



# **MEMS Surface Mount Microphone Specification**

## **Series EP4738**

Model Number: EP4738CL423CKLF

**Version 1.0**

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## **1. Purpose and the Scope**

This document contains the specific specifications (electrical and mechanical), inspection standard and the reliability standard for the purpose of the customer's approval.

## **2. Description**

Analog MEMS Surface Mount Microphone

## **3. Applications**

Consumer Electronics

## **4. Product Origin**

In China

## **5. Test Conditions**

Test should be made under the conditions of room temperature ( $20 \pm 10$  ° C) normal humidity ( $60 \pm 20$  %) and normal atmospheric pressure. In the case, however, that the judgment is questionable the test conditions are to be changed to room temperature  $20 \pm 2$  ° C, relative humidity 60 ~ 70 % and normal atmospheric pressure.

## **6. Ozone Guarantee**

Certificate on the elimination of ozone layer destroying substances such as Freon.

## **7. Quality Protection**

Test specifications of the mentioned model are based on this document. Other specification outside than this document must be discussed with us before we insert into this approval document. It means that we will not guarantee the specifications outside than this approval document.

## **8. Warranty**

The warranty period will commence upon the date of the receipt of the parts from FLEZON. In the event that the warranty is not specified on the purchasing order, the warranty period shall be half year from the date of delivery.

## **9. Our Major Material List**

Our major material is list below:

Transparent mylar: DuPont

## **10. Washing Conditions**

The products mentioned with “remove after washing” could be washed by our recommended solvent.

## **11. Flux removing Solvents**

In the view of the recent requirement for total elimination of ozone-depleting chemicals, we have decided to recommend our customers to use deionized water for their cleaning process at the condition given below, instead of “CFC” that was conventionally used.

Cleaning solvent : deionized water

Solvent temperature :  $55 \pm 5$  ° C

Immersion time :  $5 \pm 0.5$  minutes

## **12. Power Supply and Resistance Loading**

If the power supply voltage and the loading resistance is changed, the sensitivity would also change. Please make sure this 2 parts are the same as the specifications.

## **13. Filter**

Please don't tear off the top black filter on the top of microphone. It will affect the whole frequency response characteristic.

## **14. Pascal and Ubar**

1 pa = 10 ubar

So the sensitivity will increase 20 dB with “ pa “ indication.

e.g. : -60 dB ( 0 dB = 1.0 V / ubar ) = -40 dB ( 0 dB = 1.0 V / pa )

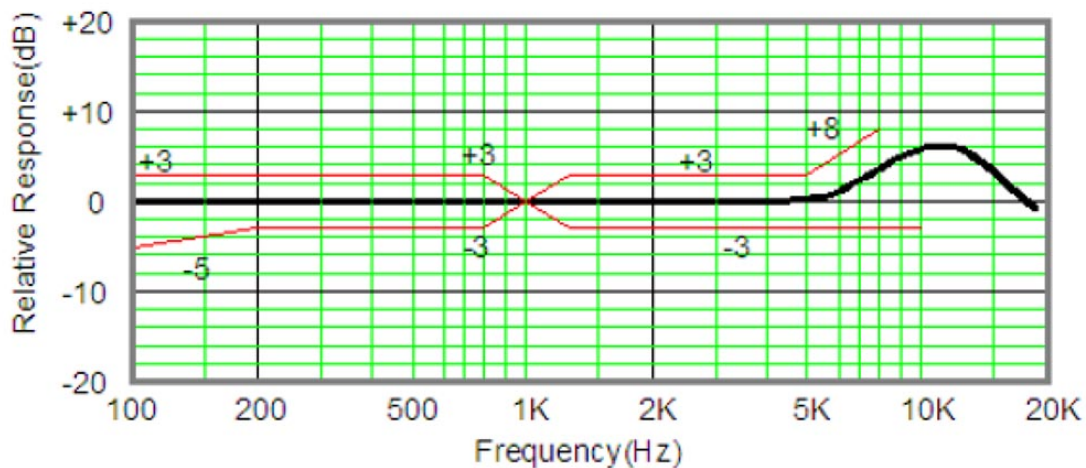
## **15. Introduction**

The MEMS Microphones are integrated with specialized Pre-amplification ASIC to provide high sensitivity, high SNR output from a capacitive audio sensor. It's packaged from surface mounting and high temperature re-flow assembly.

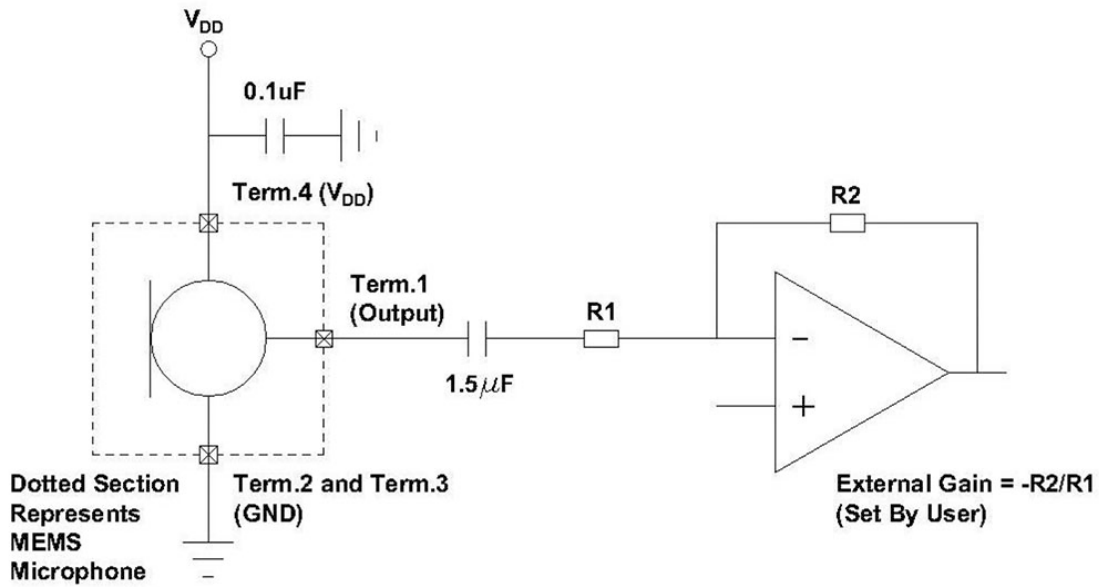
## 16. Electrical Specification

Test Conditions : 23.0 ± 2.0 °C, 55.0 ± 20.0 % R.H						
Parameter	Symbol	Condition	Limits			Unit
			Min.	Nom.	Max.	
Sensitivity	S	94.0 dB SPL at 1.0 K Hz ( 0 dB = 1.0 V / pa )	- 45.0	- 42.0	- 39.0	dB
Output Impedance	Z <sub>OUT</sub>	At 1.0 K Hz	----	----	300.0	Ω
Directivity	Omni directional					
Supply Voltage	V <sub>DD</sub>		1.5	2.0	3.6	V
Current Consumption	I <sub>DSS</sub>	V <sub>DD</sub> = 2.0 V	----	----	200.0	uA
S/N Ratio	S/N	94.0 dB SPL at 1.0 K Hz ( A - Weighted )	----	58.0	----	dB
Total Harmonic Distortion	THD	100.0 dB SPL at 1.0 K Hz	----	----	1.0	%
Power Supply Rejection	PSR	100.0 m Vp-p Square Wave @ 217.0 Hz A - Weighted	----	-70.0	----	dB
Weight	0.3					g

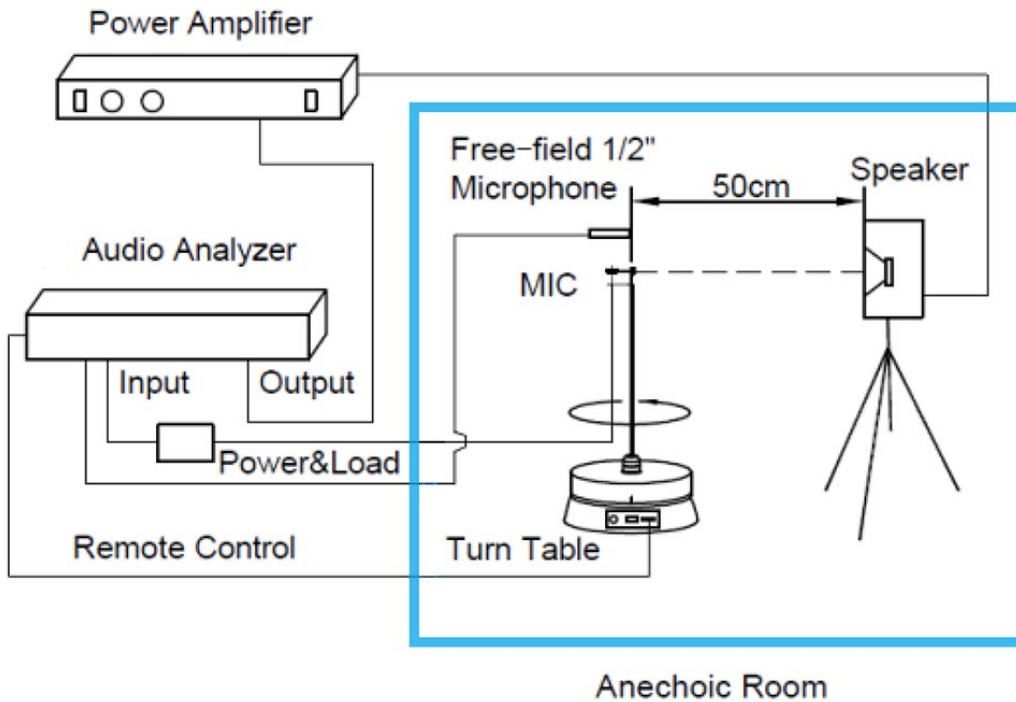
## 17. Frequency Response Curve



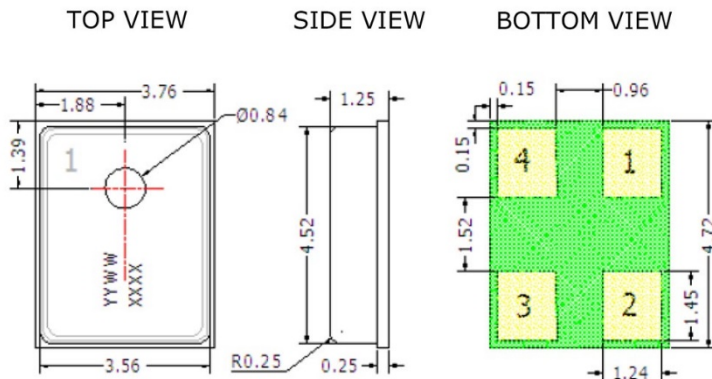
**18. Recommended Interface Circuit**



**19. Measurement System**



## 20. Mechanical Draw



Date Code	
YYWW	YY : Year WW : Work Week
XXXX	XXXX : Lot No.

Item	Dimension	Tolerance	Units
Length ( L )	4.72	± 0.10	mm
Width ( W )	3.76	± 0.10	mm
Height ( H )	1.25	± 0.10	mm
Acoustic port ( AP )	Ø 0.84	± 0.05	mm

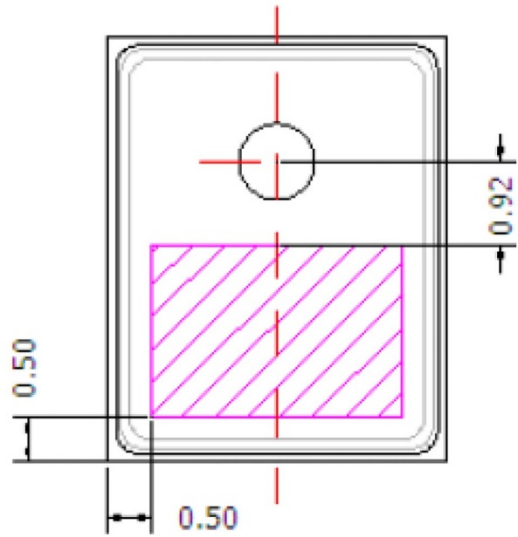
Pin #	Pin Name	Type	Description
1	Output	Signal	Output Signal
2	GND	Ground	Ground
3	GND	Ground	Ground
4	VDD	Power	Power Supply

Note:

All dimensions are in millimeter (mm).

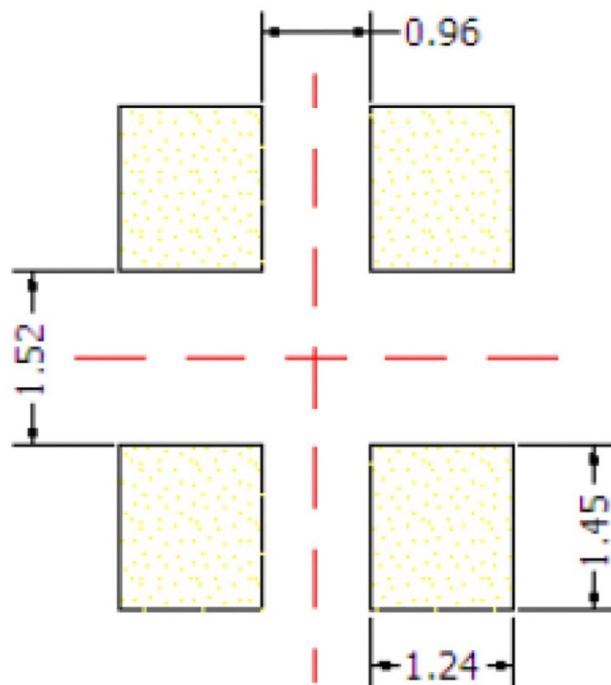
Tolerance: ± 0.1 mm unless otherwise specified.

**21. Vacuum Nozzle Pickup Location**



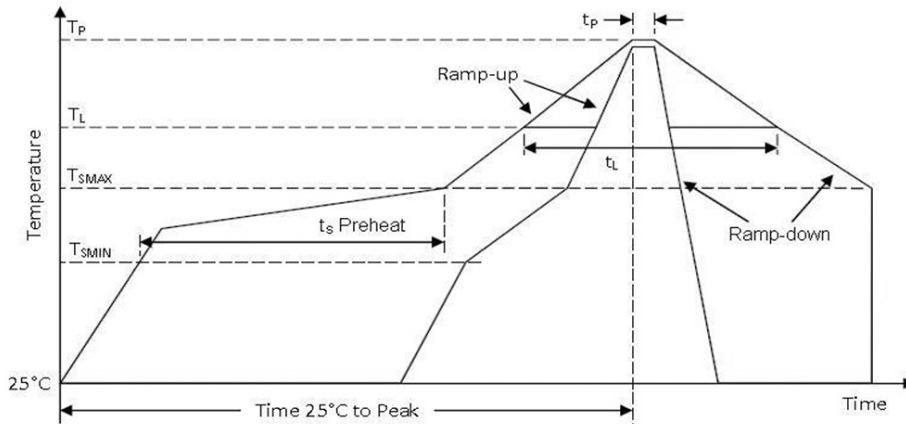
**Recommended Pickup Location**

**22. Recommended PCB Land Pattern And Solder Stencil Pattern**



**Recommended Solder Pad Layout**

## 23. Reflow Guarantee



Profile Feature	Pb-Free
Average Ramp-up rate ( $T_{SMAX}$ to $T_P$ )	3.0 °C/second max.
Preheat	
Temperature Min ( $T_{SMIN}$ )	150.0 °C
Temperature Max ( $T_{SMAX}$ )	180.0 °C
Time ( $T_{SMIN}$ to $T_{SMAX}$ ) ( $t_s$ )	60.0 -120.0 seconds
Time maintained above:	
Temperature ( $T_L$ )	217.0 °C
Time ( $t_L$ )	60.0 -90.0 seconds
Peak Temperature ( $T_P$ )	260.0 °C
Time within 5.0 °C of actual Peak Temperature ( $t_p$ )	20.0 - 40.0 seconds
Ramp-down rate( $T_P$ to $T_{SMAX}$ )	6.0 °C/second max
Time 25.0 °C to Peak Temperature	8.0 minutes max

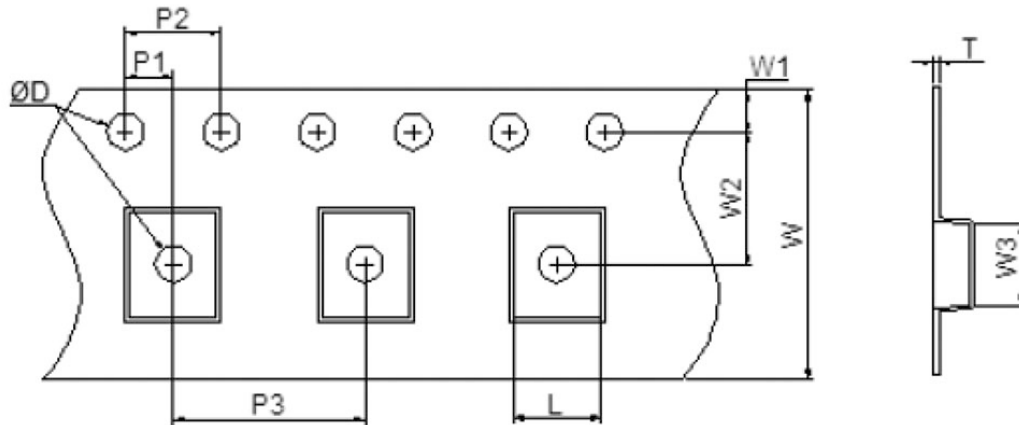
### Notes:

1. Vacuuming over acoustical hole of the microphone is not allowed, because the devices can be damaged by vacuum.
2. Washing the board after reflow process is not allowed, because board washing and Cleaning agents can damage the device. A device should not be exposed to ultrasonic processing or cleaning.
3. Recommended number of reflow is no more than 5.0 times.



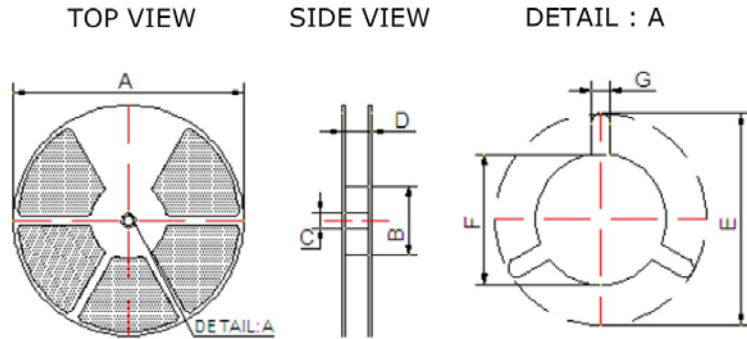
## 24. Tape & Reel Packing

Tape Specification



Symbol	Dimension		
	Minimum	Nominal	Maximum
Ø D	1.5	1.5	1.6
P1	1.9	2.0	2.1
P2	3.9	4.0	4.1
P3	7.9	8.0	8.1
L	4.0	4.1	4.2
W	11.7	12.0	12.3
W1	1.65	1.75	1.85
W2	5.4	5.5	5.6
W3	5.0	5.1	5.2
T	0.25	0.3	0.35

Reel Dimension



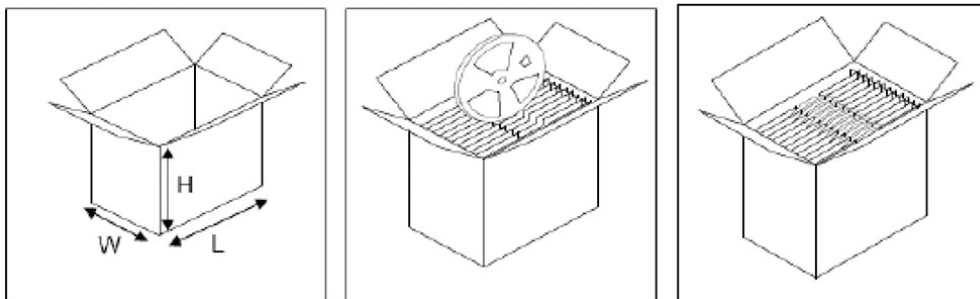
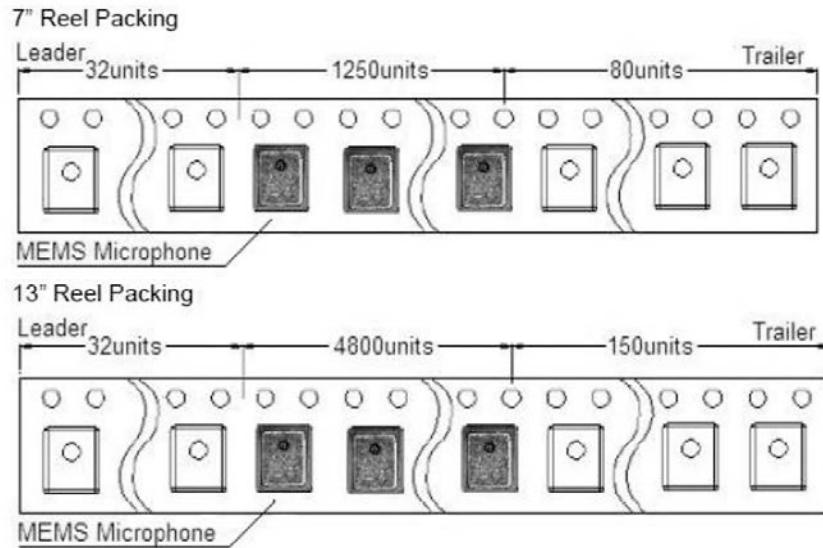
7" Reel

Description	Symbol	Dimension ( mm )		
		Minimum	Nominal	Maximum
Reel Diameter	A	----	180.0	----
Hub Diameter	B	58.0	60.0	62.0
Hub Hole Diameter	C	12.8	13.0	13.5
Reel Width ( Measured at hub )	D	----	16.0	16.4
Arbor Hole	E	20.2	----	----
Arbor Hw in mm Diameter	F	12.8	13.0	13.5
Arbor Slot Width	G	1.5	----	----

13" Reel

Description	Symbol	Dimension ( mm )		
		Minimum	Nominal	Maximum
Reel Diameter	A	----	330.0	----
Hub Diameter	B	98.0	100.0	102.0
Hub Hole Diameter	C	12.8	13.0	13.5
Reel Width ( Measured at hub )	D	----	18.0	18.4
Arbor Hole	E	20.2	----	----
Arbor Hw in mm Diameter	F	12.8	13.0	13.5
Arbor Slot Width	G	1.5	----	----

The Content of Box



Tape & Reel 7"

Qty. / Reel	Weight / Reel	Reel / Carton	Qty. / Carton	Weight Full	Dimension Carton Box	Storage
pcs	kg	Nos	Nos	Load ( kg )	( L x W x H ) mm	Temperature
1250.0	0.25	4.0	5000.0	~ 3.00	272.0 x 159.0 x 236.0	-10.0 ~ 50.0 °C

Tape & Reel 13"

Qty. / Reel	Weight / Reel	Reel / Carton	Qty. / Carton	Weight Full	Dimension Carton Box	Storage
pcs	kg	Nos	Nos	Load ( kg )	( L x W x H ) mm	Temperature
4800.0	0.7	10.0	48000.0	~ 10.00	419.0 x 276.0 x 381.0	-10.0 ~ 50.0 °C

## 25. Reliability Test

Note : The microphone sensitivity after stress must deviate by no more than  $\pm 3.0$  dB from the initial value.

Test Item	Detail
Thermal Shock	100.0 cycles of air-air thermal shock from -40.0 °C to +100.0 °C with 15.0 minute soaks
High Temperature Bias	+125.0 °C environment while under bias for 240.0 hours
Low Temperature Bias	-40.0 °C environment while under bias for 240.0 hours
Temperature/Humidity Bias	+85.0 °C / 85.0 % R.H. environment while under bias for 240.0 hours
Mechanical Shock	3.0 pulses of 10000.0 g in the X,Y and Z direction
Vibration Test	10.0 ~ 60.0 Hz : 0.35 mm ; 60.0 ~ 500.0 Hz : 5.0 g 1.0 oct/min Duration :15.0 minutes per plane
Drop Test	1.5.0 - meter height onto a concrete surface each time at three directions in state of packaging
Reflow	5.0 reflow cycles with peak temperature of +260.0 °C
ESD	150.0 pF,330.0 $\Omega$ , contact discharge $\pm 2.0$ KV/air discharge $\pm 4.0$ KV,10.0 times, apply voltage to I/O pins

## 26. Change History

Version	Date	Description
1.0	2017.05	First Released

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