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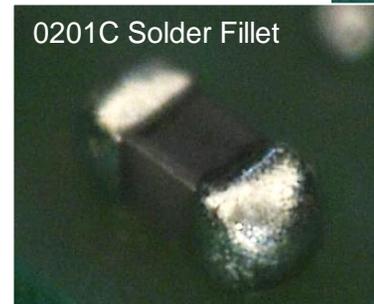
KOKI No Clean **LEAD FREE** Solder Paste

Lead Free Solder Paste for Micro-pattern Applications



S3X811-M500-6

Product Information



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.



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- Alloy Composition: Sn 3.0Ag 0.5Cu (SAC305).
- Contains lubricants to improve the continuous and intermittent printability on fine-pitch patterns.
- Adjusted flux fluidity inhibits solder powder from oxidizing and improves meltability at fine-pitch pads.
- Ensures good meltability at fine-pitch pads (e.g. 0201 chip components or 0.1 mm pitch CSP)
- Void occurrence is reduced by the use of enhanced activators and flux fluidity.
- In compliance with Halogen Free standard (BS EN14582, Br+Cl < 1,500 ppm).



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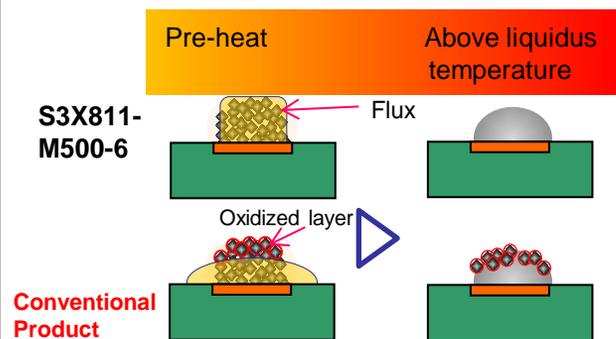
Development Background

Latest mobile devices are becoming highly functional and low-profile, that their components are also miniaturizing. The smallest chip component found on a smartphone motherboard is 0402; however, applications of 03015 or 0201 chip components are anticipated soon. S3X811-M500-6 is developed to meet the demands for a solder paste which is compatible with ever-miniaturizing fine-pitch soldering.

Development Concept

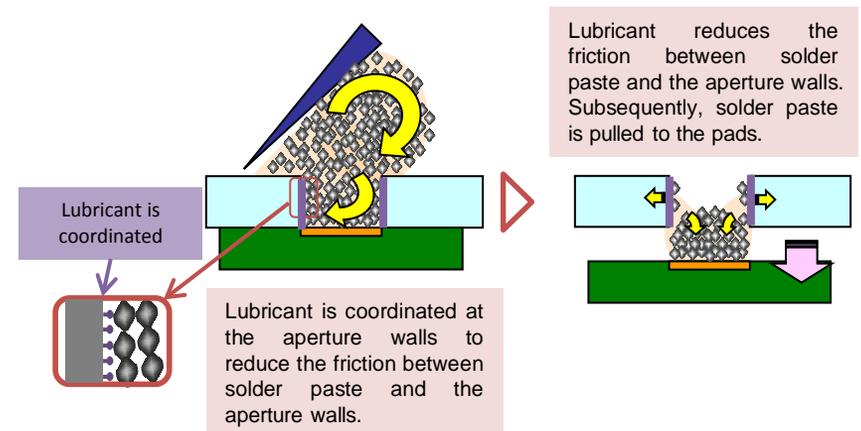
Since most mobile devices are required to be halogen-free, M500-6 is also designed to meet halogen-free standards. In general, a halogen-free solder paste suffers inferior meltability at fine-pitch pads. However, M500-6 maintains good meltability at fine-pitch pads by adjusting its flux fluidity to inhibit solder powder from being oxidized during pre-heat. In addition, M500-6 contains a lubricant with low friction coefficient to improve the printability at fine-pitch pads. Consistent fine-pitch printability and intermittent printability are ensured.

Preventing Solder Powder Degradation



M500-6 contains resin with higher softening temperature that prevents flux slump and covers solder powder entirely during preheat

Improving Fine-Pitch Printability



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Application		Printing
Product Name		S3X811-M500-6
Alloy	Alloy Composition (%)	Sn 3.0Ag 0.5Cu
	Melting Point (°C)	217 - 219
	Grain Shape	Spherical
	Grain Size (µm)	5 - 20
Flux	Halide Content (%)	0
	Flux Designation*1	ROL0
Solder Paste	Flux Content (%)	11.4±1.0
	Viscosity*2 (Pa.s)	200±30
	Copper Plate Corrosion*3	Passed
	Tack Time	>72 hours
	Shelf Life (<10°C)	6 months

*1. Flux Classification:

In compliance with IPC J-STD-004B

*2. Viscosity:

Measured by Malcom Viscometer at 25 °C ,10 rpm

*3. Copper Plate Corrosion:

In compliance with IPC-TM-650-2.6.15



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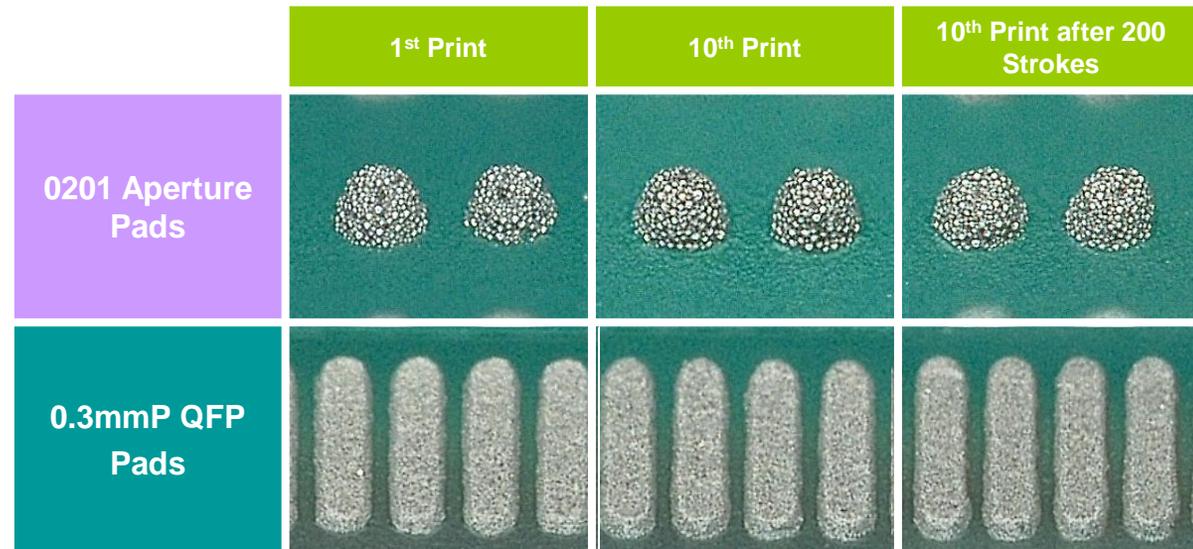
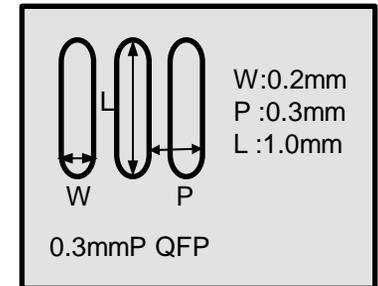
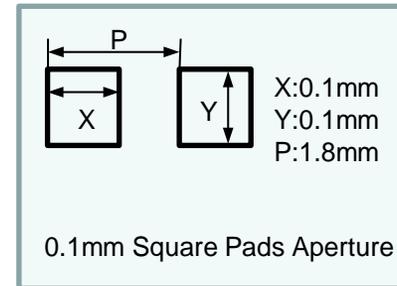
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Continuous Printability

Evaluation Method:

- Metal Stencil: 0.05mm thick (laser etched)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal squeegee, 60° angle
- Print Speed: 50 mm/sec
- Test Ambient: 24~26 °C (50~60%RH)
- Test Pads: 0.3mmP QFP pads
0201 pads (0.1mm aperture)



S3X811-M500-6 can maintain consistent print shape at 0.01mm square pads and 0.3mm pitch QFP pads.



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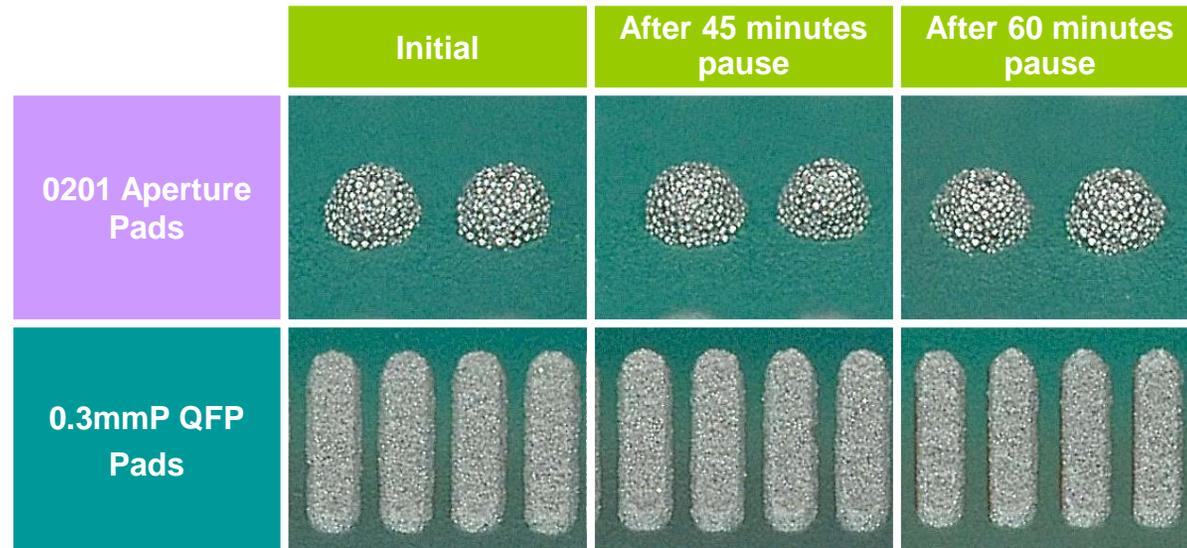
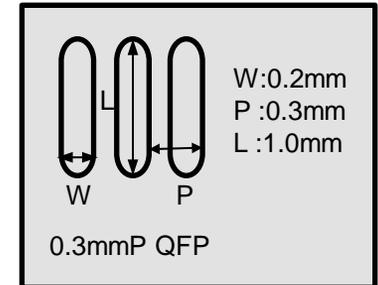
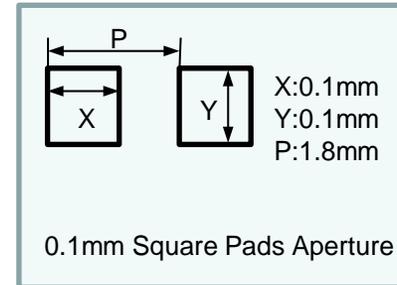
Handling Guide

Intermittent Printability

Evaluation Method:

Pause printing for 45 min. and 60 min., and then resume printing.

- Metal Stencil: 0.05mm thick (laser etched)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal squeegee, 60° angle
- Print Speed: 50 mm/sec
- Test Ambient: 24~26 °C (50~60%RH)
- Test Pads: 0.3mmP QFP pads
0201 pads (0.1mm aperture)



Stable print profile can be observed after 45 minutes pause and 60 minutes pause.



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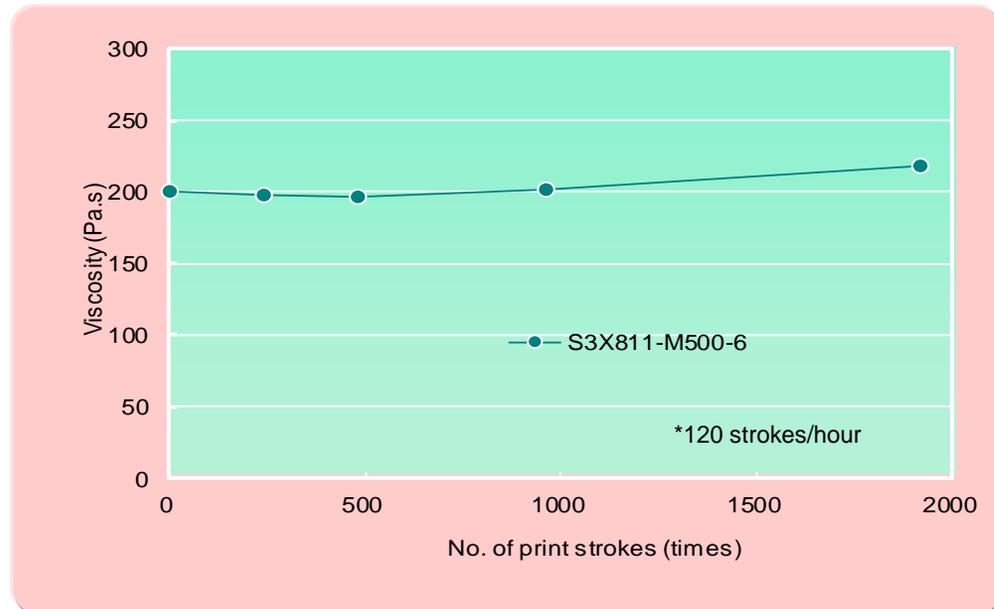
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Viscosity

Evaluation Method:

Mask the metal stencil and roll the solder paste for 16 hours to apply rolling shear. Measure the viscosity after predetermined number of strokes.

- Squeegee: Metal Squeegee (Squeegee Angle: 60°)
- Squeegee Speed: 30mm/sec.
- Squeegee Stroke: 300mm
- Printing Environment: 24~26 °C, 40~60%RH



Owing to the modified formulation that prevents the reaction between solder powder and activator, S3X811-M500-6 shows good consistent viscosity.



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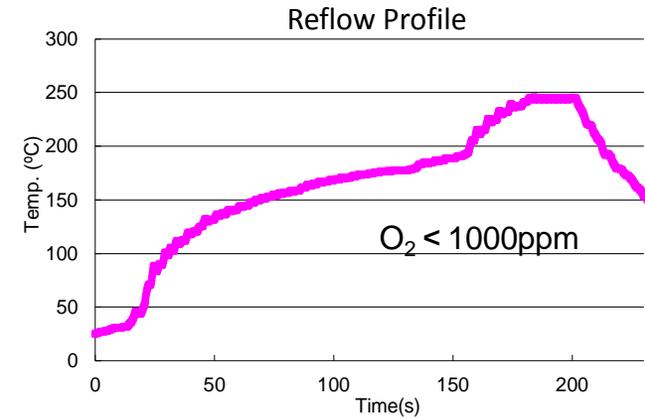
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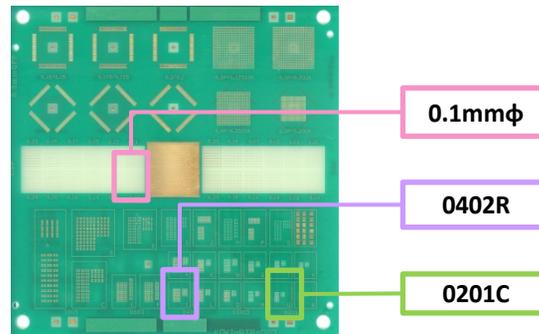
Meltability & Void

Evaluation Method

- Test PCB: FR-4 grade glass epoxy
(see the image below)
- Surface Finish: ENIG
- Stencil Thickness: 0.05mm (Laser etched)
- Evaluation Pads: 0.10mmΦCSP
- Evaluation Component: 0402R,0201C (Sn plated)
- Stencil Aperture: 100%
- Heating Method: Hot Air Oven
- Reflow Atmosphere: N₂ (O₂:<1000ppm)
- Reflow Profile: See the diagram to right



Meltability Test Board



Surface Finish: Ni-Au



Hot Air Reflow Oven



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	0.1mmφCSP	0201C	0402R
Meltability			
Void			

S3X58-M500-6 shows good meltability and very low void occurrence.



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Evaluation Method

- BS EN 14582 (Quartz Tube Combustion-IC Method)



Elements	Results
F	Not detected
Cl	Not detected
Br	Not detected
I	Not detected

Halogen Content (ppm)

S3X58-M500-6 meets halogen free standard BS EN14582 (Cl+Br <1500 ppm) (Quartz tube combustion-IC method)



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Item	Result	Method
Slump Property	0.3mm pass	JIS Z 3284-3 Heated at 180°C for 5 min.
Copper Mirror Corrosion	Type L	IPC-TM-650-2.3.32
Copper Plate Corrosion	Pass	IPC-TM-650-2.6.15
Surface Insulation Resistance	> 1E+8	IPC-TM-650-2.6.3.7
Migration 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: | 60~70° |
| 4. Print Pressure: | Low (No solder paste smear) |
| 5. Squeegee Speed: | 20~80mm/ sec. |

(2) Metal Stencil

- | | |
|---------------------------|--|
| 1. Thickness: | 30~50 μm for 0201 chip pads, |
| 2. Fabrication Method: | High quality laser or chemical etching |
| 3. Stencil Release Speed: | 7.0~10.0mm/ sec. |
| 4. Clearance: | 0 mm |

(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 air flow direction. |

2. Product Life

0~10°C: 6 months from the date of production

* How to interpret lot number

ex. Lot No. 7 02 03 2

7	02	03	2	
			→	Batch# : 2 nd batch
		→	→	Production Date: 3rd
		→	→	Production Month: February
		→	→	Production Year: 2017



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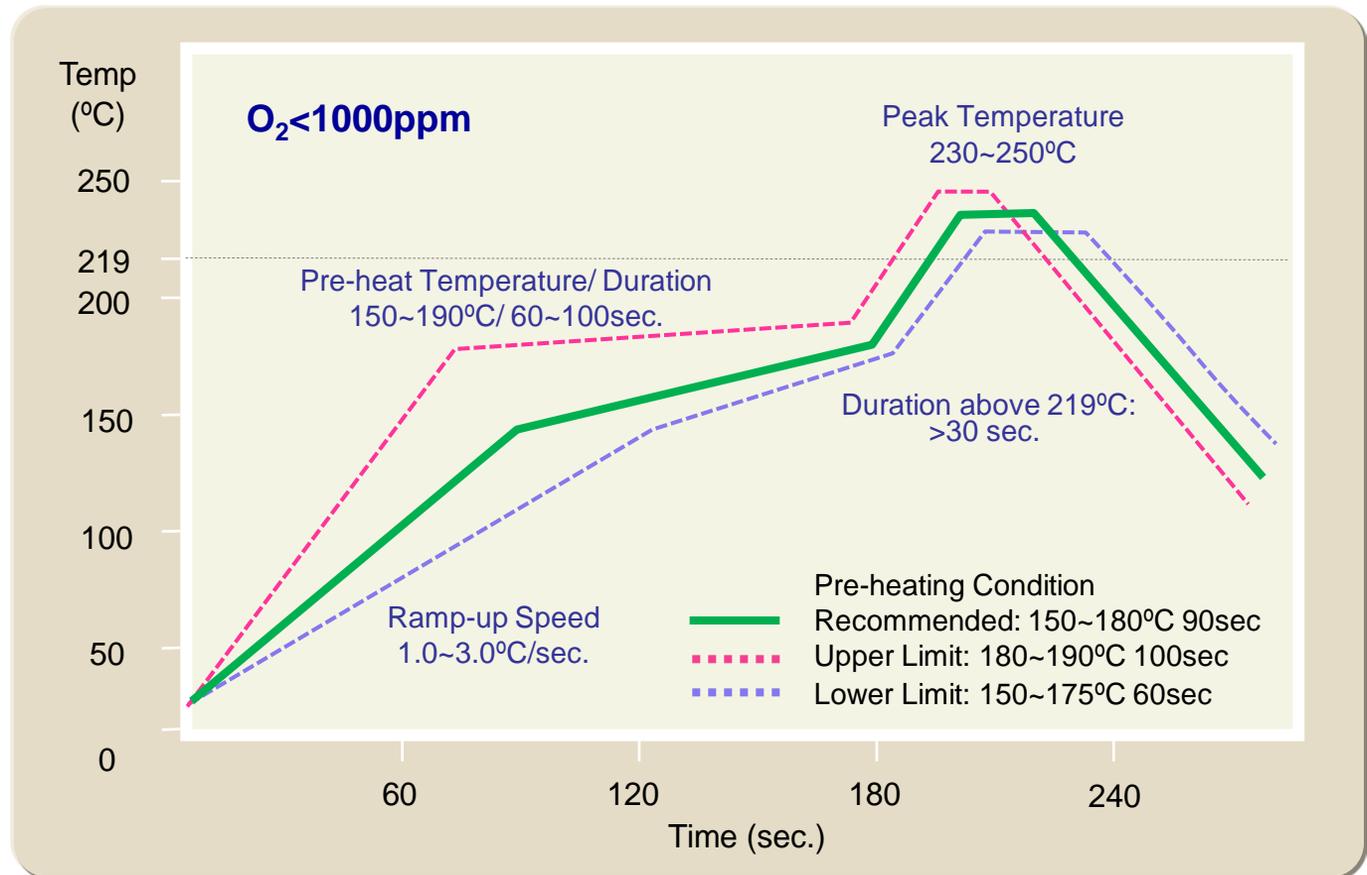
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Handling Guide – Recommended Reflow Profile



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