ECM-Like Mems Microphone

DESCRIPTION

The ZTS6618 is a high quality, low cost, low power analog output top-ported omni-directional MEMS microphone. ZTS6618 consists of a MEMS microphone element and an preamplifier. ZTS6618 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, ZTS6618 shows high immunity to EMI.

The ZTS6618 is available in a thin 1.40 X 2.30 X 1.00 mm surface-mount package. It is reflow solder compatible with no sensitivity degradation. The ZTS6618 is Halogen and Lead free.

APPLICATIONS

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

ORDERING INFORMATION

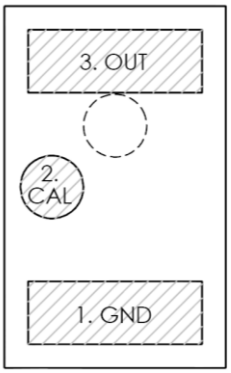
PART	RoHS	Ship, Quantity
ZTS6618	Yes	Tape and Reel, 10K

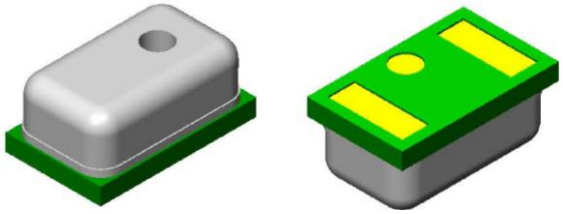
FEATURES

- 1.40 X 2.30 X 1.00 mm surface-mount package
- Stable sensitivity over power supply range of 1.5V-3.6V
- SNR of 55dBA
- Sensitivity of −42dBV
- Low current consumption of <300μA
- Multi Chip Module (MCM) Package

Pins Configuration and Description

Bottom View



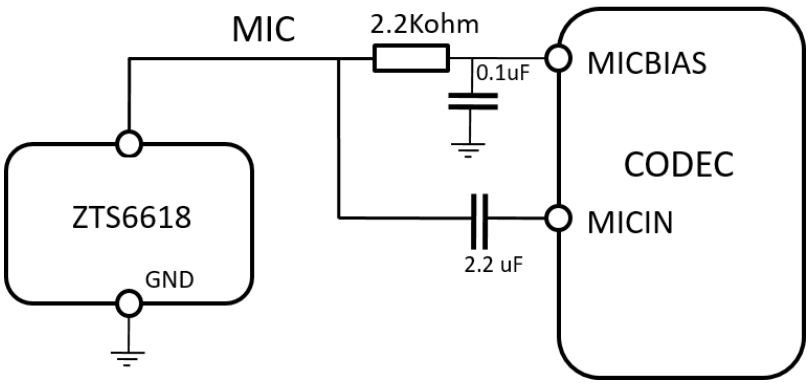


Top Bottom

Isometric Views of ZTS6618 Microphone Package

Typical Applications

The ZTS6618 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

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Tel: (886) 3577 7509; Fax: (886) 3577 7390
Email: sales@zilltek.com

Absolute Maximum Ratings

CLOCK to Ground ..... 0.8V to +3.6V
SELECT, V_{DD}, DATA to Ground ..... 0.8V to +3.6V
Input Current ..... ±5mA
Data Output Short Circuit ..... Indefinite to Ground or V_{DD}
Operating Temperature Range ..... –40°C to +125°C
Storage Temperature Range ..... –40°C to +125°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.

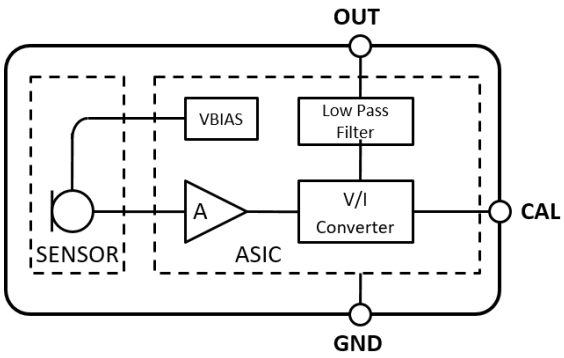
Electro-Static Discharge Sensitivity

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	GND	Ground
2	CAL	Calibration
3	OUT	Analog output signal.

Functional Block Diagram



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Specifications

(T_A = +15°C ~+25°C, V_{DD} = +1.8V with 2.2Kohm Pull high, 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}	VDD=1.8V		250	300	µA
Sensitivity (Note)		1kHz, 94dB SPL@2.2Kohm	−45	−42	−39	dBV
Signal-to-Noise-Ratio	SNR	94dB SPL@1KHz, A-weighted		55		dBA
Equivalent Input Noise	EIN			39		dBA SPL
Total Harmonic Distortion	THD	94dB SPL @ 1KHz		0.2	1	%
Acoustic Overload Point	AOP	10% THD @ 1KHz		120		dBSPL
Polarity		Increasing sound pressure	Decreasing output voltage			

Note: Base on BK sound test system.

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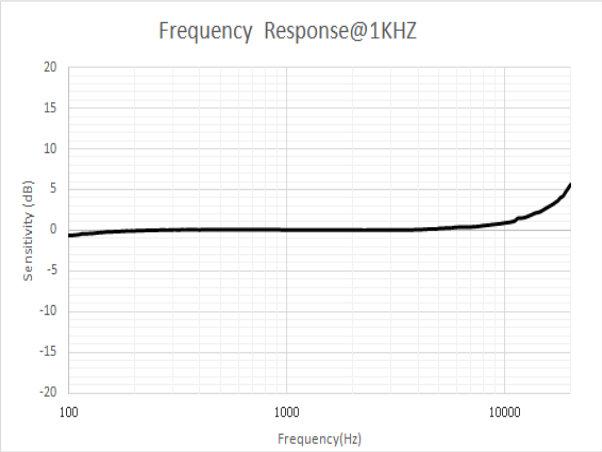
Typical Performance Characteristics



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Reliability Tests

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

1. Heat Test, Operational	Temperature: 125±3 °C Duration: 1000 hours Voltage: Applied
2. Cold Test, Operational	Temperature: -40±3°C Duration: 1000 hours Voltage: Applied
3. Heat Test, Non-Operational	Temperature: 125±3°C Duration: 1000 hours Voltage: Not Applied
4. Cold Test, Non-Operational	Temperature: -40±3°C Duration:1000 hours Voltage: Not Applied
5. Thermal Shock Test, Non-Operational	Temperature: -40±3°C and 125±3°C Duration: 30 minutes each, during 5 minutes ramp, 256 cycles Voltage: Not applied
6. Temperature humidity storage	Temperature: 85±3°C Humidity: 85±3%RH Duration: 1000 hours
	Temperature: 65±3°C Humidity: 95±3%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 ±X, ±Y, and ±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℃
14. Solderability	245±5 °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±3°C Humidity: 85±3%RH Duration: 96 hours Voltage: Applied
17. Air Blow	0.45MPa, distance 3cm, time 10s

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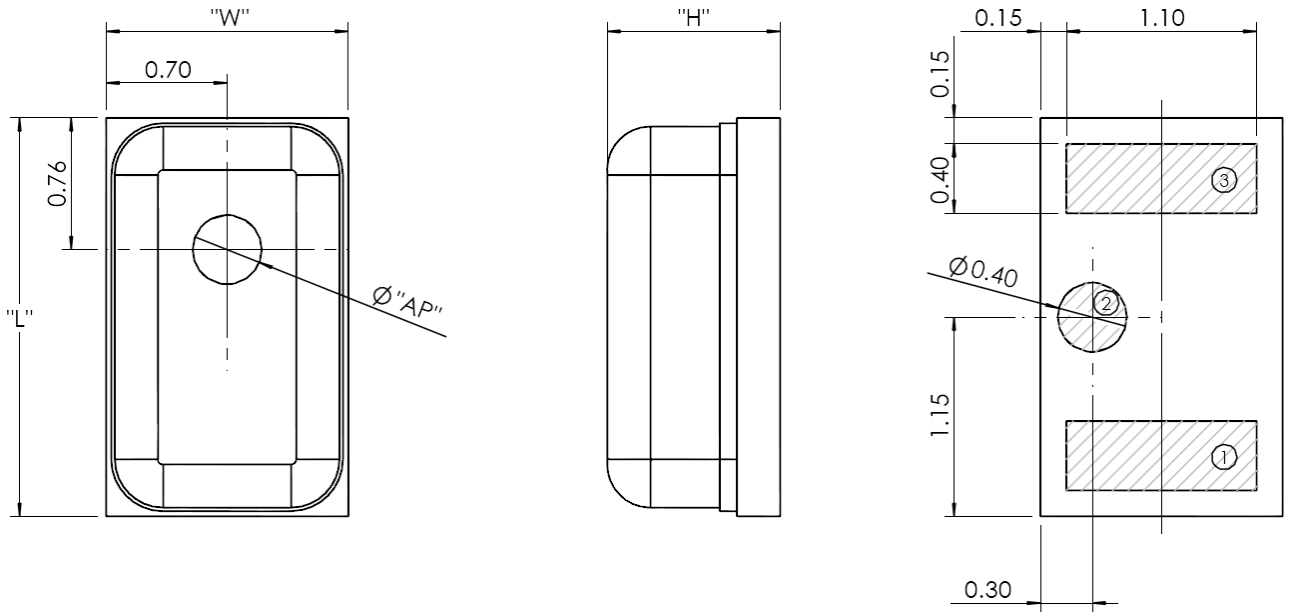
MECHANICAL SPECIFICATIOPNS



ITEM	DIMENSION	TOLERANCE	UNITS
Length (L)	2.30	±0.10	mm
Width (W)	1.40	±0.10	mm
Height (H)	1.00	±0.10	mm
Acoustic Port (AP)	Ø0.40	±0.05	mm

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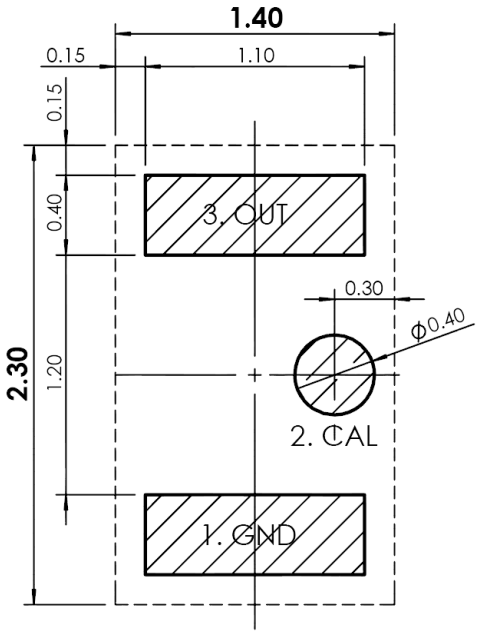
RECOMMENDED CUSTOMER LAND PATTERN

The recommended PCB land pattern for the ZTS6618 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**.

TOP VIEW
(UNITS: MM)



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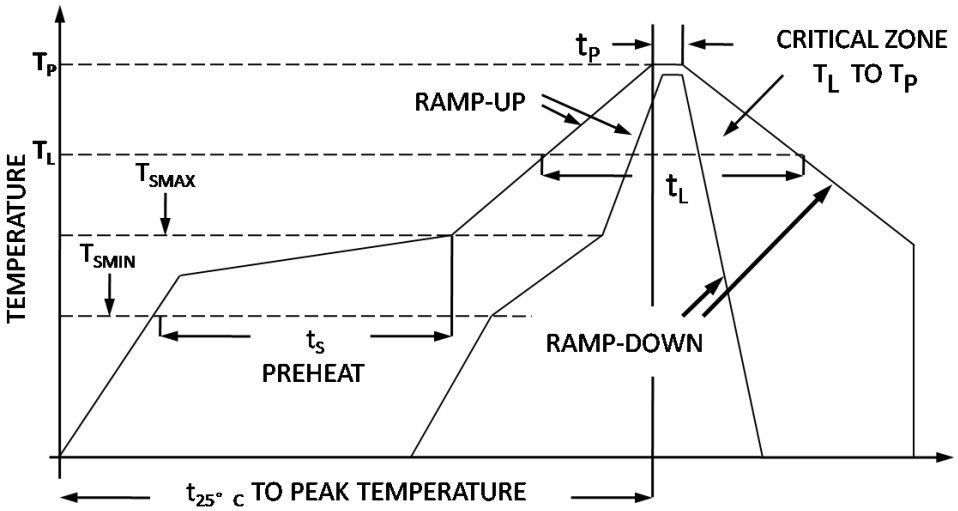
SOLDER FLOW PROFILE

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_{SMIN}	100°C	100 °C
	Maximum Temperature	T_{SMAX}	200°C	150 °C
	Time	T_{SMIN} to T_{SMAX}	60sec to 120sec	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_{25OC}) to Peak Temperature			8 min max	6 min max

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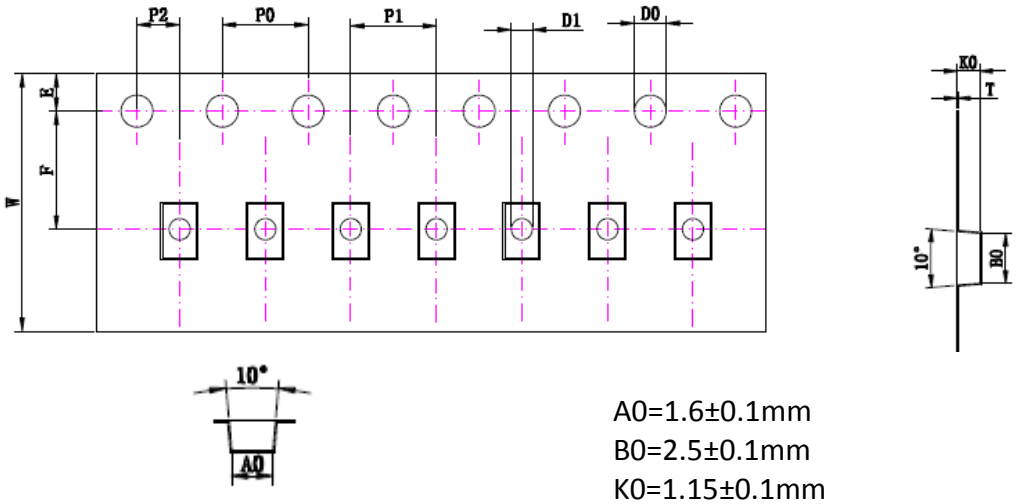
PACKAGING



A0=1.6±0.1mm
B0=2.5±0.1mm
K0=1.15±0.1mm

Unit：mm

Symbol	Spec.
K1	-
P0	4.0 ± 0.10
P1	4.0 ± 0.10
P2	2.0 ± 0.10
D_O	1.50 ± 0.05
D1	1.00 (MIN)
E	1.75 ± 0.10
F	5.50 ± 0.05
$10P_O$	40.0 ± 0.10
W	12.0 ± 0.30
T	0.20 ± 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.

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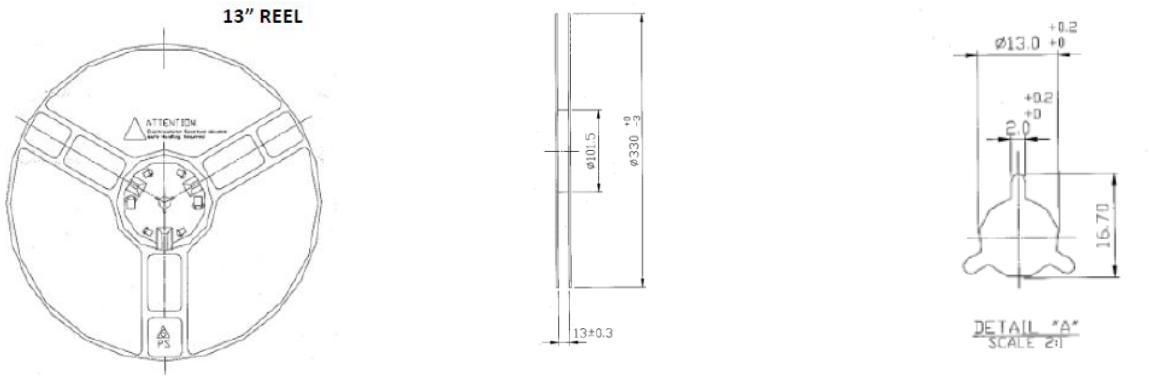
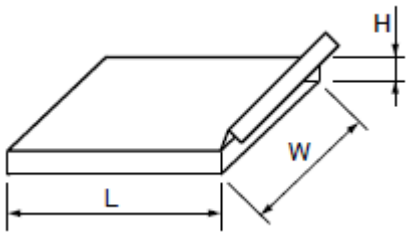


Part NO.	Reel Diameter	Quantity Per Reel	Quantity Per Inner Box	Quantity Per Outer Box
ZTS6618	13"	10000	10000	90000

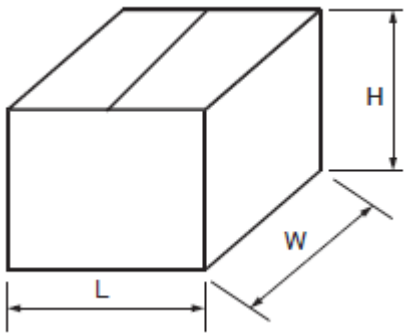
Dimensions for Inner Box



Unit：mm

L	W	H
335	339	45

Dimensions for Outer Box



Unit：mm

L	W	H
445	360	372

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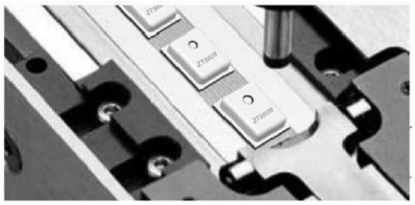
Pick and place guidelines of process



Rules of cleaning

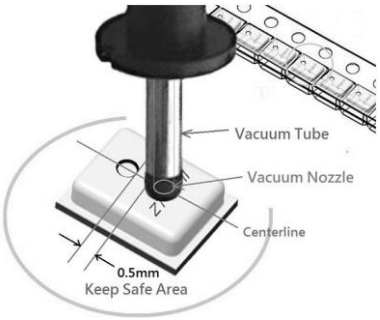
Due to Clean the PCBA gap will make MEMS Mic. unit work improperly, please do not clean it by way of ultrasonic or use any cleaning solution to wash the soldered MEMS Mic. unit. If the PCB need to be cleaned, please seal with a tape on the both side of the acoustic hole to avoid foreign material and liquid invaded.
MEMS Mic. is a electro-acoustic component which rely on its diaphragm vibrate in response to sound pressure, so that the sound pressure can be converted to electrical signals; Base on the above , If any cleaning liquid inject the Mic. unit, the vibrate spacing of the diaphragm would be constrained. As a result of that, if the diaphragm cannot vibrate well, it will make the output signal smaller or even no output.

Rules of the pressure of vacuum nozzle

If the Vacuum nozzle pressure is much more on the metal cap, it will directly affect the displacement of the diaphragm structure. When the displacement pressure is greater than the Max input sound pressure, the diaphragm will be damaged or cracked.
Note that Vacuum nozzle pressure cannot greater than 7PSI.
1K Pa = 0.145 pounds (lb / in2) = 0.0102 KGF / CM2 = 0.0098 atm.

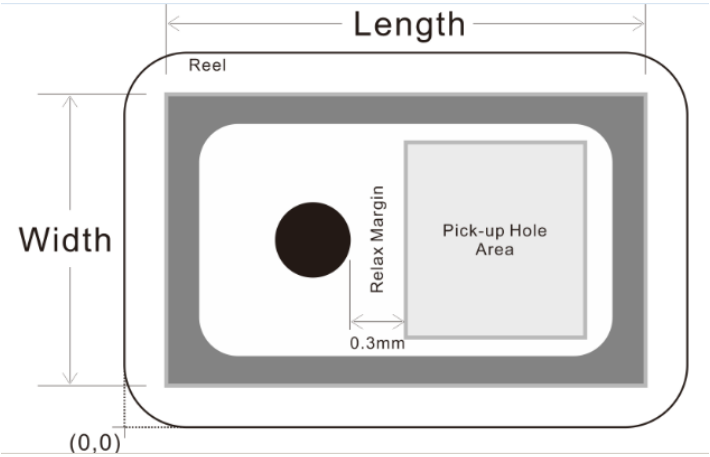
Rules of protection measurement

1. Please do not let the vacuum nozzle suck the microphone acoustic hole.
2. Do not vacuum the anti-static bag when repackaging the MEMS Mic..
3. Do not blow the acoustic hole when cleaning the PCBA with air gun.



Rules of the placement of vacuum nozzle

When pick and place the Mic. unit, the SMT Vacuum Tube should be placed in the center of the left and right sides of Mic. unit and keeps 0.5mm from the edge of the acoustic hole.
This pick and place guidelines can apply to all series of ZillTek Top-Port MEMS Mic. products.



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