

## AE0505D16 SPECIFICATION SHEET

### CAUTION:

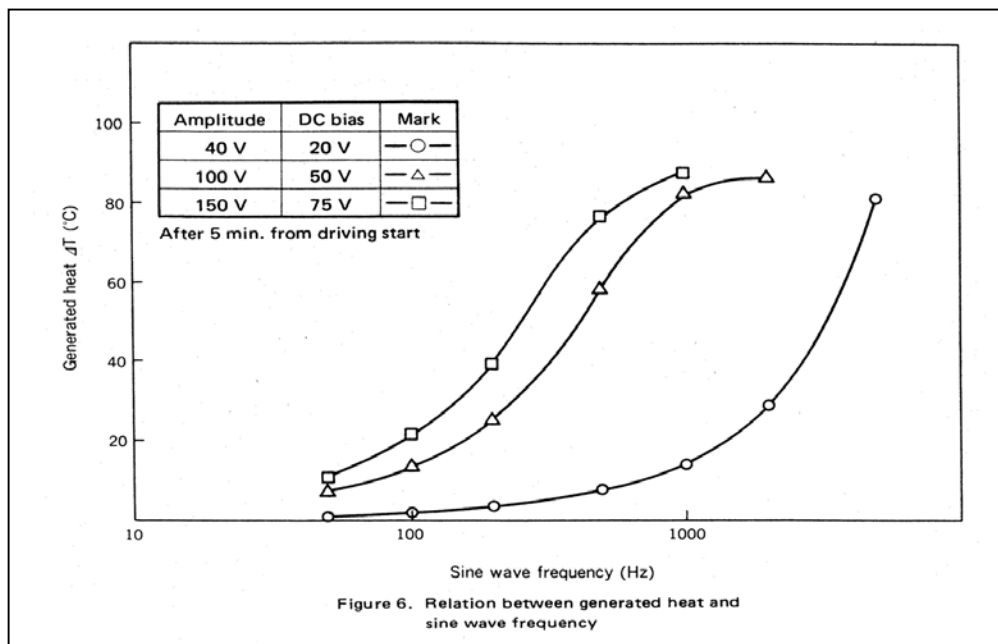
**POLARITY MATTERS! RED LEAD ATTACHES TO +V,  
WHITE LEAD ATTACHES TO GROUND (GND)!**

The AE0505D16 piezoelectric stack sold by Thorlabs is manufactured by NEC Corporation of Japan. These stacks consist of many piezoelectric ceramic layers that are assembled in series mechanically and in parallel electrically. To operate connect the red lead of the device to the positive (+) terminal of the voltage source. Do not reverse bias.

#### I. SPECIFICATIONS

Displacement at Maximum Drive Voltage:	$17.4\mu\text{m} \pm 2.0$
Maximum Drive Voltage (short term):	150 volts-see aging curve (apply positive voltage to red lead, reverse bias will destroy this device)
Displacement at Recommended Drive Voltage:	$11.6\mu\text{m} \pm 2.0$
Recommended Drive Voltage:	100 volts
Operating Temperature Range:	-25 to +85°C
Capacitance:	$1.40 \pm 0.28\mu\text{F}$
Clamping Force:	850N
Tensile Strength:	100N
Resonant Frequency:	69KHz (no mechanical load)
Young's Modulus:	$4.4 \times 10^{10} \text{ N/m}^2$
Recommended Preload:	<425 N

AC or Pulsed operation causes the device to generate heat (see plot A).



## II. MEAN TIME FAILURE

Under the most severe operating conditions (150VDC, 40°C, 90% Relative Humidity) the mean time to failure is 500 hours. When the piezoelectric is operated at the recommended operating conditions (100VDC, 25°C, 60% RH) the mean time failure is increased to 24,500 hours.

The following formulas predict the mean time to failure in hours for specific operating parameters that are below the maximum allowed.

$$\text{Mean time failure} = 500 \times (150/V)^{3.2} \times (90/RH)^{4.9} \times 1.5^{(40-T)/10}$$

V: drive voltage (VDC)    HR: relative humidity (for 60%HR=60)

T: ambient temperature (°C)

## III. CAUTIONS

Connect red wire to (+) drive voltage, do not reverse bias.

Do not exceed 150 volts, it will decrease the life expectancy of the device and in extreme cases mechanical failure will result.

Use room temperature epoxy adhesive for mechanical assembly of device.

Do not store devices above 100°C.

Do not immerse in liquid.

Do not use the device around combustible gases or liquids.

Store devices in a dry place (less than 40% RH).

Do not clean with organic solvents.