OMEGA VANZETTI®
The Leader in Infrared Temperature Measurement and Control

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CONTROL OF SEMICONDUCTOR EUTECTIC CHIP BONDING

$2,800.00
BASIC SYSTEM

Gold-silicon eutectic makes the most reliable chip-to-substrate bond in semiconductor manufacturing. However, temperature control of the process is quite critical. The eutectic flows at 385°C and the tolerance is -O°+20°C. If operated outside of these tolerances, the chip might just be "tacked" or sitting above voids or – at the high end – the gold would begin alloying into the silicon and spoil the doping.

A very thin **OMEGA VANZETTI®** optical fiber threaded through the vacuum collet (holding the chip to the base of the collet) allows the infrared detector to "see" the chip during the bonding operation. The instant when the eutectic flows, a large increment of the infrared radiation emitted by the chip's upper surface signals that the optimum temperature has been reached and, through a feedback loop, the process is terminated.

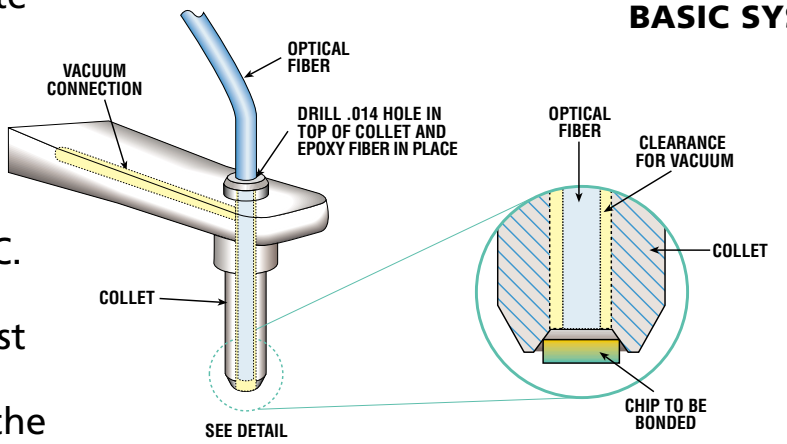

FIG. 1 – FIBER INSTALLATION IN THE COLLET OF AN EUTECTIC CHIP BONDER.

Advantages of the fiber optic infrared approach as illustrated in Fig. 1 are:

- Fast response time to 10 mSec (0 to 63%)
- Optimum temperature range
- Adjustable emissivity control
- Non-contact temperature monitoring
- Real time response enables precise control of the bonding process by signaling the precise time when scrubbing must start and when a good bond is made
- Fast response allows faster rate of heat transfer from substrate to chip
- Ensures reliable bonds of semiconductor chip to substrate
- Eliminates the high skill operator requirements and allows fully automated mass production

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