

MODEL 1M THERMOPILE DETECTOR

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TECHNICAL DESCRIPTION

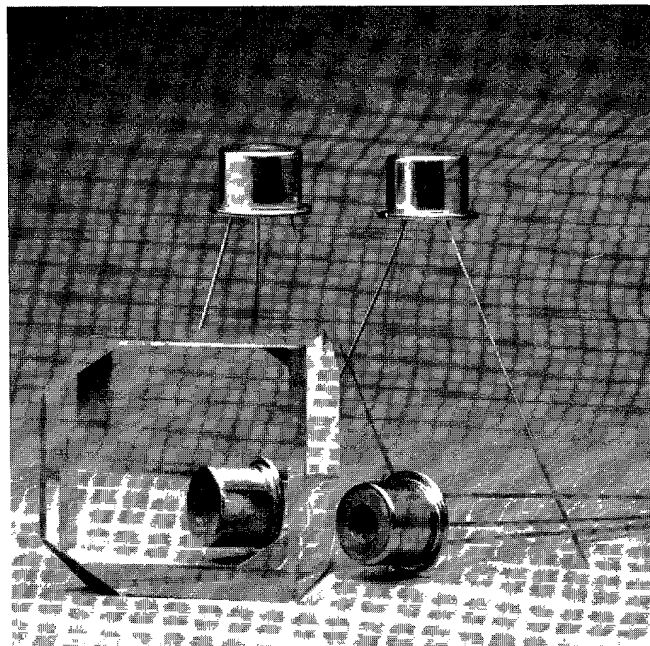
The Model 1M detector is a miniature multijunction thermopile made of evaporated bismuth and antimony. On the active junction area is deposited an energy absorbing black of either smoke or paint. The element is hermetically sealed in a TO-5 package under a purged atmosphere of Argon or Nitrogen, and then heat treated to insure long term stability. The final package is resistant to both mechanical and temperature shock.

The thermopile is a voltage generating device and therefore requires no bias voltage or current for operation. Since it acts as a pure resistance, it generates no 1/f noise but only the Johnson noise of its resistance.

The spectral absorption of the deposited blacks are essentially flat from the ultraviolet to the far infrared, and thus the spectral sensitivity of the detector depends on the choice of the window material. This spectral band pass may be limited by selecting window materials or filters to replace or augment the standard KBr window.

FEATURES

- * LOW COST
- * NO COOLING
- * NO 1/F NOISE
- * HERMETICALLY SEALED
- * RUGGED
- * HIGH RELIABILITY



ELECTRICAL CHARACTERISTICS: SPECIFICATIONS APPLY AT 25°C WITH KBr WINDOW

Parameter	Conditions	Min.	Typ.	Max.	Symbol	Units	Comments
Resistance		2.0	3.0	4.0	r	K Ω	
Resistance T.C.	0° to 85°C		-0.2			%/°C	Best linear fit (Note 1)
Noise Voltage		5.7	7.0	8.1	V _n	nV/ $\sqrt{\text{Hz}}$	V _n ² = 4kTr Δ f
Output Voltage	DC 10Hz	50 7	60 9	80 11	V _s	μ V RMS μ V	H = 325 μ W/cm ² H = 146 μ W/cm ²
Responsivity	(500K,DC,-) (500K,10,1)	19.6 6.1	23.5 7.8	31.3 9.6	R	V/W	R = V _s /HA (Note 2)
Responsivity T.C.	0° to 85°C		-0.4			%/°C	Linear (Note 1)
NEP	(500K,DC,-) (500K,10,1)	0.2 0.6	0.3 0.9	0.4 1.3	NEP	nW/ $\sqrt{\text{Hz}}$	NEP = V _n HA/V _s
D*	(500K,DC,-) (500K,10,1)	2.1 0.7	3.0 1.0	4.9 1.5	D*	10 ⁸ cm $\sqrt{\text{Hz}}$ /W	D* = V _s /V _n H $\sqrt{A}$
Time Constant	Blackbody		32		τ	mS	Chopped 3dB (Note 1)

NOTE 1: Parameter is not 100% tested, 90% of all units meet these specifications.

2: A is detector area in cm².

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PHYSICAL CHARACTERISTICS

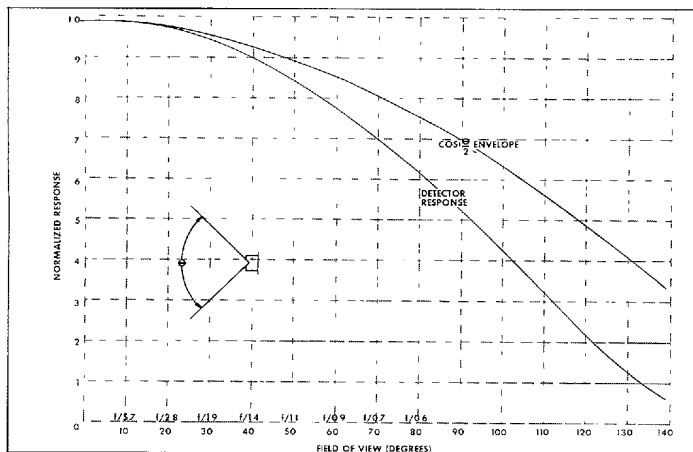
Number of Junction: 15
Sensitive Area: 1 mm diameter
Package: TO-5
Window Material: KBr or to be specified
Encapsulating Gas: Argon or Nitrogen
Field of View: 80°

OPERATING CONDITION

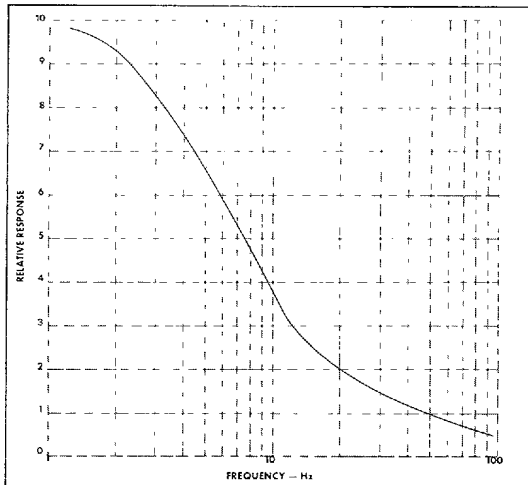
Temperature Range: -65°C to 85°C *
Maximum Incidence: 0.1 Watts/cm^2
Spectral Response: Flat from UV to far IR
Signal Output: Linear from 10^{-6} to $10^{-1} \text{ Watts/cm}^2$

*Available to 125°C on special order

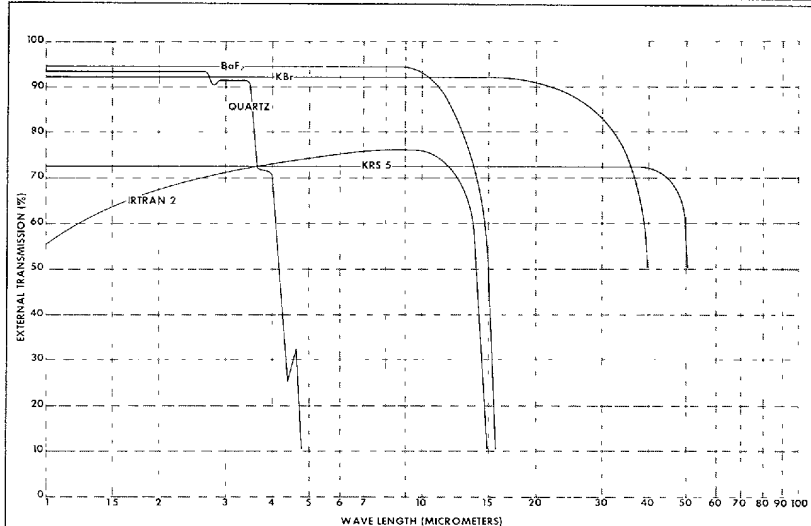
TYPICAL NORMALIZED ANGULAR RESPONSE



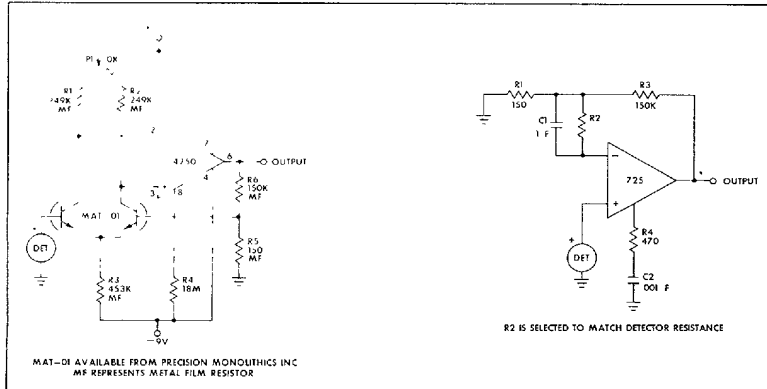
RELATIVE RESPONSE AS A FUNCTION OF FREQUENCY



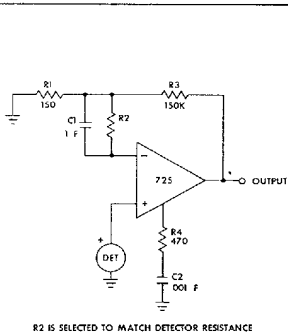
TYPICAL TRANSMISSION OF FIVE WINDOW MATERIALS FOR 1MM THICKNESS



MICRO POWER AMPLIFIER



COMMON AMPLIFIER



DETECTOR DIMENSIONS

