LIST OF FIGURES

Chapter 1

1.1 An Integrated Circuit
   (a) A pin – grid array package (b) The silicon die is under the package lid
   2

1.2 ASIC design flow
   4

1.3 The N – MOSFET
   7

1.4 Schematic of a MOSFET
   20

1.5 Schematics of the drift and diffusion contributions
   21

1.6 The I-V plot of a short channel MOST using BSIM3
   34

1.7 A plot of the PREDICTMOS parameter vs versus L
   36

1.8 Playback of I-V characteristics of 0.5μ CMOS technology
   39

1.9 The playback of the I-V characteristics of NMOSTs
   42

Chapter 2

2.1 CMOS inverter
   44

2.2 Logic Levels
   45

2.3 Voltage Transfer Curve of a CMOS inverter
   46

2.4 CMOS Inverter and its Voltage Transfer Curve showing five regions A to E
   52

2.5 Static Characteristics of CMOS Inverter for a W/L of 3μ/0.6μ for MOSFET
   Models BSIM 3, SPICE 3 and PREDICTMOS.
   57
2.6 Variation of the logic threshold voltage with the $\beta_N/\beta_P$ ratio of the PREDICTMOS model benchmarked against BSIM 3

Chapter 3

3.1 Input and Output Voltage of a CMOS Inverter 70
3.2 CMOS inverter 70
3.3 Propagation Delay of a 0.6µ CMOS Inverter 80
3.4 Effect of scaling supply voltage on propagation delay 81
3.5 Inverter driving a CRC-π Load 89
3.6 Transient Response of a CMOS Inverter 91

Chapter 4

4.1 CMOS Inverters showing the parasitic capacitances $C_{par}$, input gate capacitance $C_g$ and the load capacitance $C_L$ 122
4.2 $P_{SC}/P_d$ Vs. Capacitive Load 138
4.3 Tapering Factor Vs. Short Circuit Power Delay Product showing Minima at 4.24 138

Chapter 5

5.1 MOSTs are connected in series discharge a capacitive load 147
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>Equivalent Inverter Circuit</td>
<td>148</td>
</tr>
<tr>
<td>5.3</td>
<td>Width of SCMS vs Delay</td>
<td>152</td>
</tr>
<tr>
<td>5.4</td>
<td>Optimization of top MOST for Minimum Delay</td>
<td>152</td>
</tr>
<tr>
<td>5.5</td>
<td>Conventional Schmitt Trigger</td>
<td>157</td>
</tr>
<tr>
<td>5.6</td>
<td>KST</td>
<td>159</td>
</tr>
<tr>
<td>5.7</td>
<td>Schmitt Trigger of M. Steyaert and W. Sansen</td>
<td>161</td>
</tr>
</tbody>
</table>