

Piezoceramic Masses

Data Sheet

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We have developed Piezoceramics from the basic research to production-ready materials.
Here are some examples of our piezoceramic masses.

Characteristic Value	Masses of ceramic										
	Symbol	Unit	M420	M524.5	M1100	M202	M455	M1599	M1224	M1334	M1876
Electrical Data											
Relative dielectric constant ($\epsilon_0 = 8.85 \text{ pF/m}$)	$\epsilon_r^T_{11}$ $\epsilon_r^T_{33}$		1600	---	4750	960	---	---	700	---	6500
Dielectric loss factor	$\tan \delta$	10^{-3}	20	19	25	7	5	7	30	7	25
Coercive field strength	E_c	10^3 V/m	900	1200	570	2400	1280	---	730	615	390
Conductivity	σ	$10^{-12} \text{ 1/}\Omega\text{m}$	<1	<1	<1	<1	<1	<1	<1	<1	<1
Elektromechanical Data											
Piezoelectric coupling coefficient	k_p k_{31} k_t k_{33} k_{15}		0.60 0.34 0.48 0.69 0.66	0.64 0.36 0.44 0.69 0.72	0.70 0.42 0.50 0.71 0.67	0.50 0.28 0.45 0.60 0.57	0.57 0.31 0.47 0.32 ---	0.07 0.03 0.50 0.24 ---	0.45 0.24 0.55 0.45 0.64	0.64 0.33 0.47 0.67 0.67	0.67 0.38 0.48 0.75 0.76
Piezoelectric charge constant	d_{31} d_{33} d_{15}	10^{-12} C/N = 10^{-12} m/V	-160 355 525	-230 430 690	-315 640 895	-90 205 295	-120 125 ---	-3.80 31 ---	-58 115 310	-230 500 740	-385 860 1160
Piezoelectric voltage constant	g_{31} g_{33} g_{15}	$10^{-3} \text{ (V}\cdot\text{m)/N}$	-11.00 25.00 37.00	-9.00 17.00 30.00	-7.90 16.00 21.00	-10.00 27.00 35.00	-9.70 9.90 ---	-1.70 14.10 ---	-12.00 23.80 50.70	-7.00 15.50 25.00	-5.90 13.30 20.00
Mechanical Data											
Compliance	s^E_{11} s^E_{12} s^E_{13} s^E_{33} s^E_{55}	$10^{-12} \text{ m}^2/\text{N}$	15.40 -5.70 -6.50 18.70 45.00	14.90 -4.80 -6.00 17.20 45.00	14.20 -3.70 -6.50 20.60 43.00	11.80 -4.50 ---	12.70 -5.10 -6.70 13.80 31.10	7.40 -2.70 -4.20 12.50 ---	12.00 -5.50 -3.70 13.50 39.50	15.50 -6.10 -6.50 17.50 44.50	15.80 -5.60 -8.00 20.50 57.80
Frequency constant (Sound velocity)	N^E_p N^E_1 N_t N^D_3 N^D_5	m/s	2000 1460 1940 1830 1140	2030 1460 2120 1870 1200	1940 1470 2070 1870 1140	2290 1660 ---	2260 1595 2100 1700 ---	2900 2200 2200 2250 ---	2280 1640 1930 1740 1190	2050 1440 2050 1800 1130	1970 1400 2030 1860 1130
Mechanical quality factor	Q		100	80	50	800	890	1200	135	220	45
Density	ρ	10^3 kg/m^3	7.60	7.90	8.10	7.70	7.70	6.90	7.60	7.90	8.00
Depolarizing pressure (5%depolarization)			30	70	30	120	120	---	---	---	---
Compressive strength		10^6 N/m^2	>600	>600	>600	>600	>600	---	---	---	---
Tensile strength			~80	~80	~80	~80	~80	---	---	---	---
Thermal Behavior											
Temperature coefficient of: rel. diel. constant Frequency constant	TK^T_{33} TKN_p	10^{-6} 1/K	3500 -100	2500 150	6000 400	3000 100	2400 250	3500 ---	4800 -170	2500 400	6700 ---
Thermal Data											
Curie temperature	ϑ_c	$^{\circ}\text{C}$	320	290	177	330	300	245	305	200	121
Pyroelectric coefficient	p	$10^{-6} \text{ C/m}^2\text{K}$	420	---	---	430	---	---	---	---	---
Specific heat	c	Ws/kgK	380	380	380	380	380	380	380	380	380
Thermal conductivity	λ	W/K · m	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Thermal expansion	α^E	10^{-6} 1/K	7	7	7	7	7	7	7	7	7

All values are approximate and no guarantee of specific technical properties.
Changes in the course of technical progress are possible without notice.