

Properties of TRS Soft Piezoelectrics

Dielectric & Elastic Properties $\pm 20\%$; Piezoelectric Properties $\pm 10\%$

Property	TRSHK1
	HD
K_{33}^T	6690
K_{33}^s	2760
K_{11}^T	5260
K_{33}^s	2755
Loss	0.025
T _c (°C)	150
Density (g/cm ³)	8.0
P _{saturation} (μC/cm ²)	35
E _{coercive} (kV/cm)	5.0
Grain Size (μm)	5
Q _m	120
d ₃₃ (pC/N)	800
d ₃₃ from Meter Long Rods	---
Thin Plates	---
d ₃₁ (pC/N)	-390
d ₁₅ (pC/N)	1000
g ₃₃ (mm-V/N)	13.5
g ₁₃ (mm-V/N)	-6.6
g ₁₅ (mm-V/N)	21.5
k ₃₃	0.75
k ₃₁	0.43
k ₁₅	0.69
k _p	0.69
k _t	0.46
N ₃₃ (Hz-m)	1360
N ₃₁ (Hz-m)	1520
N _p (Hz-m)	1970
N _t (Hz-m)	2050

Elastic Property	TRSHK1 HD
s_{11}^E (m2/N)	1.39e-11
s_{33}^E (m2/N)	1.92e-11
s_{12}^E (m2/N)	-0.36e-11
s_{13}^E (m2/N)	-0.78e-11
s_{55}^E (m2/N)	4.52e-11
s_{66}^E (m2/N)	3.50e-11
σ_{12}^E	0.26
σ_{13}^E	0.40
Y_{11}^E (GPa)	72
Y_{33}^E (GPa)	52
s_{11}^D (m2/N)	1.13e-11
s_{33}^D (m2/N)	0.84e-11
s_{12}^D (m2/N)	-0.62e-11
s_{13}^D (m2/N)	-0.25e-11
s_{55}^D (m2/N)	2.20e-11
s_{66}^D (m2/N)	3.5e-11
c_{11}^E (GPa)	157
c_{33}^E (GPa)	137
c_{12}^E (GPa)	100
c_{13}^E (GPa)	105
c_{55}^E (GPa)	22
c_{66}^E (GPa)	28
c_{11}^D (GPa)	167
c_{33}^D (GPa)	168
c_{12}^D (GPa)	110
c_{13}^D (GPa)	82
c_{55}^D (GPa)	45
c_{66}^D (GPa)	28