

More Innovation.  
Less Heat.



# VAPOR CHAMBER

GUIDEBOOK

Customized Services | Professional Consultation | Fastest Lead Time

# Why do we need the Vapor Chamber?



## Server

Servers are one of the main markets for VC. As the power of today's servers continues to increase, air cooling is no longer sufficient to relieve heat. The reliability of VC is more stable than that of water cooling systems, so it has become the mainstream.

## 5G Communication Implement

With the development of 5G, related applications such as mobile phones and other electronic devices, their instantaneous heat may reach more than 10W, and in the case of limited physical activity, a thin VC will be a quick solution for heat dissipation.

## AI/Robot

Artificial intelligence requires huge computing support. If there is no strong heat dissipation capability, the calculation may be delayed or even crashed, and the VC is most suitable for solving the difficult challenge of intensive heating.

## Automotive

The electronic control system and battery in electric vehicles are all parts that need to be deheated, and the high thermal conductivity of VC can be used here as an excellent thermal component.

## AR/VR/SR/MR

The reality industry has products that combine high-end technology in various fields, and many of them, need to be worn on the human body. Therefore, the anti-heat conditions are very strict. The VC can quickly diffuse the heat source and increase heat dissipation area.

## 5G Communication Implement

## 3C Electronics

## AR/VR/SR/MR

## Netcom

Communication equipment, network equipment, etc., have many heating elements in them. In the case of limited volume, the VC can still quickly heat the heat to the casing, which is an excellent choice for both heat and volume.

## Medical/Military

In these industries, components that reduce the temperature difference or can accurately control the temperature are often required. The rapid response of temperature control components has become the good choice.

## 3C Electronics

Volume limitation and high heat dissipation capacity have become the main issues. The excellent heat transfer ability of equalization plates and the thinner volume of heat pipes have become the best solution.

## Green Energy

Recently, as the public and the government are paying more and more attention to green energy and promoting related construction and development, the thermal solution of uniform temperature plate and heat dissipation module is an indispensable part of it.

# Thermal Engineering Revolution

## Vapor Chamber

In the heat dissipation module, the VC plays the role of a high-conductivity medium, and the most different feature from other materials is that it can quickly diffuse a small area of heat source into a large area with uniform temperature.

### Specification

#### Dimensions

90 × 60 mm

#### Thickness

0.45 ± 0.05 mm

#### Recommended Power

≤ 10 W

#### Performance\*

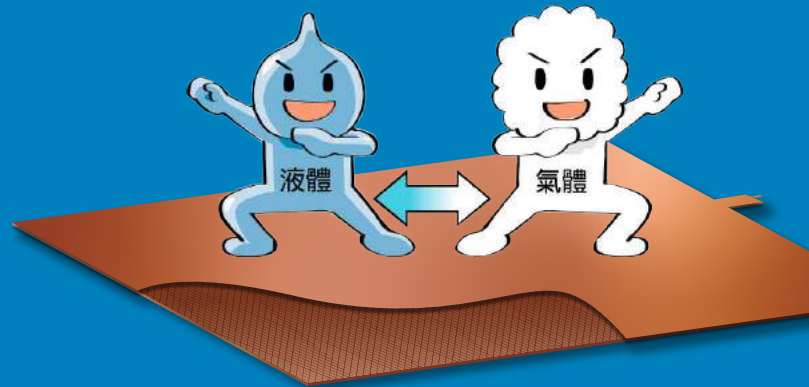
< 3 °C

\*Temperature difference: The established test conditions are heat source area 12x12mm, temperature 60°C, power 10W, and the temperature difference between the heat source and the heat source at a distance of 4cm

Flexible customized combination.

Single point high temperature heat source quickly cools down.

The best application of height restriction.



## START THE PROJECT



### Tell us your inquiry

Customer provides the design requirements and restrictions, various parameters, and design drawings to T-Global



### Project discussion

The team has repeatedly tested and verified with FloTHERM XT thermal simulation software



### Offer thermal solution plans

According to the situation, propose an appropriate heat dissipation plan to meet different goals

Customer already have the design of vapor chamber that want to customize.



Reduce the time and cost of designing heat dissipation modules



### Design module

Back and forth discussion with the client about the design of heat dissipation module, and save EVT times through thermal simulation



### Sample testing

T-Global provides samples for testing and verification to ensure that the thermal module and other institutions meet the specifications



### Trail & mass production

Completely supply the thermal module and related materials that you needed



The heat-dissipating parts are flexible and diversified

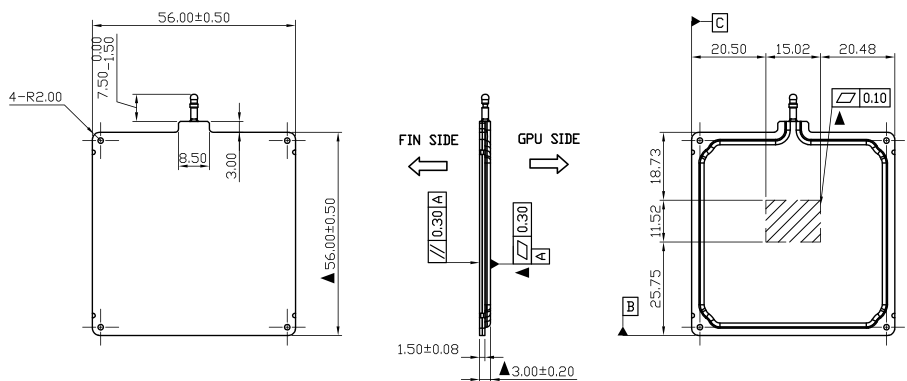


Customized design

VC001



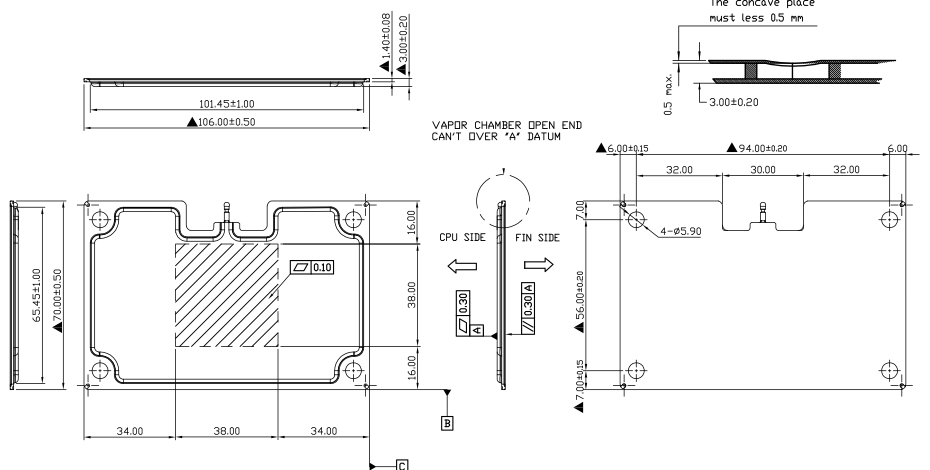
Dimensions	56×56 mm
Thickness	3.0 mm
Surface finishing	anti-oxidation
Extra components	-
Recommended Power	≥110 W



VC002



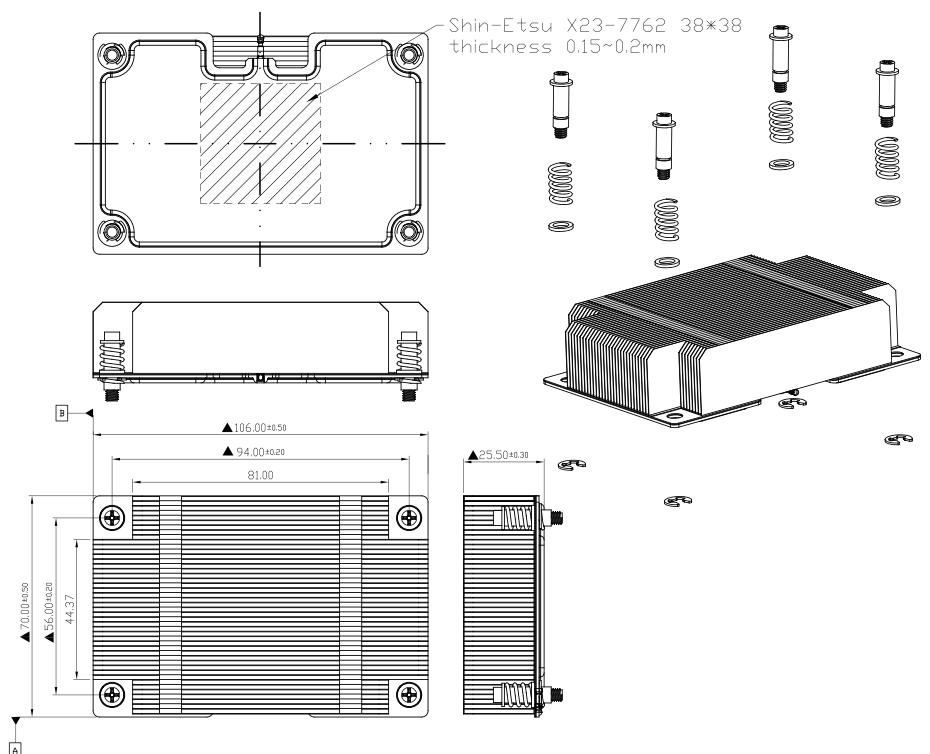
Dimensions	106×70 mm
Thickness	3.0 mm
Surface finishing	anti-oxidation
Extra components	-
Recommended Power	≥150 W



VC003



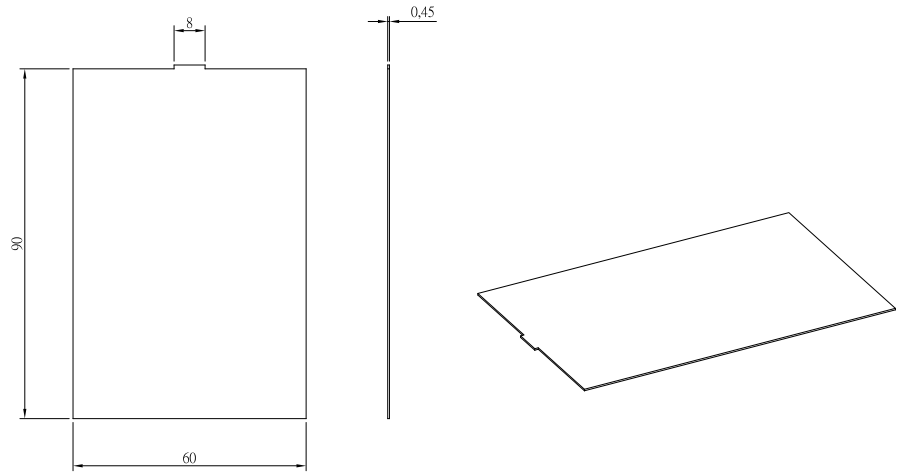
Dimensions	106×70 mm
Thickness	25.5 mm
Surface finishing	anti-oxidation
Extra components	heat sink
Recommended Power	≥150 W



## VC-0.45



Dimensions	90×60 mm
Thickness	0.45 mm
Surface finishing	anti-oxidation
Extra components	-
Recommended Power	≤10 W



## Specification

Properties	VC001	VC002	VC003	VC-0.45	Unit
Dimensions	56×56	106×70	106×70	90×60	mm
Thickness	3.0 ± 0.2	3.0 ± 0.2	25.5 ± 0.3	0.45 ± 0.05	mm
Surface finishing	anti-oxidation	anti-oxidation	anti-oxidation	anti-oxidation	-
Extra components	-	-	heat sink	-	-
Recommended Power	≥110 W	≥150	≥150	≤ 10	W

Different industries will require different specifications, please contact us directly for the most suitable specifications.

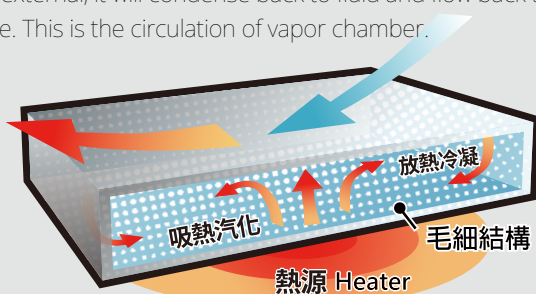
## FAQ

### Q What are the factors affecting thermal conductivity of vapor chamber?

The factors that affect the thermal conductivity of the vapor chamber include degree of vacuum, working fluid, the capillary structure, the porosity, the wetting area, the capillary radius, the quality of the procession, and several others.

### Q The working principle of the vapor chamber

The inside of vapor chamber is a capillary structure vacuum chamber. After the working fluid absorbs the heat, it will vaporize rapidly and flow to cooling zone. When it exchanged heat with the external, it will condense back to fluid and flow back to heat zone. This is the circulation of vapor chamber.



### Q What is the method for determining the size and thickness of the temperature plate?

Based on the heat dissipation area required for a project, it can be evaluated whether a vapor chamber is a suitable solution, and because they can be designed to be extremely thin, thickness space requirements are usually not an issue.

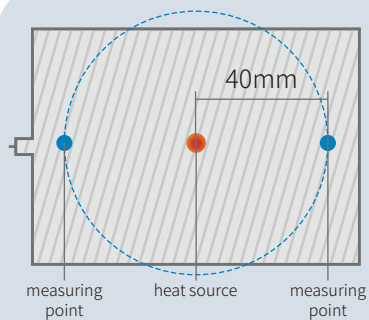
### Q How to determine the working fluid in the vapor chamber?

The application of electronic parts is generally based on pure water.

### Q What are the common heat conduction & heat dissipation mechanisms of a vapor chamber module?

In the heat dissipation module, the vapor chamber plays the role of a highly conductive medium. The most different from other materials is that it can quickly diffuse a small area of heat source into a larger area. A thermal module is mainly composed of two main parts: heat conduction and heat dissipation. The heat conduction components include heat conduction interface materials, metal sheets, heat pipes, vapor chamber, graphite, ceramic sheets and other materials, depending on the situation of each case. The heat dissipation components can be divided into air-cooled and water-cooled according to the heat dissipation method. Air-cooled parts often use fins and graphene to increase the contact area with the air; and water-cooling is the use of water as a heat transfer medium.





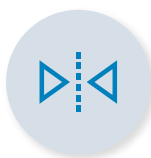
### Testing Method

By measuring the temperature difference between two points of the vapor chamber at a distance of 40mm from the heat source when the heat source is 60°C and the power is 10W, within 60 seconds.



### Setting

Set the initial value of the heat source, power and the time



### Position

Place the vapor chamber on the heat source and align the location



### Test

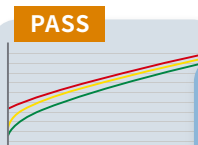
Monitor the temperature at two points of the vapor chamber, and record the curve



### Observed

Observe the temperature records and use the temperature difference to judge the performance of the vapor chamber

### Performance testing



Determine the final temperature difference between the yellow line and the green line, and test whether it is an accepted product

## Quality Assurance

### R & D



- ✓ **Complete equipment**
- ✓ **Exclusive research & development of rapid process**

### Full inspection of shipments



- 01 Size**  
Length and width tolerance  $\pm 0.1\text{mm}$   
Thickness  $0.45 \pm 0.05\text{mm}$
- 02 Appearance**  
Surface treatment, nickel-plated or anodizing
- 03 Others**  
Aging test | Thermal Shock test | Salt spray test

20<sup>+</sup>

Decades of experience in thermal engineering solutions

3500<sup>+</sup>

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Produce a large number of thermal products

1K<sup>+</sup>

Produce a large number of thermal products

## CONTACT

### Taiwan HQ

A No.33, Ln.50, Daren Rd., Taoyuan Dist., Taoyuan City 330058, Taiwan

T +886-3-361-8899 M service@tglobal.com.tw W www.tglobalcorp.com

