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NASA TECH BRIEF

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Leads Integral With the Internal Interconnection That Penetrate the Molded Wall of a Package

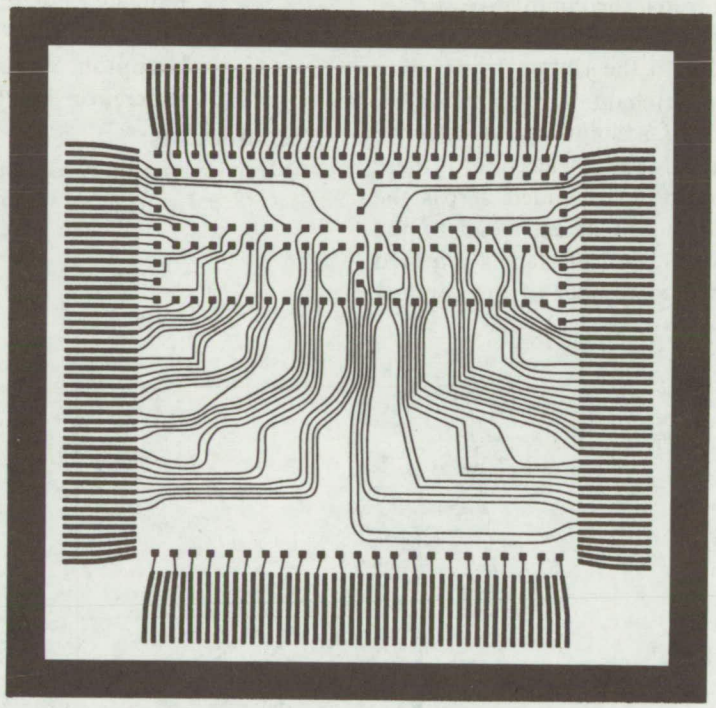

Figure 1. Exit Layer: Surface Conductors; Scale, 3.75:1

The problem:

To provide external connections, to a complex assembly of microcomponents, through the molded wall of the package of components.

A thin dielectric sheet, having a suitable conductive surface, is sometimes required to have closely spaced (say 25 mils between centers) conductor strips, disposed in parallel rows about the periphery of a central pattern of conductors and lands, suitable for a microassembly of complex microcomponents; typical strips, which serve as ribbon leads to components, are about 10 and 2 mils in width and thickness. The fabrication process removes the dielectric in the zone of these leads, leaving them suspended across the opening in the dielectric so that a suitable encapsulation or injection-molding process can form an effective seal around each lead.

(continued overleaf)

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The solution:

Now reported is successful provision of a multiplicity of external ribbon leads for use in a sealed or encapsulated microassembly wherein the leads are integral with the internal connections on a single part that can be fabricated economically by fine-detail electroplating (electroforming).

How it's done:

The desired pattern of ribbon leads is plated around the periphery of the dielectric surface simultaneously with the pattern plating of the required conductor paths in the interior. The plating metal must have such nature and crystalline structure that it meets the general requirements of electronic-package electrodes and yet differs from the conductive surface on the dielectric sheet. If the surface is then coated with a protective resistant to the etchant, except for a zone across the plated ribbon leads, the conductive surface can be etched selectively to reveal the dielectric sheet in this zone without harm to the ribbon leads, since they are not attacked by the etchant.

Subsequent immersion in a solution for selective dissolution or digestion of the dielectric in these zones leaves the ribbon leads suspended across the openings and yet still anchored at each end to the dielectric sheet. One more chemical step is required for selective etching of the remainder of the conductive surface so that all independent conductor paths on the structure are isolated.

After completion of the subassembly of the required components, or other functional elements in a circuit, the structure is clamped within a mold cavity designed to permit encapsulating or sealing compound to flow about each ribbon lead to form an environmental protection for the interior. It is convenient but not necessary to leave a strip of dielectric anchored to the outer ends of the ribbon leads so that the leads remain aligned during electrical testing and subsequent attachment to the next higher assembly.

Notes:

1. Designers of integrated-circuit assemblies may be interested.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Langley Research Center
   Langley Station
   Hampton, Virginia 23365
   Reference: TSP69-10436

Patent status:

No patent action is contemplated by NASA.

Source: John Marley of
ITT Federal Laboratories
under contract to
Langley Research Center
(LAR-10228)

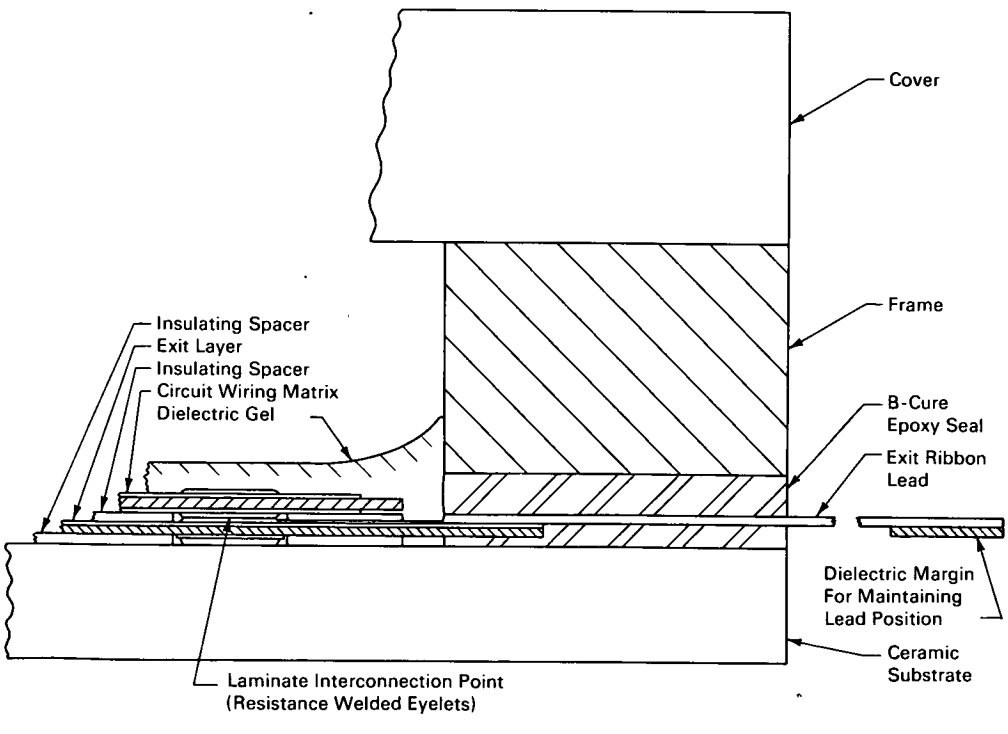

Figure 2. Partial Cross Section of Test Vehicle, Showing Details of Assembly