

## WMM7037AT7

### Top port analog silicon Microphone

[Http://www.willsemi.com](http://www.willsemi.com)

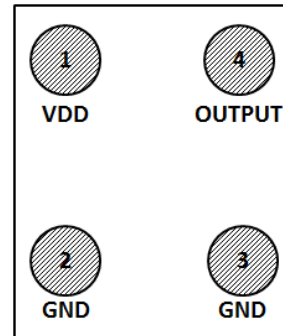
#### Descriptions

The WMM7037AT7 is a miniature, high performance, low power, top port silicon microphone. The WMM7037AT7 consists of an acoustic sensor, a low noise input buffer, and an output amplifier. These devices are suitable for portable electronic devices where excellent wideband audio performance and RF immunity are required applications.

The WMM7037AT7 is manufactured in a compact 3.76mm\*2.95mm\*1.10mm, 4-pin package.



Product appearance



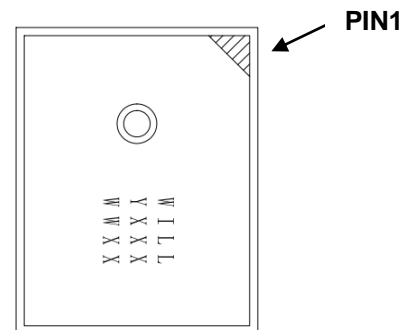
Pin configuration (Bottom view)

#### Features

- Matched Sensitivity
- High sensitivity
- High SNR
- Low current
- Small package
- MaxRF protection
- Ultra-Stable Performance
- Standard SMD Reflow
- Omnidirectional

#### Applications

- Cellphones
- Smart phones
- Laptop computers
- Smart speakers
- Digital still cameras
- Portable music recorders

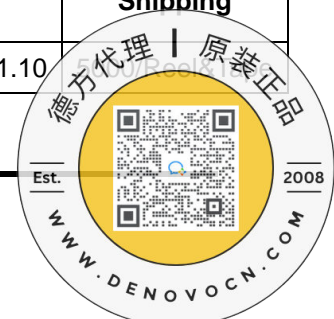


Marking (Top view)

Y = Year code  
 WW = Week code  
 X X = Data code  
 WILL = Device Logo

#### Order information

| Device          | Package (mm)   | Shipping |
|-----------------|----------------|----------|
| WMM7037AT7-4/TR | 3.76*2.95*1.10 |          |



## Absolute maximum ratings

| Parameter                | Absolute Maximum Rating | Units |
|--------------------------|-------------------------|-------|
| VDD to Ground            | -0.5, +5.0              | V     |
| OUT to Ground            | -0.3, VDD + 0.3         | V     |
| Input Current to Any Pin | ±5                      | mA    |
| Temperature Range        | -40 to +100             | °C    |

Stresses exceeding these “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation at these or any other conditions beyond those indicated under “Acoustic & Electrical Specifications” is not implied. Exposure beyond those indicated under “Acoustic & Electrical Specifications” for extended periods may affect device reliability.

## ACOUSTIC & ELECTRICAL SPECIFICATIONS

TEST CONDITIONS: 23 ±2°C, 55±20% R.H., V<sub>DD</sub>(min) < V<sub>DD</sub> < V<sub>DD</sub>(max), no load, unless otherwise indicated

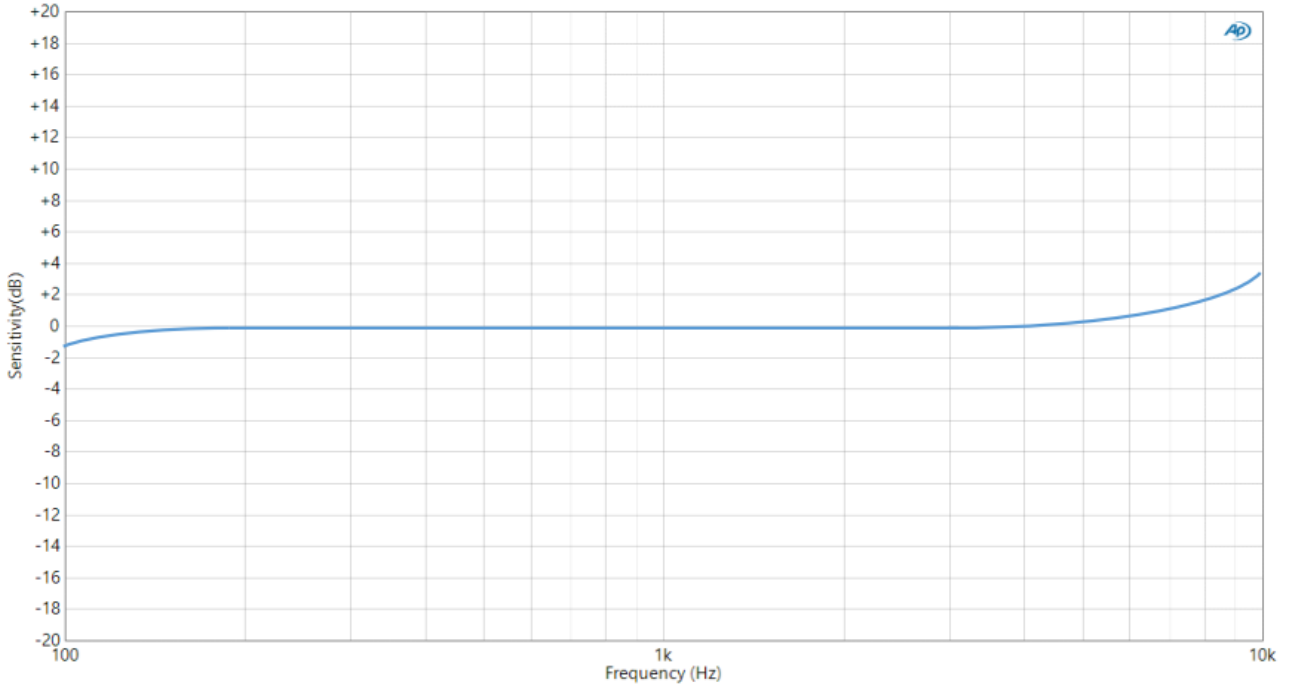
| Parameter                 | Symbol | Conditions   | Min             | Typ  | Max | Units  |
|---------------------------|--------|--|-----------------|------|-----|--------|
| Supply Voltage            | VDD    |  | 1.5             | -    | 3.6 | V      |
| Supply Current            | IDD    |  | -               | 92   | 100 | uA     |
| Sensitivity               | S      | 94dB SPL @1KHz   | -33             | -32  | -31 | dBv    |
| Signal to Noise Ratio     | SNR    | 94dB SPL @1KHz, A-weighted   | -               | 65   | -   | dB(A)  |
| Total Harmonic Distortion | THD    | 94dB SPL @1KHz, S=Typ, VDD=2.2V                                    | -               | 0.15 | 0.2 | %      |
| Acoustic Overload Point   | AOP    | 3%THD @1KHz, S=Typ, VDD=2.2V                                       | 124             | 128  | -   | dB SPL |
| Power Supply Rejection    | PSR    | 100mVpp 7/8 duty cycle rectangular wave @217Hz, A-weight, 20KHz BW | -               | -101 | -   | dBv    |
| DC Output                 |        | VDD=2.2V   | -               | -    | 1.1 | V      |
| Output impedance          | ZOUT   | @1KH   | -               | -    | 300 | Ω      |
| Directivity               |        |  | Omnidirectional |      |     |        |

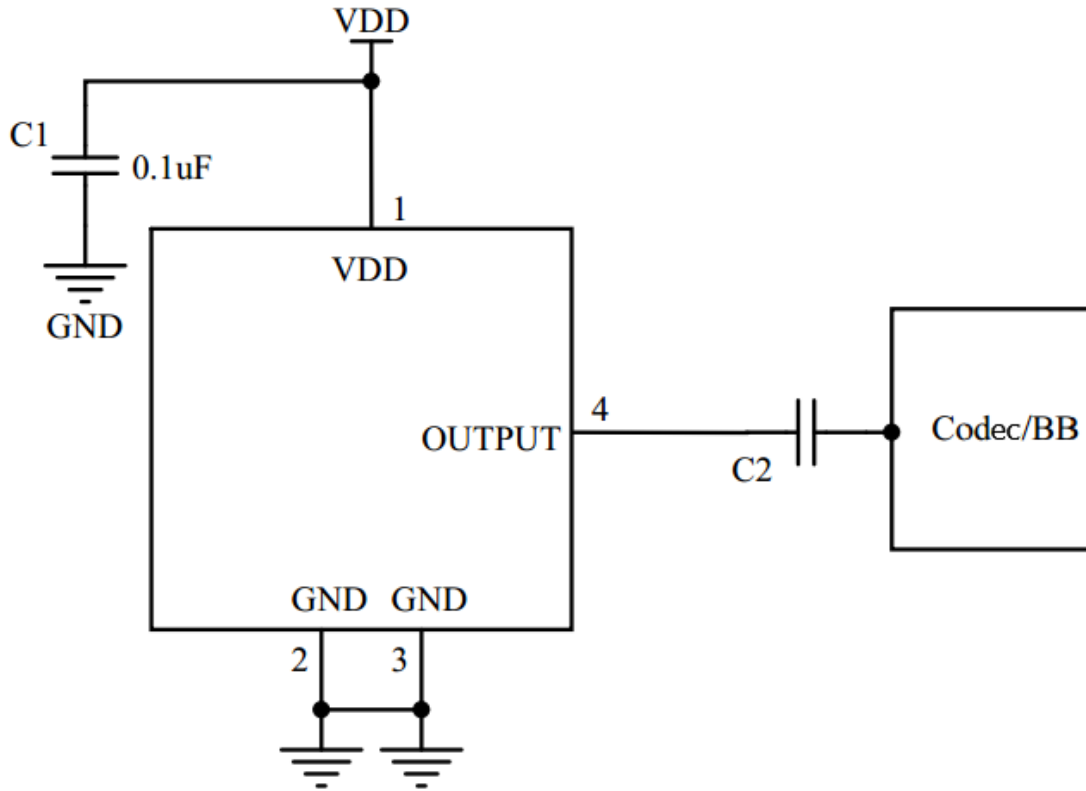
Typical specifications are measured at VDD = 2.2.



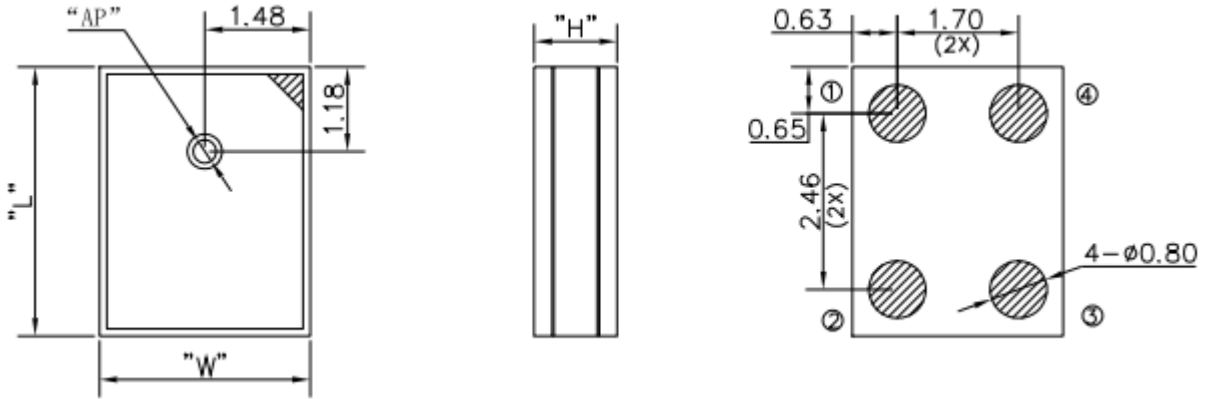
# Frequency response curve

Typical Free Field Response Normalized to 1kHz



**Application informations**

**Note:**

- All GND pins must be connected to ground.
- Capacitors near the microphone should not contain Class 2 dielectrics.

**MECHANICAL SPECIFICATIONS**


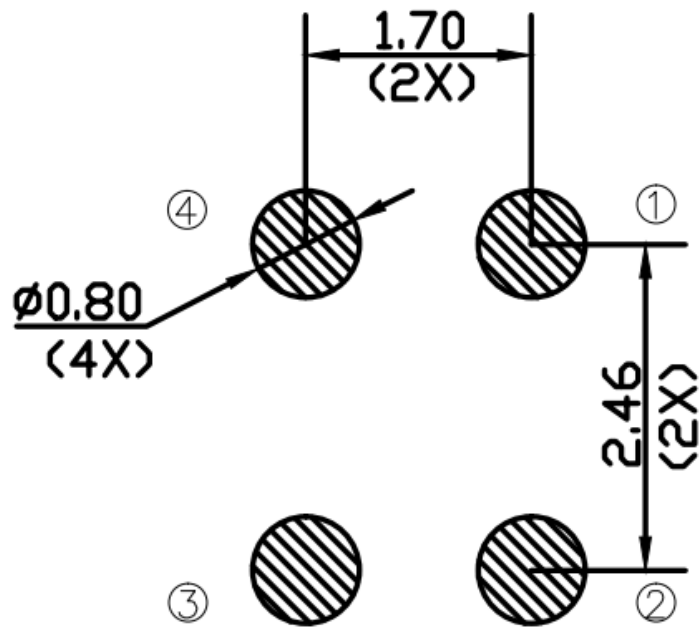
| Item               | Dimension | Tolerance |
|--------------------|-----------|-----------|
| Length(L)          | 3.76      | ±0.10     |
| Width(W)           | 2.95      | ±0.10     |
| Height(H)          | 1.10      | ±0.10     |
| Acoustic Port (AP) | Ø0.325    | ±0.05     |

| Pin# | Pin Name | Description   |
|------|----------|---------------|
| 1    | VDD      | Power Supply  |
| 2    | GND      | GND           |
| 3    | GND      | GND           |
| 4    | OUTPUT   | Output Signal |

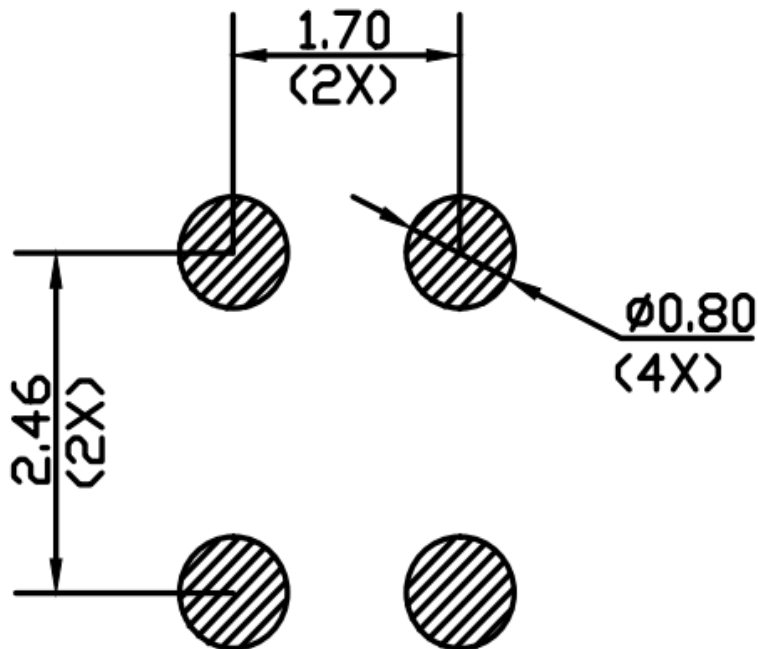
**Notes:**

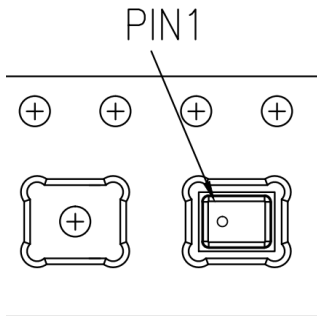
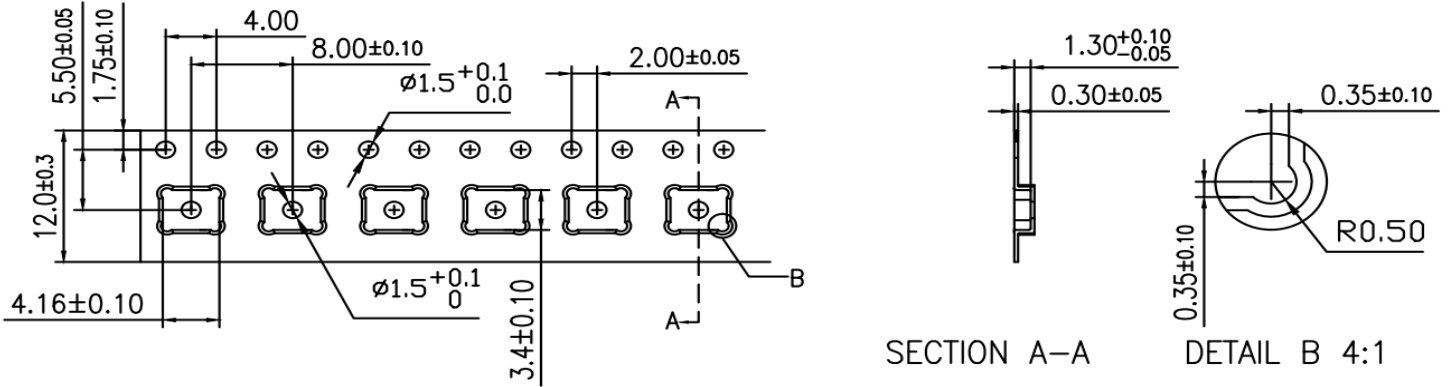
- Dimensions are in millimeters unless otherwise specified.
- Tolerance is ±0.10mm unless otherwise specified.

EXAMPLE LAND PATTERN



EXAMPLE SOLDER STENCIL PATTERN



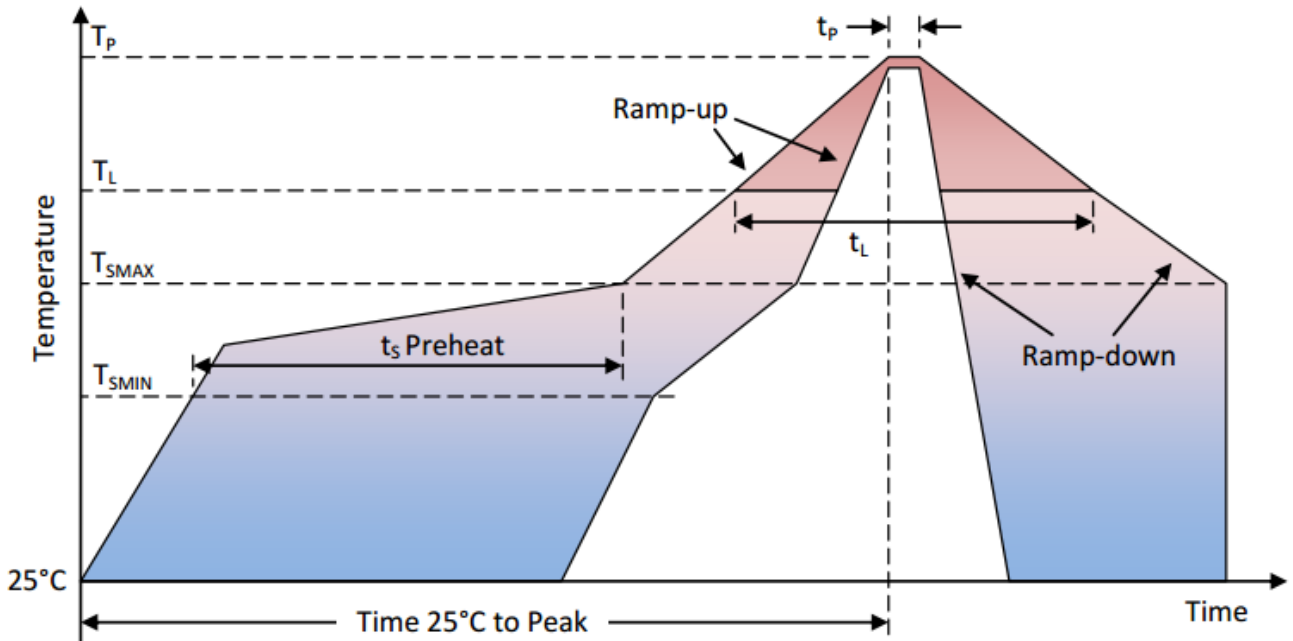
**PACKAGING & MARKING DETAIL**


| Model Number | Reel Diameter | Quantity Per Reel |
|--------------|---------------|-------------------|
| WMM7037AT7   | 13"           | 5,000             |

**Notes:**

- Dimensions are in millimeters unless otherwise specified.
- Vacuum pickup only in the pick area indicated in Mechanical Specifications.
- Tape & reel per EIA-481.
- Labels applied directly to reel and external package.



**REFERENCED REFLOW PROFILE**


| Profile Feature  | Pb-Free                          |
|--|----------------------------------|
| Average Ramp-up rate ( $T_{SMAX}$ to $T_P$ )   | 3°C/second max.                  |
| Preheat <ul style="list-style-type: none"> <li>• Temperature Min (<math>T_{SMIN}</math>)</li> <li>• Temperature Max (<math>T_{SMAX}</math>)</li> <li>• Time (<math>T_{SMIN}</math> to <math>T_{SMAX}</math>) (<math>t_s</math>)</li> </ul> | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above: <ul style="list-style-type: none"> <li>• Temperature (<math>T_L</math>)</li> <li>• Time (<math>t_L</math>)</li> </ul>   | 217°C<br>60-150 seconds          |
| Peak Temperature ( $T_P$ )   | 260°C                            |
| Time within 5°C of actual Peak Temperature ( $t_p$ )   | 20-40 seconds                    |
| Ramp-down rate ( $T_P$ to $T_{SMAX}$ )   | 6°C/second max                   |
| Time 25°C to Peak Temperature  | 8 minutes max                    |

Note:

All temperatures refer to topside of the package, measured on the package body surface.





## ADDITIONAL NOTES

(A) MSL (moisture sensitivity level) Class 2.

(B) Maximum of 3 reflow cycles is recommended.

(C) In order to minimize device damage:

- Do not board wash or clean after the reflow process.
- Do not brush board with or without solvents after the reflow process.
- Do not directly expose to ultrasonic processing, welding, or cleaning.
- Do not insert any object in port hole of device at any time.
- Do not apply over 30 psi of air pressure into the port hole.
- Do not pull a vacuum over port hole of the microphone.
- Do not apply a vacuum when repacking into sealed bags at a rate faster than 0.5 atm/sec.



## RELIABILITY SPECIFICATIONS

| Test                     | Description  |
|--------------------------|--|
| Thermal Shock            | 100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks.                                       |
| High Temperature Storage | 1000 hours at +105°C environment   |
| Low Temperature Storage  | 1000 hours at -40°C environment  |
| Temperature / Humidity   | 1000 hours at +85°C /85% R.H.  |
| Vibration                | 4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20g peak acceleration lasting 12 minutes in X, Y, and Z directions. |
| ESD-HBM                  | 3 discharges of ±2 kV direct contact to I/O pins.  |
| ESD-LID/GND              | 3 discharges of ±8 kV direct contact to lid while unit is grounded.  |
| ESD-MM                   | 3 discharges of ±200V direct contact to I/O pins.  |
| Reflow                   | 5 reflow cycles with peak temperature of +260°C  |
| Mechanical Shock         | 3 pulses of 3,000g in the X, Y, and Z direction  |

**Note:**

After reliability tests are performed, the sensitivity of the microphones shall not deviate more than 3 dB from its initial value.

