

## Specification of Thermoelectric Module

TES1-04920

### Description

The 49 couples, 23 mm × 23 mm size module which is made of selected high performance ingot to achieve superior cooling performance and greater delta T up to 70 °C, 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

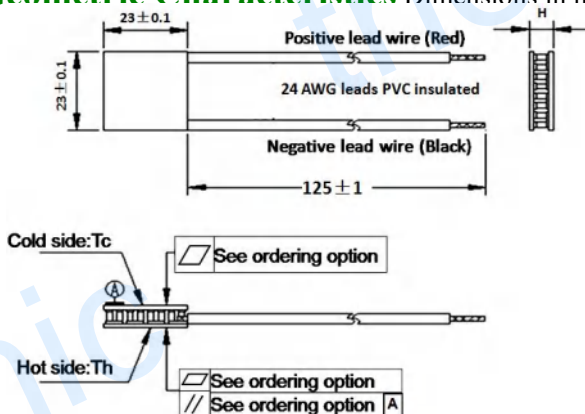
### Application

- CCD Sensor
- Laser 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)	6.1	6.6	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (amps)	2.5	2.5	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	9.6	10.5	Cooling capacity at cold side of the module under DT=0 °C
AC resistance(ohms)	1.88	2.01	The module resistance is tested under AC
Tolerance (%)	± 10		For thermal and electricity parameters

### Geometric Characteristics Dimensions in millimeters



### Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:3.0 ± 0.1	0:0.07/0.07	125±1/Specify
TF	1:3.0 ± 0.03	1:0.025/0.025	125±1/Specify

Eg. TF01: Thickness 3.0 ± 0.1 (mm) and Flatness 0.025/0.025 (mm)

### Manufacturing Options

#### A. Solder:

1. T100: BiSn (Tmelt=138°C)
2. T200: CuAgSn (Tmelt = 217°C)
3. T240: SbSn (Tmelt = 240°C)

#### C. Ceramics:

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

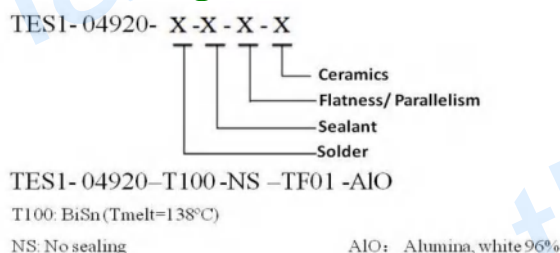
#### B. Sealant:

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

#### D. Ceramics Surface Options:

1. Blank ceramics (not metalized)
2. Metalized

### Naming for the Module

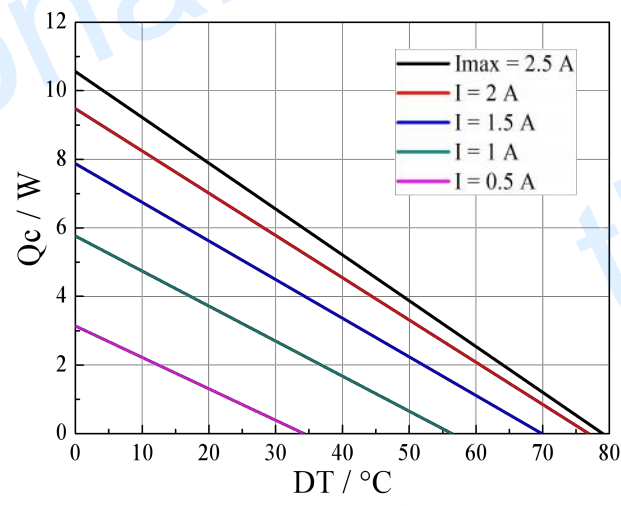
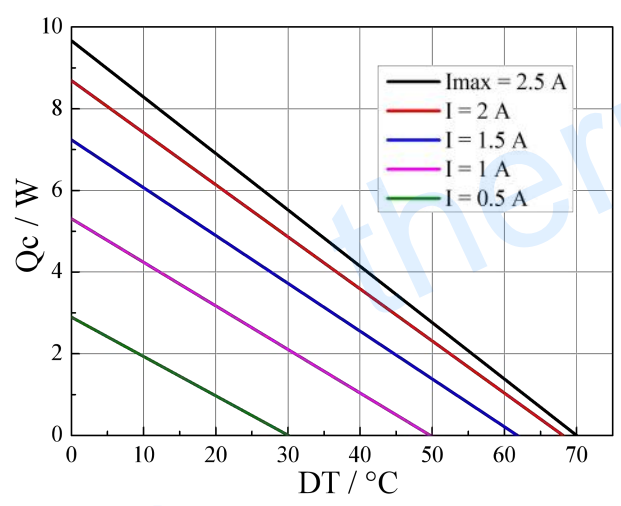


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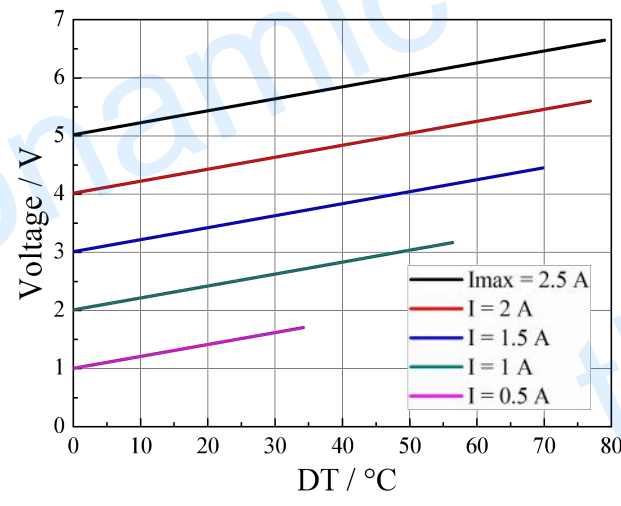
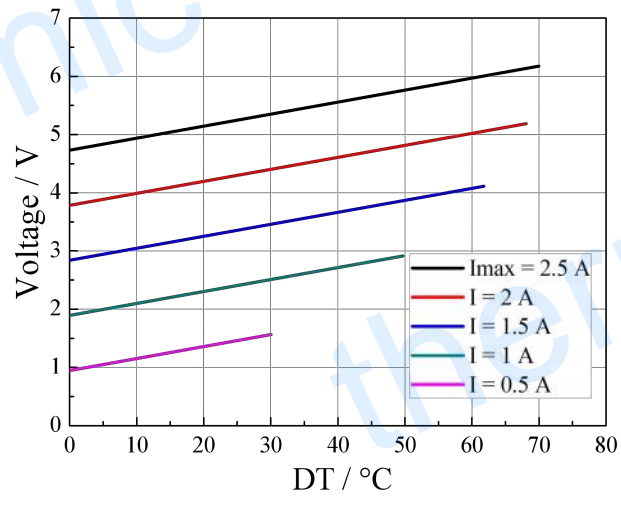
**TES1-04920**

**Performance Curves at Th=27 °C**

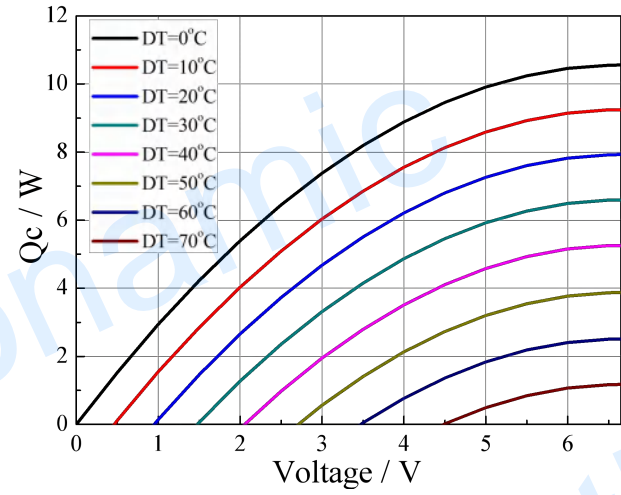
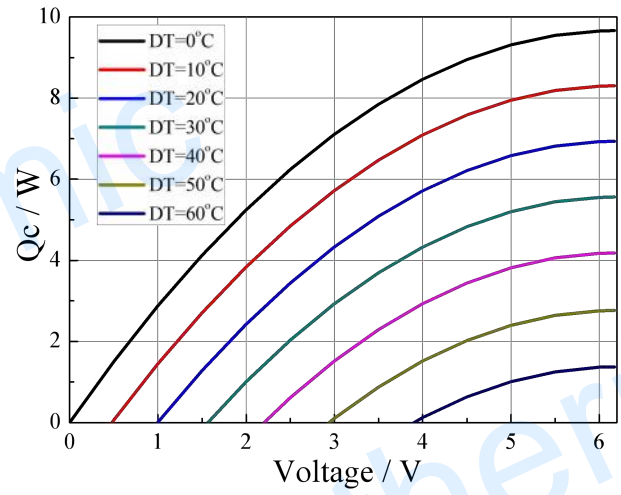
**Performance Curves at Th=50 °C**



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(\Delta T)$

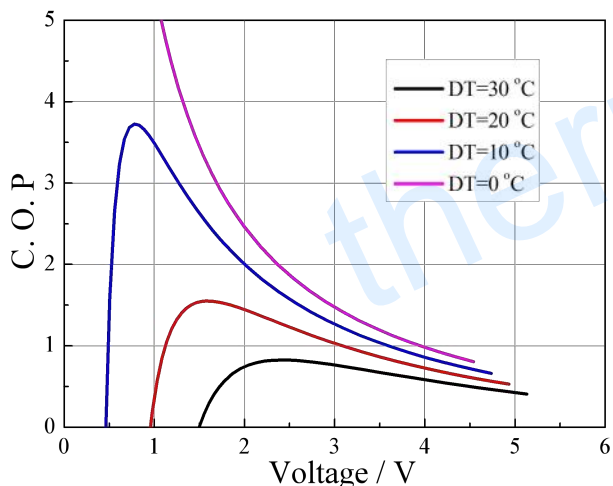


Standard Performance Graph  $Q_c = f(V)$

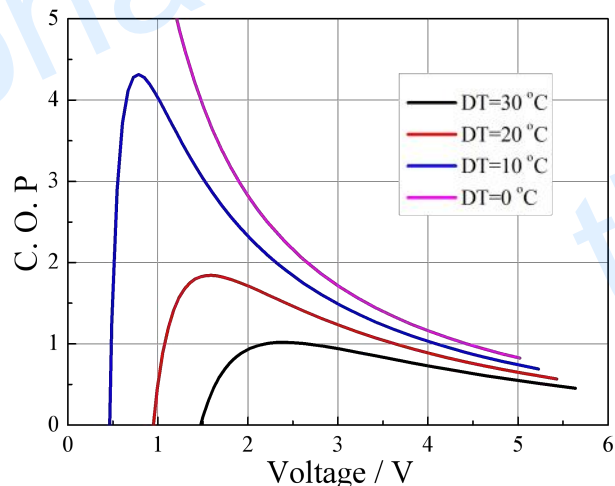
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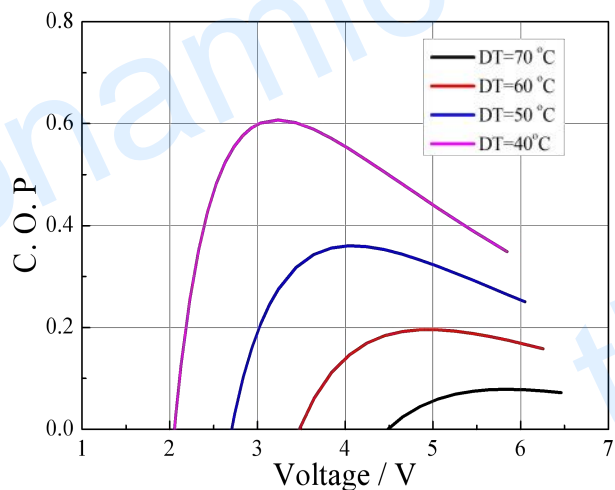
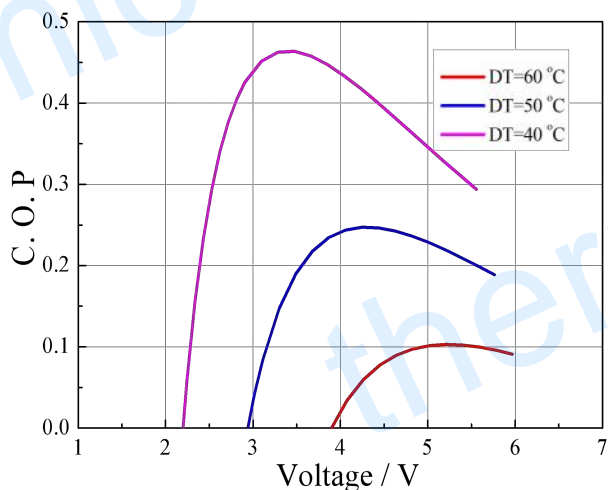
### Performance Curves at $T_h=27\text{ }^\circ\text{C}$



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



Standard Performance Graph  $COP = f(V)$  of  $\Delta T$  ranged from 0 to  $30\text{ }^\circ\text{C}$



Standard Performance Graph  $COP = f(V)$  of  $\Delta T$  ranged from 40 to  $60/70\text{ }^\circ\text{C}$

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 or storage module below  $100\text{ }^\circ\text{C}$
- Operation below  $I_{max}$  or  $V_{max}$
- Work under DC