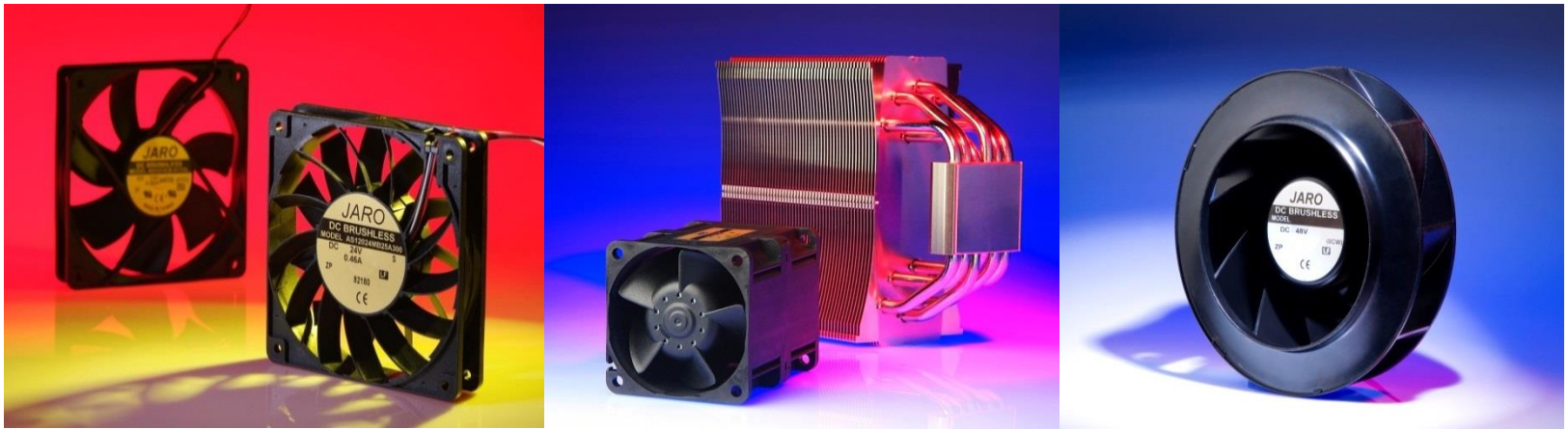




Slim Type Heat Pipe



2014-5-27
Version. 0



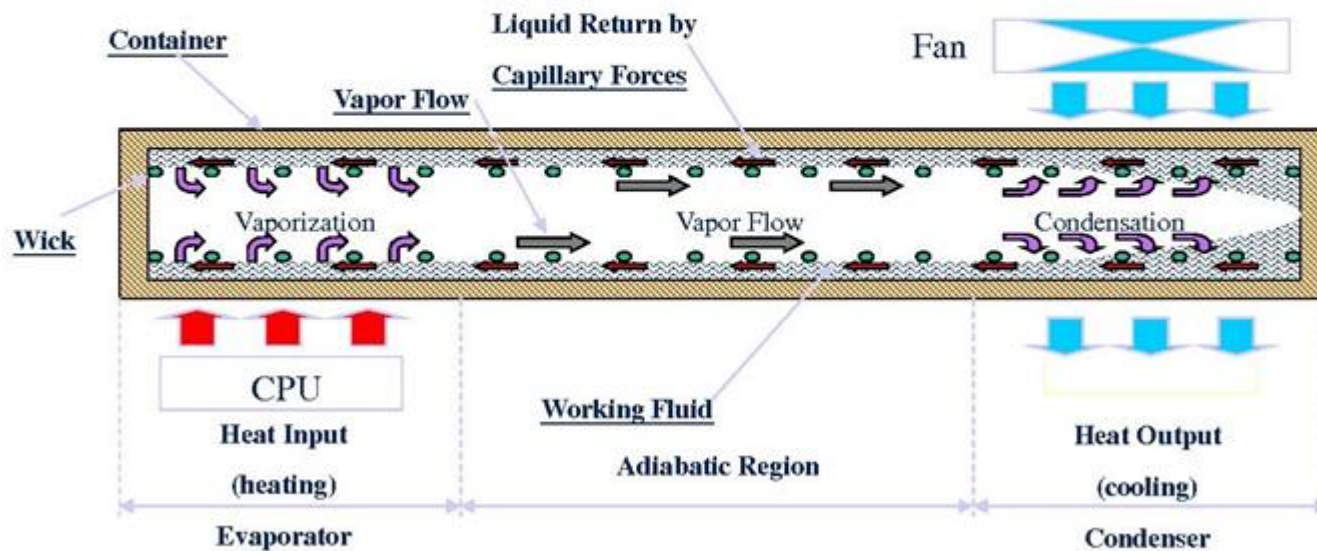
Content

- Theory
- Design Concept
- Design Purpose
- Design Reference



□ Theory

- Operation Principle : When liquid and vapor phase changes, heat is brought from evaporation section to condenser section. Then the capillary force of wick structure will bring back the working fluid to evaporation section and continue





□ Design Concept



□ Design Concept

Special Sintering

Advantage

- To add capillary vessel thickness
- To add vapor channel measure area
- It will not deformed and hold up good after press flat.



□ Design Concept

Special Sintering

Press Flatten Thickness	Capillary Vessel Structure
1.5	2 sides powder
1.2	2 sides powder
1.0	1 side powder
0.8	Fiber
0.6	Fiber

Special Central Stick

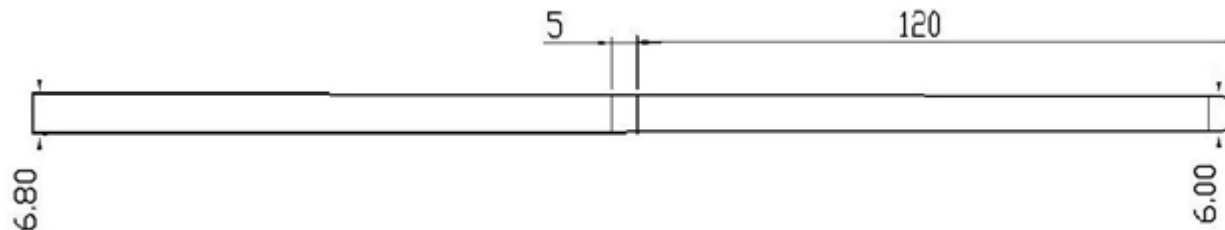
□ 2 sides



□ 1 side



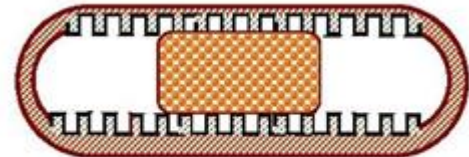
□ Cone Shape (L>250mm, Qmax>Normal)



Composite Structure (Sintering + Grooving)

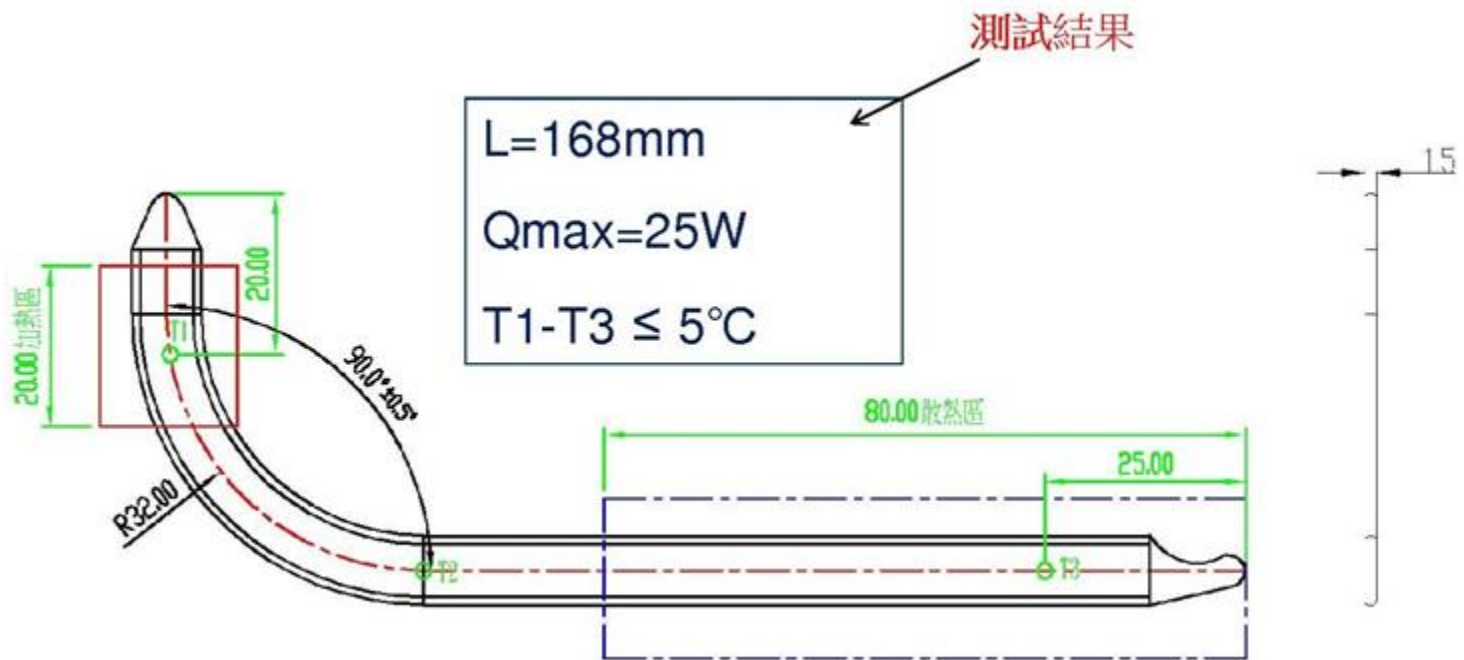
Advantage

- To add capillary vessel ostimic pressure in order to increase max heat transfer value.
- If it is broken on bent position of copper powder sintering, fluid will re-flow from groove positio



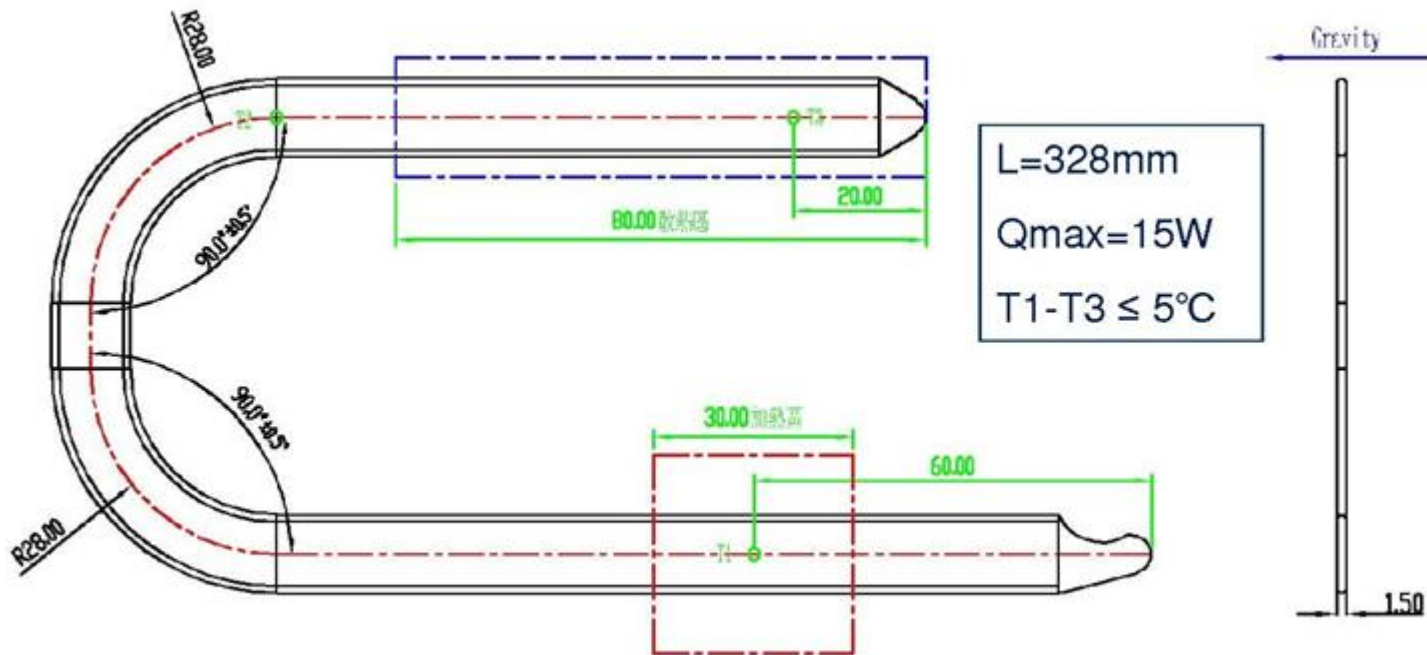
□ Design Purpose

□ Design Purpose D6-1.5T

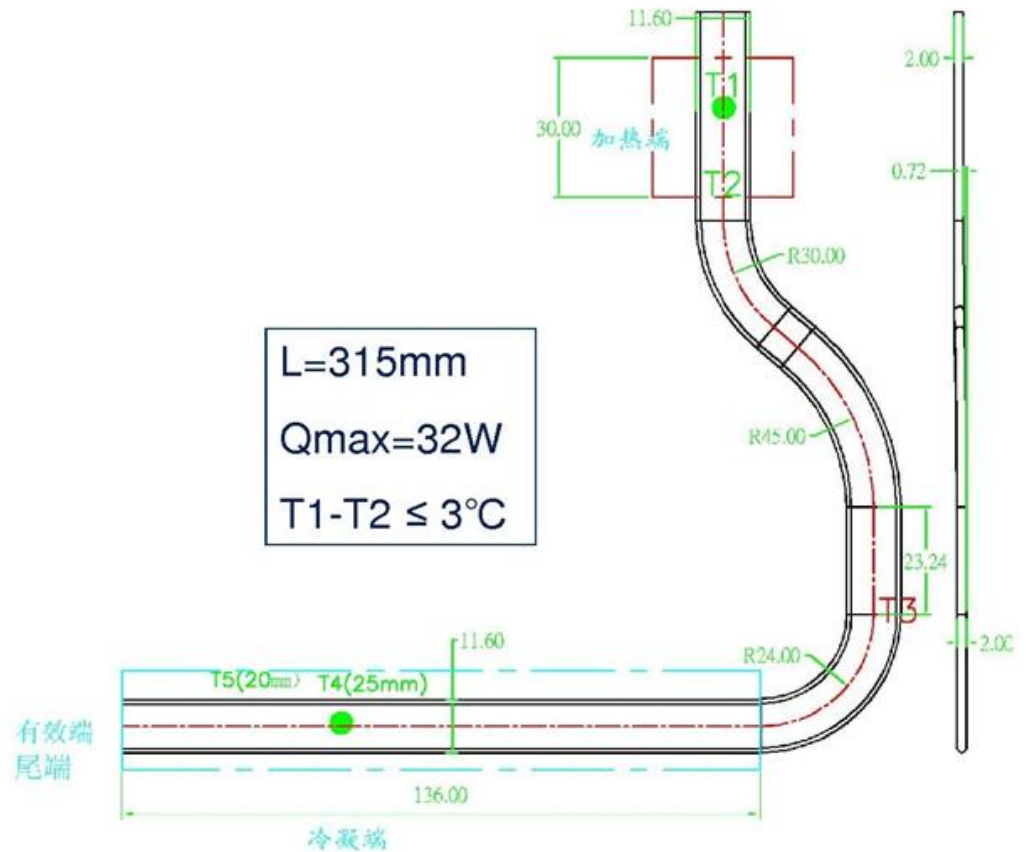


□ Design Purpose D8-1.5T

- Heat pipe height: 1.5mm
- Customer request: 10W+15W $\Delta \leq 5^\circ \text{C/W}$



- Heat pipe height: 2.0mm
- Customer request: 27W



□ Design Purpose P2030 D6

- Heat pipe height: 1.5mm
- Customer request: 25W+15W

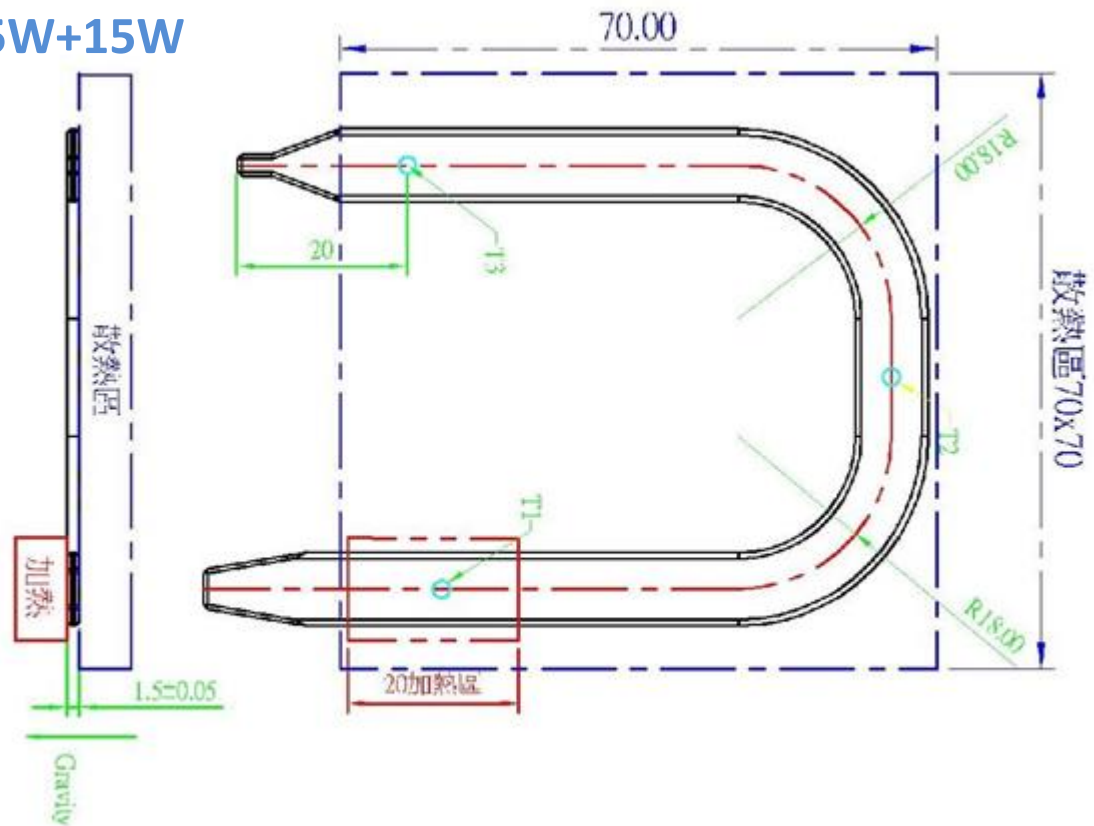
L=192mm

Q_{max} = 55W

Average temp,

Test by water cooling

$R(T1-T3) \leq 0.15 \text{ } ^\circ\text{C/W}$

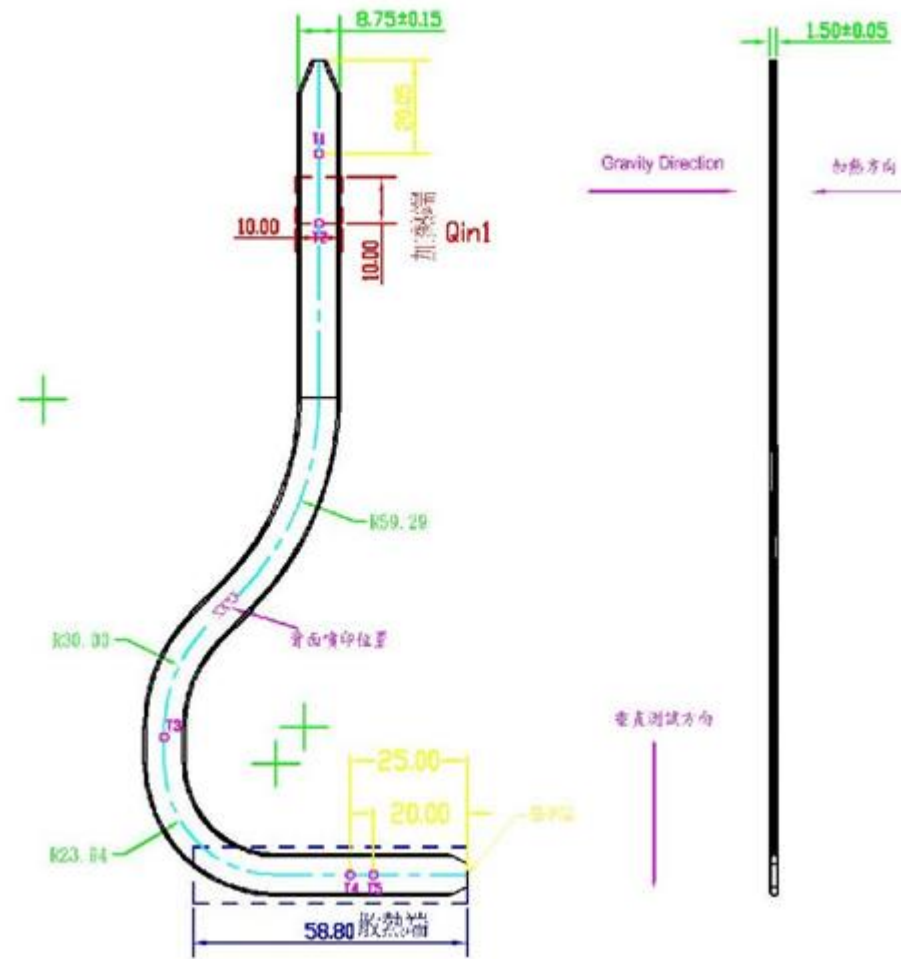


□ Design Purpose D6-1.5T

- Heat pipe height: 1.5mm
- Customer request:
Level 24W
Vertical 150W

Level: $Q_{max} = 25W$
 $T1-T4 \leq 5 \text{ degree C}$

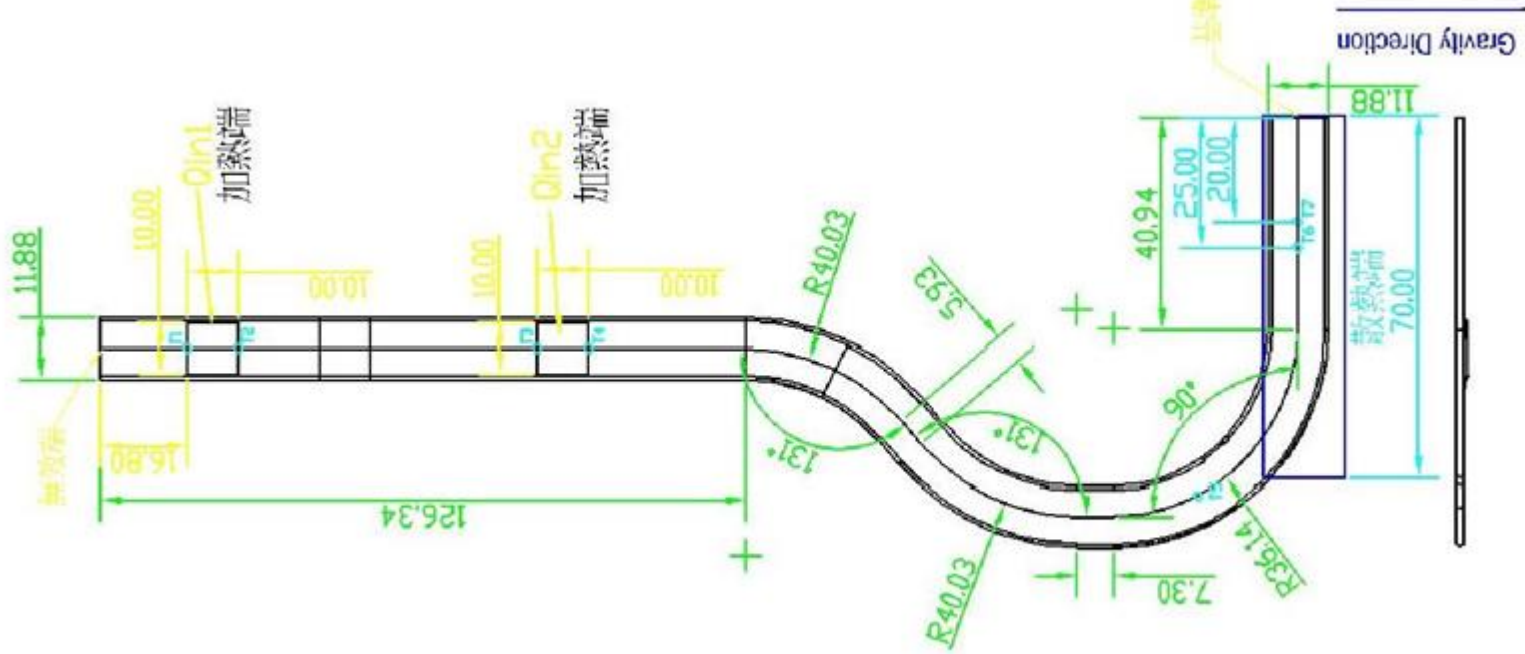
Vertical $Q_{max} = 10W$
 $T1-T4 \leq 7 \text{ degree C}$



□ Design Purpose D8+1.5T

- Heat pipe height: 1.5mm
- Customer request: 25W+15W

L=306.5mm
 Q_{max}=25W+10W
 T₁-T₃ ≤ 5°C



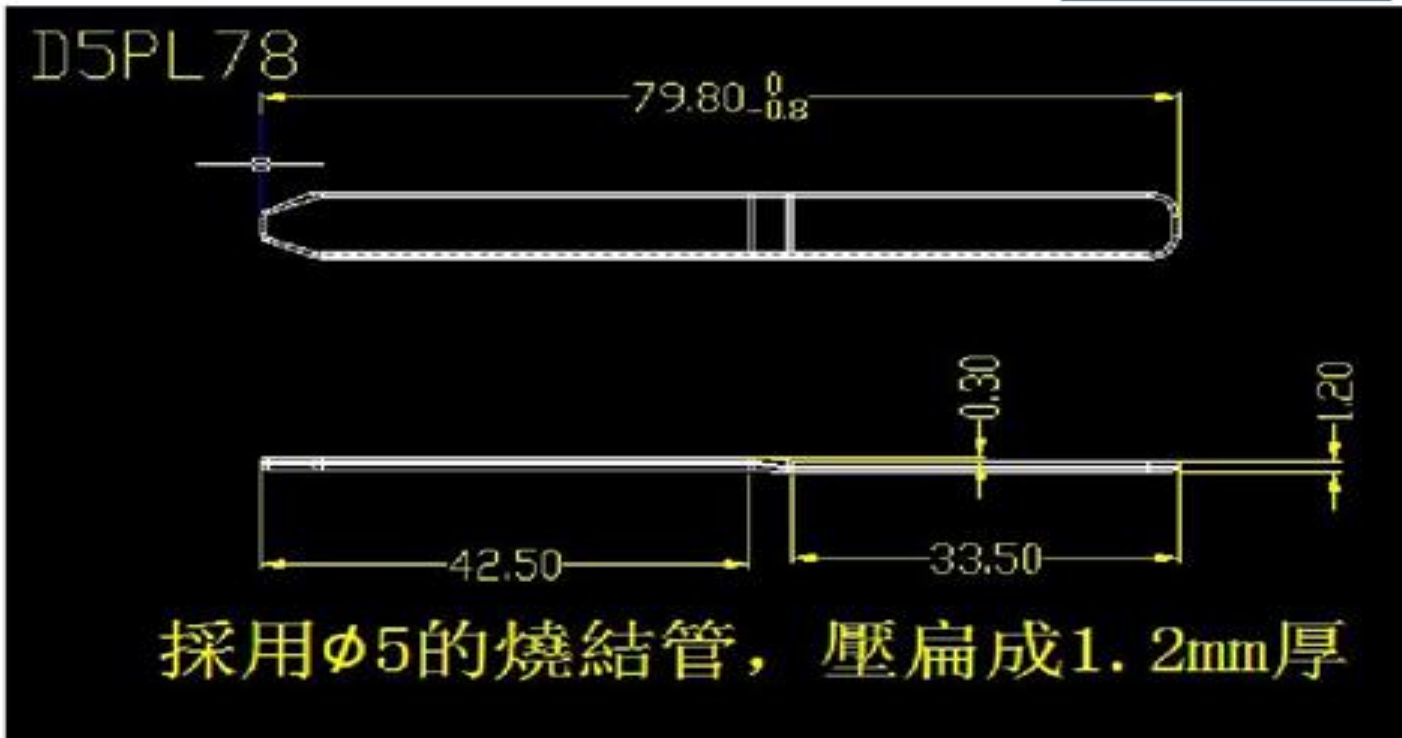
□ Design Purpose 2RBP

- Heat pipe height: 1.2mm
- Customer request: Average Temp.

L=78mm

Qmax= 均温

T1-T3 ≤ 5°C



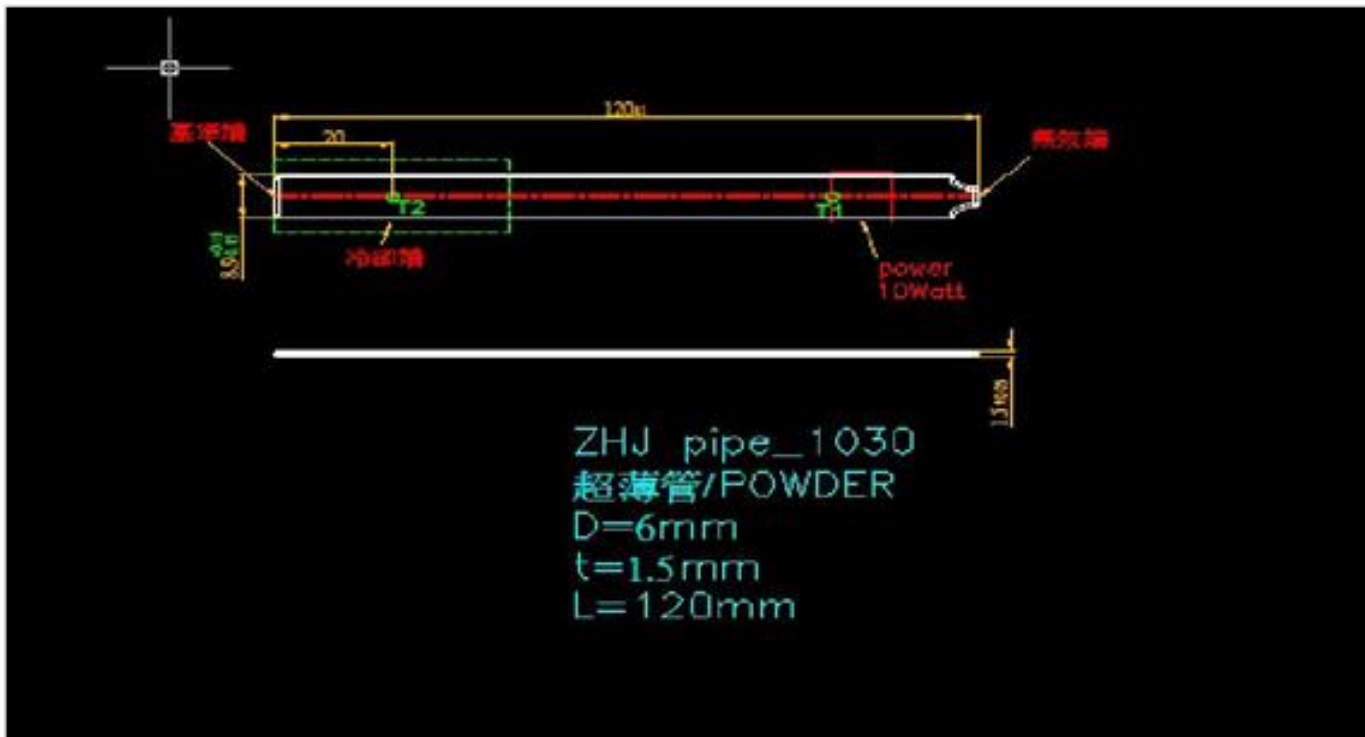
□ Design Purpose ZHJ

- Heat pipe height: 1.5mm
- Customer request: 10W

L=120mm

Qmax=10W

T1-T3 ≤ 5°C



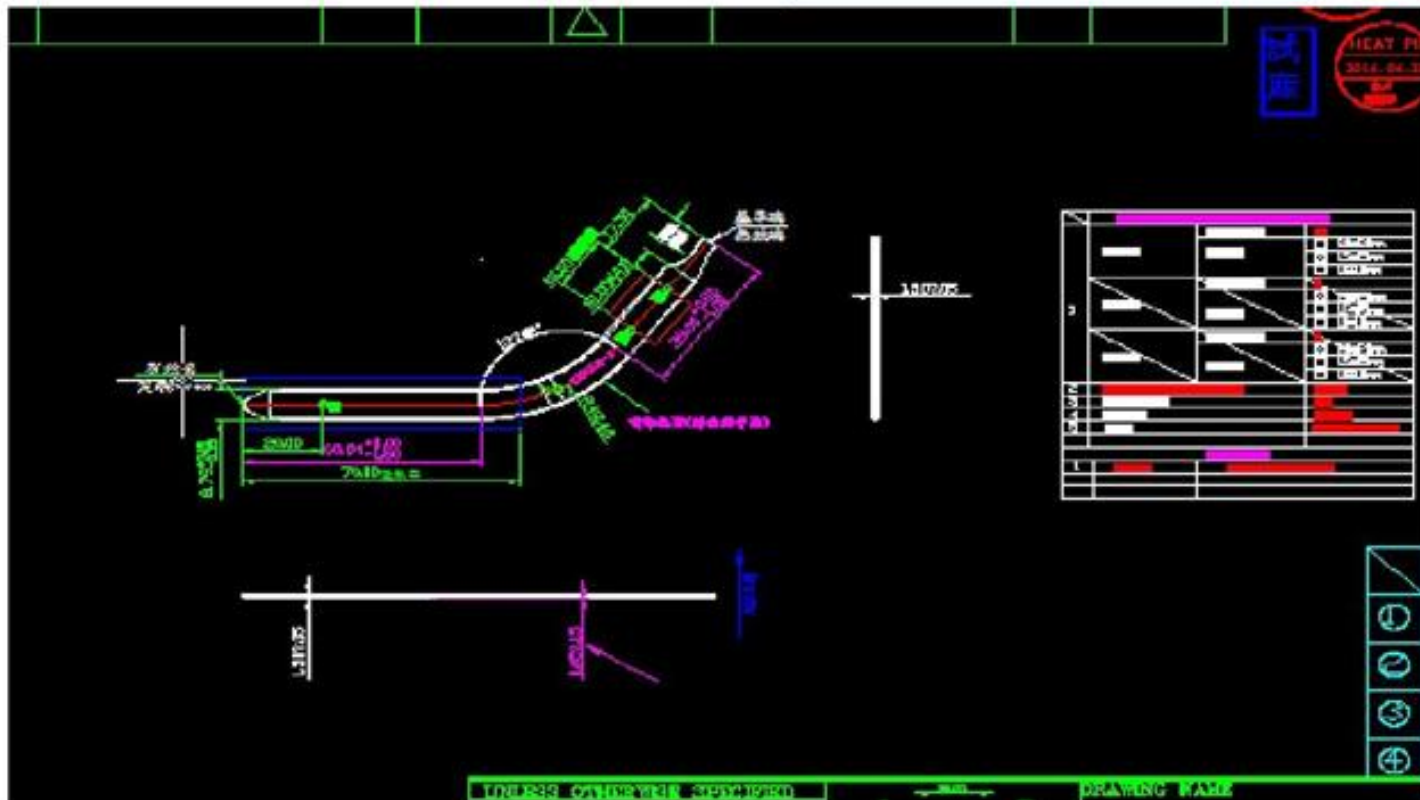
□ Design Purpose CPU-HP

- Heat pipe height: 1.5mm
- Customer request: 10W

L=138mm

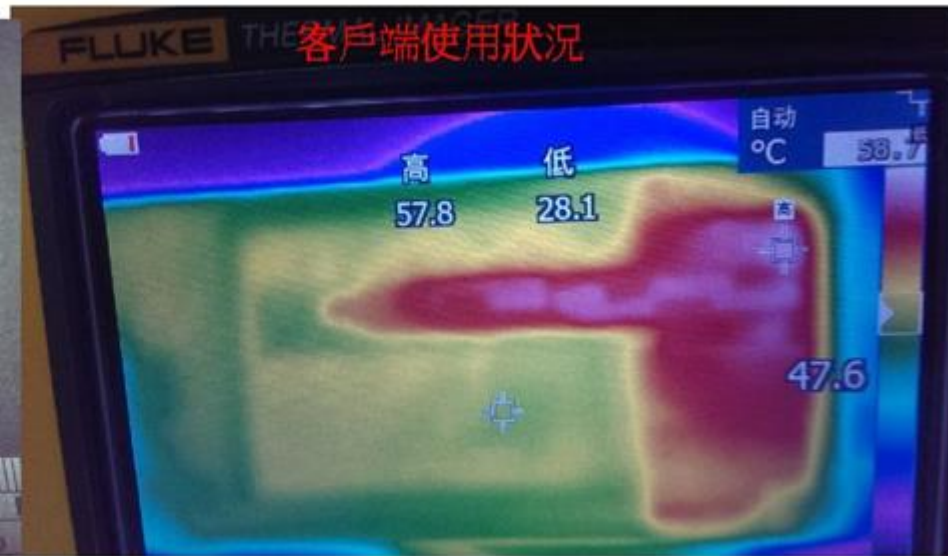
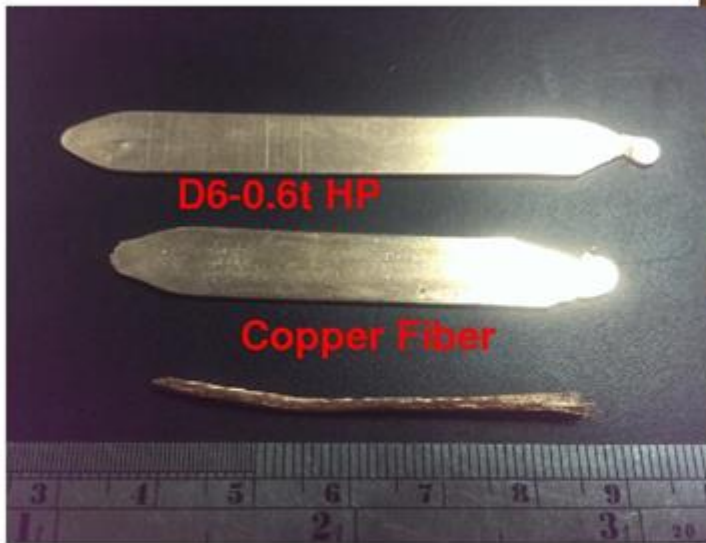
Q_{max}=18W

T₁-T₃ ≤ 5°C



□ Design Purpose D6-0.6T

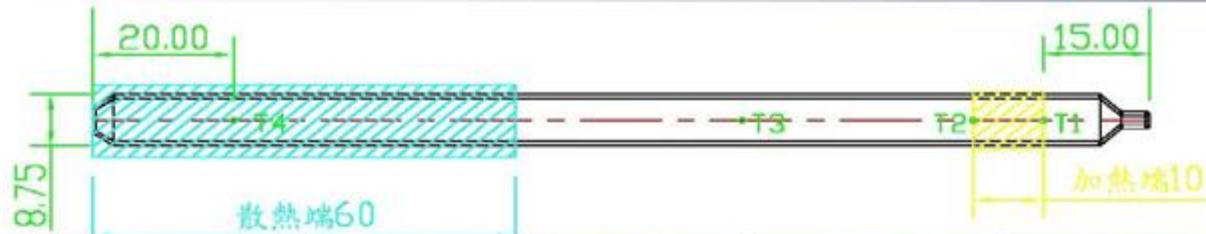
□ Heat pipe height 0.6mm



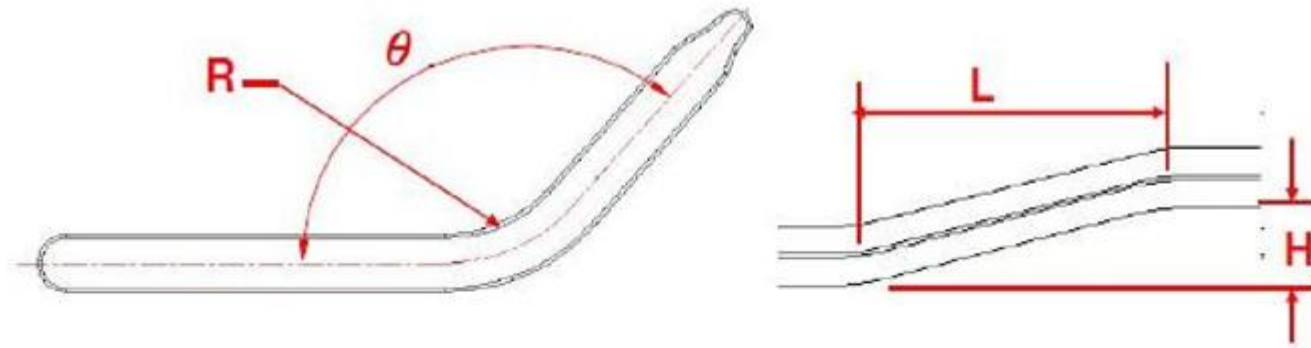


□ Design Reference

Functional Reference



管徑	銅管	熱管高度(mm)	長度(mm)	Q _{max} (W)	建議Q _{max} (W)
D6	6x0.25	1.5t	150	35	32
			200	20	17
			250	18	15
		1.2t	150	18	16
			200	15	12
			250	7	5
			150	20	17
			200	10	7
			250	10	7
			150	12	10
1.0t	150	12	10		
	200				
	250				
D8	8x0.25	1.5t	150	45	38
			200	30	26
			250	25	21



Type	Bending Radius <R>		Bending Angle <θ>		Height difference			
					Height <H>		Length <L>	
	Minimum	Recommend	Minimum	Recommend	Maximum	Recommend	Minimum	Recommend
1.5t	3.5xD	4.5xD	90°	135°	2.5mm	<0.8mm	25mm	40mm
1.2t	3.5xD	4.5xD	90°	135°	2.2mm	<0.5mm	30mm	40mm
1.0t	4.0xD	5.0xD	110°	150°	1.0mm	=0mm	35mm	45mm