51. IWK

Internationales Wissenschaftliches Kolloquium
International Scientific Colloquium

PROCEEDINGS 11-15 September 2006

FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION SCIENCE

INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING - DEVICES AND SYSTEMS, MATERIALS AND TECHNOLOGIES FOR THE FUTURE

Startseite / Index:
http://www.db-thueringen.de/servlets/DocumentServlet?id=12391

TECHNISCHE UNIVERSITÄT
ILMENAU

Impressum

Herausgeber: Der Rektor der Technischen Universität Ilmenau
Univ.-Prof. Dr. rer. nat. habil. Peter Scharff

Redaktion: Referat Marketing und Studentische Angelegenheiten
Andrea Schneider

Fakultät für Elektrotechnik und Informationstechnik
Susanne Jakob
Dipl.-Ing. Helge Drumm

Redaktionsschluss: 07. Juli 2006

Technische Realisierung (CD-Rom-Ausgabe):
Institut für Medientechnik an der TU Ilmenau
Dipl.-Ing. Christian Weigel
Dipl.-Ing. Marco Albrecht
Dipl.-Ing. Helge Drumm

Technische Realisierung (Online-Ausgabe):
Universitätsbibliothek Ilmenau
ilmedia
Postfach 10 05 65
98684 Ilmenau

Verlag:
Verlag ISLE, Betriebsstätte des ISLE e.V.
Werner-von-Siemens-Str. 16
98693 Ilrnenau

ISBN (Druckausgabe): 3-938843-15-2
ISBN (CD-Rom-Ausgabe): 3-938843-16-0

Startseite / Index:
http://www.db-thueringen.de/servlets/DocumentServlet?id=12391

51st Internationales Wissenschaftliches Kolloquium
Technische Universität Ilmenau
September 11 – 15, 2006

I. Hörselmann

Frequency Response of Transconductance on OFETs with Different Contact Designs

Functional Electrical and Electronic Materials and Devices

We prepared organic field effect transistor with spin coated poly3hexylthiophene (P3HT) as semiconductor material. Silicon dioxide was used as gate insulator. The source- and drain contacts were realized gold evaporated through a shadow mask. On the same sample we realized two different transistor designs, bottom contact (BOC) and top contact (TOC). The two transistor design were investigated by static measurements. Figure 1 shows the transfer charactristics for the two designs in linear and saturation mode. From the transfer characteristic we estimated the value of the transconductance (figure 2). In a next step we measured the frequency response of the transconductance comparing the two different designs. The frequency response of the transconductance were measured for different gate voltages in linear and saturation regime.

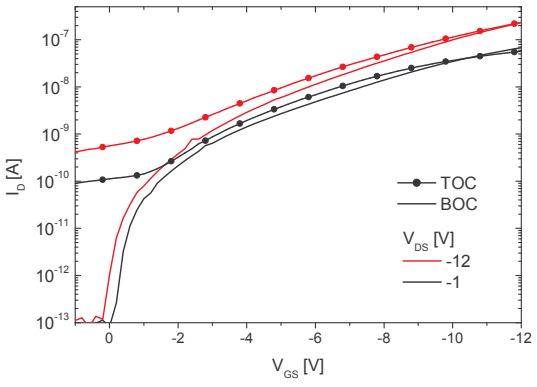

Figure 1: measured transfer characteristic

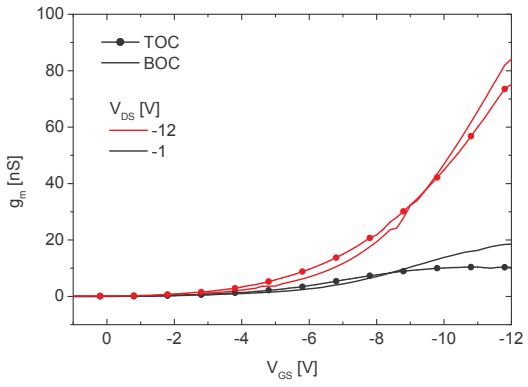

Figure 2: transconductance derived from the transfer characteristic

The differences in frequency resonce of the transconductance are notiable in the comparisation of the phase in figure 3 and 4. The top contact structure shows in the linear transistor regime an additional phase shift in the transconductance above the cut-off frequency
We compare the measurement results with two dimensional device simulations.

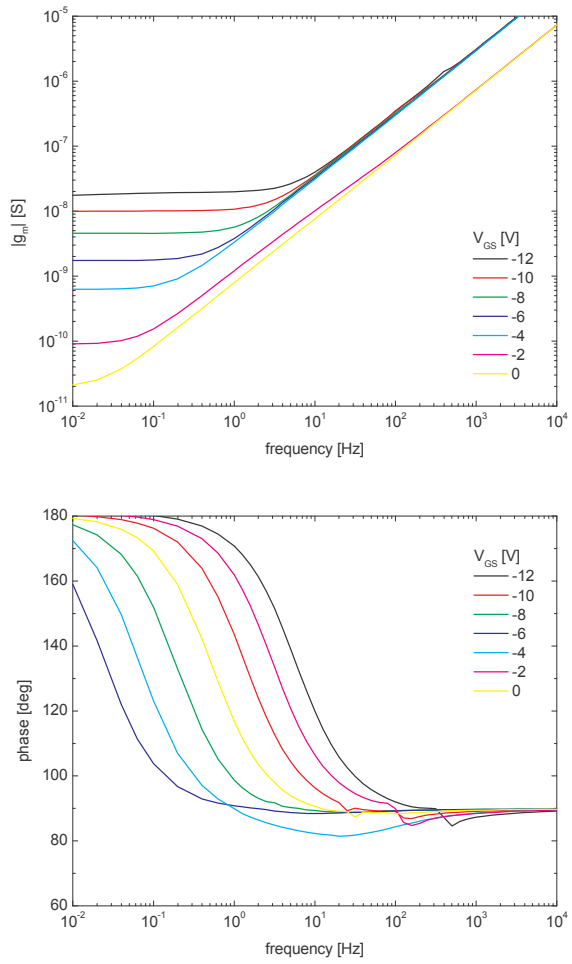

Figure 1: BOC transistor, transconductance frequency response V_{DS}=-1V

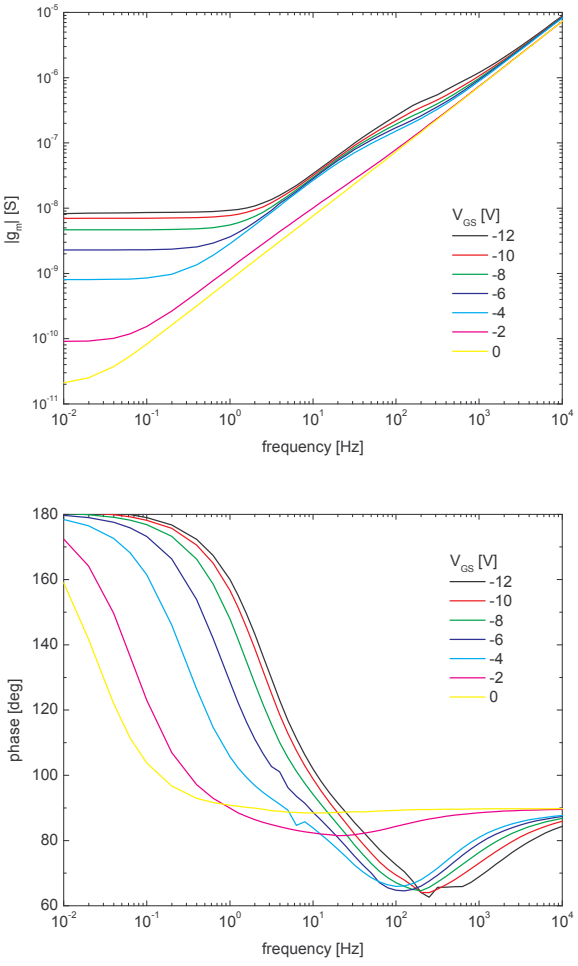

Figure 2: TOC tramsistor, transconductance frequency response V_{DS}=-1V

Authors:
Ingo Hörselmann
Andrei Herasimovich
Susanne Scheinert
TU Ilmenau, Institut für Mikro- und Nanoelektronik, P.O.B. 100565
98694, Ilmenau, Germany
Phone: +49 3677 693406
Fax: +49 3677 693354
E-Mail: ingo.hoerselmann@tu-ilmenau.de