

ABSOLUTE MAXIMUM RATINGS

Parameters	Value			Unit
	min	typ	max	
VDD, DATA to Ground	-0.3		+5.0	V
CLOCK to Ground	-0.3		+5.0	V
SELECT to Ground	-0.3		+5.0	V
Input Current	-5.0		+5.0	mA
Short Circuit Current to/from DATA	Indefinite to Ground or VDD			sec
Temparutare Range	-40		+100	°C

Note : 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 Specification" is not implied. Exposure beyond those indicated under "Acoustic & Electrical Specification" for extended periods may affect device reliability.

ELECTRICAL SPECIFICATIONS

General Microphone Specifications

TEST CONDITIONS: 23±2°C, 55±20% R.H., VDD=1.8V, fCLOCK=2.4MHz, SELECT pin grounded, no load, unless Otherwise indicated

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply Voltage	Vdd		1.62	-	3.6	V
Clock Frequency Range	Sleep Mode		0		250	kHz
	Low-Power Mode		351		800	
	Standard Performance Mode		1.024		2.475	MHz
		3.072		4.8		
Sleep Current	I _{sleep}	fCLOCK ≤ 250 kHz	-	80		μA
DC Output		Full scale = ±100	-	0	-	% FS
Directivity			Omnidirectional			
Polarity		Increasing sound	Increasing density of 1's			
Data Format			½ Cycle PDM			
Short Circuit Current	I _{sc}	Grounded DATA pin	1	-	20	mA
Output Load	C _{load}		-	-	140	pF
Fall-asleep Time		fCLOCK ≤ 250 kHz	-	-	10	ms
Wake-up Time		fCLOCK ≥ 351 kHz	-	-	15	ms
Power-up Time		VDD ≥ V(min)	-	-	50	ms
Mode-Change Time			-	-	10	ms

Standard Performance Mode

TEST CONDITIONS: fCLOCK = 2.4MHz, VDD = 1.8V, unless otherwise indicated

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply Current	I _{dd}	fCLOCK = 2.4MHz	-	800	950	μA
Sensitivity	S	94 dB SPL @ 1kHz	-27	-26	-25	dBFS
Signal to Noise Ratio	SNR	94 dB SPL @ 1kHz, A-weighted, fCLOCK = 2.4MHz	-	64.3	-	dB(A)
Total Harmonic Distortion	THD	94 dB SPL @ 1kHz, S = Typ	-	0.2	-	%
Acoustic Overload Point	AOP	10% THD @ 1kHz, S = Typ	-	120	-	dB SPL
Power Supply Rejection Ratio	PSRR	200 mVpp sinewave @ 1kHz	-	55	-	dBV/FS
Power Supply Rejection	PSR+N	100 mVpp square wave @ 217 Hz, A-weighted	-	-84	-	dBFS (A)

Low Power Mode

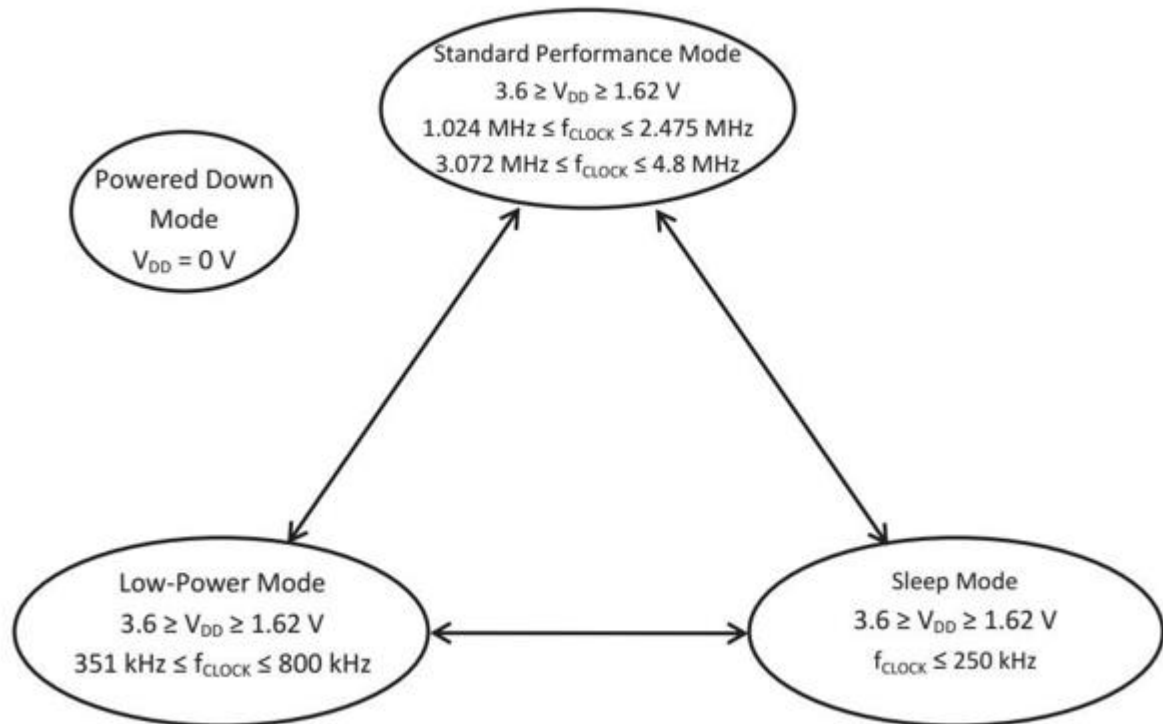
TEST CONDITIONS: fCLOCK = 768 kHz, VDD = 1.8V, unless otherwise indicated

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply Current	I _{dd}	fCLOCK = 768Hz	-	300	350	μA
Sensitivity	S	94 dB SPL @ 1kHz	-29	-26	-23	dBFS
Signal to Noise Ratio	SNR	94 dB SPL @ 1kHz, A-weighted, fCLOCK = 2.4MHz	-	64	-	dB(A)
Total Harmonic Distortion	THD	94 dB SPL @ 1kHz, S = Typ	-	0.2	-	%
Acoustic Overload Point	AOP	10% THD @ 1kHz, S = Typ	-	120	-	dB SPL
Power Supply Rejection Ratio	PSRR	200 mVpp sinewave @ 1kHz	-	59	-	dBV/FS
Power Supply Rejection	PSR+N	100 mVpp square wave @ 217 Hz, A-weighted	-	-86	-	dBFS (A)

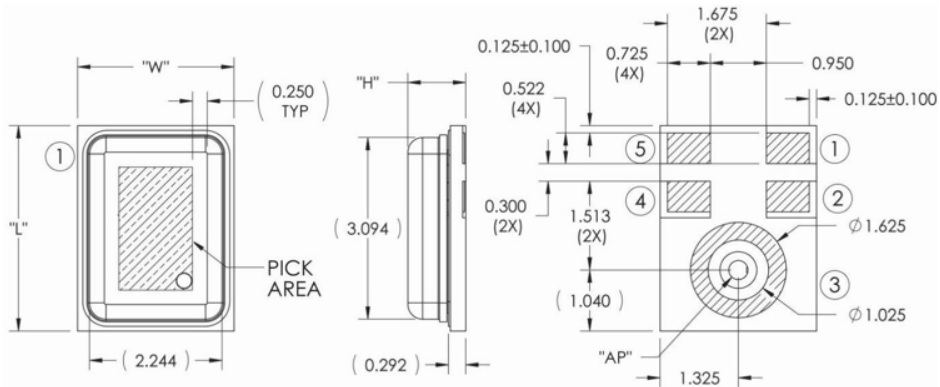
Microphone Interface Specifications

Parameter	Symbol	Conditions	min	typ	max	Unit
Logic Input High	Vih		0.65×VDD	-	VDD+0.3	V
Logic Input Low	Vil		-0.3	-	0.35×VDD	V
Logic Output High	Voh	IOUT = 2mA	VDD-0.45	-	-	V
Logic Output Low	Vol	IOUT = 2mA	-	-	0.45	V
Clock Duty Cycle		1MHz ≤ fCLOCK ≤ 4.8MHz	40	-	60	%
Clock Rise/Fall Time	tEDGE		-	-	15	ns
Delay Time for Data Assertion	tDD		18	28	40	ns
Delay Time for High Z	tDZ		3	-	16	ns

MICROPHONE STATE DIAGRAM



DIMENSIONS

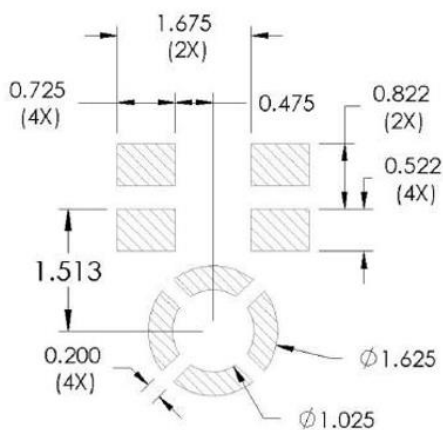


Item	Dimension	Tolerance
Length (L)	3.50	±0.1
Width (W)	2.65	±0.1
Height (H)	0.98	±0.1
Acoustic Port (AP)	Ø0.325	±0.05

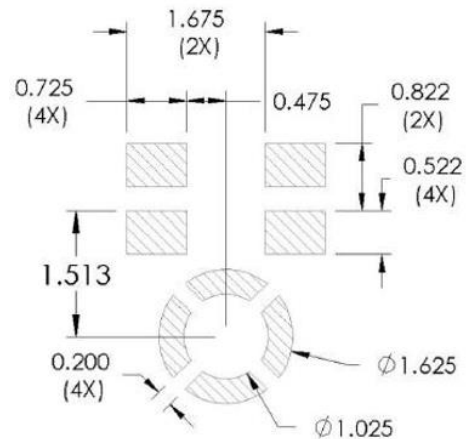
Pin#	Pin Name	Type	Description
1	DATA	Digital O	PDM Output
2	SELECT	Digital I	Lo/Hi (L/R) Select This pin is internally pulled low but should not be left floating.
3	GROUND	Power	Ground
4	CLOCK	Digital I	Clock Input
5	VDD	Power	Power Supply

Notes: Pick Area only extends to 0.25 mm of any edge or hole unless otherwise specified.
 Dimensions are in mm unless otherwise specified.
 Tolerance is ±0.15mm unless otherwise specified

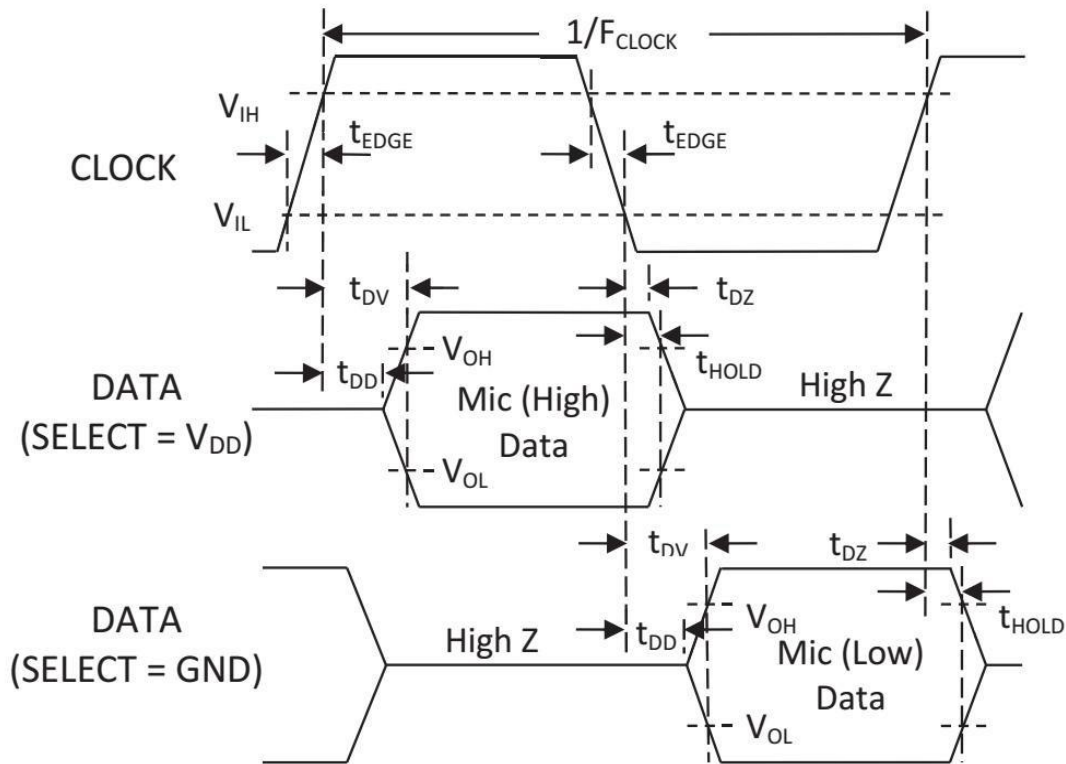
EXAMPLE LAND PATTERN



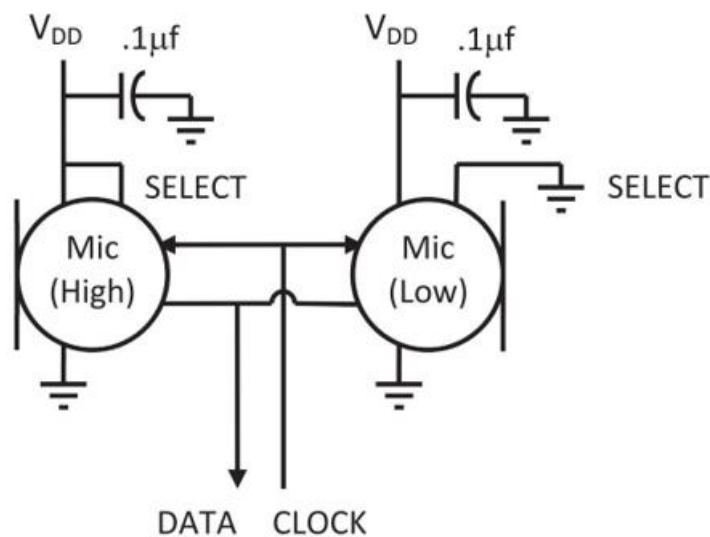
EXAMPLE SOLDER STENCIL PATTERN



TIMING DIAGRAM



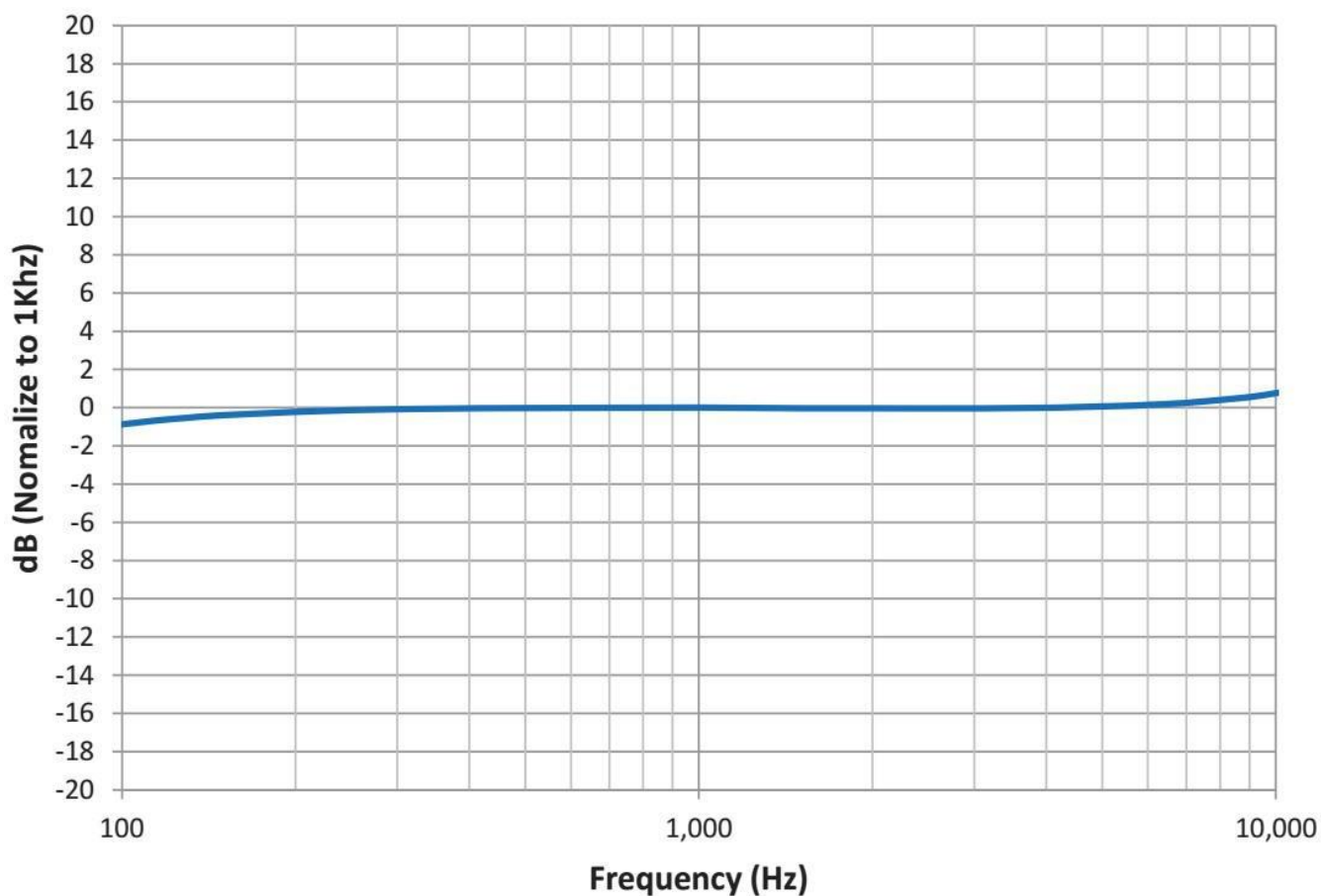
INTERFACE CIRCUIT



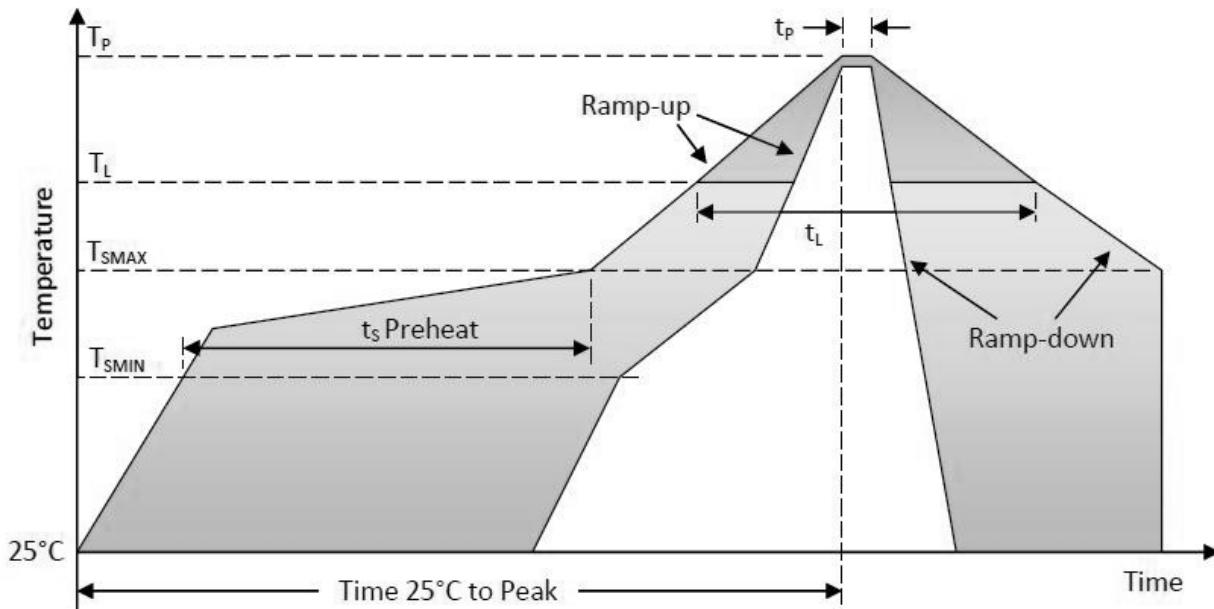
Microphone	SELECT	Asserts DATA On	Latch DATA On
Mic(High)	V_{DD}	Rising Clock Edge	Falling Clock Edge
Mic(Low)	GND	Falling Clock Edge	Rising Clock Edge

FREQUENCY CHARACTERISTICS

Typical Free Field Response Normalized to
1 kHz CLK=2.4MHz VDD=1.8V

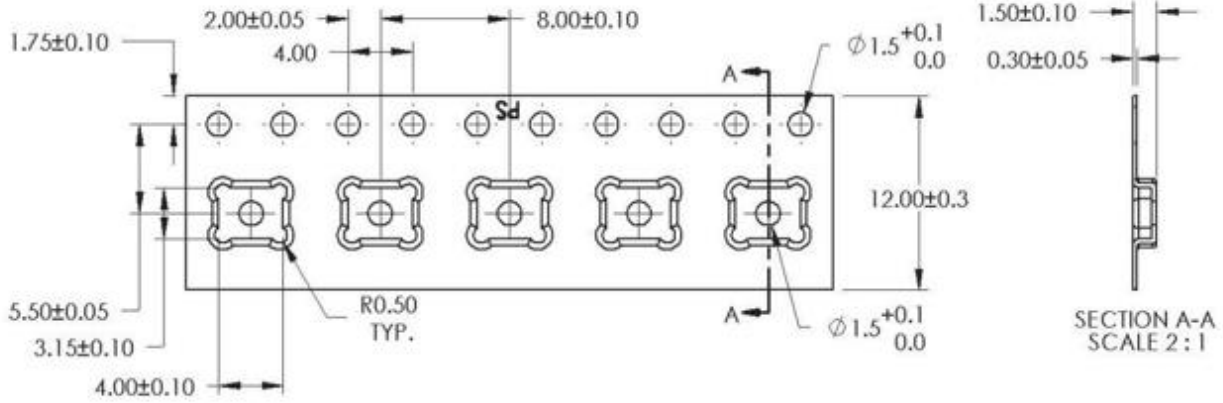


REFLOW PROFILE



Parameter		Specification
Average temperature change rate (TSMAX to TP)		3°C /second max.
Preheat	Temperature min.(TSMIN)	150°C
	Temperature max.(TSMAX)	200°C
	Time TSMIN to TSMAX	60-180 Seconds
Time Maintained Above Liquidous		60-150 Seconds
Liquidous Temperature		217°C
Peak Temperature		260°C
Time Within +5°C of Actual Peak Temperature		20 sec to 40 sec
Ramp-Down Rate		6°C/sec max
Time +25°C (t25°C) to Peak Temperature		8 min max

PACKAGING



Suffix	Reel Diameter	Quantity Per Reel
-8	13"	5,000

APPROVAL

DRAWN BY	AR, January 07, 2024
APPROVED BY	CP, January 07, 2024
REVISION	A, Initial Release

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