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**Huang**

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(54) **SEMICONDUCTOR STRUCTURES WITH TRENCH CONTACTS**

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(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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**Related U.S. Application Data**

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(51) **Int. Cl.**<sup>7</sup> ..... **H01L 29/76; H01L 29/94; H01L 31/062; H01L 31/113**

(52) **U.S. Cl.** ..... **257/329; 257/330; 257/331; 257/377**

(58) **Field of Search** ..... **257/377, 329, 257/330, 331, 332, 328, 346**

(56) **References Cited**

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(57) **ABSTRACT**

Semiconductor structures such as the trench and planar MOSFETs (UMOS), trench and planar IGBTs and trench MCTs using trenches to establish a conductor. Improved control of the parasitic transistor in the trench MOSFET is also achieved and cell size and pitch is reduced relative to conventional structures.

**15 Claims, 5 Drawing Sheets**

