

**True Hermetically Sealed
Proportionally Controlled Heater Hybrids**



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| <p>Features:</p> <ul style="list-style-type: none"> • Self-contained • Programmable via a single external resistor • Available from 10 to 50 watts | <p>Applications:</p> <ul style="list-style-type: none"> • 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 10 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 (applies to all Micropac heaters unless otherwise specified)

| | |
|---|-----------------|
| 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 (applies to all Micropac heaters unless otherwise specified)

| | |
|-----------------------|----------------------|
| 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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Reliability

Each hybrid circuit is available 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 1×10^{-7} atm-cc/sec, and all hermetically sealed (epoxy) heaters have a maximum leak rate of 1×10^{-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 $+100^{\circ}\text{C}$, but electrical performance is not guaranteed. Input current decays to 20mA max at $+120^{\circ}\text{C}$ 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.
14. Optional Burn-in ordering information:
 - A. Use -1 for Burn-in
 - B. Use -2 for No Burn-in

TABLE 1
TYPICAL

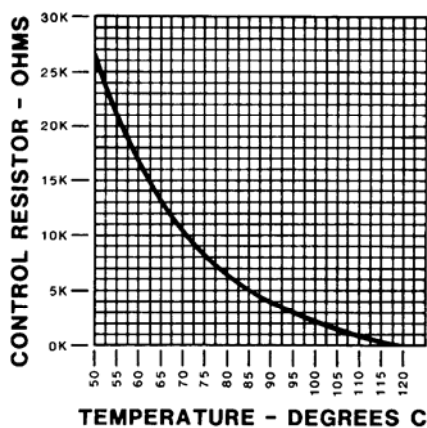
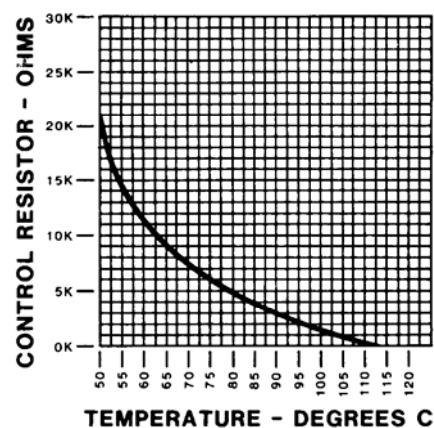






TABLE 2
TYPICAL



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True Hermetically Sealed Proportionally Controlled Heater Hybrids

| | | | | |
|---|----------------|--------------------------|---|--------------------------------------|
| D.C. True Hermetic Seal | 51974 | 28V / 28W |  | |
| | 52005 | 20.5V / 15W | | |
| | 52027 | 28V / 40W | | |
| | 52087 | 28V / 15W | | |
| | 52088 | 32V / 30W | | |
| | 52104 | 18V / 15W | | |
| | 52267 | 28V / 4W | | |
| | 52416 | 18V / 9W | | |
| | 52473 | 22V / 40W | | |
| D. C. Hermetic Seal | 51933 | 28V / 28W | | See Fig. 1 For Pkg. Dimensions |
| | 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 52055 | 20V / 40W 28V / 50W |  | |
| D. C. True Hermetic Seal (Large Substrate) | 52056 52070 | 28V / 50W 28V / 40W | | See Fig. 3 For Pkg. Dimensions |
| A. C. Hermetic Seal | 52031 52057 | 115V / 28W 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

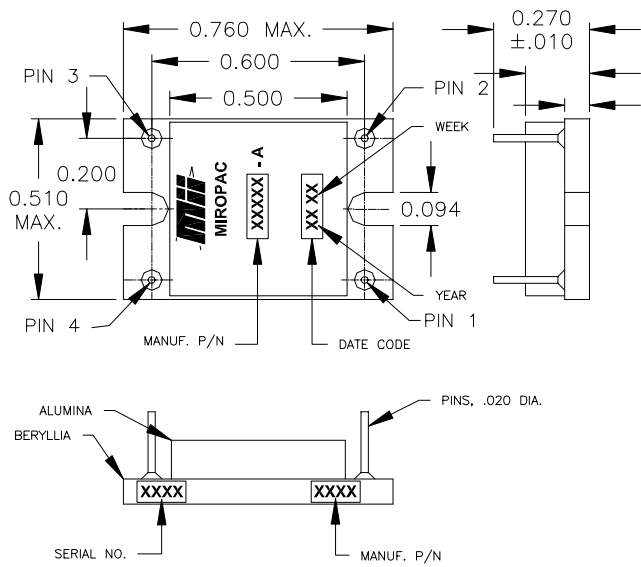


FIG. 1

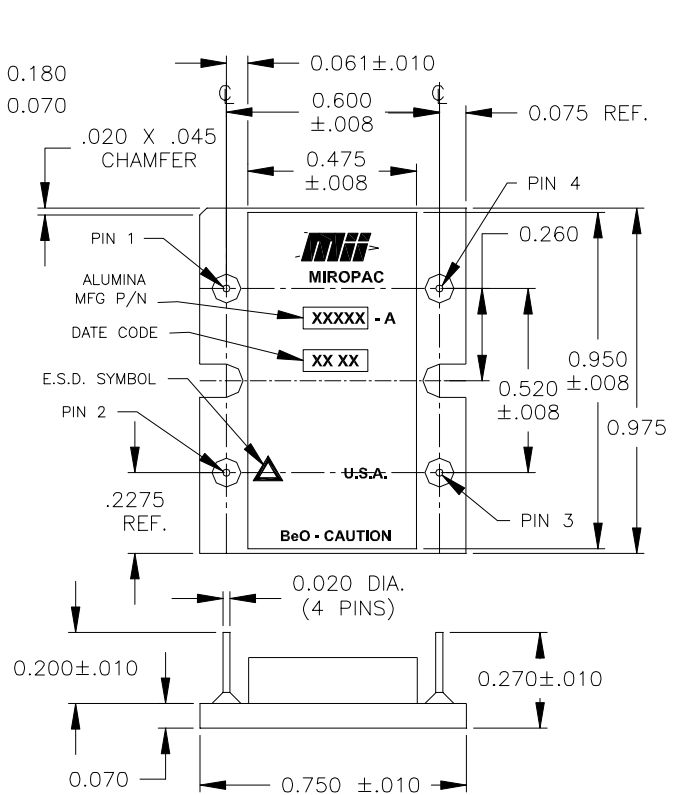


FIG. 3

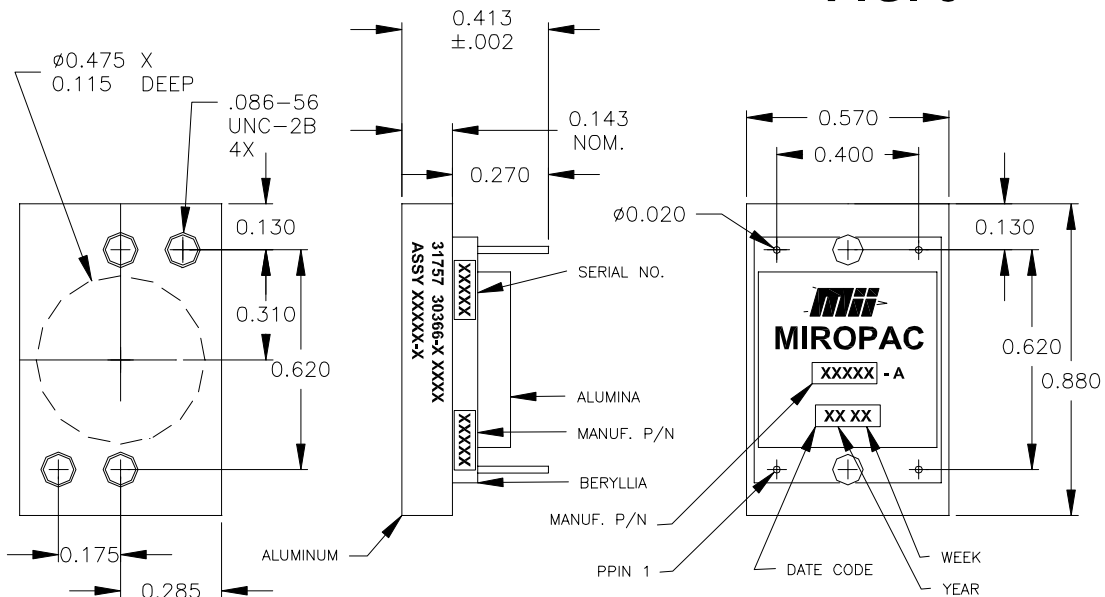


FIG. 2

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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

| | 52250-2 Fig. 1 | 52228-B Fig. 2 | |
|-----------------------------|---------------------------------|---------------------------------|----------------------|
| 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 |

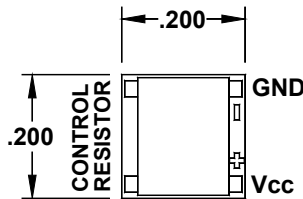


Fig. 1

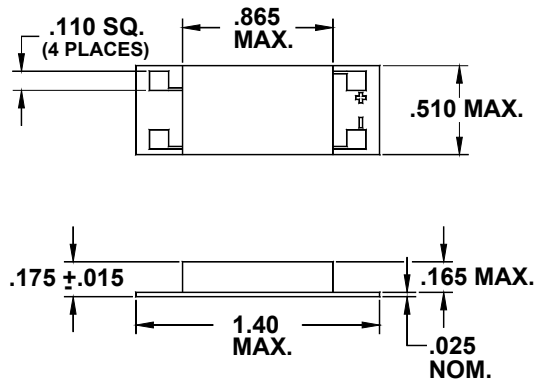


Fig. 2

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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

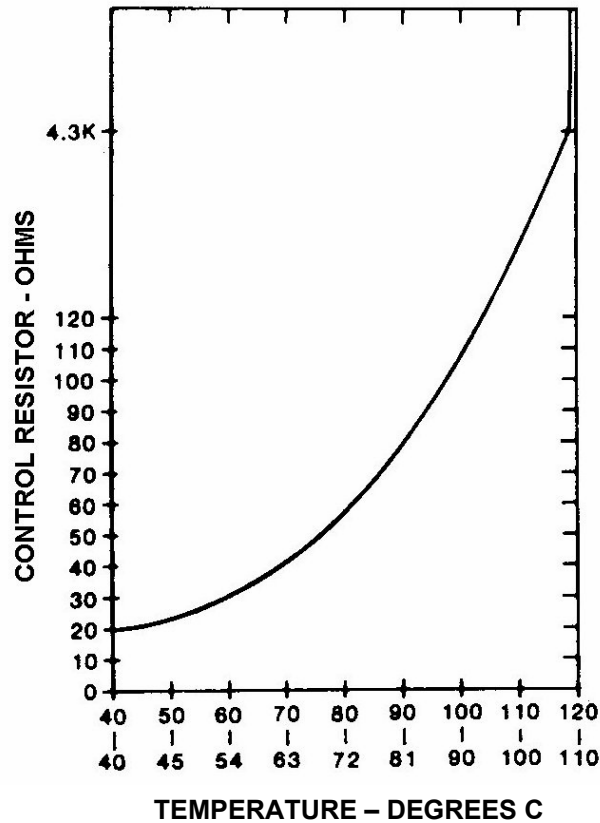


Table 1 (Typical)

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