Hitachi Anisotropic Conductive Film

ANISOLM®

AC-868G-18
(GX2 Version)

Issued 2012/2/7

(Ver. 1.3)

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Display Materials R&D Dept.

Display Materials Div.

Hitachi Chemical Co.,Ltd.

Hitachi Chemical

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1. Standard specification, bonding condition, storage condition and characteristic

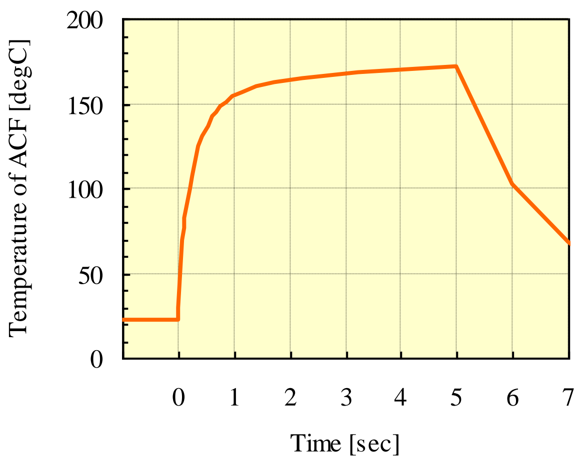
Item			Unit	AC-868G (GX2 Ver.)	Remark
Standard Specifications	Capability in interconnection circuit	Connection area	um^2	800	Min. contact area (Including Misalignment) Bump Electrode (ITO, Metal etc.) Ave.-3σ≧5pcs.
		Insulation gap	um	10	IC Bump Glass Electrode (ITO , Metal etc.) Min. space
				5	IC Bump Glass Electrode (ITO, Metal etc.) Min. space (In Misalignment)
	Conductive particle	Size	um	2.8	Ni plated plastic particle with **surface treatment**
		Density	pcs/mm^2	70,000 [3]	
	Thickness		um	18	ACF Layer + NCF Layer
	Width		mm	1.2, 1.5, 2.0	Contact us for other width request
	Length		m	100	
	Color		–	Transparent (gray)	
	Core diameter		mm	18.5	
	Configuration		–	–Double-Layer ACF– Particle-filled layer (9um) Non particle-filled layer (9um) Separator (White PET 38um)	
Bonding conditions	ACF lamination	Temperature	degC	60 - 80	Final ANISOLM temperature
		Pressure	MPa	1	Per unit area of ANISOLM
		Time	s	1 - 2	
	IC main bonding	Temperature	degC	170±10	Final ANISOLM temperature
		Pressure	MPa	80(30 -150)	Per total bump area
		Time	s	5 or more	Including temp increasing time
Storage conditions		Unopened	–	4.5 months after date of manufacture when stored at -10 to 5degC.	
		Opened	–	10 days at 25 degC or below and 70%RH or below.	

Notes:
1) Leave ANISOLM at room temperature for an hour before opening sealed bag. Make sure ANISOLM is not wet before using it.
2) Suitable bonding condition depends on specification of IC chip, glass substrate, bonding machines etc. Please contact us for detailed information. .
3) Designed Value

The values given above represent typical measurements, not guaranteed ones.

2. Precautions in bonding

2.1 Temperature profile in main-bonding of IC chip



Ex.)

Bonding condition: 170 degC-5sec

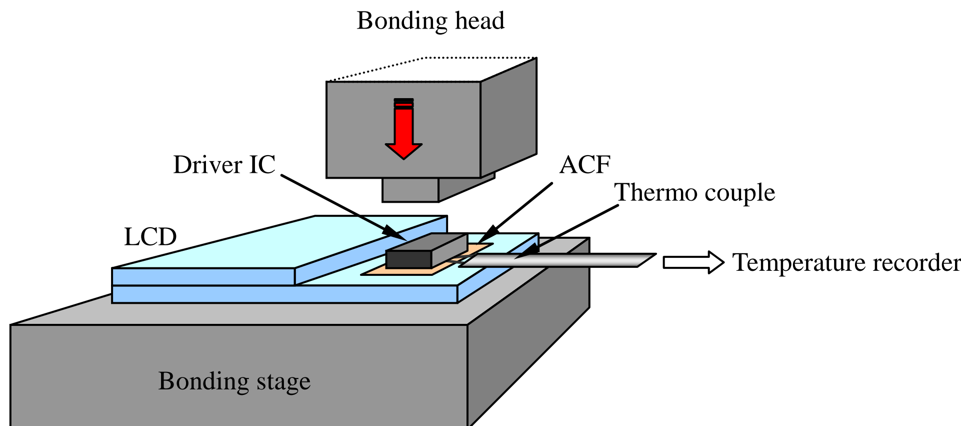
Head setting temperature: 190 degC

Chip size: 0.9mm x 20.3mm x 0.3mmt

Thickness of glass substrate: 0.5mmt

Caution: Temperature should reach at more than 90% of targeting ACF temperature within first 2 seconds.

2.2 Measurement of ANISOLM temperature



2.3 Bonding head

(1) Make sure the coplanarity of bonding head is even and parallel to IC chip.

(2) Use slightly wider head than IC chip. Example; Chip width 2.0mm → Head width 2.5mm

2.4 Misalignment of opposite circuits

Make sure opposite circuits are well aligned and matched each other.

3. Connection reliability

3.1 Measurement

(1) Used materials for measurement

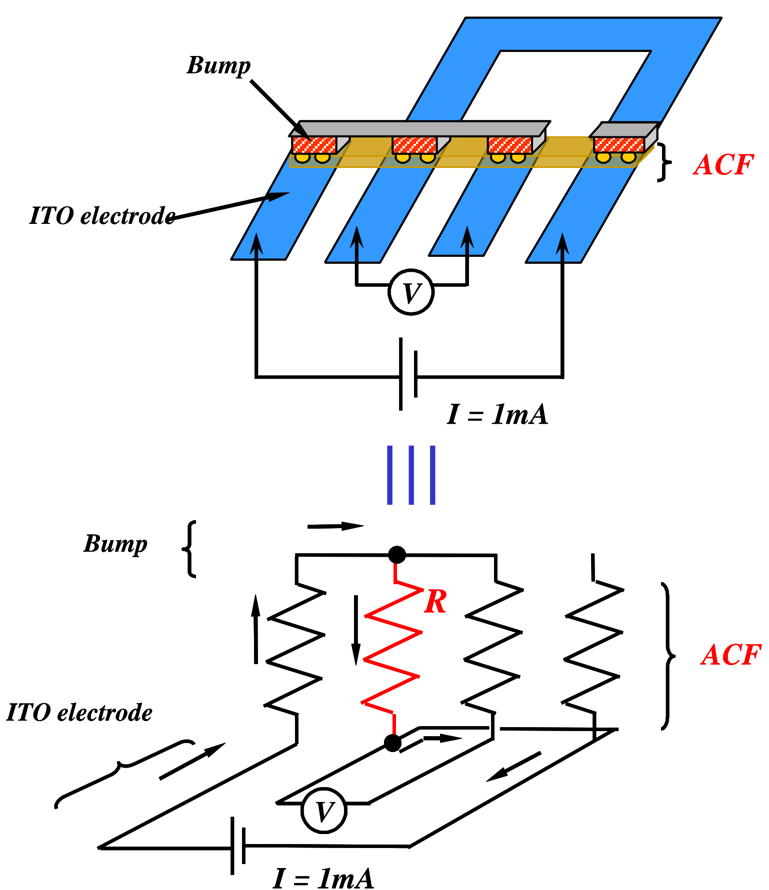
/ Test chip : Connection area **1,200**um2 (Bump size: 12 x 100um, IC size: 0.9 x 20.3 x 0.3mm)

/ Test board: ITO electrode glass (ITO thickness: 0.2um, Surface resistance: 10ohm/sq)

(2) Measurement of connection resistance (refer to the diagram below)

/ Four-probe measurement (Circuit resistance can be cancelled)

/ Applied current: 1mA



Four probe measurement in COG interconnection

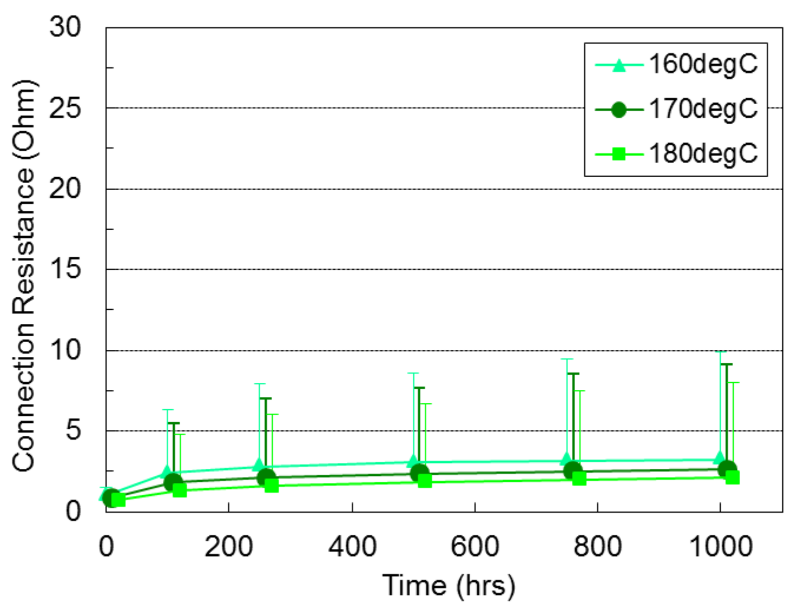
3.2 Test results

Lamination condition : 70degC, 1Mpa, 1sec

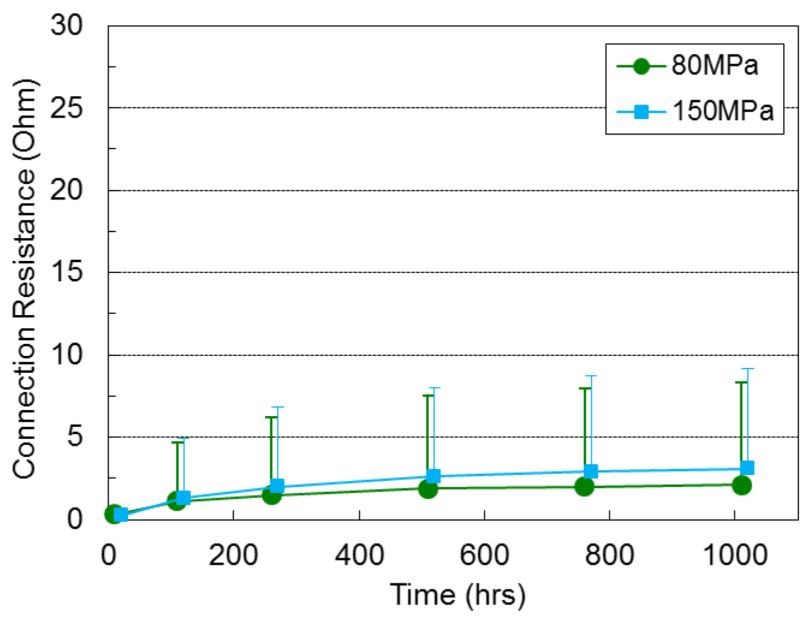
Main bonding condition: 160～180degC, 30～150MPa, 5sec

Reliability test condition: High temperature humidity test (85degC, 85%RH, 1,000hrs)

(1). **160～180degC, 30MPa,** 5sec



(2). **170degC, 80/150MPa,** 5sec



4. Insulation reliability

4.1 Non-bias test 1

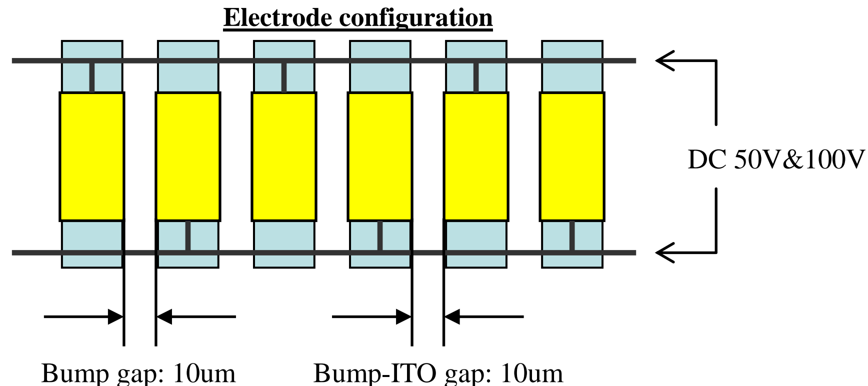
(1) Used materials for measurement

/ Test chip: Bump gap 10um (Bump size: 28 x 100um, IC size: 1.9 x 15 x 0.55mm)

/ Test board: ITO electrode glass (ITO thickness: 0.2um, Surface resistance: 10ohm/sq)

(2) Measurement of insulation resistance

The resistance of each test piece was measured after applying 50V or 100V DC to it for 60 seconds in an atmosphere at 23degC and 65%RH.

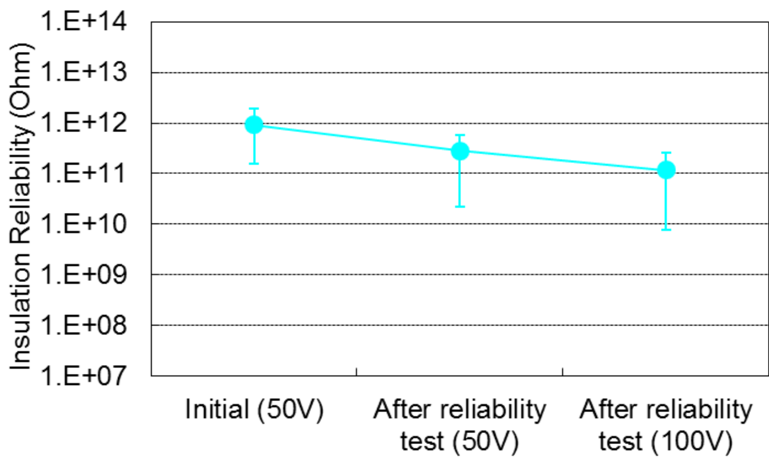


(3) Test Result

Lamination condition : 70degC, 1Mpa, 1sec

Main bonding condition: 170degC, 80MPa, 5sec

Test condition: 85degC, 85%RH, 500hrs



4.2 Non-bias test 2

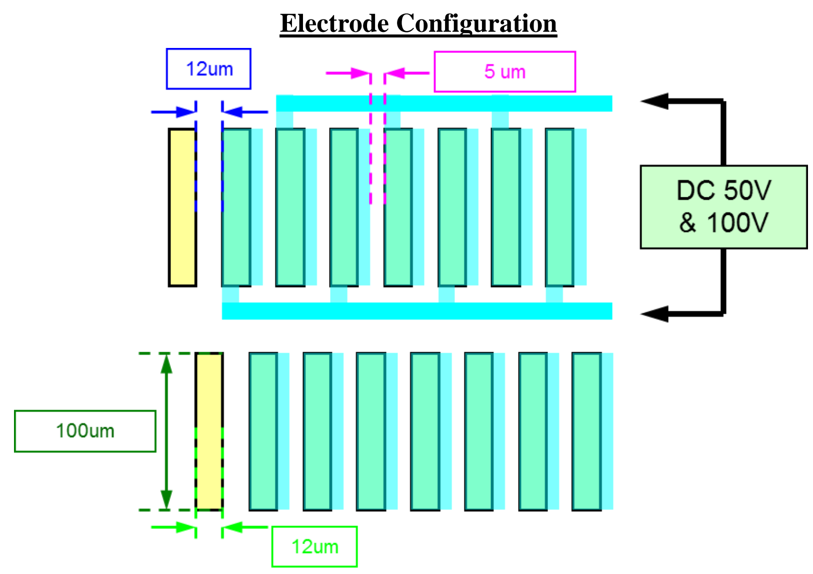
(4) Used materials for measurement

/ Test chip: Bump gap 12um (Bump size: 12 x 100um, IC size: 0.9 x 20.3 x 0.3mm)

/ Test board: ITO coated glass (ITO thickness: 0.2um, Surface resistance: 10ohm/sq)

(5) Measurement of insulation resistance

The resistance of each test piece was measured after applying 50V or 100V DC to it for 60 seconds in an atmosphere at 23degC and 65%RH.

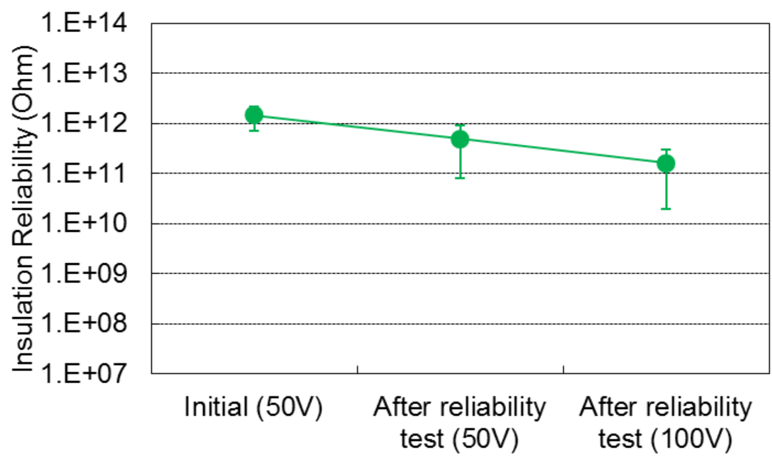


(6) Test Result

Lamination condition : 70degC, 1Mpa, 1sec

Main bonding condition: 170degC, 80MPa, 5sec

Reliability test condition: 85degC, 85%RH, 500hrs



5. Particle counts data on bump

(1) Used materials for measurement

/ Test chip 1: Bump area **1,200**um2 (**12x 100um**), IC size: 0.9 x 20.3 x 0.3mm

/ Test chip 2: Bump area **1,050**um2 (**12 x 100um**), IC size: 0.9 x 20.3 x 0.3mm

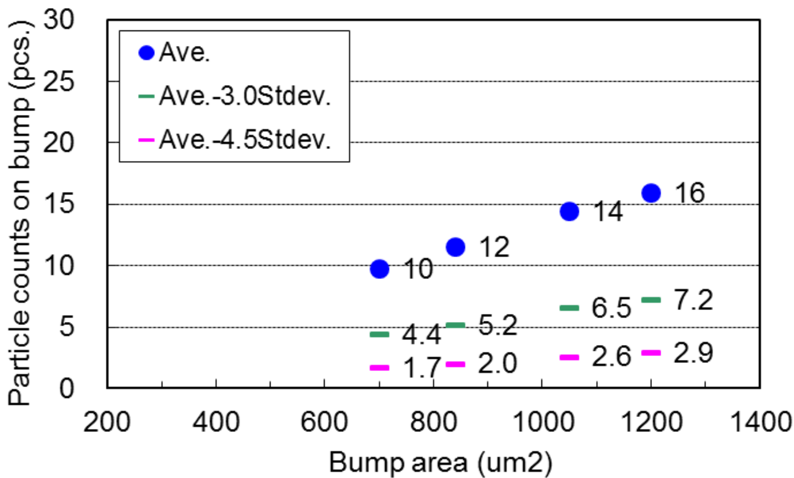
/ Test chip 3: Bump area **840**um2 (**12 x 70um**), IC size: 0.9 x 20.3 x 0.3mm

/ Test board: Al/Nd electrode glass (Al/Nd thickness: 0.15um)

(2) Measurement of particle counts on bump

After main bonding IC chip onto test glass, the number of conductive particles captured between bumps and Al/Nd electrodes (total 200 electrodes) was measured by optical microscope.

(3) ACF bonding condition: 170degC/80Mpa/5sec



6. Physical properties

Item	Unit	**AC-868GX2**
Tg *1	degC	165
Elastic modulus (at 40degC)	GPa	1.8
C.T.E *2	ppm/degC	60

Conditions

*1 Measured with DVE; Dynamic Visco-Elastic Analyzer

Test conditions: Fully cured sample, Tensile mode, 10Hz Frequency, 10degC/min

*2 Measured with TMA; Thermal Mechanical Analyzer

Test conditions: Fully cured sample, Tensile mode, 10degC/min, Load 5gf

7. Reaction rate

Measuring method:

- Facility : FT-IR
- Evaluation Sample : Hitachi Chemical's Test Pieces (IC & Glass)
- Main-Bonding Conditions : 150-190degC, 80MPa, 5s (with 50umt Teflon Sheet)
- Test Method : After removing IC chips from glass boards, the hardened ACF was collected, and measured by FT-IR spectrometer. The reaction rate is calculated from the epoxy group's absorbance of IR spectra.