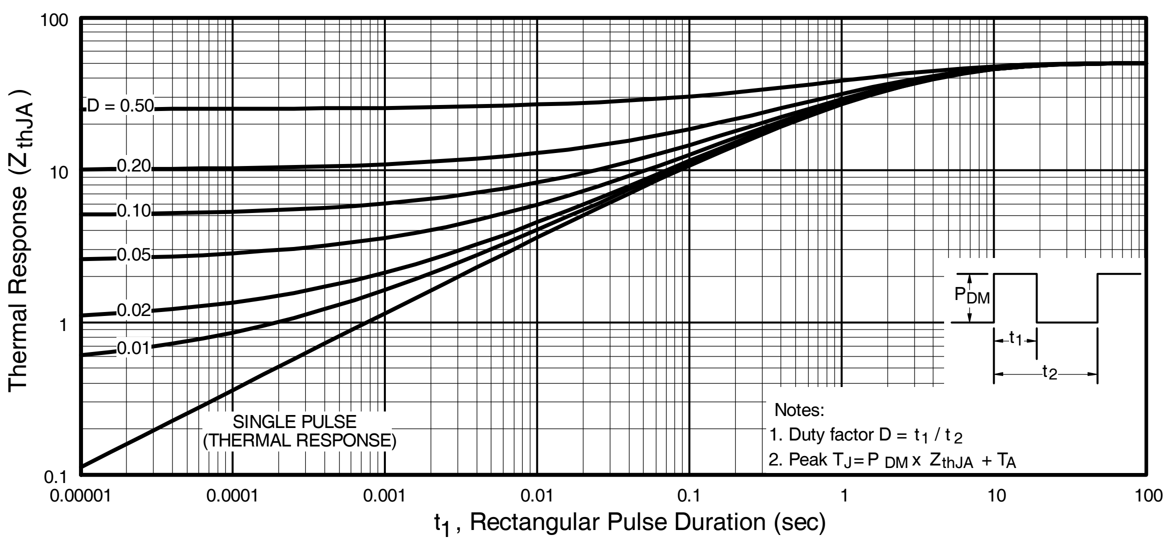



**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

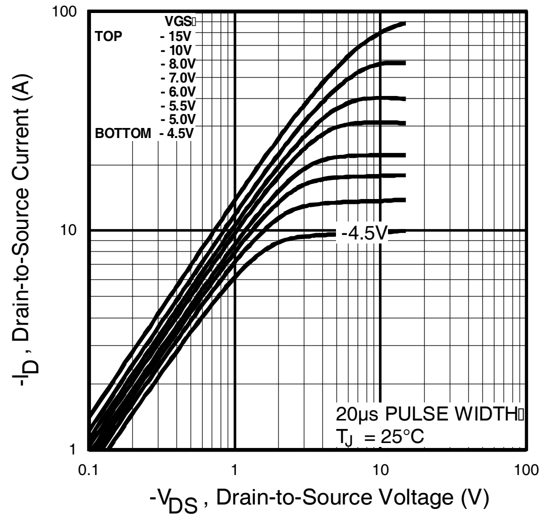



**Fig 11.** Typical Output Characteristics

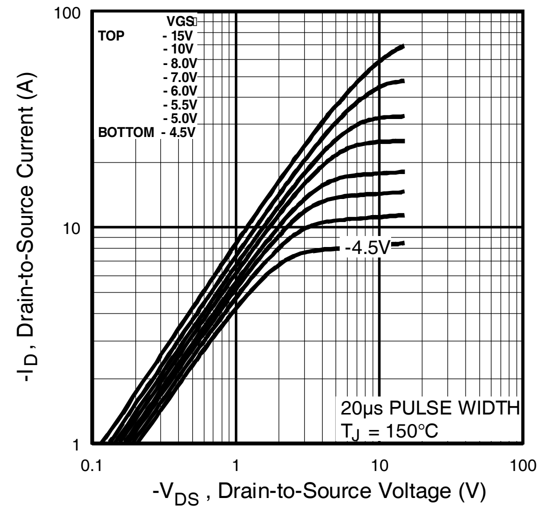



**Fig 12.** Typical Output Characteristics

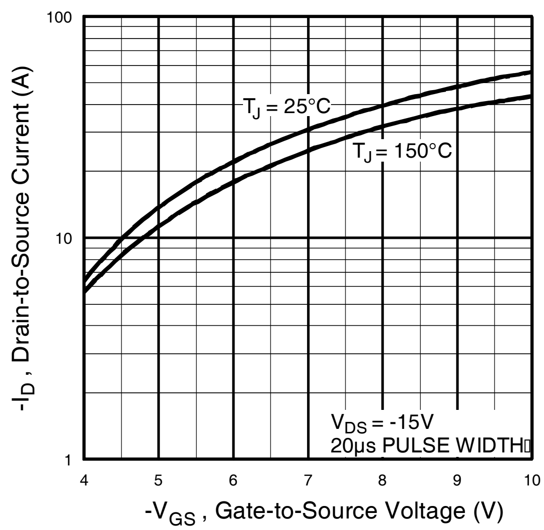



**Fig 13.** Typical Transfer Characteristics

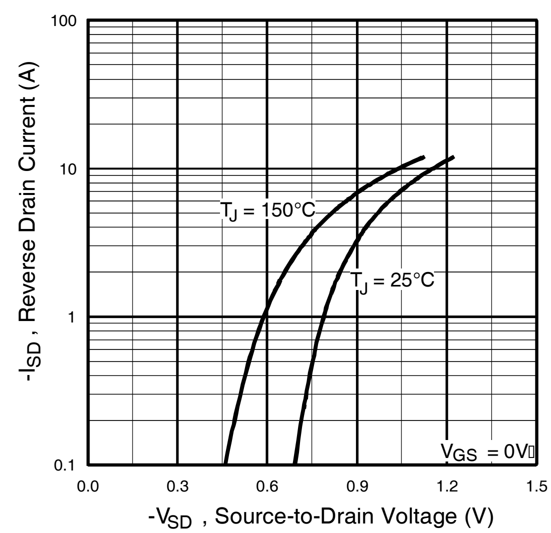



**Fig 14.** Typical Source-Drain Diode Forward Voltage

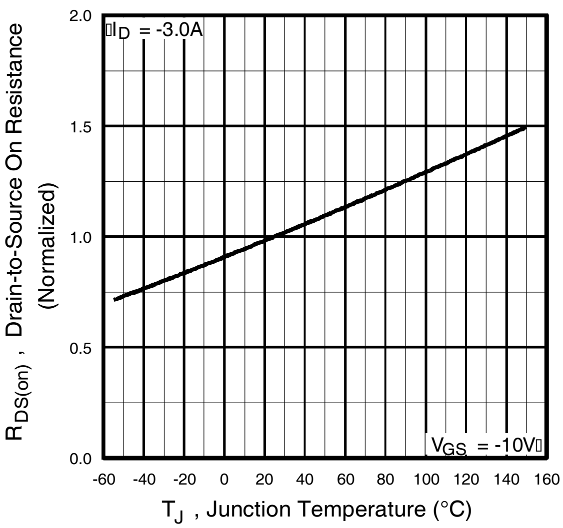



**Fig 15.** Normalized On-Resistance Vs. Temperature

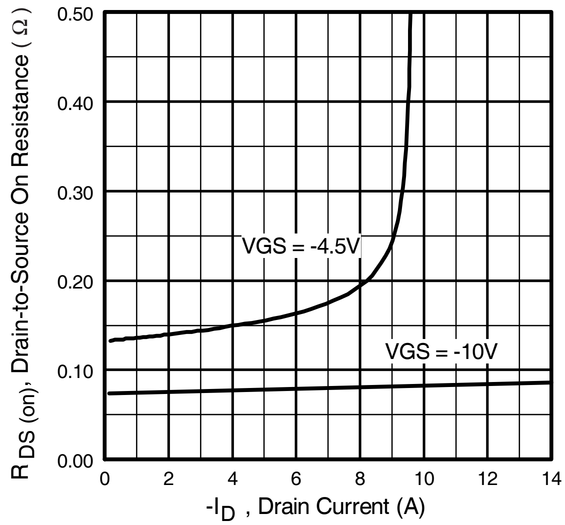



**Fig 16.** Typical On-Resistance Vs. Drain Current

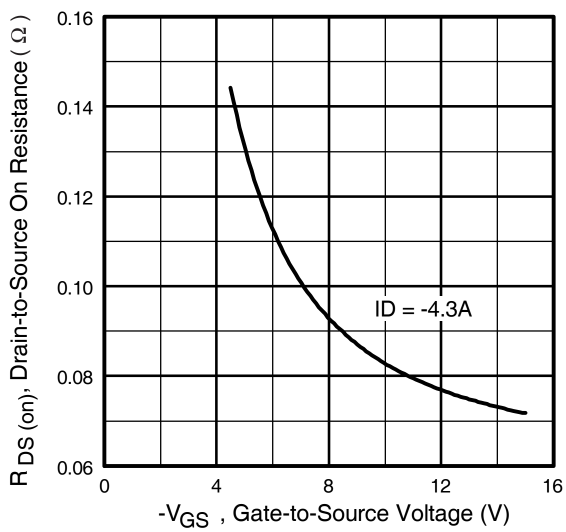



**Fig 17.** Typical On-Resistance Vs. Gate Voltage

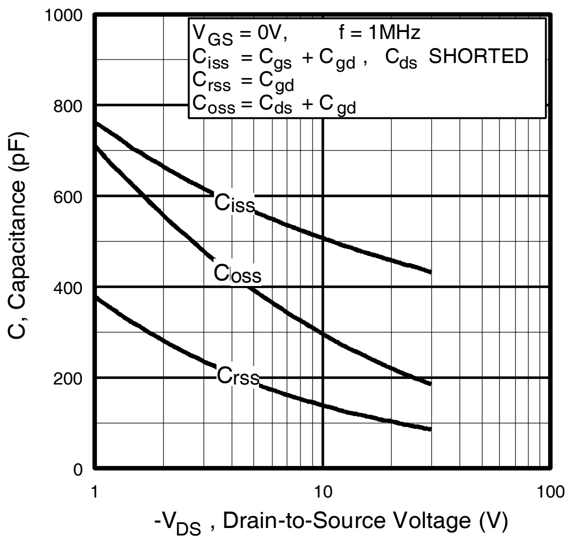



**Fig 18.** Typical Capacitance Vs. Drain-to-Source Voltage

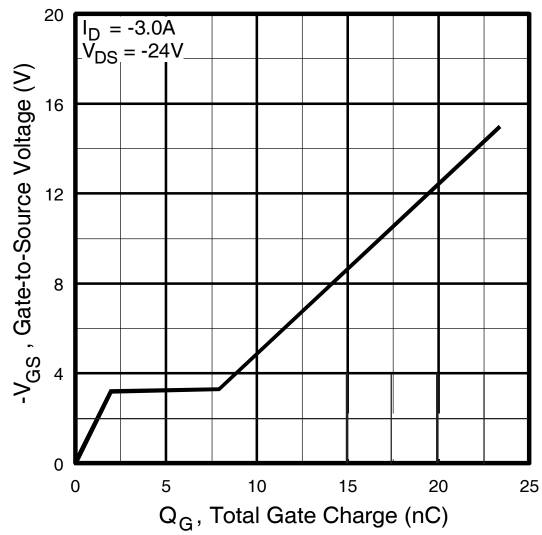



**Fig 19.** Typical Gate Charge Vs. Gate-to-Source Voltage

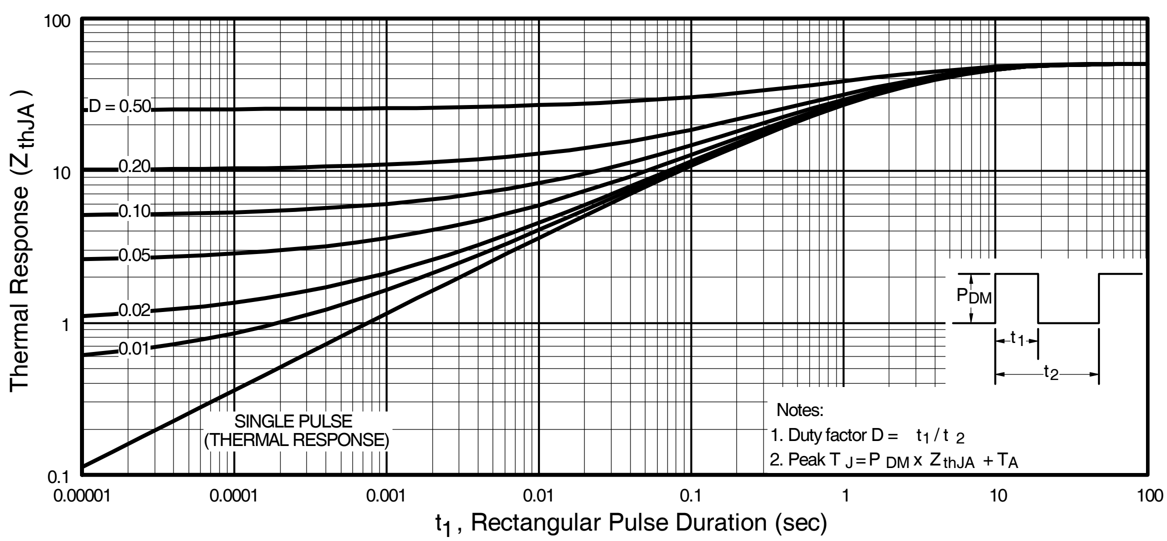
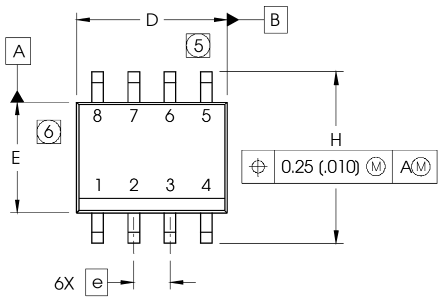


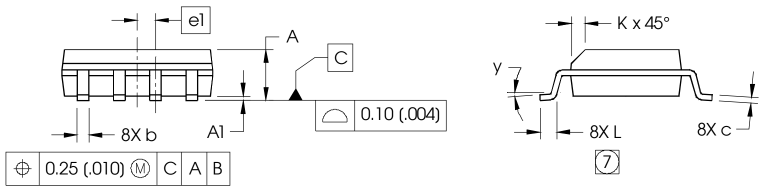

**Fig 20.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

## SO-8 Package Outline

Dimensions are shown in millimeters (inches)

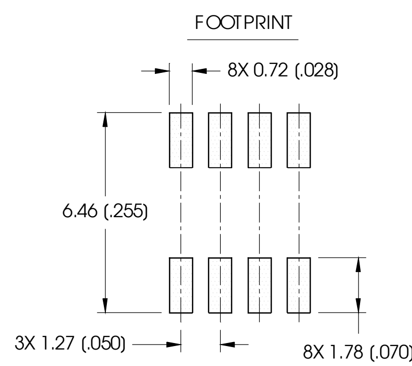



| DIM | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | .0532 | .0688 | 1.35 | 1.75 |
| A1 | .0040 | .0098 | 0.10 | 0.25 |
| b | .013 | .020 | 0.33 | 0.51 |
| c | .0075 | .0098 | 0.19 | 0.25 |
| D | .189 | .1968 | 4.80 | 5.00 |
| E | .1497 | .1574 | 3.80 | 4.00 |
| e | .050 BASIC | | 1.27 BASIC | |
| e 1 | .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° |

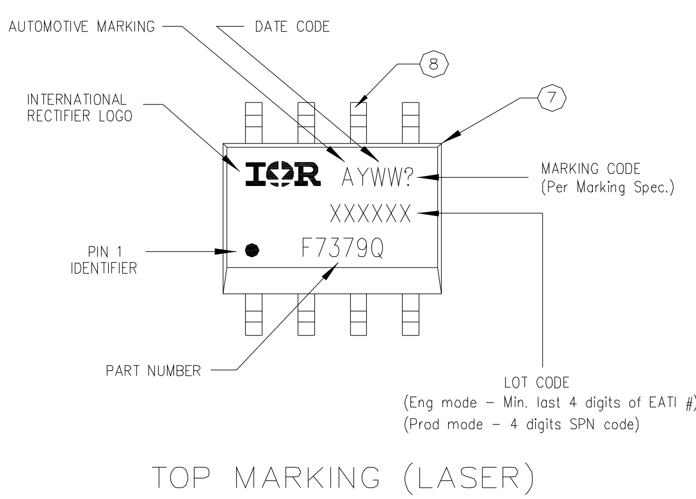



NOTES:

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.



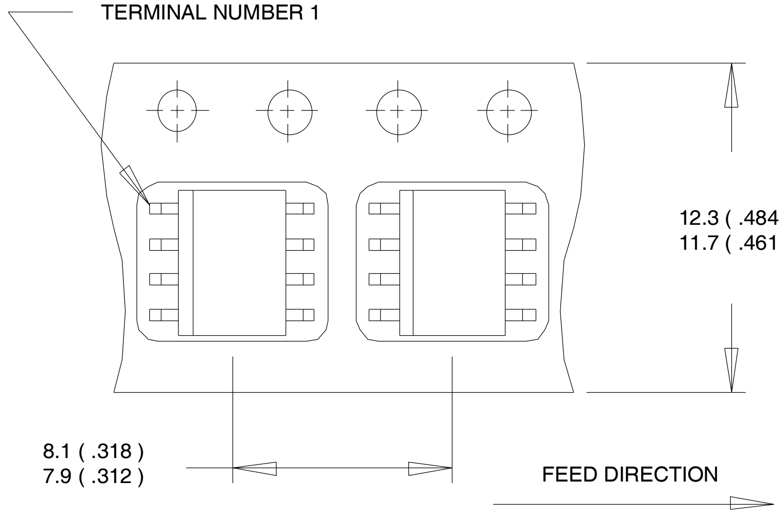

## SO-8 Part Marking



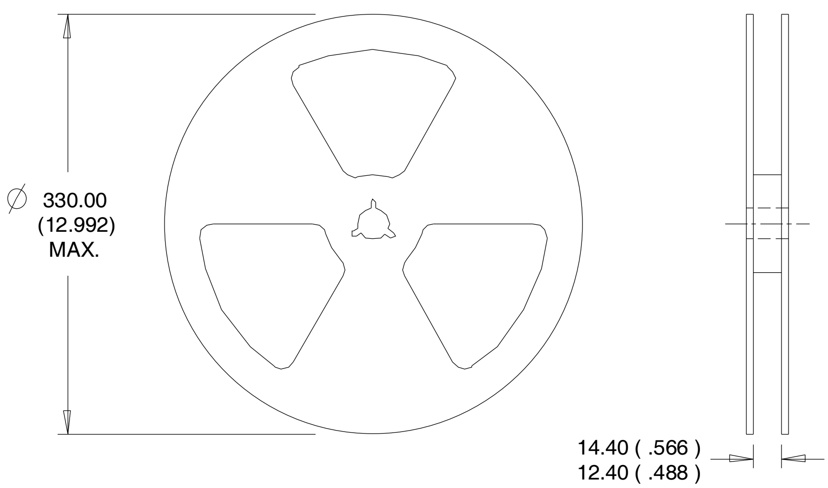

**Note: For the most current drawing please refer to IR website at http://www.irf.com/package/**

## 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.

**Notes:**

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

② N-Channel $I_{SD} \leq 2.4A$, $di/dt \leq 73A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150°C$
P-Channel $I_{SD} \leq -1.8A$, $di/dt \leq 90A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150°C$

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

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

## Ordering Information

| Base part | Package Type | Standard Pack | | Complete Part Number |
|---|---|---|---|---|
| | | Form | Quantity | |
| AUIRF7379Q | SO-8 | Tube | 95 | AUIRF7379Q |
| | | Tape and Reel | 4000 | AUIRF7379QTR |

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For technical support, please contact IR's Technical Assistance Center
http://www.irf.com/technical-info/

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