



Solder plus Support

# One-Step Underfill 688

## Underfill

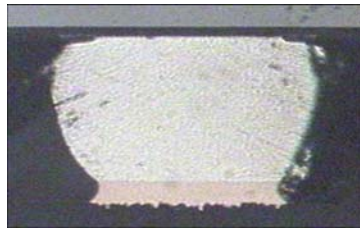
### Features

- Flux Action to Form Solder Connections
- Compatible with No-Clean Flux Residues
- Odorless During Printing and Curing
- Reworkable at 120° C (248° F)
- Eliminates Voiding
- Cures in Lead-Free Profile
- Non-Hygroscopic
- Eliminates the Need for a Cure Cycle

### Description

One-Step Underfill 688 is a non-odorous, low surface tension, one component epoxy resin designed as a one-step no-flow underfill for flip chip, CSP, BGA and micro-BGA assemblies. One-Step Underfill 688 improves product reliability through high Tg, low CTE, and good fill with no voiding. Even though One-Step Underfill 688 does not require flux, it is compatible with no-clean flux residues and provides excellent adhesion. One-Step Underfill 688 can be dispensed directly following solder paste printing, after which components are placed and the entire assembly is reflowed and cured simultaneously in a standard lead-free reflow process. This eliminates the need for a second assembly process and separate cure cycle. The result of this is faster throughput and higher yields that are achieved in one step through excellent capillary action, fast reflow characteristics, and rapid cure speeds. One-Step Underfill 688 may be reworked at 120° C and the viscosity of the product remains stable through out its shelf life. This product wets solder to OSP, ENIG, immersion silver, and immersion tin board surfaces.

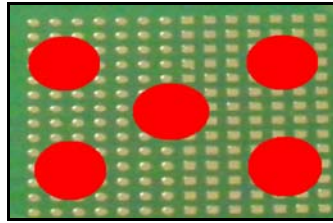
### Formed with One-Step Underfill 688



### Application

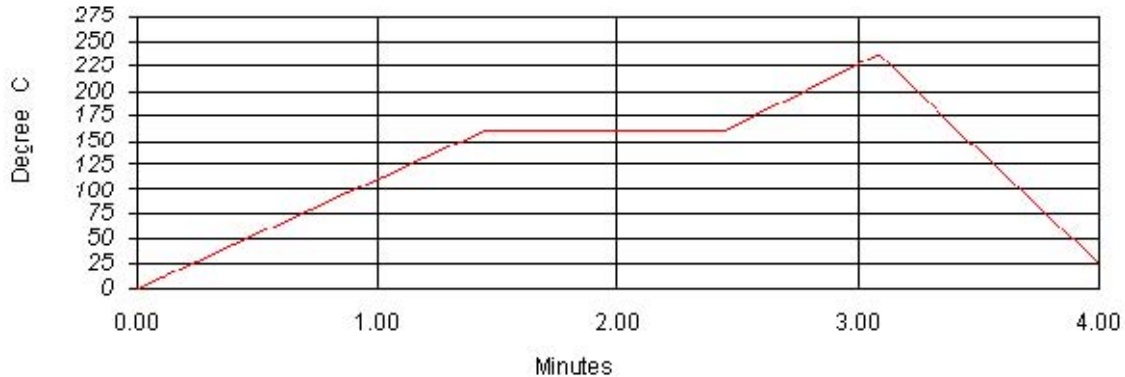
- Curing: Standard lead-free solder profile (RSS), maximum temperature 255° C (491° F).
- Rework: Flows at 120° C – 140° C (248° F – 284° F).
- Print your solder paste, dispense One-Step Underfill 688, place the components, and finally reflow all in one assembly line. One-Step Underfill 688 is designed to solder on its own without the need for solder paste.
- The dispense pattern for small die applications 6.35mm (.25”) is typically single center dot only, with no secondary dispense or final perimeter bead required. Ensure that all pads are covered with One-Step Underfill 688.
- The low viscosity and excellent wetting characteristics of the product allow the material to “self-fillet” along the edges of the die. For larger pads, multiple dots or x patterns may be required to ensure that all pads are covered.
- The dispense pattern for larger die applications is typically dot pattern from the center out. Since the product improves solder wetting there is no need to avoid solder pads. Cover all pads to be soldered to on the board and place the component.
- One-Step Underfill 688 is reworkable by heat. The suggested rework procedure is to heat the part to be removed to its standard reflow temperature and removing it with a flat spatula. Using a soldering wick and a soldering iron, soak up excessive epoxy. Scrub the pads clean, and if necessary, clean with a small amount of solvent, such as methyl ethyl ketone or isopropyl alcohol.

## Recommended Dispense Pattern



## Recommended Reflow Profile

Profile Guideline



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

## Physical Properties

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

## Corrosion Testing

<b>Reference</b>	<b>Test Coupon</b>	<b>Condition</b>	<b>Results</b>
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 or 6 months at 0°C.
- One-Step Underfill 688 has a frozen shelf life of 6 months.
- Shelf Life – Stability:

Temp°C	Time:
25	1 week
5	2 months
0	6 months
-20	Over a year

## Safety

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

### Manufacturing and Distribution Worldwide

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AIM IS ISO9001:2000 CERTIFIED

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