

# ALPHA® OM338-CSP

Ultra Fine Featured, Zero Halogen, 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 (11 mil Squares) and high throughput 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 exceptional 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. **ALPHA OM-338-CSP** is also known as ALPHA OM-338 with M13 viscosity.

*\*Although the appearance of these lead-free alloys will be different to that of tin-lead, the mechanical reliability is 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 0.25mm (0.010") with 0.100mm (4mil) stencil thickness.
- Excellent print consistency with high process capability index across all board designs.
- Print speeds of up to 200mm/sec (8"/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
- Zero Halogen

## PRODUCT INFORMATION

|                         |                                          |
|-------------------------|------------------------------------------|
| <u>Alloys:</u>          | SAC305 (96.5%Sn/3.0%Ag/0.5%Cu)           |
| <u>Powder Size:</u>     | Type 4.5                                 |
| <u>Residues:</u>        | Approximately 5% by (w/w)                |
| <u>Packaging Sizes:</u> | 500 gram jars, 6" cartridges             |
| <u>Lead Free:</u>       | Complies with RoHS Directive 2002/95/EC. |

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## APPLICATION

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25mm/sec (1"/sec) and 200mm/sec (8"/sec), with stencil thickness of 0.100mm (0.004") to 0.150mm (0.006"), particularly when used in conjunction with ALPHA 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.

## HALOGEN STATUS

ALPHA OM-338-CSP is a halogen free product and passes the standards listed in the Table below:

| Halogen Standards                                                                           |                                                                                                            |                    |        |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------|--------|
| Standard                                                                                    | Requirement                                                                                                | Test Method        | Status |
| <b>JEITA ET-7304</b><br><i>Definition of Halogen Free Soldering Materials</i>               | < 1000 ppm Br, Cl, F in solder material solids                                                             | <b>TM EN 14582</b> | Pass   |
| <b>IEC 612249-2-21</b>                                                                      | Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm Br or Cl from flame retardant source |                    | Pass   |
| <b>JEDEC</b><br><i>A Guideline for Defining "Low Halogen" Electronics</i>                   | Post soldering residues contain < 1000 ppm Br or Cl from flame retardant source                            |                    | Pass   |
| <b>Halogen Free:</b> No halogenated compounds have been intentionally added to this product |                                                                                                            |                    |        |

## 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 SDS for additional safety information. The most recent version of the SDS is available from [alphaassembly.com](http://alphaassembly.com).

## 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 4). This will prevent moisture condensation build up in the solder paste.

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## TECHNICAL DATA

| CATEGORY                                                          | RESULTS                                                                                              | PROCEDURES/REMARKS                                           |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>CHEMICAL PROPERTIES</b>                                        |                                                                                                      |                                                              |
| Activity Level                                                    | ROL-0 = J-STD Classification                                                                         | IPC J-STD-004A                                               |
| Halide Content                                                    | Halide free (by titration).<br>Passes Ag Chromate Test                                               | IPC J-STD-004A                                               |
| Halogen Test                                                      | Pass, Halogen Free                                                                                   | By formulation                                               |
| Copper Mirror Test                                                | Pass                                                                                                 | IPC J-STD-004A                                               |
| Copper Corrosion Test                                             | Pass, (No evidence of Corrosion)                                                                     | IPC J-STD-004A                                               |
| <b>ELECTRICAL PROPERTIES</b>                                      |                                                                                                      |                                                              |
| SIR (IPC 7 days @ 85° C/85% RH)                                   | Pass, $> 1.9 \times 10^{10}$ ohms                                                                    | IPC J-STD-004A<br>{Pass $\geq 1 \times 10^8$ ohm min}        |
| SIR (Bellcore 96 hrs @ 35°C/85%RH)                                | Pass, $8.3 \times 10^{12}$ ohms                                                                      | Bellcore GR78-CORE<br>{Pass $\geq 1 \times 10^{11}$ ohm min} |
| Electromigration<br>(Bellcore 96 hrs @ 65°C/85%RH<br>10V 500 hrs) | Pass, Initial= $5.3 \times 10^{10}$ ohms<br>Final= $1.5 \times 10^{11}$ ohms                         | Bellcore GR78-CORE<br>{Pass=final $>$ initial/10}            |
| <b>PHYSICAL PROPERTIES</b>                                        |                                                                                                      |                                                              |
| Color                                                             | Clear, Colorless Flux Residue                                                                        | Using 88.5% Metal, Type 4.5 Powder.<br>SAC 305               |
| Tack Force vs. Humidity (t=8 hours)                               | Pass -Change of $<1$ g/mm <sup>2</sup> over 24 hours at 25% and 75 % Relative Humidity               | IPC J-STD-005                                                |
|                                                                   | Pass -Change of $<10\%$ when stored at $25 \pm 2^\circ\text{C}$ and $50 \pm 10\%$ relative humidity. | JIS Z3284 Annex 9                                            |
| Solderball                                                        | Acceptable SAC 305                                                                                   | IPC J-STD-005                                                |
| Stencil Life                                                      | Pass Class 2, 1 hour and 72 hour                                                                     | DIN Standard 32 513, 4.4                                     |
| Spread                                                            | $> 8$ hours                                                                                          | @ 50%RH, 23°C (74°F)                                         |
| Flux Tackiness Test                                               | Pass                                                                                                 | JIS-Z-3197: 1999 8.3.1.1                                     |
| Slump                                                             | Pass                                                                                                 | DIN 32513 Talc Test                                          |
|                                                                   | Pass                                                                                                 | IPC J-STD-005 (10 min 150°C)                                 |
|                                                                   | Pass                                                                                                 | DIN Standard 32 513, 5.3                                     |
|                                                                   | Pass                                                                                                 | JIS-Z-3284-1994 Annex 8                                      |

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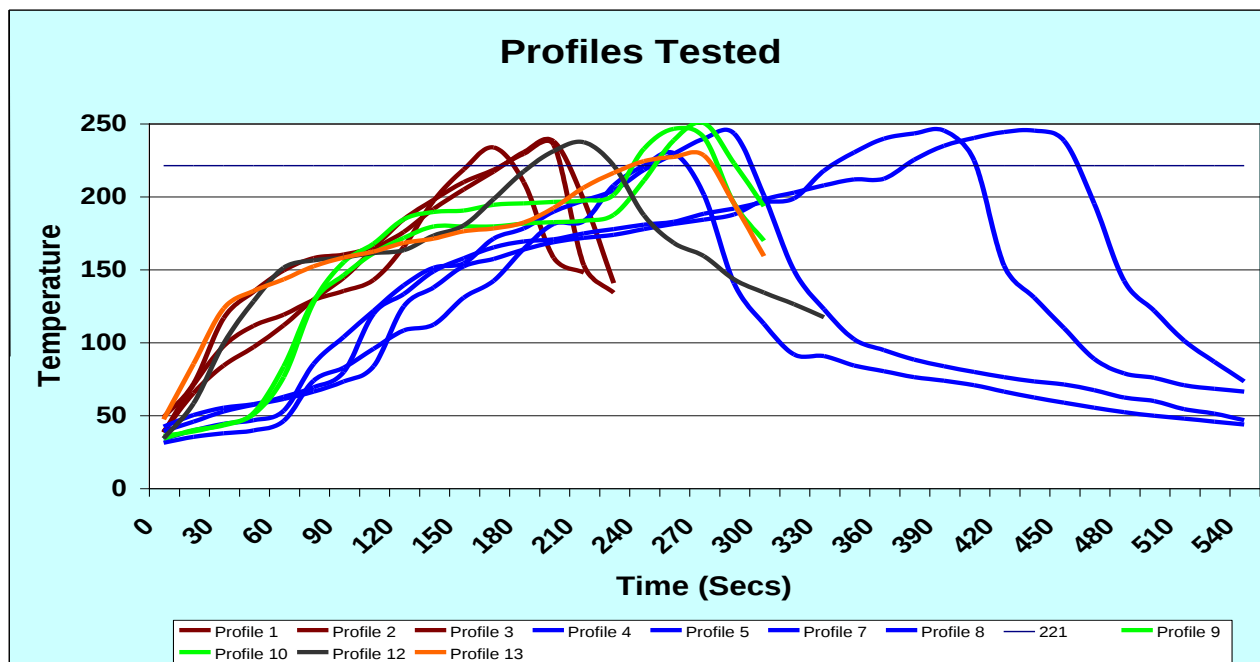
## PROCESSING GUIDELINES

| 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><u>STENCIL:</u> Recommend 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 Alpha stencil site for advice.</p> <p><u>SQUEEGEE:</u> Metal (recommended)</p> <p><u>PRESSURE:</u> 0.16-0.34 kg/cm of squeegee length (0.9-2.0 lbs/inch).</p> <p><u>SPEED:</u> 25 to 200mm per second (1 to 8 inches per second).</p> <p><u>STENCIL RELEASE SPEED:</u> 5-20mm/sec.</p> <p><u>PASTE ROLL:</u> 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.</p> <p><u>PRINT PUMP HEAD:</u> Passes MPM 2000 print compaction and DEK ProFlow™ testing.</p> | <p><u>ATMOSPHERE:</u> Clean-dry air or nitrogen atmosphere.</p> <p><u>PROFILE (SAC Alloys):</u><br/>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).</p> <p><sup>(1)</sup> Higher density assemblies may require preheating with within the profile and may be accomplished as follows:</p> <p>From 40°C to Liquidus: Between 2min 30 sec. and 4 min. (optimum<sup>(2)</sup> is 3 min.) From 170°C to Liquidus: Between 45 sec. and 75 sec. (optimum<sup>(2)</sup> is 1 min.) From 130°C to Liquidus: Between 1min. 20 sec. and 2 min. 15 sec. (optimum<sup>(2)</sup> is 1min. 30 sec.) Time above liquidus: Between 30 sec. and 90 sec. (optimum<sup>(2)</sup> is 45 sec. to 70 sec.)</p> <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>Note 2: OM-338 is designed to work under a wide range of reflow profiles in order to find the optimum profile for your process. This can be achieved by balancing:</p> <p>Minimum Delta T's (depending on board mass and thermal oven characteristics)</p> <p>Maximum Reflow Yield (includes voiding, cosmetics, solder balling, etc.)</p> <p>Minimum Stress and Overheat for Components and Boards (refer to suppliers' guidelines and specifications.</p> <p>Contact your local Alpha Application Engineer for further details.</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> <li>- ATRON® AC 205 (Zestron)</li> </ul> <p>Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200, Bioact™ SC-10E and ZESTRON® SD 301 cleaners.</p> |

## ALPHA® OM338-CSP

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Figure #1 – Reflow Envelope



### CONTACT INFORMATION

To confirm this is the most recent issue, please contact Alpha Assembly Solutions

AlphaAssembly.com

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency directory assistance Chemtrec 1 - 800 - 424 - 9300.

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