

Low Noise Bottom Port MEMS Microphone

DESCRIPTION

The ZTS6556 is a high quality, low cost, low power analog output bottom-ported omni-directional MEMS microphone. ZTS6556 consists of a MEMS microphone element and an preamplifier. ZTS6556 has a high SNR and flat wideband frequency response, resulting in natural sound with high intelligibility. Extra EMI filter for RF noise attenuation is built inside. Due to the built-in filter, ZTS6556 shows high immunity to EMI.

The ZTS6556 is available in a thin 2.75mm × 1.85mm × 0.90mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The ZTS6556 is halide free.

APPLICATIONS

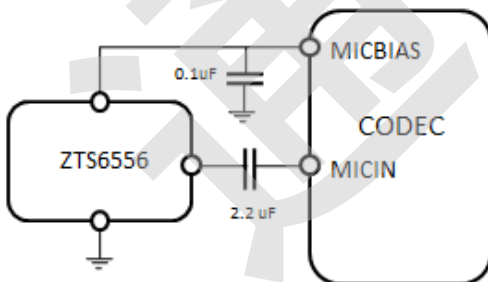
- Mobile telephones
- Smart phones
- PDAs
- Digital video cameras
- Portable media devices with audio input

ORDERING INFORMATION

| PART | RoHS | Ship, Quantity |
|---------|------|---------------------|
| ZTS6556 | Yes | Tape and Reel, 5.2K |

Typical Applications

The ZTS6556 output can be connected to a codec microphone input or to a high input impedance gain stage. A dc-blocking capacitor is required at the output of the microphone.



Connect to Audio OPAM

Note:

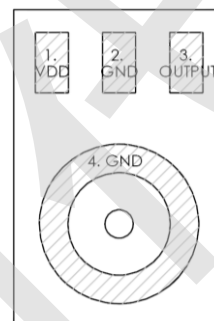
All Ground pins must be connected to ground.

Capacitors near the microphone should not contain Class 2 dielectrics.

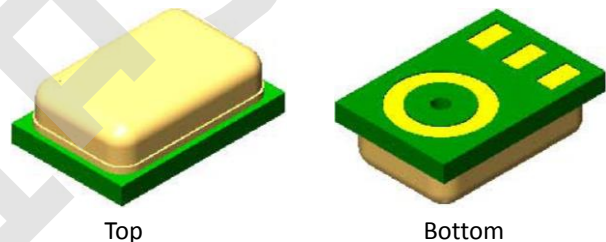
FEATURES

- Small package
- Flat Frequency Response SNR of 64dBA
- Low Current
- Max RF protection
- Ultra-Stable Performance
- Standard SMD Reflow
- Omni-directional

Pins Configuration and Description



Bottom view

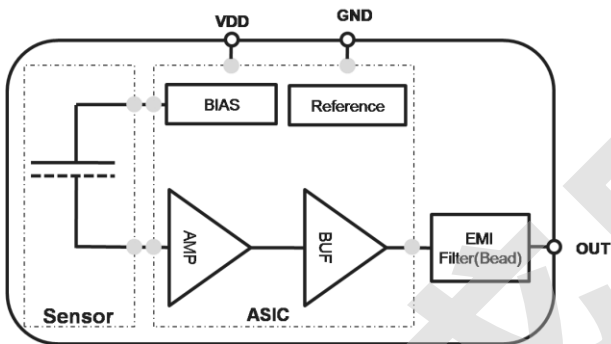


Absolute Maximum Ratings

V_{DD} to Ground-0.5V to +5V
 OUT to Ground.....-0.3V to V_{DD}+0.3V
 Input Current to Any Pin.....± 5 mA
 Temperature Range.....-40°C to +100°C

CAUTION: Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Functional Block Diagram



Electro-Static Discharge Sensitivity



This integrated circuit can be damaged by ESD. It is recommended that all integrated circuits be handled with proper precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure.

Pins Description

| Pin | Symbol | Description |
|-----|--------|-----------------------|
| 1 | VDD | Power Supply |
| 2 | GROUND | Ground |
| 3 | OUT | Analog output signal. |
| 4 | GROUND | Ground |

Specifications

(TEST CONDITIONS: 23 ±2°C, 55±20% R.H., $V_{DD}(\min) \leq V_{DD} \leq V_{DD}(\max)$, no load, unless otherwise indicated.)

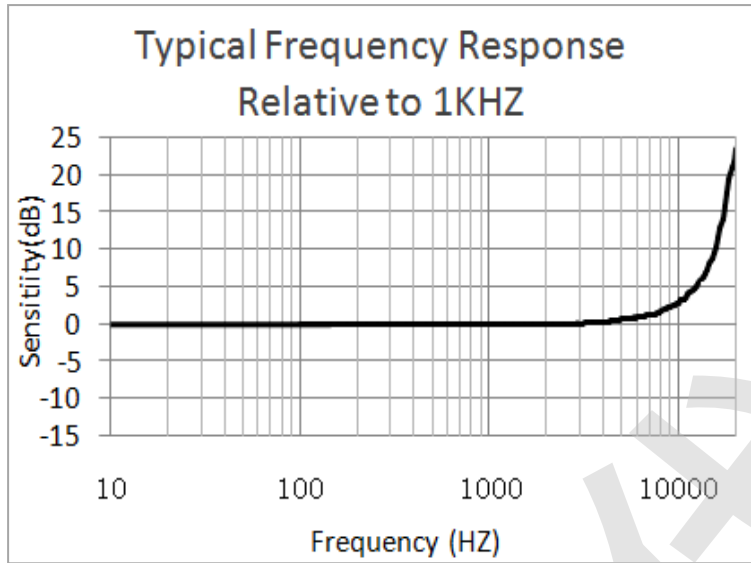
| PARAMETER | Symbol | CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|-----------|----------------------------------------------------------------|----------------------------|------|-----|--------|
| Supply Voltage ¹ | V_{DD} | | 0.8 | - | 3.6 | V |
| Supply Current ^{1,2} | I_{DD} | | - | 18 | - | μA |
| Sensitivity ¹ | S | 94 dB SPL @ 1 kHz | -36 | -35 | -34 | dBV/Pa |
| Signal to Noise Ratio | SNR | 94 dB SPL @ 1 kHz, A-weighted | - | 64 | - | dB(A) |
| Total Harmonic Distortion | THD | 94 dB SPL @ 1 kHz | - | 0.2 | 1 | % |
| Acoustic Over load Point | AOP | 10% THD @ 1 kHz | | 125 | - | dB SPL |
| Power Supply Rejection Ratio | PSRR | 200mVpp sinewave @ 1 kHz, $V_{DD} = 1.8V$ | - | 65 | - | dB |
| Power Supply Rejection | PSR | 100 mVpp square wave @ 217 Hz, $V_{DD} = 1.8V$, A-weighted | - | -90 | - | dBV(A) |
| DC Output | | $V_{DD} = 1.5V$ | - | 0.75 | - | V |
| Output Impedance | Z_{OUT} | @ 1 kHz | - | 4000 | - | |
| Directivity | | | Omni-directional | | | |
| Polarity | | Increasing sound pressure | Increasing output pressure | | | |

Note:

¹ 100% tested

² Maximum specifications are measured at maximum V_{DD} . Typical specifications are measured at $V_{DD} = 1.8V$.

Typical Performance Characteristics



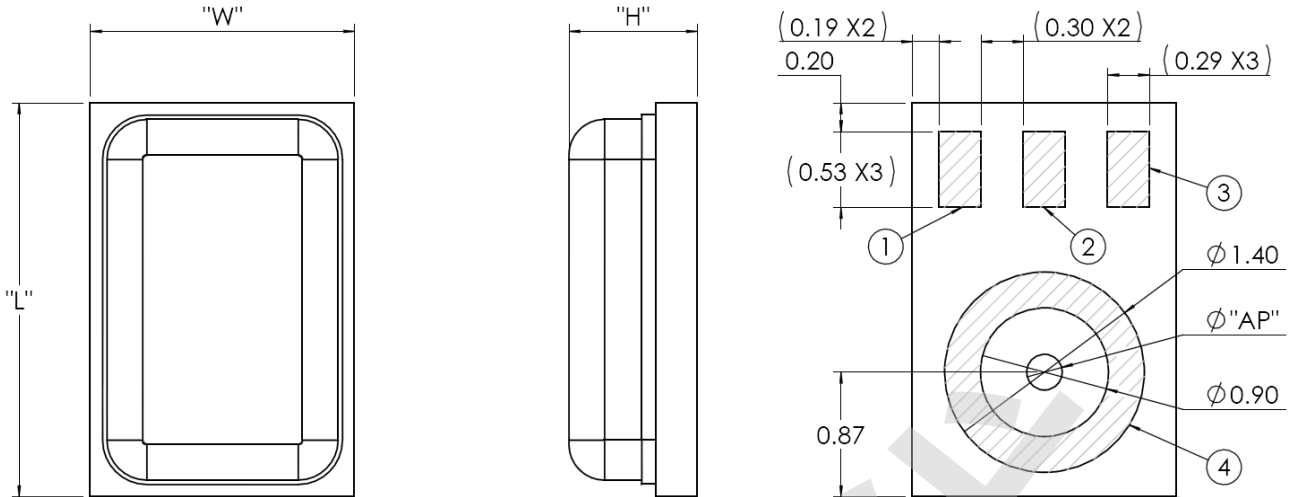
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Reliability Specifications

The microphone sensitivity after stress must deviate by no more than $\pm 3\text{dB}$ from the initial value.

| | |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Heat Test, Operational | Temperature: $125\pm 3^{\circ}\text{C}$ Duration: 1000 hours Voltage: Applied |
| 2. Cold Test, Operational | Temperature: $-40\pm 3^{\circ}\text{C}$ Duration: 1000 hours Voltage: Applied |
| 3. Heat Test, Non-Operational | Temperature: $125\pm 3^{\circ}\text{C}$ Duration: 1000 hours Voltage: Not Applied |
| 4. Cold Test, Non-Operational | Temperature: $-40\pm 3^{\circ}\text{C}$ Duration: 1000 hours Voltage: Not Applied |
| 5. Thermal Shock Test, Non-Operational | Temperature: $-40\pm 3^{\circ}\text{C}$ and $125\pm 3^{\circ}\text{C}$ Duration: 30 minutes each, during 5 minutes ramp, 256 cycles Voltage: Not applied |
| 6. Temperature humidity storage | Temperature: $85\pm 3^{\circ}\text{C}$ Humidity: $85\pm 3\% \text{RH}$ Duration: 1000 hours |
| | Temperature: $65\pm 3^{\circ}\text{C}$ Humidity: $95\pm 3\% \text{RH}$ Duration: 168 hours |
| 7. Free Fall Test 1.5m | Placed inside test fixture and dropped on concrete from height 1.5m. 4 times by each surface and corner |
| 8. Vibration | 4 cycles of 20 to 2000 Hz sinusoidal sweep with 20G peak acceleration lasting 12 minutes in X, Y, and Z directions |
| 9. Mechanical Shock | 5 pulses of 10000g in each of the $\pm X$, $\pm Y$, and $\pm Z$ directions |
| 10. Electrostatic Discharge Test | Capacitance: 150pF Resistance: 330 Ω Duration: 10 times Air Discharge: Level 4 (+/-15kV) Direct contact discharge: Level 4 (+/-8kV) |
| 11. Human Body Mode | ± 2000 Volt |
| 12. Charged-Device Model | ± 250 Volt |
| 13. Reflow | 5 reflow cycles with peak temperature of 260°C |
| 14. Solderability | $245\pm 5^{\circ}\text{C}$, 5sec, 95% Tin on pad surface |
| 15. Tumble test | 300 tumbles from a height of 1m onto a steel base. |
| 16. HAST | Temperature: $130\pm 3^{\circ}\text{C}$ Humidity: $85\pm 3\% \text{RH}$ Duration: 96 hours Voltage: Applied |
| 17. Air Blow | 0.45MPa, distance 3cm, time 10s |

MECHANICAL SPECIFICATIOPNS

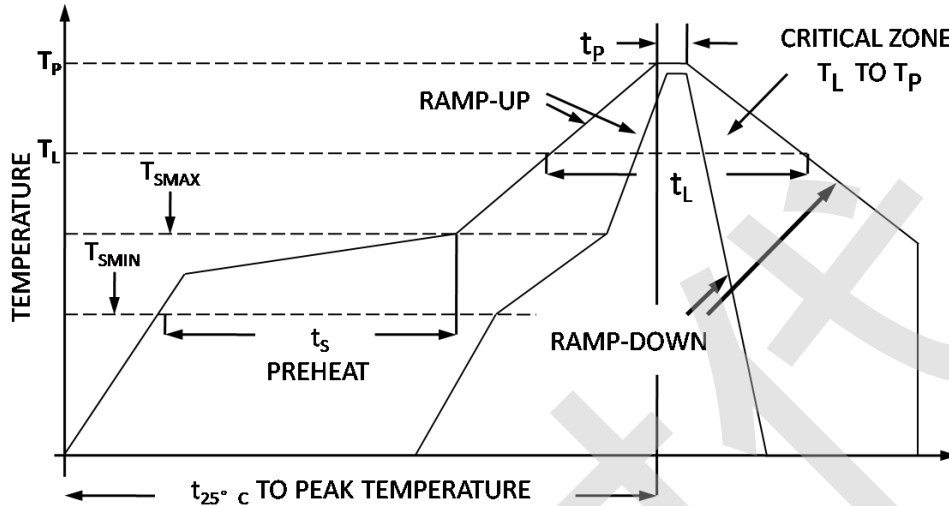


| Item | Dimension | Tolerance |
|--------------------|-------------|-------------|
| Length (L) | 2.75 | ± 0.10 |
| Width (W) | 1.85 | ± 0.10 |
| Height (H) | 0.90 | ± 0.10 |
| Acoustic Port (AP) | $\phi 0.25$ | ± 0.050 |

| Pin# | Pin Name | Type | Description |
|------|----------|--------|-----------------------|
| 1 | VDD | Power | Power Supply |
| 2 | GROUND | Ground | Ground |
| 3 | OUT | Output | Analog output signal. |
| 4 | GROUND | Ground | Ground |

SOLDER FLOW PROFILE

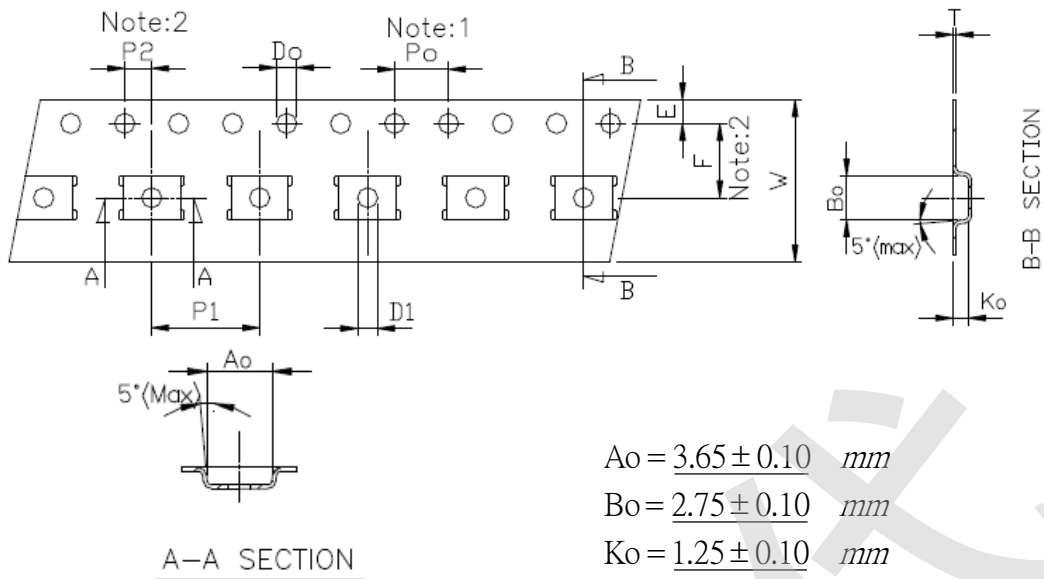
The reflow profile specified in this section describes expected maximum heat exposure of components during the reflow process of NMP product PWBs. Temperature is measured on top of component. All components have to tolerate at least this profile five times (5x) without affecting electrical performance, mechanical performance or reliability.



Pb-free and Sn63/Pb37 reflow profile requirements for soldering heat resistance:

| Parameter | Reference | Pb-Free | Sn63/Pb37 |
|-----------------------------------------------|---------------------|--------------------------|---------------------|
| Average Ramp Rate | T_L to T_p | 1.25°C/sec max | 1.25 °C /sec max |
| Prehear | Minimum Temperature | 100°C | 100 °C |
| | Maximum Temperature | 200°C | 150 °C |
| | Time | T_{SMIN} to T_{SMAX} | 60sec to 120sec |
| Ramp-Up Rate | T_{SMAX} to T_L | 1.25°C/sec | 1.25 °C /sec |
| Time Maintained Above Liquidous | t_L | 60sec to 150sec | 60sec to 150sec |
| Liquidous Temperature | T_L | 217°C | 183 °C |
| Peak Temperature | T_p | 260°C +0°C/-5°C | 215 °C +3 °C /-3 °C |
| Time Within +5°C of Actual Peak Temperature | t_p | 20 sec to 30 sec | 20 sec to 30 sec |
| Ramp-Down Rate | T_{peak} | 6°C/sec max | 6 °C /sec max |
| Time +25°C (t_{250C}) to Peak Temperature | | 8 min max | 6 min max |

PACKAGING

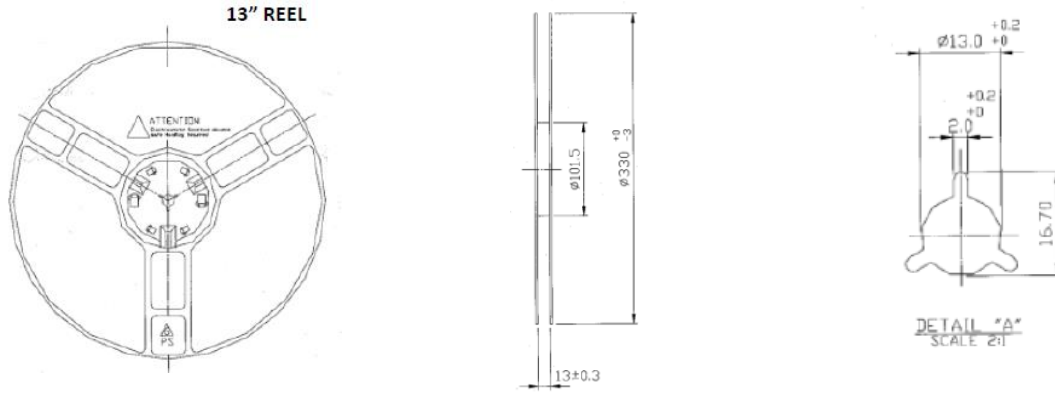


Unit : mm

| Symbol | Spec. |
|------------------|-------------|
| K1 | - |
| P _o | 4.0 ± 0.10 |
| P1 | 8.0 ± 0.10 |
| P2 | 2.0 ± 0.05 |
| D _o | 1.55 ± 0.05 |
| D1 | 1.50 (MIN) |
| E | 1.75 ± 0.10 |
| F | 5.50 ± 0.05 |
| 10P _o | 40.0 ± 0.10 |
| W | 12.0 ± 0.20 |
| T | 0.30 ± 0.05 |

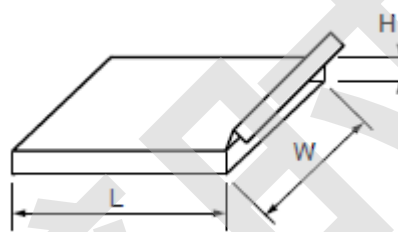
Notice :

- 1 · 10 Sprocket hole pitch cumulative tolerance is ± 0.1mm.
- 2 · Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
- 3 · A_o & B_o measured on a place 0.3mm above the bottom of the pocket to top surface of the carrier.
- 4 · K_o measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
- 5 · Carrier camber shall be not that 1mm per 100mm through a length of 250mm.



| Part NO. | Reel Diameter | Quantity Per Reel | Quantity Per Inner Box | Quantity Per Outer Box |
|----------|---------------|-------------------|------------------------|------------------------|
| ZTS6556 | 13" | 5200 | 5200 | 46800 |

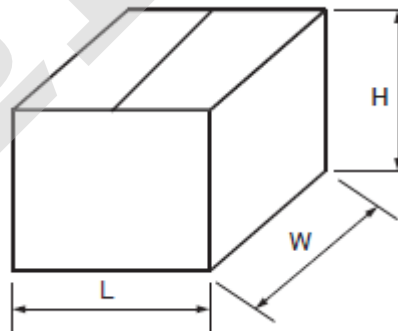
Dimensions for Inner Box



Unit : mm

| L | W | H |
|-----|-----|----|
| 335 | 339 | 45 |

Dimensions for Outer Box



Unit : mm

| L | W | H |
|-----|-----|-----|
| 445 | 360 | 372 |