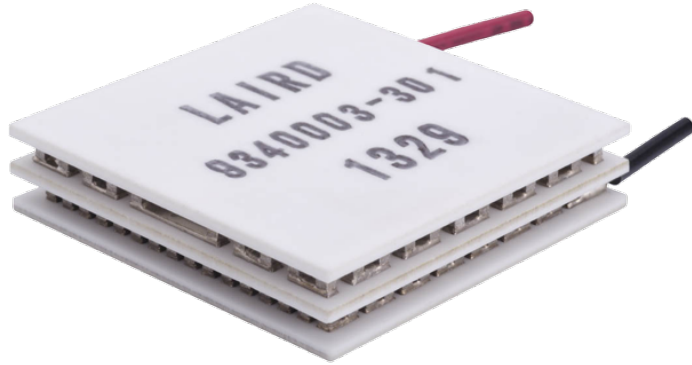


Multistage MS Series Thermoelectric Cooler

The MS2-190-10-10-12-12-11-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 ΔT of 91 °C at $Q_c = 0$.

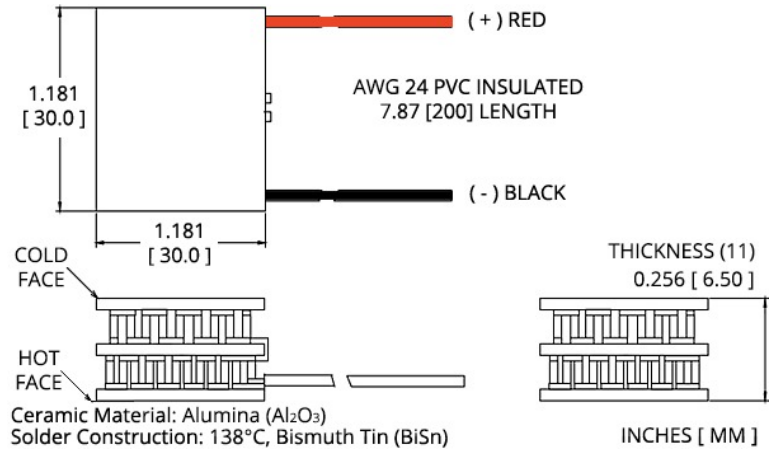


Features

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

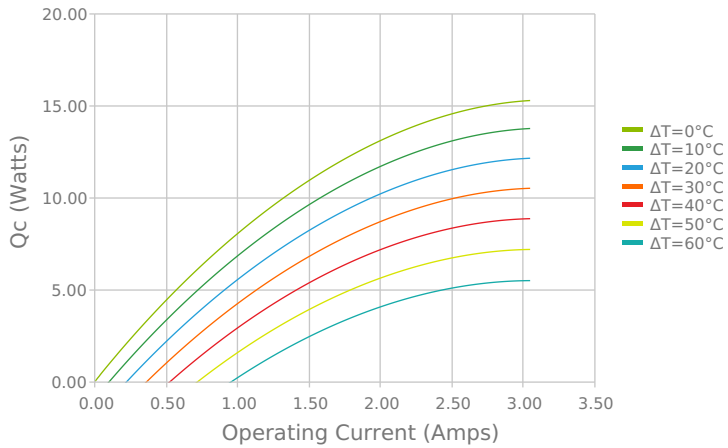
Applications

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

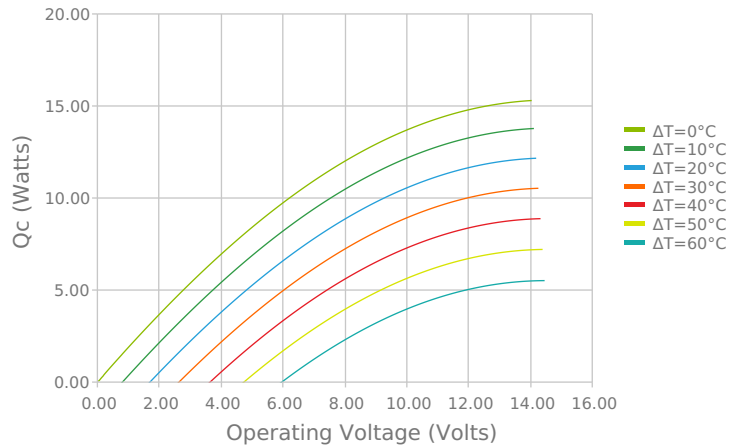


ELECTRICAL AND THERMAL PERFORMANCE

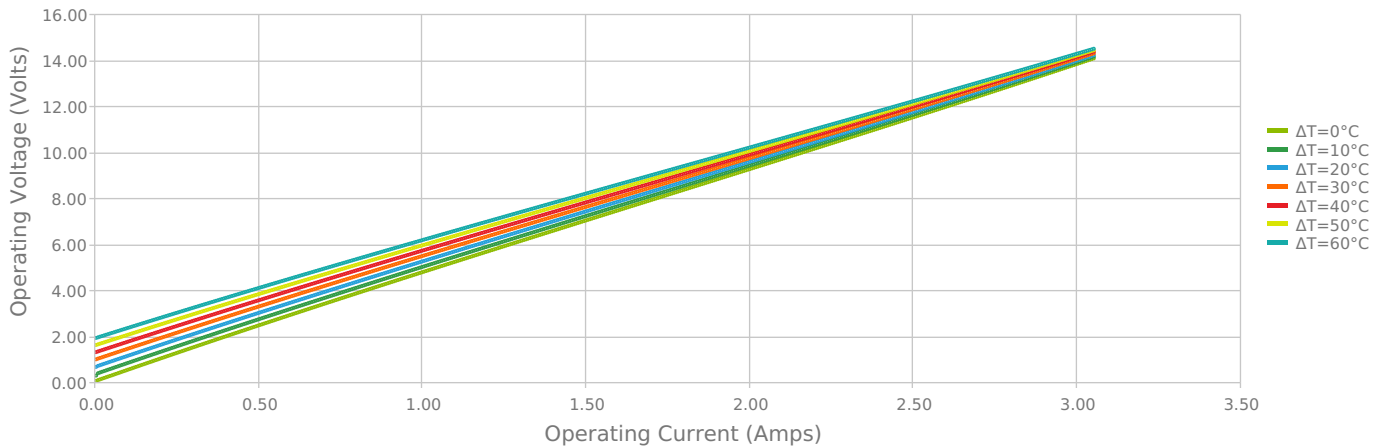
Heat Pumped at Cold Side
 $T_{hot} = 27\text{ °C}$



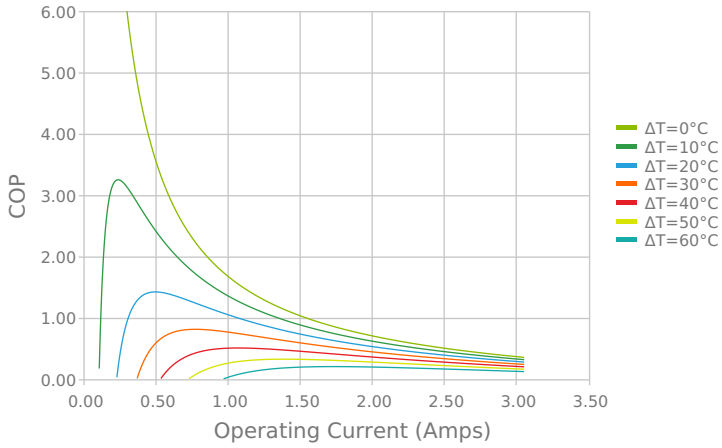
Heat Pumped at Cold Side
 $T_{hot} = 27\text{ °C}$



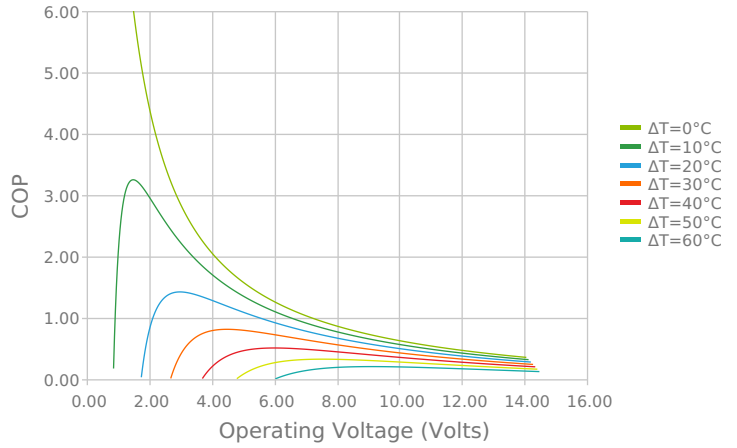
Current vs Voltage (I vs V)
 $T_{hot} = 27\text{ °C}$



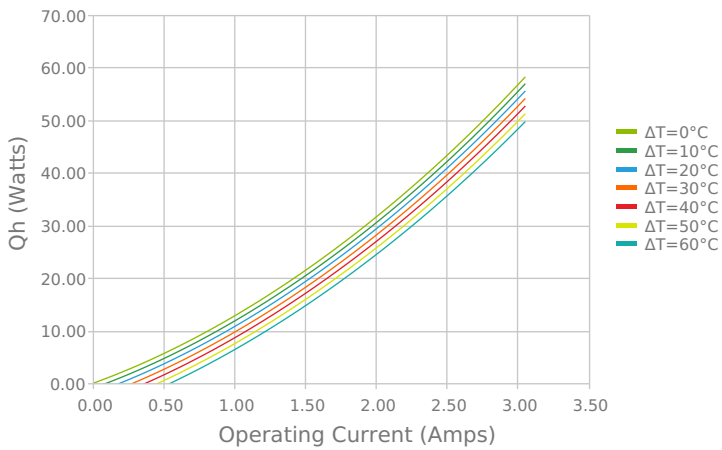
Coefficient of Performance (COP = Qc/Pin)
Thot = 27 °C



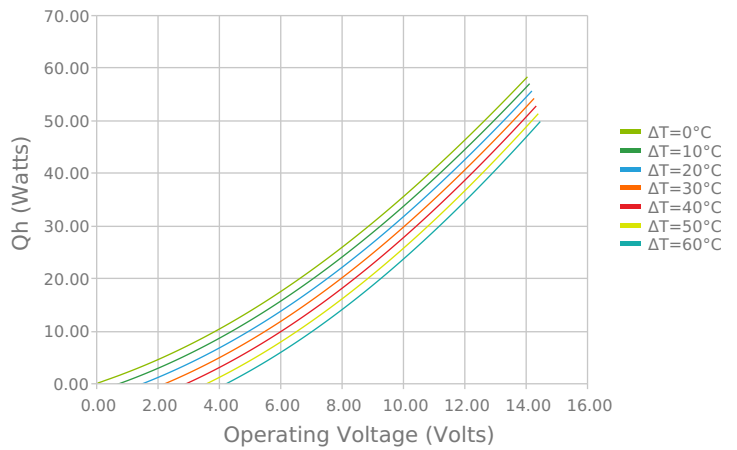
Coefficient of Performance (COP = Qc/Pin)
Thot = 27 °C



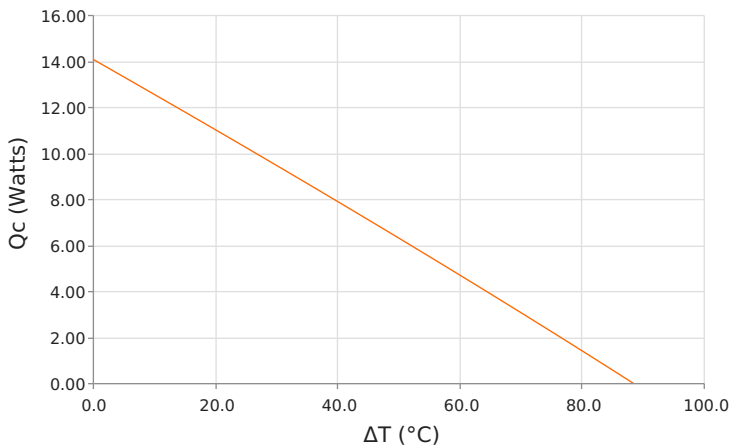
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)
Thot = 27 °C



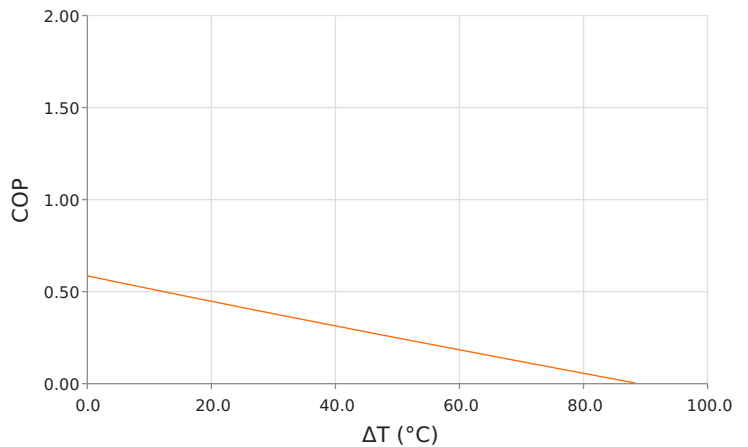
Total Heat Dissipated at Hot Side (Qh=Qc+Pin)
Thot = 27 °C



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*

Hot Side Temperature	27.0 °C
Qcmax ($\Delta T = 0$)	15.4 Watts
ΔT_{max} ($Q_c = 0$)	91.0 °C
I_{max} (I @ ΔT_{max})	3.0 Amps
V_{max} (V @ ΔT_{max})	14.3 Volts
Module Resistance	4.85 Ohms
Max Operating Temperature	80 °C
Weight	18.0 gram(s)

* Specifications reflect thermoelectric coefficients updated March 2020

FINISHING OPTIONS

Suffix	Thickness	Flatness / Parallelism	Hot Face	Cold Face	Lead Length
11	30.000 ±0.203 mm 1.181 ± 0.008 in	0.025 mm / 0.203 mm 0.001 in / 0.008 in	Lapped	Lapped	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_{max} or V_{max} when operating module
3. Reference assembly guidelines for recommended installation
4. Solder tinning also available on metallized ceramics

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