One-Step Underfill 688

Solder plus Support

Underfill

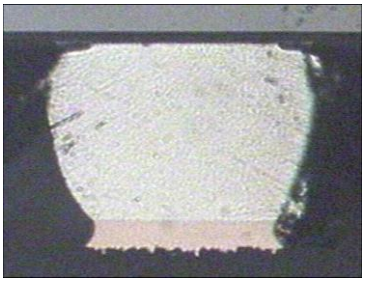
Features

- Eliminates Voiding
- Compatible with No-Clean Flux Residues
- For use with solder bumps or spheres
- Cures in Lead-Free Profile
- Flux and Underfill in One-Step
- Eliminates Underfill Cure Cycle

Description

One-Step Underfill 688 is a low surface tension, one component epoxy resin designed as a one-step underfill for flip chip, CSP, BGA and micro-BGA assemblies. One-Step Underfill 688 contains a fluxing agent, eliminating the need for solder paste with bumped/balled components. 688 eliminates the need for a separate epoxy dispense and cure step following solder reflow. One-Step Underfill 688 improves drop-shock and mechanical performance with a high Tg, low CTE, low voiding underfill. 688 is compatible with AIM solder paste or liquid flux residues, as well as common surface finishes.

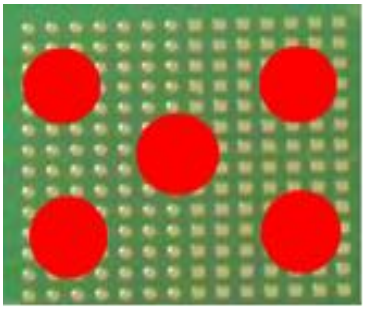
Formed with One-Step Underfill 688



Application

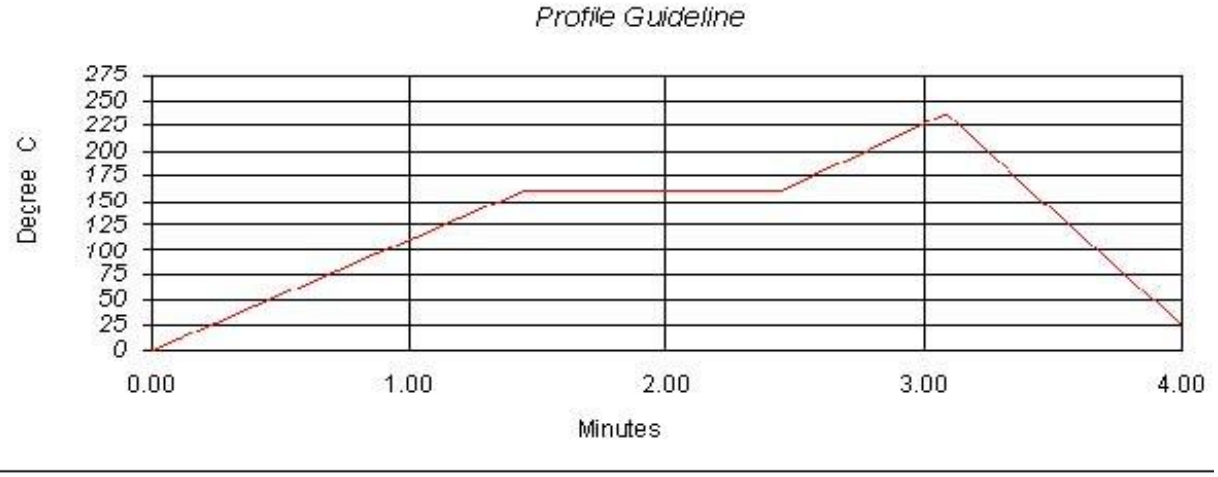
- Print lead-free solder paste. Dispense One-Step Underfill 688 on PCB where solder bumps will be placed. Solder paste should NOT be applied to these areas. Place all components. Reflow in recommended lead-free profile. Curing: MUST be cured in a lead-free solder profile, maximum temperature 255°C (491°F).
- The dispense pattern for small die applications 6.35mm (.25") is typically single center dot only. Ensure that all pads are covered with One-Step Underfill 688.
- The dispense pattern for larger die applications is typically dot pattern from the center out ensuring all pads are covered.
- One-Step Underfill 688 can be reworked. Heat the component to solder reflow temperature and remove it with a flat spatula. Soldering wick and a soldering iron may be used to remove residual epoxy. Clean the pads with a small amount of solvent, such as methyl ethyl ketone or isopropyl alcohol.
- Rework: One-Step Underfill 688 softens at 120°C – 140°C (248°F – 284°F).

Recommended Dispense Pattern



Recommended Reflow Profile

One-Step Underfill 688 is designed for lead-free processing. If a lead-free profile is not run or longer curing is needed, a 150°C (302°F) soak can be added. Twenty minutes is recommended, however the length of time is dependent on the density of the board.



RATE OF RISE 2°C / SEC MAX	*RAMP TO 150°C (302°F)*	*PROGRESS THROUGH 150°C-175°C (302°F-347°F)*	*TO PEAK TEMP 235°C-250°C (455°F-483°F)*	*TIME ABOVE 217°C (422°F)*	*COOLDOWN ≤ 4 °C / SEC*	*PROFILE LENGTH AMBIENT TO COOL DOWN*
	≤ 75 **SECONDS**	30-60 **SECONDS**	45-75 **SECONDS**	60 ± 15 **SECONDS**	45± 15 SE**CONDS**	2.75-3.5 **MINUTES**

Physical Properties

Parameter	Value
Appearance	Purple when not cured Clear when cured
CTE (before Tg) CTE (after Tg)	62.7 ppm Typical 174.6 ppm Typical
Tg	64.1 C Typical
Total Volatiles	<1% Typical
Specific Gravity @25°C	1.27 g/cc Typical

Certification

Parameter	Value
J-STD-004	REL1

Corrosion Testing

Reference	Test Coupon	Condition	Results
Halide IPC-TM-650 method 2.3.33	Silver Chromate Paper	N/A	Pass
Corrosion IPC-TM-650 method 2.6.15	Pure Copper	40 ± 1°C and 93 ± 2% RH	Pass
Corrosion IPC-TM-650 method 2.6.15	Pure Copper	40 ± 1°C and 93 ± 2% RH	Pass

Surface Insulation Resistance

Reference	Conditions	Results	Results
IPC-TM-650 method 2.6.3.3. §5.5.1.	Control coupons	> 1E9 Ωat 96 and 168h	Pass
J-STD-004 § 3.2.4.5.1.	Sample coupons	> 1E8 Ωat 96 and 168h	Pass
IPC-TM-650 method	Post-test visual inspection	No dendrite growth or corrosion	Pass

Electromigration

Test	Conditions	Specification	Results
Electromigration	65C/85% RH, 500Hrs, bare copper IPC-B-25A coupon Initial 6.13E+9 Ohms Final 7.26E+10 Ohms	Rf/Ri > 0.1	Pass

Handling and Storage

- One-Step Underfill 688 has a work life of 2 months at 5°C (41°F) or 3 months at 0°C (32°F).
- One-Step Underfill 688 has a frozen shelf life of 3 months.
- Sealed Shelf Life – Stability:

Temperature	Time
25°C (77°F)	1 week
5°C (41°F)	2 months
0°C (32°F)	3 months
≤ -20°C (-4°F)	Over a year

Safety

- Use with adequate ventilation and proper personal protective equipment.
- Refer to the accompanying Safety Data Sheet for specific emergency information.
- Do not dispose of any hazardous materials in non-approved containers.
- Non-REACH compliant.

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