International
IOR Rectifier

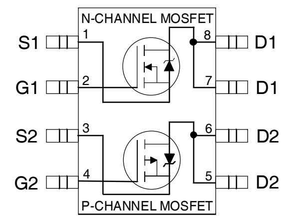
AUTOMOTIVE MOSFET

PD - 96364

AUIRF7319Q

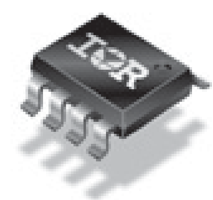
HEXFET® Power MOSFET

Features
- Advanced Planar Technology
- Low On-Resistance
- Dual N and P Channel MOSFET
- Surface Mount
- Fully Avalanche Rated
- Automotive [Q101] Qualified*
- Lead-Free, RoHS Compliant



Top View

	N-Ch	P-Ch
$V_{(BR)DSS}$	30V	-30V
$R_{DS(on)}$ typ.	0.023Ω	0.042Ω
max.	0.029Ω	0.058Ω
I_D	5.8A	-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.

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	6.5	-4.9	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	5.2	-3.9	
I_{DM}	Pulsed Drain Current ①	30	-30	
I_S	Continuous Source Current(diode Conduction)	2.5	-2.5	
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	82	140	mJ
I_{AR}	Avalanche Current	4.0	-2.8	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 T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150		°C

Thermal Resistance

	Parameter	Typ.	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/

04/01/11

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	—	0.022	—	V/°C	Reference to 25°C, I_D = 1mA
		P-Ch	—	0.022	—		Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	N-Ch	—	0.023	0.029	Ω	V_{GS} = 10V, I_D = 5.8A ④
			—	0.032	0.046		V_{GS} = 4.5V, I_D = 4.7A ④
		P-Ch	—	0.042	0.058		V_{GS} = -10V, I_D = -4.9A ④
			—	0.076	0.098		V_{GS} = -4.5V, I_D = -3.6A ④
$V_{GS(th)}$	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	—	14	—	S	V_{DS} = 15V, I_D = 5.8A ④
		P-Ch	—	7.7	—		V_{DS} = -15V, I_D = -4.9A ④
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 = 55°C
		P-Ch	—	—	-25		V_{DS} = -24V, 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	—	22	33	nC	N-Channel
		P-Ch	—	23	34		I_D = 5.8A V_{DS} = 15V, V_{GS} =10V
Q_{gs}	Gate-to-Source Charge	N-Ch	—	2.6	3.9		
		P-Ch	—	3.8	5.7		P-Channel ④
Q_{gd}	Gate-to-Drain ("Miller") Charge	N-Ch	—	6.4	9.6		I_D = -4.9A V_{DS} = -15V, V_{GS} =-10V
		P-Ch	—	5.9	8.9		
$t_{d(on)}$	Turn-On Delay Time	N-Ch	—	8.1	12	ns	N-Channel
		P-Ch	—	13	19		V_{DD} = 15V, ID=1.0A, RG = 6.0Ω
t_r	Rise Time	N-Ch	—	8.9	13		R_D = 15Ω
		P-Ch	—	13	20		P-Channel ④
$t_{d(off)}$	Turn-Off Delay Time	N-Ch	—	26	39		V_{DD} = -15V, ID=-1.0A, RG = 6.0Ω
		P-Ch	—	34	51		R_D = 15Ω
t_f	Fall Time	N-Ch	—	17	26		
		P-Ch	—	32	48		
C_{iss}	Input Capacitance	N-Ch	—	650	—	pF	N-Channel
		P-Ch	—	710	—		VGS = 0V, V_{DS} = 25V, f =1.0Mhz
C_{oss}	Output Capacitance	N-Ch	—	320	—		
		P-Ch	—	380	—		P-Channel
C_{rss}	Reverse Transfer Capacitance	N-Ch	—	130	—		VGS = 0V, V_{DS} = -25V, f =1.0Mhz
		P-Ch	—	180	—		

Diode Characteristics

	Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current	N-Ch	—	—	2.5	A	
	(Body Diode)	P-Ch	—	—	-2.5		
I_{SM}	Pulsed Source Current	N-Ch	—	—	30		
	(Body Diode) ①	P-Ch	—	—	-30		
V_{SD}	Diode Forward Voltage	N-Ch	—	0.78	1.0	V	T_J = 25°C, I_S = 1.7A, V_{GS} = 0V ③
		P-Ch	—	-0.78	-1.0		T_J = 25°C, I_S = -1.7A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	N-Ch	—	45	68	ns	N-Channel
		P-Ch	—	44	66		T_J = 25°C, I_F = 1.7A di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	N-Ch	—	58	87	nC	P-Channel ④
		P-Ch	—	42	63		T_J = 25°C, I_F = -1.7A di/dt = 100A/μs

Notes ① through ⑤ are on page 10

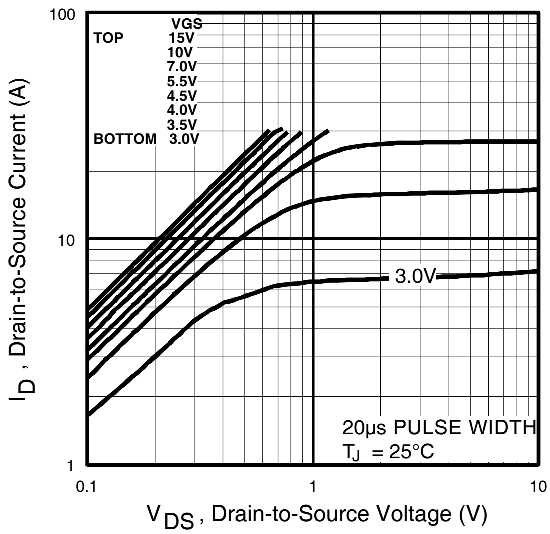


Fig 1. Typical Output Characteristics

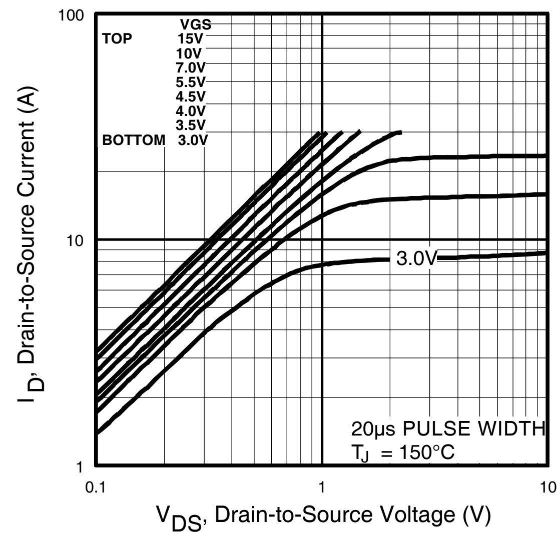


Fig 2. Typical Output Characteristics

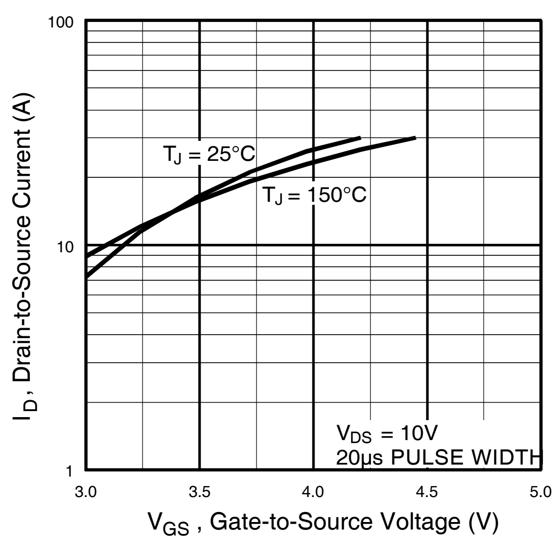


Fig 3. Typical Transfer Characteristics

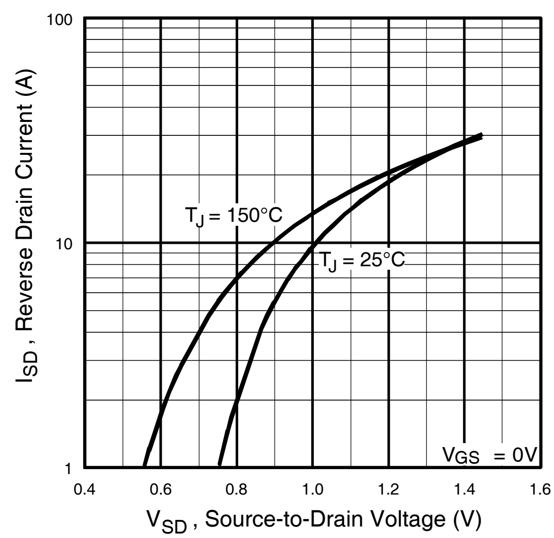


Fig 4. Typical Source-Drain Diode Forward Voltage

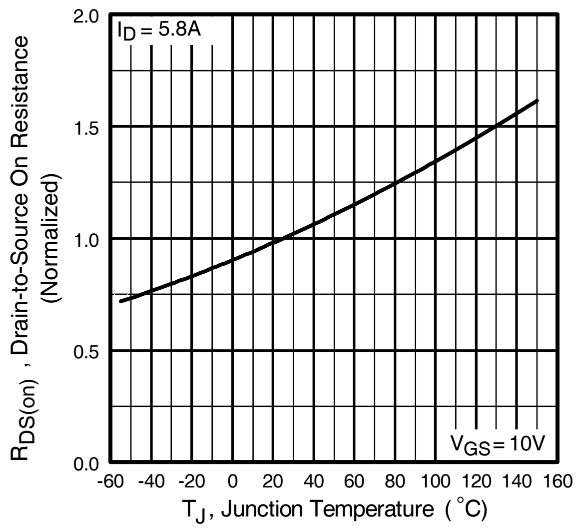


Fig 5. Normalized On-Resistance Vs. Temperature

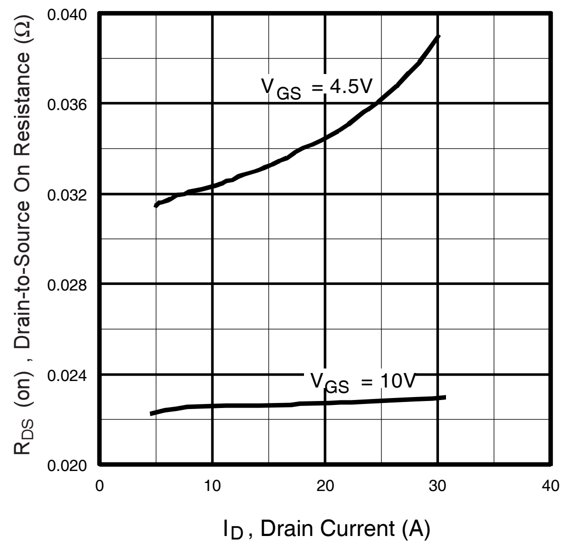


Fig 6. Typical On-Resistance Vs. Drain Current

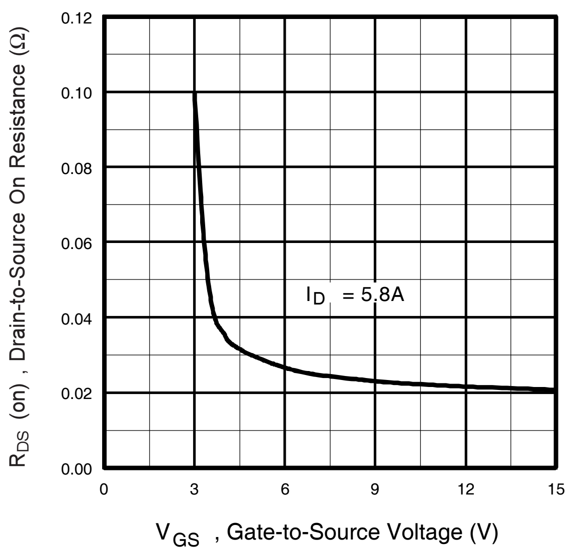


Fig 7. Typical On-Resistance Vs. Gate Voltage

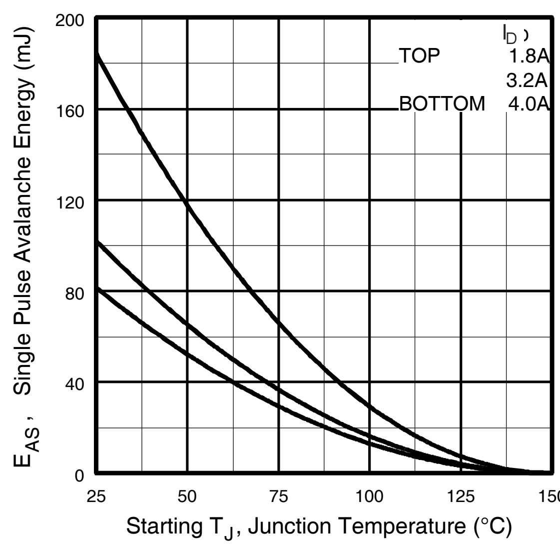


Fig 8. Maximum Avalanche Energy Vs. Drain Current

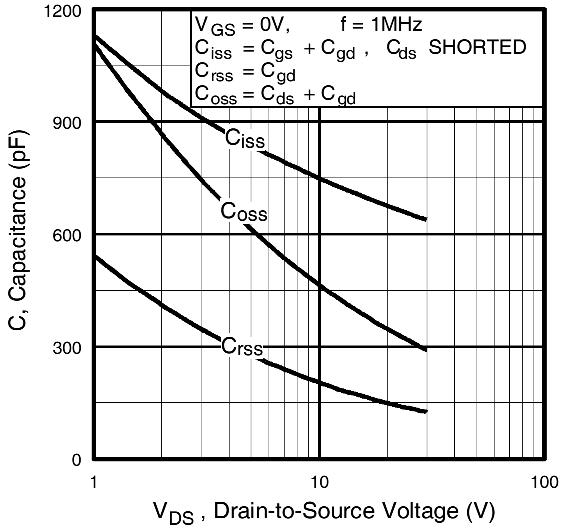


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

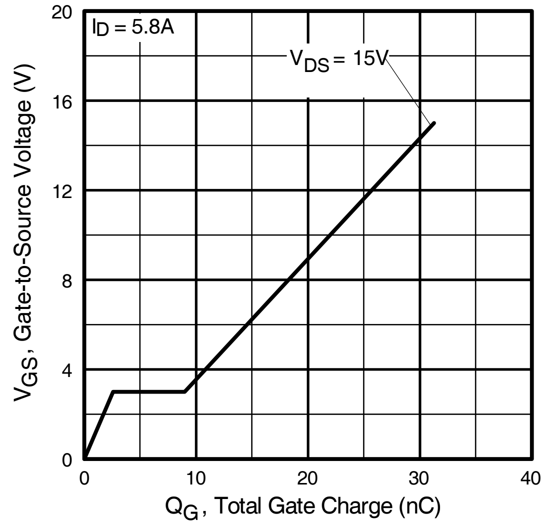


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

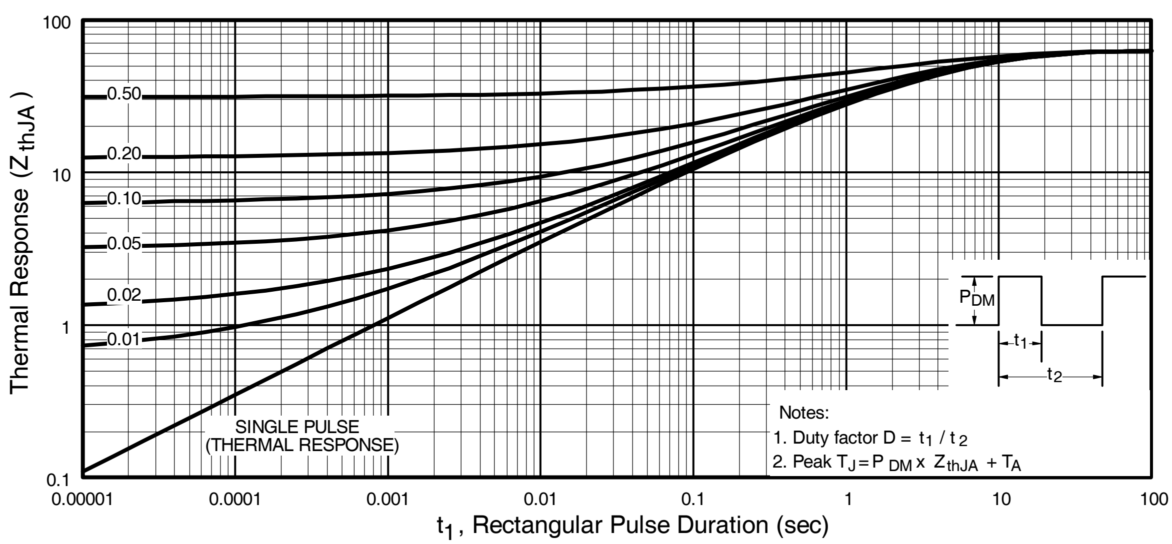


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

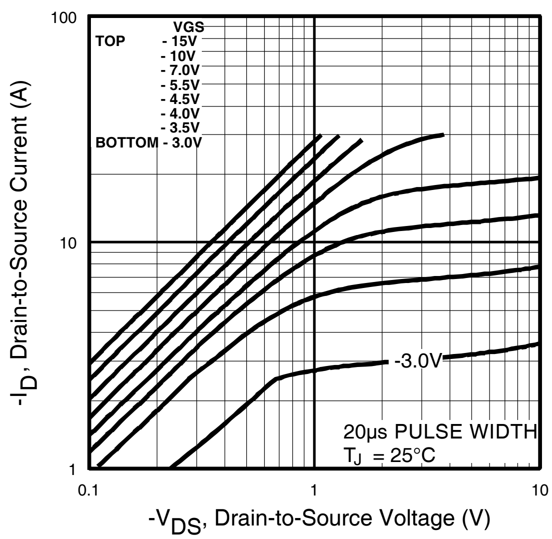


Fig 12. Typical Output Characteristics

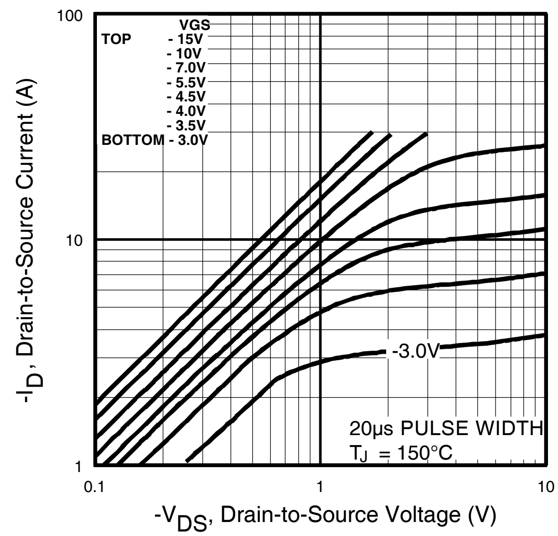


Fig 13. Typical Output Characteristics

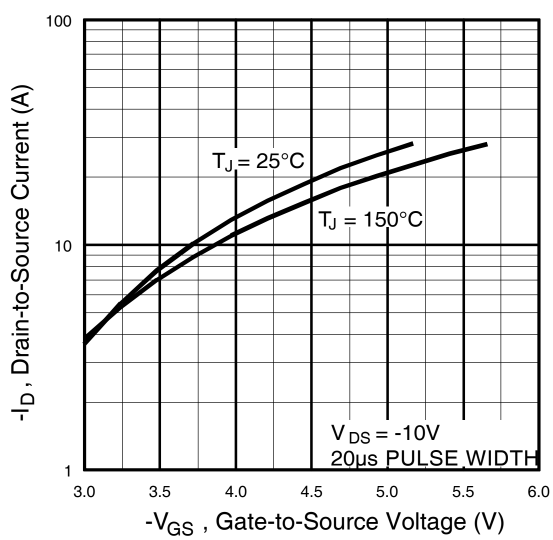


Fig 14. Typical Transfer Characteristics

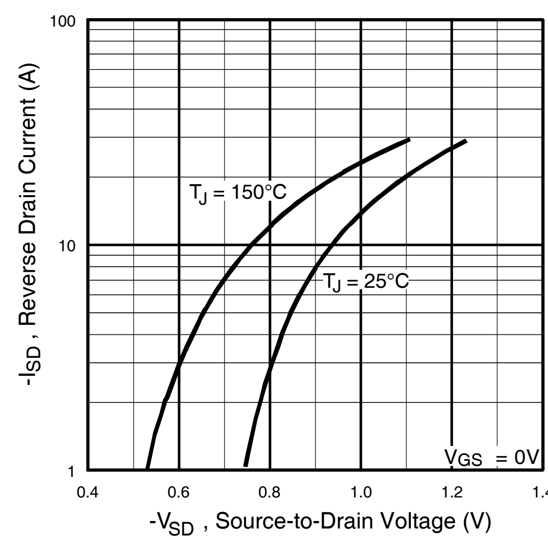


Fig 15. Typical Source-Drain Diode Forward Voltage

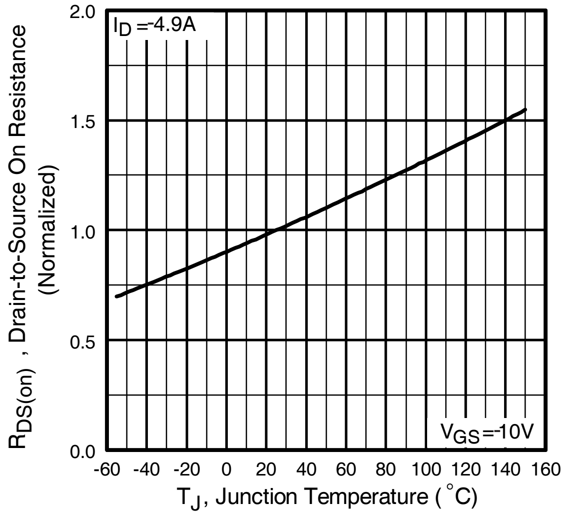


Fig 16. Normalized On-Resistance Vs. Temperature

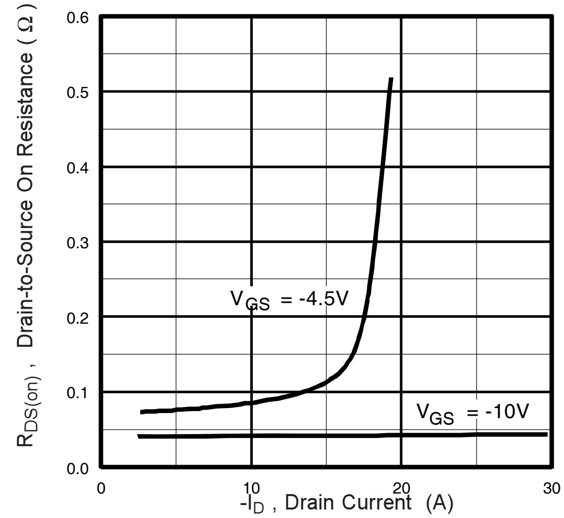


Fig 17. Typical On-Resistance Vs. Drain Current

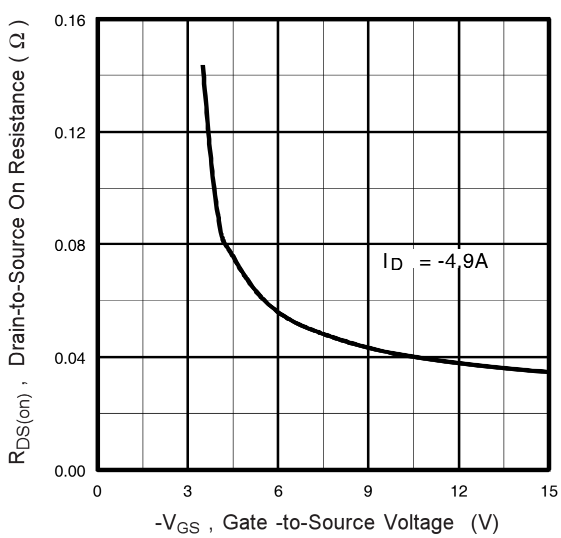


Fig 18. Typical On-Resistance Vs. Gate Voltage

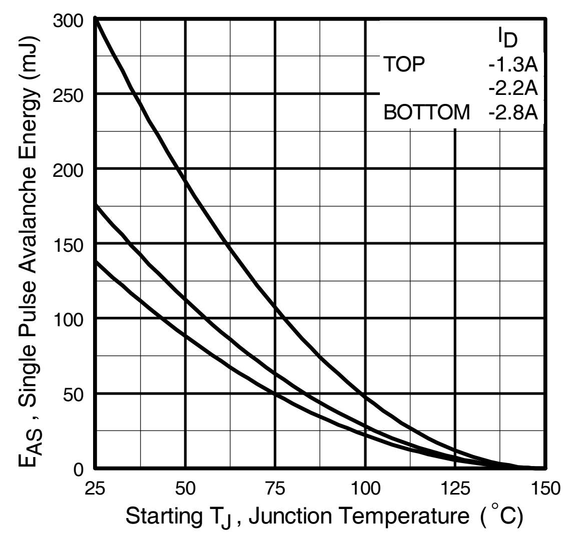


Fig 19. Maximum Avalanche Energy Vs. Drain Current

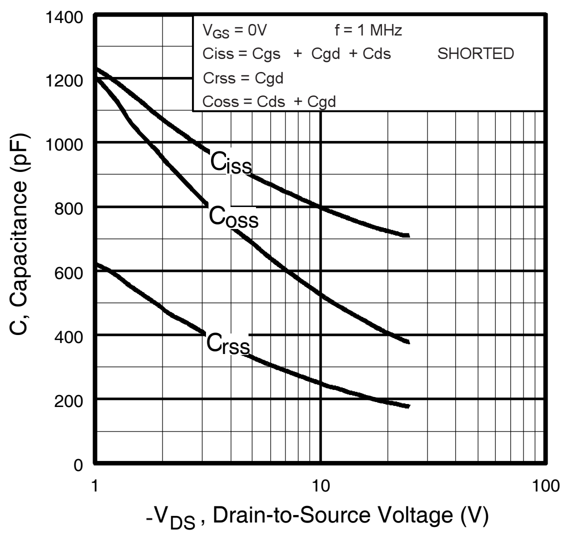


Fig 20. Typical Capacitance Vs. Drain-to-Source Voltage

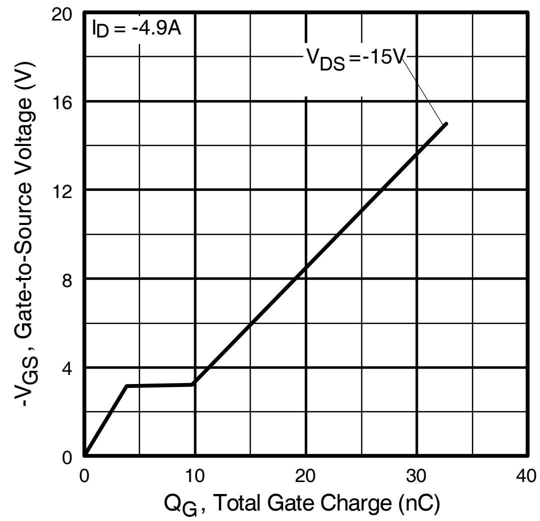


Fig 21. Typical Gate Charge Vs. Gate-to-Source Voltage

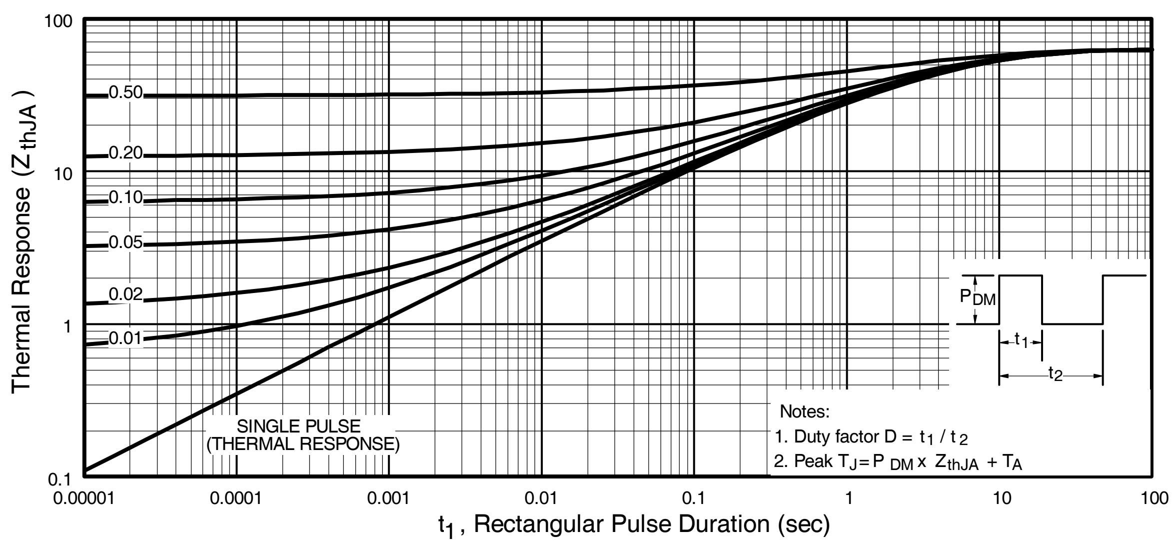
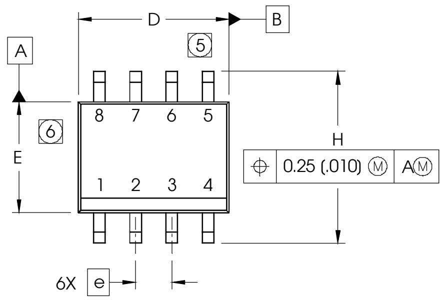


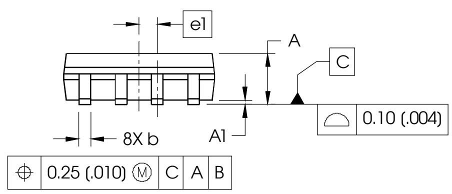
Fig 22. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

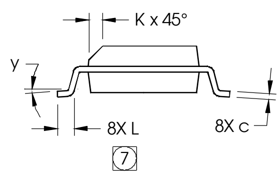
SO-8 Package Outline

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°





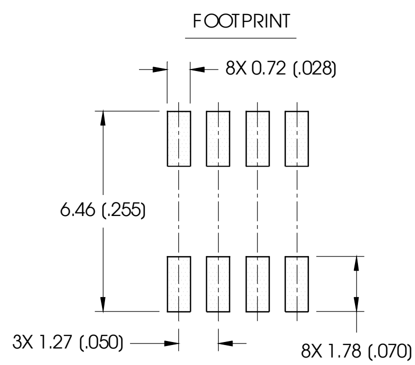
NOTES:

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.

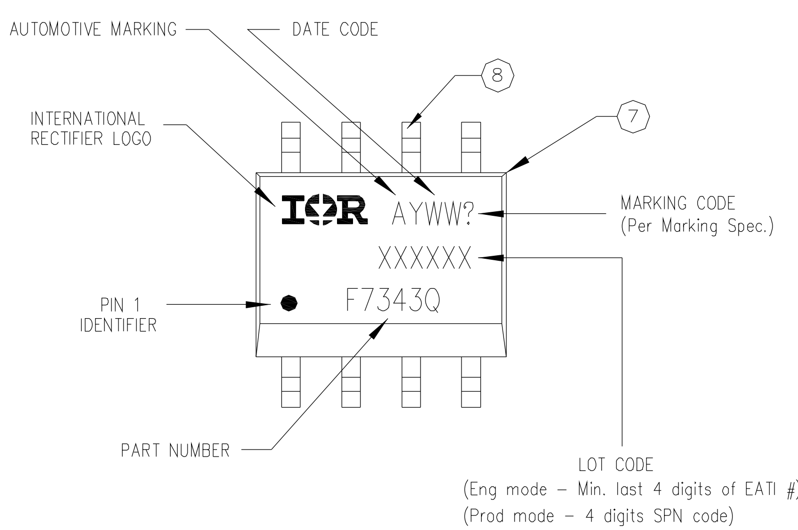
5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].

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.



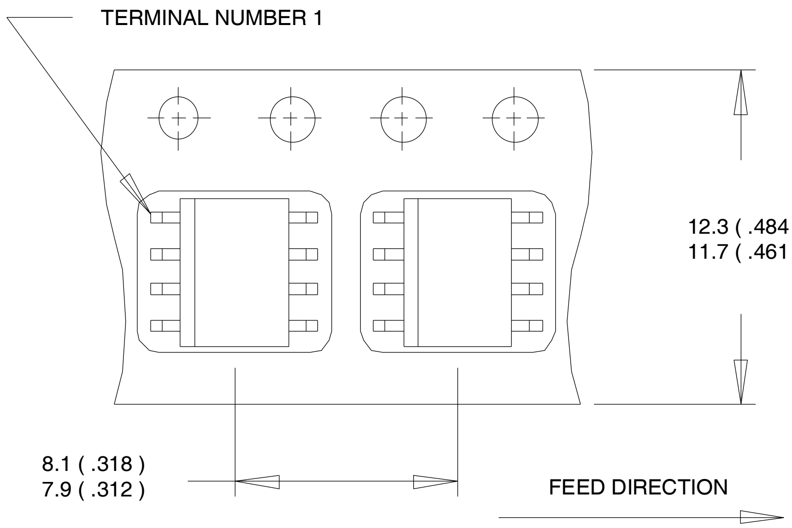
SO-8 Part Marking



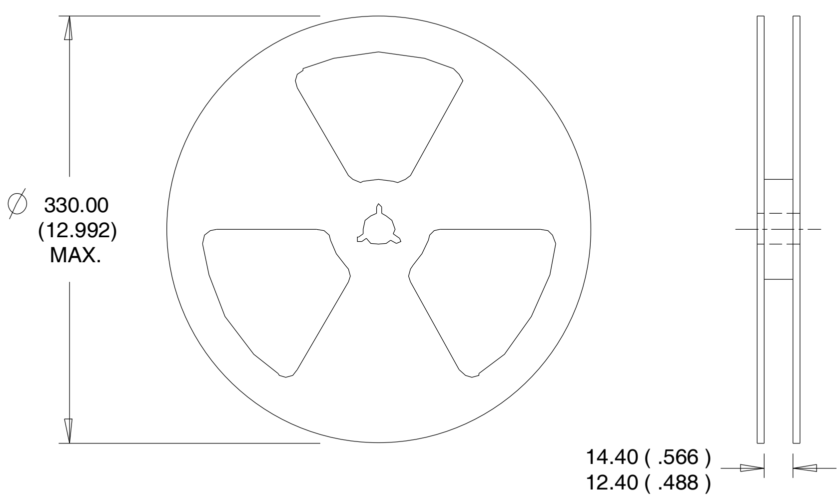
Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

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. 22)

② N-Channel $I_{SD} \leq 4.0A$, $di/dt \leq 74A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150°C$
P-Channel $I_{SD} \leq -2.8A$, $di/dt \leq 150A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150°C$

③ N-Channel Starting $T_J = 25°C$, L = 10mH $R_G = 25\Omega$, $I_{AS} = 4.0A$. (See Figure 12)
P-Channel Starting $T_J = 25°C$, L = 35mH $R_G = 25\Omega$, $I_{AS} = -2.8A$.

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

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

Ordering Information

Base part	Package Type	Standard Pack		Complete Part Number
		Form	Quantity	
AUIRF7319Q	SO-8	Tube	95	AUIRF7319Q
		Tape and Reel	4000	AUIRF7319QTR

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

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