

## AUIRF7805Q

HEXFET® Power MOSFET

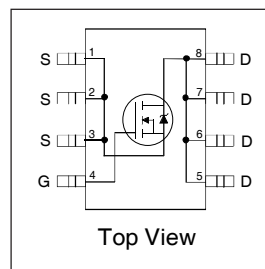
### Features

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

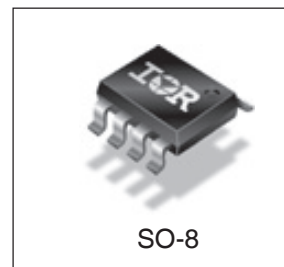
### Description

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.



$V_{(BR)DSS}$		30V
$R_{DS(on)}$	typ.	9.2mΩ
	max.	11mΩ
$I_D$		13A



<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

### 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-to-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	± 12	
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	13	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	10	
$I_{DM}$	Pulsed Drain Current ①	100	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation ③	2.5	W
$P_D @ T_A = 70^\circ\text{C}$	Power Dissipation ③	1.6	
	Linear Derating Factor	0.02	W/°C
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		

### Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ②	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ③	—	50	

HEXFET® is a registered trademark of International Rectifier.

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

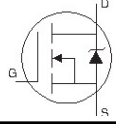
## Static Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage <sup>⑥</sup>	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance <sup>⑥</sup>	—	9.2	11	m $\Omega$	$V_{GS} = 4.5V, I_D = 7.0A$ ②
$V_{GS(th)}$	Gate Threshold Voltage ⑥	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	70	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	10		$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 100^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -12V$

## Dynamic Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

$Q_g$	Total Gate Charge	—	22	31	nC	$V_{GS} = 5.0V$ $V_{DS} = 16V$ $I_D = 7.0A$
$Q_{gs1}$	Pre-V <sub>th</sub> Gate-to-Source Charge	—	3.7	—		
$Q_{gs2}$	Post-V <sub>th</sub> Gate-to-Source Charge	—	1.4	—		
$Q_{gd}$	Gate-to-Drain Charge	—	6.8	—		
$Q_{sw}$	Switch Charge ( $Q_{gs2} + Q_{gd}$ )	—	8.2	11.5		
$Q_{oss}$	Output Charge	—	3.0	3.6	nC	$V_{DS} = 16V, V_{GS} = 0V$
$R_G$	Gate Resistance	0.5	—	1.7	$\Omega$	
$t_{d(on)}$	Turn-On Delay Time	—	16	—	ns	$V_{DD} = 16V, V_{GS} = 4.5V$ ② $I_D = 7.0A$ $R_G = 2\Omega$ Resistive Load
$t_r$	Rise Time	—	20	—		
$t_{d(off)}$	Turn-Off Delay Time	—	38	—		
$t_f$	Fall Time	—	16	—		

## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode) ①	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	106		
$V_{SD}$	Diode Forward Voltage ⑥	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 7.0A, V_{GS} = 0V$
$Q_{rr}$	Reverse Recovery Charge ④	—	88	—	ns	$di/dt = 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$
$Q_{rr(s)}$	Reverse Recovery Charge (with Parallel Schottky) ④	—	55	—	nC	$di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ When mounted on 1 inch square copper board,  $t < 10$  sec.
- ④ Typ = measured -  $Q_{oss}$
- ⑤  $R_{\theta}$  is measured at  $T_J$  of approximately  $90^\circ\text{C}$ .
- ⑥ Devices are 100% tested to these parameters.

## Qualification Information<sup>†</sup>

<b>Qualification Level</b>		Automotive (per AEC-Q101) <sup>††</sup>	
		Comments: This part number(s) passed Automotive qualification. IR's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.	
<b>Moisture Sensitivity Level</b>		SO-8	MSL1
<b>ESD</b>	Machine Model	Class M3(+/- 300V) <sup>†††</sup> (per AEC-Q101-002)	
	Human Body Model	Class H1B(+/- 1000V) <sup>†††</sup> (per AEC-Q101-001)	
	Charged Device Model	Class C5(+/- 2000V) <sup>†††</sup> (per AEC-Q101-005)	
<b>RoHS Compliant</b>		Yes	

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

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

<sup>†††</sup> Highest passing voltage

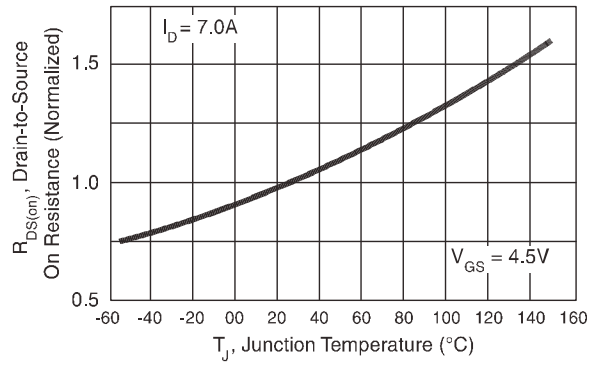


Fig 1. Normalized On-Resistance vs. Temperature

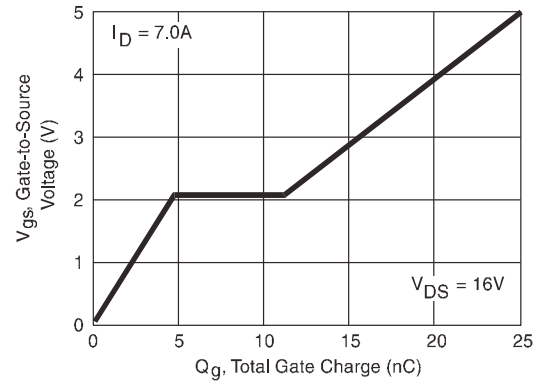


Fig 2. Typical Gate Charge vs. Gate-to-Source Voltage

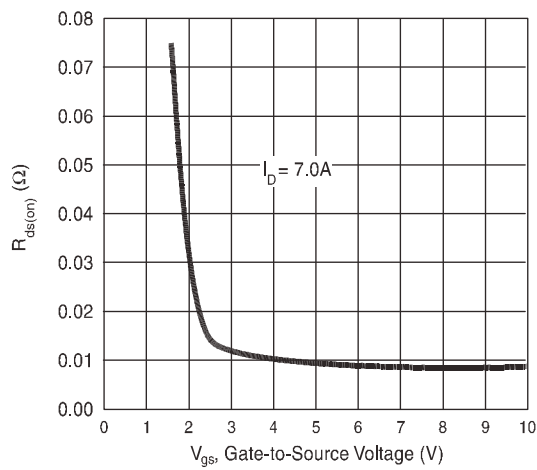


Fig 3. Typical  $R_{DS(on)}$  vs. Gate-to-Source Voltage

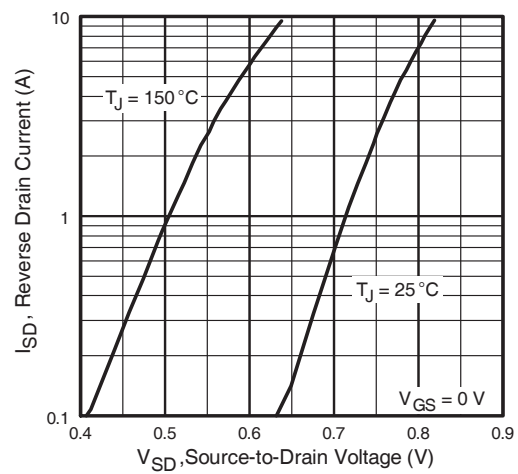


Fig 4. Typical Source-Drain Diode Forward Voltage

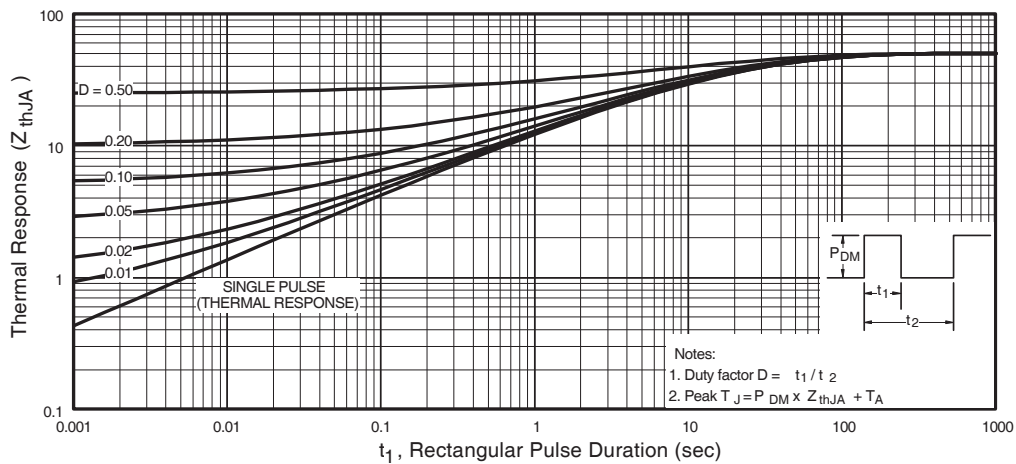
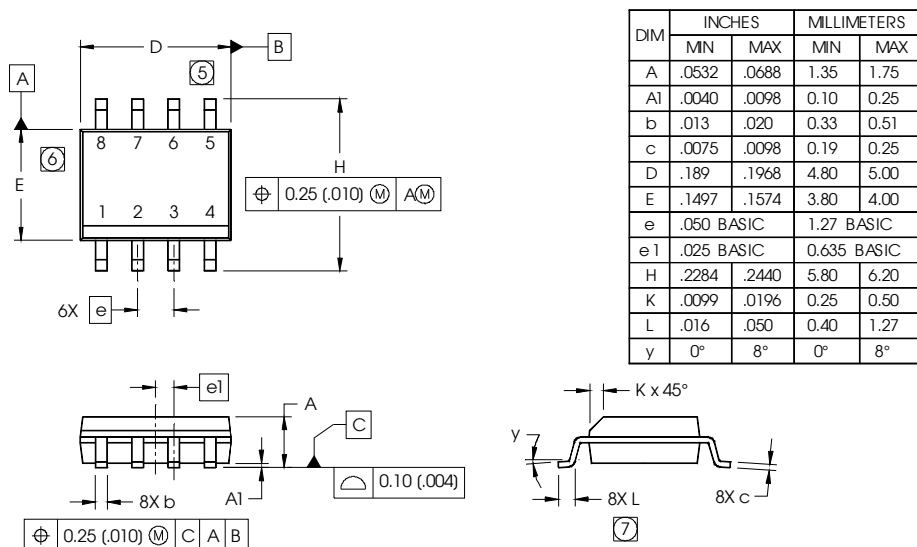


Figure 5. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

## SO-8 Package Outline

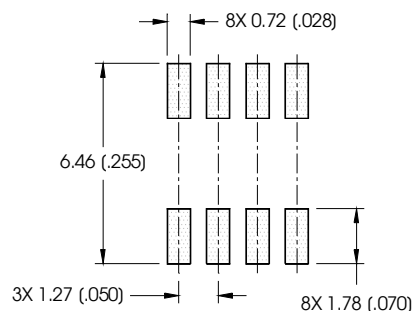
Dimensions are shown in millimeters (inches)



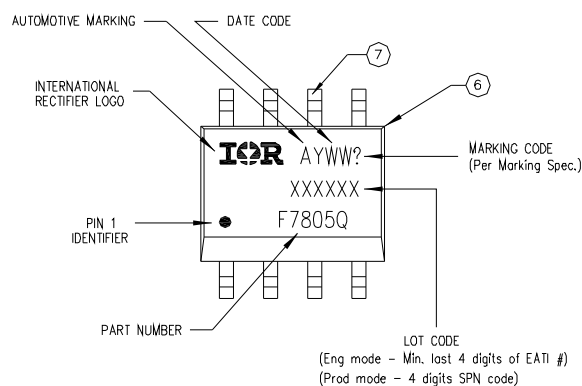
### NOTES:

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



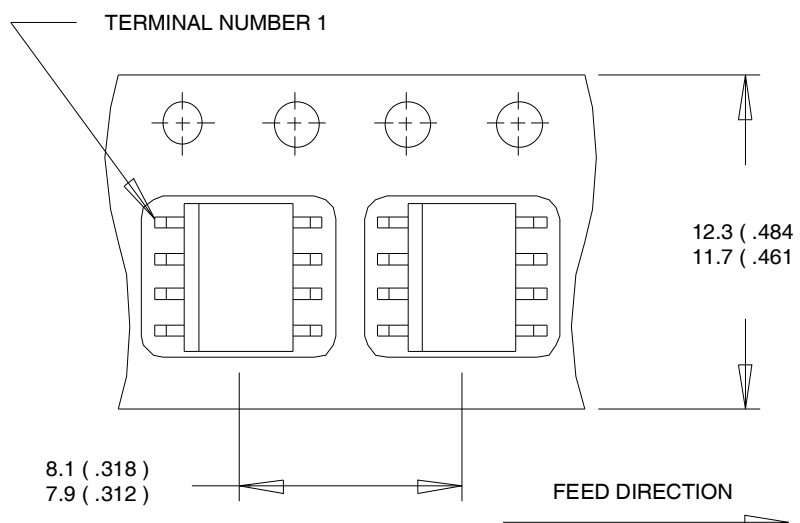
## SO-8 Part Marking



TOP MARKING (LASER)

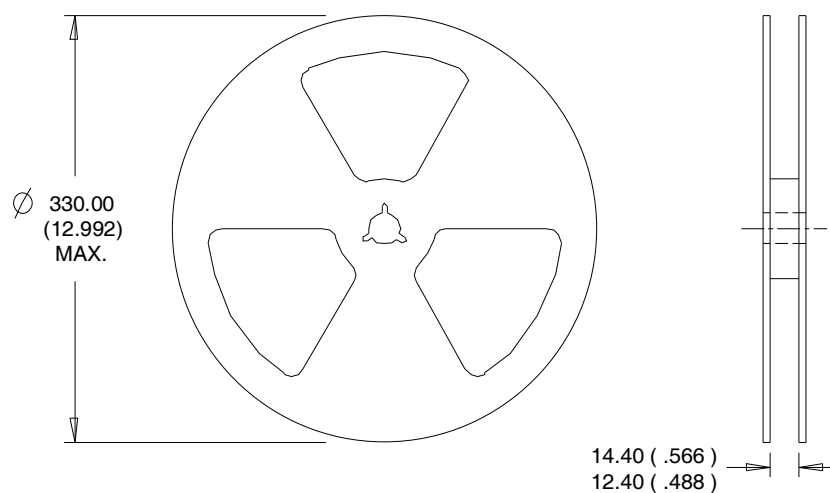
## SO-8 Tape and Reel

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	
AUIRF7805Q	SO-8	Tube	95	AUIRF7805Q
		Tape and Reel	4000	AUIRF7805QTR

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

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