PVDF-TrFE Piezo is fragile. Handle with Extra Care to avoid break!!!

P(VDF-TrFE) Piezoelectric & Pyroelectric Film

Preliminary Datasheet http://piezopvdf.com/piezo-pvdf-trfe-film/

δ+ PolyK δ-

PolyK's piezo- & pyro P(VDF-TrFE) copolymer sheets are available in a range of thicknesses and sheet sizes. The film is manufactured using state of the art casting and extrusion techniques followed by thermal and electrical processing and the testing appropriate for your application.

The film sheets are offered with or without electrodes. Sputtered Au, Cr, Ni, and Cu are standard options (50-200 nm). Patterned electrodes are available in both sputtered metal (shadow mask) and screen printed thick film silver ink. Typical sheet size from 100 mm x 100 mm, up to 250 mm x 250 mm. Rolls of 500 mm wide piezo film can be produced upon request.

Typical Thickness in Stock: 3 µm, 5/9/12/15/20/25/30/40 /50/60/80/ 100/120/250/500 µm, 1 mm, 2 mm.

Application Note:

Estimation of resonance frequency:

$$f_r = \frac{v}{2t}$$

v: speed of sound in piezo film (~2250 m/s for PVDF-TrFE copolymers), t: film thickness

For 40 µm thick PVDF-TrFE copolymer

$$f_r = \frac{v}{2t} = 28.1\ MHz$$

Typical Applications of Piezo PVDF-TrFE Copolymer:

- **High Coupling Factor & Ultrathin/Flexible**: PVDF-TrFE copolymer piezo film has low dielectric constant K ~8.0, while K of PVDF is higher than 12.5. Therefore, for the same d_{33} and same stress, the voltage output signal (g_{33}) of PVDF-TrFE piezo sensor is significantly higher than PVDF sensor. In ultrasound applications when the piezo film is also used to generate acoustic wave, for the same power input, the output acoustic wave of copolymer is higher than PVDF (reversely proportional to K). In such applications also use the piezo film as a sensor, the performance of copolymer can be 100% better than PVDF.
- **Underwater Hydrophone**: when pressure/force applied on the entire piezo element, effective hydrodynamic piezo constant $d_H = d_{33} - d_{31} - d_{32}$. PVDF-TrFE has much lower d31 than PVDF so the copolymer will perform significantly better than PVDF in such applications with their high d_H and g_H.
- **High Temperature 125 °C**: Piezo performance of PVDF will decrease significantly at 85-125 °C (50%). PVDF-TrFE piezo film with certain composition can survive 125 °C with minimal decay in piezo d_{33}. We offer 125 °C piezo copolymer film to customers whose sensor processes request high temperature of 125 °C.
- **Ultrasound Transducers**, ● Underwater Hydrophone, ● **Fingerprint** Transducer [smartphone, tablet], ● Pyroelectric Sensor, ● Ultrathin piezo/pyro sensor & transducer

PolyK also produces piezo PVDF film in large rolls (400 mm wide) >1000 m at low cost.

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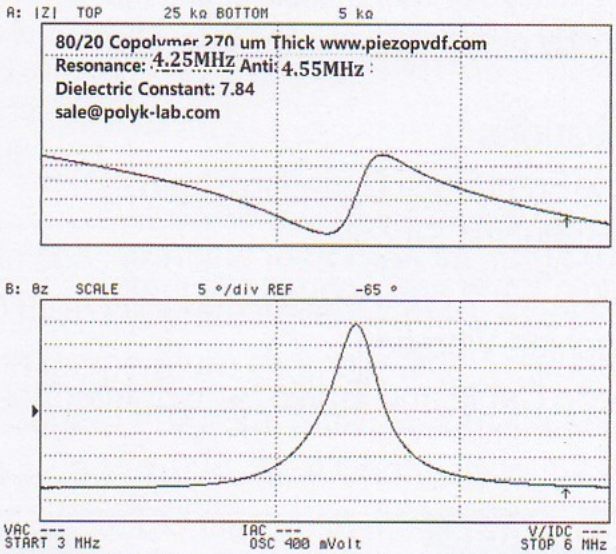
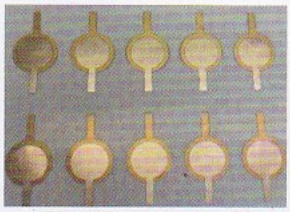
Typical Performance

Parameter	Units	TYP value
Thickness	µm	0.2 – 2000
*k_t	-	>25%
*Q_m	-	<15
*v_3	m/s	2,250 ± 10%
ε_r' (1kHz)	-	7.5 – 8.5
ε_r'' (1kHz)	%	1.0 -1.5
P_r	mC/m²	85 - 95
E_c	V/m	45-50
d_{33} (110Hz)	pC/N	>25
$d_{31/2}$ (110Hz)	pC/N	8.0
d_H	pC/N	>20
g_{33}	V-m/N	>360
p_q		~40 µC/°K- m²
Size	cm	25 x 25 max
Young's Modulus	GPa	>2.0
Mass Density	g/cm³	~1.8
Speed of Sound	m/s	~2250
Max Temp.	°C	125
Thermal Shrinkage		Almost no shrinkage even at 125 °C

*measured at thickness resonance. @~20°C





Piezo Transducer with Au electrode

1 mm thick hydrophone chicklet gum

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PRELIMINARY DATA SHEET

PARAMETRIC INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE

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