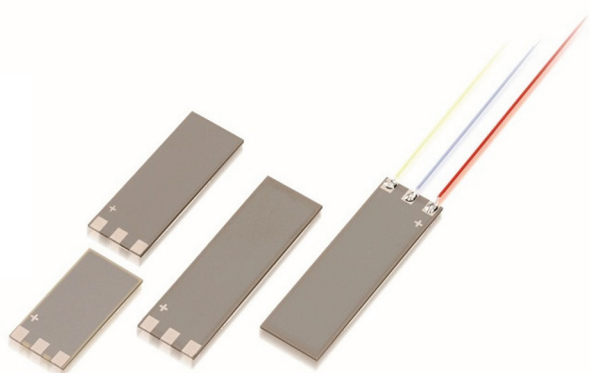


# PICMA® Bender

## All-Ceramic Bending Actuators with High Displacement



### PL112 – PL140

- Displacement to 2 mm
- Fast response in the ms range
- Nanometer resolution
- Low operating voltage
- Operating temperature up to 150°C
- UHV-compatible to 10<sup>-9</sup> hPa

### PICMA® multilayer bender elements with high reliability

Operating voltage 0 to 60 V. Bidirectional displacement, bimorph design. Ceramic insulation, polymer free. UHV-compatible to 10<sup>-9</sup> hPa, no outgassing, high bakeout temperature. Reliable even under extreme conditions.

### Fields of application

Industry and research, vacuum. For medical technology, laser technology, sensor technology, automation tasks, pneumatic valves.

### Specifications

	PL112.10	PL122.10	PL127.10	PL128.10	PL140.10	Unit	Tolerance
Operating voltage range	0 to 60 (±30)	0 to 60 (±30)	0 to 60 (±30)	0 to 60 (±30)	0 to 60 (±30)	V	
Displacement	±100	±310	±450	±450	±1000	µm	±20 %
Remaining length L <sub>F</sub>	12	22	27	28	40	mm	
Length L	18	25	31	36	45	mm	±0.5 mm
Width W	9.60 ±0.2	9.60 ±0.2	9.60 ±0.2	6.15 ±0.1	11.00 ±0.2	mm	
Height TH	0.67	0.67	0.67	0.67	0.55	mm	±0.1 mm
Blocking force	±2.1	±1.25	±1.1	±0.55	±0.5	N	±20 %
Electrical capacitance	2 × 1.1	2 × 2.5	2 × 3.4	2 × 1.2	2 × 4.1	µF	±20 %
Resonant frequency	1800	600	420	360	160	Hz	±20 %
Operating temperature range	-20 to 150	-20 to 85	-20 to 85	-20 to 150	-20 to 85	°C	
Piezo ceramic	PIC252	PIC251	PIC251	PIC252	PIC251		

Electrical capacitance: Measured at 1 V<sub>pp</sub>, 1 kHz, RT, clamped on one side with remaining length L<sub>F</sub>, no load.

Resonant frequency: Measured at 1 V<sub>pp</sub>, clamped on one side with remaining length L<sub>F</sub>, no load.

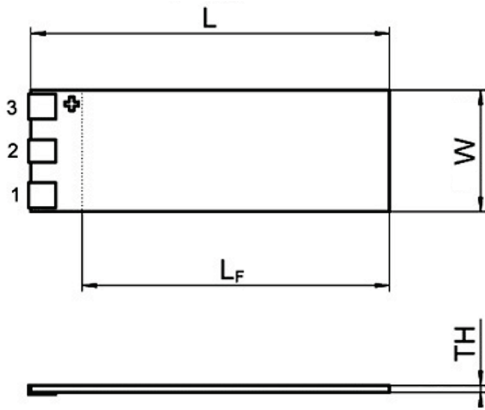
Standard connections: Solderable contacts (PL1xx.10) or PTFE-insulated stranded wires, UHV compatible, 100 mm, AWG 32, Ø 0.49 mm (PL1xx.11).

Recommended mounting: Epoxy resin adhesive.

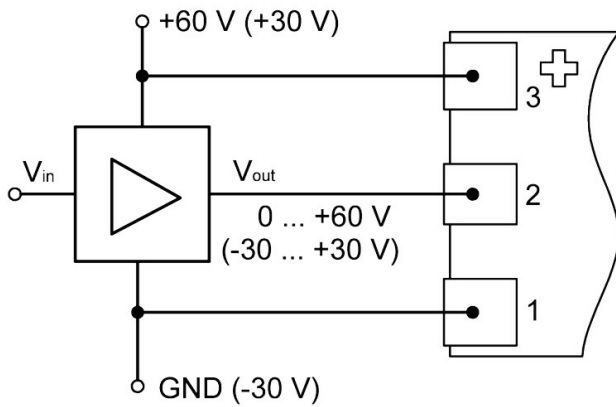
All specifications depend on actual clamping conditions and mechanical load applied.

Custom designs or different specifications on request.

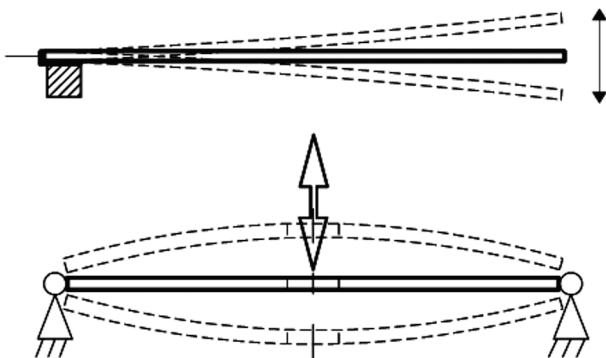
## Drawings / images



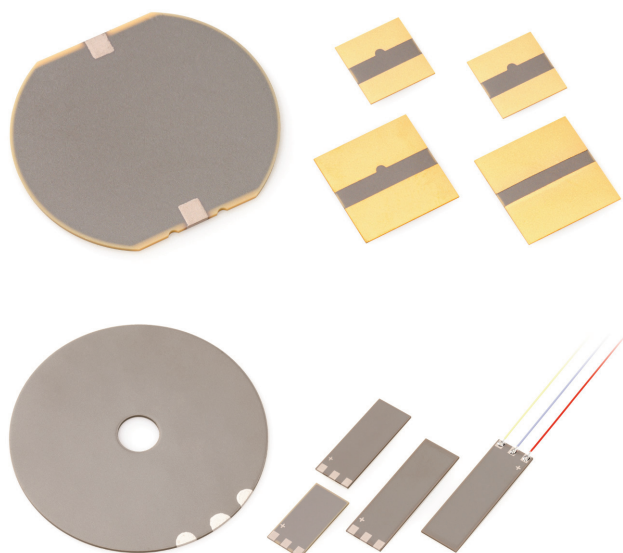
PL112.10 – PL140.10.  $L$ ,  $L_F$ ,  $W$ ,  $TH$ , see data table.



PICMA® Bender bending actuators have differential control.



Displacement of the PICMA® bending actuators: Clamped on one side (top) and on both sides (bottom).



Multilayer contracting plates can be manufactured in a variety of shapes, e.g., rectangular or disc-shaped, and are available on request. These plates can be applied for example, to metal or silicon substrates, in order to realize bender or pump elements with low control voltages.

## Ordering Information

### PICMA® Bender actuators

#### PL112.10

PICMA® multilayer piezo bending actuator, 200 µm travel range, 18 mm × 9.60 mm × 0.67 mm

#### PL122.10

PICMA® multilayer piezo bending actuator, 620 µm travel range, 25 mm × 9.60 mm × 0.67 mm

#### PL127.10

PICMA® multilayer piezo bending actuator, 900 µm travel range, 31 mm × 9.60 mm × 0.67 mm

#### PL128.10

PICMA® multilayer piezo bending actuator, 900 µm travel range, 36 mm × 6.15 mm × 0.67 mm

#### PL140.10

PICMA® multilayer piezo bending actuator, 2000 µm travel range, 45 mm × 11.00 mm × 0.55 mm

### PICMA® Bender actuators with PTFE-insulated stranded wires

#### PL112.11

PICMA® multilayer piezo bending actuator, 200 µm travel range, 18 mm × 9.60 mm × 0.67 mm, stranded wires

#### PL122.11

PICMA® multilayer piezo bending actuator, 620 µm travel range, 25 mm × 9.60 mm × 0.67 mm, stranded wires

#### PL127.11

PICMA® multilayer piezo bending actuator, 900 µm travel range, 31 mm × 9.60 mm × 0.67 mm, stranded wires

#### PL128.11

PICMA® multilayer piezo bending actuator, 900 µm travel range, 36 mm × 6.15 mm × 0.67 mm, stranded wires

#### PL140.11

PICMA® multilayer piezo bending actuator, 2000 µm travel range, 45 mm × 11.00 mm × 0.55 mm, stranded wires

Custom designs or different specifications on request.