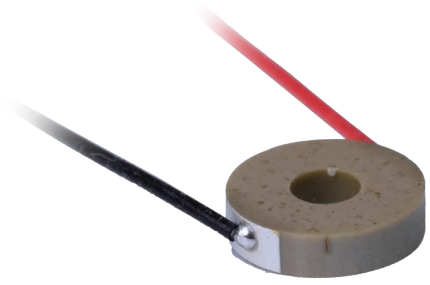
Piezo Chip Actuator - Ring



Features

- AC lifetime: 10^9 cycles
- Compact structure
- Microsecond-level response
- Vacuum compatible up to 10^{-6} Pa
- Sub-nanometer resolution
- Curie temperature: 230°C
- Operating voltage: -20 to +150V

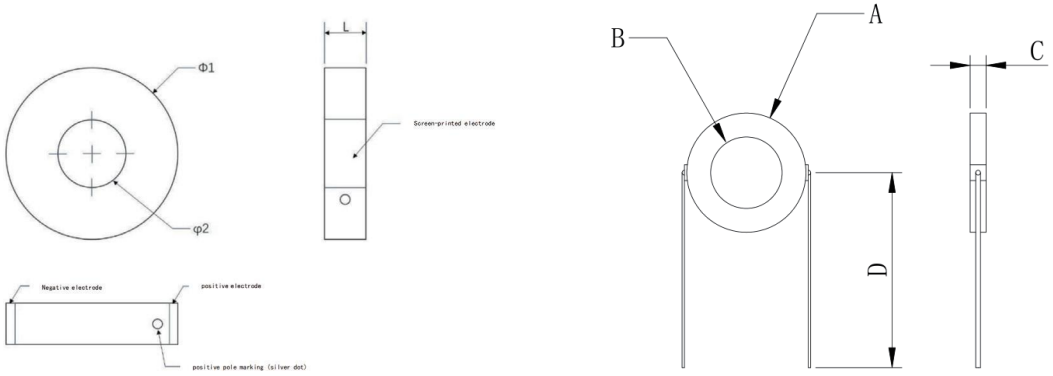
Description

The Piezo Chip Actuator consists of multiple ceramic layers and electrode layers stacked and intersected internally, with external electrodes printed on both sides to lead out the internal electrodes. Through precision grinding processes, the height tolerance of each piezoelectric ceramic is controlled to be smaller than ±5μm. The company has achieved seamless integration from piezoelectric ceramic powder to the finished actuator, and mass production has been implemented. Currently, the products are applied in the fields of nanoscale positioning, precision manufacturing, and dispensing valve technology.

Applications

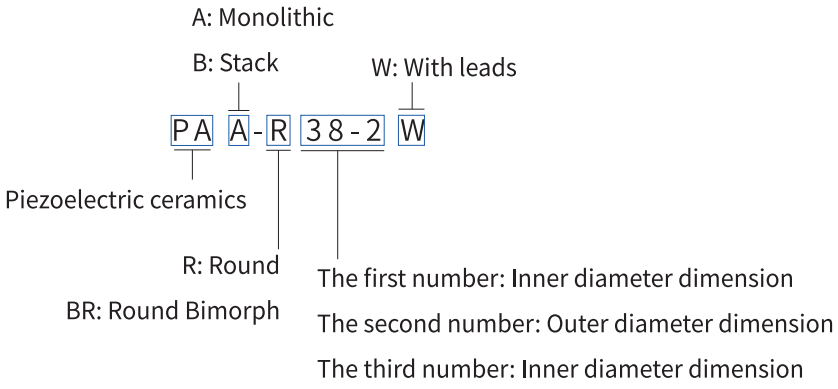
- Laser tuning
- Micro-jetting
- Life science

Interface Definition



General dimension, Unit: mm

Model Interpretation



Technical Specifications

	PAA-R38-2W	PAA-R915-2W	Unit	Tolerance
Active axes	Z	Z		
Max. displacement	2.6	3.0	μm	±15%
Displacement hysteresis	<15%	<15%		
Blocking force (150 V)	1800	2000	N	Max. value
Electrical properties				
Operating voltage	150	0~200	V	
Resonant frequency	515	440	kHz	Max. value
Resonant impedance	150	110	mΩ	±15%
Antiresonant frequency	670	560	kHz	Max. value
Dielectric loss	<2.0%	<2.0%	%	
Electrical capacitance	550	1300	nF	±15%
Miscellaneous				
Operating temperature range	-25~130	-25~130	°C	
Electrode	Silver	Silver		
Cable length	75	75	mm	±5 mm
Curie temperature	230	230	°C	
Dimensions				
Φ1/A	8.3	15	mm	±0.1 mm
ϕ2/B	3	9	mm	±0.1 mm
L/C	2	2	mm	±5 μm
MTTF	8.53	7.5	year	

* MTTF test conditions: 300V, 85% humidity, 85℃ environment

Optional soldering of standard wiring harness available, length 75mm, AWG32, PTFE insulation, followed by 'W' in the product code

Other specifications can be customized on request.

Customization Information

- **Drive Voltage:** YiNGUAN can flexibly customize the maximum drive voltage of the device. The common available options for the maximum drive voltage we provide are 50V, 75V, 100V, 120V, 150V and 200V. Other special maximum drive voltages can also be customized flexibly according to customer requirements.

- **Output Displacement:** The output displacement mainly depends on the length of the device. Monolithic annular actuators offer a maximum displacement range of up to 3.5μm.

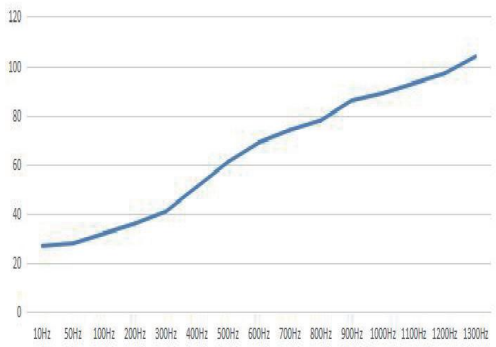
- **Operating Frequency:** Ring-type monolithic actuators feature high resonant frequency and small capacitance. Their heat generation and temperature rise at high frequencies are lower, consequently enabling higher drive frequencies. YiNGUAN recommends a maximum drive frequency of 1kHz for monolithic actuators. If operation at higher drive frequencies is required, the drive voltage should be proportionally reduced to prevent device damage due to overheating.

- **Dimensions:** The inner diameter, outer diameter, and height of the annular stack can be customized flexibly according to customer needs. For the outer diameter, the minimum available size is 3mm, and the maximum is 20mm. For the inner diameter, the minimum available size is 1mm, and the maximum is 10mm. In terms of height, customization up to 3mm is supported.

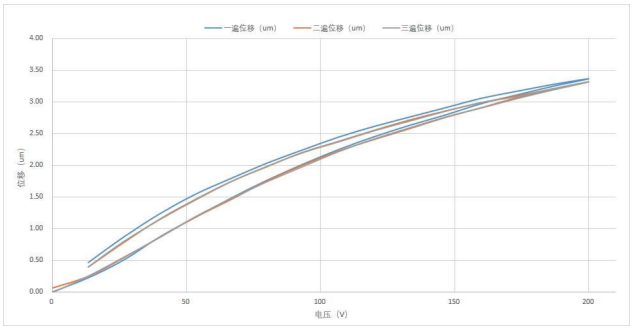
- **Wiring Harness:** A wiring harness can be optionally equipped while meeting the AWG usage standards. The standard length of the harness is 7.5cm of tinned wire, and both the length and orientation of the harness can be customized flexibly according to customer requirements. To facilitate the connection of positive and negative electrode wires, the soldering point position can be selected within the allowable error range of performance variation.

Performance Chart

Temperature versus drive frequency variation



Graph of temperature rise versus drive voltage frequency (Measured after applying a sinusoidal drive voltage of 0 to 200V at specified frequencies for 10 minutes)



Displacement graph of PAA-R915-2W at 25°C, No-load condition, 200V