United States Patent [19]

Lowrey et al.

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[24]	SPLIT-PULYSILICUN CMUS PROCESS
	INCORPORATING SELF-ALIGNED
	SILICIDATION OF CONDUCTIVE REGIONS

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[51]	Int. Cl.5	H01L 21/265; H01L 21/33
[52]	U.S. Cl	437/34; 437/44
		437/57; 357/42; 357/44
[59]	Field of Secret	427/27 28 20 30

437/34, 56, 57, 200, 192, 40, 41, 44, 233; 357/23.3, 23.4, 40, 41, 42, 44

[56] References Cited

U.S. PATENT DOCUMENTS

4,530,150	7/1985	Shirato	437/44
4,577,391	3/1986	Hsia et al	437/34
4,599,789	7/1986	Gasner	437/34
4,637,124	1/1987	Okuyama et al	437/41
4,745,086	5/1988	Parrillo	437/44

FOREIGN PATENT DOCUMENTS

		Japan 437/41
		Japan
		Japan 437/44
0165355	7/1987	Japan 437/233

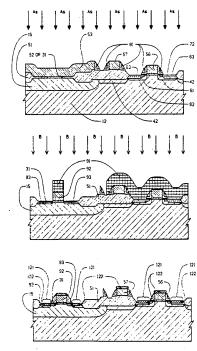
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[57] ABSTRACT

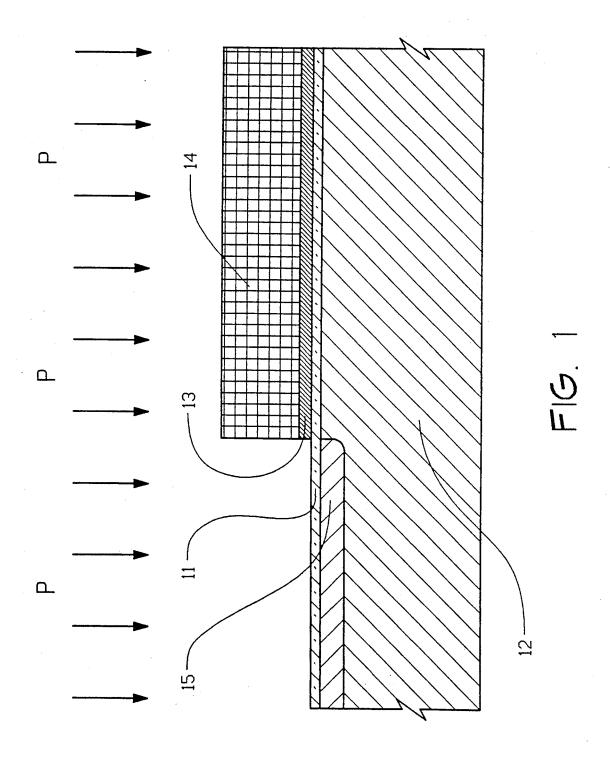
An improved CMOS fabrication process which uses separate masking steps to pattern N-channel and Pchannel transistor gates from a single layer of conductively-doped polycrystalline silicon (poly) and incorporates self-aligned salicidation of conductive regions. The object of the improved process is to reduce the cost and improve the reliability, performance and manufacturability of CMOS devices by a process which features a dramatically reduced number of photomasking steps and which further allows self-aligned salicidation of transistor conductive regions. By processing N-channel and P-channel devices separately, the number of photomasking steps required to fabricate complete CMOS circuitry in a single-polysilicon-layer or single-metal layer process can be reduced from eleven to eight. Starting with a substrate of P-type material, N-channel devices are formed first, with unetched poly left in the future P-channel regions until N-channel processing is complete. The improved CMOS process provides the following advantages over conventional process technology: Use of a masked high-energy punch-through implant for N-channel devices is not required; individual optimization of N-channel and P-channel transistors is made possible; a lightly-doped drain (LDD) design for both N-channel and P-channel transistors is readily implemented; source/drain-to-gate offset may be changed independently for N-channel and P-channel devices; and N-channel and P-channel transistors can be independently controlled and optimized for best LDD performance and reliability.

5 Claims, 13 Drawing Sheets

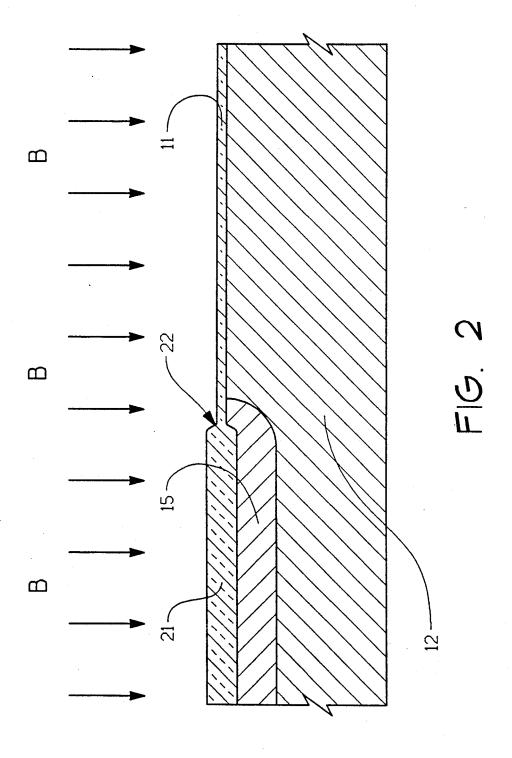




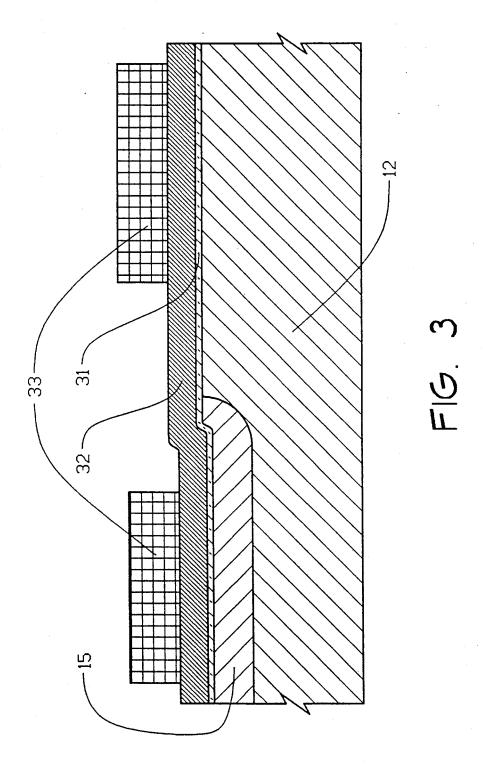
June 4, 1991

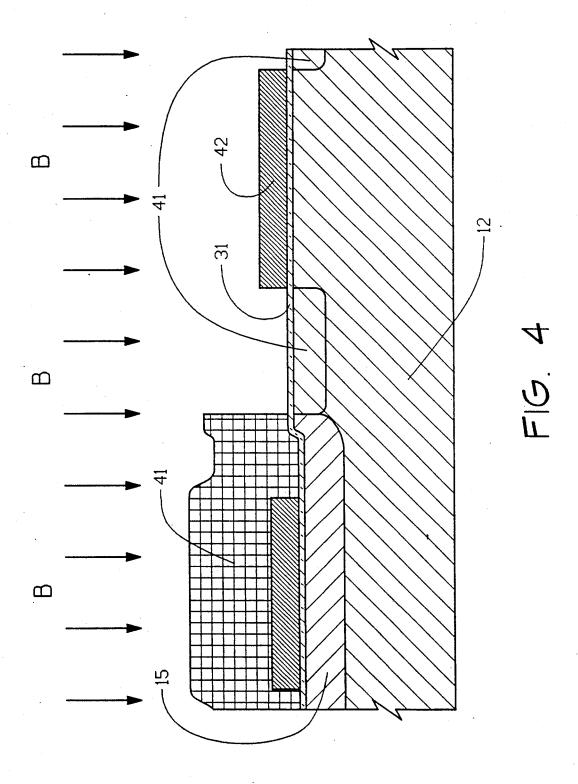












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