HITACHI CHEMICAL DATA SHEET

Hitachi Anisotropic Conductive Film
ANISOLM®
AC-7206U-18

Page

R & D Dept.
Goshomiya Works
Hitachi Chemical Co., Ltd.

1. Standard Specification, Bonding and Storage Conditions, Repairability, and Characteristics

Item					Unit		AC-7206U		Remark
Standard specification	Smallest connection circuit	Line		Resolution	μm	pcs	25		
		Spacing			μm	/mm	25	20	
	Thickness				μm		18		
	Width				mm		1.2,1.5,1.8,2.0,2.5		
	Length				m		200		
	Color				—		Transparent(gray)		
	Core				mm		18.5		
Bonding conditions	Temporary bonding	Temperature			℃		80±10		ANISOLM's ultimate temperature
		Pressure			MPa		1		
		Time			s		5		
	Final bonding	Temperature			℃		170±10		ANISOLM's ultimate temperature
		Pressure			MPa		3		
		Time			s		20		
Storage conditions	Shelf life	Packed			—		6 months after date of manufacture when stored at -10 to 5℃.		
		Unpacked			—		1 month at 25℃ or below and 70%RH or below.		
		Pre-bonded			—		2 months at -10 to 5℃.1 month at 25℃ or below and 70%RH or below.		
Repairability					—		Repairable		By acetone or toluene
Characteristics	Connection resistance				Ω		1		ITO glass / TCP; bonding width, 1.5mm
	Insulation resistance				Ω		10^{12}		Space 25μm; bonding width, 2.5mm
	Peel strength(20℃)				kN/m		1.2		ITO glass / TCP hot-bonded
	Tack strength(20℃)				kN/m		0.08		ITO glass / TCP cold-bonded
	Separator peeling strength				gf/2.5mm		1.5		ITO glass
	Operating range	Temperature			℃		-40 to 100		Under no stress
		Current			A/mm^2		50 or below		
		Voltage			V		50 or below		

Notes:

1)Take ANISOLM out of the refrigerator or other storage without taking it out of its hermetic containers. Leave the ANISOLM in the containers at room temperature for about an hour. Then make sure that it does not risk condensation before using it.

2)Connection resistance: The table indicates a half of the resistance between neighboring circuits.
Current measured: 1mA. Includes the circuit resistances of the FPC and ITO glass.

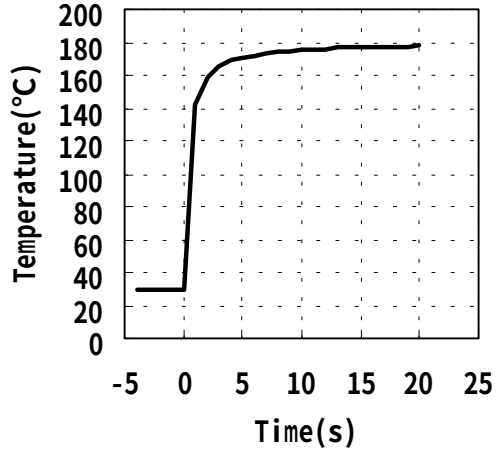
3)Tack strength: Pre-bond an ANISOLM sample to an ITO glass, peel its separator off, then tack s FPC to it at room temperature. Then measure the tack strength of this sample.

4)Operating range: As per reliability tests using Hitachi's test pieces.(This range varies according to the material used and external stress applied. Check the reliability of specific pieces.)

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

2. Precautions in Bonding

2.1. Connection time and ANISOLM temperature(Typical)



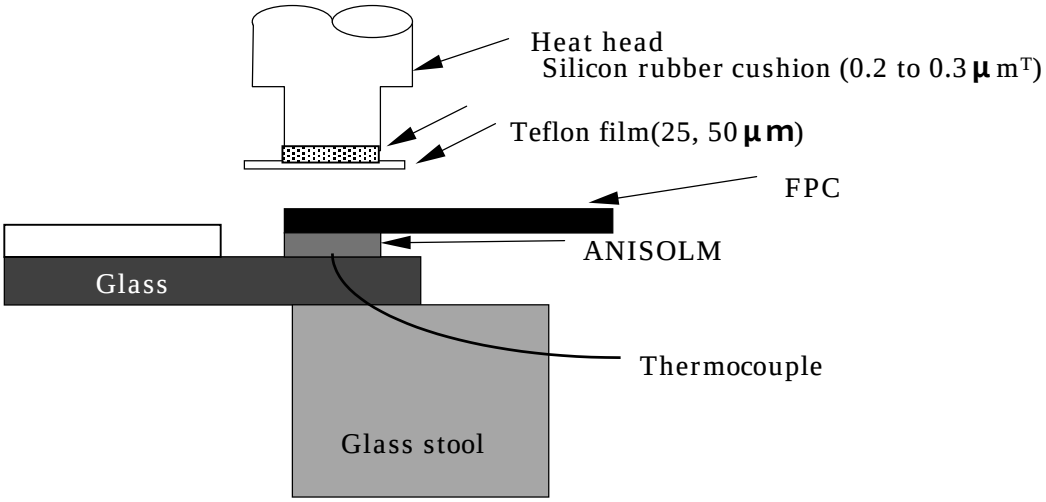
Head temperature: 305°C

TCP: Pl, 75μm; Cu, 18μm; Au plating

Glass board: 1.1mm^{t}

Ratio of temperature reached 5 seconds later: 90% or more of the ultimate temperature(°C)

2.2. Measuring ANISOLM temperature



2.3. Heat/Pressure Head

(1) Adjust carefully the eveness and parallelism of the heating head to keep the equal pressure.
(2) Use a head slightly wider than the ANISOLM piece to be connected.
-Example: ANISOLM width, 2.5mm→ head width, 3.0mm
(3) Tip the head with a thin and hard cushion, not a soft and thick one. Silicon rubber(about 0.2 mm thick with a hardness of 70 degrees or above) may be used for example.
The use of too soft a cushion or excessive pressure in connection will drive adhesive in the space toward the end, resulting in insufficient adhesion. Be particularly careful when the space is wider than the circuits.

2.4. Misalignment of Opposite Circuits

(1) Align opposite circuits well. Do not let them get misaligned.
(2) In designing TABs (FPCs), allow for the misalignment of opposite circuits due to their expansion during connection.
(3) Keep the circuit misalignment at or less than the circuit width.

3. Connection Reliability

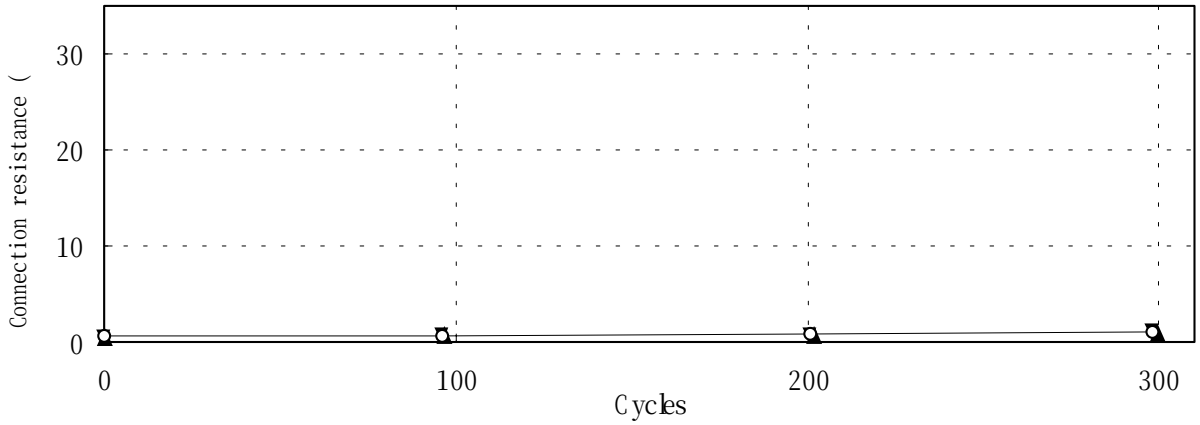
-Connection circuits

TCP: Pl, 75μm; Cu, 18μm; Sn plating; pitch, 50μm

Glass: ITO sputter; 15Ω/□;electrodes all over

-Bonding conditions; 170℃－3MPa－20s; ANISOLM width 1.5mm

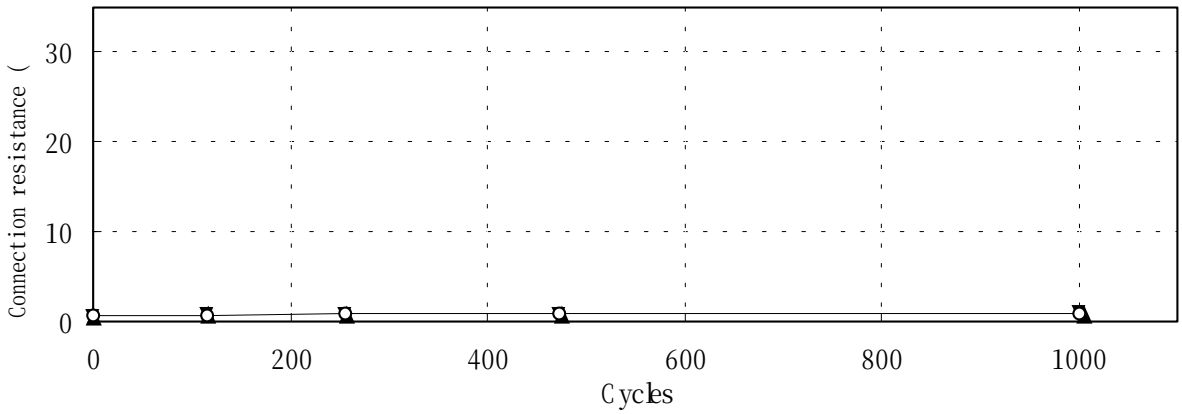
3.1. Changes in connection resistance in a moisture absorption and freeze test



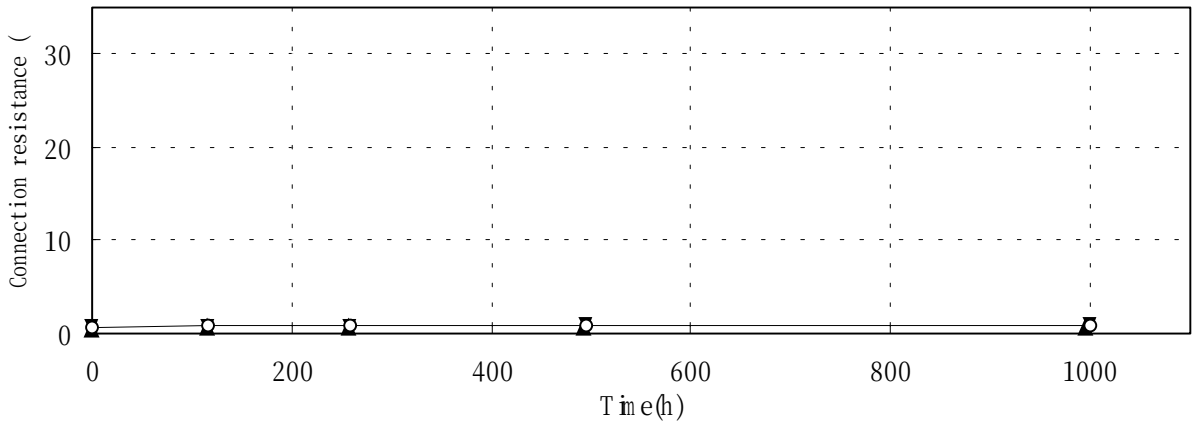
(-30℃, 60min⇔70℃, 100min,95%RH,60min)

3.2. Changes in connection resistance in a thermal shock test

(-40℃, 30min⇔room temperature, 5min⇔100℃, 30min)

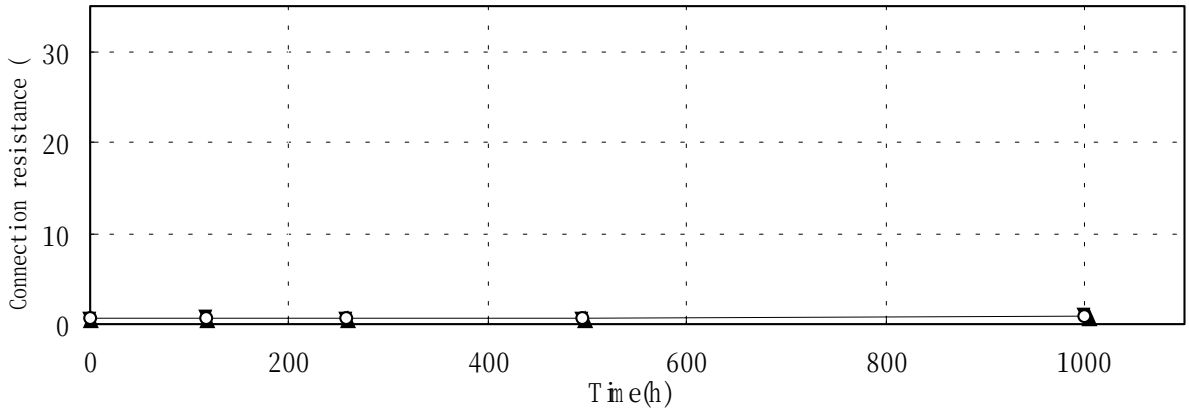


3.3. Changes in connection resistance in a high-temperature, high-humidity test (85℃, 85%RH)



3.4. Changes in connection resistance in a high-temperature test (100℃)

3.5. Changes in connection resistance in a low-temperature test (-40℃)

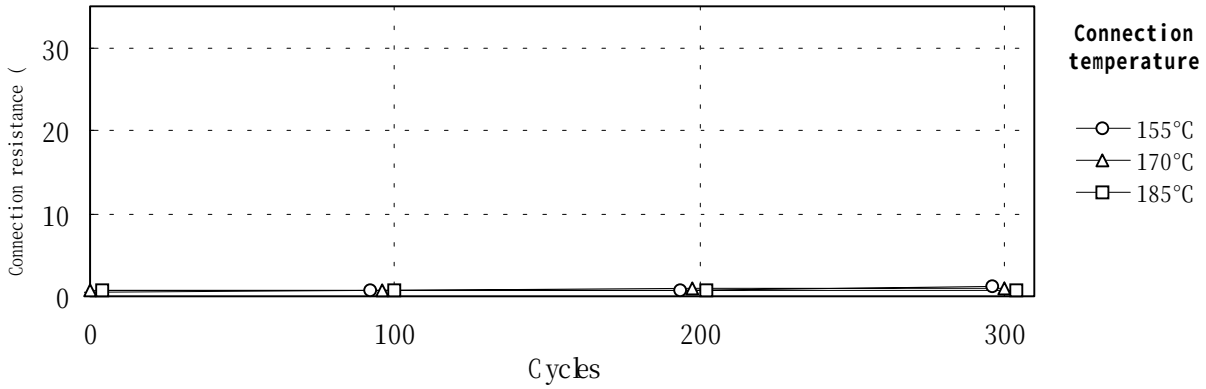


AC-7206U-18 changes little in connection resistance over time in various tests, thus a stable connection reliability is obtained.

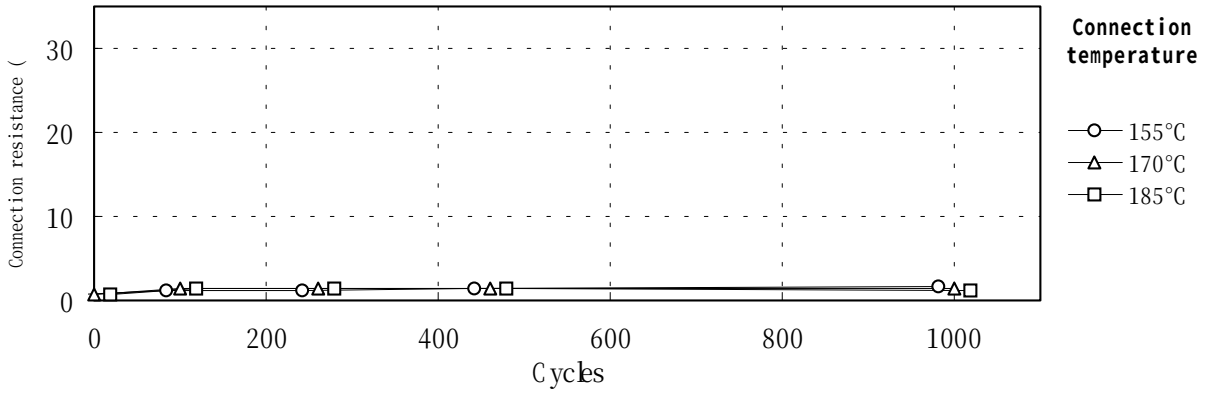
4. Effect of Bonding Temperature on Connection Reliability

-Connection circuits
TCP: Pl, 75μm; Cu, 18μm; Sn plating; pitch, 50μm
Glass: ITO sputter; 15Ω/□; electrodes all over
-Bonding conditions; 155,170,185,3MPa,20s; ANISOLM width 1.5mm

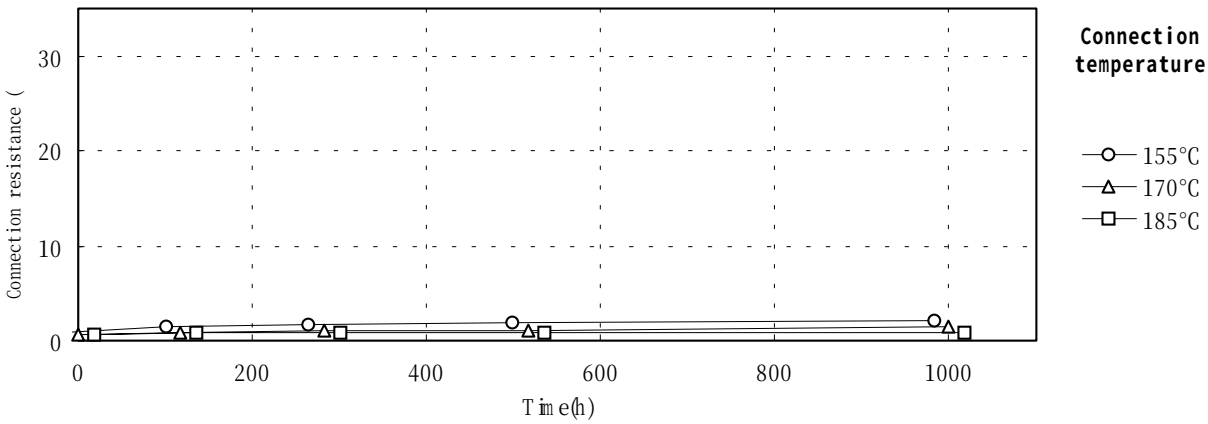
4.1. Changes in connection resistance in a thermal shock test
(-40℃, 30min⇔room temperature, 5min⇔100℃, 30min)



4.2. Changes in connection resistance in a high-temperature, high-humidity test (85℃, 85%RH)



4.3. Changes in connection resistance in a high-temperature, high-humidity test (85℃, 85%RH)



AC-7206U connected at 155℃ to 185℃ change little in connection resistance over time, thus a stable connection reliability is obtained.

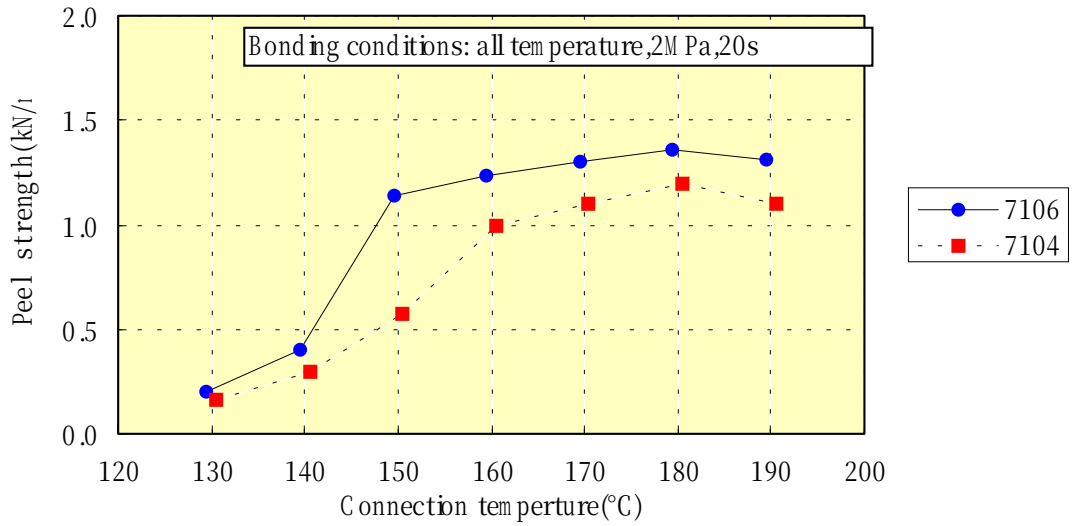
5. Peel Strength

-Connection circuits

TCP: Pl, 75μm; Cu, 18μm; Sn plating; pitch, 50μm

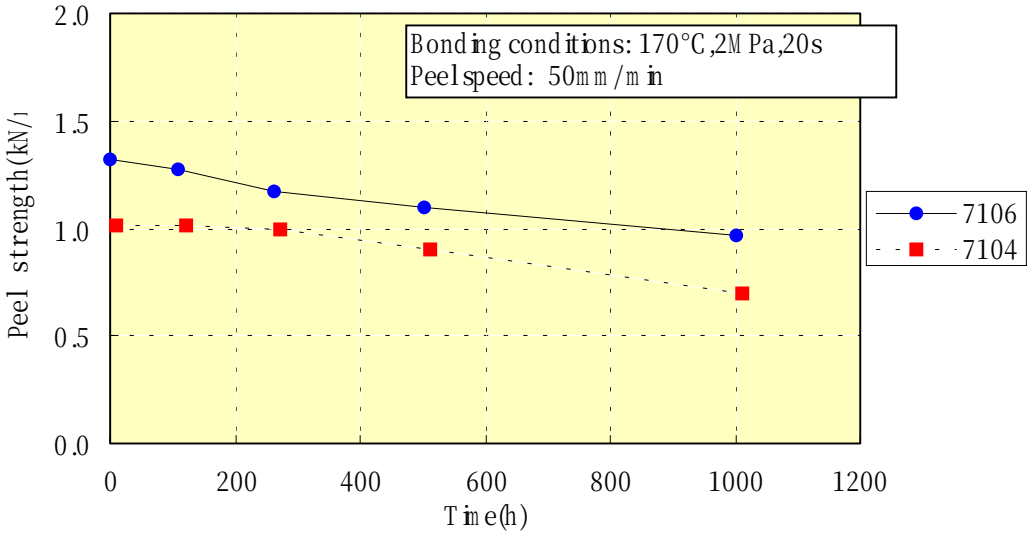
Glass: ITO sputter; 15Ω/□;electrodes all over

5.1. Connection Temperature Characteristics of Peel Strength



A high adhesive strength is obtained by bonding at 150℃ and above.

5.2. Changes in peel strength in a high-temperature, high-humidity test (85℃, 85%RH)



Our high-temperatature, high-humidity test indicated a considerably small decline in the abhesive Strength of samples, thus showing the high stability of our product.

6. Insulation Reliability

-Connection circuits

FPC: Pl, 125μm; Cu, 12μm; Ni(2μm)/Au(0.1μm) plating; pitch, 100μm

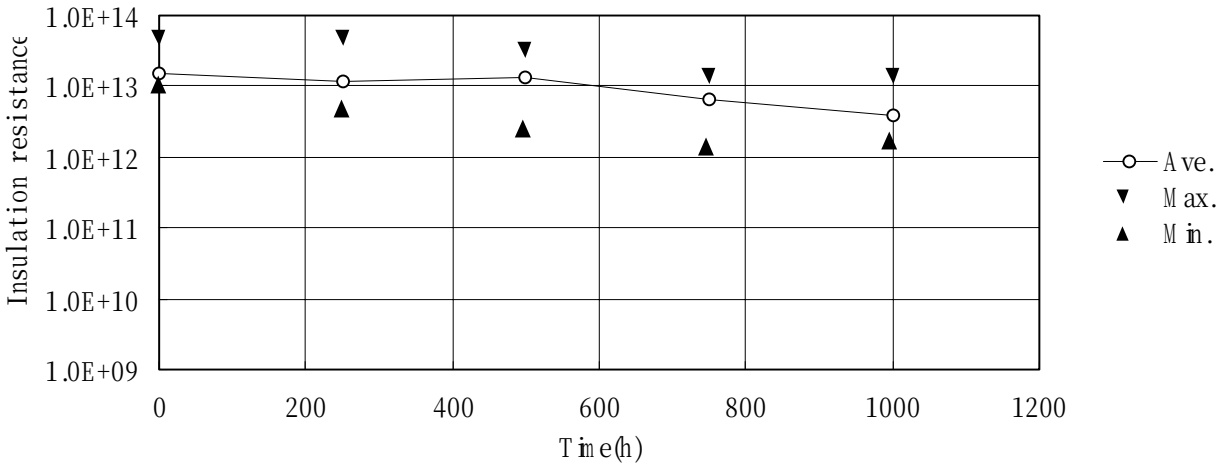
Plate:Insulation glass plate

-Measuring method

Measure the resistance of samples with the condition to 100V DC for 60 seconds.

Measurement condition : 23℃ and 65%RH

Reliability of test condition : High-temperature, high-humidity test (85℃, 85%RH)



7. Checking Connection Status

Item	Flatness and contact of conductive particles
Evaluating equipment	Metallographic, laser, or electron microscope
Criteria of judgment	All conductive particles should be flat enough.
Reason	The flatness of conductive particles when connection is established increases the contact area between the particles and electrodes, resulting in a stable conduction and a high connection reliability.
Method and action	Use an ANISOLM piece of appropriate thickness according to the thickness and line-to-space ratio of the copper foil, and establish connection under appropriate bonding conditions (temperature, pressure, and time)
Remark	The flatness of conductive particles in connection and a high connection reliability is obtained when the ANISOLM piece between opposite circuits is 3 micrometers thick at the maximum (when measured with a laser microscope, micrometer, or equivalent).

8. Physical Properties

ANISOLM	Elastic modules(GPa)	tanΔ max
	40℃	(℃)
AC-7206U	1.2	125

-Measuring conditions

DVE: hardened specimens (170℃,2min); tensile mode

Frequency, 10Hz; programming rate, 10℃/min.

9. Reaction Rate

-measuring:

Each specimen was heated and hardened in oil kept at a specified temperature for a specified time, the amount of heat generated was measured with a DSC unit, and the reaction rate was determined with the following formula;

Reaction rate = $(Q_0-Q_T)/Q_0 \times 100$

Q_0：initial amount of heat generated

Q_T：amount of heat generated after hardening