

# Specification of Thermoelectric Module

## TEFC1-21520

### Description

The 215 couples, 12mm x 36mm 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

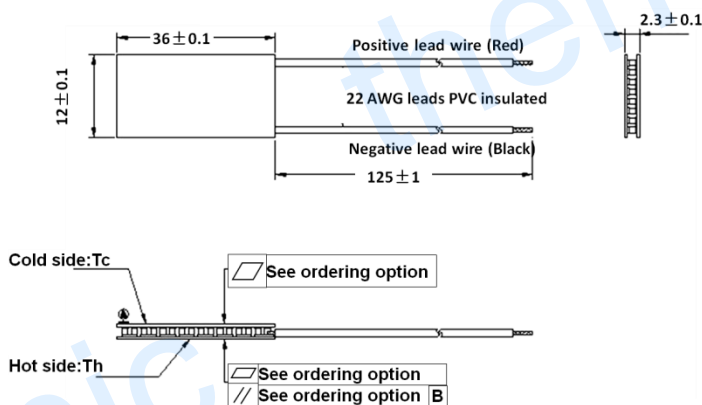
### Application

- Temperature stabilizer
- CPU cooler and scientific instrument
- Liquid cooling
- laser cooling
- CCD sensor
- 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)	26.8	29.0	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (Amps)	2.2	2.2	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	36.4	39.2	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (Ohms)	9.35	10.07	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)

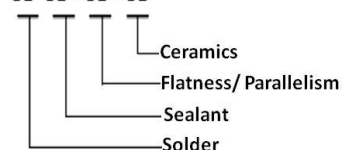
### Ordering Option

Suffix	Thickness H (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:2.3± 0.1	0:0.1/0.13	125±1/Specify
TF	1:2.3 ± 0.05	1:0.08/0.1	125±1/Specify
TF	2:2.3± 0.025	2:0.05/0.08	125±1/Specify

Eg. TF01: Thickness 2.3± 0.1 (mm) and Flatness 0.008/0.008 (mm)

### Naming for the Module

TEFC1- 21520- X -X - X - X



TEFC1- 21520-T200-NS -TF01 -AlO

T200: CuSn (T<sub>melt</sub>=227°C)

NS: No sealing

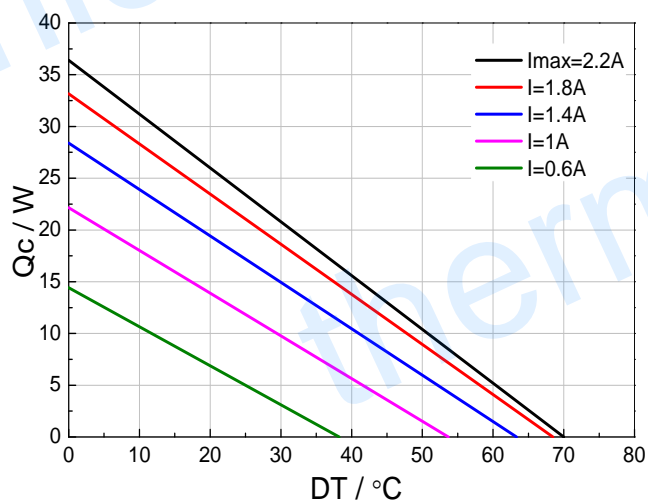
AlO: Alumina, white 96%

TF01: Thickness ± 0.1 (mm) and Flatness/ Parallelism 0.08/0.1 (mm)

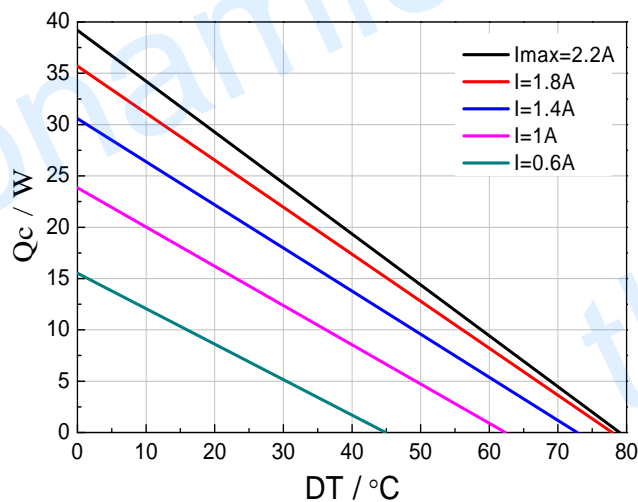
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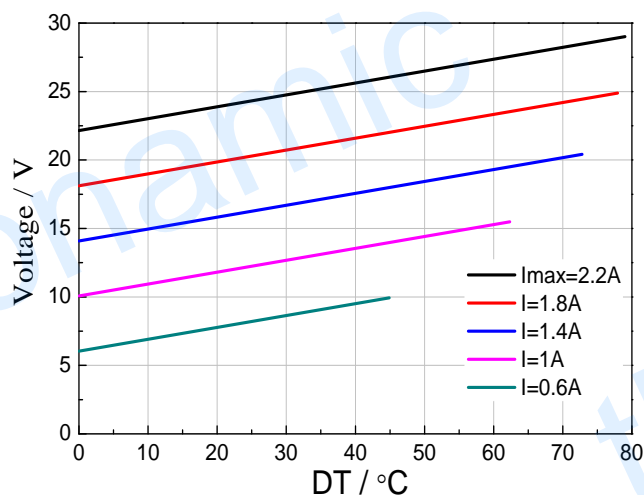
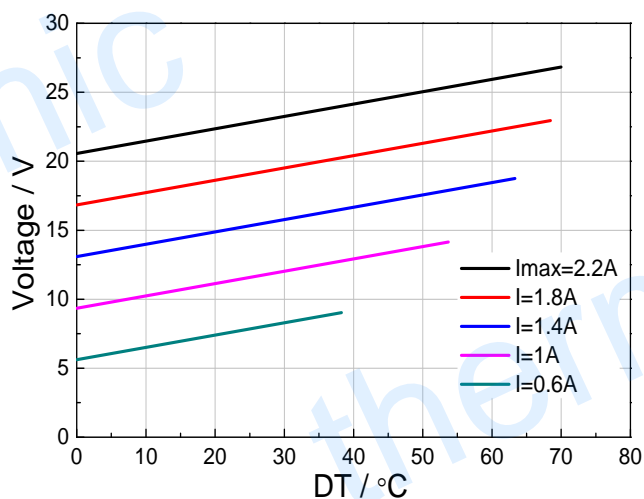
### Performance Curves at Th=27 °C



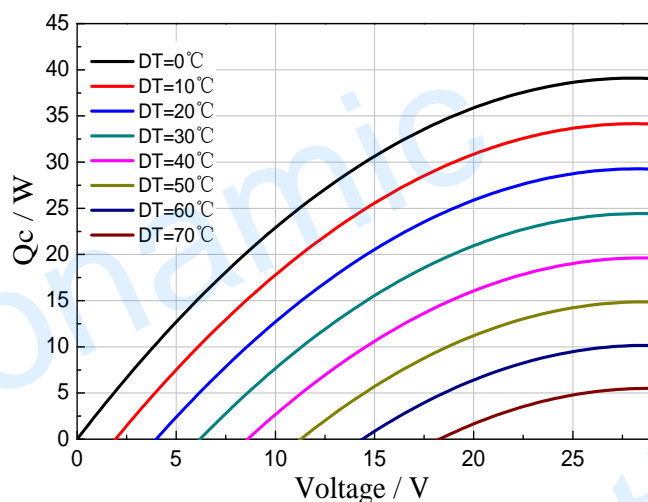
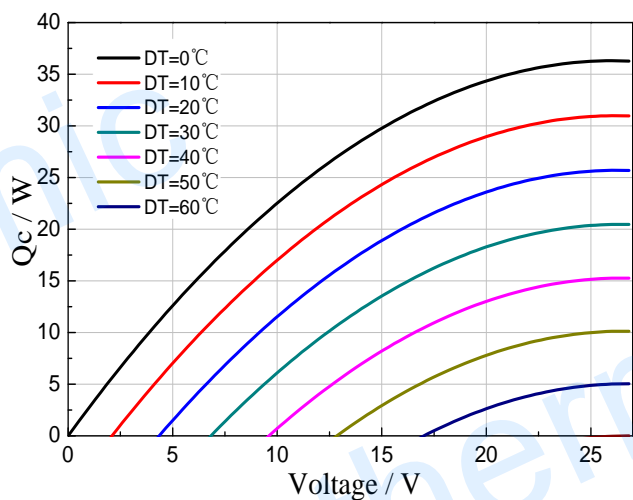
### Performance Curves at Th=50 °C



Standard Performance Graph  $Q_c = f(DT)$



Standard Performance Graph  $V = f(DT)$

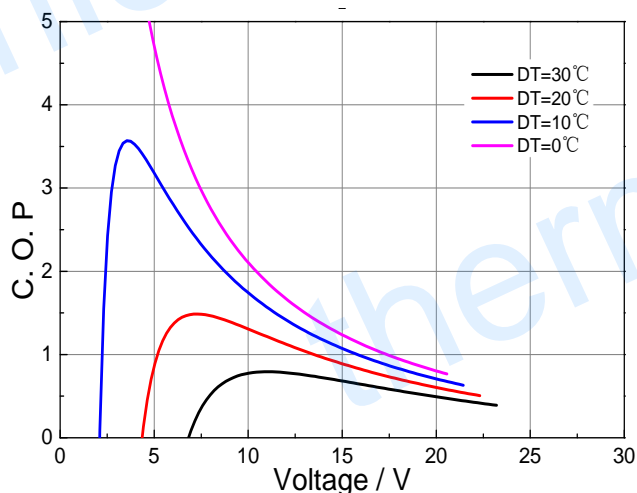


Standard Performance Graph  $Q_c = f(V)$

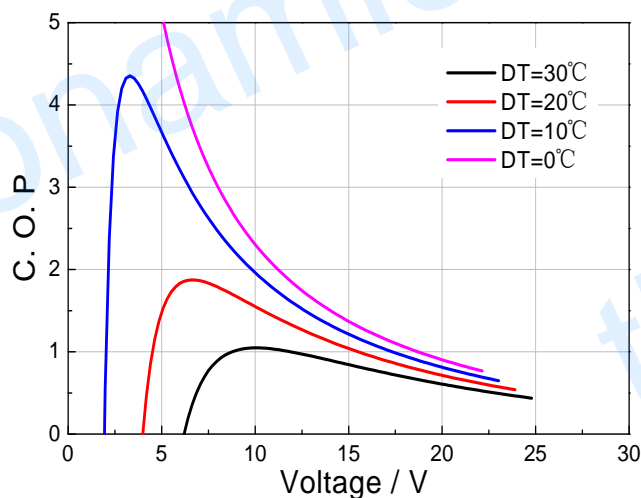
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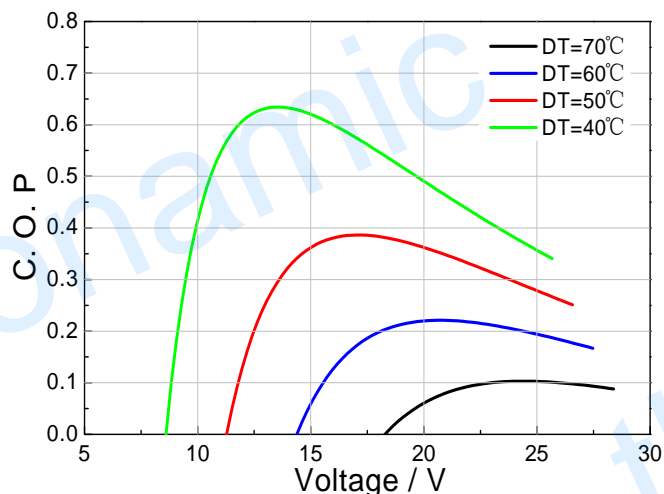
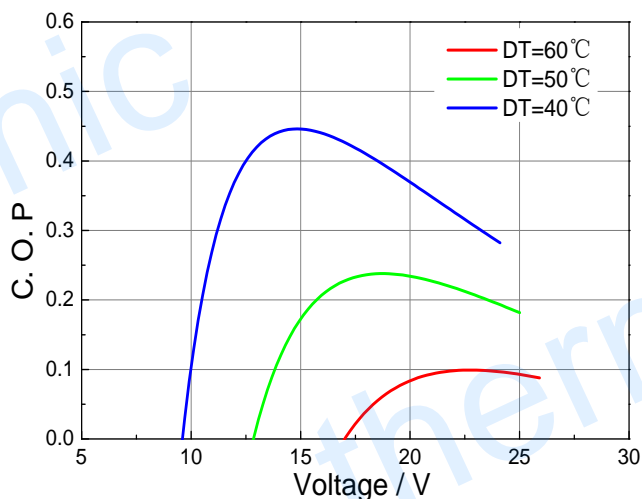
### Performance Curves at Th=27 °C



### 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.