Koki no-clean LEAD FREE solder paste

Contents

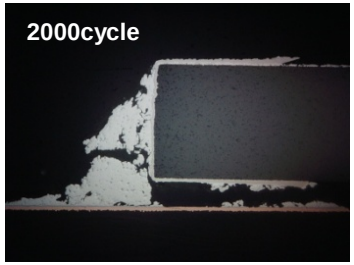
High Durability Alloy with Anti-crack Flux Residue

SB6N58-N300

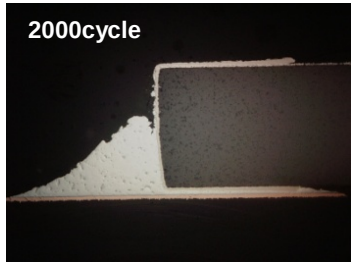
Product information

Cross section image of 6330R joint after thermal cycle test

Test Condition Low: -40ºC, High: +125ºC



SAC305



SB6N

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

Contents

Features

- High durability alloy composition with In content
  Alloy Composition : **Sn 3.5Ag 0.5Bi 6.0In**
- Can withstand crack growth due to thermal cycle and inhibit loss of joint strength
- Achieves stable printing on 0.4mm Pitch QFP and 0.30mm diameter
- Maintains optimal wetting with 0.4mm Pitch QFP, 0.30mm diameter and 1005 Chip
- No occurrence of severe flux residue crack that stretches over the leads even under harsh thermal cycle conditions (-40 ºC ~+125ºC, 3000cycles)

SB6N58-N300

Specifications

Contents

Application		Printing - Stencil
Product		**SB6N58-N300**
Alloy	Alloy Composition (%)	**Sn 3.5Ag 0.5Bi 6.0In**
	Melting Point (ºC)	202~210
	Shape	Spherical
	Particle size (μm)	20 – 38
Flux	Halide Content (%)	0
	Flux Type*3	ROL0*3
Product	Flux Content (%)	9.6±1.0
	Viscosity*1 (Pa.s)	180±20
	Copper plate corrosion*2	Passed
	Tack Time (100gf)	> 8 hours
	Shelf Life (below 10ºC)	6 months

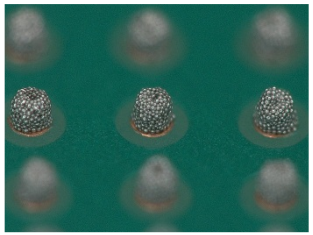
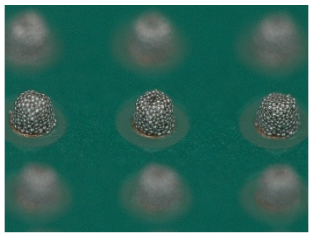
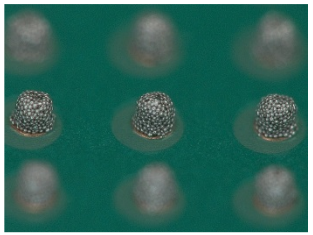
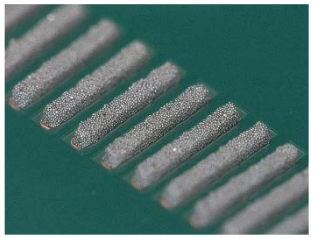
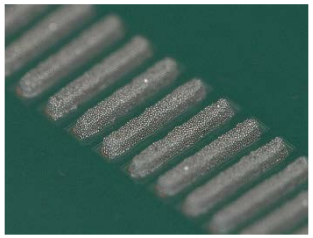
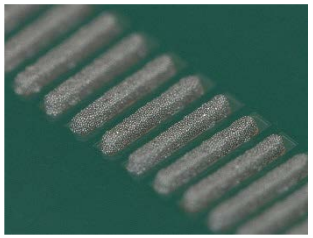
*1. Viscosity : Malcom spiral type viscometer,PCU-205 at 25ºC 10rpm
*2. Copper plate corrosion : According to IPC J-STD-004
*3. Flux type : According to IPC J-STD-004

Contents

Continual printing

Test condition

・Stencil:	0.15mm thickness, laser cut stencil	・Print Pressure:	40N
・Printer :	Model YVP-Xg YAMAHA Motor	・Stencil Separation speed :	10mm/sec.
・Squeegee :	Metal blade, Angle - 60˚	・Atmosphere :	23.0~27.0ºC (40~60%RH)
・Print speed :	40mm/sec.	・Test pattern :	0.30mm dia. 0.5mm Pitch QFP Pad Pattern

	Initial	10th	After 200 strokes 10th
0.30mm dia.			
0.5mm Pitch QFP Pad Pattern			

Achieved stable printability on 0.30mm diameter and 0.5mm pitch QFP pad patterns.

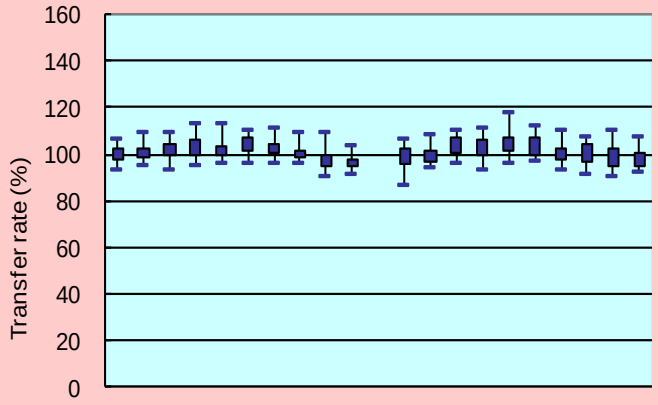
Maintained the same printability from initial print and even after 200 strokes.

Continual printing(SPI DATA)

• SPI: KOHYOUNG aSPIre2

MAX
Quartile
MIN

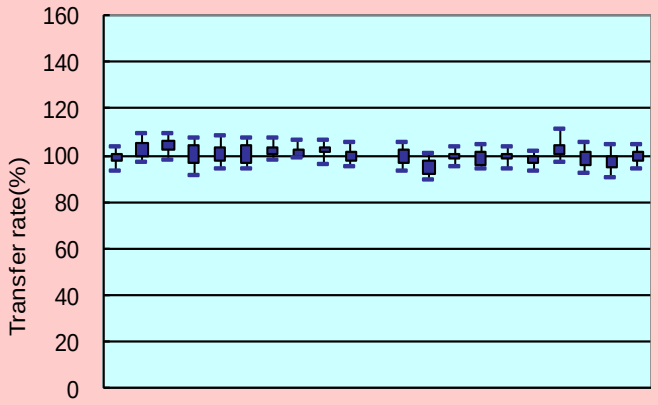
0.30mm dia.



Initial **1st ~ 10th**

After 200 strokes **1st ~ 10th**

0.5mm Pitch QFP Pad Pattern



Initial **1st ~ 10th**

After 200 strokes **1st ~ 10th**

The solder paste release after 200 strokes of printing resulted almost the same as the initial print.

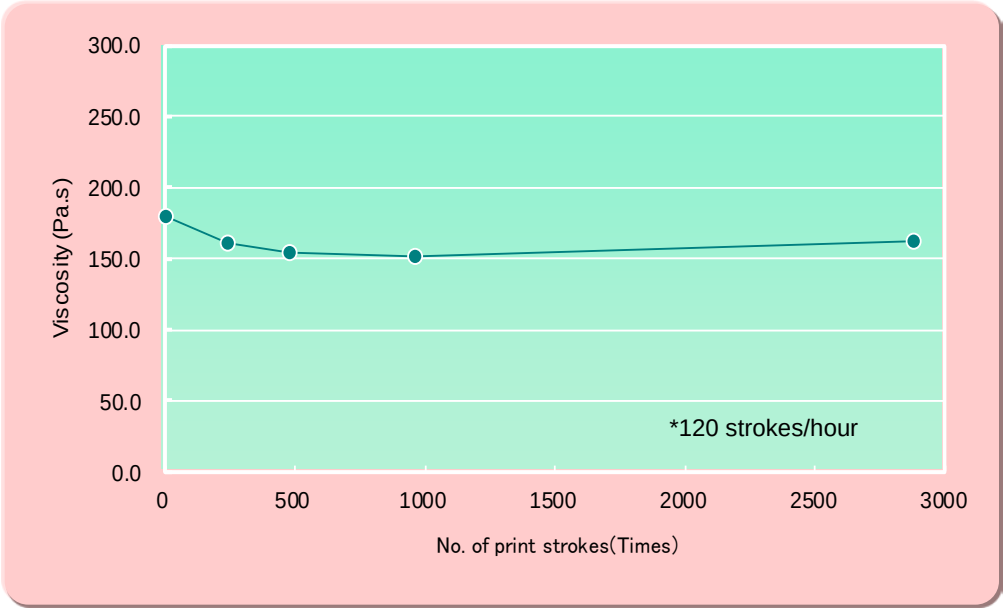
Contents

Viscosity variation

Test condition

Print (knead) solder paste on the sealed-up stencil continually up for 24 hours to observe viscosity variation.

- Squeegee : Metal blade, Angle - 60°
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 23.0~27.0ºC (40~60%RH)

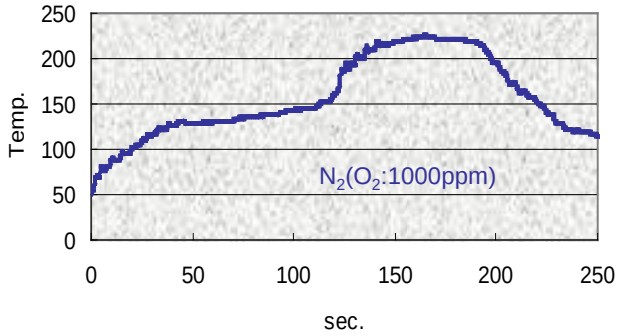


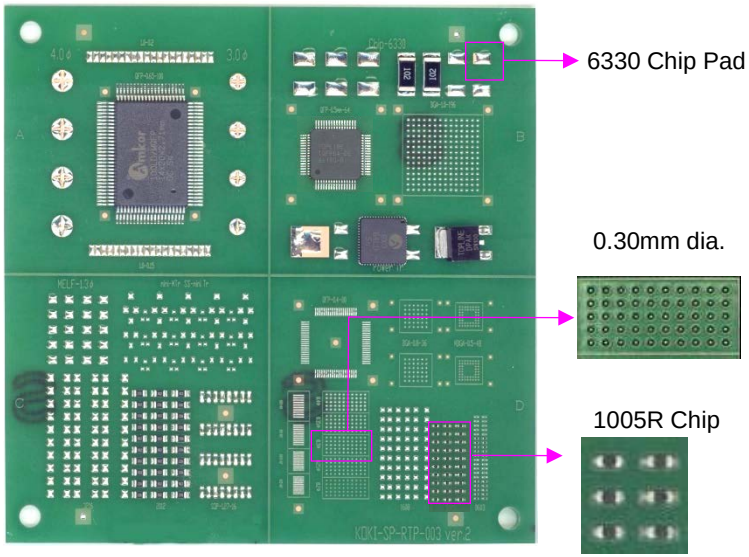
Viscosity variation after continual printing have been prevented by the suitable flux composition and activator selection for the solder alloy composition.

Wetting test (1)

Test conditions

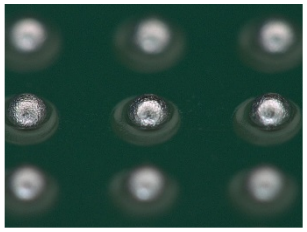
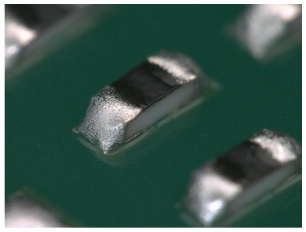
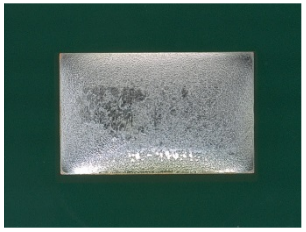
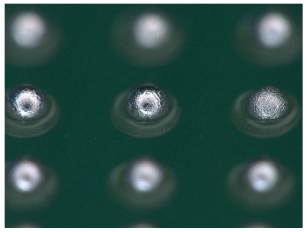
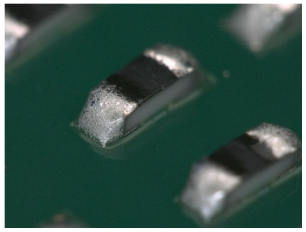
・Material :	Glass epoxy FR-4
・Surface treatment:	OSP
・Stencil thickness:	0.15mm (laser cut)
・Pad size:	0.30mm dia.,6330 Chip Pad
・Component:	1005R Chip (100%Sn)
・Stencil aperture:	100%
・Heat source:	Hot air convection
・Atmosphere :	N_2 (O_2:1000ppm)
・Reflow profile:	See reflow profile on the upper right corner





Hot air convection

Wetting test (2)

	0.30mm dia.	1005R Chip	6330 Chip Pad
Initial			
After 200 strokes			

No sign of dewetting on a large area such as 6330 Chip Pad. In addition, no unmelted solder but only good wettability at fine printing like 0.30mm diameter circle and 1005R Chip.

Contents

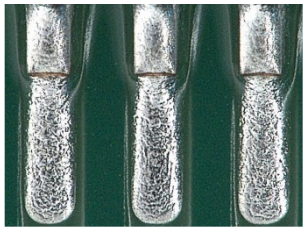
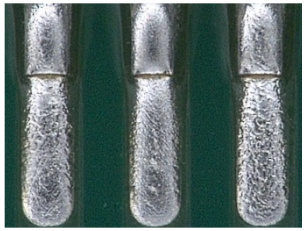
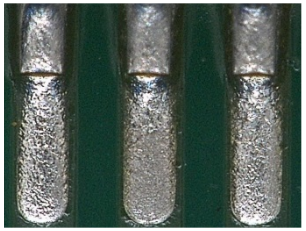
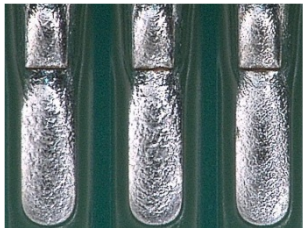
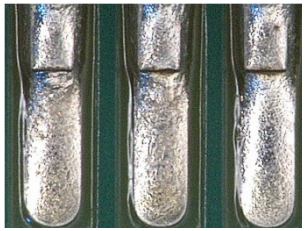
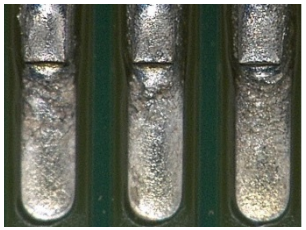
Crack free residue

Thermal cycle test condition(1)

- Low temperature : -30ºC
- High temperature : +80ºC
- Holding time : 30min.
- Component : 0.5mm Pitch QFP (Sn-100%)
- PCB preparation : Same as “Wetting test (1)”

Thermal cycle test condition(2)

- Low temperature : -40ºC
- High temperature : +125ºC
- Holding time : 15min.
- Component : 0.5mm Pitch QFP (Sn-100%)
- PCB preparation : Same as “Wetting test (1)”

	initial	After 2000 cyc.	After 3000 cyc.
Test condition (1)			
Test condition (2)			

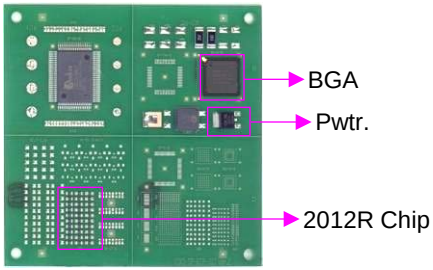
Inhibits the occurrence of severe flux residue crack that stretches over the 0.50mm pitch QFP leads after 3000 cycles.

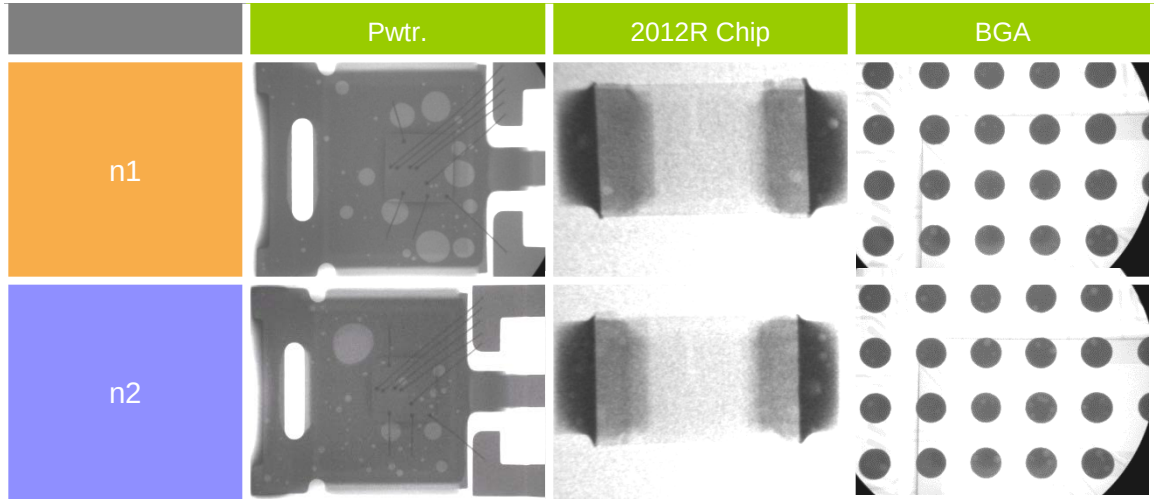
Contents

Voiding

Test conditions

- Material : Glass epoxy FR-4
- Surface treatment: OSP
- Stencil thickness: 0.15mm (laser cut)
- Components : Pwtr.,2012R Chip (Sn-100%)
  BGA ball - SAC305
- Stencil aperture : 100% aperture opening to pad area
- Heat source : Hot air convection
- Reflow profile : Same as “Wetting test (1)”





Newly introduced additive prevents void occurrence.

SB6N58-N300

Other properties

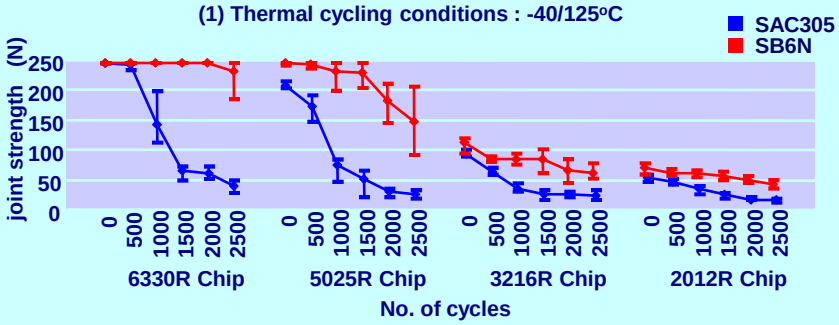
Contents

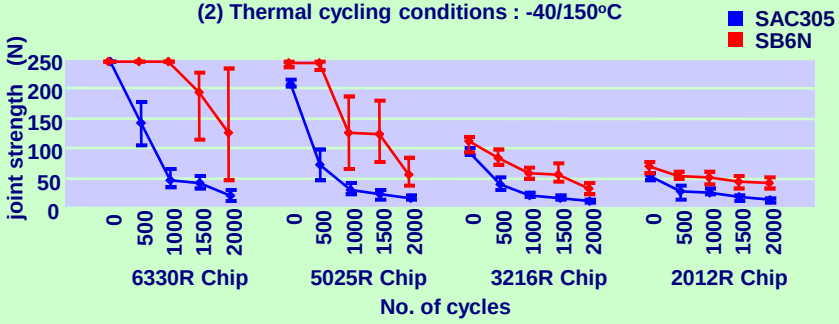
Item	Result	Method
Tack time （≧100gf)	> 8 hours	JIS Z 3284
Heat slump	0.2mm pass	JIS Z 3284
Heat slump	< Category 3	JIS Z 3284
Copper mirror corrosion	Pass	IPC J-STD-004
Copper plate corrosion	Pass	IPC J-STD-004
Voltage applied SIR	> 1E+9	JIS Z 3284
Halogen contents	0%	IPC J-STD-004 JIS Z 3284

Contents

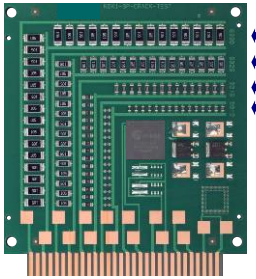
Alloy features; Shear strength

- Thermal cycling conditions : (1) -40/+125ºC, 30min./cycle
  (2) -40/+150ºC, 30min./cycle
- Testing machine : SEISIN SS30WD





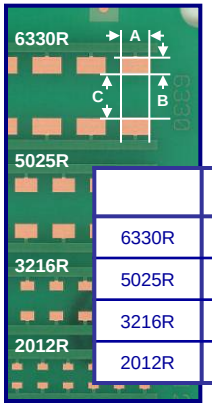
Test board & components



6330R (30pcs)
5025R (30pcs)
3216R (30pcs)
2012R (30pcs)

PCB : FR4
Surface finish : OSP
Cu thickness : 18µm
PCB thickness : 1.6mm

Pad size



(mm)

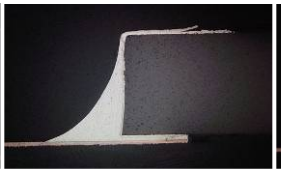
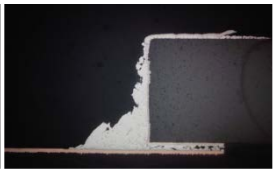
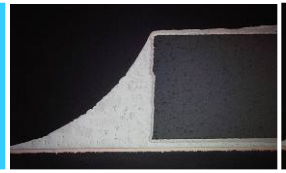
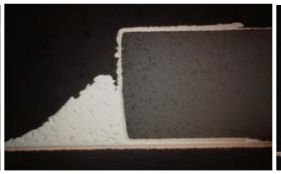
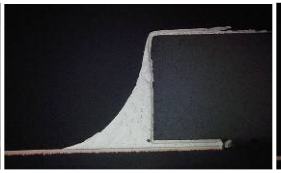
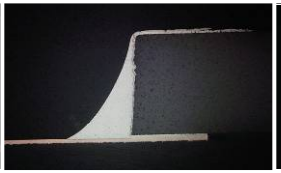
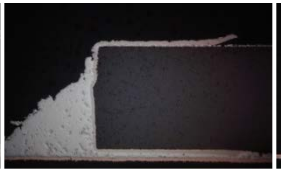
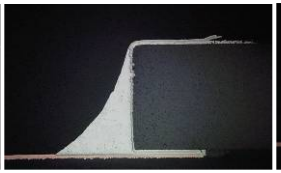
	A	B	C
6330R	3.00	1.70	4.60
5025R	2.30	1.40	3.30
3216R	1.40	0.90	2.20
2012R	1.05	0.60	1.30

SB6N shows better joint strength compared to SAC305 (Sn3.0Ag0.5Cu) due to the reinforcing elements such as Bi and In.

SB6N tends to show little loss of joint strength after thermal cycling.

Contents

Alloy features; Cross-sectional observation

		6330R Chip		2012R Chip	
		Before	2000 cycles	Before	2000 cycles
-40/+125°C	SAC 305				
	SB6N				
-40/+150°C	SAC 305				
	SB6N				

SB6N tends to show lesser fillet deformation and crack growth after thermal cycling than SAC350(Sn3.0Ag0.5Cu) as solid solution is formed by Sn, Bi and In that strengthens the alloy.

Handling guide

1. Printing

(1) Recommended printing parameters

(1) Squeegee

1. Kind	:	Flat
2. Material	:	metal blade
3. Angle	:	60º
4. Pressure	:	Lowest
5. Squeegee speed	:	20~80mm/sec.

(2) Stencil

1. Thickness	:	150~120μm for 0.65~0.5mm pitch pattern
2. Type	:	Laser or electroform
3. Separation speed	:	7.0~10.0mm/sec.
4. Snap-off distance	:	0mm

(3) Ambiance

1. Temperature	:	23~27ºC
2. Humidity	:	40~60%RH
3. Air draft	:	Draft in the printer badly affects stencil life and tack performance of solder paste.

2. Shelf lifes

0~10ºC : 6 months from manufacturing date

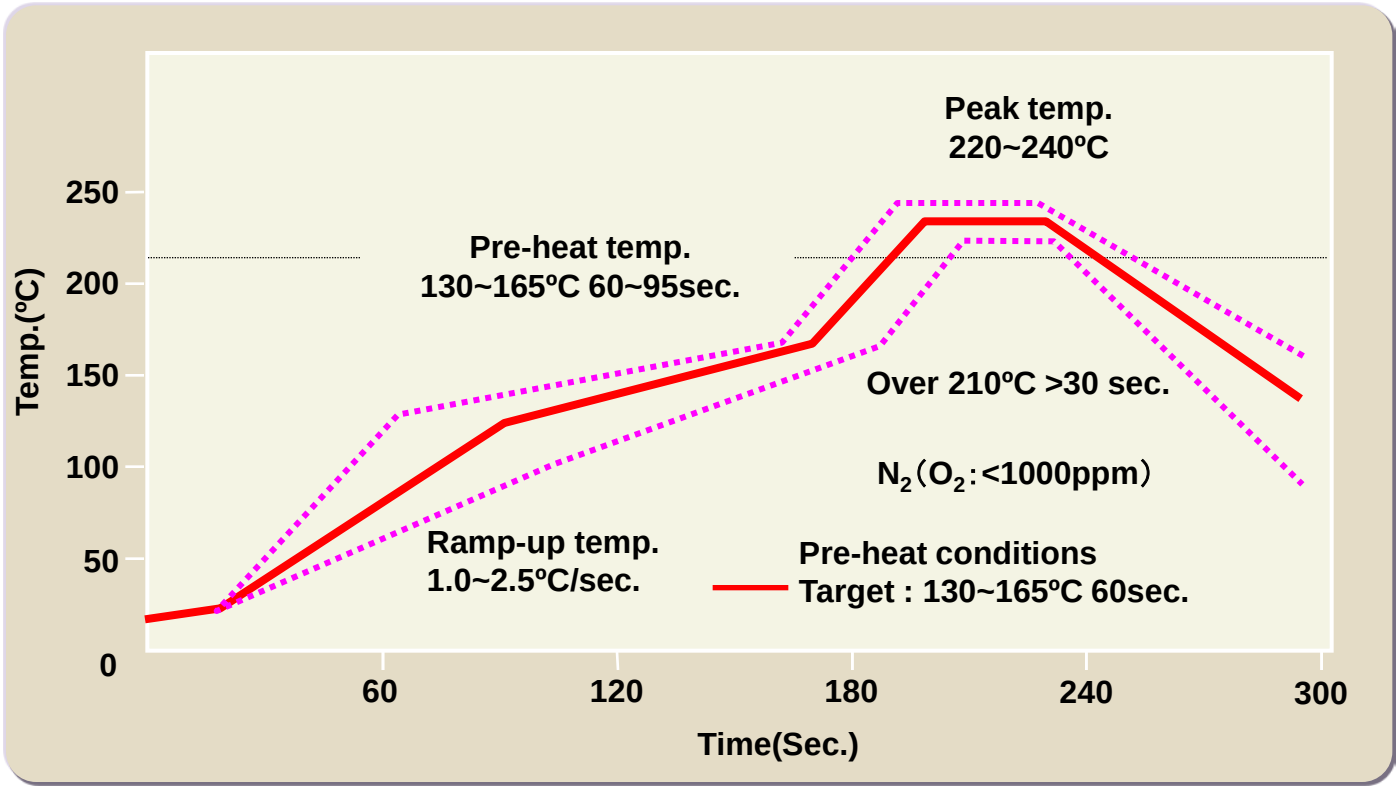
* Manufacturing date can be obtained from the lot number

ex. **Lot No. 4 02 12 2**

No. of lot : 2nd
Date : 12th
Month : Feb
Year : 2014

Handling guide – Recommended reflow profile

Contents



Handling guide – Recommended reflow profile

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