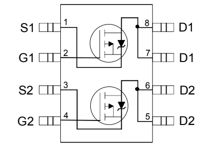
HEXFET® Power MOSFET

Features

- Advanced Planar Technology
- Low On-Resistance
- Dual P Channel MOSFET
- Dynamic dv/dt Rating
- Logic Level
- 150°C Operating Temperature
- Fast Switching
- Lead-Free, RoHS Compliant
- Automotive Qualified *



Top View

V_{DSS}		-20V
$R_{DS(on)}$	max.	0.090Ω
I_D		-4.3A

SO-8
AUIRF7304Q

G	D	S
Gate	Drain	Source

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	
AUIRF7304Q	SO-8	Tape and Reel	4000	AUIRF7304QTR

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.

Symbol	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	-4.7	A
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	-4.3	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ -4.5V	-3.4	
I_{DM}	Pulsed Drain Current ①	-17	
P_D @T_A = 25°C	Maximum Power Dissipation ③	2.0	W
	Linear Derating Factor	0.016	W°/C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
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 ④	——	62.5	°C/W

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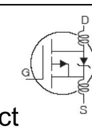
*Qualification standards can be found at www.infineon.com

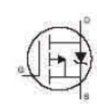
Static @ T_J = 25°C (unless otherwise specified)

	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	——	-0.012	——	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	0.090	Ω	V_{GS} = -4.5V, I_D = -2.2A ③
		——	——	0.140		V_{GS} = -2.7V, I_D = -1.8A ③
$V_{GS(th)}$	Gate Threshold Voltage	-0.70	——	-1.5	V	V_{DS} = V_{GS}, I_D = -250μA
gfs	Forward Trans conductance	4.0	——	——	S	V_{DS} = -16V, I_D = -2.2A
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)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	——	——	22	nC	I_D = -2.2A
Q_{gs}	Gate-to-Source Charge	——	——	3.3		V_{DS} = -16V
Q_{gd}	Gate-to-Drain Charge	——	——	9.0		V_{GS} = -4.5V, See Fig.6 & 12 ③
$t_{d(on)}$	Turn-On Delay Time	——	8.4	——	ns	V_{DD} = -10V
t_r	Rise Time	——	26	——		I_D = -2.2A
$t_{d(off)}$	Turn-Off Delay Time	——	51	——		R_G = 6.0Ω
t_f	Fall Time	——	33	——		R_D = 4.5Ω , See Fig.10 ③
L_D	Internal Drain Inductance	——	4.0	——	nH	Between lead, 6mm (0.25in.) from package and center of die contact 
L_S	Internal Source Inductance	——	6.0	——		
C_{iss}	Input Capacitance	——	610	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	310	——		V_{DS} = -15V
C_{rss}	Reverse Transfer Capacitance	——	170	——		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	——	——	-17		
V_{SD}	Diode Forward Voltage	——	——	-1.0	V	T_J = 25°C,I_S = -1.8A,V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	——	56	84	ns	T_J = 25°C ,I_F = -2.2A,
Q_{rr}	Reverse Recovery Charge	——	71	110	nC	di/dt = 100A/μs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See Fig. 11)
② $I_{SD} \leq$ -2.2A, di/dt $\leq$ 50A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C.
③ Pulse width $\leq$ 300μs; duty cycle $\leq$ 2%.
④ When mounted on 1 inch square copper board , t $\leq$ 10sec.

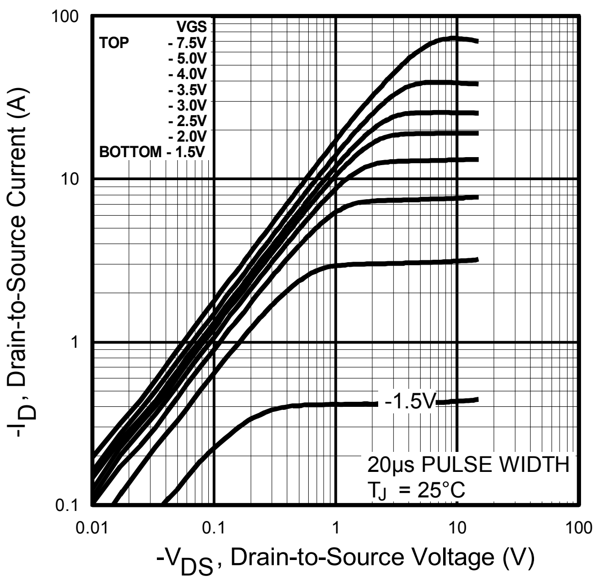


Fig. 1 Typical Output Characteristics

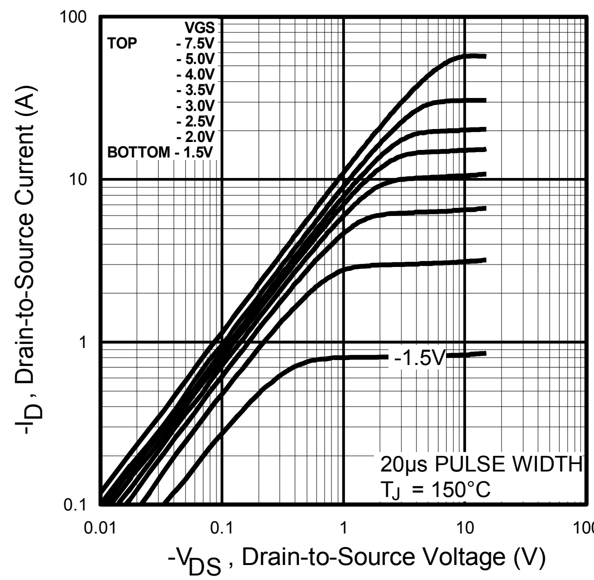


Fig. 2 Typical Output Characteristics

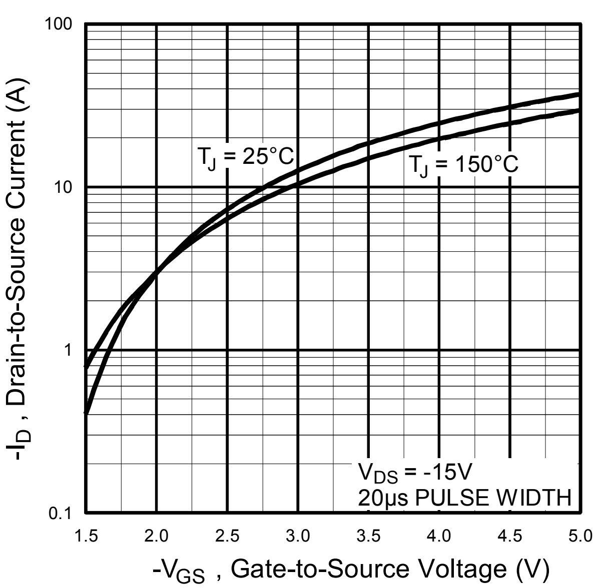


Fig. 3 Typical Transfer Characteristics

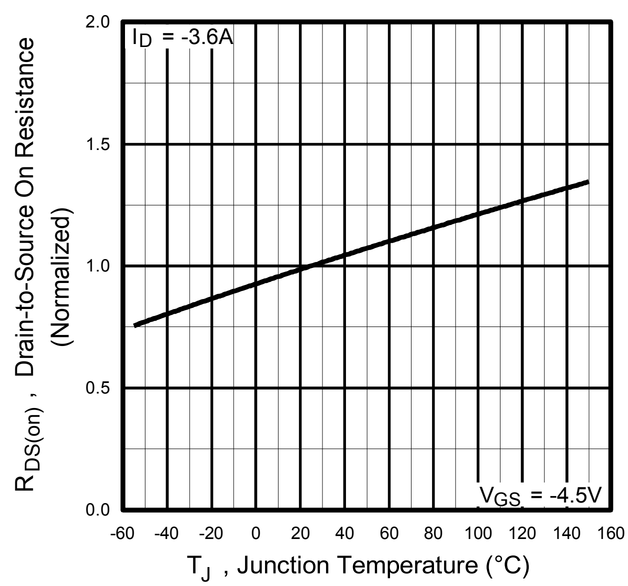
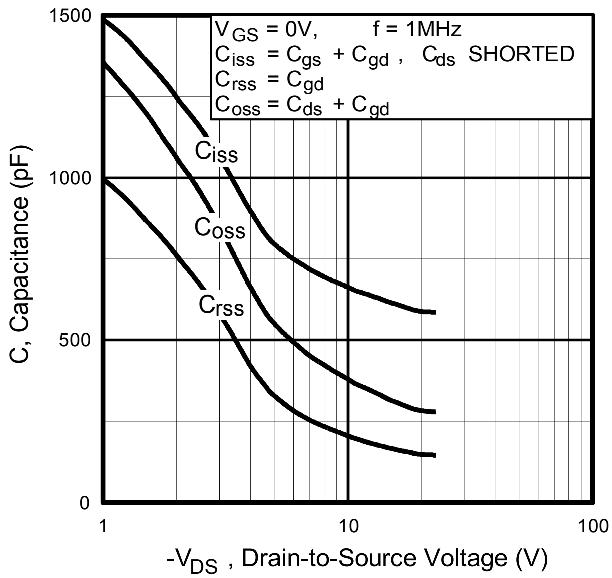


Fig. 4 Normalized On-Resistance Vs. Temperature



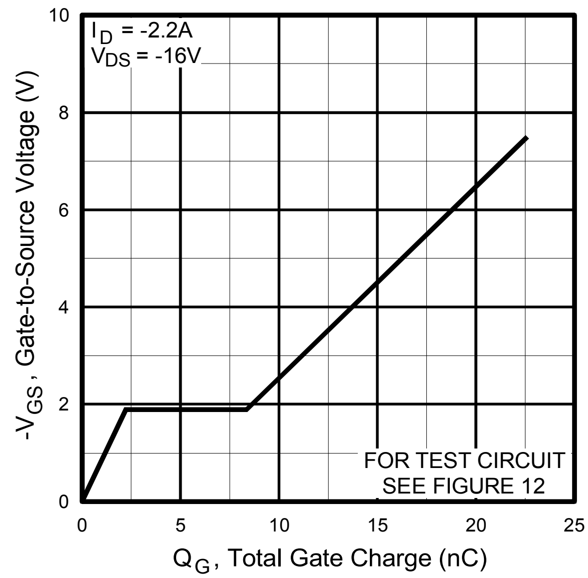
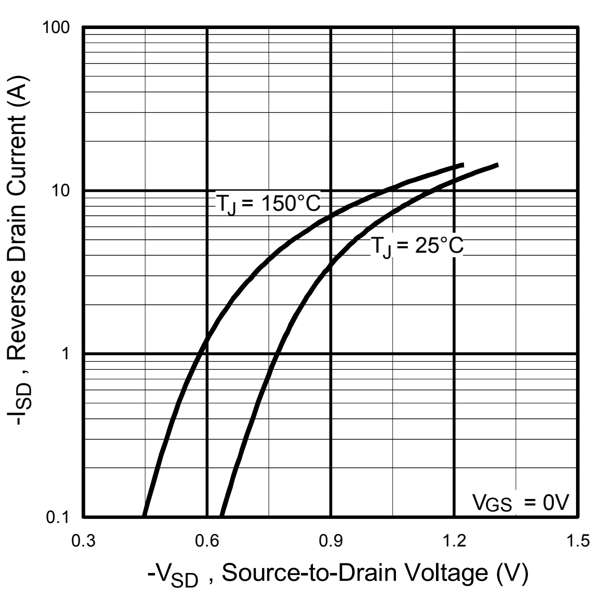


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

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



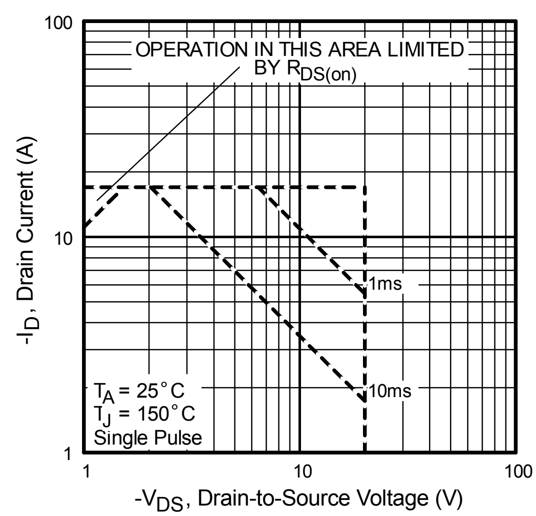


Fig. 7 Typical Source-Drain Diode Forward Voltage

Fig 8. Maximum Safe Operating Area

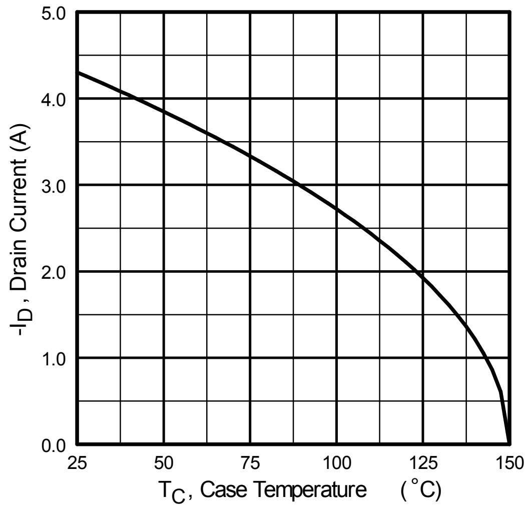


Fig 9. Maximum Drain Current Vs. Ambient Temperature

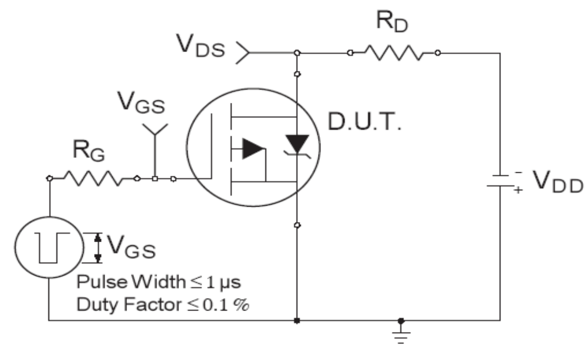


Fig 10a. Switching Time Test Circuit

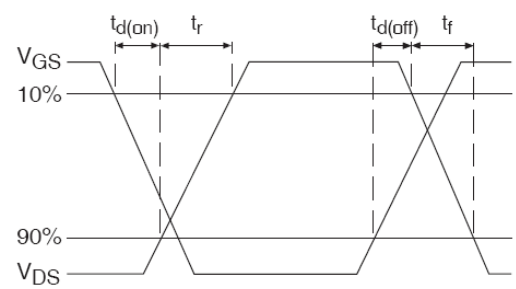


Fig 10b. Switching Time Waveforms

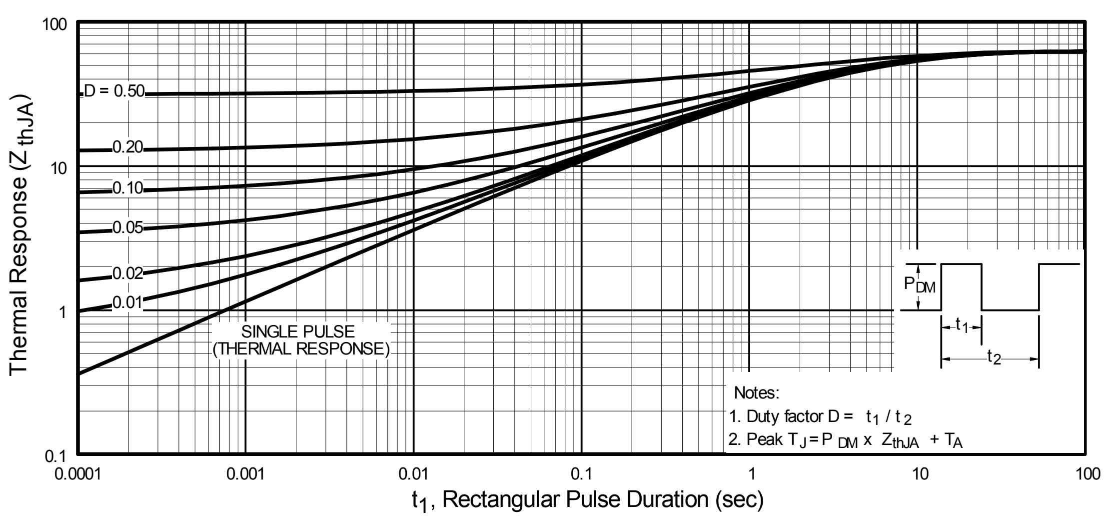


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

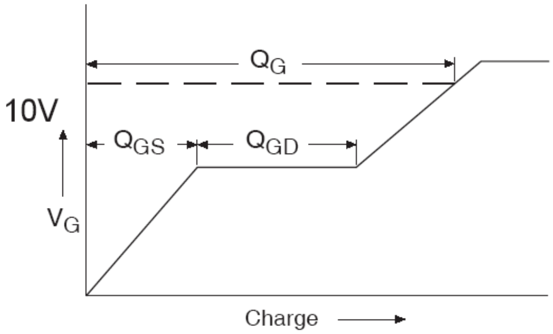


Fig 12a. Basic Gate Charge Waveform

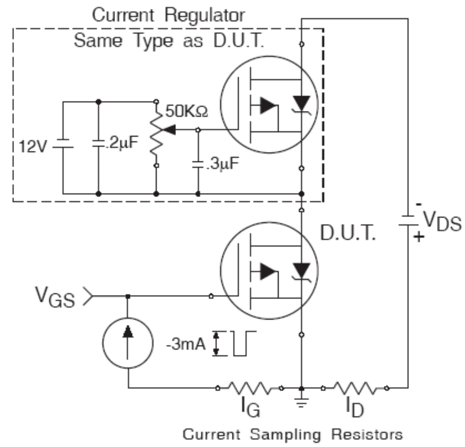


Fig 12b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit

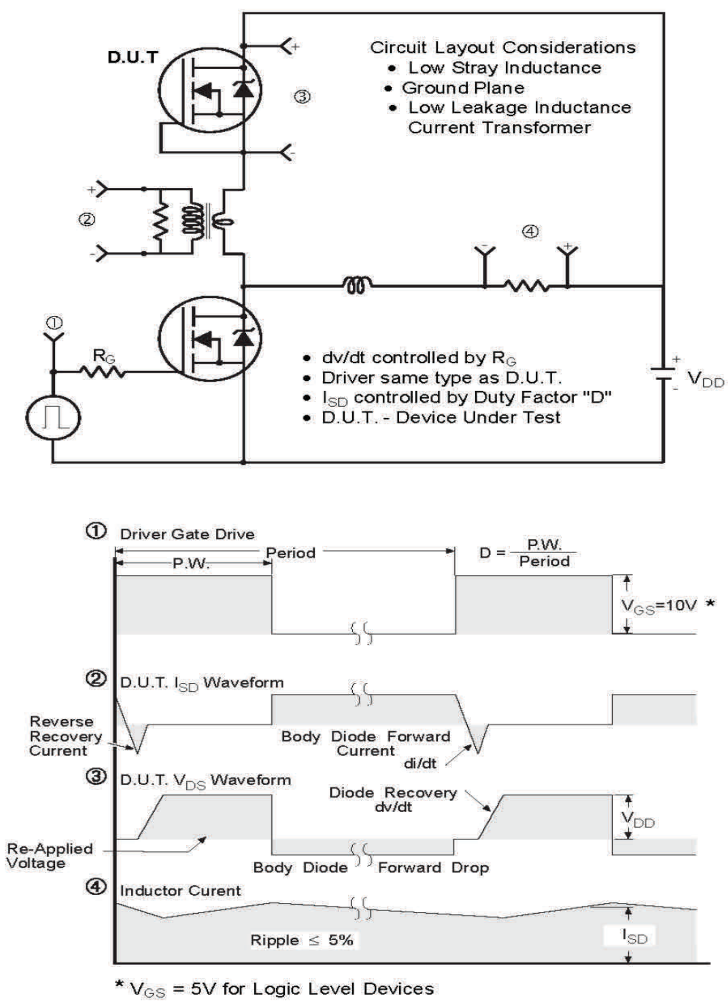
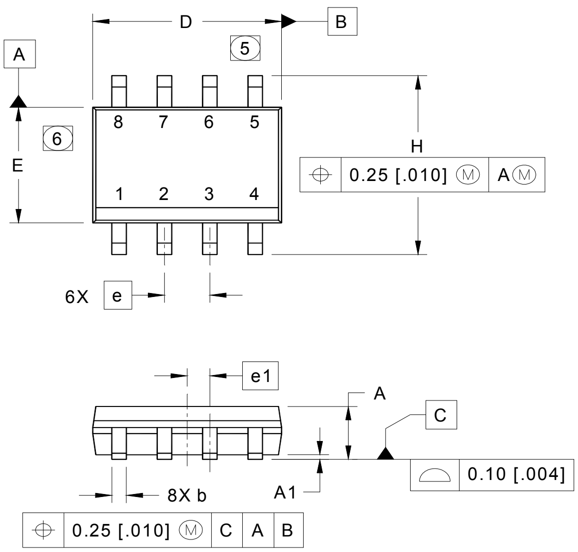
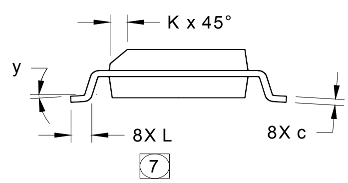


Fig 13. Peak Diode Recovery dv/dt Test Circuit for P-Channel HEXFET® Power MOSFETs

SO-8 Package Outline (Dimensions are shown in millimeters (inches))



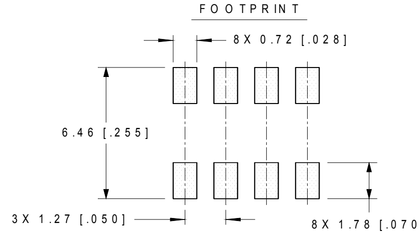


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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

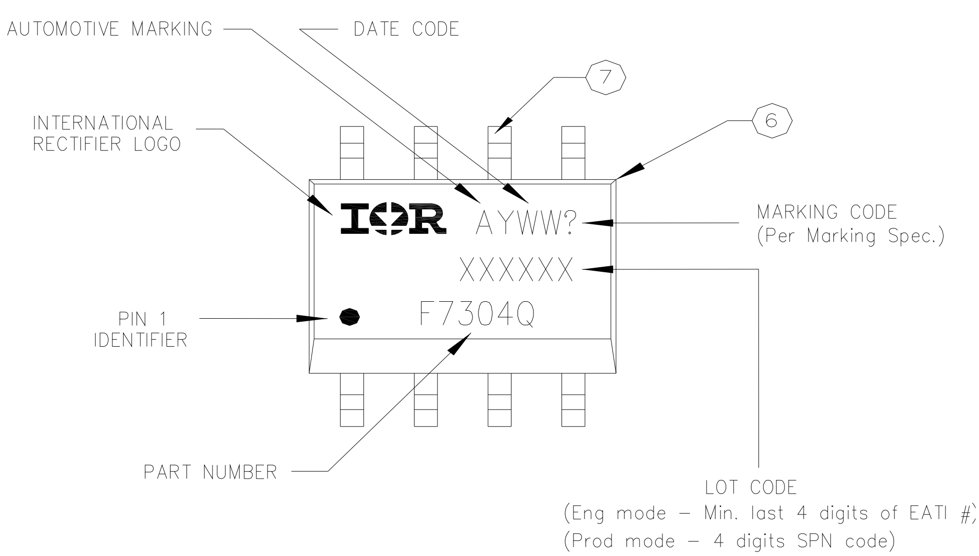
NOTES:

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

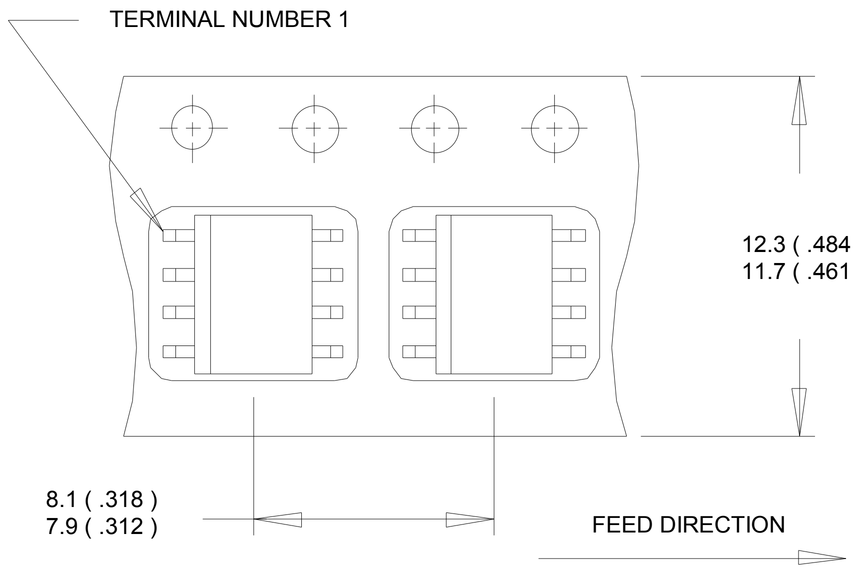


SO-8 Part Marking Information

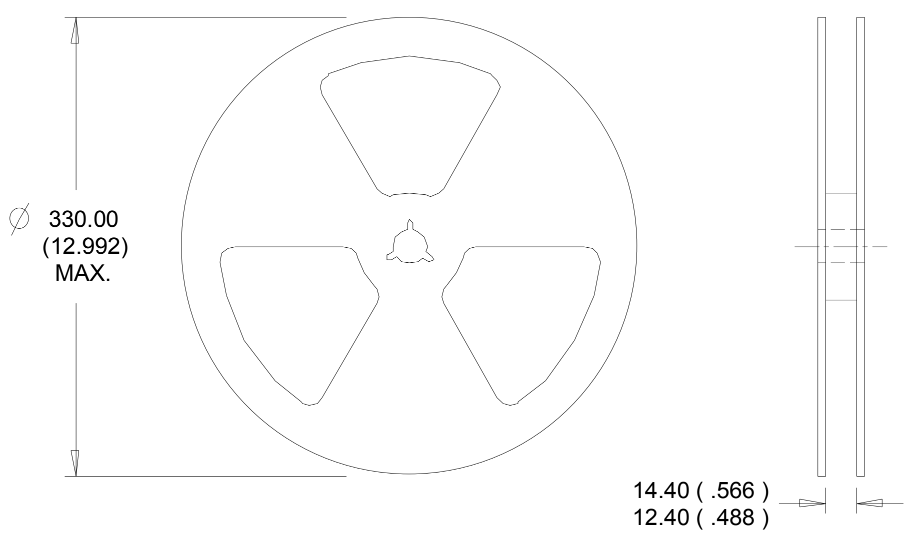


Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

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

Qualification Level		Automotive (per AEC-Q101)	
		Comments: This part number(s) passed Automotive qualification. Infineon'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 H0 (+/- 250V)† AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V)† AEC-Q101-005	
RoHS Compliant		Yes	

† Highest passing voltage.

Revision History

Date	Comments
11/16/2015	• Updated datasheet with corporate template • Corrected ordering table on page 1.

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