

**52421**

**SOLID STATE THERMOSTAT CONTROLLER**  
**Space Application Series...**



**HYBRID MICROELECTRONICS**  
**PRODUCTS DIVISION**

**Features:**

- Operates With RTD Temperature Sensor
- Output Is Either "ON" Or "OFF"
- Standard And Custom Factory Settings Of:
  - Resistance Control Set Points (Temperatures),
  - Hysteresis, (Minimum/Maximum) And
  - Timing (On/Off Delays)
  - Test (Load Power On/Off) Capability
- Optional Mounting Configurations Available

**Applications:**

Meets The Demanding Requirements Of *Space Platform Environments*, Where Precise Temperature Control Is Required.

**DESCRIPTION**

Micropac's Space level Thermostat Controller 52421 operates with external RTD (Resistance Temperature Device) temperature sensor and provides a power switched (On / Off) output within a temperature window. The RTD sensor is conditioned then controls a high-side MOSFET power switch for an external HEATER.

Models are available with dual channels providing either "OR" or "AND" configurations.

Wired combinations of the "OR" configuration device, along with a single channel device, provides a tri-redundancy control system which guarantees both the power ON and power OFF states of the Heater

**ABSOLUTE MAXIMUM RATINGS**

|   |                           |
|---|---------------------------|
| Operating Temperature (T <sub>A</sub> ) .....     | -55°C to +125°C           |
| Storage Temperature (T <sub>STG</sub> ) .....     | -65°C to +165°C           |
| Maximum Steady State V <sub>IN</sub> .....        | +132 Volts DC             |
| Peak Transient Input V <sub>IN(T)</sub> .....     | +180 Volts DC for 5 Secs. |
| Steady State Load Current...(Source or Sink)..... | 1.1Amps.                  |

**APPLICABLE QUALITY STANDARDS OF MICROPAC INDUSTRIES, INC.**

- MIL-PRF-38534 Class H and Class K Qualified.
- MIL-PRF-19500 JAN S Qualified.
- MIL-STD-883 Test Methods and Procedures
- ISO 9001 Quality Standard

**Micropac Industries** cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.  
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## GENERAL ELECTRICAL SPECIFICATIONS

(25°C unless otherwise stated)

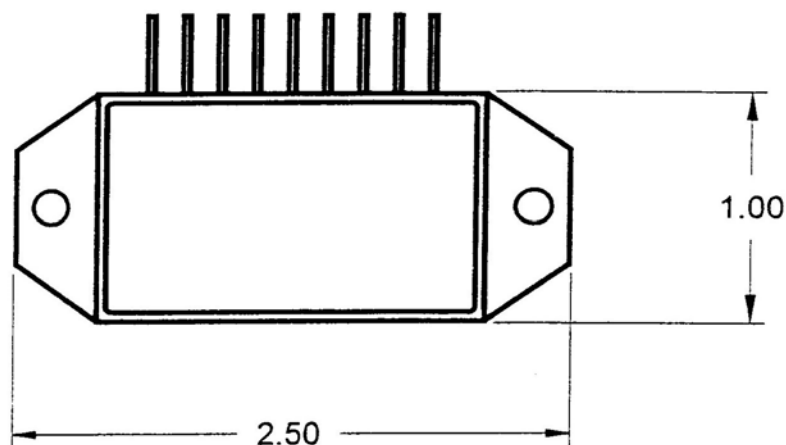
| TEST                           | CONDITIONS   | MIN       | MAX                  | UNITS         |
|--------------------------------|--|-----------|----------------------|---------------|
| Quiescent Power Supply Current | Terminal #1 = +126 VDC<br>$I_{LOAD}$ (Terminals 3 and 4) = 0 A<br>RTD = Max  |           | 5.5                  | mA            |
| Over voltage Current Spikes    | Between Terminals #1 and #2 = +180 VDC<br>For 5 seconds<br>RTD = Min   |           | 50.0                 | mA            |
| Heater Current                 | Terminals #3 - #4 = Heater Load<br>Terminal #1 = +120 VDC  | 1.1       |                      | A             |
| Output Off Current             | Terminal #1 = +126 VDC<br>Between Terminals #3 and #4 =<br>R shunt $\leq$ 10 ohms<br>RTD = Max<br>$T_{CASE} = 25^{\circ}C$<br>$T_{CASE} = 125^{\circ}C$ or $T_{CASE} = -55^{\circ}C$                                       |           | $\pm 250$<br>$\pm 1$ | $\mu A$<br>mA |
| Full Load Saturation Voltage   | Terminal #1 = +120 VDC<br>Test Load, 120 ohms $\pm 5\%$ , 250 Watts<br>RTD = Min<br>$V_{SAT}$ , Measured between Terminals #4 and #2<br>$T_{CASE} = 25^{\circ}C$<br>$T_{CASE} = 125^{\circ}C$ or $T_{CASE} = -55^{\circ}C$ |           | 1.9<br>2.8           | V<br>V        |
| Self Test Input Impedance      | Terminal #1 = +120 VDC<br>RTD = Max<br>As Measured between Terminals #8 and #9   | 5,000,000 |                      | $\Omega$      |
| On Time, Load Current          | Terminal #1 = +120 VDC<br>RTD switched Max to Min<br>Measuring the 10-90 time of the rising Heater Load Current, Terminals #3 and #4   | 1.0       |                      | mS            |
| Off Time, Load Current         | Terminal #1 = +120 VDC<br>RTD switched Min to Max<br>Measuring the 90-10 time of the falling Heater Load Current, Terminals #3 and #4  | 2.0       |                      | mS            |

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## DUAL CHANNEL TERMINAL NUMBER DESCRIPTION

| TERMINAL | REF        | DESCRIPTION                           |
|----------|------------|---------------------------------------|
| 1        | Vin        | Positive power supply voltage         |
| 2        | AGND       | Power return for all function         |
| 3        | +H         | Current source for Heater (High Side) |
| 4        | -H         | Current return for Heater             |
| 5        | RTD1-H     | Current source for RTD #1             |
| 6        | RTD1-L     | Current return RTD #1                 |
| 7        | RTD1-S     | for RTD #1 Shield to case             |
| 8        | ST1        | Self Test #1, "ON"                    |
| 9        | ST1 Return | Self test #1 Common                   |

## Package Dimensions



## TYPICAL PRESET "RTD" PROFILES AVAILABLE

|      | P/N TBD | P/N TBD | P/N TBD | P/N TBD | P/N TBD |
|------|---------|---------|---------|---------|---------|
| Ton  | -80°F   | -70°F   | -60°F   | -50°F   | -42°F   |
| Toff | -73°F   | -63°F   | -53°F   | -43°F   | -35°F   |

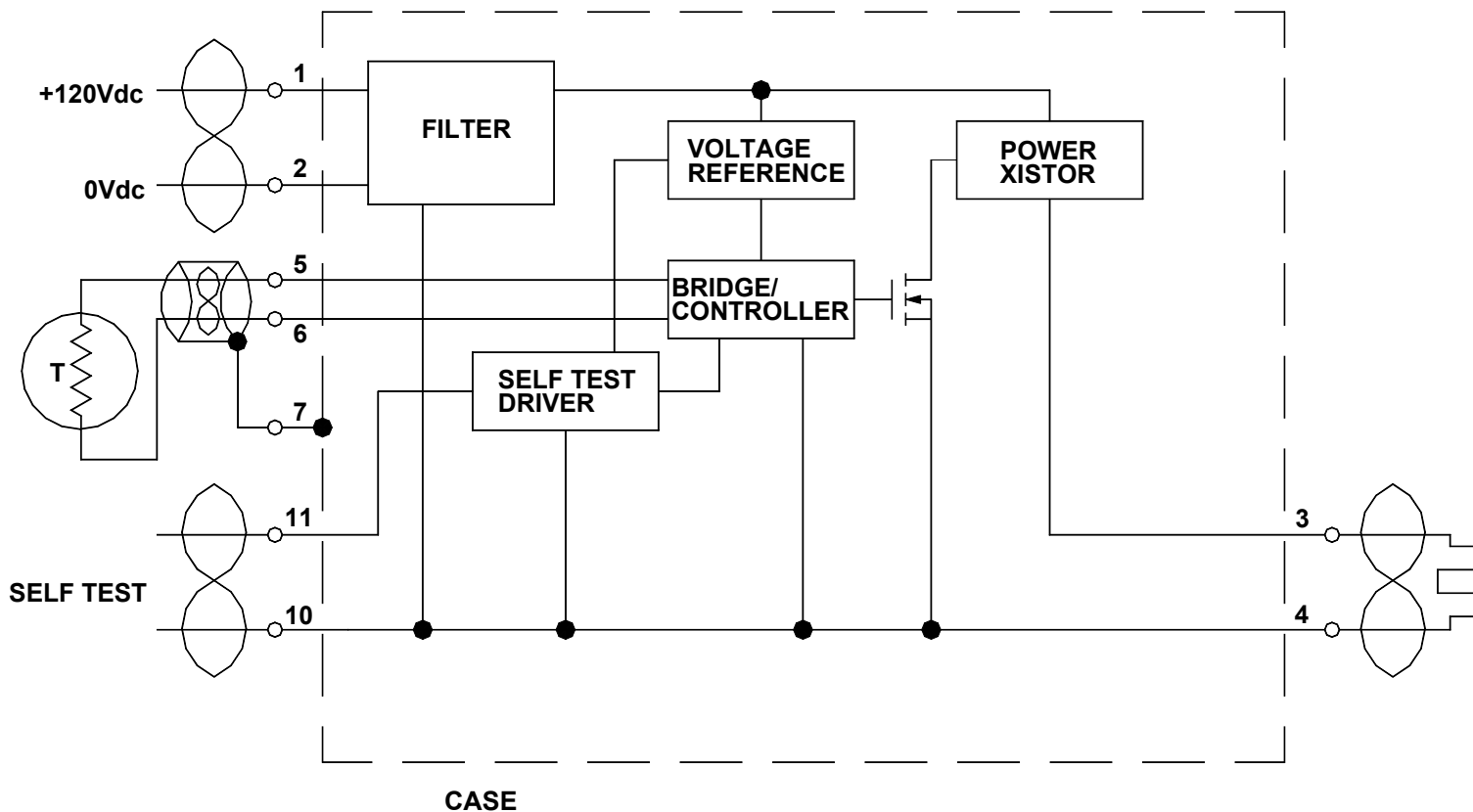
|      | P/N TBD | P/N TBD | P/N TBD | P/N TBD |
|------|---------|---------|---------|---------|
| Ton  | -28°F   | -10°F   | 0°F     | 23°F    |
| Toff | -21°F   | -3°F    | 7°F     | 30°F    |

RTD SENSORS **NOT PROVIDED** BY Micropac Industries, Inc.

The above preset thresholds and switching levels are based on the use of standard 1000 ohm RTDs. Example: IEC-751, 1000 ohms at 0°C (ice point), resistance curve with an alpha of 0.003891 and with an error not to exceed 0.75 °F.

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Functional Block Diagram



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