Attention to counterfeit products.

Counterfeit flux core and other inauthentic SMIC solder products have been distributed abroad. Please purchase genuine SMIC products from SMIC subsidiaries or authorized distributors.

Contact

SENJU METAL INDUSTRY CO., LTD.
HEADQUARTERS
Senju Hashido-cho 23, Adachi-ku, Tokyo 120-8555, Japan
Phone +81-3-3888-9151
URLs www.senju.com/en
Solder Preform is pre-forms of solid solder alloys with potential to change the future. Combination of machining technologies such as rolling and pressing are used to process the solder alloy into various shapes, allowing the solder to be used effectively. With the evolution of the soldering process, SMIC has developed ECO SOLDER PREFORM that has various structures to help customer's innovation.

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- Flux Cored 10
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- Base Material Physical Properties for Solder Coated Metal

**Line up**
Promote various synergies by selecting from 6 shapes as well as from solder alloy composition and dimensions.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Structure</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribbon</td>
<td>Single Layered</td>
<td>Ni Balls Contained</td>
</tr>
<tr>
<td>Square</td>
<td>Flux Coated</td>
<td>Solder Coated Metal</td>
</tr>
<tr>
<td>Disc</td>
<td>Flux Coated Metal</td>
<td>Double Layered</td>
</tr>
<tr>
<td>Washer</td>
<td>Solder Coated Metal</td>
<td></td>
</tr>
<tr>
<td>Chip</td>
<td>Base Material</td>
<td></td>
</tr>
<tr>
<td>Wire</td>
<td>Physical Properties</td>
<td></td>
</tr>
</tbody>
</table>

Custom shapes and dimensions are available for customer requirements.
Wound in tape reels and can be cut into required lengths prior to mounting.

Reliable heat sealing for areas where paste printing is difficult, preventing uneven heating.

Note) Various shapes and sizes can be made according to customer requirements.

Shape

**Ribbon**
- W Width
  - Min: 0.5 mm (0.020 in.)
  - Max: 70 mm (2.756 in.)
- T Thickness
  - Min: 0.05 mm (0.002 in.)
  - Max: 0.35 mm (0.014 in.)
- L Length
  - Please ask about this specification.

**Square**
- T Thickness
  - Min: 0.05 mm (0.002 in.)
  - Max: 2.5 mm (0.098 in.)

**Disc**
- OD Outer Diameter
  - Min: 0.3 mm (0.012 in.)
  - Max: 62 mm (2.441 in.)
- T Thickness
  - Min: 0.05 mm (0.002 in.)
  - Max: 2.5 mm (0.098 in.)

**Washer**
- OD Outer Diameter
  - Min: 1.2 mm (0.047 in.)
  - Max: 40 mm (1.575 in.)
- ID Inner Diameter
  - Min: 0.6 mm (0.024 in.)
  - Max: 35 mm (1.378 in.)
- T Thickness
  - Min: 0.05 mm (0.002 in.)
  - Max: 2.5 mm (0.098 in.)

**Chip**
- SIDE A
  - Min: 0.6 mm (0.024 in.)
  - Max: 3.2 mm (0.126 in.)
- SIDE B
  - Min: 0.3 mm (0.012 in.)
  - Max: 1.6 mm (0.063 in.)

**Wire**
- OD Outer Diameter
  - Min: 0.3 mm (0.012 in.)
  - Max: 1 mm (0.039 in.)
- L Length
  - Please ask about this specification.

Minimum and maximum values may vary depending on the alloy composition.

Soldering methods for each shape

**Ribbon**
- Wound in tape reels and can be cut into required lengths prior to mounting.

**Square**
- Fixed amount of solder is supplied to components within a predetermined tolerance range.
- Enables identification by matching the pad shapes of substrates and components.
- Feeding to where it’s difficult to supply solder paste and flux coated solder.

**Disc**
- Processed into shapes to fit the components.

**Washer**
- Reliable heat sealing for areas where paste printing is difficult, preventing uneven heating.
Chip

Reinforces the area where the amount of solder is insufficient

- Unique pressing technique flattening all four bonding faces of the chips
- Automatic mounting possible with chip mounter
- Joint reinforcement of pin thru-hole components using reflow

Wire

Makes low-cost, high-quality die bonding a reality

- The wire method allowing soldering at a cheaper price than the preform method
- Fewer surface scratches and oxide film combined with good wettability making flux-free soldering possible
- Superb condition of the wire surface suppressing the formation of voids

### Unique pressing technique allows flattening of all four bonding faces of the chips

![Chip solder mounting](image1)

### Automatic mounting possible with chip mounter

![Component mounting](image2)

### Joint reinforcement of pin thru-hole components using reflow

![Preform method](image3)

### Wettability and voids

<table>
<thead>
<tr>
<th>Surface condition of wires (SEM)</th>
<th>Wettability comparison (in reducing atmosphere)</th>
<th>Comparison of voids</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMIC products</td>
<td>Less scratches, oil, grease and oxide film deposits</td>
<td>Excellent wettability</td>
</tr>
<tr>
<td>On-market products</td>
<td></td>
<td>Void percentage: Less than 2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Void percentage: Less than 5%</td>
</tr>
</tbody>
</table>
Single Layered

Solder Alloy Composition and Shapes for Customer’s Requirements

- Consistent solder joint quality in mass production with fixed shapes and quantity.
- Allows for flux-free soldering in inert atmospheres.
- Solder alloys with difficult process properties, such as those containing Bi and Sb, are available.

Shape

Ideal for die bonding

- Ensures standoff to prevent cracking due to concentrated thermal stress.
- Flat layered structure improves wire bonding accuracy.
- Unique Ni ball technology eliminates causes of voids and helps maintain heat dissipation performance.

Structure

Single Layered preform is the standard type of ECO SOLDER PREFORM. Can be applied in various soldering methods by selecting proper solder alloy composition depending on requirements and processing into proper shapes. In addition, the product is processed with high dimensional accuracy, which contributes to mass production stability.

Applications

Ideal for die bonding where it is difficult to feed the solder and expecting to eliminate voids.

Ni Balls Contained

Ni Ball Spacer Function Improves Joint Reliability

- Ensures standoff to prevent cracking due to concentrated thermal stress.
- Flat layered structure improves wire bonding accuracy.
- Unique Ni ball technology eliminates causes of voids and helps maintain heat dissipation performance.

Structure

Ni Balls Contained preform has nickel balls with a small particle size inside the preform. When soldering, it forms a standoff with the particle size of the Ni balls as the minimum to ensure the evenness of the soldering components.

Applications

- High-quality power modules

Performance / Lineup

- Spacer function of Ni balls

Ni balls suppress variations in solder thickness

Solder thickness [μm]
**Flux Cored**

Synergistic Effect of Preform and Flux
- Fixed shapes and quantity while adding the functions of flux.
- Ideal for thru-hole soldering of connectors, discrete and metal components.
- Reduces production costs by switching from selective flow soldering.

Flux Cored preform has flux inside the preform. In addition to eliminating the flux application process, storage and handling are also easier due to the solid stability. Customers can choose alloys and flux according to the requirements and purposes.

**Applications**

- Assembling metal components
- Selective heat soldering of heat-sensitive components
- Thru-hole reflow soldering of inserted components

**Performance / Lineup**

Please refer to our eco solder preform product catalogue.

<table>
<thead>
<tr>
<th>Flux Type</th>
<th>IPC Classification</th>
<th>Applicable Base Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFC1</td>
<td>R</td>
<td>ROL0 Ni/Au plating, Ag, Cu, etc.</td>
</tr>
<tr>
<td>SFC2</td>
<td>Halogen free</td>
<td>ROL0 Ni/Au plating, Ag, Cu, etc.</td>
</tr>
<tr>
<td>SFC3</td>
<td>RMA</td>
<td>ROL1 Ni/Au plating, Ag, Cu, etc.</td>
</tr>
<tr>
<td>SFC4</td>
<td>RA</td>
<td>ROL1 Ni, brass, Cu, Sn, etc.</td>
</tr>
<tr>
<td>SFC5</td>
<td>RA</td>
<td>ROM1 Ni, brass, Cu, Sn, etc.</td>
</tr>
</tbody>
</table>

Please contact us for more information about other products.

**Flux Coated**

Excellent Joints Even on Uneven Surfaces
- Flux application is not necessary.
- Allows the paste to be applied to hard-to-apply uneven surfaces.

Flux Coated preform is the general-purpose preform which is evenly dry-coated with flux, eliminating the need of manual fluxing.

**Applications**

- Select coating flux according to the purpose
Solder Coated Metal

Applying the Shapes, Dimensions, and Properties of Base Metal to Soldering

- Thick solder coating protects the base metal surface and ensures the solder feed.
- Base metal ensures the soldering standoff and improves its reliability.
- Molding technology enables supplying a variety of shapes.

Structure

Solder Coated Metal can be used as composite solder joining components by forming a solder alloy layer on the surface of ferrous and non-ferrous base metals through a melt coating process and shaping it according to the purpose.

Applications

- Component for hermetically sealed devices
- Base metal can be used as a spacer
- Forms 10 to 25 μm solder coating thickness

Performance

- Ensures standoff and adds joint characteristics
- Uniformity of the solder coating layer
- Maintains peel resistance

Integrating Materials with Different Properties to Develop New Joint Processing

- Solder alloys with different properties are laminated.
- Two-step soldering utilizing different melting temperatures.
- Optimal joint for electrodes with different surface materials.

Structure

Double layered preform is a multifunctional product where two solder alloys with different properties are roll cladded. Enables two-step joints by temperature and optimum composition solder joints with different materials and treatments by utilizing the difference in temperatures and mechanical properties.

Applications

- Joining with optimum solder composition for bonding surface conditions
- Surface treatment for identifying the composition of the surface
- Cutoff fuses for temperature sensors

Performance

- Ensures standoff and adds joint characteristics
- Uniformity of the solder coating layer
- Maintains peel resistance

Note) All products are tailor made. Please contact us when considering these products.
Solder Alloy Lineup

<table>
<thead>
<tr>
<th>Alloy name</th>
<th>Alloy composition(wt%)</th>
<th>Melting temperature range(℃)</th>
<th>Structure of products</th>
</tr>
</thead>
<tbody>
<tr>
<td>M705</td>
<td>Sn-3.0Ag-0.5Cu</td>
<td>217 – 220</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M30</td>
<td>Sn-3.5Ag</td>
<td>221 – 223</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M31</td>
<td>Sn-3.5Ag-0.75Cu</td>
<td>217 – 219</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M34</td>
<td>Sn-1.0Ag-0.5Cu</td>
<td>217 – 227</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M30</td>
<td>Sn-0.75Cu</td>
<td>227 – 229</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M40</td>
<td>Sn-1.0Ag-0.7Cu-Bi-In</td>
<td>211 – 222</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M10</td>
<td>Sn-0.5Sb</td>
<td>240 – 243</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M14</td>
<td>Sn-10Sb</td>
<td>245 – 266</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M794</td>
<td>Sn-3.4Ag-0.7Cu-Bi-Sb-Ni-x</td>
<td>210 – 221</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M725</td>
<td>Sn-0.7Cu-Ni-P</td>
<td>228 – 230</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>M731</td>
<td>Sn-3.5Ag-0.6Cu-0.6Sb</td>
<td>221 – 226</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
<tr>
<td>L20</td>
<td>Sn-58Bi</td>
<td>139 – 141</td>
<td>● ● ● ● ● ● ● ● ● ● ●</td>
</tr>
</tbody>
</table>

Please contact us for more information about other alloy composition.

- M705: 3% Ag general-purpose alloy with more than 20 years of experience
- M794: Heat & fatigue-resistant alloy for automotive applications
- M731: Heat & fatigue-resistant general-purpose alloy for automotive applications
- M20: Ag-free, Cu based general-purpose alloy
- M10: Sb based general-purpose alloy with a high melting point
- L20: Bi based general-purpose alloy with a low melting point

Realization of fixed shape & quantity by low-temperature, Bi-based solder preform

Typical composition

L20 (Sn-58Bi)

Improving mass production stability for low-temperature soldering and effective for solder feeding methods to which solder pastes are difficult to apply.

Supplying fixed quantity of high-strength solder ensures reliable soldering that can withstand severe environments such as those in automotive, industrial, and aerospace equipment.

High-strength, Sb-based solder composition preforms allow for secure soldering of electronic power devices

Typical composition

M14 (Sn-10Sb)