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 10⁻⁹ 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 actuators 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.

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

Technical Data / Product Order Numbers

<table>
<thead>
<tr>
<th>Order number*</th>
<th>Dimensions A x B x TH in mm</th>
<th>Displacement [µm @ 100 V] ±20%</th>
<th>Blocking force [N]</th>
<th>Electrical capacitance [nF] ±20%</th>
<th>Resonant frequency [kHz]</th>
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<td>2 x 2 x 2</td>
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* For optional wire leads change order number extension to .x1 (e.g. PL022.31)
Resonant frequency measured at 1 Vpp, capacitance measured at 1 Vpp, 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.