

Ultralow Noise Microphone with Top Port and Analog Output

DESCRIPTION

The ZTS6016 is a high quality, low cost, low power analog output top-ported omni-directional MEMS microphone. ZTS6016 consists of a MEMS microphone element and an preamplifier. ZTS6016 has a high SNR and flat wideband frequency response, resulting in natural sound with high intelligibility. Due to built-in filter, ZTS6016 shows high immunity to EMI.

The ZTS6016 is available in a thin 3.10mm × 2.50mm × 1.00mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The ZTS6016 is halide free.

APPLICATIONS

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

ORDERING INFORMATION

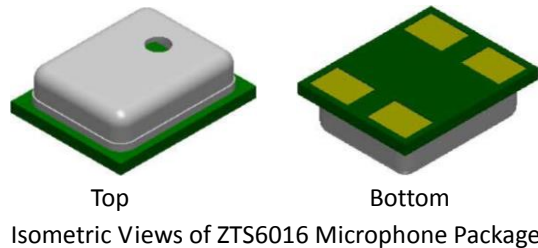
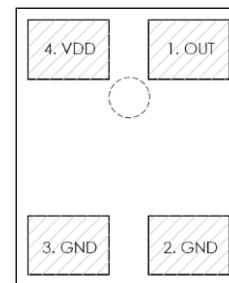
PART	RoHS	Ship, Quantity
ZTS6016	Yes	Tape and Reel, 5.2K

FEATURES

- 3.10mm×2.50mm×1.00mm surface-mount package
- Stable sensitivity over power supply range of 1.5V-3.6V
- SNR of 59 dBA
- Sensitivity of -42dBV
- Low current consumption of <100µA
- Multi Chip Module (MCM) Package

Pins Configuration and Description

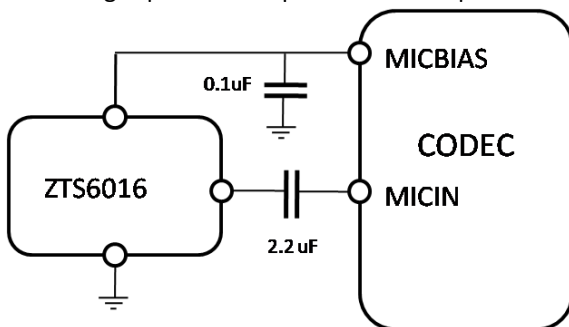
Bottom View



Isometric Views of ZTS6016 Microphone Package

Typical Applications

The ZTS6016 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.



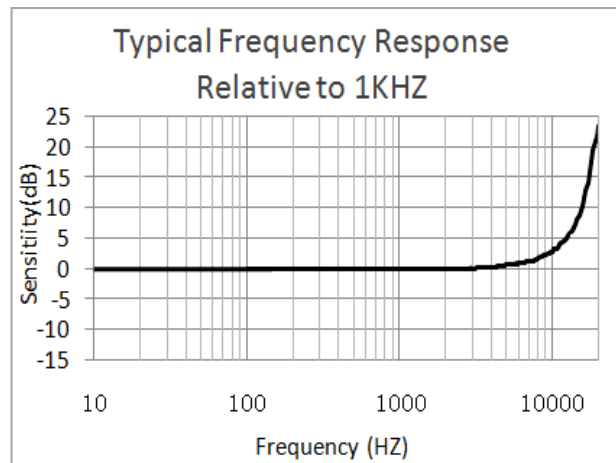
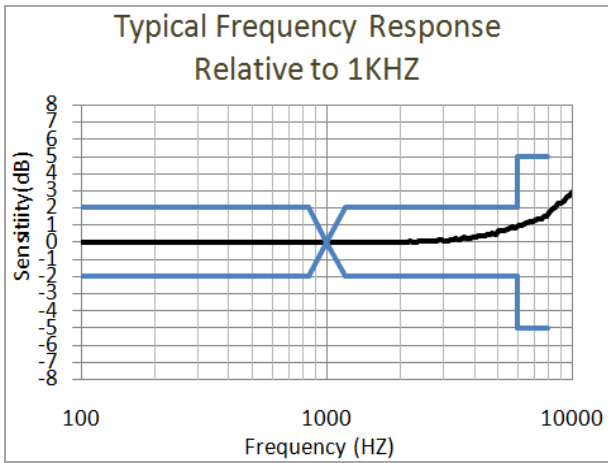
Connect to Audio Codec

Specifications

(T_A = +15°C ~+25°C, V_{DD} = +1.8V, unless otherwise noted.)

PARAMETER	Symbol	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Directivity				Omni		
Supply Voltage	V _{DD}		1.5		3.6	V
Current Consumption	I _{DD}			65	90	μA
Sensitivity (Note)		1KHz, 94dB SPL	-43	-42	-41	dBV
Signal-to-Noise-Ratio	SNR	1KHz, 94dB SPL, A-weighted (20Hz~10KHz)		59		dB
Equivalent Input Noise	EIN			35		dBA SPL
Total Harmonic Distortion	THD	1KHz, 110dB SPL			1	%
Acoustic Overload Point	AOP	1KHz THD=10%		128		dB SPL
Power Supply Rejection Ratio	PSRR	217Hz, 100mV V _{p-p} , square wave on V _{DD}		65		dBA
Power Supply Rejection	PSR	217Hz, 100mV V _{p-p} , square wave on V _{DD}		-90		dBV(A)
Output Impedance	Z _{out}			200	350	Ω
Output DC Offset				0.75		V
Output Current Limit				90		μA
Polarity				Noninverting		

Typical Performance Characteristics



TDMA Disturbance Immunity

- 75 dB Max @500~2500MHz (Direct RF injection test according to set figure , this set figure is based on below block diagram.)

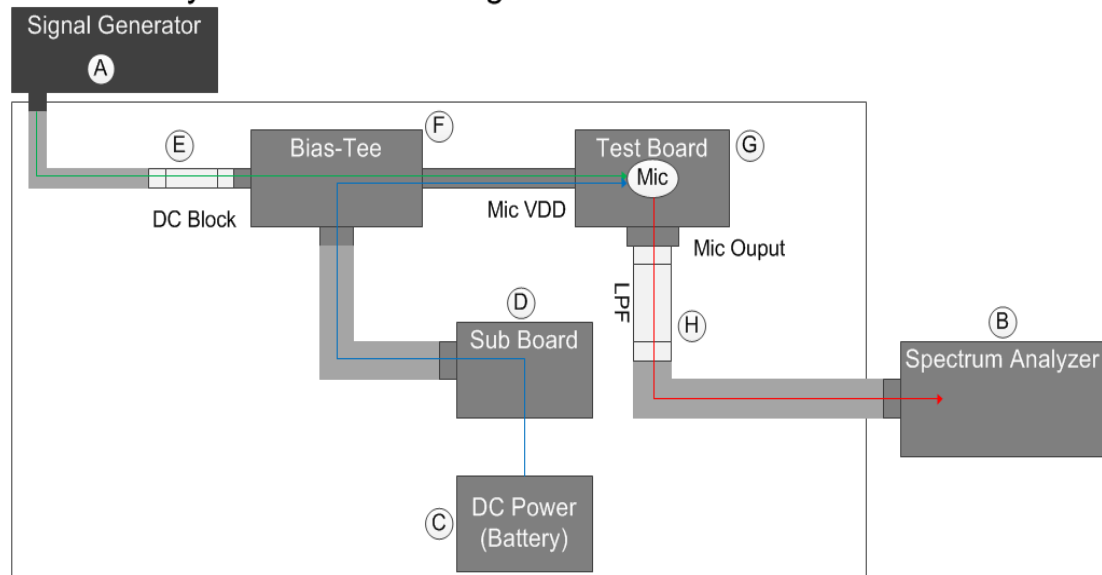
Instrument settings

Signal Generator

- modulation: 1 kHz, AM, depth 80%
- test frequency and amplitude from frequency/amplitude table

MHz	dBm	MHz	dBm	MHz	dBm	MHz	dBm	MHz	dBm
100	-4.08	600	-2.85	1100	-1.64	1600	-0.52	2100	0.05
200	-3.68	700	-2.61	1200	-1.33	1700	-0.29	2200	0.12
300	-3.31	800	-2.39	1300	-1.25	1800	-0.11	2300	0.27
400	-3.24	900	-2.11	1400	-1.08	1900	-0.04	2400	0.31
500	-3.09	1000	-1.84	1500	-0.86	2000	-0.01	2500	0.45

RF Immunity Measurement Diagram



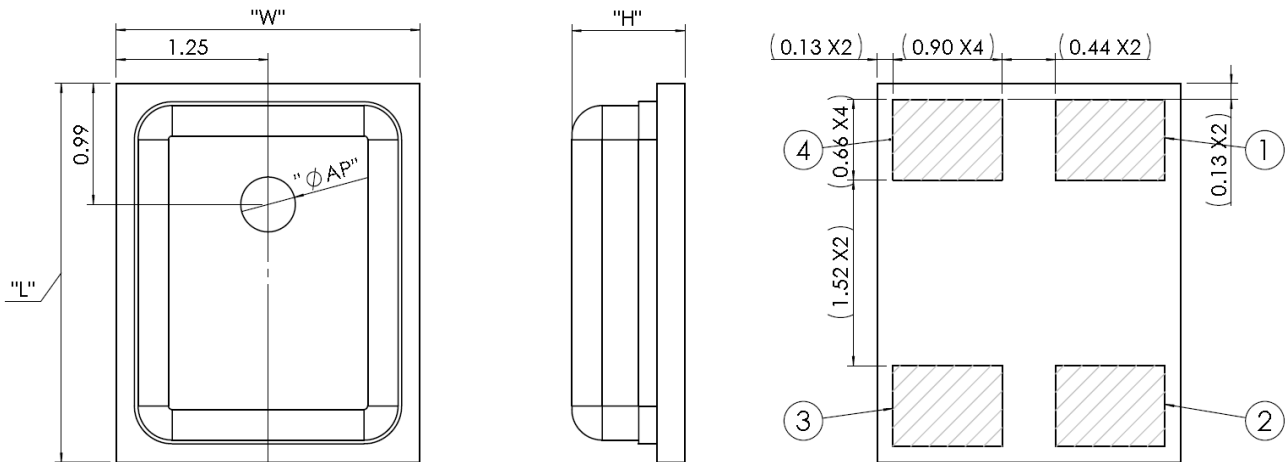
A	Signal Generator	Rode & Schwarz SMIQ 03B
B	Spectrum Analyzer	Audio Precision APx525
C	DC Power	Battery 3V
D	Sub Board with RL & Capacitor	C: 0.1uF
E	DC block	Agilent 11742A
F	Bias-Tee	Mini-Circuits ZFBT-6GW
G	Test Board	ZTS6016 EVB
H	Low pass filter (Pass band 5M~2.5GHz)	Mini-Circuits SLP-2.5, SLP-5, SLP-150, SLP-450, SLP-1200, SLP-1650

Reliability Tests

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: 330Ω 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 SPECIFICATIONNS

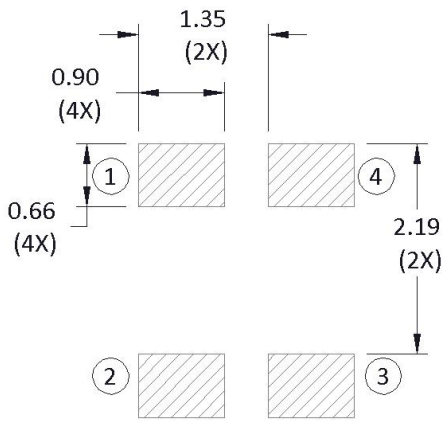


Item	Dimension	Tolerance
Length (L)	3.10	±0.100
Width (W)	2.50	±0.100
Height (H)	1.00	±0.100
Acoustic Port (AP)	Ø0.45	±0.050

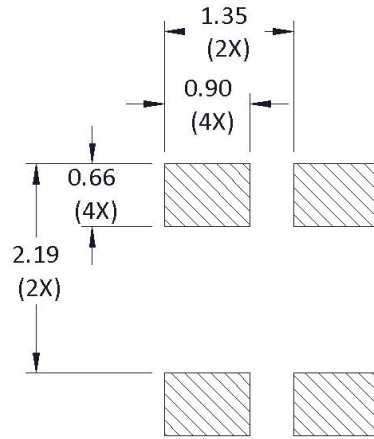
Pin#	Pin Name	Description
1	OUT	Analog output signal.
2, 3	GND	Ground.
4	VDD	Power Supply.

RECOMMENDED CUSTOMER LAND PATTERN

The recommended PCB land pattern for the ZTS6016 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.



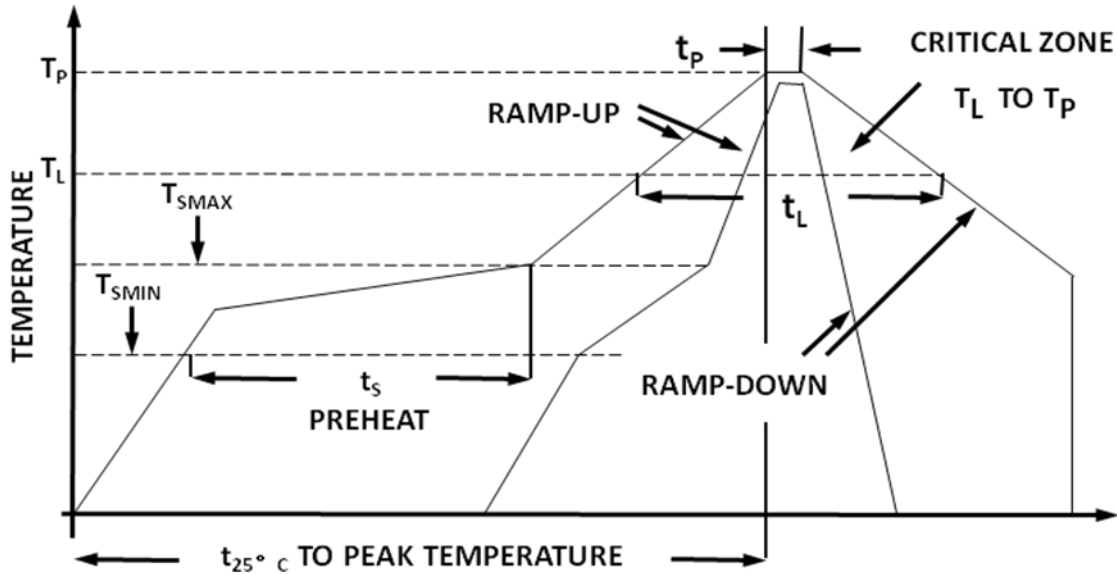
PCB Land Pattern Layout (Dimensions Shown in mm).



Suggested Solder Paste Stencil Pattern Layout.

SOLDER FLOW PROFILE

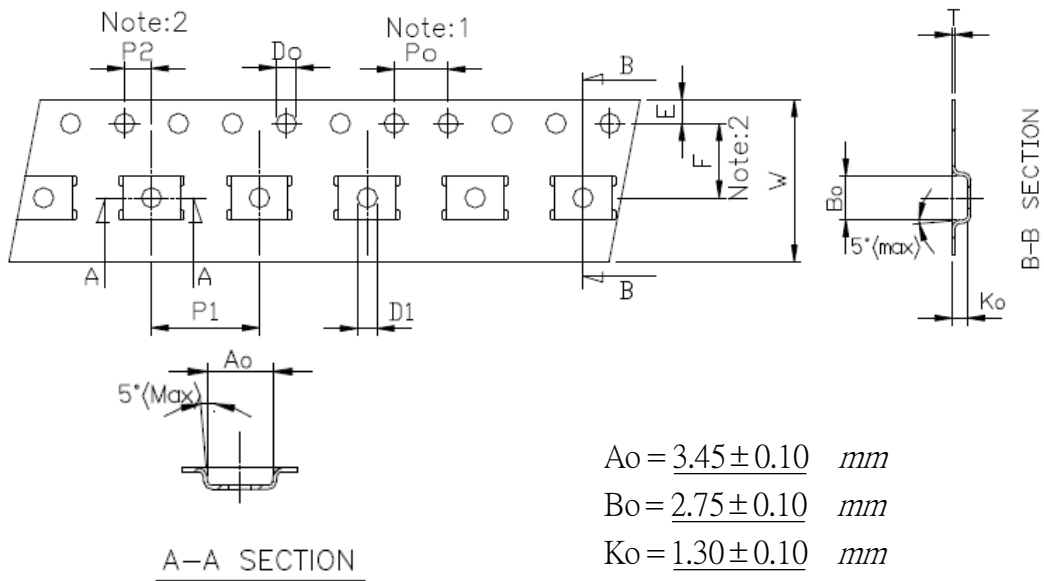
The reflow profile specified in this section describes expected maximum heat exposure of components during the reflow process of NMP product PWBs. Temperature is measured on top of component. All components have to tolerate at least this profile five times (5x) without affecting electrical performance, 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	T _S MIN	100°C
	Maximum Temperature	T _S MAX	200°C
	Time	T _S MIN to T _S MAX	60sec to 120sec
Ramp-Up Rate	T _S MAX 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

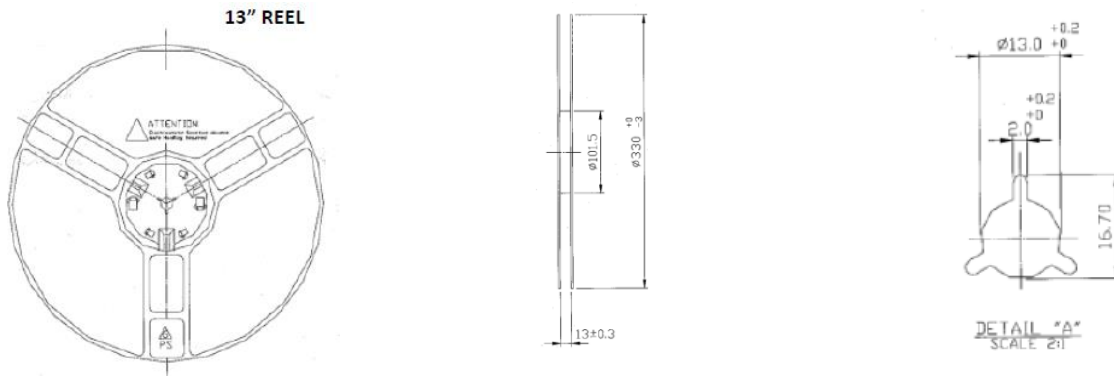


Unit : mm

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

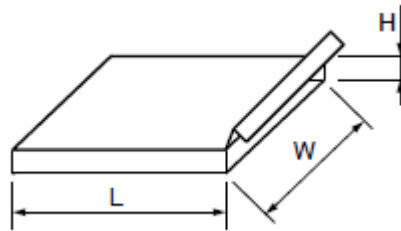
Notice :

- 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
ZTS6016	13"	5,200	5,200	46,800

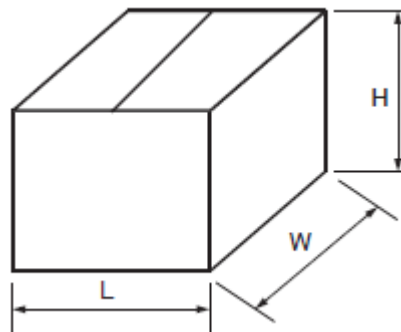
Dimensions for Inner Box



Unit : mm

L	W	H
335	339	45

Dimensions for Outer Box



Unit : mm

L	W	H
445	360	372