

## LF52 (Lead-Free)

### KNN Piezoceramic Material

#### Description

LF52 is a lead-free piezoceramic formulation based on the potassium sodium niobate system (KNN). It offers low dissipation and is proposed as an alternative to very hard PZT ceramics for customers who are looking to replace lead-containing piezoceramics in their applications.

#### Key Features and Benefits

- Lead-Free Product
- High Mechanical Quality Factor
- High Curie Temperature

#### Ideal Applications

- High-Power Transmitters
- Therapeutics (HIFU, Surgery, Dental)
- Ultrasonic Cleaning, Cutting and Welding

Property	Symbol	Unit	Value
Relative Free Dielectric Constant (1 kHz)	$K_{33}^{\sigma}$	-	700
Dielectric Dissipation Factor (1 kHz)	$\tan\delta$	-	0.004
Curie Temperature	$T_C$	°C	340
Density	$\rho$	g/cm <sup>3</sup>	4.50
Mechanical Quality Factor	$Q_m$	-	910
Coupling Coefficients	$k_p$	-	0.40
	$k_t$	-	0.38
	$k_{31}$	-	0.24
	$k_{33}$	-	0.46
Piezoelectric Charge Coefficient (Displacement Coefficient)	$d_{31}$		-55
	$d_{33}$	pC/N	110
	$d_{15}$		300
Frequency Constants	$N_p$		3400
	$N_t$	Hz·m	2900
	$N_{31}$		2500
	$N_{33}$		2500