

# Specification of Thermoelectric Module

## TEC1-03103

### Description

The 31 couples, 20 mm × 20 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 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

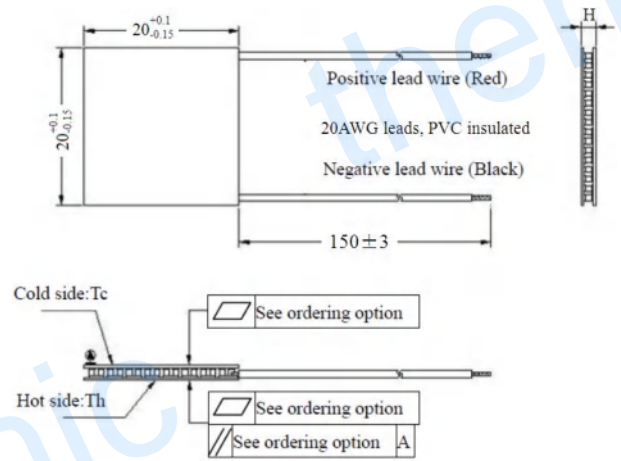
### Application

- 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)	4.0	4.38	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (Amps)	3.8	3.8	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	9.3	10.5	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (Ohms)	0.78	0.84	The module resistance is tested under AC
Tolerance (%)	± 10		For thermal and electricity parameters

### Geometric Characteristics Dimensions in millimeters



### Manufacturing Options

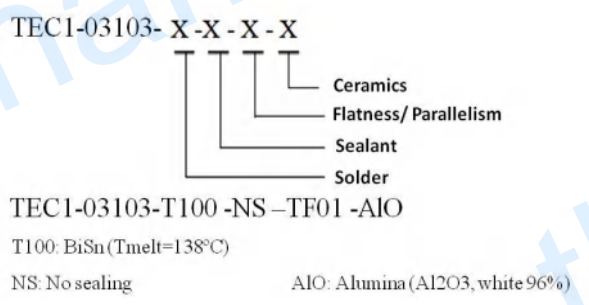
- A. Solder:**
  1. T100: BiSn (Tmelt=138°C)
  2. T200: CuAgSn (Tmelt = 217°C)
  3. T240: SbSn (Tmelt = 240°C)
- B. Sealant:**
  1. NS: No sealing (Standard)
  2. SS: Silicone sealant
  3. EPS: Epoxy sealant
- C. Ceramics:**
  1. Alumina (Al<sub>2</sub>O<sub>3</sub>, white 96%)
  2. Aluminum Nitride (AlN)
- D. Ceramics Surface Options:**
  1. Blank ceramics (not metalized)
  2. Metalized

### Ordering Option

Suffix	Thickness H / (mm)	Flatness/ Parallelism (mm)	Lead wire length (mm) Standard/Optional length
TF	0:4.2±0.1	0:0.05/0.05	150±3/Specify
TF	1:4.2±0.03	1:0.02/0.02	150±3/Specify

Eg. TF01: Thickness 4.2±0.1 (mm) and Flatness 0.02/0.02(mm)

### Naming for the Module

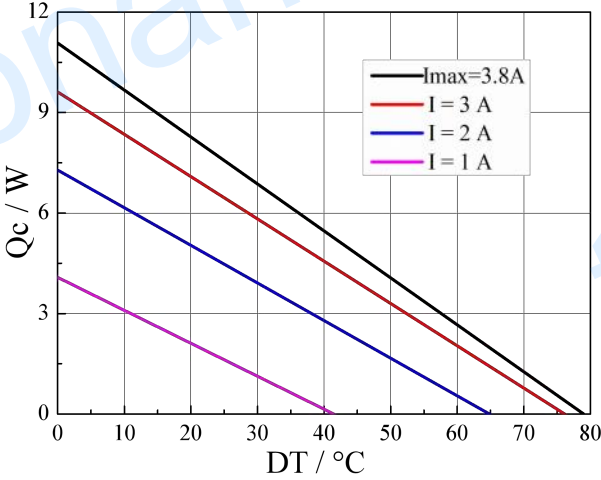
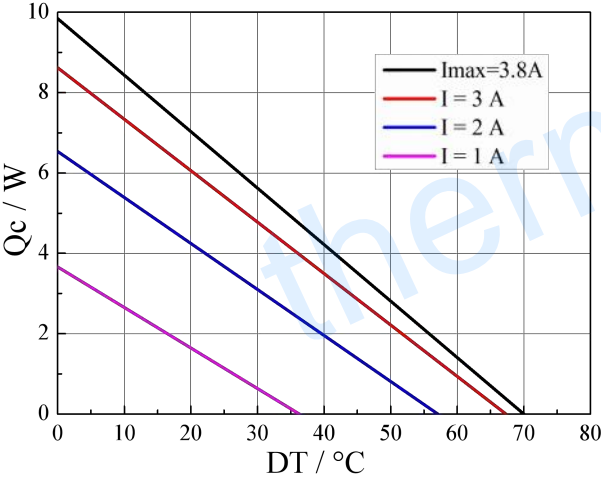


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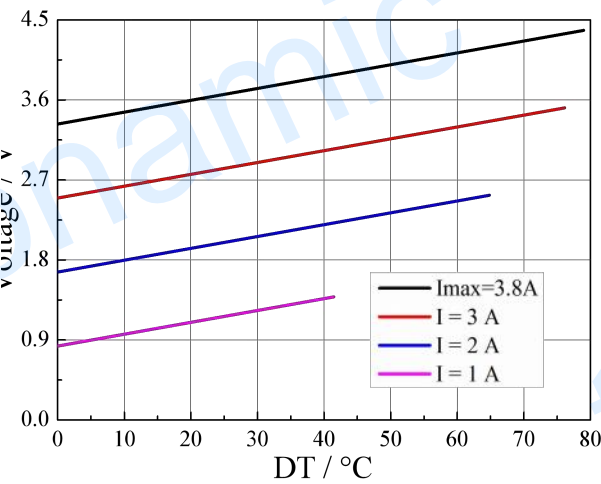
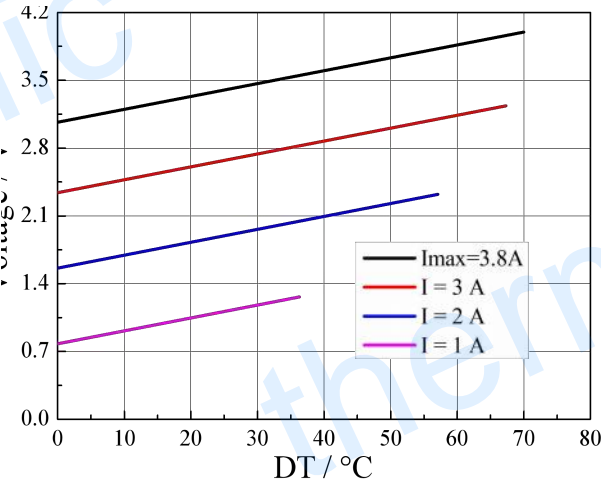
**TEC1-03103**

**Performance Curves at Th=27 °C**

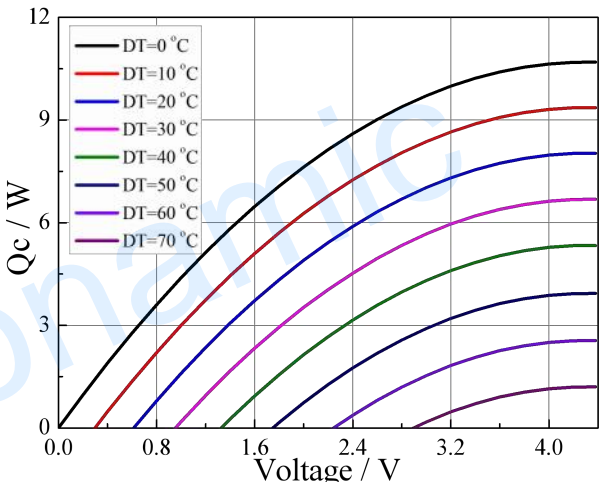
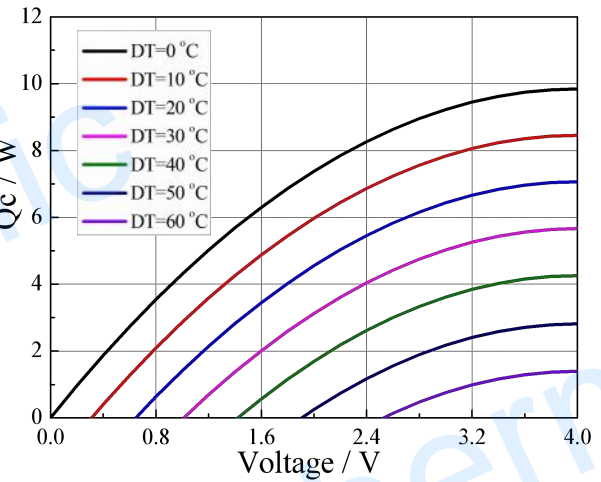
**Performance Curves at Th=50 °C**



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(DT)$

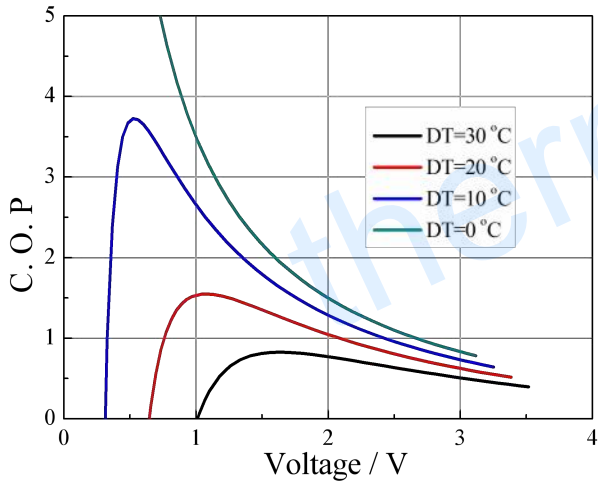


Standard Performance Graph  $Q_c = f(V)$

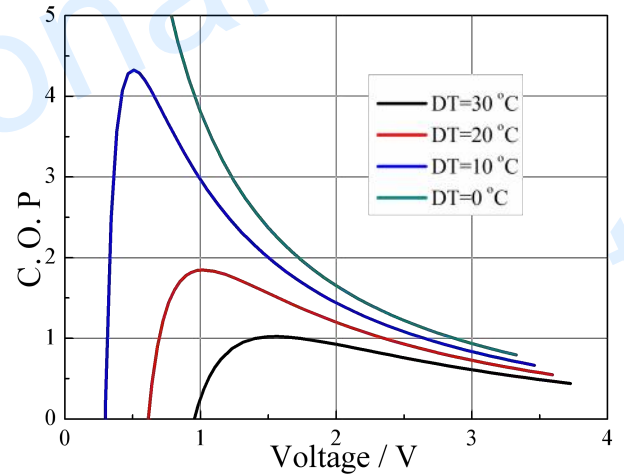
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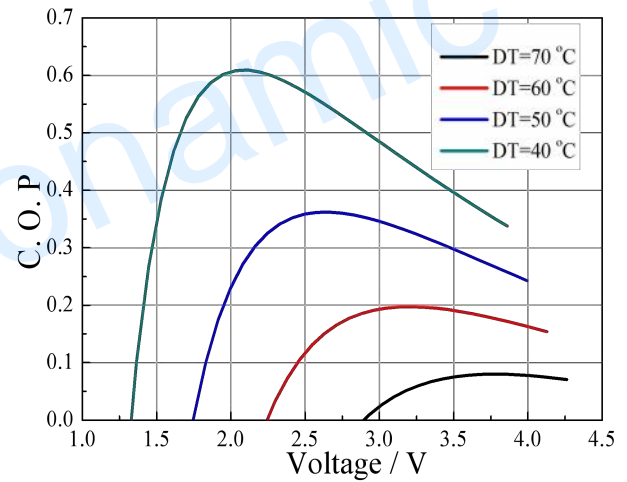
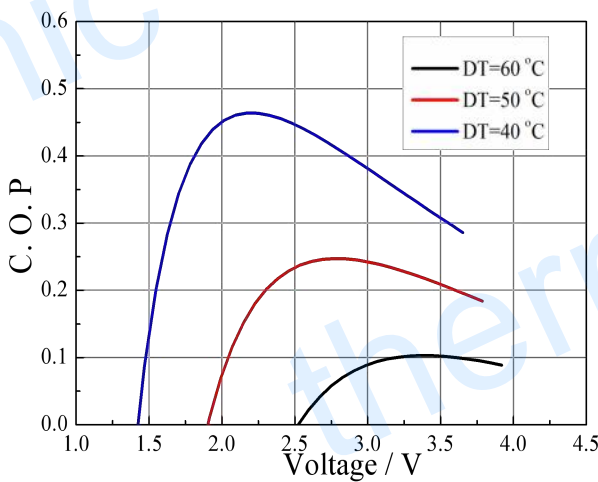
## Performance Curves at $T_h=27\text{ }^\circ\text{C}$



## 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  $V_{max}$
- Work under DC