

# Multistage Series MS3-231-10-15

## Thermoelectric Modules



The MS Series of thermoelectric modules (TEMs) are designed to reach cool down temperatures that are not achievable with single stage TEMs.

This product line is available in numerous heat pumping capacities, geometric shapes and temperature differentials. Assembled with Bismuth Telluride semiconductor material and thermally conductive Aluminum Oxide ceramics, the MS Series is designed for higher current and lower heat-pumping applications.

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### FEATURES

- High temperature differential
- Precise temperature control
- Reliable solid state operation
- Environmentally friendly
- DC operation
- RoHS compliant

### APPLICATIONS

- CCD cameras
- Electron microscope
- Calibration equipment
- Photonics laser systems
- Gas analyzers
- Infrared (IR) sensors
- Guidance systems

### SPECIFICATIONS

| TECHNICAL                 |      |
|---------------------------|------|
| Hot Side Temperature (°C) | 25°C |
| Qmax (Watts)              | 6.9  |
| Delta Tmax (°C)           | 104  |
| I <sub>max</sub> (Amps)   | 1.9  |
| V <sub>max</sub> (Volts)  | 15.5 |

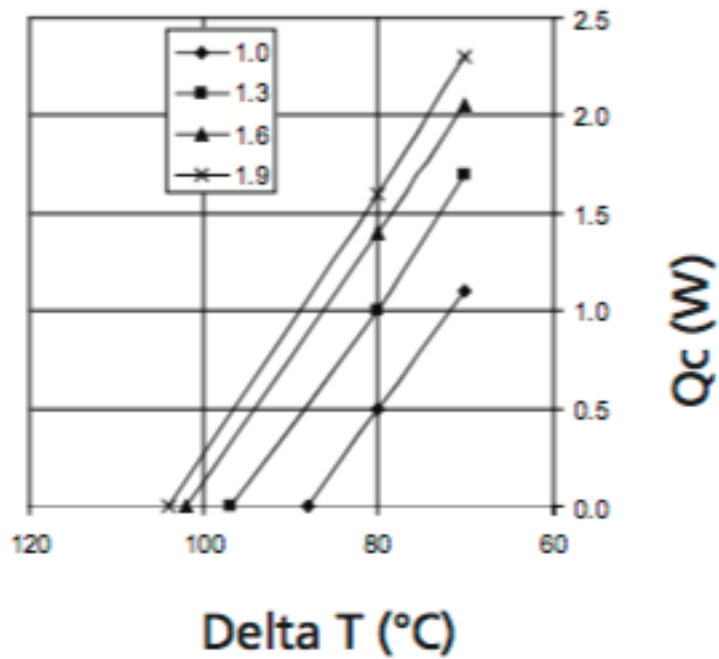
| SUFFIX | THICKNESS<br>(PRIOR TO<br>TINNING) | FLATNESS &<br>PARALLELISM | HOT FACE   | COLD FACE  | LEAD LENGTH |
|--------|------------------------------------|---------------------------|------------|------------|-------------|
| 00     | 0.382"±0.008"                      | 0.001"/0.004"             | Metallized | Metallized | 7.87"       |
| 11     | 0.374"±0.008"                      | 0.001"/0.002"             | Lapped     | Lapped     | 7.87"       |
| 22     | 0.382"±0.008"                      | 0.001"/0.004"             | Pre-tinned | Pre-tinned | 7.87"       |

### SEALING OPTIONS

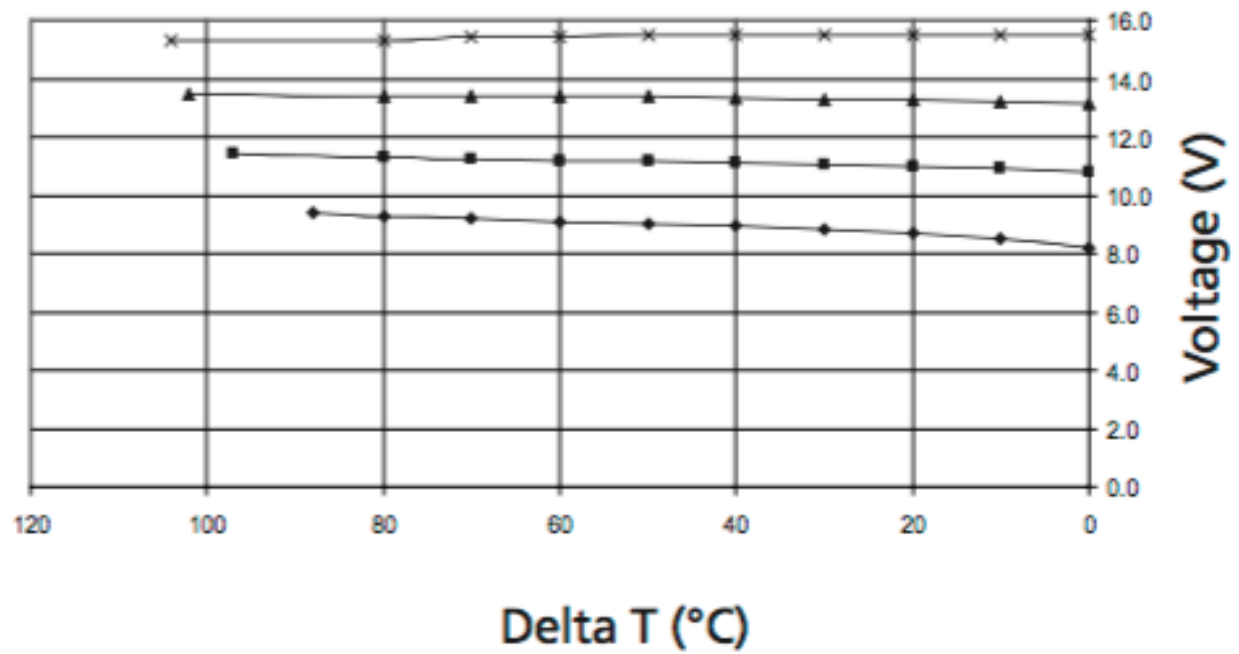
| SUFFIX | SEALANT | COLOR | TEMP RANGE    | DESCRIPTION                                  |
|--------|---------|-------|---------------|----------------------------------------------|
| RT     | RTV     | White | -60 to 204 °C | Non-corrosive, silicone adhesive             |
| EP     | Epoxy   | Black | -55 to 150 °C | Low density syntactic foam epoxy encapsulant |

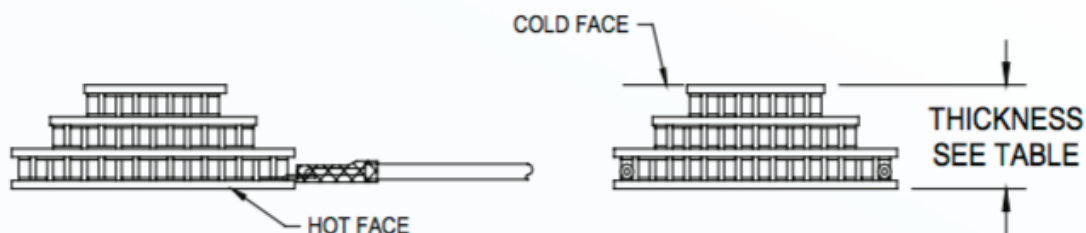
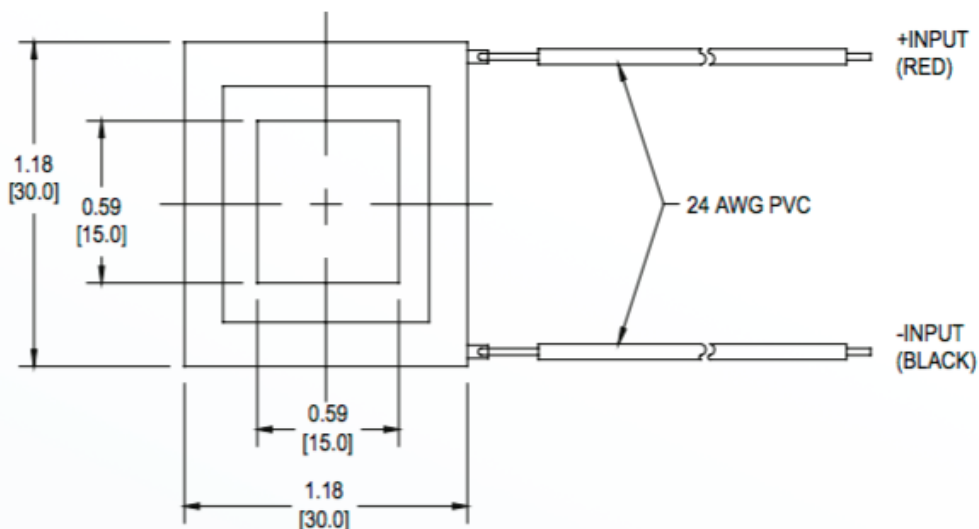
Performance Curves at  $T_h = 25^\circ\text{C}$

THERMO



ELECTRIC





Ceramic Material: **96% Alumina Ceramics**  
Solder Construction: 138°C, Bismuth Tin (BiSn)

## NOTES

1. Max operating temperature: 80°C
2. Do not exceed I<sub>max</sub> or V<sub>max</sub> when operating module
3. Reference assembly guidelines for recommended installation
4. Solder tinning also available on metallized ceramics

Laird-ETS-MS3-231-10-15-Data-Sheet-082216

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