

1973

12-bit engine-control microprocessor (Toshiba)

~ Integrated Circuit ~

In 1970, the Air Pollution Control Law (the so-called Muskie Act) was enacted in the United States, and automobile manufacturers began to promote the development of electronic engine control technology to cope with this situation. In 1971, Toshiba participated in Ford's Electronic Engine Control (EEC) project and developed the world's first 12-bit microprocessor in 1973. The specification of 12 bits was set from the required precision of the analog quantity for engine control, and it was a state-of-the-art product at the time when Intel's 8-bit microprocessor appeared.

This microprocessor system was configured with 12-bit common bus as the core of the architecture, and 128 × 4-bit RAM, 512 × 4-bit EPROM, 512 × 4-bit ROM, memory control chip, I/O control chip, 12-bit bidirectional bus drivers, general-purpose 418-bit registers, and 8-bit interrupt latch chips were developed. In terms of architecture, the microprogram control method was adopted for the first time as a semiconductor microprocessor. The CPU chip TLCS-12 adopted a silicon gate 6μm process, and it had about 2800 gates and the chip size was 5.5 mm x 5.9 mm.

The 12-bit CPU, RAM, EPROM, ROM, memory control chip, I/O control chip, etc. were delivered as EEC modules, but mass production actually started in 1975 after real vehicle running tests.

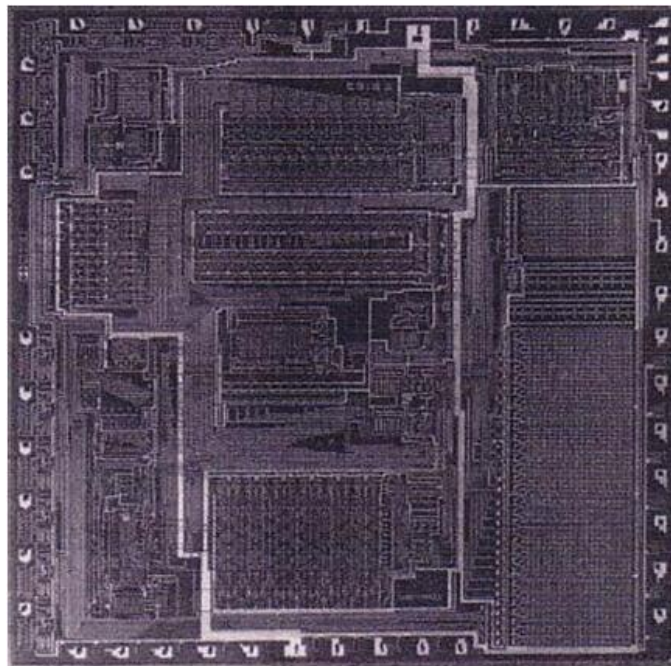


Fig. CPU chip of the 12-bit microprocessor (By courtesy of Toshiba)