ROHM AND HAAS ELECTRONIC MATERIALS

SHIPLEY BPR™-100 PHOTORESIST

For Advanced Packaging Applications

Regional Product Availability			
N. America	Japan/Korea	Asia	Europe
✔	✔	✔	✔

DESCRIPTION

Shipley BPR-100 Photoresist is a liquid, negative-tone photoresist formulated for use in a wide variety of plating and etching processes used in Wafer Level Packaging (WLP) manufacturing. Shipley BPR-100 Photoresist can be used on virtually all metal and organic substrates, including, aluminum, copper, gold, nickel, titanium, chromium, silicon, silicon oxide, glass, ceramic and polyamide. Shipley BPR-100 Photoresist is specifically designed to fill the need for a 100 micron single-spin, bump plating photoresist for WLP applications.

ADVANTAGES

- Single-spin film thickness >100 microns
- Near vertical side walls
- Broad band exposure processing
- Excellent adhesion to all WLP substrates
- Aqueous development—no image swelling
- Acrylate based, retains flexibility after cure and does not crack
- Excellent chemical resistance—withstands a variety of both alkaline and acid plating and etching solutions, including electroless copper and electroless nickel

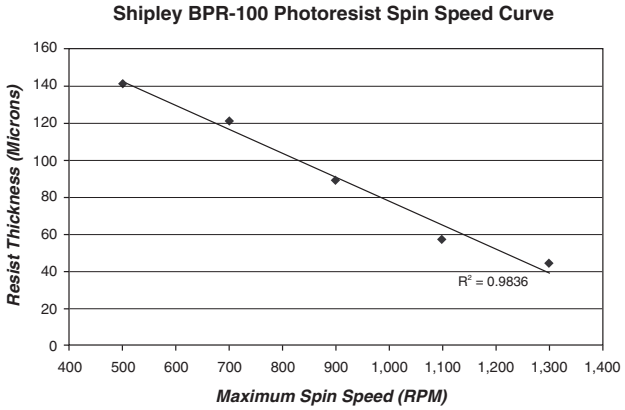
PROCESS GUIDELINES

Shipley BPR-100 Photoresist is most commonly processed with conventional broad band (350–400 nm) radiation, although it may be imaged with laser or i-line (365 nm) radiation. A bake after developing is required. A baseline process sequence is provided as a starting point.

BASELINE PROCESS SEQUENCE

I. Spin Coat

Shipley BPR-100 Photoresist is designed to produce low defect coatings over a very broad range of film thickness.



General recommended coating conditions are:

1. Automatic Dispense: Approximately 0.9 ml of Shipley BPR-100 Photoresist per inch of substrate diameter. Material is viscous [8,000 cps @ 24°C (75°F), 14,000 cps @ 19°C (66°F)]. Dispense material at 0.4 ml per second at 50 rpm.
2. Spread Cycle: Ramp to 500 rpm at 100 rpm/second acceleration for 10 seconds.
3. Spin Cycle: Ramp to 800 rpm for a total of 30 seconds.

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4. Dry Off: 30 seconds at 300 rpm.
5. Edge Bead Removal: EBR solvent, 500 rpm; time varies per thickness and extent of solvent loss. Generally apply for 15 seconds (apply with back side wash).
6. Bake Side Wash: EBR solvent, 18 seconds at 500 rpm apply with back side wash.
7. Hot Plate Soft Bake: 3 minutes at 65°C (149°F), 300 micron off-contact conduction bake.
8. Transfer to wafer boat.
9. Convection oven bake: 90°C (194°F), 20–30 minutes. Do not exceed 110°C (230°F). Alternate thermal application step (in place of batch convection bake) apply a second hot plate treatment [7 minutes, 100°C (212°F), 300 micron off contact conduction bake].
10. Cool wafers to room temperature before exposure.

Edge Bead Removal

Apply acetone, or other Rohm and Haas Electronic Materials-approved material as described above.

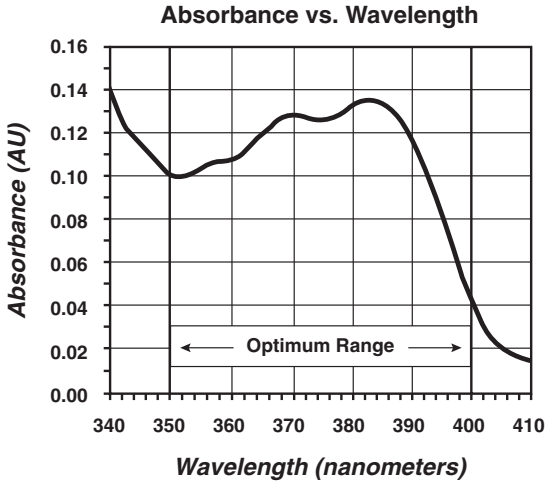
II. Bake

After the resist has been applied to the substrate, it must be baked to evaporate the solvent. In a production environment, Shipley BPR-100 Photoresist is normally baked on a level hot plate for 2–3 minutes and then transferred to a convection oven for final drying.

For best results, ramping or stepping the soft bake temperature is recommended. Lower initial bake temperatures allow the solvent to evaporate out of the film at a more controlled rate.

III. Exposure

Shipley BPR-100 Photoresist is to be exposed with commercially-available mercury vapor UV light sources. The following graph displays the absorbance spectra for the unexposed resist. Coated substrates are to be handled in a "yellow light" area in clean room conditions. The resists are exposed at an energy dose between 900–1,100 mJ/cm^2 (measured using standard radiometer @ 365 nm wavelength) using a high-intensity light source that generates its peak output of wavelengths between 350–400 nanometers. Coating uniformity and complete baking of the Shipley BPR-100 Photoresist is essential for standardizing optimum exposure.



IV. Development

Shipley BPR-100 Photoresist is developed with Shipley BPR Developer. Refer to the Shipley BPR Developer data sheet for details on bath make-up and operation of this aqueous developer.

V. Post bake

All applications require post-treatments after development. A post bake at 90–110°C (194–230°F) for 3–10 minutes may be used. Higher temperatures/longer bake times may make resist removal more difficult.

Specific applications may require variations to post bake time and temperature. Consult with your Rohm and Haas Electronic Materials Technical Representative.

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VI. Etch/Plate

Shipley BPR-100 Photoresist can be used with a wide variety of acid and alkaline etchants and plating baths.

VII. Removal

The Shipley BPR-100 Photoresist is removed with Shipley BPR Photostripper at 50°C (122°F). Refer to the data sheet for Shipley BPR Photostripper for details on the make-up and operation of the solvent-based photoresist stripper.

EQUIPMENT

Shipley BPR-100 Photoresist is compatible with most commercially-available photoresist processing equipment. Compatible materials include stainless steel, glass, ceramic, nylon, PTFE, unfilled polypropylene and high-density polyethylene.

PRODUCT DATA

For the specific Product Data values, please refer to the Certificate of Analysis provided with the shipment of the product(s).

ASSOCIATED PRODUCTS

Shipley BPR-100 Photoresist

Shipley BPR Developer

Shipley BPR Photostripper

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

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