

# Specification of Thermoelectric Module

## TEC1-12405CH4.7

### Description

The 124 couples, 40 mm × 40 mm size module is a single stage module which is made of our high performance ingot to achieve superior cooling performance and 70 °C or larger delta Tmax, is designed for superior cooling and heating up applications. Beyond the standard below, we can design and manufacture the custom made module according to your special requirements.

### Features

- No moving parts, no noise, and solid-state
- Compact structure, small in size, light in weight
- Environmental friendly
- RoHS compliant
- Precise temperature control
- Exceptionally reliable in quality, high performance

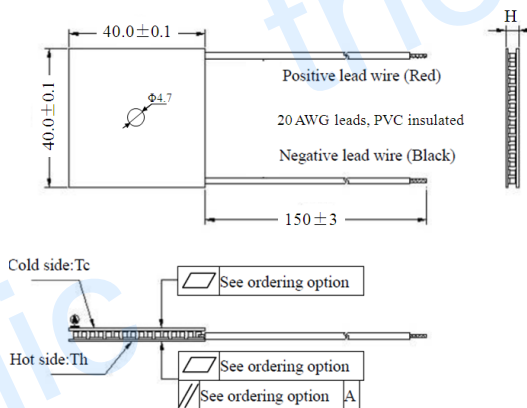
### Application

- Food and beverage service refrigerator
- Portable cooler box for cars
- Liquid cooling
- Temperature stabilizer
- CPU cooler and scientific instrument
- Photonic and medical systems

### Performance Specification Sheet

Th (°C)	27	50	Hot side temperature at environment: dry air, N <sub>2</sub>
DT <sub>max</sub> (°C)	70	79	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side
U <sub>max</sub> (Voltage)	15.6	16.8	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (Amps)	5	5	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	48.9	53.4	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (Ohms)	2.35	2.55	The module resistance is tested under AC
Tolerance (%)	± 10		For thermal and electricity parameters

### Geometric Characteristics Dimensions in millimeters



### Manufacturing Options

#### A. Solder:

1. T100: BiSn (Melting Point=138°C)
2. T200: CuSn (Melting Point= 227 °C)

#### B. Sealant:

1. NS: No sealing (Standard)
2. SS: Silicone sealant
3. EPS: Epoxy sealant
4. Customer specify sealing

#### C. Ceramics:

1. Alumina (Al<sub>2</sub>O<sub>3</sub>, white 96%)(AIO)
2. Aluminum Nitride (AlN)

#### D. Ceramics Surface Options:

1. Blank ceramics (not metalized)
2. Metalized (Copper-Nickel plating)

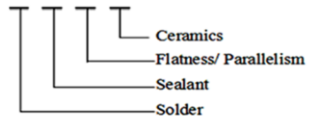
### Ordering Option

Suffix	Thickness H / (mm)	Flatness/ Parallelism (mm)	Lead wire length (mm) Standard/Optional length
TF	0:3.7 ±0.1	0:0.05/0.05	150±3/Specify
TF	1:3.7 ±0.05	1:0.025/0.025	150±3/Specify
TF	2:3.7 ±0.025	2:0.015/0.015	150±3/Specify

Eg. TF01: Thickness 3.7±0.1(mm) and Flatness 0.025/0.025(mm)

### Naming for the Module

TEC1-12405CH4.7-X-X-X-X



TEC1-12405CH4.7-T100-NS-TF01-AIO

CH4.7: Center hole diameter 4.7mm

T100: BiSn (T<sub>melt</sub>=138°C)

NS: No sealing

AIO: Alumina white 96%

TF01: Thickness ± 0.1 (mm) and Flatness/Parallelism 0.025/0.025(mm)

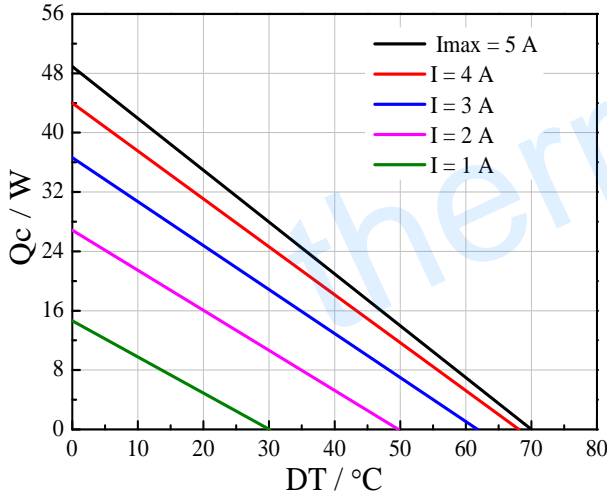
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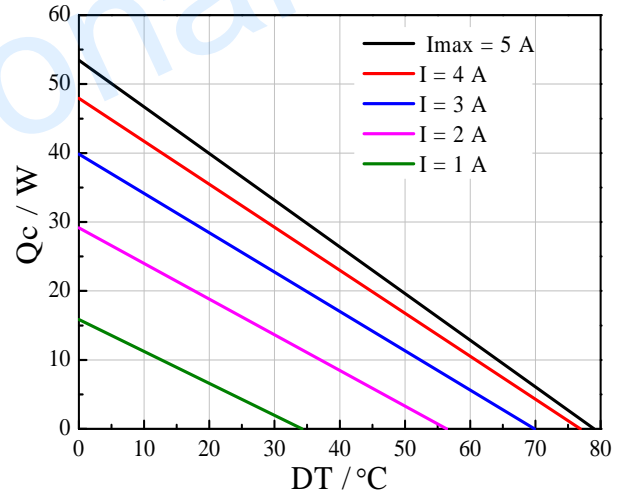
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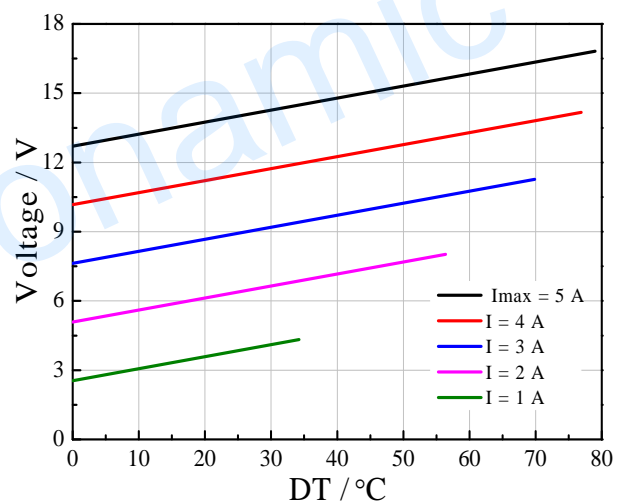
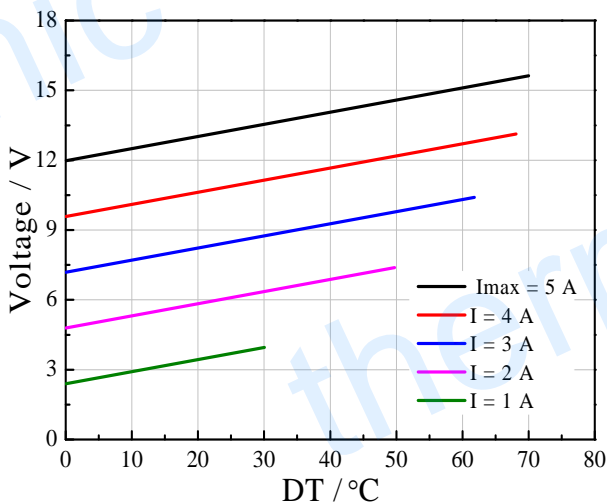
#### Performance Curves at $T_h=27\text{ }^\circ\text{C}$



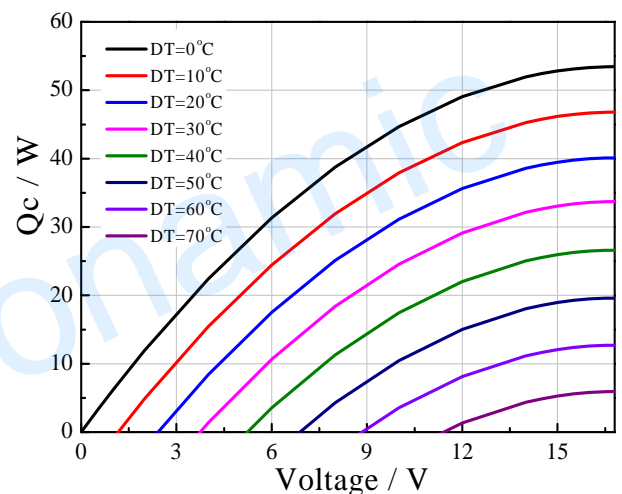
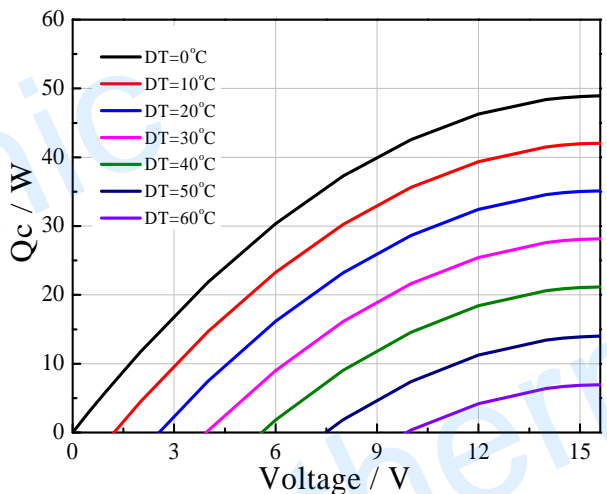
#### Performance Curves at $T_h=50\text{ }^\circ\text{C}$



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(DT)$



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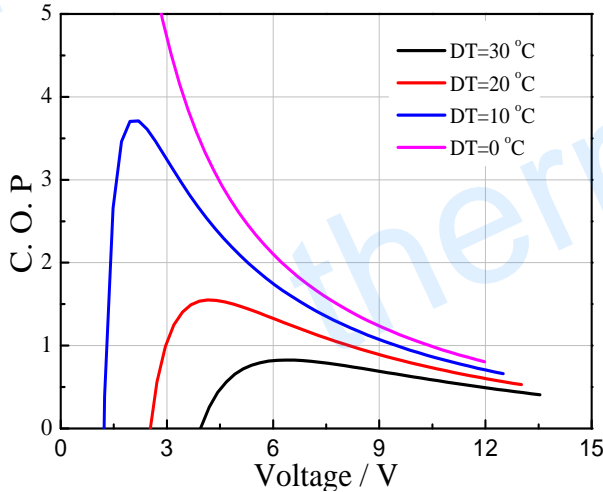
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Standard Performance Graph  $Q_c = f(V)$

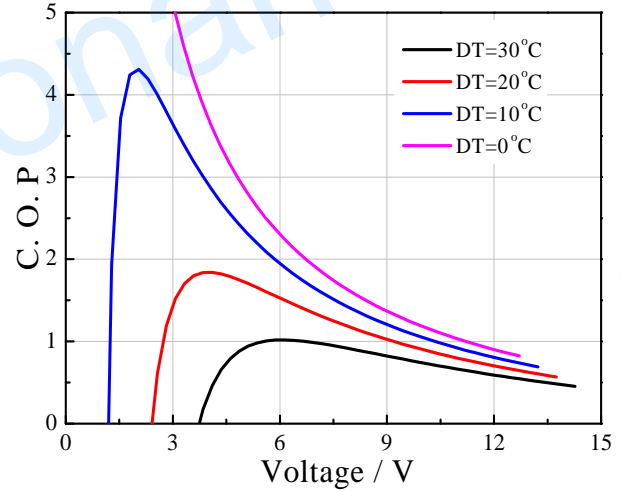
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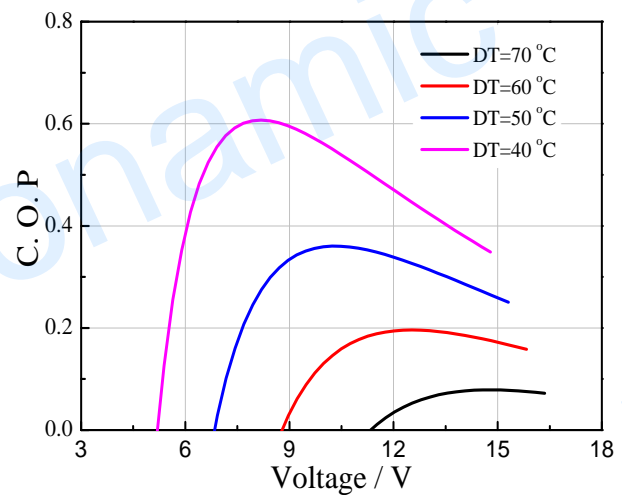
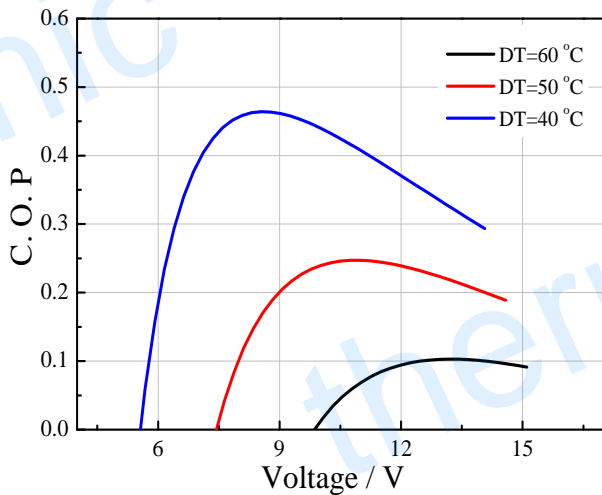
Performance Curves at  $T_h = 27\text{ }^\circ\text{C}$



Performance Curves at  $T_h = 50\text{ }^\circ\text{C}$



Standard Performance Graph COP = f(V) of DT ranged from 0 to 30 °C



Standard Performance Graph COP = f(V) of DT ranged from 40 to 60/70 °C

Remark: The coefficient of performance (COP) is the cooling power  $Q_c$ /Input power ( $V \times I$ ).

### Operation Cautions

- Cold side of the module stucked on the object being cooled
- Hot side of the module mounted on a heat radiator
- Operation below  $I_{max}$  or  $V_{max}$
- Work under DC

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