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#55001-3
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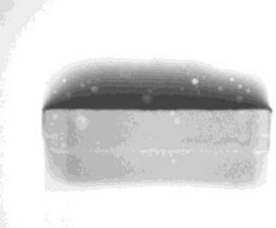
Koki no-clean LEAD FREE solder paste

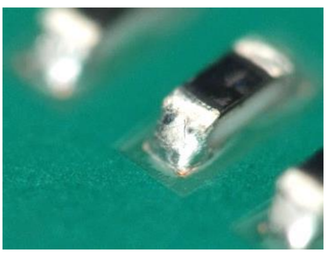
High Performance Low Voiding LF Solder Paste

S3X58-G801

Product Information



0603R



0603R

Disclaimer
This Product Information contains product performance assessed strictly according to our own test procedures and is not the guaranteed results at end-users. Please conduct thorough process optimization before mass production application.

Features

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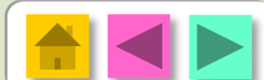
- Solder alloy composition: Sn 3.0Ag 0.5Cu (SAC305)
- Ensures consistent continual printability with fine pitch patterns
- Low volatile ingredients were carefully selected and newly developed oxidation/ reduction gas release technology delivers low void occurrence in the solder joints
- Good wettability performance toward oxidized/degraded metal substrates
- Good solder coalescence with micro-components (0603 size chip) even under air atmosphere reflow owing to a heat-resistant activator system



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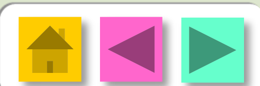


Features

Development Background

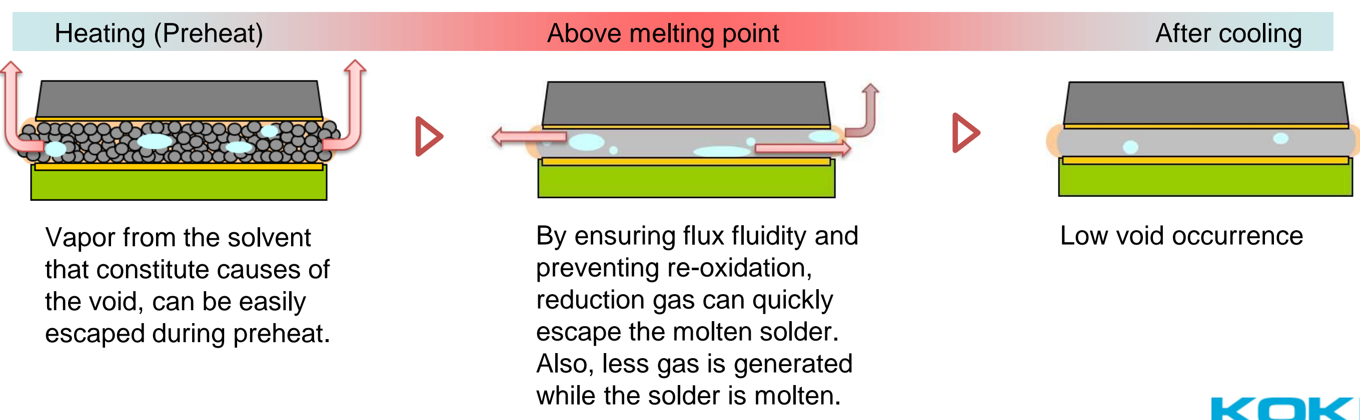
The gas formed in the molten solder remained in the solder joint after cooling and becomes void, which is a reliability concern. Originally, it was difficult to achieve low-void solder joint regardless of the variables in the process condition, such as the size of component, surface finish on the PCB, or the volume of the solder paste. KOKI developed a solder paste which satisfies both low voids in the solder joints and different needs in the market.

Development Concept

S3X58-G801 is designed to reduce the reaction gas, which causes void, from all possible sources, such as rosin, thixotropic agent and activator. In addition, flux fluidity is improved so that the reduction gas can promptly escape from the molten solder. Furthermore, G801 possesses high wettability to prevent the re-oxidation of the solder. As a result, G801 is capable of easing the influence of different reflow profile or surface finish on the PCB and providing low-void solder joints regardless of the component type.

Low-Void Technology (Schematic Image)

Inhibit gas from the flux and release any reduction gas quickly to achieve low-void property



S3X58-G801

Specifications

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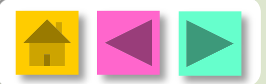
Application		Print
Product Name		S3X58-G801
Alloy Properties	Alloy Composition (%)	Sn 3.0Ag 0.5Cu
	Melting Point (ºC)	217 - 219
	Powder Shape	Spherical
	Grain Size (µm)	20 - 38
Flux Properties	Halide Content (%)	0
	Flux Designation *1	ROL0
Solder Paste Properties	Flux Content (%)	11.6±1.0
	Viscosity *2 (Pa.s)	220±30
	Cu Plate Corrosion *3	Passed
	Tack Time	> 48hours
	Shelf Life (below 10ºC)	6 months
Other Grain Size		*S3X48-G801* (20-45µm)

*1 Flux Designation: In accordance with IPC J-STD-004
*2 Viscosity: Measured by Malcom Viscometer at 25ºC, 10rpm
*3 Cu Plate Corrosion: In accordance with IPC-TM-650-2.6.15



Printability: Continuous Printability

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Test condition:

- Stencil Thickness: 0.12mm (Laser)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal, 60º
- Print Speed: 40 mm/sec.
- Test Environment: 24~26ºC (50~60%RH)
- Evaluation Lands: 0.4mmP QFP / 0.25mmΦ CSP

	1st Print	10th Print	10th Print after 200 strokes
0.25mmΦCSP			
0.4mmP QFP			

S3X58-G801 ensured stable print shape at 0.25mmΦ CSP and 0.4mmp QFP lands.

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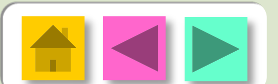
Printability: Fine Pitch Printability

Test condition:

- Stencil Thickness: 0.12mm (Laser)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal, 60º
- Print Speed: 40 mm/sec.
- Test Environment: 24~26ºC (50~60%RH)
- Evaluation Lands: 0.4mmP QFP narrow pitch lands
  Print width 0.25mm, spacing 0.15mm

	1st Print	7th Print	10th Print
S3X58-G801			
Conventional product			

G801 performed stable printability at fine-pitch area by preventing slump and flux bleeding.



Meltability: Reflow Test Procedure

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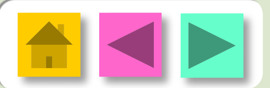
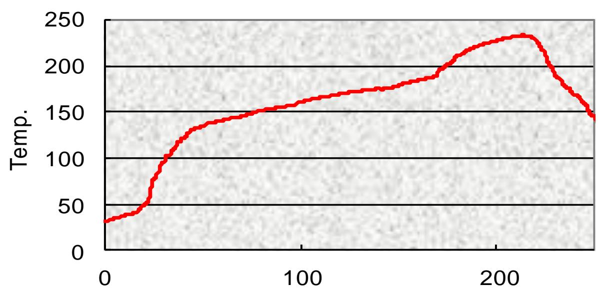
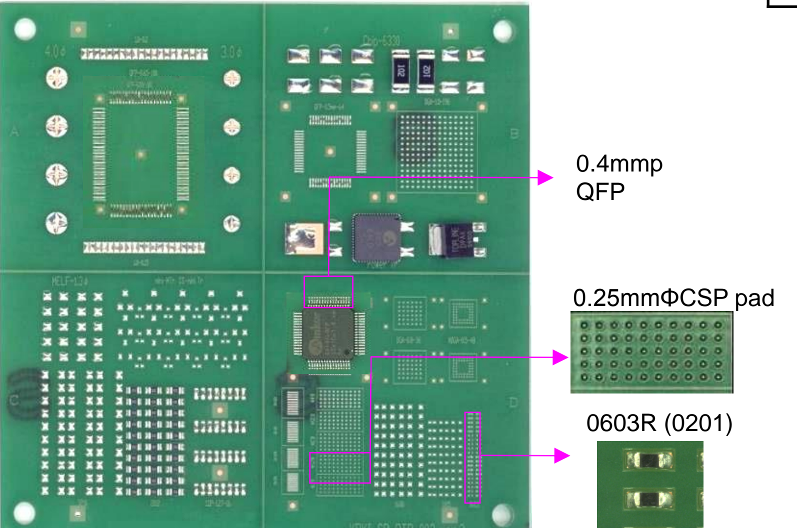


Test condition:

- Test PCB: FR-4 (see the image below)
- PCB Surface Finish: OSP, ImSn and ENIG
- Stencil Thickness: 0.12mm (Laser)
- Land: 0.25mmΦ CSP
- Components: 0603R (0201) and 0.4mmP QFP(100% Sn)
- Stencil Aperture: 100%
- Heating Method: Hot Air Convection
- Reflow Atmosphere: Air Atmosphere
- Reflow Profile: See the Reflow Profile to the right



150~190ºC	220ºC≧	Peak Temp.
87s	30s	232℃



Hot Air Reflow Oven

Meltability: Reflow Test Results

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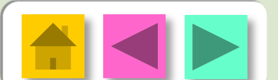
	0603R(0201)	0.25mmΦ	0.4mmpQFP
OSP			
ImSn			
ENIG			

G801 performed good meltability on fine-pitch lands and lead components.



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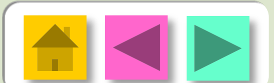

Meltability: De-Wetting Test

Test condition:

- Test Substrate: Oxidized Ni, Cu, ImSn and Brass plates
- Oxidizing Condition: Place substrates in an oven set at 150ºC for 16 hours
- Stencil Thickness: 0.20mm (Laser)
- Stencil Aperture: 6.5mmΦ
- Heating Method: Same as provided in slide No. 9

	Oxidized Ni	Oxidized Cu	Oxidized ImSn	Oxidized Brass
S3X58-G801				
Conventional				

G801 performed good meltability toward oxidized substrates regardless of the type.

Void Property

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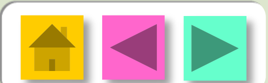
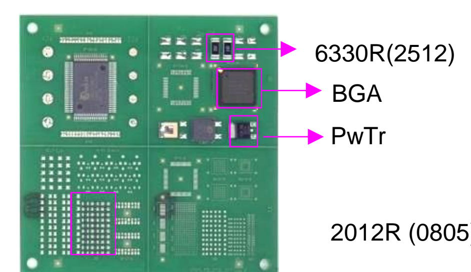
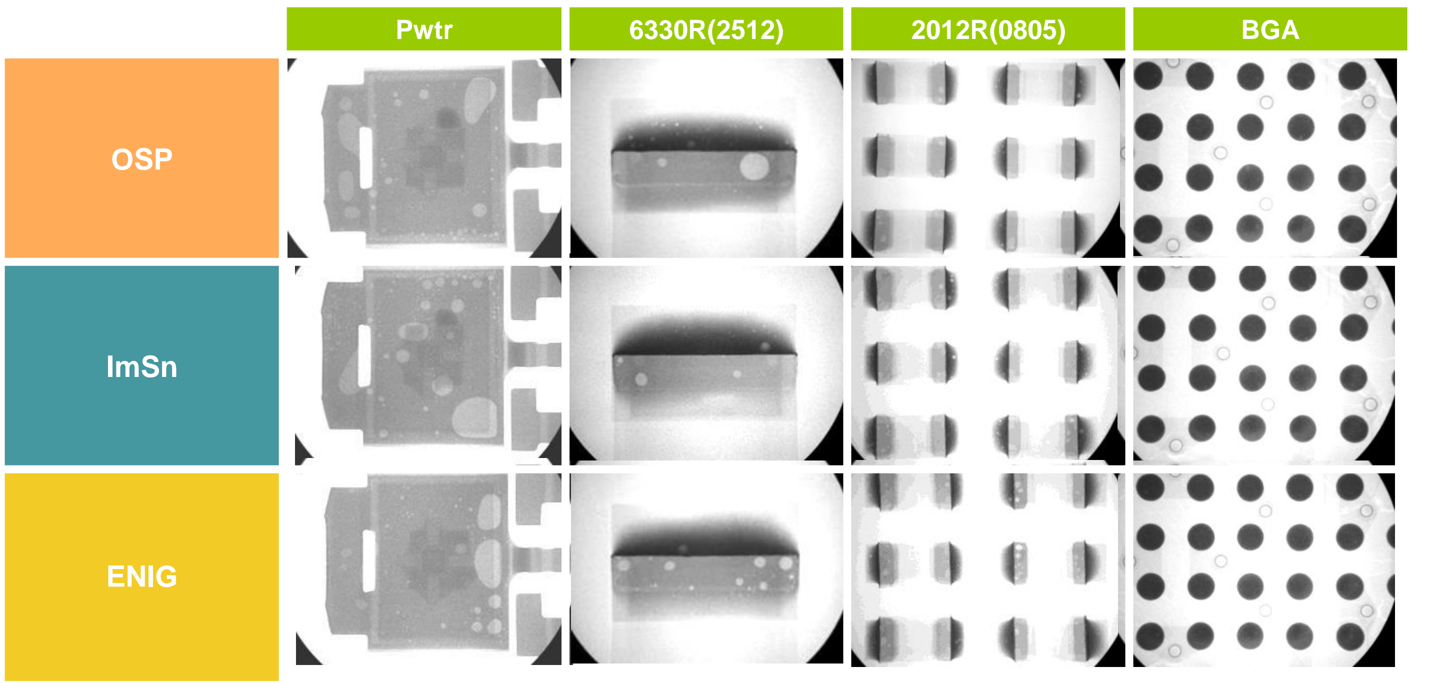


Test condition:

- Test PCB: FR-4 (see the image to right)
- Surface Finish: OSP, ImSn and ENIG
- Stencil Thickness: 0.12mm (Laser)
- Stencil Aperture: 100%
- Component: Pw.Tr., 6330R (2512), 2012R (0805), 100% - Sn plated and BGA ball - SAC305
- Heating Method: Hot Air Oven
- Reflow Atmosphere: Air Atmosphere
- Heating Method: Same as provided in slide No. 9





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Void Property - Results

Evaluation Method:

- Test condition: As per slide #9.
- A number of specimen: Pwtr x 9 pcs. / 6330R x 6pcs. / 2012R x 5pcs. / BGA x 5pins

Maximum
Average
Minimum

OSP

void ratio %

50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0

Pwtr, 6330R, 2012R, BGA

ImSn

void ratio %

50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0

Pwtr, 6330R, 2012R, BGA

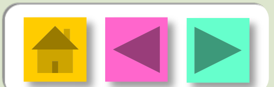
ENIG

void ratio %

50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0

Pwtr, 6330R, 2012R, BGA

S3X58-G801 realizes low voiding with various types of components.



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Item	Result	Method
Tack Time	> 48 hours (>100g.f)	JIS Z 3284-3
Slump Property	0.2mm pass	JIS Z 3284-3 Heating Condition: 150˚Cx10 min.
	0.2mm pass	IPC-TM-650-2.4.35 Heating Condition: 150˚Cx10 min.
Solder Balling Test	Within category 3	JIS Z 3284-4
Cu Mirror Corrosion Test	Type L	IPC-TM-650-2.3.32
Cu Plate Corrosion Test	Pass	IPC-TM-650-2.6.15
Surface Insulation Resistance Test	> 1E+9	IPC-TM-650-2.6.3.3
Electromigration Test	No evidence of electromigration	IPC-TM-650-2.6.14.1

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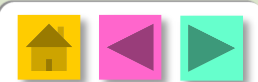


1. Printing

1) Recommended Printing Condition

(1) Squeegee

1. Shape: Flat
2. Material: Metal or Urethane
3. Angle: 60~70º
4. Print Pressure: Low (no solder paste smear on stencil)
5. Squeegee Speed: 20~80mm/ sec.

(2) Metal Stencil

1. Thickness: 0.10~0.15mm for 0.4~0.65mm pitch lands
2. Fabrication Method: Laser or chemical etched
3. Stencil Release Speed: 7.0~10.0mm/ sec.
4. Clearance: 0mm

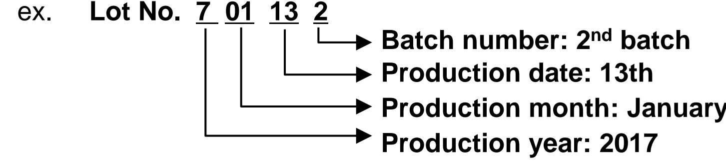
(3) Ambient

1. Temperature: 23~27°C
2. Humidity: 40~60%RH
3. Air Conditioning: Direct air blow on metal stencil would cause the solder paste to dry up quicker. Please use a shield to adjust the airflow.

2. Product Life

Stored at 0~10ºC: 6 months from the date of production

* How to interpret lot number



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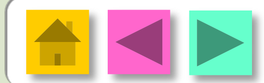
Handling Guide – Recommended Reflow Profile



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