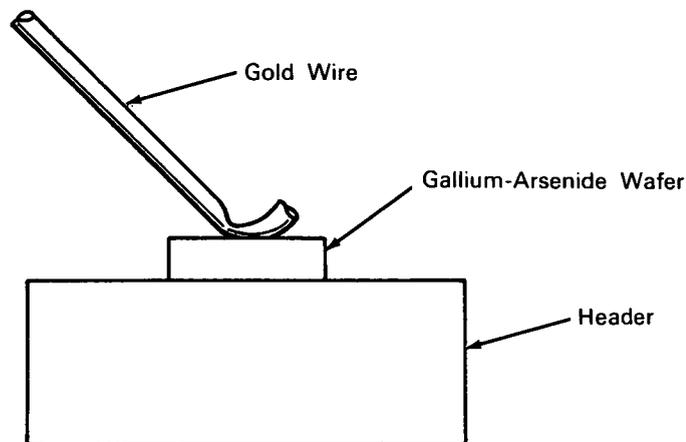


NASA TECH BRIEF



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Thermocompression Bonding Produces Efficient Surface-Barrier Diode



The problem: Current high-production diode fabrication processes involve complicated and costly etching, evaporation, or heating cycles. A process eliminating these cycles would permit economical construction of quality diodes with fast recovery times.

The solution: Thermocompression bonding of a gold wire to a gallium-arsenide wafer produces a surface barrier diode with good conduction characteristics and recovery times in fractions of a nanosecond.

How it's done: An N-type single crystal gallium arsenide wafer with a net impurity concentration of about $2.8 \times 10^{17} \text{ cm}^{-3}$ forms the diode base. A gold wire is attached to this base by thermocompression bonding at 375°C , slightly below the eutectic temperature of the combination. The wafer is then conventionally bonded to a gold-antimony plated header.

Notes:

1. The properties exhibited by this combination may be of interest to manufacturers of semiconductor devices.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
 Jet Propulsion Laboratory
 4800 Oak Grove Drive
 Pasadena, California, 91103
 Reference: B65-10007

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: International Business Machines
 under contract to Jet Propulsion Laboratory
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