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(12) **United States Patent**
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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(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.

(21) Appl. No.: **10/187,560**

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(65) **Prior Publication Data**

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Related U.S. Application Data

(60) Continuation of application No. 09/498,476, filed on Feb. 4, 2000, now Pat. No. 6,437,399, which is a division of application No. 08/885,922, filed on Jun. 30, 1997, now Pat. No. 6,037,628.

(51) **Int. Cl.**⁷ **H01L 29/76**

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

(58) **Field of Search** **257/329, 330, 257/331, 289, 334, 472; 438/430; 437/203**

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5 Claims, 5 Drawing Sheets

