

# Researchers develop new printing method for mass production of thin film transistors

June 18 2014

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VTT Technical Research Centre of Finland has developed a method for the manufacture of thin film transistors using a roll-to-roll technique only. Thin film transistors can now be manufactured using roll-to-roll techniques, such as printing, for the deposition of patterns on the substrate layer of film. This is set to expand the range of electronic components and products, while slashing their production costs. Thin film transistors are more suitable than traditional silicon chip transistors for applications such as large-surface display screens, certain sensor applications, toys, games and smart cards.

A transistor is a basic electronic component which can function as an electrical switch, an amplifier or a memory element. For transistor technology, roll-to-roll fabrication techniques have a range of advantages. These include the possibility to use large surface areas, as well as mechanical flexibility, transparency and low production start-up costs. Until now, production of thin film transistors has typically been only partly based on roll-to-roll techniques, resulting in fairly high mass production costs.

As the technology matures, it is predicted that the markets for thin film transistors will grow from their current value of three million dollars to around 180 million over the next decade.

VTT has developed thin film transistor production techniques as part of the EU POLARIC research project. With the aid of a special self-aligning technique, the method under development eliminates the

challenge of aligning the patterns in the different thin film layers accurately against each other in the roll-to-roll process. In addition, the pattern size for transistor components is pushed to the limit of minuteness possible for printing techniques; this means patterns of a few dozen micrometres at their tiniest..

Producing thin film transistors using a self-aligning roll-to-roll manufacturing process is one of the few demonstrations internationally so far. Initial experiences of this [thin film transistor](#) manufacturing process are promising. It provides VTT with the ideal basis for using the process to test thin film materials as they develop, to develop more complex electronic circuits and to trial various applications. The goal is to keep developing the technology until it matures enough to provide a springboard for new business activities. VTT is now seeking companies interested in developing applications based on printed thin film transistors.

Provided by VTT Technical Research Centre of Finland

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