



# An Organic TFT Compact Model Including the Subthreshold Regime

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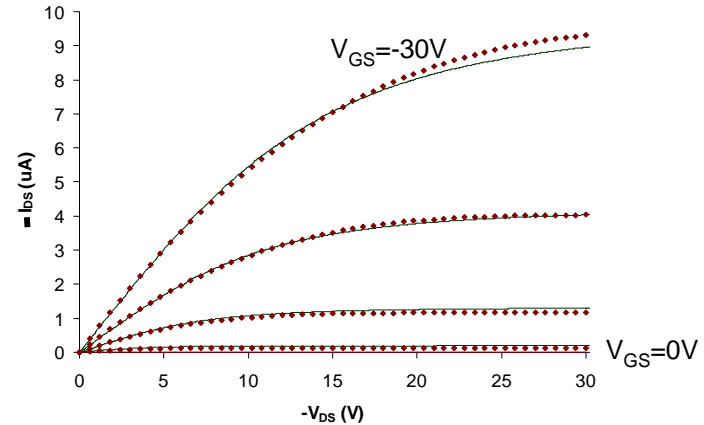
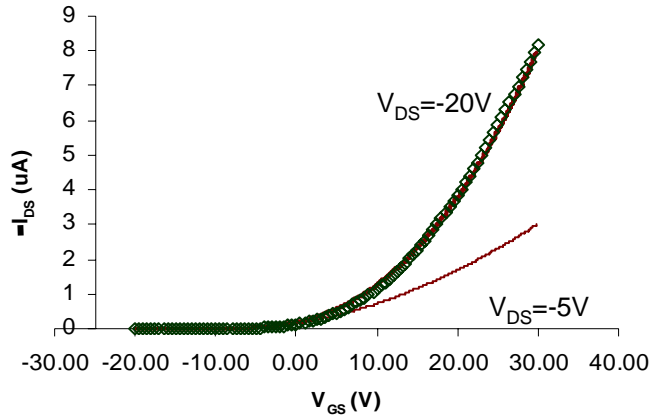
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# Results

## ■ $I_{DS}-V_{GS}$ Curves (170 $\mu\text{m}/130\mu\text{m}$ , Pentacene, SiO<sub>2</sub>, Infineon)



M. Estrada *et al.*, *Solid State Electronics*, 49 (2005)

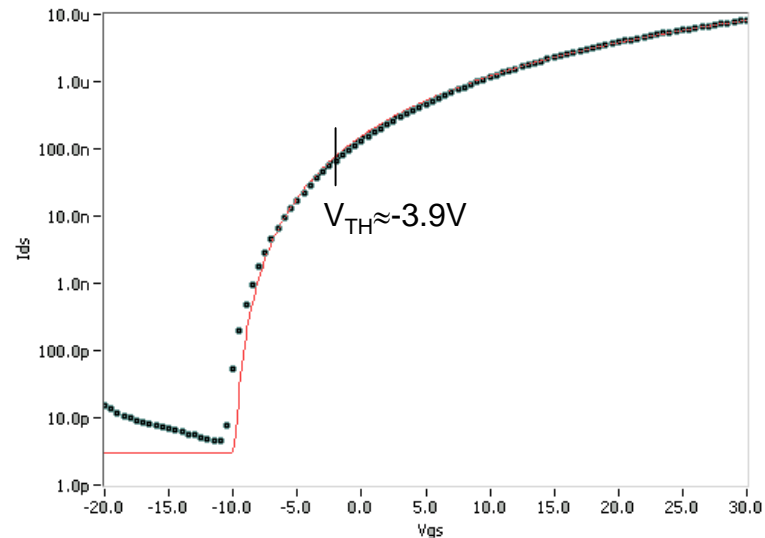
$$I_{DS} = \frac{W}{L} \cdot C_{\text{diel}} \frac{\mu_{\text{FET}} (V_{GS} - V_T)}{1 + R \frac{W}{L} \cdot C_{\text{diel}} \mu_{\text{FET}} (V_{GS} - V_T)} \cdot \frac{V_{DS} (1 + \lambda V_{DS})}{\left(1 + \left(\frac{V_{DS}}{V_{DSat}}\right)^m\right)^{1/m}} + I_0$$

$$V_{DSat} = \alpha_S (V_{GS} - V_T)$$

$$\mu_{\text{FET}} = \mu_0 \left(\frac{V_{GS} - V_T}{V_{aa}}\right)^{\gamma_a} = \mu_{\text{FET0}} (V_{GS} - V_T)^{\gamma_a}$$

Subthreshold extension: replace  $V_{GS}$  by

$$V_{GS} - V_T \rightarrow V_{GSX} = \frac{1}{2} \left( V_{GS} - V_T + \sqrt{(V_{GS} - V_T)^2 + 4V_K^2} \right)$$



# Conclusions

- A simple extension to subthreshold of a Compact Model for Organic TFT has been presented.
- This extension takes into account the change of behaviour (non-exponential) from MOS due to the different transport mechanisms involved.
- Good results are achieved with a very simple model.



# Thank you