

Side-Port™ MEMS Microphone with Analog Output

DESCRIPTION

The ZTS6021 is an industrial level high quality, low cost, low power analog output side-ported omni-directional MEMS microphone. ZTS6021 consists of a MEMS microphone element and a preamplifier. ZTS6021 has a high SNR and flat wideband frequency response, resulting in natural sound with high intelligibility. Due to built-in filter, ZTS6021 shows high immunity to EMI. The ZTS6021 is available in a thin 3.76mm × 2.95mm × 1.1mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The ZTS6021 is halide free.

Protected by U.S. patent, 14308522 and China patent, ZL 2014 2 0004275. 8, and other pending patents.

APPLICATIONS

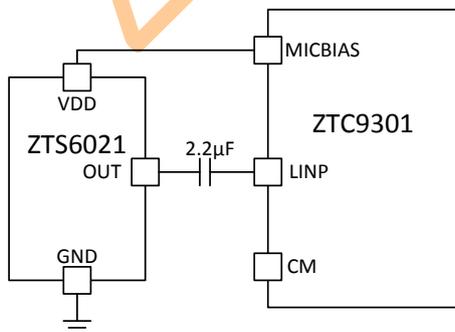
- Mobile telephones
- PDAs
- Digital video cameras
- Portable media devices with audio input
- IP Camera
- Automotive

ORDERING INFORMATION

PART	RoHS	Ship, Quantity
ZTS6021	Yes	Tape and Reel, 5.2K

Typical Applications

The ZTS6021 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.

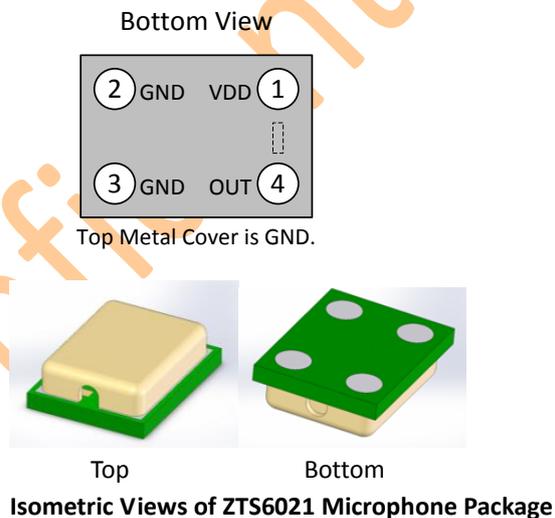


Connect to Audio Codec

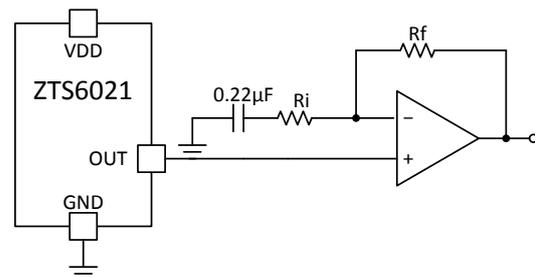
FEATURES

- 3.76mm×2.95mm×1.1mm surface-mount package
- Stable sensitivity over power supply range of 1.65V-3.6V
- SNR of 59dBA
- Sensitivity of -42dBV
- Power Supply Reject Ratio 60dB
- Low current consumption of <200µA
- Multi Chip Module (MCM) Package

Pins Configuration and Description



Isometric Views of ZTS6021 Microphone Package



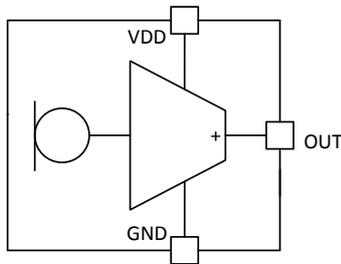
Connect to Audio OPAMP

Absolute Maximum Ratings

Supply Voltage +1.65V to +3.6V
 Sound Pressure Level 160dB
 Mechanical Shock 10000g
 Vibration Per MIL-STD-883 Method
 2007, Test Condition B
 Temperature Range -40°C to +105°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	GND	Ground.
3	GND	Ground.
4	OUT	Analog Output Signal.

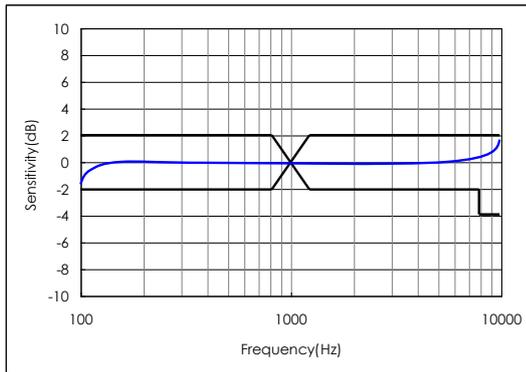
Specifications

($T_A = +15^\circ\text{C} \sim +25^\circ\text{C}$, $V_{DD} = +1.8\text{V}$, unless otherwise noted.)

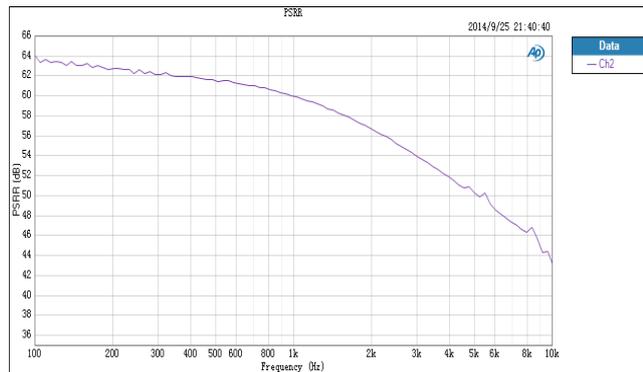
PARAMETER	Symbol	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Directivity				Omni		
Supply Voltage	V_{DD}		1.65		3.6	V
Current Consumption	I_{DD}				200	μA
Sensitivity (Note)		1kHz, 94dB SPL	-43	-42	-41	dBV
Signal-to-Noise-Ratio	SNR			59		dB
Equivalent Input Noise	EIN			33		dBa SPL
Total Harmonic Distortion	THD	105dB SPL			3	%
Power Supply Rejection Ratio	PSRR	217Hz, 100mV Vp-p, square wave on V_{DD}		60		dB
Maximum Acoustic Input				120		dB SPL
Output Impedance	Z_{out}			500		Ω
Output DC Offset				0.8		V
Output Current Limit				90		μA
Polarity				Noninverting		

Note: Base on BK sound test system.

Typical Performance Characteristics



Frequency Response Normalized to 1kHz.



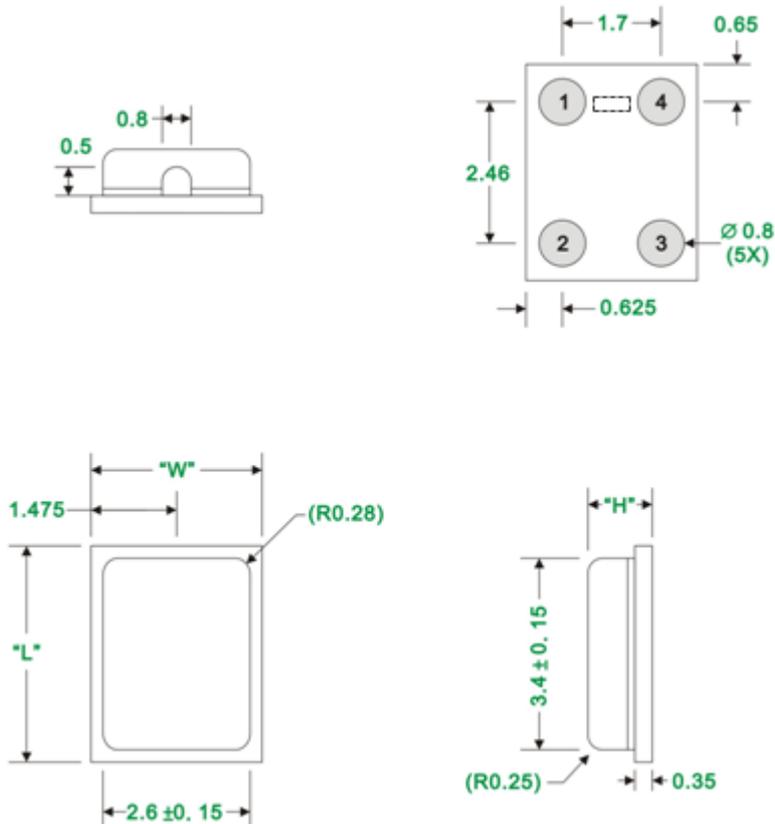
Reliability Tests

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

1.Heat Test, Operational	Temperature: $85\pm 3^{\circ}\text{C}$ Humidity: $85\pm 5\% \text{RH}$ Duration: 12 hours Voltage: Applied
2.Cold Test, Operational	Temperature: $-40\pm 3^{\circ}\text{C}$ Duration: 12 hours Voltage: Applied
3.Heat Test, Non-Operational	Temperature: $85\pm 3^{\circ}\text{C}$ Humidity: $50\pm 5\% \text{RH}$ Duration: 96 hours Voltage: Not Applied
4.Cold Test, Non-Operational	Temperature: $-40\pm 3^{\circ}\text{C}$ Duration: 96 hours Voltage: Not Applied
5.Condensation Test, Non-Operational	Temperature: $25\pm 3^{\circ}\text{C}$ and $55\pm 3^{\circ}\text{C}$ Humidity: $95\pm 5\% \text{RH}$ Duration: 1 hours each, during 10 minutes ramp, 45 cycles Voltage: Not applied
6.Temperature Cycling, Non-Operational	Temperature: $-40\pm 3^{\circ}\text{C}$ and $85\pm 3^{\circ}\text{C}$ Humidity: $50\pm 5\% \text{RH}$ Duration: 2 hours each, during 6 hours ramp, 5 cycles Voltage: Not applied
7.Thermal Shock Test, Non-Operational	Temperature: $-40\pm 3^{\circ}\text{C}$ and $85\pm 3^{\circ}\text{C}$ Duration: 30 minutes each, during 5 minutes ramp, 256 cycles Voltage: Not applied
8.Free Fall Test 1.5m	Placed inside test fixture and dropped on concrete from height 1.5m. (1)3 times by 6 surfaces (2)1 times by 12 edges (3)1 times by 8 corners

9.Random Vibration	Temperature: 23±5°C Humidity: 35~70% RH Duration: 2 hours each axis(X,Y,Z) Power Spectral Density: 5Hz 0.10m2/s3(=1.0391*10-3g2/Hz) 12Hz 2.20m2/s3(=22.8602*10-3g2/Hz) 20Hz 2.20m2/s3(=22.8602*10-3g2/Hz) 200Hz 0.04m2/s3(=0.41534*10-3g2/Hz) 200Hz 0.04m2/s3(=0.41564*10-3g2/Hz)
10.Repeated Low Level Free Fall Test	Placed inside test fixture and dropped on rubber mat from height of 10cm. Each face 2500 times(Total 6 faces, 15000times)
11.1m Repeated Rotating Free Fall	Placed inside test fixture and dropped on steel sheet from height of 1.0m. 100 times(all faces) Rotation speed of barrel: 10~12 falls/minute
12.Free Fall Test for master box	Corner drop: Each Corner 1 time Edge drop: Each Edge 1 time Face drop: Each Face 1 time
13.Random Vibration for master box	Sinusoidal wave vibration Frequency: 5~50Hz Acceleration:7.4m/s2(0.76G) Sweep speed:9Hz/min(5~50Hz, one way 5 min) Test duration: Direction of Face 1-3 20min Direction of Face 2-4 20min Direction of Face 5-6 20min Sample and direction of vibration : 1 direction for 1 sample Package on vibrating table: Free
14.Substrate bending Test	Deflection: 3mm Rate: 0.5mm/sec
15.Adhesion	Load: 10 N Duration: 10 seconds
16.Electrostatic Discharge Test	Capacitance: 150pF Resistance: 330Ω Duration: 10 times Air Discharge: Level 3(+/-8kV) Direct contact discharge: Level 1 (+/-2kV)
17.Human Body Model	2000 Volts (100pF,1500Ω)
18.Charged Device Model	500 Volts
19.Self alignment effect	Displacement: 0.15mm

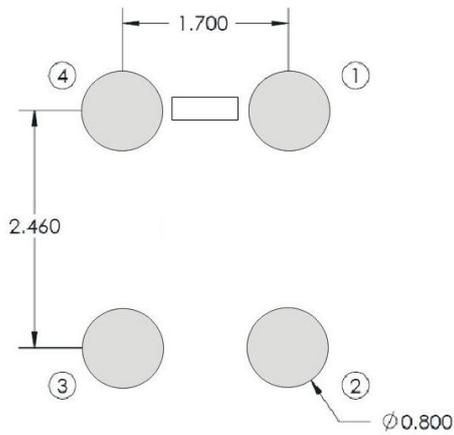
MECHANICAL SPECIFICATION



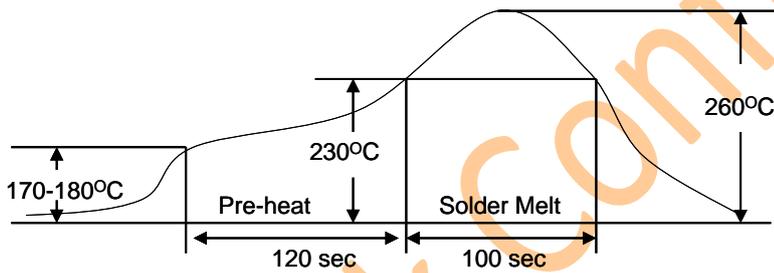
ITEM	DIMENSION	TOLERANCE	UNITS
Length (L)	3.760	±0.100	mm
Width (W)	2.950	±0.100	mm
Height (H)	1.100	±0.100	mm

RECOMMENDED CUSTOMER LAND PATTERN

The recommended PCB land pattern for the ZTS6021 should have a 1:1 ratio to the solder pads on the microphone package. Care should be taken to avoid applying solder paste to the sound hole in PCB. The dimensions of suggested solder paste pattern refer to the land pattern **which should be shrunk by 0.025 per side**.



SOLDER FLOW PROFILE



Stage	Temperature Profile	Time (maximum)
Pre-heat	+170°C ~ +180°C	120sec
Supply Voltage	> +230°C	100sec
Peak	+260°C maximum	30sec