Product specification

The DCSS4-050512 is composed of a transversely moving shear ceramic stack and a longitudinally moving piezoelectric ceramic stack, bonded together with epoxy resin to enable multi-axis actuation. Each part has its own control wires, with the red wire serving as the positive terminal (+) and the black wire as the negative terminal (-) of the product.

DCS4-050512

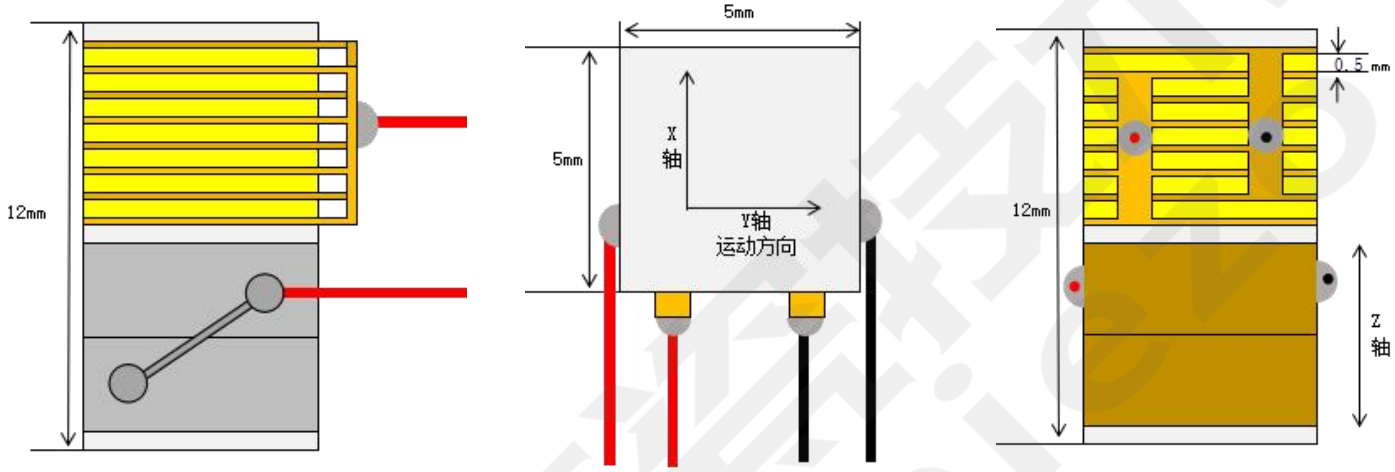
Performance Parameters

Driving voltage	**Longitudinal**	-30~150 V	**Static capacitance**	**Longitudinal**	530nF ± 15%
	tangential	-200~200 V		**tangential**	10nF ± 15%
displacement	**Z-Longitudinal**	7.0 μm ± 15%	**wastage**	**Longitudinal**	<2.0%
	tangent	7.0 μm ± 15%		**tangential**	<3.0%
retardation	**Longitudinal**	<15%	**Resonant frequency**	**Longitudinal**	125kHz
	tangential	<40%		**tangential**	2100KHz
Shear load	**Longitudinal**	1000N	**Longitudinal load**	**Recommended**	400N
	tangential	50N		**Max**	1000N
Curie temperature		230 °C	**Service temperature**		-25 ~ 130 °C
Ceramic size	L:	5.0mm	**Package size**	L: Max	8.5 ± 0.1mm
	W:	5.0mm		W: Max	8.5 ± 0.1mm
	H:	12.0mm		H:	12.0± 0.01mm

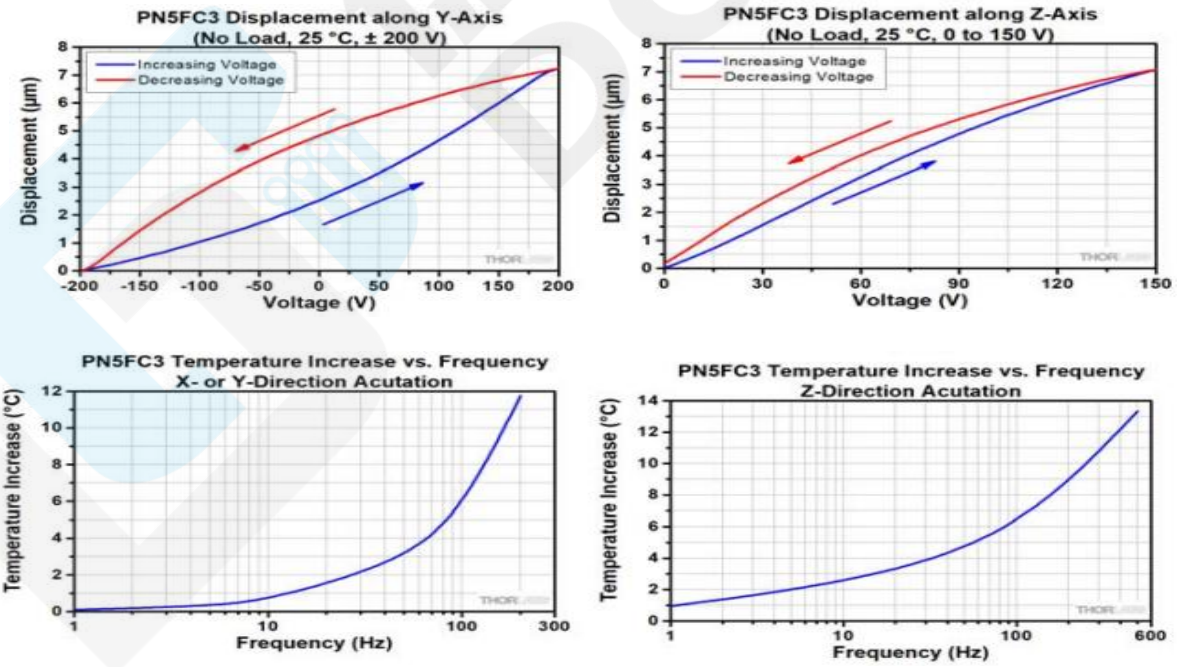
- All specifications are quoted at 25°C, unless otherwise stated.
- The displacement may vary slightly for different loads, and the maximum displacement occurs when used with the recommended load.

Product specification

Product Size



Performance Curve



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

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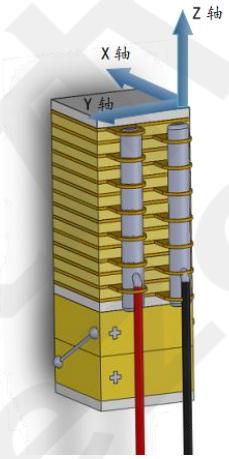
operation

1.In piezoelectric ceramic shear elements, there is an orthogonal relationship between the polarization direction of the piezoelectric material and the electric field direction induced by the voltage bias. When operating the piezoelectric ceramic shear element according to specifications, applying a bias voltage to the electrodes generates shear strain within the piezoelectric element. Simultaneously, microscopic reversible changes occur in the piezoelectric material to better align the overall polarization direction with the applied electric field direction.



2. During use, ensure the product is correctly assembled according to the XYZ directions as shown in the figure.

Installation & Use

1.The DCSS4-050512 stack has four wires: red for the positive terminal and black for the negative terminal. These wires are grouped in pairs, with the upper pair controlling transverse displacement and the lower pair controlling longitudinal displacement.

2.Hysteresis is an inherent characteristic of piezoelectric ceramic materials. The hysteresis effect of the tangential motion part reaches 40%, which is larger than that of the longitudinal strain (15%). This must be taken into consideration during use.

3.The transverse displacement of the stack does not vary linearly with the driving voltage. For example, when driven at ±100V, the displacement is approximately 30% of that at ±200V.

4.The driving voltage range for the ceramic has been provided in the table above. Exceeding this range may shorten the ceramic's service life and could potentially damage the stack.

5. One end of the stack is attached with an alumina end piece with a Mohs hardness of 9 and a surface roughness of <1μm. It is recommended that the installed load or surface have a Mohs hardness >6 and a surface roughness <10μm. Additionally, ensure good parallelism to distribute the load evenly across the stack's mounting surface.

6. The stack can be fixed using adhesive. To ensure bonding effectiveness, it is recommended to apply an axial pressure of 1~3 MPa during adhesive curing, and the curing temperature should be kept below 80°C.

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Matters Needing Attention

1.After driving, the piezoelectric element will be filled with charge. Directly short-circuiting the red and black wires for discharge may cause sparking and even lead to ceramic failure.
It is recommended to use a resistor (>1 kΩ) to release the charge during discharge.

2.The storage temperature for the piezoelectric stack should be less than 80°C, and the humidity should be less than 50%.

3.Do not immerse the piezoelectric stack in organic solvents or expose it to flammable gases or liquids.