



# NTC THERMISTORS: TYPE 1F, 2F

## DESCRIPTION:

THERMOFLAKES consist of thick film thermistors which have no substrate backings. Since their lead-wires are fired directly into their electrodes, solder leaching and diffusion are completely eliminated. This results in excellent, low noise ohmic contacts.

## APPLICATIONS:

The high surface-to-mass ratio associated with a THERMOFLAKE results in low heat capacity and fast response time. THERMOFLAKES are ideally suited for infrared detection. Since the thermistor materials used are good absorbers of IR energy, satisfactory results may be obtained without the use of special absorption coatings.

## DATA:

### STANDARD THICKNESSES AND EFFECTIVE AREA

THERMOFLAKES are available in standard thicknesses of 25 microns (0.001") and 50 microns (0.002"). Area ranges from .020" x .020" to .120" x .120". See Table A.

THERMOFLAKES with larger and smaller cross sections are available on special request. When used for detecting IR energy, the flake is mounted in an inverted position so that its black side faces the incident radiation and its electrodes face away from the IR source. This results in greater efficiency since the entire flake area becomes the effective area.

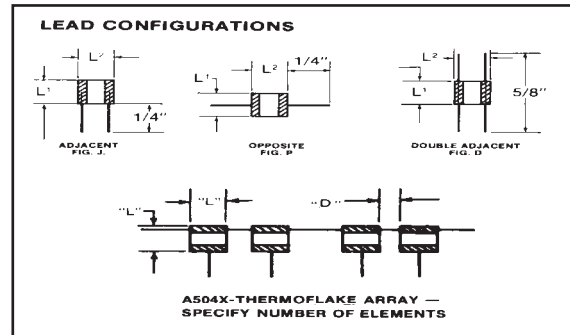
### COATINGS AND FILTERS

Absorptive coatings, such as 3M Black Velvet, are available on request. The absorptivity of the uncoated THERMOFLAKE is reasonably flat at approximately 40-45% in the range of 5-15 microns. Although an absorptive coating will result in a somewhat flatter spectral response at almost twice the absorptivity, it will not necessarily improve the sensitivity. This is due to the fact that the increased absorptivity is obtained at the expense of increased thermal mass. Coated germanium filters which exhibit a passband of 7.5-13 microns are available from stock. Other windows are available on request.

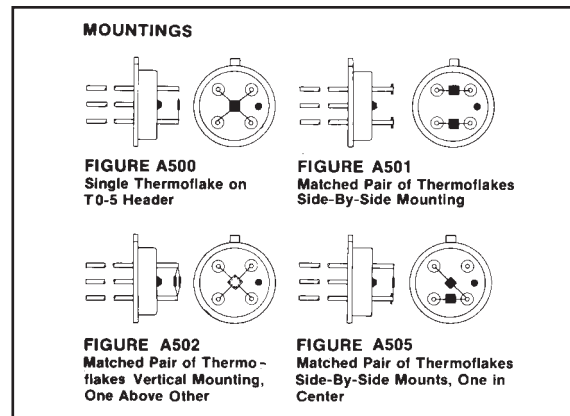
### MAXIMUM AMBIENT TEMPERATURE

THERMOFLAKES may be operated at temperatures as high as 300°C although maximum stability is obtained at temperatures below 105°C.

## DIMENSIONS:



## MOUNTINGS:



## THERMAL AND ELECTRICAL PROPERTIES\*

- Dissipation Constant: 0.2-0.4 Milliwatt/°C
- Thermal Time Constant: 35-75 Milliseconds

\*Values specified are for the THERMOFLAKE mounted by its leads in still air at 25°C. The actual value, within the range provided, depends upon the cross section and thickness of the flake. Time constant values represent cooling response to an electrical pulse which does not heat the leads significantly.

### RESISTANCE RANGE

50 K ohms to 2 Megohms, see Table B for standard values. Values between 1K ohm and 100 Megohms are available on special order.

### TEMPERATURE COEFFICIENT

Varies between -3.9%/°C and -4.4%/°C depending on size, thickness and the resistance of the THERMOFLAKE.

**TABLE A: THERMOFLAKE SIZES**

ORDERING CODE	F20	FB20	F40	FB40	F80	FA80	F120	
<b>L<sub>1</sub></b>	Inches	.020	.020	.040	.040	.080	.080	.120
	(mm)	(.5)	(.5)	(1)	(1)	(2)	(2)	(3)
<b>L<sub>2</sub></b>	Inches	.020	.040	.040	.080	.080	.120	.120
	(mm)	(.5)	(.5)	(1)	(2)	(2)	(3)	(3)

**TABLE B: STANDARD RESISTANCE VALUES**

Resistance @ 25°C (in ohms)	50k	100k	200k	500k	1 Meg	1.5 Meg	2 Meg
Ordering Code	503	104	204	504	105	155	205

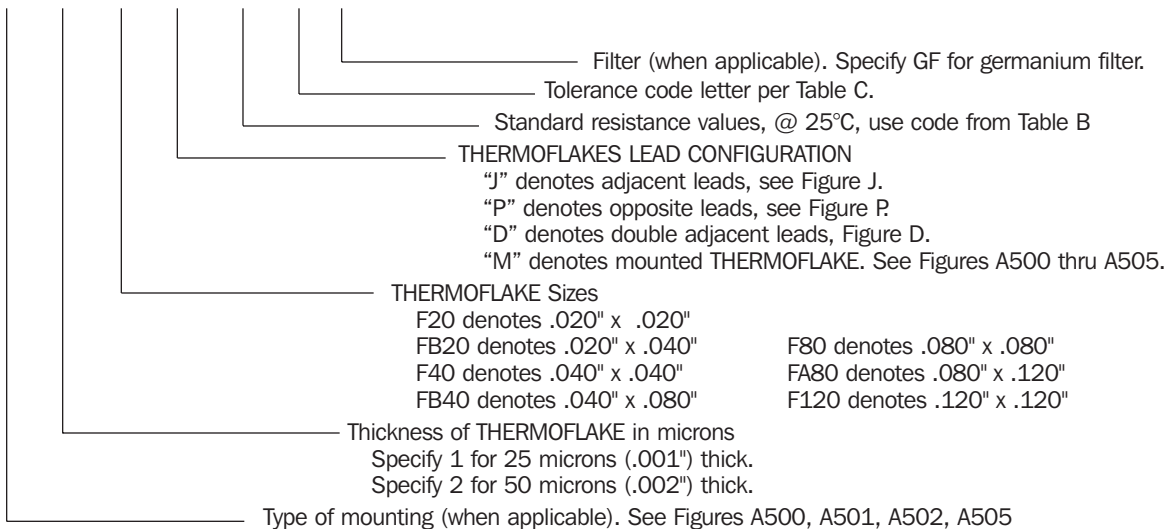
**TABLE C: STANDARD TOLERANCES:**

Tolerance Code Letter	J	K	L	M	N	P	Q	R	
± % Tolerance at 25°C	5	10	15	20	25	30	40	50	Non-standard (specify value)

**CODING:**

The ordering code should be specified as follows:

**A500 - 2 F40 M 105 N - GF**



**ORDERING EXAMPLES:**

1. A 50 micron thick THERMOFLAKE with a cross section of 1mm x 1mm, mounted on a TO-5 header (mounting A500) and having a resistance of 1 megohm ±25% at 25°C would be specified as A500-2F40M105N. If a coated germanium filter were required, the part number would be: A5002F40M105N-GF.
2. An unmounted THERMOFLAKE having a thickness of 25 microns, a cross section of 2mm x 2mm, double adjacent leads and a resistance of 500k ohms ±20% at 25°C would be specified as 1F80D504M.