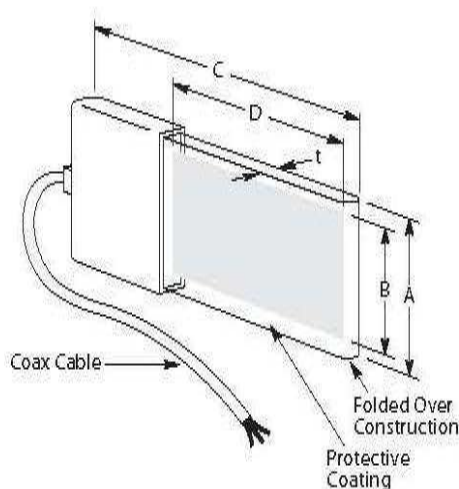


## SDT SHIELDED PIEZO SENSORS



### DIMENSIONS



DIMENSION in INCHES (mm)

A Film	B Electrode	C Film	D Electrode	t ( $\mu\text{m}$ )	Cap (nF)
.640 (16)	.520 (13)	1.64 (41)	1.18 (30)	75	2.78

### SPECIFICATIONS

- ◆ Shielded coaxial cable lead
- ◆ Shielded sensor
- ◆ Low noise
- ◆ Flexible
- ◆ Multi-purpose
- ◆ Piezo film Technology

The “S” in SDT stands for “Shielded Sensor.” SDT1 Piezo Film Sensors consist of a rectangular element of Piezo film together with a molded plastic housing and 18” of coaxial cable. The film element, screen printed with silver ink, is folded over on itself, providing self-shielding of the transducer area. This is important in applications in high EMI environments.

The SDT1 can be adhered to other surfaces using double sided adhesives, epoxy or cyanoacrylate (super glue). Care should be taken if the sensor is to be removed, as the double-side adhesive can peel the metallization from the film.

When adhered to a surface in this manner, the SDT1 is an excellent contact microphone or dynamic strain gage. The output from the SDT1 can input directly to an oscilloscope (10 M $\Omega$  preferred input impedance) or a signal analyzer.

### FEATURES

- ◆ Shielded piezo film sensor
- ◆ High longitudinal strain coefficient
- ◆ Integral coax cable
- ◆ Wide frequency response

### APPLICATIONS

- ◆ Machine monitoring
- ◆ Acoustic emission detection
- ◆ Contact microphone
- ◆ Vibration / impact sensing
- ◆ Detecting machine tool chatter
- ◆ Acoustic pickup
- ◆ Vibration analysis for equipment and product design

## INSTRUCTIONS

Using a double-sided adhesive tape, adhere the sensing element to the vibrating object. The adhesive tape should have a thin and non-foam type carrier. A double-sealed tape, such as 3M® 444, works well.

Clean off the surface of the object upon which the sensor is to be placed, removing any foreign particles such as dirt, dust, grease, etc. Then apply the adhesive tape to the clean surface. Next, adhere the SDT1-028K to the adhesive by attaching the end of the sensor element first and smoothing out the element (avoiding any creases or air bubbles) towards the lead attach.

The adhesive must continue out and hold down the plastic lead attachment housing as well, to prevent errant results. Similarly, it is recommended that the wire be taped down in some instances (this can be done with masking tape in a designated position).

If the sensor is to be used in an environment above 45°C [114°F], then a different adhesive system is recommended since the double sided tape can become soft and affect the sensor's ability to detect vibration. Cyanoacrylate or a five-minute epoxy are useable, but they are permanent.

The leads can be connected directly into an oscilloscope or frequency analyzer with preferably, a 10 MΩ impedance.

## SENSOR OPERATION

Operating in a reciprocal fashion, changes in length generate a corresponding charge and hence, voltage to appear on the electrodes of the film. The transducer behaves like an “active” capacitor, consequently, loading of the signal by the input impedance of the measuring device must be considered. Due to the thinness of the films, the associated capacitance can be sufficient to give adequate low frequency response into standard 1 MΩ loads, but use of an X10 probe will extend the low frequency range by a decade. For extremely small devices and low frequency vibration levels, some buffering may be desirable. For the majority of analysis work, this is unnecessary and the film can feed directly to the instrument.

The low mass contributed by the transducer is of major importance, and its non-resonant behavior. Frequency response is inherently flat into the MHz region with only the R-C roll off at low frequencies distorting the profile. Since it is responding to strain rather than acceleration, high signal levels may be generated by low frequency flexing, so a distinction must be made between the frequency response of the film for changes in its primary parameter (i.e., strain) and its relative behavior compared with, say piezoelectric accelerometers.

The response of the sensor to strain enforces its likeness to a strain gauge, but with much higher output. The sensor performs well at low frequencies where displacement is large and acceleration low, as well as at high frequencies where displacement is small and acceleration high. The sensor has a flat response over a very wide frequency range, with resonant frequency points above 10 MHz.

**SDT1-028K Low Frequency Response**

