

ELECTROMECHANICAL PROPERTIES												
		100	402	406	409	502	532	552	700	802	804	809
Physical Properties	Density ($\times 10^3 \text{ Kg/m}^3$)	6.0	7.6	7.7	7.6	7.7	7.6	7.6	7.6	7.6	7.7	7.6
	Curie Temperature ($^{\circ}\text{C}$)	450	350	300	320	350	220	200	350	350	320	310
	Mechanical Q_M (-)	20	500	600	500	80	75	75	600	900	900	1000
	Maximum Operating Temperature ($^{\circ}\text{C}$)	350	150	150	150	150	120	120	150	150	150	150
Electrical Properties @ 25 $^{\circ}\text{C}$	Dielectric Constant @ 1 KHz (-)	300	1250	1500	1350	2000	2700	3400	425	1000	1050	1000
	Dissipation Factor @ 1 KHz (%)	1.5	0.5	0.5	0.4	1.5	2.0	2.2	1.5	0.4	0.4	0.4
	Planar Coupling Factor k_p (-)	0.10	0.52	0.55	0.60	0.60	0.63	0.63	0.51	0.51	0.47	0.50
	Transverse Coupling factor k_{31} (-)	-	0.33	0.35	0.33	0.34	0.36	0.36	0.30	0.30	0.30	0.30
	Longitudinal Coupling Factor k_{33} (-)	0.35	0.67	0.70	0.68	0.69	0.70	0.71	0.66	0.61	0.60	0.62
	Shear Coupling Factor k_{15} (-)	-	0.68	0.67	0.70	0.69	0.67	0.67	0.67	0.54	0.55	0.55
	Transverse Charge Coefficient d_{31} ($\times 10^{-12} \text{ m/V}$)	-	-120	-150	-109	-175	-230	-270	-60	-100	-100	-95
	Longitudinal Charge Coefficient d_{33} ($\times 10^{-12} \text{ m/V}$)	85	275	320	275	425	490	550	150	220	240	215
	Shear Charge Coefficient d_{15} ($\times 10^{-12} \text{ m/V}$)	-	480	500	450	580	670	720	362	320	320	330
	Transverse Voltage Coefficient g_{31} ($\times 10^{-3} \text{ V m/N}$)	-	-10.8	-11.3	-9.1	-11.0	-9.6	-9.0	-16.0	-11.3	-10.8	-10.7
	Longitudinal Voltage Coefficient g_{33} ($\times 10^{-3} \text{ V m/N}$)	32.0	24.9	24.1	23.0	24.0	20.5	18.3	39.9	24.9	25.8	24.3
	Shear Voltage Coefficient g_{15} ($\times 10^{-3} \text{ V m/N}$)	-	43.4	37.7	35.0	36.4	28.0	23.9	52.0	36.2	34.4	28.0
Mechanical Properties @ 25 $^{\circ}\text{C}$	Young's Modulus ($\times 10^{10} \text{ N/m}^2$)	-	7.6	7.2	7.6	7.1	6.3	6.0	8.6	7.2	7.3	9.0
	Poisson's Ratio (-)	-	0.31	0.22	0.30	0.31	0.31	0.31	0.25	0.31	0.25	0.30
	Elastic Compliance s_{11}^E ($\times 10^{-12} \text{ m}^2/\text{n}$)	-	11.5	14.1	11.7	15.4	15.9	15.9	10.8	10.4	10.6	10.8
	Elastic Compliance s_{33}^E ($\times 10^{-12} \text{ m}^2/\text{n}$)	-	15.0	16.1	17.3	18.4	18.0	20.2	13.9	13.5	13.2	15.0
Frequency Constants @ 25 $^{\circ}\text{C}$	Planar Frequency Constant N_p (Hz-m [KHz-in])	-	2159 [85.0]	2180 [85.8]	2159 [85.0]	2057 [81.0]	1943 [76.5]	1981 [78.0]	2366 [93.1]	2360 [92.9]	2300 [90.6]	2360 [92.9]
	Transverse Frequency Constant N_t (Hz-m [KHz-in])	-	1689 [66.5]	1610 [63.4]	1689 [66.5]	1359 [53.5]	1321 [52.0]	1359 [53.5]	1750 [68.9]	1750 [68.9]	1720 [67.7]	1750 [68.9]
	Length Frequency Constant N_L (Hz-m [KHz-in])	-	2060 [81.1]	2050 [80.7]	2060 [81.1]	1857 [73.1]	1650 [65.0]	1650 [65.0]	2040 [80.3]	2000 [78.7]	2000 [78.7]	2000 [78.7]
	Thickness Frequency Constant N_t (Hz-m [KHz-in])	1473 (58.0)	2032 [80.0]	2007 [79.0]	2032 [80.0]	1980 [78.0]	1727 [68.0]	1753 [69.0]	2100 [82.7]	2100 [82.7]	2050 [80.7]	2100 [82.7]
Shear Frequency Constant N_s (Hz-m [KHz-in])	-	1325 [52.2]	1295 [51.0]	1325 [52.2]	1204 [47.4]	1058 [41.7]	1100 [43.3]	1470 [57.9]	1460 [57.5]	1425 [56.1]	1460 [57.5]	
Aging Rates	Dielectric Constant (% per time decade)	0.0	-3.0	-4.0	-3.0	-0.5	-0.5	-0.5	+0.1	-3.0	-1.5	-3.0
	Resonant Frequency (% per time decade)	0.0	0.8	1.0	0.8	0.1	0.1	0.1	0.8	0.8	1.1	0.8
	Coupling Constant (% per time decade)	0.0	-2.0	-2.3	-2.0	-1.0	-1.0	-1.0	0.0	-2.0	-1.5	-2.0
Electric Field Dependence @ 200KV/m [5 V/mill] rms and 25 $^{\circ}\text{C}$	Dielectric Constant (% increase)	-	8.0	10.0	8.0	30.0	30.0	30.0	8.0	2.0	2.0	2.0
	Dissipation Factor (% increase)	-	1.1	1.0	0.5	10.0	10.0	10.0	0.5	0.5	0.5	0.5
Maximum Operating Field	AC (KV/m [V/mill]) rms	-	350 [9]	350 [9]	350 [9]	300 [8]	200 [5]	200 [5]	350 [9]	400 [10]	400 [10]	400 [10]
	DC - forward (KV/m [V/mill])	-	700 [18]	700 [18]	700 [18]	600 [15]	400 [10]	400 [10]	700 [18]	800 [20]	800 [20]	800 [20]
	DC - reverse (KV/m [V/mill])	-	350 [9]	350 [9]	350 [9]	300 [8]	200 [5]	200 [5]	350 [9]	400 [10]	400 [10]	400 [10]