TO BE KEPT SECRETS FROM OUTSIDERS

13 February 2012

TECHNICAL REPORT

CP36531-18AJ

Anisotropic Conductive Film for Chip on Glass

- Trial products -

ADVANCED MATERIAL DIVISION

Products Development Department

Note on the characteristic data given - Data on the characteristics of the products described in this document based on the results of evaluations carried out by the company. This does not guarantee that the characteristics of the product conform with your usage environment. Before use, review the usage conditions based on evaluation data obtained from the equipment and substrates actually used.

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Features

-COG application for TFT

-Interconnect a small-to-medium-sized FPD with an IC chip.

-Fine pitch (smaller and Insulated particle)

-Low temperature bonding

-Low warpage model

Note：This report has been prepared on the basis of our reliable tests、however is not intended to guarantee the performance described hereunder.

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Specifications

Items		CP36531-18AJ	*Remarks*
Curing system		Epoxy-Cation	*1
Structure and thickness	1) ACF-layer	6μm	1) 2) 3)
	2) NCF-layer	12μm	
	3) Base film / color	38μm / white	
Conductive particles	1) Material	Ni plated polymer	1) 2)
	2) Insulator coated	Yes	
	Particle diameter	3μm	
	Particle density	61K pcs/mm^2	*Design value. Calculated in ACF layer*
Minimum overlap area of conductors		1200μm^2	*(Average -4.5σ ≧3pcs)* *2
Minimum bump space		12μm	*Space between bumps.*
Minimum conductor space		7μm	*Space between neighboring circuits.*

**1: There is a possibility that interference of cation curing reaction happens depending on the material. (PI layer of IC, Panel with Soda lime glass, etc).*
Confirmation tests of the interference is required on each material.
**2:Where the faced conductor overlaps.*

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Bonding conditions and Properties

Bonding conditions *5

items		CP36531-18AJ	Remarks
ACF laminating conditions	Temperature	50～80℃	*1
	Pressure	1.0MPa	*3
	Time	1～2sec	*2
Main bonding conditions	Temperature	160～180℃	*1
	Pressure	40～80MPa	*4
	Time	5sec	*2

Properties of cured ACF

items		CP36531-18AJ	Remarks
Elastic modulus	at 30℃	3.0GPa	*DMA*
Glass transition temperature (Tg)		146 ℃	*DMA, tanδ peak*

**1: Temperature of ACF lamination and main bonding: It is not equipment temperature, but actual temperature of ACF.*
**2: Time of ACF lamination and main bonding: Time from the start of bonding to the point where the temperature reaches the target.*
**3: Pressure of ACF lamination: It is calculated based on the area of ACF lamination.*
**4: The pressure is calculated based on the total area of bumps.*
**5: Bonding condition may differ depending on chip size and metal pattern. We recommend this as a starting point to determine your own optimized conditions.*

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Bonding Temperature Profile

Measurement : Date Logger
Cushion material Teflon 50μmt

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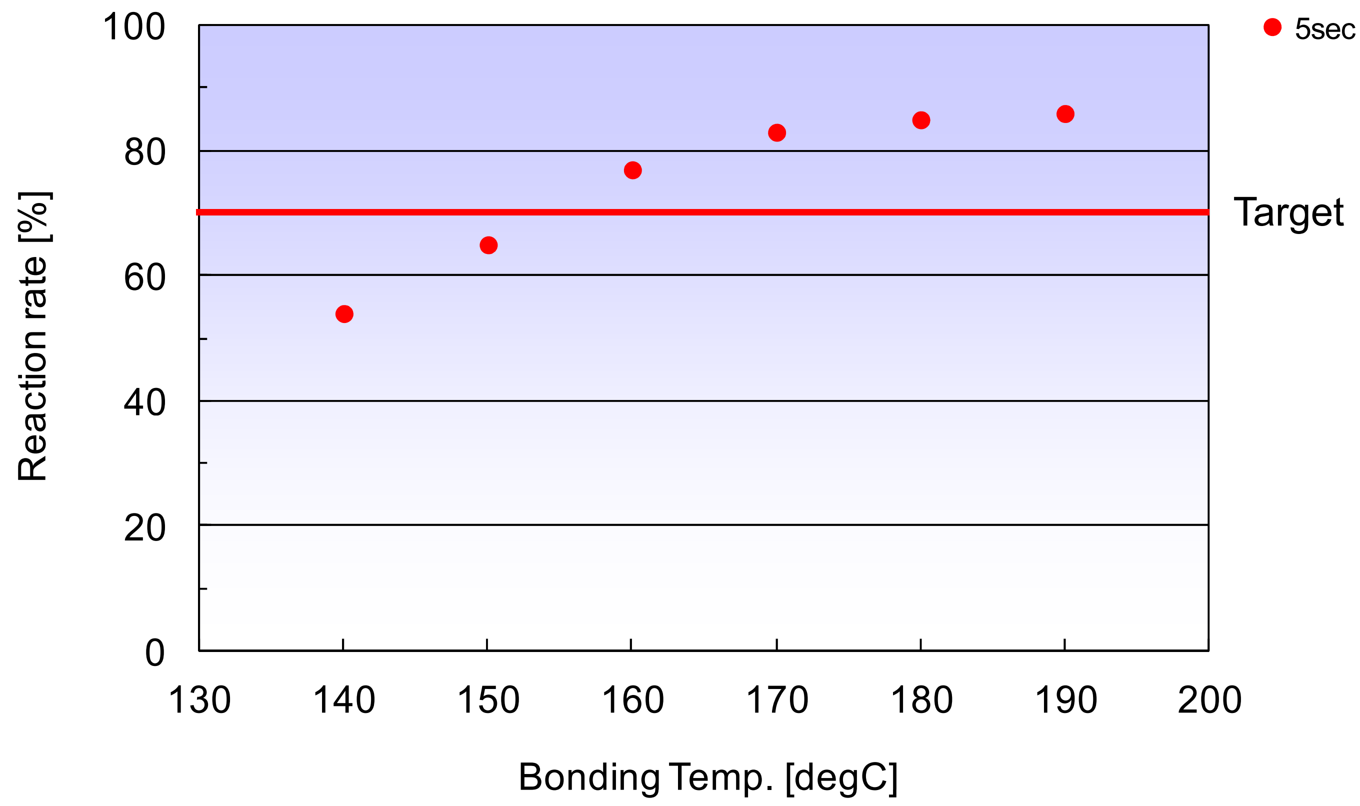
Reaction rate

IC	: 1.8mmx20mm, t= 0.5mm, Au-plated bump 30μmx85μm, h=15μm
Glass	: t =0.5mm , ITO 10 Ω□
Bonding condition	: 140-190℃, 60MPa, 5sec
Measurement	: FT-IR Method



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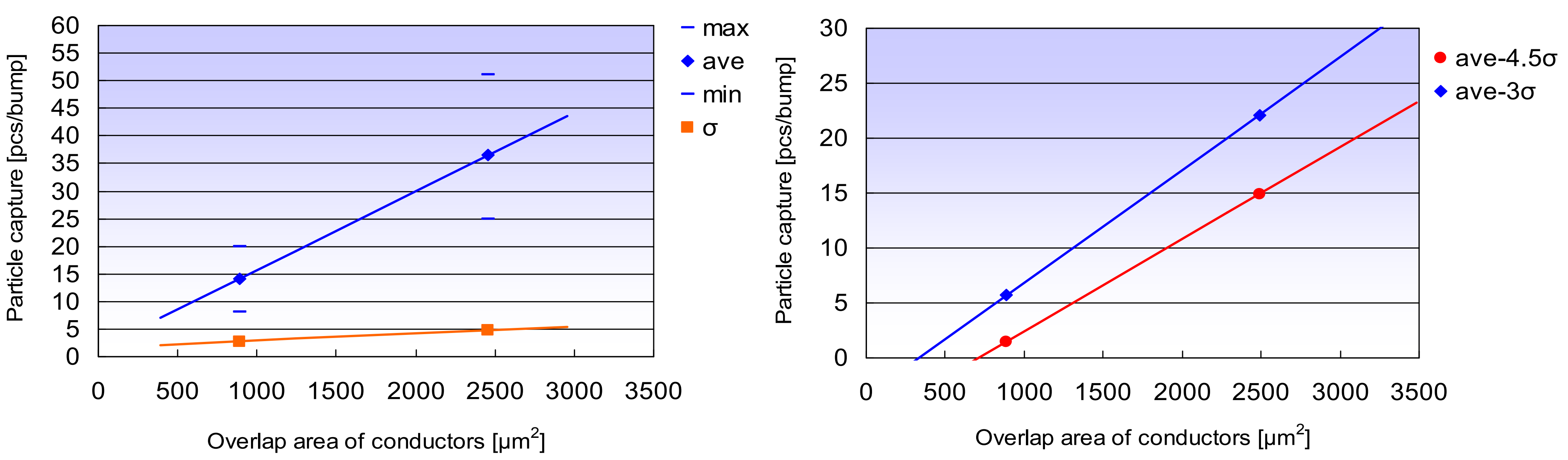
Particle capture

IC	: 1.8mmx20mm, t= 0.5mm, Au-plated bump, h= 15μm
Glass	: t=0.5mm , ITO 10 Ω□
Bonding condition	: 170℃, 60MPa, 5sec
Measurement	: 100bumps



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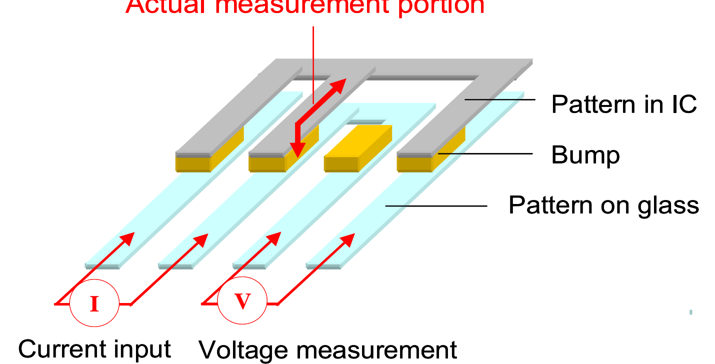
Conductive resistance

IC	: 1.8mmx20mm, t= 0.5mm, Au-plated bump 30μmx85μm, h=15μm
Glass	: t =0.5mm , ITO 10 Ω/☐
Bonding condition	: 160 /170 /180℃, 60MPa, 5sec
Aging condition	: 85℃85%R.H.



160℃, 60MPa, 5sec

Conductive resistance [ohm] (0–60) vs. Aging time [h] (0, 125, 250, 375, 500); legend: max, ave

170℃, 60MPa, 5sec

Conductive resistance [ohm] (0–60) vs. Aging time [h] (0, 125, 250, 375, 500); legend: max, ave

180℃, 60MPa, 5sec

Conductive resistance [ohm] (0–60) vs. Aging time [h] (0, 125, 250, 375, 500); legend: max, ave

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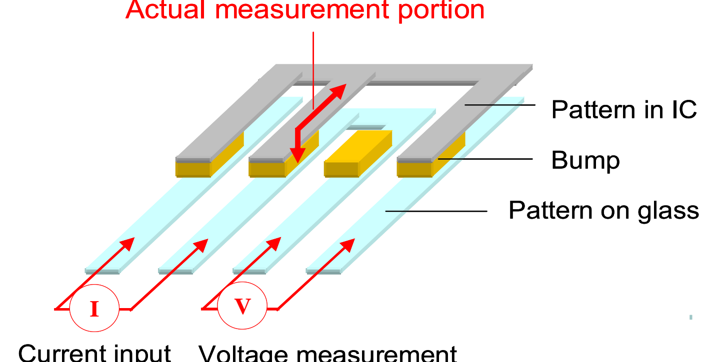
Conductive resistance

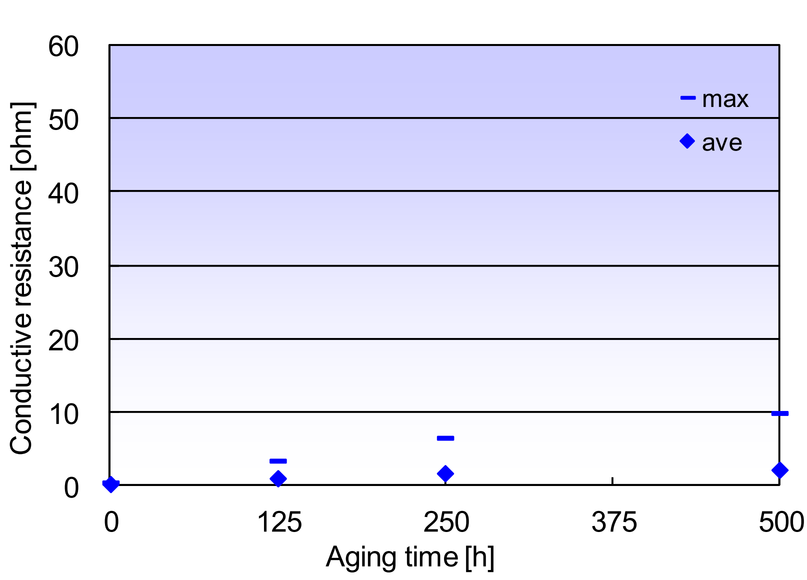
IC : 1.8mmx20mm, t= 0.5mm,
Au-plated bump 30μmx85μm, h=15μm

Glass : t =0.5mm , ITO 10 Ω/☐

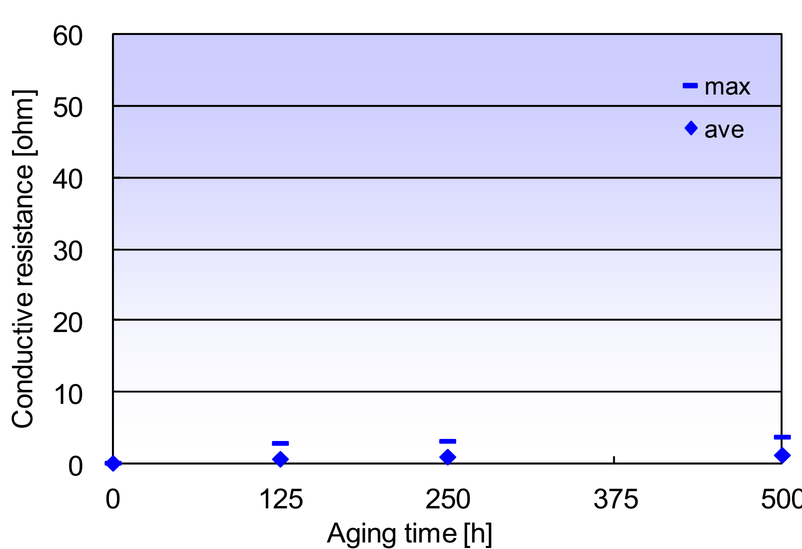
Bonding condition : 170℃, 40/ 80 MPa, 5sec

Aging condition : 85℃85%R.H.





170℃, 80MPa, 5sec



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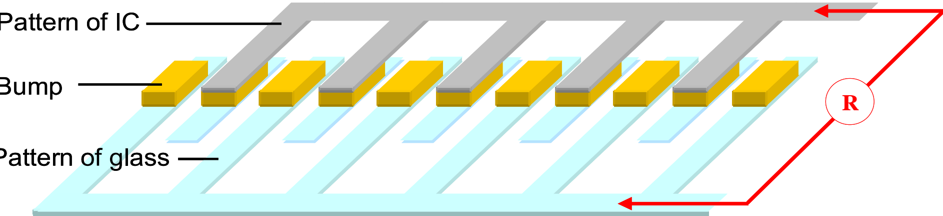
Insulation resistance

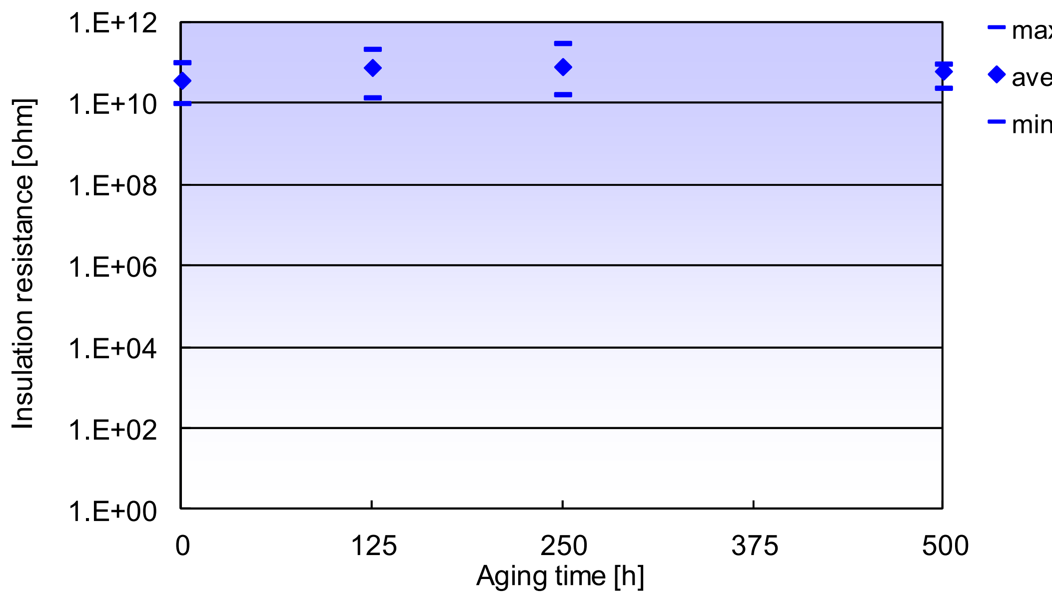
IC : 1.5mmx13mm, t= 0.5mm, Au-plated bump 25x140um
Bump space=10μm, The number of gap =16sets (10points/set)

Glass : t =0.5mm , ITO 10 Ω/□

Bonding condition : 170℃, 60MPa, 5s

Aging condition : 85℃85%R.H.





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