

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

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Powerful Wetting Lead Free Solder Paste **S3X58-M500C-5**

Product information



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



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Product features

- Solder alloy composition is **Sn 3.0Ag 0.5Cu** (SAC305)
- **EXCELLENT WETTING** to severely oxidized patterns or components, such as oxidized Cu substrate, oxidized Sn and NiPd plating.
- **PERFECT MELTING** and wetting at super fine pitch (>0.4mm pitch) and micro components (>0.25mm dia CSP, 0603 chip).
- Specially formulated flux chemistry ensures **EXTREMELY LOW VOIDING** with CSPs and broad contact area components, e.g. QFN.
- Designed to prevent occurrence of **HIDDEN PILLOW DEFECTS**.
- Enables **REUSE** of leftover from previous day. Economical.



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Application		Printing - Stencil
Product		S3X58-M500C-5
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	ROL0*3
Product	Flux Content (%)	11.5±1.0
	Viscosity*1 (Pa.s)	220±30
	Copper plate corrosion*2	Passed
	Tack Time	> 48 hours
	Shelf Life (below 10°C)	6 months
	Optional powder (µm)	20 – 45; Product code S3X48-M500C-5

*1. Viscosity :

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

*2. Copper plate corrosion :

In accordance with IPC J-STD-004

*3. Flux type :

According to IPC J-STD-004



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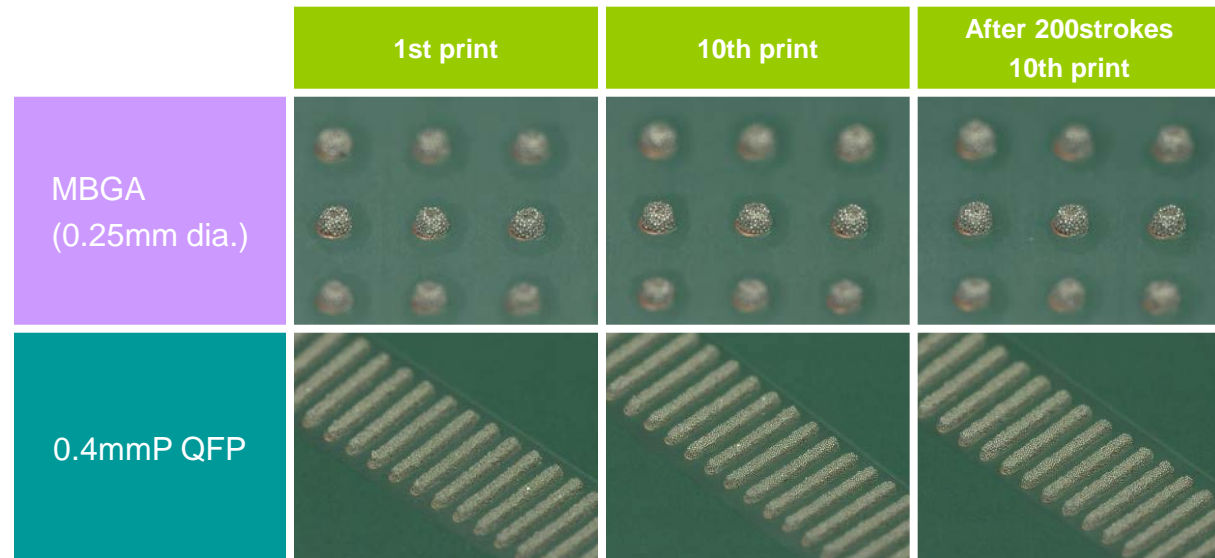
Other properties

Handling guide

Continual printing

Test condition:

- Stencil : 0.12mm thickness, laser cut stencil
- Printer : Model YVP-Xg YAMAHA Motor
- Squeegee : Metal blade, Angle - 60°
- Print speed : 40 mm/sec
- Atmosphere : 24~26 °C (50~60%RH)
- Test pattern : 0.4mmP QFP pad pattern - Width 0.20 mm Length 1.5 mm Distance 0.2 mm
BGA pad pattern - Diameter 0.25mm



Newly developed additives provide a lubricating effect that greatly improves the paste release properties and assures excellent print quality with micro-BGA, even at high printing speeds.



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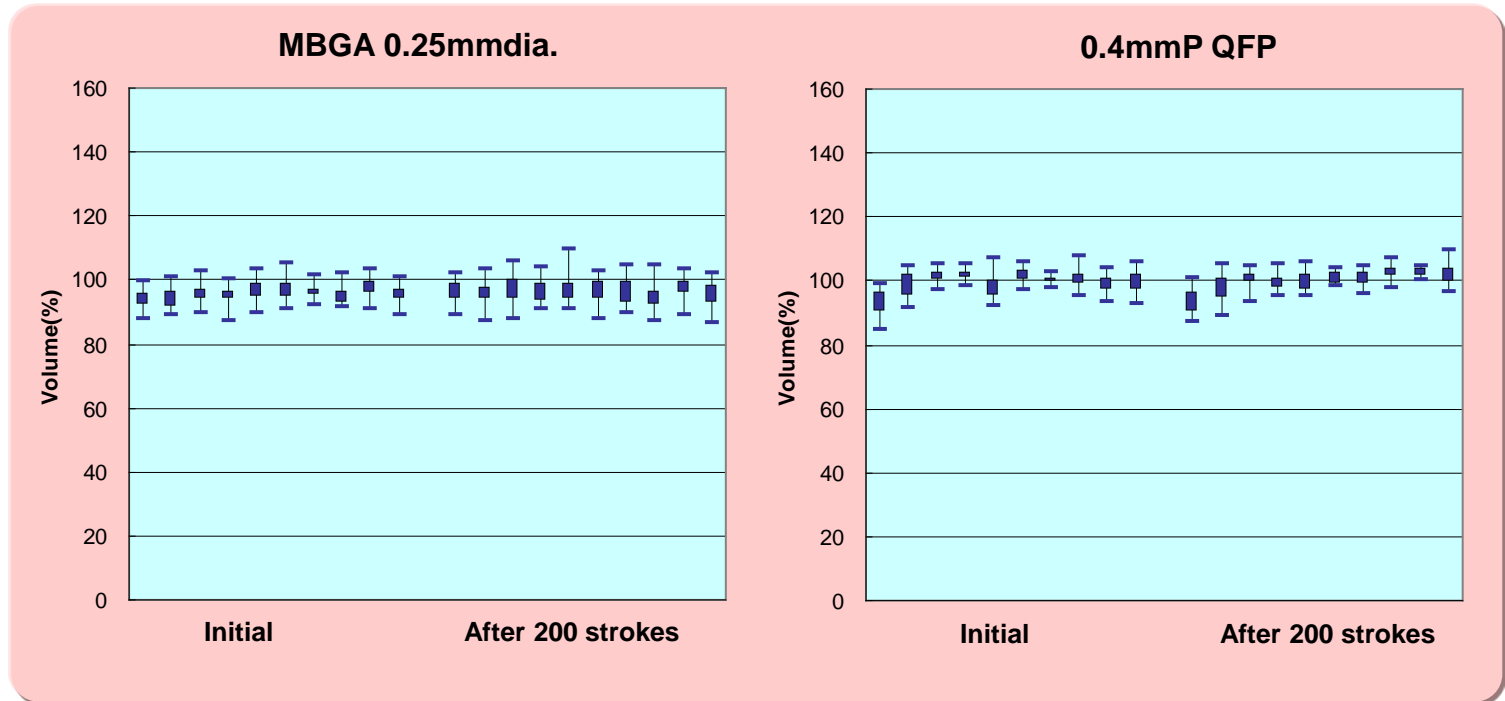
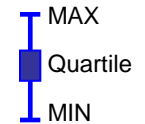
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Continual printing (SPI DATA)

- SPI: KOHYOUNG aSPIre



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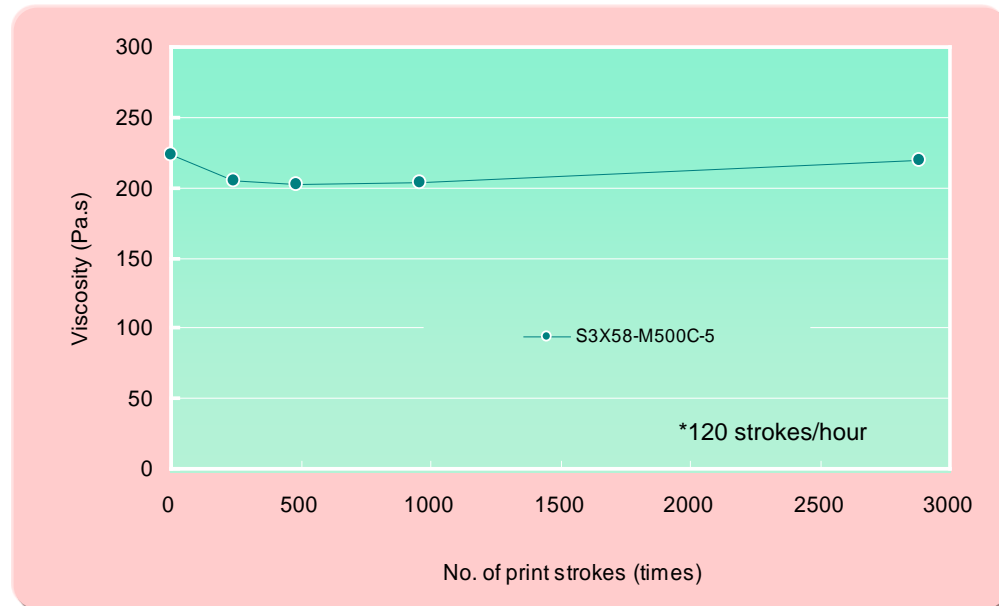
Other properties

Handling guide

Viscosity variation

Test condition

- Print (knead) solder paste on the sealed-up stencil continually up for 24 hours to observe viscosity variation.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26°C, 40~60%RH



A newly developed flux formula has succeeded in delivering consistent long term printability by preventing excessive viscosity drop due to shear thinning. Furthermore excessive increase of viscosity due to the chemical reaction between solder powder and flux during print rolling, is also eliminated.



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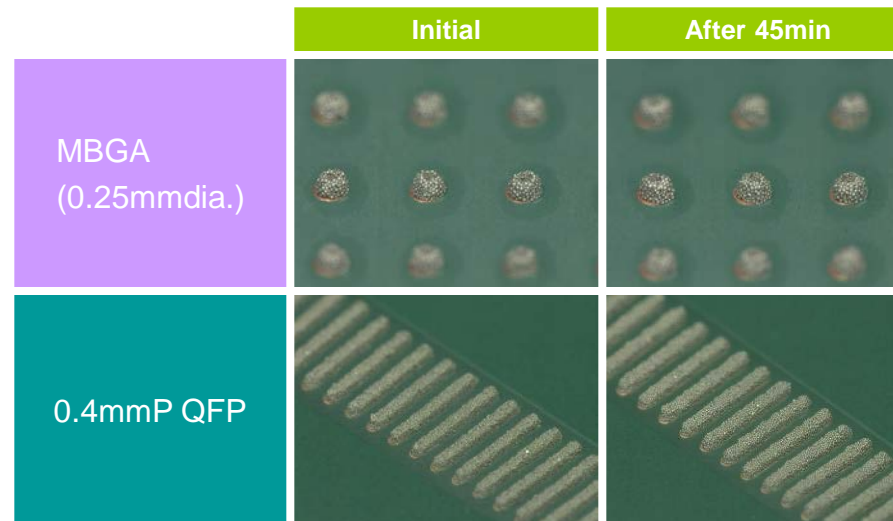
Handling guide

Intermittent printability (Stencil idle time)

Print solder paste continuously and stop to idle the paste for 45min. intervals, and resume the printing and observe the 1st print result to verify intermittent printability.

Test condition

- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 40mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26°C, 40~60%RH
- Test pattern : 0.4mmP QFP pad pattern - Width 0.20 mm Length 1.5 mm Distance 0.2 mm
MBGA pad pattern - Diameter 0.25mm



Unique solvent formulation system assures extremely long stencil idle time, eliminating printing faults and improving the process window and production yields.



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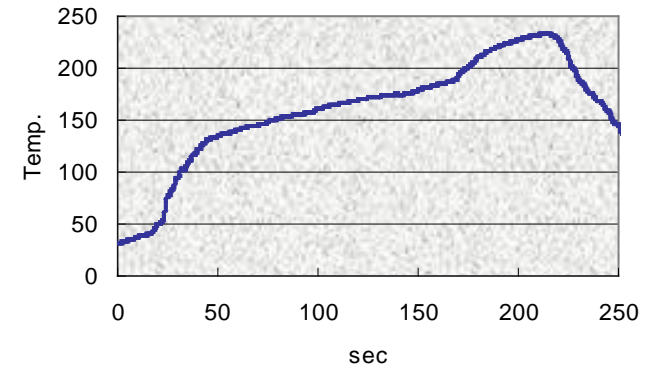
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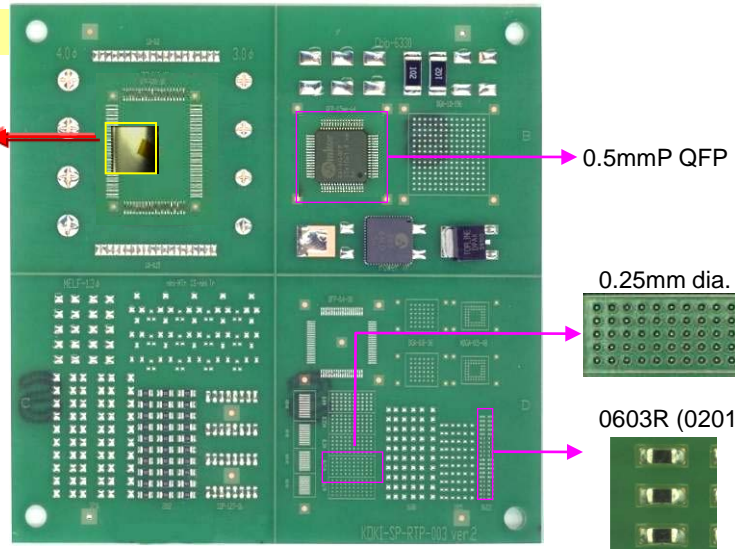
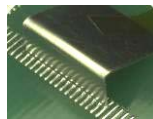
Wetting test

Test conditions

- Material : Glass epoxy FR-4
- Surface treatment : OSP, ImSn (Pre-reflowed x 2 times), Ni/Au
- Stencil thickness : 0.12mm (laser cut)
- Pad size : 0.25mm diameter
- Component: 0603R (0201) chip (100%Sn)
0.5mmP QFP(Ni-Pd)
Ni plate
- 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 the reflow profile on the right



Wetting to Ni plate



Convection reflow oven



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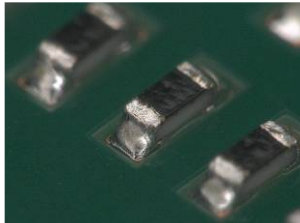


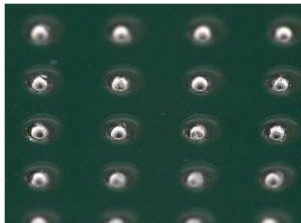
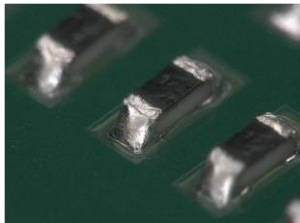
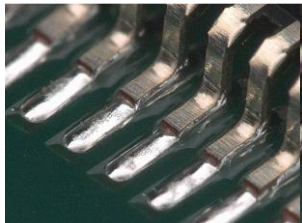

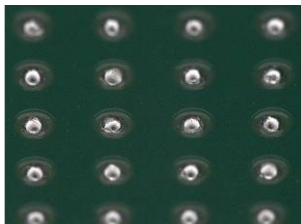
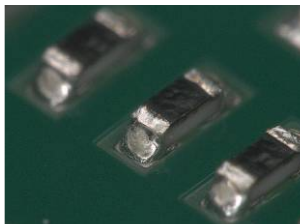


Anti-pillow

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Wetting test

	MBGA (0.25mmdia.)	0603R (0201)	0.5mmP QFP (NiPd)	Ni plate
OSP				
ImSn (Pre-reflowed x 2 times)				
Au				

Generally, S3X58-M500C-5 indicated good coalescence with super fine patterns as well as large pads. It showed good meniscus/wetting to a Ni plate (simulation test to QFP component) while a competitive product had lesser results.



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Wetting test – Solder dewetting

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.

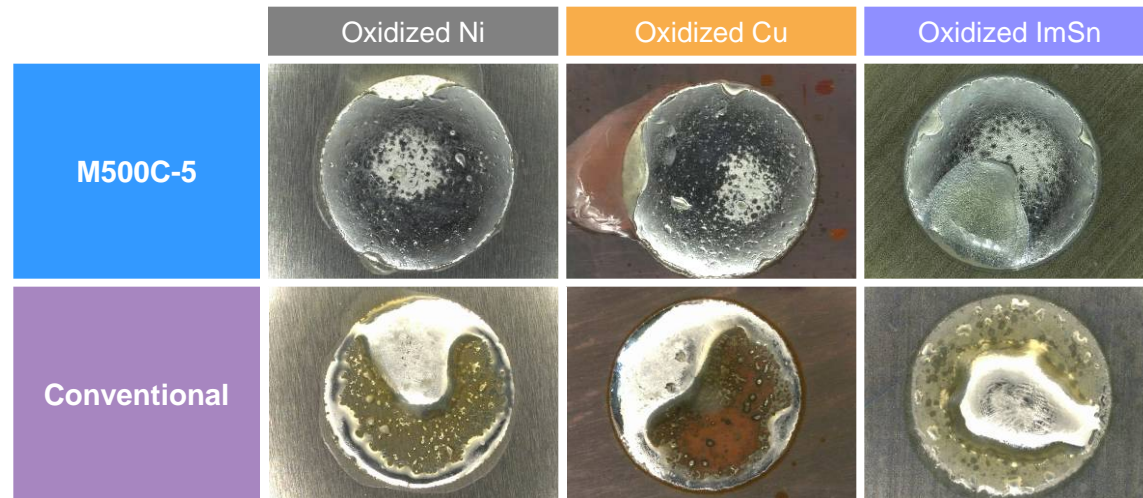
Preparation (ImSn)

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).



S3X58-M500C-5 secures good solder spreading even on the oxidized Ni ,Cu plates and ImSn plates.



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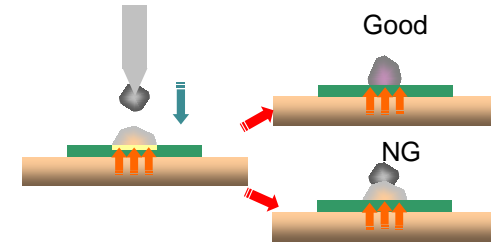
Other properties

Handling guide

Anti-pillow test

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.



Pillow defect

	30sec	40sec	50sec
M500C-5			
Conventional solder paste			

S3X58-M500C-5 indicates much longer heat durability up to 50sec., while the conventional solder paste lost activation in less than 30 sec. once the solder paste had started to melt. The results demonstrates that S3X58-M500C-5 effectively prevents the occurrence of head-in-pillow defects.



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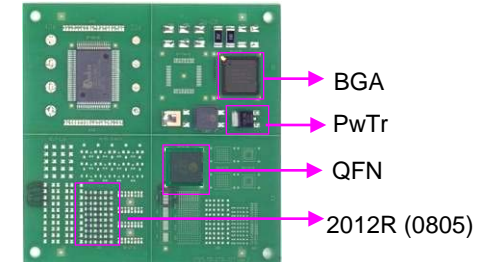
Other properties

Handling guide

Voiding

Test condition

- Material : Glass epoxy FR-4
- Surface treatment : OSP, ImSn, NiAu
- 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 : Same as "Wetting test"



Surface finish	Pwtr.	QFN	2012R(0805)	BGA
OSP				
ImSn				
NiAu				



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Item	Result	Method
Tack time	> 48 hours	JIS Z 3284
Heat slump	0.4mm pass	JIS Z 3284
Solder balling	< Category 3	JIS Z 3284
Copper mirror corrosion	Type L	IPC-JSTD-004
Copper plate corrosion	Pass	IPC-JSTD-004 JIS Z 3194
Voltage applied SIR	> 1E+9	IPC-JSTD-004 JIS Z 3194



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1. Printing

1) Recommended printing parameters

(1) Squeegee

- 1. Kind : Flat
- 2. Material : Rubber or metal blade
- 3. Angle : 60~70° (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 : 23~27°C
- 2. Humidity : 40~60%RH
- 3. Air Flow : Excessive air flow in the printer badly affects stencil life and tack performance of solder pastes.

2. Shelf life

0~10°C : 6 months from manufacturing date

* Manufacturing date can be obtained from the lot number

ex. Lot No. 3 03 06 2

- No. of lot : 2nd
- Date : 6th
- Month : March
- Year : 2013



Handling guide - Recommended reflow profile

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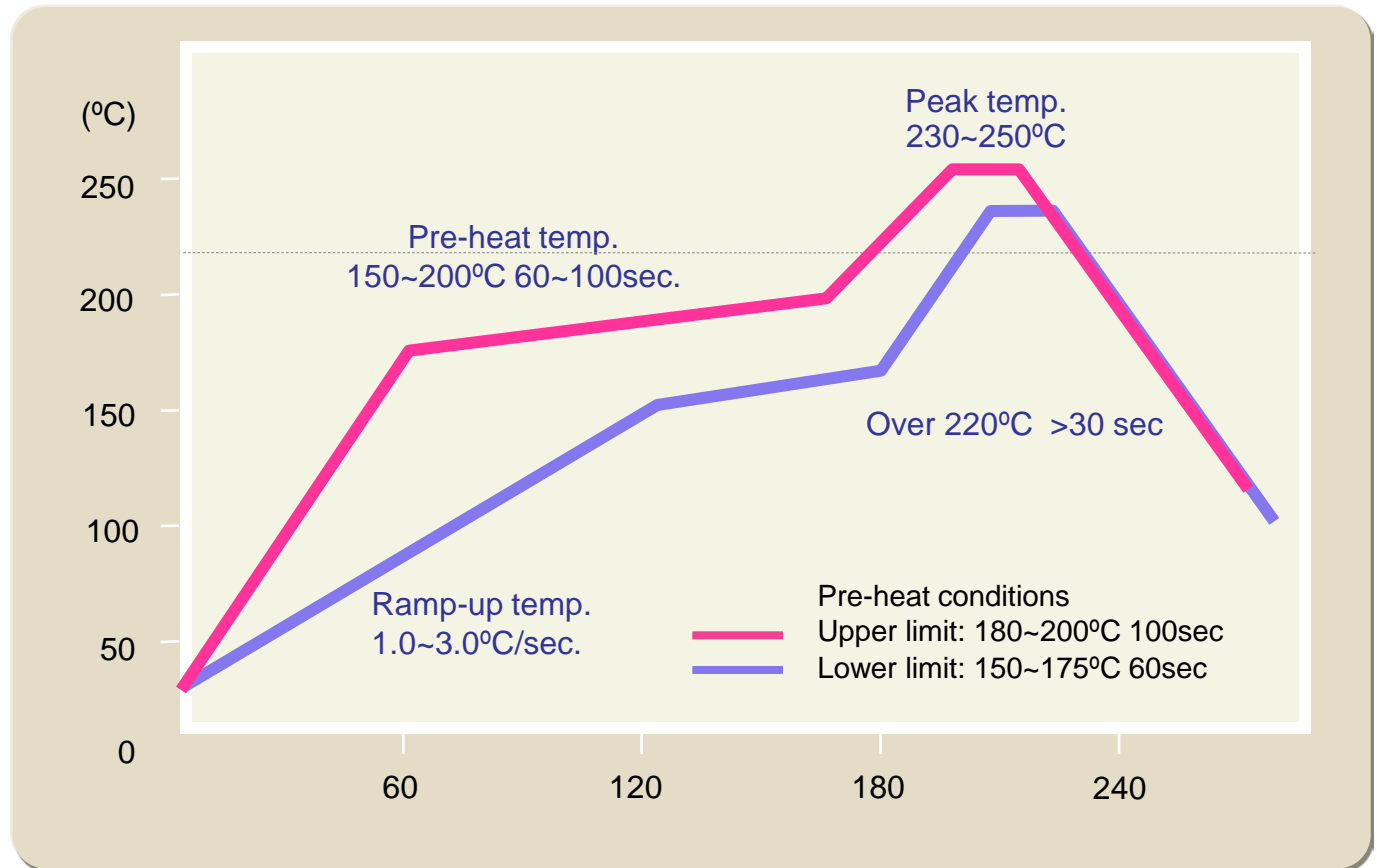
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