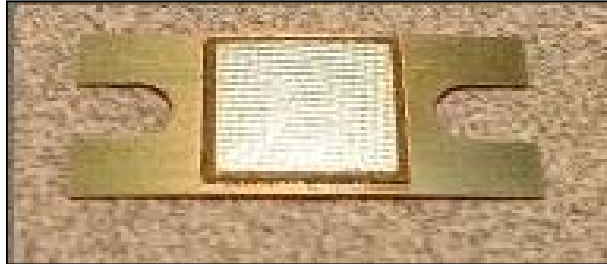


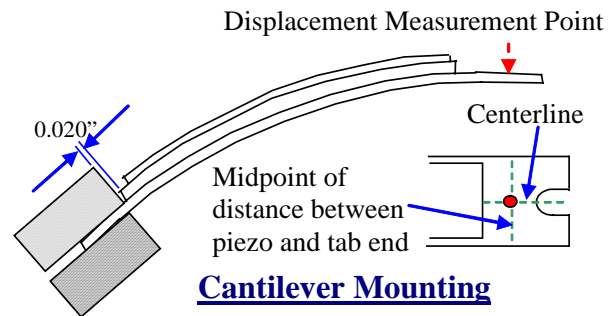
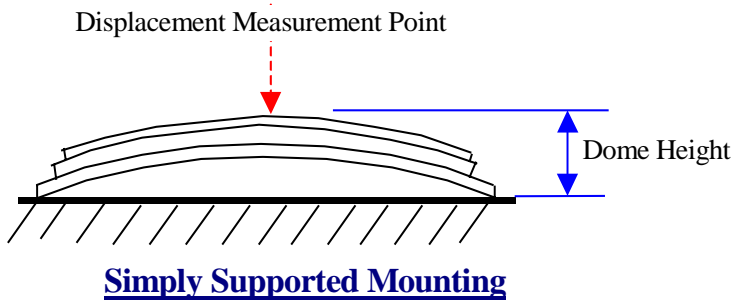


THUNDER® TH-9R Data Sheet



TH-9R Dimensions & Physical Properties	
Mass	0.0022 lbs
	1.0 g
Footprint (domed) ¹	0.870" x 0.415"
	22.10 mm x 10.54 mm
Footprint (flat) ²	0.875" x 0.415"
	22.23 mm x 10.54 mm
Piezo Thickness	0.008"
	0.20 mm
Total Thickness	0.017"
	0.43 mm
Dome Height ³	0.025"
	0.61 mm

TH-9R Specifications: Electrical and Mechanical Properties						
Capacitance	Max. Voltage ⁴			Typical Maximum Displacement		Block Force
	+	-	Peak to Peak (Zero DC offset)	Simply Supported	Cantilevered	
7 nF	480 V	240 V	+/- 240 V	0.004"	0.005"	7 lbf
				0.10 mm	0.13 mm	31 N



¹ **Footprint (domed):** Thunder dimensions after manufacturing and attaining domed shape. These dimensions are always slightly less than the dimensions of the stainless steel substrate before manufacturing.

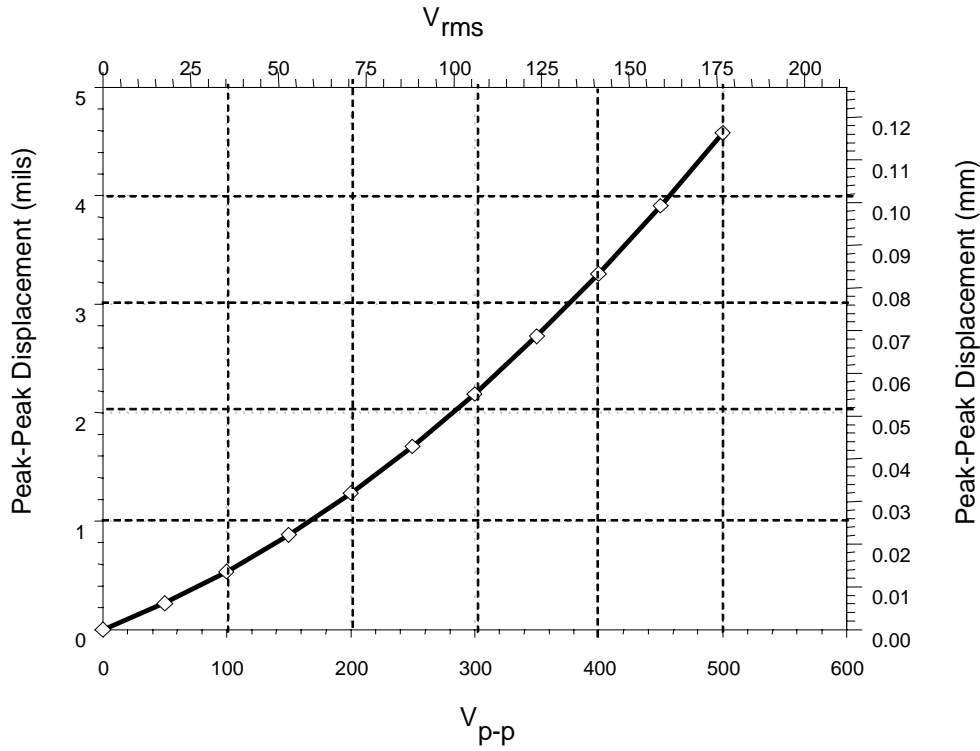
² **Footprint (flat):** Dimensions of the stainless steel substrate before the manufacturing process.

³ **Dome Height:** Distance between the flat surface on which the Thunder rests in simply supported condition and the highest point on the Thunder.

⁴ **Max. Voltage:** The maximum voltage that can be applied to the Thunder is governed by the thickness of the piezoceramic layer. For the grade and type of piezoceramic used in Thunder manufacturing, the maximum applicable electric field is +60V/mils (2362 V/mm) and -30V/mils (1181 V/mm). So the maximum positive and negative voltage applicable is the product of the piezo thickness and the corresponding electric field. Consequently, the amplitude of the periodic voltage (without DC offset) that the Thunder can be subjected to is limited by the maximum negative voltage.

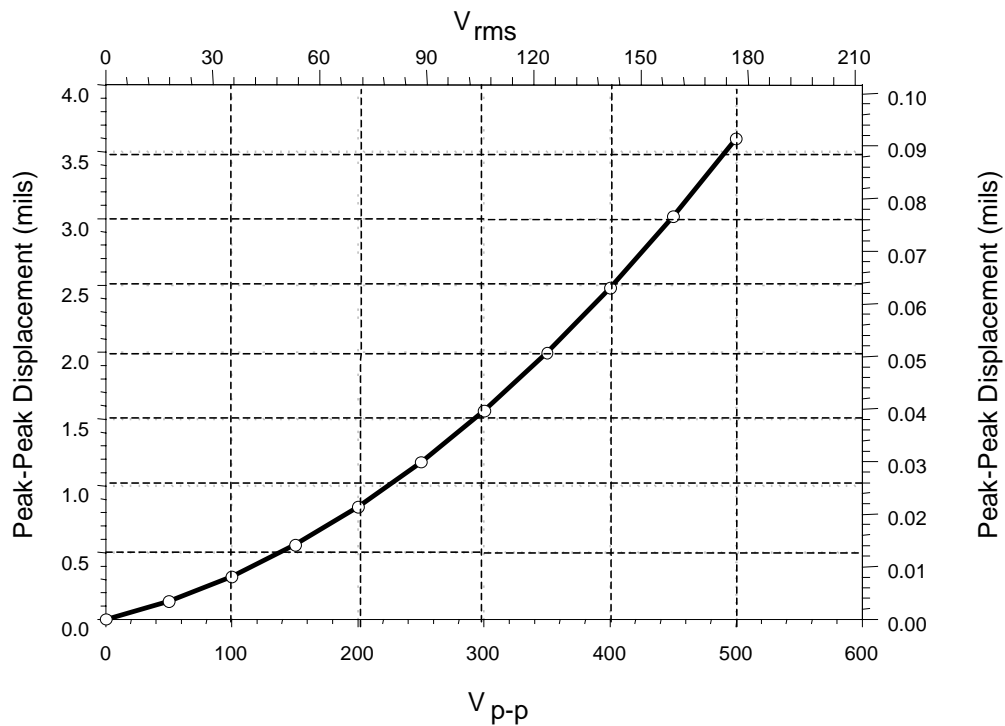
Displacement vs. Voltage : Cantilevered

Typical Performance at 1 Hz Sinusoidal Drive, No Load



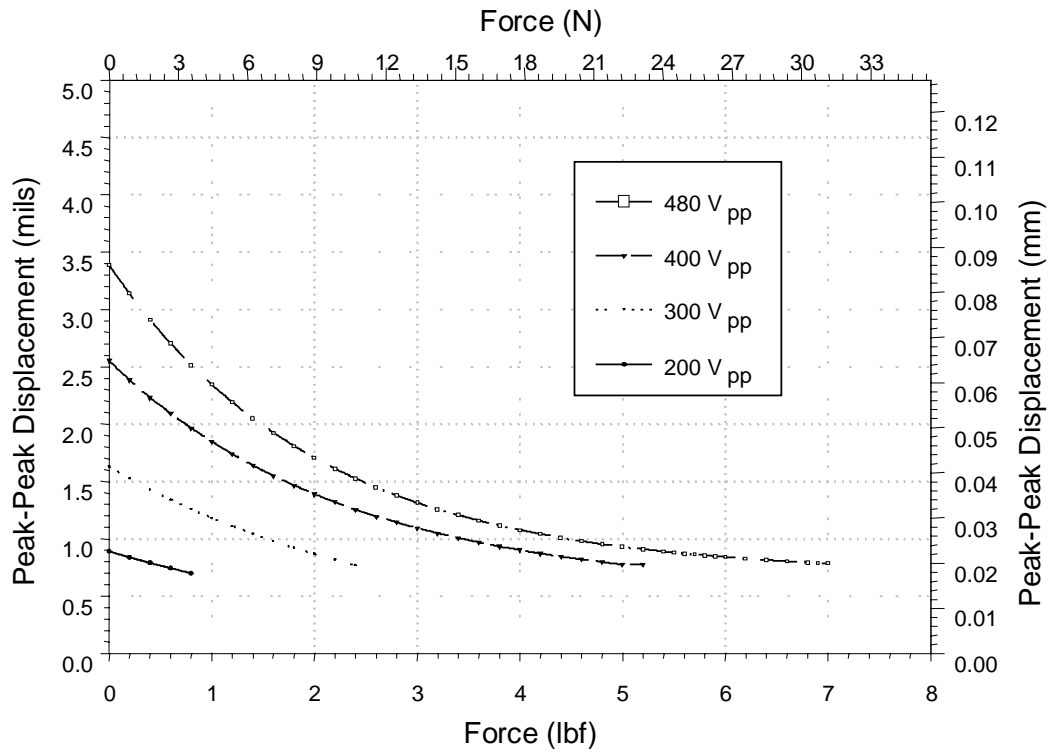
Displacement vs. Voltage : Simply Supported

Typical Performance at 1 Hz Sinusoidal Drive, No Load



Displacement vs. Force : Simply Supported

Typical Performance at 1 Hz Sinusoidal Drive



Displacement vs. Force Simply Supported

Typical Performance at 60 Hz Sinusoidal Drive

