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Late 1980s

Using a sputtering technique for silicide gates

~ Process Technology ~

In the latter half of the 1980s, at the time of shifting to 1.3 μm - 0.8 μm, the Al gate electrode was replaced by polysilicon gate, but there was a limit in reducing the resistivity by doped polysilicon, and the parasitic resistance of the interconnects became a problem. In this situation, a polycide gate was introduced to solve this problem. It was made by laminating an alloyed high melting point metal with Si on poly-Si as the stable material at high temperatures and also capable of reducing the resistivity. Sputtering method was applied, because it was difficult to deposit the silicide film by CVD. In the sputtering method, it was possible to deposit silicide directly by using a silicide target composed of molybdenum or tungsten and Si mixed in advance as a powder.
Originally silicide was predominantly molybdenum or tungsten, but materials spread to cobalt and titanium later.
In the 1990s, the technology advanced to self-aligned silicide (salicide), in which the metal electrode material was sputtered over the entire surface and only the portion of Si and gates which were shaped by etching was silicided.

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