

**Multistage MS Series Thermoelectric Cooler**

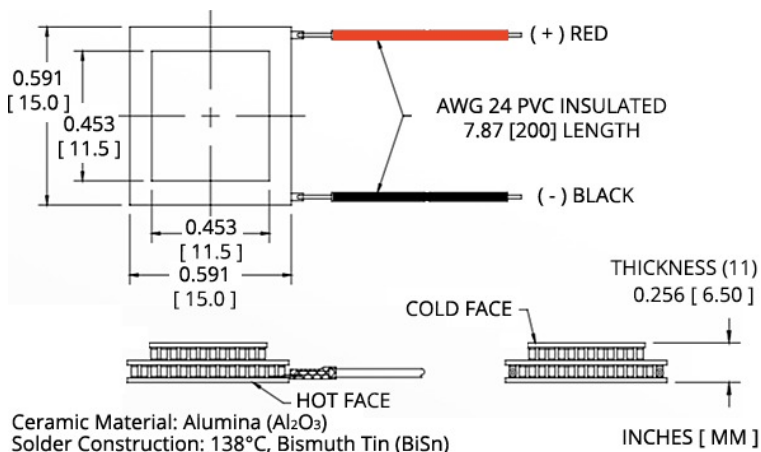
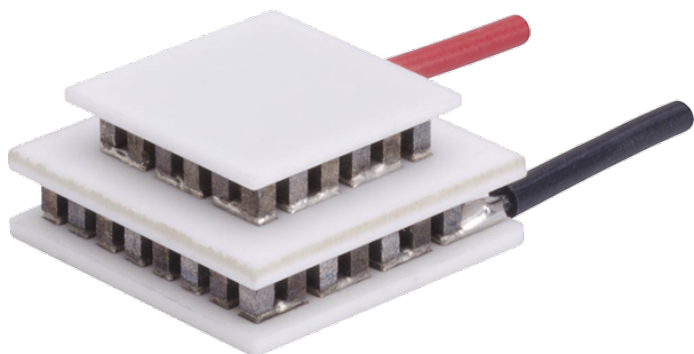
The MS2-049-10-10-15-15-11-W8 multistage thermoelectric cooler is able to reach colder temperatures than single stage thermoelectric coolers. It has a maximum Qc of 3.1 Watts when ΔT = 0 and a maximum ΔT of 89 °C at Qc = 0.

**Features**

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

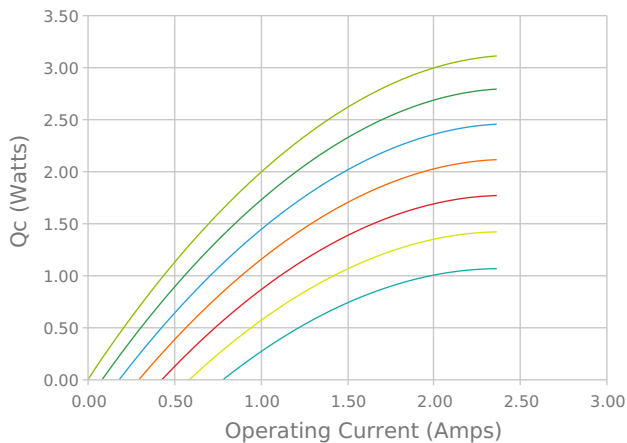
**Applications**

- Thermoelectric Cooling for CMOS Sensors
- Heads-Up Displays, Imaging Sensors

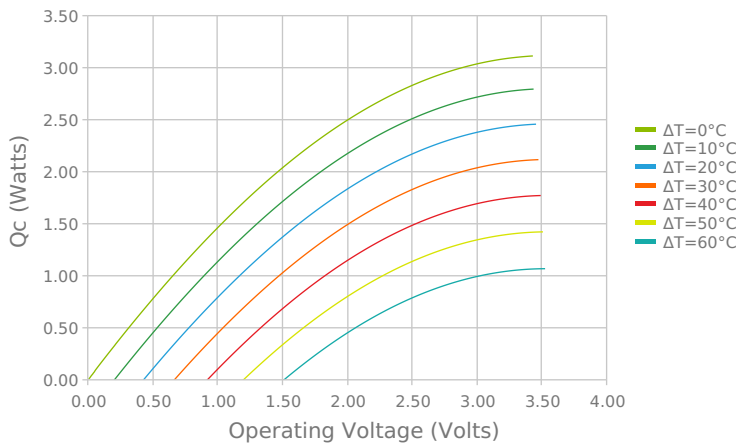


**ELECTRICAL AND THERMAL PERFORMANCE**

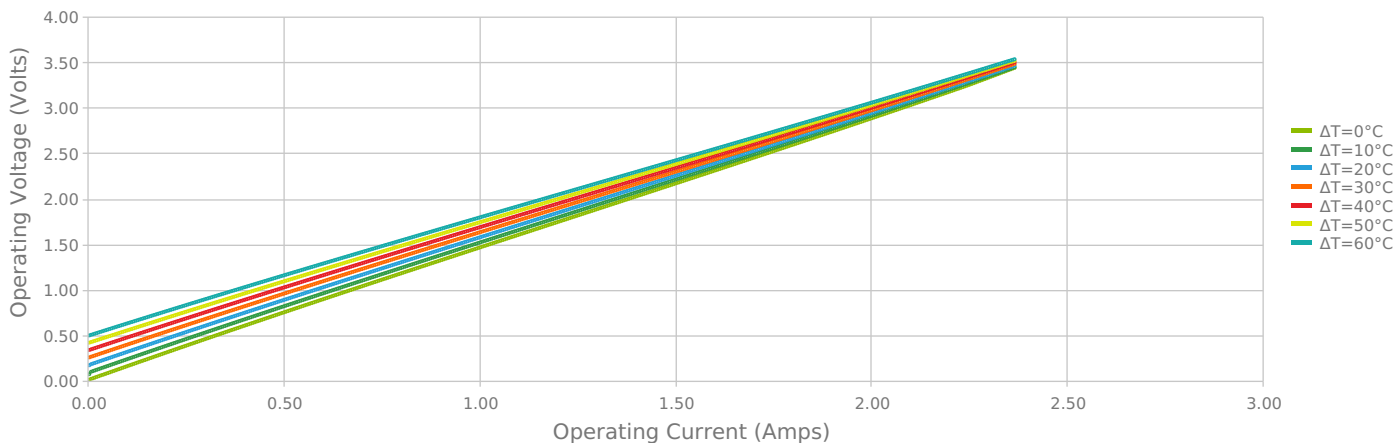
Heat Pumped at Cold Side  
 Thot = 27 °C



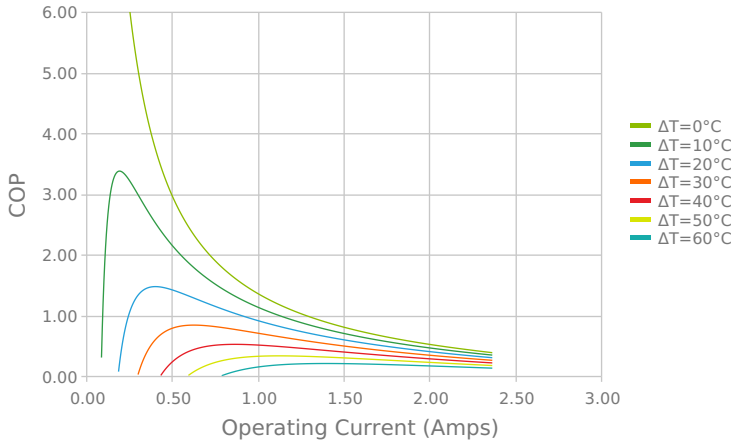
Heat Pumped at Cold Side  
 Thot = 27 °C



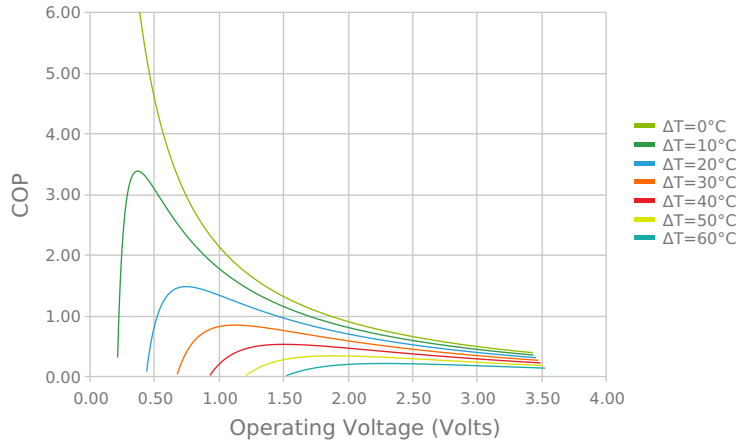
Current vs Voltage (I vs V)  
 Thot = 27 °C



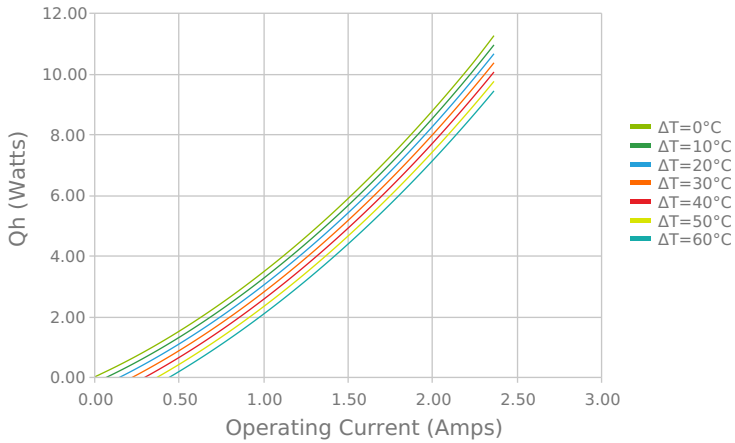
Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C



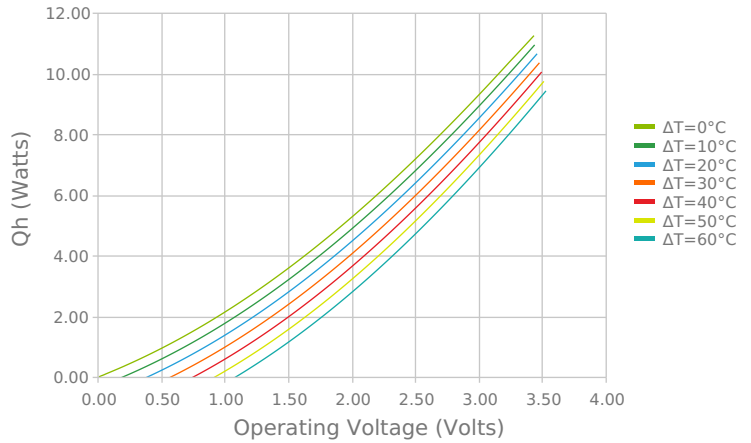
Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C



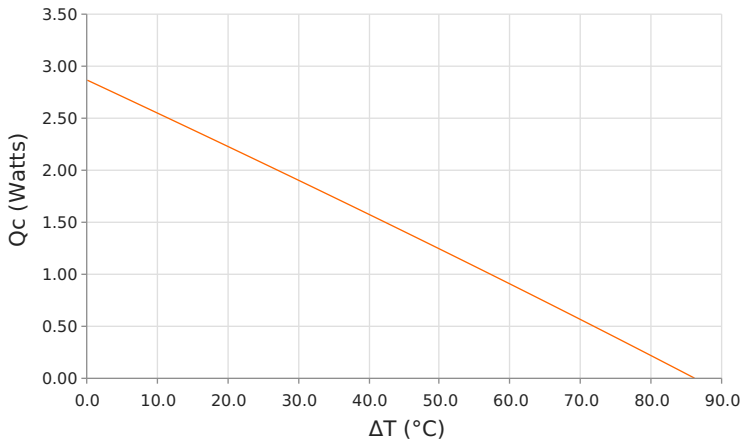
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)  
Thot = 27 °C



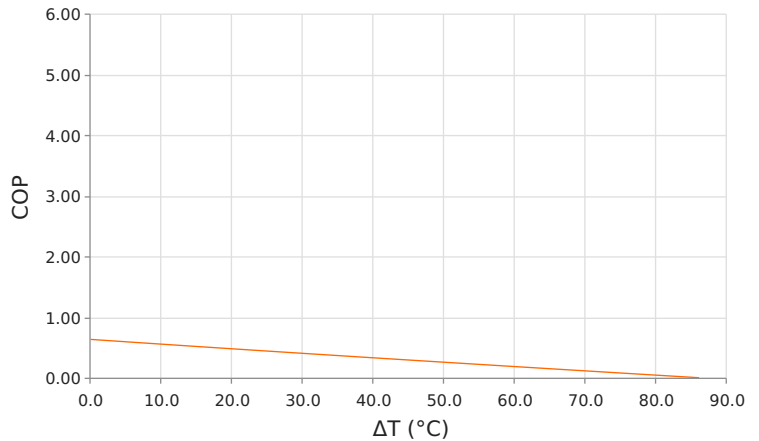
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)  
Thot = 27 °C



Heat Pumped at Cold Side (Qc)  
Thot = 27 °C | Current = 1.8 Amps



Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C | Current = 1.8 Amps



## SPECIFICATIONS\*

|   |                |
|---|----------------|
| <b>Hot Side Temperature</b>                               | <b>27.0 °C</b> |
| <b>Qcmax (<math>\Delta T = 0</math>)</b>                  | 3.1 Watts      |
| <b><math>\Delta T_{max}</math> (<math>Q_c = 0</math>)</b> | 89.0 °C        |
| <b>I<sub>max</sub> (I @ <math>\Delta T_{max}</math>)</b>  | 2.3 Amps       |
| <b>V<sub>max</sub> (V @ <math>\Delta T_{max}</math>)</b>  | 3.5 Volts      |
| <b>Module Resistance</b>                                  | 1.52 Ohms      |
| <b>Max Operating Temperature</b>                          | 80 °C          |
| <b>Weight</b>   | 5.0 gram(s)    |

\* Specifications reflect thermoelectric coefficients updated March 2020

## FINISHING OPTIONS

| Suffix | Thickness                            | Flatness / Parallelism                     | Hot Face | Cold Face | Lead Length         |
|--------|--------------------------------------|--|----------|-----------|---------------------|
| 11     | 11.500 ±0.203 mm<br>0.453 ± 0.008 in | 0.025 mm / 0.203 mm<br>0.001 in / 0.008 in | Lapped   | Lapped    | 199.9 mm<br>7.87 in |

## SEALING OPTIONS

| Suffix | Sealant | Color | Temp Range | Description          |
|--------|---------|-------|------------|----------------------|
|        | None    |       |            | No sealing specified |

## 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

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Date: 04/24/2020