



#53009 Revised on 2016.3.15



CHALLENGING NEW TECHNOLOGIES



Contents



Features



- Alloy Composition: Sn 3.0Ag 0.5Cu (SAC305).
- Contains lubricants to improve the fine-pitch printability.
- Adjusted flux fluidity inhibits solder powder from oxidizing and improves meltability at fine-pitch pads.
- Ensures good meltability at smaller components (0201 size chip component).
- Void occurrence is reduced by tuning the activators and flux fluidity.
- In compliance with Halogen Free standard (BS EN14582, Br+Cl < 1,500 ppm).





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Features Contents Features **Specifications** Printability Viscosity Meltability Voiding Property Pre-heat Halogen Content M500-4 General Properties Oxidized layer Handling Guide Conventional Product

Development Background

Latest mobile devices are becoming highly functional and low-profile that the their components are also miniaturizing. The smallest chip component found on a smartphone motherboard is 0402; however, application of 03015 or 0201 chip component is anticipated. S3X811-M500-4 is particularly 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, M500-4 is also designed to meet halogen-free standard. In general, a halogen-free solder paste suffers inferior meltability at fine-pitch pads. However, M500-4 overturns this tendency especially at fine-pitch pads by means of flux fluidity adjustment to inhibit solder powder from being oxidized during pre-heat. In addition, M500-4 contains a lubricant with low friction coefficient to improve printability at fine-pitch pads for consistent printing results.

Preventing Solder Powder Degradation



M500-4 contains resin with higher softening temperature that prevents flux slump and provides coatings on solder powder during preheat.



Improving Fine-Pitch Printability

Lubricant reduces the friction between solder paste and the aperture walls. Subsequently, solder paste is pulled to



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Printing

Specifications

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		5		
Product Name		S3X811-M500-4		
Alloy	Alloy Composition (%)	Sn 3.0Ag 0.5Cu		
	Melting Point (°C)	217 - 219		
	Grain Shape	Sphere		
	Grain Size (µm)	5 - 20		
Flux	Halide Content (%)	0		
	Flux Classification*1	ROL0		
Solder Paste	Flux Content (%)	11.5±1.0		
	Viscosity*2 (Pa.s)	200±30		
	Copper Plate Corrosion*3	Passed		
	Tack Time	> 48 hours		
	Shelf Life (<10°C)	6 months		
	Other Grain Sizes Available	10-25μm: S3X70-M500-4 20-38μm: S3X58-M500-4		

*1. Flux Classification:

*2 . Viscosity:

*3. Copper Plate Corrosion:

Application

In compliance with IPC J-STD-004A Measured by Malcom Viscometer at 25°C ,10rpm In compliance with IPC-TM-650-2.6.15











By printing S3X811-M500-4 with 50 µm stencil, consisting print results were obtained at 0201 pads.





	Printability (So	Ider Pow	der Gra	in Size a	nd Sten	cil Th	ickne	ss)
Contents								
Features				Stencil Thic	kness: 80µm			
		0402	pads	03015	5 pads	C	201 pads	
Specifications			30	<u>a</u> 🚳		*	5 S	@ @
Printability	S3X70-M500-4	sich sin	4 85 985			() ()	i 🖉	@
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Viscosity						8	8 8	****
	S3X811-M500-4					(\$) (\$)	89 (B	**
Meltability					an 19	•		a a
Voiding Property		Stencil Thickness: 50µm						
		0402 pads		03015	5 pads	0201 pads		
Halogen Content							00	
General Properties	S3X70-M500-4		allan allan			**	* *	
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	S3X811-M500-4						(* (*	
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Continual Printability

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- Metal Stencil: 50 µm thick (laser)
- Printer: YVP-Xg, YAMAHA Motor Co., Ltd.
- Squeegee: Metal squeegee, 60° angle
- Printing Speed: 35 mm/sec.
- Test Ambient: 24~26 °C (50~60%RH)
- Test Pad Size: Line pads, 0.15mm pitch (0.15x0.15mm) and 0201 pads (0.1x0.08mm)

	1 st Print	10 th Print	10 th Print after 200 Strokes
0201 Pads			
Line Pads, 0.15 mm Pitch			Mar and a second second



Consistent print shape transfer throughout the continuous printing test can be observed even at a super finepitch pads.







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Initial print sample and after 200 strokes sample of S3X811-M500-4 show good meltability at 0201 chip pads after reflowed by different reflow profiles.







Voiding Property

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Evaluation Method

- Test Board: FR-4 (see the image on page 9t)
- ENIG - Board Surface Finish:
- 50µm (Laser) - Metal Stencil:
- Stencil Aperture: 100%
- Test Component: 0201C(100% Sn plating) and 0.5mm p BGA (Ball: SAC305)
- Hot Air Reflow Oven - Heating Method:
- Test Ambient: N_2 (O₂: <1000ppm)
- Profile B in the chart on page 9 - Reflow Profile:



Both 0201C and 0.5mm P BGA maintain low void occurrence from the initial print to after 200 strokes.



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General Properties Contents Features Specifications Item Result **Method** Printability Tack Time > 48 hours JIS Z 3284-3 JIS Z 3284-3 Viscosity Slump Property 0.3mm pass Heating Condition: 150°C for 10 minutes Meltability **Copper Mirror Corrosion** Type L IPC-TM-650-2.3.32 Voiding Property **Copper Plate Corrosion** Pass IPC-TM-650-2.6.15 Halogen Content Surface Insulation > 1E+9 IPC-TM-650-2.6.3.3 Resistance **General Properties** No evidence of migration **Migration Test** IPC-TM-650-2.6.14.1 Handling Guide occurrence







Handling Guide

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Footuroo	1. Printing - Recomme
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Halogen Content	3. Air Conditio
General Properties	2. Product Life Store at 0∼10ºC
Handling Guide	* How to
	e.g.

Recommended printin	g condition
eegee	
hape:	Flat
laterial:	Metal or Urethane
ngle:	55~60°
rint Pressure:	Low (No solder paste smear)
queegee Speed:	20~60mm/sec.
al Stencil	
hickness:	For 0201 chip pads, 30~50μm
abrication Method:	Laser or chemical etching
tencil Release Speed:	7.0~10.0mm/ sec.
learance:	Omm
pient	
emperature:	23~27°C
umidity:	40~60%RH
ir 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.
fe	
at 0~10°C: 6	months from the date of production
* How to interpret lo	t number



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