

Piezoelectric Chip, 150 V, 3.0 μm Travel

PA4GKH5



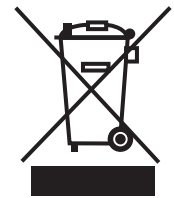
Description

The PA4GKH5 piezoelectric chip with isolated inner hole 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 $3.0 \mu\text{m} \pm 15\%$. A silver plus sign is located next to the electrode that should receive positive bias; the other electrode should be grounded. The electrodes are bare.

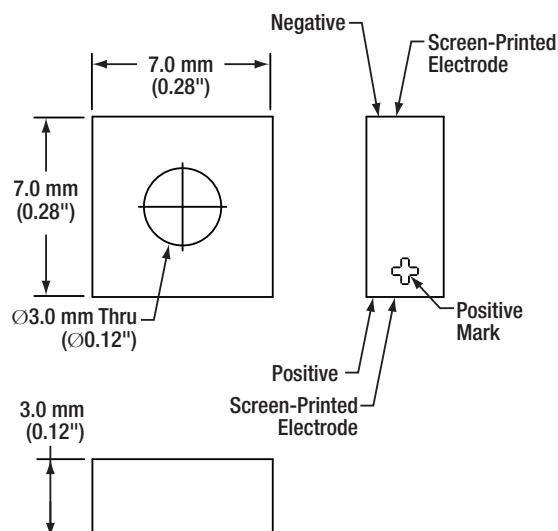
Specifications

PA4GKH5 ^a	
Drive Voltage Range	0 - 150 V
Displacement (Free Stroke) at 150 V	$3.0 \mu\text{m} \pm 15\%$
Hysteresis	<15% (See Graph on Next Page)
Load (Recommended)	700 N (155 lbs)
Blocking Force at 150 V	1600 N (360 lbs)
Resonant Frequency	430 kHz (No Load)
Impedance at Resonant Frequency	100 m Ω
Anti-Resonant Frequency	570 kHz
Dissipation Factor	<2.0%
Capacitance	440 nF $\pm 15\%$
Operating Temperature	-25 to 130 °C
Curie Temperature	230 °C
External Electrodes	Screen-Printed Silver
Dimensions	Hole diameter: $3.0 \text{ mm} \pm 0.1 \text{ mm}$ Width 1: $7.0 \text{ mm} \pm 0.1 \text{ mm}$ Width 2: $7.0 \text{ mm} \pm 0.1 \text{ mm}$ Length: $3.0 \text{ mm} \pm 5 \mu\text{m}$

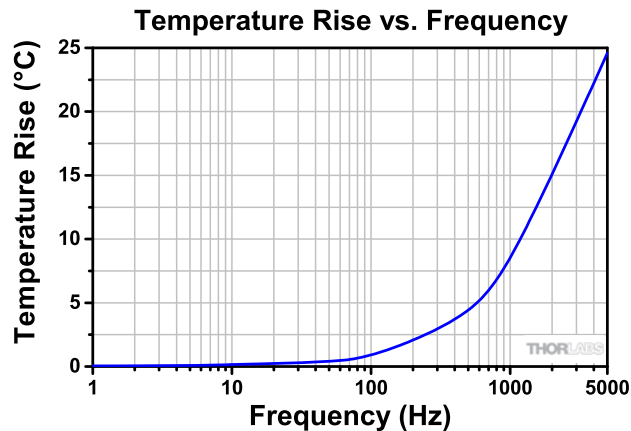
a. All specifications are quoted at 25 °C, unless otherwise stated.



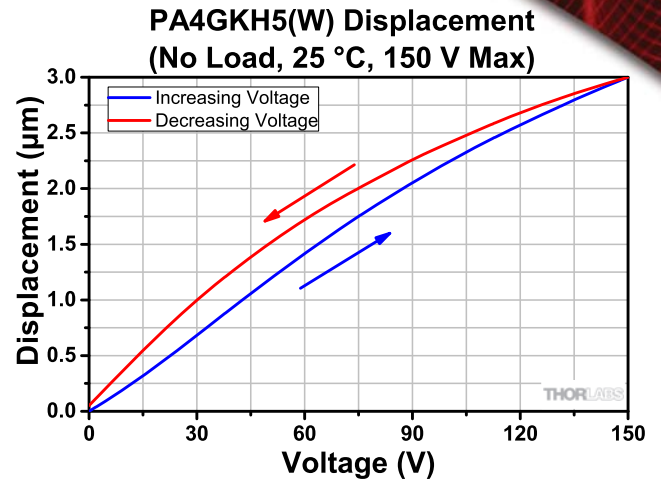
Drawing



Typical Performance Plots



Temperature rises were measured after applying a sine-wave drive voltage ranging from 0 to 150 V at the specified frequency for 10 minutes.



Operation

Electrical Considerations

- The electrode closest to the silver plus sign should be positively biased, and the opposite electrode should be grounded. The maximum drive voltage is 150 V. Exceeding 150 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.