

Silicon TFTs on flexible substrate

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Due to its matured technology, silicon TFTs possess several advantages in terms of industrial compatibility, electrical stability, reliability in the environment and process reproducibility, etc. The purpose deals on the possibility to use such reliable TFTs on flexible electronics with high compliance. The objective is to fabricate directly, without report step, silicon electronics on flexible substrate.

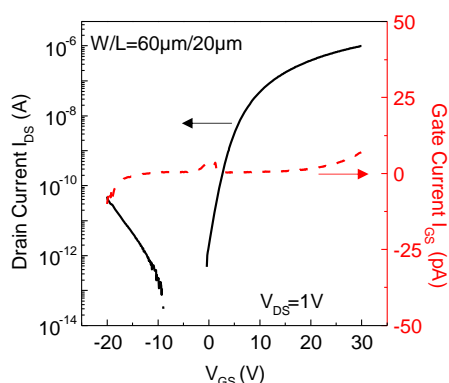
The electrical characteristics and their electrical stability of low temperature fabricated microcrystalline silicon TFTs on PEN and Polyimide substrate will be shown. Then The TFTs are submitted to different mechanical compressive and tensile stress and their behavior will be checked still the lowest curvature radius.

TFTs have been found to hold bending at curvature radius of 1.5 mm without losing their performance, and 0.75 mm without breaking. The characteristics stay nearly unchanged even after 100 or 200 cycles bending.

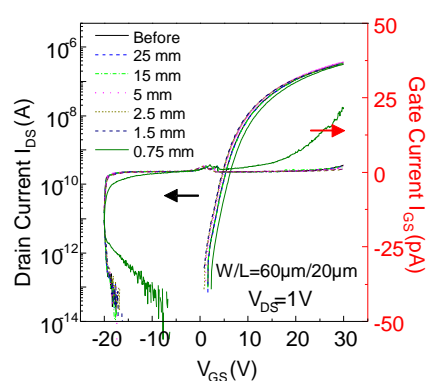
These results anticipate the possibility to use silicon in reliable and foldable electronics.

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Transfer characteristic of microcrystalline silicon based TFT on PEN sheet. The behavior of the leakage gate current is also shown.



Transfer characteristics and gate current measured in flat position after bending at different curvature radii leading to compressive stress

Transfer characteristics of W/L=40μm/20μm TFT in flat position before and after aggressive tensile stress at R=2.5 mm applied during 200 cycles