

PZT5H Materials (Soft PZT)

Technical Data (Typical Values)

Property	Symbol	Units	Material Type			
			3221HD	3203STD	3203HD	3241HD
Dielectric Constant (1kHz)	K^T_3		3450	3250	3800	4100
Dielectric Loss Factor (1kHz)	$\tan\delta_e$		0.02	0.02	0.02	0.02
Dielectric Constant (1kHz)	K^T_1		3550	2800	3200	3420
Clamped Dielectric Constant	K^S_3		1000	775	1200	1300
Density	ρ	g/cm ³	7.87	7.7	7.87	7.88
Curie Point	T_c	°C	242	225	225	223
Mechanical Quality Factor	Q_m		50	50	50	50
Coercive Field (Measured < 1 Hz)	E_c	kV/cm	8.8	10.6	8.0	9.0
Remanent Polarization	P_r	μCoul/cm ²	38.5	37.2	39.0	38.5
Coupling Coefficients	k_p		0.74	0.69	0.75	
	k_{33}		0.78	0.70	0.78	0.77
	k_{31}		0.46	0.41	0.43	0.44
	k_t		0.54	0.56	0.55	0.55
	k_{15}		0.78	0.72	0.78	0.75
Piezoelectric Charge (Displacement Coefficient)	d_{31}	Coul/N x 10 ⁻¹²	-300	-270	-320	-325
	d_{33}	(or)	600	530	650	640
	d_{15}	m/V x 10 ⁻¹²	1000	790	1000	880
Piezoelectric Voltage Coefficient (Voltage Coefficient)	g_{31}	V·m/N x 10 ⁻³	-9.8	-9.4	-9.5	-8.9
	g_{33}		19.7	18.4	19.0	17.6
	g_{15}		31.8	31.9	35.3	29.1
Frequency Constants	N_r		1830	1920		
	N_{tr}	Hz·m	2020	1870	2000	2000
	N_{ta}		2340	2220	2350	2340
	N_{31}			1400		
Thermal Expansion (Perpendicular to poling)	α	ppm/°C			3.5	
Specific Heat	C_p	J/kg·°C			420	
		J/mol·°C			138	
Thermal Conductivity		W/cm·°C			1.9-2.3	
with Au Electrodes	K_d	W/m·°K			1.2	
		W/m·°K			1.45	
Poisson's Ratio	ν			0.31	0.31	
Elastic Constants Short Circuit	S^E_{11}		16.0	16.7	16.6	15.6
	S^E_{33}		19.8	19.7	21.0	19.2
	S^E_{12}	x 10 ⁻¹² m ² /N	-4.2	-5.6	-4.2	-4.7
	S^E_{13}		-7.2	-7.6	-8.2	-7.7
	S^E_{55}		54.0	48.5	52.4	45.9
Elastic Constants Open Circuit	S^D_{11}		12.6	13.9	13.5	12.5
	S^D_{33}	x 10 ⁻¹² m ² /N	7.8	10.0	8.2	7.8
	S^D_{55}		21.1	23.4	20.5	20.1
Elastic Constants Short Circuit	Y^E_{11}	x 10 ¹⁰ N/m ²	6.2	5.9	6.0	6.4
	Y^E_{33}		5.1	5.1	4.8	5.2
Elastic Constants Open Circuit	Y^D_{11}	x 10 ¹⁰ N/m ²	7.6	7.2	7.5	8.0
	Y^D_{33}		12.8	10.0	13.2	12.8



PEP Products

PZT5A & 5H Materials Technical Data (Typical Values)