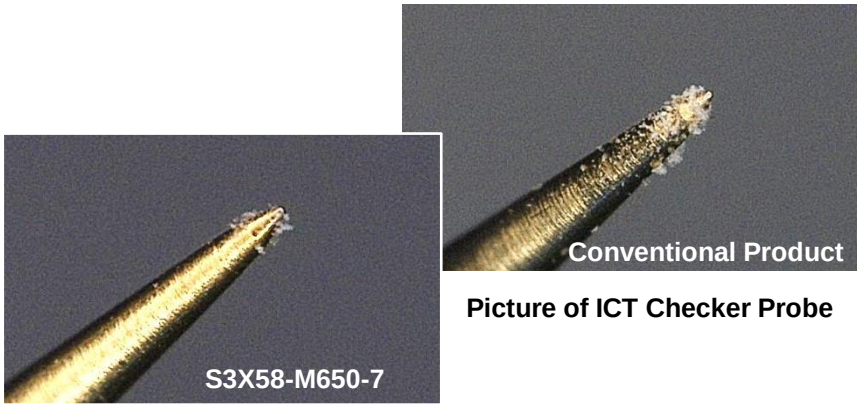
Koki no-clean LEAD FREE solder paste

Contents

ICT Compatible Lead Free Solder Paste

S3X58-M650-7

Product Information



Picture of ICT Checker Probe

The product performances contained in this Technical Information are assessed strictly according to the test procedures and may not be compatible with results at the end-users. Please conduct thorough investigation to determine optimal process condition before mass production application.

Contents

Features

- Alloy Composition: Sn 3.0Ag 0.5Cu
- Specially designed flux for improved performance on In-Circuit Testing (ICT)
- Low void occurrence on Area Array Package components such as BGA
- Displays good meltability on 0.25mm φ and 0603 chip component
- Complies with Halogen Free Standard (Br+Cl:<1500ppm) per BS EN 14582

Contents

Specifications

Application		Printing
Product Name		**S3X58-M650-7**
Alloy	Alloy Composition (%)	**Sn 3.0Ag 0.5Cu**
	Melt Point (ºC)	217~219
	Shape	Sphere
	Grain Size (um)	20–38
Flux	Halide Content (%)	0
	Flux Type	ROL0*1
Solder Paste	Flux Content (%)	11.5±1.0
	Viscosity (Pa.s)	200±30*2
	Copper Plate Corrosion	Passed*3
	Tack Time	> 48 hours
	Shelf Life (10ºC)	6 months

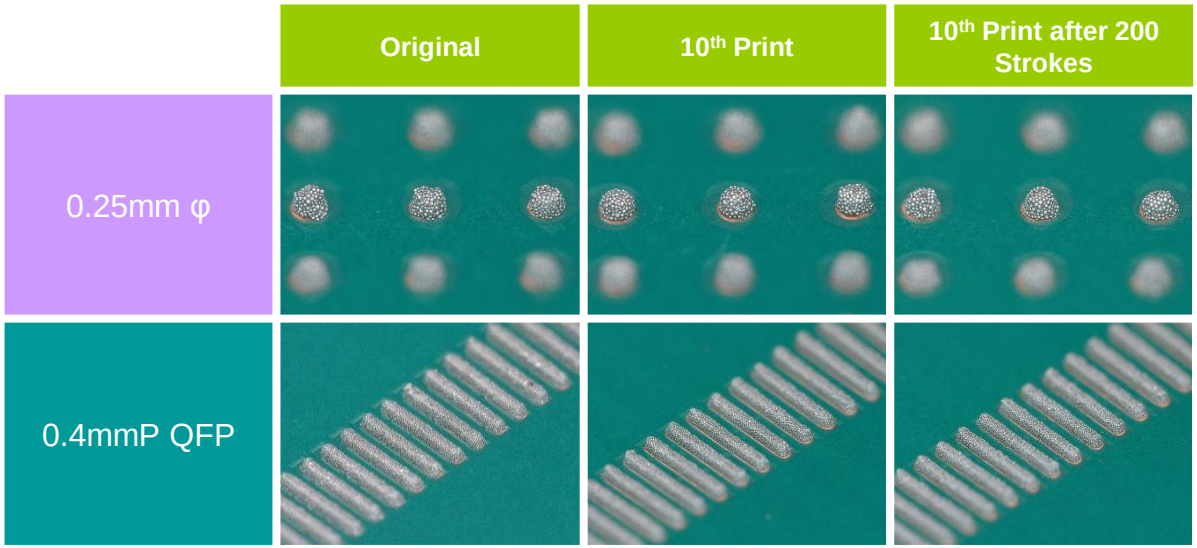
*1. Flux Type: In compliance with IPC J-STD-004B
*2. Viscosity: Measured at 25ºC-10rpm by Malcom PCU-205
*3: Copper Plate Corrosion: In compliance with IPC-TM-650-2.6.15

Contents

Continual Printability

Test conditions:

- Stencil Thickness: 0.12mm (Laser)
- Printer: Model YVP-Xg YAMAHA Motor
- Squeegee: Metal Squeegee (Squeegee Angle - 60º)
- Print Speed: 40 mm/sec
- Printing Environment: 24~26ºC (50~60%RH)
- Tested Patterns: 0.25 mmφ,0.4mmP QFP



Stable solder prints were obtained from the original print to after 200 strokes.

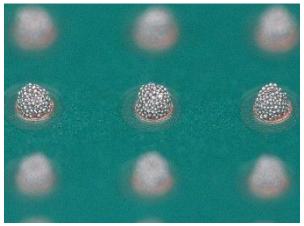
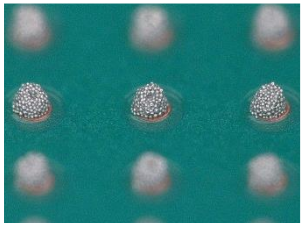
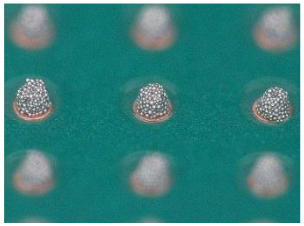
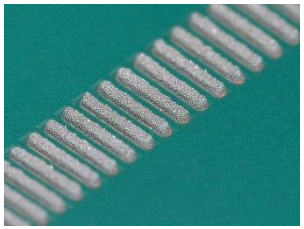
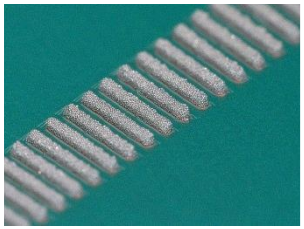
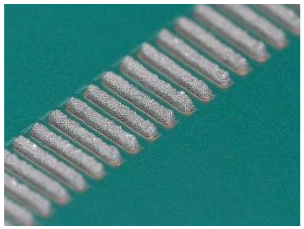
Contents

Intermittent Printability

Test method:

Pause printing for 30 to 60 minutes, and then resume printing. Verify the print profile on the 1st print result to evaluate intermittent printability.

- Stencil Thickness: 0.12mm (Laser)
- Squeegee: Metal Squeegee (Squeegee Angle - 60º)
- Print Speed: 40mm/sec.
- Print Stroke: 300mm
- Printing Environment: 24~26ºC, 40~60%RH
- Tested Patterns: 0.25 mmφ, 0.4mmP QFP

	Original	1st after 30 min. Pause	1st after 60 min. Pause
0.25mm φ			
0.4mmP QFP			

S3X58-M650-7 performs good intermittent printability up to 60 minutes pause.

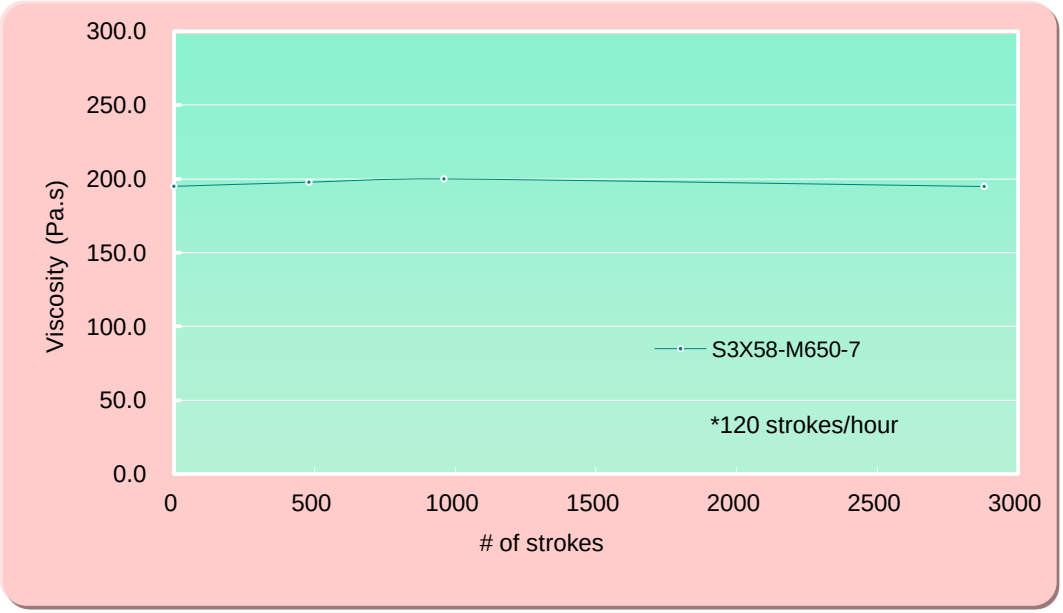
Contents

Viscosity Change Property

Test method:

Mask the metal stencil and conduct continual rolling shear. Measure the viscosity after predetermined number of strokes.

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



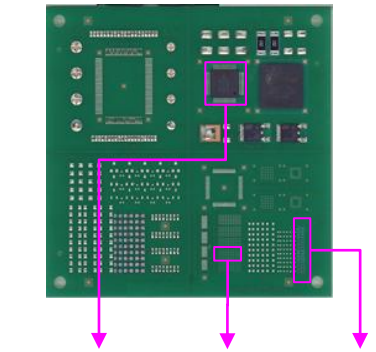
S3X58-M650-7 showed almost no viscosity change by rolling shear. It has good viscosity retention property.

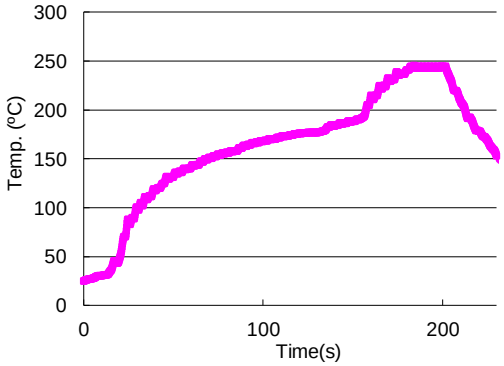
Contents

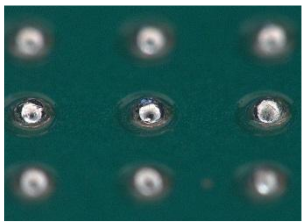
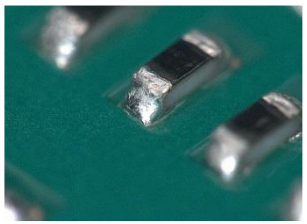
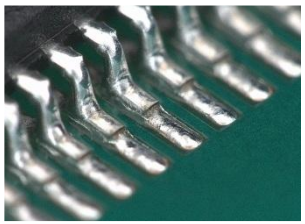
Meltability

Test conditions:

- Test Board: Glass Epoxy FR-4
- Surface Treatment: OSP
- Stencil Thickness: 0.12mm (Laser)
- Evaluated Locations: 0.25mm φ ,
  0.5mmP QFP (Sn plating)
  0603R (Sn plating)
- Aperture: 100%
- Reflow: Hot Air Oven
- Atmosphere: Air Atmosphere
- Reflow Profile: See the chart to the right





	0.25mmφ	0603R	0.5mmP QFP
S3X58-M650-7			

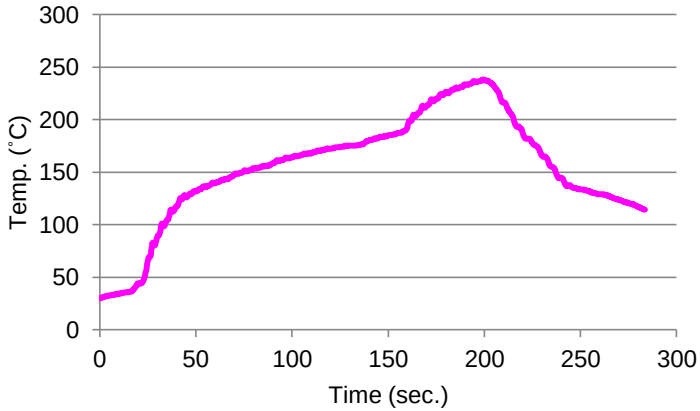
Even though S3X58-M650-7 is halogen free, it can be observed that the paste has wetted well on various different components and lands tested.

Contents

Meltability（Dewetting Test）

Test conditions:

- Tested Substrate : Cu, Sn, Ni, Brass
- Stencil Thickness: 0.20mm (Laser)
- Aperture: 6.5mmφ
- Reflow: Hot Air Oven
- Atmosphere: Air Atmosphere
- Reflow Profile: See the chart to the right



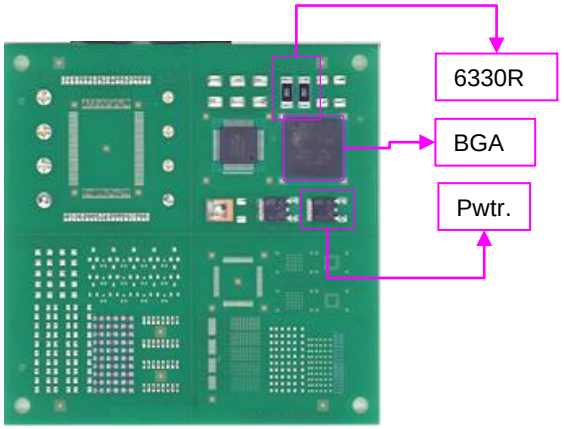
	Cu	Sn	Ni	Brass
S3X58-M650-7				

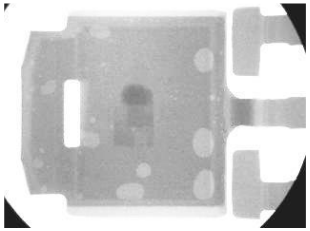
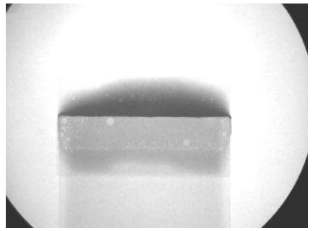
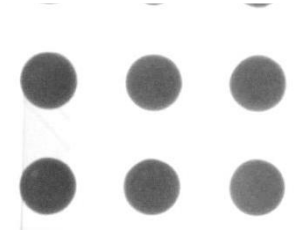
S3X58-M650-7 shows good wettability to various substrates tested.

Contents

Voiding Property

- Test Board: Glass Epoxy FR-4
- Surface Treatment: OSP
- Stencil Thickness: 0.12mm (Laser)
- Evaluation Locations: Power Transistor, 6330R (Sn plating)
  BGA ball - SAC305
- Aperture: 100%
- Reflow: Hot Air Oven
- Reflow Atmosphere: Air Atmosphere
- Reflow Profile: Same profile as meltability test



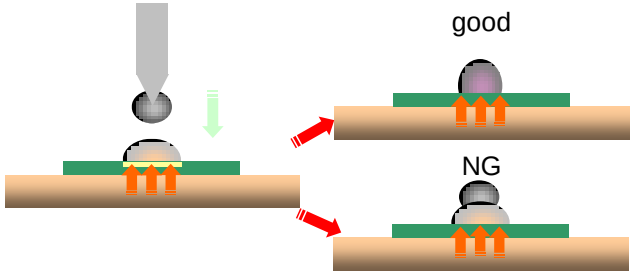
	Pw. Tr	6330R	BGA
S3X58-M650-7			

S3X58-M650-7 showed less void occurrence. Void occurrence was especially low on BGA.

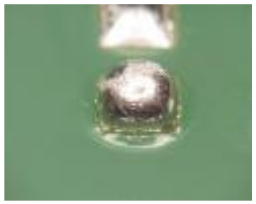
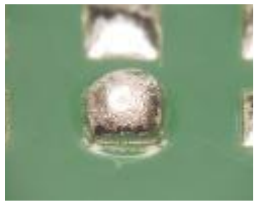
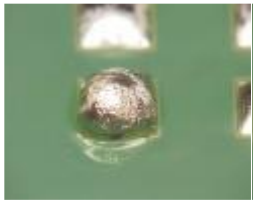
Contents

Head-in-Pillow Property

- Test Board: Glass Epoxy FR-4
- Surface Treatment: OSP
- Stencil Thickness: 0.12mm (Laser)
- Pad Size: 0.8 x 0.8mm
- Component: 0.76mm Ball (SAC305)
- Stencil Aperture: 100%
- Heating: Solder Bath@285ºC
- Mounting Interval: 10sec.



Drop a solder ball every 10 seconds after solder melt. The ball and solder stop merging when the flux activation is exhausted, no merger will occur.

	20sec	30sec	40sec
S3X58-M650-7			
Conventional Product			

S3X58-M650-7 retains good activation even at 40 seconds after solder melt. owing to adjusted flux fluidity and activators.

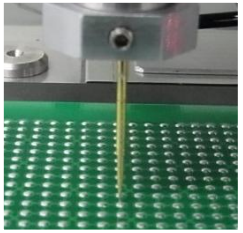
Contents

ICT Compatibility

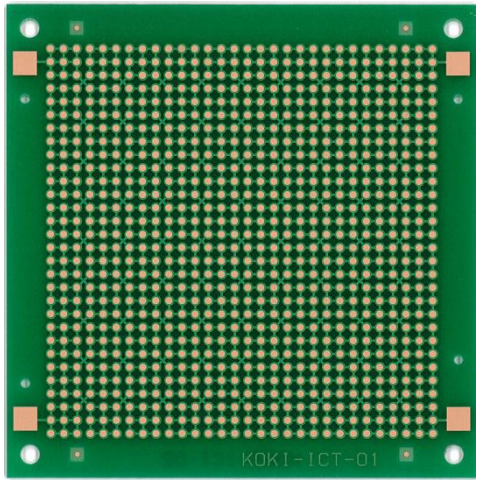
Test Method

Print an ICT Performance Test Board and reflow. Let the board stand for one day. Use ICT equipment and measure the resistance between the probe and PCB.

- Test Method: Glass Epoxy FR-4
- Surface Treatment: OSP
- Stencil Thickness: 0.15mm (Laser)
- Evaluation Location: 1.5mmφ
- Aperture: 100%
- Reflow: Hot Air Oven
- Reflow Atmosphere: Air Atmosphere
- Reflow Profile: Same as meltability test
- # of Tests: 900 times
- Probe Pressure: 3.0N
- Probe Shape: Crown and Straight



ICT Test Board



Probe: Straight

Probe: Crown

Contents

ICT Compatibility

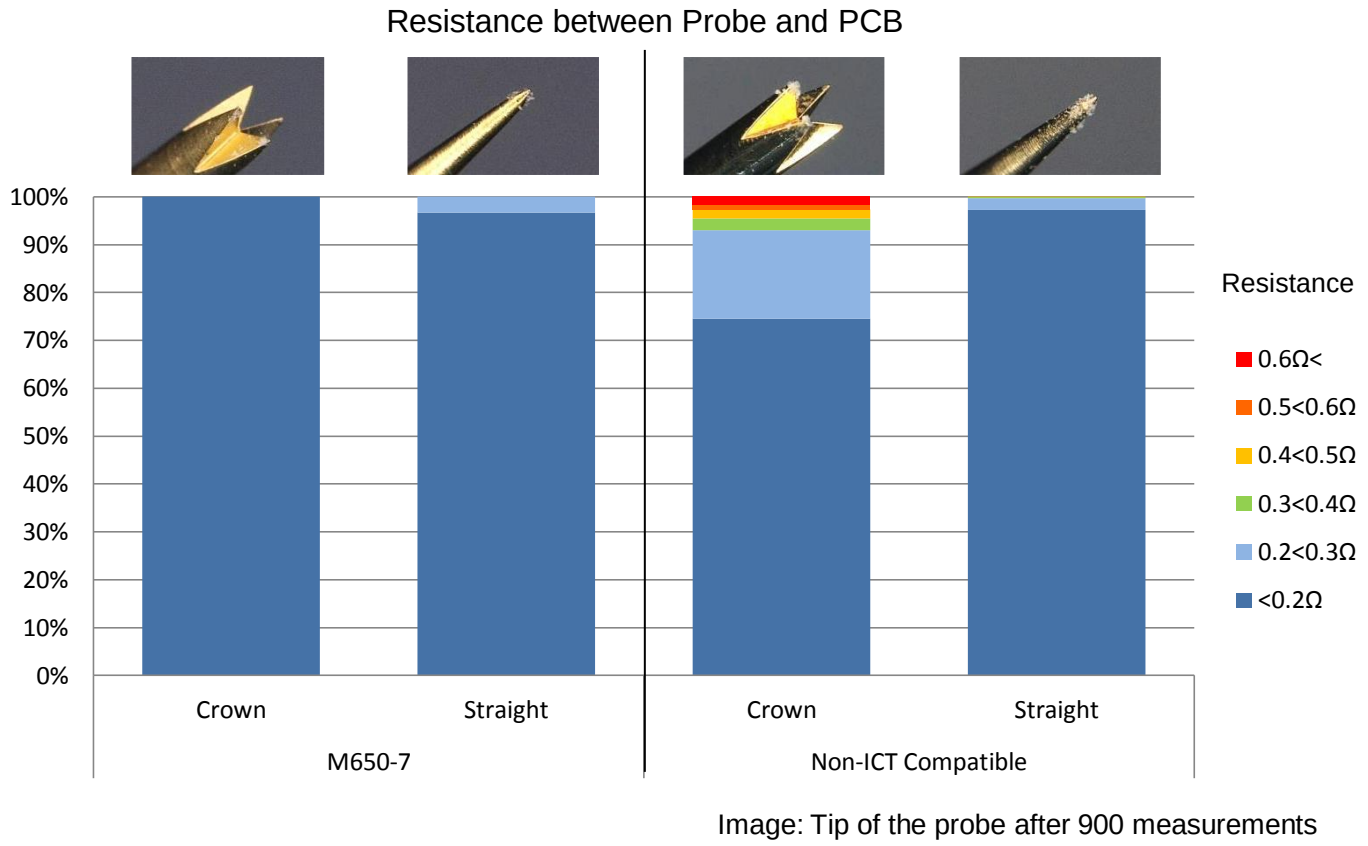


Image: Tip of the probe after 900 measurements

M650-7 shows lower contact resistance and leaves less residue left on the probes as compared to the conventional product tested. M650-7 should improve the straight pass rate at the ICT.

Halogen Content

Measurement Method: BS EN14582

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

Halogen Content (ppm)

S3X58-M650-7 complies with halogen free standard of BS EN14582 (Br+Cl <1500ppm)

Contents

General Properties

Item	Result	Method
Tack Time	> 48 hours	JIS Z 3284-3
Slump Property	0.3mm pass	JIS Z 3284-3 180ºCx 5min
Solder Ball Test	< Category 3	JIS Z 3284-4
Copper Mirror Corrosion Test	Type L	IPC-TM-650-2.3.32
Copper Plate Corrosion Test	Pass	IPC-TM-650-2.6.15 JIS Z 3197
SIR Test	>1E+9	IPC-TM650-2.6.14.1 JIS Z 3197

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Handling Guide

1. Printing - Recommended Print Condition
   (1) Squeegee
      1. Shape : Flat
      2. Material : Polyurethane or metal blade
      3. Squeegee Angle : 60º
      4. Print Pressure : Slightly Low
      5. Print Speed : 20~80mm/sec.

   (2) Stencil
      1. Thickness : For 0.65~0.4mm pitch patterns, 150~80μm
      2. Fabrication : Laser or chemical etching
      3. Stencil Release Speed : 7.0~10.0mm/sec.
      4. Clearance : 0mm

   (3) Usage Condition
      1. Temperature : 23~27ºC
      2. Humidity : 40~60%RH
      3. Air Conditioning : Direct air blow on to the metal stencil dries solder paste quicker. Please adjust air flow direction by positioning a shield.

2. Shelf Life
   0~10ºC : 6 months from the date of production

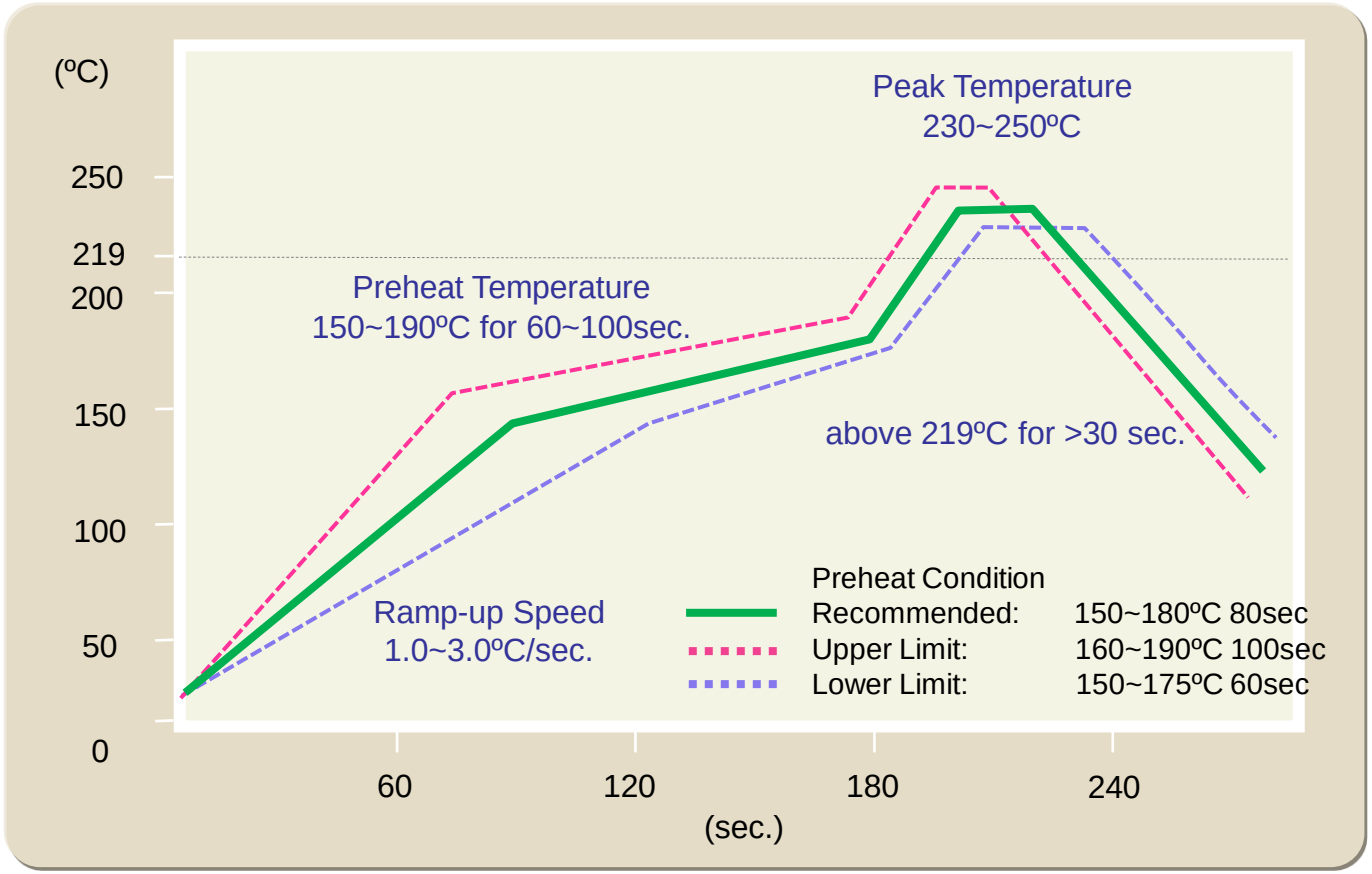
   * How to interpret the Lot #

   ex. **Lot No. 5 03 04 2**

   Batch # : 2nd batch
   Date of production: 4th
   Month of production: March
   Year of production: 2015

Contents

Handling Guide – Recommended Reflow Profile



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Handling Guide – Supplemental Information on Reflow Profile