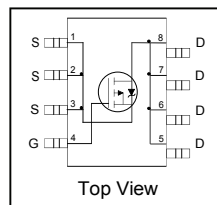


### Features

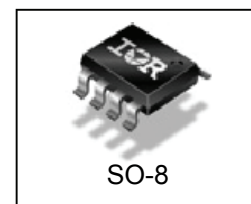
- Advanced Process Technology
- Low On-Resistance
- Logic Level Gate Drive
- P-Channel MOSFET
- Dynamic dV/dT Rating
- 150°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free, RoHS Compliant
- Automotive Qualified\*

### Description

Specifically designed for Automotive applications, this cellular design of HEXFET® Power MOSFETs utilizes the latest processing techniques to achieve low on-resistance per silicon area. This benefit combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in Automotive and a wide variety of other applications.



$V_{DS}$	-20V
$R_{DS(on)}$ max	0.06Ω
$I_D$	-5.4A



Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF7207Q	SO-8	Tube	95	AUIRF7207Q
		Tape and Reel	2500	AUIRF7207QTR

### 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	-20	V
$I_D$ @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ -10V	-5.4	A
$I_D$ @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ -10V	-4.3	
$I_{DM}$	Pulsed Drain Current ①	-43	
$P_D$ @ $T_A = 25^\circ\text{C}$	Power Dissipation	2.5	W
$P_D$ @ $T_A = 70^\circ\text{C}$	Power Dissipation	1.6	
	Linear Derating Factor	0.02	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 12	V
$V_{GSM}$	Gate-to-Source Voltage Single Pulse $t_p < 10\mu\text{s}$	-16	V
$E_{AS}$	Single Pulse Avalanche Energy (Thermally Limited) ②	140	mJ
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 150	°C

### Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	50	°C/W

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

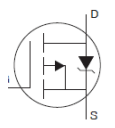
**Static Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	—	—	V	$V_{GS} = 0V$ , $I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.011	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.06	$\Omega$	$V_{GS} = -4.5V$ , $I_D = -5.4A$ ④
		—	—	0.125		$V_{GS} = -2.7V$ , $I_D = -2.7A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-0.7	—	-1.6	V	$V_{DS} = V_{GS}$ , $I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	8.3	—	—	S	$V_{DS} = -10V$ , $I_D = -5.4A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	-1.0	$\mu A$	$V_{DS} = -16V$ , $V_{GS} = 0V$
		—	—	-25		$V_{DS} = -16V$ , $V_{GS} = 0V$ , $T_J = 125^\circ\text{C}$
$I_{GSS}$	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)**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$Q_g$	Total Gate Charge	—	15	22	nC	$I_D = -5.4A$
$Q_{gs}$	Gate-to-Source Charge	—	2.2	3.3		$V_{DS} = -10V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	5.7	8.6		$V_{GS} = -4.5V$
$t_{d(on)}$	Turn-On Delay Time	—	11	—	ns	$V_{DD} = -10V$
$t_r$	Rise Time	—	24	—		$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	43	—		$R_G = 6.0\Omega$
$t_f$	Fall Time	—	41	—		$R_D = 10\Omega$
$C_{iss}$	Input Capacitance	—	780	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	410	—		$V_{DS} = -15V$
$C_{rss}$	Reverse Transfer Capacitance	—	200	—		$f = 1.0\text{ MHz}$

**Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-3.1	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	-43	A	
$V_{SD}$	Diode Forward Voltage	—	—	-1.0	V	$T_J = 25^\circ\text{C}$ , $I_S = -3.1A$ , $V_{GS} = 0V$ ③
$dv/dt$	Peak Diode Recovery ③	—	5.0	—	V/ns	$T_J = 175^\circ\text{C}$ , $I_S = -3.1A$ , $V_{DS} = -20V$
$t_{rr}$	Reverse Recovery Time	—	42	63	ns	$T_J = 25^\circ\text{C}$ , $I_F = -3.1A$
$Q_{rr}$	Reverse Recovery Charge	—	50	75	nC	

**Notes:**

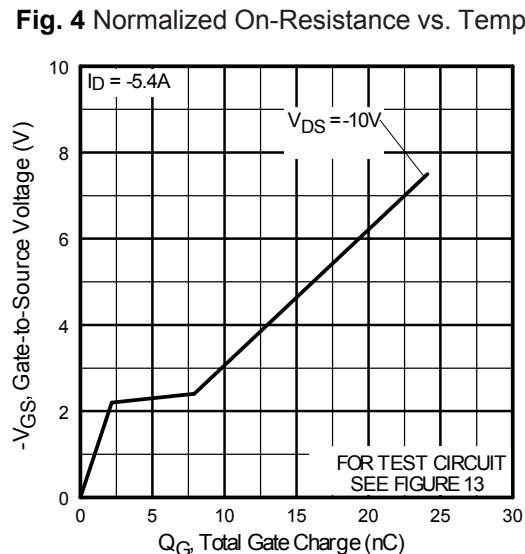
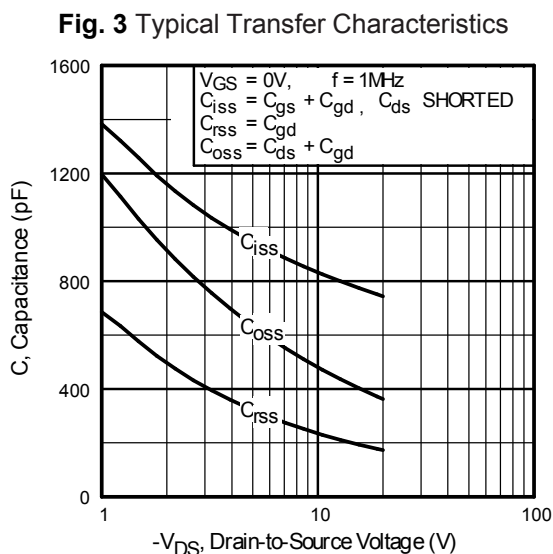
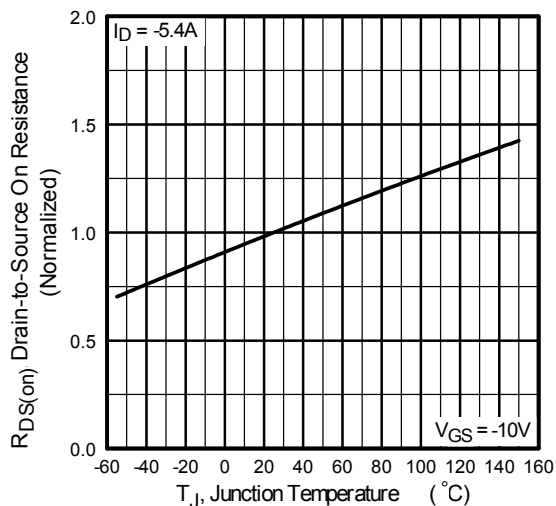
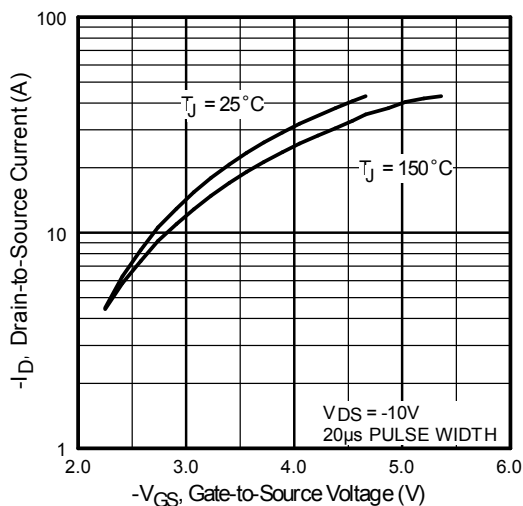
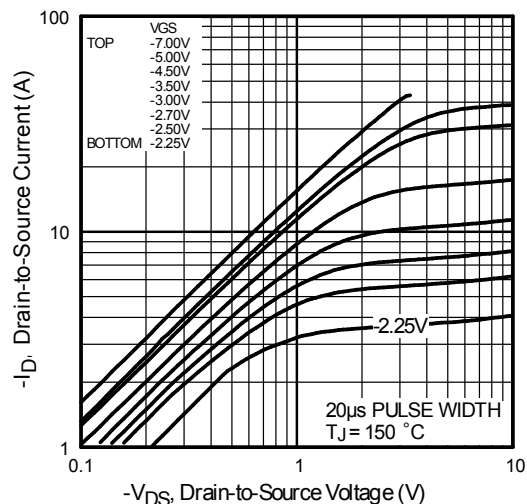
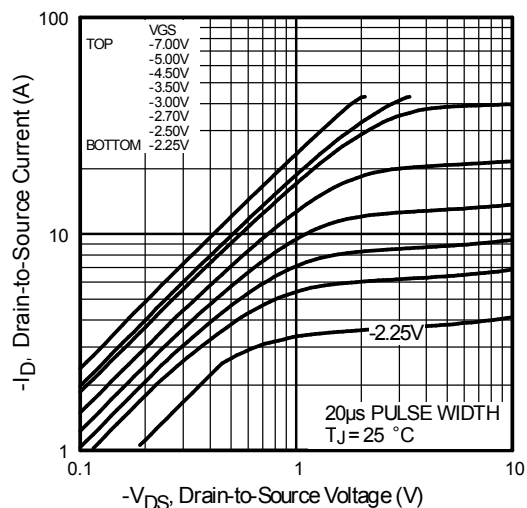
□ ① Repetitive rating; pulse width limited by max. junction temperature.

② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 9.6mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = -5.4A$ .

③  $I_{SD} \leq -5.4A$ ,  $di/dt \leq -79A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$ .

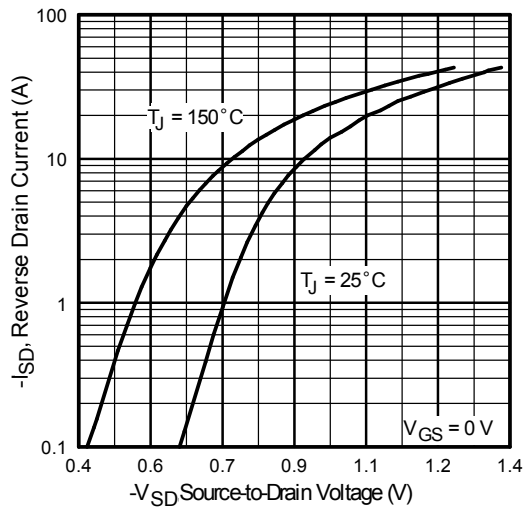
④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

⑤ When mounted on 1 inch square copper board,  $t < 10\text{ sec}$ .

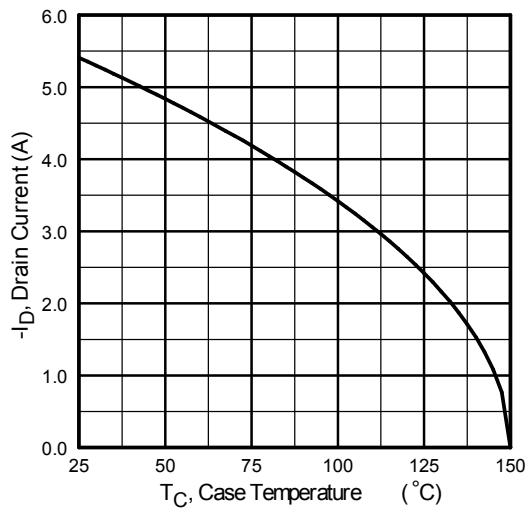


**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage

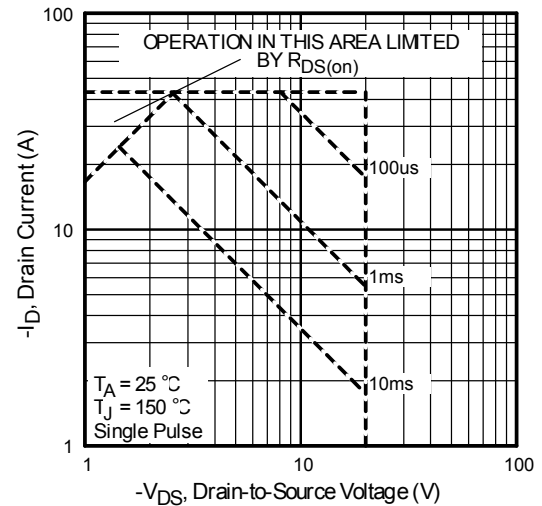
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



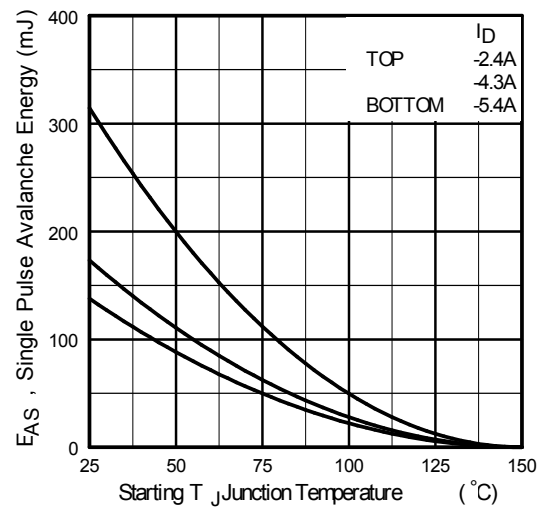
**Fig. 7** Typical Source-to-Drain Diode Forward Voltage



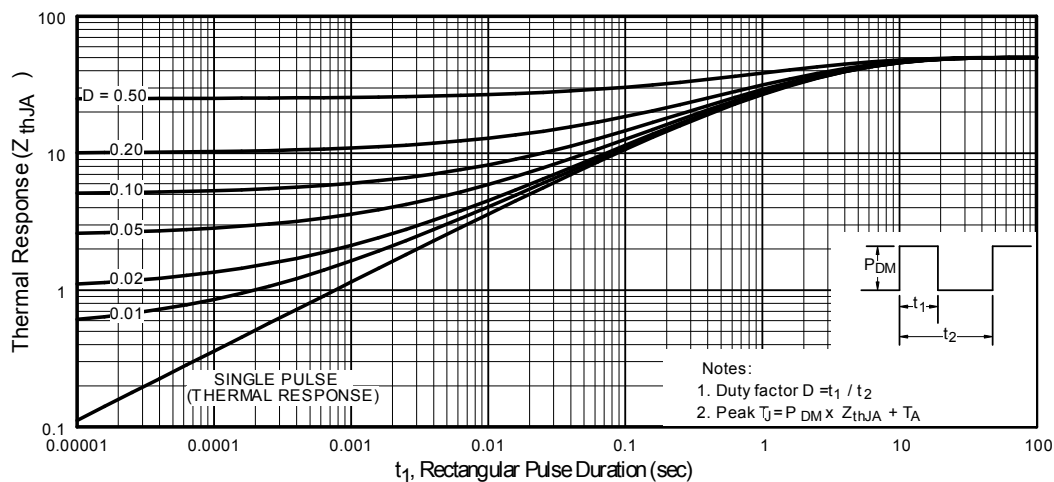
**Fig 9.** Maximum Drain Current vs. Case Temperature



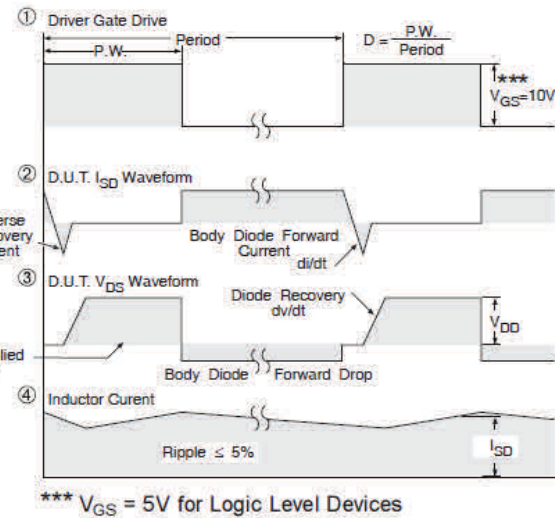
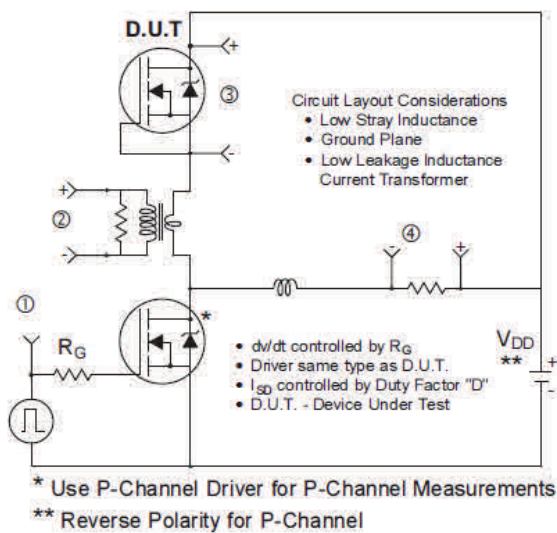
**Fig 8.** Maximum Safe Operating Area



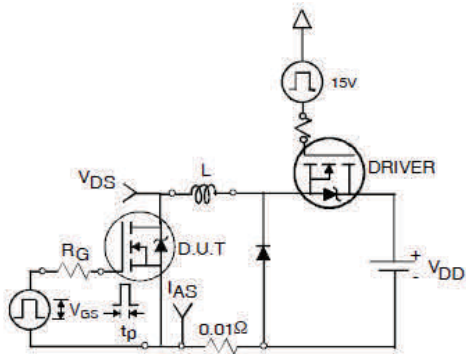
**Fig 10.** Maximum Avalanche Energy vs. Drain Current



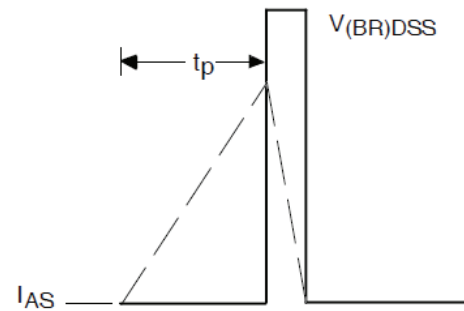
**Fig 13.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



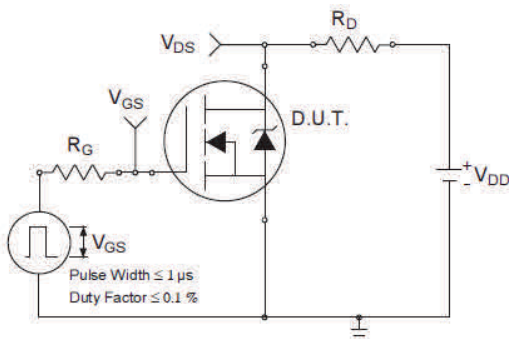
**Fig 14. Peak Diode Recovery  $dv/dt$  Test Circuit for N-Channel HEXFET® Power MOSFETs**



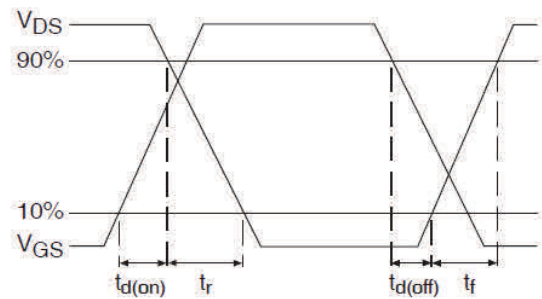
**Fig 14a. Unclamped Inductive Test Circuit**



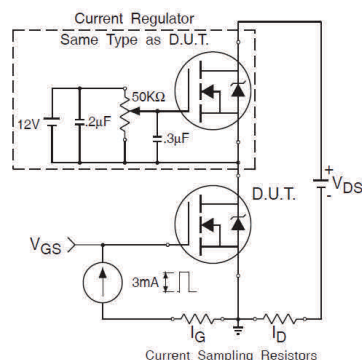
**Fig 14b. Unclamped Inductive Waveforms**



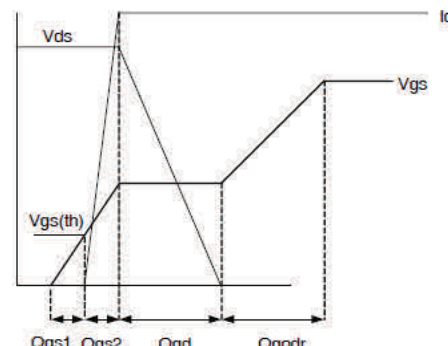
**Fig 15a. Switching Time Test Circuit**



**Fig 15b. Switching Time Waveforms**



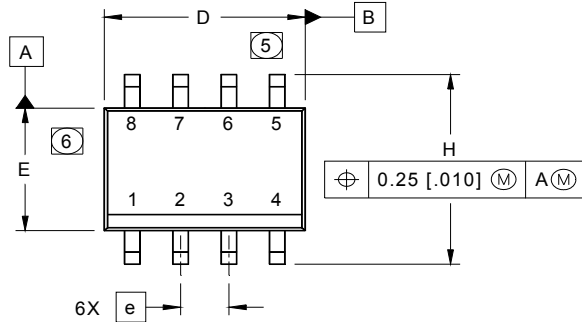
**Fig 16a. Gate Charge Test Circuit**



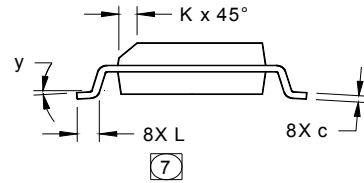
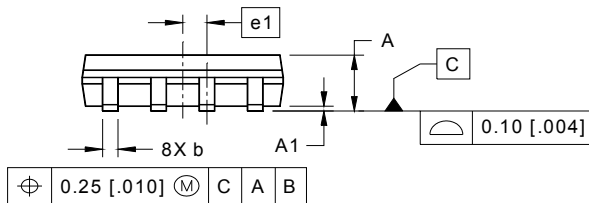
**Fig 16b. Gate Charge Waveform**

## SO-8 Package Outline

Dimensions are shown in millimeters (inches)

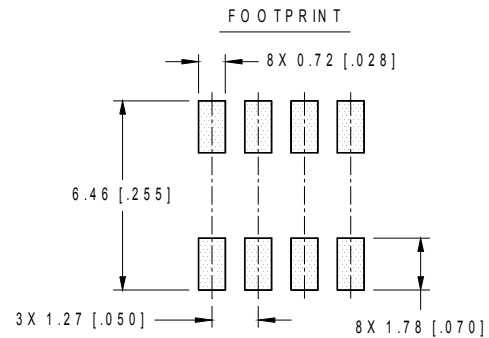


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°

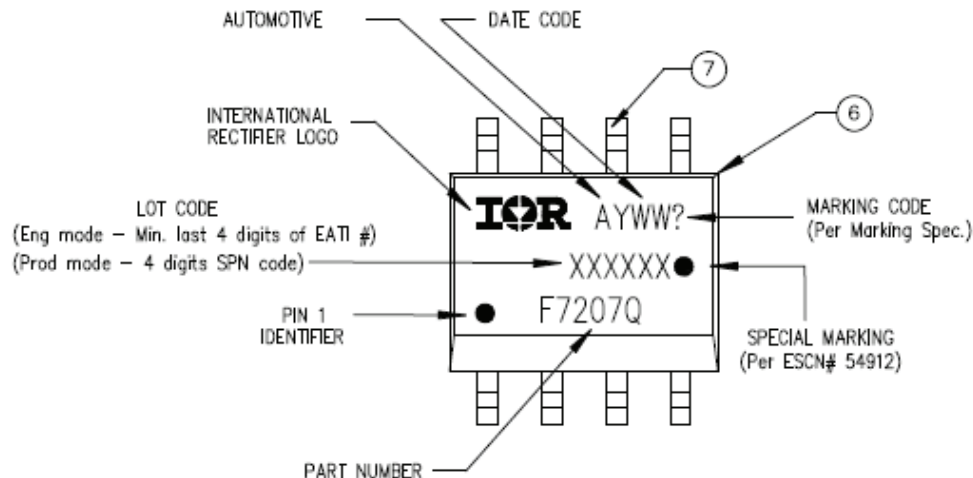


### NOTES:

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 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



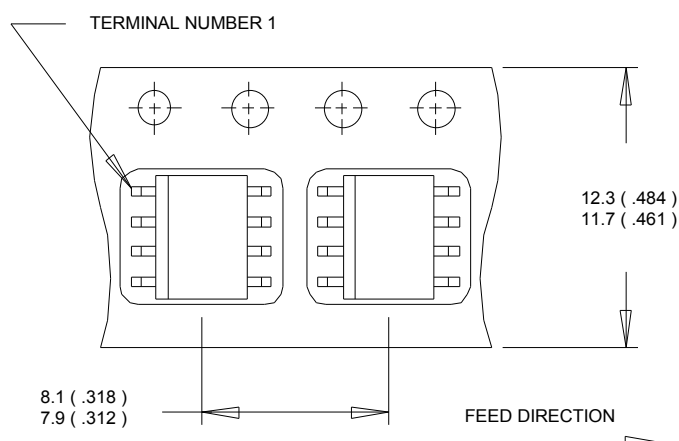
## SO-8 Part Marking



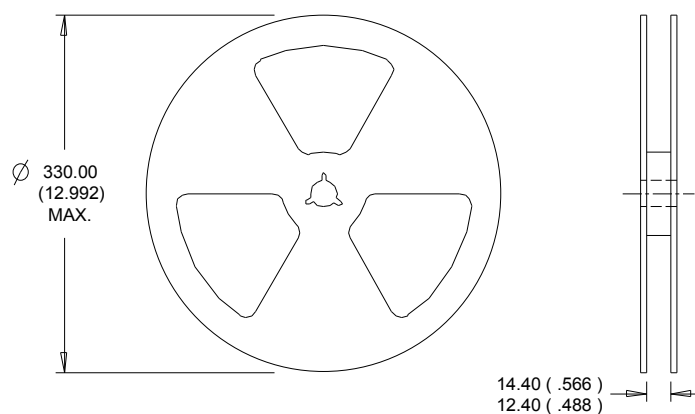
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

**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.

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

# Qualification Information<sup>†</sup>

Qualification Information		Automotive (per AEC-Q101)	
Qualification Level		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 M1B (+/- 100V) <sup>††</sup>	
		AEC-Q101-002	
	Human Body Model	Class H1A (+/- 500V) <sup>††</sup>	
		AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) <sup>††</sup>	
AEC-Q101-005			
RoHS Compliant		Yes	

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

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



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For technical support, please contact IR’s Technical Assistance Center

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

**WORLD HEADQUARTERS:**

101 N. Sepulveda Blvd., El Segundo, California 90245

Tel: (310) 252-7105

Revision History	
Date	Comments
4/3/2014	• Added "Logic Level Gate Drive" bullet in the features section on page 1