Specification of Thermoelectric Module

TETC1-12706

Description

The 127 couples, 40 mm ×40 mm size single module which is made of our high performance ingot to achieve superior cooling performance and 74℃ or larger delta Tmax, is designed for superior cooling and heating applications. The module is able to run million thermal cycles in 70 ℃ temperature change range with less 3% degrading. Beyond the standard below, we can design and manufacture the custom made module according to your special requirements.

Features

- High effective cooling and efficiency.
- 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

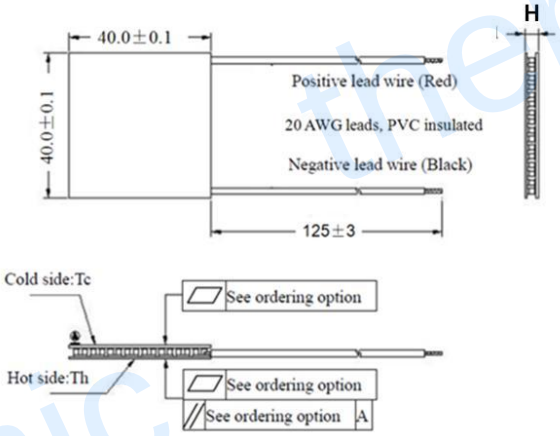
Application

- Food and beverage service refrigerator
- Portable cooler box for cars
- Temperature stabilizer
- Liquid cooling
- CPU cooler and scientific instrument
- Photonic and medical systems

Performance Specification Sheet

Th(℃)	27	90	Hot side temperature at environment: dry air, N_2
DT_{max}(℃)	74	100	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side
U_{max}(Voltage)	16.8	20.3	Voltage applied to the module at DT_{max}
I_{max}(amps)	6.3	6.3	DC current through the modules at DT_{max}
Q_{Cmax}(Watts)	66	81.0	Cooling capacity at cold side of the module under DT=0 ℃
AC resistance(ohms)	2.05	2.45	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 (Melting Point=138 ℃)
2. T200: CuSn (Melting Point=227 ℃)

B. Sealant:

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

C. Ceramics:

1. AlO :Alumina (Al_2O_3, white 96%)
2. AlN :Aluminum Nitride
3. AL : Aluminum substrate

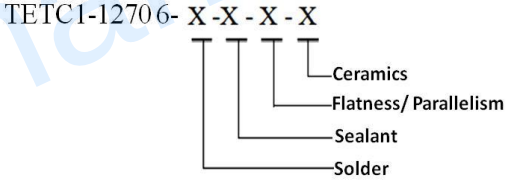
D. Ceramics Surface Options:

1. Blank ceramics (not metalized)
2. Metalized (Copper-Nickel plating)

Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:3.8±0.1	0:0.05/0.05	125±3/Specify
TF	1:3.8±0.05	1:0.025/0.025	125±3/Specify
TF	2:3.8±0.025	2:0.015/0.015	125±3/Specify
Eg. TF01: Thickness 3.8±0.1(mm) and Flatness 0.025/0.025(mm)			

Naming for the Module



TETC1-12706-T100 -NS –TF01 -AlO

T100: BiSn (Tmelt=138°C)

NS: No sealing AlO: Alumina (Al2O3, white 96%)

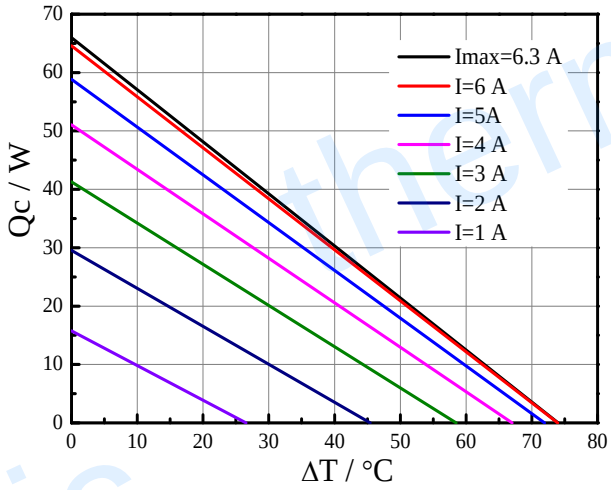
TF01: Thickness ±0.1(mm) and Flatness/Parallelism 0.025/0.025 (mm)

Operation Cautions

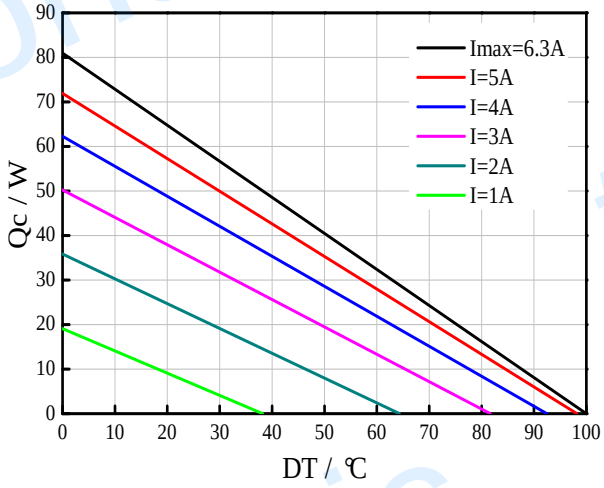
- Attach the cold side of module to the object to be cooled
- Attach the hot side of module to a heat radiator for heat dissipating
- Operation below I_{max} or V_{max}
- Work under DC

Performance Curve

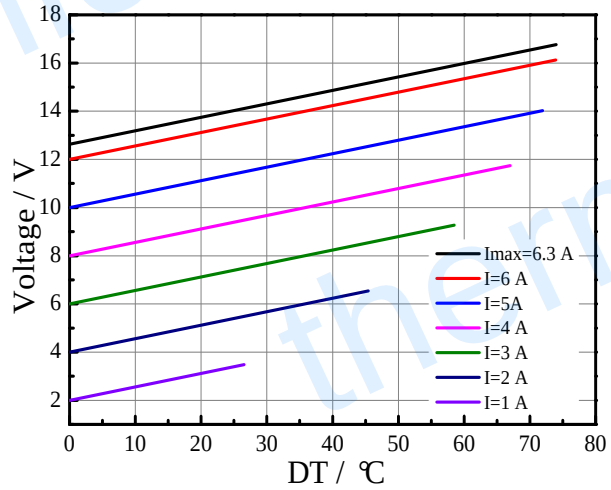
Performance Curves at Th=27 ℃

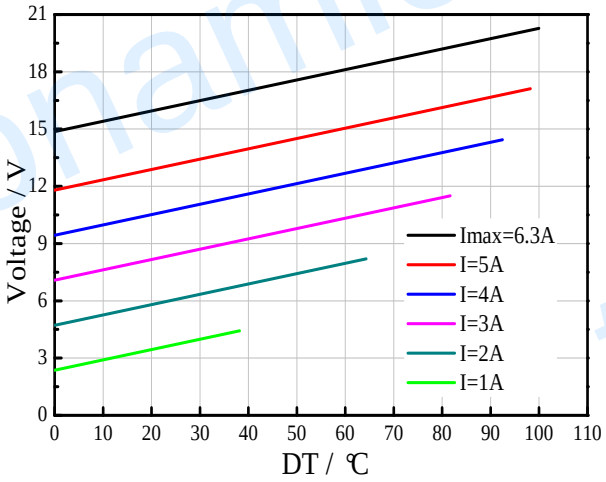


Performance Curves at Th=90 ℃

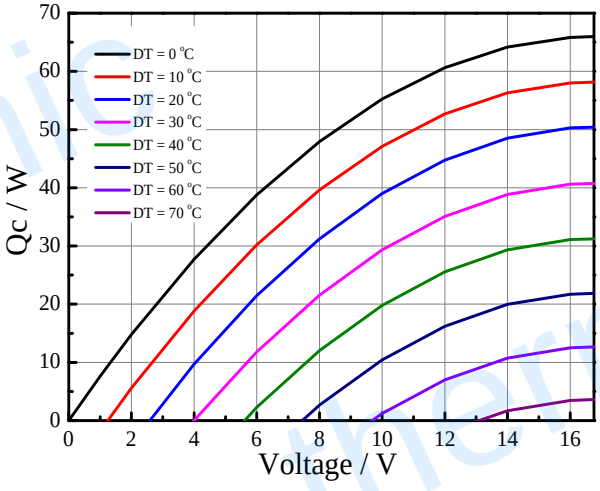


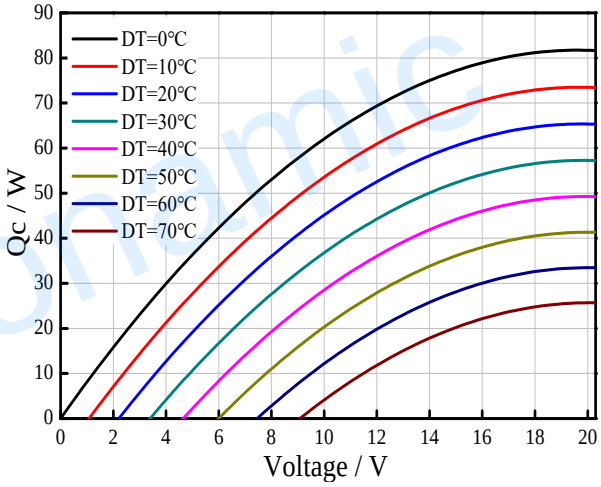
Standard Performance Graph Qc= f(DT)





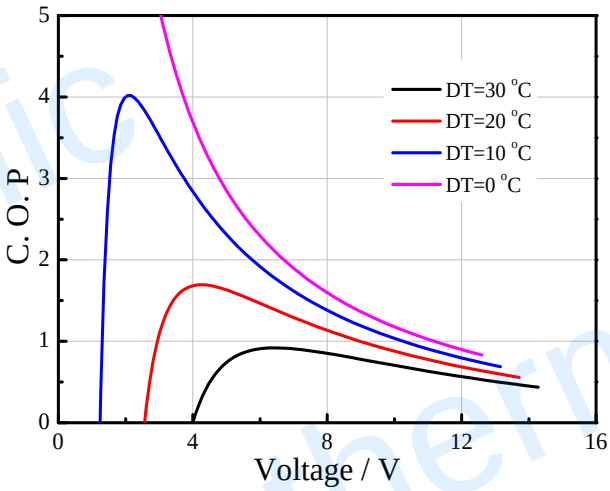
Standard Performance Graph V= f(ΔT)



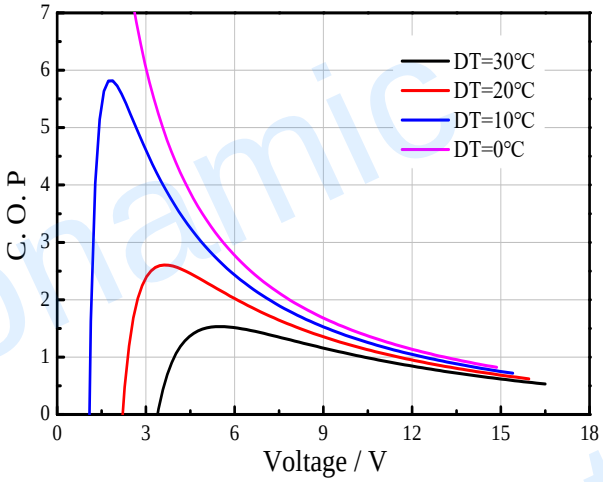


Standard Performance Graph Qc= f(V)

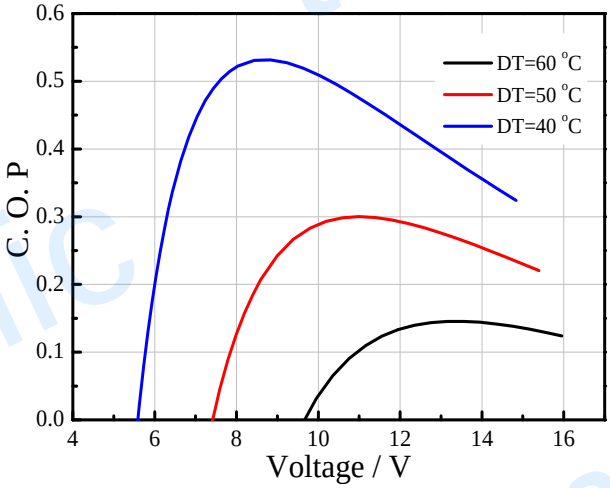
Performance Curves at Th = 27 ℃

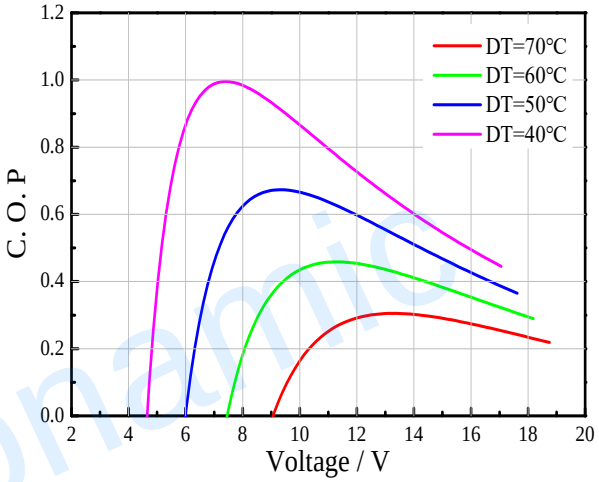


Performance Curves at Th = 90 ℃



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



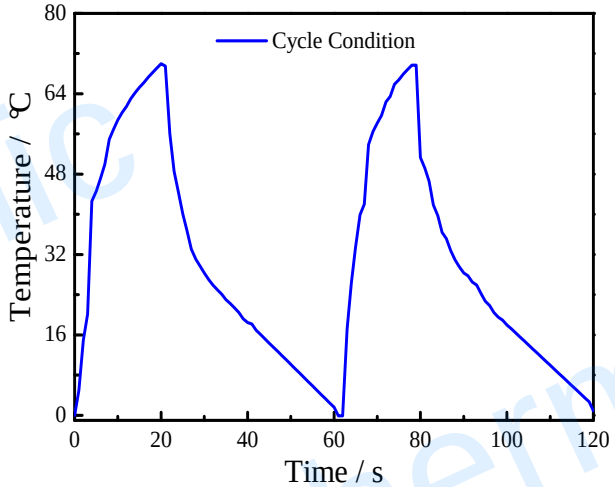


Standard Performance Graph COP = f(V) of ΔT ranged from 40 to 60/70 ˚C

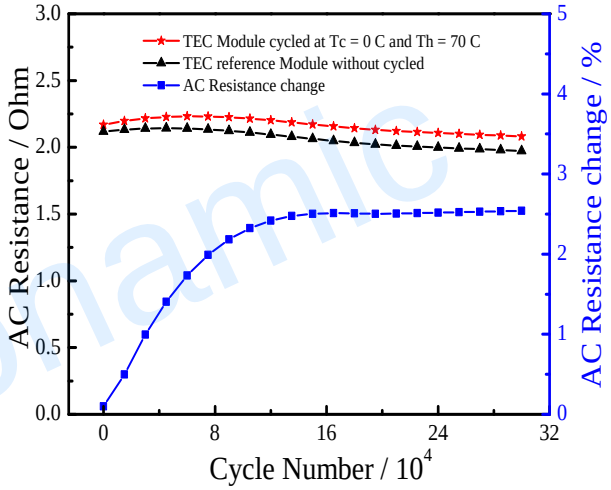
Remark: The coefficient of performance (COP) is the cooling power Qc/Input power (V ×I).

A typical 127 couples module is fabricated by the unique “soft” process and has demonstrated that it only has 2.5% degrading after 300,000 thermal cycling. The below graphic shows that in beginning 120,000 cycles, it degrade about 2.5%, and then go on stable with very tiny degrading in further 180,000 thermal cycles. It is derived out that the modules can go over million thermal cycles.

TEC Thermal Cycle Lifetime Test



Typical cooling-heating cycle



The Chart for AC Resistance and AC Resistance Changes *vs*. Cycle Number