

AEO505D08F
SPECIFICATION SHEET

CAUTION:

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

The AE0505D08F 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: 9.1um +/- 1.5
 Maximum Drive Voltage (short term): 150 volts (apply positive voltage to red lead, reverse bias will destroy this device)

Displacement at Recommended Drive Voltage: 6.1um +/- 1.5
 Recommended Drive Voltage: 100 volts

Operating Temperature Range: -25 to +85°C
 Capacitance: 0.75µF +/- 20%
 Clamping Force: 850 N
 Tensile Strength: 85 N
 Resonant Frequency: 138 KHz (no mechanical load)
 Young's Modulus: 4.4 x 10¹⁰ N/m²
 Recommended Preload: <425 N

AC or Pulsed operation causes the device to generate heat (see Figure 1).

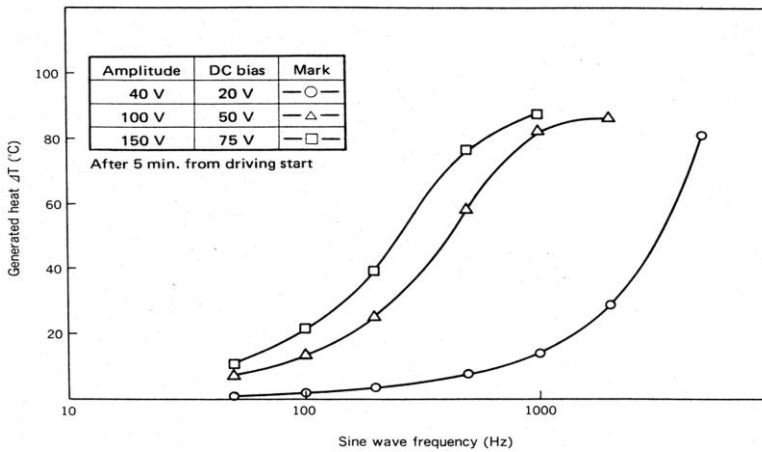


Figure 1- Sine wave Frequency vs. Generated Heat

II. MEAN TIME FAILURE

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

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

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

V: drive voltage HR: relative humidity (for 60% HR=60)
T: Ambient Temperature

III. CAUTIONS

Connect red wires 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 about 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.

IV. ROHS Compliance Statement:

The AE0505D08F Piezoelectric stack is considered "exempt" from ROHS compliance as of 7/1/06. While all connections to the stack are made with lead-free materials, the stack itself contains lead.

