

# Specification of Thermoelectric Module

## TES1-12720

### Description

The 127 couples, 25 mm x 25 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 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

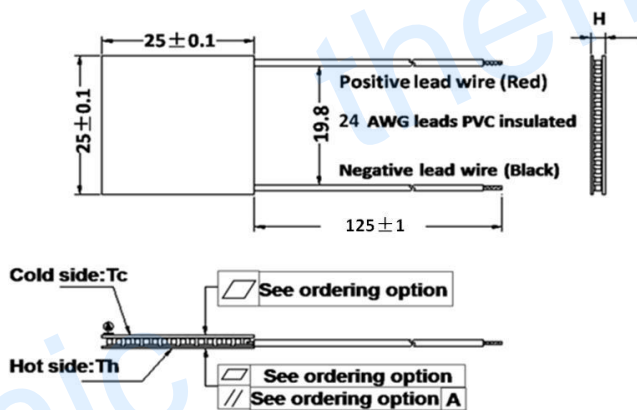
### Application

- 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)	15.9	17.2	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (Amps)	2.4	2.4	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	24.2	26.0	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (Ohms)	5.06	5.45	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 (T<sub>melt</sub>=138°C)
2. T200: CuSn (T<sub>melt</sub> = 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%)
2. Aluminum Nitride (AlN)

#### D. Ceramics Surface Options:

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

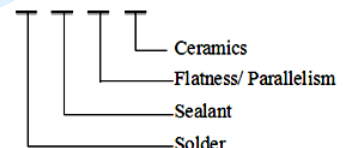
### Ordering Option

Suffix	Thickness H (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:3.35± 0.1	0: 0.05/0.05	125±1/Specify
TF	1: 3.35 ± 0.05	1: 0.025/0.025	125±1/Specify
TF	2:3.35± 0.025	2: 0.015/0.015	125±1/Specify

Eg. TF01: Thickness 3.35± 0.1 (mm) and Flatness 0.025/0.025 (mm)

### Naming for the Module

TES1-12720- X-X -X - X



TES1-12720-T100 -NS -TF01 -A10

T100: BiSn(T<sub>melt</sub>=138°C)

NS: No sealing

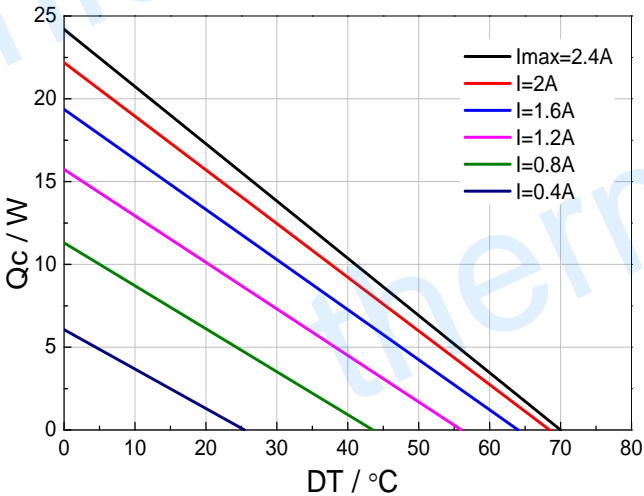
A10: Alumina white 96%

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

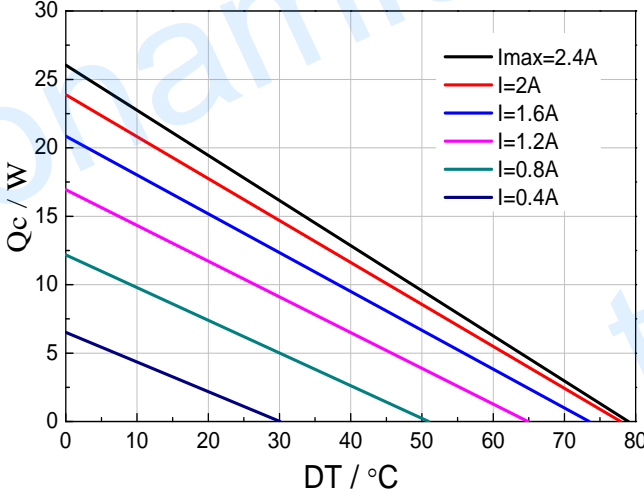
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**TES1-12720**

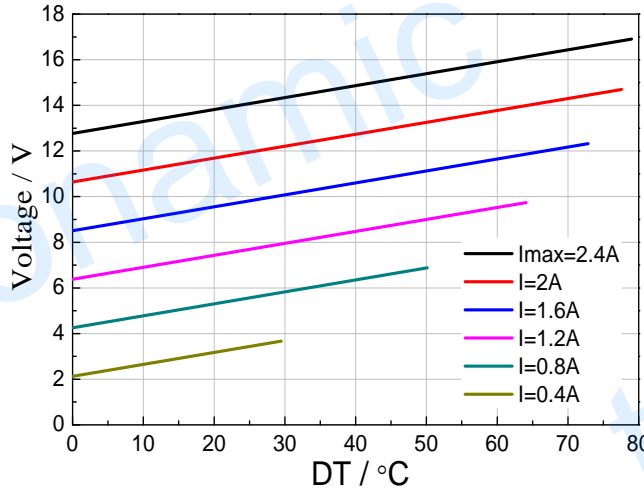
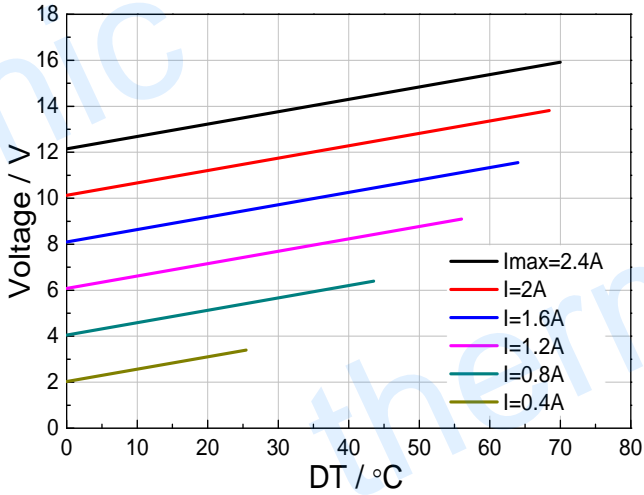
**Performance Curves at Th=27 °C**



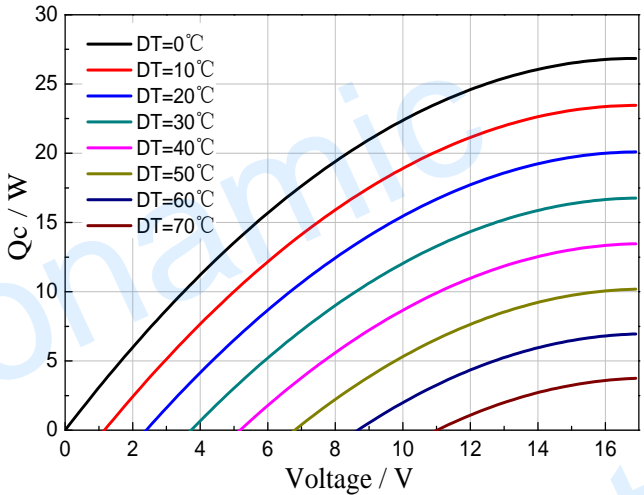
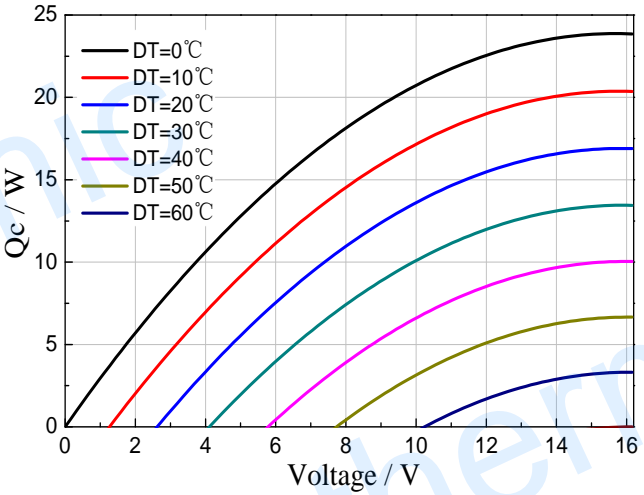
**Performance Curves at Th=50 °C**



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(DT)$

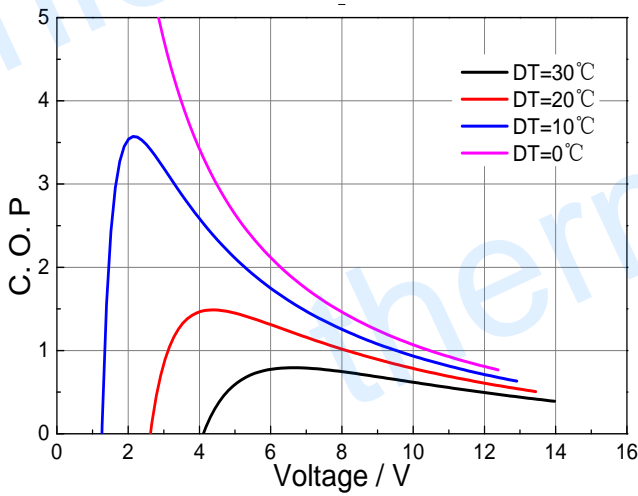


Standard Performance Graph  $Q_c = f(V)$

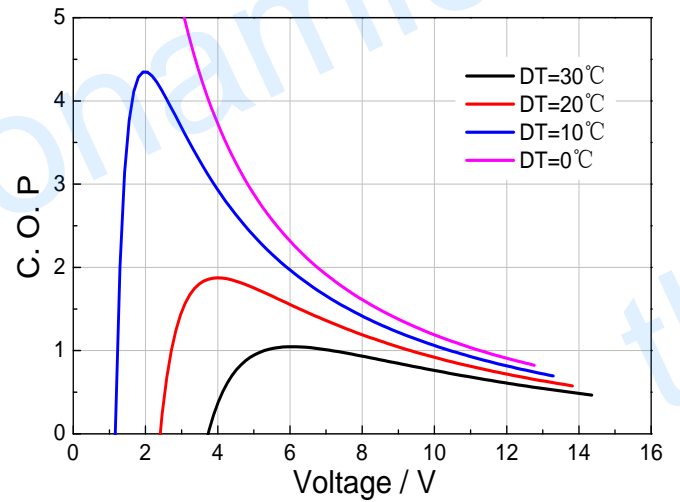
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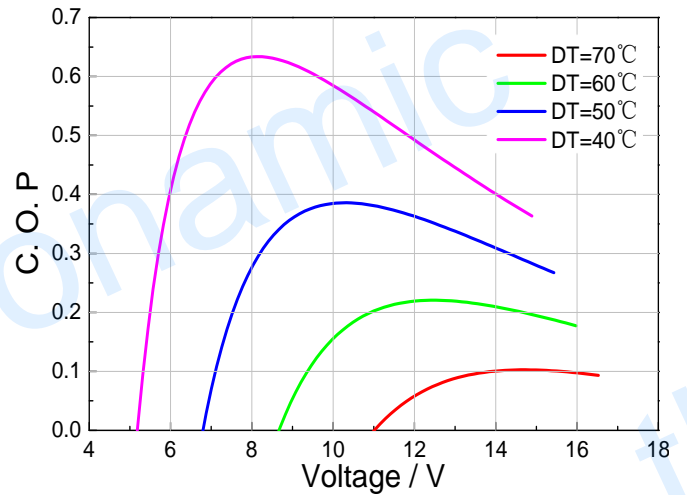
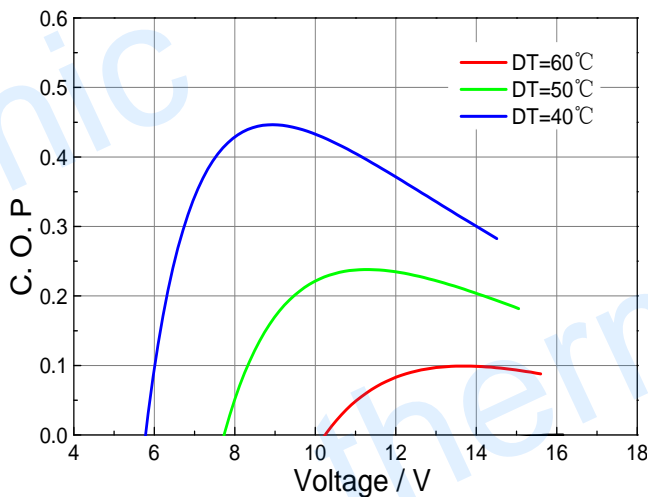
## Performance Curves at Th=27 °C



## Performance Curves at Th=50 °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 Caution

- 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

**Note:** All specifications subject to change without notice.