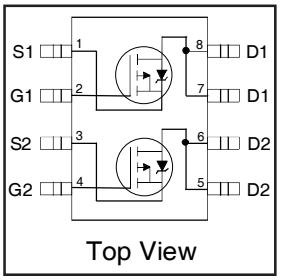
HEXFET® Power MOSFET

Features

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



Top View

$V_{(BR)DSS}$		-30V
$R_{DS(on)}$	typ.	0.042Ω
	max.	0.058Ω
I_D		-4.9A


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.

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF7316Q	SO-8	Tube	95	AUIRF7316Q
		Tape and Reel	4000	AUIRF7316QTR

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
V_{DS}	Drain-Source Voltage	-30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V ⑤	-4.9	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V ⑤	-3.9	
I_{DM}	Pulsed Drain Current ①	-30	
I_S	Continuous Source Current (Diode Conduction)	-2.5	
P_D @T_A = 25°C	Power Dissipation ⑤	2.0	W
P_D @T_A = 70°C	Power Dissipation ⑤	1.3	
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy	140	mJ
I_{AR}	Avalanche Current	-2.8	A
E_{AR}	Repetitive Avalanche Energy	0.20	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ⑤	62.5	°C/W

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*Qualification standards can be found at http://www.irf.com/

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Static Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

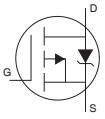
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.022	—	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.042	0.058	Ω	V_{GS} = -10V, I_D = -4.9A ④
		—	0.076	0.098		V_{GS} = -4.5V, I_D = -3.6A④
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	-3.0	V	V_{DS} = V_{GS}, I_D = -250µA
gfs	Forward Transconductance	—	7.7	—	S	V_{DS} = -15V, I_D = -4.9A
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	µA	V_{DS} = -24V, V_{GS} = 0V
		—	—	-25		V_{DS} = -24V, V_{GS} = 0V, T_J = 55°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = 20V

Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	—	23	34	nC	I_D = -4.9A
Q_{gs}	Gate-to-Source Charge	—	3.8	5.7		V_{DS} = -15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	5.9	8.9		V_{GS} = -10V, See Fig.10 ④
$t_{d(on)}$	Turn-On Delay Time	—	13	19	ns	V_{DD} = -15V
t_r	Rise Time	—	13	20		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	—	34	51		R_G = 6.0Ω
t_f	Fall Time	—	32	48		R_D = 15Ω ④
C_{iss}	Input Capacitance	—	710	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	380	—		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	—	180	—		f = 1.0MHz,See Fig.5

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-30		
V_{SD}	Diode Forward Voltage	—	-0.78	-1.0	V	T_J = 25°C, I_S = -1.7A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	44	66	ns	T_J = 25°C,I_F = -1.7A
Q_{rr}	Reverse Recovery Charge	—	42	63	nC	di/dt = 100A/µs④



Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
② Starting T_J = 25°C, L = 35mH, R_G = 25Ω, I_{AS} = -2.8A.
③ I_{SD} ≤ -2.8A, di/dt ≤ 150A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C
④ Pulse width ≤ 300µs; duty cycle ≤ 2%.
⑤ Surface mounted on FR-4 board, t ≤ 10sec.

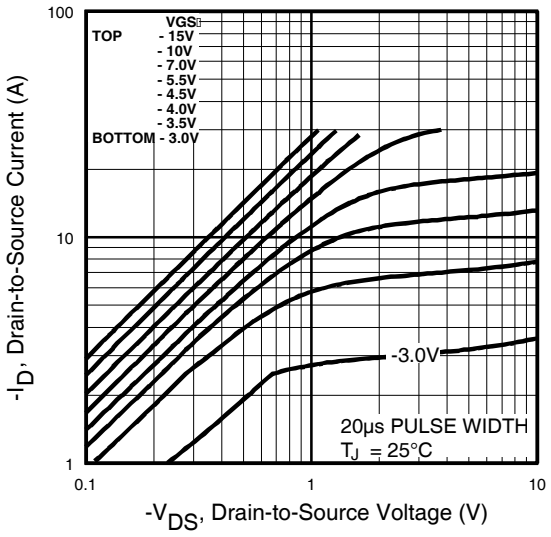


Fig 1. Typical Output Characteristics

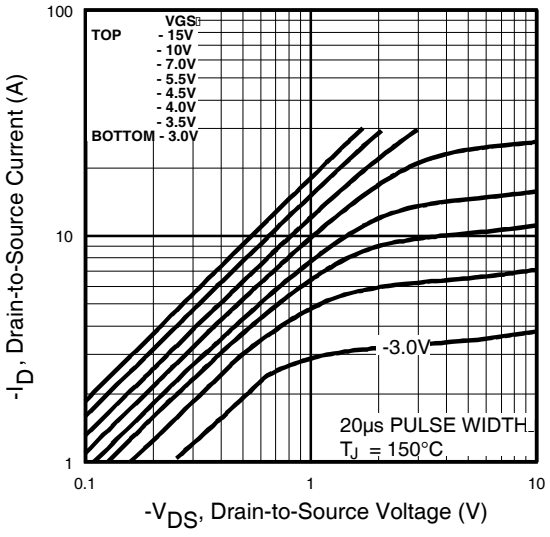


Fig 2. Typical Output Characteristics

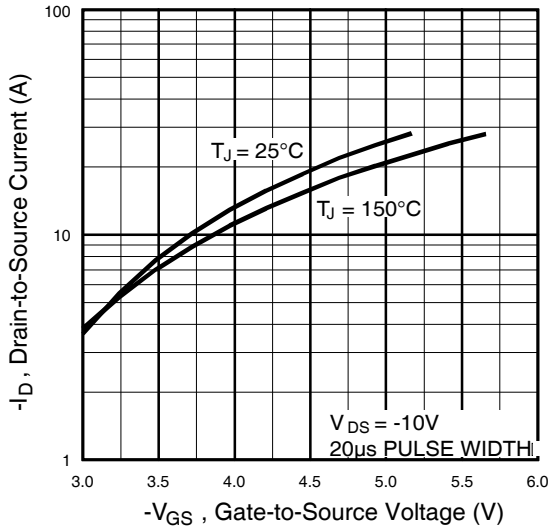


Fig 3. Typical Transfer Characteristics

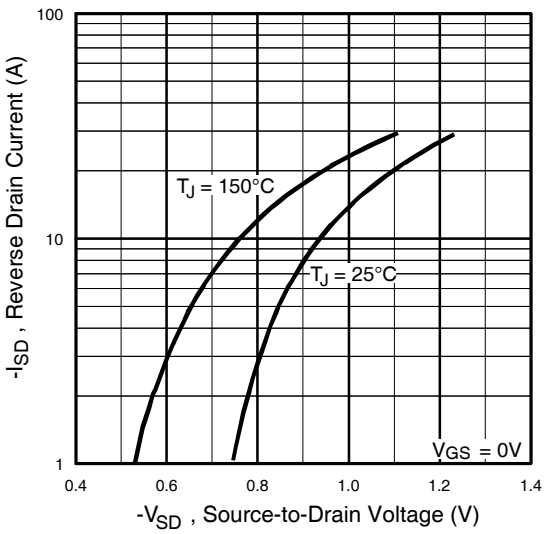


Fig 4. Typical Source-Drain Diode Forward Voltage

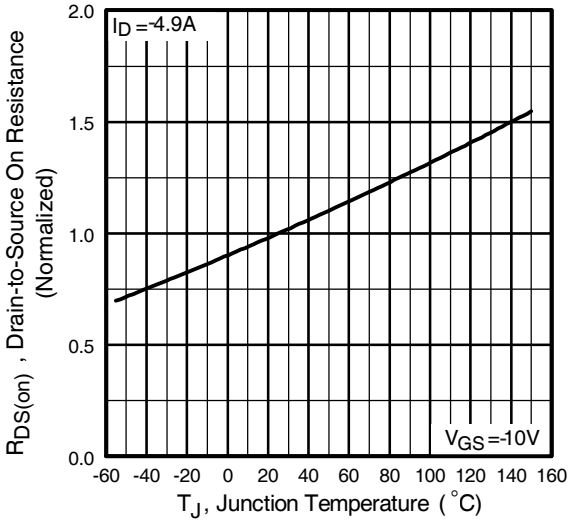


Fig 5. Normalized On-Resistance Vs. Temperature

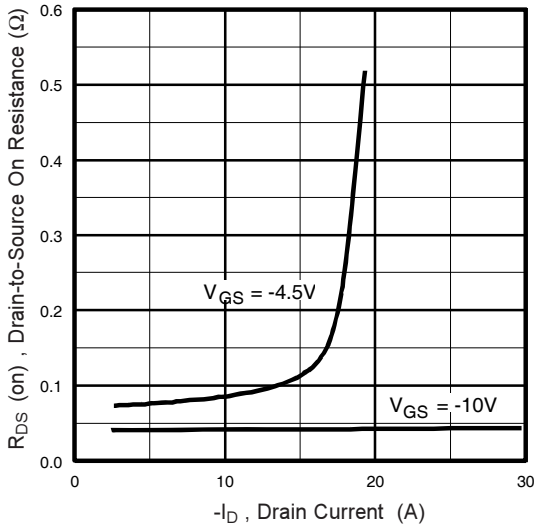


Fig 6. Typical On-Resistance Vs. Drain Current

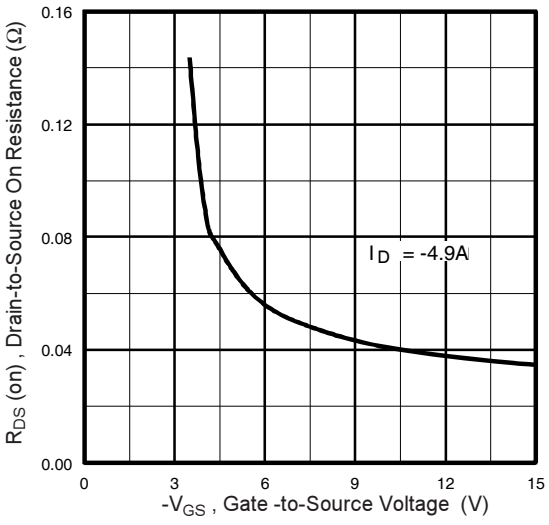


Fig 7. Typical On-Resistance Vs. Gate Voltage

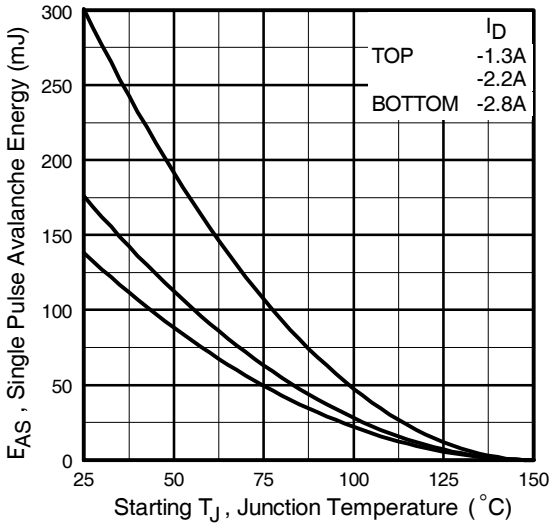


Fig 8. Maximum Avalanche Energy Vs. Drain Current

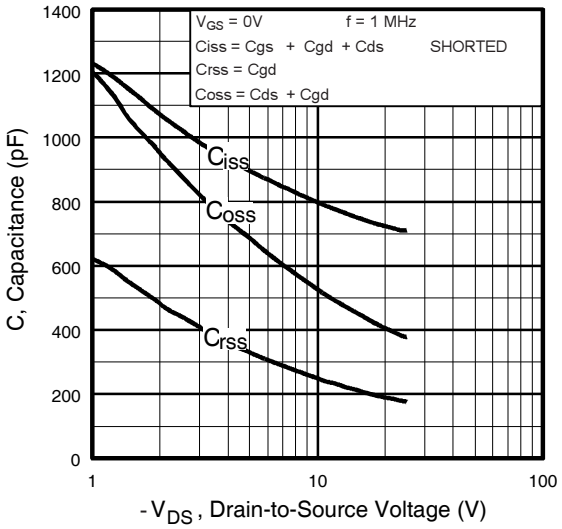


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

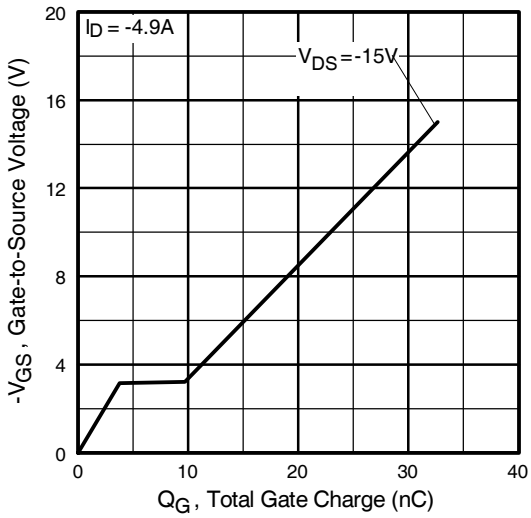


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

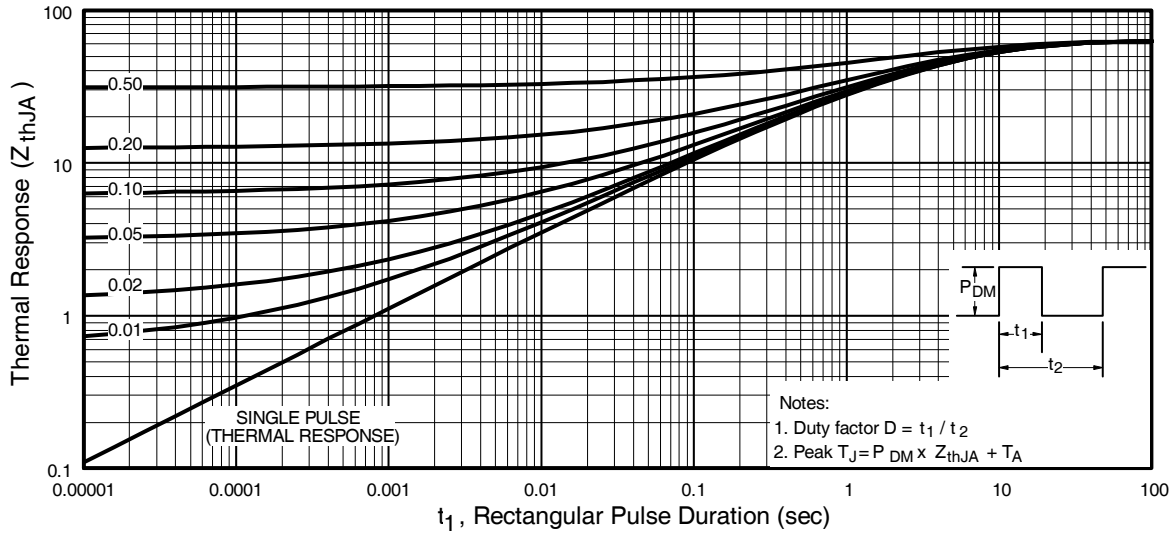
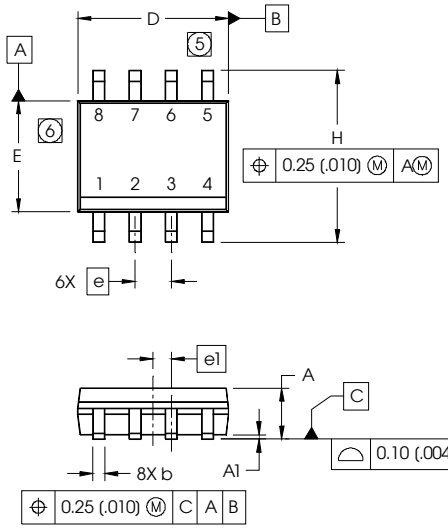


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Outline

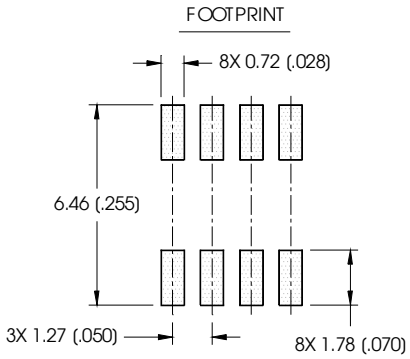
Dimensions are shown in millimeters (inches)



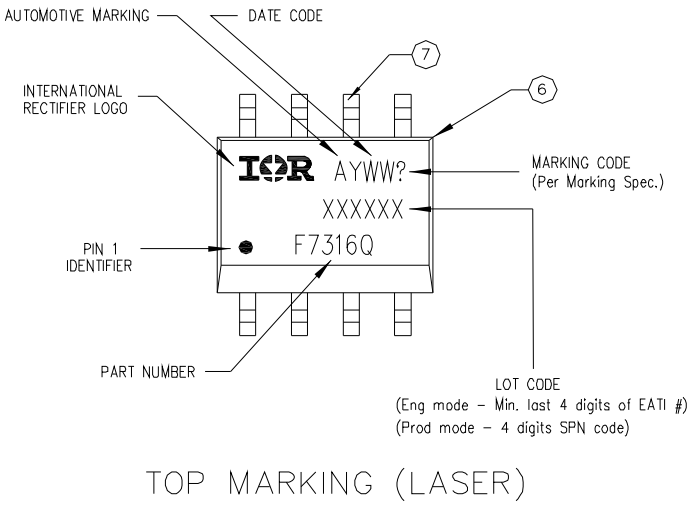
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	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.



SO-8 Part Marking



TOP MARKING (LASER)

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

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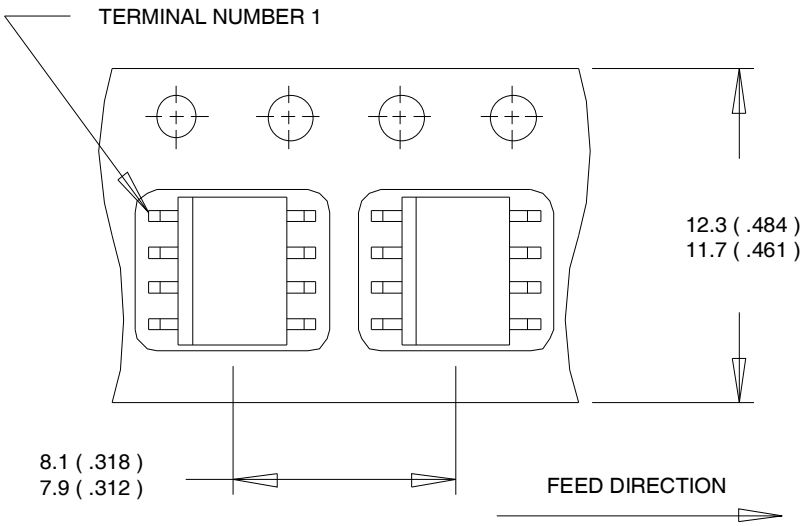
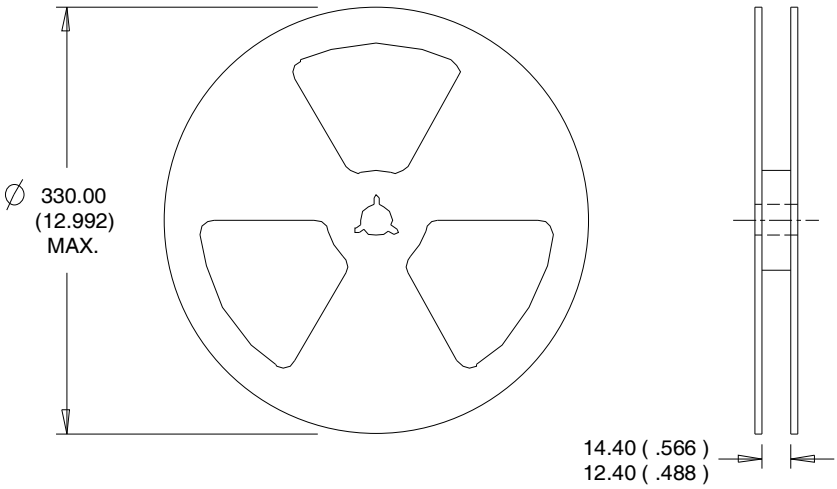
SO-8 Tape and Reel

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

Qualification Information†

Qualification Level		Automotive (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)††† (per AEC-Q101-002)	
	Human Body Model	Class H1A(+/- 500V)††† (per AEC-Q101-001)	
	Charged Device Model	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

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http://www.irf.com/technical-info/

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Revision History

Date	Comments
3/27/2014	• Added "Logic Level Gate Drive" bullet in the features section on page 1 • Updated part marking on page 6 • Updated data sheet with new IR corporate template