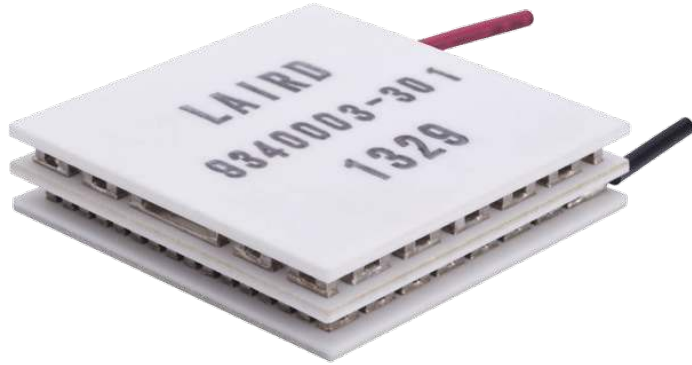


**Multistage MS Series Thermoelectric Cooler**

The MS2-190-10-10-12-12-00-W8 multistage thermoelectric cooler is able to reach colder temperatures than single stage thermoelectric coolers. It has a maximum  $Q_c$  of 15.4 Watts when  $\Delta T = 0$  and a maximum  $\Delta T$  of 91 °C at  $Q_c = 0$ .

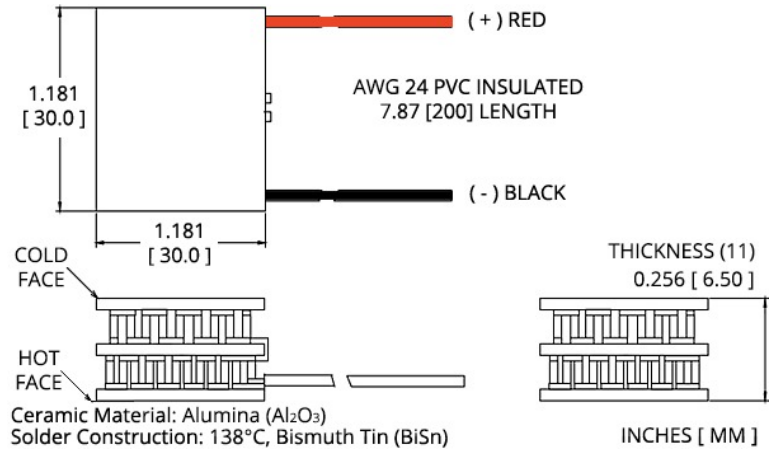


**Features**

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

**Applications**

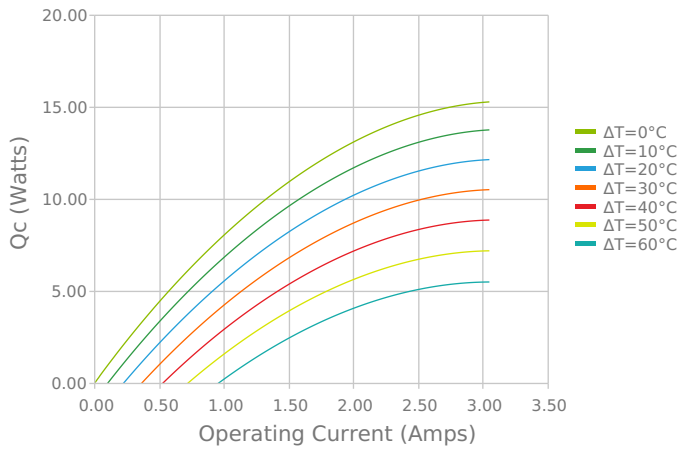
- Thermoelectric Cooling for CMOS Sensors
- Heads-Up Displays, Imaging Sensors



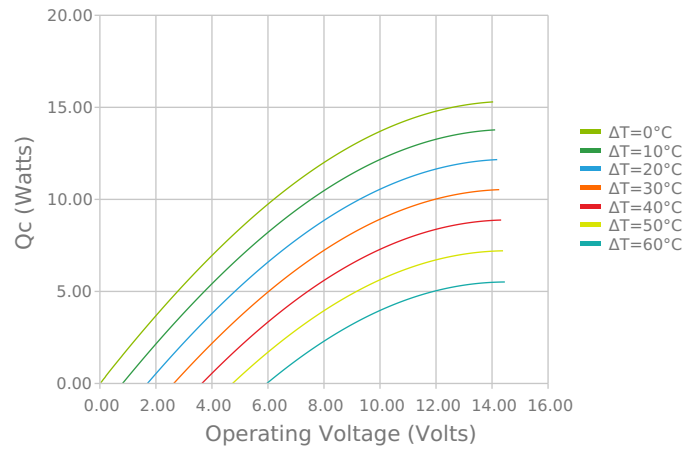
**ELECTRICAL AND THERMAL PERFORMANCE**

For maximum performance, be sure to orient the CONTROL side of the TEC against the application to be managed and the HEATSINK side against the heat sink or other heat rejection method. The CONTROL side is always opposite the side with lead attachments. Lead attachment is a passive heat loss and less impactful if located on the side that attaches to the heat exchanger.

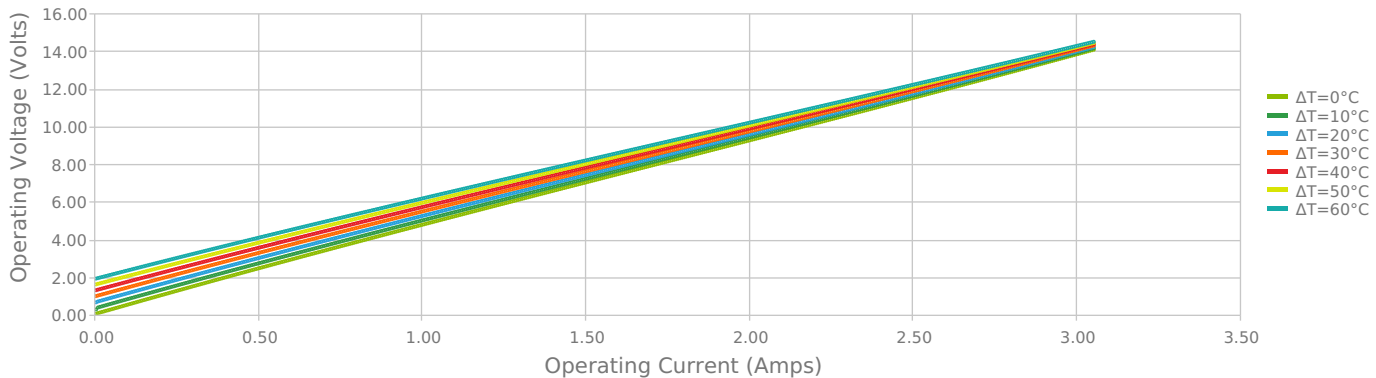
Heat Pumped at Cold Side  
 $T_{hot} = 27\text{ °C}$



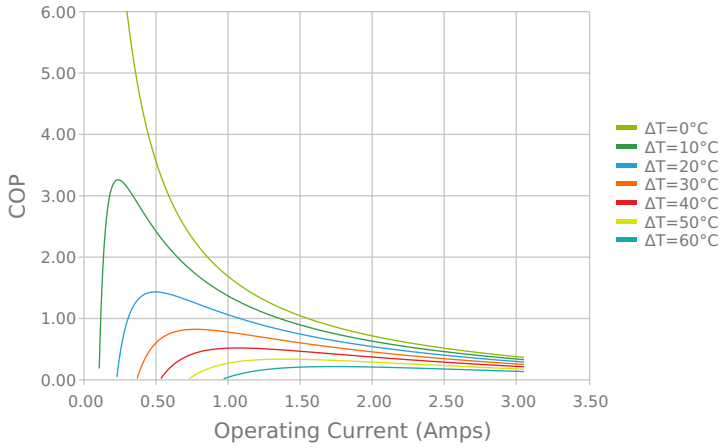
Heat Pumped at Cold Side  
 $T_{hot} = 27\text{ °C}$



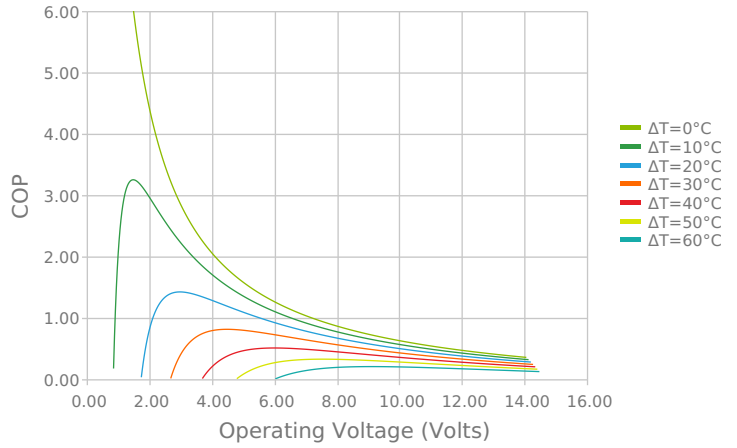
Current vs Voltage (I vs V)  
 $T_{hot} = 27\text{ °C}$



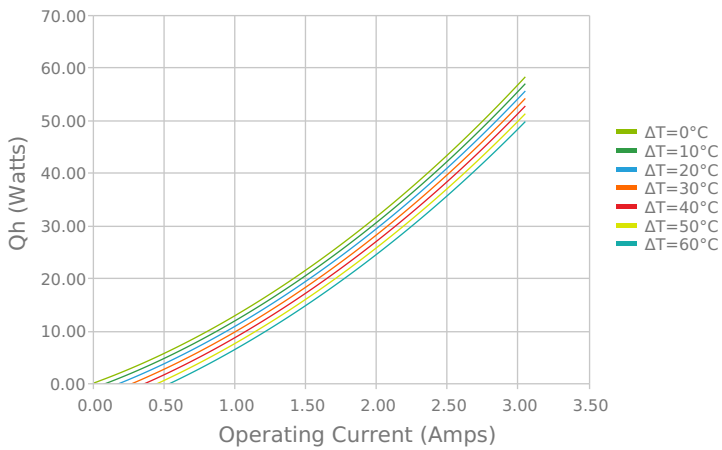
Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C



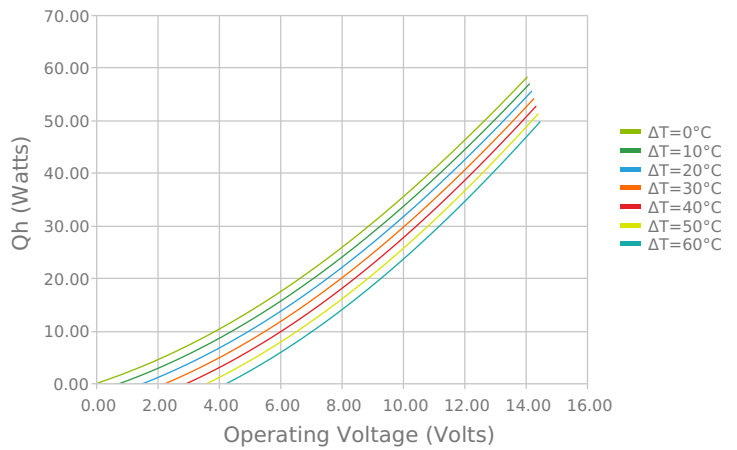
Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C



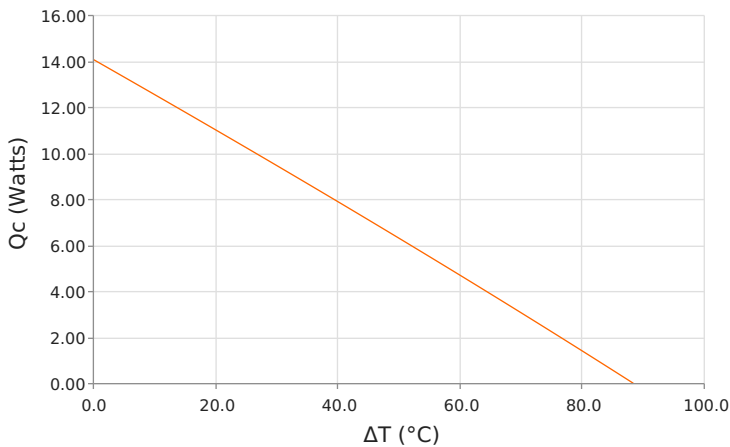
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)  
Thot = 27 °C



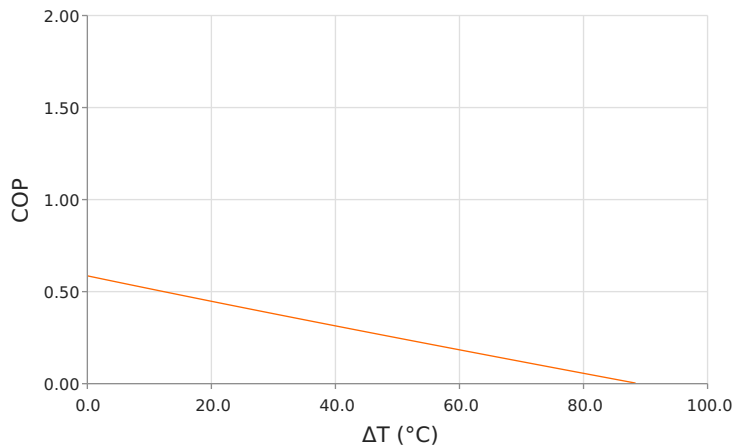
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)  
Thot = 27 °C



Heat Pumped at Cold Side (Qc)  
Thot = 27 °C | Current = 2.3 Amps



Coefficient of Performance (COP = Qc/Pin)  
Thot = 27 °C | Current = 2.3 Amps



## SPECIFICATIONS\*

<b>Hot Side Temperature</b>	<b>27.0 °C</b>
<b>Qcmax (<math>\Delta T = 0</math>)</b>	15.4 Watts
<b><math>\Delta T_{max}</math> (<math>Q_c = 0</math>)</b>	91.0 °C
<b>I<sub>max</sub> (I @ <math>\Delta T_{max}</math>)</b>	3.0 Amps
<b>V<sub>max</sub> (V @ <math>\Delta T_{max}</math>)</b>	14.3 Volts
<b>Module Resistance</b>	4.85 Ohms
<b>Max Operating Temperature</b>	80 °C
<b>Weight</b>	18.0 gram(s)

\* Specifications reflect thermoelectric coefficients updated March 2020

## FINISHING OPTIONS

Suffix	Thickness	Flatness / Parallelism	Hot Face	Cold Face	Lead Length
00	6.703 ± 0.203 mm 0.264 ± 0.008 in	0.025 mm / 0.203 mm 0.001 in / 0.008 in	Metallized	Metallized	199.9 mm 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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