

## Other Features

This microcomputer has other features especially for automotive use, which will be briefly described here.

The process is a CMOS device in technology  $1.2\mu$  double layer metal, and approximately 740,000 transistors have been integrated on the single chip. The packaging is QFP with 120pins, in conformity with EIAJ specifications, and provides high density mounting while still maintaining resistance to humidity. A photograph of the chip and its package are shown in Fig.7.

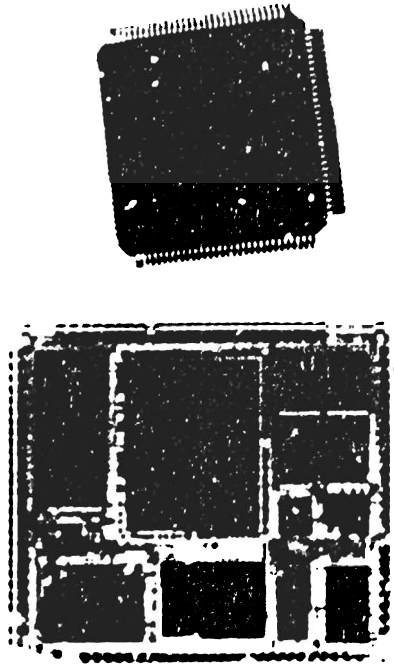


Fig. 7 Chip and Package

The operating temperature range is  $-40$  to  $125^{\circ}\text{C}$ , and the operating voltage is between 4 and 5.5 volts, thus allowing a broad operating environment.

A 2 to  $4\mu$ sec filter function has been installed in the timer input port to counteract possible degradation due to noise.

A power-down mode is provided.

## 5. System Overview

The configuration of the system utilizing this newly developed 16-bit microcomputer is shown in Fig.8.

This system has been designed as an advanced model for combined control centered upon a 3-liter six-cylinder DOHC engine and a four-speed automatic transmission.

The engine control system provides sequential injection control for the six cylinders, spark advance control with a knock control function, idle speed control, a variable intake control function and other controls. The transmission control system provides gears shifting control, hydraulic control within the transmission, and other functions. Combined control functions include spark retardation and fuel cutting to reduce the engine torque (This reduces the shock when gears are shifted). Further, the system also provides other integrated controls through communication with the traction control ECU, cooling fan control ECU and air conditioner control ECU. It also has an on-board diagnostics function, and a backup function for use if the microcomputer should fail.

