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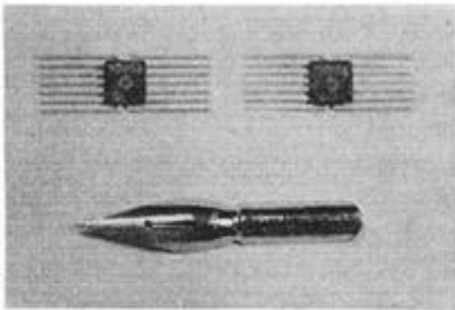
1967

Development of diode transistor logic (DTL) in 10-pin FPG packages

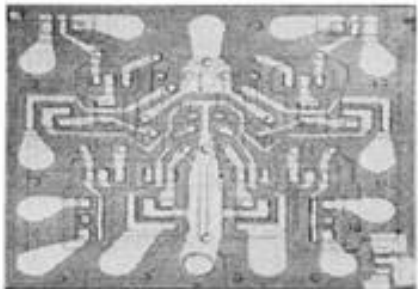
~ Packaging ~

Hitachi developed a digital IC around 1967. The major parameters were as follows: wiring rule was 15um, gate material was formed by aluminum evaporation method, the package was a 10-pin FPG (Flat Package Glass), the outer lead pitch was 1.27 mm, and the lead frame material was Kovar material (Fe-Ni-Co alloy). The lead frame pattern was formed by etching and aluminum was vapor-deposited with the mask in the wire bonding portions. Base and cap were formed by powder molding method, metallized in the chip mount area with Au paste. Low melting point glass powder was applied to the cap and the base, respectively. After pre-attaching the lead frame to the base, a cap was placed and heated to melt the glass powder and sealed.

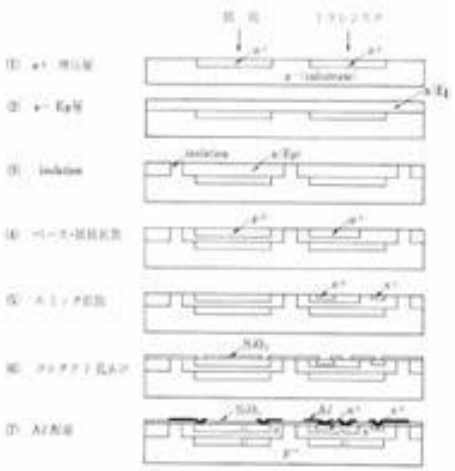
In mounting the FPG to the printed circuit board, each lead was soldered one by one by manual work. This digital IC was applied to the mainframe computers such as HITAC 8000 series which attracted considerable attention because they were the first Japan domestic computer with the IC.



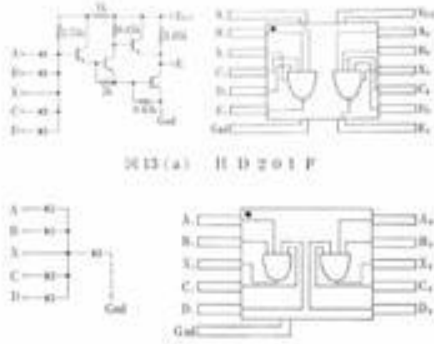
Example of completed devices



Chip after Al metallization



Manufacturing Process of digital IC



HD202F