

Heat Curing Type SMT Adhesive for Printing

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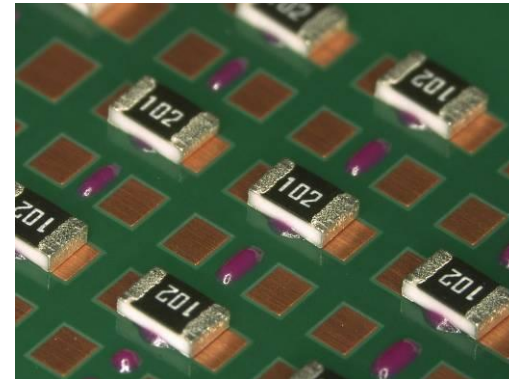
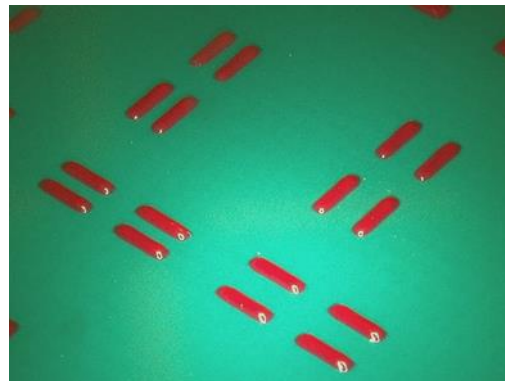
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Heat Curable SMT Adhesive for Printing JU-48P

Product Information



This Product Information contains product performances assessed strictly according to our own test procedures and may not be compatible with results at end-users.



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Product features

- Heat Curable SMT Adhesive for Printing
- Superior storage stability and continual printing precision
- Not classified as transport hazard material under UN Model Class 9 Packing Group III – Environmentally Hazardous Substances and Mixtures (UN3077 nor UN3082).
- Superior shape retention after printing



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Specifications

Application		Heat Curing Type SMT Adhesive for Printing		
Product		JU-48P		
Item	Condition · Unit	Result	Reference	
Before curing	Composition	-	Epoxy	
	Appearance · Color	Visual inspection	Paste · Red	
	Specific gravity	25°C,	1.50±0.10	specific gravity cup method
	Viscosity	25°C · Pa·s	150±25	Malcom spiral type viscometer, PCU-205 · 10rpm
	Non volatile	%	>99	105°C, 180min
	Shelf life	Below (10 °C)	6 months (Tentative)	
After curing	Appearance, Color	Visual inspection	Polymerized · Red	
	Solder resistivity	SAC305 solder bath at 250°C x 10sec. dipping, *1	No abnormality	2012R
	Solvent resistivity	IPA, acetone, *2	No abnormality	JIS K 6911
	Surface insulation resistance	Initial room temp, Ω, *1	>1.0X10 ¹³	JIS comb electrode, 200um application
		85 °C, 85%RH, 50V, 1000h inside chamber, Ω, *1	>1.0X10 ⁹	
	Glass transition temperature	°C	105	DSC
Boiled water absorption	Boiled water 1hr, %, *2	<1.0	JIS K 6911	

The measured values indicated above are not to be guaranteed.

*1: Curing condition 130 °C X 90sec *2: Curing condition 130 °C X 10min



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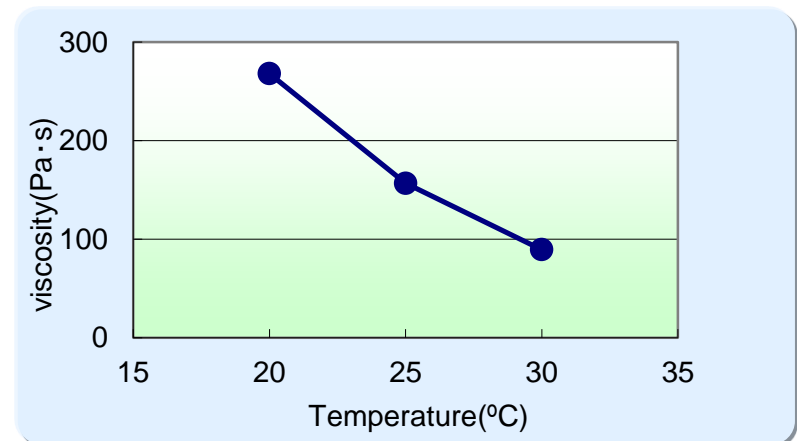
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Temperature vs. Viscosity

Equipment :PCU-205(Malcom spiral type viscometer,PCU-205 at 25°C 10rpm)
method :10rpm (JIS Z 3284)

Temperature (°C)	Viscosity (Pa·s)
20	268
25	157
30	90



Viscosity of JU-48P depends on the temperature; therefore, temperature at work area must be strictly controlled.



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Viscosity variation

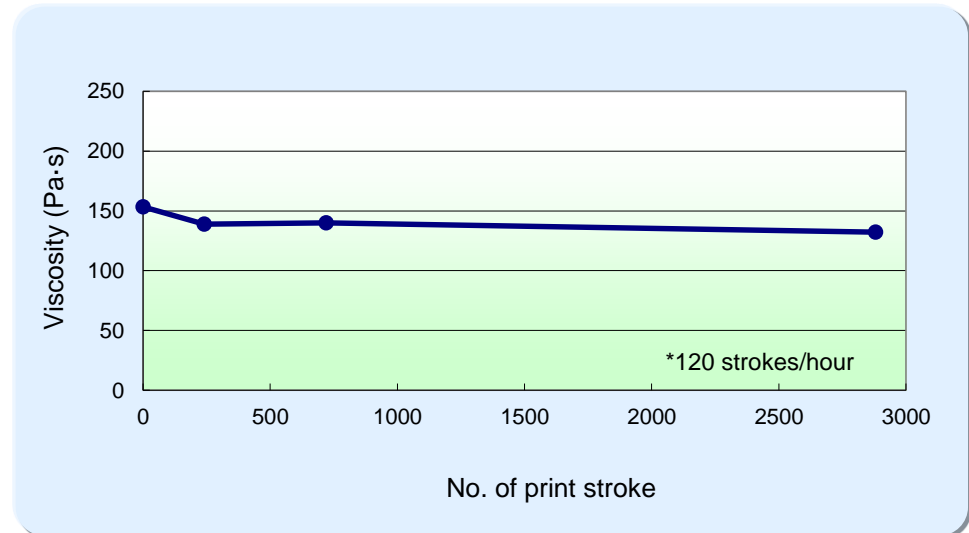
Print (knead) adhesive on the sealed-up stencil continually up to 24 hours to observe viscosity variation.

<Printing method>

- Squeegee : Metal blade, Angle - 60°
- Tact time: 2stroke/1min.
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26°C, 40~60%RH
- Equipment :PCU-205(Malcom spiral type viscometer,PCU-205 at 25°C 10rpm)

Unit : Pa·s

No. of print strokes	Viscosity
0	154
240	139
720	140
2880	132



JU-48P shows little changes on viscosity upon continual printing and achieved stable printability.



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Printed JU-48 using printer settings as shown below with different metal stencil thickness.
For each metal stencil thickness, the parameter ranges are verified for valid printing.

<Printing condition>

Stencil	: t=0.15,0.20,0.25,0.40mm , laser cut stencil
Printer	: YVP-Xg (YAMAHA)
Squeegee	: Metal blade/60°
Pressure	: 30N
Print speed	: 10mm/sec.
Separation speed	: 1.0 mm/sec
PCB	: FR-4
Atmosphere	: 24.5~25.5°C (50~60%RH)
Another	: t=0.15,0.20,0.25mm One-way print (single stroke) t=0.25,0.40mm Two-way print (double stroke)

Thresholds of continual printing aperture patterns for each metal stencil thickness under Koki recommended condition have been provided on pages 7 and 8. However, these test results are obtained from the printer used at Koki and not guaranteed. Please confirm the printing performance of the targeted pattern by using own printer and equipment.



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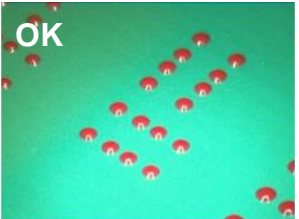


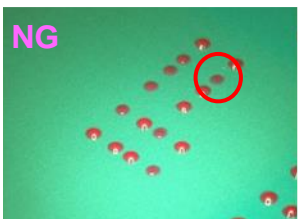
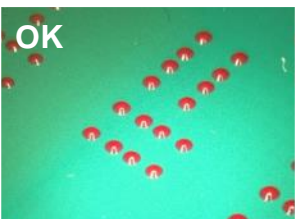
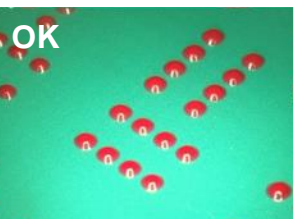
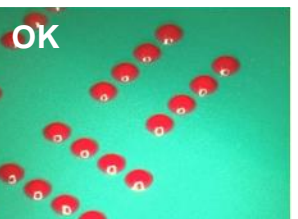




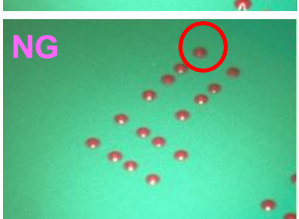
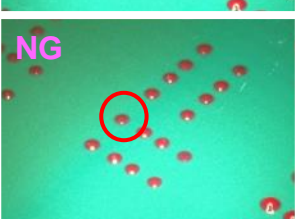
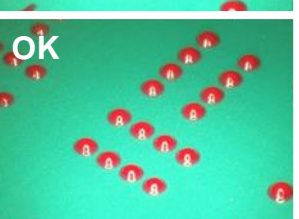

Strength by Condition

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Printability (Circle)

	Φ0.5mm	Φ0.6mm	Φ0.8mm	Φ1.0mm	Print able
t=0.15mm	OK 	OK 	OK 	OK 	Φ0.5 mm
t=0.20mm	NG 	OK 	OK 	OK 	Φ0.6 mm
t=0.25mm	NG 	NG 	NG 	OK 	Φ1.0 mm
t=0.25mm (Two-way)	NG 	NG 	OK 	OK 	Φ0.8 mm

○: Poor print



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Printability (Line)

	0.2,0.3,0.4mm With-0.9mm	0.4mm with-1.5mm	0.3,0.4,0.5mm With-1.7mm	0.5mm with-2.0mm	Print able
t=0.15mm	OK 	OK 	OK 	OK 	0.2mm with- 0.9mm
t=0.20mm	NG 	OK 	OK 	OK 	0.4mm with- 1.5mm
t=0.25mm	NG 	NG 	OK 	OK 	0.5mm with- 1.7mm
t=0.25mm (Two-way)	NG 	NG 	OK 	OK 	0.5mm with- 1.7mm

○: Poor print



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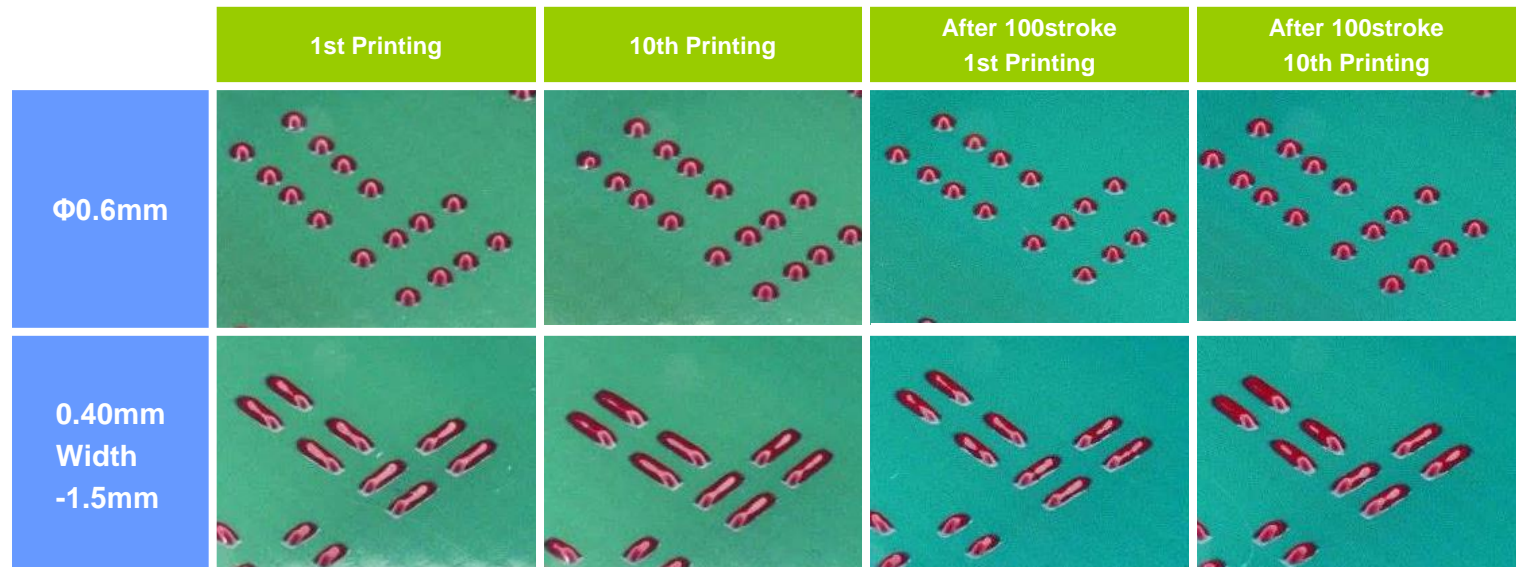
Continual printability

< Printing condition >

Stencil : t=0.20mm , laser cut stencil

Test condition : Same as P6 test condition

Test method : Continuous printing of 10 test boards, conduct 100 rolling strokes and wash metal stencil after then continuous printing of 10 test boards.



No print defects during continual printing.



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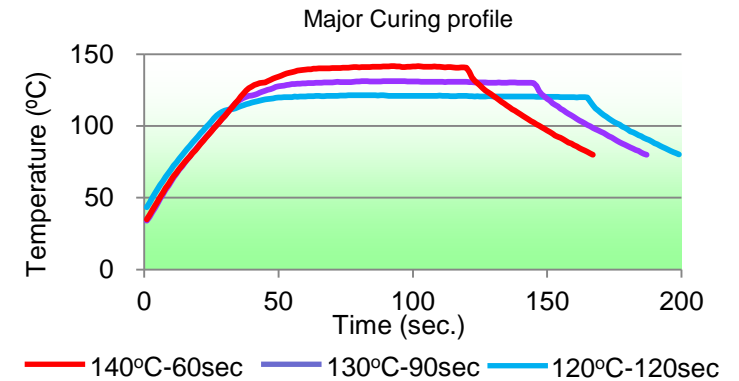
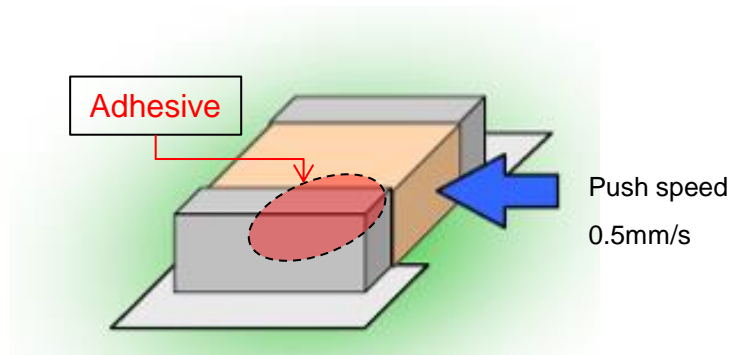
<Test method >

Print the adhesive on epoxy test board using a metal stencil, then mount appropriate modules.

Cure at a specified temperature for a specified time, wait for 30 minutes, then measure adhesion strength using bond tester.

<Test condition >

- Equipment : Bond-strength tester (Seishin Kogyo)
Reflow simulator SMT SCOPE SK-5000 (Sanyo Seiko)
- Test condition : 5mm/sec. of push speed, room temperature
- PCB : FR-4
- Stencil : t=0.15mm
- Components : 2012R φ0.8 one point dip



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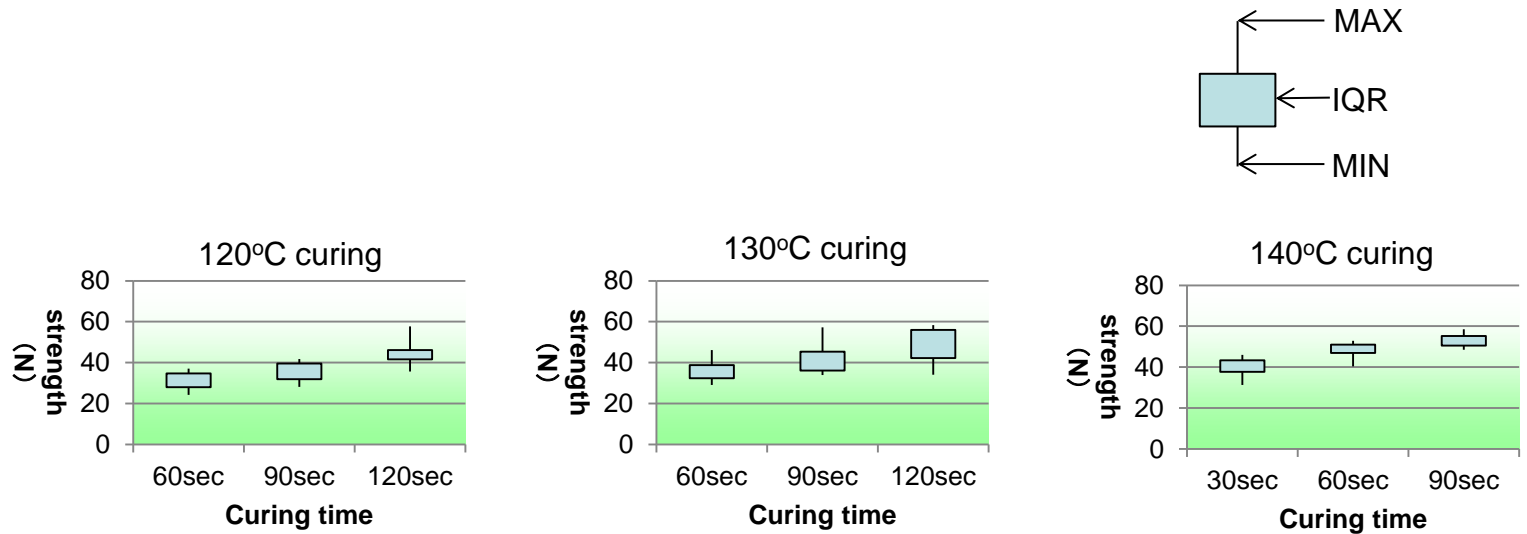
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Bonding strength

Unit : N

Curing Temp.		120°C curing			130°C curing			140°C curing		
Curing Time (sec.)		60sec	90sec	120sec	60sec	90sec	120sec	30sec	60sec	90sec
Bonding strength	AVE.	31.0	35.9	44.7	36.4	42.5	49.0	39.5	48.3	53.3
	MIN.	24.3	28.1	36.4	29.1	34.0	34.1	31.7	40.4	48.5



Recommended curing conditions: over 120 seconds for 120°C, over 90 seconds for 130 °C and over 60 seconds for 140°C.

(Recommended conditions minimum bonding stress exceed 30N)



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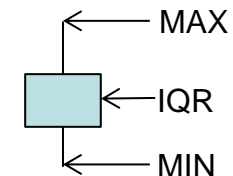
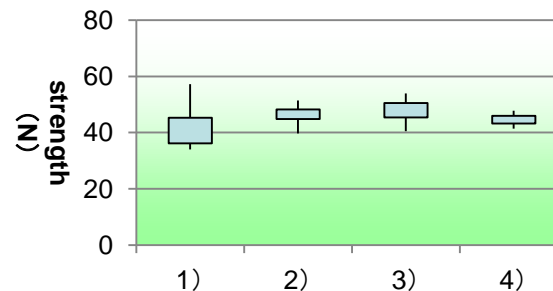
Verify strength changes in adhesive before and after rolling test.

<Test method >

- Adhesive Condition : 1) No rolling, 2) Continual rolling for 24 hours, 3) 30°C x 3Days+ continual rolling for 24 hours
4) 40°Cx 3Days + continual rolling for 24 hours; same as continual printing test in P5
- Strength Condition : 0.8mm dia. x 0.15mm
- Components : 2012R
- Curing condition : 130 °C x 90sec

Unit : N

	1) No rolling	2) Rolling 24 hrs.	3) 30°Cx3D+Rolling	4) 40°Cx3d+ Rolling
Evaluation Count	12	12	12	12
AVE.	42.5	46.0	43.3	44.6
MIN.	34.0	39.7	40.4	41.4



No decrease in adhesion strength after temperature variation and 24 hours rolling.



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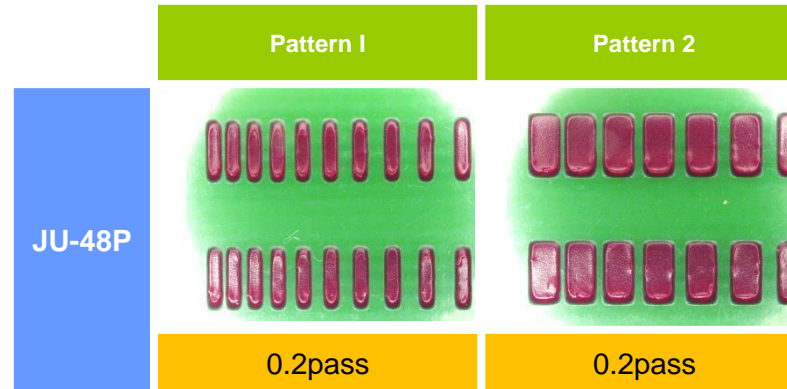
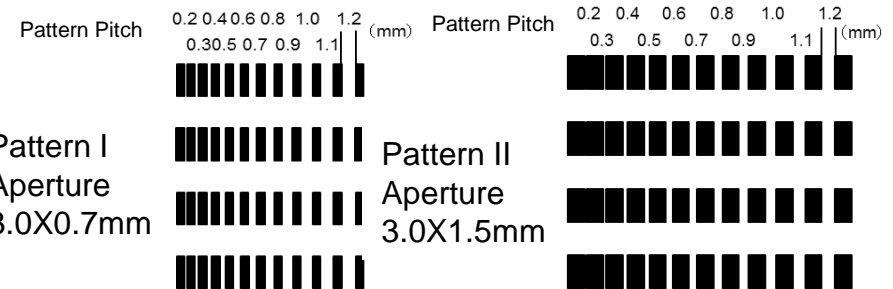
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Heat slump

<Test condition >

Print condition : manual
 Stencil : t=0.20mm
 Stencil Aperture : Refer to the image (bottom right)
 Curing condition : 120 °C X 5min



Only minimal heat slump at apertures when printed with pattern pitch indicated above.



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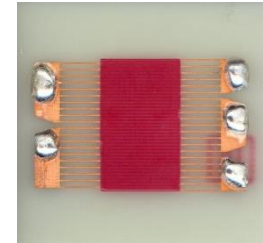
Voltage applied SIR

<Test Method>

Using a comb pattern test board, print adhesive on overlapped area, then cure with the condition listed below. Apply 50V voltage in constant temperature and humidity test chamber for 1000 hours, and observe abnormalities such as evidence of migration. Measure also SIR every hour.

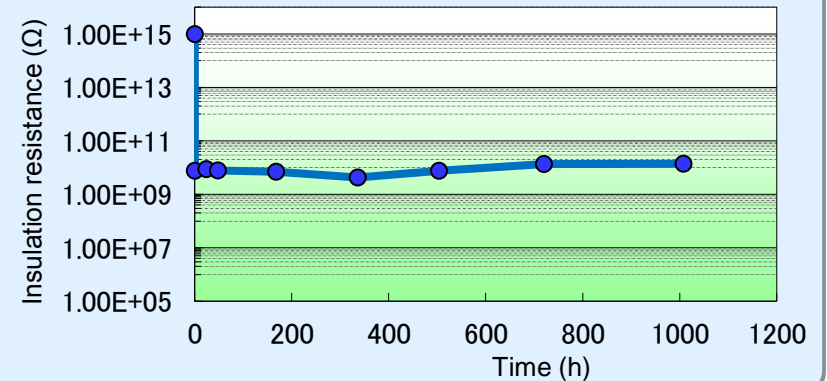
<Test condition >

Stencil : t=0.20mm
 PCB : Comb shaped test board per JIS Z 3197
 Print type : Evenly printed on overlapped area of comb shaped test board
 (refer to image to right)
 Curing condition : 130 °C X10min
 Voltage applied : 50V
 Measurement voltage :100V
 Test conditions : 85 °C X 85%RH



Evaluation Result

Time	Chamber	Major(Ω)
Initial	Out chamber	9.2X10 ¹⁴
0Hr	In chamber	7.6X10 ⁹
24Hr	In chamber	8.6X10 ⁹
168Hr	In chamber	7.2X10 ⁹
336Hr	In chamber	4.3X10 ⁹
500Hr	In chamber	7.5X10 ⁹
1000Hr	In chamber	1.4X10 ¹⁰
1000Hr	Out chamber	9.0X10 ¹²



JU-48P maintained good surface insulation resistance.



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Recommended usage parameters

(1) Squeegee

- | | |
|--------------------------|---|
| 1. Material : | Urethane or Rubber or metal blade |
| 2. Pressure : | 20 ~ 60N
If using metal squeegee, set printing pressure which shows slight fainting.
If using Urethane squeegee, set printing pressure which show no gouging. |
| 3. Squeegee speed : | 10 ~ 20mm/sec. (slowly) |
| 4. Adhesive application: | For 250mm squeegee, 150 – 200g (generously) |
| 5. Other: | If using metal stencil thicker than t=0.2mm, 2 way printing (2 strokes) is recommended. |

(2) Stencil

- | | |
|-----------------------|---|
| 1. Material : | metal or Rubber |
| 2. Separation speed: | 0.5~2.0mm/sec.(slowly) |
| 3. Snap-off distance: | 0mm |
| 4. Stencil cleaning: | Good stencil cleaning agent for metal stencil, ink and adhesive promoted by cleaning agent manufacturers.
Also, adhesive on the aperture side should be thoroughly cleaned using a brush in case the metal stencil cleaner is not available. |

(3) Ambiance

- | | |
|----------------------|---|
| 1. Temperature : | 22~27°C |
| 2. Humidity : | 40~60%RH |
| 3. Curing condition: | 120°C - more than 2 minutes, 130°C – more than 1.5 minutes,
140°C – more than 1 minute |
| 4. Shelf life : | 6 months (at 0 – 10 °C, tentative specification) |

* Manufacturing date can be obtained from the lot number

i.e. **Lot No. 4 06 10 2**

4	06	10	2	
└───┬───┬───┬───┘				
			└───┘	No. of lot : 2nd
		└───┘		Date : 10th
		└───┘		Month : Jun
		└───┘		Year : 2014

