



US005920790A

# United States Patent [19]

[11] **Patent Number:** **5,920,790**

**Wetzel et al.**

[45] **Date of Patent:** **Jul. 6, 1999**

[54] **METHOD OF FORMING A SEMICONDUCTOR DEVICE HAVING DUAL INLAID STRUCTURE**

### OTHER PUBLICATIONS

[75] Inventors: **Jeffrey T. Wetzel; John J. Stankus**, both of Austin, Tex.

B. Luther et al., "Planar Copper-Polyimide Back End of the Line Interconnections for ULSI Devices", Jun. 8-9, 1993 VMIC Conference, Catalog No. 93ISMIC-102, pp. 15-21.

[73] Assignee: **Motorola, Inc.**, Schaumburg, Ill.

*Primary Examiner*—John F. Niebling  
*Assistant Examiner*—David A. Zarneke

[21] Appl. No.: **08/921,293**

### [57] ABSTRACT

[22] Filed: **Aug. 29, 1997**

A method for forming semiconductor device (1) that includes providing a substrate (10) having a metal interconnect (12), depositing a via interlevel dielectric (ILD) layer (20) over the substrate (10) and the metal interconnect (12), etching the via ILD layer (20) to form a via (30) over the metal interconnect (12), depositing a trench ILD layer (32) over the via ILD layer (20) and the via (30), etching the trench ILD layer (32) to form a trench (40), the trench (40) being contiguous with the via (12), and depositing a metal (44) so as to fill the via (30) and the trench (40), and provide electrical connection with the metal interconnect (12).

[51] **Int. Cl.<sup>6</sup>** ..... **H01L 21/4763**

[52] **U.S. Cl.** ..... **438/618; 438/622; 438/623; 438/624; 438/627; 438/628; 438/634; 438/638**

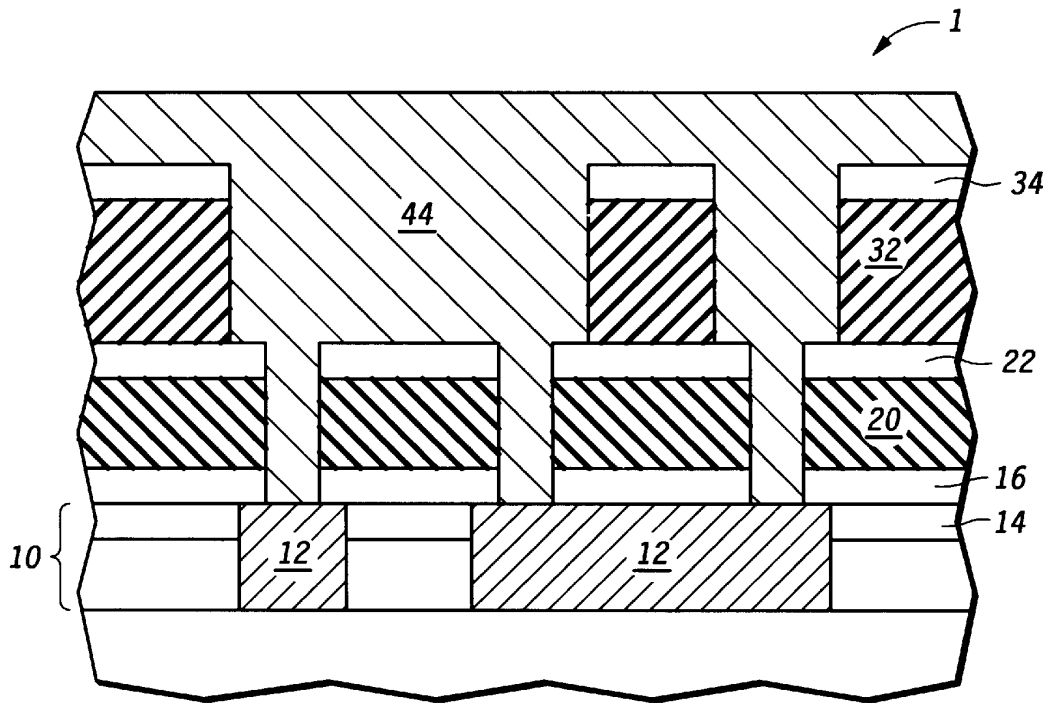
[58] **Field of Search** ..... **438/618, 622, 438/623, 624, 627, 628, 634, 638**

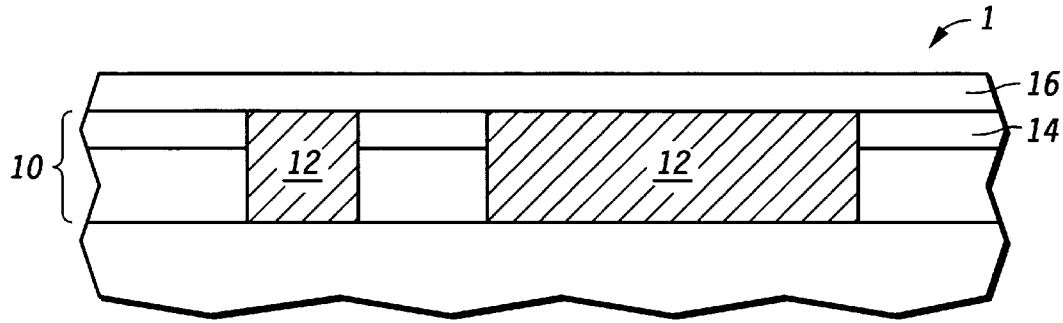
### [56] References Cited

#### U.S. PATENT DOCUMENTS

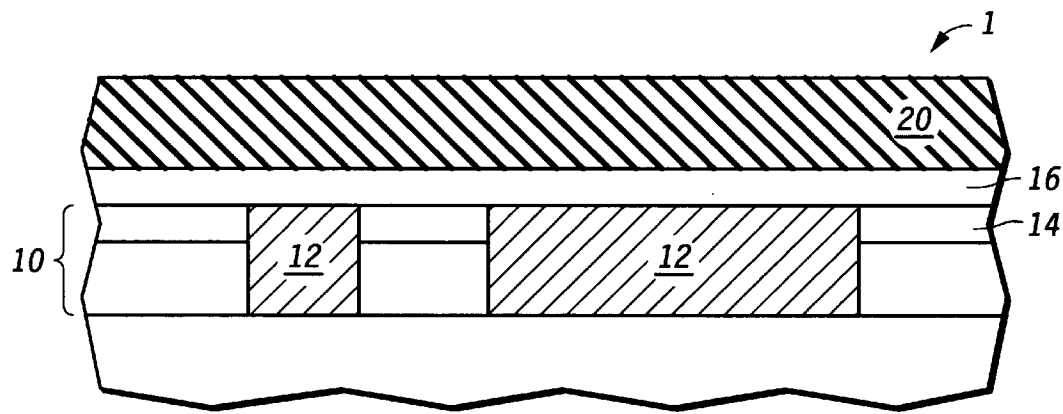
4,702,792	10/1987	Chow et al.	156/628
4,789,648	12/1988	Chow et al.	437/225
4,944,836	7/1990	Beyer et al.	156/645

**26 Claims, 4 Drawing Sheets**

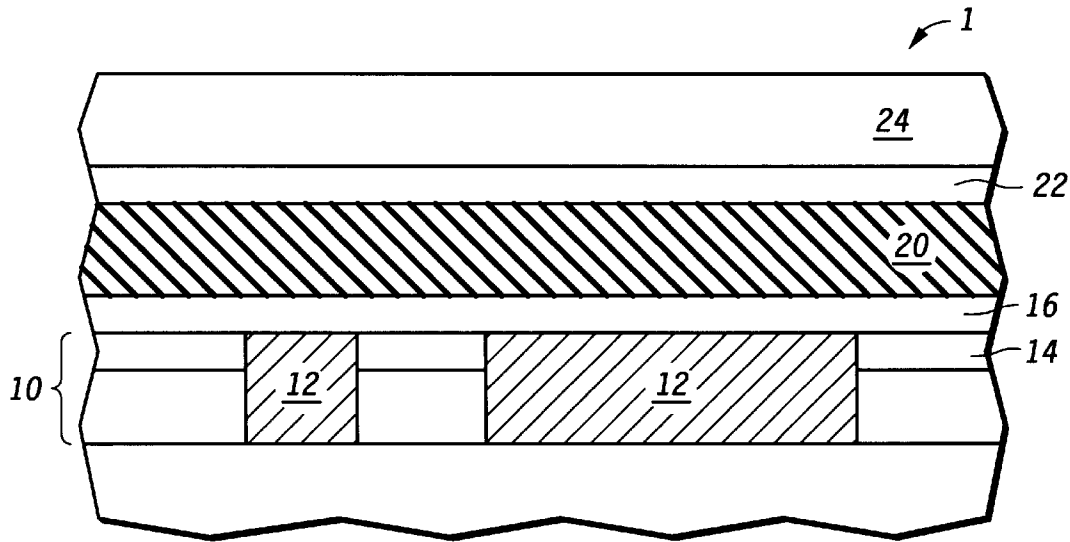




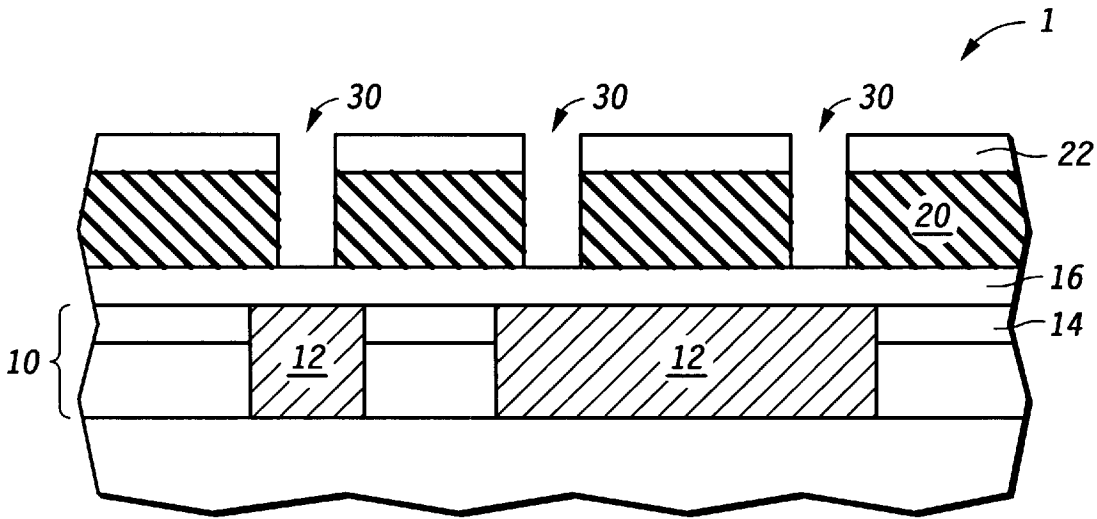
**FIG. 1**



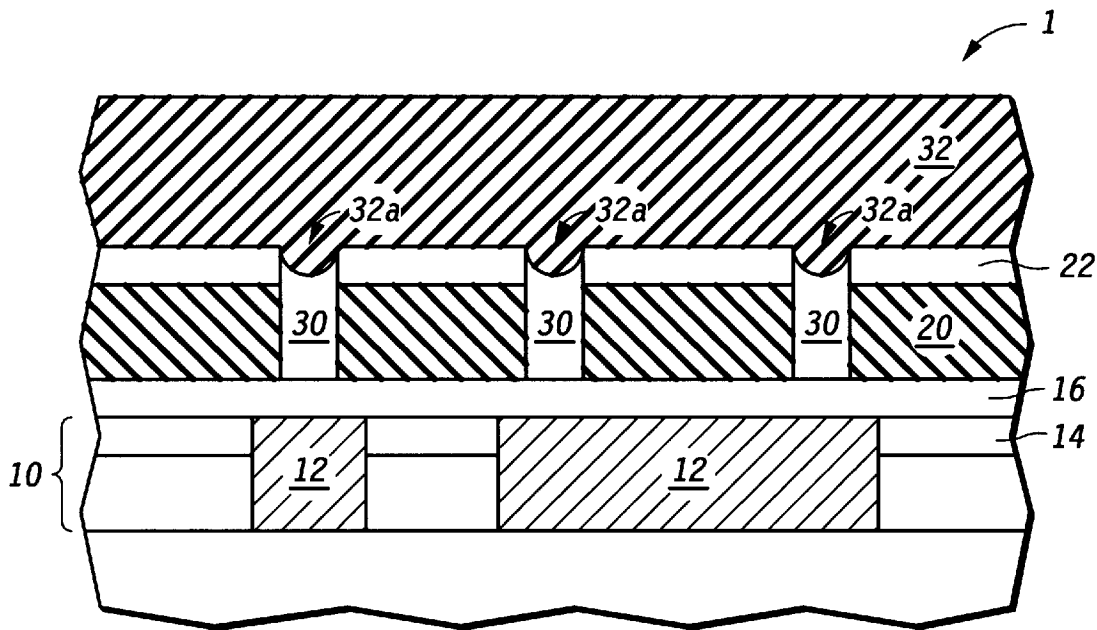
**FIG. 2**



**FIG. 3**



**FIG. 4**



**FIG. 5**

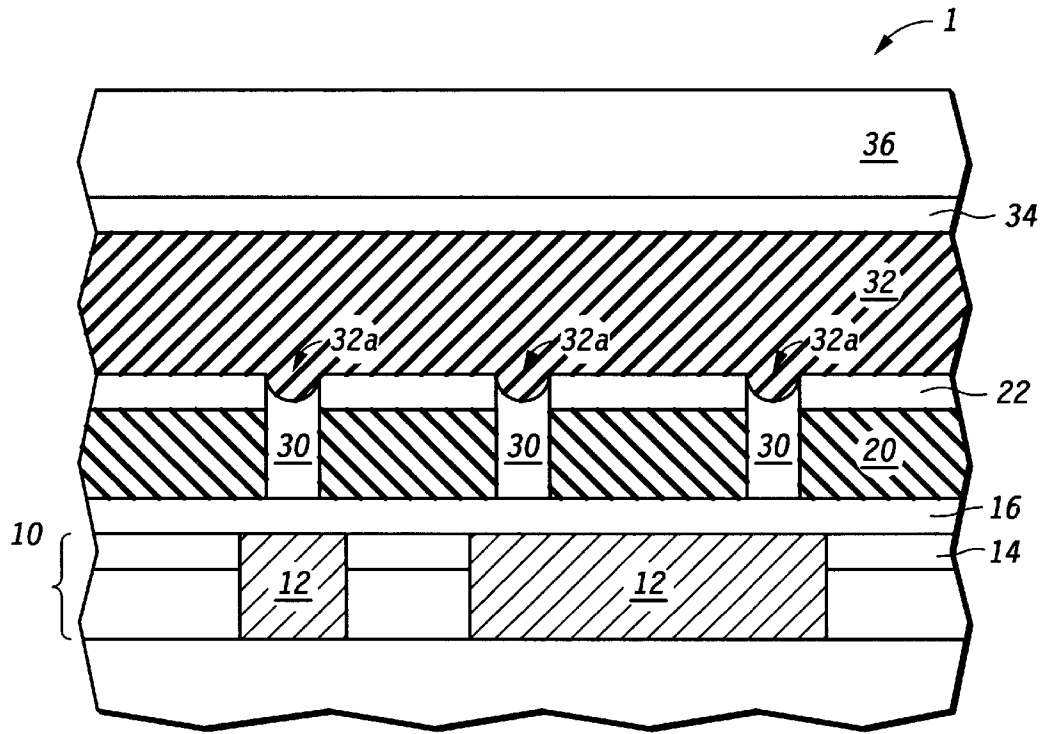


FIG. 6

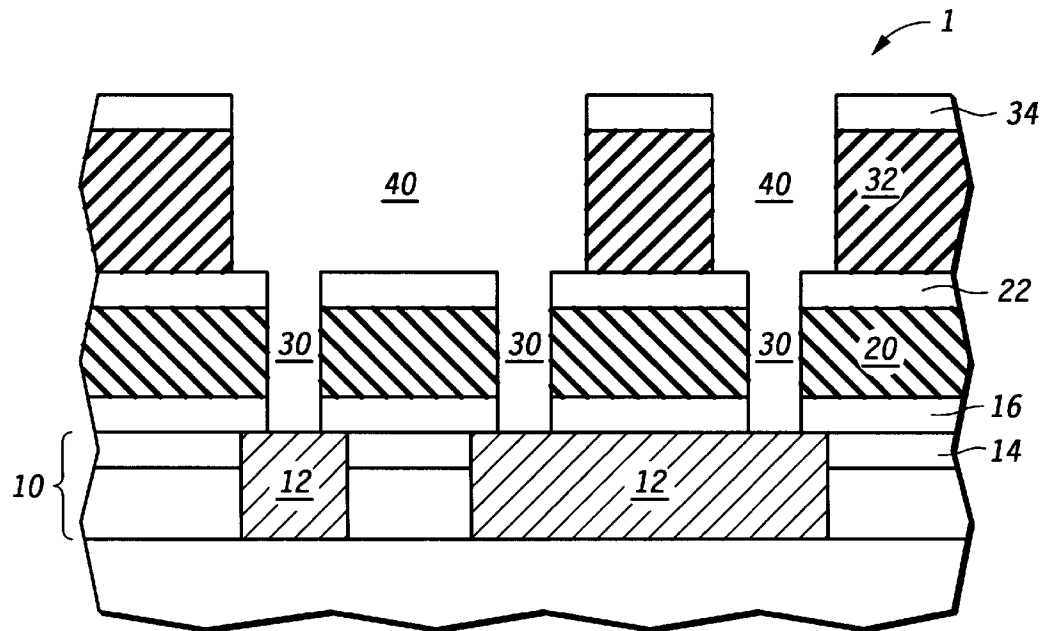


FIG. 7

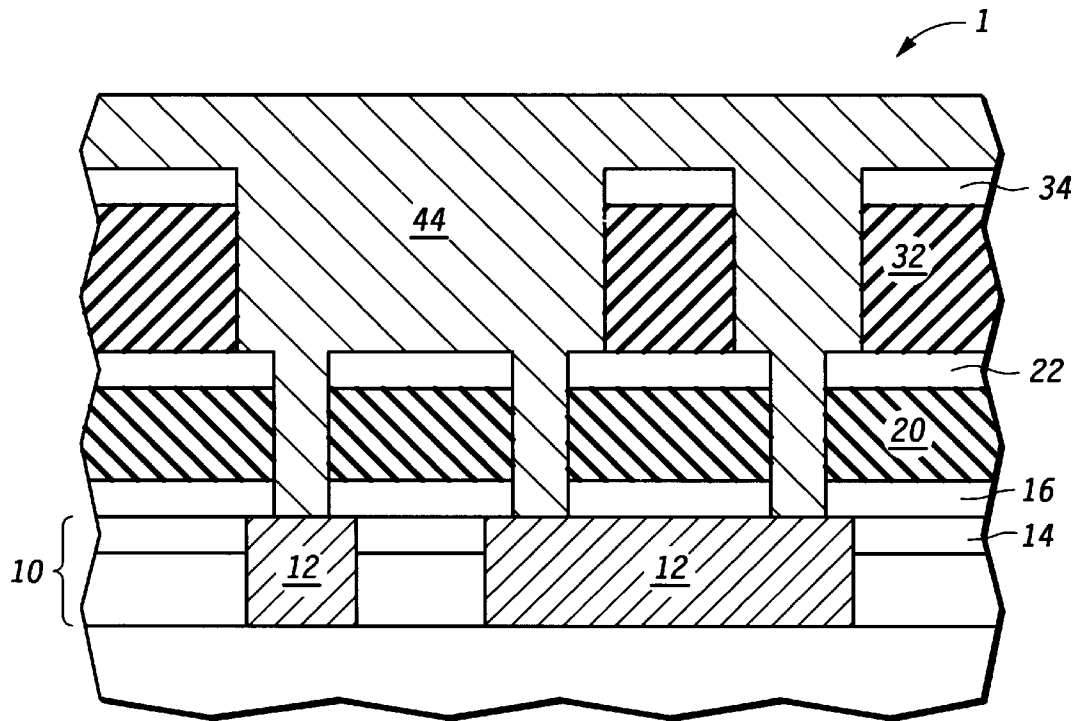


FIG. 8

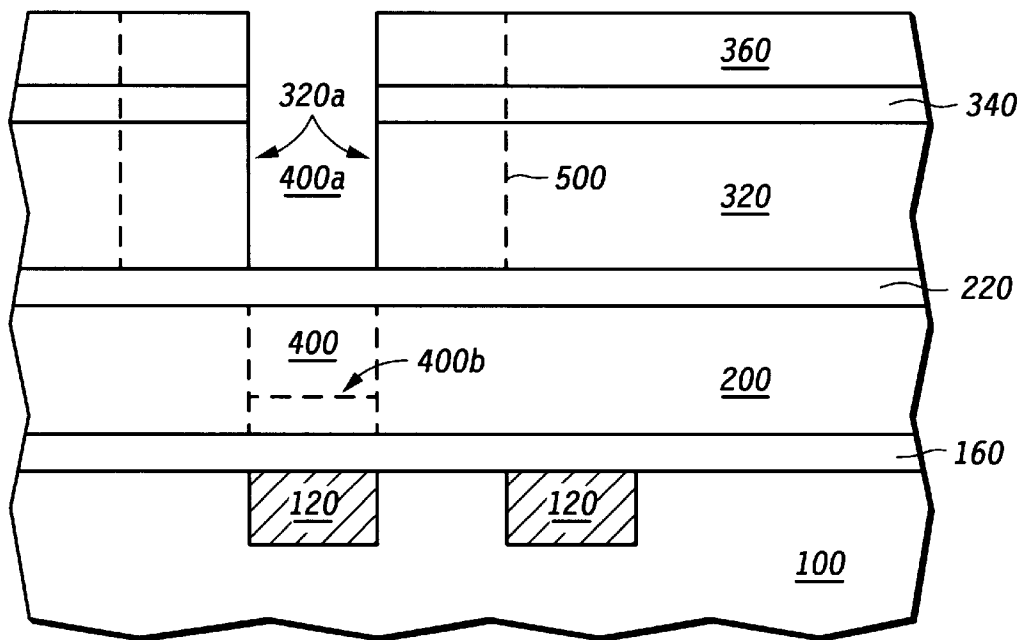


FIG. 9  
-PRIOR ART-

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