Round Piezoelectric Stack with Two End Plates, 200 V, 11.0 µm Travel

PK25FA2P2

Description

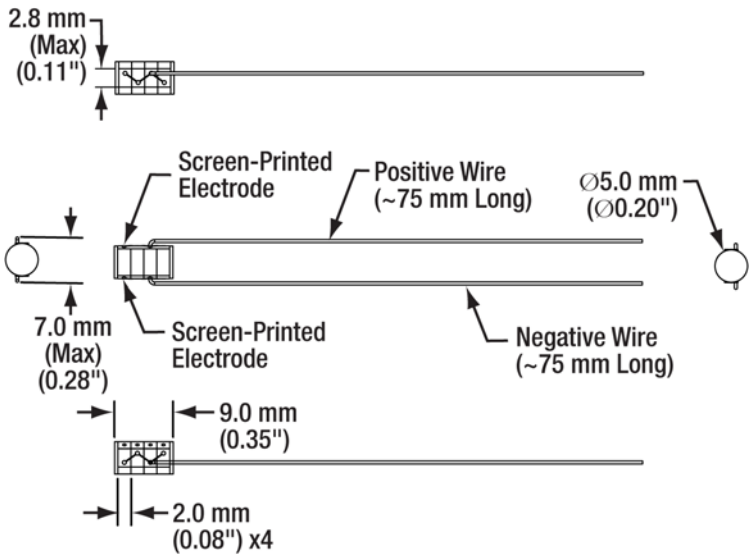
The PK25FA2P2 round piezoelectric stack consists of multiple chips that are bonded via epoxy and glass beads. The stack offers a maximum displacement of 11.0 µm ± 15%. A red wire is attached to the electrode that should receive positive bias, and a black wire is attached to the electrode that should be grounded.

Specifications

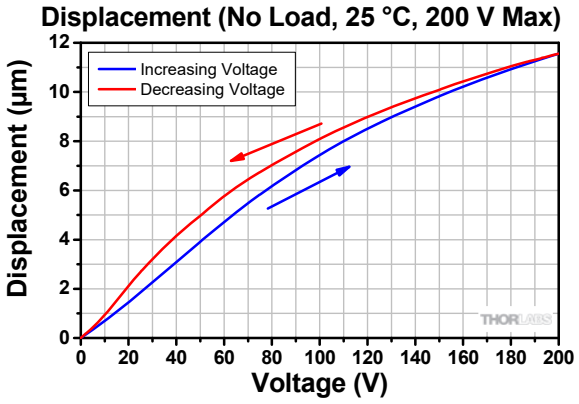
PK25FA2P2[a]	
Drive Voltage Range	0 - 200 V
Displacement (Free Stroke) at 150 V[b]	9 µm ± 15%
Displacement (Free Stroke) at 200 V[b]	11 µm ± 15%
Hysteresis	<15% (See Graph on Next Page)
Load for Maximum Displacement[c]	310 N (70 lbs)
Blocking Force at 150V	780 N (175 lbs)
Resonant Frequency	135 kHz (No Load)
Impedance at Resonant Frequency	150 mΩ
Anti-Resonant Frequency	170 kHz
Dissipation Factor[d]	<2.0%
Capacitance[d]	570 nF ± 15%
Operating Temperature	-25 to 130 °C
Curie Temperature	230 °C
External Electrodes	Screen-Printed Silver
Outer Dimensions[e]	Max Diameter: 7.0 mm Length: 9.0 mm
Piezo Stack Dimensional Tolerance	± 0.1 mm

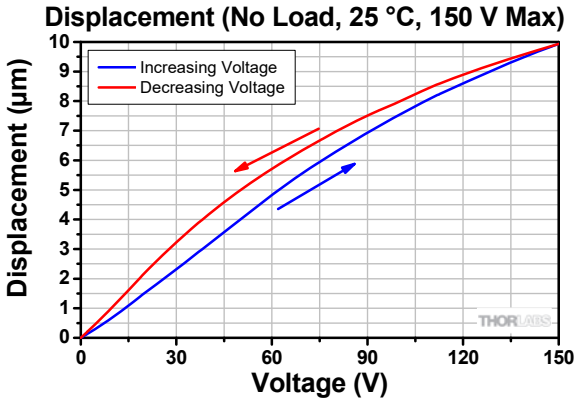
a. All specifications are quoted at 25 °C, unless otherwise stated.
b. The "free stroke" displacement corresponds to no load.
c. Displacement varies with loading. When used with this load, these chips achieve the maximum displacement, which is larger than the free stroke displacement
d. Specified at 1 kHz, 1 V_{RMS}.
e. Outer dimensions include the electrodes, wire connection area, Kapton® tape, and stack diameter, but not the wire length.

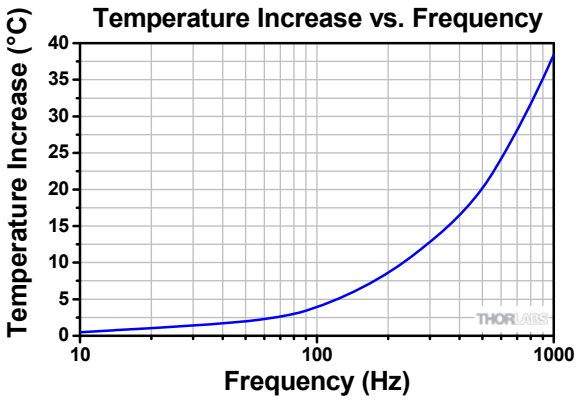
Drawing



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 black 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 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 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.