

AGERE SYSTEMS INVENTION SUBMISSION

This invention submission is being provided to an attorney in order to determine how to protect intellectual property and to facilitate efforts to acquire appropriate protection. Distribution of this invention submission shall be limited to attorneys and persons acting on behalf of Agere to facilitate making such determinations.

Name(s) of Submitters	Telephone No:	Loc/Room	SBU/Org. Title:	HR ID:	E-Mail Address
Mark Bachman	610-712-3088	AL 22A-253EO		3942423	mbachman@agere.com
Daniel Chesire	407-371-7564	OR 301E228	30005549	2001928	chesire@agere.com
Taeho Kook	610-712-5109	AL 22V229B	30005549	8089628	kook@agere.com
Sailesh Merchant	610-712-7183	AL 22F228C	30005549	8807929	Smerchant@agere.com

TITLE: Novel Method for Fabricating and Testing Flip Chip Devices

IP LAW USE	
Submission No:	125278
Date Received:	5/10/04
Attorney:	FMR

1. Describe the problem your invention solves: For devices made with flip chip technology, testing on Al or Cu pads prior to bumping to test the chip is not allowed because probe marks gouge the pad surface, making the deposition of under bump metallization (UBM) difficult and subsequent bumping processes unreliable. Thus what is needed in the art is a method of allowing chips to be probed prior to bumping so that wafer level tests can be undertaken.

2. Based on information of which you are already aware, describe:

Previous attempts to solve the problem your invention solves:

Previous attempts to solve the issue involve using peripheral probe pads that are connected to the bump pad or probe after bumping.

The disadvantages of the previous attempts:

In the first case, interconnects have to be made from the probe pad to the bump pad, leading to interconnect delays, and/or loss of yield from extra material regions that are susceptible to defects. This configuration defeats the advantages of using area array bumps. In the case of probe after bumping, there is always the possibility that mis-processing at bumping may erroneously lead the test engineers to assume lack of chip functionality unless partitioning studies are completed.

3. Summarize (30 words or less) the new feature(s) of your invention that solve the problem:

Separate regions for bumping and probing for flip chip devices allows easy integration of solder bumps without loss in yield and increased contact resistance.

4. Succinctly describe your invention, referring to drawings, sketches, photographs, etc., in sufficient detail to enable one knowledgeable in the invention's field of technology to understand construction and operation of the invention. Drawings, etc., should show only those features necessary for an understanding of the invention. Describe how/why your invention overcomes the disadvantages noted in 2. (ii) above.

Fig. A shows the conventional art where a common probe and bump region over a Cu or Al metal pad is shown. The metal pad is covered with a passivation layer and an opening in the passivation layer is shown. While the metal pad is shown in the shape of an octagon, a circular bond pad can also be used, as is well known in the art.

Fig. B shows a preferred embodiment of the present invention: a schematic diagram of a metal pad with a square (shown) or rectangular (not shown) probe region, integral with a separate octagonal (shown) bump region. Separate passivation openings for the respective probe and bump regions are also shown. The probe region can be configured on any side of the octagon, such as shown in Fig. C.

*** Provide the information requested in this box on each page of the submission, as well as drawings, sketches, photographs, etc. ***

Submitter(s) signature(s) and date:

This invention submission has been read and understood by the following two witnesses:

_____	date	_____	date
_____	date	_____	date

ATTORNEY-CLIENT PRIVILEGED DOCUMENT

Metal redistribution layers (RDL) are shown in Fig. D to connect the bump region to other metal runners or interconnect, to other pads, either directly or through vias (for example, one is shown in the illustration).

While octagonal pads have been shown, a circular pad with a circular passivation opening, such as illustrated in Fig. E, is also conceived.

5. **Advantages of your invention:** The use of separate regions for bump formation and probing for testing wafers prior to bumping is easier and reliable.
6. **Explain how use of your invention would be detected:** Top down views during reverse engineering of parts.

*** Provide the information requested in this box on each page of the submission, as well as drawings, sketches, photographs, etc. ***

Submitter(s) signature(s) and date:

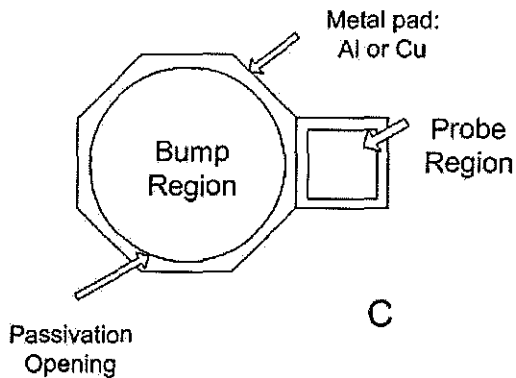
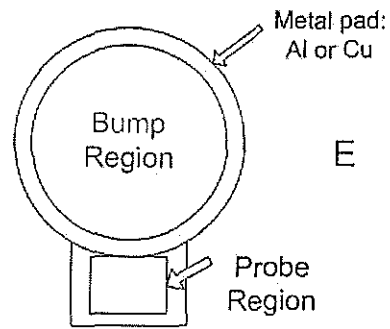
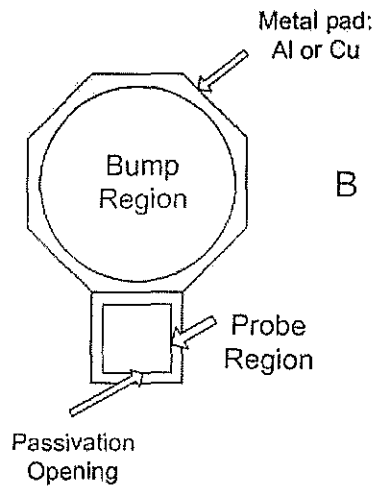
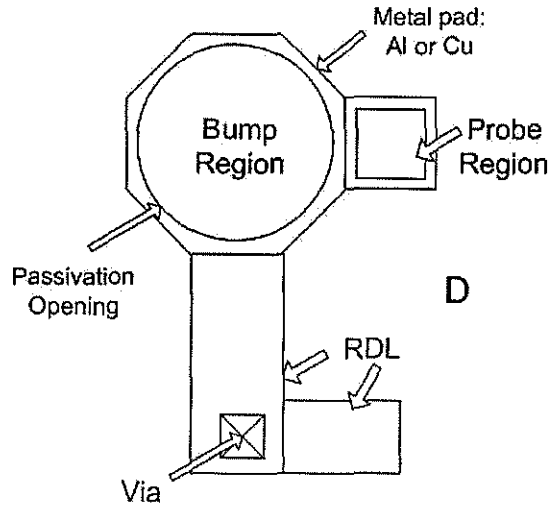
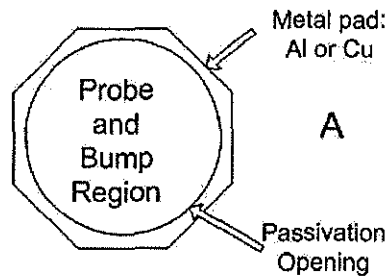
This invention submission has been read and understood by the following two witnesses:

date

date

date

date



*** Provide the information requested in this box on each page of the submission, as well as drawings, sketches, photographs, etc. ***

Submitter(s) signature(s) and date:

This invention submission has been read and understood by the following two witnesses:

date

date

date

date

ATTORNEY-CLIENT PRIVILEGED DOCUMENT