



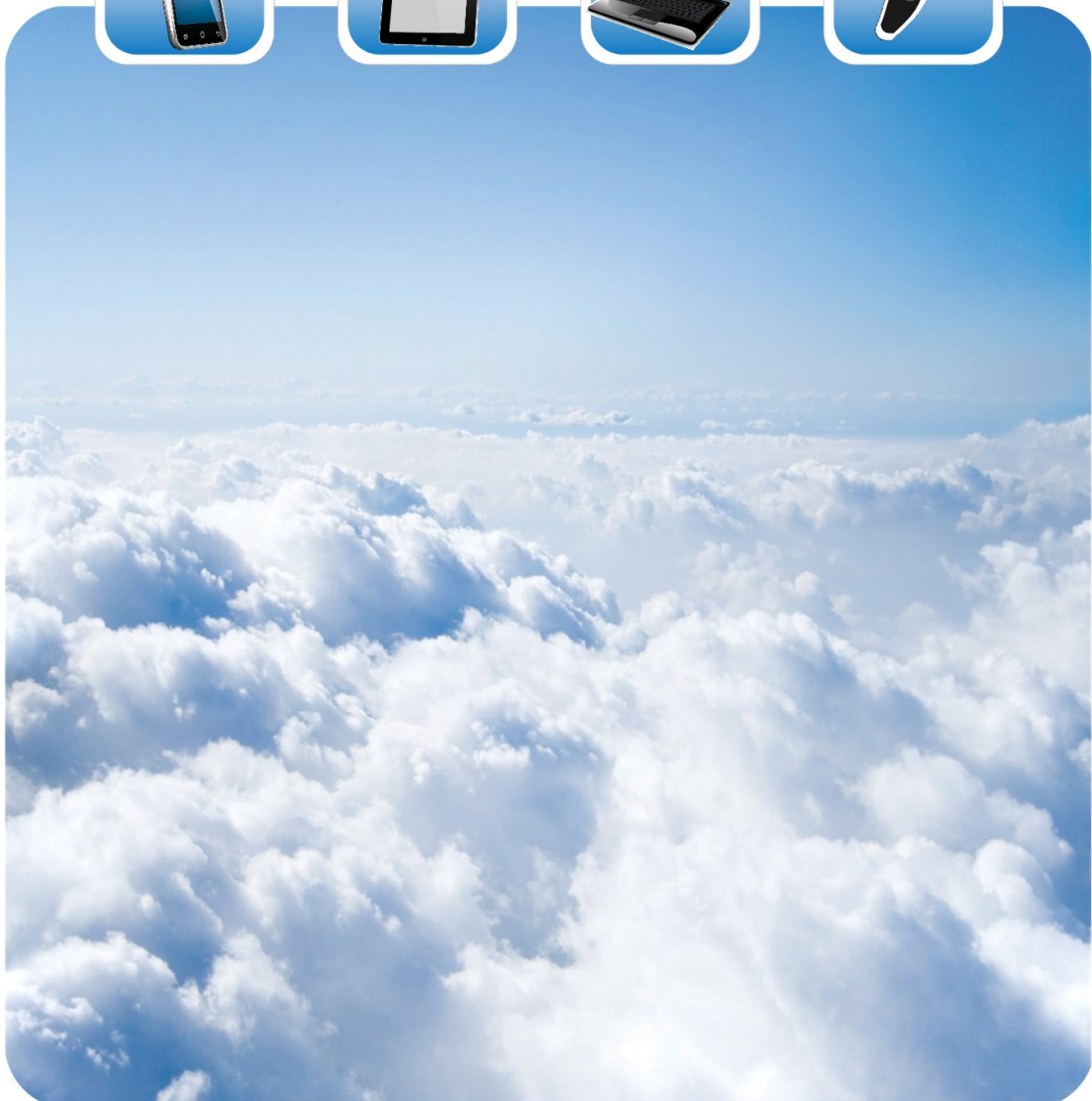
苏州敏芯微电子技术股份有限公司
MEMSensing Microsystems (Suzhou, China) Co., Ltd.

Data Sheet

V 1.2 / Oct . 2017

MSM42A3125H9R-L

Analog output MEMS microphone



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MSM42A3125H9R-L

Analog output MEMS microphone



GENERAL DESCRIPTION

MSM42A3125H9R-L is an omnidirectional, Top-ported, analog output MEMS microphone. It has high performance and reliability.

MSM42A3125H9R-L is available in a thin 3.1 mm × 2.5 mm × 1.0 mm metal can LGA package. It is SMT compatible with no sensitivity degradation.

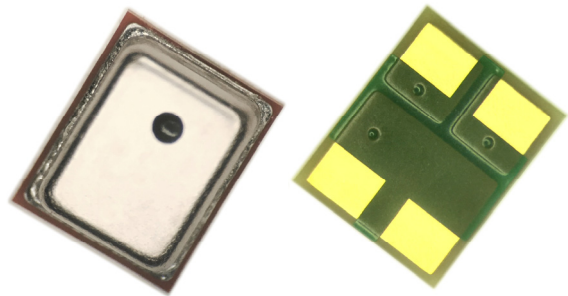
APPLICATIONS

- ✧ Mobile Phone
- ✧ Laptop
- ✧ Tablet computer
- ✧ Bluetooth headset
- ✧ Earphone
- ✧ Wearable intelligent equipment

FEATURES

- ✧ Low Noise
- ✧ Omnidirectional
- ✧ Standard SMD Reflow
- ✧ Compatible with Sn/Pb and Pb-free solder processes
- ✧ RoHS/Halogen free compliant

PRODUCT VIEW



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ABSOLUTE MAXIMUM RATINGS

| Parameter | Maximum value | Unit |
|------------------------------------|---------------|--------|
| Supply Voltage | -0.3 to 4.0 | V |
| Sound Pressure Level | 140 | dB SPL |
| Temperature Range | -40 to 100 | °C |
| Electrostatic discharge protection | 2 (HBM) | kV |

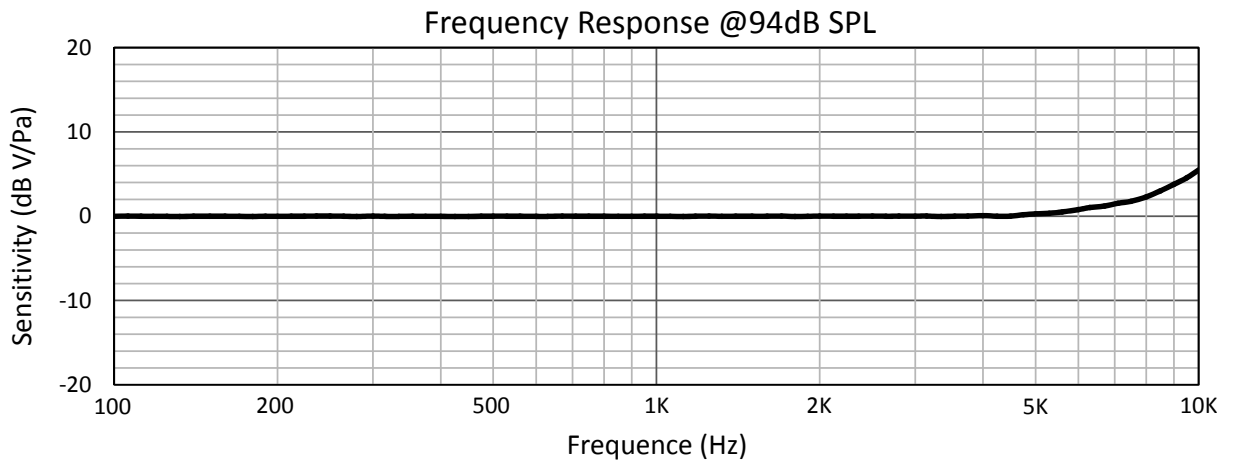
Stresses exceeding these “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation at these or any other conditions beyond those indicated under “Acoustic & Electrical Specifications” is not implied. Exposure beyond those indicated under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

ACOUSTIC & ELECTRICAL SPECIFICATIONS

| All data taken at 25°C, Relative Humidity 45±5% unless otherwise specified | | | | | |
|--|---|------|------|--------|--|
| | Limits | | | unit | condition |
| | Min. | Nom. | Max. | | |
| Directivity | Omni directional | | | | |
| Sensitivity | -45 | -42 | -39 | dB | @1kHz ref 1V/Pa |
| Operation voltage | 1.5 | - | 3.6 | V | |
| Freq. range | Refer to the frequency response graphic | | | Hz | Ref to sensitivity@1kHz |
| Sensitivity loss across supply voltage | No change across the voltage range | | | dB | |
| Signal to noise ratio | - | 60 | - | dB | 20 kHz bandwidth, A-weighted |
| THD | - | 0.1 | - | % | 94dB SPL @1kHz S =Nom, Rload > 2 k |
| AOP | - | 130 | - | dB SPL | 10% THD @1kHz S =Nom, Rload > 2 k |
| Polarity | Increasing output voltage | | | | Increasing sound pressure |
| Output impedance | - | 200 | - | Ω | @1kHz |
| DC Output | 0.7 | | | V | |
| PSRR | - | 70 | - | dB | 200mVpp sine wave @ 1 kHz, VDD = 1.8V |
| PSR | - | -100 | - | dBV(A) | 100 mVpp square wave@ 217 Hz, VDD = 1.8V, A-weighted |
| Current consumption | - | 150 | 170 | μA | |
| Storage temperature | -40 | - | 100 | °C | |

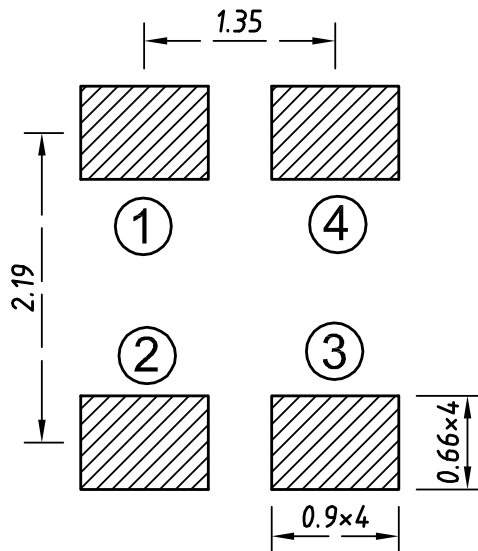


TYPICAL FREQUENCY RESPONSE



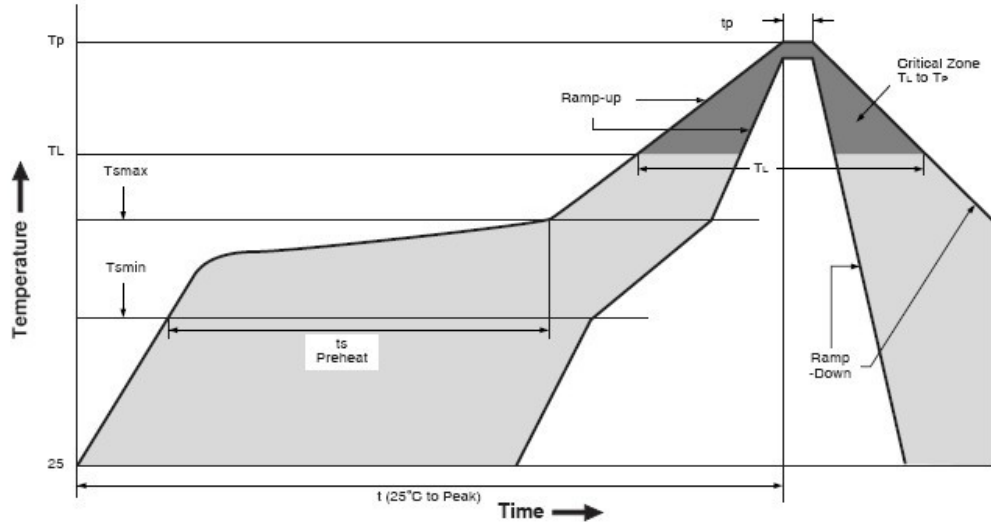
SMT Parameters:

1. Recommend PCB land pattern layout & Example solder stencil pattern: (unit: mm)





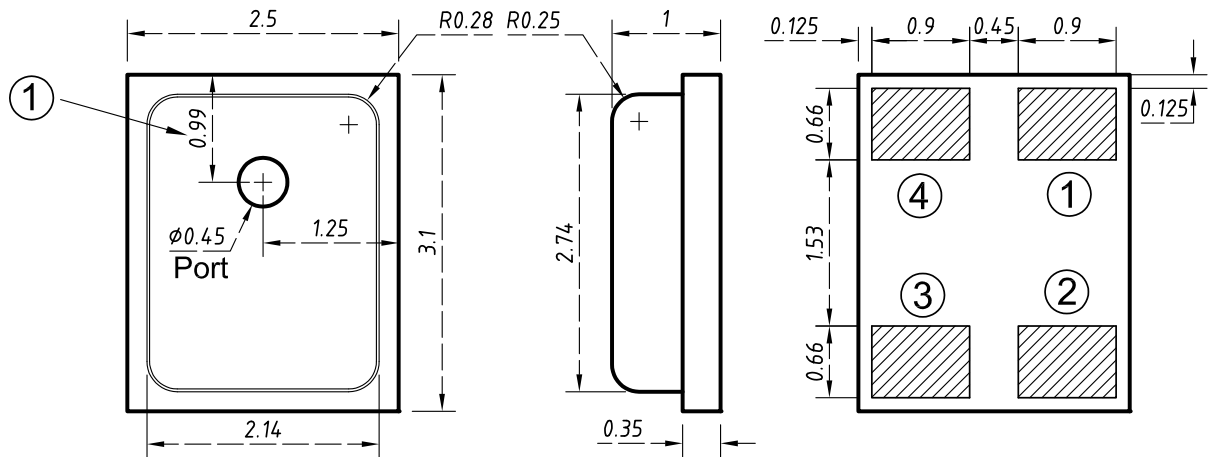
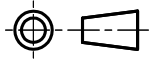
2. Recommend reflow profile:



| Description | Parameter | Pb-free |
|--|---------------------|-------------------|
| Average ramp-up rate | T_{smax} to T_P | 3°C/sec max |
| Preheat | | |
| Minimum temperature | T_{SMIN} | 150 °C |
| Maximum temperature | T_{SMAX} | 200 °C |
| Time(T_{SMIN} to T_{SMAX}) | t_s | 60 sec to 180 sec |
| Ramp-up rate | T_{SMAX} to T_L | 1.25 °C/sec |
| Time maintained above liquidus temperature | t_L | 60 sec to 150 sec |
| Liquidus temperature | T_L | 217 °C |
| Peak temperature | T_P | 260 °C |
| Time within 5°C of actual peak temperature | t_p | 20 sec to 40 sec |
| Ramp-down rate | T_P to T_{smax} | 6 °C/sec max |
| Time 25 °C ($t_{25 °C}$) to peak temperature | t | 8 minutes max |



OUTLINE DIMENSIONS AND PIN DEFINITION:



TOP VIEW

SIDE VIEW

BOTTOM VIEW

PIN function description

| PIN# | Function |
|------|----------|
| 1 | OUT |
| 2 | GND |
| 3 | GND |
| 4 | VDD |

| Item | Dimension | Tolerance |
|--------------------|-----------|-----------|
| Length (L) | 3.10 | ±0.10 |
| Width (W) | 2.50 | ±0.10 |
| Height (H) | 1.00 | ±0.10 |
| Acoustic Port (AP) | ∅0.45 | ±0.05 |

Dimensions are in millimeters
Tolerance is ±0.15mm unless otherwise specified.

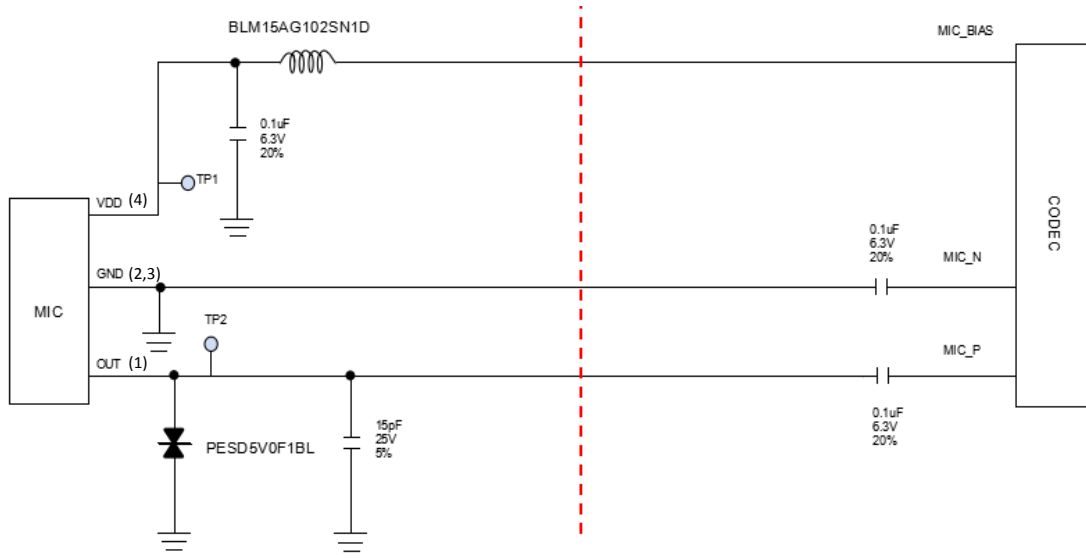
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RECOMMENDED INTERFACE CIRCUIT:

- Recommended Application Example (differential amplification circuit)



NOTE: It is recommended that the components on the left side of red line be placed close to MIC, and components on the right side of red line be placed close to codec.

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ADDITIONAL NOTES

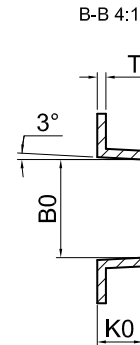
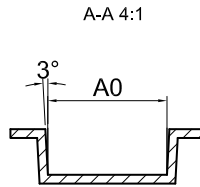
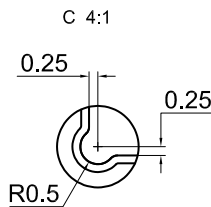
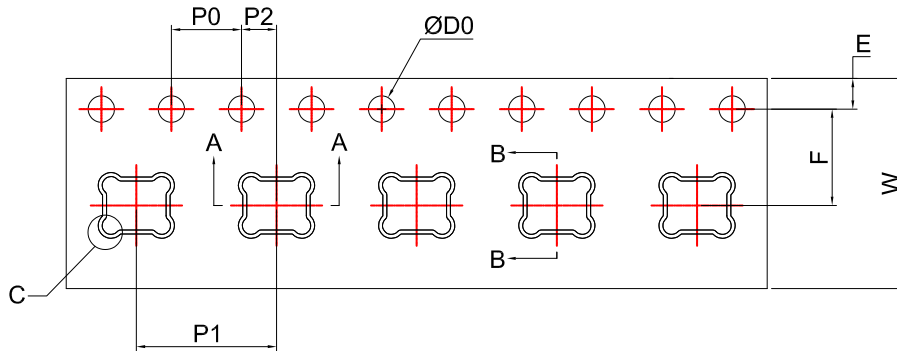
- (A) MSL (moisture sensitivity level) Class 2a.
- (B) Maximum of 3 reflow cycles is recommended.
- (C) In order to minimize device damage:
 - Do not board wash or clean after the reflow process.
 - Do not brush board with or without solvents after the reflow process.
 - Do not directly expose to ultrasonic processing, welding, or cleaning.
 - Do not insert any object in port hole of device at any time.
 - Do not apply air pressure into the port hole.
 - Do not pull a vacuum over port hole of the microphone.

MATERIALS STATEMENT

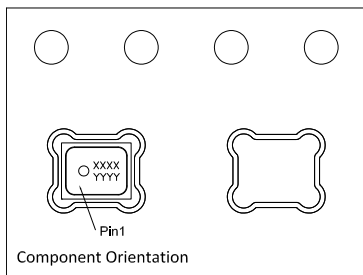
Meets the requirements of the European RoHS and Halogen-Free.



PACKAGING & MARKING DETAIL:



Direction of Feed →



| | | | | | |
|---------|------------|------------|-----------|------------------------------------|-----------|
| ITEM | W | E | F | ØD0 | K0 |
| DIM(mm) | 12.00±0.30 | 1.75±0.10 | 5.50±0.10 | 1.50 ^{+0.10} ₀ | 1.25±0.10 |
| ITEM | P0 | 10P0 | P1 | A0 | B0 |
| DIM(mm) | 4.00±0.10 | 40.00±0.20 | 8.00±0.10 | 3.40±0.10 | 2.80±0.10 |
| ITEM | P2 | T | | | |
| DIM(mm) | 2.00±0.10 | 0.25±0.05 | | | |

Note:

- 1) Dimensions are in mm;
- 2) Don't put the vacuum suction nozzle alignment the port hole;
- 3) Tape & Reel Per EIA-481 standard;
- 4) Label applied to external package and direct to reel;
- 5) Static voltage <100V;

| Model Number | Reel Diameter | Quantity Per Reel |
|-----------------|---------------|-------------------|
| MSM42A3125H9R-L | 13 inch | 5700 |



RELIABILITY SPECIFICATIONS

| Test | Description |
|---------------------------|--|
| Thermal Shock | 100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks. (IEC 68-2-4) |
| High Temperature Storage | 1,000 hours at +105°C environment (IEC 68-2-2 Test Ba) |
| Low Temperature Storage | 1,000 hours at -40°C environment (IEC 68-2-2 Test Aa) |
| Reflow | 5 reflow cycles with peak temperature of +260°C |
| ESD-HBM/LID-GND | 3 discharges of ±2 kV direct contact to I/O pins. (MIL 883E, Method 3015.7)& 3 discharges of ±8 kV direct contact to lid while unit is grounded. (IEC 61000-4-2) |
| Vibration | 4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20 G peak acceleration lasting 12 minutes in X, Y, and Z directions. (Mil-Std-883E, Method 2007.2 A) |
| Mechanical Shock | 3 pulses of 3,000 G in the X, Y and Z direction (IEC 68-2-27, Test Ea) |
| High Temperature Bias | 1,000 hours at +105°C under bias (IEC 68-2-2 Test Ba) |
| Low Temperature Bias | 1,000 hours at -40°C under bias (IEC 68-2-2 Test Aa) |
| Temperature/Humidity Bias | 1,000 hours at +85°C/85% R.H. under bias. (JESD22-A101A-B) |
| Drop Test | To be no interference in operation after dropped to 1.0cm steel plate 18 times from 1.5 meter height |

NOTE:Sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at 20±2°C, R.H 60%~70%)

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REVISION HISTORY:

| Revision | Subjects (major changes since last revision) | Date |
|----------|--|------------|
| 1.0 | Initial Release | 2017-05-02 |
| 1.1 | Modified the Reliability Specifications | 2017-06-30 |
| 1.2 | Update packaging detail | 2017-10-11 |

公司销售、技术支持联系方式

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