

Analogue Silicon Microphone

DESCRIPTION

The WM7120 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 WM7120 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 WM7120E 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
 - WM7120IMS, SNR 59dB, Sensitivity +/-3dB
 - WM7120IMSE, 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
- 3.76mm x 2.95mm x 1.10mm Package

APPLICATIONS

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

BLOCK DIAGRAM

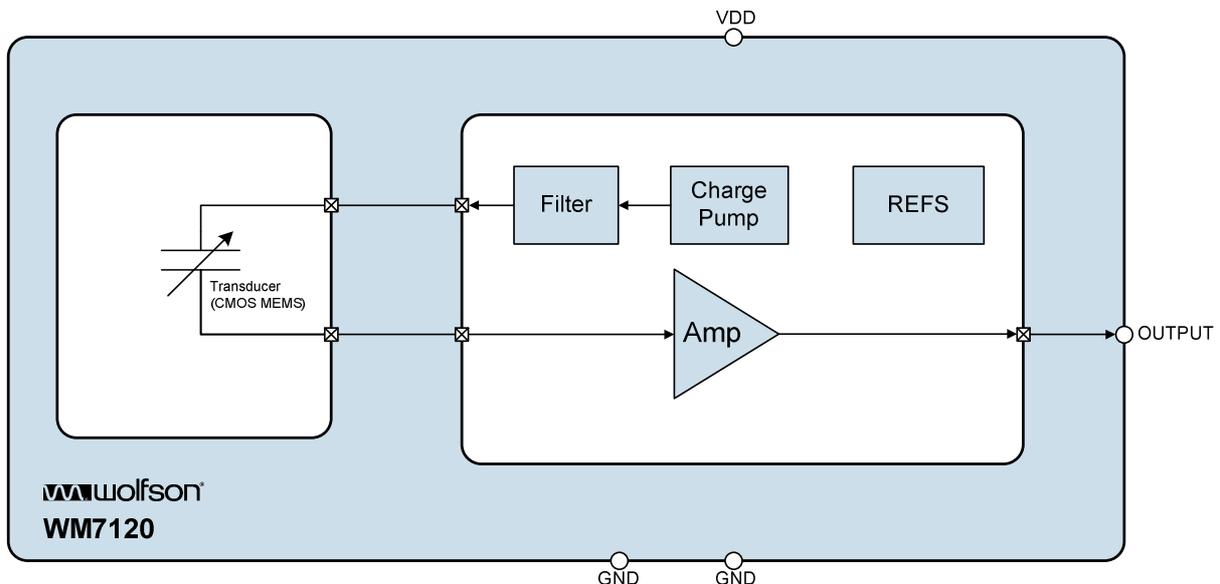
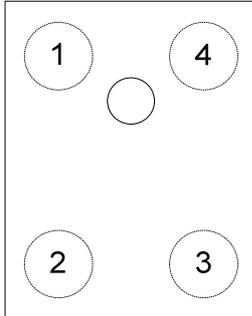


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PIN CONFIGURATION



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 |
|---------------|-----------------------------------|-------------------|----------------------------|----------------------------|
| WM7120IMS/V | Standard | -40 to +100°C | MSL2A | +260°C |
| WM7120IMS/RV | Standard (tape and reel) | -40 to +100°C | MSL2A | +260°C |
| WM7120IMSE/V | Standard Enhanced | -40 to +100°C | MSL2A | +260°C |
| WM7120IMSE/RV | Standard Enhanced (tape and reel) | -40 to +100°C | MSL2A | +260°C |

Note:

Reel quantity = 5,700

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 | -40°C | +100°C |
| Storage temperature prior to soldering | 30°C max / 60% RH max | |
| Storage temperature after soldering | -40°C | +100°C |

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

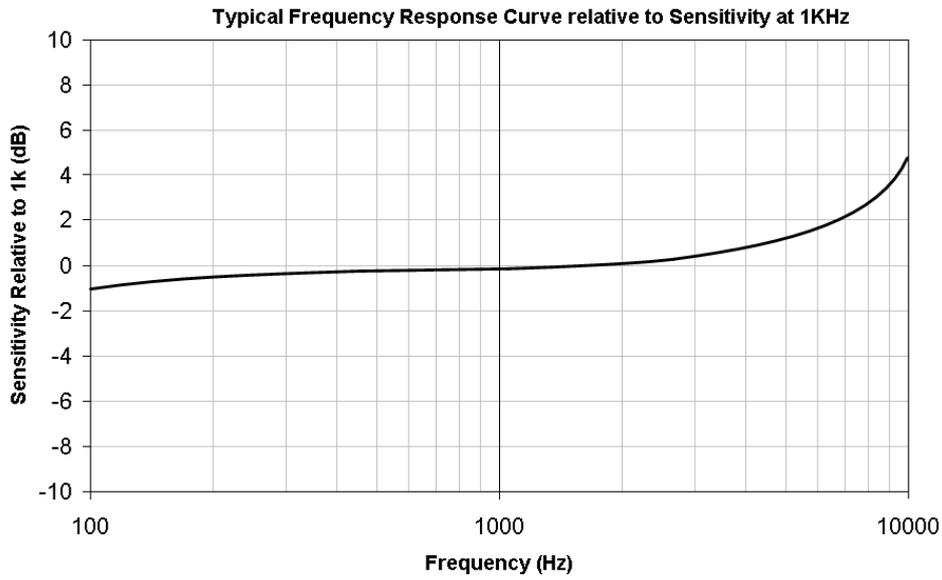
Test Conditions: VDD=2.1V, T_A = 25°C

| 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

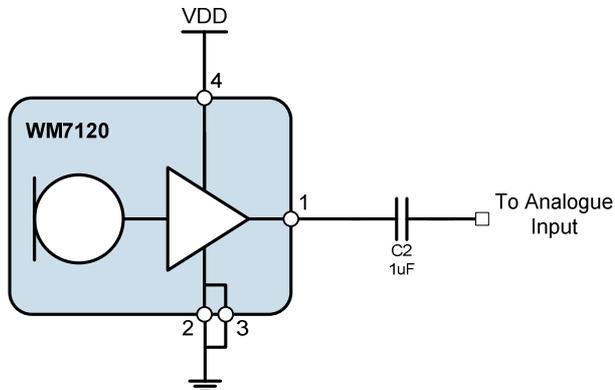


Figure 1 WM7120 Recommended External Components

Note:

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 WM7120. As an example, Figure 2 details the connection of the WM7120 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 from the Wolfson website.

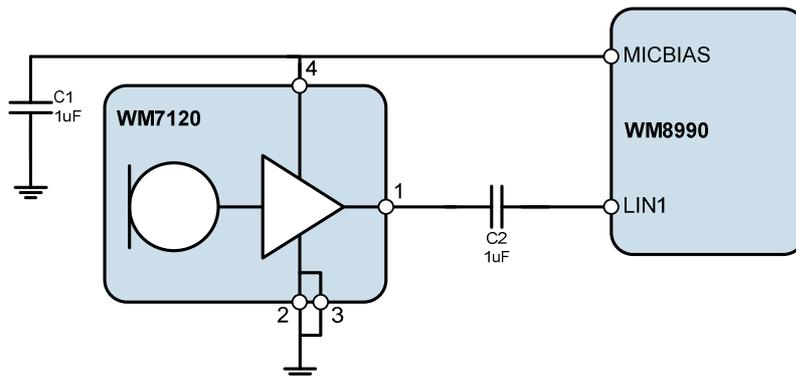
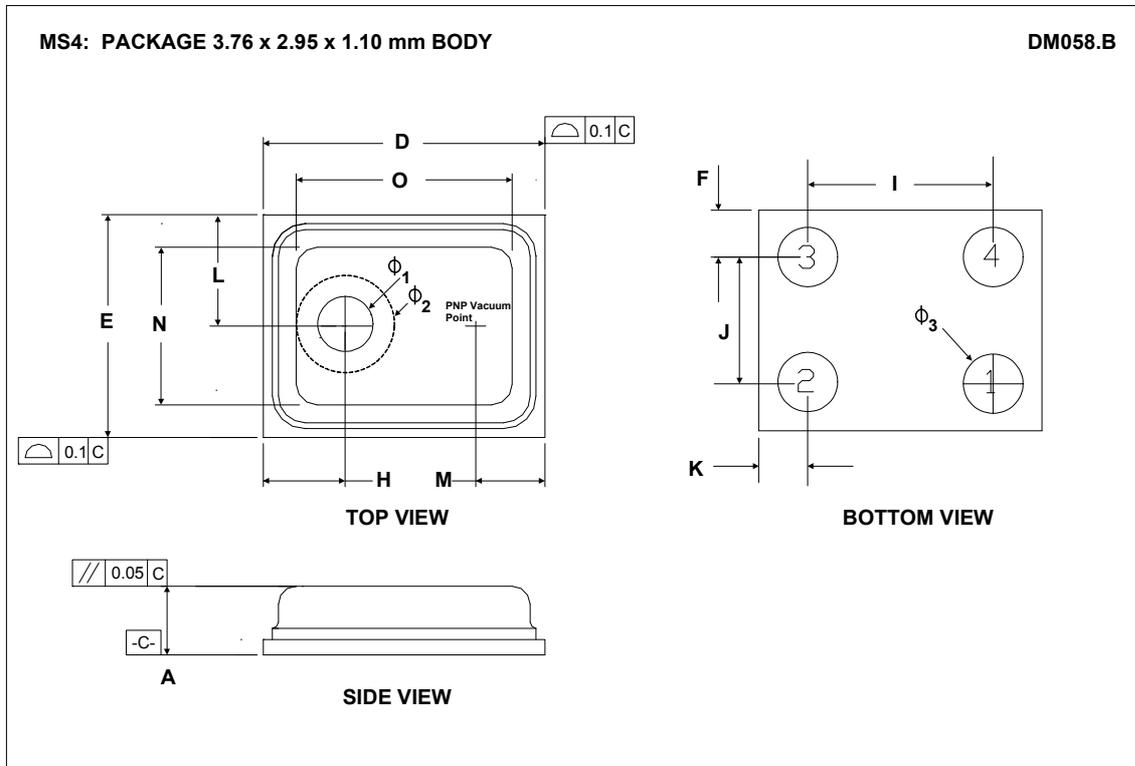


Figure 2 Connection of WM7120 to WM8990

PACKAGE DIMENSIONS



| Symbols | Dimensions (mm) | | | NOTE |
|----------|-----------------|-------|-------|-------------|
| | MIN | NOM | MAX | |
| A | 1.00 | 1.10 | 1.20 | |
| D | 3.66 | 3.76 | 3.86 | |
| E | 2.85 | 2.95 | 3.05 | |
| F | 0.5 | 0.65 | 0.8 | |
| H | 1.03 | 1.18 | 1.33 | |
| I | 2.31 | 2.46 | 2.61 | |
| J | 1.50 | 1.65 | 1.80 | |
| K | 0.50 | 0.65 | 0.80 | |
| L | 1.325 | 1.475 | 1.625 | |
| M | | 1.16 | | |
| N | | 1.90 | | Flat Area |
| O | | 2.71 | | Flat Area |
| ϕ_1 | 0.50 | 0.55 | 0.60 | |
| ϕ_2 | | 1.31 | | Gasket Area |
| ϕ_3 | 0.65 | 0.80 | 0.95 | |

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 50 μ m (FLATNESS).
 3. LID SHOULD BE PARALLEL TO THE SEATING PLANE \pm 50 μ m.

RECOMMENDED CUSTOMER LAND PATTERNS

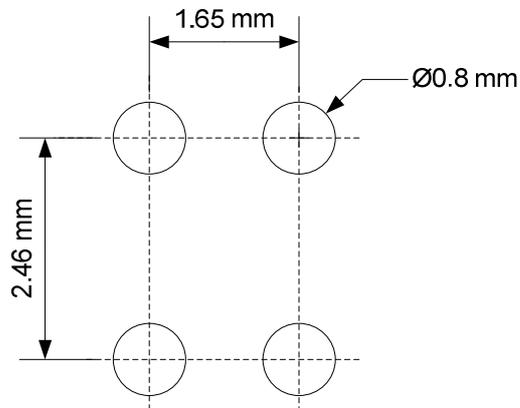


Figure 3 Recommended Customer PCB Land Pattern

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