Title: METAL-INSULATOR-METAL (MIM) SWITCHING DEVICES

Abstract: A gated nano-electro-mechanical (NEM) switch employing metal-insulator-metal (MIM) technology and related devices and methods which can facilitate implementation of low-power, radiation-hardened, high-temperature electronic devices and circuits. In one example embodiment a gate electrode is configured as a cantilever beam whose free end is coupled to a MIM stack. The stack moves into bridging contact across a source and drain region when the applied gate voltage generates a sufficient electrostatic force to overcome the mechanical biasing of the cantilever beam. A second set of contacts can be added on the cantilever beam to form a complementary switching structure, or to a separate cantilever beam. The switching can be configured as non-volatile in response to stiction forces. NEM circuits provide a number of advantages within a variety of circuit types, including but not limited to: logic, memory, sleep circuits, pass circuits, and so forth.
INTERNATIONAL SEARCH REPORT

International application No
PCT/US07/67798

A CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H01L 29/78 (2007.1 0)
USPC - 200/181
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)
IPC(8) - H01L 29/78 (2007.10)
USPC - 200/181, 257/213-413

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Micromachined Transducers Sourcebook, Kovacs, 1998
Nanoelectronics and Information Technology Advanced Electronic Materials and Novel Devices, R Waser, 2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO EAST System (US, USPG-PUB, EPO, JPO, FPRS, DERWENT), GoogleScholar, DialogPro, IEEExplore

C DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
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<tbody>
<tr>
<td>A</td>
<td>US 6,509,605 B1 (SMITH) 21 January 2003 (21 01 2003) Fig 3A-3C</td>
<td>1-52</td>
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<tr>
<td>A</td>
<td>IONESCU et al Modeling and Design of a Low Voltage SOI Suspended Gate MOSFET (SG-MOSFET) with a Metal-Over-Gate Architecture Proceeding of the International Symposium on Quality Electronic Design 2002 pages 1-6</td>
<td>1-52</td>
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</table>

D Further documents are listed in the continuation of Box C

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Date of the actual completion of the international search
26 October 2007

Date of mailing of the international search report
14 MAR 2008

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