

**True Hermetically Sealed  
Proportionally Controlled Heater Hybrids**



**Features:**

- Self-contained
- Programmable via a single external resistor
- Available from 40 to 50 watts

**Applications:**

- Microwave Oscillators
- Telecommunications
- Other areas where temperature control is needed

**DESCRIPTION**

A self-contained hybrid circuit heater that is programmable via a single external resistor. These systems are ideal for microwave oscillators, telecommunications and other areas where temperature control is needed. Heaters are available from 40 to 50 watts.

**Typical Electrical Characteristics for DC Heater (28V DC Input, 28 Watts (51974))**

Operating Voltage Range (See Note 13) .....	28 ±1 VC
Voltage Limits .....	24 VDC Min, 32 VDC Max
Reverse Voltage Protection .....	To 50 V
Operating Current Range .....	.015 to 1.00 A
Turn on Current .....	To 1.00 A
Quiescent Current .....	Less than .019 A

**Typical Electrical Characteristics for AC Heaters (115 VAC Input, 28 Watts (52034))**

Operating Voltage Range .....	100 to 125 VAC, 50 to 400 Hz
Voltage Limits .....	0 to 150 VAC
Operating Current, Steady State .....	.001 to .280 A
Turn-on Current Range (at 115 VAC) .....	To .280 A
Quiescent Current .....	Less than 1 mA

**Temperature Characteristics**

Control Range (See Note 1, 2 & 3) .....	+50°C to +100°C
Variation with Load (See Note 4) .....	10°C Max
Variation over Operating Range (See Note 5) .....	±2°C
Maximum Control Temperature (See Note 6) .....	+120°C

**Environmental Characteristics**

Operating Temperature .....	-55°C to +100°C
Altitude .....	70,000 ft. Max
Shock .....	20 G Max
Vibration .....	50 G at 2,000 Hz Max
Humidity .....	Greater than 95%

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# True Hermetically Sealed Proportionally Controlled Heater Hybrids

## Reliability

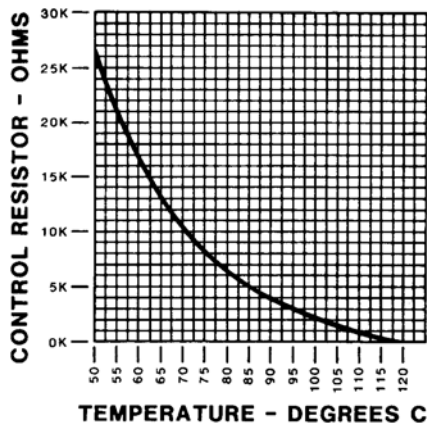
Each hybrid circuit is subjected to the following reliability screening per MIL-PRF-38534

- Precap internal visual Method 2017, Condition B
- Temperature cycling, Method 1010, Condition B
- Constant acceleration, Method 2001, Condition B, Y axis only
- Optional Burn-in per Mii specifications
- Fine and Gross leak test, Method 1014, Conditions A & C
- External visual, Method 2009

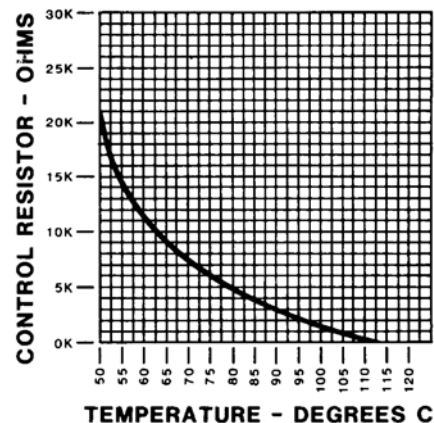
## Notes

1. DC Heaters (Small Substrate) Use Table 1 for control resistor, and Figure 1 for dimensions.
2. DC Heaters (Large Substrate) Use Table 2 for control resistor, and Figure 3 for dimensions.
3. AC Heaters (Large Substrate) Use Table 2 for control resistor, and Figure 3 for dimensions.
4. Maximum temperature variation for current change from 5% over quiescent to 95% of turn-on current.
5. Maximum temperature variation over operating voltage range when ambient temperature is constant and the supply current is between 5% over quiescent and 95% of turn-on current.
6. Maximum temperature with any value of control resistor, including 0 ohms.
7. All True hermetically sealed (solder welded) heater modules are leak tested to meet MIL-PRF-38534, Method 1014, Test Conditions A & C, with a maximum lead rate of  $1 \times 10^{-7}$  atm-cc/sec, and all hermetically sealed (epoxy) heaters have a maximum leak rate of  $1 \times 10^{-6}$  atm-cc/sec.
8. Optimum heat transfer is obtained by using a thermal joint compound such as Dow Corning 340 on the mounting surface.
9. Operation is possible over +100°C, but electrical performance is not guaranteed. Input current decays to 20mA max at +120°C without damage to the heater module.
10. All Mii DC heaters are protected against reverse voltage up to 50 V.
11. The standard ceramic heater design has pins for interconnect. The standard Micropac part number with or without the A suffix will have pins & Micropac can supply the heater without pins and with pad metalization designed for wire bonding. The version without pins will have a B suffix to the standard Micropac part number.
12. Maximum power rating for control resistor is 1/8 watts. Precise resistor values should be determined by measuring the surface temperature.
13. The heater is operational from 24 to 32 VDC, however for optimum performance 28 VDC is recommended.

**TABLE 1**  
TYPICAL



**TABLE 2**  
TYPICAL



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## True Hermetically Sealed Proportionally Controlled Heater Hybrids

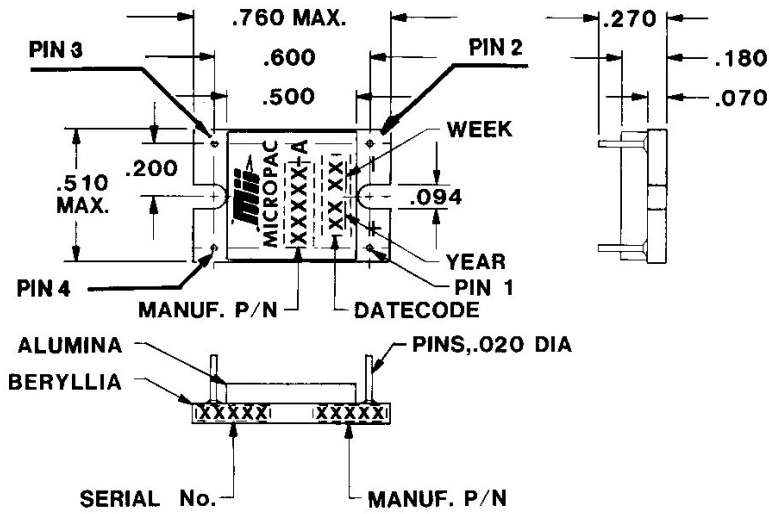
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D.C. True Hermetic Seal	51974	28V / 28W
	52005	20.5V / 15W
	52027	28V / 40W
	52086	18V / 15W
	52087	28V / 15W
	52088	32V / 30W
D. C. Hermetic Seal	51933	28V / 28W
	51948	20V / 4W
	51949	28V / 21W
	51951	20V / 20W
	51952	28V / 40W
	51960	15V / 20W
	51961	24V / 8W
	51966	30V / 6W
	51969	15V / 4W
	51970	15V / 7.5W
	51971	15V / 20W
	51985	20.5V / 15W
	52012	40V / 40W
	52013	28V / 11W
	52029	15V / 15W
	52041	15V / 28W
	52066	28V / 15W
D. C. Hermetic Seal (Large Substrate)	52048	20V / 40W
	52055	28V / 50W
D. C. True Hermetic Seal (Large Substrate)	52056	28V / 50W
	52070	28V / 40W
A. C. Hermetic Seal	52031	115V / 28W
	52057	115V / 40W
A. C. True Hermetic Seal	52034	115V / 28W

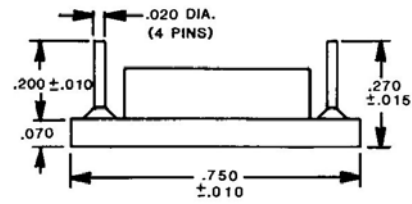
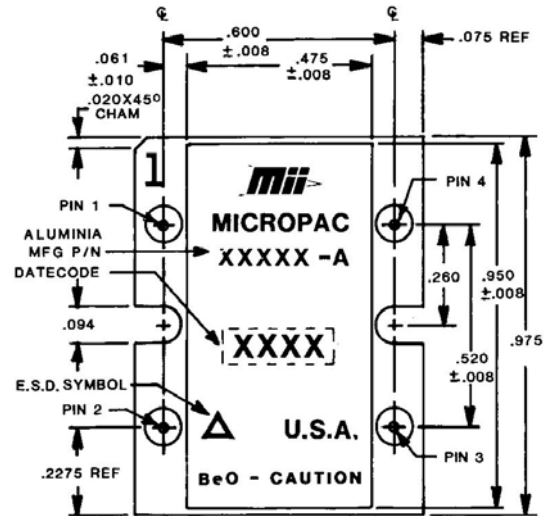
Pin No.	Function
1	+ Voltage
2	- Voltage (Return Voltage)
3	Control
4	Control

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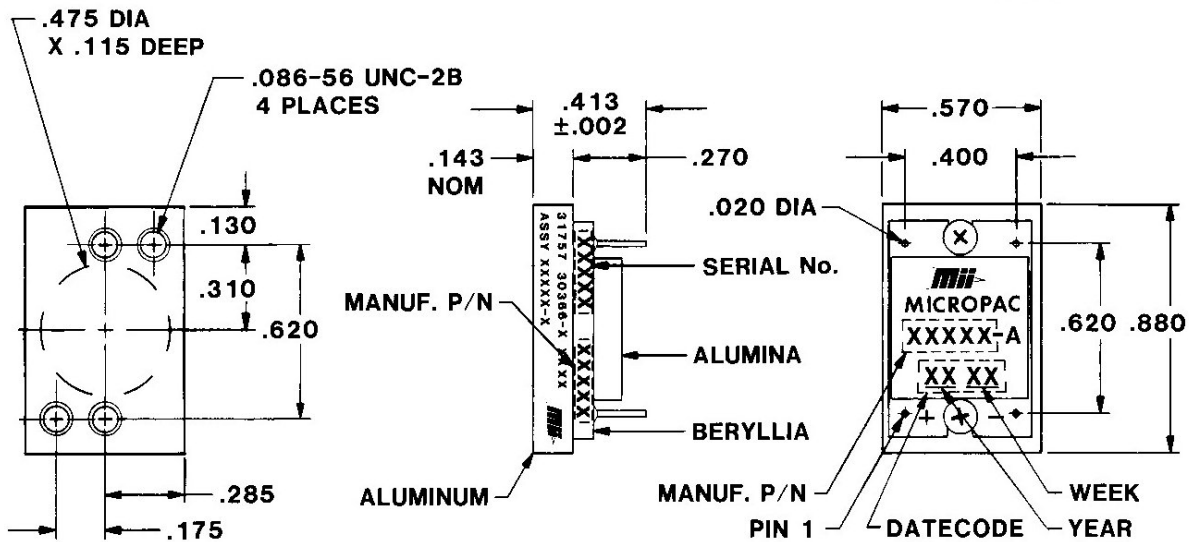
# True Hermetically Sealed Proportionally Controlled Heater Hybrids



**FIG. 1**



**FIG. 3**



**FIG. 2**

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# True Hermetically Sealed Proportionally Controlled Heater Hybrids

## Proportionally Controlled Micro DC Heater Hybrid

Micropac Industries, Inc., a supplier of state of the art integrated hybrid circuits, introduces a new Micro D heater offering a low cost alternative to standard heaters, as a temperature stabilization method for a variety of applications including Saw Filters, VCOs and YIG Oscillators. These heaters are programmable via a single external resistor. Dimensions are .200 by .200 (Fig. 1) to 1.4 by .5 inches (Fig. 2). Power ratings are from 1.5 watts to 28 watts. For more information on custom heater hybrids, please contract your local Mii representative or call Mii directly.

### Electrical Characteristics

	<b>52250-2 Fig. 1</b>	<b>52228-B Fig. 2</b>	
Operating Voltage	15.0	24.0	VDC
Voltage Limits	13.0 17.0	22.0 28.0	VDC min. VDC max.
Operating Current	10 to 100	15 to 200	mA
Turn On Current	to 100	to 200	mA
Isolation (Pin to Backside)	1000	1000	VDC
Power Dissipation	1.5	4.8	watts

Pin	Function
1	+VDC
2	-VDC
3	Control
4	Control

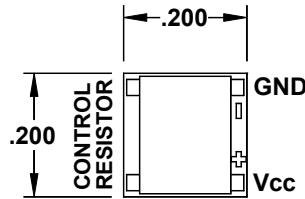


Fig. 1

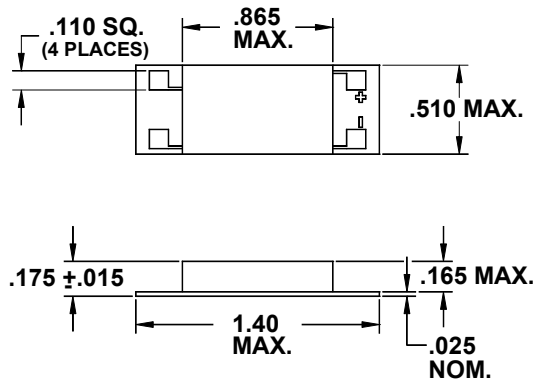


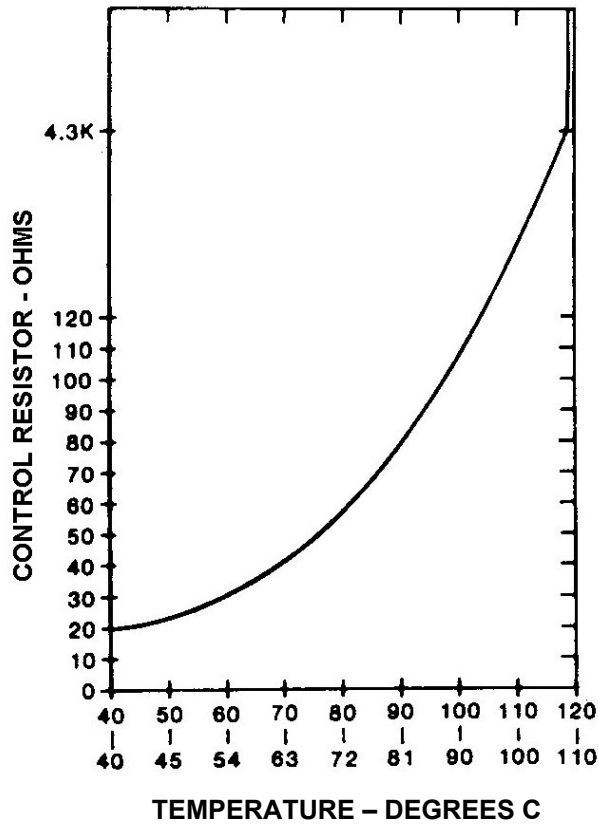
Fig. 2

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**Temperature Characteristics**

Control Range (Table 1)	+50 to +100	+50 to +100	°C
Variation with load	10	10	°C
Variation Over Operating Range	±2	±2	°C
Maximum Control Temperature	+100	+100	°C
Operating Temperature	-55 to +100	-55 to +100	°C

**TEMPERATURE CHARACTERISTIC CURVE**



**Table 1 (Typical)**

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