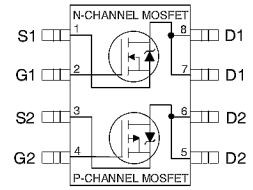
International
IOR Rectifier

PD - 96106

IRF7307QPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dual N and P Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Automotive [Q101] Qualified
- Lead-Free



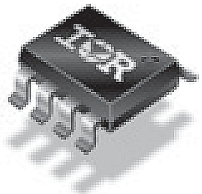
Top View

	N-Ch	P-Ch
V_{DSS}	20V	-20V
$R_{DS(on)}$	0.050Ω	0.090Ω

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.


SO-8

Absolute Maximum Ratings

	Parameter	Max.		Units
		N-Channel	P-Channel	
I_D @ T_A = 25°C	10 Sec. Pulse Drain Current, V_{GS} @ 4.5V	5.7	-4.7	A
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	5.2	-4.3	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	4.1	-3.4	
I_{DM}	Pulsed Drain Current ①	21	-17	
P_D @T_A = 25°C	Power Dissipation	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	-5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150		°C

Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient④	–––	62.5	°C/W

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

	Parameter		Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	N-Ch	20	—	—	V	V_{GS} = 0V, I_D = 250µA
		P-Ch	-20	—	—		V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	N-Ch	—	0.044	—	V/°C	Reference to 25°C, I_D = 1mA
		P-Ch	—	-0.012	—		Reference to 25°C, I_D = -1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	N-Ch	—	—	0.050	Ω	V_{GS} = 4.5V, I_D = 2.6A ③
			—	—	0.070		V_{GS} = 2.7V, I_D = 2.2A ③
		P-Ch	—	—	0.090		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	N-Ch	0.70	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
		P-Ch	-0.70	—	—		V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	N-Ch	8.30	—	—	S	V_{DS} = 15V, I_D = 2.6A ③
		P-Ch	4.00	—	—		V_{DS} = -15V, I_D = -2.2A ③
I_{DSS}	Drain-to-Source Leakage Current	N-Ch	—	—	1.0	µA	V_{DS} = 16V, V_{GS} = 0V
		P-Ch	—	—	-1.0		V_{DS} = -16V, V_{GS} = 0V,
		N-Ch	—	—	25		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
		P-Ch	—	—	-25		V_{DS} = -16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	N-P	—	—	±100		V_{GS} = ± 12V
Q_g	Total Gate Charge	N-Ch	—	—	20	nC	N-Channel I_D = 2.6A, V_{DS} = 16V, V_{GS} = 4.5V ③ P-Channel I_D = -2.2A, V_{DS} = -16V, V_{GS} = -4.5V
		P-Ch	—	—	22		
Q_{gs}	Gate-to-Source Charge	N-Ch	—	—	2.2		
		P-Ch	—	—	3.3		
Q_{gd}	Gate-to-Drain ("Miller") Charge	N-Ch	—	—	8.0		
		P-Ch	—	—	9.0		
$t_{d(on)}$	Turn-On Delay Time	N-Ch	—	9.0	—	ns	N-Channel V_{DD} = 10V, I_D = 2.6A, R_G = 6.0Ω, R_D = 3.8Ω ③ P-Channel V_{DD} = -10V, I_D = -2.2A, R_G = 6.0Ω, R_D = 4.5Ω
		P-Ch	—	8.4	—		
t_r	Rise Time	N-Ch	—	42	—		
		P-Ch	—	26	—		
$t_{d(off)}$	Turn-Off Delay Time	N-Ch	—	32	—		
		P-Ch	—	51	—		
t_f	Fall Time	N-Ch	—	51	—		
		P-Ch	—	33	—		
L_D	Internal Drain Inductace	N-P	—	4.0	—	nH	Between lead tip and center of die contact
L_S	Internal Source Inductance	N-P	—	6.0	—		
C_{iss}	Input Capacitance	N-Ch	—	660	—	pF	N-Channel V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz ③ P-Channel V_{GS} = 0V, V_{DS} = -15V, f = 1.0MHz
		P-Ch	—	610	—		
C_{oss}	Output Capacitance	N-Ch	—	280	—		
		P-Ch	—	310	—		
C_{rss}	Reverse Transfer Capacitance	N-Ch	—	140	—		
		P-Ch	—	170	—		

Source-Drain Ratings and Characteristics

	Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	N-Ch	—	—	2.5	A	
		P-Ch	—	—	-2.5		
I_{SM}	Pulsed Source Current (Body Diode) ①	N-Ch	—	—	21		
		P-Ch	—	—	-17		
V_{SD}	Diode Forward Voltage	N-Ch	—	—	1.0	V	T_J = 25°C, I_S = 1.8A, V_{GS} = 0V ③
		P-Ch	—	—	-1.0		T_J = 25°C, I_S = -1.8A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	N-Ch	—	29	44	ns	N-Channel T_J = 25°C, I_F = 2.6A, di/dt = 100A/µs P-Channel ③ T_J = 25°C, I_F = -2.2A, di/dt = 100A/µs
		P-Ch	—	56	84		
Q_{rr}	Reverse Recovery Charge	N-Ch	—	22	33	nC	
		P-Ch	—	71	110		
t_{on}	Forward Turn-On Time	N-P	Intrinsic turn-on time is neglegible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 23)

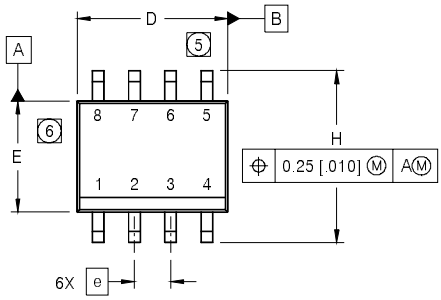
② N-Channel I_{SD} ≤ 2.6A, di/dt ≤ 100A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C
P-Channel I_{SD} ≤ -2.2A, di/dt ≤ 50A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

③ Pulse width ≤ 300µs; duty cycle ≤ 2%.

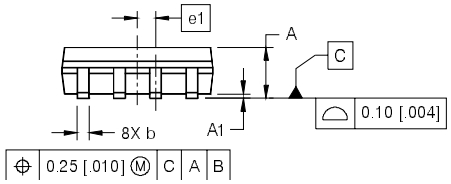
④ Surface mounted on FR-4 board, t ≤ 10sec.

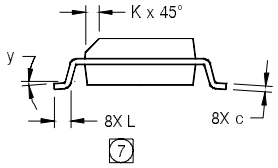
SO-8 Package Outline

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°





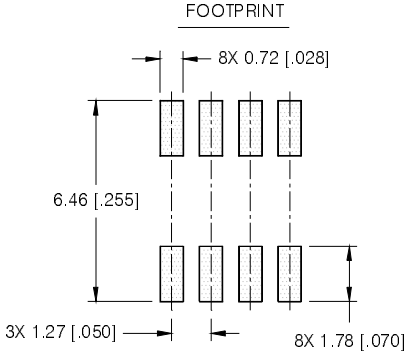
NOTES:

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].

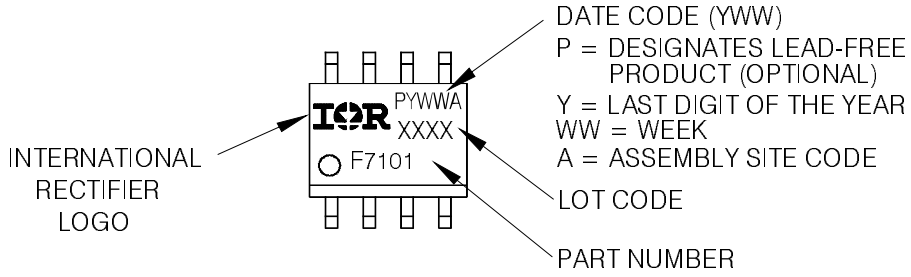
6 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].

7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



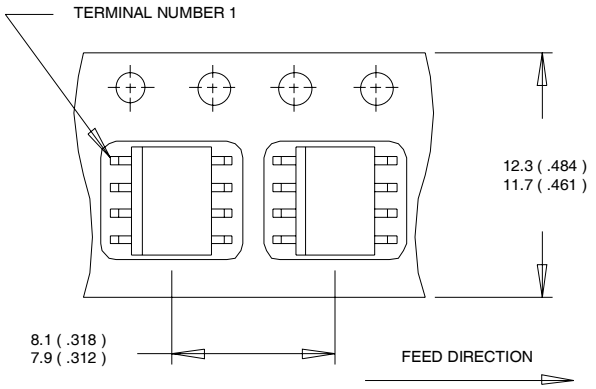
SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

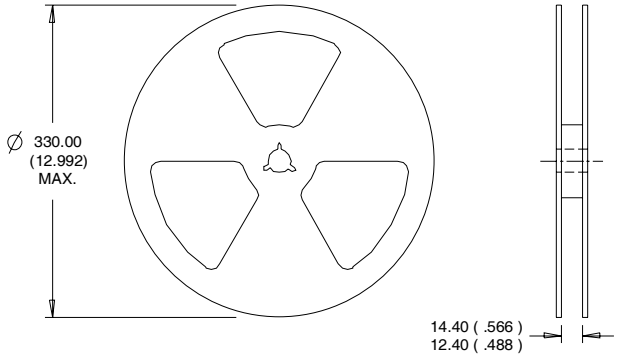


SO-8 Tape and Reel

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.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Automotive [Q101] market.
Qualification Standards can be found on IR's Web site.

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