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Lead Free SOLUTIONS you can TRUST

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#56012E-2
Revised on NOV. 12, 2020

Contents

Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

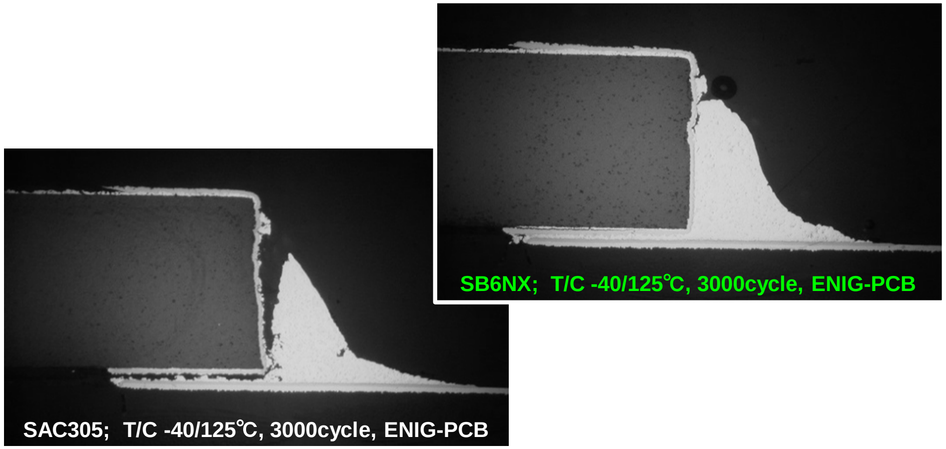
Koki no-clean LEAD FREE solder paste

High-Reliability Solder Alloy Lead Free Solder Paste

SB6NX58-HF350

Halogen Free
HF

Product Information



SB6NX; T/C -40/125℃, 3000cycle, ENIG-PCB

SAC305; T/C -40/125℃, 3000cycle, ENIG-PCB

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.

KOKI
CHALLENGING NEW TECHNOLOGIES

SB6NX58-HF350

Contents

- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

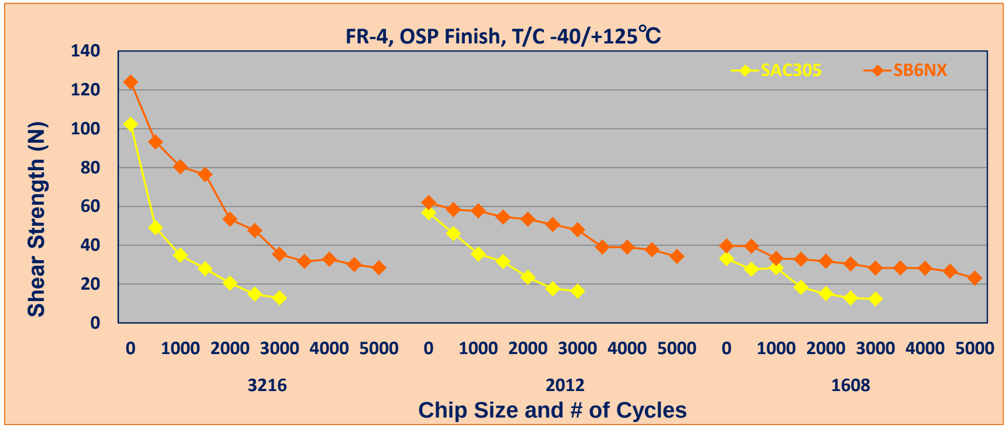
Features

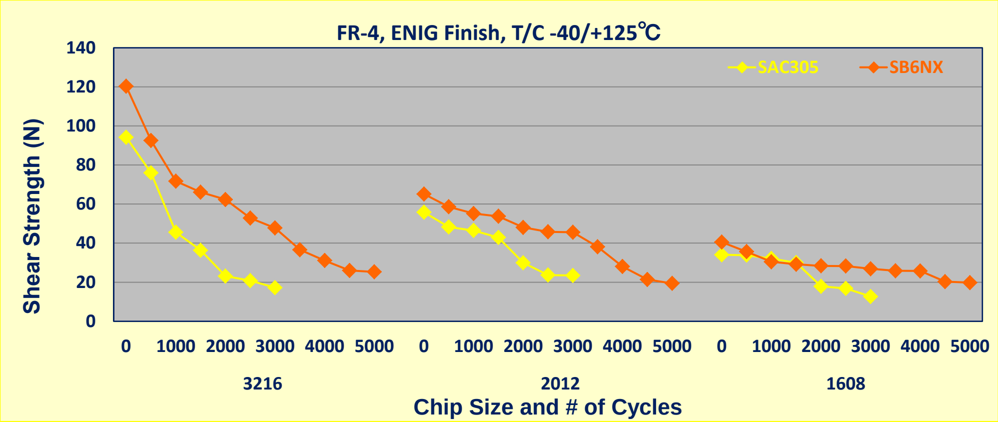
- Alloy composition is Sn/3.5Ag/0.5Bi/6.0In/0.8Cu
- High joint reliability on Electroless Ni-Au (ENIG) surface finish
- Superior solder coalescence with 0.25mm dia. CSP and 0603 chip
- Compatible with Halogen Free requirements (Cl+Br: 0ppm) per test method BS EN14582
- No intentional addition of Halogen compounds
- Flux type: ROL0 (IPC J-STD-004B)

SB6NX58-HF350

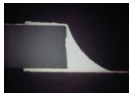
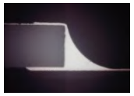
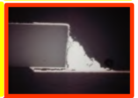
Contents
Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Alloy Property: Joint Reliability after Thermal Cycling (-40/+125˚C)





Partial Crack
Full Crack

3216R		SB6NX	SAC305
Initial	OSP		
	ENIG		
1000 Cycle	OSP		
	ENIG		
3000 Cycle	OSP		
	ENIG		

PCB Material: (Nikkan Industries, L-6504C2 UV)	FR4
Cu Pad Finish:	OSP and ENIG*
*P Concentration on Ni-P Layer:	7%
*Ni-P Layer Thickness:	5μm
Cu Pad Thickness:	18μm
PCB Thickness:	1.6mm

SB6NX’s joint reliability after thermal cycling is higher than SAC305 on both OSP finish and ENIG finish PCBs. SB6NX solder joints also show solder fillets with lower amount of cracks. SB6NX has been confirmed to possess higher thermal cycle resistance as compared to SAC305 alloy.

SB6NX58-HF350

Contents

Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Specifications

Application		Printing - Stencil
Product		**SB6NX58-HF350**
Alloy	Alloy Composition (%)	Sn 3.5Ag 0.5Bi 6.0In 0.8Cu
	Melting Point (ºC)	202-204
	Shape	Spherical
	Particle Size (μm)	20 - 38
Flux	Halide Content (%)	0
	Flux Type*1	ROL0
Product	Flux Content (%)	10.8±1.0
	Viscosity*2 (Pa.s)	200±30
	Copper Plate Corrosion*3	Passed
	Tack Time	> 48 hours
	Shelf Life (0 - 10ºC)	6 months

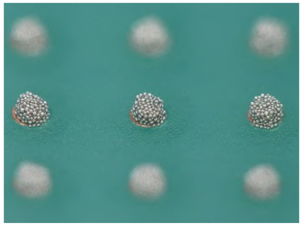
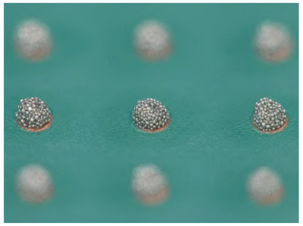
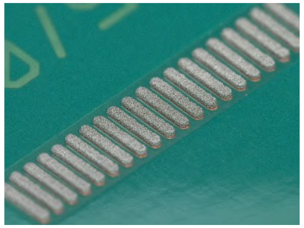
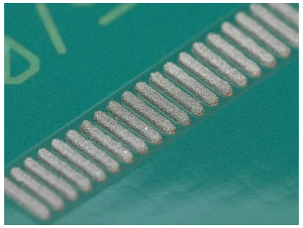
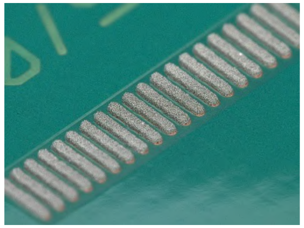
1. Flux type :	According to IPC J-STD-004B
2. Viscosity:	Malcom spiral type viscometer,PCU-205 at 25ºC 10rpm
3. Copper plate corrosion :	In accordance with IPC-TM-650-2.6.15

Contents

- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

Continuous Printability

- Stencil : 0.12mm thickness, laser cut stencil
- Printer : Model YVP-Xg YAMAHA Motor
- Squeegee : Metal blade, angle - 60º
- Print speed : 40 mm/sec
- Printing environment : 24~26ºC (50~60%RH)
- Test pattern : MBGA pad pattern - Diameter 0.25 mm 0.4mmP QFP

	1st print	10th print	After 200strokes 10th print
0.25mm dia. CSP pattern			
0.4mmP QFP			

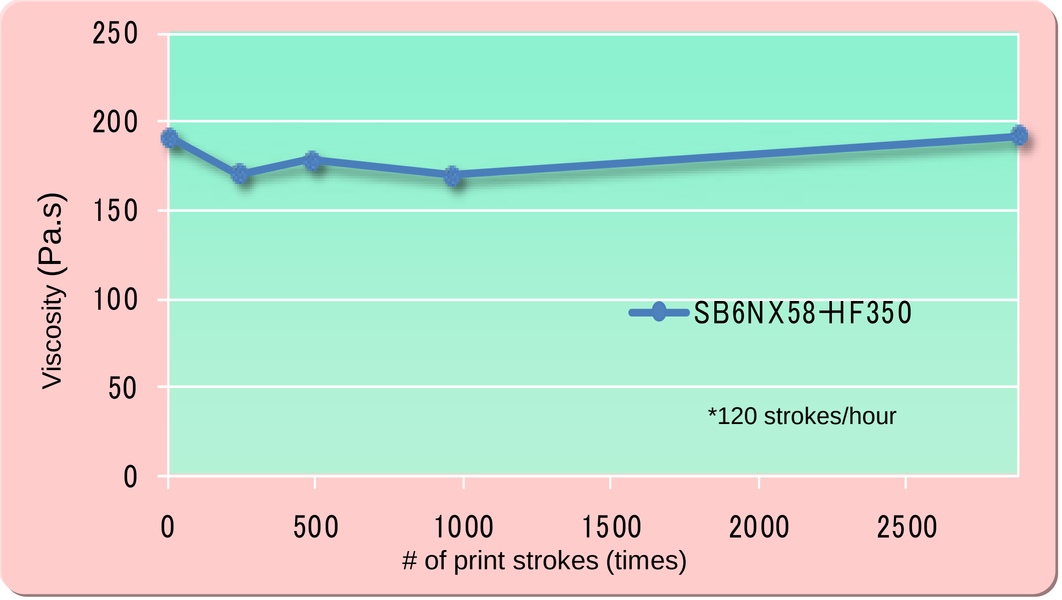
The solder paste retains its shape in continual printing with the fine pitch components.

SB6NX58-HF350

Contents
Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Viscosity Stability

- Print (knead) solder paste on the sealed-up stencil continuously up to24 hours to observe Viscosity Stability.
- Squeegee : Metal blades
- Squeegee angle : 60º
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 24~26ºC, 40~60%RH



*120 strokes/hour

Viscosity shows very little change after continuous kneading thanks to the newly engineered optimum formulation of thixotropic agents in the paste..

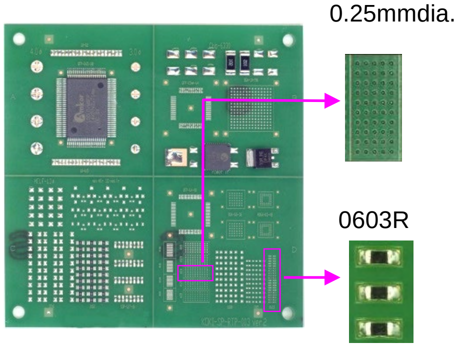
SB6NX58-HF350

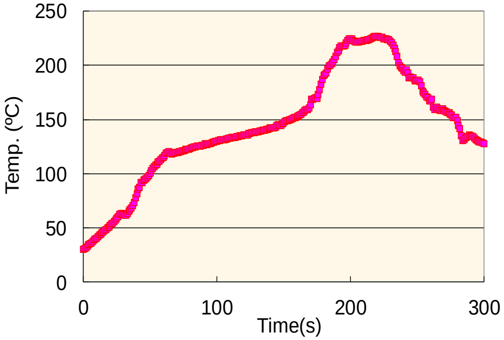
Contents

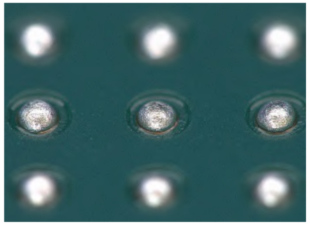
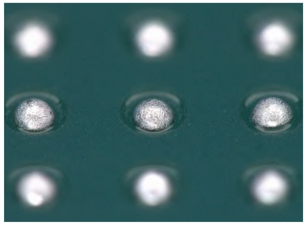
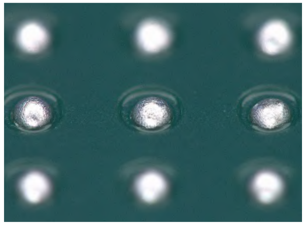
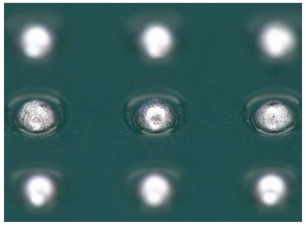
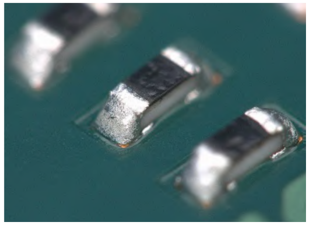
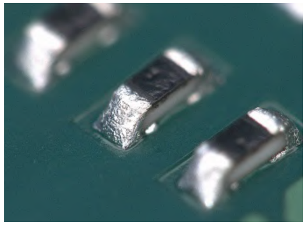
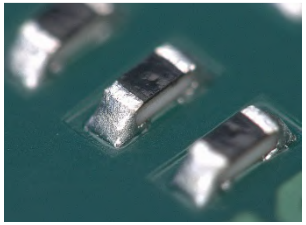
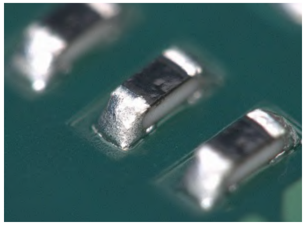
- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

Super Fine Pattern Coalescence / Wetting

• Material :	Glass epoxy FR-4
• Surface treatment :	OSP, ENIG, ImSn, ImAg
• Stencil thickness :	0.12mm (laser cut)
• Pad size :	0.25mm diameter
• Component:	0603R chip, 100%Sn
• Stencil aperture :	100%
• Heat source :	Hot air convection
• Atmosphere :	Air
• Reflow profile :	See on right hand side





	OSP	ENIG	ImSn	ImAg
0.25mm dia. CSP pattern				
0603R				

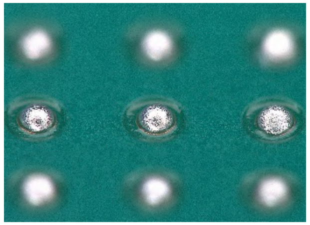
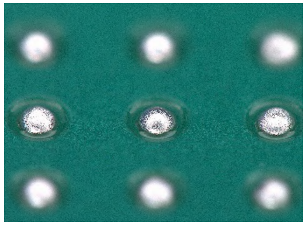
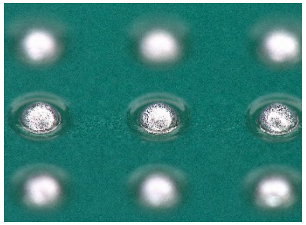
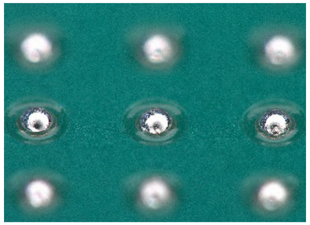
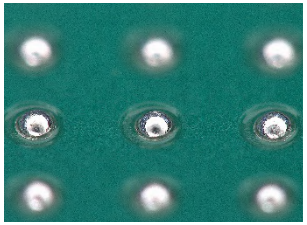
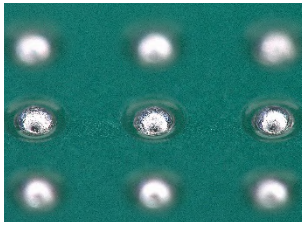
Regardless of the type of surface finish, SB6NX58-HF350 shows superior coalescence and excellent wettability at ultra fine pattern components.

Contents

Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Wetting comparison SB6NX with SAC305

- Surface treatment : OSP, ImSn, ENIG
- Reflow profile : SB6NX - Same as “*Wetting Property* ”
  SAC305 - SAC305 standard profile
- Pad size: 0.25mm diameter
- Other test condition : Same as “*Wetting Property* ”

	OSP	ImSn	ENIG
SB6NX58-HF350			
SAC305 Halogen Free solder paste			

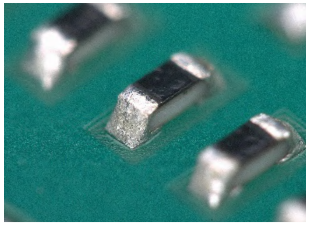
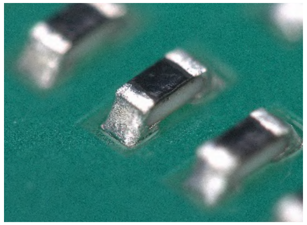
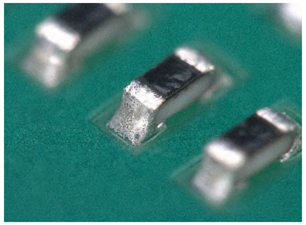
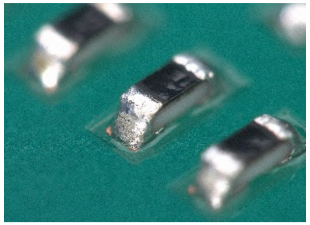
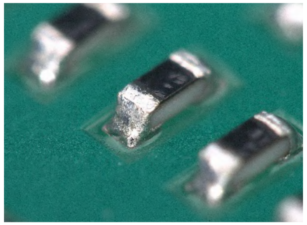
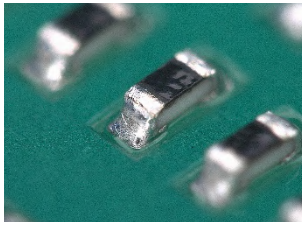
SB6NX58-HF350 shows equivalent wetting properties to a SAC305 halogen-free solder paste.

Contents

Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Wetting comparison SB6NX with SAC305

- Surface treatment : OSP, ImSn, ENIG
- Reflow profile : SB6NX - Same as "*Wetting Property* "
  SAC305 - SAC305 standard profile
- Component: 0603 chip, 100%Sn
- Other test condition : Same as "*Wetting Property* "

	OSP	ImSn	ENIG
SB6NX58-HF350			
SAC305 Halogen Free solder paste			

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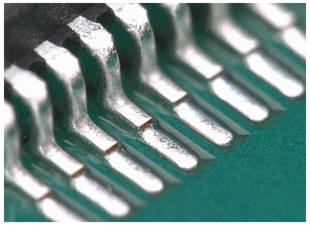
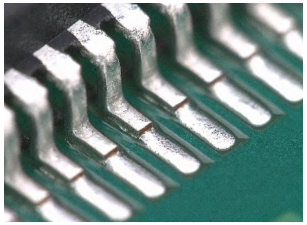
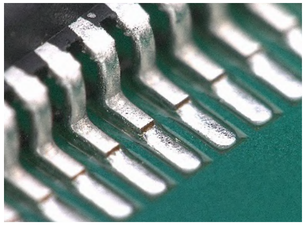
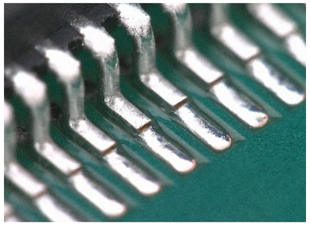
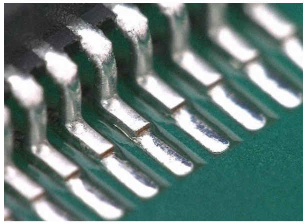
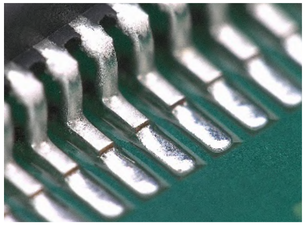
Contents
Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Wetting comparison SB6NX with SAC305

- Surface treatment : OSP, ImSn, ENIG
- Reflow profile : SB6NX - Same as “*Wetting Property* ”
  SAC305 - SAC305 standard profile
- Component: 0.5mmPitch QFP, 100%Sn
- Other test condition : Same as “*Wetting Property* ”

	OSP	ImSn	ENIG
SB6NX58-HF350			
SAC305 Halogen Free solder paste			

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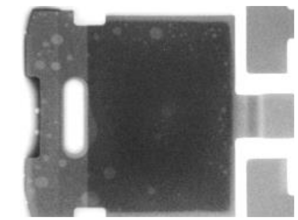
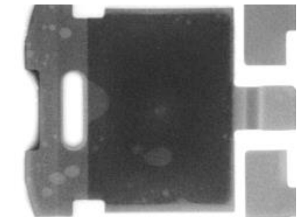
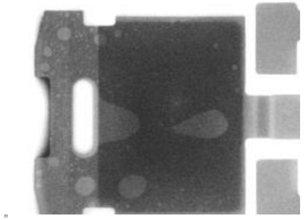
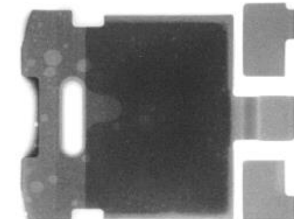
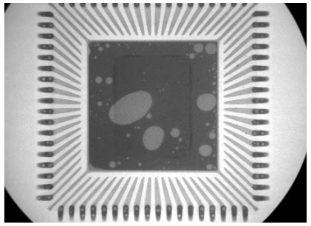
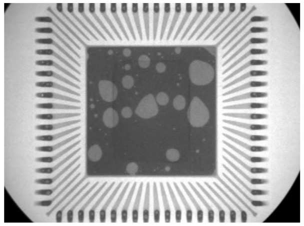
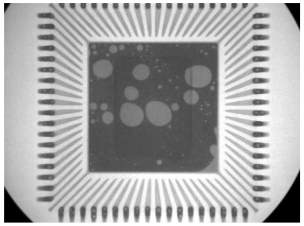
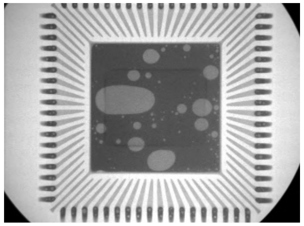
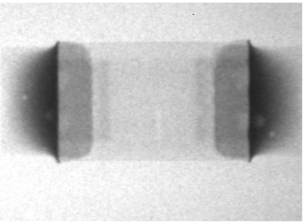
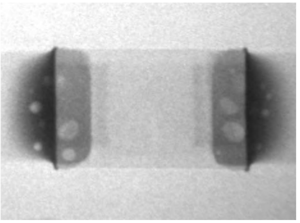
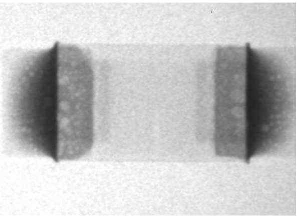
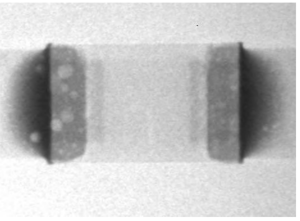
Contents
Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Voiding Property

- Material : Glass epoxy FR-4
- Surface treatment : OSP, Ni-Au, ImSn, ImAg
- Stencil thickness : 0.12mm (laser cut)
- Component: PwTr, QFN, 2012R chip (100%Sn)
- Stencil aperture : 100%
- Heat source : Hot air convection
- Atmosphere : Air
- Reflow profile : Same as “*Wetting Property* ”

	OSP	ENIG	ImSn	ImAg
PwTr				
QFN				
2012R				

Irrespective of the type of surface finish, SB6NX58-HF350 shows very low and stable voiding characteristics on various component types.

SB6NX58-HF350

Contents

- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

Halogen Content

Measurement Method

Ion Chromatography, Quartz combustion tube

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

Halogen Free HF

SB6NX58-HF350 is classified as ROL0 (F+Cl+Br+I =<500 ppm according to IPC J-STD-004B).

Contents

Features

Alloy Properties

Specifications

Continuous Printability

Viscosity Stability

Wetting Property

Voiding Property

Halogen Content

Other Properties

Handling Guide

Precaution for Use

Other Properties

Item	Result	Method
Tack time	**> 48 hours**	JIS Z 3284-3
Heat slump	**0.3mm pass**	JIS Z 3284-3
Solder balling	**< Category 3**	JIS Z 3284-4
Copper mirror corrosion	**Type L**	IPC-TM-650 2.3.32
Copper plate corrosion	**Pass**	IPC-TM-650 2.6.15
Voltage applied SIR	**>1E+10**	IPC-TM-650 2.6.3.7

Contents

Features
Alloy Properties
Specifications
Continuous Printability
Viscosity Stability
Wetting Property
Voiding Property
Halogen Content
Other Properties
Handling Guide
Precaution for Use

Handling Guide

1. Printing - Recommended Printing Condition

(1) Squeegee

1. Shape:	Flat
2. Material:	Metal or Urethane
3. Angle:	60~70º
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 blowing on metal stencil would cause the solder paste to dry up quicker.

2. Product Life

Stored at 0~10ºC: 6 months from the date of production

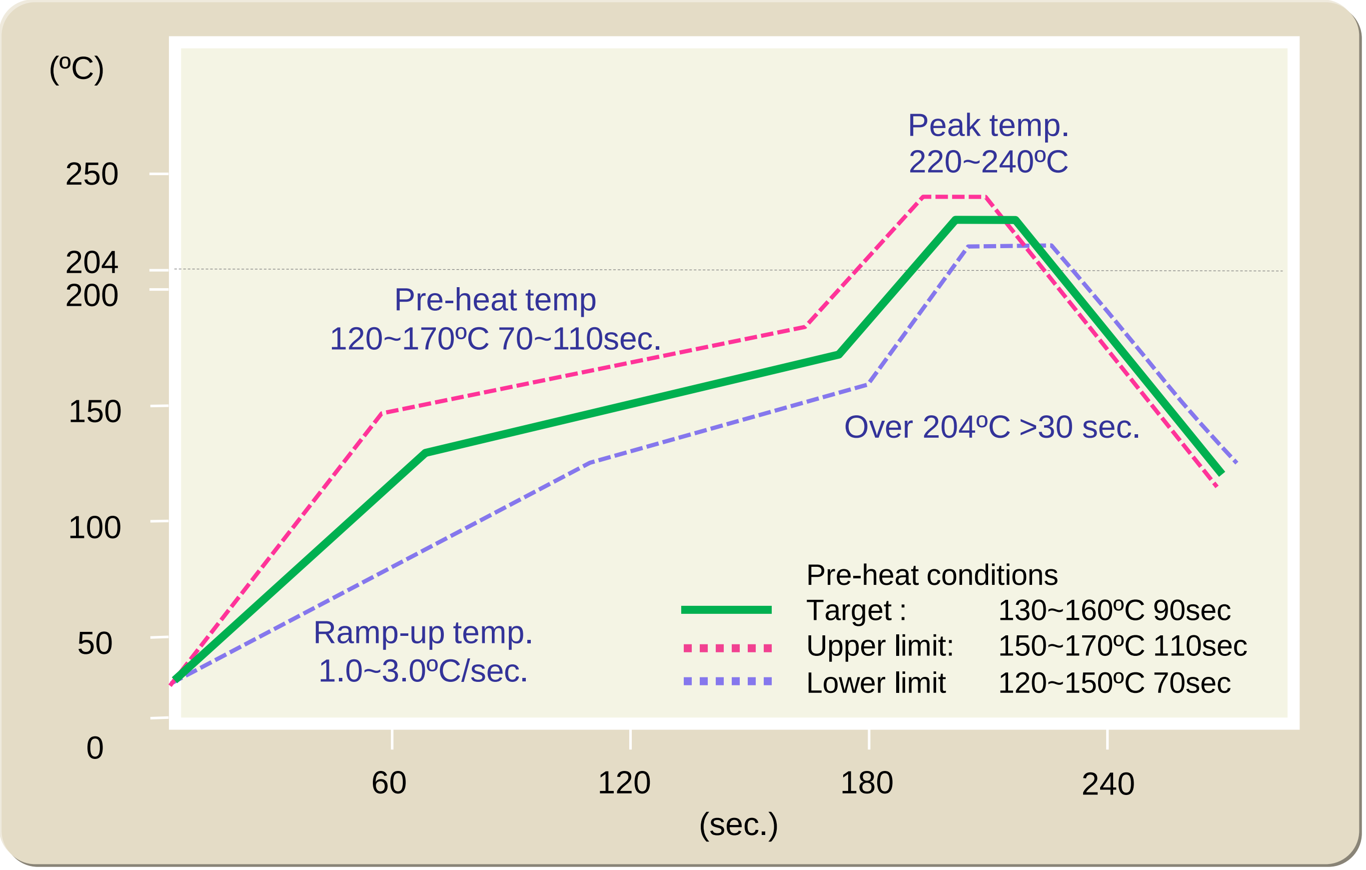
* Manufacturing date can be obtained from the lot number

ex. Lot No. 8 09 04 1

No. of lot	: 1st
Day	: 4th
Month	: Sep.
Year	: 2018

Contents
- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

Handling Guide - Recommended reflow profile



Pre-heat conditions

🟩	Target :	130~160ºC 90sec
▪▪▪	Upper limit:	150~170ºC 110sec
▪▪▪	Lower limit	120~150ºC 70sec

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Contents

- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

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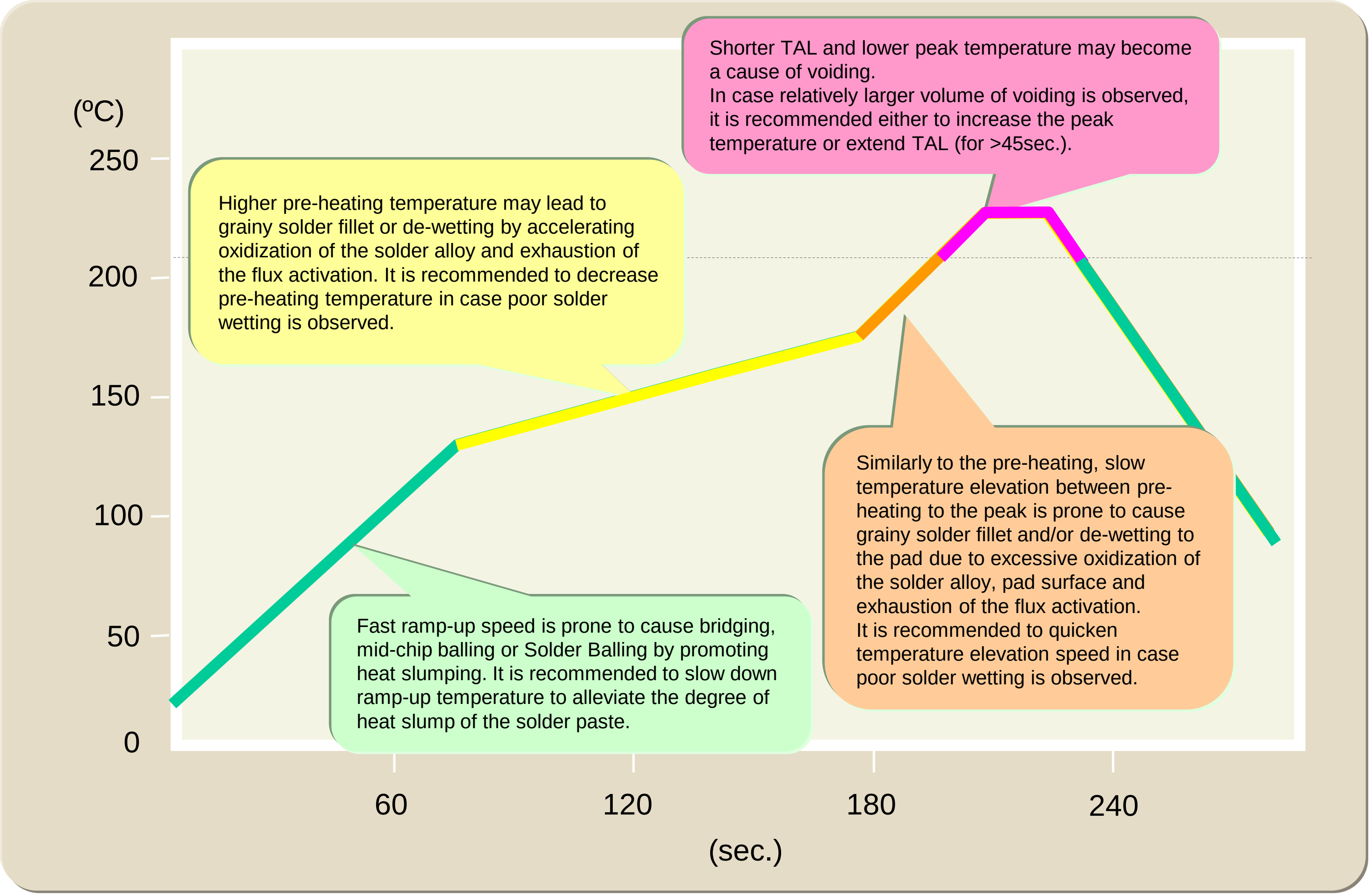

Shorter TAL and lower peak temperature may become a cause of voiding.
In case relatively larger volume of voiding is observed, it is recommended either to increase the peak temperature or extend TAL (for >45sec.).

Higher pre-heating temperature may lead to grainy solder fillet or de-wetting by accelerating oxidization of the solder alloy and exhaustion of the flux activation. It is recommended to decrease pre-heating temperature in case poor solder wetting is observed.

Similarly to the pre-heating, slow temperature elevation between pre-heating to the peak is prone to cause grainy solder fillet and/or de-wetting to the pad due to excessive oxidization of the solder alloy, pad surface and exhaustion of the flux activation.
It is recommended to quicken temperature elevation speed in case poor solder wetting is observed.

Fast ramp-up speed is prone to cause bridging, mid-chip balling or Solder Balling by promoting heat slumping. It is recommended to slow down ramp-up temperature to alleviate the degree of heat slump of the solder paste.

Contents

- Features
- Alloy Properties
- Specifications
- Continuous Printability
- Viscosity Stability
- Wetting Property
- Voiding Property
- Halogen Content
- Other Properties
- Handling Guide
- Precaution for Use

Precaution for use

Due to a nature of the alloy composition, as it contains Bismuth (Bi), it may be prone to the "Lift-off"/ Fillet-Lifting phenomenon occurring in soldering through hole components (Pin-in-Paste process).

Please conduct thorough evaluation and inspection of through hole components prior to accepting it as a finished product.

Should you have any questions regarding this matter, please feel free to contact us.