Specification of Thermoelectric Module

TETC1-12503SCH4.6

Description

The 125 couples, 40 mm × 40 mm size module is made of selected high performance ingot and fabricated by our unique "soft" processes to achieve superior cooling/heating performance. The module is able to run million thermal cycles in 70 °C temperature change range with less 3% degrading. It is good for the need of frequently cooling down and heating up to 100 ºC 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

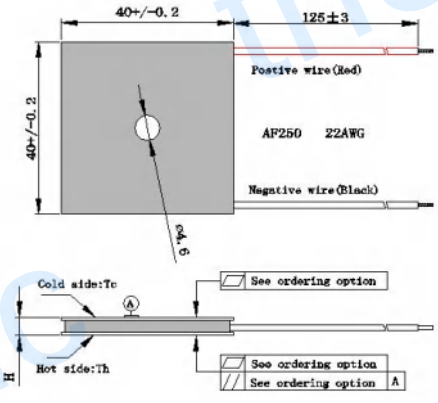
Application

- 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(ºC)	27	50	Hot side temperature at environment: dry air, N_2
DT_{max}(ºC)	74	83	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side
U_{max}(Voltage)	16.1	17.4	Voltage applied to the module at DT_{max}
I_{max}(amps)	3.6	3.6	DC current through the modules at DT_{max}
Q_{Cmax}(Watts)	37.7	40.6	Cooling capacity at cold side of the module under DT=0 ºC
AC resistance(ohms)	3.35	3.60	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=138ºC)
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_2O_3, white 96%)
2. Aluminum Nitride (AlN)

D. Ceramics Surface Options:

1. Blank ceramics (not metalized)
2. Metalized

Flatness/ Parallelism Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:4.8±0.1	0:0.08/0.08	125±3/Specify
TF	1:4.8±0.03	1:0.03/0.03	125±3/Specify
Eg. TF01: Thickness 4.8 ± 0.1 (mm) and Flatness 0.03 / 0.03 (mm)			

Naming for the Module

TETC1- 12503SCH4.6 - X - X - X - X

- Ceramics
- Flatness/ Parallelism
- Sealant
- Solder

TETC1- 12503SCH4.6 - T200 -NS - TF01 - AlO

T200: Solder, CuSn (Melting Point=227 ºC)

NS: No sealing AlO: Alumina white 96%

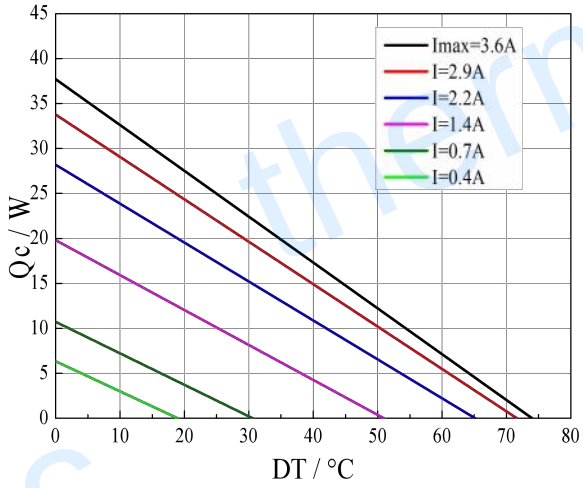
Tel: +86-791-88198288 Fax: +86-791-88198308 Email: info@thermonamic.com Web Site: www.thermonamic.com

Operation Cautions

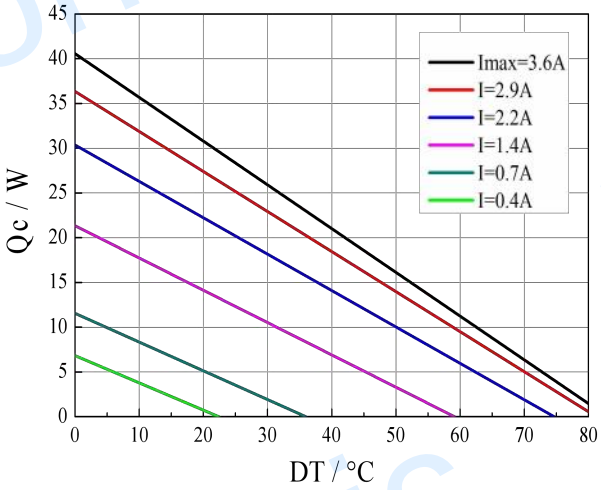
- Attach the cold side of module to the object to be cooled
- Attach the hot side of module to a heat radiator for heat dissipating
- Operation below I_{max} or V_{max}
- Work under DC

Performance Curve

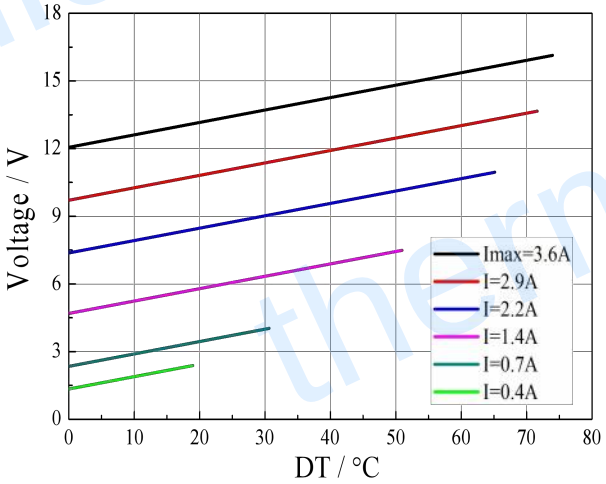
Performance Curves at Th=27 ºC

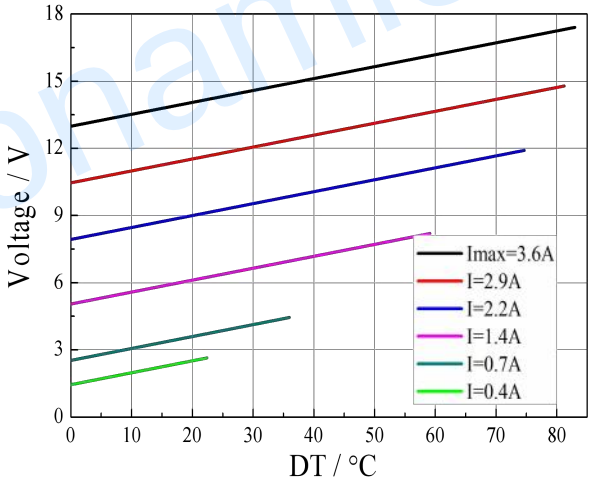


Performance Curves at Th=50 ºC

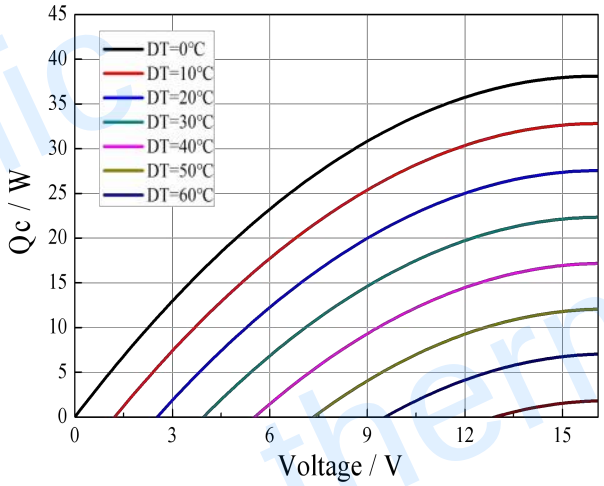


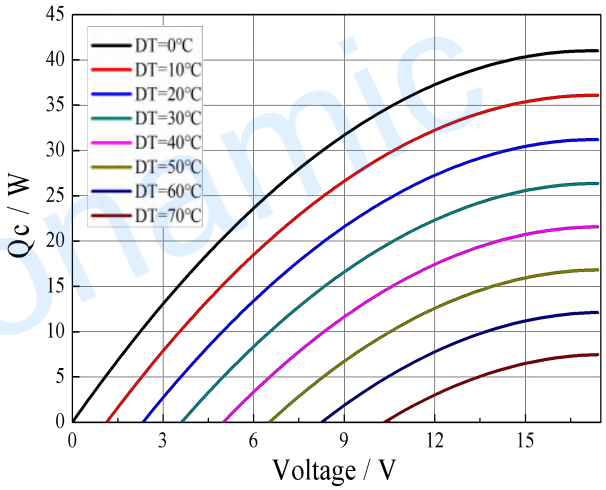
Standard Performance Graph Qc= f(DT)





Standard Performance Graph V= f(ΔT)

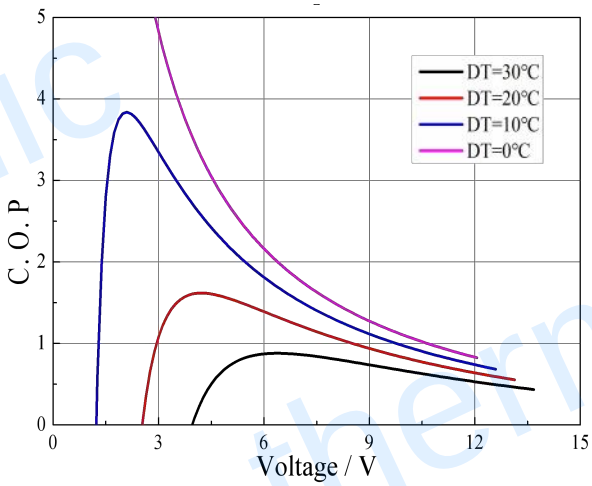




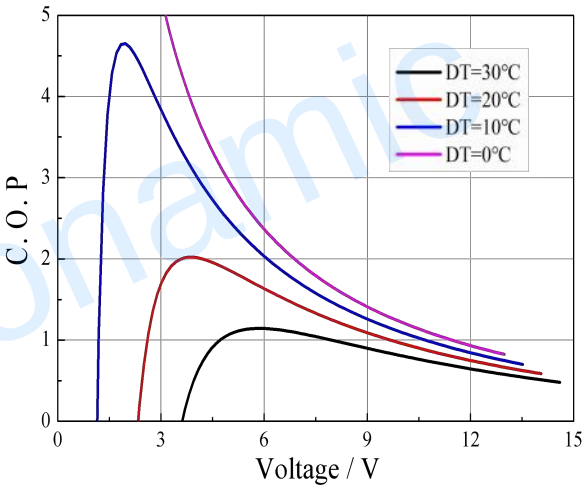
Standard Performance Graph Qc= f(V)

Tel: +86-791-88198288 Fax: +86-791-88198308 Email: info@thermonamic.com Web Site: www.thermonamic.com

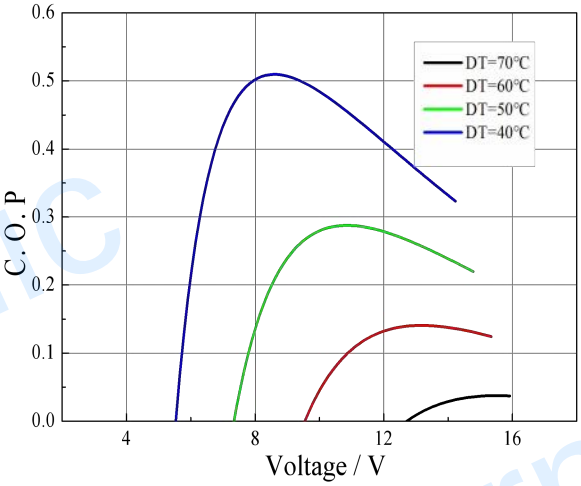
Performance Curves at Th=27 ºC

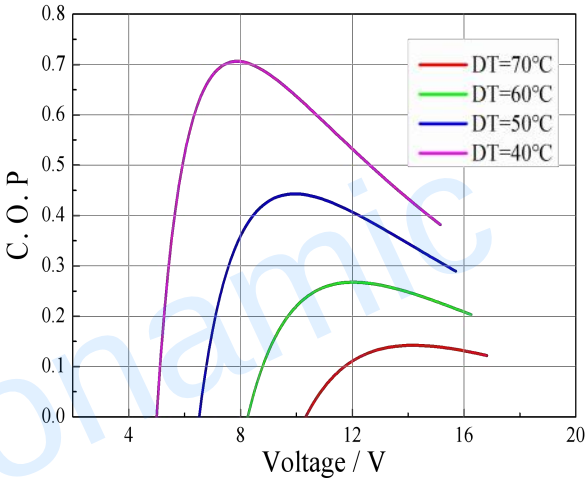


Performance Curves at Th=50 ºC



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



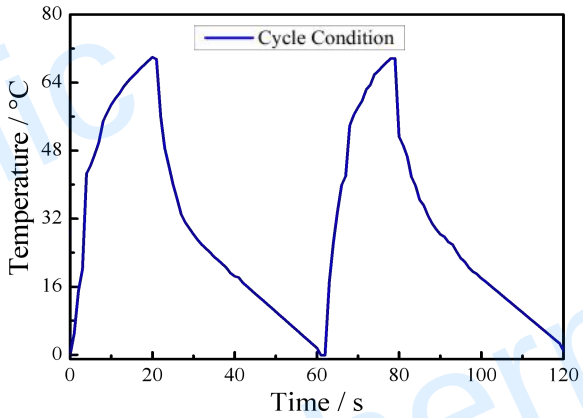


Standard Performance Graph COP = f(V) of ΔT ranged from 40 to 70 ˚C

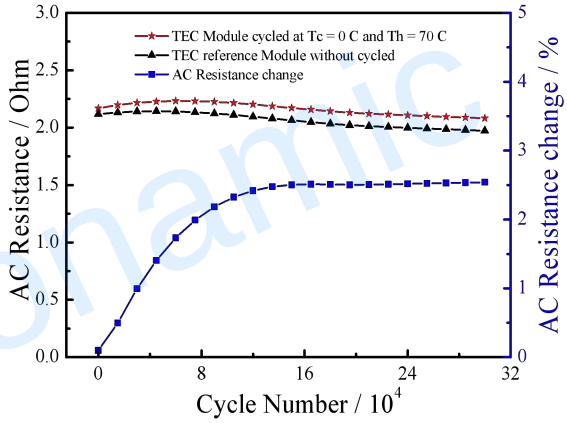
Remark: The coefficient of performance (COP) is the cooling power Qc/Input power (V × I).

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 On TETC1-12706



Typical cooling-heating cycle



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