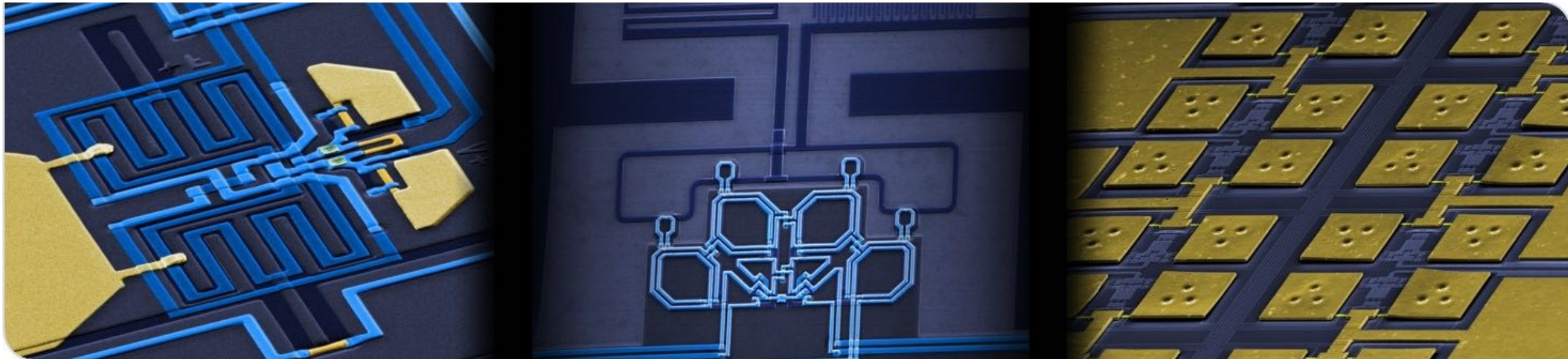


Bauelemente der Elektrotechnik

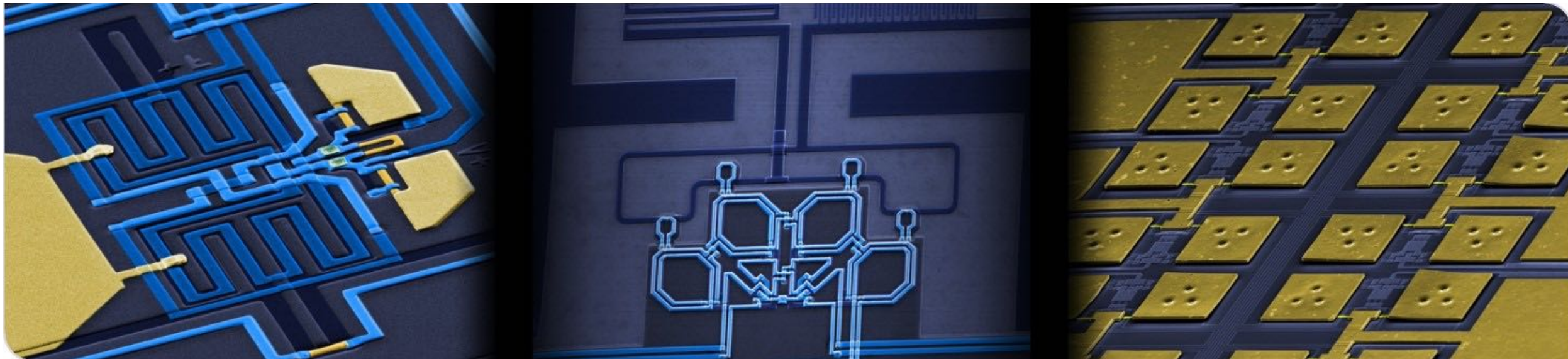
Prof. Dr. rer. nat. Sebastian Kempf
Wintersemester 2021/22



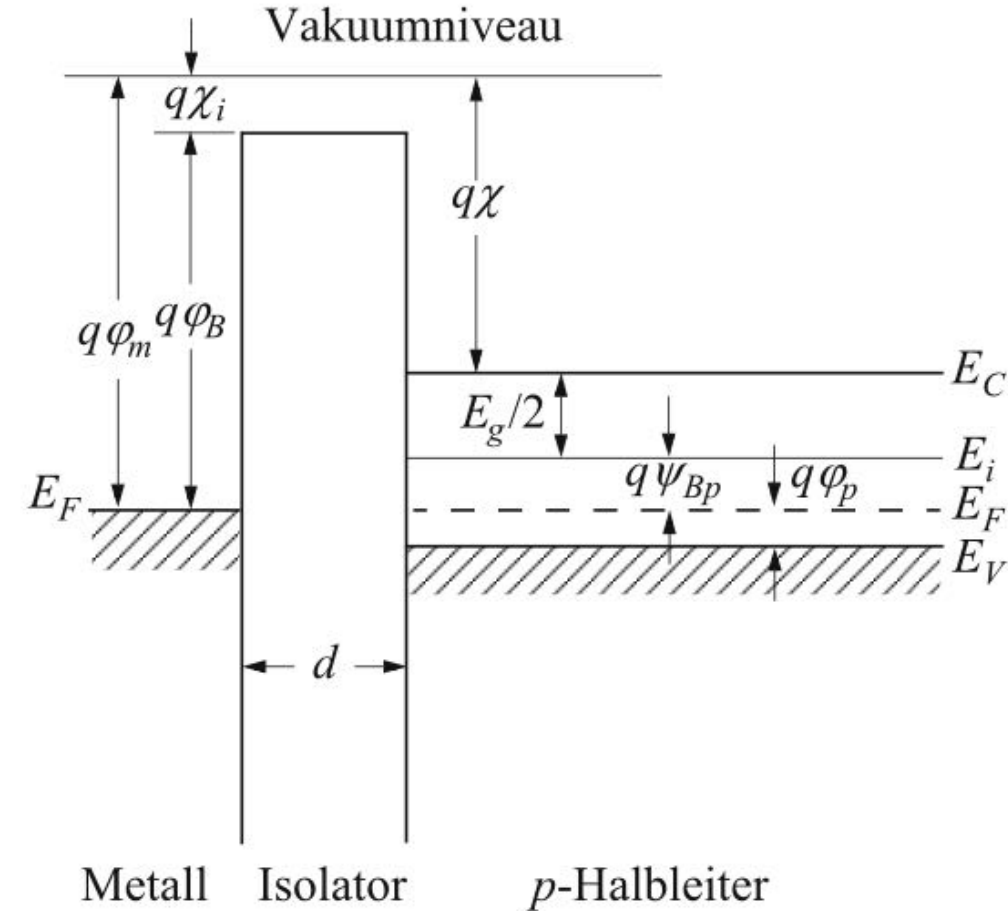
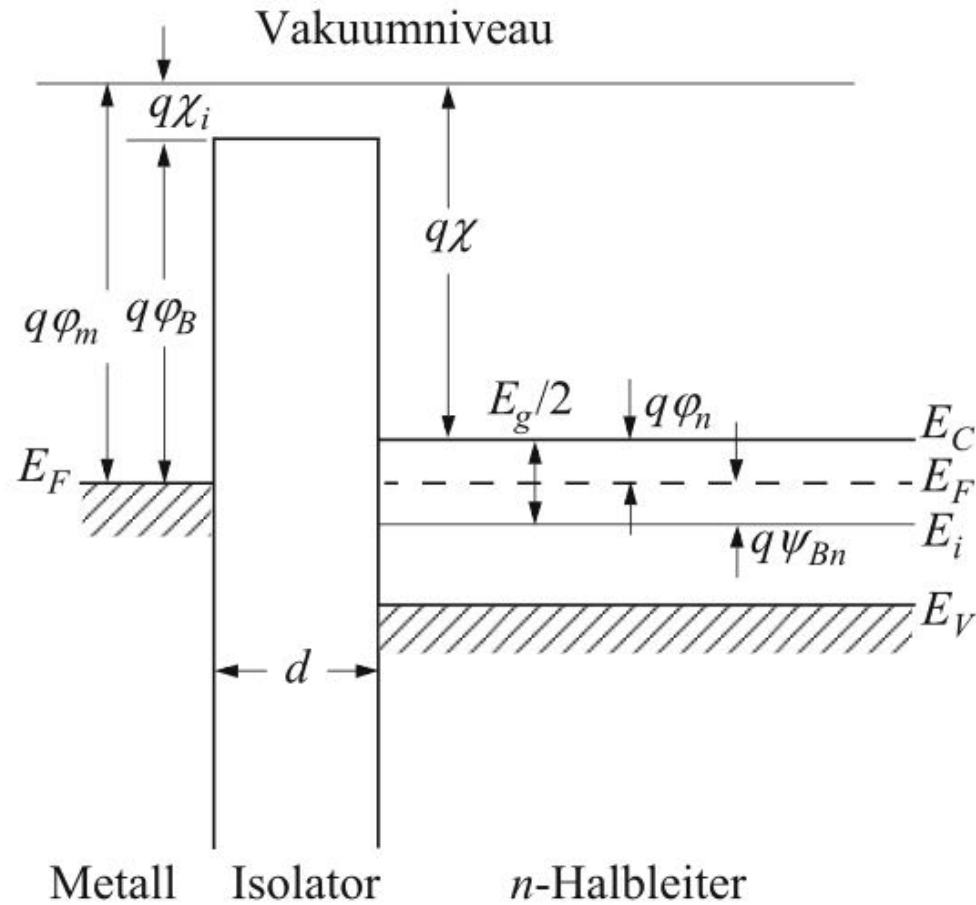
Bauelemente der Elektrotechnik

Metall-Oxid-Halbleiter-Strukturen (MOS-Strukturen) und abgeleitete Bauelemente

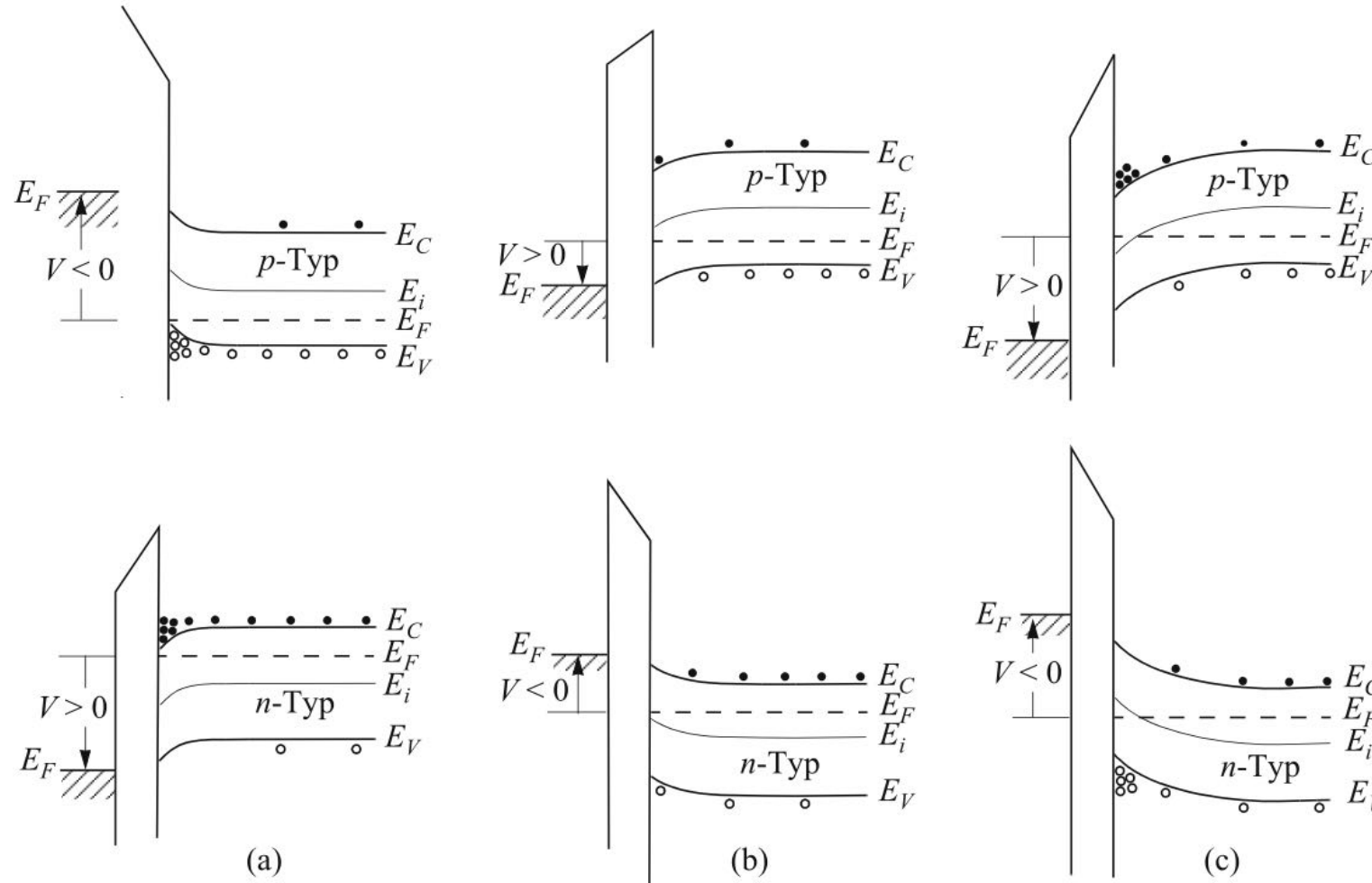
Wintersemester 2021/22



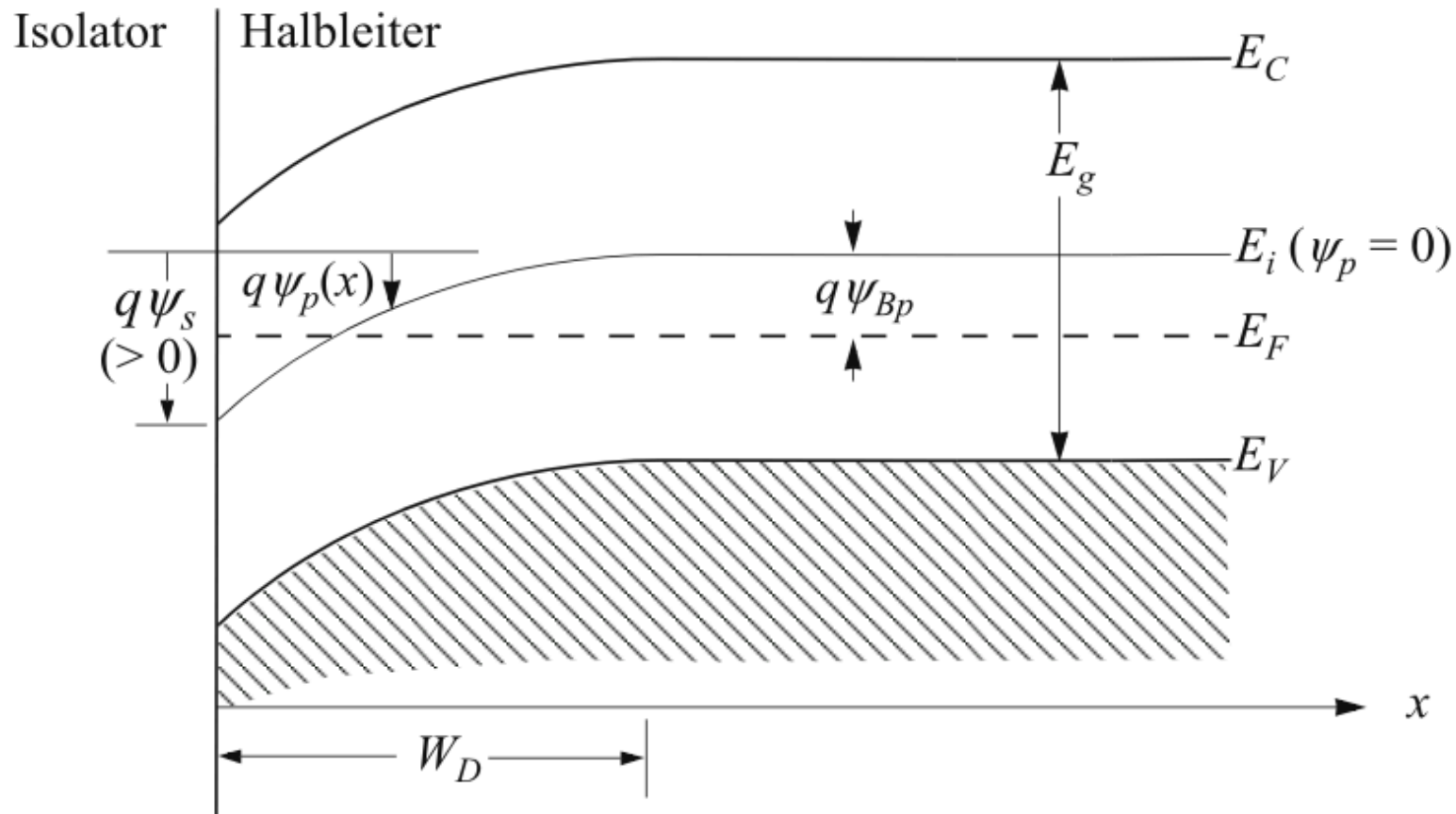
Banddiagramm MIS-Kondensator



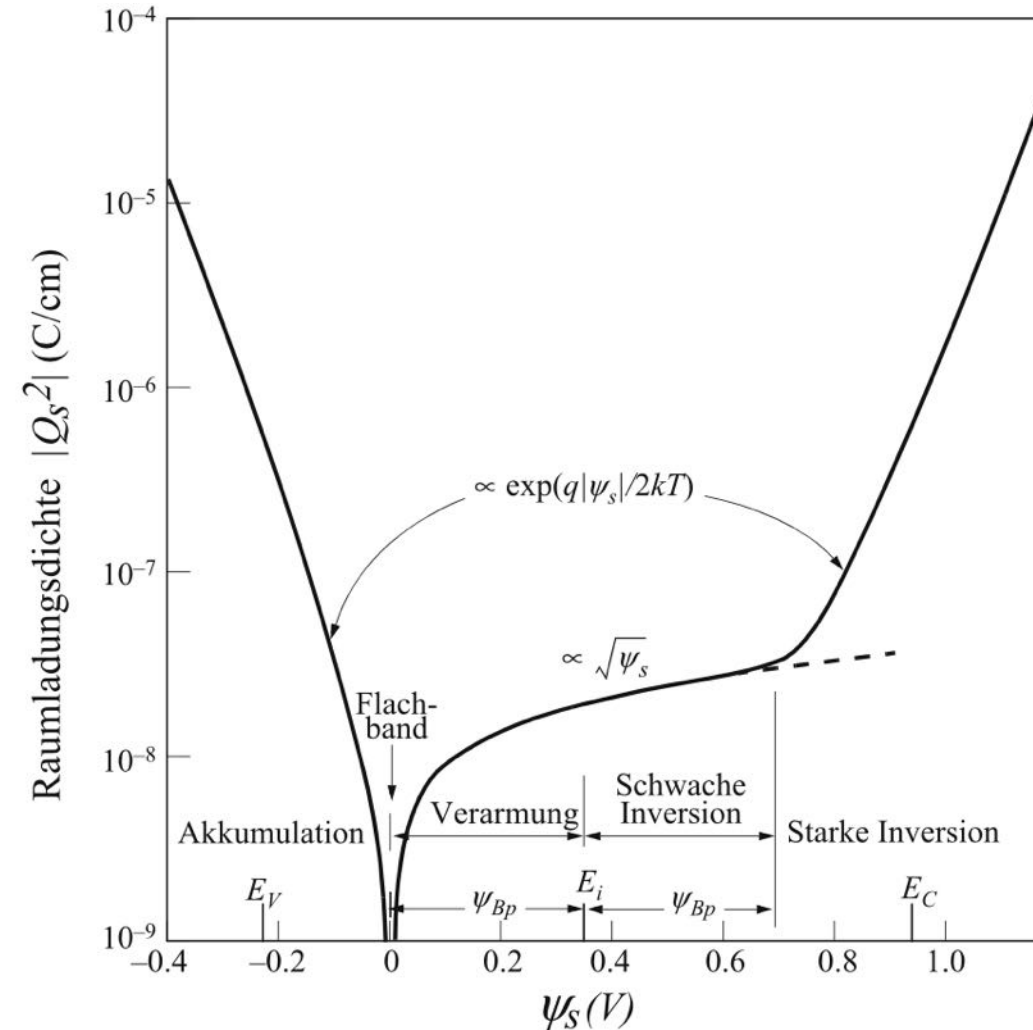
Banddiagramme unter Vorspannung



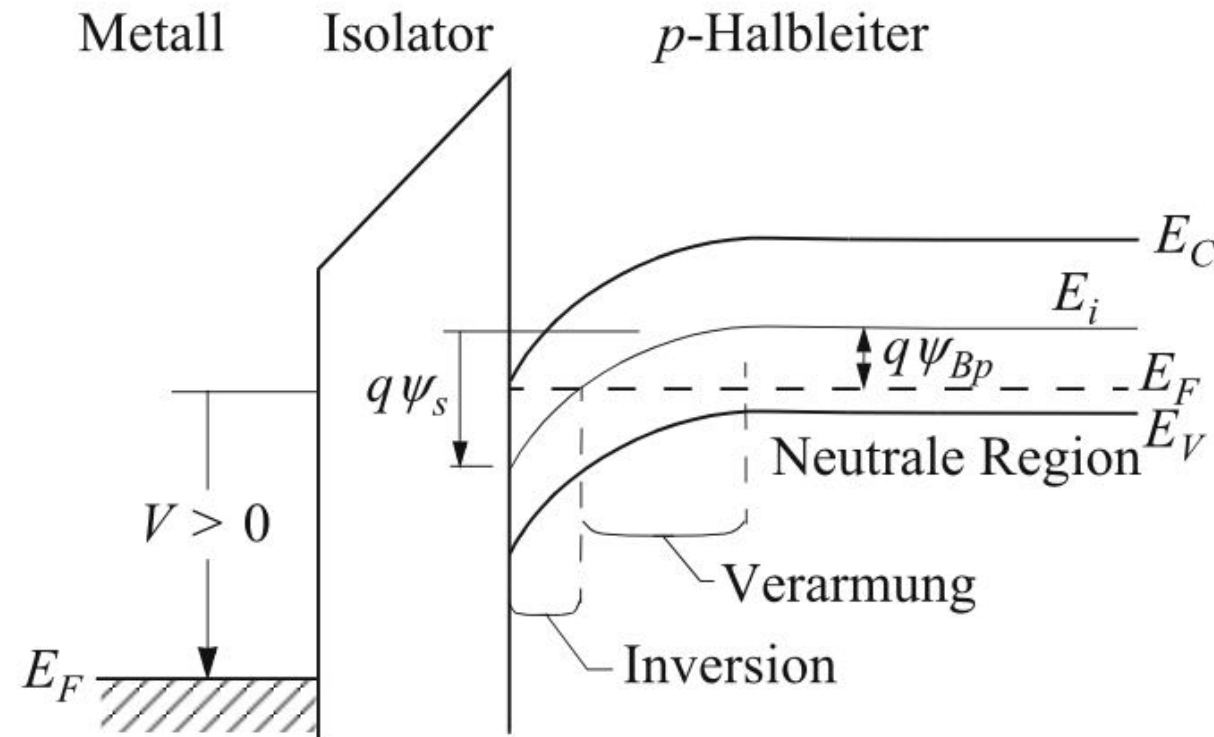
Banddiagramm an Halbleiter-Oberfläche



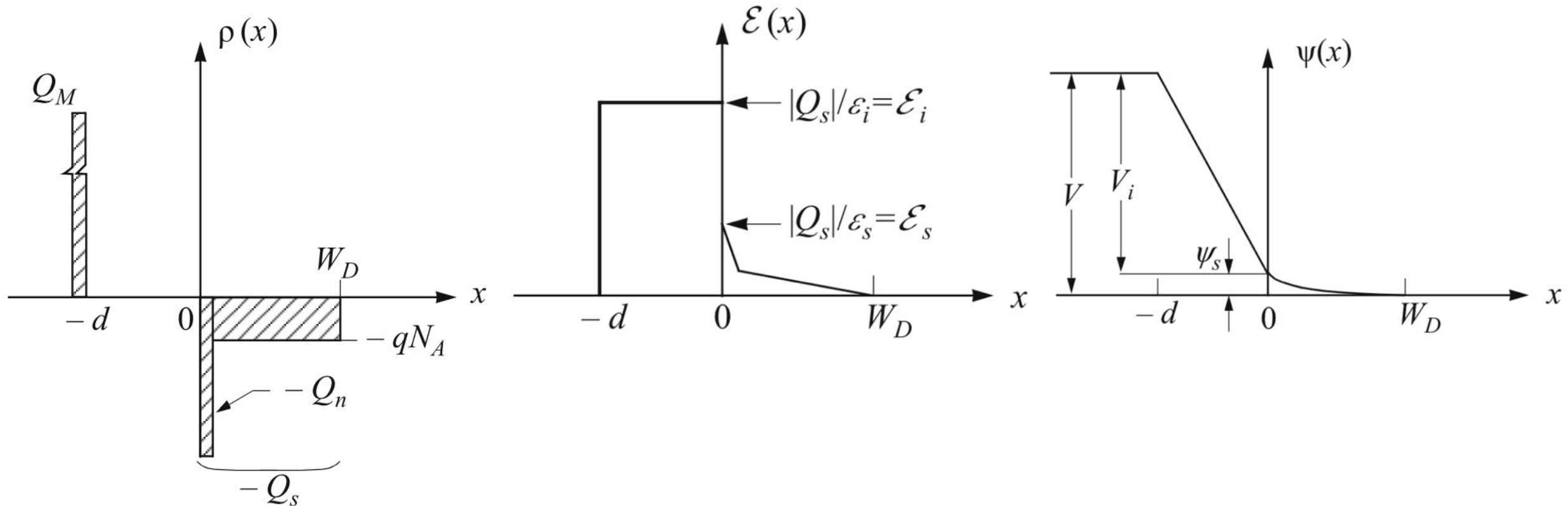
Raumladungsdichte



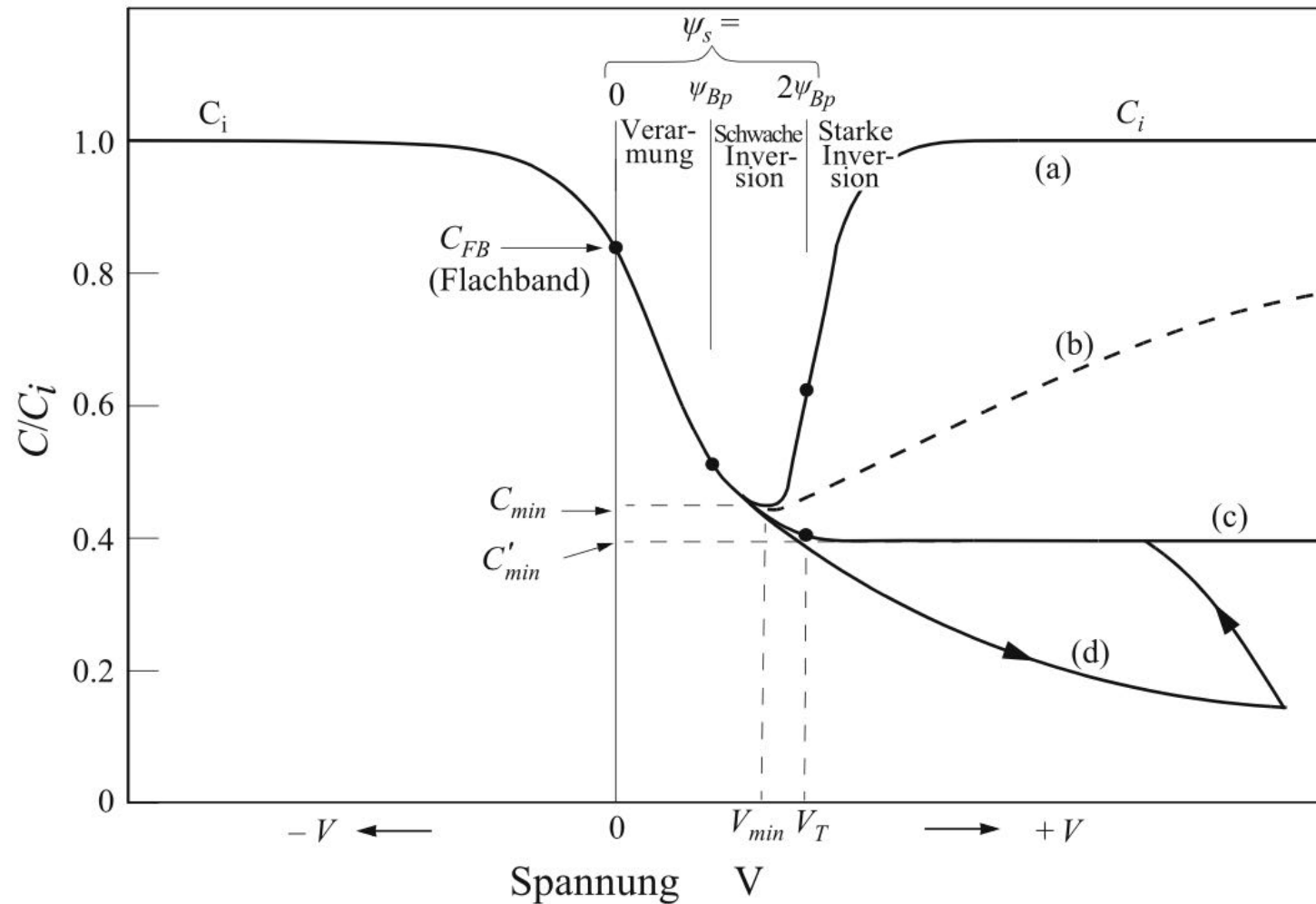
Idealer MIS-Kondensator im Bereich starker Inversion



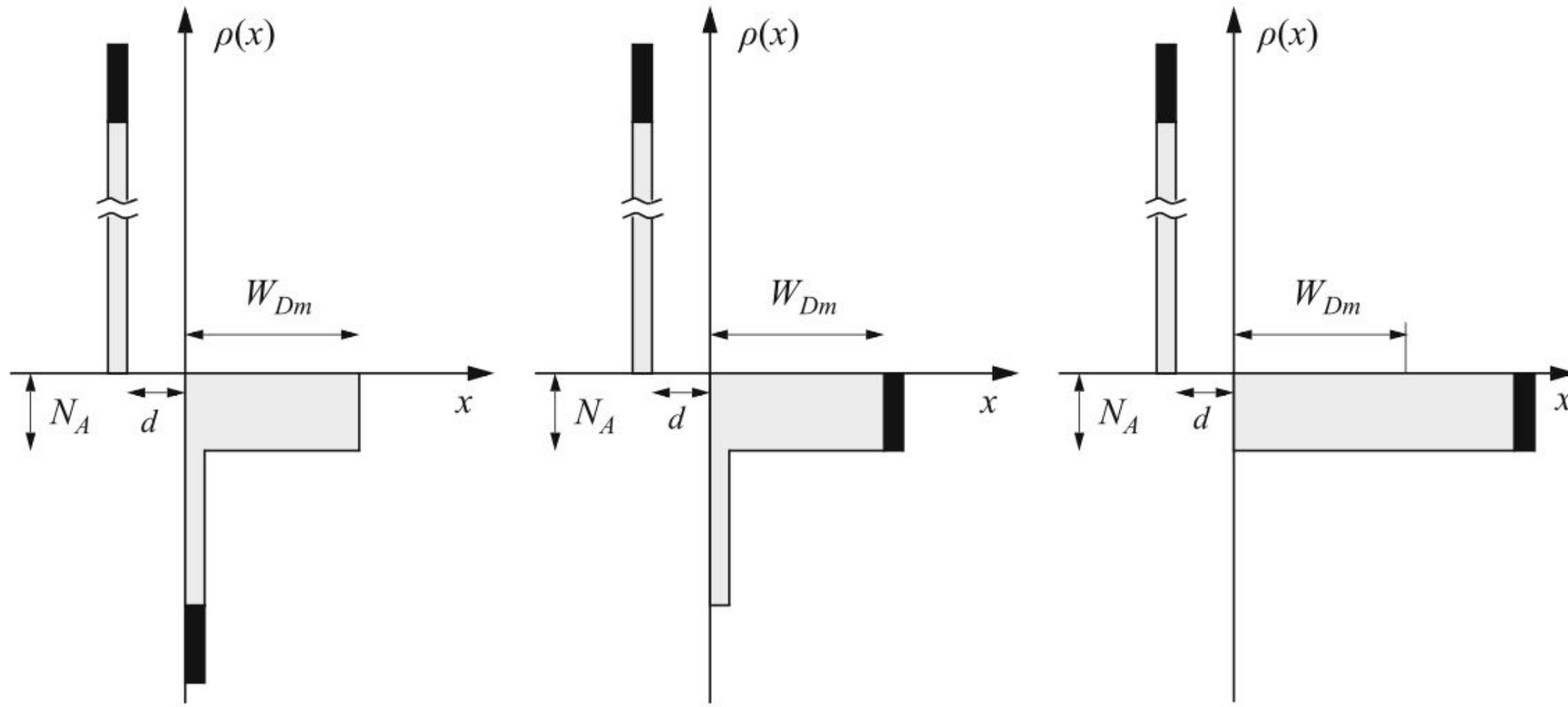
Idealer MIS-Kondensator im Bereich starker Inversion



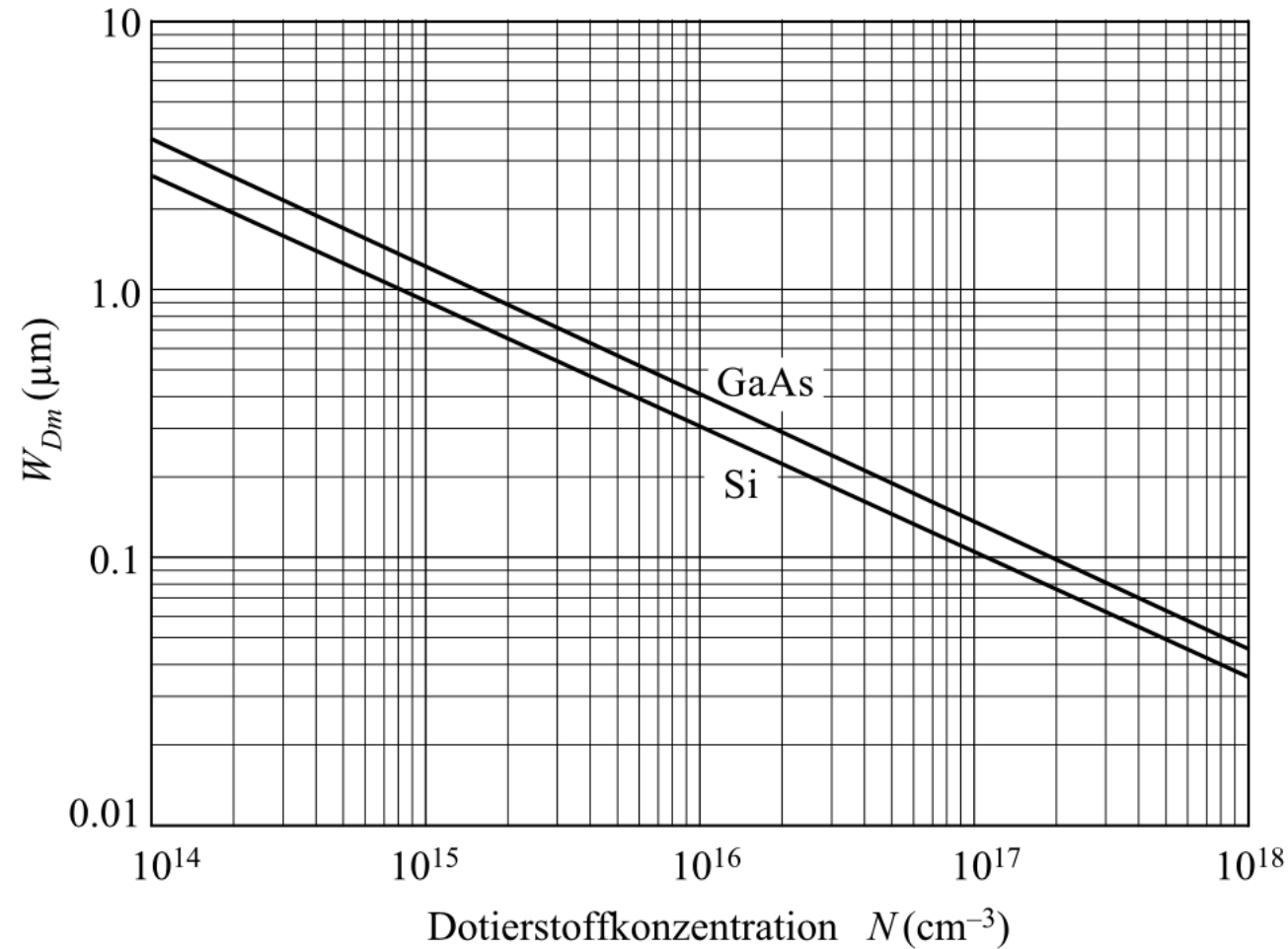
Kapazitätskurven eines idealen MIS-Kondensators



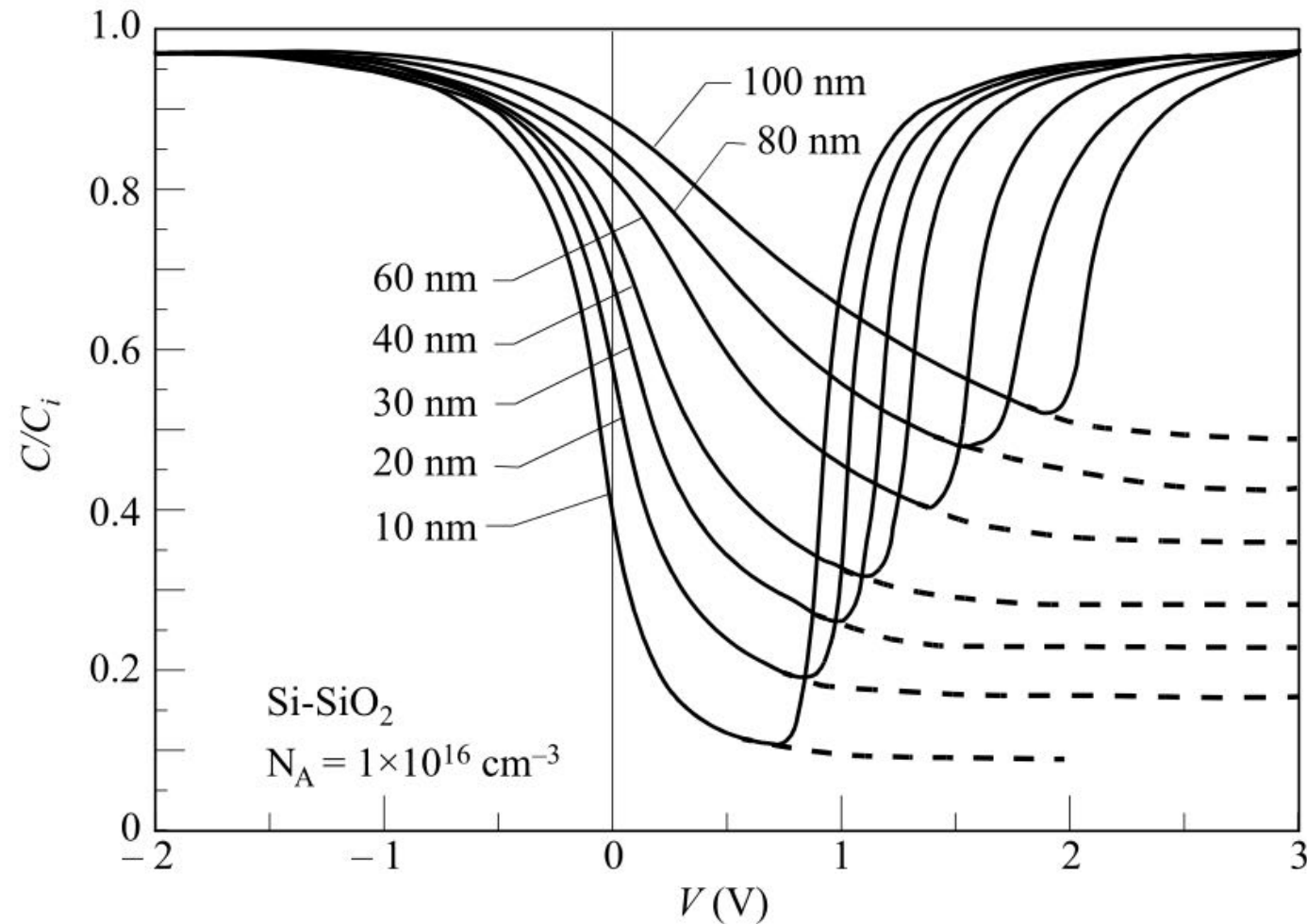
Differentielle Verschiebungsladung im Bereich starker Inversion



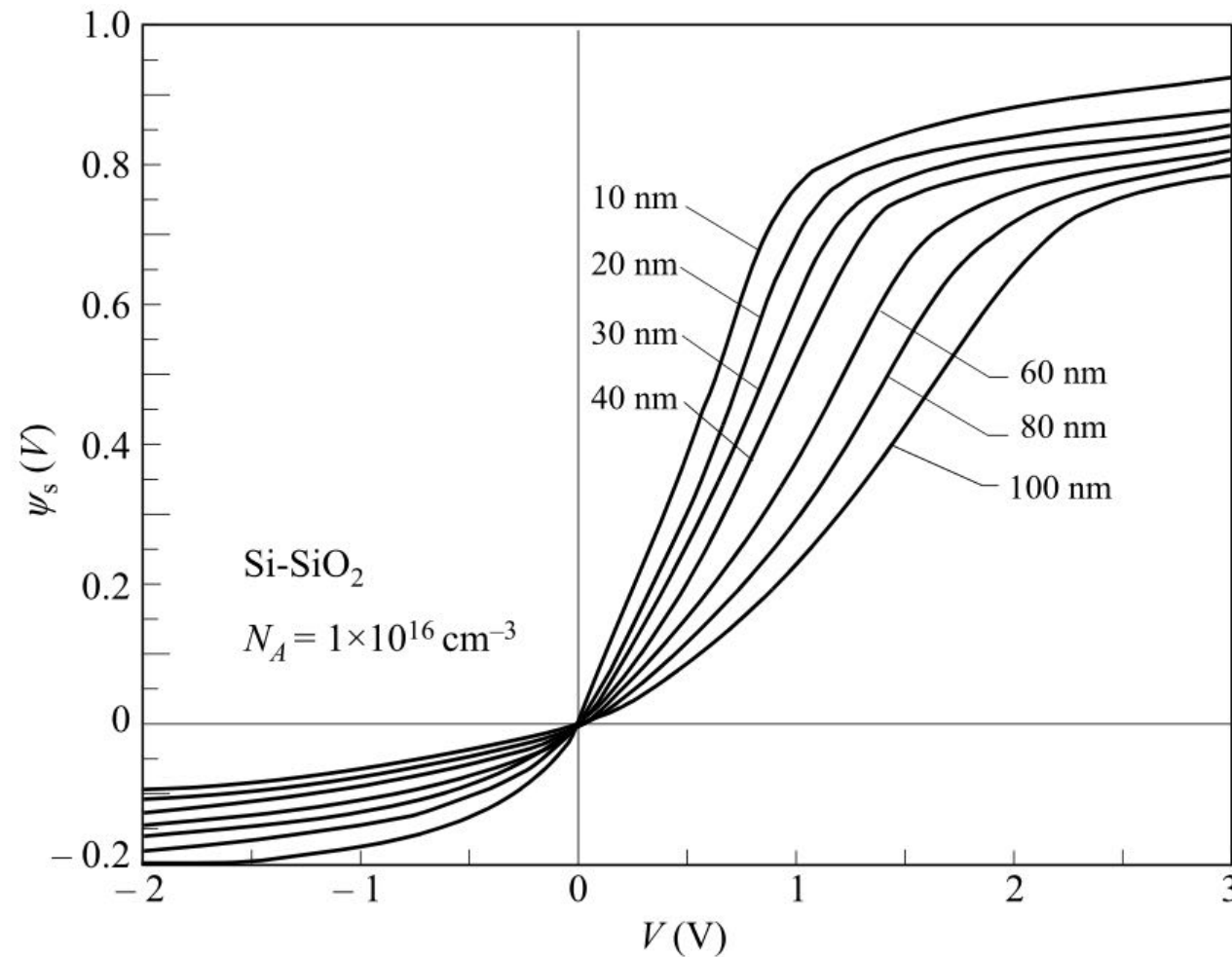
Max. Breite der Verarmungszone für starke Inversion



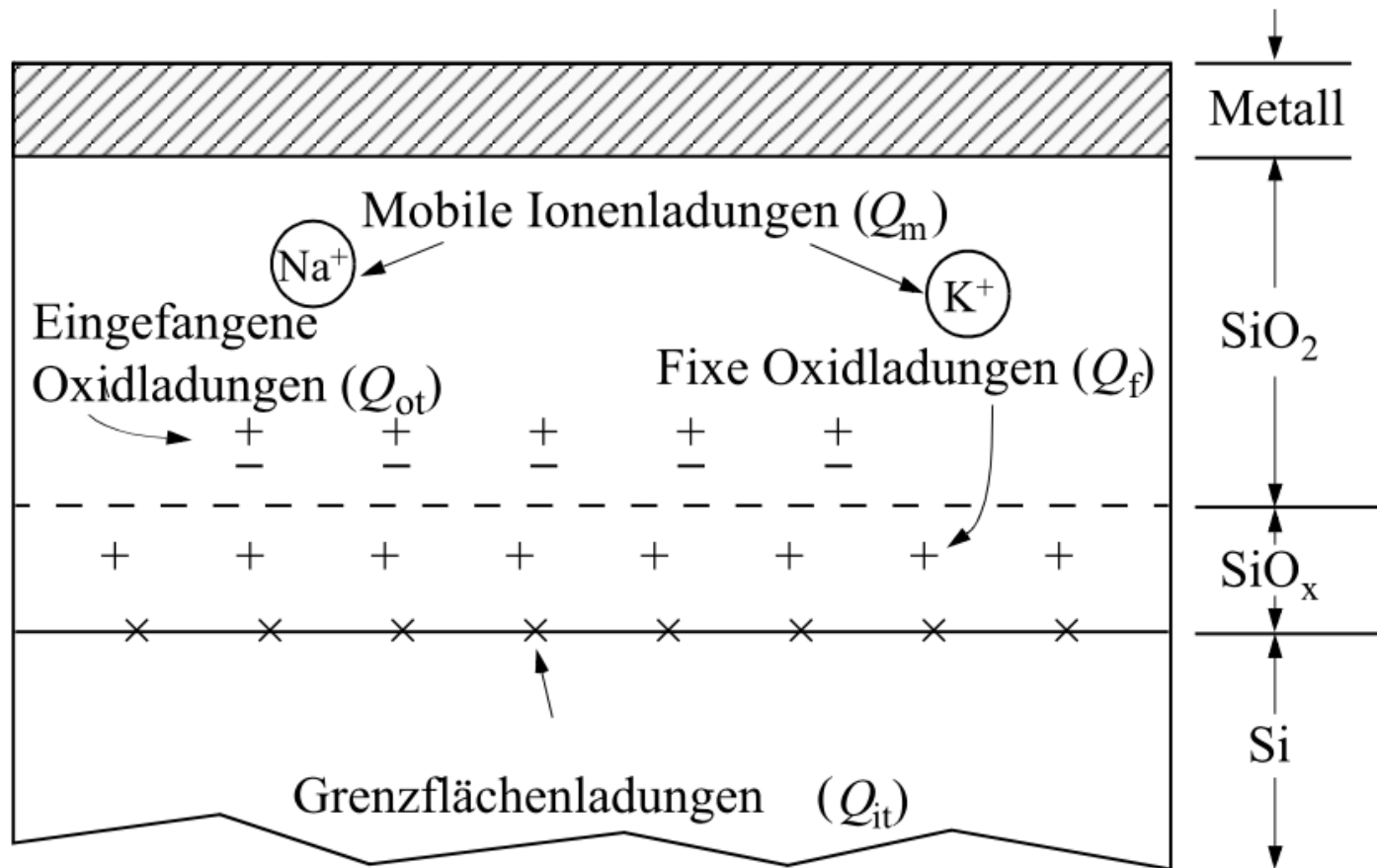
Kapazitätskurven idealer MIS-Kondensatoren



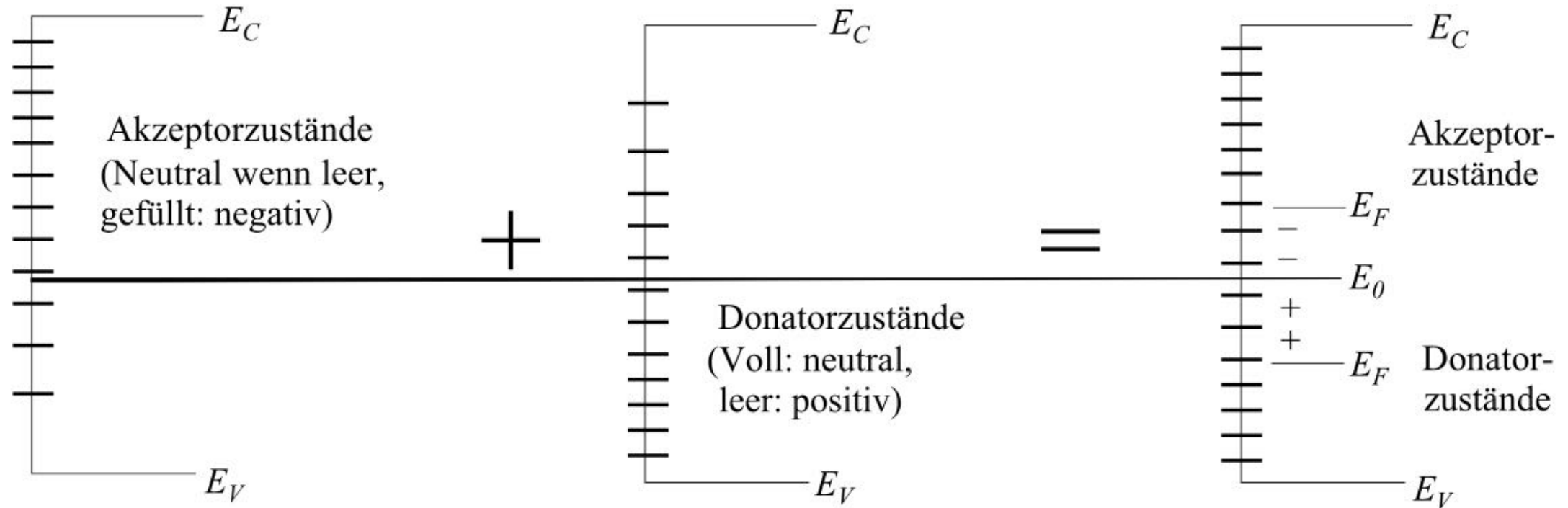
Spannungsabhängigkeit des Oberflächenpotentials



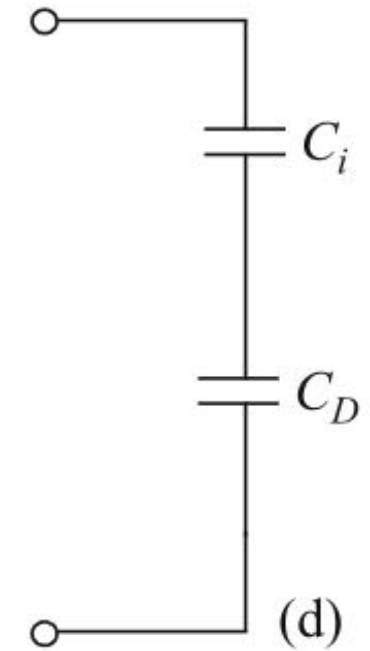
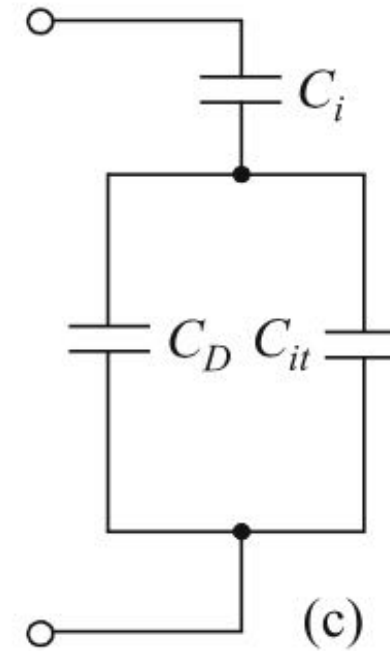
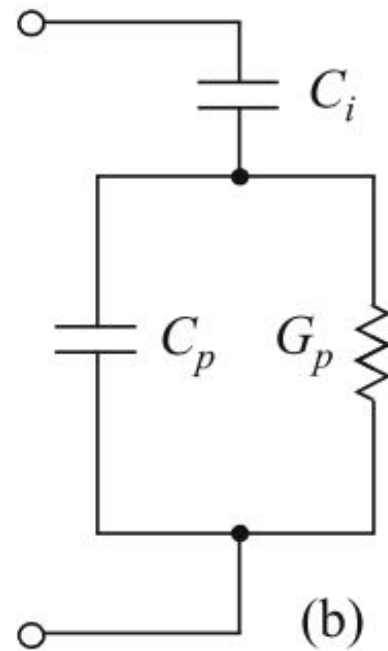
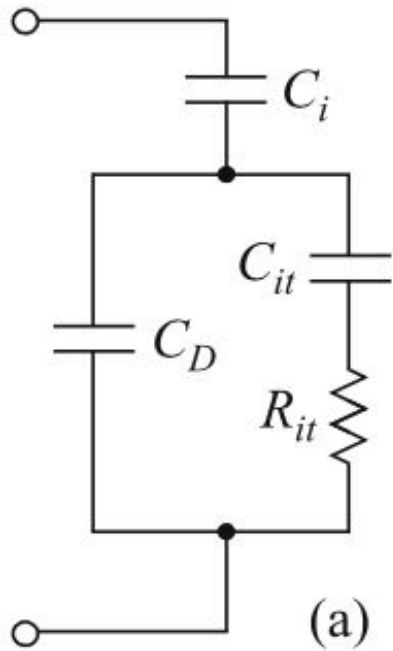
Grenzflächenzustände und Ladungen realer MOS-Kondensatoren



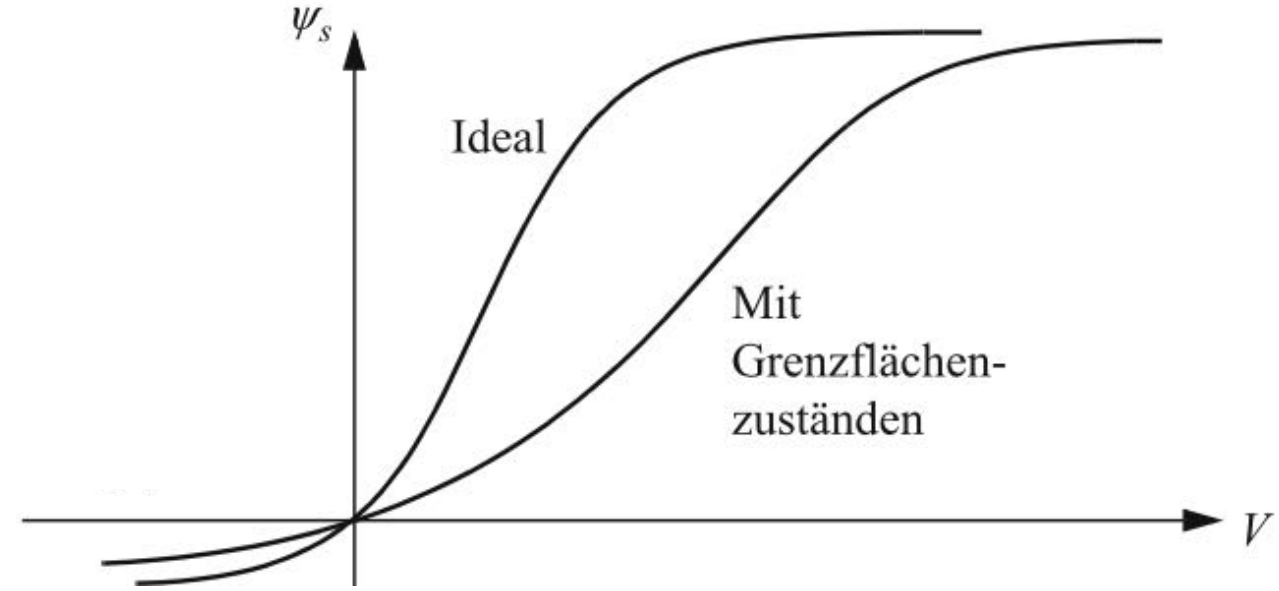
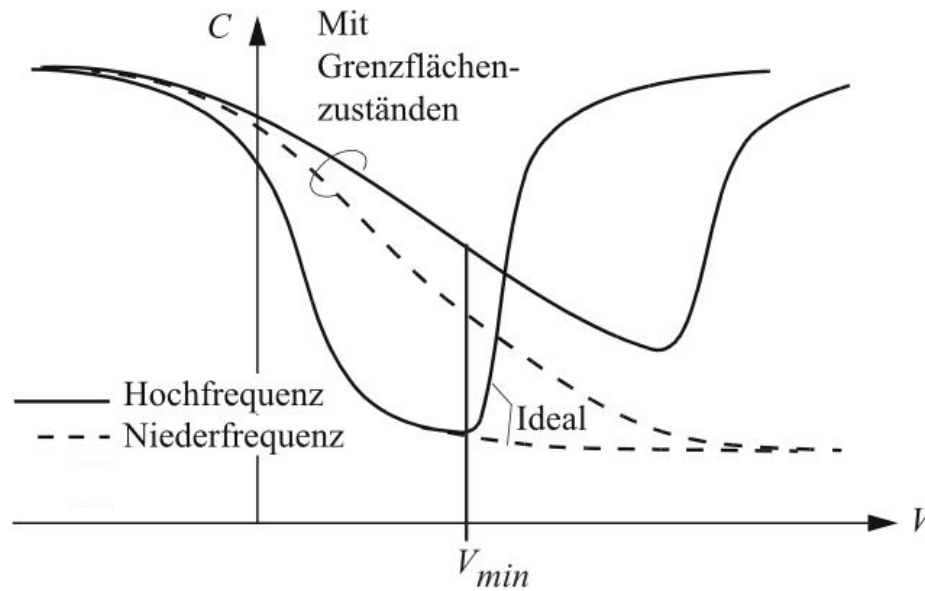
Akzeptor- und donatorartige Grenzflächenzustände



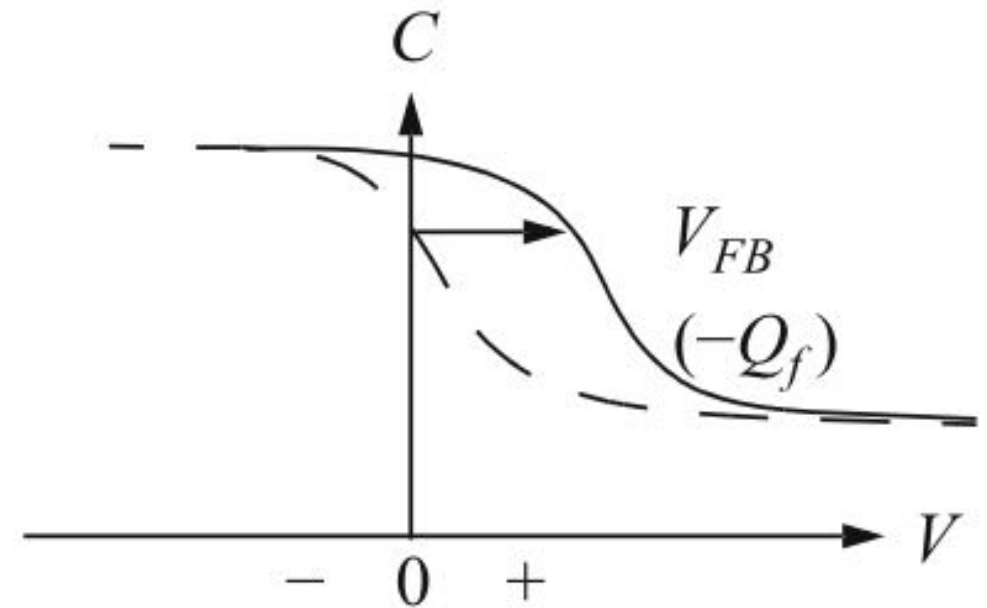
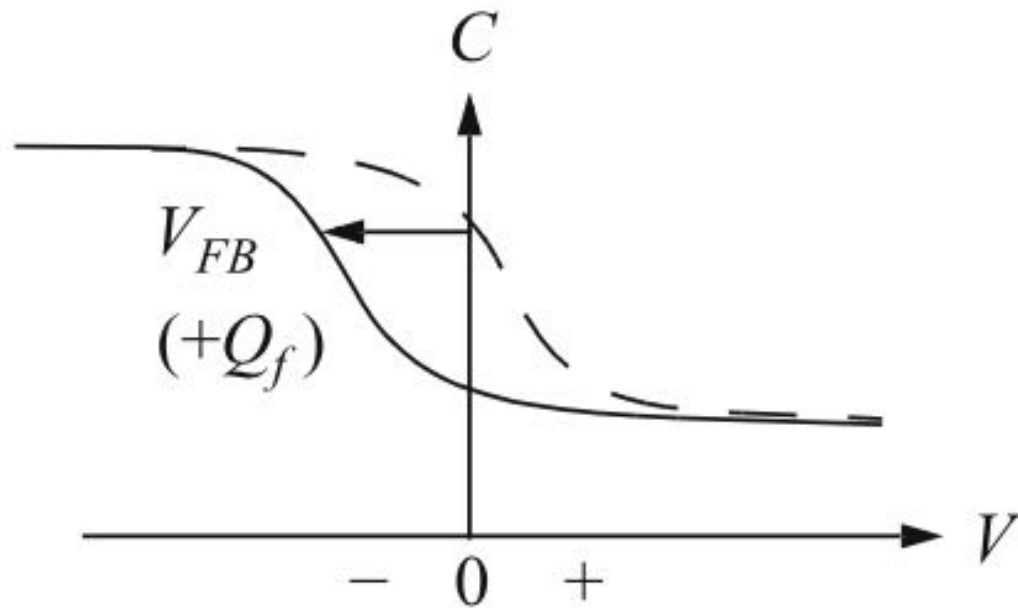
Ersatzschaltbild Grenzflächenzustände



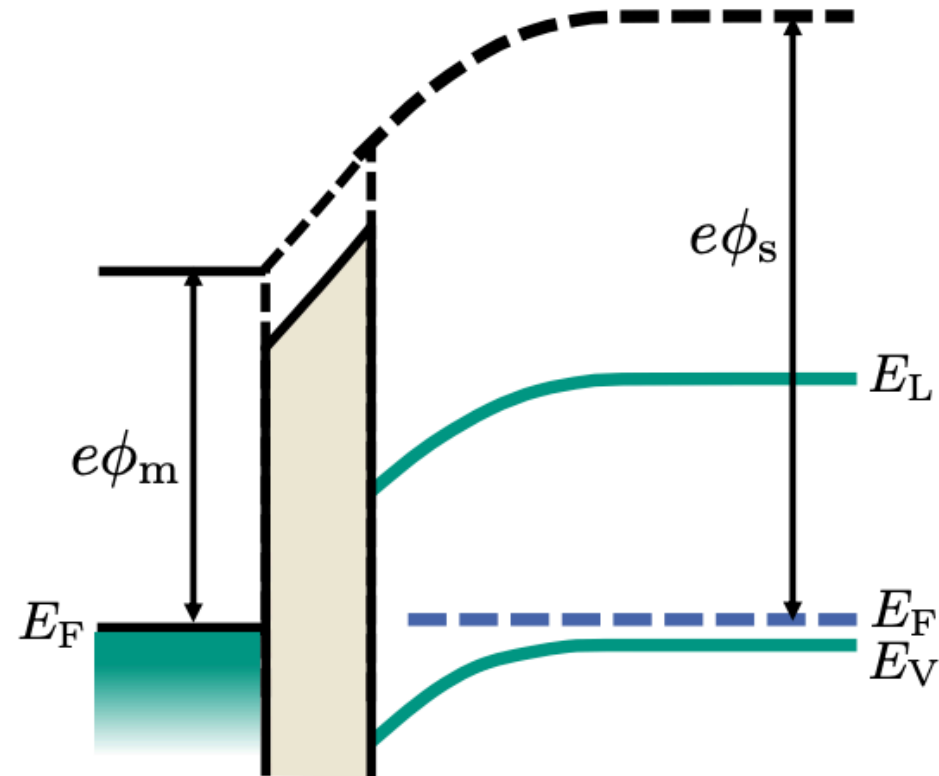
Einfluss von Grenzflächenzuständen



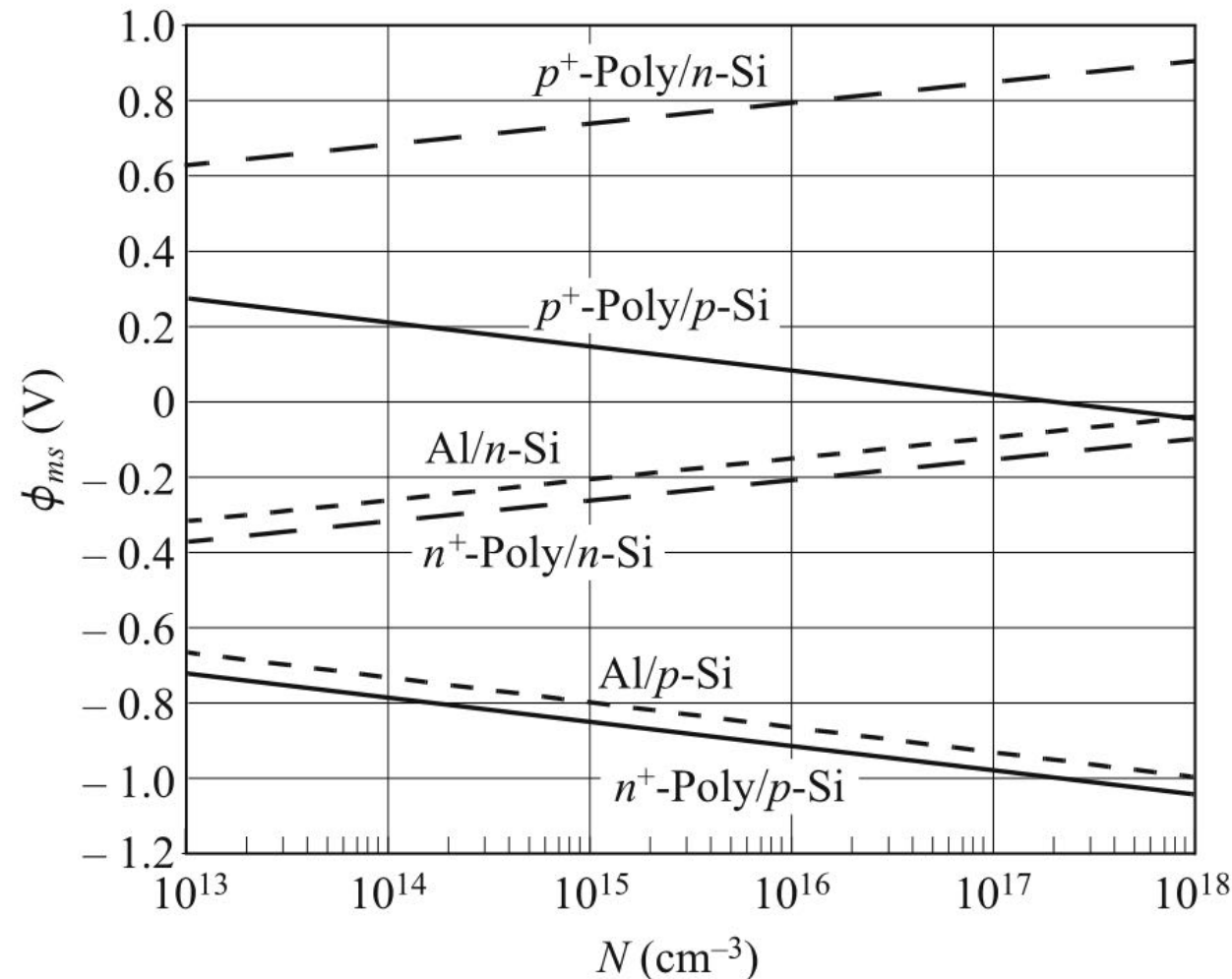
Feste Oxidladungen



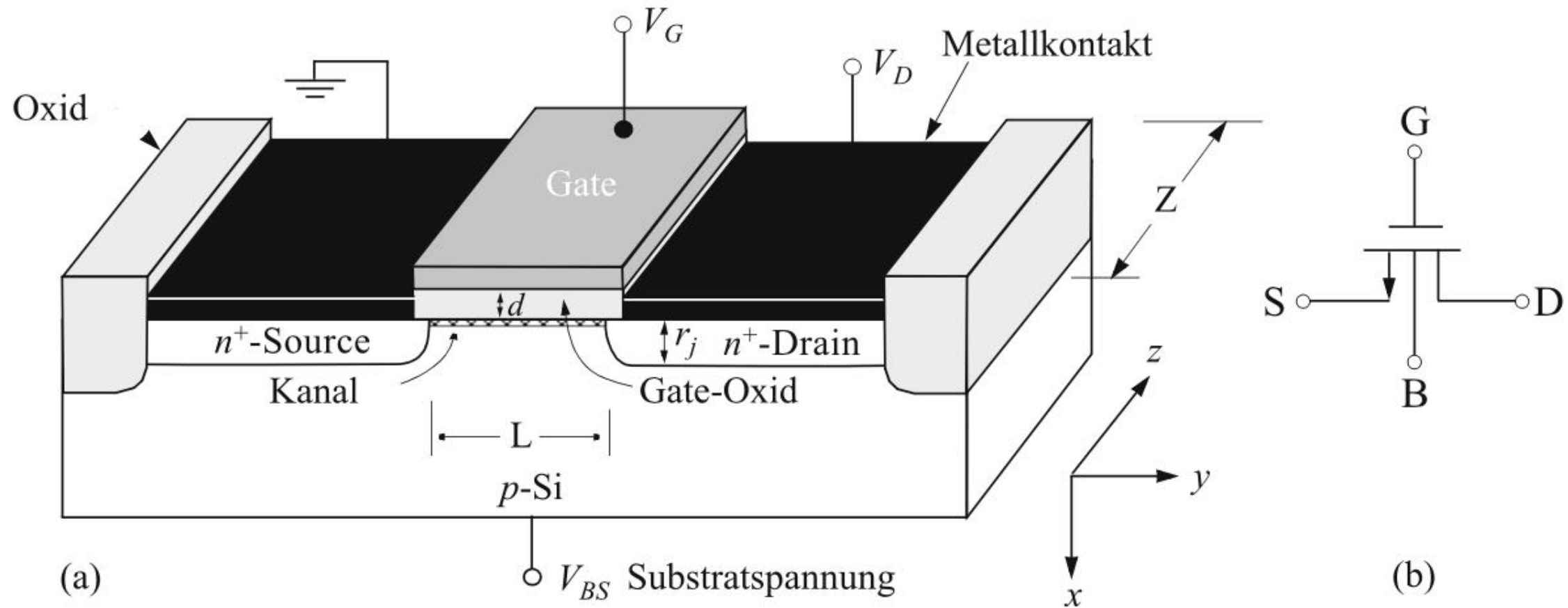
Differenz der Austrittsarbeiten



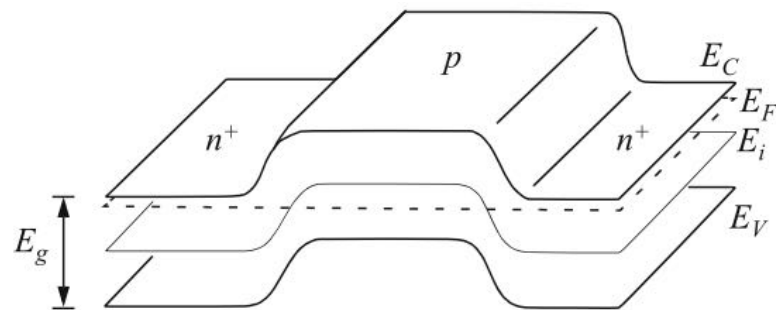
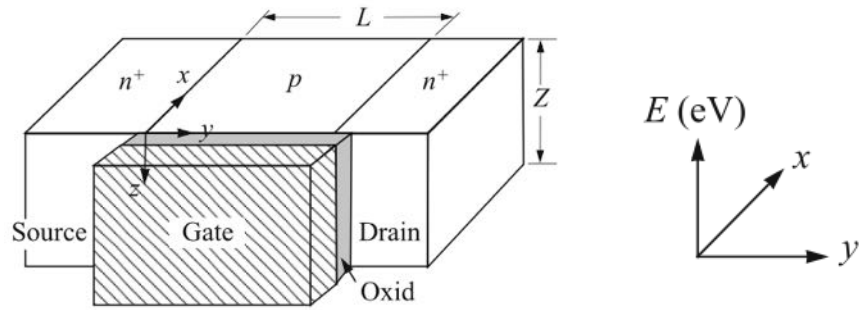
Differenz der Austrittsarbeit für verschiedene Gate-Materialien



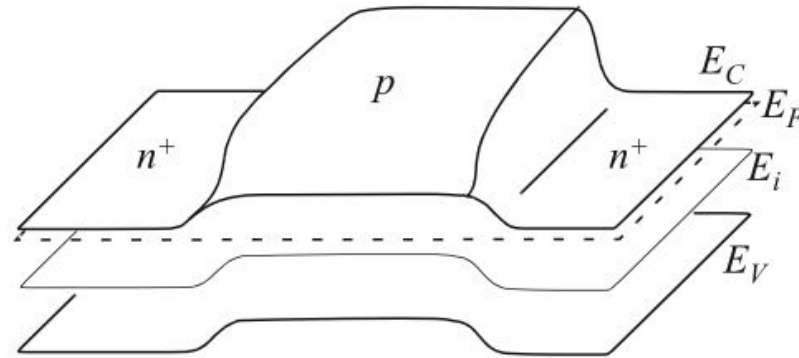
Aufbau eines n-Kanal-MOSFET



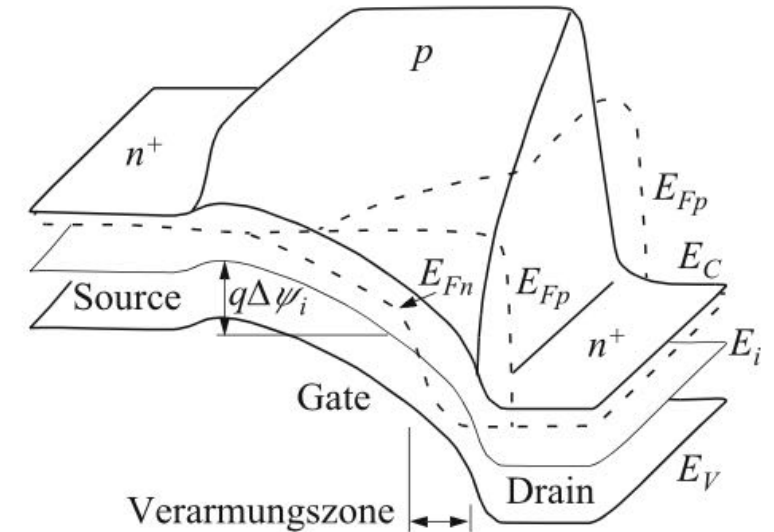
Potentiallandschaft eines n-Kanal-MOSFET



$$V_D = 0, V_G = 0$$



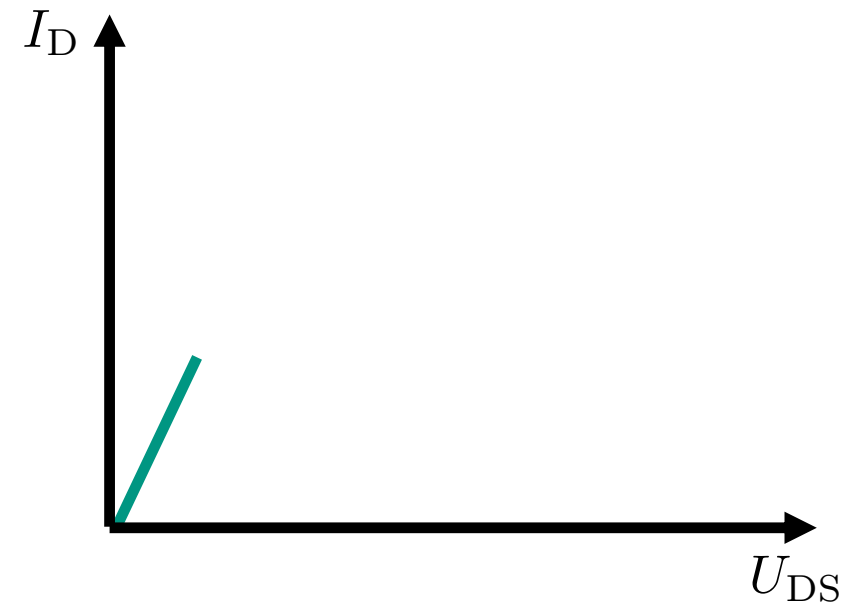
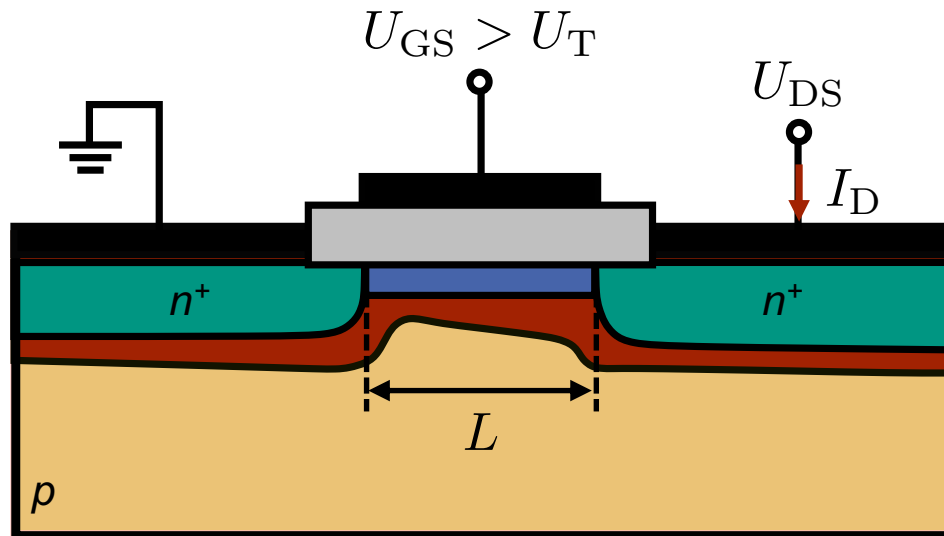
$$V_D = 0, V_G \neq 0$$



$$V_D \neq 0, V_G \neq 0$$

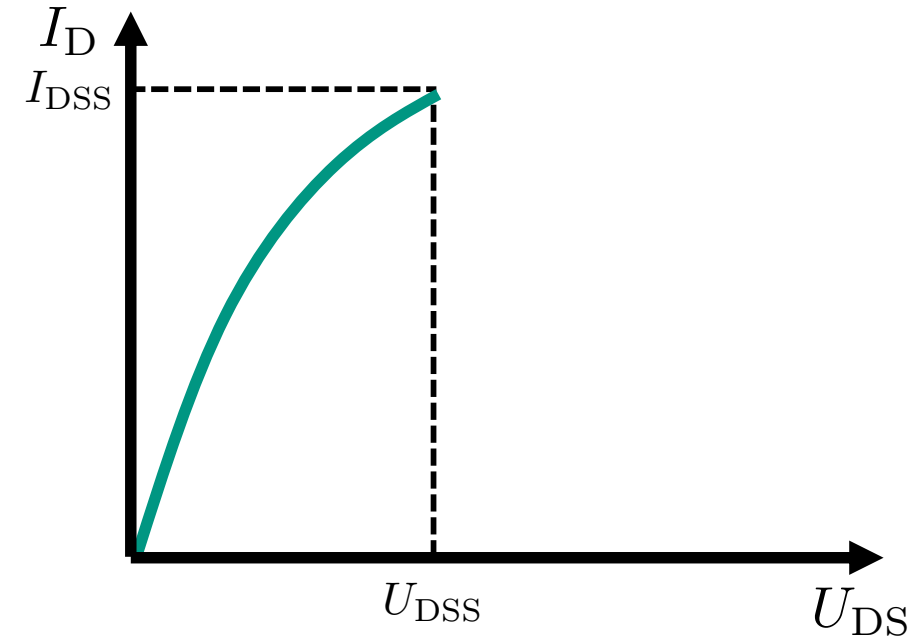
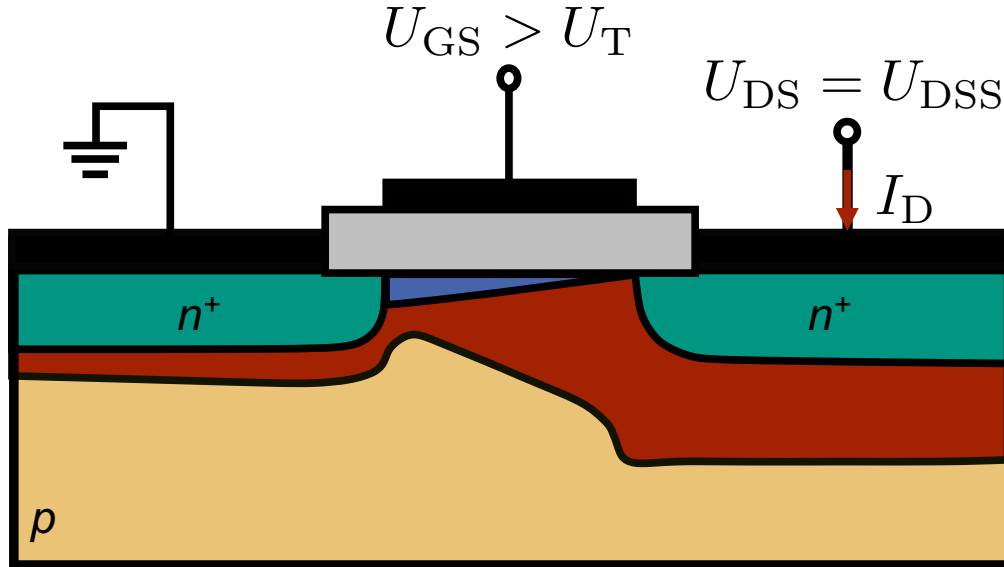
Qualitative Beschreibung MOSFET-Kennlinie

U_D klein



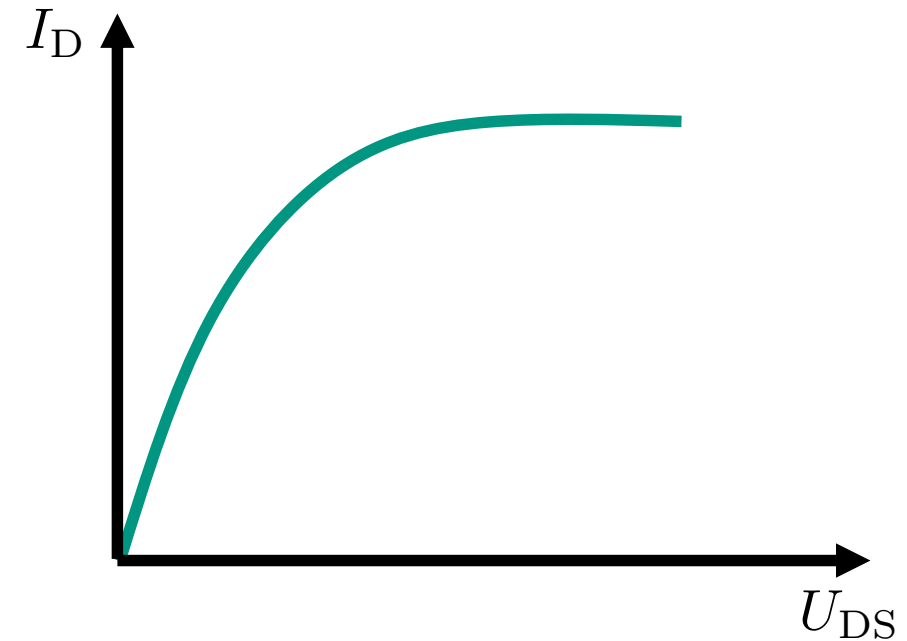
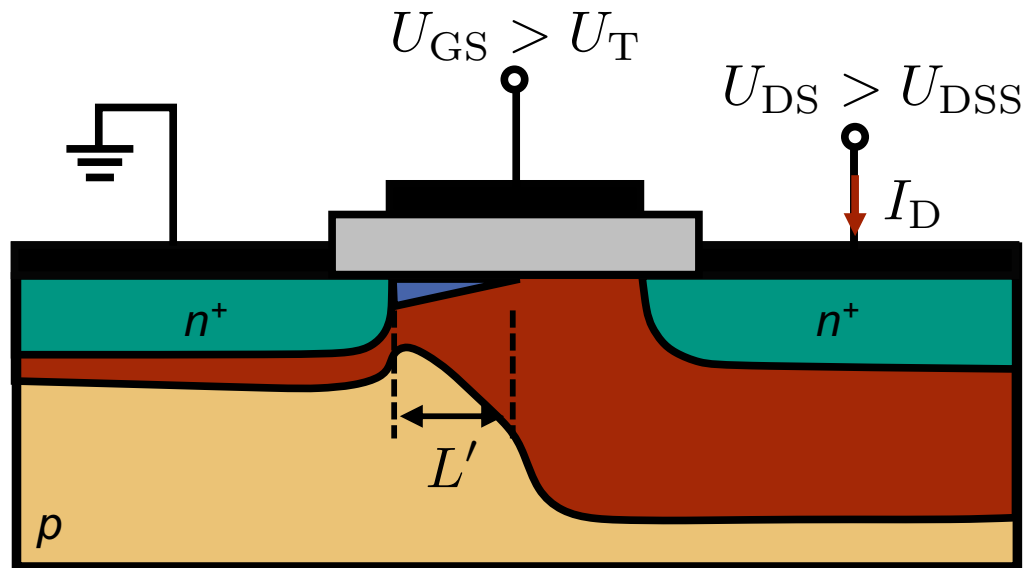
Qualitative Beschreibung MOSFET-Kennlinie

$$U_D = U_{DSS}$$

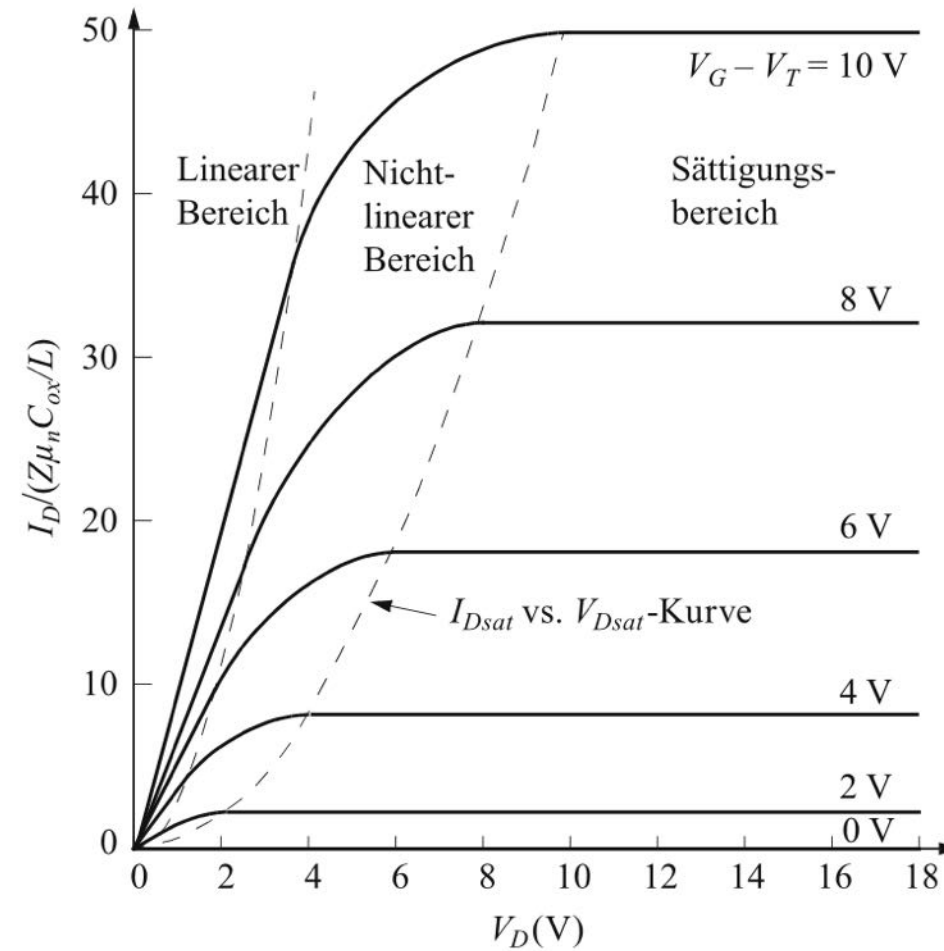


Qualitative Beschreibung MOSFET-Kennlinie

$$U_D > U_{DSS}$$



Kennlinie idealer MOSFET



Bauelemente der Elektrotechnik

Prof. Dr. rer. nat. Sebastian Kempf
Wintersemester 2021/22

