International Rectifier

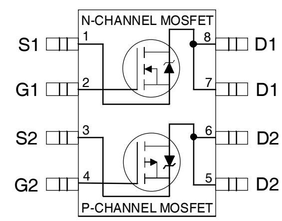
**AUTOMOTIVE MOSFET**

# AUIRF7343Q

HEXFET® Power MOSFET

## Features

- Advanced Planar 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, RoHS Compliant




Top View

| | N-Ch | P-Ch |
|---|---|---|
| $V_{(BR)DSS}$ | 55V | -55V |
| $R_{DS(on)}$ typ. | 0.043Ω | 0.095Ω |
| max. | 0.050Ω | 0.105Ω |
| $I_D$ | 4.7A | -3.4A |

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 | 55 | -55 | V |
| $I_D$ @ $T_A$ = 25°C | Continuous Drain Current, $V_{GS}$ @ 10V | 4.7 | -3.4 | A |
| $I_D$ @ $T_A$ = 70°C | Continuous Drain Current, $V_{GS}$ @ 10V | 3.8 | -2.7 | |
| $I_{DM}$ | Pulsed Drain Current ① | 38 | -27 | |
| $P_D$ @$T_A$ = 25°C | Power Dissipation⑤ | 2.0 | | W |
| $P_D$ @$T_A$ = 70°C | Power Dissipation⑤ | 1.3 | | |
| $E_{AS}$ | Single Pulse Avalanche Energy③ | 72 | 114 | mJ |
| $I_{AR}$ | Avalanche Current | 4.7 | -3.4 | A |
| $E_{AR}$ | Repetitive Avalanche Energy | 0.20 | | mJ |
| $V_{GS}$ | 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 ⑤ | —— | 62.5 | °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 | 55 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| | | P-Ch | -55 | — | — | | $V_{GS}$ = 0V, $I_D$ = -250μA |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | N-Ch | — | 0.059 | — | V/°C | Reference to 25°C, $I_D$ = 1mA |
| | | P-Ch | — | 0.054 | — | | Reference to 25°C, $I_D$ = -1mA |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | N-Ch | — | 0.043 | 0.050 | Ω | $V_{GS}$ = 10V, $I_D$ = 4.7A ④ |
| | | | — | 0.056 | 0.065 | | $V_{GS}$ = 4.5V, $I_D$ = 3.8A ④ |
| | | P-Ch | — | 0.095 | 0.105 | | $V_{GS}$ = -10V, $I_D$ = -3.4A ④ |
| | | | — | 0.150 | 0.170 | | $V_{GS}$ = -4.5V, $I_D$ = -2.7A ④ |
| $V_{GS(th)}$ | Gate Threshold Voltage | N-Ch | 1.0 | — | — | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| | | P-Ch | -1.0 | — | — | | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |
| gfs | Forward Transconductance | N-Ch | 7.9 | — | — | S | $V_{DS}$ = 10V, $I_D$ = 4.5A ④ |
| | | P-Ch | 3.3 | — | — | | $V_{DS}$ = -10V, $I_D$ = -3.1A ④ |
| $I_{DSS}$ | Drain-to-Source Leakage Current | N-Ch | — | — | 2.0 | μA | $V_{DS}$ = 55V, $V_{GS}$ = 0V |
| | | P-Ch | — | — | -2.0 | | $V_{DS}$ = -55V, $V_{GS}$ = 0V |
| | | N-Ch | — | — | 25 | | $V_{DS}$ = 55V, $V_{GS}$ = 0V, $T_J$ = 55°C |
| | | P-Ch | — | — | -25 | | $V_{DS}$ = -55V, $V_{GS}$ = 0V, $T_J$ = 55°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 | — | 24 | 36 | nC | N-Channel<br>$I_D$ = 4.5A $V_{DS}$ = 44V, $V_{GS}$ =10V<br>P-Channel ④<br>$I_D$ = -3.1A $V_{DS}$ = -44V, $V_{GS}$ =-10V |
| | | P-Ch | — | 26 | 38 | | |
| $Q_{gs}$ | Gate-to-Source Charge | N-Ch | — | 2.3 | 3.4 | | |
| | | P-Ch | — | 3.0 | 4.5 | | |
| $Q_{gd}$ | Gate-to-Drain ("Miller") Charge | N-Ch | — | 7.0 | 10 | | |
| | | P-Ch | — | 8.4 | 13 | | |
| $t_{d(on)}$ | Turn-On Delay Time | N-Ch | — | 8.3 | 12 | ns | N-Channel<br>$V_{DD}$ = 28V, ID=1.0A, RG = 6.0Ω<br>$R_D$ = 28Ω<br>P-Channel ④<br>$V_{DD}$ = -28V, ID=-1.0A, RG = 6.0Ω<br>$R_D$ = 28Ω |
| | | P-Ch | — | 14 | 22 | | |
| $t_r$ | Rise Time | N-Ch | — | 3.2 | 4.8 | | |
| | | P-Ch | — | 10 | 15 | | |
| $t_{d(off)}$ | Turn-Off Delay Time | N-Ch | — | 32 | 48 | | |
| | | P-Ch | — | 43 | 64 | | |
| $t_f$ | Fall Time | N-Ch | — | 13 | 20 | | |
| | | P-Ch | — | 22 | 32 | | |
| $C_{iss}$ | Input Capacitance | N-Ch | — | 740 | — | pF | N-Channel<br>VGS = 0V, $V_{DS}$ = 25V, f =1.0Mhz<br>P-Channel<br>VGS = 0V, $V_{DS}$ = -25V, f =1.0Mhz |
| | | P-Ch | — | 690 | | | |
| $C_{oss}$ | Output Capacitance | N-Ch | — | 190 | — | | |
| | | P-Ch | — | 210 | | | |
| $C_{rss}$ | Reverse Transfer Capacitance | N-Ch | — | 71 | — | | |
| | | P-Ch | — | 86 | | | |

### Diode Characteristics

| | Parameter | | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | N-Ch | — | — | 2.0 | A | |
| | | P-Ch | — | — | -2.0 | | |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ① | N-Ch | — | — | 38 | | |
| | | P-Ch | — | — | -27 | | |
| $V_{SD}$ | Diode Forward Voltage | N-Ch | — | 0.70 | 1.2 | V | $T_J$ = 25°C, $I_S$ = 2.0A, $V_{GS}$ = 0V ③ |
| | | P-Ch | — | -0.80 | -1.2 | | $T_J$ = 25°C, $I_S$ = -2.0A, $V_{GS}$ = 0V ③ |
| $t_{rr}$ | Reverse Recovery Time | N-Ch | — | 60 | 90 | ns | N-Channel<br>$T_J$ = 25°C, $I_F$ = 2.0A di/dt = 100A/μs ƒ<br>P-Channel ④<br>$T_J$ = 25°C, $I_F$ = -2.0A di/dt = 100A/μs ƒ |
| | | P-Ch | — | 54 | 80 | | |
| $Q_{rr}$ | Reverse Recovery Charge | N-Ch | — | 120 | 170 | nC | |
| | | P-Ch | — | 85 | 130 | | |

**Notes:**

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 22 )

② N-Channel $I_{SD} \leq$ 4.7A, di/dt ≤ 220A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C
P-Channel $I_{SD} \leq$ -3.4A, di/dt ≤ -150A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C

③ N-Channel Starting $T_J$ = 25°C, L = 6.5mH $R_G$ = 25Ω, $I_{AS}$ = 4.7A.
P-Channel Starting $T_J$ = 25°C, L = 20mH $R_G$ = 25Ω, $I_{AS}$ = -3.4A.

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

⑤ Surface mounted on FR-4 board, t ≤ 10sec.

## 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 | Class M2 (200V)†††<br>(per AEC-Q101-002) | |
| | Human Body Model | Class H1A (500V)†††<br>(per AEC-Q101-001) | |
| | Charged Device Model | Class C5 (1125V)†††<br>(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

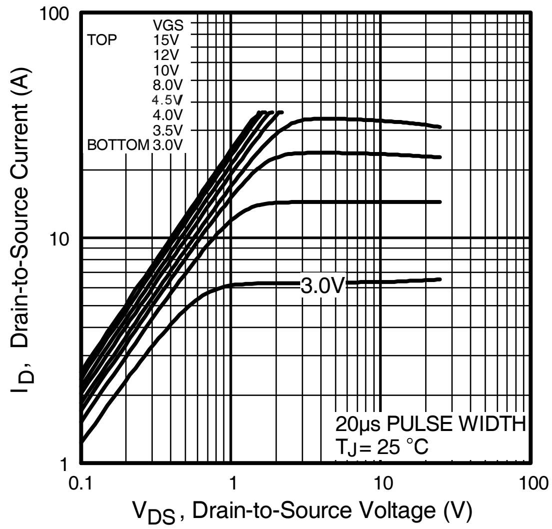



**Fig 1.** Typical Output Characteristics

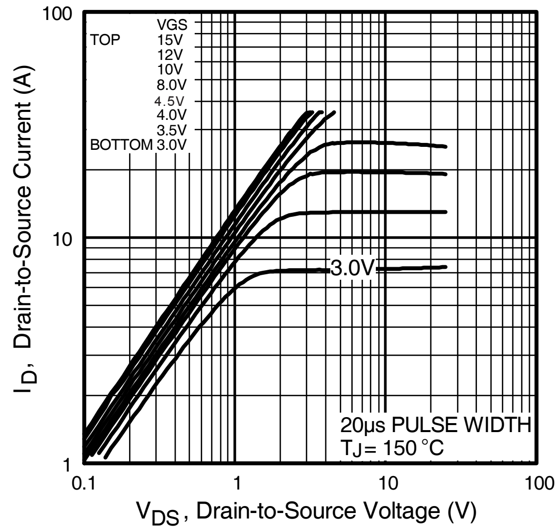



**Fig 2.** Typical Output Characteristics

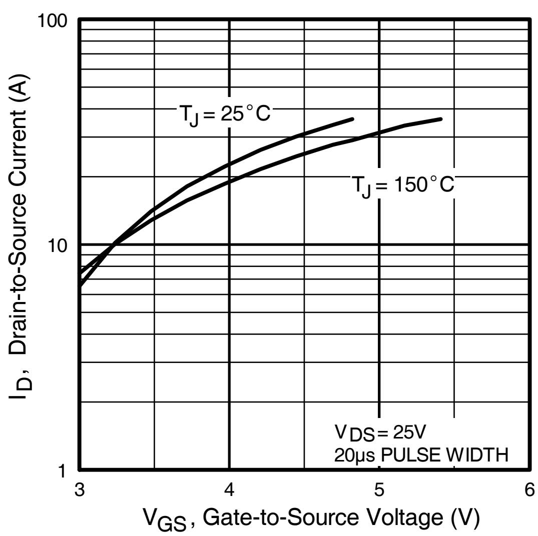



**Fig 3.** Typical Transfer Characteristics

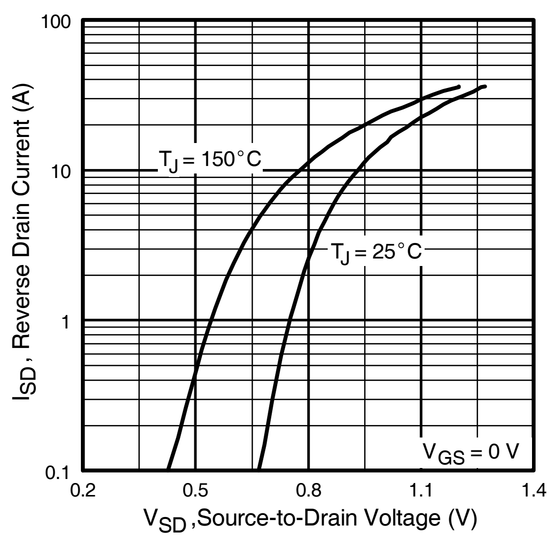



**Fig 4.** Typical Source-Drain Diode Forward Voltage

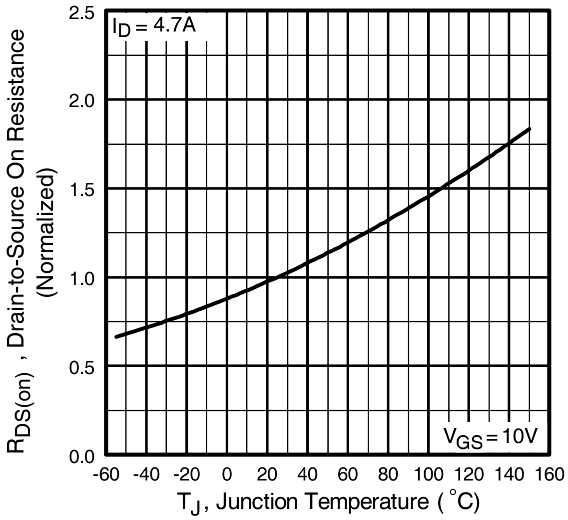



**Fig 5.** Normalized On-Resistance Vs. Temperature

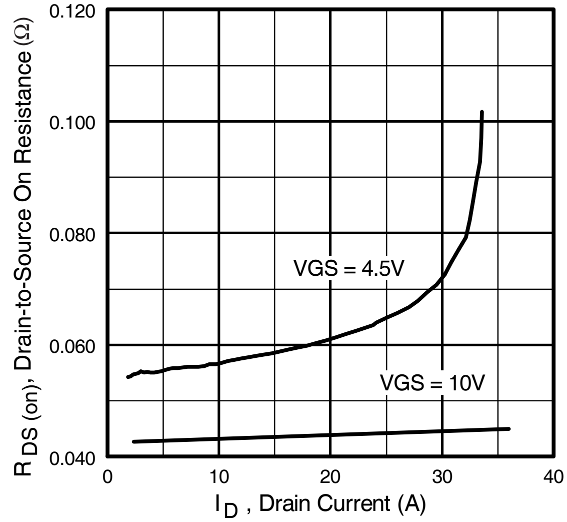



**Fig 6.** Typical On-Resistance Vs. Drain Current

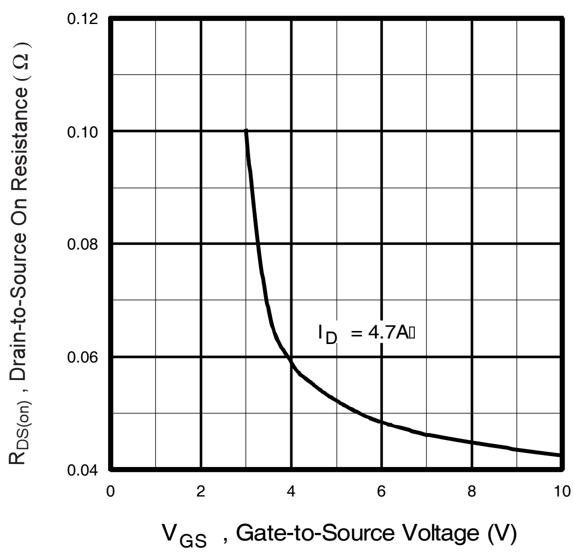



**Fig 7.** Typical On-Resistance Vs. Gate Voltage

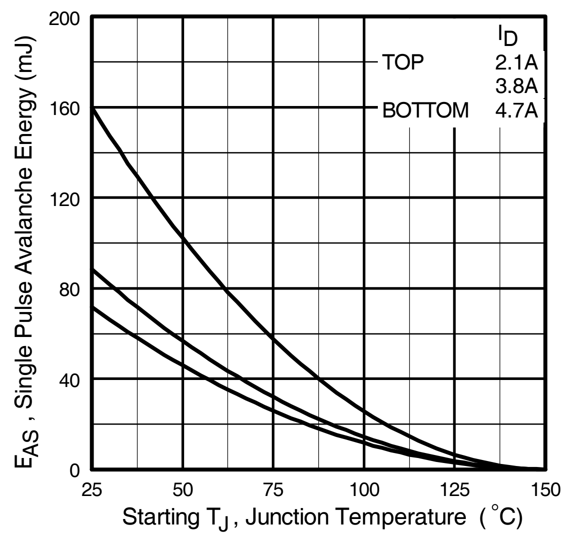



**Fig 8.** Maximum Avalanche Energy Vs. Drain Current

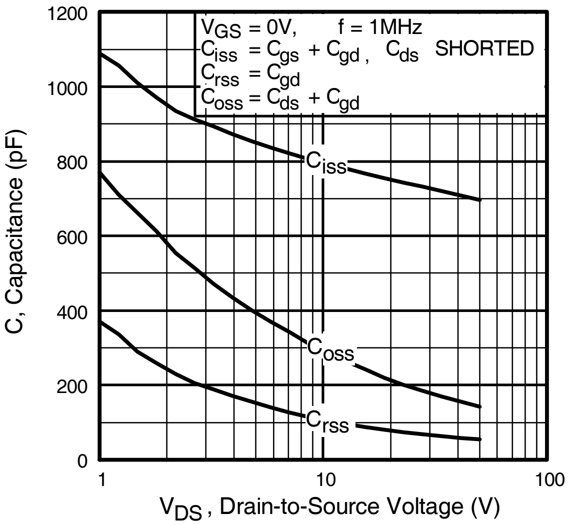



**Fig 9.** Typical Capacitance Vs. Drain-to-Source Voltage

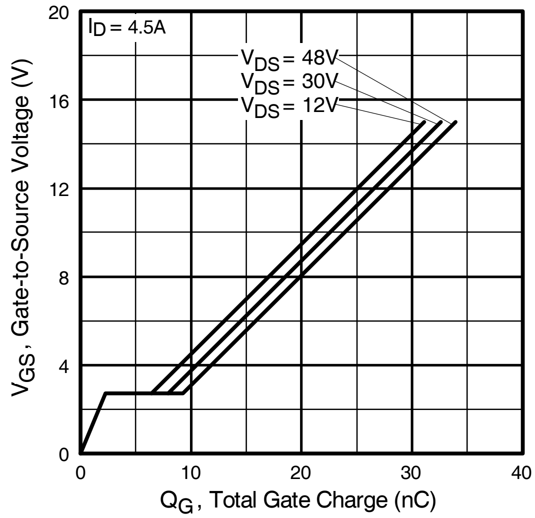



**Fig 10.** Typical Gate Charge Vs. Gate-to-Source Voltage

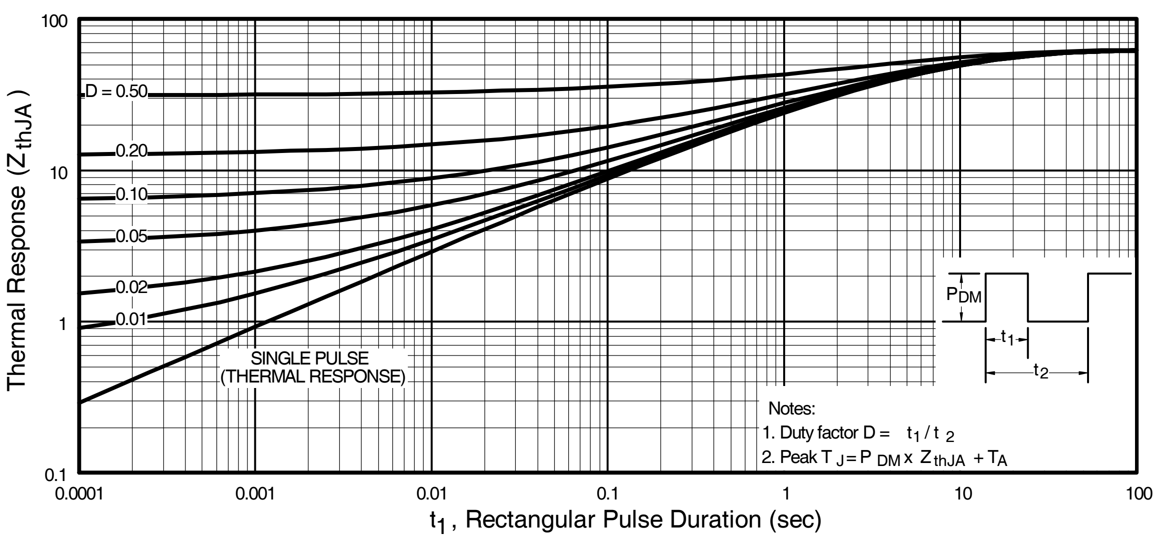



**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

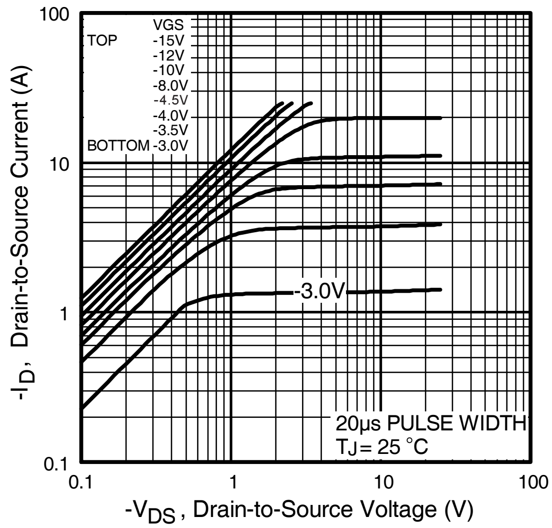



**Fig 12.** Typical Output Characteristics

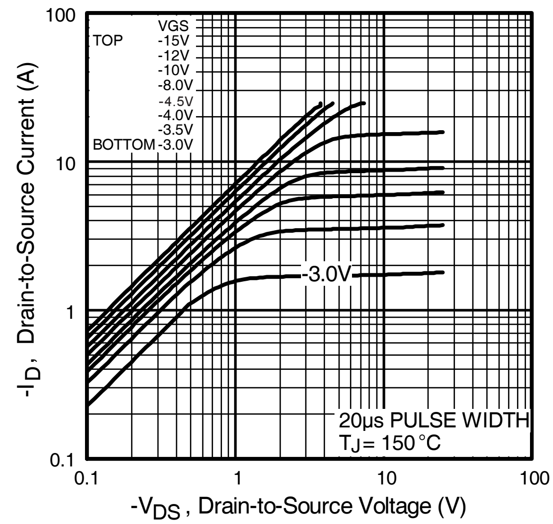



**Fig 13.** Typical Output Characteristics

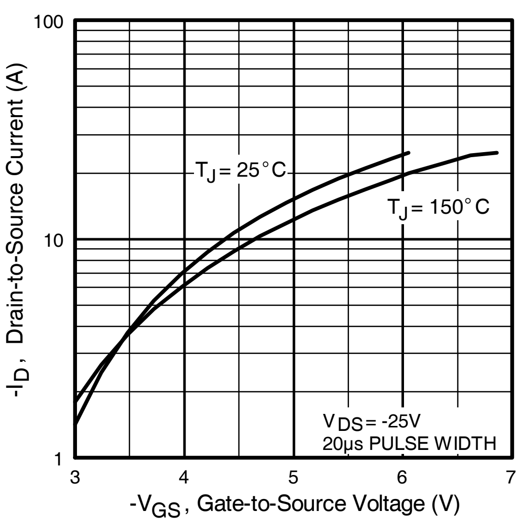



**Fig 14.** Typical Transfer Characteristics

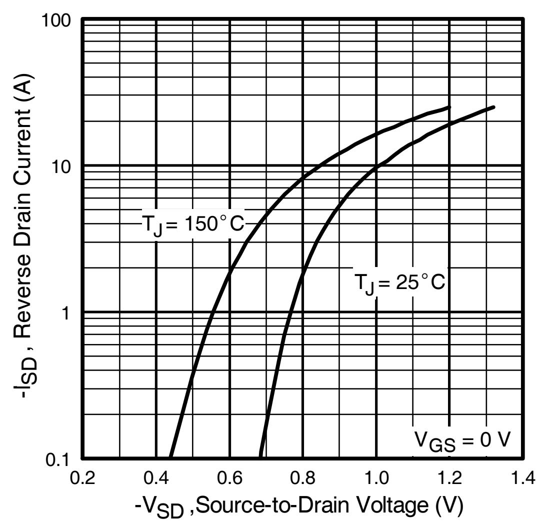



**Fig 15.** Typical Source-Drain Diode Forward Voltage

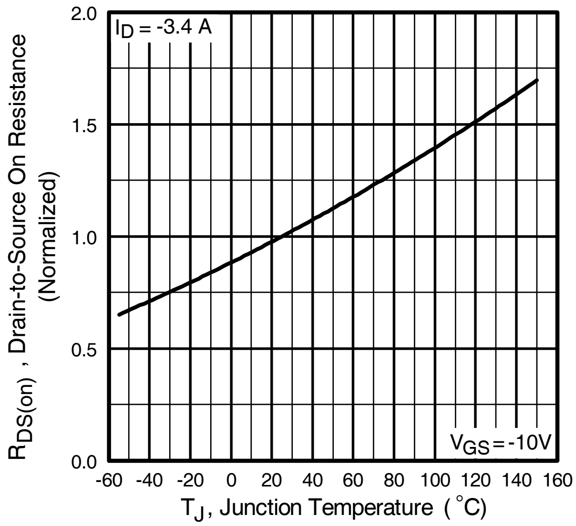



**Fig 16.** Normalized On-Resistance Vs. Temperature

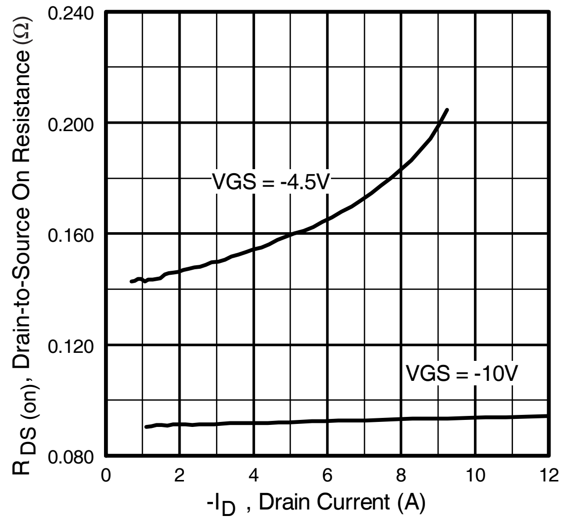



**Fig 17.** Typical On-Resistance Vs. Drain Current

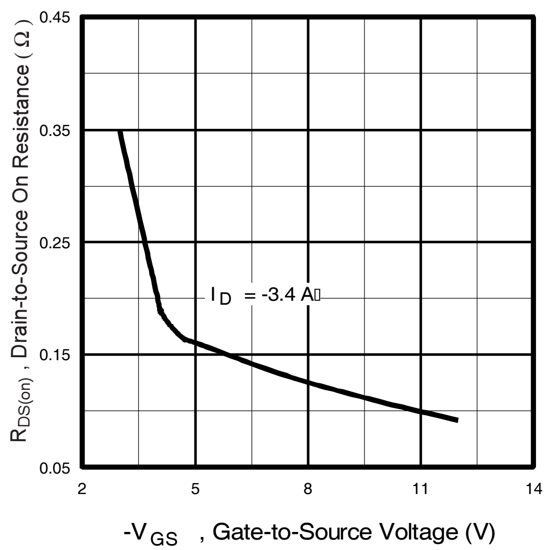



**Fig 18.** Typical On-Resistance Vs. Gate Voltage

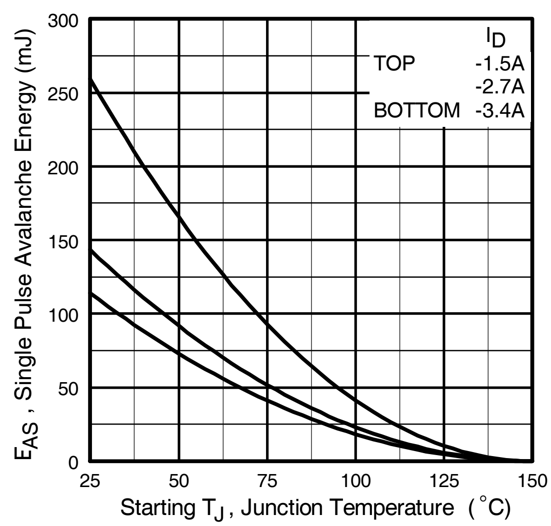



**Fig 19.** Maximum Avalanche Energy Vs. Drain Current

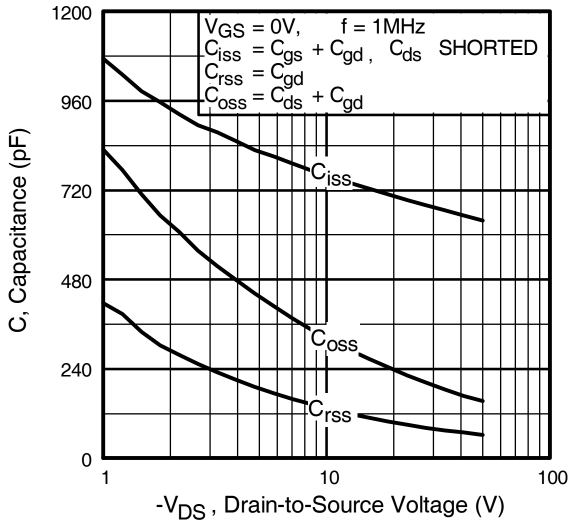



**Fig 20.** Typical Capacitance Vs. Drain-to-Source Voltage

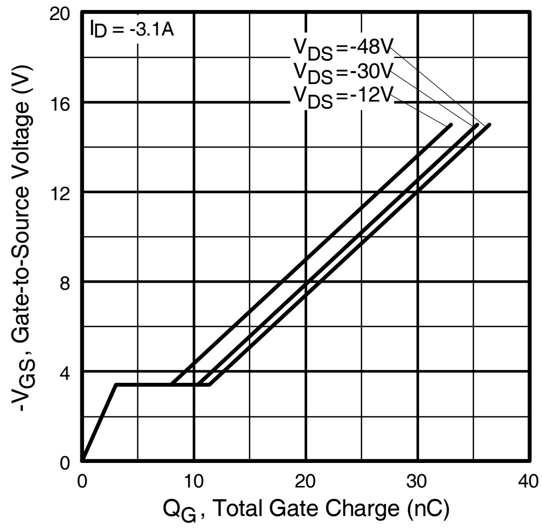



**Fig 21.** Typical Gate Charge Vs. Gate-to-Source Voltage

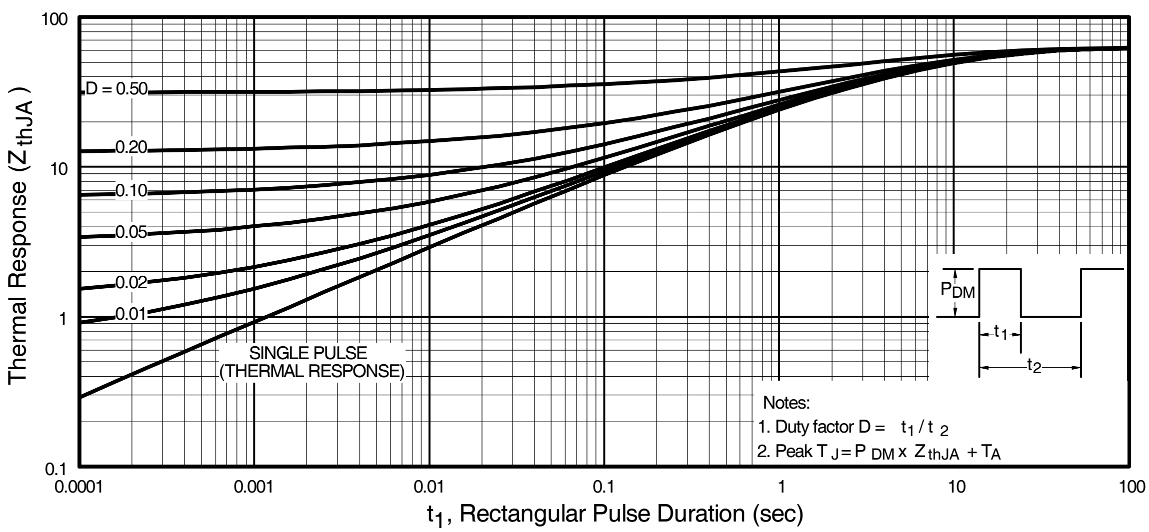
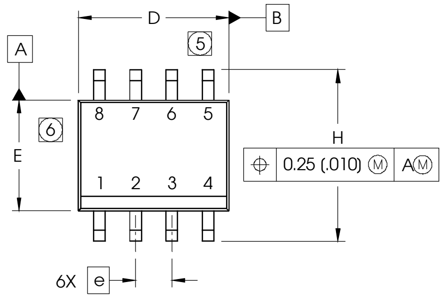


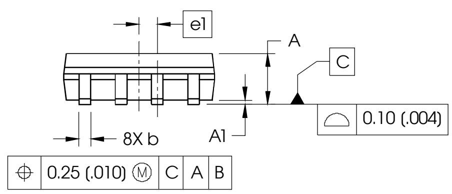

**Fig 22.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

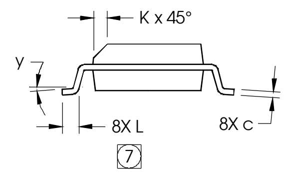
## SO-8 Package Outline

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 | |
| 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:

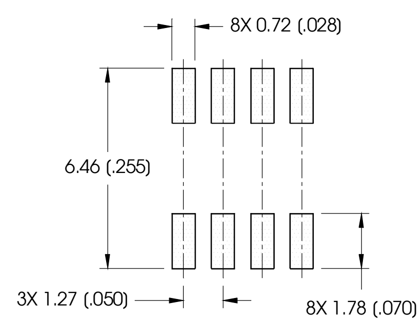
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].

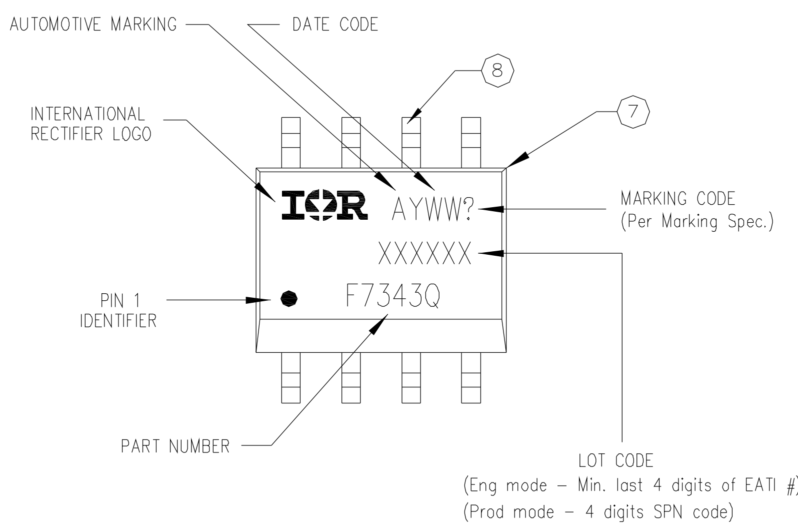
6 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].

7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



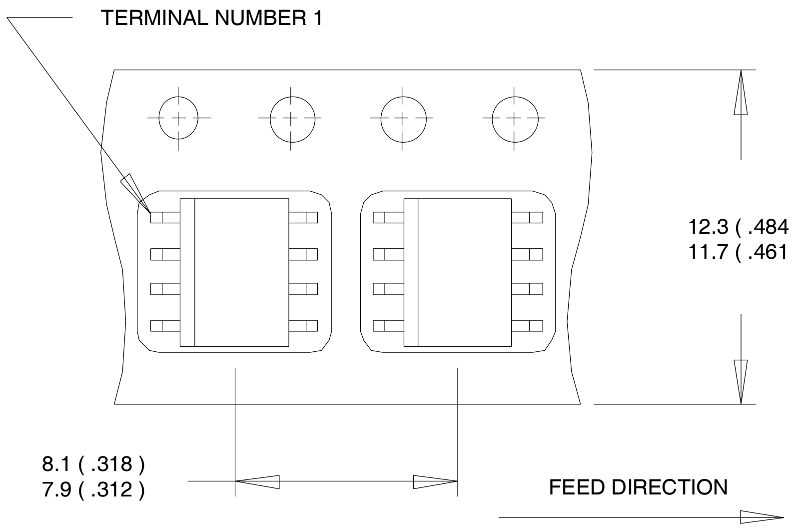

## SO-8 Part Marking



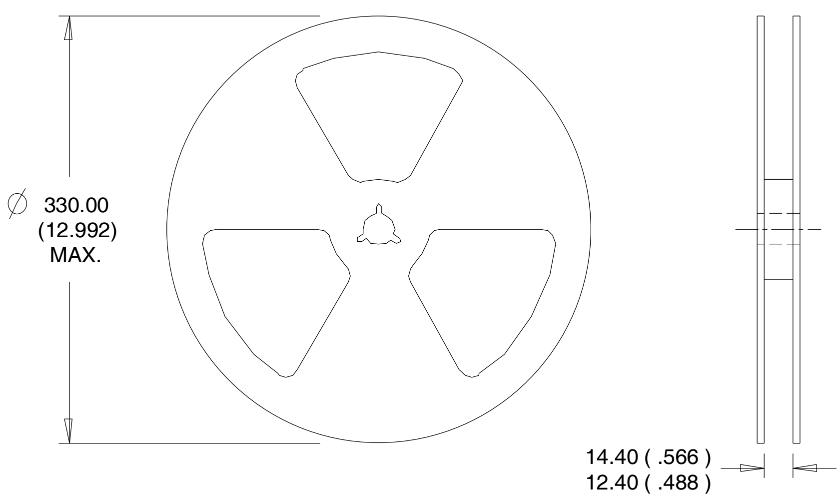

**Note: For the most current drawing please refer to IR website at http://www.irf.com/package/**

## 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.

## Ordering Information

| Base part | Package Type | Standard Pack | | Complete Part Number |
|---|---|---|---|---|
| | | Form | Quantity | |
| AUIRF7343Q | SO-8 | Tube | 95 | AUIRF7343Q |
| | | Tape and Reel | 4000 | AUIRF7343QTR |

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**WORLD HEADQUARTERS:**
101 N. Sepulveda Blvd., El Segundo, California 90245
Tel: (310) 252-7105