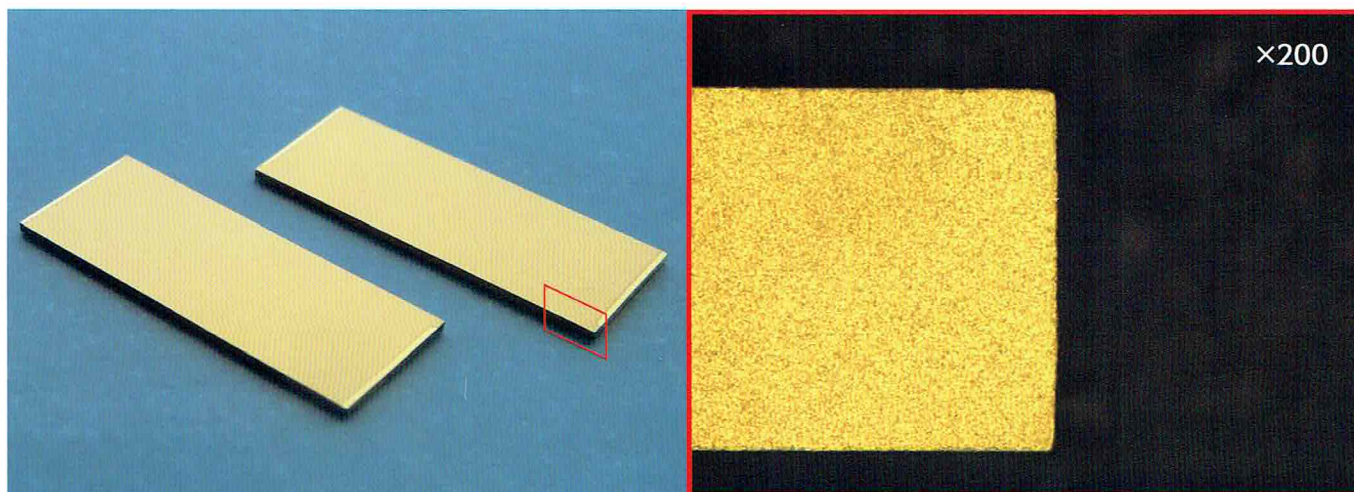


## CuW submount



### Materials

Composition	W90/Cu10
Thermal conductivity	170W/m·K
CTE	6.5ppm/°C

### Dimension / tolerance

Length	
Width	Refer table
Thickness	
Surface roughness	Ra<0.4
Warpage	<5μm
Edge radius	<20μm

### Metallization

All surface	Ni 1.0-5.0μm/Au 0.1-0.3μm
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### AuSn solder

Composition	Au75/Sn25(wt%)
Thickness	5μm ±1μm

### Options

Material selection (W80/Cu20, W85/Cu15)  
 Sputtering layer (Ti, Pt, Au etc.)  
 Additional structure (Hole, Step)  
 Less warpage (≤3μm)  
 Tighten width tolerance (±0.01mm)

※ This is standard specification.

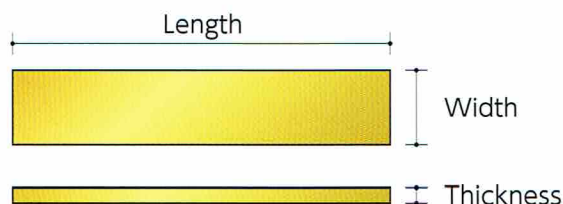
In case you have any request except for this, please feel free to contact us.

### Applications

- Submount for Laser diode
- Base for power semiconductor device

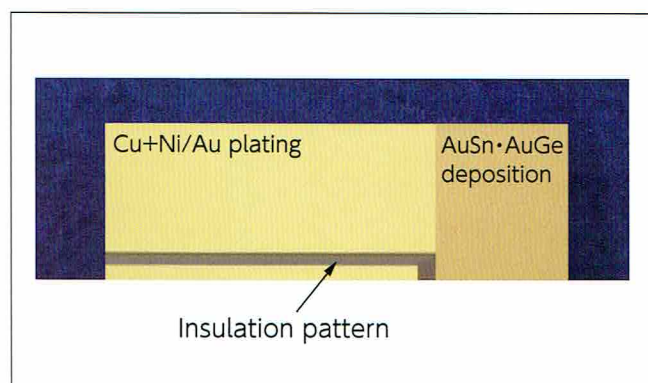
### Table : Standard specifications

Unit:mm

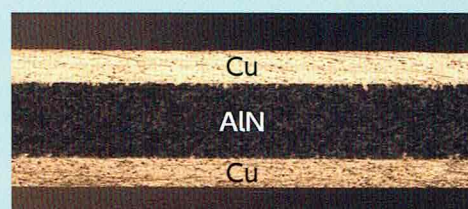


Length (±0.05)	Width (±0.05)	Thickness (±0.02)
10.6	2.0	0.20
	3.0	0.25
	4.0	0.30
		0.40
5.6	5.6	

## Plated type Cu-AlN-Cu submount



Cross section



Each layer thickness is controllable

- AlN+Cu plated material to achieve higher thermal conductivity
- CTE matching with LD
  - Adjusting Cu and AlN thickness makes it possible to control CTE
- Ideal for multi-emitting type LD
- Pull back is not required on critical edge area
  - Ideal for P side down type LD
- AuSn/AuGe solder vapor deposition
- Easy alignment for LD with sharp edge
  - Edge radius less than 20μm
- Thicker Cu plating is available (<100μm)

### Applications

- Submount for high power LD

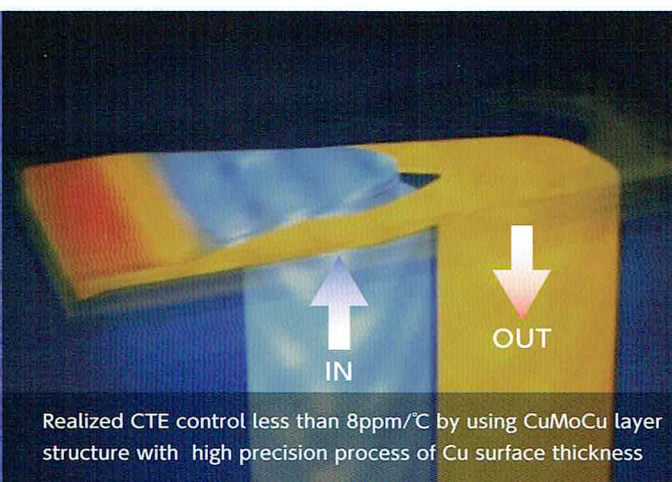
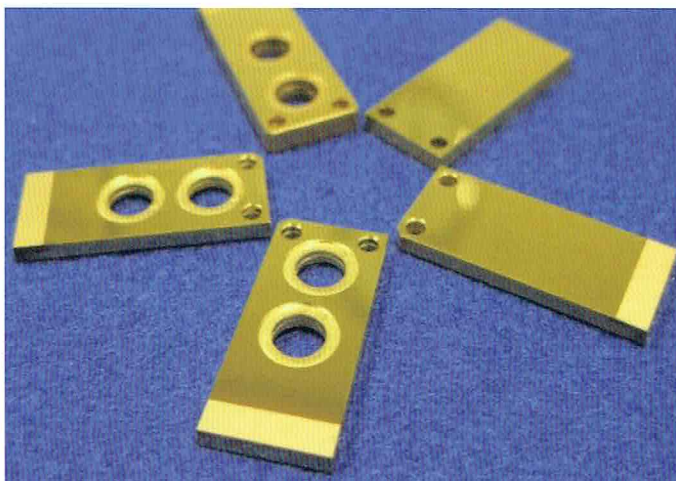
### Characteristics comparison data <Reference>

	Unit	Cu - AlN - Cu	AlN	CuW (10 / 20)
Material features	—	Insulation	Insulation	Conductive
Thermal conductivity	W/m·K	190~250※	170	180 / 200
CTE	ppm/°C	6~10※	4.6	6.5 / 8.3
Electric-resistance	Ω·m	-	-	5.3 / 4.0 (×10 <sup>-8</sup> )
Work voltage	V	<200	<200	NA
Relative permittivity (@1MHz)	-	9	9	NA
Dissipation factor (Tanδ)	-	5×10 <sup>-4</sup>	5×10 <sup>-4</sup>	NA

※ Possible to control with designing



## Microchannel cooler



### Applications

- Water cooling heatsink for high power LD

### Realize higher power/longer life LD module

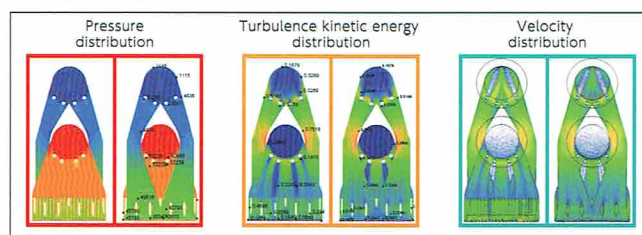
- Possible to mount 120W class LD
- Realize CTE 8ppm/°C
  - Possible to mount LD direct on microchannel cooler without submount
- Realize longer life of LD module
  - CTE matching on LD mounting area
  - Complete Au coating on inside of the channel for preventing corrosion
- AuSn solder deposition on LD mounting area
- Joint development with Fraunhofer ILT (Germany)

### Options

- Material selection: Cu-W-Cu or Cu  
(In case of Cu made MCC, submount is required)
- Diamound turning finish

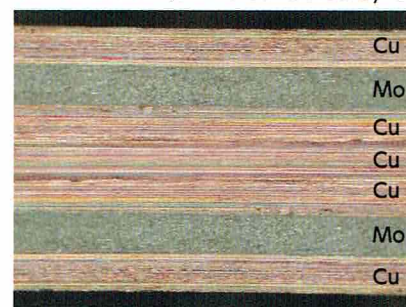
※Patented in Japan, U.S. and EPC.

### Fluid simulation



### CTE matching structure

Cross section (CTE is controlled by CuMoCu 7 layers)



### Evaluation features of standard specification

	Features	Remarks
TC	Approx. 0.5°C/W	500ml/min
Flow rate	Approx. 500ml/min	150kPa
Warpage	<1μm	LD mounting area
Size	11.0×20.0×1.55t(mm)	Single type
	11.0×27.0×1.55t(mm)	Stack type

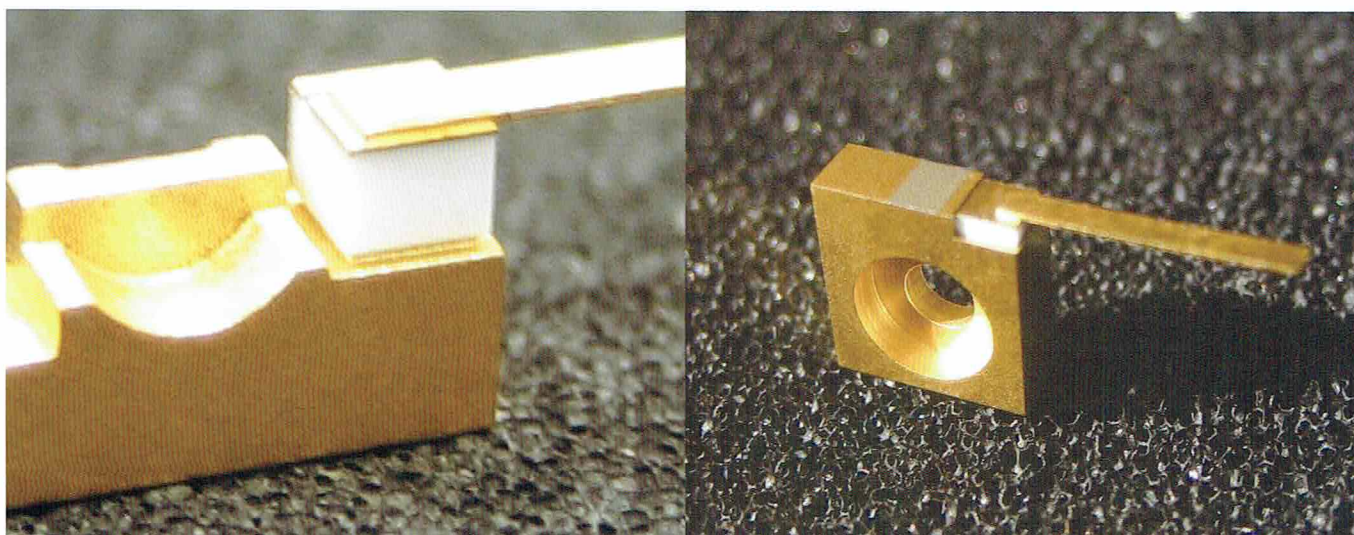
※Above information is as of August, 2014

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## Mount / Carrier



### Applications

- Carrier for opt-telecommunication LD, PD
- Carrier for high power LD

### Materials

Body	Cu (OFHC) / CuW10
Lead	Kv, Cu, Mo
Ceramic	Al <sub>2</sub> O <sub>3</sub> (92-96%)

### Dimension/Tolerance

Dimension	upon request (Refer image from A to L)
Surface roughness	Ra<0.4
Edge Radius	≤10/50/80μm

### Metallization

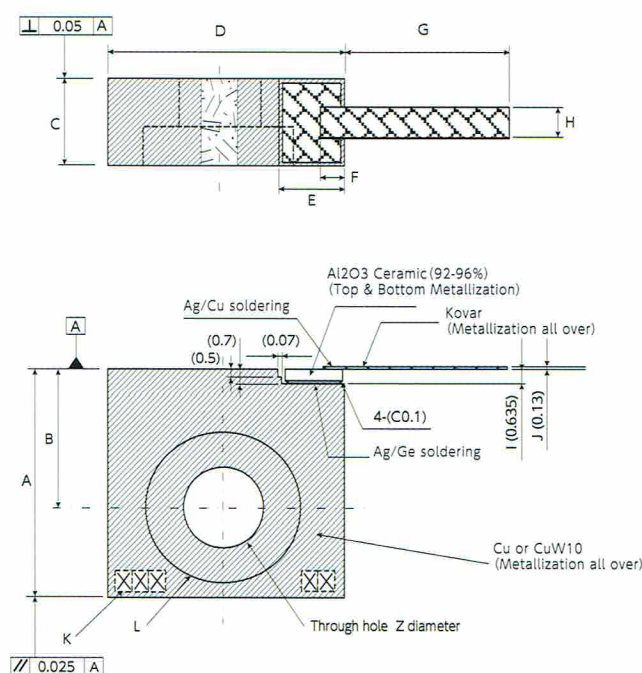
All surface	Ni 1.0-5.0μm/Au 0.1-0.3μm
-------------	---------------------------

### Options

- AuSn solder
- Diamond turning finish (Top and Front surface)

※This is standard specification.  
In case you have any request except for this, please feel free to contact us.

### Dimensional image

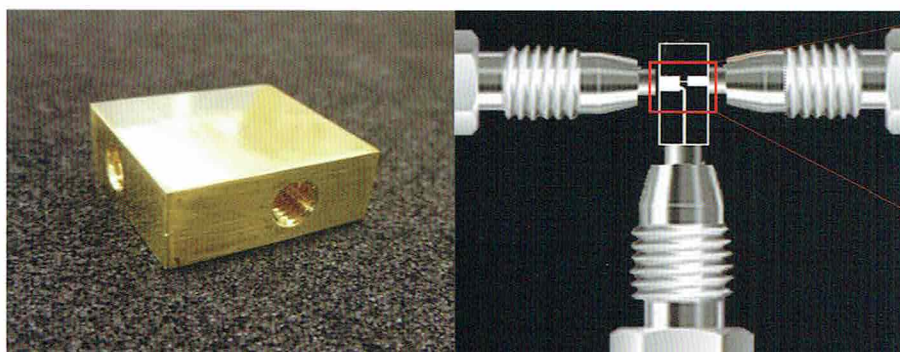
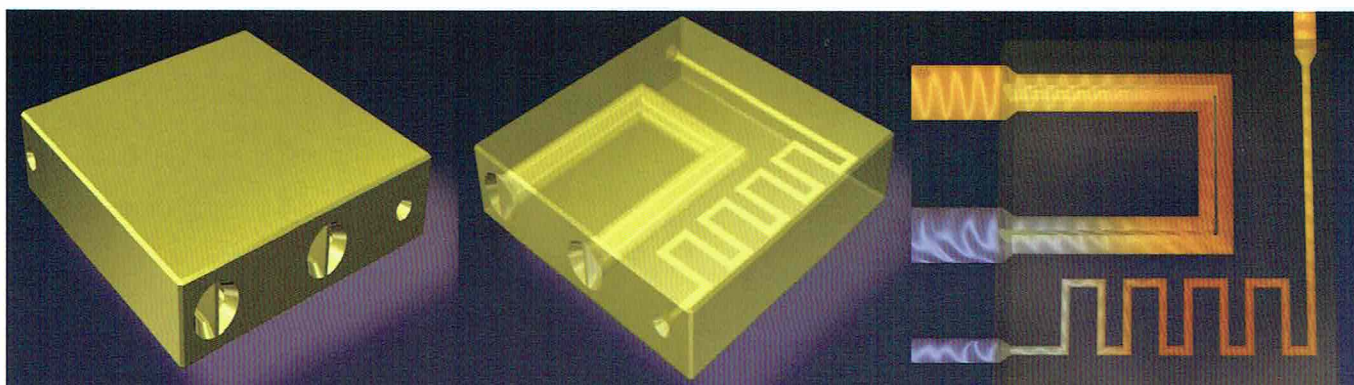


※Above information is as of August, 2014

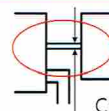
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## High pressure Seamless microchannel



X-ray transmission image



Channel width 20 $\mu$ m

Co-developed with Japan Science and Technology Agency and  
The National Institute of Advanced Industrial Science and Technology (Natsume project)

### Realize seamless structure (No bonding layer)

- 3D structure channel
- Inside channel is completely coated by plating
  - Prolong module life by corrosion resistance improvement
- Flexible designing upon requirements
  - Minimum outer dimension : 2.0x2.0x0.6mm
- Solid structure without bonding layer
  - Work under high pressure
  - No liquid / gas leakage

### Options

- Add screw tap on joint area
- Diamond turning process
  - Better flatness, sharp edge on device mounting area

### Applications

- Heatsinks (water/gas cooling)
- Mixing device
- Analytical device
- Reactor device etc.