US009543426B2

(12) **United States Patent**
Xie et al.

(10) **Patent No.: US 9,543,426 B2**
(45) **Date of Patent: Jan. 10, 2017**

(54) **SEMICONDUCTOR DEVICES WITH SELF-ALIGNED CONTACTS AND LOW-K SPACERS**

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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 10 days.

(21) Appl. No.: **13/957,587**

(22) Filed: **Aug. 2, 2013**

(65) **Prior Publication Data**

US 2014/0042502 A1 Feb. 13, 2014

Related U.S. Application Data

(62) Division of application No. 13/584,055, filed on Aug. 13, 2012, now Pat. No. 8,524,592.

(51) **Int. Cl.**

H01L 29/78	(2006.01)
H01L 29/66	(2006.01)
H01L 21/768	(2006.01)

(52) **U.S. Cl.**

CPC ***H01L 29/78*** (2013.01); ***H01L 29/6656*** (2013.01); ***H01L 29/66545*** (2013.01); ***H01L 29/66628*** (2013.01); ***H01L 29/66636*** (2013.01); *H01L 21/76897* (2013.01)

(58) **Field of Classification Search**

CPC H01L 29/518; H01L 29/6656; H01L 29/66621; H01L 21/823864; H01L 29/78; H01L 29/42376; H01L 21/28114

USPC 257/387

See application file for complete search history.

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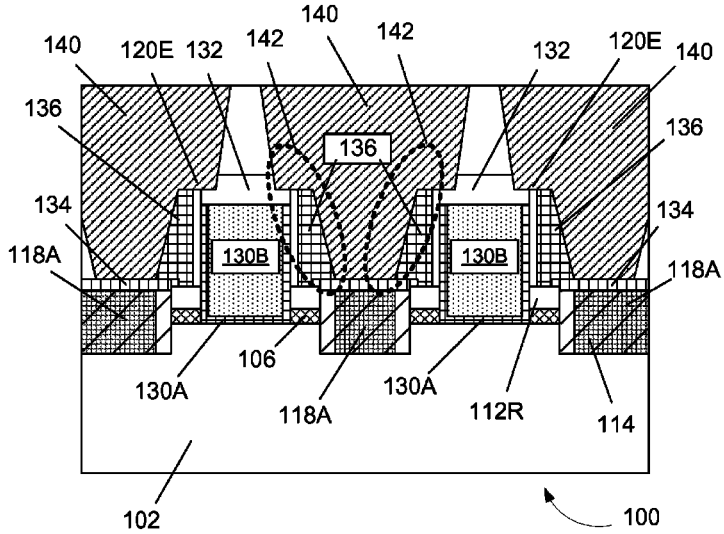
(57) **ABSTRACT**

One illustrative method disclosed herein includes removing a portion of a sacrificial sidewall spacer to thereby expose at least a portion of the sidewalls of a sacrificial gate electrode and forming a liner layer on the exposed sidewalls of the sacrificial gate electrode. In this example, the method also includes forming a sacrificial gap fill material above the liner layer, exposing and removing the sacrificial gate electrode to thereby define a gate cavity that is laterally defined by the liner layer, forming a replacement gate structure, removing the sacrificial gap fill material and forming a low-k sidewall spacer adjacent the liner layer. A device is also disclosed that includes a gate cap layer, a layer of silicon nitride or silicon oxynitride positioned on each of two upstanding portions of a gate insulation layer and a low-k sidewall spacer positioned on the layer of silicon nitride or silicon oxynitride.

21 Claims, 12 Drawing Sheets