



PRODUCT INFORMATION

Part Numbers

CM3OS-0326-D1

Revision

2-2018

Type

Digital Omni-directional MEMS Microphone

Compliance

- **RoHS, Lead Free**
- **ISO 9001:2000**
- **REACH: SUBSTANCE OF VERY HIGH CONCERN (SVHC)** This product does NOT contain any of the REACH Substances of Very High Concern (SVHC), and is in compliance with European Union REACH Regulation No.1907/2006 regarding chemical substances which must be registered or disclosed.



1. Acoustic and Electrical Characteristics

General Microphone Specifications

Test condition: $V_{DD} = 1.8V$, $L = 50\text{ cm}$, $f_{CLK} = 2.4MHz$, select pin grounded, no load

Parameter	Symbol	Condition	Limits			Unit
			Min.	Rated	Max.	
Directivity			Omni-directional			
Supply Voltage	V_{DD}		1.6	1.8	3.6	V
Frequency Range	Sleep Mode		0	-	150	kHz
	Standard Mode		1.024	-	3.5	MHz
Current Consumption (Sleep Mode)	I_{sleep}		-	10	-	μA
Short Circuit Current	I_{SC}	Ground Data Pin	-	-	20	mA
Output Load	C_{load}		-	140	-	pF
Fall-asleep Time			-	-	10	ms
Wake-up Time	T_w	$f_{CLK} \geq 200kHz$	-	-	20	ms
Start-up Time	T_s		-	-	50	ms
Mode-Change Time			-	-	10	ms



Standard Performance Mode

Test condition: $V_{DD} = 1.8V$, $L = 50\text{ cm}$, $f_{CLK} = 2.4\text{MHz}$

Parameter	Symbol	Condition	Limits			Unit
			Min.	Center	Max.	
Sensitivity	S	$f = 1\text{kHz}$, $P_{in} = 1\text{Pa}$	-27	-26	-25	dBFS ¹
Current Consumption ²	I	$f_{CLK} = 2.4\text{MHz}$	-	-	450	μA
Signal to Noise Ratio	SNR	$f = 1\text{kHz}$, $P_{in}=1\text{Pa}$ A-Weighted Curve	-	65	-	dB
Distortion	THD	94dB SPL @ 1kHz	-	-	1	%
Acoustic Overload Point	AOP	10% THD @ 1kHz	-	120	-	dB SPL
Power Supply Rejection	PSR	100mV _{pp} Square Wave @ 217 Hz	-	-88	-	dBFS
Power Supply Rejection Ratio	PSRR	100mV _{pp} Square Wave @ 217 Hz	-	62	-	dBFS

Low Power Mode

Test condition: $V_{DD} = 1.8V$, $f_{CLK} = 768\text{kHz}$

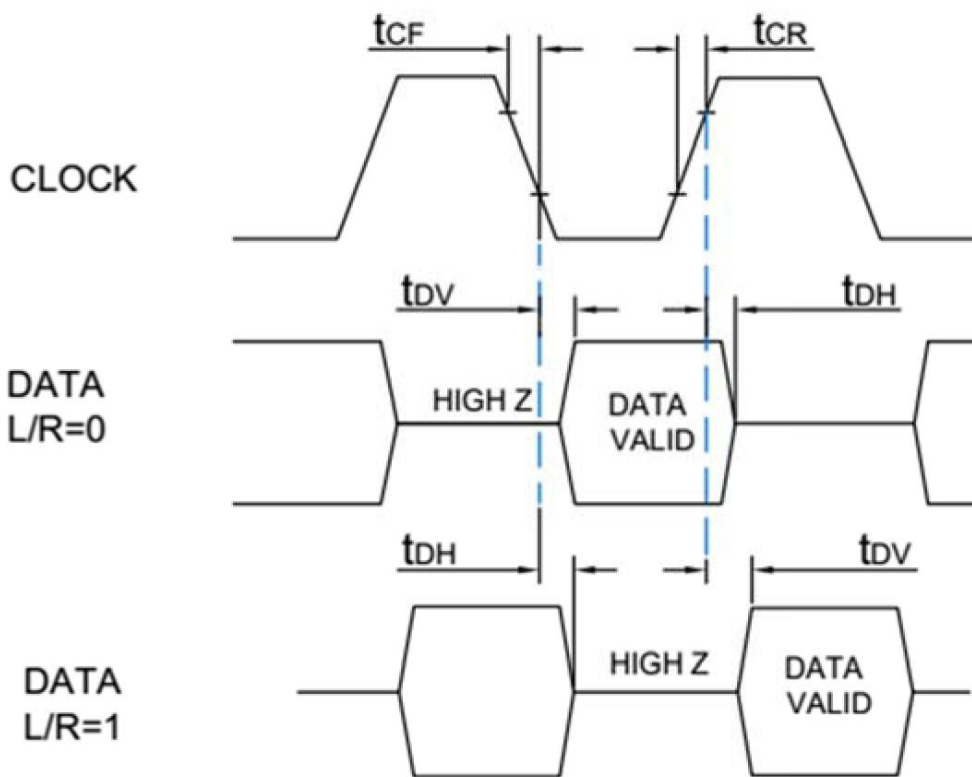
Parameter	Symbol	Condition	Limits			Unit
			Min.	Center	Max.	
Sensitivity	S	$f = 1\text{kHz}$, $P_{in} = 1\text{Pa}$	-26.5	-25.5	-24.5	dBFS
Current Consumption	I	$f_{CLK} = 768\text{kHz}$	-	250	300	μA
Signal to Noise Ratio	SNR	$f = 1\text{kHz}$, $P_{in}=1\text{Pa}$ A-Weighted Curve	-	64	-	dB
Distortion	THD	94dB SPL @ 1kHz	-	-	1	%
Acoustic Overload Point	AOP	10% THD @ 1kHz	-	119	-	dB SPL
Power Supply Rejection	PSR	100mV _{pp} Square Wave @ 217 Hz	-	-88	-	dBFS
Power Supply Rejection Ratio	PSRR	100mV _{pp} Square Wave @ 217 Hz	-	62	-	dBFS

1. dBFS = $20 \times \log(A/B)$ where A is the level of the signal, B is the level that corresponds to the Full-scale level.
2. The current consumption depends on the applied Clock Frequency and the load on the DATA output.



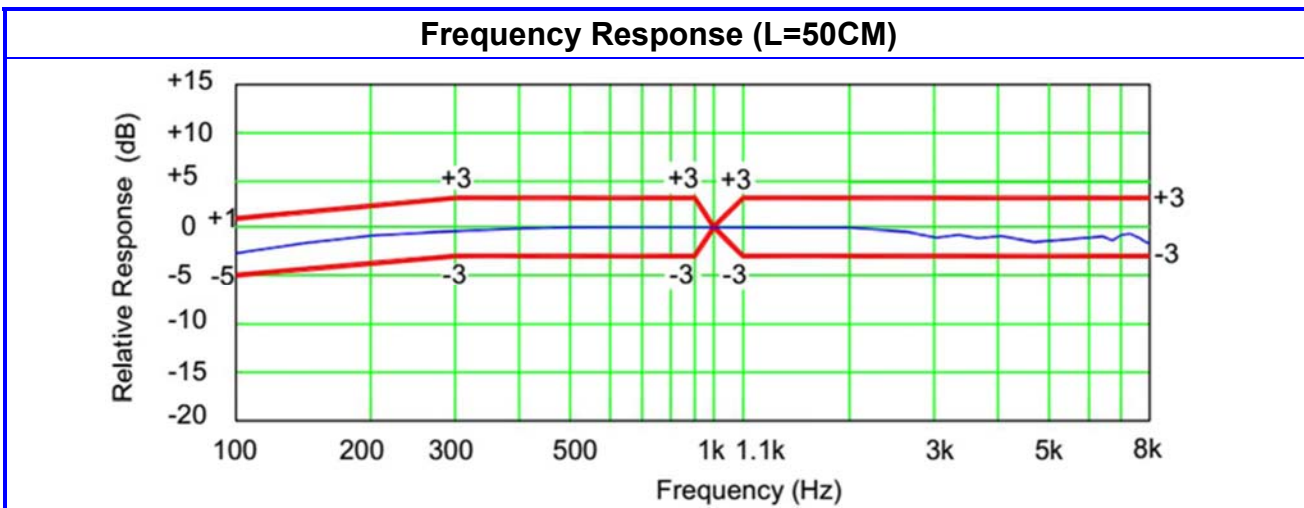
Microphone Interface Specifications

Parameter	Symbol	Condition	Limits			Unit
			Min.	Center	Max.	
Logic Input High	V_{IH}		$0.65 V_{DD}$	-	3.6	V
Logic Input Low	V_{IL}		-0.3	-	$0.35 V_{DD}$	V
Logic Output High	V_{OH}		$V_{DD} - 0.45$	-	V_{DD}	V
Logic Output Low	V_{OL}		0	-	0.45	V
SELECT(high)			$V_{DD} - 0.45$	-	3.6	V
SELECT(low)			-0.3	-	0.2	V
Clock Duty Cycle		$f_{CLK} \leq 2.4MHz$	40	-	60	%
		$2.4MHz < f_{CLK} < 3.5MHz$	48	50	52	%
Clock Rise/Fall Time	t_{CF}, t_{CR}		-	-	6	ns
Delay Time for Valid Data	t_{DV}	No load for min t_{DV}	18	-	50	ns
		Max C_{Load} for max t_{DV}				
Delay Time for High Z	t_{DZ}		5	-	16	ns



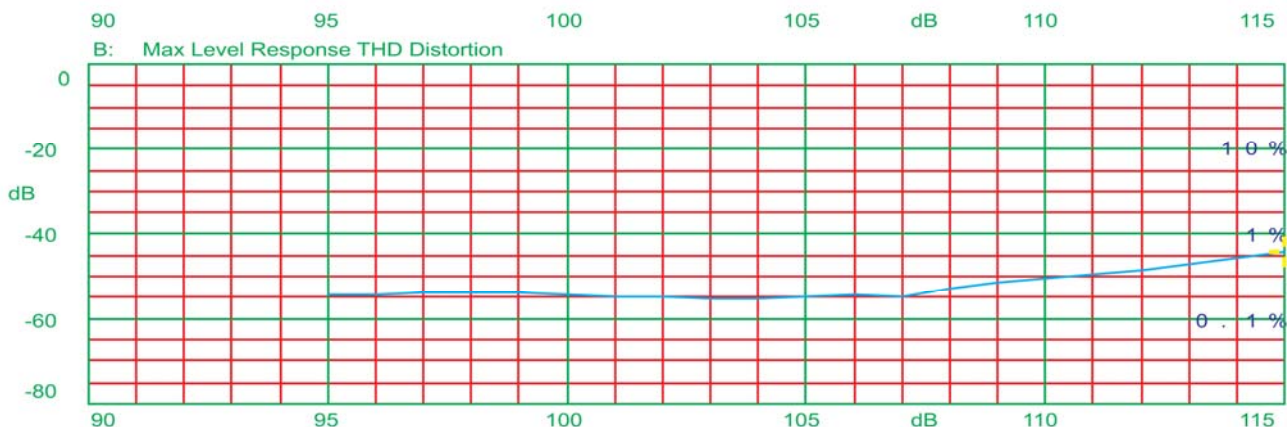


2. Frequency Response Curve



¹ 0dB = 1V/Pa, per I.E.C. (International Electrotechnical Commission) recommendation. To convert to a 0dB "ubar" reference, subtract 20 dB. Example: -40dB (1V/Pa) = -60dB (0dB = 1V/ubar)

3. THD Curve



4. Operating and Storage Application

4.1. Temperature Condition

4.1.a. Storage temperature range: -40°C ~+70°C.

4.1.b. Operating temperature range: -40°C ~+100°C.

5. Mechanical Characteristics

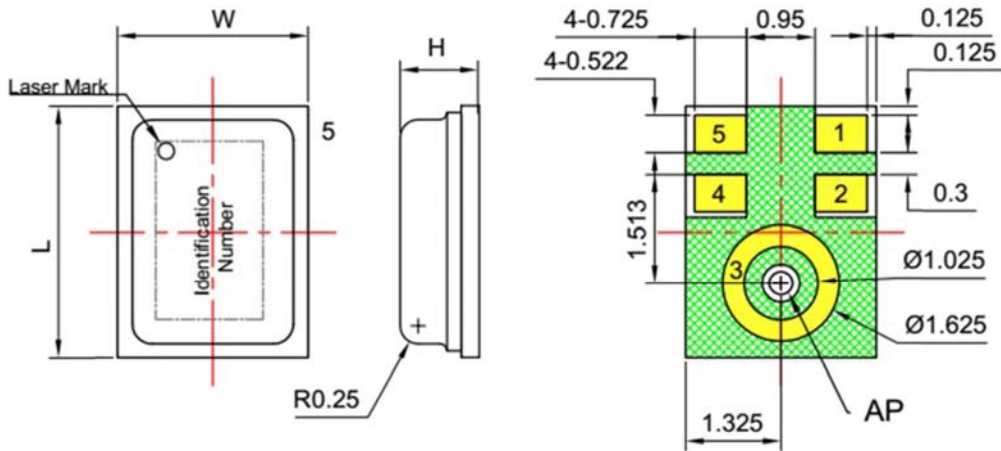
5.1. Weight: Less than 0.05 grams

5.2. All dimensions are: in millimeter (mm).

5.3. Tolerance: ±0.1 mm unless otherwise specified.

5.4. Microphone Dimensions: 3.50 mm x 2.65 mm x 0.98 mm

5.5. Microphone Material: Copper with Gold and Nickel plating



Top View

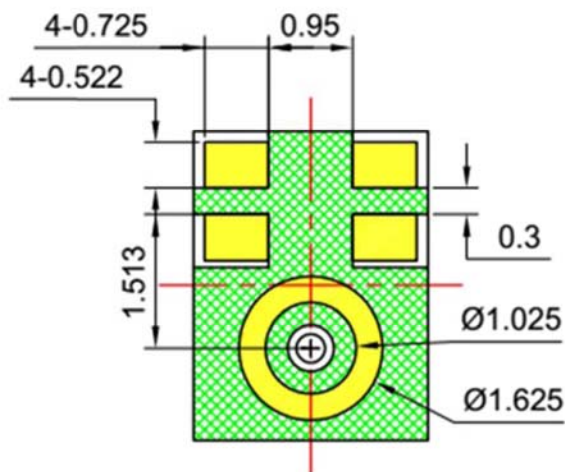
Bottom View

Pin#	Function
1	Data
2	L/R
3	GND
4	CLK
5	VDD

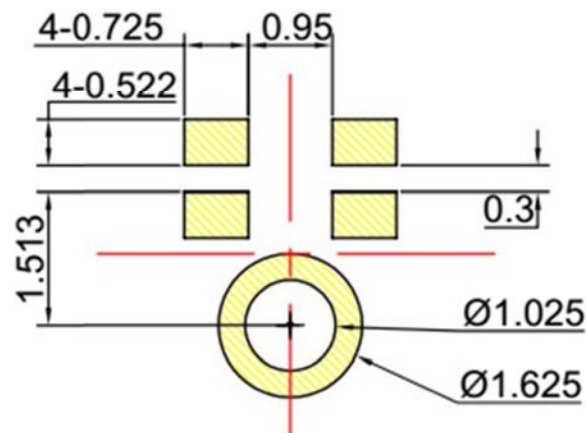
ITEM	DIMENSION	TOLERANCE	UNITS
Length(L)	3.50	± 0.10	mm
Width(W)	2.65	± 0.10	mm
Height(H)	0.98	± 0.10	mm
ACOUSTIC PORT(AP)	$\text{Ø}0.325$	± 0.05	mm

6. Recommended Land Pattern

The Pattern of MIC Pad(Unit:mm)

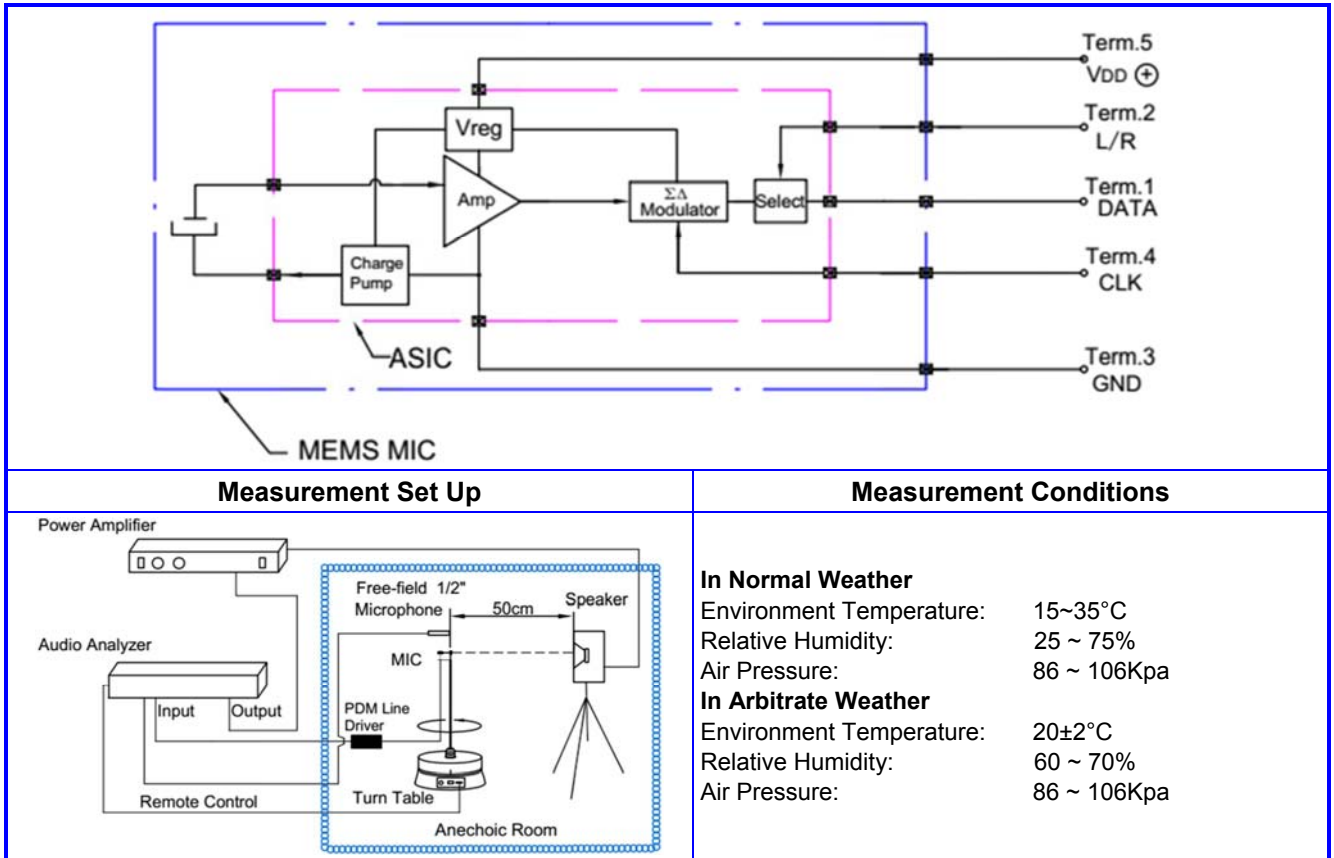


Recommended Soldering Surface Land Pattern (Unit:mm)





7. Measurement Circuit



8. Part Number Description

ID	Description
C	Challenge Electronics
M	Microphone
3	3.50 mm Length
O	Omni-directional
S	SMD Termination
-	dash
03	3.6 V Maximum Voltage
26	-26 dB Typical Sensitivity
-	Dash
D	Digital Signal
1	Version 1

9. Warranty

For a period of one (1) year from date of shipping under normal handling and operations conditions
This warranty does not apply to products damaged through misuse, abuse, improper installation, alteration, rework, or attempt to repair

Revision	Description	By	Date
0-2018	Initial Specification Sheet	JL	01/16/2018
1-2018	Added THD Curve and corrected microphone dimensions in 5. Mechanical Characteristics	JL	2018-06-04
2-2018	Added Recommended Land Pattern	JL	2018-07-23