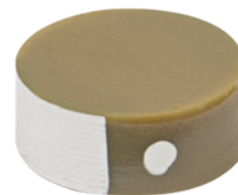


PA25FE



Description

The PA25FE round piezoelectric chip has a 5.0 mm diameter. It consists of a series of stacked piezoelectric ceramic layers, each possessing screen-printed electrodes. The printed layers are isostatically pressed to form the chip. The electrodes are electrically in parallel, and the PA25FE provides a maximum displacement of $2.8 \mu\text{m} \pm 15\%$. A silver dot is located next to the electrode that should receive positive bias; the other electrode should be grounded. The electrodes are bare.

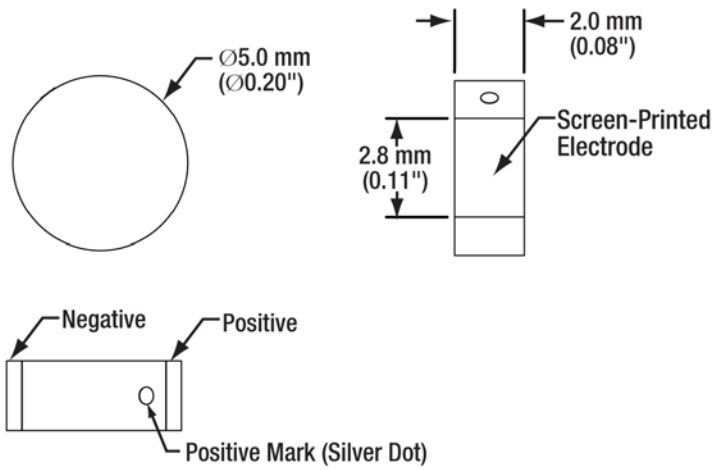
Specifications

PA25FE ^a	
Drive Voltage Range	0 - 200 V
Displacement (Free Stroke) at 150 V ^b	$2.5 \mu\text{m} \pm 15\%$
Displacement (Free Stroke) at 200 V ^b	$2.8 \mu\text{m} \pm 15\%$
Hysteresis	<15% (See Graph on Next Page)
Load for Maximum Displacement ^c	310 N (70 lbs)
Blocking Force at 150 V	780 N (175 lbs)
Resonant Frequency	350 kHz (No Load)
Impedance at Resonant Frequency	210 m Ω
Anti-Resonant Frequency	470 kHz
Dissipation Factor ^d	<2.0%
Capacitance ^d	$150 \text{ nF} \pm 15\%$
Operating Temperature	-25 to 130 °C
Curie Temperature	230 °C
External Electrodes	Screen-Printed Silver
Dimensions	Diameter: $5.0 \text{ mm} \pm 0.1 \text{ mm}$ Length: $2.0 \text{ mm} \pm 5 \mu\text{m}$

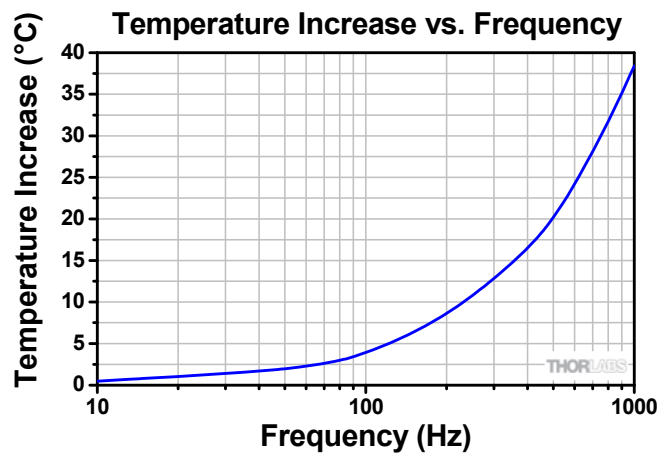
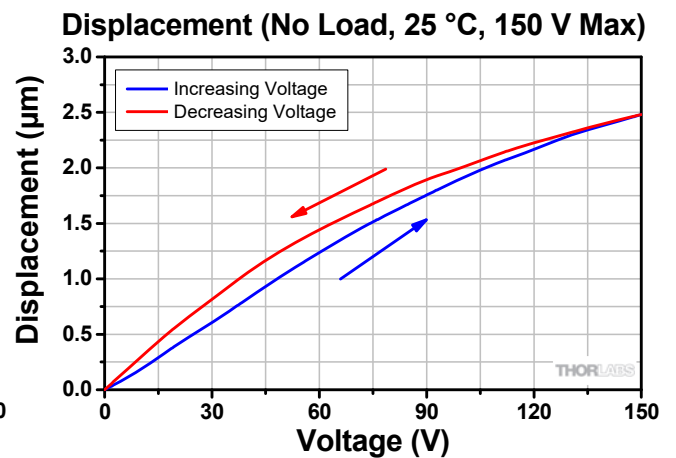
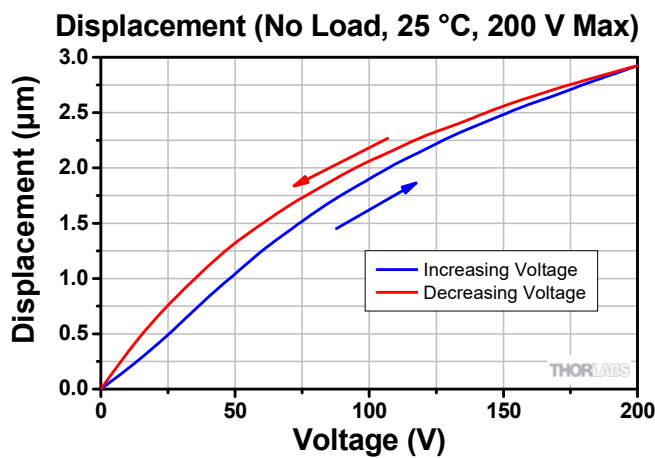
- All specifications are quoted at 25 °C, unless otherwise stated.
- The “free stroke” displacement corresponds to no load.
- Displacement varies with loading. When used with this load, these chips achieve the maximum displacement, which is larger than the free stroke displacement.
- Specified at 1 kHz, 1 V_{RMS}.



Drawing



Typical Performance Plots



The temperature increase of the chip was measured after applying a sine-wave drive voltage, with maximum and peak-to-peak amplitudes of 200 V, at the specified frequency for 10 minutes.

Operation

Electrical Considerations

- The electrode closest to the silver dot should be positively biased, and the opposite electrode should be grounded. The maximum drive voltage is 200 V. Exceeding 200 V will decrease the device's lifespan and may cause mechanical failure. Reverse biasing the device 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 largest face since the edges do not translate. Attaching a load to the smaller 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.