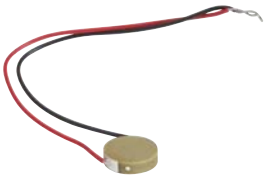
Round Piezoelectric Chip with Wires, 200 V, 3.3 µm Travel



PA25LEW

Description

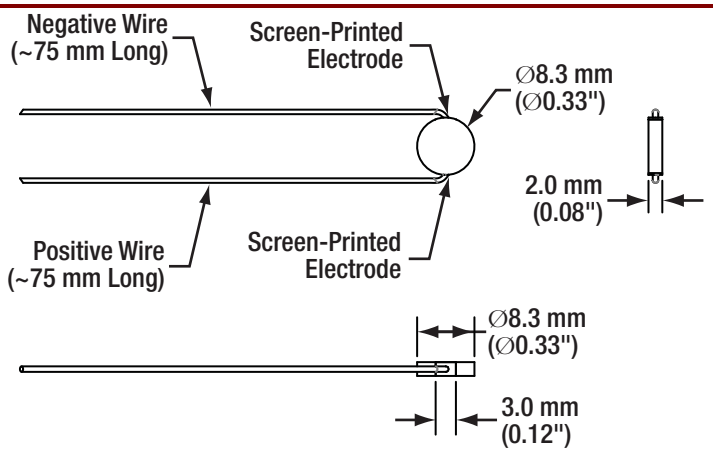
The PA25LEW round piezoelectric chip has an 8.3 mm diameter. It consists of a series of stacked piezoelectric ceramic layers, each possessing screen-printed electrodes. The printed layers are isostatically pressed to form the chip. The electrodes are electrically in parallel, and the PA25LEW provides a maximum displacement of 3.3 µm ± 15%. A red wire is soldered to the electrode that should receive positive bias; a silver dot is also located next to this electrode. The other electrode should be grounded.

Specifications

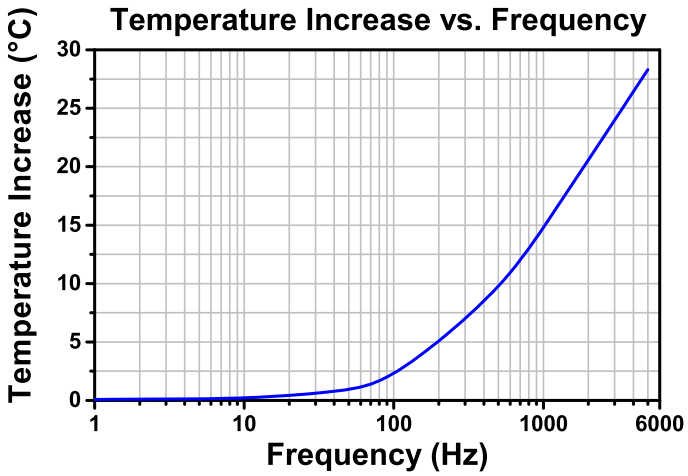
PA25LEW[a]	
Drive Voltage Range	0 to 200 V
Displacement (Free Stroke) at 150 V[b]	3.0 µm ± 15%
Displacement (Free Stroke) at 200 V[b]	3.3 µm ± 15%
Hysteresis	<15% (See Graphs on Next Page)
Load for Maximum Displacement[c]	720 N (162 lbs)
Blocking Force at 150 V	1800 N (405 lbs)
Resonant Frequency	235 kHz (No Load)
Impedance at Resonant Frequency	150 mΩ
Anti-Resonant Frequency	300 kHz
Dissipation Factor[d]	<2.0%
Capacitance[d]	580 nF ± 15%
Operating Temperature	-25 to 130 °C
Curie Temperature	230 °C
External Electrodes	Screen-Printed Silver
Dimensions	Max Diameter: 9.4 mm Piezo Diameter : 8.3 mm ± 0.1 mm Length: 2.0 mm ± 5 µm

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

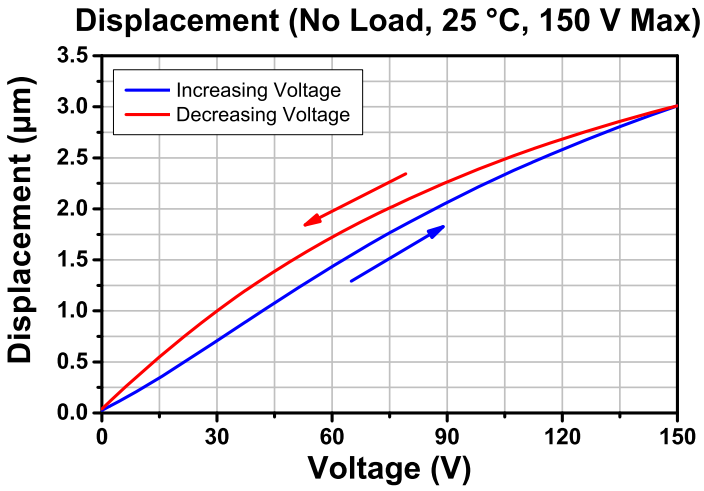
Drawing

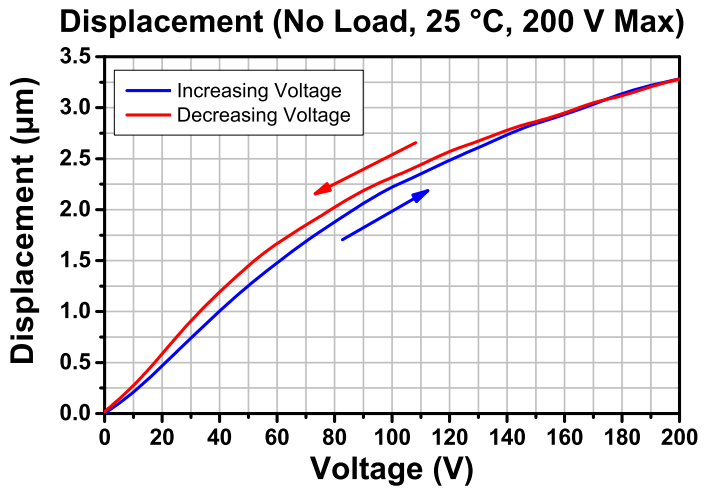


Typical Performance Plots



The temperature increase of the chip was measured after applying a sine wave driving voltage, with maximum and peak-to-peak amplitudes of 150 V, at the specified frequency for 10 minutes.





Operation

Electrical Considerations

- The electrode attached to the red wire should be positively biased, and the electrode attached to the black wire should be grounded. The recommended maximum drive voltage is 200 V, and the absolute maximum 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.
- If it becomes necessary to reattach the wires to the electrodes, use a soldering iron at 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 red and black wires has the risk of electricity discharging, spark, and even failure. We recommend using a resistor (>1 kΩ) between the wires to release the charge.

Attaching Devices to the Piezoelectric Chip

- 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 acceptable.
- 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.