

Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

KOKI No Clean **LEAD FREE** Solder Paste

Lead Free Solder Paste for Micro-pattern Applications

S3X811-M500-6

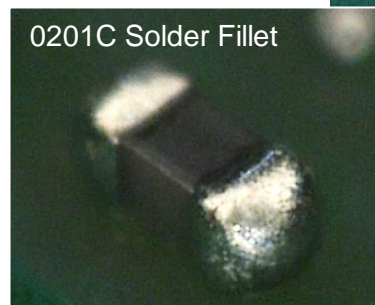
Product Information



Print Shape at 0201
size pad



0201C Solder Fillet



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.



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

Features

- Alloy Composition: Sn 3.0Ag 0.5Cu (SAC305).
- Contains lubricants to improve the continuous and intermittent printability on fine-pitch patterns.
- Adjusted flux fluidity inhibits solder powder from oxidizing and improves meltability at fine-pitch pads.
- Ensures good meltability at fine-pitch pads (e.g. 0201 chip components or 0.1 mm pitch CSP)
- Void occurrence is reduced by the use of enhanced activators and flux fluidity.
- In compliance with Halogen Free standard (BS EN14582, Br+Cl < 1,500 ppm).



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

Features

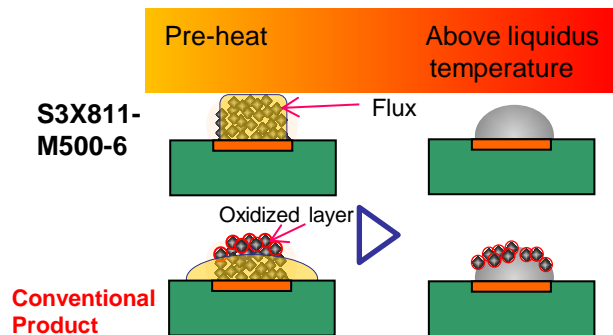
Development Background

Latest mobile devices are becoming highly functional and low-profile, that their components are also miniaturizing. The smallest chip component found on a smartphone motherboard is 0402; however, applications of 03015 or 0201 chip components are anticipated soon. S3X811-M500-6 is developed to meet the demands for a solder paste which is compatible with ever-miniaturizing fine-pitch soldering.

Development Concept

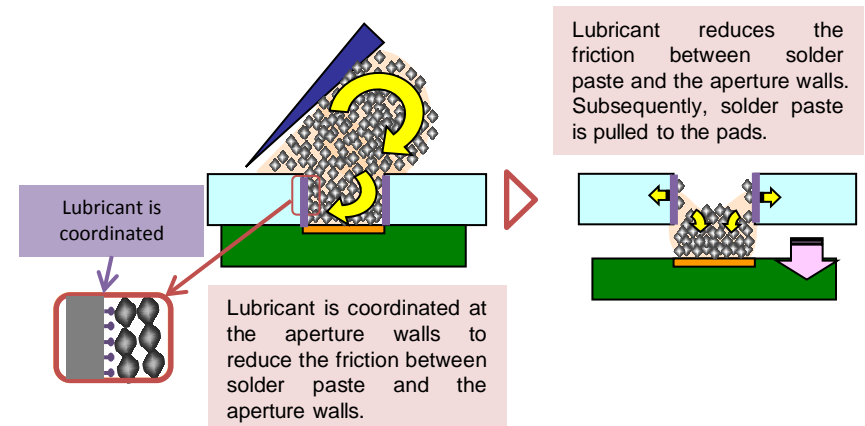
Since most mobile devices are required to be halogen-free, M500-6 is also designed to meet halogen-free standards. In general, a halogen-free solder paste suffers inferior meltability at fine-pitch pads. However, M500-6 maintains good meltability at fine-pitch pads by adjusting its flux fluidity to inhibit solder powder from being oxidized during pre-heat. In addition, M500-6 contains a lubricant with low friction coefficient to improve the printability at fine-pitch pads. Consistent fine-pitch printability and intermittent printability are ensured.

Preventing Solder Powder Degradation



M500-6 contains resin with higher softening temperature that prevents flux slump and covers solder powder entirely during preheat

Improving Fine-Pitch Printability



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

Specifications

Application		Printing
Product Name		S3X811-M500-6
Alloy	Alloy Composition (%)	Sn 3.0Ag 0.5Cu
	Melting Point (°C)	217 - 219
	Grain Shape	Spherical
	Grain Size (μm)	5 - 20
Flux	Halide Content (%)	0
	Flux Designation*1	ROL0
Solder Paste	Flux Content (%)	11.4±1.0
	Viscosity*2 (Pa.s)	200±30
	Copper Plate Corrosion*3	Passed
	Tack Time	>72 hours
	Shelf Life (<10°C)	6 months

*1. Flux Classification:

*2. Viscosity:

*3. Copper Plate Corrosion:

In compliance with IPC J-STD-004B

Measured by Malcom Viscometer at 25 °C , 10 rpm

In compliance with IPC-TM-650-2.6.15



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

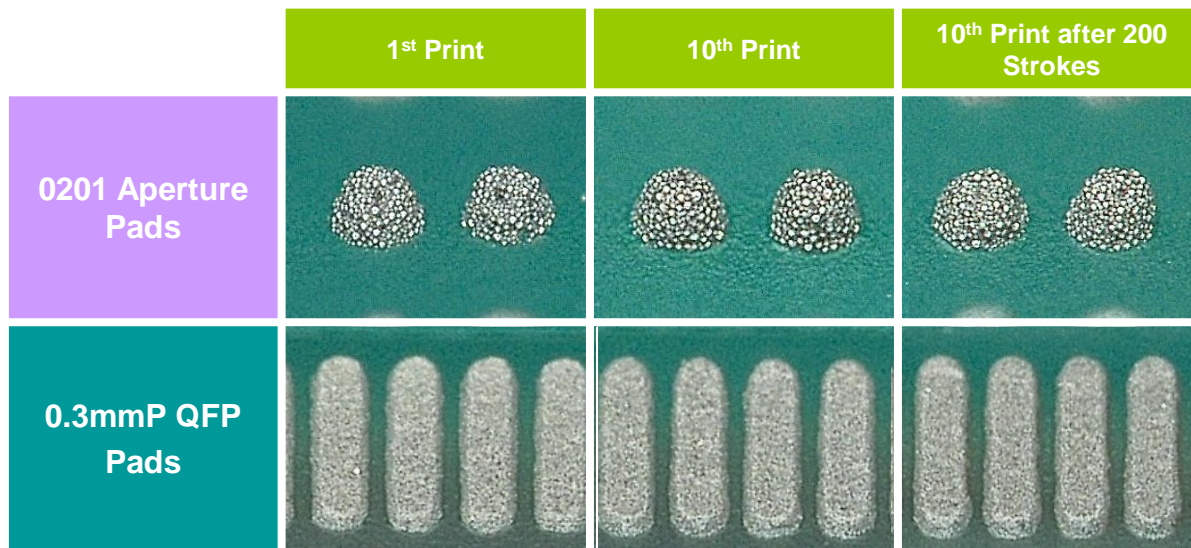
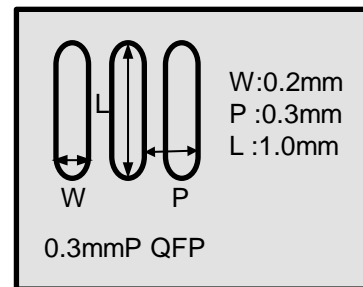
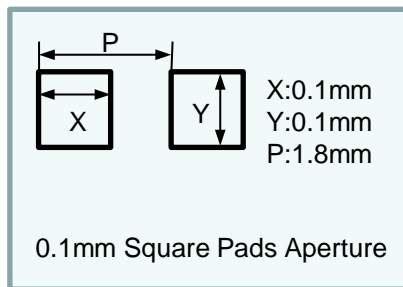
General Properties

Handling Guide

Continuous Printability

Evaluation Method:

- Metal Stencil: 0.05mm thick (laser etched)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal squeegee, 60° angle
- Print Speed: 50 mm/sec
- Test Ambient: 24~26 °C (50~60%RH)
- Test Pads: 0.3mmP QFP pads
0201 pads (0.1mm aperture)



S3X811-M500-6 can maintain consistent print shape at 0.01mm square pads and 0.3mm pitch QFP pads.



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

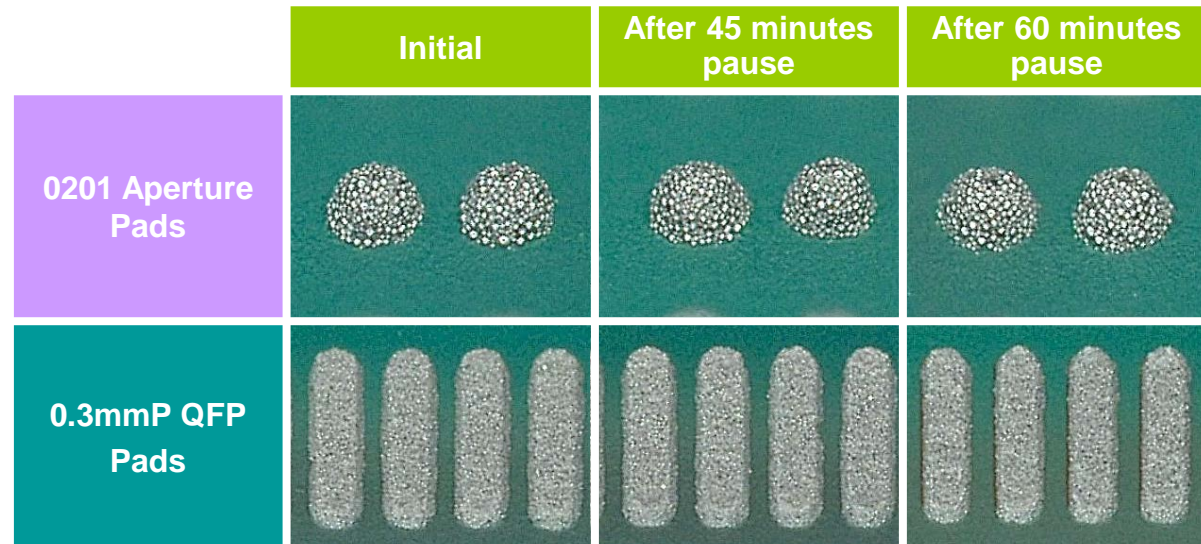
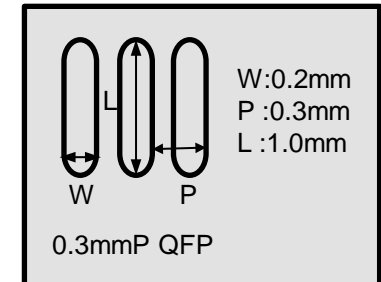
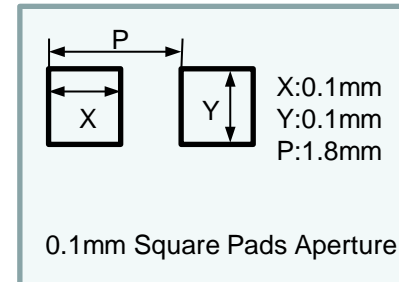
Handling Guide

Intermittent Printability

Evaluation Method:

Pause printing for 45 min. and 60 min., and then resume printing.

- Metal Stencil: 0.05mm thick (laser etched)
- Printer: YVP-Xg YAMAHA Motor
- Squeegee: Metal squeegee, 60° angle
- Print Speed: 50 mm/sec
- Test Ambient: 24~26 °C (50~60%RH)
- Test Pads: 0.3mmP QFP pads
0201 pads (0.1mm aperture)



Stable print profile can be observed after 45 minutes pause and 60 minutes pause.



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

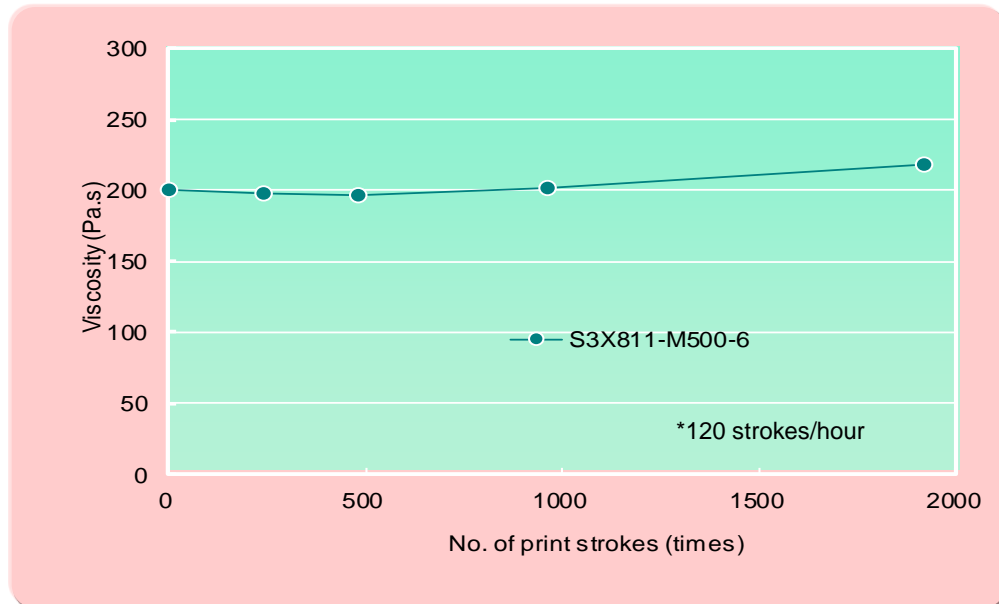
Handling Guide

Viscosity

Evaluation Method:

Mask the metal stencil and roll the solder paste for 16 hours to apply rolling shear. Measure the viscosity after predetermined number of strokes.

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



Owing to the modified formulation that prevents the reaction between solder powder and activator, S3X811-M500-6 shows good consistent viscosity.



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

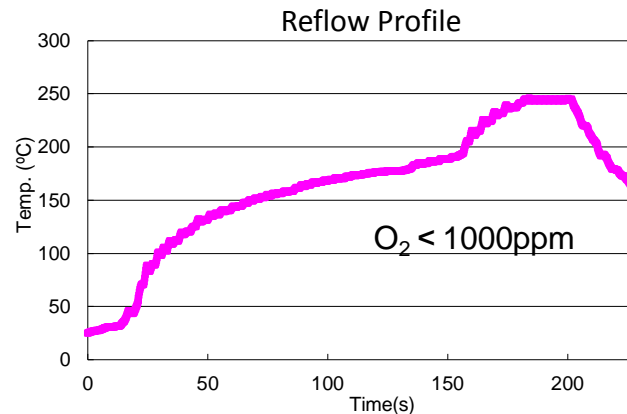
General Properties

Handling Guide

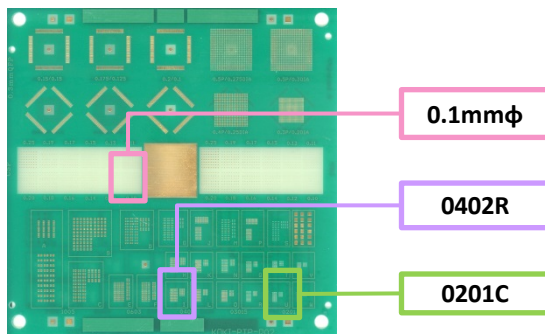
Meltability & Void

Evaluation Method

- Test PCB: FR-4 grade glass epoxy
(see the image below)
- Surface Finish: ENIG
- Stencil Thickness: 0.05mm (Laser etched)
- Evaluation Pads: 0.10mmΦCSP
- Evaluation Component: 0402R, 0201C (Sn plated)
- Stencil Aperture: 100%
- Heating Method: Hot Air Oven
- Reflow Atmosphere: N₂ (O₂: <1000ppm)
- Reflow Profile: See the diagram to right



Meltability Test Board



Surface Finish: Ni-Au



Hot Air Reflow Oven

Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

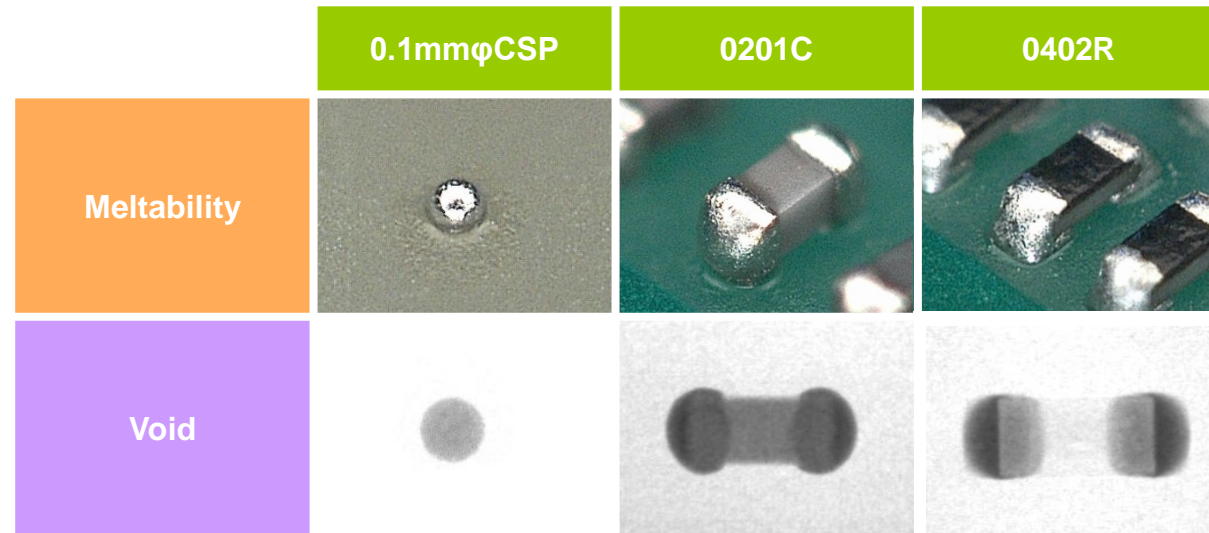
Meltability & Void

Halogen Content

General Properties

Handling Guide

Meltability & Void



S3X58-M500-6 shows good meltability and very low void occurrence.



Contents

[Features](#)
[Specifications](#)
[Continuous Printability](#)
[Intermittent Printability](#)
[Viscosity](#)
[Meltability & Void](#)
[Halogen Content](#)
[General Properties](#)
[Handling Guide](#)

Halogen Content

Evaluation Method

- BS EN 14582 (Quartz Tube Combustion-IC Method)



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

Halogen Content (ppm)

S3X58-M500-6 meets halogen free standard BS EN14582 (Cl+Br <1500 ppm) (Quartz tube combustion-IC method)



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

General Properties

Item	Result	Method
Slump Property	0.3mm pass	JIS Z 3284-3 Heated at 180°C for 5 min.
Copper Mirror Corrosion	Type L	IPC-TM-650-2.3.32
Copper Plate Corrosion	Pass	IPC-TM-650-2.6.15
Surface Insulation Resistance	> 1E+8	IPC-TM-650-2.6.3.7
Migration Test	No evidence of electromigration	IPC-TM-650-2.6.14.1



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

Handling Guide

1. Printing

1) Recommended printing condition

(1) Squeegee

- | | |
|--------------------|-----------------------------|
| 1. Shape: | Flat |
| 2. Material: | Metal or Urethane |
| 3. Angle: | 60~70° |
| 4. Print Pressure: | Low (No solder paste smear) |
| 5. Squeegee Speed: | 20~80mm/ sec. |

(2) Metal Stencil

- | | |
|---------------------------|--|
| 1. Thickness: | 30~50 μm for 0201 chip pads, |
| 2. Fabrication Method: | High quality laser or chemical etching |
| 3. Stencil Release Speed: | 7.0~10.0mm/ sec. |
| 4. Clearance: | 0 mm |

(3) Ambient

- | | |
|----------------------|--|
| 1. Temperature: | 23~27°C |
| 2. Humidity: | 40~60%RH |
| 3. Air Conditioning: | Direct air blow on metal stencil would cause the solder paste to dry up quicker. Please use a shield to adjust the air flow direction. |

2. Product Life

0~10°C: 6 months from the date of production

* How to interpret lot number

ex. Lot No. 7 02 03 2

7	02	03	2	
			→	Batch# : 2 nd batch
		→		Production Date: 3rd
	→			Production Month: February
→				Production Year: 2017



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

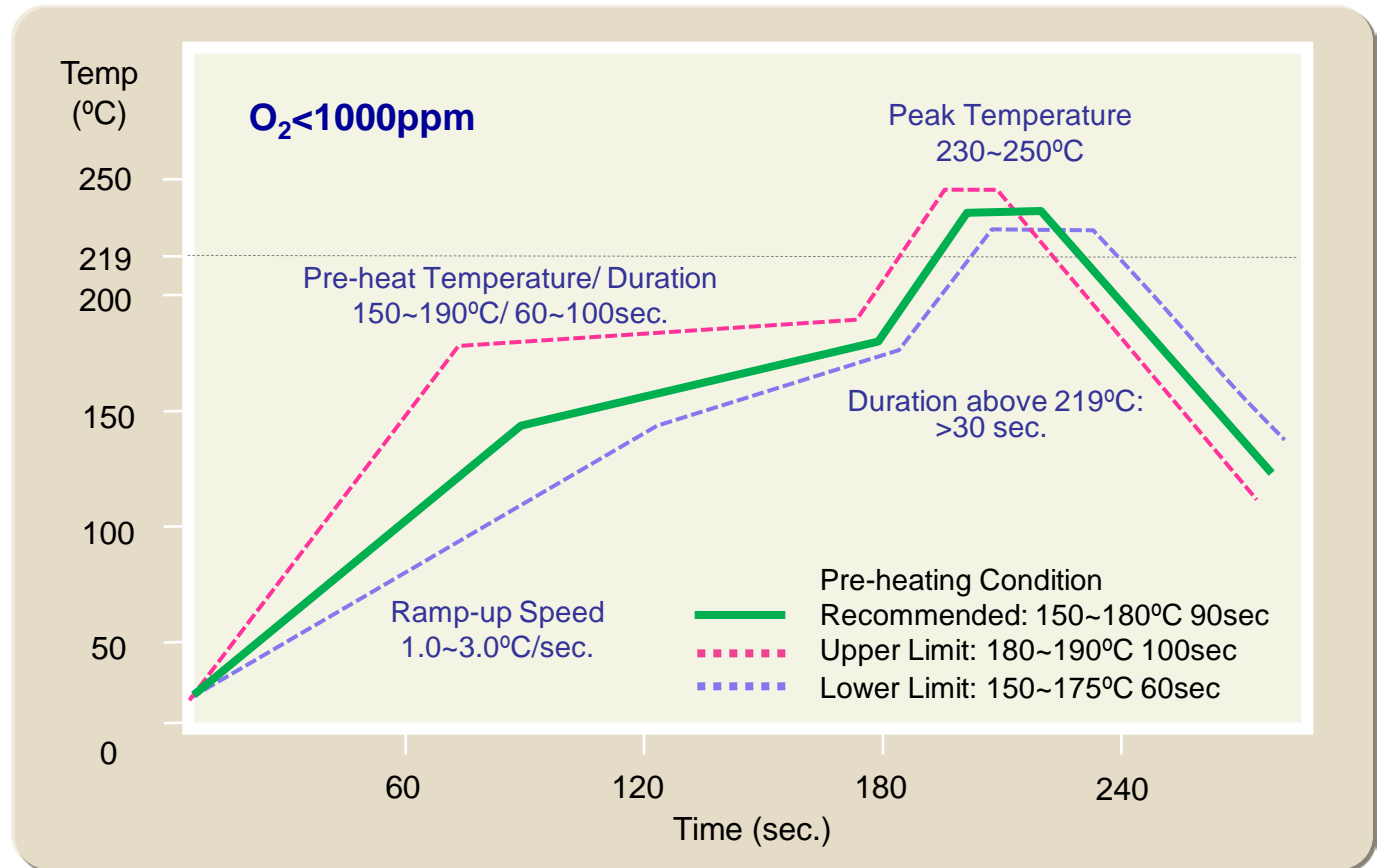
Meltability & Void

Halogen Content

General Properties

Handling Guide

Handling Guide – Recommended Reflow Profile



Contents

Features

Specifications

Continuous Printability

Intermittent Printability

Viscosity

Meltability & Void

Halogen Content

General Properties

Handling Guide

Handling Guide- Supplemental Information on Reflow Profile

