

# Specification of Thermoelectric Module

## TEC1-16104

### Description

The 161 couples, 40 mm × 40 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

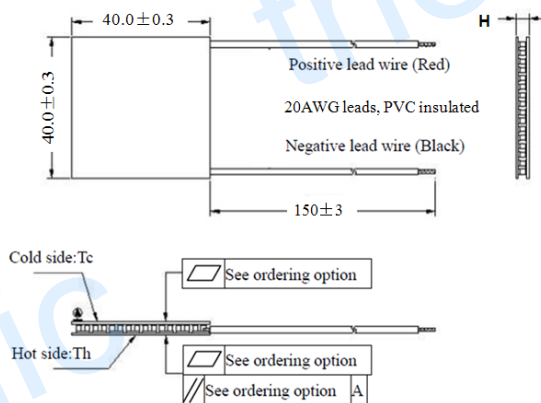
### Application

- 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)	20.2	21.8	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (amps)	4.8	4.8	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	60.9	66.6	Cooling capacity at cold side of the module under DT=0 °C
AC resistance(ohms)	3.3	3.55	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 (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 other than above

#### C. Ceramics:

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

#### D. Ceramics Surface Options:

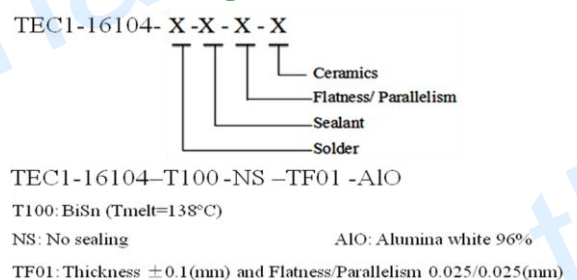
1. Blank ceramics (not metallized)
2. Metallized (Au plating)

### Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:3.9 ± 0.1	0:0.05/0.05	150 ± 3/Specify
TF	1:3.9 ± 0.05	1:0.025/0.025	150 ± 3/Specify
TF	2:3.9 ± 0.025	2:0.015/0.015	150 ± 3/Specify

Eg. TF01: Thickness 3.9 ± 0.1 (mm) and Flatness 0.025 / 0.025 (mm)

### Naming for the Module

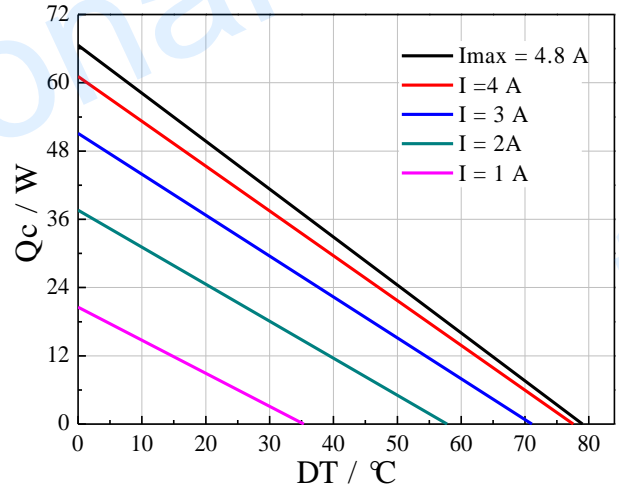
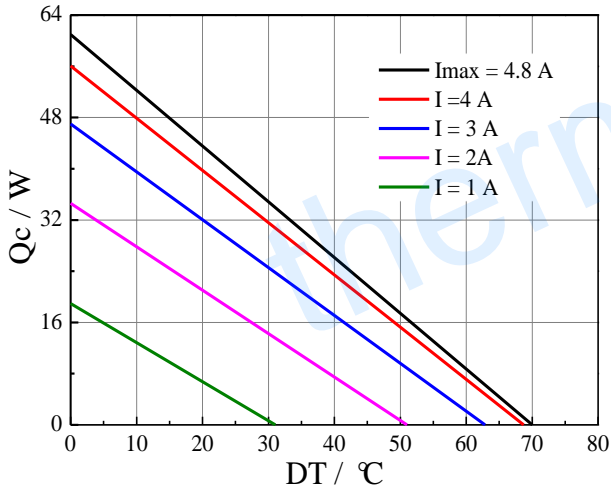


# Specification of Thermoelectric Module

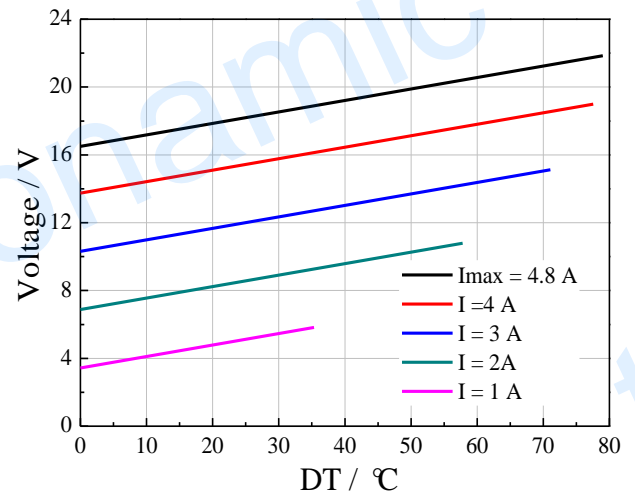
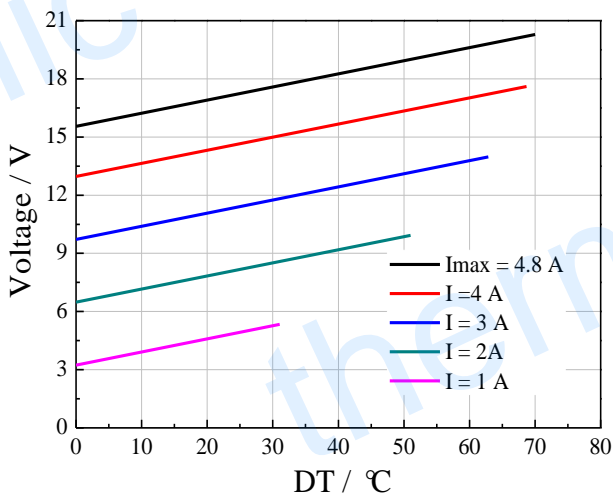
## TEC1-16104

### Performance Curves at Th=27 °C

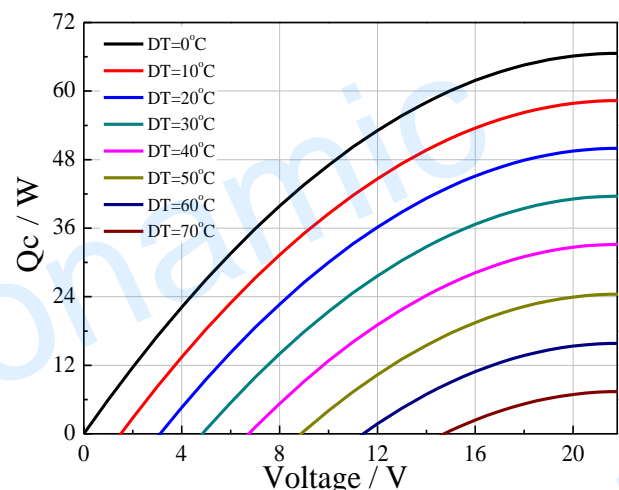
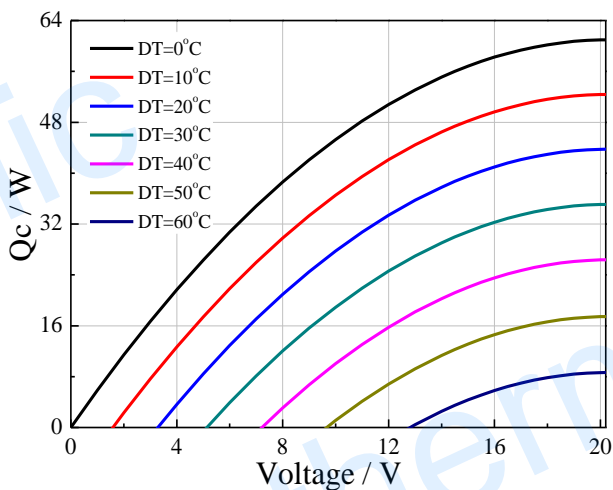
### Performance Curves at Th=50 °C



Standard Performance Graph  $Q_c = f(DT)$



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

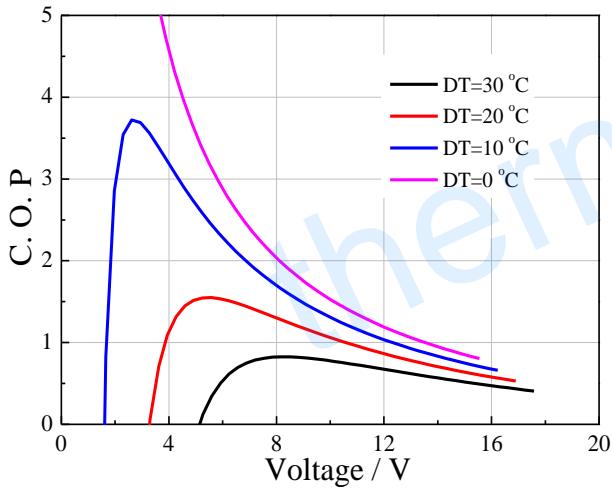


Standard Performance Graph  $Q_c = f(V)$

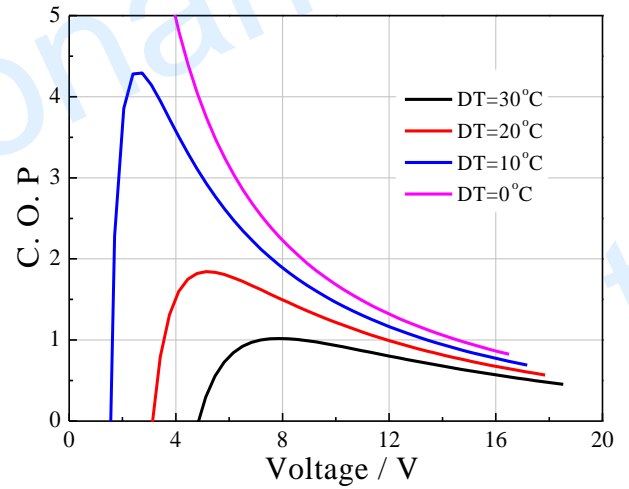
## Specification of Thermoelectric Module

**TEC1-16104**

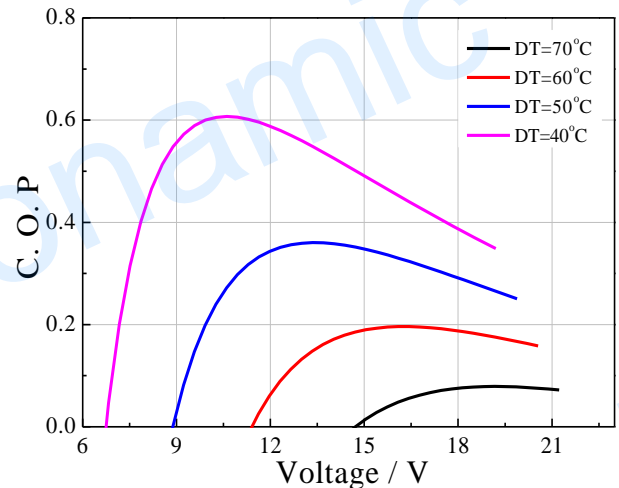
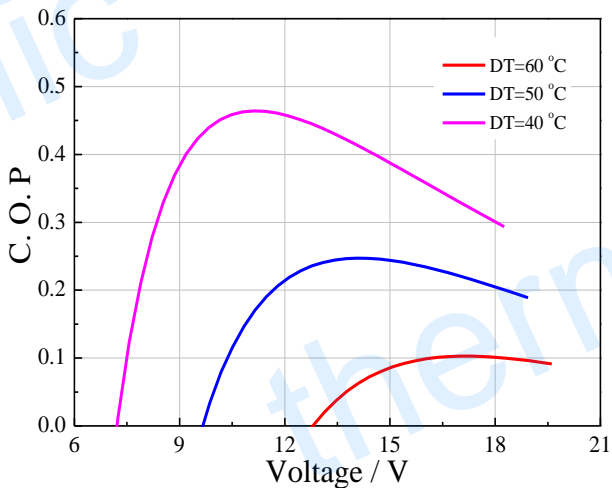
**Performance Curves at Th=27 °C**



**Performance Curves at Th=50 °C**



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



Standard Performance Graph COP = f(V) of ΔT 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
- Storage module below 100 °C
- Operation below  $I_{max}$  or  $V_{max}$
- Work under DC