



Description

The PA2AD piezoelectric chip consists of stacked piezoelectric ceramic layers (which are mechanically in series) that are sandwiched between interdigitated electrodes (which are electrically in parallel). It offers a maximum displacement of $1.1 \mu\text{m} \pm 15\%$. A black dot is located next to the electrode that should receive positive bias; the other electrode should be grounded. The electrodes are bare.

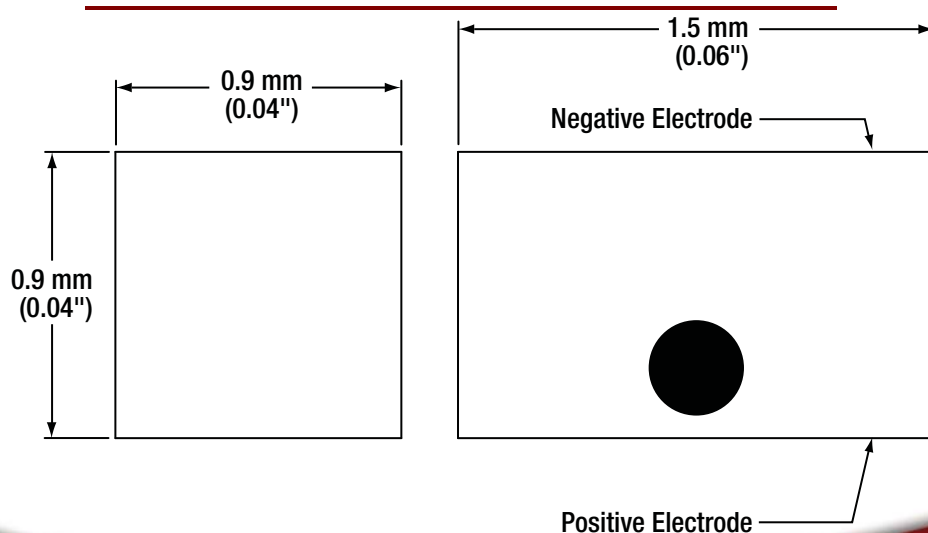
Specifications

PA2AD ^a	
Drive Voltage Range	0 - 75 V
Displacement (Free Stroke) at 75 V	$1.1 \mu\text{m} \pm 15\%$
Hysteresis	<15% (See Graph on Next Page)
Load (Recommended)	13 N (3 lbs)
Blocking Force at 75V	32 N (7.2 lbs)
Resonant Frequency	850 kHz (No Load)
Impedance at Resonant Frequency	1000 m Ω
Anti-Resonant Frequency	1050 kHz
Dissipation Factor	<2.0%
Capacitance	$15.0 \text{ nF} \pm 15\%$
Operating Temperature	-25 to 130 °C
Curie Temperature	230 °C
External Electrodes	Screen-Printed Silver
Dimensions	Width 1: $0.9 \text{ mm} \pm 0.1 \text{ mm}$ Width 2: $0.9 \text{ mm} \pm 0.1 \text{ mm}$ Length: $1.5 \text{ mm} \pm 5 \mu\text{m}$



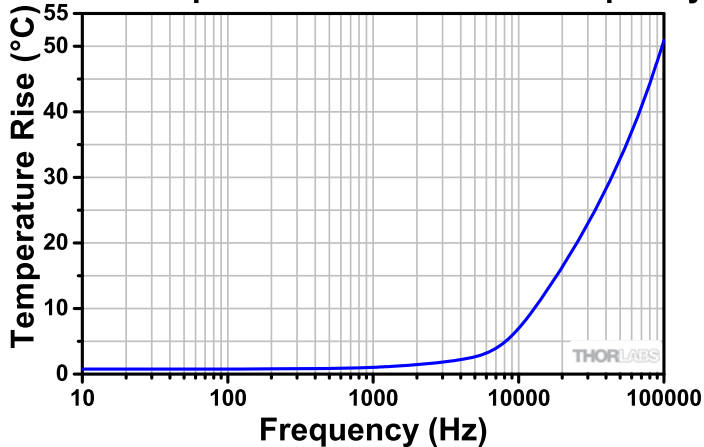
a. All specifications are quoted at 25 °C, unless otherwise stated.

Drawing



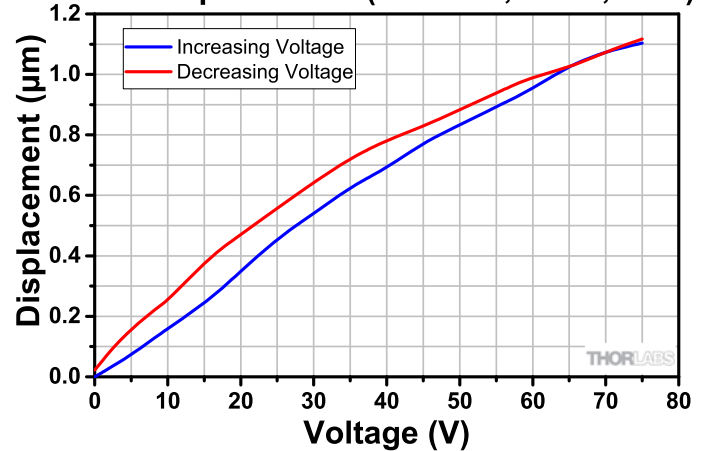
Typical Performance Plots

PA2AD Temperature Rise vs. Drive Frequency



These temperature rises were measured after applying a sine-wave drive voltage ranging from 0 to 75 V at the specified frequency for 10 minutes.

PA2AD Displacement (No Load, 25 °C, 75 V)



Operation

Electrical Considerations

- The electrode closest to the black dot should be positively biased, and the opposite electrode should be grounded. The maximum drive voltage is 75 V. Exceeding 75 V will decrease the device's lifespan and may cause mechanical failure. Reverse biasing may cause mechanical failure.
- When soldering wires to the electrodes, use a temperature no greater than 370 °C (700 °F) for a maximum of 2 seconds per spot. Solder to the middle of the electrode, keeping the spot as small as possible.
- Caution: After driving, the piezo is fully charged. Directly connecting the positive and negative electrodes has the risk of electricity discharging, spark, and even failure. We recommend using a resistor (>1 kΩ) between the electrodes to release the charge.

Attaching Devices to the Piezo

- Any epoxy which cures at a temperature lower than 80 °C is safe to use. We recommend Thorlabs Item Numbers 353NDPK or TS10. Loctite® Hysol® 9340 is also usable.
- Loads should only be attached to the central area of the 0.9 mm × 0.9 mm face since the edges do not translate. Attaching a load to other faces may lead to mechanical failure.

Storage Instructions

- Do not store the device at temperatures above 80 °C.
- Do not store the device in humid environments. The relative humidity (RH) should be less than 40%.
- Do not immerse the device in organic solvents.
- Do not use the device around combustible gases or liquids.