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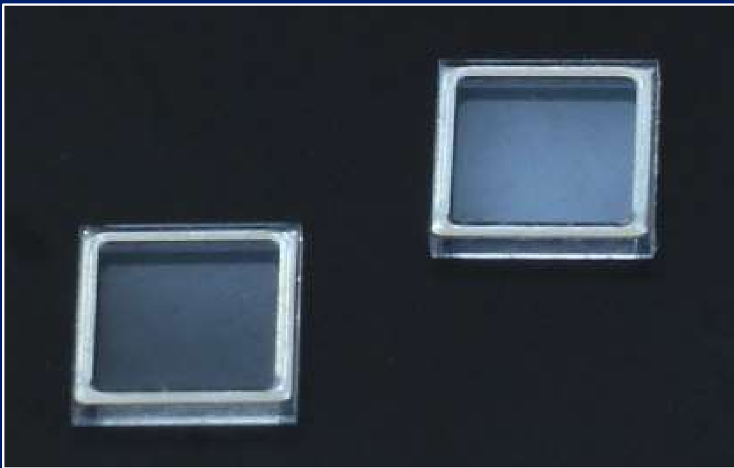
Glass lid with AGC Solder



AGC Inc. Electronics Company
Electronics Materials General Division
Advanced Materials Division
Development & Planning Div.

Overview : Glass LID with AGC Solder

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<Features>

1) Low temperature sealing

Since it has a lower melting point than gold-tin solder,
it can be joined and sealed at low temperatures.

2) Hetero-materials can be bonded (glass & ceramic)

It can bond between heterogeneous materials because
of lower Young's modulus compared to gold-tin solder.

3) Hermetic under "ambient" atmosphere

It is less likely to oxidize than gold-tin solder.

Oxygen sealing suppresses deterioration over time of LED or LD chips.

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Recommendation of bonding condition

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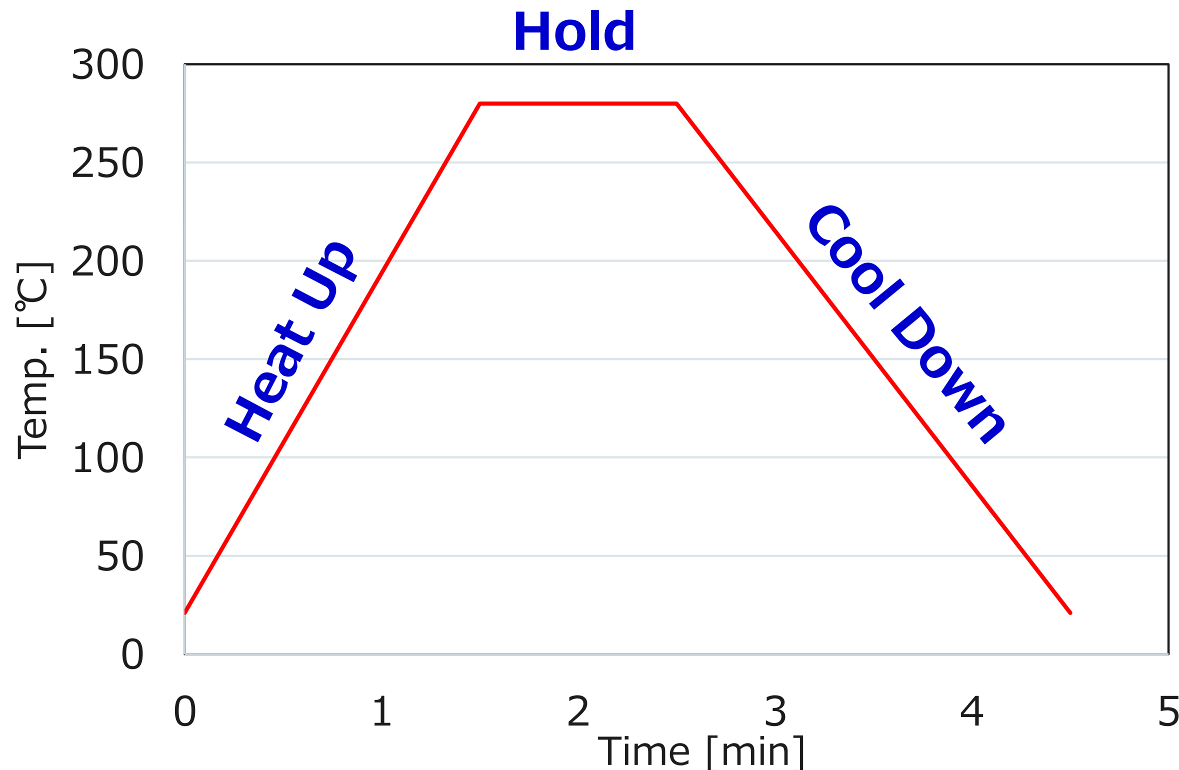

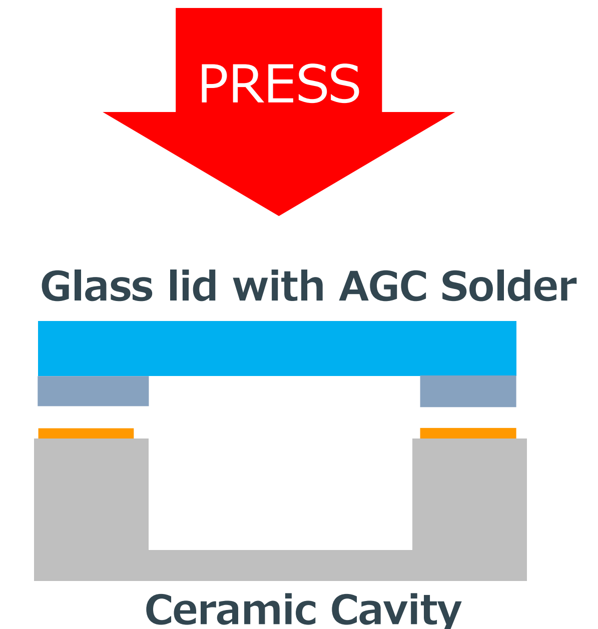

	Heat up	Hold	Cool down
Time [min]	～1.5	1	2
Temp [℃]	R.T.→280	280	280→R.T

R.T. = Room Temp.

※ Depending on the ceramics cavity spec or the customer's post-bonding process condition, it may be better to adjust this recommendation.
Please feel free to contact us.

Hermetic Sealing is completed simply by pressing glass lid and heating the AGC Solder.

Overview : Glass LID with AGC Solder

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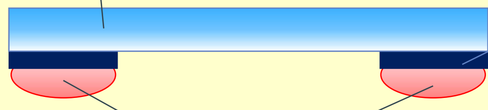
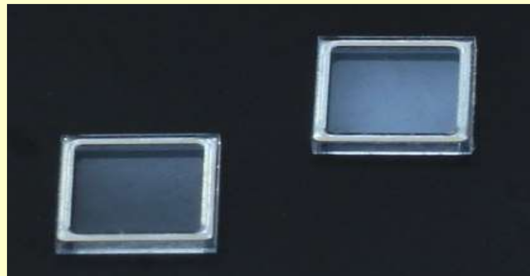
Glass LID
Silica, Borosilicate, etc.



Metalize
(LID-side)

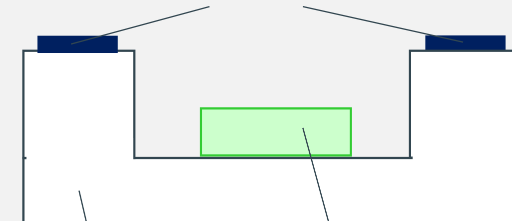
AGC Solder



LID & Solder

AGC supply

Metalize (Cavity-side)

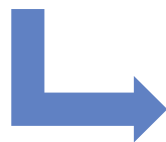


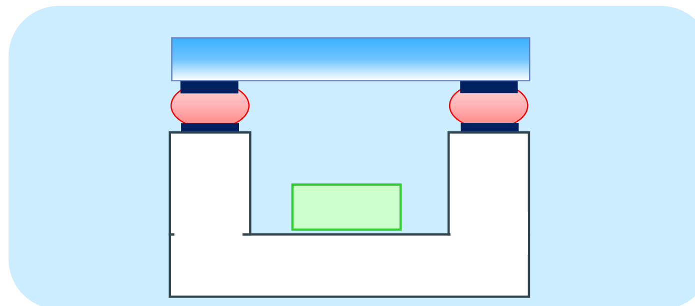
LED, LD chip

Ceramic Cavity

Customer preparation

Hermetic sealing





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Hardness of Solder after bonded

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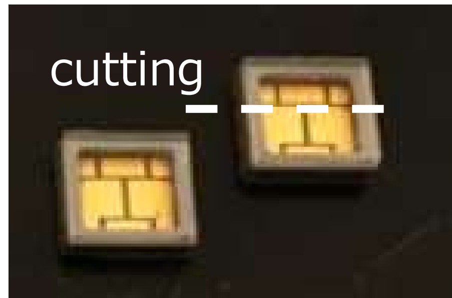
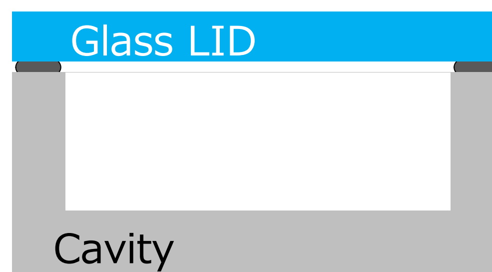
3.5mm-sq.PKG





Solder
(AGC Solder, Au-Sn solder)

■ Vickers hardness after bonded

Vickers hardness of each solder after bonded was measured.

Hardness of AGC Solder is extremely low.
It means AGC Solder shows that it retains flexibility to reduce stress after bonded.

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Hermetic evaluation result

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Helium leak test result after sealing

・Measuring method : Bombing method
・Measurement condition :
Measured within 1 hour after applying He pressure to 5.1 atm / 2 hours

① Immediately after sealing

⇒ **Helium leak rate 4.9×10^{-9} Pa*m³/s or less**

② After reflow heat resistance test

＊Reflow condition: Heated at 260 ℃ for 40 seconds 5 times

⇒ **Helium leak rate 4.9×10^{-9} Pa*m³/s or less**

Leak rate does not change even after repeated reflow heating

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Material properties / characteristics

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Physical property	AGC Solder (Sn-Ni-)	Au-20Sn	memo
Melting point (℃)	230	280	
CTE（ppm/℃)	22.9	17.5	20～200℃
Young's modulus (GPa)	20	57	Slope of Strain-Stress line
Thickness of surface oxide layer after heating up in air for bonding （nm)	5	23	Under the “ambient” atmosphere

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Product variations

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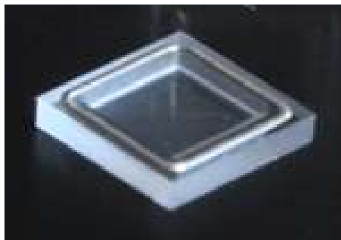
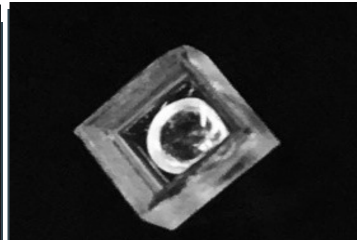
1. Various shape LID

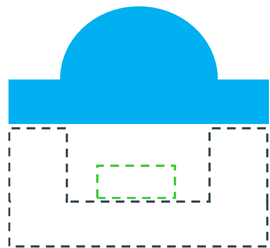
① Lens LID

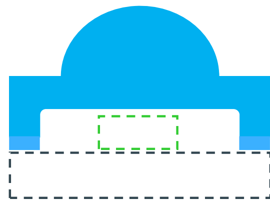


② Cavity LID



③Lens-Cavity LID



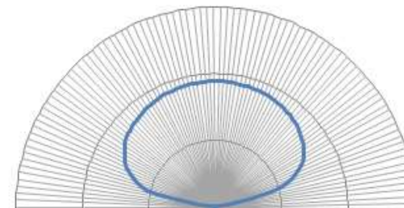


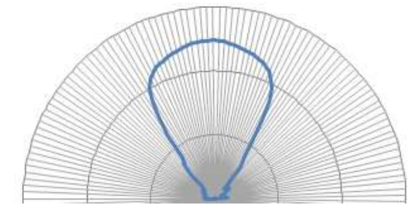
① : Lens LID make design flexibility of equipment increase

② : Cavity LID make assemble cost reduced because it can use ceramic plate for chip bonding

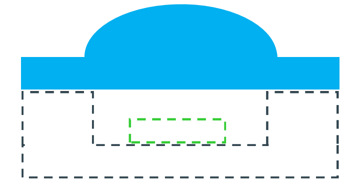
③ : ①+②

2. Very precise lens shape control





Flat LID



Lens LID

With our high-precision lens shape controllability, it is possible to realize highly symmetric ray distribution without stray light.

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END

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