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(54) Title: APPLICATION OF HIGH POWER MAGNETRON SPUTTERING TO THROUGH SILICON VIA METALLIZATION

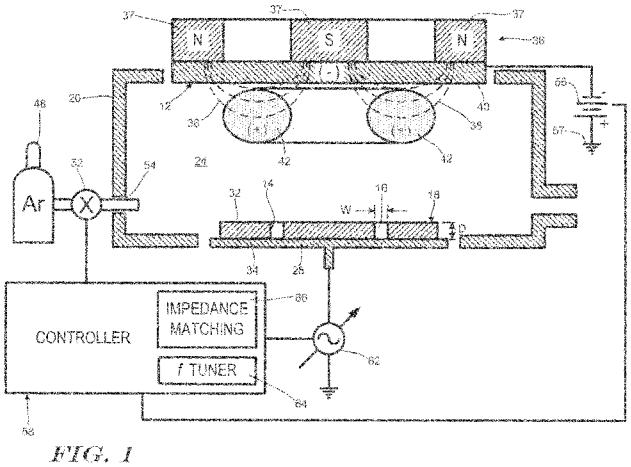


FIG. 1

(57) Abstract: A method of magnetically enhanced sputtering an electrically-conductive material onto interior surfaces of a trench described herein includes providing a magnetic field adjacent to a target formed at least in part from the electrically-conductive material, and applying a DC voltage between an anode and the target as a plurality of pulses. A high-frequency signal is applied to the pedestal supporting the semiconductor substrate to generate a self-bias field adjacent to the semiconductor substrate. The high-frequency signal is applied to the pedestal in pulses, during periods of time that overlap with the periods during which the DC voltage pulses are applied. The periods of time that the high-frequency signals are applied include a duration that extends beyond termination of the DC voltage pulse applied between the anode and the target. During each DC voltage pulse the electrically-conductive material is sputter deposited onto the side walls of the trench formed in the semiconductor substrate.

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A. CLASSIFICATION OF SUBJECT MATTER
INV. C23C14/35 H01J37/34 H01L21/768

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C23C H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 106 709 A (APPLIED MATERIALS INC [US]) 13 June 2001 (2001-06-13)	13-19
A	paragraphs [0059] - [0068]; figures 5,15-22	1-12
A	KOUZNETSOV V ET AL: "A NOVEL PULSED MAGNETRON SPUTTER TECHNIQUE UTILIZING VERY HIGH TARGET POWER DENSITIES" SURFACE AND COATINGS TECHNOLOGY, ELSEVIER, AMSTERDAM, NL, vol. 122, 1 January 1999 (1999-01-01), pages 290-293, XP001104997 ISSN: 0257-8972 the whole document	1-19

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	HELMERSSON U ET AL: "Ionized physical vapor deposition (IPVD): A review of technology and applications" THIN SOLID FILMS, ELSEVIER-SEQUOIA S.A. LAUSANNE, CH, vol. 513, no. 1-2, 14 August 2006 (2006-08-14), pages 1-24, XP025005808 ISSN: 0040-6090 [retrieved on 2006-08-14] page 8, paragraph 3 - page 10, paragraph 1	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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