Issue 29 November 2011

InfoTracks

Semitracks Monthly Newsletter

New Semitracks Blog!

In order to keep our readers better up-to-date and informed, Semitracks Inc. has launched its new blog!

Read more, Page 3

Source and Drain Extensions Part III

By Christopher Henderson

Finally, we describe an implementation of a double raised source/drain structure on an SOI substrate. One starts with an ultra-thin SOI wafer and performs trench isolation, channel implant, grows the gate oxide and patterns the gate. An offset spacer is grown to isolate the raised source/drain regions from the gate. Next, selective silicon growth forms the double-raised structure. This is followed by the extension implant and main spacer. Next, selective silicon growth forms the single and double-raised structure, followed by drain/source implant and anneal. One then deposits the metal for silicidation and anneals the structure. This method has been demonstrated on a logic process with embedded SRAM. It reduces the series resistance in a fully depleted SOI structure, improving the ring oscillator speed by almost 25%.

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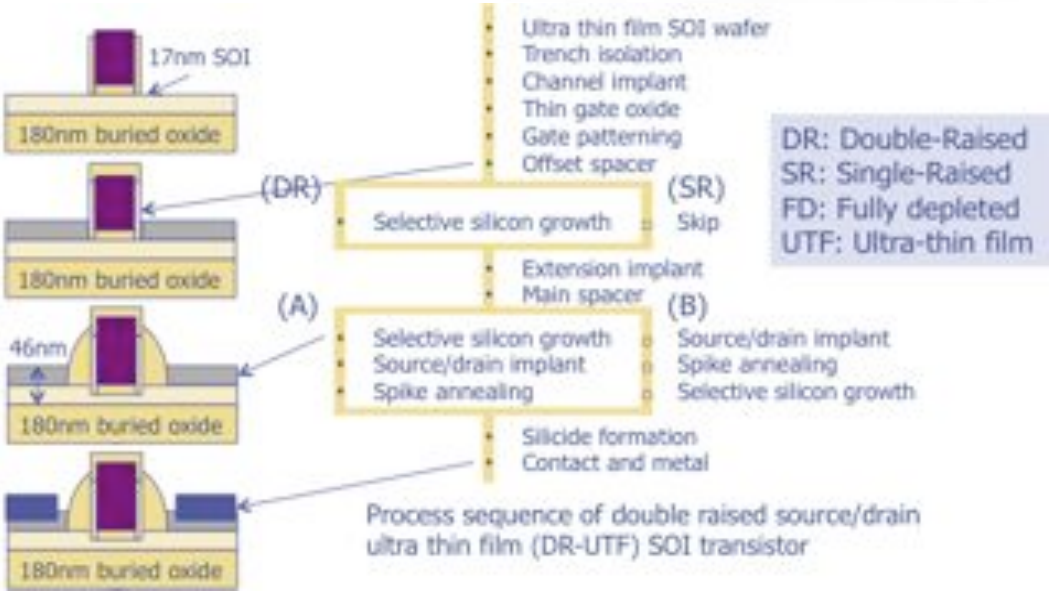

Fig. 4. Process for double raised source/drains on SOI.

In the next issue we'll describe other techniques used on source/drain regions, like co-implantation of inactive species, carbon implants, and Schottky barrier structures.

Ask the Experts

Q: How can I limit the breakdown damage when an oxide is stressed in a power MOSFET device?

A: Use a current limiting resistor or set a lower compliance limit on the SMU. A more active monitoring circuit may be needed if the FN tunneling current is already significant.

To post, read, or answer a question, visit our forums.
We look forward to hearing from you!

Technical Tidbit: Aluminum Sliding

Thermomechanical stress in components can lead to some interesting failure mechanisms. An example of this is a mechanism called aluminum sliding. This was first reported in the early 1990s by Intel, but more recently, some companies have experienced a resurgence in this problem.

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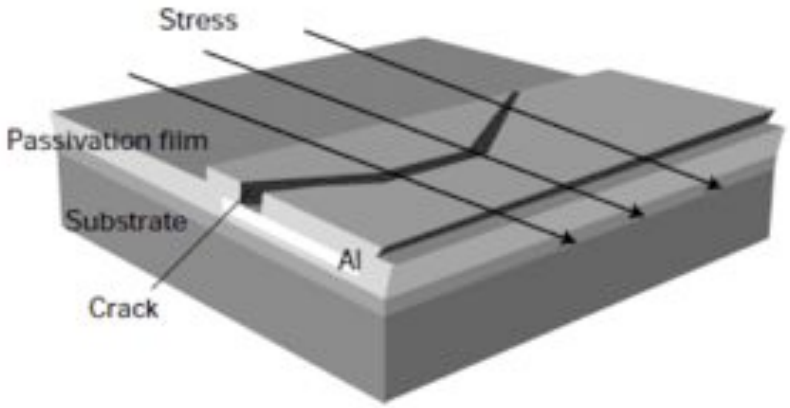
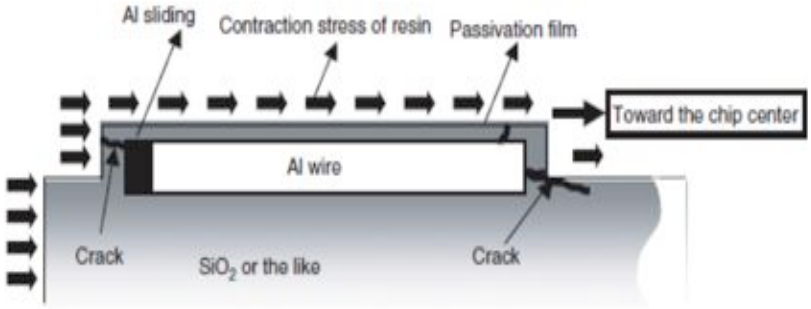
New Semitracks Blog!

Semitracks has started a blog to keep you up to date on industry developments and items that affect Semiconductor Product Engineering and Reliability. In addition to industry developments, we'll include some short articles on technology items of interest. These may vary from historical items that help place current developments in context, to future developments that are likely to affect the industry. If you have comments or feedback, or topics you would like to see addressed, please feel free to e-mail us at info@semitracks.com.

See it for yourself at:
http://www.semitracks.com/index.php/en/blog

The stress can deform the top-most aluminum layer and cause cracking in the silicon-dioxide silicon-nitride top dielectric layer. This mechanism is exacerbated by thermal cycling. Some methods to minimize this problem include: identifying and using a molding compound with a coefficient of thermal expansion that better matches that of the die, increasing the passivation, or top dielectric, thickness, using a polyimide protective overcoat to absorb the stress, and using narrower aluminum lines that limit the adhesion and stress buildup.





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Upcoming Courses

LED Packaging

December 12-13, 2011 - Austin

Copper Wire Bonding Tech

December 15-16, 2011 - Malaysia

Semiconductor Reliability

January 16-18, 2012 – San Jose

Wafer Fab Processing

January 16-19, 2012 – San Jose

Polymers in Electronics/FTIR

January 17-18, 2012 - Phoenix

Feedback

If you have a suggestion or a comment regarding our courses, online training, discussion forums, or reference materials, or if you wish to suggest a new course or location, please call us at 1-505-858-0454 or e-mail us at info@semitracks.com.

To submit questions to the Q&A section, inquire about an article, or suggest a topic you would like to see covered in the next newsletter, please contact Jeremy Henderson by email at jeremy.henderson@semitracks.com.

We are always looking for ways to enhance our courses and educational materials.

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For more information on Semitracks online training or public courses, visit our website!

http://www.semitracks.com