



Bonding Materials

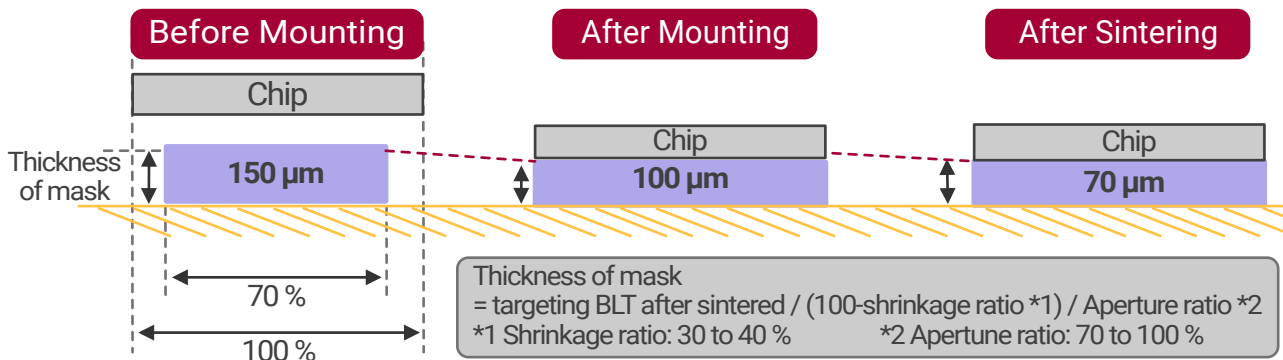


MAX4022 - Next Generation Die Attachment

Pressure-free silver sintering paste bondable on bare copper substrate

Advantage

- » Pressure-free for easy bonding without chip damage
- » High bonding strength equivalent to that of pressurized sintered silver
- » Advanced thermal conductivity
- » High reliability with 1,000 cycles between -55 °C and 150 °C
- » Extended shelf life (up to 12 months)
- » Stable workability over 168 hours tack free



1. Application Of Paste

Dispensing: from 26G
Printing Area: 0.5 to 20 mm²

2. Mounting Chip

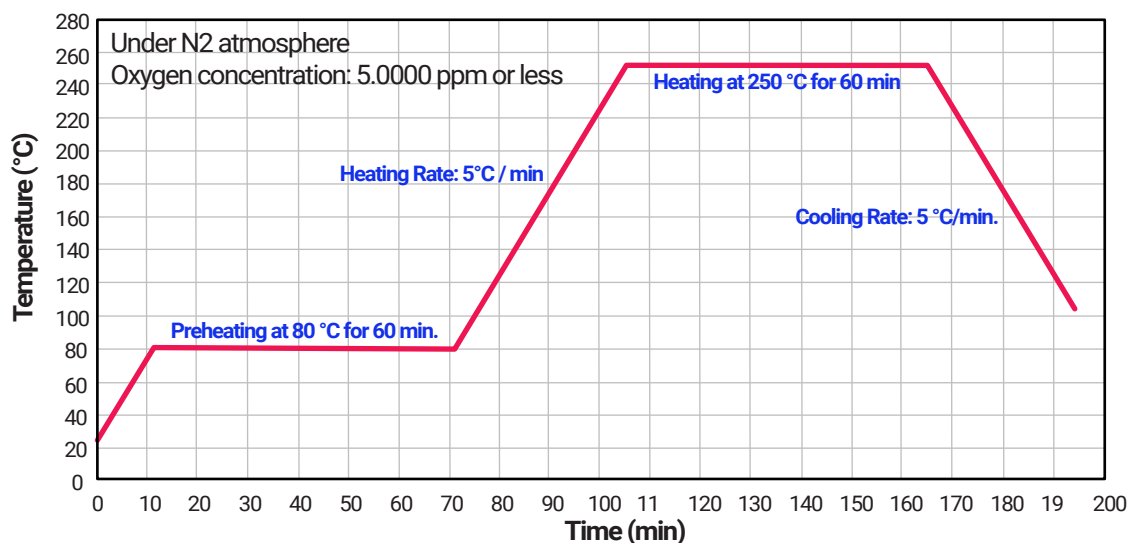
Just to adjust indentation load
* Make sure the paste spreads
4 corners of the chip entirely

3. Heating w/inert oven etc.

Heating Rate: 3 to 10 °C/min
Printing Area: 80 °C for 10 to 120 min*
*Depending on chip size
Heating: 250 °C for 60 min

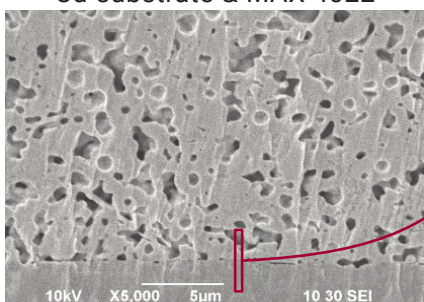
4. Cooling

Until the temperature
drops below 150 °C
Cooling Rate: 5 to 20 °C/min

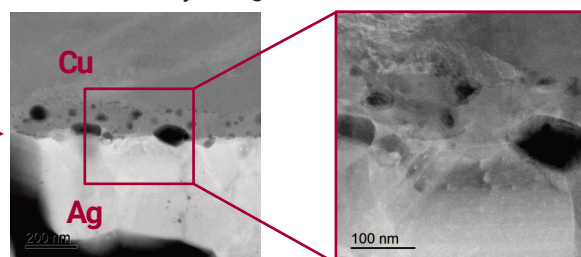


High bonding strength equivalent to pressurized silver sintering

Interface between
Cu-substrate & MAX 4022



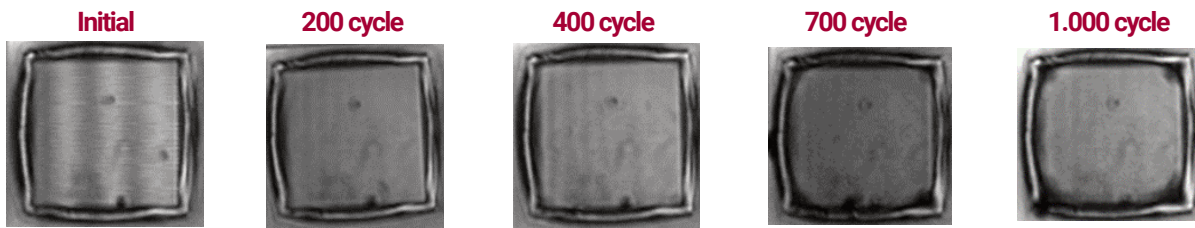
Boundary image observed with TEM



There is no clear boundary between copper & silver
and is assumable that they are mutually diffused.

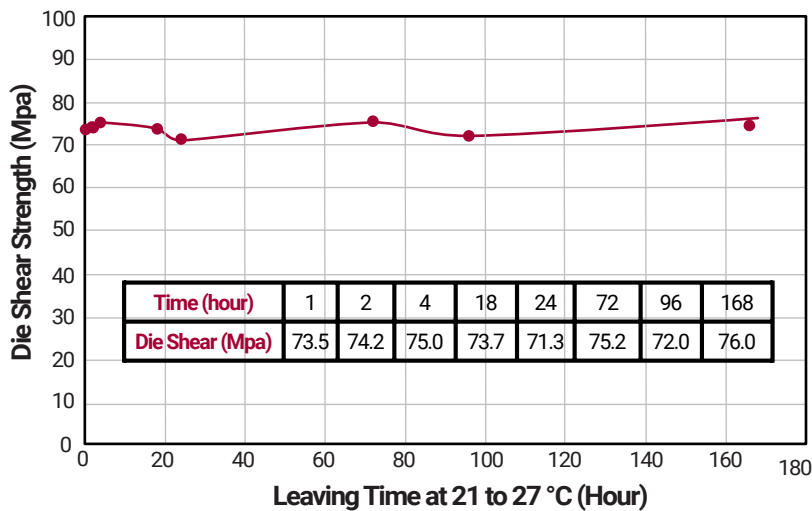
High reliability endurable 1.000 cycles between -55 °C and 150 °C

Thermal cycle test -55 °C to 150 °C, dwell time: 30 min , SAT image, Target: all layers of bonded body



Die: Si (Ti-Ni-Au) 8.0 mm² 200 μmT / Substrate: Copper, Preheating: 80 °C for 60 min → Heating: 250 °C for 60 min

Stable workability more than 168 hours tack-free time



No drying of the paste and no loss of adhesion to the chip

The strength remains the same even leaving for 168 hours at room temperature after printing

BLT: 100 μmT at printing
Leaving Temperature: 21 to 27 °C
Chip Size: 2.5 mm²
Heating: 250 °C for 60 minutes
Leaving Time: 168 hours after printing

Precautions for Application

- » Please allow MAX4022 to reach room temperature (~1 hour) before opening. Please push out the paste (~100 to 200 mg) from the tip of the syringe before placing it in the dispenser. If necessary, stir with a rotary container mixer.
- » MAX4022 should be used within 24 hours after opening. If it is unavoidable to reuse MAX4022, please store it again in the refrigerator and check that there are no problems with dispensing or fluidity before use.

Properties

| Item | Figure | Remarks |
|----------------------|-------------------------------|-----------------------------------------|
| Viscosity | 50 to 100 Pa*s | Type E Vis cometer, 5 rpm at 25 °C |
| Silver Content | 88.0 % | Weight loss |
| Pot Life | 24 hours | Nihon Handa Method |
| Shelf Life | 12 months in fridge | - |
| Heating Atmosphere | Nitrogen | O ² content 1000 ppm or less |
| Die Shear Strength | 60 MPa | Bond tester |
| Vickers Hardness | 47 | JIS Z 2244 (HV 0.025, 15 S) |
| CTE | 20 ppm | Thermal mechanical analyzer |
| Thermal Conductivity | 330 W/m * K | Xenon flush |
| Thermal Resistivity | Less than 0.03 °C/W | Steady state method |
| Volume Resistivity | 5.6 x 10 ⁻⁶ Ω * cm | JIS K 7194 |
| Substrate | Cu, Au and Ag | - |

Find out more



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