



Piezo Bender:

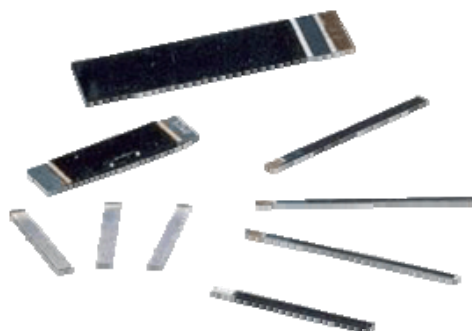
Table of Contents...

Bimorph Sensors and Actuators..... 2

Piezoceramic Sound Elements 3

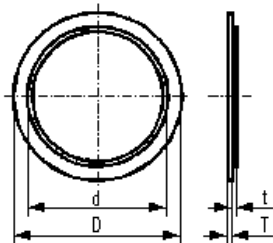
Bimorph Sensors and Actuators

Bimorph sensors/actuators are made from a sandwiched pair of piezoelectric elements which can expand and contract in length. When used as a sensor, bending causes one side to go into tension and the other into compression. Having a response frequency in the audible range permits the bimorph element to be used as a high sensitivity sound sensor. When used as an actuator, an electrical input results in a bending force which can be used as a switching element in a wide range of applications (Braille readers, micro-pumps, valve flappers, audio-phones, vibration switches etc.)

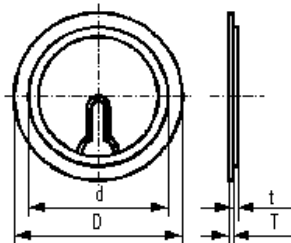


Model	Length	Width	Thickness	Free Length	Voltage	Deflection	Force
QDA60-20-0.6	60mm	20mm	0.60mm	53mm	150V _{DC}	≥ 2.6mm	≥ 0.40N
QDA60-10-0.6	60mm	10mm	0.60mm	53mm	150V _{DC}	≥ 2.6mm	≥ 0.20N
QDA49-2.3-0.75	49mm	2.3mm	0.75mm	38mm	200V _{DC}	≥ 1.5mm	≥ 0.10N
QDA45-10-0.6	45mm	10mm	0.60mm	38mm	150V _{DC}	≥ 1.3mm	≥ 0.20N
QDA45-6.5-0.6	45mm	6.5mm	0.60mm	38mm	150V _{DC}	≥ 1.3mm	≥ 0.15N
QDA40-20-0.6	40mm	20mm	0.60mm	33mm	150V _{DC}	≥ 1.1mm	≥ 0.50N
QDA40-10-0.6	40mm	10mm	0.60mm	33mm	150V _{DC}	≥ 1.1mm	≥ 0.18N
QDA35-2.5-0.6	35mm	2.5mm	0.60mm	28mm	150V _{DC}	≥ 0.7mm	≥ 0.11N

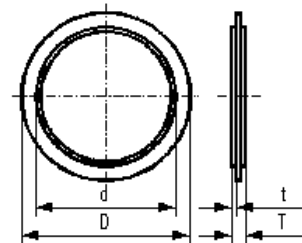
Piezoceramic Sound Elements



FT, FTBD - XX T,G,H,
X.X A



FT, FTBD - XX T,G,H,
X.X B



FTBS - XX T,G,H,
X.X A

With Full Electrode

Part Number	Resonant Freq. (kHz)	Resonant Impedance Ω (max)	Capacitance (PF @ 1kHz) $\pm 30\%$	Input Voltage (VP-P max)	Diameter (mm)		Thickness (mm)		Plate
					D ± 0.2	d ± 0.2	T ± 0.2	t ± 0.2	
FT-25T-4.8A1	4.8 ± 0.5	300	25,000	30	25	20	0.50	0.25	Brass
FT-27T-3.8A1	3.8 ± 0.5	300	25,000	30	27	20	0.45	0.22	Brass
FT-27T-3.4A1	3.4 ± 0.5	300	25,000	30	27	20	0.42	0.20	Brass
FT-35T-1.8A1	1.8 ± 0.5	300	40,000	30	35	25	0.33	0.15	Brass
FT-35T-2.6A1	2.6 ± 0.5	300	30,000	30	35	25	0.42	0.20	Brass
FT-35T-2.8A1	2.8 ± 0.5	300	20,000	30	35	25	0.48	0.23	Brass
FT-35G-3.0A1	3.0 ± 0.5	300	25,000	30	35	25	0.55	0.30	SUS
FT-43T-3.0A1	3.0 ± 0.5	300	30,000	30	43	25	0.42	0.20	Brass
FT-50T-2.6A1	2.6 ± 0.5	250	50,000	30	50	30	0.42	0.20	Brass
FT-50T-3.0A1	3.0 ± 0.5	300	30,000	30	50	25	0.42	0.20	Brass
FTBD-12T-9.5A1	9.5 ± 1.0	1,000	8,000	30	12	9	0.22	0.10	Brass
FTBD-13.5T-7.5A1	7.5 ± 1.0	1,000	9,000	30	13.5	10	0.22	0.10	Brass
FTBD-15T-6.0A1	6.0 ± 1.0	500	14,000	30	15	12	0.22	0.10	Brass
FTBD-20T-3.9A1	3.9 ± 0.5	300	25,000	30	20	15	0.22	0.10	Brass
FTBD-20G-4.0A1	4.0 ± 0.5	300	25,000	30	20	15	0.22	0.10	SUS
FTBD-27T-2.6A1	2.6 ± 0.3	300	40,000	30	27	20	0.22	0.10	Brass
FTBD-27G-2.7A1	2.7 ± 0.3	300	40,000	30	27	20	0.22	0.10	SUS
FTBD-31T-1.3A1	1.3 ± 0.3	300	47,000	30	31	20	0.22	0.10	Brass
FTBD-31T-1.6A1	1.6 ± 0.3	300	40,000	30	31	20	0.22	0.10	Brass
FTBD-31T-1.6A1	1.6 ± 0.3	300	90,000	30	31	20	0.22	0.10	Brass
FTBD-31T-1.8A1	1.8 ± 0.3	300	40,000	30	31	20	0.22	0.10	Brass
FTBD-31H-1.3A1	1.3 ± 0.3	300	47,000	30	31	20	0.22	0.10	Alloy
FTBD-31G-1.3A1	1.3 ± 0.3	300	47,000	30	31	25	0.22	0.10	SUS
FTBD-32T-1.4A1	1.4 ± 0.3	300	60,000	30	32	25	0.22	0.10	Brass
FTBD-35T-1.2A1	1.2 ± 0.3	300	60,000	30	35	25	0.22	0.10	Brass
FTBD-38T-1.1A1	1.1 ± 0.3	300	60,000	30	38	30	0.22	0.10	Brass
FTBD-41T-0.8A1	0.8 ± 0.3	300	100,000	30	41	25	0.22	0.10	Brass
FTBD-41T-1.0A1	1.0 ± 0.3	300	60,000	30	41	25	0.22	0.10	Brass
FTBD-41T-0.8A1	0.8 ± 0.3	300	37,000	30	41	25	0.22	0.10	Brass
FTBD-41G-0.8A1	0.8 ± 0.3	300	77,000	30	41	25	0.22	0.10	SUS
FTBD-41T-0.7A1	0.7 ± 0.3	300	77,000	30	41	25	0.22	0.10	Brass
FTBD-43T-0.8A1	0.8 ± 0.3	300	60,000	30	43	25	0.22	0.10	Brass

With Feedback Electrode

Part Number	Resonant Freq. (kHz)	Resonant Impedance Ω (max)	Capacitance (PF @ 1kHz)		Input Voltage (VP-P max)	Diameter (mm)		Thickness (mm)		Plate
			C ₁ ±30%	C ₂ ±30%		D±0.2	d±0.2	T±0.2	t±0.2	
FT-20T-6.6B1	6.6±0.5	500	10,000	1,400	30	20	15	0.42	0.20	Brass
FT-27T-4.2B1	4.2±0.5	500	14,000	1,700	30	27	20	0.52	0.25	Brass
FT-27T-4.6B1	4.6±0.5	200	16,000	1,900	30	27	20	0.48	0.23	Brass
FT-35T-2.6B1	2.6±0.5	300	26,000	2,600	30	35	25	0.42	0.20	Brass
FT-35T-2.8B1	2.8±0.5	300	30,000	4,000	30	35	25	0.38	0.20	Brass
FT-35G-2.8B1	2.8±0.5	300	28,000	2,800	30	35	25	0.53	0.30	SUS
FT-35G-3.0B1	3.0±0.5	300	23,000	2,900	30	35	25	0.50	0.25	SUS
FT-35G-2.8B1	2.8±0.5	300	45,000	6,000	30	35	25	0.55	0.32	SUS
FTBD-20T-3.9B1	3.9±0.5	300	20,000	2,200	30	20	15	0.22	0.10	Brass
FTBD-20G-4.0B1	4.0±0.5	300	20,000	22,000	30	20	15	0.22	0.10	SUS
FTBD-21H-3.8B1	3.8±0.5	300	20,000	2,500	30	21	15	0.27	0.15	Alloy
FTBD-22G-4.0B1	4.0±0.5	300	30,000	4,000	30	22	20	0.22	0.10	SUS
FTBD-27T-2.6B1	2.6±0.3	300	30,000	4,000	30	27	20	0.22	0.10	Brass

Super Thinner

Part Number	Resonant Freq. (kHz)	Resonant Impedance Ω (max)	Capacitance (PF @ 1kHz) ± 30%	Input Voltage (VP-P max)	Diameter (mm)		Thickness (mm)		Plate
					D±0.2	d±0.2	T±0.2	t±0.2	
FTBD-12T-4.5A1	4.5±1.0	1,000	12,000	30	12	9	0.12	0.05	Brass
FTBD-12T-4.5B1	4.5±1.0	1,000	9,000	30	12	9	0.12	0.05	Brass
FTBD-12H-4.6A1	4.6±1.0	1,000	12,000	30	12	9	0.12	0.05	Alloy
FTBD-12H-4.6B1	4.6±1.0	1,000	9,000	30	12	9	0.12	0.05	Alloy
FTBD-15H-2.6A1	2.6±0.5	1,000	75,000	30	15	12	0.12	0.05	Alloy
FTBD-20H-2.2A1	2.2±0.5	800	90,000	30	20	15	0.12	0.05	Alloy

Special-Shaped with Double Electrode

Part Number	Resonant Freq. (kHz)	Resonant Impedance Ω (max)	Capacitance (PF @ 1kHz) $\pm 30\%$	Input Voltage (VP-P max)	Diameter (mm)		Thickness (mm)		Plate
					D ± 0.2	d ± 0.2	T ± 0.2	t ± 0.2	
FTBD-15T-7.0A1	7.0 ± 0.5	700	10,000	30	15	9.6	0.22	0.10	Brass
FTBD-15T-7.0A1	7.0 ± 0.5	700	14,000	30	15	11	0.22	0.10	Brass
FTBS-21T-4.0A1	4.0 ± 0.5	100	80,000	30	21	20x2	0.38	0.10	Brass
FTBS-21.4T-3.0A1	3.0 ± 0.5	200	100,000	30	21.4	20x2	0.38	0.10	Brass
FTBS-23.5T-3.0A1	3.0 ± 0.5	150	100,000	30	23.5	22x2	0.38	0.10	Brass
FTBS-23.5T-3.5A1	3.5 ± 0.5	150	80,000	30	23.5	20x2	0.38	0.10	Brass
FTBS-27T-2.8A1	2.8 ± 0.5	150	120,000	30	27	25x2	0.38	0.10	Brass
FTBS-27T-3.0A1	3.0 ± 0.5	150	80,000	30	27	20x2	0.38	0.10	Brass
FTBS-31T-2.5A1	2.5 ± 0.5	100	120,000	30	31	25x2	0.38	0.10	Brass
FTBS-35T-3.0A1	3.0 ± 0.5	150	120,000	30	35	25x2	0.38	0.10	Brass
FTBS-33T-2.0A1	2.0 ± 0.5	150	120,000	30	33	25x2	0.38	0.10	Brass
FTBS-41T-2.5A1	2.5 ± 0.5	100	120,000	30	41	25x2	0.38	0.10	Brass
FTBS-41T-1.0A1	1.0 ± 0.5	100	200,000	30	41	30x2	0.38	0.10	Brass