

# Specification of Thermoelectric Module

## TEFC1-16715

### Description

The 167 couples, 12.5 mm × 18 mm size module is a single stage 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 requirement. It has higher cooling efficiency than normal type module. 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

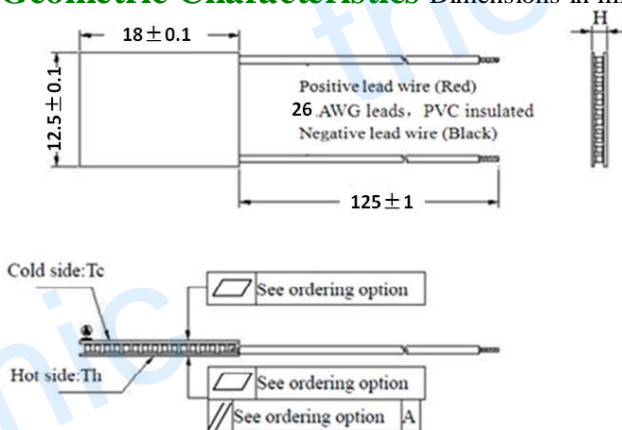
### Application

- 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>
ΔT <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)	20.8	22.5	Voltage applied to the module at DT <sub>max</sub>
I <sub>max</sub> (amps)	1.5	1.5	DC current through the modules at DT <sub>max</sub>
Q <sub>Cmax</sub> (Watts)	19.5	21.4	Cooling capacity at cold side of the module under DT=0 °C
AC resistance (ohms)	10.65	11.46	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)

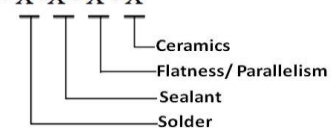
### Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0: 1.6±0.1	0: 0.1/0.13	125±1/Specify
TF	1: 1.6±0.05	1: 0.08/0.1	125±1/Specify
TF	2: 1.6±0.025	2: 0.05/0.08	125±1/Specify

Eg. TF01: Thickness 1.6 ± 0.1 (mm) and Flatness 0.08 / 0.1 (mm)

### Naming for the Module

TEFC1- 16715- X -X - X - X



TEFC1- 16715-T100-NS -TF01 -AIO

T100: BiSn (T<sub>melt</sub>=138°C)

NS: No sealing

AIO: Alumina, white 96%

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

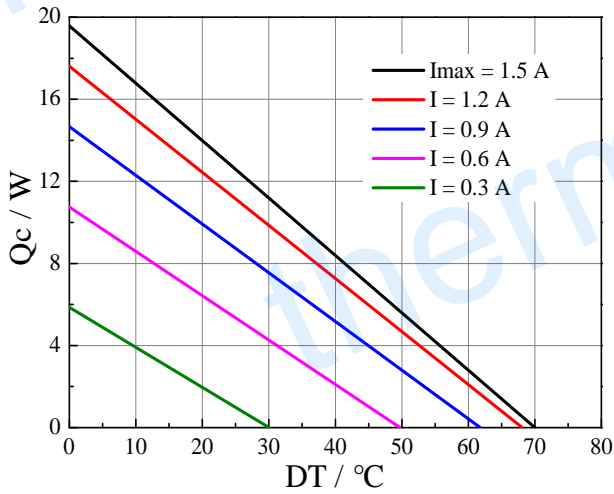
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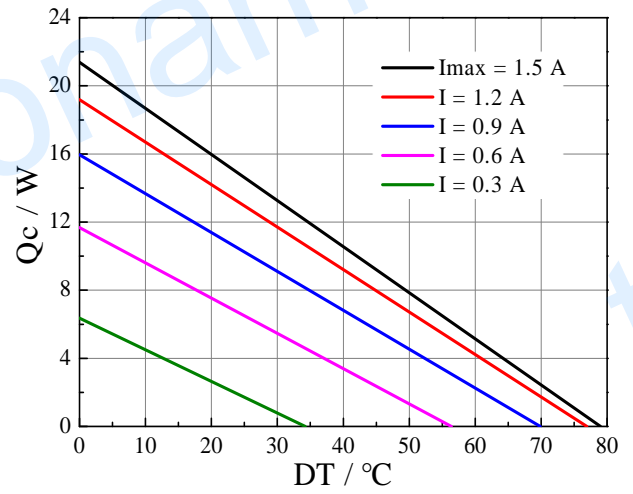
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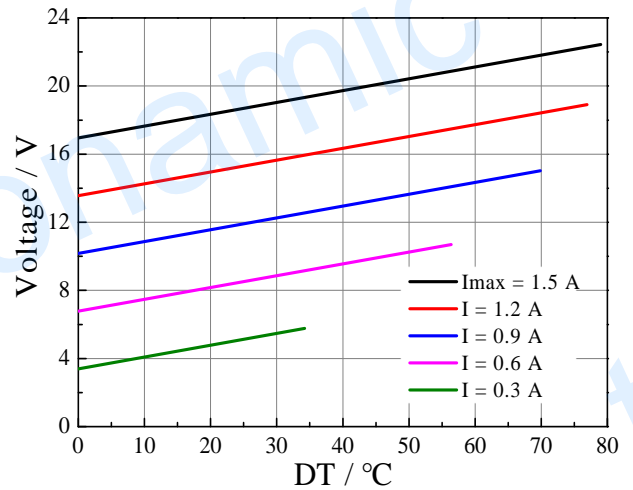
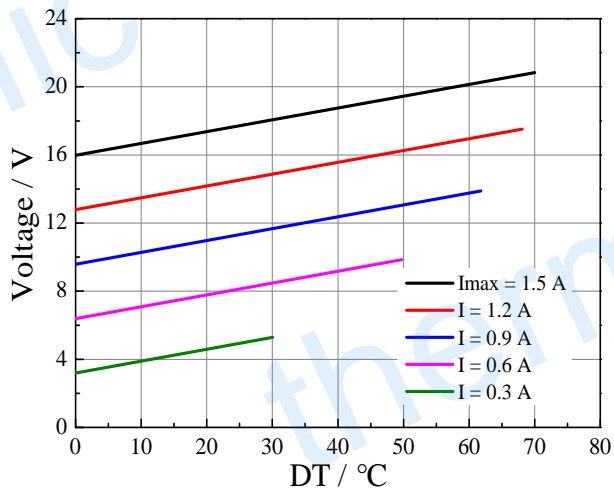
## Performance Curves at Th=27 °C



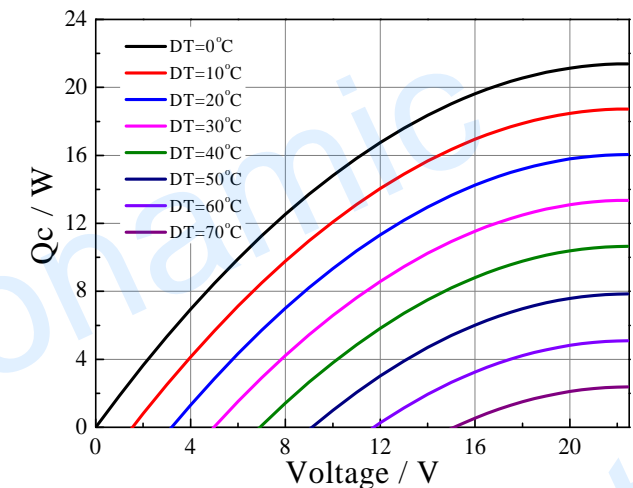
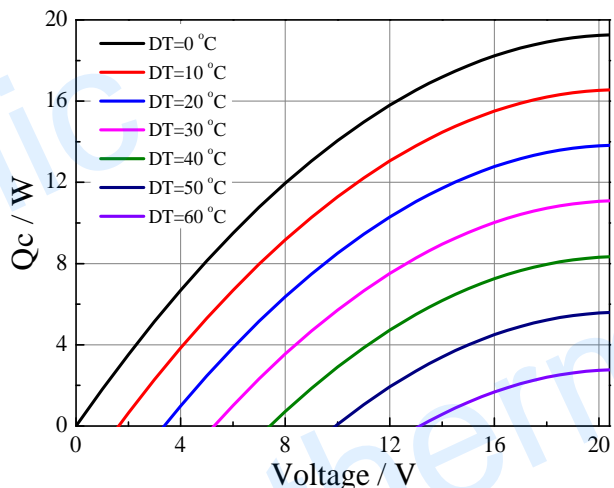
## Performance Curves at Th=50 °C



Standard Performance Graph  $Q_c = f(DT)$



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



Standard Performance Graph  $Q_c = f(V)$

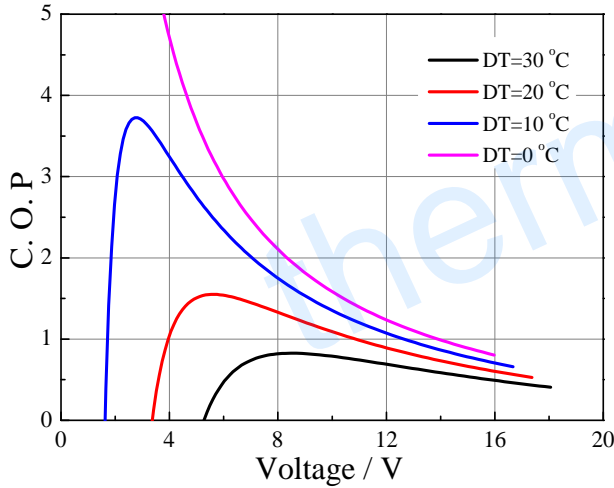
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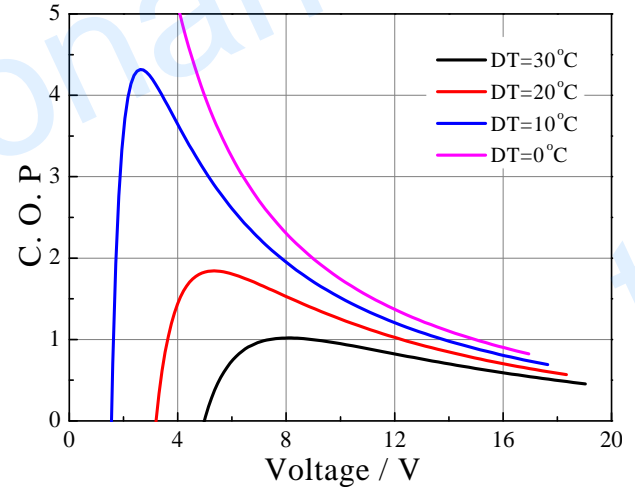
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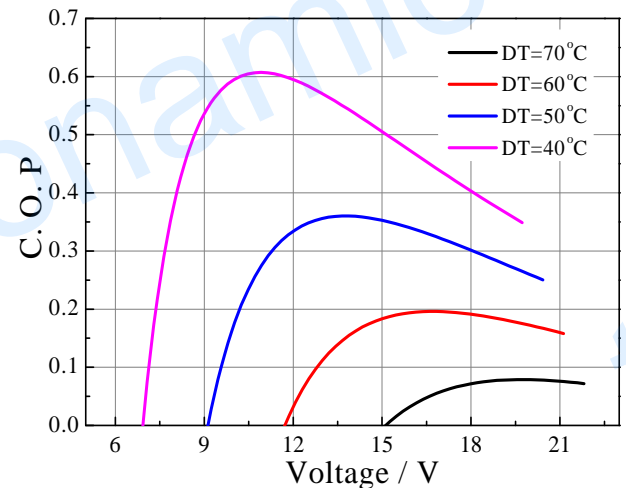
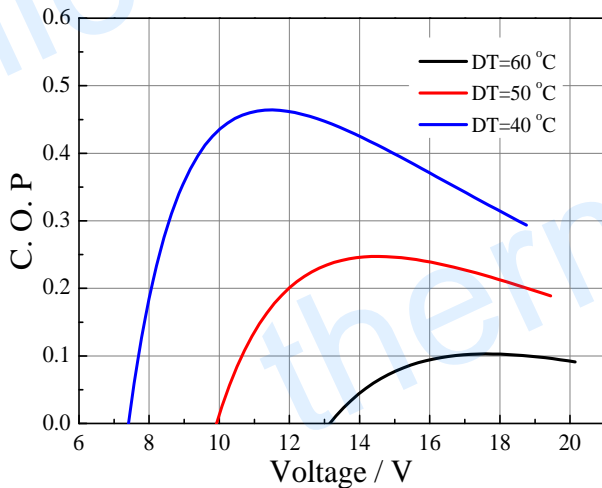
### Performance Curves at Th=27 °C



### Performance Curves at Th=50 °C



Standard Performance Graph COP = f(V) of  $\Delta T$  ranged from 0 to 30 °C



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

- Cold side of the module stucked on the object being cooled
- Hot side of the module mounted on a heat radiator
- Storage module below 100 °C
- Operation below  $I_{max}$  or  $V_{max}$
- Work under DC

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