WM7110 Series

Analogue Silicon Microphone

DESCRIPTION

The WM7110 is a compact high Signal to Noise Ratio (SNR) silicon analogue microphone for use in consumer applications requiring low supply current, typically 140µA, and excellent signal quality. It offers low THD and good linearity to offer excellent sound quality. Using Wolfson Microelectronics' unique CMOS/MEMS membrane technology it delivers high reliability and performance in a miniature low profile package.

The WM7110 can withstand the high temperatures needed for automated reflow solder assembly, which can damage conventional microphones. Automated pick and place equipment can be used for assembly on to circuit boards.

The WM7110E offers tighter sensitivity tolerance which reduces the variation between microphones and removes the need for production in-line calibration to compensate for microphone variation.

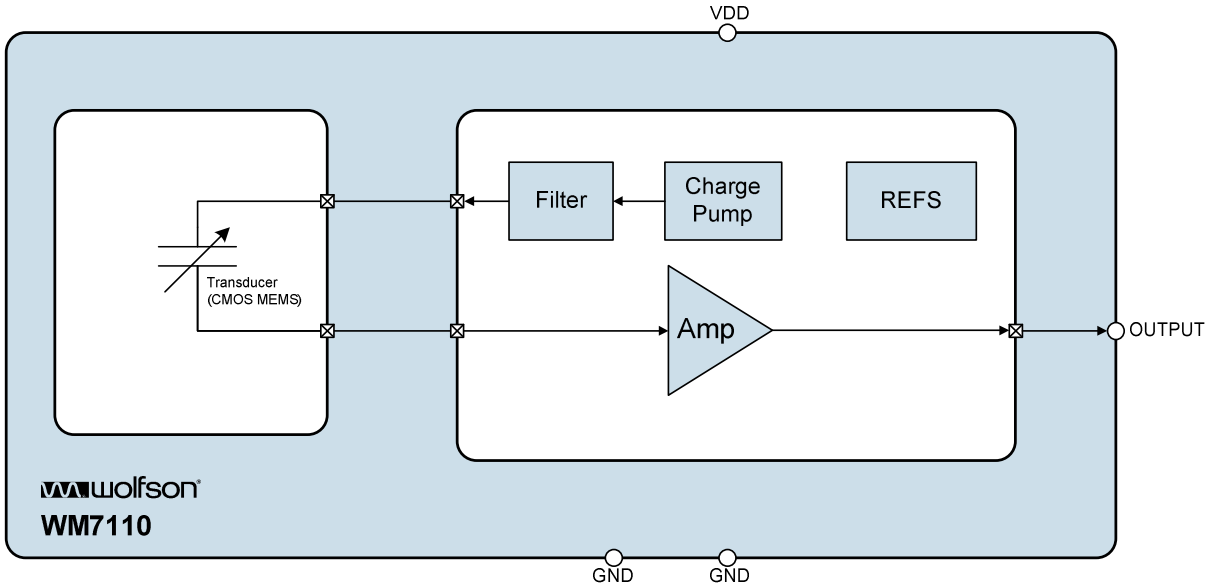
FEATURES

- Excellent SNR and Sensitivity tolerance options
  - WM7110IMS, SNR 59dB, Sensitivity +/-3dB
  - WM7110IMSE, SNR 59dB, Sensitivity +/-1dB
- Low supply current 140µA
- Low profile packaging
- Automated flow solder assembly
- Analogue output
- Top Port Package
- 1.5V to 3.7V supply
- 4.72mm x 3.76mm x 1.25mm Package

APPLICATIONS

- Mobile phone handsets
- Portable media players
- Digital still cameras
- Digital video cameras
- Bluetooth headsets
- Portable navigation devices
- Portable games consoles

BLOCK DIAGRAM



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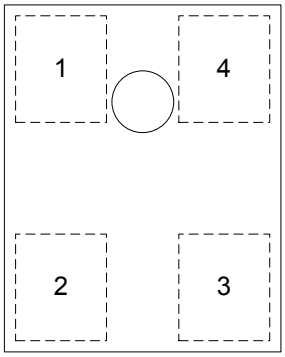
PIN CONFIGURATION



Top View

PIN DESCRIPTION

PIN	NAME	TYPE	DESCRIPTION
1	OUTPUT	Analogue Output	Microphone analogue output signal
2	GND	Supply	Analogue ground
3	GND	Supply	Analogue ground
4	VDD	Supply	Analogue supply

ORDERING INFORMATION

DEVICE	DESCRIPTION	TEMPERATURE RANGE	MOISTURE SENSITIVITY LEVEL	PEAK SOLDERING TEMPERATURE
WM7110IMS/V	Standard	-40 to +100°C	MSL2A	+260°C
WM7110IMS/RV	Standard (tape and reel)	-40 to +100°C	MSL2A	+260°C
WM7110IMSE/V	Standard Enhanced	-40 to +100°C	MSL2A	+260°C
WM7110IMSE/RV	Standard Enhanced (tape and reel)	-40 to +100°C	MSL2A	+260°C

Note:

Reel quantity = 4,800

All devices are Pb-free and Halogen free.

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings are stress ratings only. Permanent damage to the device may be caused by continuously operating at or beyond these limits. Device functional operating limits and guaranteed performance specifications are given under Electrical Characteristics at the test conditions specified.

ESD Sensitive Device. This device is manufactured on a CMOS process. It is therefore generically susceptible to damage from excessive static voltages. Proper ESD precautions must be taken during handling and storage of this device.

Wolfson tests its package types according to IPC/JEDEC J-STD-020 for Moisture Sensitivity to determine acceptable storage conditions prior to surface mount assembly. These levels are:

MSL1 = unlimited floor life at <30°C / 85% Relative Humidity. Not normally stored in moisture barrier bag.
MSL2 = out of bag storage for 1 year at <30°C / 60% Relative Humidity. Supplied in moisture barrier bag.
MSL2A = out of bag storage for 4 weeks at <30°C / 60% Relative Humidity. Supplied in moisture barrier bag.
MSL3 = out of bag storage for 168 hours at <30°C / 60% Relative Humidity. Supplied in moisture barrier bag.
The Moisture Sensitivity Level for each package type is specified in Ordering Information.

CONDITION	MIN	MAX
Supply Voltage	-0.3V	+4.2V
Operating temperature range, T_A	-40ºC	+100ºC
Storage temperature prior to soldering	30°C max / 60% RH max	
Storage temperature after soldering	-40ºC	+100ºC

Do not put a vacuum over the port hole of the microphone. Placing a vacuum over the port hole can damage the device. For information on recommended pick and place vacuum point, please refer to the package dimension drawing.

Do not board wash the microphone after a reflow process. Board washing and the associated cleaning agents can damage the device. Do not expose to ultrasonic cleaning methods.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Analogue Supply Range	VDD	1.5		3.7	V
Ground	GND		0		V

ACOUSTIC AND ELECTRICAL CHARACTERISTICS

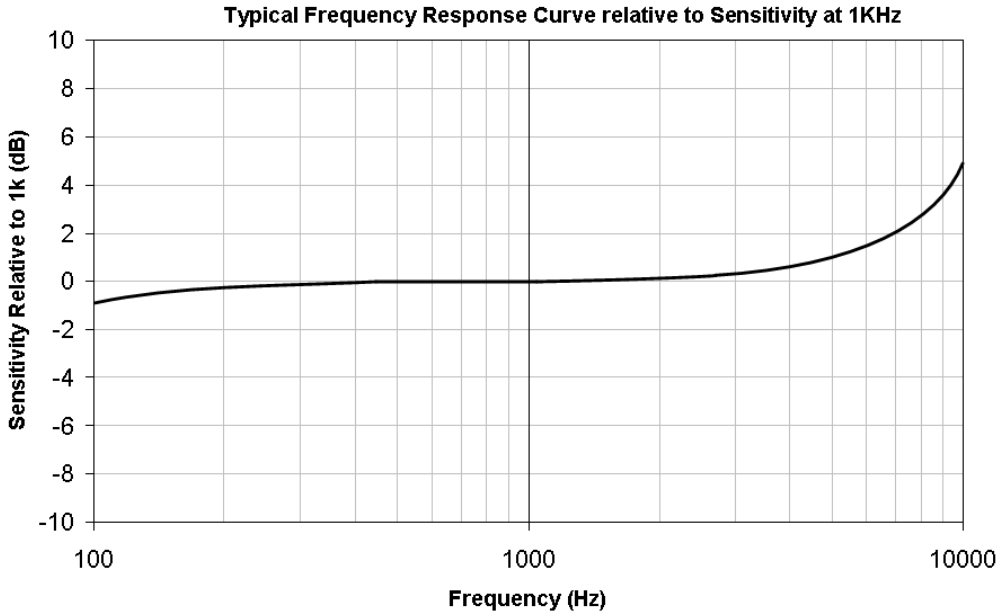
Test Conditions: VDD=2.1V, T_A = 25°C

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Directivity			Omni-directional				
Sensitivity	S	1kHz 94dB SPL (0dB = 1V/Pa)	-45	-42	-39	dB	Standard
			-43	-42	-41	dB	Enhanced
Current Consumption	I_{VDD}			140	190	µA	
Total Harmonic Distortion	THD	1kHz 104dB SPL		0.25		%	
Signal to Noise Ratio	SNR	A- Weighted 20Hz – 20kHz		59		dB	
Input Referred Noise	ENL	A- Weighted 20Hz – 20kHz		35		dB SPL	
Power Supply Rejection Ratio	PSRR		40	50		dB	
Output DC Impedance	Z_{OUT}			100		Ω	
Minimum Load Impedance				20		kΩ	
Acoustic Overload		THD < 10%		125		dB SPL	

TERMINOLOGY

1. Signal-to-Noise Ratio (dB) – SNR is a measure of the ratio between the sensitivity of the microphone to a 94dB SPL sine wave and the A-Weighted analogue idle noise.
2. Total Harmonic Distortion (dB) – THD is the level of the rms value of the sum of harmonic distortion products relative to the amplitude of the applied sound pressure level.
3. All performance measurements carried out with 20 kHz low pass filter, and where noted an A-weighted filter. Failure to use such a filter will result in higher THD and lower SNR readings than are found in the Acoustic and Electrical Characteristics. The low pass filter removes out of band noise; although it is not audible it may affect dynamic specification values.

FREQUENCY RESPONSE CURVE



APPLICATIONS INFORMATION

RECOMMENDED EXTERNAL COMPONENTS

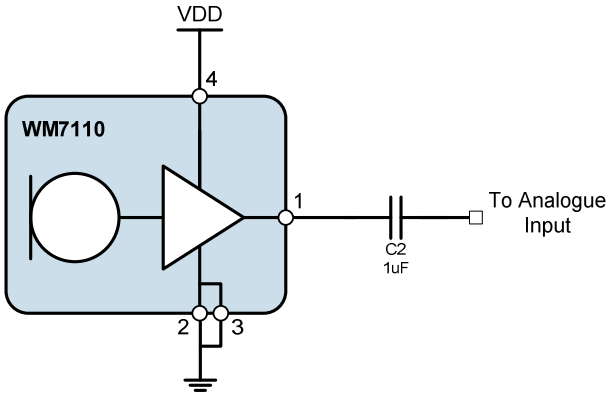


Figure 1 WM7110 Recommended External Components

Notes:

1. The value of C2 should be selected with reference to the input impedance of the analogue input the microphone is connected to. C2 and the input impedance create a high pass filter, the value of C2 should be selected to pass the lowest frequency of audible interest.

CONNECTION TO A WOLFSON AUDIO CODEC

Wolfson has a range of audio CODEC's, DAC's and ADC's with microphone input interfaces which support the direct connection of the WM7110. As an example, Figure 2 details the connection of the WM7110 to the WM8990 audio CODEC. The same principles can be applied to Wolfson devices which support microphone inputs. Further details on the WM8990 can be obtained form the Wolfson website.

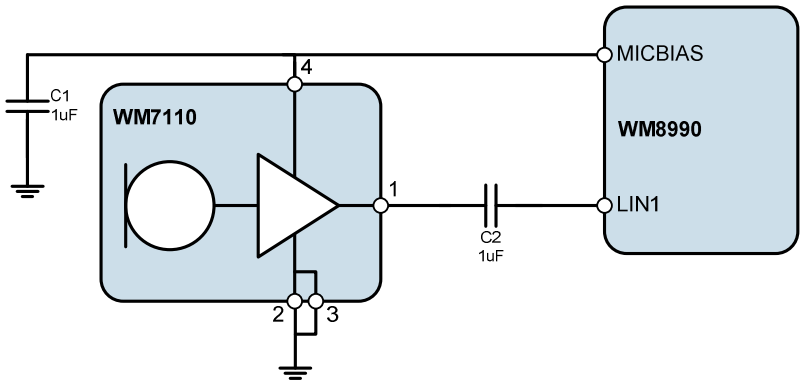
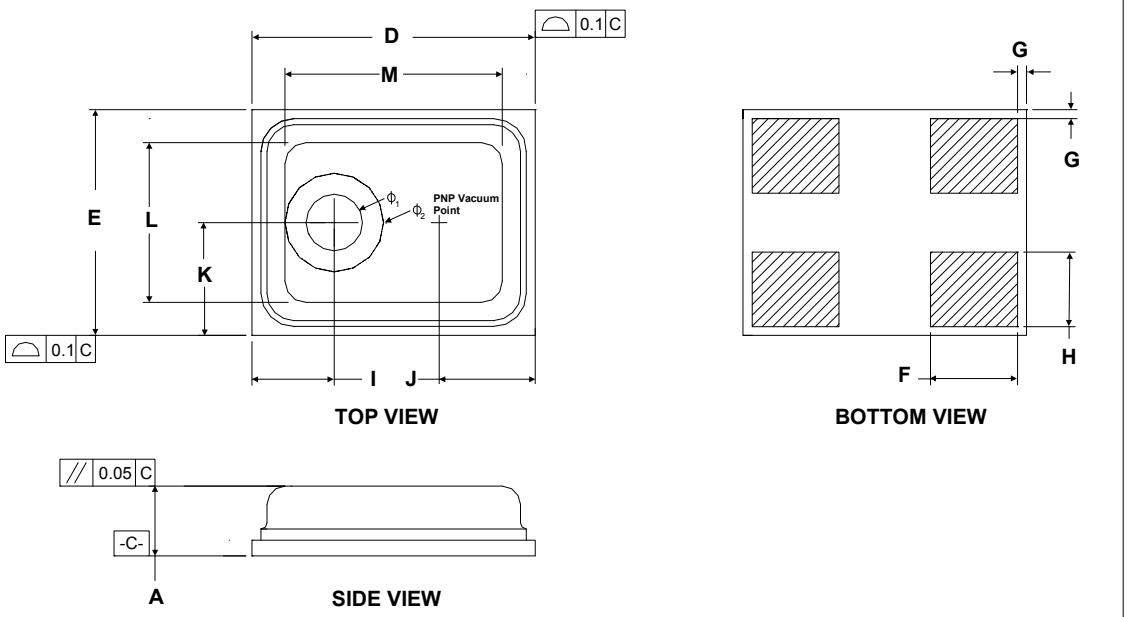


Figure 2 Connection of WM7110 to WM8990

PACKAGE DIMENSIONS

MS4: PACKAGE 4.72 x 3.76 x 1.25 mm BODY **DM057.B**



Symbols	Dimensions (mm)			
	MIN	NOM	MAX	NOTE
A	1.15	1.25	1.35	
D	4.62	4.72	4.82	
E	3.66	3.76	3.86	
F	1.30	1.45	1.60	
G		0.15		
H	1.09	1.24	1.39	
K	1.63	1.88	2.13	
I	1.17	1.37	1.57	
J		1.60		
L		2.66		Flat Area
M		3.62		Flat Area
ϕ_1	0.89	0.94	0.99	
ϕ_2		1.64		Gasket Area

NOTES:
1. THE SEATING PLANE IS REPRESENTED BY PRIMARY DATUM -C-
2. THE DEVIATION FROM THE SEATING PLANE DUE TO WARPAGE OR TWIST IS SPECIFIED AS MAX 50µm (FLATNESS).
3. LID SHOULD BE PARALLEL TO THE SEATING PLANE ±50µm.

RECOMMENDED CUSTOMER LAND PATTERNS

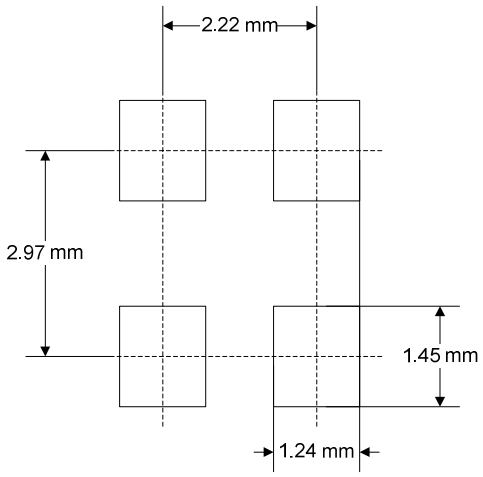


Figure 3 Recommended Customer PCB Land Pattern

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