Exploring Channel Doping Designs for High-Performance Tunneling FETs*

NEMO5

Problem:

- *ON/OFF ratio of TFETs is limited by*

(1) low S-C tunneling probability

(2) high S-D tunneling leakage

- *Lowering the drain doping (Nd) is not a scable design*
- *The source-pocket (SP) design requires a high pocket doping density (Np)*

Objective:

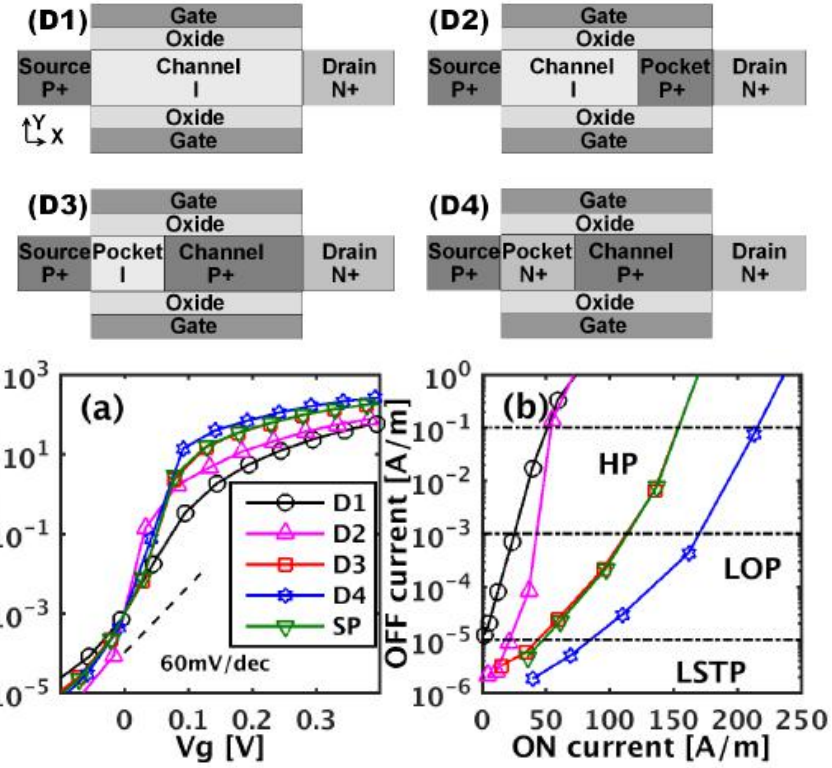
- *Exploring different channel doping strategies to improve I_{ON}*

Approach:

- *(D1): a conventional nTFET with intrinsic channel; (D2): intrinsic channel with a P+ drain pocket; (D3): P+ channel with an intrinsic source pocket; (D4): P+ channel with an N+ source pocket.*

Results / Impact:

- *D2 improves the SS (and I_{ON}) and it is more scalable than lowering Nd*
- *D3 performs similarly to the SP design*
- *D4 further improves I_{ON} of the SP design without having to increase Np*



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