

**EC738 Advanced Devices**  
**Pages for Textbook (2nd Edition)**

**Basic Semiconductor Physics**

Chapter 2:

p.11-20 (top), p.31-33.

p. 35-40,

**MOS Capacitor**

Chapter 2: p72-80

Fig. 2.37-2.38

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**Long Channel MOSFET**

General Eqn (Double Integral Model): p.148-153

Regions of Operation (linear, saturation, pinchoff: p.156 - top of p.163.

Depletion Approximation: p. 82.

Charge Sheet Approximation: to be ploaded on group from 1st Ed.

Threshold Voltage: p.156, p84-85, p82.

Flatband Voltage: p. 91.

Body Coeff: p. 157.

Body Effect (substrate biasing): p. 166-167, p.97

Subthreshold Slope: p. 163- top of p. 166.

**Short Channel MOSFET**

Potential Contours &  $V_t$ : Ch. 3. p.176-179

Velocity Saturation: Ch. 3. p.186- p. 188, Fig. 3.27-3.29

Channel Length Modulation (CLM): Ch. 3. p. 195

Charge Sharing Model &  $V_t$  dependence on L and  $V_{ds}$ : p. 176, p.179, p.252, also to be uploaded on group using 1st Ed.

$L_{\text{effective}}$  calculation due to CLM: p.195, p.242-243, p.250, Also, to be uploaded using 1st Ed.

**Scaling Theory, Performance Factors**

Scaling: p. 204 - 209

$I_{off}$  and  $I_{on}$  : 213 - 216

S/D resistance: p. 250, p. 274

Power & Switching Time: p. 263-265

Parasitic Capacitance: p. 278 - 281, p. 301-303, p. 309.

Interconnect Scaling: p. 283-290

**Advanced Topics**

BSIM model, Circuit simulation using device models

Device Engineering: Doping profiles, LDD, Halo implants

Small & Large signal models, NQS  
SOI