

# ALPHA<sup>®</sup> OM-338-CSP

## ULTRA FINE FEATURE LEAD-FREE SOLDER PASTE

### DESCRIPTION

**ALPHA OM-338-CSP** is a lead-free, no-clean solder paste designed for a broad range of applications. **ALPHA OM-338-CSP's** broad processing window is designed to minimize transition concerns from tin/lead to lead free solder paste. This material is engineered to deliver the comparable performance to a tin lead process.\* **ALPHA OM-338-CSP** yields excellent print capability performance across various board designs and, particularly, with ultra fine feature repeatability and high "through-put" applications.

Outstanding reflow process window delivers good soldering on CuOSP with excellent coalescence on a broad range of deposit sizes, excellent random solder ball resistance and mid-chip solder ball performance. **ALPHA OM-338-CSP** is formulated to deliver excellent visual joint cosmetics. Additionally, **ALPHA OM-338-CSP's** capability of IPC Class III for voiding and ROL0 IPC classifications ensures maximum long-term product reliability.

*\*Although the appearance of these lead-free alloys will be different to that of tin-lead, with mechanical reliability equal to or greater than with that of tin-lead or tin-lead-silver.*

### FEATURES & BENEFITS

- Maximizes reflow yield for lead-free processing, allowing full alloy coalescence at circular dimensions as small as 0.24mm (0.096") with 0.100mm (4mil) stencil thickness.
- Excellent print consistency with high process capability index across all board designs.
- Print speeds of up to 150mm/sec (6"/sec), enabling a fast print cycle time and a high throughput.
- Wide reflow profile window with good solderability on various board / component finishes.
- Excellent solder and flux cosmetics after reflow soldering
- Reduction in random solderballing levels, minimizing rework and increasing first time yield
- Meets highest IPC 7095 voiding performance classification of Class III.
- Excellent reliability properties, halide-free material
- Compatible with either nitrogen or air reflow

### PRODUCT INFORMATION

<u>Alloys:</u>	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu) e1 alloys per JESD97 Classification For other alloys, contact your local Cookson Electronics Sales Office.
<u>Powder Size:</u>	Type 4.5
<u>Residues:</u>	Approximately 5% by (w/w)
<u>Packaging Sizes:</u>	500 gram jars, 6"
<u>Lead Free:</u>	Complies with RoHS Directive 2002/95/EC.

### APPLICATION

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25mm/sec (1"/sec) and 150mm/sec (6"/sec), with stencil thickness of 0.100mm (0.004") to 0.150mm (0.006"), particularly when used in conjunction with ALPHA<sup>®</sup> Stencils. Blade pressures should be 0.16-0.34 kg/cm of blade (0.9 -2lbs/inch), depending upon the print speed. The higher the print speed employed, the higher the blade pressure that is required. The reflow process window will give high soldering yield with good cosmetics and minimized rework.

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## SAFETY

While the **ALPHA OM-338-CSP** flux system is not considered toxic, its use in typical reflow will generate a small amount of reaction and decomposition vapors. These vapors should be adequately exhausted from the work area. Consult the MSDS for additional safety information.

## STORAGE

**ALPHA OM-338-CSP** should be stored in a refrigerator upon receipt at 0 to 10°C (32-50°F). **ALPHA OM-338-CSP** should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 2). This will prevent moisture condensation build up in the solder paste.

### ALPHA OM-338-CSP TECHNICAL DATA

CATEGORY	RESULTS	PROCEDURES/REMARKS
<b>CHEMICAL PROPERTIES</b>		
Activity Level	ROL-0 = J-STD Classification	IPC J-STD-004
Halide Content	Halide free (by titration). Passes Ag Chromate Test	IPC J-STD-004
Copper Mirror Test	<b>Pass</b>	IPC J-STD-004
Copper Corrosion Test	<b>Pass</b> , (No evidence of Corrosion)	IPC J-STD-004
<b>ELECTRICAL PROPERTIES</b>		
SIR (IPC 7 days @ 85° C/85% RH)	<b>Pass</b> , > 1.9 x 10 <sup>10</sup> ohms	IPC J-STD-004 {Pass ≥ 1 x 10 <sup>8</sup> ohm min}
SIR (Bellcore 96 hours @ 35°C/85%RH)	<b>Pass</b> , 8.3 x 10 <sup>12</sup> ohms	Bellcore GR78-CORE {Pass ≥ 1 x 10 <sup>11</sup> ohm min}
Electromigration (Bellcore 96 hours @ 65°C/85%RH 10V 500 hours)	<b>Pass</b> , Initial= 5.3 x 10 <sup>10</sup> ohms Final= 1.5 x 10 <sup>11</sup> ohms	Bellcore GR78-CORE {Pass=final > initial/10}
<b>PHYSICAL PROPERTIES</b>		
Color	Clear, Colorless Flux Residue	SAC 305, 405 alloy
Tack Force vs. Humidity (t=8 hours)	<b>Pass</b> -Change of <1 g/mm <sup>2</sup> over 24 hours at 25% and 75 % Relative Humidity	IPC J-STD-005
	<b>Pass</b> -Change of <10% when stored at 25±2°C and 50±10% relative humidity.	JIS Z3284 Annex 9
Viscosity	OM-338-CSP: 88.3% metal load designated M14 for printing.	Malcom Spiral Viscometer; J-STD-005
Solderball	<b>Acceptable</b> (SAC 305 and SAC405 alloys)	IPC J-STD-005
	<b>Pass</b> Class 2, 1 hour and 72 hour	DIN Standard 32 513, 4.4
Stencil Life	> 8 hours	@ 50%RH, 23°C (74°F)
Spread	<b>Pass</b>	JIS-Z-3197: 1999 8.3.1.1
Flux Tackiness Test	<b>Pass</b>	DIN 32513 Talc Test
Slump	<b>Pass</b>	IPC J-STD-005 (10 min 150°C)
	<b>Pass</b>	DIN Standard 32 513, 5.3
	<b>Pass</b>	JIS-Z-3284-1994 Annex 8



ALPHA OM-338-CSP Processing Guidelines			
STORAGE-HANDLING	PRINTING	REFLOW (See Figure #1)	CLEANING
<ul style="list-style-type: none"> <li>•Refrigerate to guarantee stability @ 0-10°C (32-50°F)</li> <li>•Shelf life of refrigerated paste is six months.</li> <li>•Paste can be stored for 2 weeks at room temperatures up to 25°C (77°F) prior to use.</li> <li>•When refrigerated, warm-up of paste container to room temperature for up to 4 hours. Paste must be ≥19°C (66°F) before processing. Verify paste temperature with a thermometer to ensure paste is at 19°C (66°F) or greater before setup. Printing can be performed at temperatures up to 29°C (84°F).</li> <li>•Do not remove worked paste from stencil and mix with unused paste in jar. This will alter rheology of unused paste.</li> <li>•These are starting recommendations and all process settings should be reviewed independently.</li> </ul>	<p><b>STENCIL:</b> Recommend Cookson Electronics ALPHA CUT or ALPHA FORM stencils @ 0.100mm - 0.150 mm (4-6 mil) thick for 0.4 - 0.5 mm (0.016" or 0.020") pitch. Stencil design is subject to many process variables. Contact your local Cookson Electronics stencil site for advice.</p> <p><b>SQUEEGEE:</b> Metal (recommended)</p> <p><b>PRESSURE:</b> 0.16-0.34 kg/cm of squeegee length (0.9-2.0 lbs./inch).</p> <p><b>SPEED:</b> 25 to 200mm per second (1 to 8 inches per second).</p> <p><b>PASTE ROLL:</b> 1.5-2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade "Exceeding the maximum diameter may cause curtaining (sticking to the squeegee when it is lifted from the stencil)."</p>	<p><b>ATMOSPHERE:</b> Clean-dry air or nitrogen atmosphere.</p> <p><b>PROFILE (SAC Alloys):</b> A straight ramp profile @ 0.8°C to 1.7°C per second ramp rate is recommended (TAL 35-90 sec and peak 232-250°C)<sup>1</sup>. Higher density assemblies may require preheating within the profile and may be accomplished as follows:</p> <ul style="list-style-type: none"> <li>- Ramp @ 0.8-1.7°C/sec. to 135-160°C.</li> <li>- Ramp from 130°C to liquidus over 60-90 seconds.</li> <li>- Ramp from 150°C to liquidus over 30-60 seconds.</li> <li>- Time above liquidus = 35-90 seconds</li> <li>- Ramp down to R.T. @ 3 to 7°C per second (fast ramp down is recommended)</li> </ul> <p>Note 1: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics.</p>	<p>ALPHA OM-338-CSP residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, ALPHA BC-2200 aqueous cleaner is recommended. For solvent cleaning, agitation for 5 min in the following cleaners is recommended:</p> <ul style="list-style-type: none"> <li>- ALPHA SM-110E</li> <li>- Bioact™ SC-10E</li> <li>- Kyzen Micronox MX2501</li> </ul> <p>Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 and Bioact™ SC-10E cleaners.</p>

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Figure #1 – Reflow Envelope

