



PRODUCT DATASHEET

Analog MEMS Microphone

For Active Noise Cancellation

IM3729T321-M314H



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1. Introduction

1.1 Overview

IM3729T321-M314H is an analog top port MEMS microphone with high performance and reliability. The IM3729T321-M314H integrates a MEMS microphone element, an impedance converter, and an output amplifier.

Other high-performance specifications include 122 dB SPL acoustic overload point in high performance mode, ± 1 dB sensitivity tolerance and enhanced immunity to both radiated and conducted RF interface.

Excellent acoustic performance, along with the compact size(3.76*2.95*1.00mm) is best-suited for a wide range of consumer electronic products, offering a product with high-quality to meet the application requirement.

1.2 Product Features

- Omnidirectional
- High SNR
- High Sensitivity
- RF Protection
- HD Voice MEMS Microphone
- RoHS/Halogen free compliant
- Standard SMD Reflow

1.3 Typical Application

- Smartphones
- Microphone Arrays
- Tablets
- Cameras
- Headsets
- Notebook PCs
- Smart home devices, Internet of Things

2. Absolute Maximum Ratings

| Parameter | Absolute Maximum Rating | Units |
|-----------------------------------|-------------------------|-------|
| Voltage Range of VDD to Ground | -0.3 to +3.9 | V |
| Voltage Range of Output to Ground | -0.3 to +3.9 | V |
| Input Current to Any Pin | ±5 | mA |
| Temperature Range | -40 to +100 | °C |

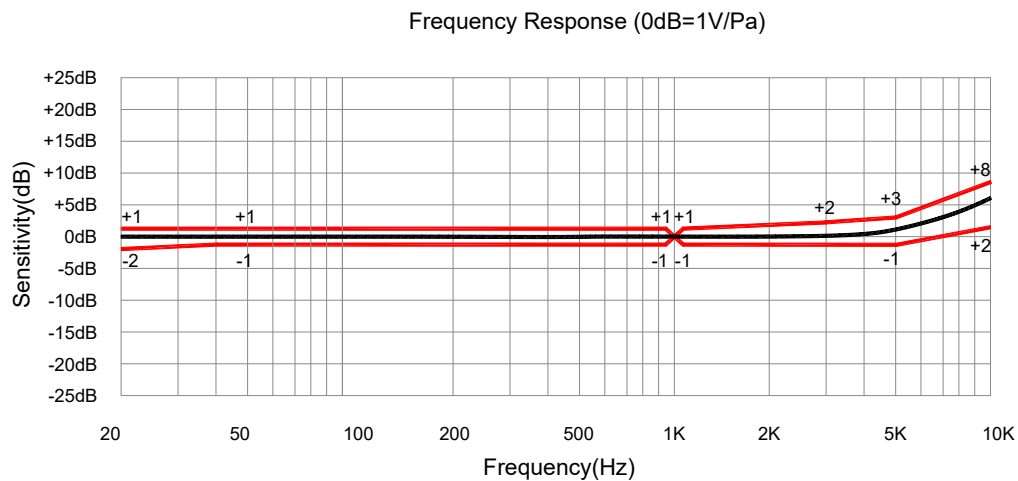
Stresses exceeding these “Absolute Maximum Ratings” could cause permanent damage to the microphone. These are stress rating only. Functional operation at these or any other conditions beyond those indicated under “Absolute and Electrical Characteristics” is not implied. Exposure beyond those indicated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

3. Acoustic and Electrical Characteristics

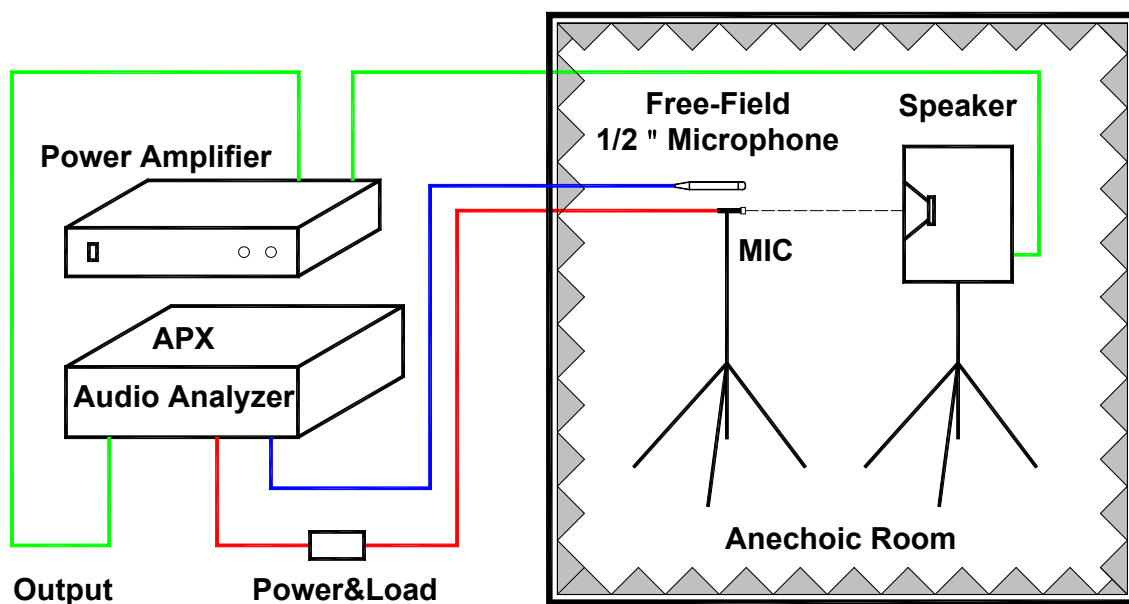
(Test Conditions: 23±2°C, 55±20% R.H)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit | |
|------------------------------|------------------|---|-----|------|-----|--------|--|
| Directivity | D(θ) | Omni-Directional | | | | | |
| Sensitivity | S | 94dB SPL @1KHz | -33 | -32 | -31 | dBV/Pa | |
| Supply Voltage | V _{DD} | | 1.6 | 2.0 | 3.6 | V | |
| Current Consumption | I _{DSS} | V _{DD} =2.0V | | | 250 | μ A | |
| S/N Ratio | S/N | 94dB SPL @1KHz (A-weighted) | | 64 | | dB(A) | |
| Total Harmonic Distortion | THD | 94dB SPL @1KHz | | 0.15 | | % | |
| Acoustic Overload Point | AOP | 10% THD @ 1 kHz | | 122 | | dB SPL | |
| Power Supply Rejection Ratio | PSRR | 200mVpp sinewave @ 1kHz, VDD = 2.0V | | 60 | | dB | |
| Power Supply Rejection | PSR | 100 mVpp square wave @ 217 Hz, VDD = 2.0V, A-weighted | | -90 | | dBV(A) | |
| Output Impedance | Z _{out} | @1KHz | | | 300 | Ω | |

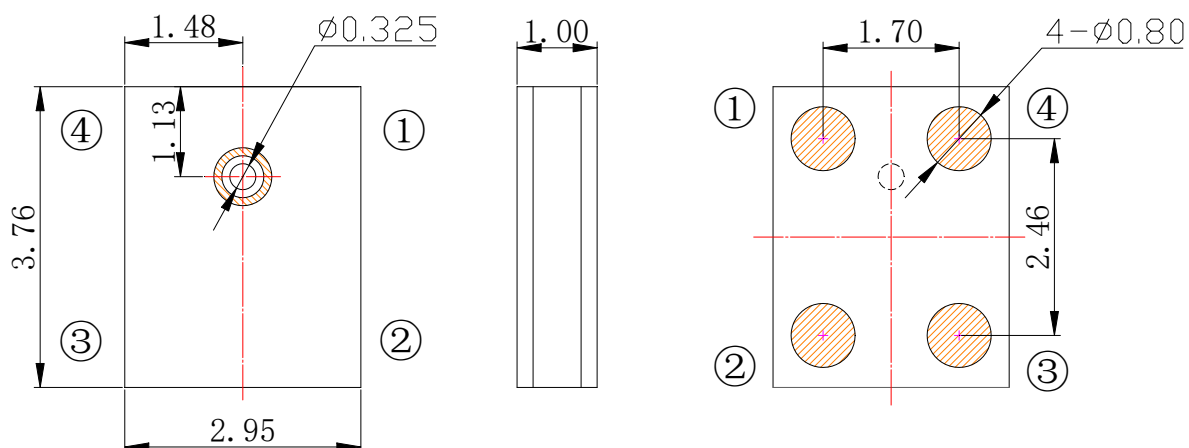
4. Frequency Response Curve



5. Test Setup Drawing



6. Mechanical Specifications



| Item | Dimension | Tolerance | Units |
|-------------------|-----------|-----------|-------|
| Length(L) | 3.76 | ±0.10 | mm |
| Width(W) | 2.95 | ±0.10 | mm |
| Height(H) | 1.00 | ±0.15 | mm |
| Acoustic port(AP) | Φ0.325 | ±0.10 | mm |

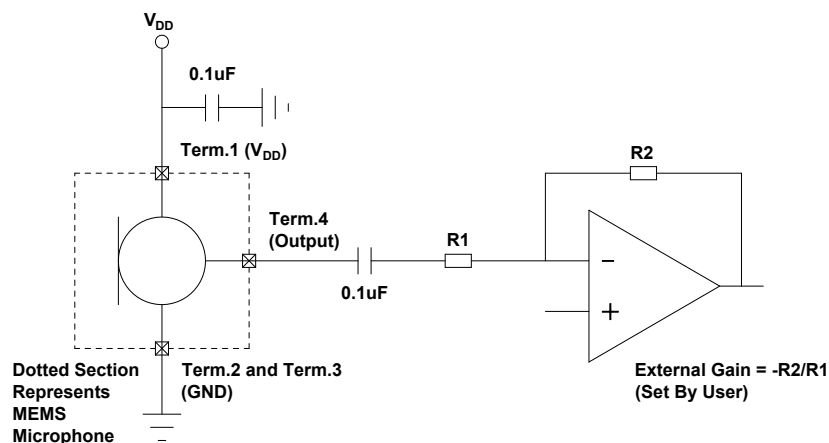
| Pin Output | |
|------------|-----------------|
| Pin# | Function |
| 1 | V _{DD} |
| 2 | GND |
| 3 | GND |
| 4 | Output |

Note:

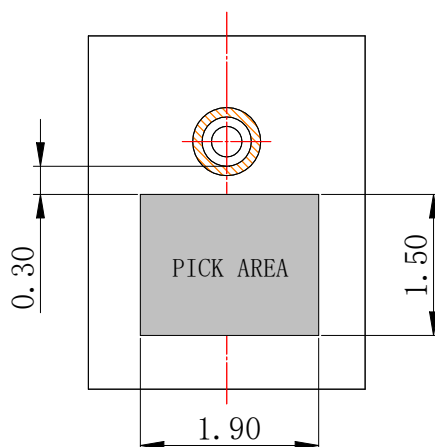
All dimensions are in millimeter(mm).

Tolerance: +/-0.1mm unless otherwise specified.

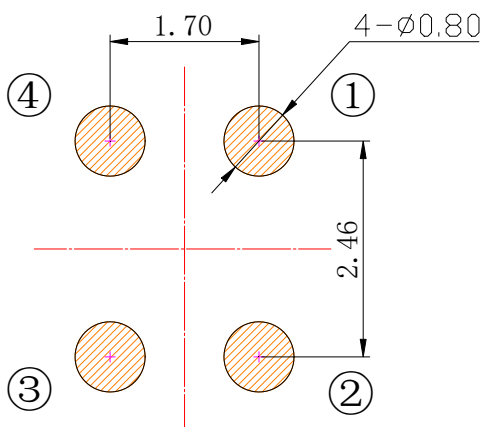
7. Recommended Interface Circuit



8. Vacuum nozzle pickup location

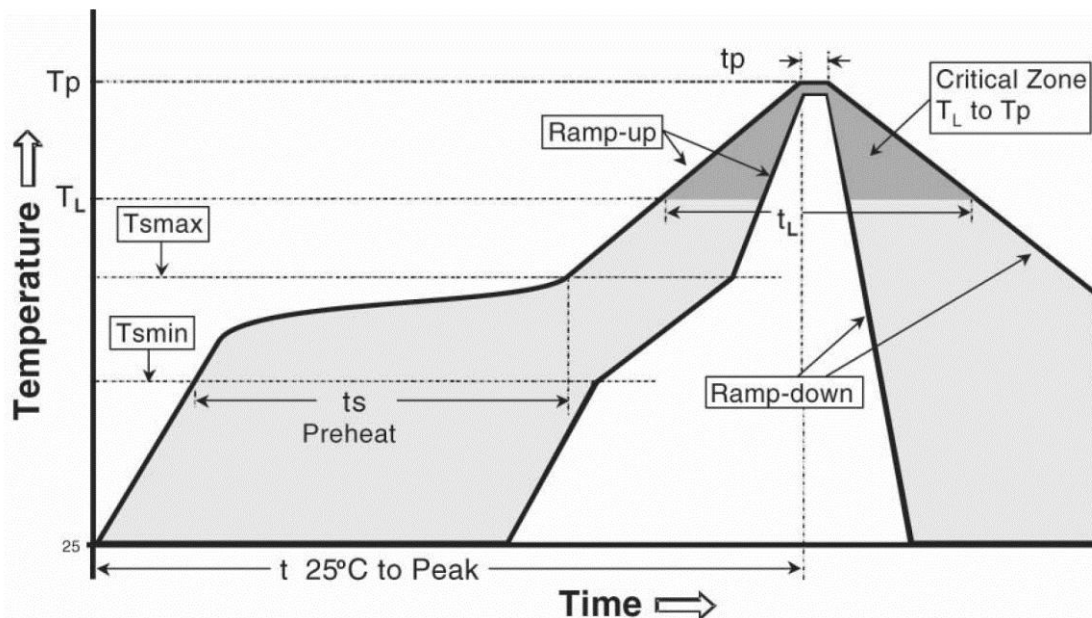


9. Example solder stencil pattern





10. Recommended Reflow Profile



| Profile Feature | Pb-Free |
|--|----------------------------------|
| Average Ramp-up rate (T_{smax} to T_P) | 3°C/second max. |
| Preheat Temperature Min (T_{smin}) Temperature Max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) | 150°C 200°C 60-180 seconds |
| Time maintained above: Temperature (T_L) Time (t_L) | 217°C 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 |

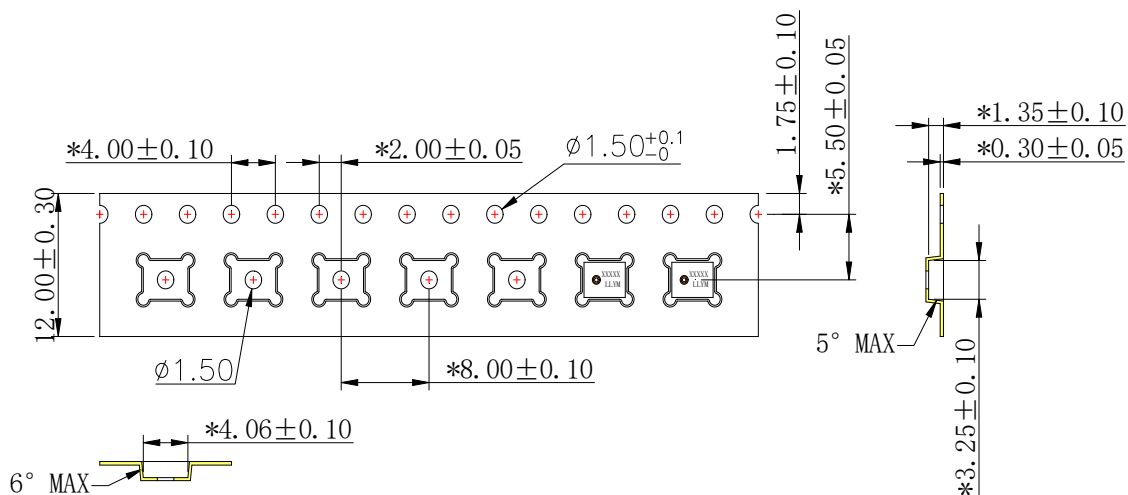
Notes:

1. Pulling vacuum over acoustical hole of the microphone is not allowed, because the device can be damaged by vacuum.
2. Wash the board after reflow process is not allowed, because board washing and cleaning agents can damage the device. Device should not be exposed to ultrasonic processing or cleaning.
3. Recommended number of reflow is no more than 3 times.

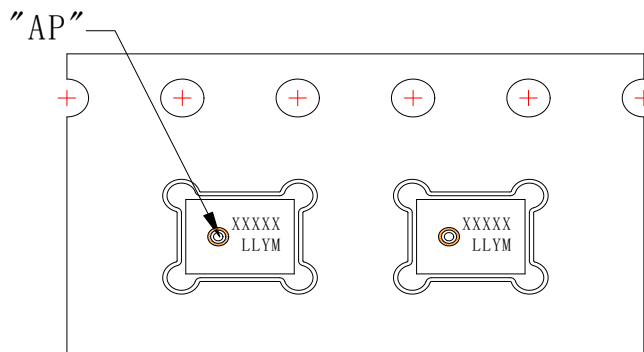


11. Packaging Specifications

11.1. Tape Specification

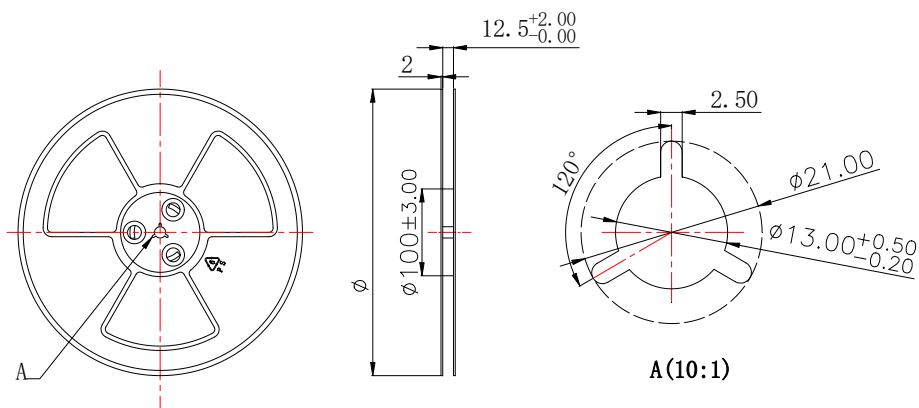


| Line | Character | Description |
|------|-----------|-------------------|
| 1 | XXXXX | Unique Trace Code |
| 2 | LL | Identify Code |
| 3 | Y | Year |
| 4 | M | Month |



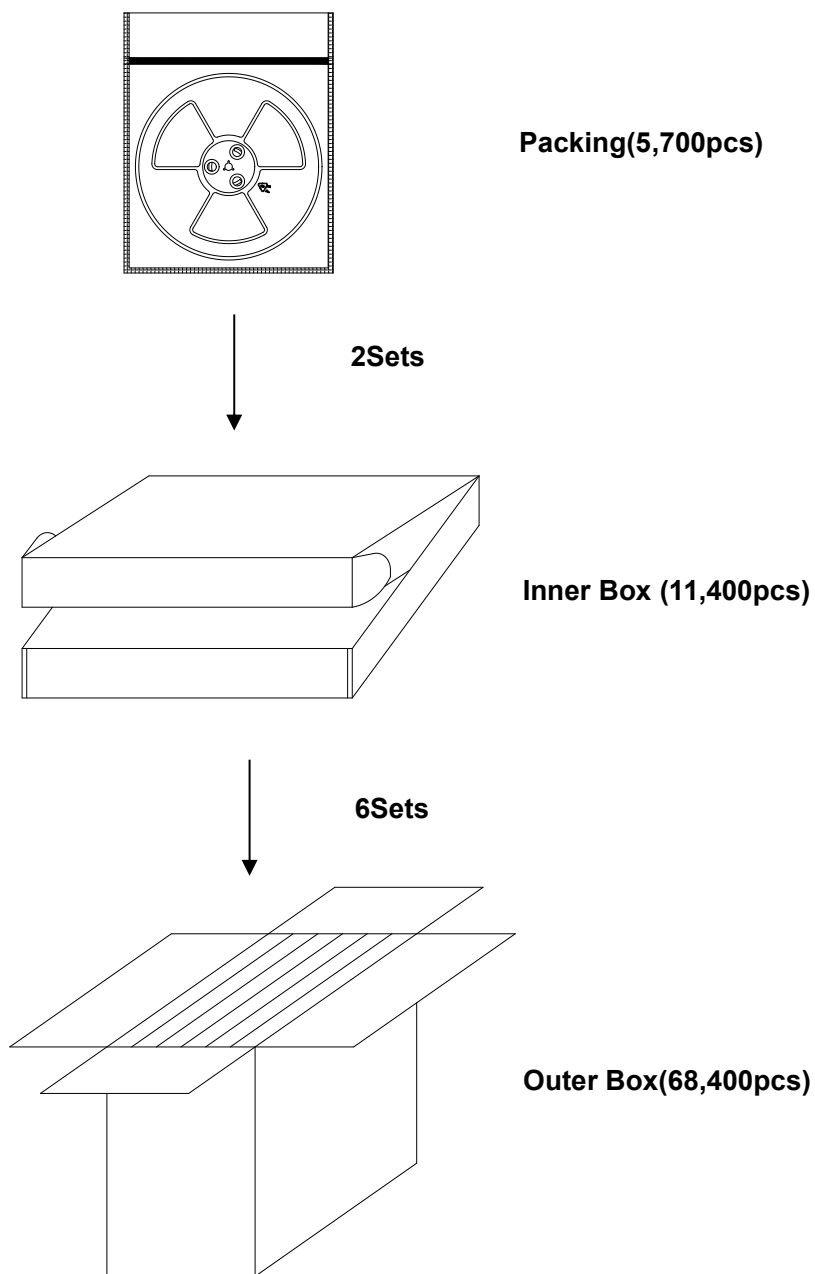
11.2. Reel Dimension

13" reel dimensions (unit:mm)





11.3. The Content of Box(13" reel)



| Qty/ Reel | Qty/ One Inner Box | Qty/ Outer Box (Six Inner Box) |
|-----------|--------------------|--------------------------------|
| 5,700 pcs | 11,400 pcs | 68,400 pcs |
| Φ 330mm | 355×340×45mm | 365×290×370mm |



12. Reliability Specifications

| Test Item | Detail |
|--------------------------|--|
| Thermal Shock | 100 cycles of air-air thermal shock from -40°C to +105°C with 15 minute soaks. |
| High Temperature Storage | +105°C environment for 500 hours. |
| Low Temperature Storage | -40°C environment for 500 hours. |
| High Temperature Test | +105°C environment while under bias for 500 hours. |
| Low Temperature Test | -40°C environment while under bias for 500 hours. |
| Humidity Test | +85°C/85% R.H. environment while under bias for 500 hours. |
| Vibration Test | 16 minutes in each X, Y, Z axis from 20 to 2,000 Hz with peak acceleration of 20G. |
| Drop Test | 1.5-meter height onto a concrete surface each time at three directions in state of packaging. |
| Reflow Test | 5 reflow cycles with peak temperature of +260°C. |
| ESD Test | Under C=150pF, R=330ohm. Tested to ±8KV contact to the case and tested to ±2kV contact to I/O terminals. 10 times. Grounding. |

Note: The microphone sensitivity after stress must deviate by no more than ±3dB from the initial value.

