

**True Hermetically Sealed Proportionally Controlled  
Metal Package Heater Hybrids**

**Mii**

HYBRID MICROELECTRONICS  
PRODUCTS DIVISION

**Features:**

- Self-contained
- Programmable via a single external resistor
- Available in 28 watt and 48 watt versions
- Standard products

**Applications:**

- Ideal for microwave oscillators
- Telecommunications
- Other areas where temperature control is needed

**DESCRIPTION**

The Mii heater is a self-contained hybrid circuit heater programmable for temperature by a single external resistor. These systems are ideal for microwave oscillators, telecommunications and other areas where temperature control is needed. Metal package heaters are available in 28 watt and 40 watt versions..

**Typical Electrical Characteristics for DC Metal Package Heater**

|  |                        |
|--|------------------------|
| Mii P/N 52280-2 .....                      | 28 VDC Input, 28 Watts |
| Mii P/N 52280-1 .....                      | 28 VDC Input, 40 Watts |
| Operating Voltage Range (See Note 1) ..... | 28± 1 VDC              |
| Voltage Limits .....                       | 24 VDC Min, 32 VDC Max |
| Reverse Voltage Protection .....           | to 50 VDC              |
| Operating Current Range .....              | 0.005 to 1.00 A        |
| Turn-on Current .....                      | to 1.00 A              |
| Quiescent Current .....                    | Less than .005 A       |

**Typical Temperature Characteristics**

|  |                 |
|--|-----------------|
| Control Range .....                            | +50°C to +100°C |
| Variation with Load (See Note 2) .....         | 10° C Max       |
| Input Voltage Variation (See Note 3) .....     | ±2°C            |
| Maximum Control Temperature (See Note 4) ..... | +120°C          |

**Environmental Characteristics**

|                             |                     |
|-----------------------------|---------------------|
| Operating Temperature ..... | -55°C to +100°C     |
| Altitude .....              | 70,000 Ft. Max      |
| Shock .....                 | 200G Max            |
| Vibration .....             | 50G at 2,000 Hz Max |
| Humidity .....              | Greater than 95%    |

**Micropac Industries** cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.  
**Micropac** reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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## Reliability

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

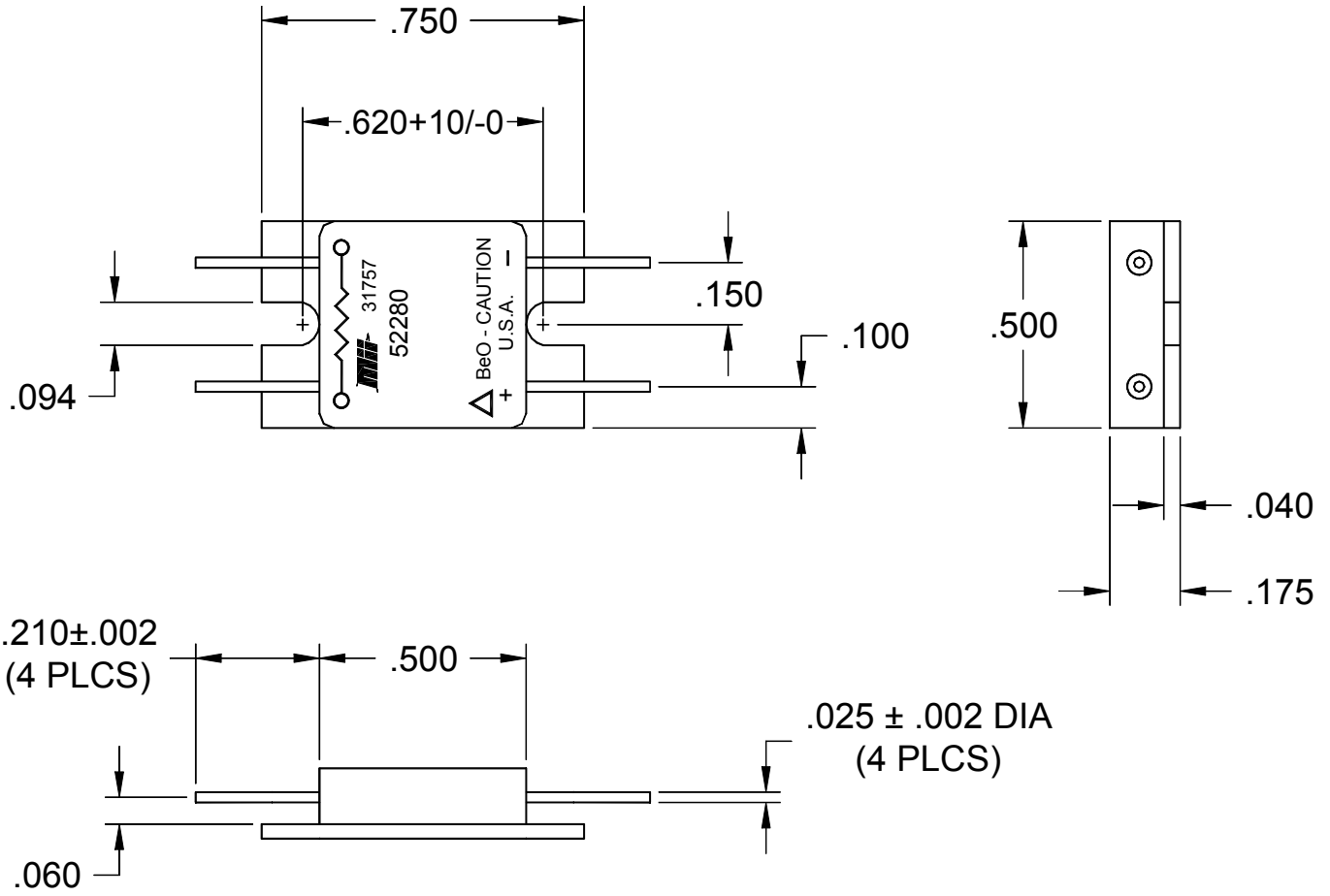
- Precap internal visual Methods 2017 and 2032
- High Temperature stabilization bake, Method 1008, Condition C (performed at Customer's request only)
- Temperature cycling, Method 1010, Condition B
- Constant acceleration, Method 2001, Condition B, Y axis only
- Optional burn-in per Mii specifications
- Fine and Gross lead test, Method 1014, Conditions A<sub>1</sub> & C<sub>1</sub>

## Notes:

1. The heater is operational from 24 to 32 VDC; however, for optimum performance 28 VDC is recommended.
  2. Maximum temperature variation for current change from 5% over Quiescent to 95% of turn on current.
  3. 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.
  4. Maximum temperature with any value of control resistor, including 0 ohms.
    - All metal package hermetically sealed heaters are leak tested to meet MIL-PRF-38534, Method 1014, test conditions A & C, with a maximum leak rate of  $1 \times 10^{-7}$  atm-cc/sec.
    - Optimum heat transfer is obtained by using a thermal joint compound such as Dow Corning 340 on the mounting surface.
    - Operation is possible above 100°C, but electrical performance is not QA guaranteed. Input current decays to  $\leq 20$  mA max at = 120°C without damage to the heater.
    - All Mii heaters are protected against reverse voltage up to 50 V.
    - Maximum power rating for control resistor is 1/8 watt. Precise resistor values should be determined by measuring the surface temperature.
    - Micropac Industries, Inc. will work with the potential customer for voltage and wattage ratings not currently available.
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