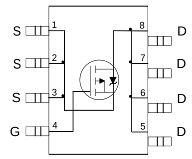
International
IOR Rectifier

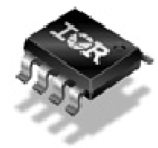
AUTOMOTIVE GRADE

AUIRF7207Q



Top View

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


SO-8

Features

- Advanced Process Technology
- Low On-Resistance
- 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.

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 (TA) is 25°C, unless otherwise specified.

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	-20	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -10V	-5.4	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ -10V	-4.3	
I_{DM}	Pulsed Drain Current ①	-43	
P_D @T_A = 25°C	Power Dissipation	2.5	W
P_D @T_A = 70°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 tp<10µs	-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/

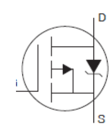
Static Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	——	——	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	-0.011	——	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	0.06	Ω	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 = -250µA
gfs	Forward Transconductance	8.3	——	——	S	V_{DS} = -10V, I_D = -5.4A
I_{DSS}	Drain-to-Source Leakage Current	——	——	-1.0	µA	V_{DS} = -16V, V_{GS} = 0V
		——	——	-25		V_{DS} = -16V, V_{GS} = 0V, T_J = 125°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°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 = 6.0Ω
t_f	Fall Time	——	41	——		R_D = 10Ω
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 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°C, I_S = -3.1A, V_{GS} = 0V③
dv/dt	Peak Diode Recovery ③	——	5.0	——	V/ns	T_J = 175°C, I_S= -3.1A, V_{DS} = -20V
t_{rr}	Reverse Recovery Time	——	42	63	ns	T_J = 25°C, I_F = -3.1A
Q_{rr}	Reverse Recovery Charge	——	50	75	nC	di/dt = 100A/µs

Notes:

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

② Starting T_J = 25°C, L = 9.6mH, R_G = 25Ω, I_{AS} = -5.4A.

③ I_{SD} ≤ -5.4A, di/dt ≤ -79A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C.

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

⑤ When mounted on 1 inch square copper board, t<10 sec.

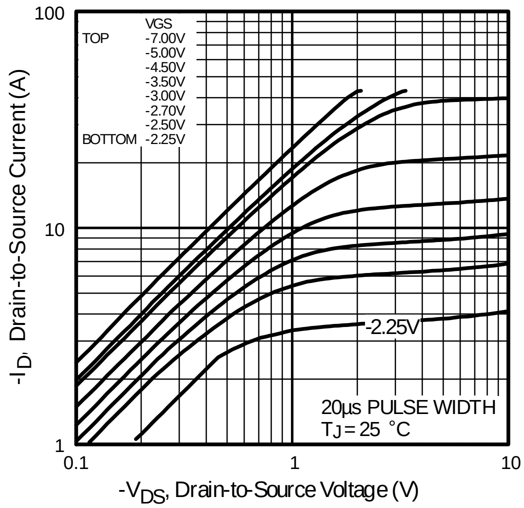


Fig. 1 Typical Output Characteristics

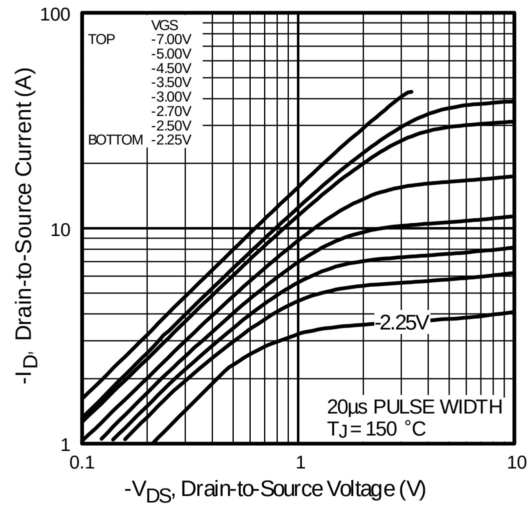


Fig. 2 Typical Output Characteristics

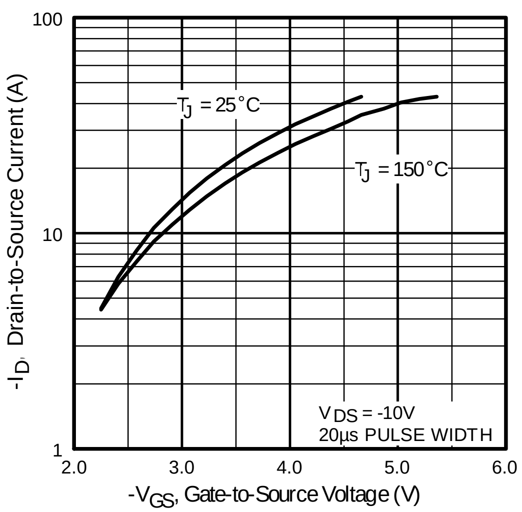


Fig. 3 Typical Transfer Characteristics

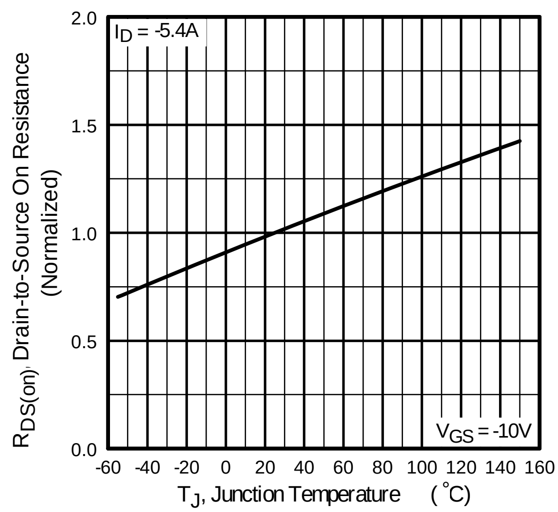


Fig. 4 Normalized On-Resistance vs. Temperature

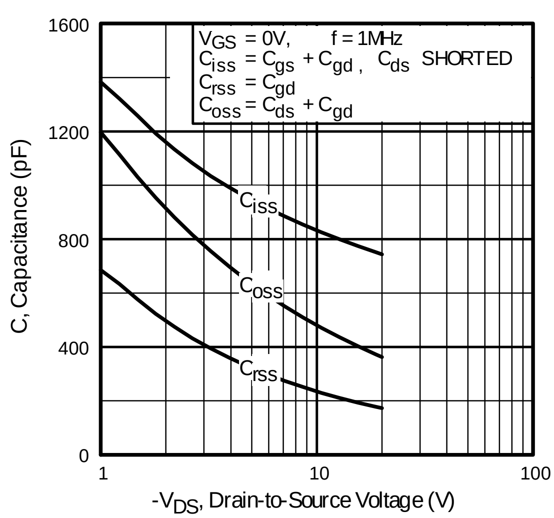


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

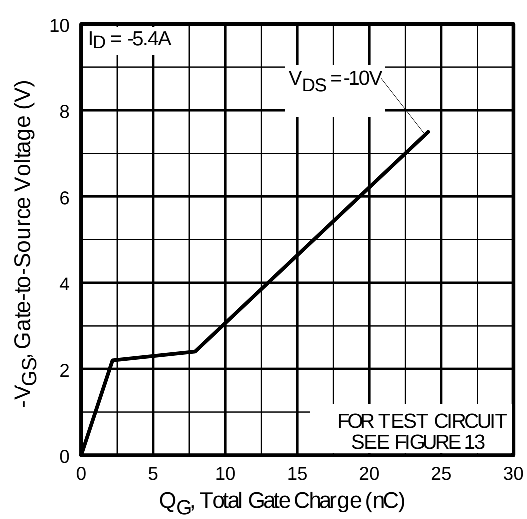


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

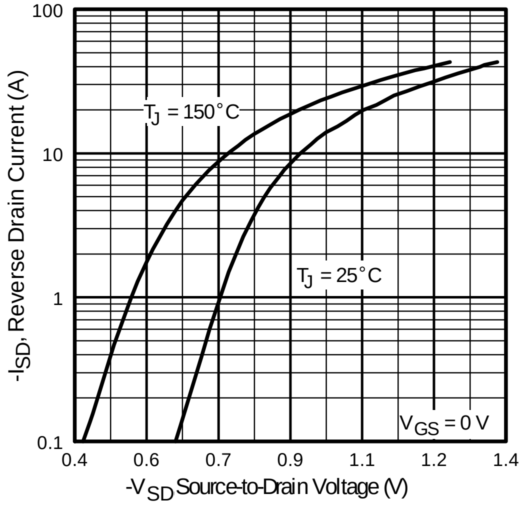


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

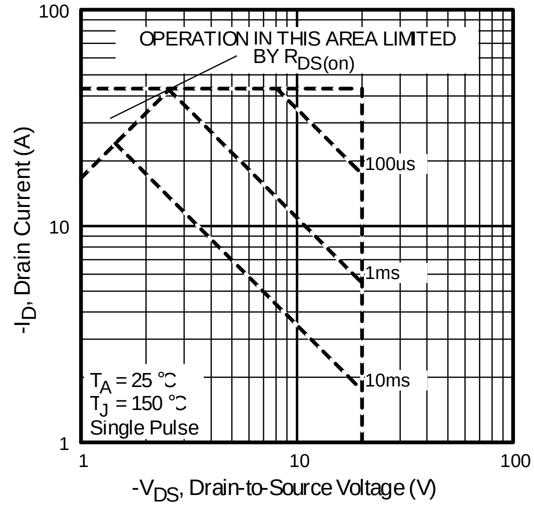


Fig 8. Maximum Safe Operating Area

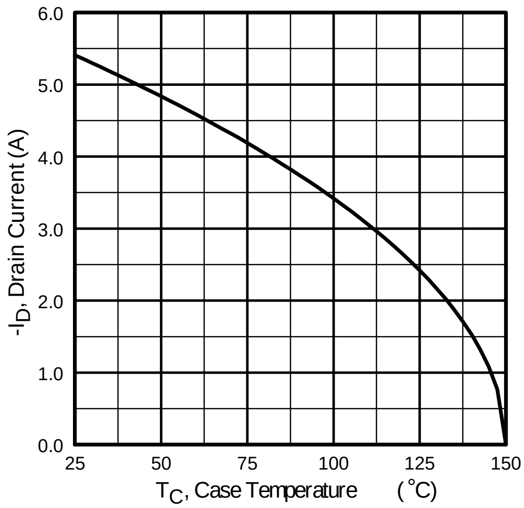


Fig 9. Maximum Drain Current vs. Case Temperature

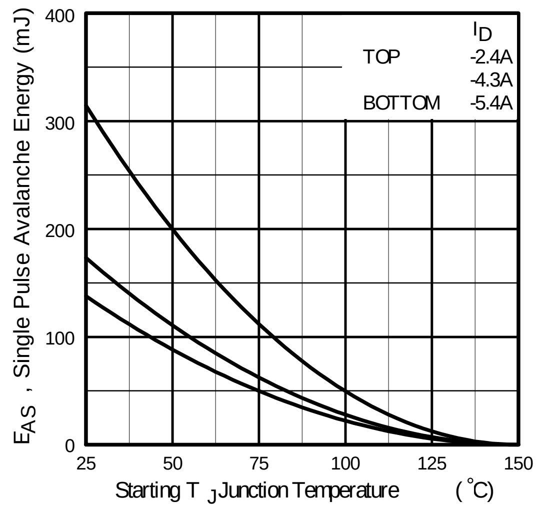


Fig 10. Maximum Avalanche Energy vs. Drain Current

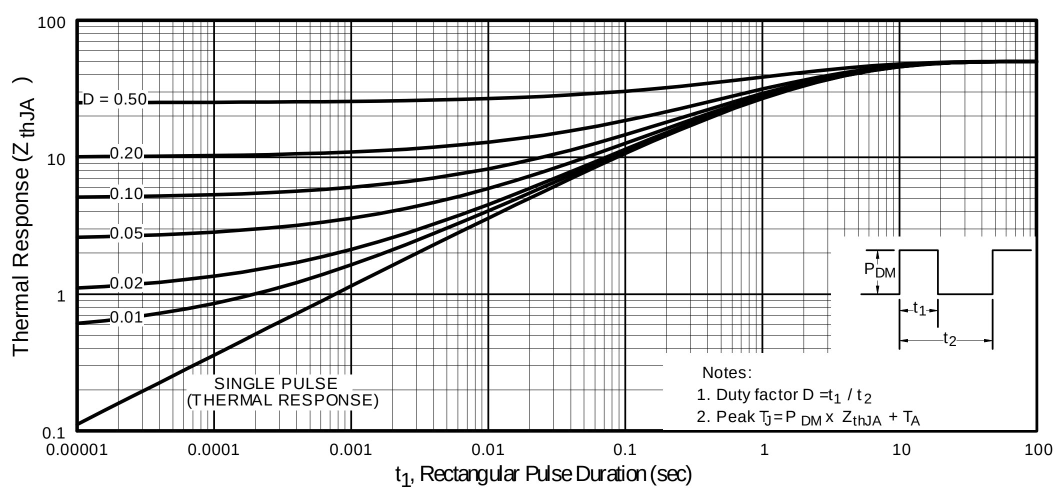


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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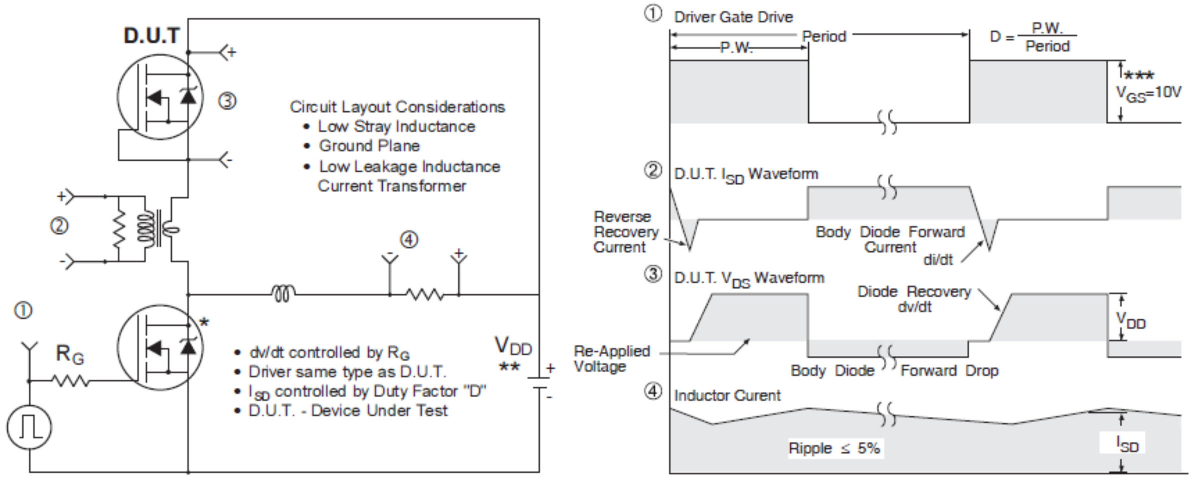


* Use P-Channel Driver for P-Channel Measurements

** Reverse Polarity for P-Channel

*** V_{GS} = 5V for Logic Level Devices

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

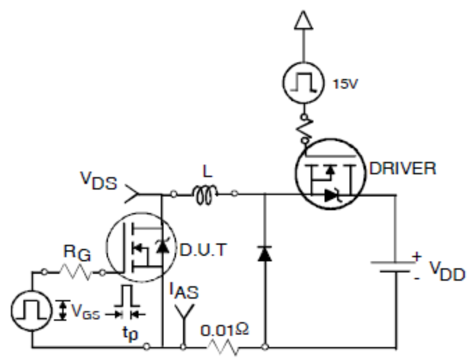


Fig 14a. Unclamped Inductive Test Circuit

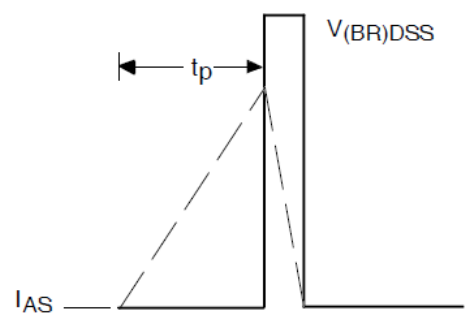


Fig 14b. Unclamped Inductive Waveforms

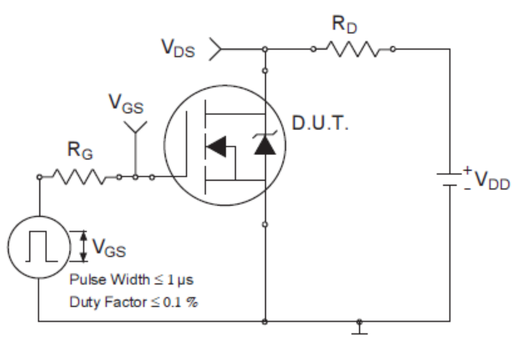


Fig 15a. Switching Time Test Circuit

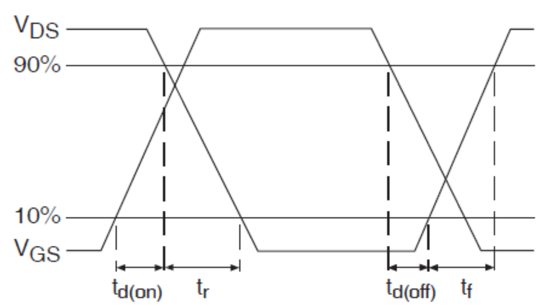


Fig 15b. Switching Time Waveforms

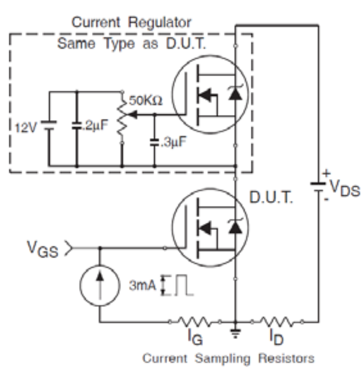


Fig 16a. Gate Charge Test Circuit

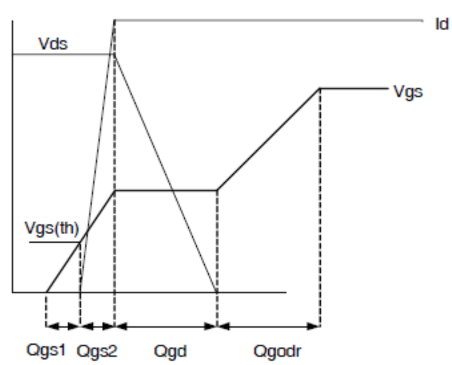
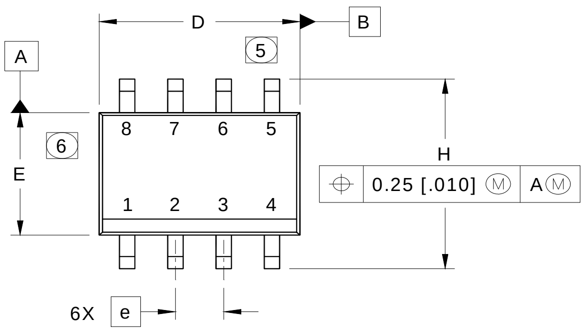


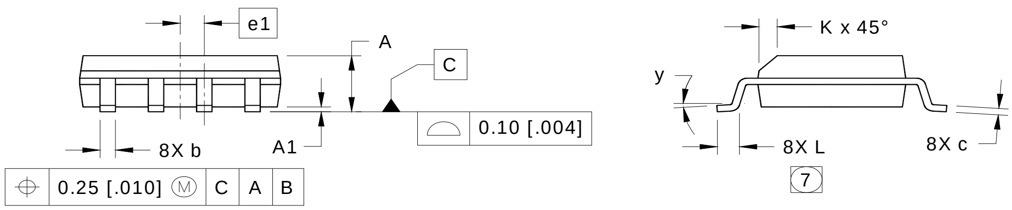
Fig 16b. Gate Charge Waveform

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



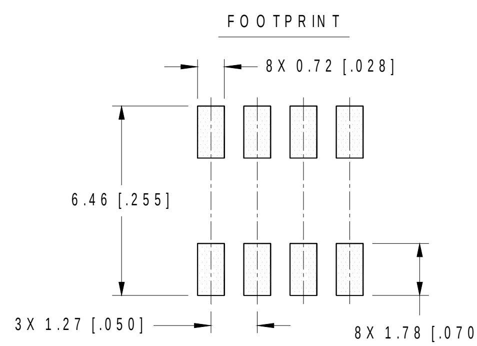
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



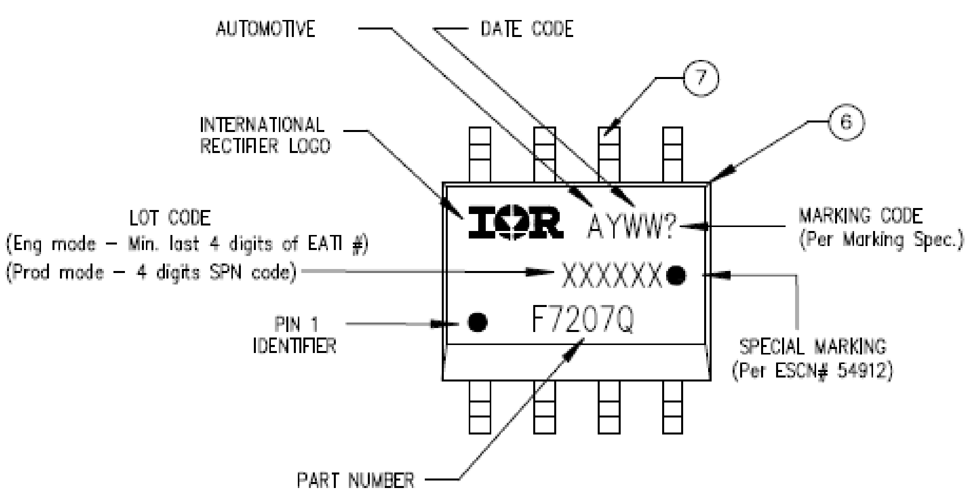
NOTES:

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 [.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/

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 M1B (+/- 100V)††	
		AEC-Q101-002	
	Human Body Model	Class H1A (+/- 500V)††	
		AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V)††	
		AEC-Q101-005	
RoHS Compliant		Yes	

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

†† Highest passing voltage.

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