

# Specification of Thermoelectric Module

## TES1-13160C

### Description

The 131 couples, 36.2 mm × 48.4 mm size single 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 to 100 °C applications. If higher operation or processing temperature is required, please specify, 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

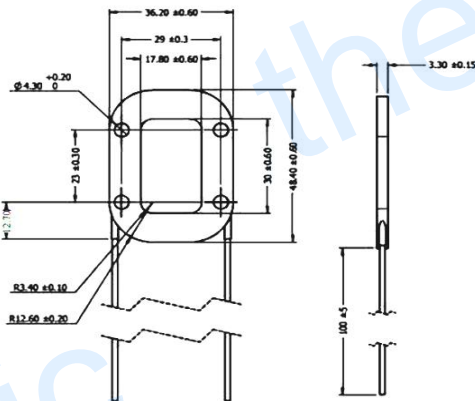
### Application

- 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)	16.4	17.8	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (Amps)	6.4	6.4	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	66.5	71.6	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (Ohms)	1.96	2.11	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 (Tmelt=138°C)
2. T200: CuSn (Tmelt = 227 °C)

#### B. Sealant:

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

#### C. Ceramics:

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

#### D. Ceramics Surface Options:

1. Blank ceramics (not metallized)
2. Metallized (Au plating)

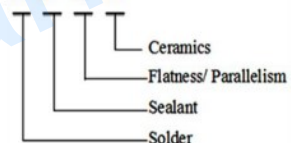
### Ordering Option

Suffix	Thickness H (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0: 3.3 ± 0.15	0: 0.05/0.05	100 ± 5 / Specify
TF	1: 3.3 ± 0.05	1: 0.025/0.025	100 ± 5 / Specify
TF	2: 3.3 ± 0.03	2: 0.015/0.015	100 ± 5 / Specify

Eg. TF01: Thickness 3.3 ± 0.15 (mm) and Flatness 0.025/0.025 (mm)

### Naming for the Module

TES1-13160C-X-X-X-X



TES1-13160C-T100-NS-TF01-A10

T100: Solder: BiSn (Melting Point=138°C)

NS: No sealing

A10: Alumina white 96%

TF01: Thickness ± 0.15(mm) and Flatness/Parallelism 0.025/0.025(mm)

Creative technology with fine manufacturing processes provides you the reliable and quality products

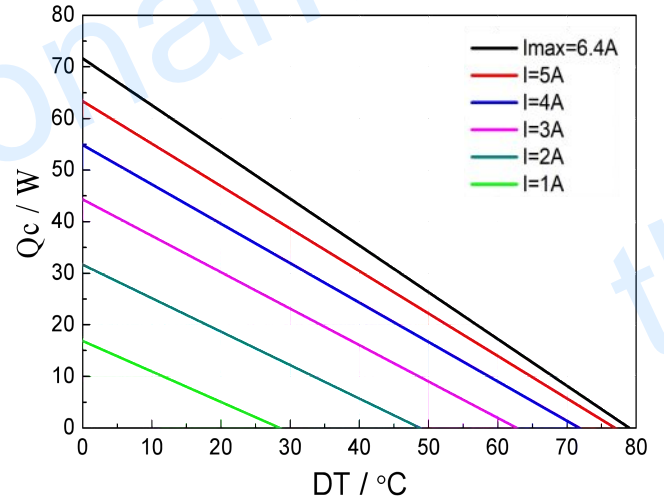
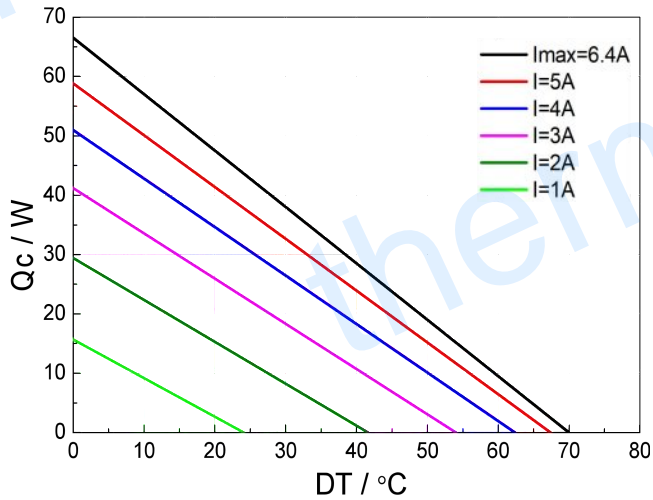
Tel: +86-791-88198288 Fax: +86-791-88198308 Email: [sales@thermonamic.com.cn](mailto:sales@thermonamic.com.cn) Web Site: [www.thermonamic.com.cn](http://www.thermonamic.com.cn)

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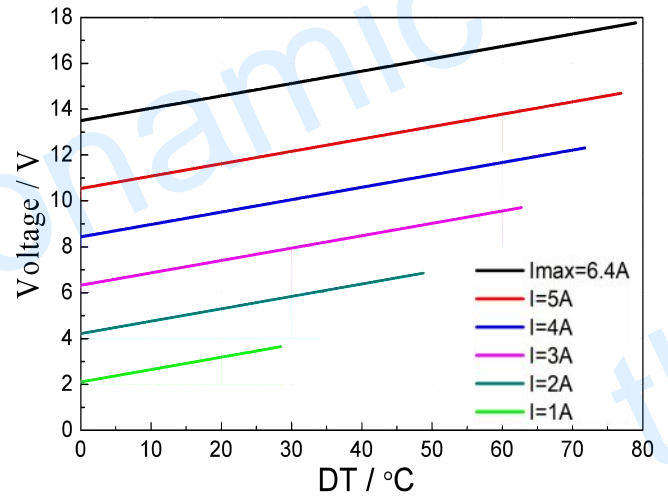
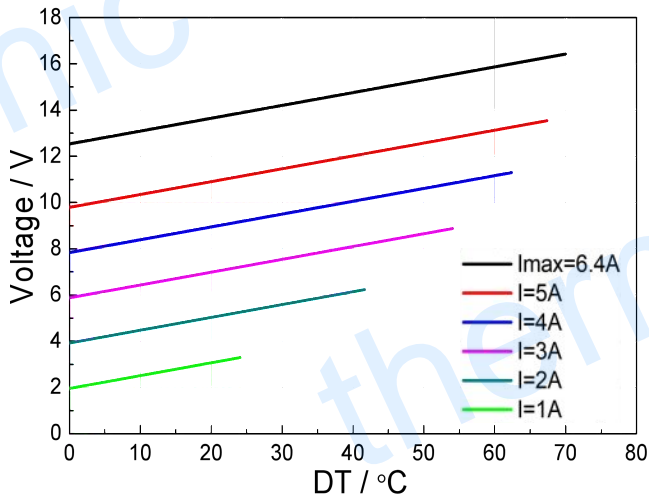
## TES1-13160C

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

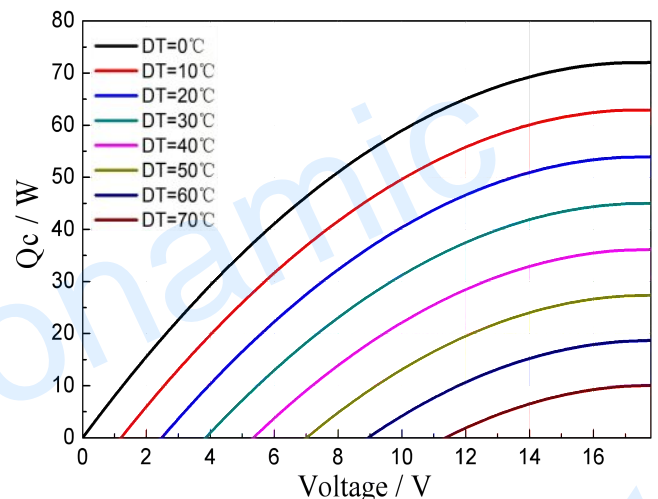
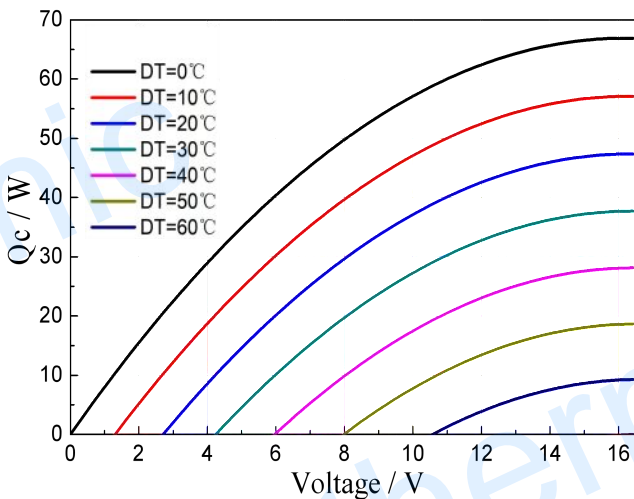
### Performance Curves at $T_h=50^\circ\text{C}$



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(DT)$

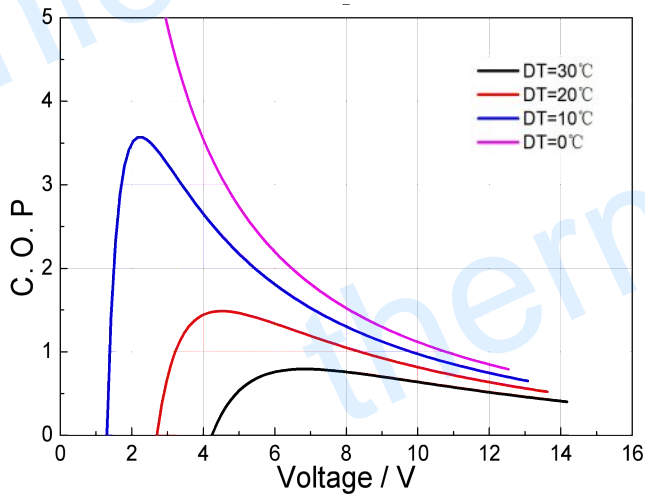


Standard Performance Graph  $Q_c = f(V)$

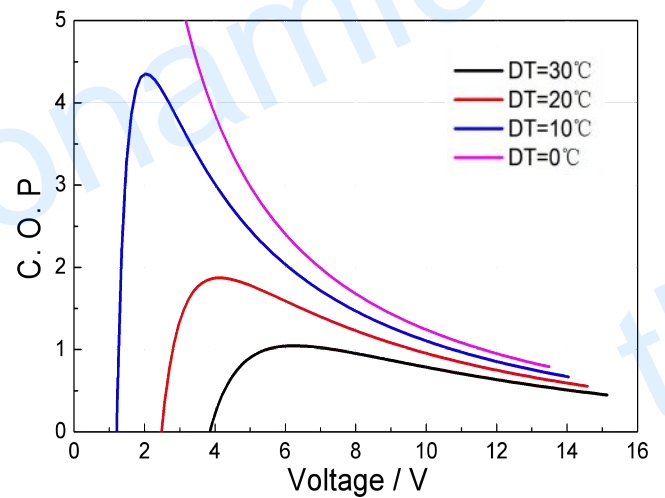
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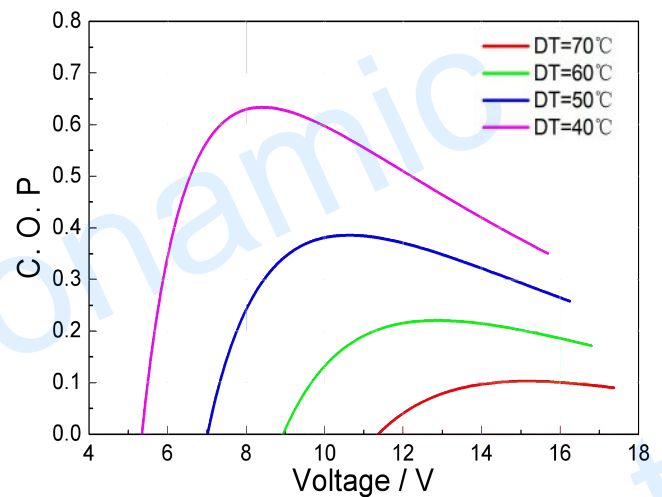
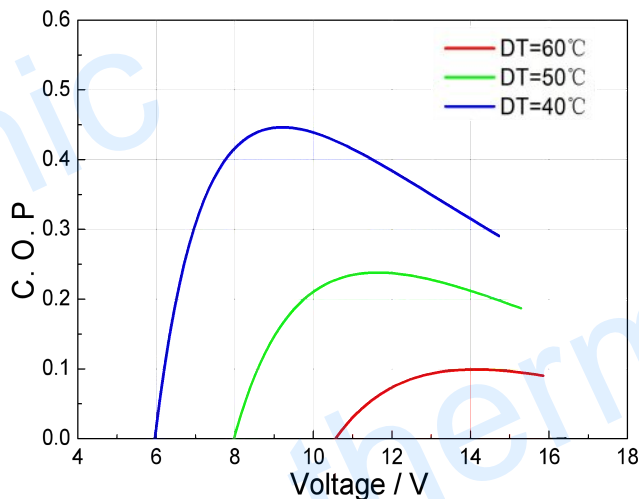
#### Performance Curves at $T_h=27\text{ }^\circ\text{C}$



#### 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

- Attach the cold side of module to the object to be cooled
- Attach the hot side of module to a heat radiator for heat dissipating
- Operation below  $I_{max}$  or  $V_{max}$
- Operation or storage module below 100 °C
- Work under DC