

**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  
P.81-98

**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 uploaded 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<sub>off</sub> and I<sub>on</sub> : 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

**Selected Topics**

BSIM model, Circuit simulation using device models  
Device Engineering: Doping profiles, LDD, Halo implants  
Small & Large signal models, NQS  
SOI