

In-containing high durability alloy solder paste

# SB6NX58-M500SI

Sn 3.5Ag 0.5Bi 6.0In 0.8Cu



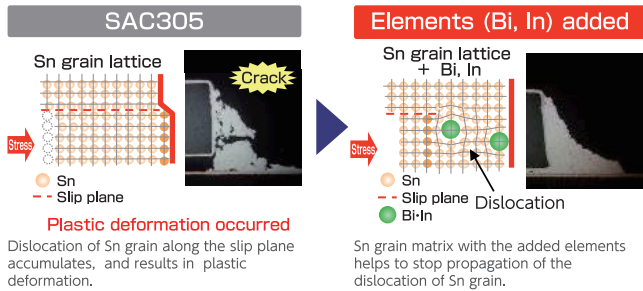
JPN PAT.#5280520

Highly thermal stress resistant alloy with indium

## Solid solution strengthening by In and Bi

### Change of form at the solder joint after thermal cycling

● Component: 6330 chip resistor ● T/C : -40 / +125°C, 2000 cycles



## Improved compatibility with ENIG

Au from ENIG diffuses into the solder quickly. Then, Ni from electroless Ni-P layer diffuses and forms Sn-Ni IMC layer. Ni continues diffusing and thickening of Sn-Ni IMC layer. This causes a concentration of P and makes the joint interface brittle.

By adding Cu, quite compatible with Ni, SB6NX precipitates and forms Cu<sub>6</sub>Sn<sub>5</sub> IMC at the interface with Ni-P. This acts as Ni barrier layer and effectively prevents the continual diffusion of Ni/thickening of Sn-Ni IMC layer / concentration of P, and realizes high joint reliability with ENIG finish.

Metal element
Bi
In
+ Cu

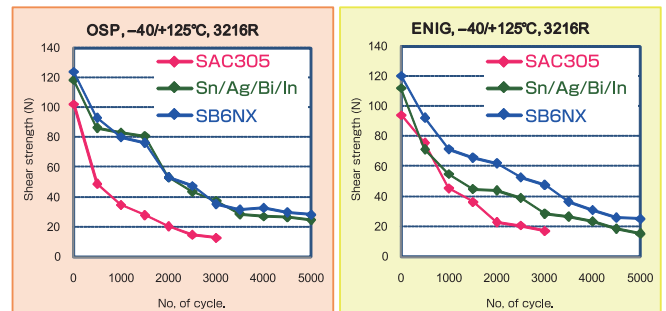
## For the better joint reliability

### SB6NX & Sn/Ag/Bi/In vs. ENIG

SEM-EDX	SB6NX		Sn/Ag/Bi/In	
	Initial	-40/+125°C, 1000cycle	Initial	-40/+125°C, 1000cycle
SEM	Solder Ni-P layer Cu			Ni-P layer disappear
Cu		Cu forms a Ni barrier layer		
Ni		Prevents growth of Sn-Ni IMC layer		Sn-Ni IMC layer grow
P				P concentrates

Ni barrier layer effectively prevents growth of Sn-Ni IMC layer after T/C.

### Shear strength after T/C at -40/+125°C



SB6NX ensures as high shear strength with ENIG as OSP substrate.

### Alloy properties

Items	Unit	SAC305	SB6NX
Liquidus	°C	219	206
Solidus	°C	217	202
Specific gravity	g/cm <sup>3</sup>	7.4	7.4
Tensile strength	MPa	25°C	34.5
		150°C	14
Elongation	%	25°C	41
		150°C	24

SB6NX has improved elongation property compared to SAC305. Better elongation property at 150°C contributes to preventing propagation of crack in T/C.

### Product specifications

Product name	SB6NX58-M500SI
Alloy composition (%)	Sn 3.5Ag 0.5Bi 6.0In 0.8Cu
Melting point (°C)	202-206
Particle size (μm)	20-38
Viscosity (Pa·s)	200
Flux content (%)	11.0
Halide content (%)	0
Flux type	ROLO

High reliability alloy with indium	High reliability	Halogen free
Fine pitch printing >0.4mm pitch >0.3mm dia. CSP	No clean type	Tack time >48hours