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NASA TECH BRIEF

Marshall Space Flight Center

Packaging Concept for LSI Beam Lead Integrated Circuits

The problem:

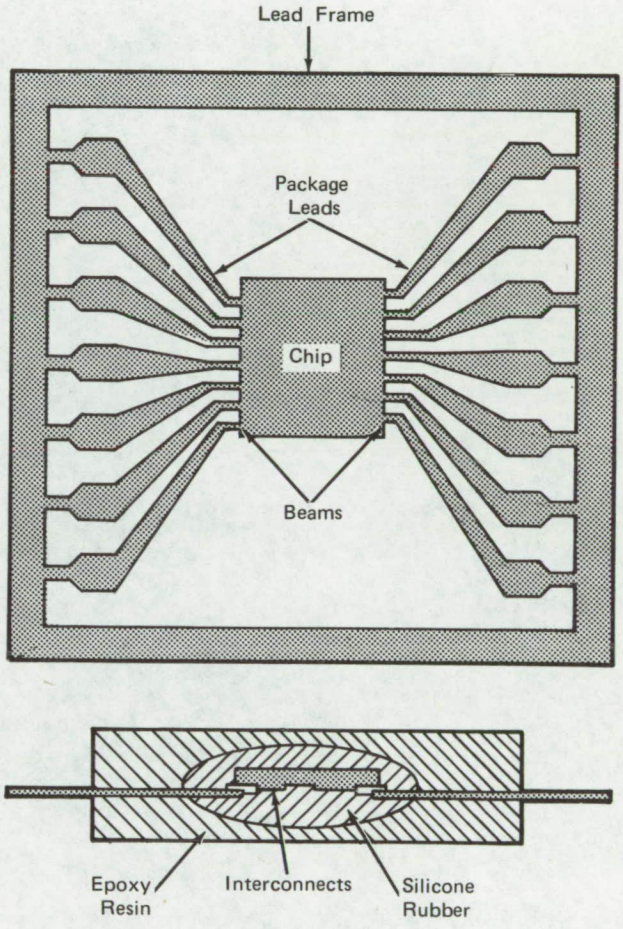
In today's packaging methods of large scale integrated (LSI) circuits, the circuit package has become the limiting factor on system size. Previously, metal, plastic, or ceramic packages were prefabricated, and the integrated circuit chips were mounted inside the package by soldering or epoxy bonding.

The solution:

A packaging system has been devised utilizing a lead frame to mount a beam lead integrated circuit chip. After molding, the lead frame becomes a part of the package. One size lead frame can be used for chips in the range of 0.127 x 0.127 cm (50x50 mils). Formerly, a new package design was required for different chip sizes.

How it's done:

A beam lead chip is mounted on a lead frame as shown in the figure. The art work is layed out on a pattern generator on a one to one scale of the lead frame. The photographic pattern is then exposed on a 0.0127 cm (0.005 in) thick Kovar plate. The Kovar plate is then etched and the lead frame is gold plated to a thickness of 0.00127 cm (0.0005 in). The beam lead chip is then positioned on the lead frame and thermo-compression bonding of the gold beam leads to the lead frame is accomplished. The beam lead chip, now supported in the lead frame by the thermo-compression bonds, can be readily probed for electrical testing. It is then potted in place with a high purity space grade silicone rubber. The lead frame is then masked off using Teflon tape to prevent the rubber from coming in contact with the remaining part of the leads. It is then placed into a molding machine and molded using a low expansion and high thermal conductivity material, such as resin epoxy. The beam lead chip is now encapsulated into a finished package as shown in the figure. The complete packaging can be fabricated in a few minutes at a cost of a few cents per package.



Note:

Requests for further information may be directed to:

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Reference: B72-10329

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Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, non-exclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to:

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