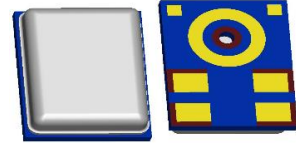




PUIaudio



Data Sheet

DMM-3537-2-B

The PUI Audio DMM-3537-2-B digital PDM output MEMS omni-directional microphone features a nominal -37dBFS sensitivity, 68dB(A) signal-to-noise ratio, and a bottom port.

Features:

- 2.65mm x 3.50mm package
- 1.0mm height
- -37dBFS sensitivity
- 68dB (typical) signal-to-noise ratio
- Omni-directional polar response

Specifications $V_{SUPP} = 1.8V_{DC}$, $f_{IN} = 1kHz$, Acoustic Input = 94dB SPL (1Pa), 0 dBV = 1V @ 1Pa, bandwidth (BW) = 20Hz $\leq f \leq 20kHz$, A-weighted, unless otherwise stated.

Parameters			Values	Units
Typical Sensitivity	f _{CLK} = 2.4MHz		-37 ±1	dBFS
	f _{CLK} = 768kHz		-21 ±1	
Typical Signal-to-Noise Ratio 20Hz ≤ f ≤ 20kHz acoustic bandwidth A-weighted	f _{CLK} ≤ 2.4MHz		68	dB
	f _{CLK} = 768kHz		65	
Typical Frequency Range			20 ≤ f ≤ 20,000	Hz
Maximum Total Harmonic Distortion A-weighted 768kHz ≤ f _{CLK} ≤ 2.4MHz			0.15	%
Typical Acoustic Overload Point (AOP) THD = 10%	f _{CLK} = 2.4MHz		135	dBSPL
	f _{CLK} = 768kHz		118	
Operating Voltage Range			1.65 ≤ V _S ≤ 1.98	V _{DC}
Typical Power Supply Current	f _{CLK} = 2.4MHz		310	μA
	f _{CLK} = 768kHz		150	
	f _{CLK} ≤ 200kHz		9	
Directivity			Omnidirectional	-
Environmental Compliances			RoHS/Halogen Free	-
Typical Power Supply Rejection (PSR) 100mV _{PP}	f _{CLK} = 2.4MHz	f _{NOISE} = 20Hz Sine Wave	-99	dBFS
		f _{NOISE} = 1kHz Sine Wave	-124	
		f _{NOISE} = 5kHz Sine Wave	-105	
		f _{NOISE} = 10kHz Sine Wave	-101	
		f _{NOISE} = 20kHz Sine Wave	-99	
		f _{NOISE} = 217Hz Square Wave	-105	
	f _{CLK} = 768kHz	f _{NOISE} = 217Hz Square Wave	-90	

Specifications (continued) $V_{SUPP} = 1.8V_{DC}$, $f_{IN} = 1kHz$, Acoustic Input = 94dB SPL (1Pa), 0 dBV = 1V @ 1Pa, bandwidth (BW) = $20Hz \leq f \leq 20kHz$, A-weighted, unless otherwise stated.

Parameters			Values	Units
Typical Power Supply Rejection (PSRR) 200mVpp Sine Wave f _{NOISE} = 1kHz		f _{CLK} = 2.4MHz	82	dBFS
		f _{CLK} = 768kHz	67	
Clock Frequency	Standard operational mode	Minimum	2.0	MHz
		Maximum	4.8	
	Low power operational mode	Minimum	400	
		Maximum	800	
	Sleep mode	Minimum		kHz
		Maximum	200	
Logic-High Input Level (V _{IH})		Minimum	(0.65)V _{DD}	V
		Maximum		
Logic-Low Input Level (V _{IL})		Minimum		
		Maximum	(0.35)V _{DD}	
Logic-High Output Level (V _{OH}) I _{OUT} = 0.5mA		Minimum	(0.70)V _{DD}	
		Maximum		
Logic-Low Output Level (V _{OL}) I _{OUT} = 0.5mA		Minimum		
		Maximum	(0.30)V _{DD}	
Bit-Clock Duty-Cycle (D _{CLK})	f _{CLK} < 3.3MHz	Minimum	45	%
		Maximum	55	
	3.3MHz ≤ f _{CLK} ≤ 4.8MHz	Minimum	TBD	
		Maximum	TBD	
Maximum Bit-Clock Rise and Fall Time			6	ns
Delay Time for Valid Data T2, T4 in Timing Diagram	C _{LOAD} = 0pF	Minimum	18	
	C _{LOAD} = 140pF	Maximum	20	
Delay Time for High-Z Logic Output T1, T3 in Timing Diagram		Minimum	5	
		Maximum	16	
Short-Circuit Logic Output Current		Minimum	1	mA
		Maximum	20	
Maximum Logic Output Capacitance Load			140	pF
Maximum Time to Activate Wake-Up (T _{WAKE}) f _{CLK} ≥ 351kHz			6	ms
Maximum Time to Activate Sleep State (T _{SLEEP}) f _{CLK} ≤ 1.0kHz			1	
Maximum Mode Change Time (T _{CHANGE})			3.5	
Weight			<0.3	gm
Operating Temperature			-40 ≤ T ₀ ≤ 105	°C
Storage Temperature			-55 ≤ T _S ≤ 150	°C
MSL (Moisture Sensitivity Level) Class*			1	-

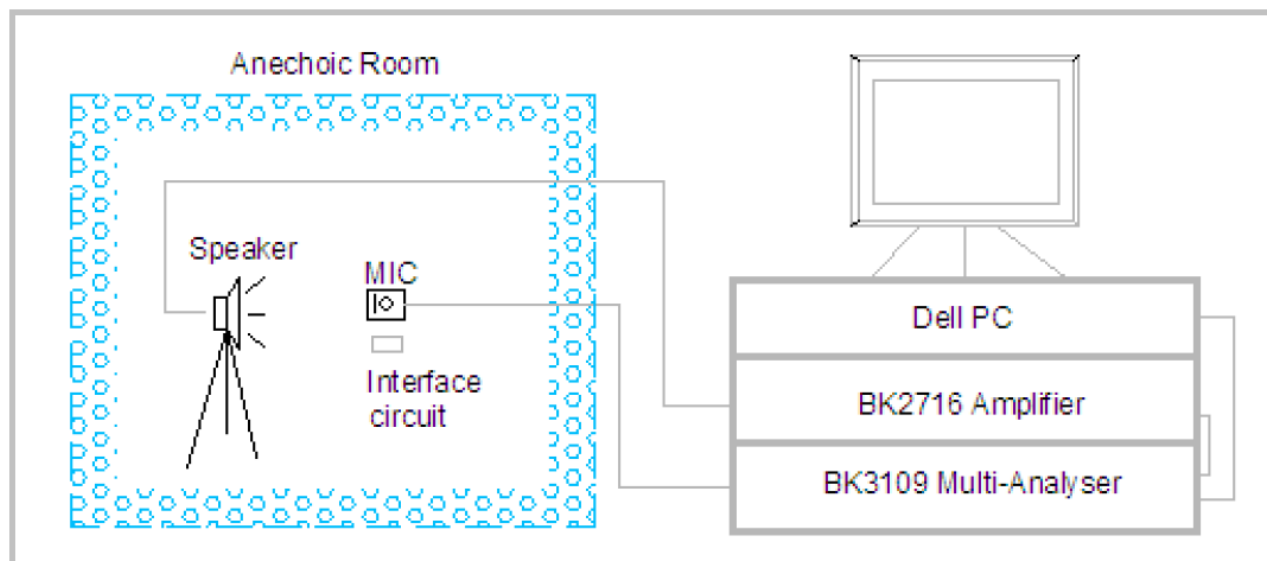
*MSL level dependent on product remaining in sealed packaging until use

Absolute Maximum Ratings

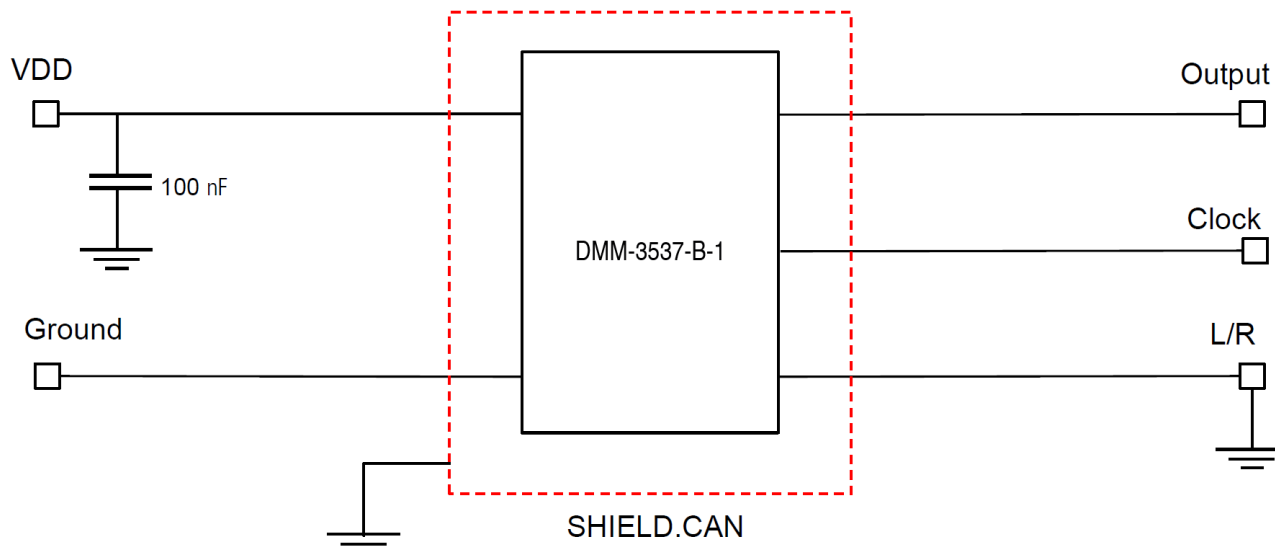
Parameters	Values	Units
Maximum Voltage on V_{DD} with respect to Ground	$-0.3 \leq V_{DD} \leq 1.98$	V_{DC}

Measurement Method

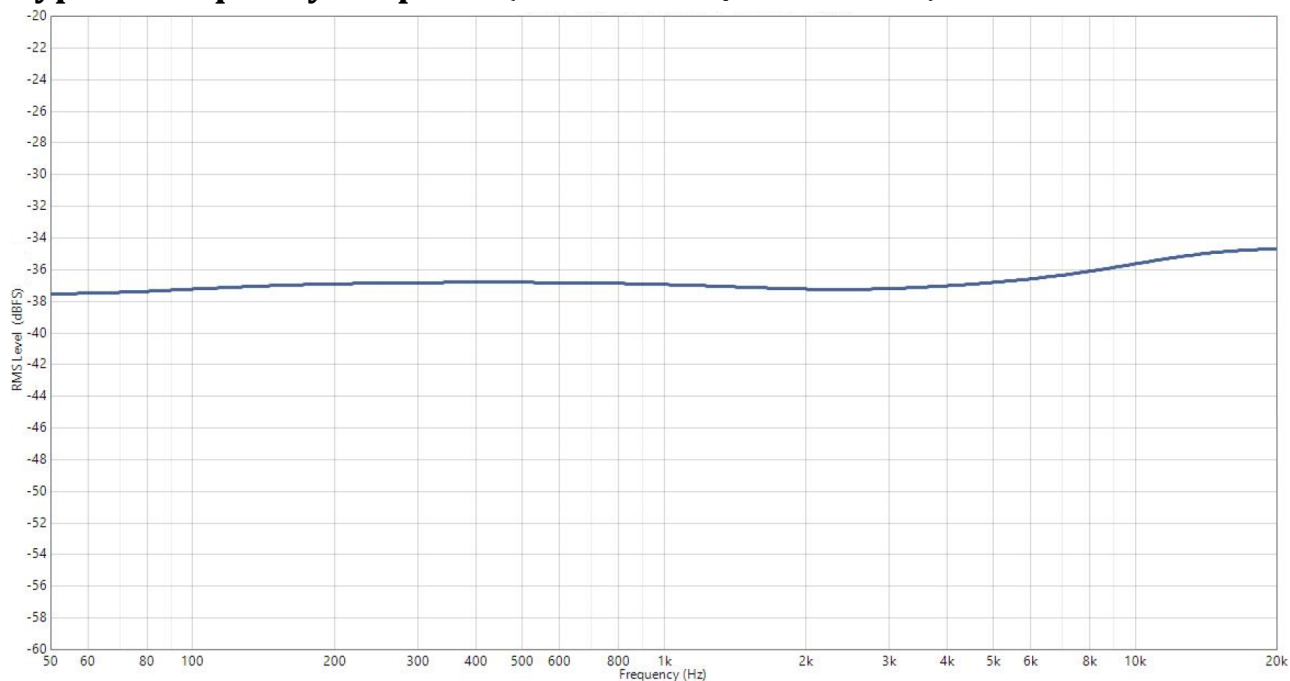
Acoustic input applied to the microphone has a 94dB SPL amplitude.



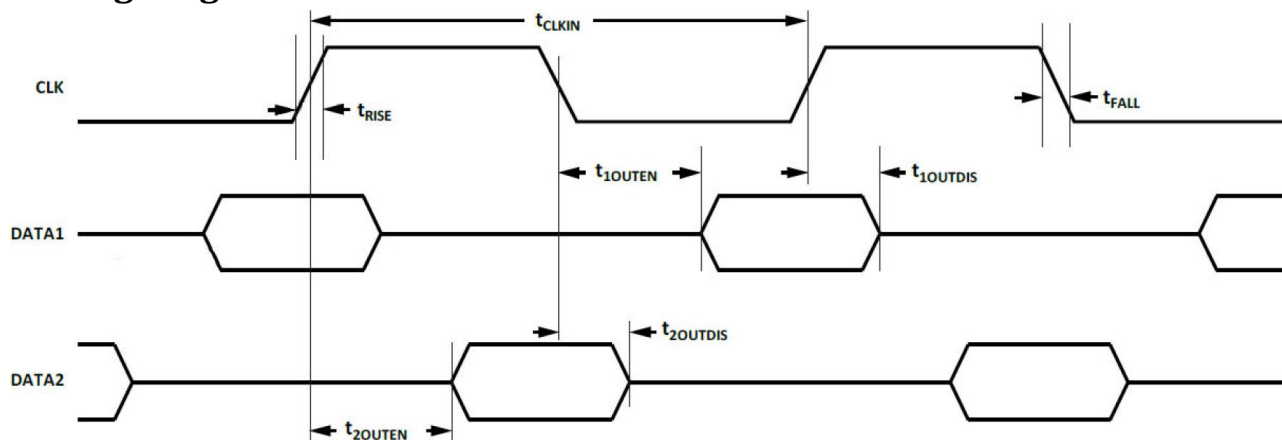
Recommended Drive Circuit



Typical Frequency Response (94dB SPL acoustic input set at $f_{IN} = 1\text{kHz}$.)



Timing Diagram

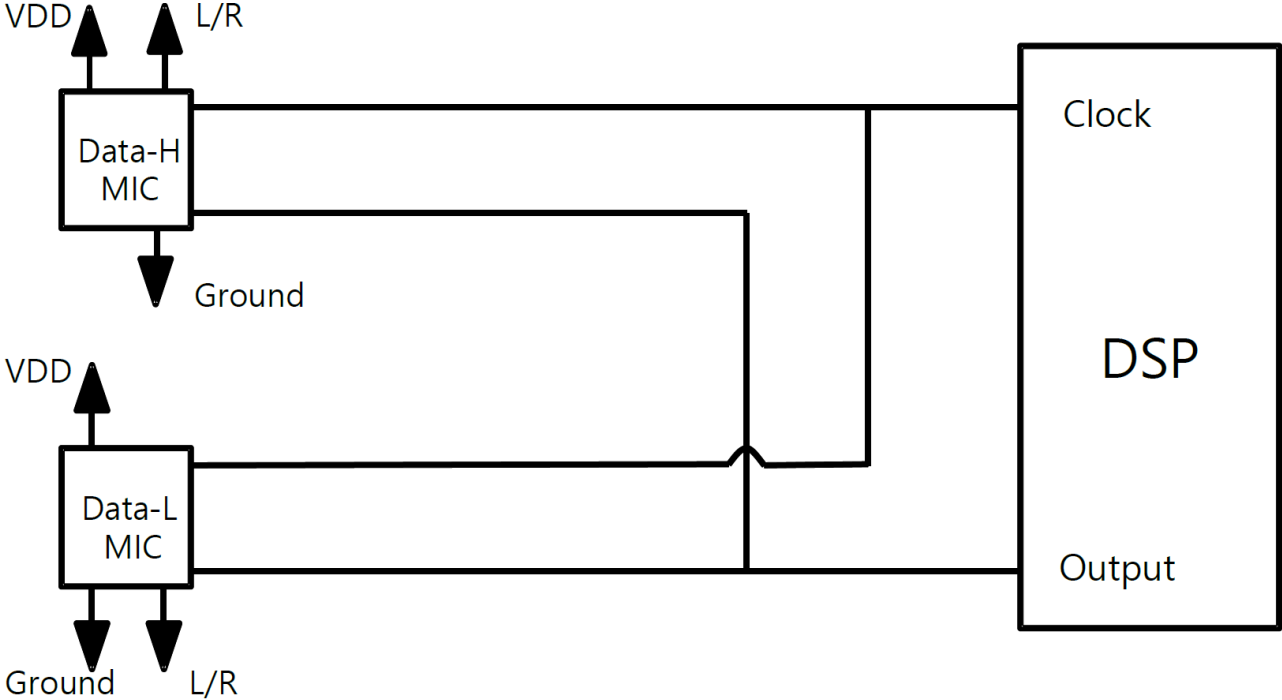


$$30\text{ns} \leq T_{1OUTEN}, t_{2OUTEN} \leq 70\text{ns}$$

$$5\text{ns} \leq T_{1OUTDIS}, t_{2OUTDIS} \leq 18\text{ns}$$

$$t_{RISE}, t_{FALL} \leq 25\text{ns}$$

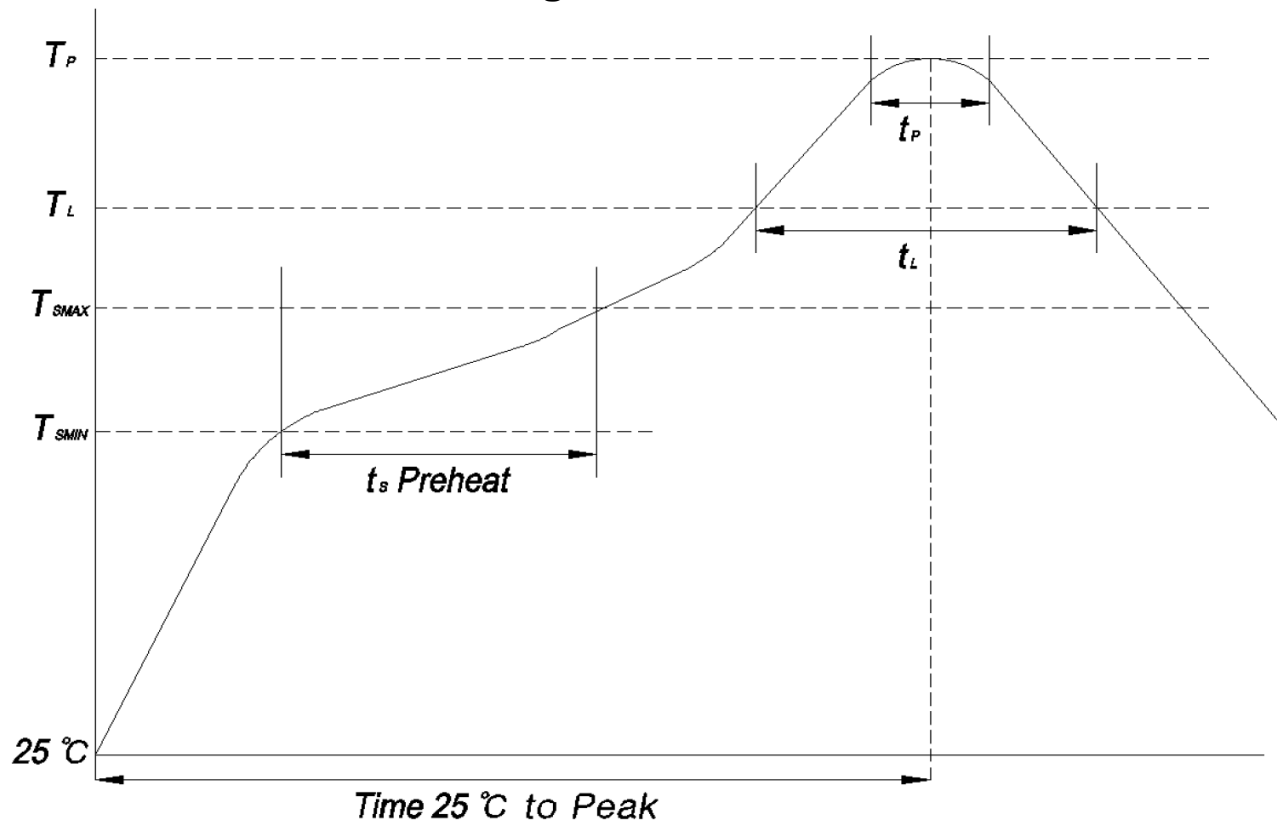
Typical Two-Channel Connection Diagram



Reliability Testing Microphone frequency response and sensitivity shall not deviate more than ±3 dB.

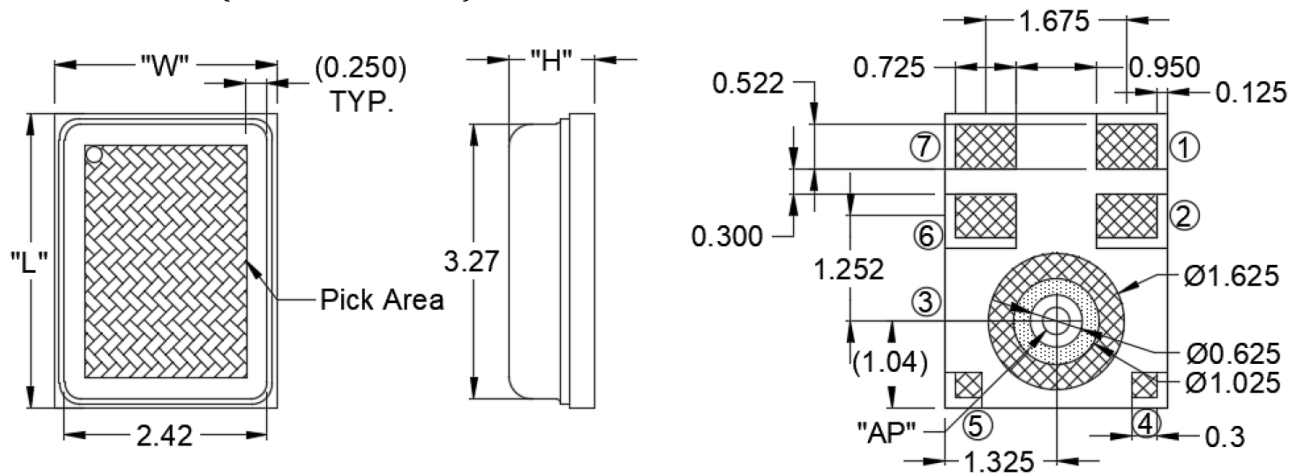
Type of Test	Test Specifications
Simulated Reflow (Without Solder)	Samples for qualification testing require 3 passes 260±5 °C reflow solder profiles. 2 hours of setting time is required between each reflow profile test.
Static Humidity	Precondition at +25°C for 1 hour. Expose to +85°C with 85% relative humidity for 120 hours. Finally, dry at room ambient for 3±1 hour before taking final measurement.
Temperature Shock	Each cycle shall consist of 30 minutes at -40°C, 30 minutes at +85°C with 5 minutes transition time. Test duration is for 30 cycles, starting from cold to hot temperature.
ESD Sensitivity	Perform ESD sensitivity threshold measurements for each contact according to MIL-STD-883G, Method 3015.7 for Human Body Model. Identify the ESD threshold levels indicating passage of 8000V Human Body Model.
Vibration Test	Vibrate randomly along three perpendicular directions for 30 minutes in each direction, 4 cycles from 10Hz to 55 Hz with a peak acceleration of 20 Gs.
Shock Test	Subject samples to half-sine shock pulses (3000±15% Gs for 0.3ms) in each direction, for a total of 18 shocks.
Drop Test	Drop samples from 1.5m height onto a steel surface, total 18 times and inspected for mechanical damage.

Recommended Reflow Soldering Procedure



Profile Feature		Lead(Pb) Free Solder
Preheat	Temperature min. (T_{SMIN})	150 °C
	Temperature max. (T_{SMAX})	200 °C
	Time (t_s)	60-120 Seconds
Liquidus	Temperature (T_L)	217 °C
	Time (t_L)	60-150 Seconds
Peak	Temperature (T_P)	260 °C
	Time within 5 °C of actual peak temperature (t_P)	30 Seconds Max.
Ramp up	Average ramp up rate T_{SMAX} to T_P	3 °C / Second Max.
Ramp down	Average ramp down rate T_P to T_{SMAX}	6 °C / Second Max.
Time 25 °C to Peak temperature		8 Minutes Max.

Dimensions (±0.15mm tolerance)

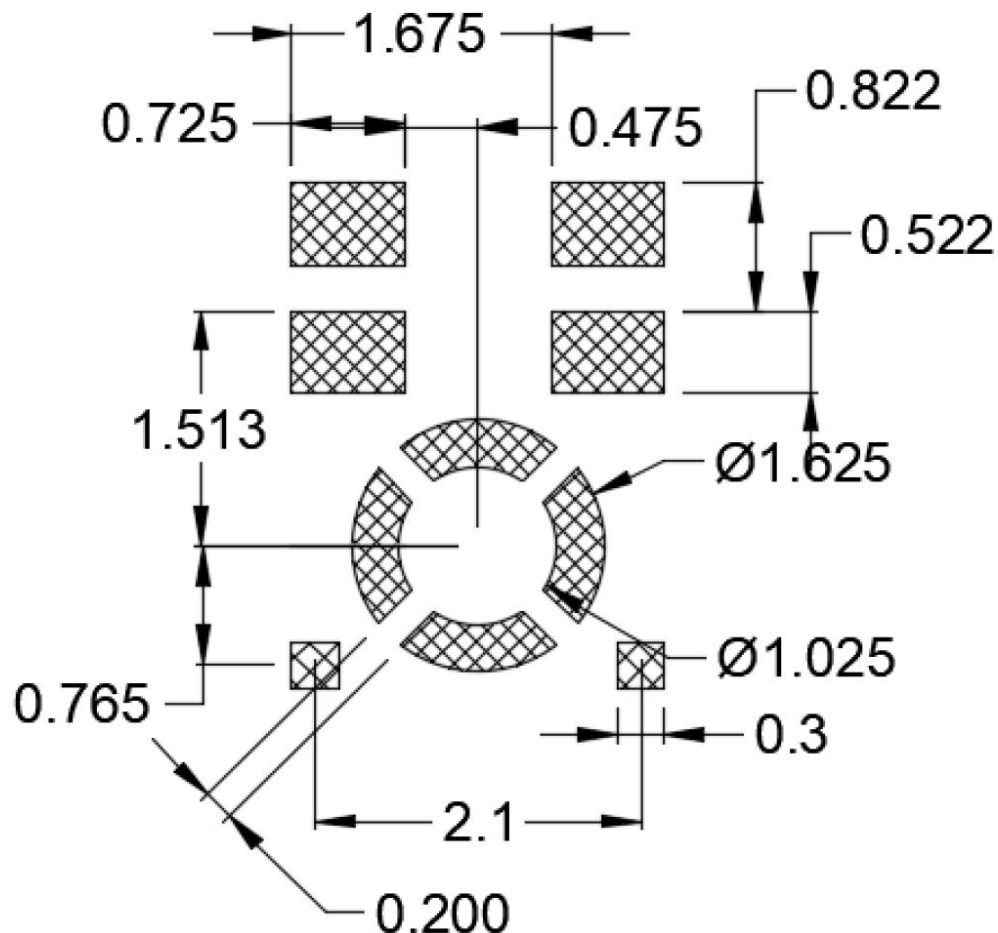
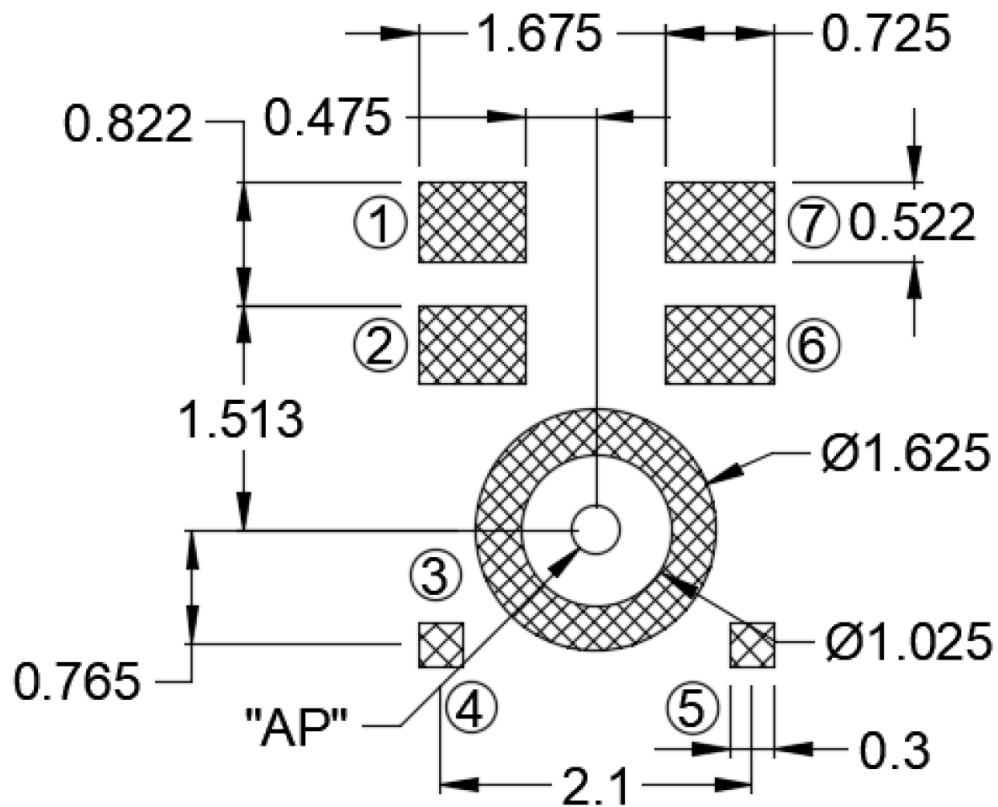


Item	Dimension	Tolerance
Length(L)	3.50	±0.10mm
Width(W)	2.65	±0.10mm
Height(H)	1.00	±0.10mm
Acoustic Port(AP)	Ø0.325	±0.05mm

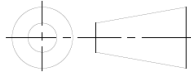
PIN	NAME	FUNCTION
1	Output	Digital Output
2	L/R	Left or Right Channel Selection DATA1(Right) : SELECT tied to GND DATA2(Left) : SELECT tied to VDD
3	Ground	Ground
4	NC	No connection
5	NC	No connection
6	Clock	Clock input to Microphone
7	VDD	VDD

Note: Connect the "L/R" pin to ground when the microphone is used in a single-channel application.

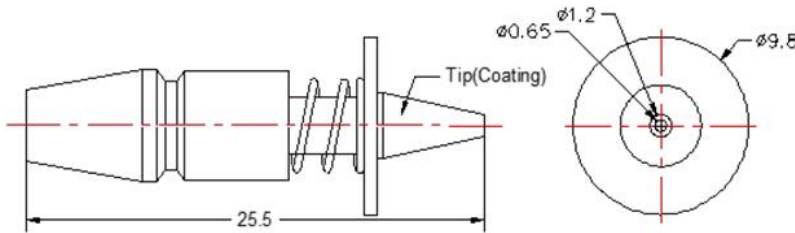
PCB Land and Stencil Pattern (This land pattern is advisory only and its use or adaptation is entirely voluntary. PUI Audio disclaims all liability of any kind associated with the use, application, or adaptation of this land pattern.)



Pick and Place Tool Recommendations

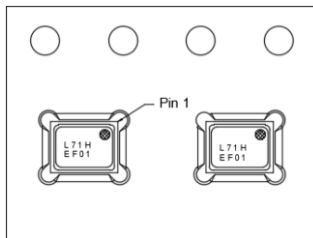
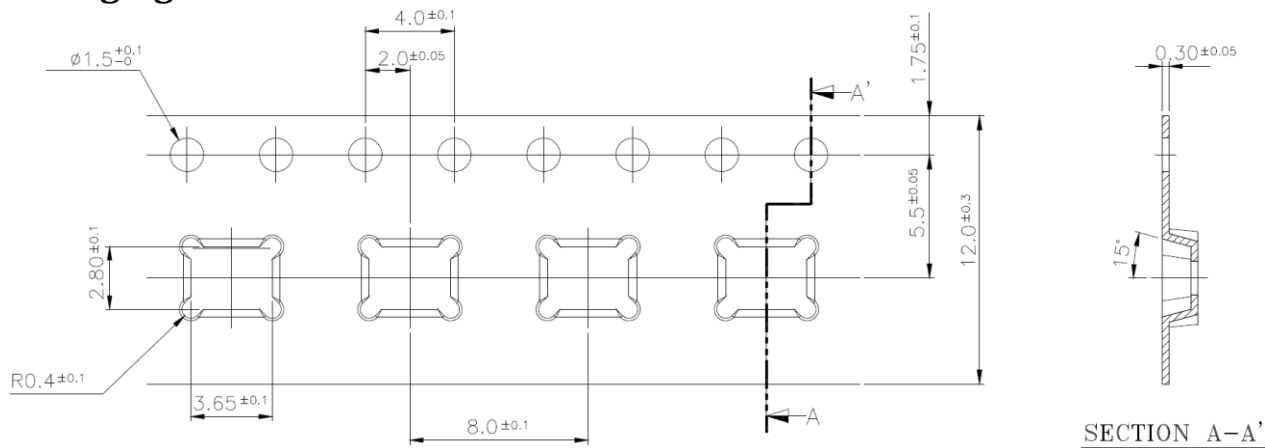


Note : Pick Area only extends to 0.25mm of any edge or hole unless otherwise specified.

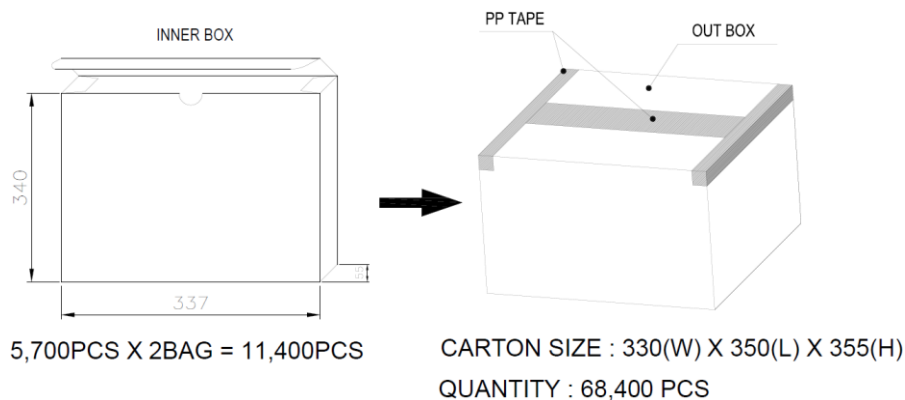


Recommended Nozzle Model : CN065
 Interier Diameter : Φ 0.65mm
 Externer Diameter : Φ 1.2mm

Packaging



Reel Diameter	Quantity Per Reel
13"	5,700



Specifications Revisions

Revision	Description	Date	Approval
A	Datasheet released from Engineering	04/21/2025	KH

Note:

- Unless otherwise specified:
 - All dimensions are in millimeters.
 - Default tolerances are ± 0.5 mm and angles are $\pm 3^\circ$.
- Specifications subject to change or withdrawal without notice.