International
IOR Rectifier

IRF7103QPbF

AUTOMOTIVE MOSFET

HEXFET® Power MOSFET

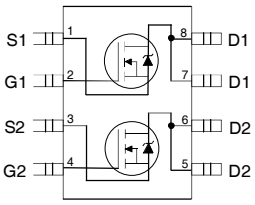
Typical Applications

- Anti-lock Braking Systems (ABS)
- Electronic Fuel Injection
- Power Doors, Windows & Seats

V_{DSS}	$R_{DS(on)}$ max (mΩ)	I_D
50V	130@V_{GS} = 10V	3.0A
	200@V_{GS} = 4.5V	1.5A

Benefits

- Advanced Process Technology
- Dual N-Channel MOSFET
- Ultra Low On-Resistance
- 175°C Operating Temperature
- Repetitive Avalanche Allowed up to Tjmax
- Automotive [Q101] Qualified
- Lead-Free



Top View


SO-8

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 175°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.

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	3.0	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	2.5	
I_{DM}	Pulsed Drain Current ①	25	
P_D @T_A = 25°C	Power Dissipation ③	2.4	W
	Linear Derating Factor	16	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ④	22	mJ
I_{AR}	Avalanche Current ①	See Fig. 16c, 16d, 19, 20	A
E_{AR}	Repetitive Avalanche Energy ⑥		mJ
dv/dt	Peak Diode Recovery dv/dt ⑤	12	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

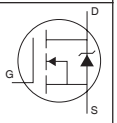
	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	——	42	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④⑤	——	50	

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	50	——	——	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.057	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	130	mΩ	V_{GS} = 10V, I_D = 3.0A ②
		——	——	200		V_{GS} = 4.5V, I_D = 1.5A ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	——	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	3.4	——	——	S	V_{DS} = 15V, I_D = 3.0A
I_{DSS}	Drain-to-Source Leakage Current	——	——	2.0	µA	V_{DS} = 40V, V_{GS} = 0V
		——	——	25		V_{DS} = 40V, V_{GS} = 0V, T_J = 55°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -20V
Q_g	Total Gate Charge	——	10	15	nC	I_D = 2.0A
Q_{gs}	Gate-to-Source Charge	——	1.2	——		V_{DS} = 40V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	2.8	——		V_{GS} = 10V
$t_{d(on)}$	Turn-On Delay Time	——	5.1	——	ns	V_{DD} = 25V ②
t_r	Rise Time	——	1.7	——		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time	——	15	——		R_G = 6.0Ω
t_f	Fall Time	——	2.3	——		R_D = 25Ω
C_{iss}	Input Capacitance	——	255	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	69	——		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	——	29	——		f = 1.0MHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	3.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	12		
V_{SD}	Diode Forward Voltage	——	——	1.2	V	T_J = 25°C, I_S = 1.5A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	——	35	53	ns	T_J = 25°C, I_F = 1.5A
Q_{rr}	Reverse Recovery Charge	——	45	67	nC	di/dt = 100A/µs ②



Notes:

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

② Pulse width ≤ 400µs; duty cycle ≤ 2%.

③ Surface mounted on 1 in square Cu board

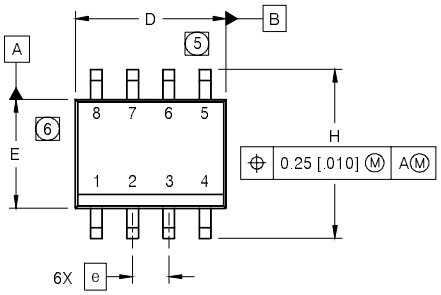
④ Starting T_J = 25°C, L = 4.9mH R_G = 25Ω, I_{AS} = 3.0A. (See Figure 12).

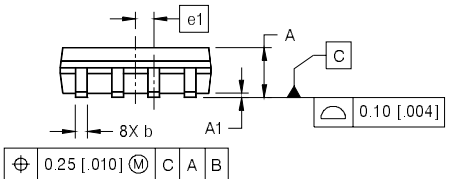
⑤ I_{SD} ≤ 2.0A, di/dt ≤ 155A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C

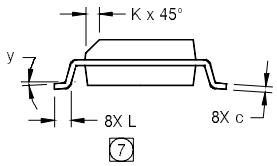
⑥ Limited by T_{Jmax} , see Fig.16c, 16d, 19, 20 for typical repetitive avalanche performance.

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



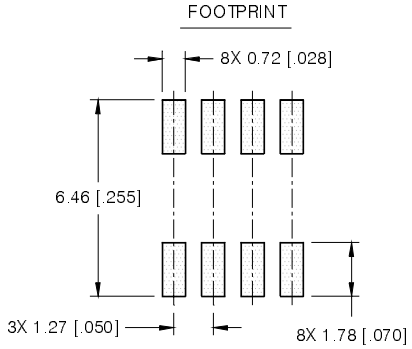




DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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

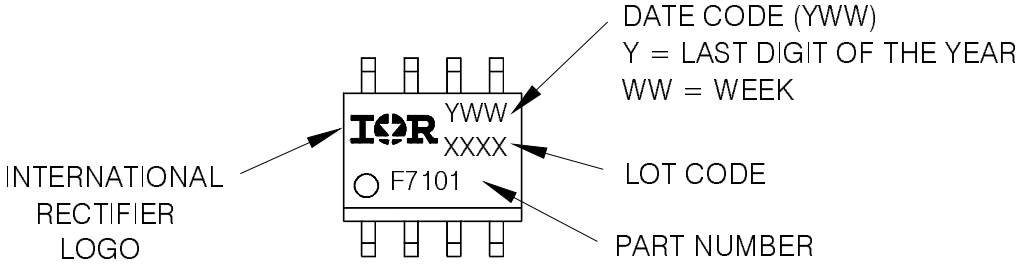
NOTES:

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.

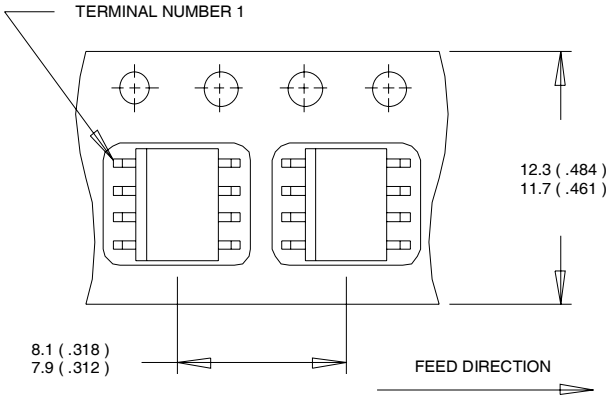


SO-8 Part Marking

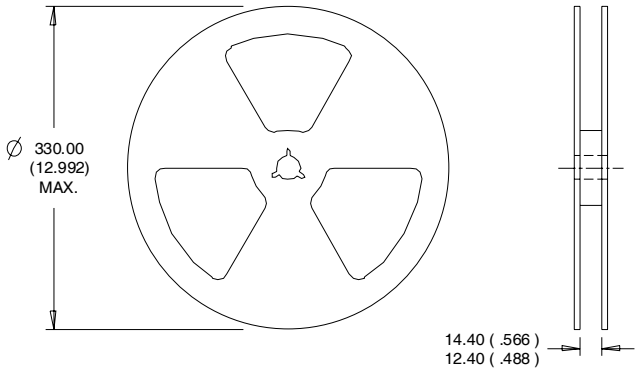
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



SO-8 Tape and Reel



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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