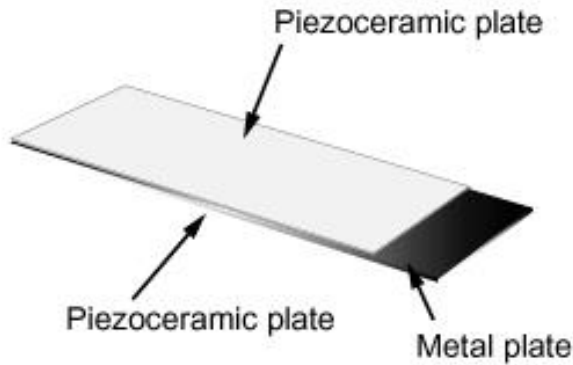


■ Piezoelectric bimorph element



● Features

- Simple structure
- Displacement of hundreds of μm obtainable at low voltage
- Low power consumption
- No electromagnetic noise generation

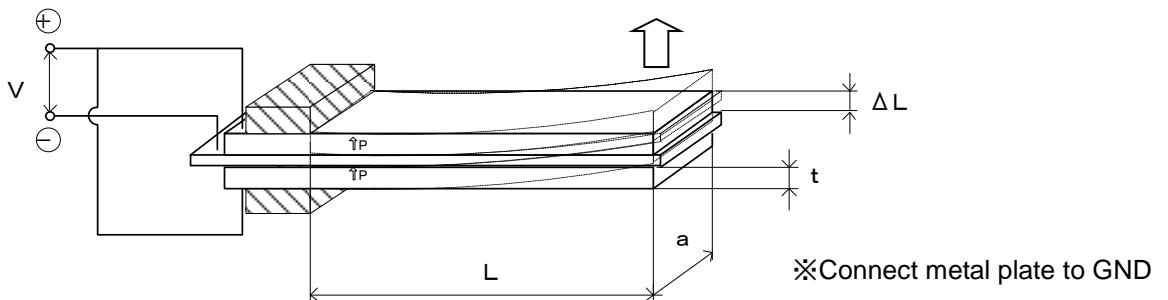
● Applications

- Piezoelectric relays
- Bimorph fans
- Piezoelectric valves
- Flow sensors

● Operating principle (Examples of parallel connection type)

Piezoelectric bimorph element has a structure in which two “piezoelectric plates” polarized in the thickness direction are bonded to both sides of a “metal plate”.

When “voltage (V)” is applied to this piezoelectric bimorph element, the upper “piezoelectric plate” contracts due to the piezoelectric lateral effect, and the lower “piezoelectric plate” expands. As a result, it will bend upward as a whole. (See the figure below)



ΔL : Tip displacement
 t : Thickness

L : Length of element
 V : Input voltage

a : Width

● Standard models

		Parts number	PZBA00030	PZBA00031
Dimensions	Length of element (L)		48mm	33mm
	Total length		65mm	43mm
	Width (a)		20mm	4mm
Electrical characteristics	Capacitance		140nF	20nF
	Resonant frequency		103Hz	190Hz

PZBA00030 and PZBA00031 are both parallel connection types.

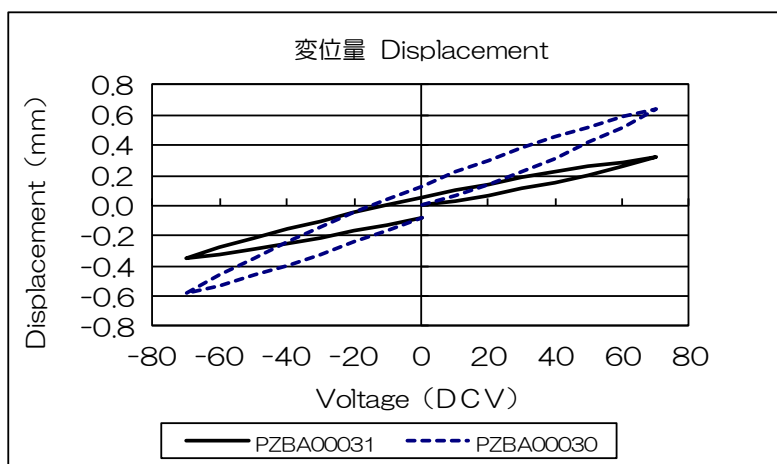
● Example of displacement characteristics (Electrical energy → mechanical energy)

The tip displacement (ΔL) and generated force (F) when voltage (V) is applied to the piezoelectric bimorph element are expressed by the following equations.

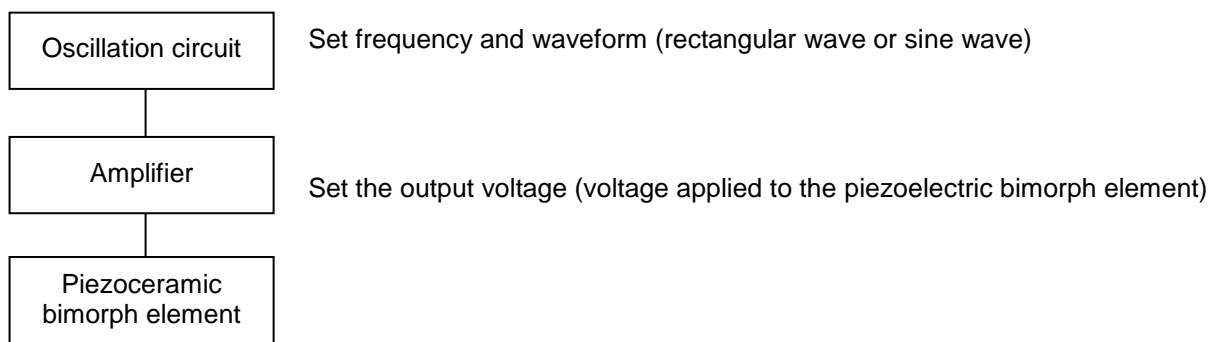
Formula	変位量 Displacement (mm)	$\Delta L = \frac{3}{4} \left(\frac{L}{t} \right)^2 \cdot d_{31} \cdot V$
	発生力 Displacement force (N)	$F = \frac{2t \cdot a}{L} \cdot \frac{d_{31}}{s_{11}^E} \cdot V$

L : Length of element (m) t : Thickness (m) V : Input voltage (DCV)
 d_{31} : Piezoelectric d constant (m/V) s_{11}^E : Elastic compliance (m^2/N)

Examples of standard models are shown. When DC70V is applied to the piezoelectric bimorph element, the tip of the element is displaced about 0.6mm with PZBA00030 and about 0.3mm with PZBA00031.



● Example of drive circuit (Block diagram)



● About RoHS

This product complies with the revised RoHS Directive (2011/65 / EU) and the revised Directive (EU) 2015/863 of Appendix Annex II.

However, lead is contained in the glass in the piezoelectric ceramic plate and Ag electrode (Exemption No. 7 (C)-I).