

Koki no clean **LEAD FREE** solder paste

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Crack free & moisture proof flux residue
Lead Free Solder Paste

S3X58-CF100-2

Product information



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



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Product features

- Solder alloy composition is Sn 3.0Ag 0.5Cu (SAC305)
- Inhibits ionic migration in severe environmental changes, such as temperature and humidity
- Flux residue remains CRACK FREE after 1000 cycles of thermal cycling (-30 to +80°C)
- Applicable for AIR REFLOW, assuring excellent WETTING over a range of large to micro components such as 1005 chip and 0.35mm dia. BGA.
- Suitable for automotive, industrial and marine applications
- Conformal coating may be eliminated



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Application		Printing - Stencil
Product		S3X58-CF100-2
Alloy	Alloy Composition (%)	Sn 3.0Ag 0.5Cu
	Melting Point (°C)	217~219
	Shape	Spherical
	Particle size (um)	20 – 38
Flux	Halide Content (%)	0
	Flux Type	ROLO*3
Product	Flux Content (%)	11.2±1.0
	Viscosity*1 (Pa.s)	190±30
	Copper plate corrosion*2	Passed
	Tack Time	> 24 hours
	Shelf Life(below 10°C)	6 months

*1. Viscosity :

Malcom spiral type viscometer,PCU-205 at 25°C 10rpm

*2. Copper plate corrosion :

In accordance with IPC J-STD-004

*3. Flux type :

According to IPC J-STD-004



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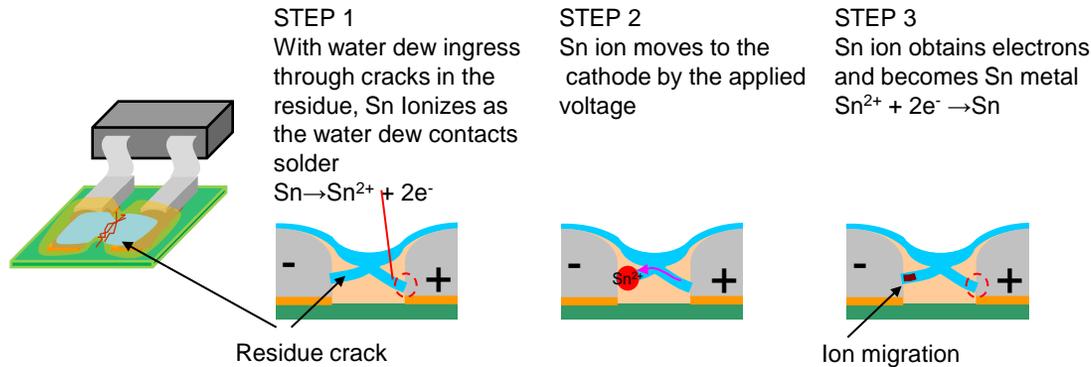
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Reliability of flux residue

TECHNOLOGY

- Mechanism causing the occurrence of ionic migration by water dew



Dew contact with solder has possibility to cause ionic migration.

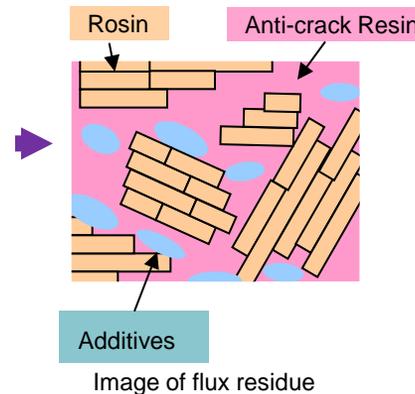
- Solution



- Crystalline
- Fragile



- Flexible over wide temp. range thanks to low Tg (<-40°C)



Anti crack resin gives the flux residue plasticity so that the flux residue remains free of cracks.

S3X58-CF100-2 has; Hybrid flux formulation of rosin and “anti crack resin” that prevents the flux residue from cracking and protects the solder joint from water dew contact.



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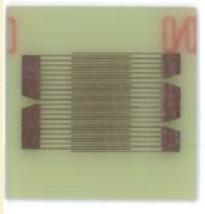
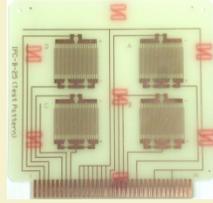
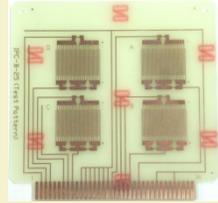
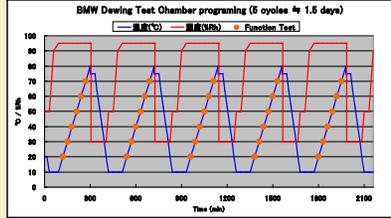
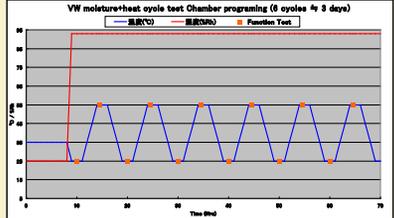
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Reliability of flux residue

TEST METHOD

Test method	SIR High temp./Humidity (conventional)	Dew test method (A)	Dew test method (B) IEC 60068-2-30
Test board	JIS comb board Lines: 0.318mm width Spacing: 0.318mm width Stencil: 0.1mm thick 	IPC-B-25 (E pattern) Lines: 0.318mm width Spacing: 0.318mm width Stencil: 0.1mm thick 	IPC-B-25(E pattern) Lines: 0.318mm width Spacing: 0.318mm width Stencil: 0.1mm thick 
Environment condition	Temperature: 85°C Humidity: 85%RH Time: 1008 hrs	Temperature: 10°C~80°C Humidity: 30%RH~95%RH Cycle: 30 times 	Temperature: 25°C~55°C Humidity: 25%RH~93%RH Temp.Cycle: 6 times 
Applied Voltage	45-50V	50V	50V
Measuring Voltage	100V	100V	100V

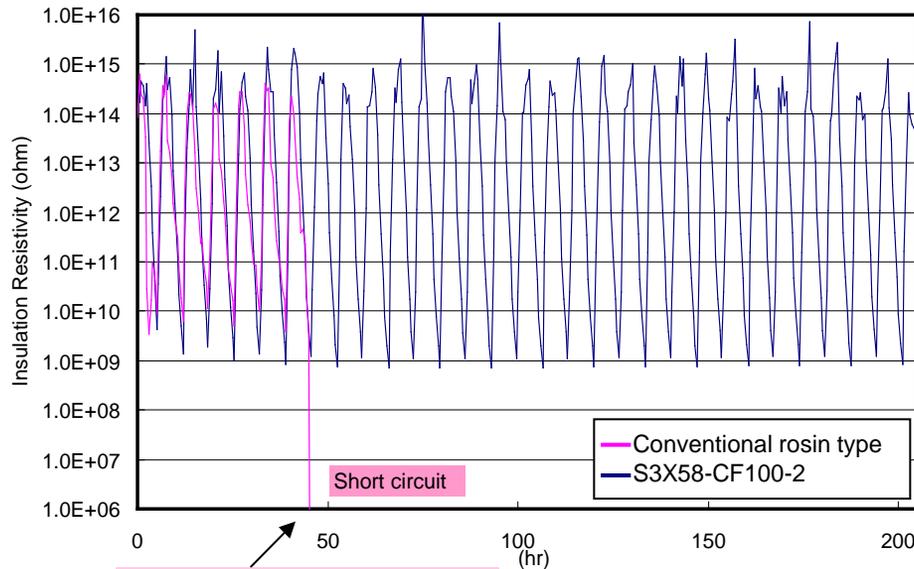


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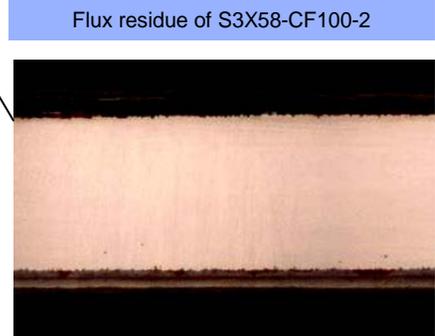
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Reliability of flux residue – Dew test

Result – Dew test method (A)



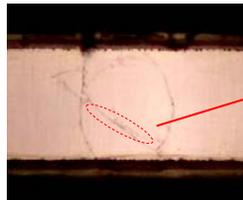
*Test boards have pretreatment of thermal cycling(-30/80°C x1000cycles)



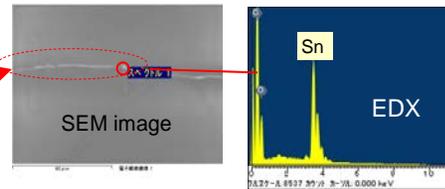
- >No electromigration is observed.
- >Residue remains crack-free.

Flux residue of conventional rosin type

Black-colored short path is showed in the cracking residue.



SEM-EDX analysis



- >Evidence of Sn migration is observed.
- >Migration occurred along the residue cracking.

Flux residue of S3X58-CF100-2 shows high resistance and no evidence of electromigration issues under the high humidity environment, while conventional rosin type results exhibit short circuit and migration occurrence between the electrodes.



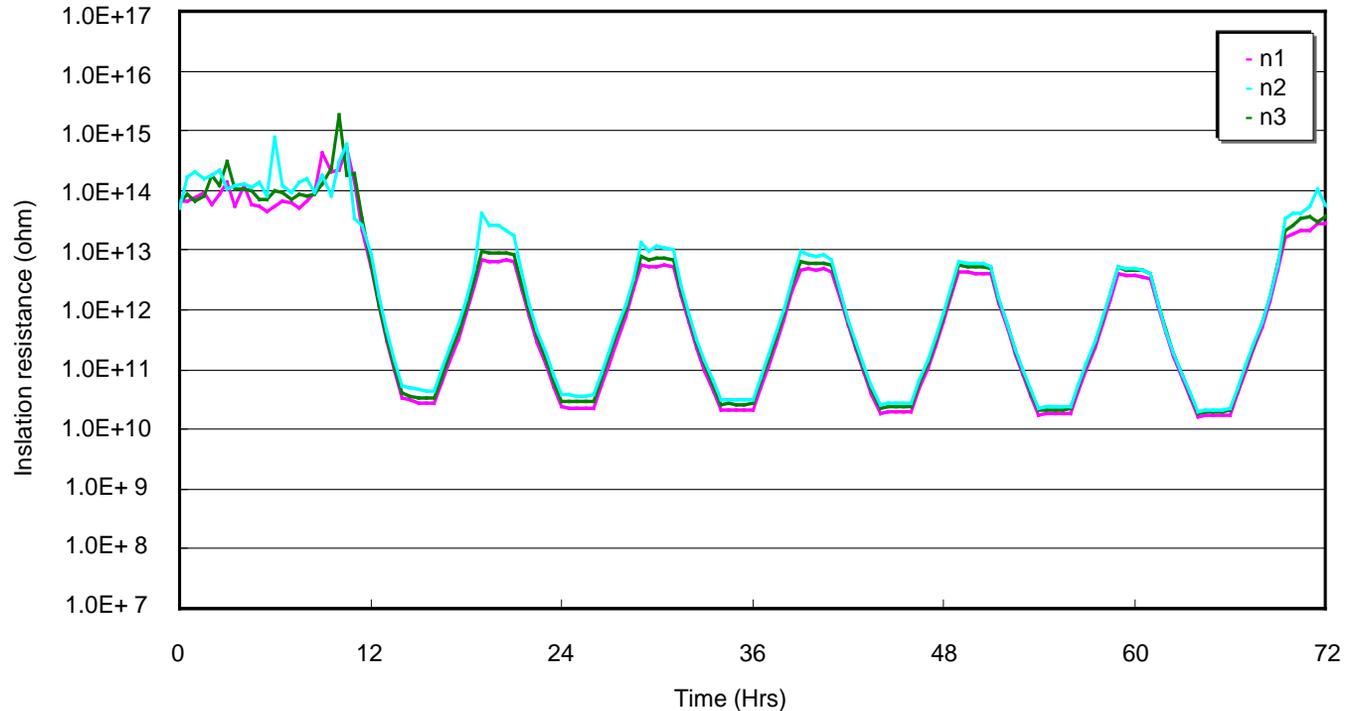
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Reliability of flux residue – Dew test

Result – dewing test method (B)

*Test boards have pretreatment of thermal cycling(-30/80°C x1000cycles)



*Pretreatment means enhancement of residue cracking.
But the residue keeps crack free with high resistance even after pretreatment.

Flux residue of S3X58-CF100-2 shows high resistacne of over 1.0E+10 ohm under the high humidity environment in method (B).



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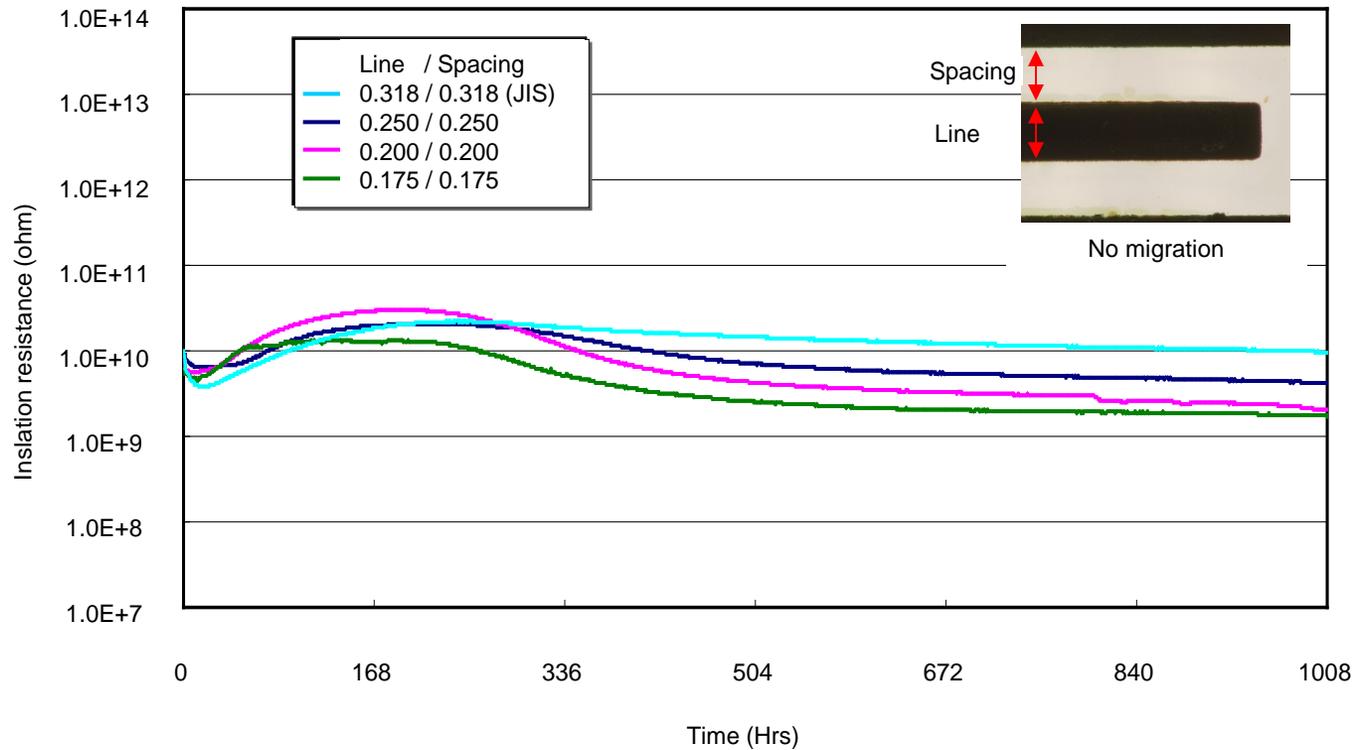
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Reliability of flux residue – SIR test

Result – SIR High temp./Humidity with narrow spacing

*Test boards have pretreatment of thermal cycling(-30/80°C x1000cycles)



Flux residue of S3X58-CF100-2 shows high resistance even with the narrow spacing of 0.175mm.



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Reliability of flux residue - Anti-cracking property

- Material : Glass epoxy FR-4
 - Surface treatment : OSP
 - Stencil thickness : 0.15mm (laser cut)
 - Stencil aperture : 100% aperture opening to pad
 - Components : 0.5mmP QFP
 - Pad : 1.0-0.15Gap
 - Heat source : Hot air convection
 - Atmosphere : Air
 - Reflow profile : Same as "Super fine pattern wetting"
- Thermal cycling : -30/+80°C, 30min./cycle x 1000cycles
 - Test chamber : TS-100 (ETAC)



No cracking has occurred in the flux residue between the leads or electrodes, even after thermal cycling of -30/+80 °C x 1000 cycles.



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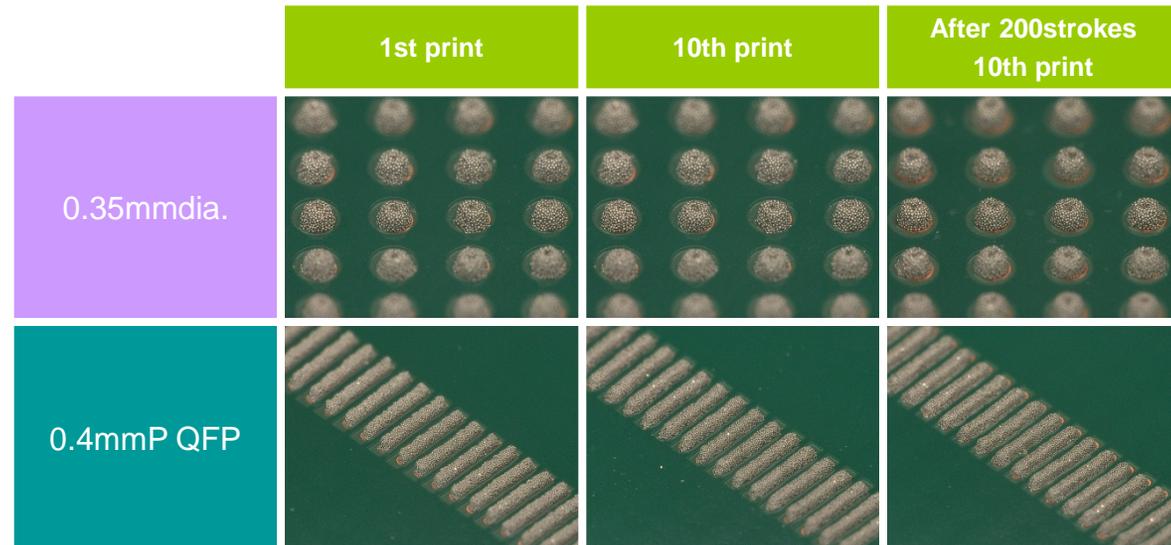
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Continual printability

- Stencil : 0.15mm thickness, laser cut stencil
- Printer : Model YVP-Xg YAMAHA Motor
- Squeegee : Metal blade, Angle - 60°
- Print speed : 40 mm/sec
- Atmosphere : 24~26 °C (50~60%RH)
- Test pattern : 0.4mmP QFP pad pattern - 0.35mm dia.



Consistent and quality printability over the whole continual printing process.



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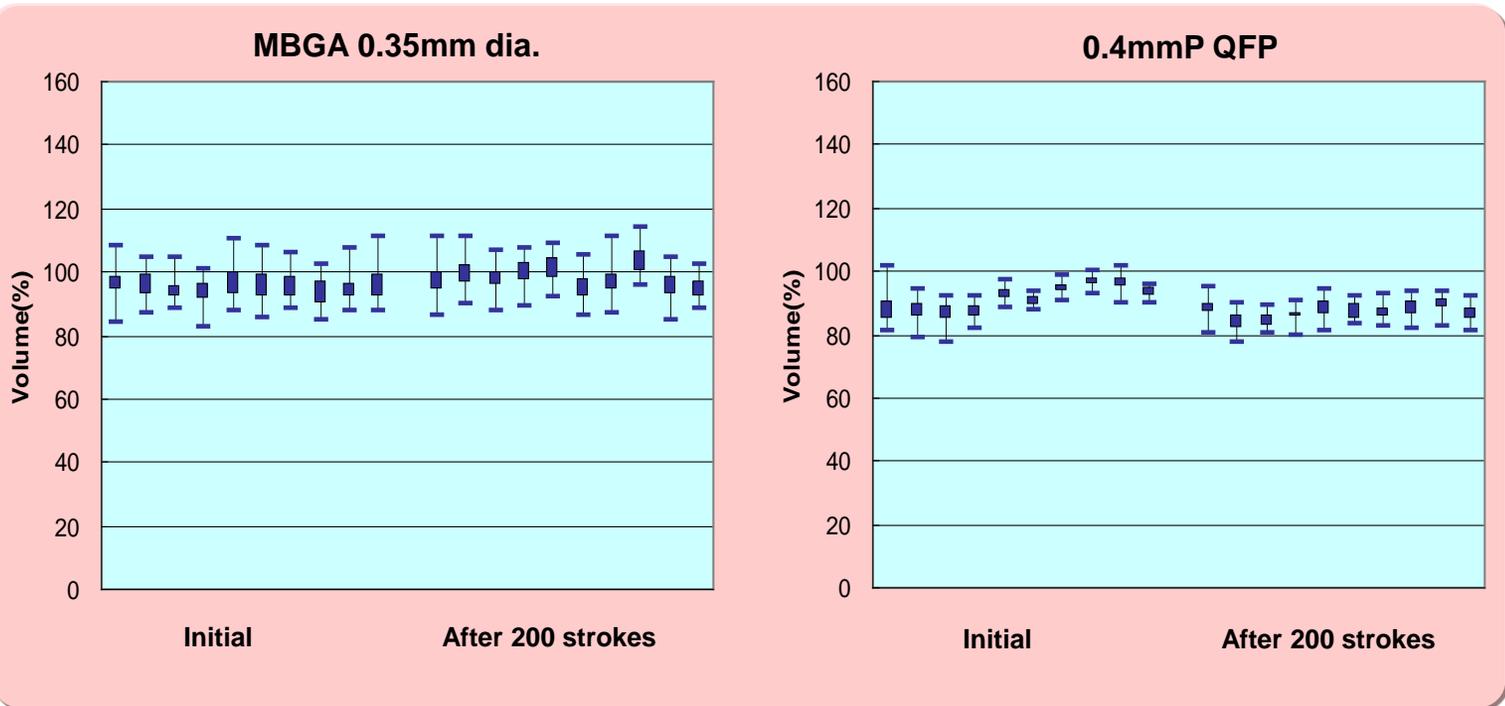
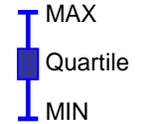
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Continual printing (SPI DATA)

- SPI: KOHYOUNG aSPIre



Newly developed additives provide a lubricating effect that greatly improves the paste release properties from stencil apertures and assures excellent print quality even with micro-BGA.



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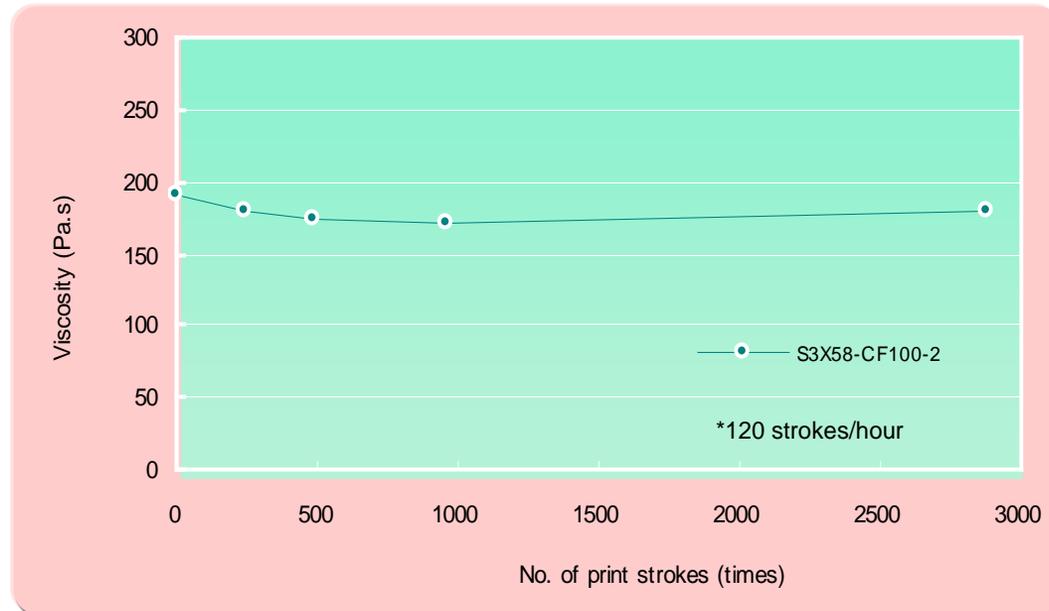
Other properties

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Viscosity variation

Print (knead) solder paste on the sealed up stencil continually for 24 hours to observe any viscosity variation.

- Squeegee : Metal blade, Angle - 60°
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26°C, 40~60%RH



A newly developed flux formula has succeeded to realize consistent long term printability. This is achieved by preventing excessive viscosity drop due to shear thinning and excessive viscosity increase due to the chemical reaction between solder powder and flux during print rolling.



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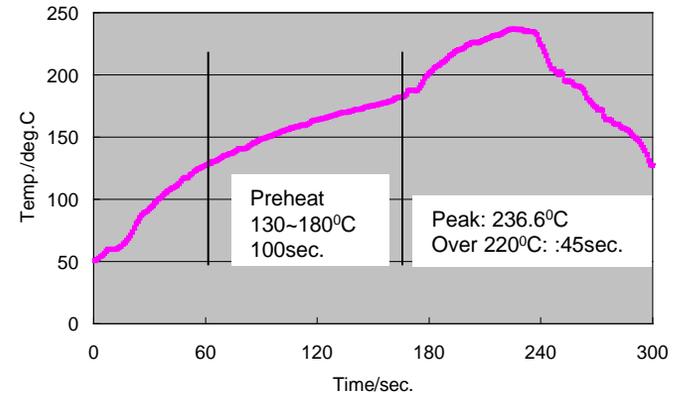
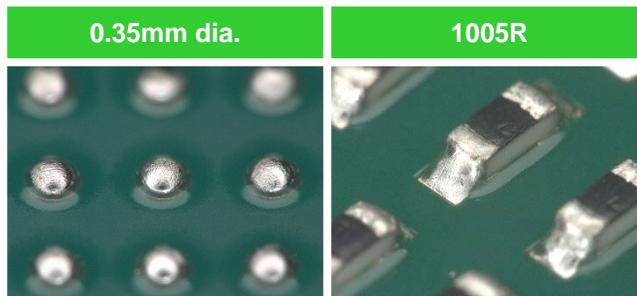
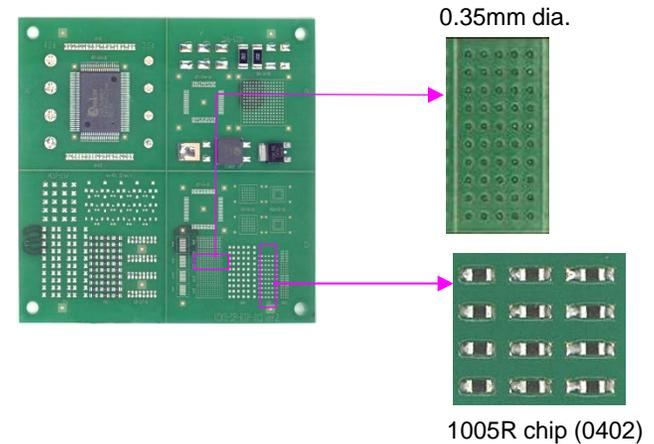
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Super fine pattern wetting

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.15mm (laser cut)
- Pad size : 0.35mm diameter
- Component : 1005R chip, 100%Sn
- Stencil aperture : 100% aperture opening to pad
- Heat source : Hot air convection
- Atmosphere : Air
- Reflow profile : See below



Larger relative surface areas of solder paste exposed due to miniaturization of components (CSP, 1005 chips), often causes incomplete coalescence of the solder due to excessive oxidation during the reflow. An improved flux formula ensures complete coalescence by minimum deterioration of the flux's barrier performances .



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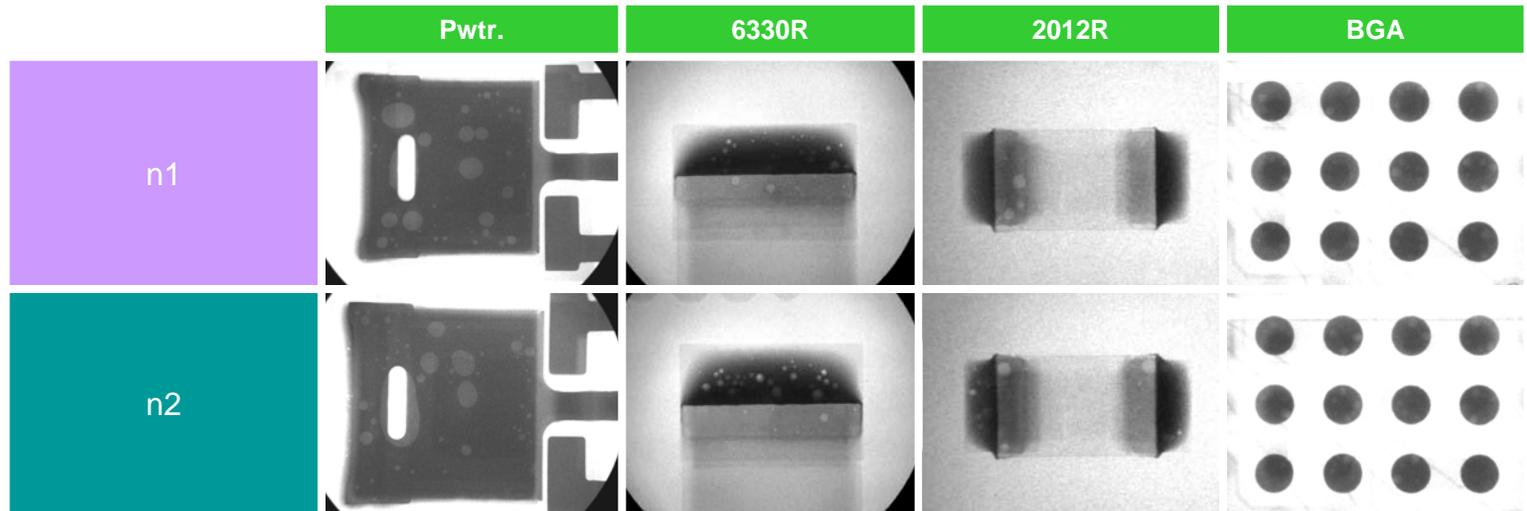
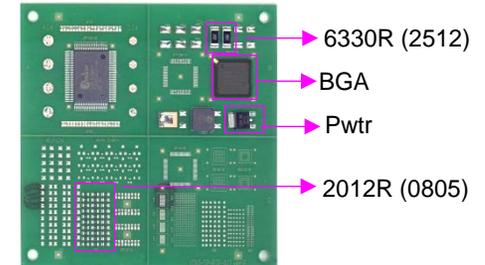
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Voiding

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.15mm (laser cut)
- Stencil aperture : 100% aperture opening to pad
- Components : Pwtr, 2012R 100% Sn plated
6330R 100% Sn plated, BGA ball - SAC305
- Heat source : Hot air convection
- Atmosphere : Air
- Reflow profile : Same as "Super fine pattern wetting"



Combination of a flux chemistry that allows quick flow and the evacuation of flux gas from the molten solder alloy.



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Item	Result	Method
Tack time	> 24 hours	JIS Z 3284
Heat slump	0.3mm pass	JIS Z 3284
Solder balling	< Category 3	JIS Z 3284
Copper mirror corrosion	Type L	IPC-JSTD-004
Copper plate corrosion	Pass	IPC-JSTD-004 JIS Z 3284
Voltage applied SIR	> 1E+9 ohm	IPC-JSTD-004 JIS Z 3284



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1. Printing

1) Recommended printing parameters

(1) Squeegee

- 1. Kind : Flat
- 2. Material : Rubber or metal blade
- 3. Angle : 60~70°
- 4. Pressure : Lowest
- 5. Squeegee speed : 20~80mm/sec.

(2) Stencil

- 1. Thickness : 150~120μm for 0.65~0.4mm pitch pattern
- 2. Type : Laser or electroform
- 3. Separation speed : 7.0~10.0mm/sec.
- 4. Snap off distance : 0mm

(3) Ambiance

- 1. Temperature : 23~27°C
- 2. Humidity : 40~60%RH
- 3. Air conditioning : Excessive air flow in the printer badly affects stencil life and tack performance of solder pastes.

2. Shelf life

0~10°C : 6 months from manufacturing date

* Manufacturing date can be obtained from the lot number

ex. Lot No. 3 05 13 2

→	No. of lot	: 2nd
→	Date	: 13th
→	Month	: May
→	Year	: 2013



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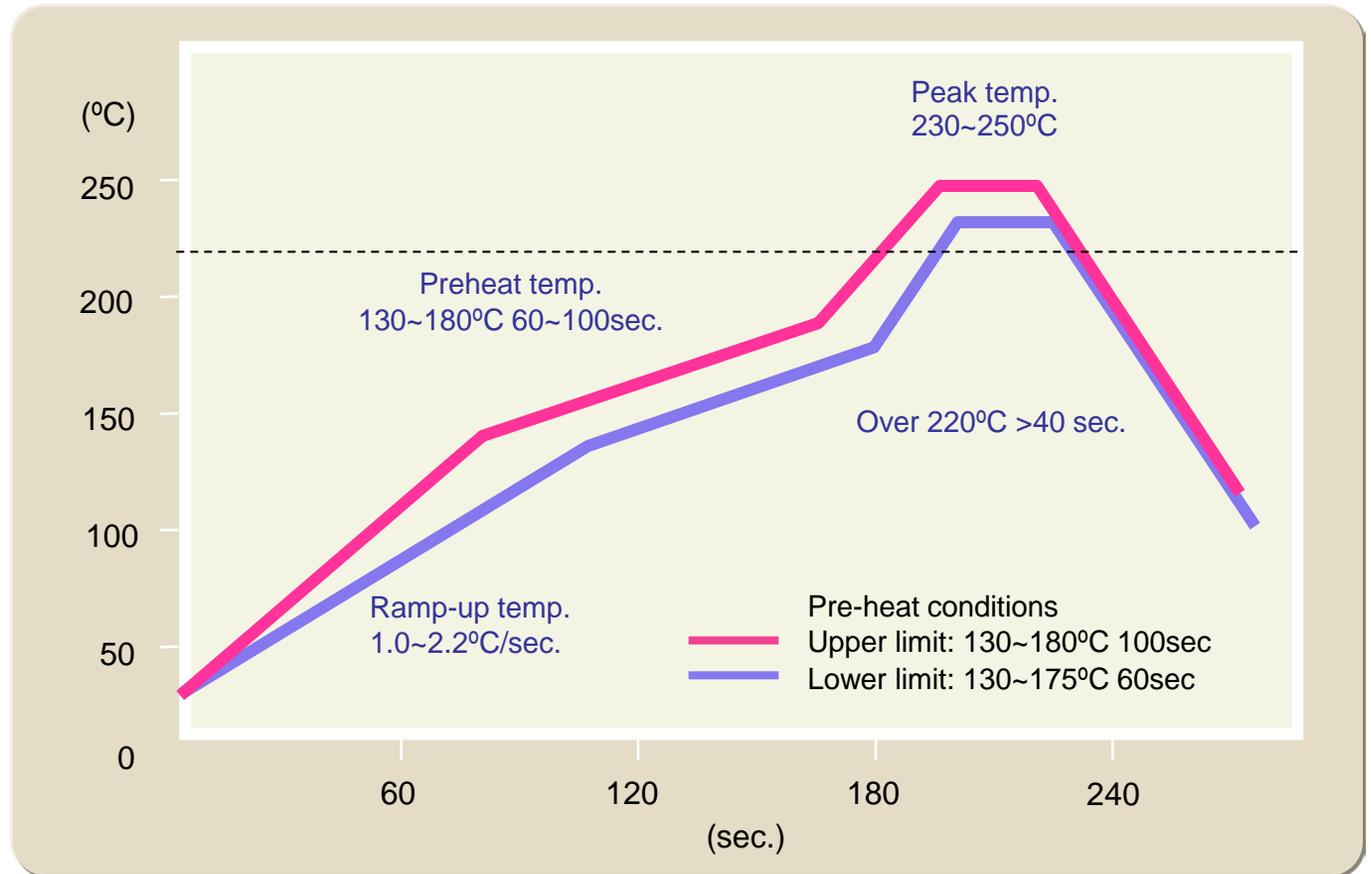
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