Specification of Thermoelectric Module

TEC1-12706

Description

The 127 couples, 40mmx40mm size module is a single stage module which is designed for cooling and heating up to 100℃ 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

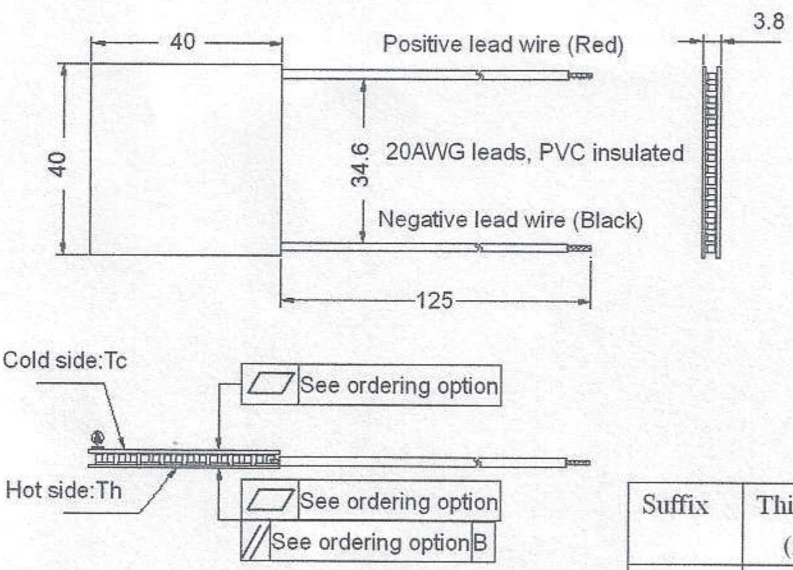
Application

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

Peformance Specification Sheet

Th(℃)	27	50	Hot side temperature at environment: dry air, N_2
DT_{max}(℃)	68	76	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side
U_{max}(Voltage)	15.0	16.8	Voltage applied to the module at DT_{max}
I_{max}(amps)	6.4	6.4	DC current through the modules at DT_{max}
Q_{Cmax}(Watts)	65.0	71.3	Cooling capacity at cold side of the module under DT=0℃
AC resistance(ohms)	2.00	2.23	The module resistance is tested under AC

Geometric Characteristics Dimensions in millimeters



Sealing Option

Suffix	Sealant
NS	No sealing
SS	Silicone sealant
EPS	Epoxy
OS	Customer specify sealing other than above

Ordering Option

Suffix	Thickness (mm)	Flatness/ Parallelism (mm)	Lead wire length(mm) Standard/Optional length
TF	0:3.8±0.1	0:0.035/0.035	125±1/Specify
TF	1:3.8±0.05	1:0.025/0.025	125±1/Specify
TF	2:3.8±0.03	2:0.015/0.015	125±1/Specify
Eg. TF01: Thickness 3.8±0.1(mm) and Flatness 0.025/0.025(mm)			

Additional

Ceramic material: Alumina (Al_2O_3,white 96%)

Solder tinning: Bismuth Tin (BiSn) M.P. 138℃

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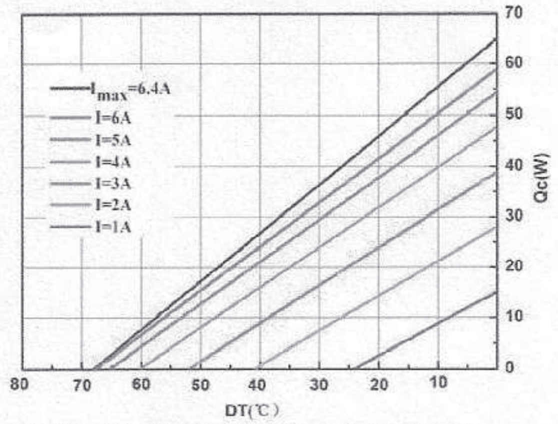
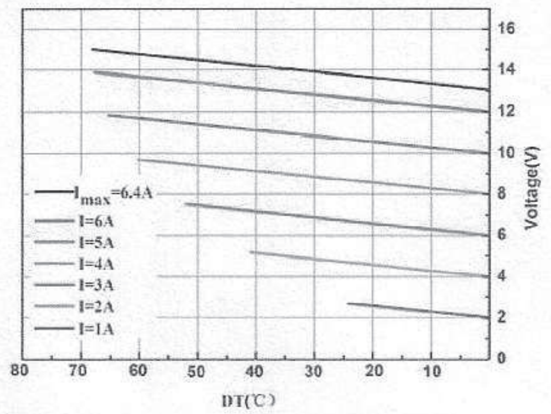
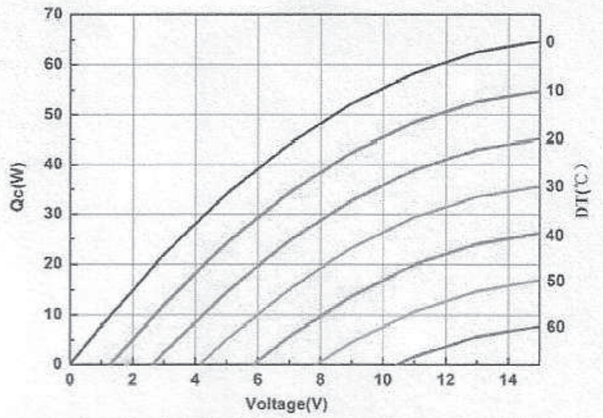
Performance Curves at Th=27℃



The chart for Q_c Vs DT under various currents

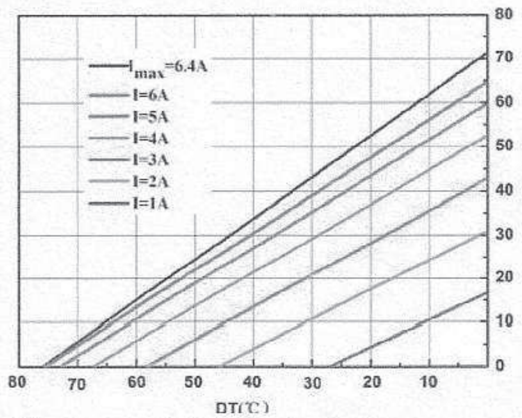


The chart for Voltage Vs DT under various currents

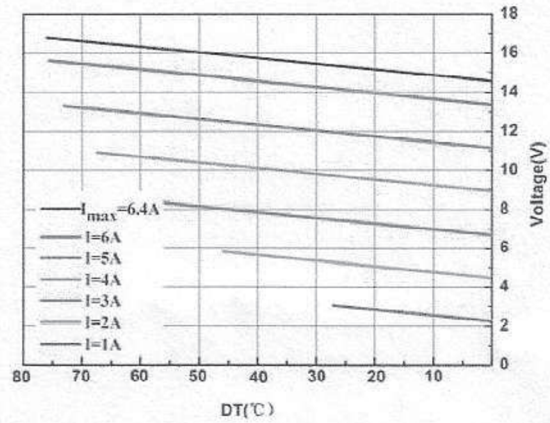


The chart for Q_c Vs Voltage under various DT

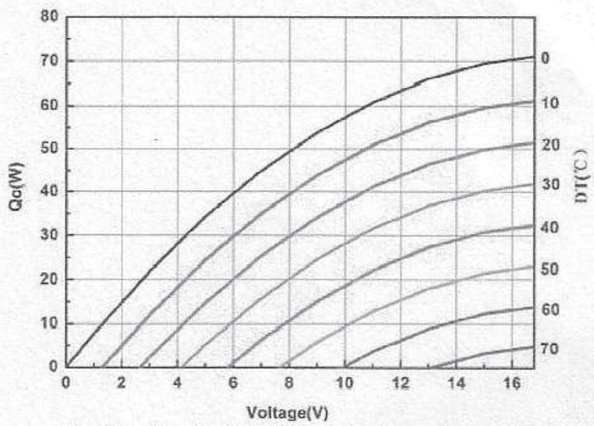
Performance Curves at Th=50℃



The chart for Qc Vs DT under various currents



The chart for Voltage Vs DT under various currents



The chart for Q_c Vs Voltage under various DT

Operation Cautions

- Cold side of the module sticked on the object being cooled
- Hot side of the module mounted on a heat radiator
- Work under DC
- Operation below I_{max} or V_{max}
- Operation or storage module below 100℃

Specification of Bi_2Te_3-Based Thermoelectric Ingot

Description

The Bi_2Te_3-based thermoelectric ingot is grown by [illegible] with the alloy of Bi, Sb, Te, Se, special doping and our unique crystallizing processes. The Bi_2Te_3-based thermoelectric ingot is used to produce thermoelectric modules for cooling and heating applications, and converting heat into electricity. Generally, the figure of merit *ZT* of our p-type and n-type ingots is larger than 1 at 300K, and the good feature attracts many high-end customers. Meanwhile, our ingot is featured with good mechanical strength and highly stable property, providing the key stone for producing the high performance and reliable Peltier cooling and power generation modules.

Features

- Silver-white Color
- p-Type and n-type ingot $ZT \geqslant 0.9$@300K

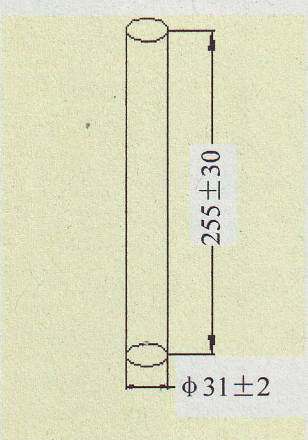
Application

- High performance and reliable Peltier cooling and power generation modules

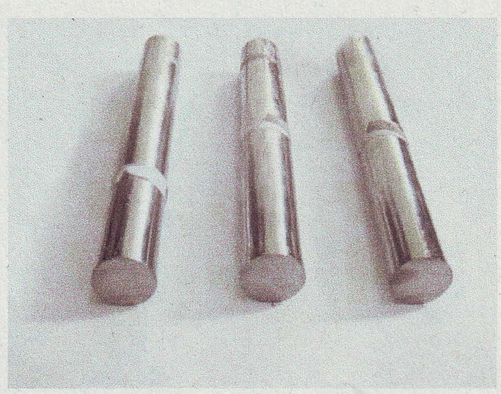
Peformance Specification Sheet

Performance Specification	p-Type	n-Type	Note
Diameter (mm)	31±2	31±2	
Length (mm)	250±30	250±30	
Density (gcm^{-3})	6.8	7.8	
Electrical Conductivity σ($10^2 Sm^{-1}$)	850~1250	850~1250	300K
Seebeck Coefficient α(μVK^{-1})	190~230	190~230	300K
Thermal Conductivity κ($Wm^{-1}K^{-1}$)	1.2~1.6	1.2~1.6	300K
Power Factor P(WmK^{-2})	≥0.0036	≥0.0036	300K
ZT value	≥0.9	≥0.9	300K

Geometric Characteristics (in millimeters)

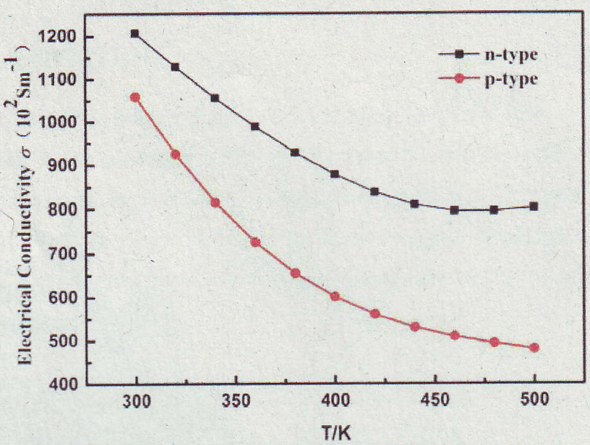


p-type Ingot

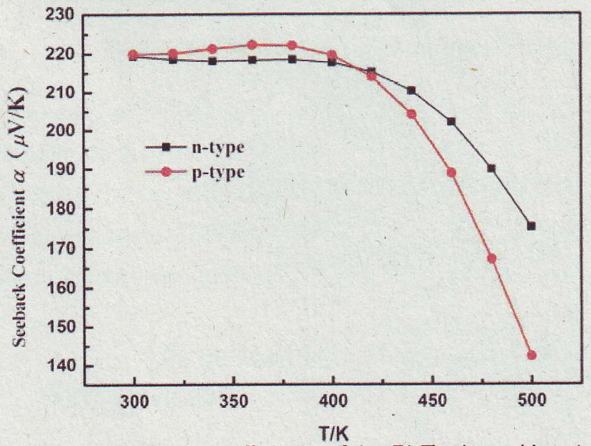


n-type Ingot

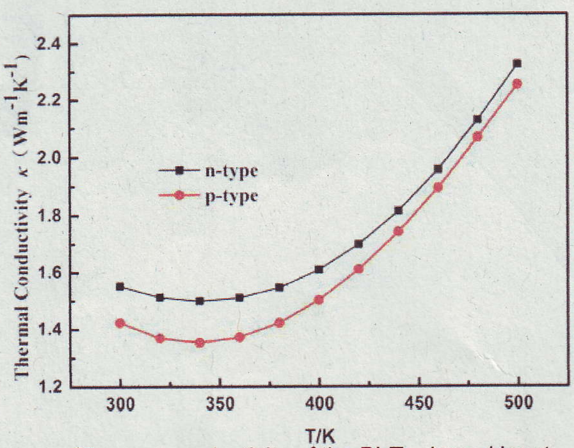
Specification of Bi_2Te_3-Based Thermoelectric Ingot



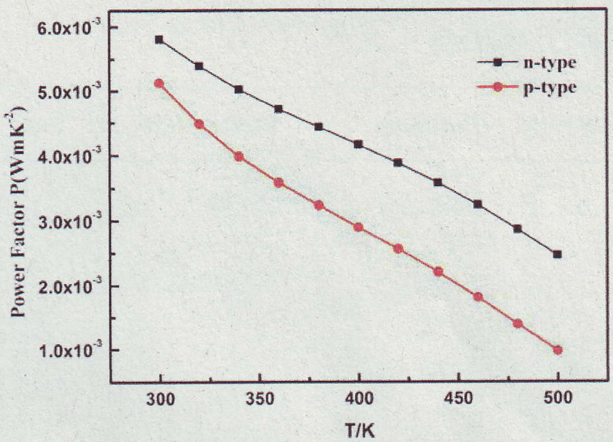
Electrical conductivity of the Bi_2Te_3-based ingot



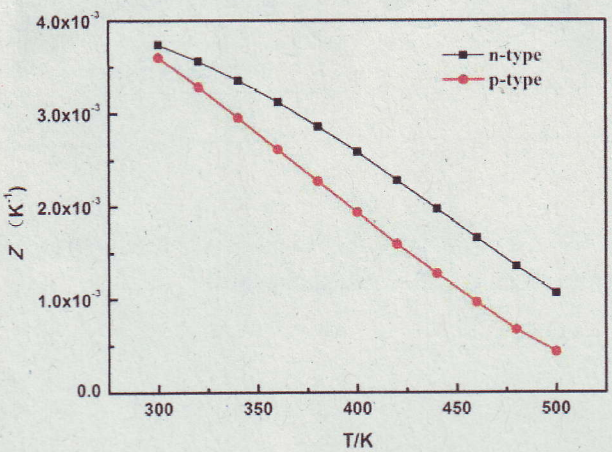
Seeback coefficients of the Bi_2Te_3-based ingot



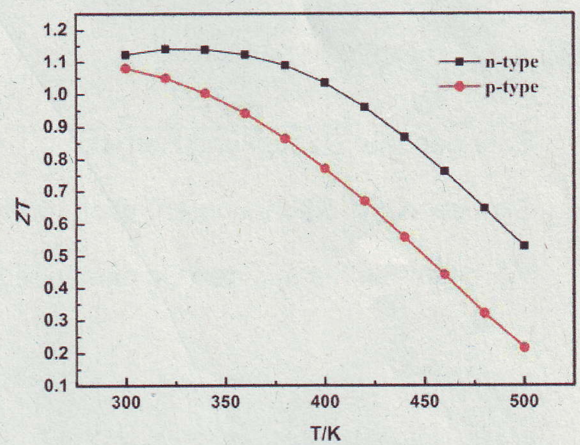
Thermal conductivity of the Bi_2Te_3-based ingot



Power factors of the Bi_2Te_3-based ingot



Z values of the Bi_2Te_3-based ingot



ZT values of the Bi_2Te_3-based ingot

Operation Cautions

- Caution on handling
- Storage in dry environment

Remarks:

Electrical conductivity σ and Seebeck coefficient α are measured by using a ZEM-1apparatus (Japan Vacuum Tech) in the temperature range from 300 to 500 K. The thermal conductivity κ is obtained from the measured thermal diffusivity *D*, specific heat *Cp* and density *d* according to the relationship $\kappa = D \times Cp \times d$. Thermal diffusivity and specific heat are determined using a laser flash method (NETZSCH:LFA 457) and a power-compensation differential scanning calorimeter (TA:DSCQ20), respectively. All measurements are performed in the temperature range from 300 to 500 K.

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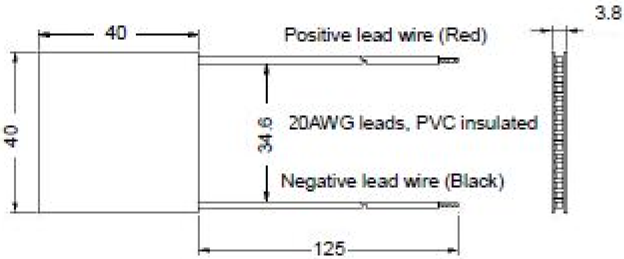

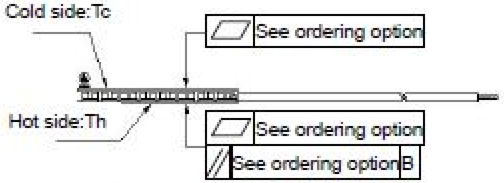

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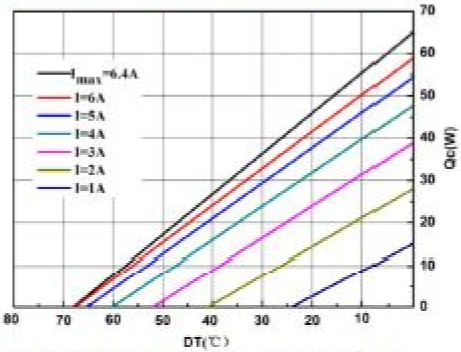

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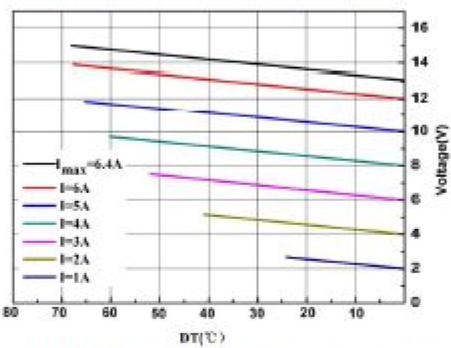

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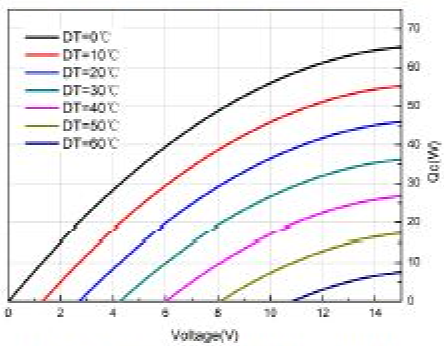

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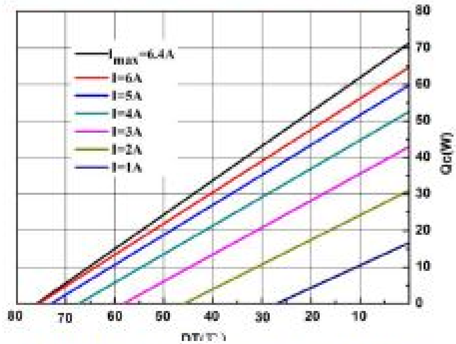
Performance Curves at Th=50℃



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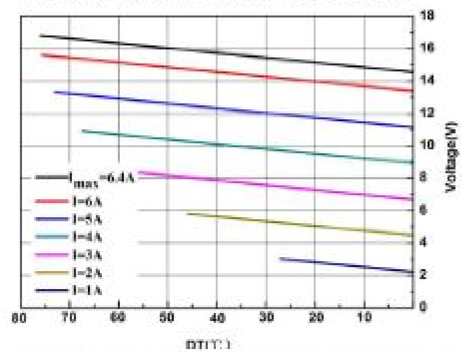

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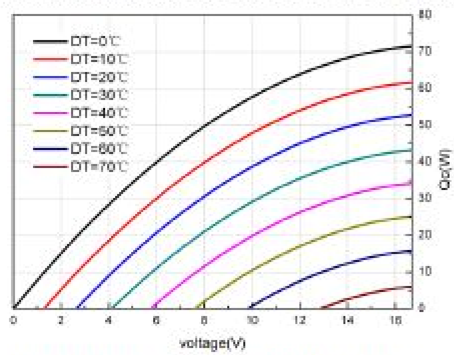

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