苏州敏芯微电子技术有限公司
MEMSensing Microsystems Co., Ltd

Data Sheet

V 1.0 / Jun. 2014

MSM381A3729Z8-C

Analog output MEMS microphone

GENERAL DESCRIPTION

MSM381A3729Z8-C is an omnidirectional, Bottom-ported, analog output MEMS microphone. It has high performance and reliability. It is with excellent RF immunity performance .

MSM381A3729Z8-C is available in a thin 3.76 mm × 2.95 mm × 1.1 mm metal cap LGA package. It is SMT compatible with no sensitivity degradation.

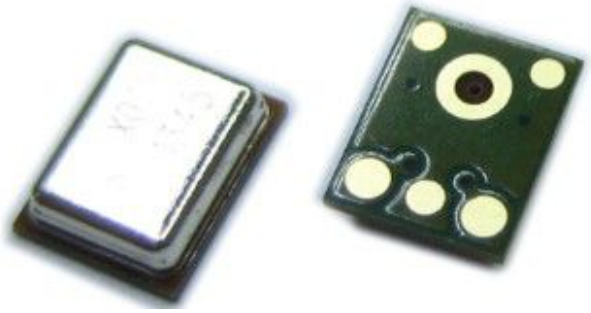
FEATURES

- ✧ Low Noise
- ✧ Omnidirectional
- ✧ Excellent RF immunity
- ✧ Standard SMD Reflow
- ✧ Compatible with Sn/Pb and Pb-free solder processes
- ✧ RoHS/Halogen free compliant

APPLICATIONS

- ✧ Mobile Phone
- ✧ Laptop
- ✧ Tablet computer
- ✧ Bluetooth headset
- ✧ Earphone
- ✧ Wearable intelligent equipment

PRODUCT VIEW



ABSOLUTE MAXIMUM RATINGS

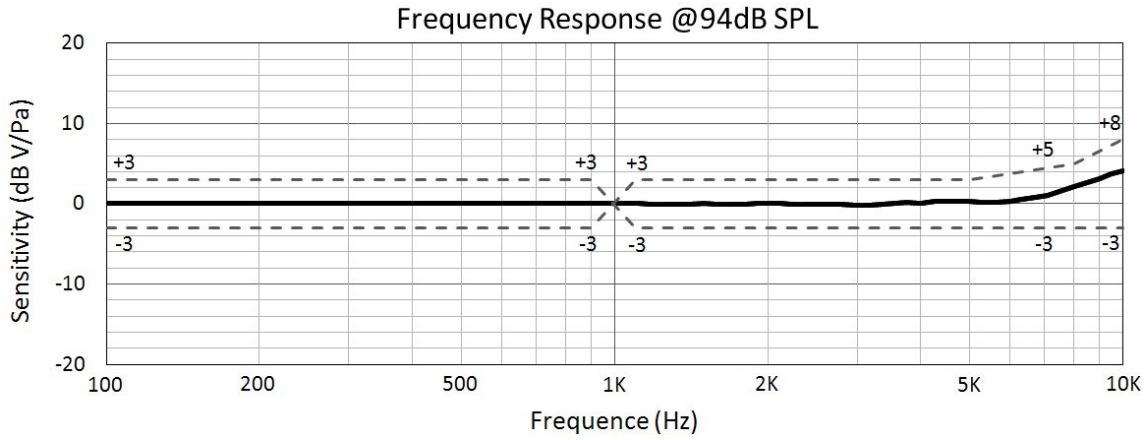
Parameter	Maximum value	Unit
Supply Voltage	−0.3 to 4.0	V
Sound Pressure Level	140	dB SPL
Mechanical Shock	10,000	g
Temperature Range	−40 to 100	°C
Electrostatic discharge protection	8 (HBM)	kV

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

ACOUSTIC & ELECTRICAL SPECIFICATIONS

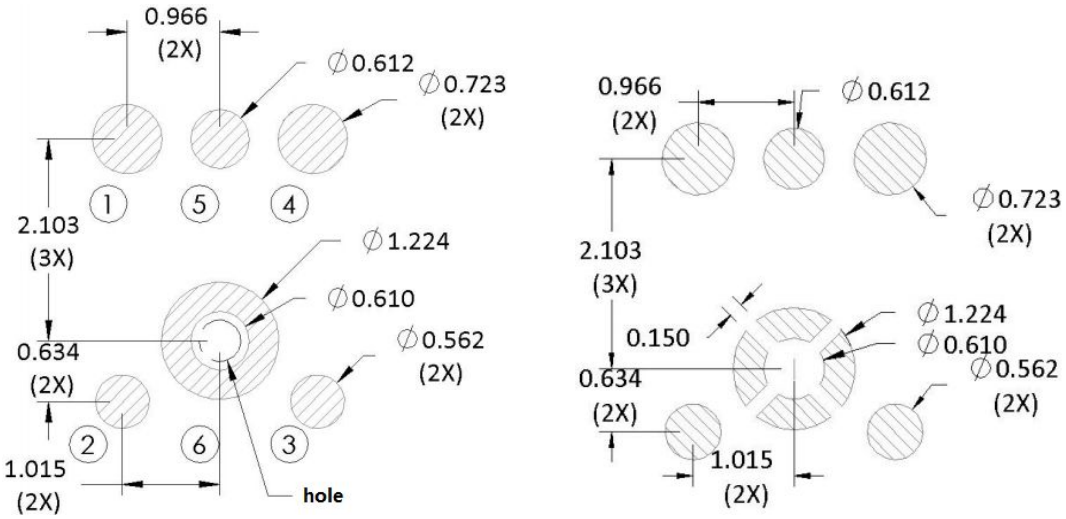
All data taken at 25°C, Relative Humidity 45±5% unless otherwise specified					
	Limits			**unit**	**condition**
	Min.	Nom.	Max.		
Directivity		Omni directional			
Sensitivity	-39	-38	-37	dB	@1kHz ref 1V/Pa
Operation voltage	1.5	-	3.6	V	
Freq. range	Refer to the frequency response graphic			Hz	±3dbRef sensitivity@1kHz
Sensitivity loss across supply voltage	No change across the voltage range			dB	
Signal to noise ratio	-	63	-	dB	94 dB SPL @ 1 kHz, A-weighted
THD	-	-	1%		100dB SPL @1kHz S =Nom, Rload > 2 k
	-	-	10%		120dB SPL @1kHz S =Nom, Rload > 2 k
Out impedance	-	-	200	Ω	@1kHz
DC Output		0.7		V	
PSRR	-	60	-	dB	200mVpp sinewave @ 1 kHz, VDD = 1.8V
PSR	-	-92	-	dBV(A)	100 mVpp squarewave@ 217 Hz, VDD = 1.8V, A-weighted
Current consumption	-	160	180	μA	
Operating temperature	-40	-	100	℃	
Storage temperature	-40	-	100	℃	

TYPICAL FREQUENCY RESPONSE

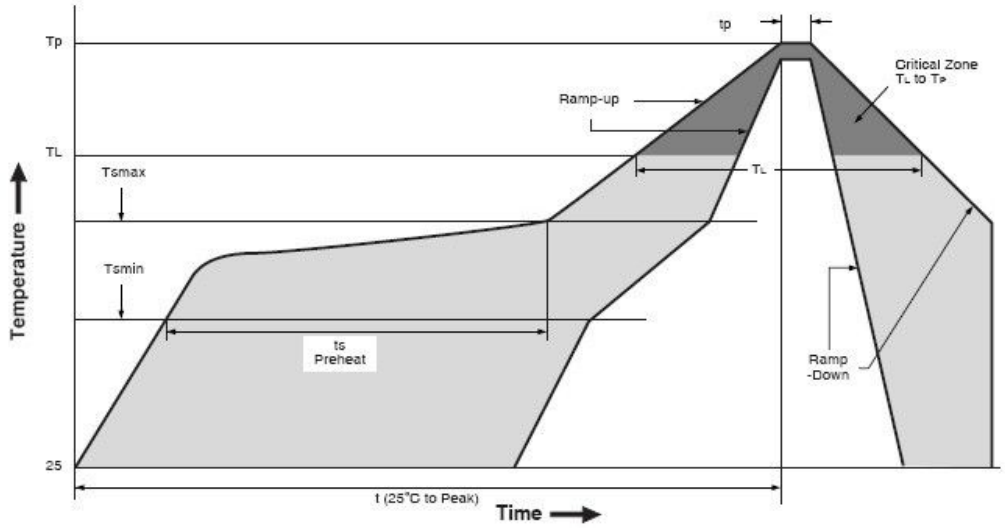


SMT Parameters：

1. Recommend PCB land pattern & stencil pattern layout：（unit: mm）

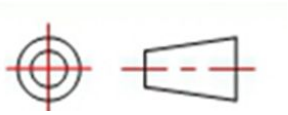


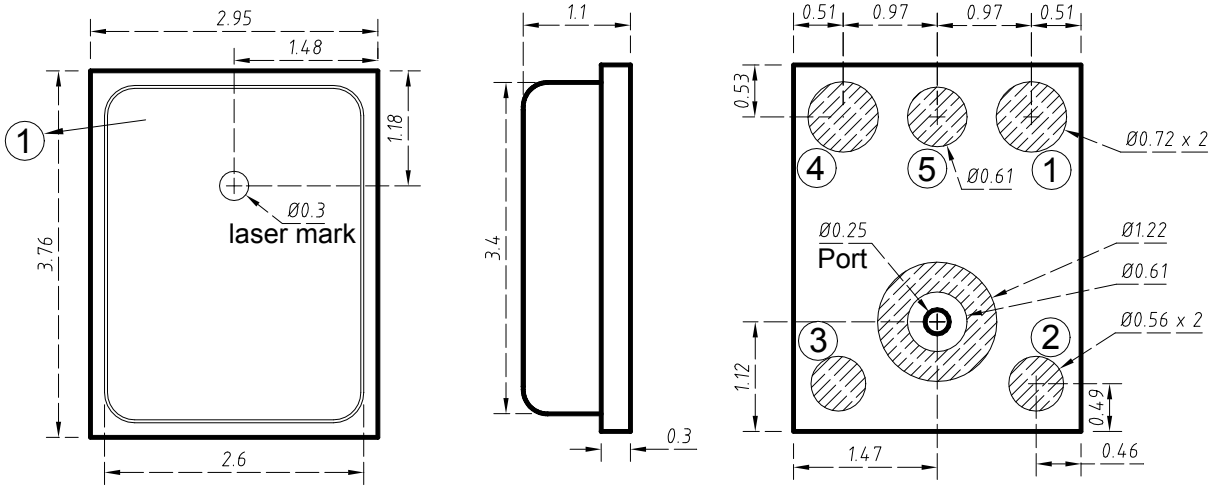
2. Recommend reflow profile:



Description	Parameter	Pb-free
Average ramp-up rate	$T_{smax}$to T_P	3°C/sec max
Preheat		
Minimum temperature	T_{SMIN}	150 °C
Maximum temperature	T_{SMAX}	200 °C
Time(T_{SMIN} to T_{SMAX})	t_S	60 sec to 180 sec
Time maintained above liquidous temperature	t_L	60 sec to 150 sec
Liquidous temperature	T_L	217 °C
Peak temperature	T_P	260 °C
Time within 5°C of actual peak temperature	t_P	20 sec to 40 sec
Ramp-down rate	T_P to T_{smax}	6 °C/sec max
Time 25 °C (t25 °C) to peak temperature	t	8 minutes max

OUTLINE DIMENSIONS AND PIN DEFINITION:





TOP VIEW SIDE VIEW BOTTOM VIEW

PIN function description

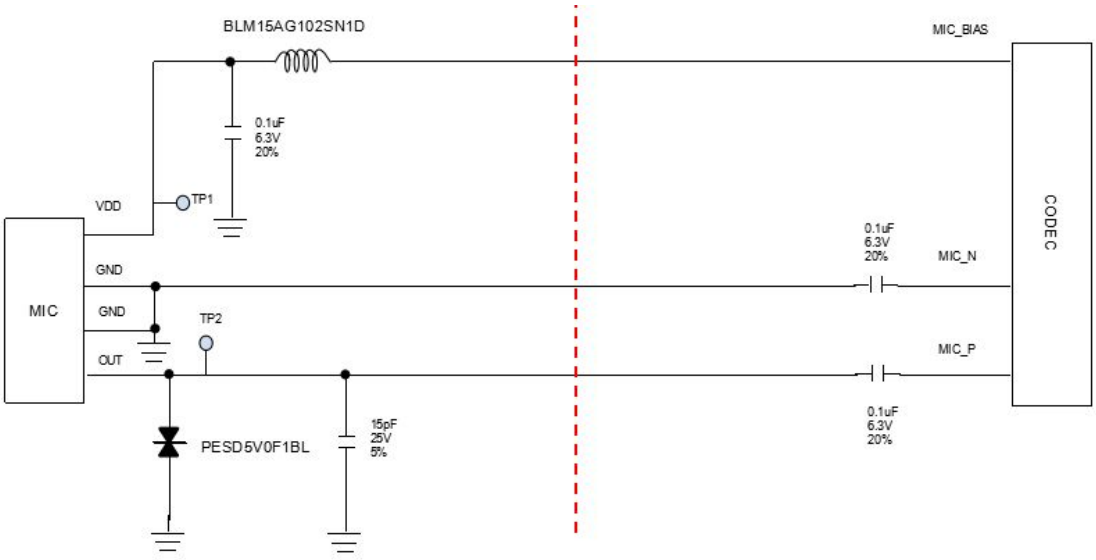
PIN#	Function
1	OUT
2	GND
3	GND
4	VDD
5	GND
6	GND

Item	Dimension	Tolerance
Length (L)	3.76	±0.10
Width (W)	2.95	±0.10
Height (H)	1.10	±0.10
Acoustic Port (AP)	Ø0.25	±0.10

Dimensions are in millimeters
Tolerance is ±0.15mm unless otherwise specified.

RECOMMENDED INTERFACE CIRCUIT：

- **Recommended Application Example (differential amplification circuit)**



NOTE： It is recommended that the components on the lest side of red line be placed close to MIC， and components on the right side of red line be placed close to codec.

ADDITIONAL NOTES

(A) MSL (moisture sensitivity level) Class 1.

(B) Maximum of 3 reflow cycles is recommended.

(C) In order to minimize device damage:

Do not board wash or clean after the reflow process.

Do not brush board with or without solvents after the reflow process.

Do not directly expose to ultrasonic processing, welding, or cleaning.

Do not insert any object in port hole of device at any time.

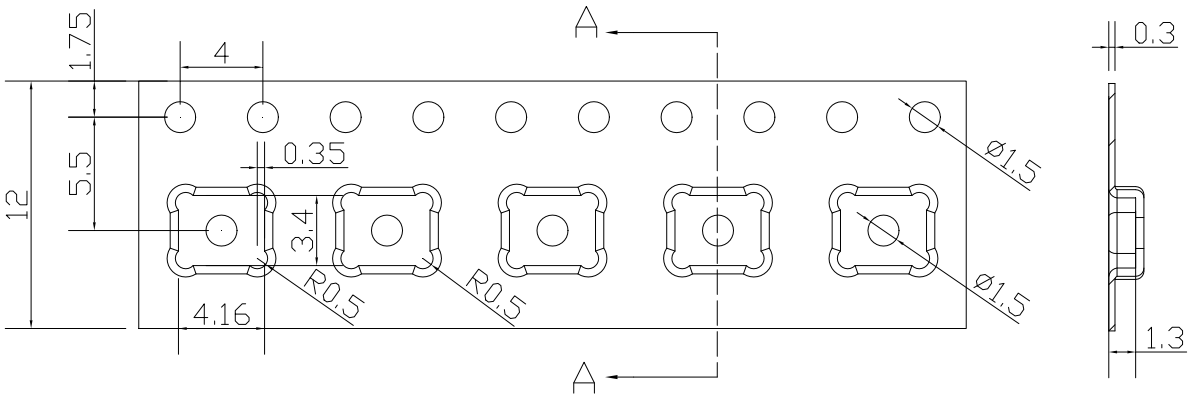
Do not apply over 30 psi of air pressure into the port hole.

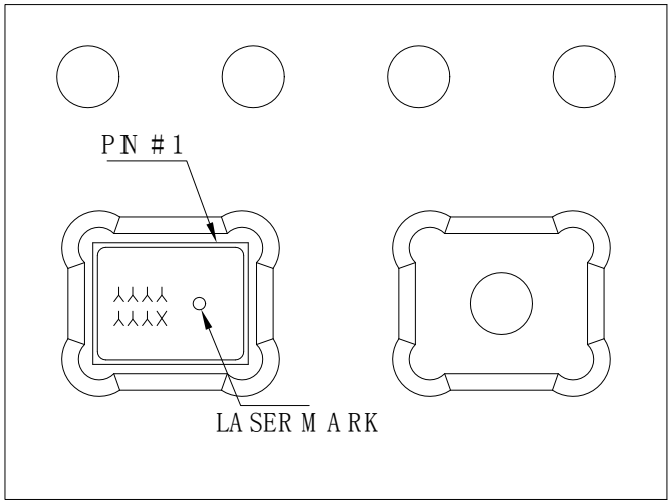
Do not pull a vacuum over port hole of the microphone.

MATERIALS STATEMENT

Meets the requirements of the European RoHS and Halogen-Free.

PACKAGING & MARKING DETAIL:





Note: Dimensions are in mm.

DIRECTION OF FEED

Component Orientation

Model Number	Reel Diameter	Quantity Per Reel
MSM381A3729Z8-C	13 inch	5000
	7 inch	1000

RELIABILITY SPECIFICATIONS

Test	Description
Thermal Shock	100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks. (IEC 68-2-4)
High Temperature Storage	1,000 hours at +105°C environment (IEC 68-2-2 Test Ba)
Low Temperature Storage	1,000 hours at -40°C environment (IEC 68-2-2 Test Aa)
Reflow	5 reflow cycles with peak temperature of +260°C
ESD-HBM/LID-GND	3 discharges of ±2 kV direct contact to I/O pins. (MIL 883E, Method 3015.7)& 3 discharges of ±8 kV direct contact to lid while unit is grounded. (IEC 61000-4-2)
ESD-MM	3 discharges of ±200 V direct contact to I/O pins. (ESD STM5.2)
Vibration	4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20 G peak acceleration lasting 12 minutes in X, Y, and Z directions. (Mil-Std-883E, Method 2007.2 A)
Mechanical Shock	3 pulses of 10,000 G in the X, Y, and Z direction (IEC 68-2-27, Test Ea)
High Temperature Bias	1,000 hours at +105°C under bias (IEC 68-2-2 Test Ba)
Low Temperature Bias	1,000 hours at -40°C under bias (IEC 68-2-2 Test Aa)
Temperature/Humidity Bias	1,000 hours at +85°C/85% R.H. under bias. (JESD22-A101A-B)
Drop Test	To be no interference in operation after dropped to 1.0cm steel plate 18 times from 1.5 meter height

NOTE:sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at 20±2℃, R.H 60%～70%)

REVISION HISTORY:

Revision	Subjects (major changes since last revision)	Date
1.0	Initial Release	2014-06-01