ECO+PLUS® series
Lead free SOLUTIONS you can TRUST

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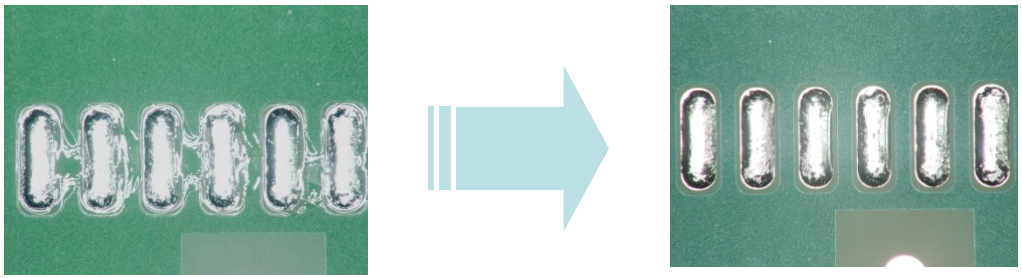
Ver. 49026E-0
2012.06.21

Contents

Koki no-clean & cleanable LEAD FREE solder paste

S3X58-A230

Product information



*Cleaned by Zestron Vigon A250

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

KOKI
CHALLENGING NEW TECHNOLOGIES

Contents

Product Features

- Solder alloy composition is **Sn Ag3.0 Cu0.5**
- Designed for both no-clean and **CLEANING** application
- **PERFECT MELTING** and wetting at fine pitch (0.4mm pitch) and micro components (0.25mm dia CSP, 1005 chip).
- Designed to prevent occurrence of **HIDDEN PILLOW DEFECTS**.

Specifications

Application		Printing – Stencil
Product		**S3X58-A230**
Alloy	Composition (%)	Sn Ag3.0 Cu0.5
	Melting point (°C)	217 – 219
	Shape	Spherical
	Particle size (μm)	20 – 38
Flux	Halide content (%)	0.06 ± 0.01
	Flux type*3	ROL1
Product	Flux content (%)	12.0 ± 0.5
	Viscosity*1 (Pa.S)	170 ± 20
	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 25ºC 10rpm
2. Copper plate corrosion : In accordance with JIS
3. Flux type : According to IPC J-STD-004A

Specifications – Alloy selections

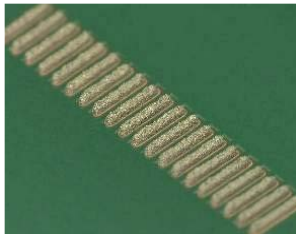
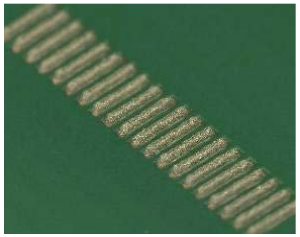
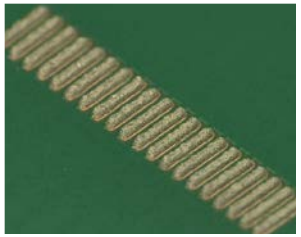
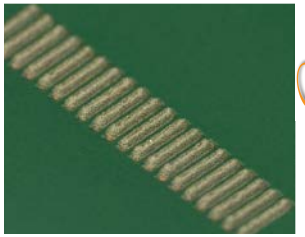
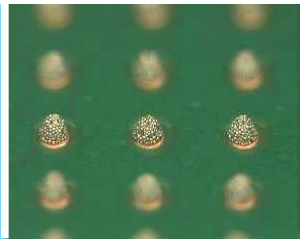
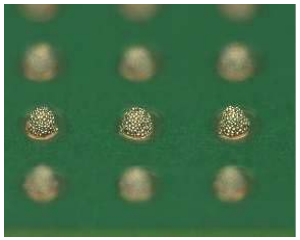
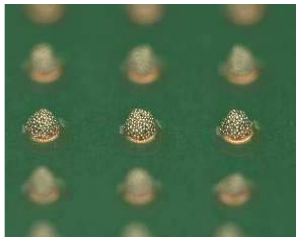
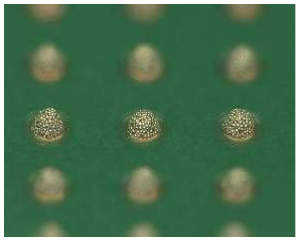
S3X - 58 - A230

- S3X: Alloy composition
- 58: Particle size
- A230: Flux number

Alloy composition (%)	**S3X** : Sn Ag3.0 Cu0.5
Particle size（μm)	**58** : 20 ~ 38
Flux number	Solids and solvent used

Continual printability

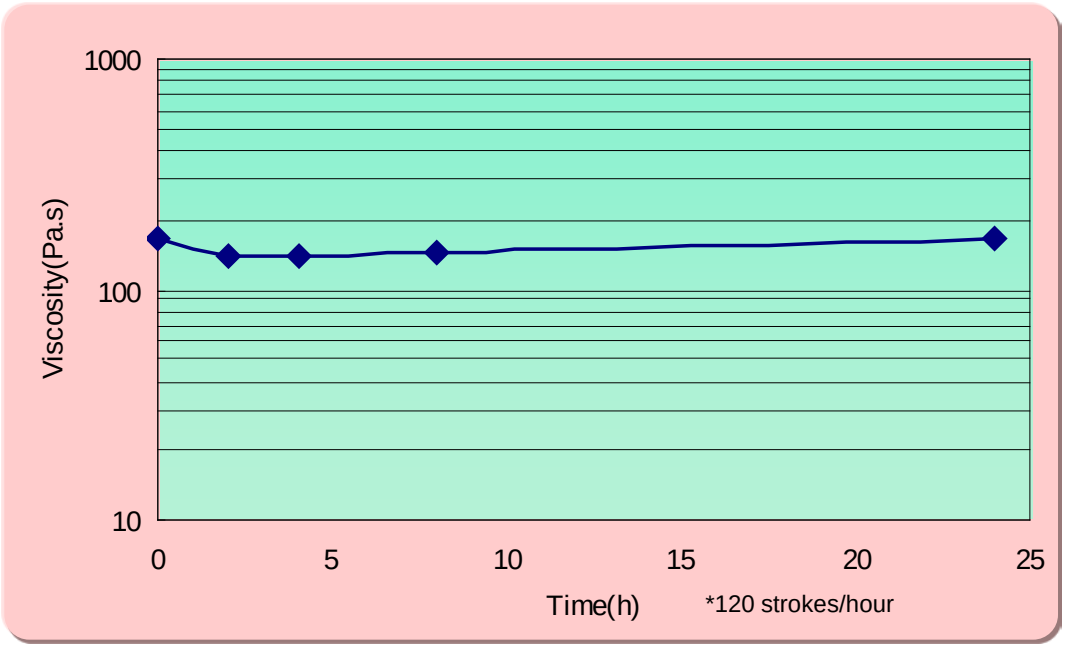
Print parameters		Test patterns	
Stencil :	0.12mm thickness, laser cut stencil	1. QFP pad pattern :	Width 0.2 mm
Printer :	Model Yamaha YVP-Xg		Length 1.5 mm Distance 0.2 mm
Squeegee :	Metal blade, Angle - 60°	2. MBGA pad pattern :	Diameter 0.25 mm
Print speed :	40 mm/sec		
Stencil separation speed :	10.0 mm/sec		
Atmosphere :	24.5~25.5° C (50~60%RH)		

	1st ;print	10th print	1st print after 200 strokes	10th print after 200 strokes
QFP pattern (0.4mm pitch)				
MBGA Pad pattern (0.25mm dia.)				

Contents

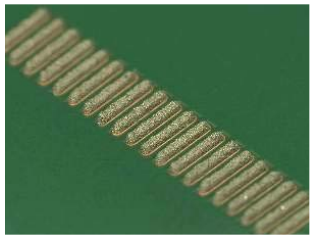
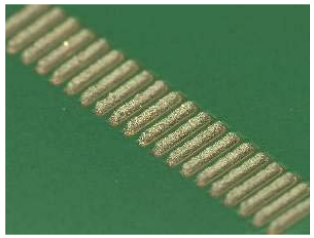
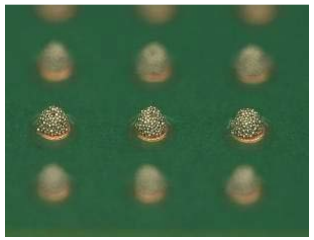
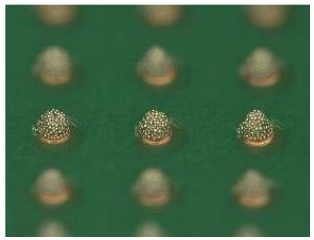
Viscosity variation in continual printing

- Print (knead) solder paste on the sealed-up stencil continually up 2880 strokes and observe viscosity variation.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 23.0~26.0°C, 50~60%RH



Intermittent printability (Stencil idle time)

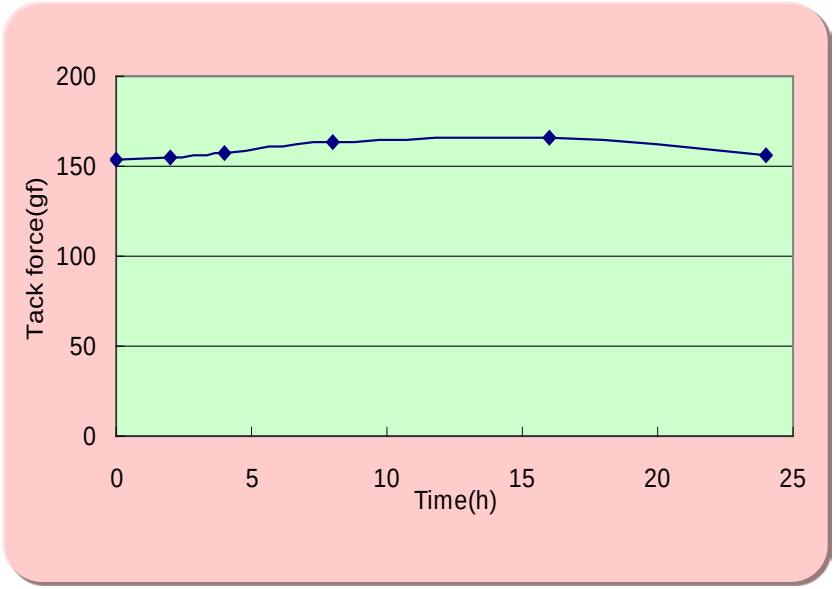
- Print solder paste continuously and stop to idle the paste for 60 min. intervals, and resume the printing and observe the 1st print result to verify intermittent printability.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 40mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26°C, 40~60%RH
- Test pattern : QFP pad pattern - Width 0.25 mm Length 1.5 mm Distance 0.2 mm
  MBGA pad pattern - Diameter 0.25 mm

	1st print	1st print After 60 min.
QFP pattern (0.4mm pitch)		
MBGA Pad pattern (0.25mm Diameter)		

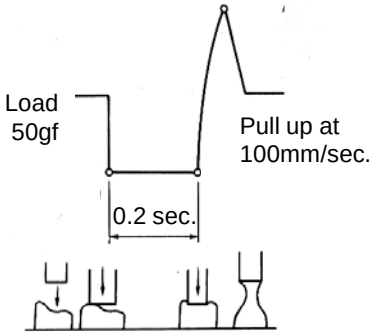
Newly developed additives provide a lubricating effect that greatly improve the paste release properties and assures excellent print quality with microBGA.

Tack time

- Stencil : 0.2mm thick, 0.6mm dia. aperture
- Measurement instrument : Malcom tackimeter TK-1
- Probe pressure : 50gf
- Pressurizing time : 0.2sec
- Pull speed : 10mm/sec.
- Test method : In accordance with JIS Z 3284
- Test environment : 24~26°C, 40~60%RH



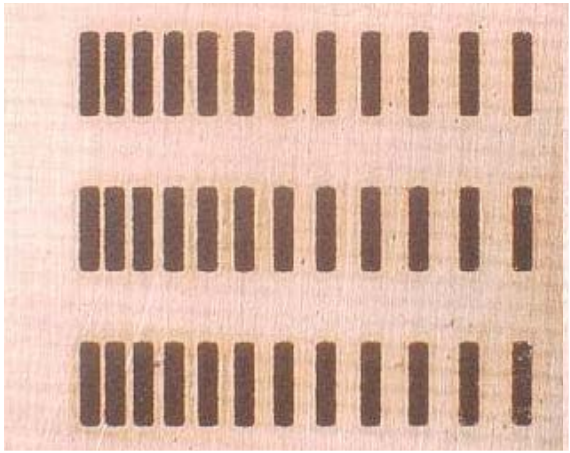
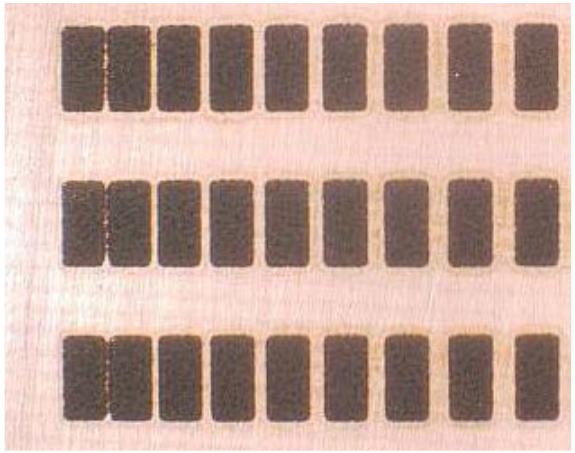
Tensile strength = Tack force



Unique solvent system successfully assures sufficient tack time.

Heat slump

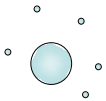
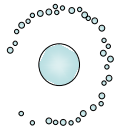
- Stencil thickness : 0.2mm
- Stencil aperture : Pattern (1) 3.0mm × 0.7mmm
  Pattern (2) 3.0mm × 1.5mm
- Spacing between apertures: 0.2mm to 1.2mm
- Heat profile : 180ºC × 5min.

Pattern (1)	Pattern (2)
	
No merge at 0.2mm	No merge at 0.3mm

Improved heat slump property assures reduced soldering defects, such as solder beading and bridging.

Solder balling (Residue cosmetics)

- Stencil : 0.2mm thick
- Stencil aperture : 6.5mm diameter
- Solder pot temperature : 250ºC
- Test method : In accordance with JIS Z 3284

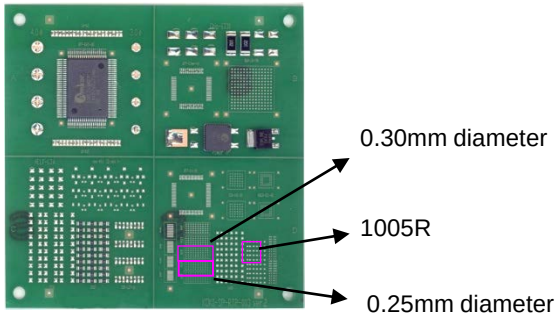
Category 1	2	3	4
			

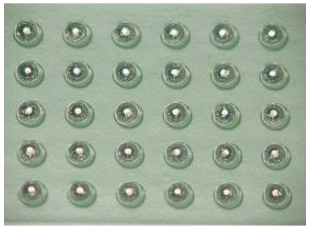
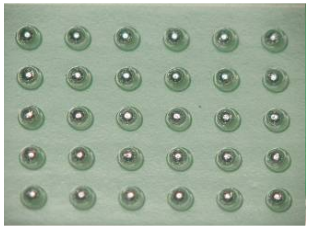
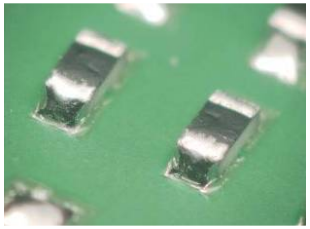
1 hour after printing	24 hour after printing
	
Category 3	Category 3

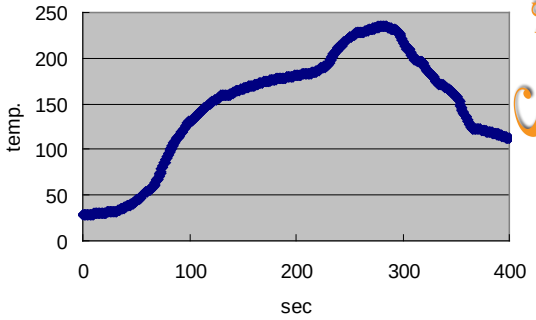
Contents

Fine pattern wetting

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Pad size : 0.30mm, 0.25mm diameter
- Component: 1005 chip, (Sn Plated)
- Stencil aperture : 100% aperture opening to pad
- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones
- Atmosphere : Air
- Reflow profile : See below



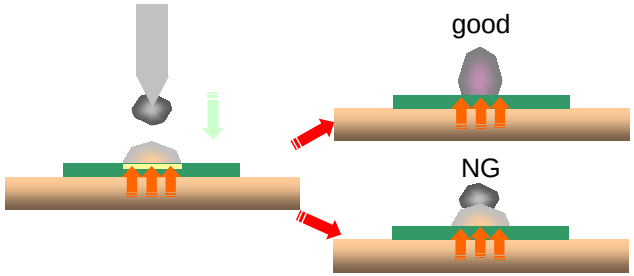
0.30mm diameter	0.25mm diameter	1005 chip pattern
		



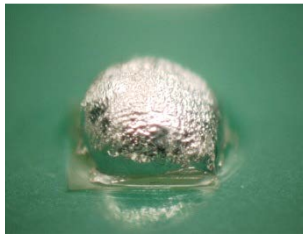
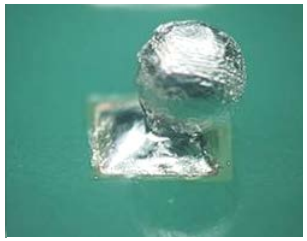
Larger relative surface areas of solder paste exposed due to miniaturization of components (CSP, 0603 chips), often cause incomplete melting due to excess oxidation during the reflow. An improved flux formula ensures complete coalescence by minimum deterioration of barrier performances .

Anti-Pillow test

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



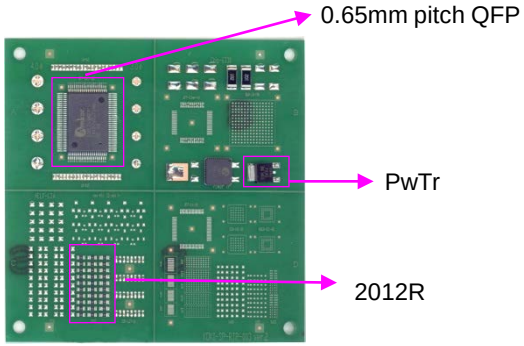
Drop solder ball every 10 sec. after the solder paste has melted to see heat durability of flux.

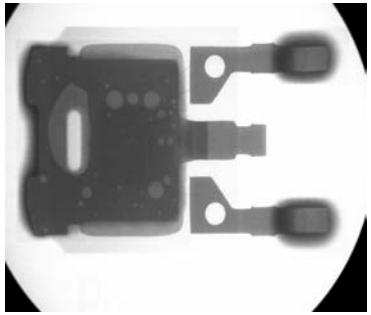
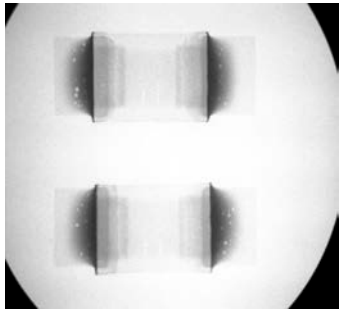
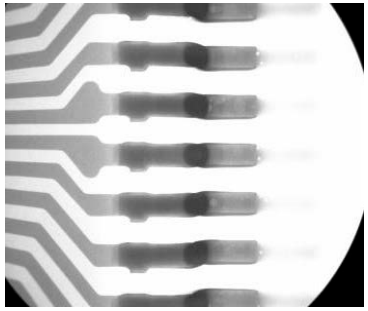
	10sec	30sec	50sec
S3X58-A230			
Conventional paste (ROL0)			

S3X58-A230 indicated heat durability to 50sec., while the conventional solder paste lost activation less than 30 sec. since the solder paste started melting.

Voiding

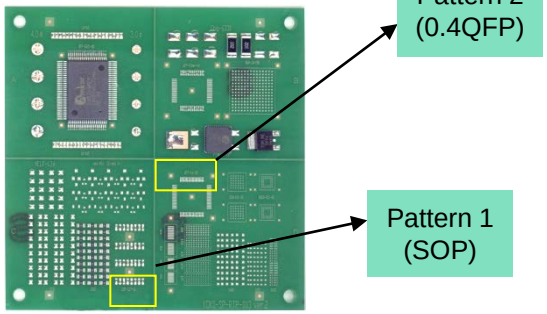
- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Stencil aperture : 100% aperture opening to pad
- Components 0.65mm pitch QFP: PwTr, 2125R, 0.65mm pitchQFP 100% Sn plated
- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones
- Atmosphere : Air
- Reflow profile : Same as *" Fine pattern wetting"*

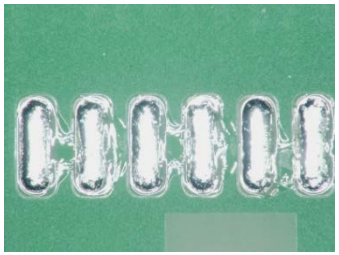
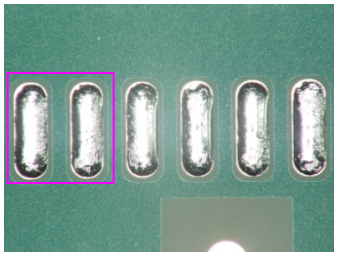
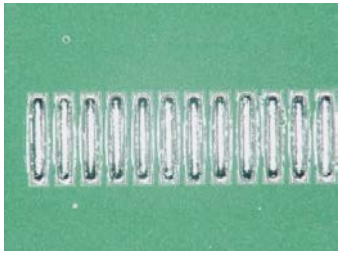
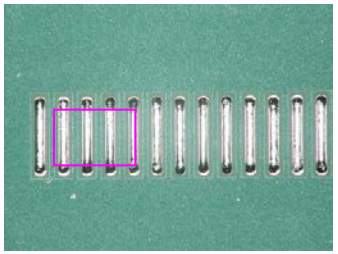
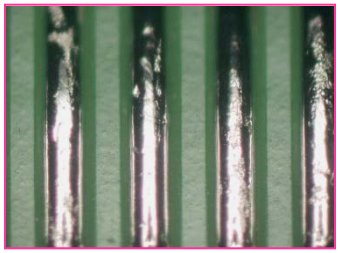


	PwTr	2012R	0.65QFP
S3X58-A230			

Cleaning

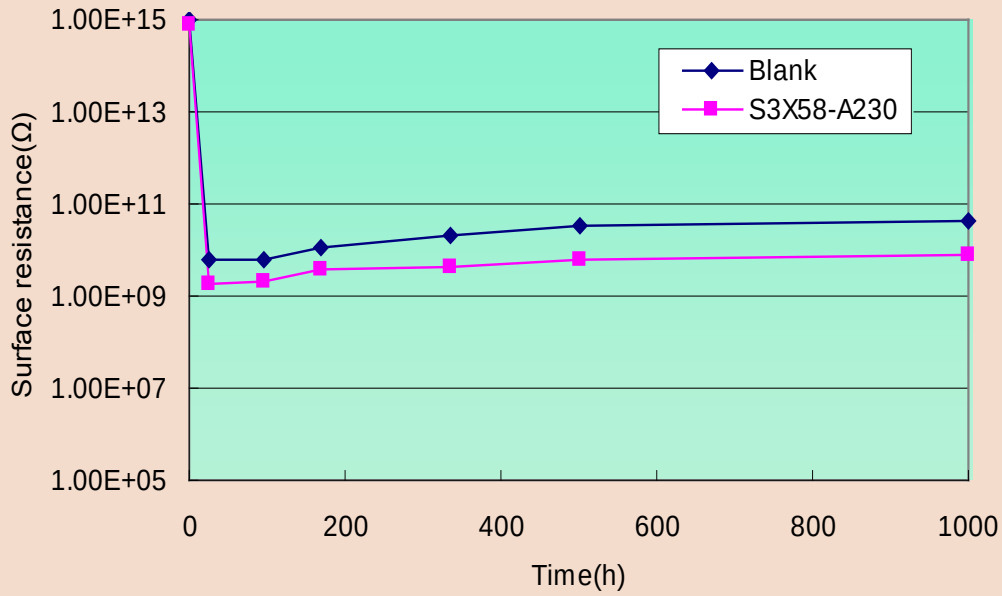
- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Stencil aperture : 100% aperture opening to pad
- Confirmative pattern: SOP, 0.4mm pitch QFP
- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones
- Atmosphere : Air
- Reflow profile : Same as *"Fine pattern wetting"*
- Cleaning method: Dipping and stirring for 4 mins in Vigon A250



	Before Cleaning	After Cleaning	
Pattern 1 (SOP pattern)			
Pattern 2 (QFP pattern)			

Voltage applied surface insulation resistance

- Test conditions : 85±2ºC × 83~87%RH × 1000 hours
- Stencil thickness : 100 micron
- Comb type electrode : JIS type-II
- Measurement voltage : DC100V
- Voltage applied : DC50V
- Test method : JIS Z 3197



No evidence of electromigration can be observed.

Handling guide

1. Printing
  1) Recommended printing parameters
    (1) Squeegee
      1. Kind : Flat
      2. Material : Rubber or metal blade
      3. Angle : 60~70º (rubber) or metal blade
      4. Pressure : Lowest
      5. Squeegee speed : 20~80mm/sec.

    (2) Stencil
      1. Thickness : 150~100μm 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 : 22~25ºC
      2. Humidity : 40~60%RH
      3. Air draft : Air draft in the printer badly affects stencil life and tack performance of solder pastes.

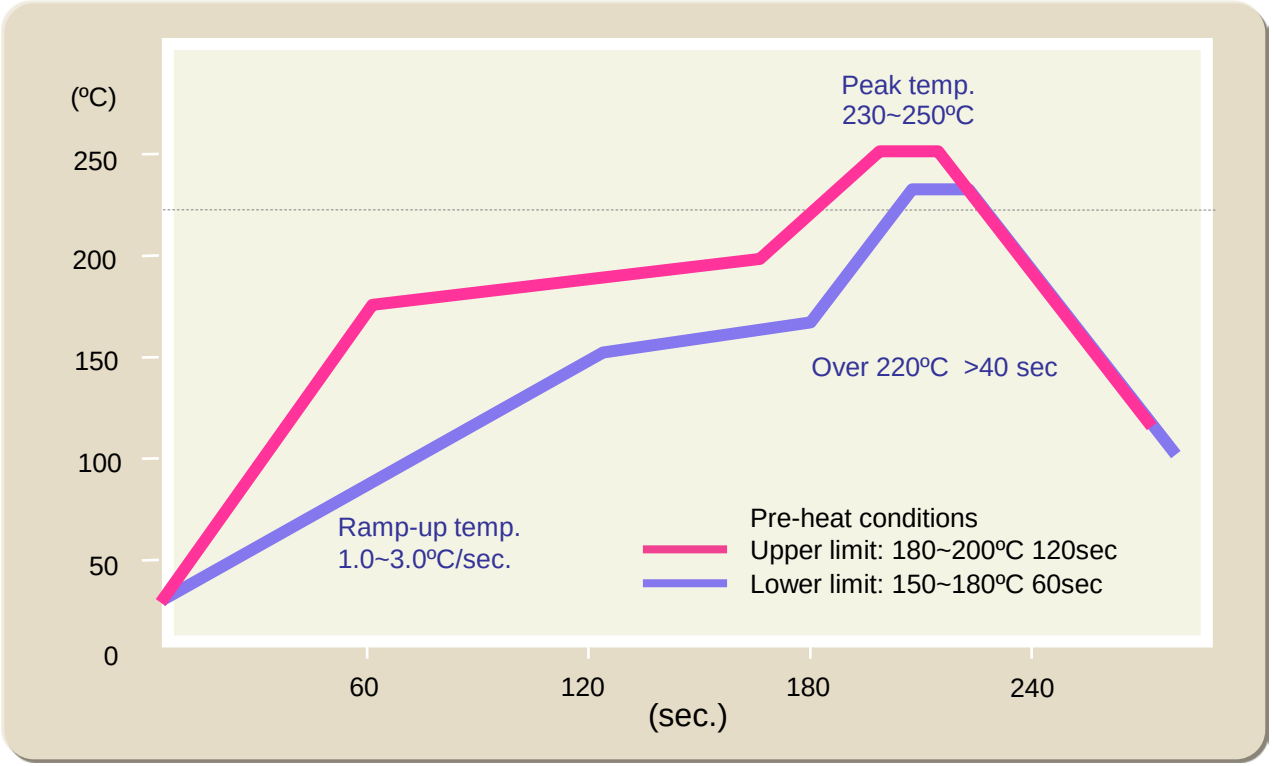
2. Shelf life
    0~10ºC : 6 months from manufacturing date

* Manufacturing date can be obtained from the lot number

ex. **Lot No. 2 06 19 2**

- **No. of lot : 2nd**
- **Date : 19th**
- **Month : June**
- **Year : 2012**

Handling guide - Recommended reflow profile



Excessive pre-heating (time & temperature) may cause excessive oxidation the solder paste, components and substrate.

Relatively short and low pre-heat may be recommendable, especially for fine pitch/micro pattern components .