

Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Koki no-clean **LEAD FREE** solder paste

Powerful Wetting Lead Free Solder Paste **S3X58-M500C-7**

Product information

S3X58-M500C-7



Conventional solder paste



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.



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Feature

- Solder alloy composition is **Sn 3.0Ag 0.5Cu** (SAC305)
- **EXCELLENT WETTING** on severely oxidized pads (Copper, Tin and Nickel Palladium, etc.)
- **PERFECT MELTING** and **WETTING** on super fine pitch (>0.4mm pitch) and micro (>0.25mm dia CSP, 0603 chip) components.
- Specially formulated flux chemistry ensures **EXTREMELY LOW VOIDING** with CSPs and large pad area components like power transistors, QFNs.
- Designed to prevent occurrence of **Head-In-Pillow (HiP) DEFECTS**.
- Enables **REUSE** of leftover paste from previous day (**ECONOMICAL**)



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

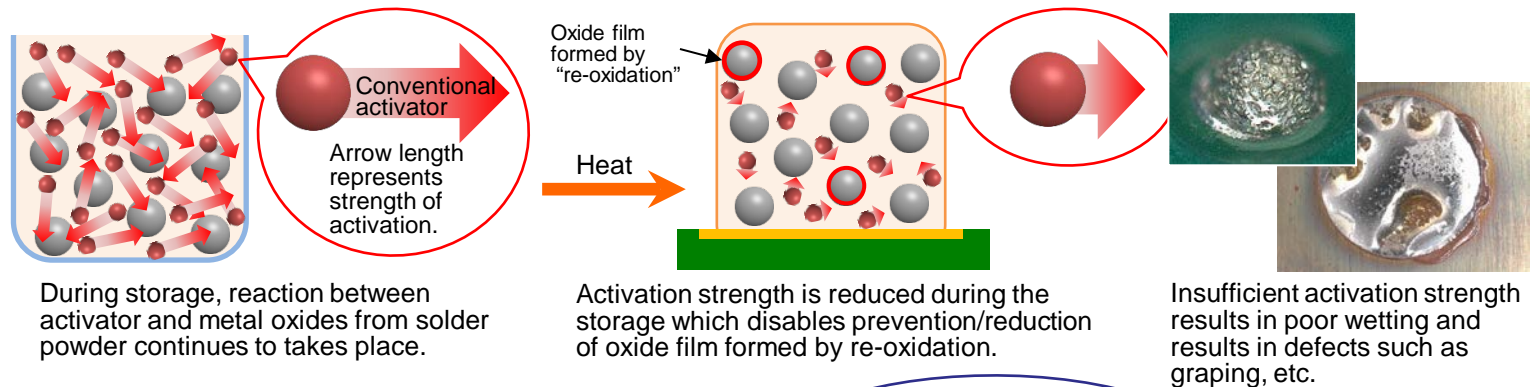
General Properties

Handling Guide

Feature – Activator technique

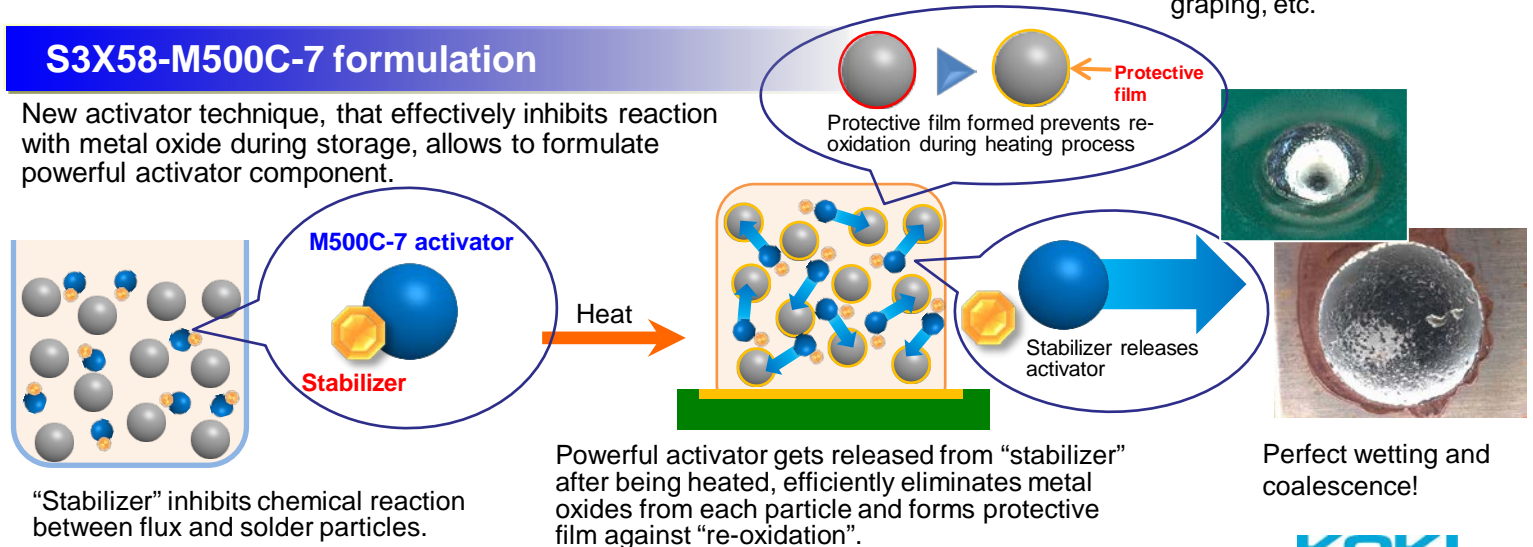
Conventional formulation

Aggressive activators to achieve powerful wetting leads to intense chemical reaction with solder powder.



S3X58-M500C-7 formulation

New activator technique, that effectively inhibits reaction with metal oxide during storage, allows to formulate powerful activator component.



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Specification

Application		Printing
Product name		S3X58-M500C-7
Alloy	Alloy composition (%)	Sn 3.0Ag 0.5Cu
	Melting point (°C)	217 - 219
	Shape	Spherical
	Particle size (μm)	20 - 38
Flux	Halide content (%)	0
	Flux type* ¹	ROL0
Solder paste	Flux content (%)	11.8±1.0
	Viscosity * ² (Pa.s 25°C)	200±30
	Copper plate corrosion* ³	Passed
	Copper mirror	> 72 hours
	Heat slump	6 months

*¹ Flux type:

IPC J-STD-004

*² Viscosity:

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

*³ Copper plate corrosion:

IPC TM650-2.6.15



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

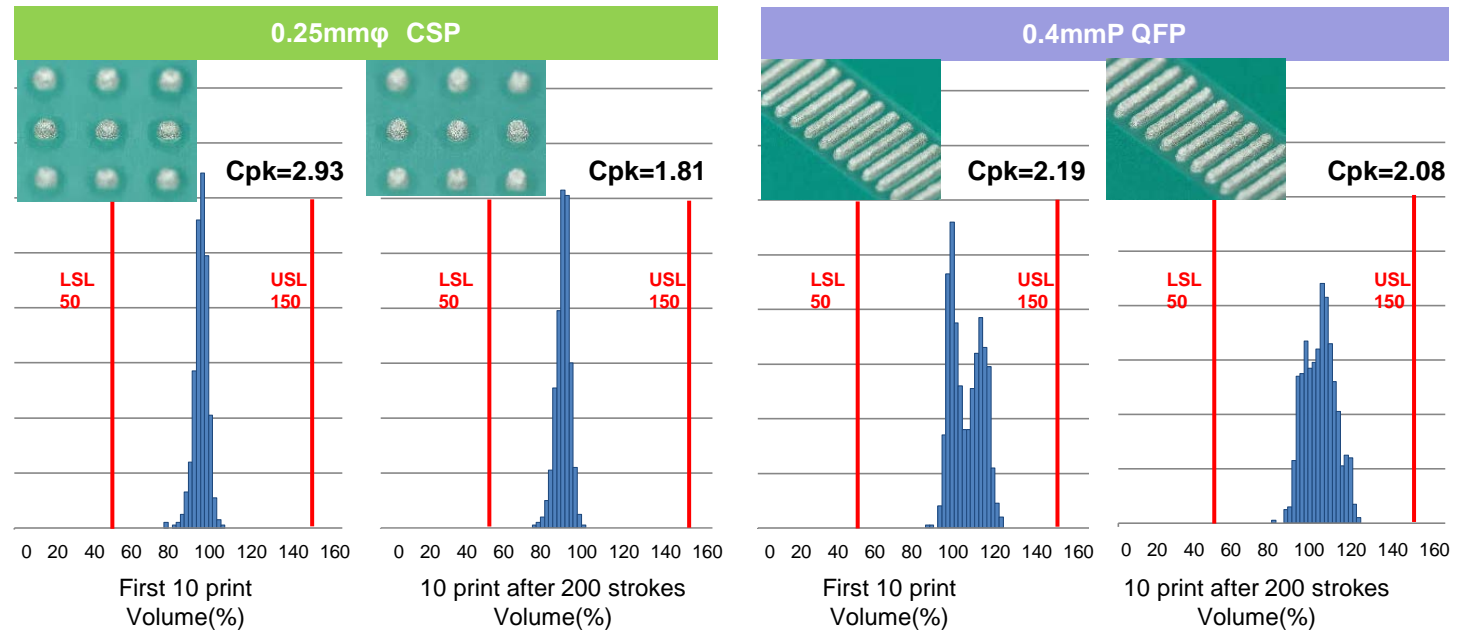
Handling Guide

Continual printability

Evaluation Method:

Print 10 test PCBs, measure and inspect the print transfer rate. Roll the solder paste for 200 strokes, then clean the stencil. Print another 10 test PCBs and inspect the print transfer rate.

- | | | | |
|------------------|-----------------------------|---------------------|--------------------------|
| - Metal Stencil: | 0.12mm thick (laser etched) | - Test Environment: | 24~26 °C (50~60%RH) |
| - Printer: | YVP-Xg YAMAHA Motor | - Evaluation Lands: | 0.4mmP QFP pad (80 pins) |
| - Squeegee: | Metal, angle is 60° | | 0.25mmΦ CSP (50 pads) |
| - Print Speed: | 40 mm/sec | - SPI | KOHYOUNG aSPler |



Consistent and high transfer efficiency can be achieved on 0.25mm dia. pattern and 0.4mm pitch QFP pattern.



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Intermittent printability

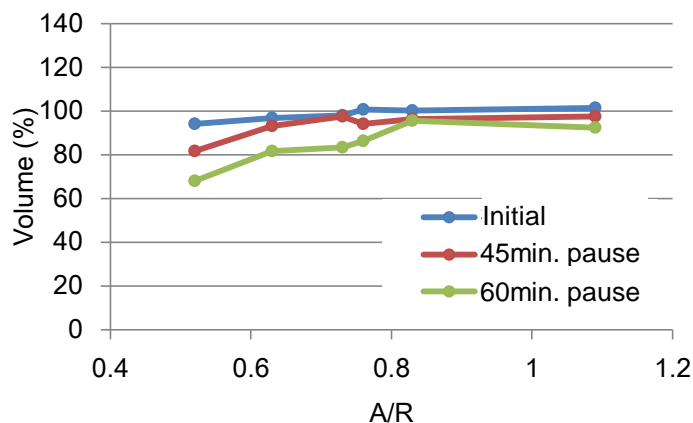
Evaluation Method:

Pause printing for 45 and 60 minutes, then resume printing. Verify the print transfer rate after the pause.

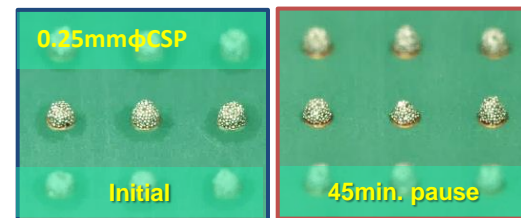
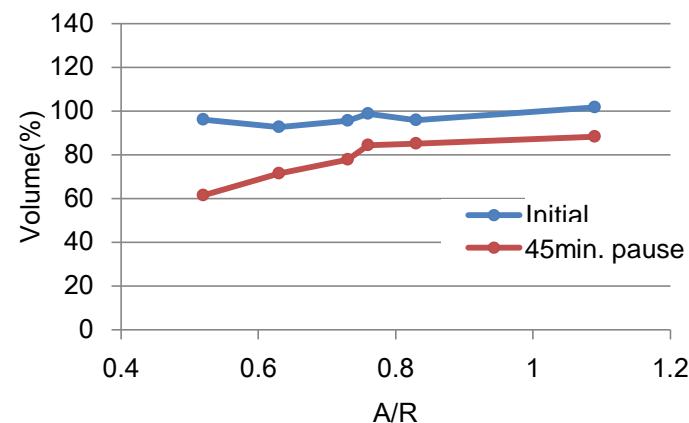
- Metal Stencil: 0.12mm thick (laser etched)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal, angle is 60°
- Print Speed: 40 mm/sec

- Test Environment: 24~26 °C (50~60%RH)
- Evaluation lands: 0.25, 0.30, 0.35 and 0.40mmφ CSP 0.4mmpQFP
- SPI KOHYOUNG aSPler

S3X58-M500C-7 formulation



Conventional formulation



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

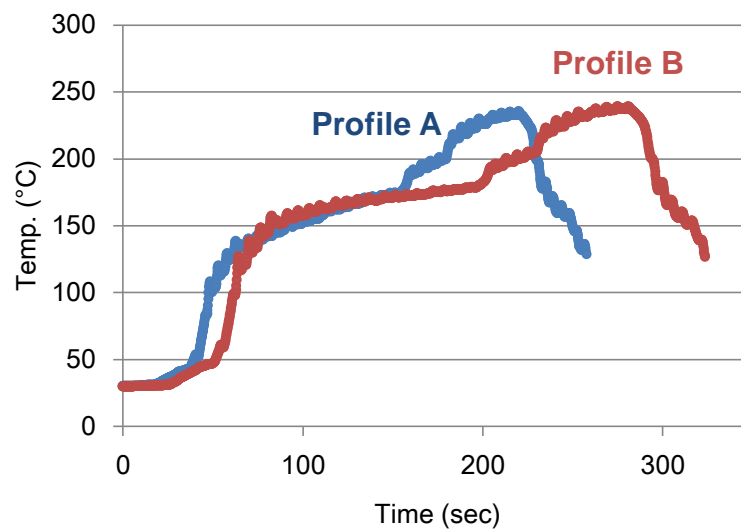
General Properties

Handling Guide

Meltability

Test conditions

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Pad size : 0.25mm diameter
- Component: 0.4mmP QFP
- Stencil aperture : 100% aperture opening to pad
- Heat source : Hot air convection
- Reflow profile : Refer below reflow profiles.



Hellar MK5



	Profile A	Profile B
150~190°C	70sec	130sec
190~220°C	20sec	30sec

Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

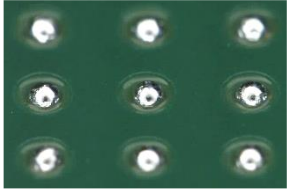
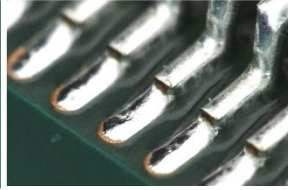
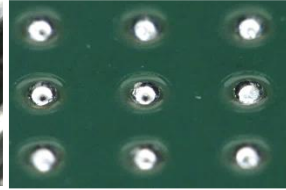





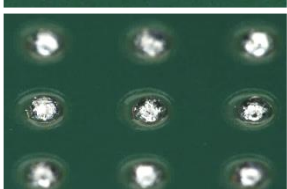

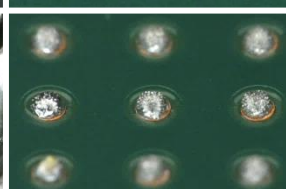

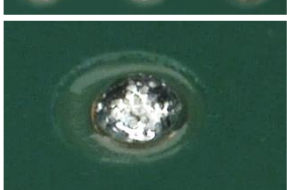
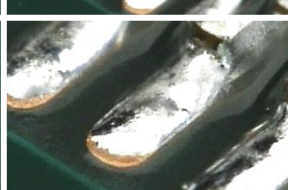


Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Meltability

	Profile A		Profile B	
	0.25mm dia.	0.4mmP QFP	0.25mm dia.	0.4mmP QFP
S3X58-M500C-7				
Conventional Solder paste				
				
				

S3X58-M500C-7 ensures superior wetting to the leads and also complete coalescence on micro pads even under harsher reflow profile.



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

De-wetting

Test condition

- Material pieces : Nickel, Copper, ImSn
- Stencil thickness : 0.20mm (laser cut)
- Stencil aperture : 6.5mm diameter
- Heat source: Same as "Wetting test"

Preparation (Ni)

The nickel plates must be cleaned with acetone, dry with a mop, put them in a hydrochloride acid bath (1.75% in weight) for 2 min, then clean the acid with de-ionized water and air dry.

Store inside the oven in boiling de-ionized water for 5 minutes.

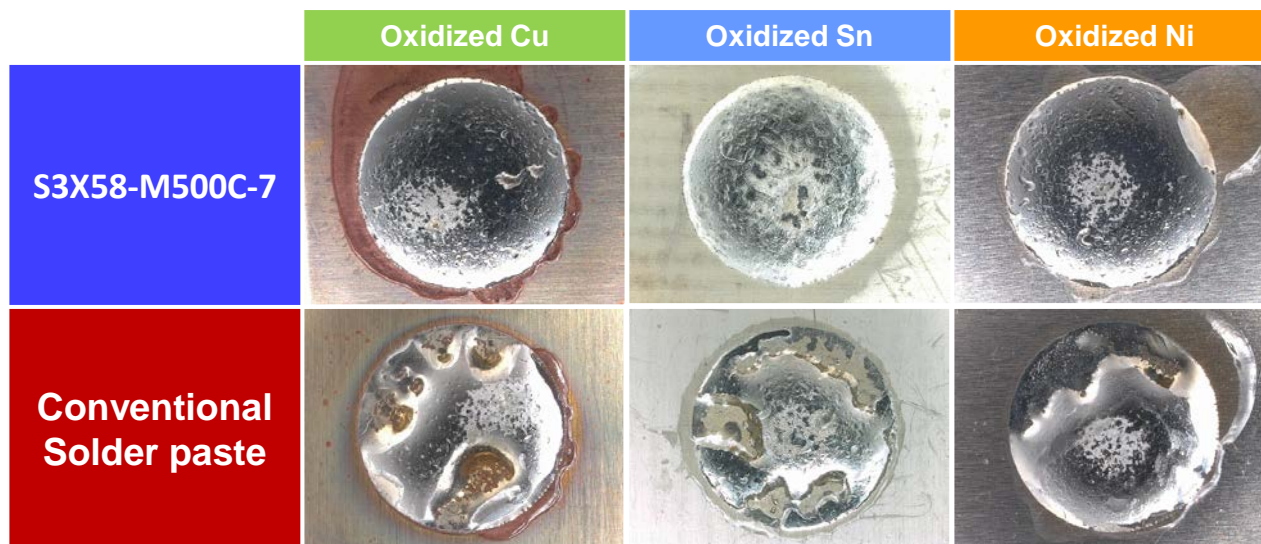
Preparation (ImSn)

Store inside the oven at 180°C (10 hrs).

Preparation (Cu)

The copper plates must be cleaned with acetone, dry with a mop, put them in a hydrochloride acid bath (1.75% in weight) for 5 min, and then clean the acid with de-ionized water and air dry.

Store inside the oven at 70°C in a pot of de-ionized water (70 %RH for 24 hrs).



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

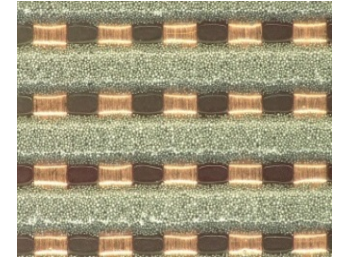
General Properties

Handling Guide

Coagulation property

Test conditions

- Stencil: 100um
- Substrate: Comb electrode coupon
IPC-B-25 (L/S:0.318/0.318mm; Cu)
- Reflow profile: Profile A, B *Refer to "Meltability"



Print solder pate across the tracks and observe coagulation property.

	Profile A		Profile B	
S3X58-M500C-7				
Conventional Solder paste				

S3X58-M500C-7 resulted with no solder balls with conventional reflow profile and very few solder balls with an harsher profile suggesting its suitability for over-print application.

Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

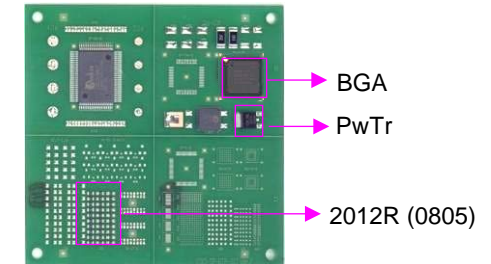
General Properties

Handling Guide

Voiding

Test condition

- Material : Glass epoxy FR-4
- Surface treatment : OSP, ImSn, ENIG
- Stencil thickness : 0.12mm (laser cut)
- Components : PwTr, 2012R (0805) 100% - Sn plated
BGA ball - SAC305, QFN Sn plated
- Heat source : Hot air convection
- Atmosphere : Air
- Reflow profile : Refer to "Meltability"



	Pwtr.	2012R	BGA
OSP	10.6%	5.0%	1.2%
ImSn	12.2%	4.3%	1.5%
ENIG	5.3%	7.8%	1.9%



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

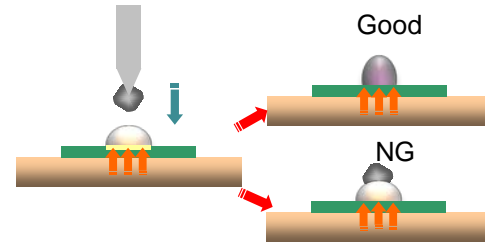
General Properties

Handling Guide

Anti-Head-in-Pillow property

Test condition

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Pad size : 0.8 x 0.8mm diameter
- Component: 0.76mm ball SAC305
- Stencil aperture : 100% aperture opening to pad
- Heat source : Solder pod 275°C
- mount interval: 10sec.



Drop a solder ball every 10 sec. after the solder paste has melted to see the heat durability of flux.

	30 sec.	40 sec.	50 sec.	60 sec.
S3X58-M500C-7	Complete merger 	Complete merger 	Complete merger 	Complete merger
Conventional solder paste	Complete merger 	Partial merger 	Partial merger 	Head-in-Pillow

S3X58-M500C-7 indicates much longer heat durability (up to 60 sec) as compared to a conventional solder paste (less than 40 sec.) once the solder paste started to melt. The result demonstrates that S3X58-M500C-7 effectively prevents the occurrence of head-in-pillow defects.



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

General properties

Item	Result	Method
Tack time	> 72 hours (>100g.f)	JIS Z 3284-3
Heat slump	0.3mm pass	JIS Z 3284-3 150°C-10min
Solder balling	Category	JIS Z 3284-4
Copper mirror corrosion	Type L	IPC-TM650-2.3.32
Copper plate corrosion	Pass	IPC-TM650-2.6.15
Voltage applied SIR	> 1E+9	IPC-TM650-2.6.3.3
ECM	No evidence of electrochemical migration	IPC-TM650-2.6.14.1



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Handling guide

1. Printing - 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 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 0~10°C: 6 months from the date of production

3. Note:

Clean the back of the stencil every 2 to 10 prints to prevent any print defect

* How to interpret lot number

ex. Lot No. 7 10 12 2

→	Batch number:	2 nd batch
→	Production date:	12th
→	Production month:	October
→	Production year:	2017



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

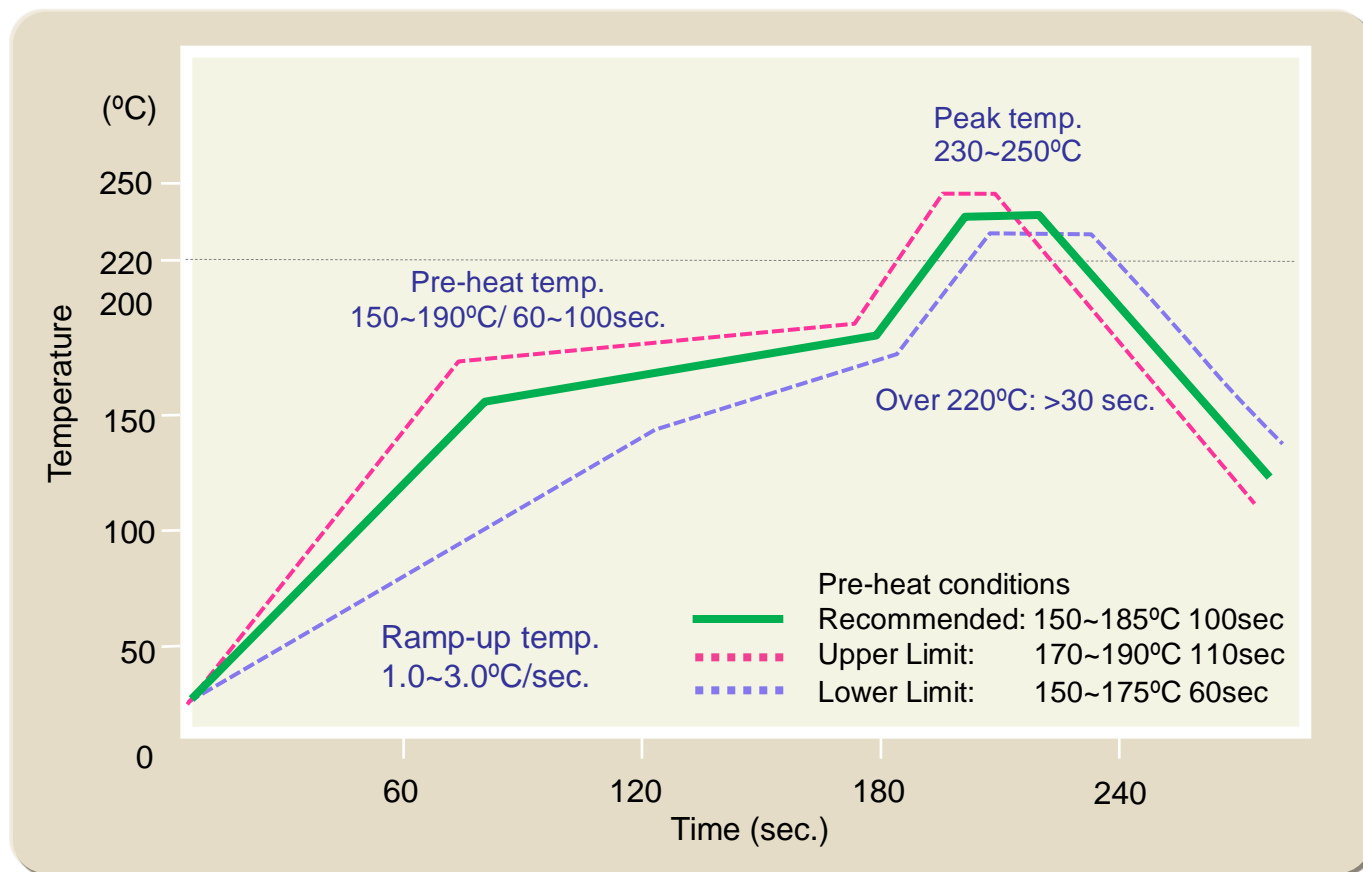
Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Handling guide – Recommended reflow profile



Contents

Features

Specification

Continual Printability

Intermittent Printability

Meltability

De-wetting

Coagulation Property

Voiding

Anti-Head-in-Pillow

General Properties

Handling Guide

Handling guide- Supplemental Information on Reflow Profile

