HOMO-JUNCTION BOTTOM-GATE AMORPHOUS In–Ga–Zn–O TFTs WITH METAL INDUCED SOURCE /DRAIN REGIONS

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A fabrication process for homo-junction bottom-gate (HJBG) amorphous In–Ga–Zn–O (a-IGZO) thin-film transistors (TFTs) is proposed, in which the a-IGZO section as source/drain (S/D) region is induced to a low resistance state by coating a thin metal Al film and then performing a thermal annealing in oxygen, and that as channel region is protected from back etching by depositing and patterning a protective layer. Experimental results show that with a 5 nm Al film and a 200 ºC annealing, the sheet resistance of the S/D a-IGZO is 803 Ω/□ and keeps stable during subsequent thermal treatment. In addition, the annealing generated thin Al_2O_3 film contributes to improve the thermal stability and ambient atmosphere immunity of the fabricated HJBG TFTs.

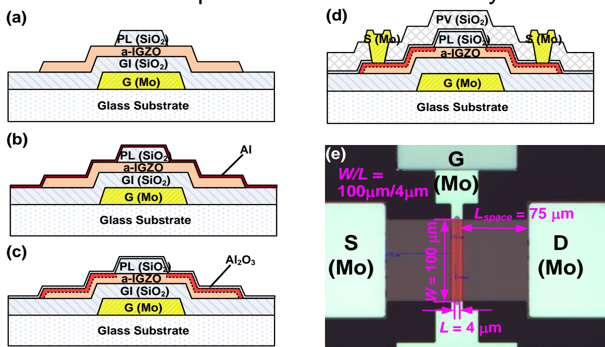

Fig. 1. Schematic fabrication steps of a-IGZO TFT

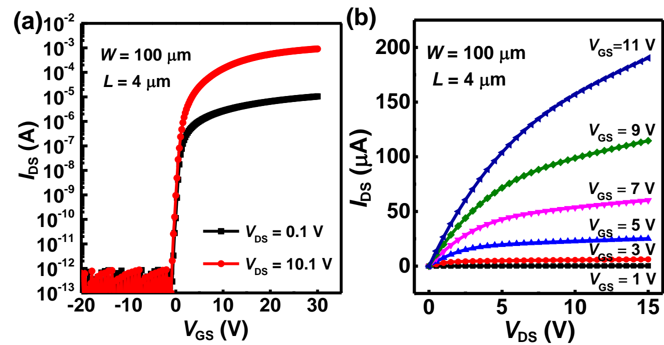

Fig. 2. Current–voltage (I – V) characteristics of a TFT in the proposed Al reacted HJBG process.

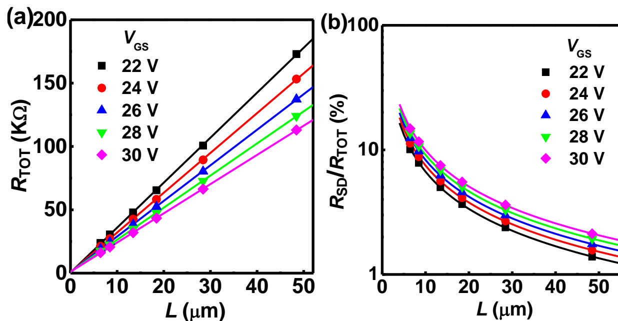

Fig. 3. (a) Total resistance and (b) ratio of source/drain parasitic resistance to the total resistance versus channel length.

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