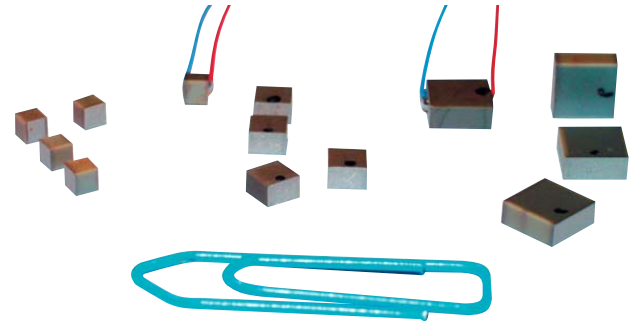


# PL022 • PL033 • PL055

## PICMA® Chip Monolithic Multilayer Piezo Actuators (LVPZT)



PICMA® Chip actuators are the smallest ceramic-encapsulated multilayer piezo actuators available. Standard cross-sections range from 2 x 2 to 5 x 5 mm.

- Ceramic Encapsulation for Extended Lifetime
- Ultra-Compact, from 2 x 2 x 2 mm
- High Curie Temperature
- Ideal for Dynamic Operation
- Sub-Millisecond Response / Sub-Nanometer Resolution
- UHV Compatible to 10<sup>9</sup> hPa
- Superior Lifetime

### Ultra-Compact Monolithic Piezo Actuators

PICMA® Chip actuators are the smallest monolithic multilayer piezo actuators available. Providing sub-nanometer resolution and sub-millisecond response, they are ideally suited to high-level dynamic applications. PICMA® actuators consist of a highly reliable ceramic-encapsulated PZT block with solderable terminations, and come in standard sizes as small as 2 x 2 x 2 mm.

### Optimized PZT Ceramics, Humidity Resistance

PICMA® actuators are made from a ceramic material in which the piezoceramic properties such as stiffness, capacitance, displacement, temperature stability and lifetime are optimally combined. The monolithic, ceramic-encapsulated design provides better humidity protection than polymer-film insulation.

### Long Lifetime and High Performance—Ideal for Dynamic Operation

PICMA® Chip actuators are superior to conventional actua-

tors in high-endurance situations, where they show substantially longer lifetimes both in static and dynamic operation, even in harsh environments. Due to their high resonant frequency, these actuators are ideally suited for dynamic operation with light loads; an external preload is recommended for dynamic operation with larger loads. The high Curie temperature of 320 °C provides a usable temperature range extending up to 150 °C, well above the 80 °C limit of conventional multilayer actuators. At the low end, operation down to a few Kelvin is possible (with reduction in performance specifications).

### Optimum UHV Compatibility—No Outgassing

The lack of polymer insulation and the high Curie temperature make for optimal ultra-high-vacuum compatibility (no outgassing / high bakeout temperatures of up to 150 °C).

### Amplifiers, Drivers & Controllers

PI offers a wide range of control electronics for piezo actuators from low-power drivers to multi-channel, closed-loop, digital controllers. Of course, PI also designs custom amplifiers and controllers.

#### Piezo Actuators

Nanopositioning & Scanning Systems

Active Optics / Steering Mirrors

Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers & Nanopositioning Controllers

Hexapods / Micropositioning

Photonics Alignment Solutions

Motion Controllers

Ceramic Linear Motors & Stages

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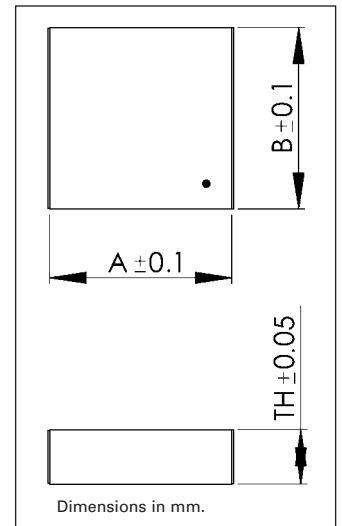
#### Application Examples

- Static and dynamic nanopositioning
- Laser tuning
- Micro-dispensing
- Interferometry
- Life sciences
- Photonics

#### Technical Data / Product Order Numbers

Order number*	Dimensions A x B x TH in mm	Displacement [ $\mu\text{m}$ @ 100 V] $\pm 20\%$	Blocking force [N]	Electrical capacitance [nF] $\pm 20\%$	Resonant frequency [kHz]
PL022.30	2 x 2 x 2	2.2	> 250	25	> 300
PL033.30	3 x 3 x 2	2.2	> 300	50	> 300
PL055.30	5 x 5 x 2	2.2	> 500	250	> 300

\* For optional wire leads change order number extension to .x1 (e.g. PL022.31)  
Resonant frequency measured at 1 V<sub>pp</sub>, capacitance measured at 1 V<sub>pp</sub>, 1 kHz.



Recommended preload for dynamic operation 15 to 30 MPa  
Max. operating voltage: -20 to +100 V  
Max. operating temperature: 150°C  
Standard Mechanical Interface: ceramic (top & bottom)  
Standard Electrical Interface: solderable termination  
Available Options: special mechanical interfaces, etc.  
Other specifications on request.