

Wafer Bumping Applications

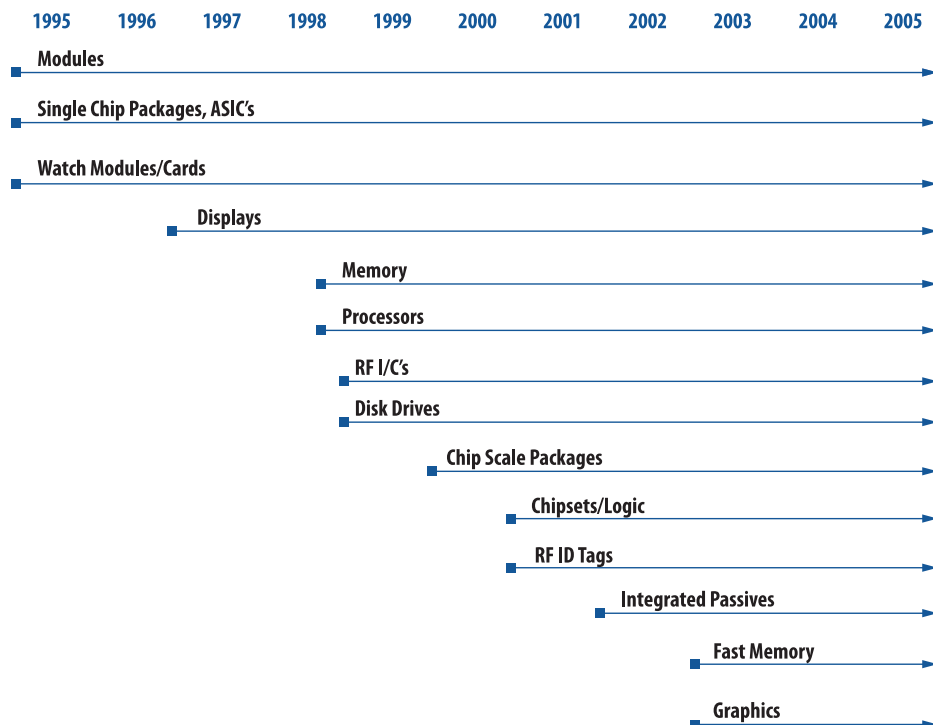
The demand for wafer level packaging (the ability to package the chip directly on the wafer) has seen significant growth in recent years and is expected to experience double digit growth through 2010. This growth is due to the ability to shift the cost per package to the number of die per wafer rather than the number of contacts per device. Larger wafers, smaller die and higher contact density provide an opportunity to reduce the overall cost of packaging technology without impacting yield.

TRENDS

The flip chip method of interconnecting and packaging an integrated circuit without the use of wire bonding was introduced in the mid 1970's. Technological advances and cost improvements since then have enabled the technology to move into mainstream processes. Performance benefits include, but are not limited to:

- Higher number of interconnects per unit area
- Faster interconnection speed due to short signal path
- Lower power consumption
- Smaller footprint package uses less board area

Flip chip technologies have been integrated into commercial applications since the early 1990's. As performance requirements become more demanding, new applications continue to transition to the use of wafer bumping technology to meet the increasing challenges of electronic devices. Due to environmental concerns with the use of lead and lead-based solders, there is an increasing trend toward more environmentally friendly metal interconnects. New lead-free bump metallurgy has emerged to meet the increasingly demanding environmental concerns. The interconnects include gold, tin/silver, tin/copper and tin/silver/copper alloys.



PHOTORESIST STRIPPING CHALLENGES

Wafer bumping uses a standard lithographic process to create bumps in the exact location and dimension required for an electrical connection with an external device. This includes the use of positive and negative photoresists or dry film materials. The process requires the use of organic solvent based photoresist strippers that can effectively and efficiently remove and dissolve all traces of the high aspect ratio photopolymers from the surface of the device. Compatibility with polyimide films, and the metal and metal alloys that make up the bumps, are critical performance attributes of the cleaning chemistries used in the process.

Generation	Application	Bump Metal	Photoresist	Technical Issues
Gold bump	LCD or Display drivers	<ul style="list-style-type: none"> • Au and Au alloys 	<ul style="list-style-type: none"> • Positive Photoresist 	<ul style="list-style-type: none"> • Bump metal and under bump metal compatibility • High aspect ratio resist removal
Solder bump	Memory, Logic, processors etc.	<ul style="list-style-type: none"> • Pb and Pb alloys • Sn and Sn alloys 	<ul style="list-style-type: none"> • Positive Photoresist • Negative Photoresist • Dry Film 	<ul style="list-style-type: none"> • Polyimide compatibility • Bump metal compatibility • Resist and Flux removal

MALLINCKRODT BAKER, INC. PHOTORESIST STRIPPERS FOR WAFER BUMPING

Mallinckrodt Baker, Inc. offers a line of organic solvent based photoresist strippers that address the performance and compatibility needs of the wafer level packaging process. The product line features organic solvent blends with powerful photoresist dissolution properties that are compatible with most bump metallurgy combinations.

Generation	Gold Bumps	Solder Bumps
J.T.Baker® Cleaning Chemistry Solutions	Photoresist Strippers <ul style="list-style-type: none"> • BAKER PRS-3000™ 	Photoresist Strippers <ul style="list-style-type: none"> • BAKER ALEG-625™

PRODUCT HIGHLIGHTS

Bulk Photoresist Strippers Performance Characteristics

	Description
BAKER PRS-3000	<ul style="list-style-type: none"> • Solvent based positive photoresist stripper • Effective removal of high temperature and UV cured photoresist • Compatible with gold and lead based solder bumps
BAKER ALEG-625	<ul style="list-style-type: none"> • Powerful solvent based photoresist stripper • Capable of removing positive and negative photoresists

APPLICATION SUPPORT

Mallinckrodt Baker, Inc. has a staff of Applications Engineers available to work with you to implement a process that provides a total solution encompassing the use of J.T.Baker chemistries in your existing tools or a new facility. Evaluations can be conducted at your manufacturing site or at the Mallinckrodt Baker, Inc. application laboratory. For additional information about J.T.Baker products for bump and packaging applications, contact us at 1-800-JTBAKER (800-582-2537) or at 1-908-859-9346.

**THE FULL LINE OF J.T.BAKER PERFORMANCE CHEMICALS:
PHOTORESIST STRIPPERS AND RESIDUE REMOVERS**

SOLVENT Based:

Photoresist Stripper/ Residue Remover	Product Number		Purpose	Application
	Bottles	Drums		
BAKER PRS-1000™	6383	6373	Positive Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER PRS-2000™	6400	6410	Positive Photoresist Stripper	Flat Panel Display
BAKER PRS-3000™	6403	6413	Positive Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER ALEG™-200	6505	6515	Positive Photoresist Stripper	Flat Panel Display
BAKER ALEG-310	6406	6416	Residue Remover/ Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER ALEG-355	6405	6415	Positive Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER ALEG-370	6408	6418	Residue Remover/ Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER ALEG-445	6401	6411	Positive Photoresist Stripper	Aluminum/Silicon Dioxide, Flip Chips, Bumps, Compound Semiconductors
BAKER ALEG-625	6409	6409	Positive and Negative Photoresist Stripper	Flip Chips, Bumps, Compound Semiconductors
BAKER CLκ™-820	6414	6424	Photoresist Stripper	Copper/Low-κ
BAKER CLκ-870	6489	N/A	Residue Remover	Copper/Low-κ
BAKER CLκ-888	5108	5118	Photoresist Stripper/ Residue Remover	Copper/Low-κ

AQUEOUS Based:

BAKER REZI-28	6426	6436	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors
BAKER REZI-28a (Concentrate)	6425	6435	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors
BAKER REZI-37	6428	N/A	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors
BAKER REZI-38	6427	6437	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors
BAKER REZI-39	6341	6351	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors
BAKER REZI-68	6429	6439	Residue Remover	Aluminum/Silicon Dioxide, Copper/ Low-κ, Compound Semiconductors

Mallinckrodt Baker Microelectronic Materials

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