

[54] HOT ELECTRON COLLECTOR FOR A LDD TRANSISTOR

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[51] Int. Cl.<sup>5</sup> ..... H01L 29/78

[52] U.S. Cl. .... 357/233; 357/23.12; 357/53; 357/59

[58] Field of Search ..... 357/23.3, 23.5, 23.12, 357/53, 23.4, 59 E, 59 G, 59 J; 437/44, 35

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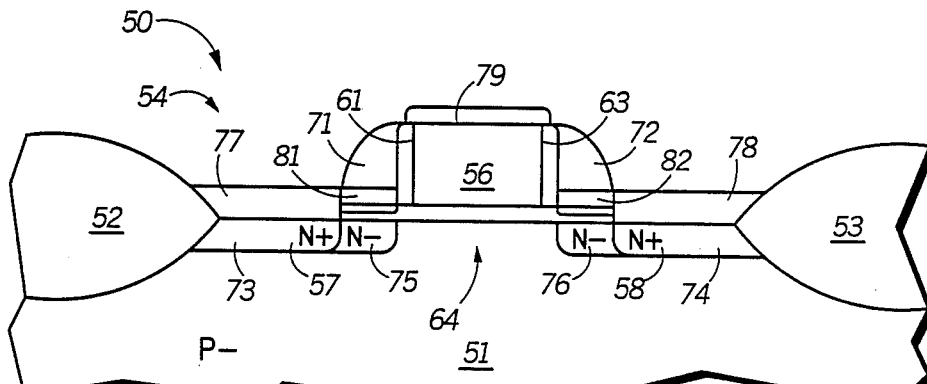
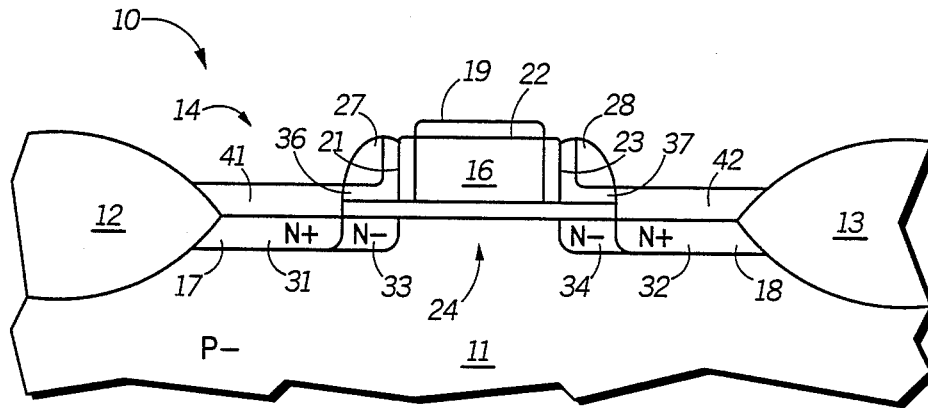
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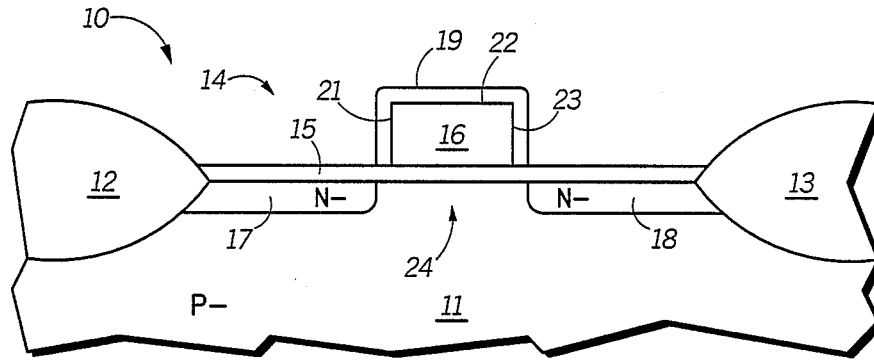
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[57] ABSTRACT

A lightly-doped drain (LDD) structure has conductive shield overlying the lightly-doped drain and source portions to collect and/or remove hot carriers which can otherwise cause instabilities such as gain degradation and threshold voltage shifts in short-channel MOS devices. The hot carriers eventually deteriorate the performance of the transistor to the point where the transistor provides insufficient performance. Thus, the lifetime of a transistor is affected by the degradation caused by the formation of hot carriers. The lifetime is increased by collecting the hot carriers in the conductive material over the lightly-doped source and drain.

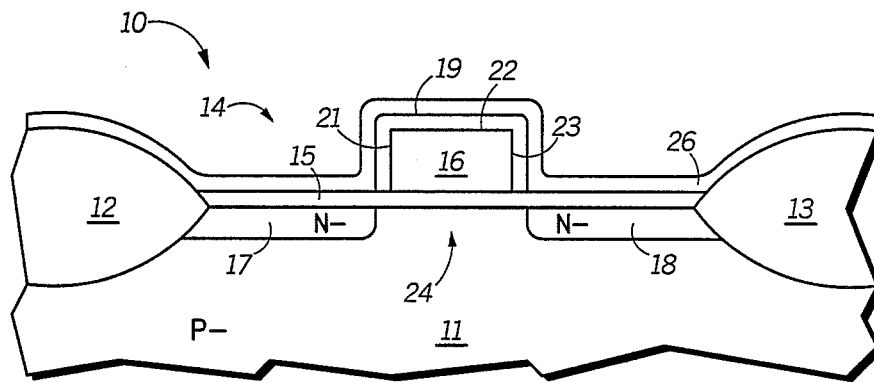
14 Claims, 4 Drawing Sheets



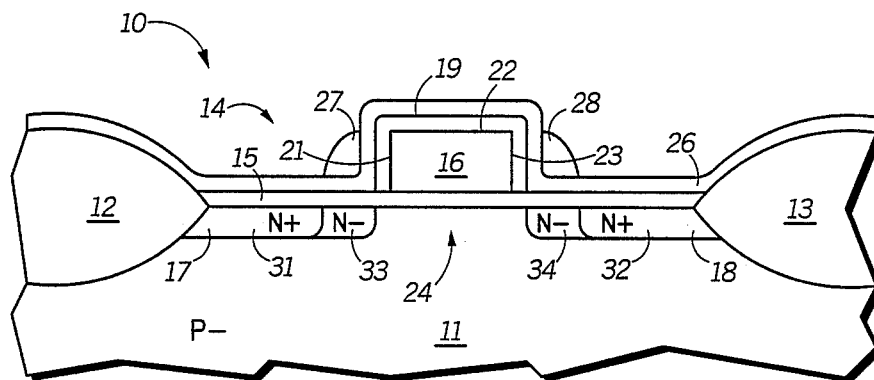


**FIG. 1**

-PRIOR ART-



**FIG. 2**



**FIG. 3**

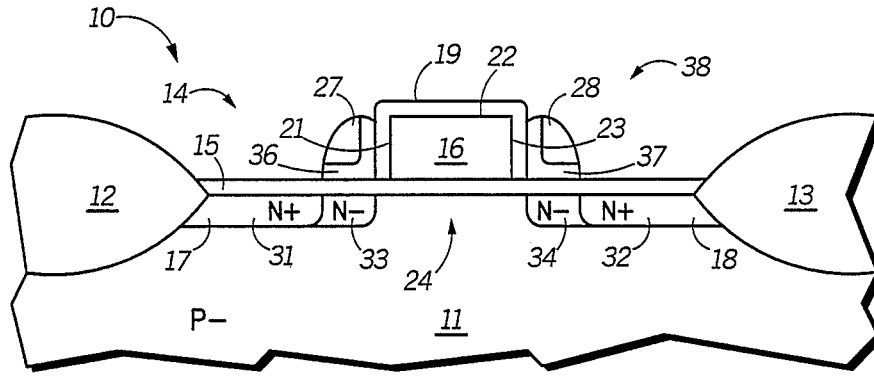


FIG. 4

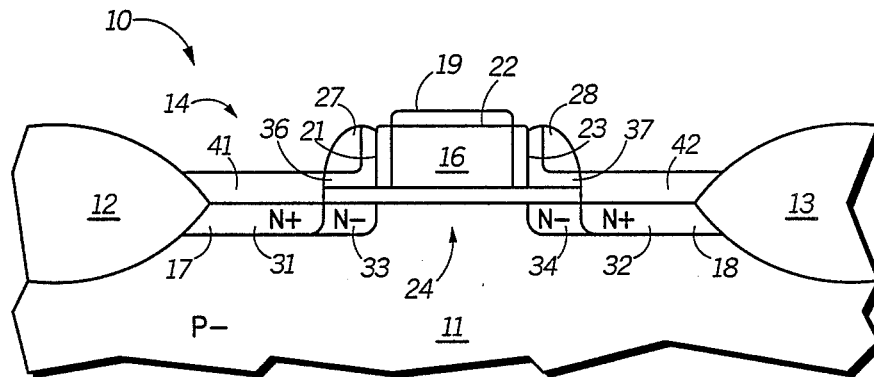


FIG. 5

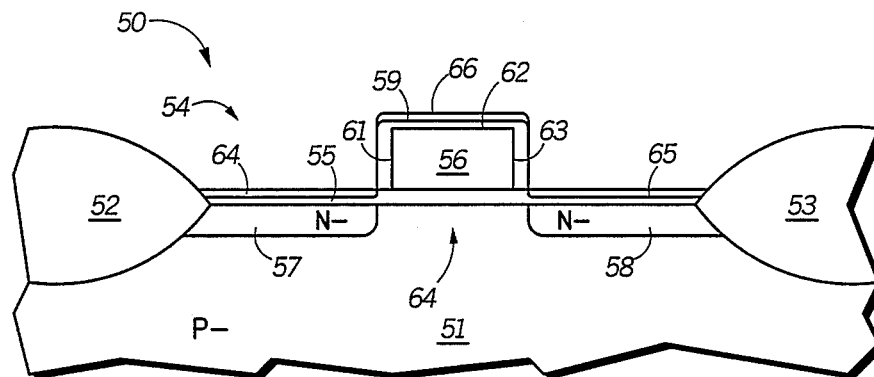


FIG. 6

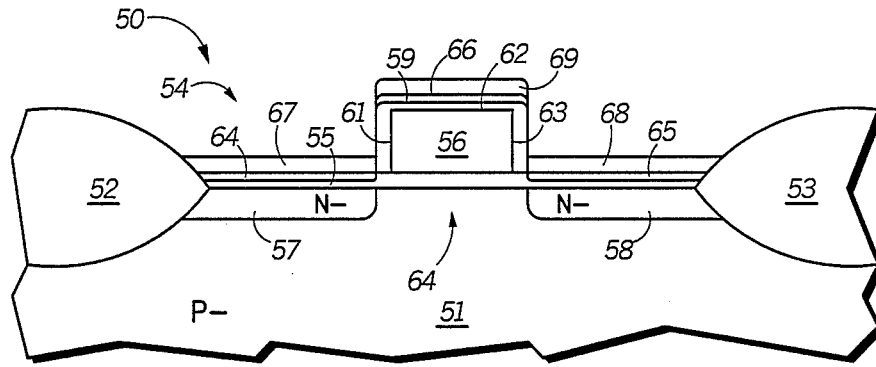


FIG. 7

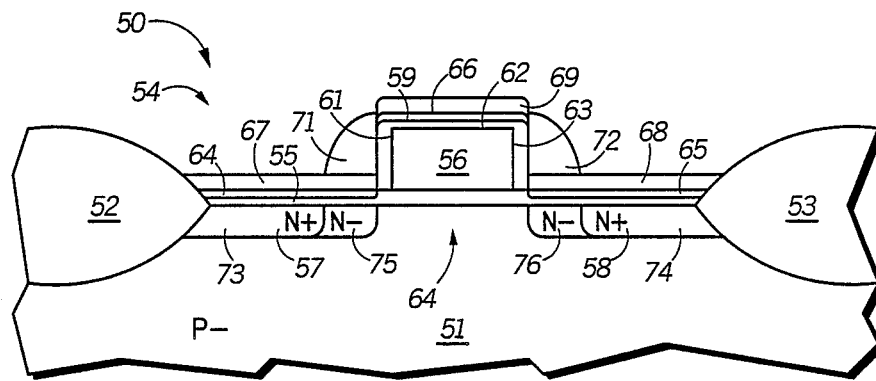


FIG. 8

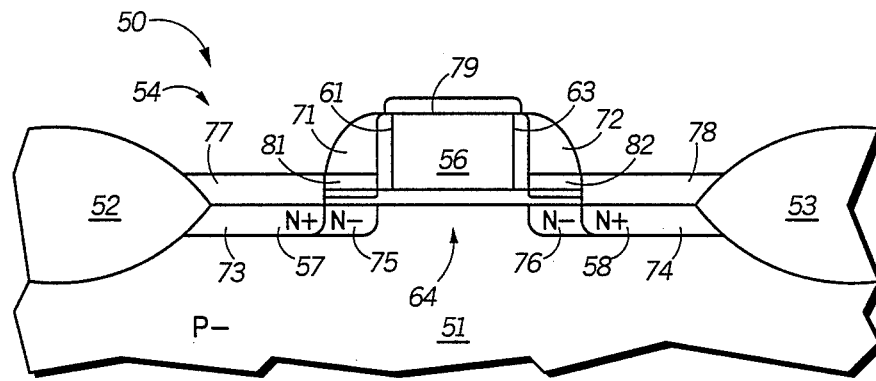
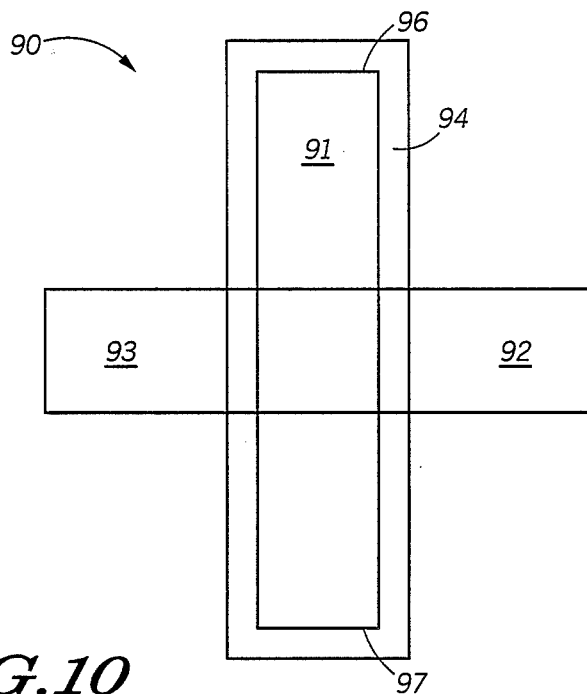
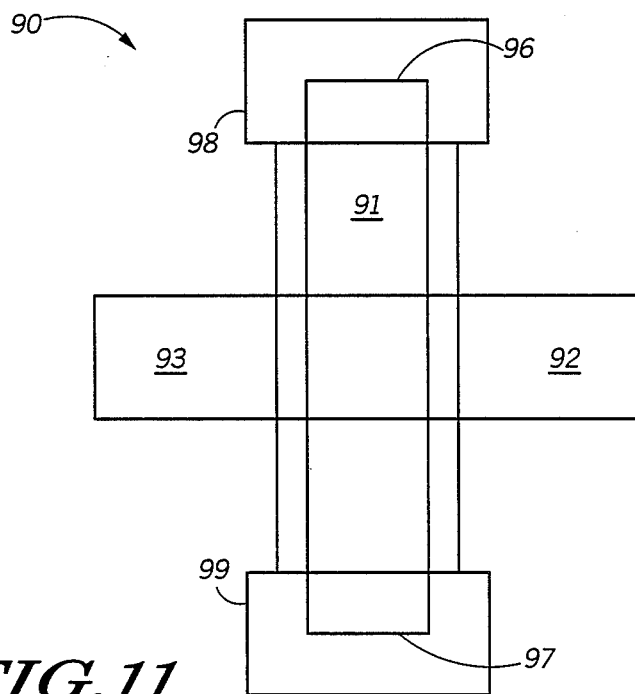


FIG. 9



**FIG. 10**



**FIG. 11**

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