CHAPTER 14

ELECTRONIC SCIENCE

Doctoral Theses

144. AWASTHI (Yogendra Kumar)
Modeling of Multilayer Anisotropic Microstrip and Study of Pulse Propagation.
Supervisor : Prof. A. K. Verma
Th 18915

Abstract

Develops the closed-form models to compute the frequency dependent line parameters for microstrip line. The microstrip is in single and multilayer iso/anisotropic dielectric environments. The Hammersted-Jensen closed-form expression and Variational method are adapted to get the static line parameters. Wheeler's incremental inductance rule and perturbation method, with the concept of the stopping distance, are used to compute the frequency dependent line parameters for the multilayer line. Finally the circuit model is presented that provides dispersion in the lower frequency range due to the finite conductivity of the conductors. It also gives the frequency dependent complex characteristic impedance due to losses. The circuit model further computer the attenuation of lines more realistically.

Contents

145. KATYAL (Neha)

Investication of Wave Mixing in Photorefractive Materials (Sillenites).

Supervisors : Prof. Avinashi Kapoor and Dr. Natasha

Th 18914

Abstract

Describes some of the various aspects of two-wave mixing in photorefractive optically active Sillenite crystals. Investigates two-wave mixing in photorefractive Sillenite crystals with the major emphasis on the effect of optical activity. It has been analyzed that by varying pump beam polarization, the polarization of signal beam can be controlled. This feature can be utilized in various applications of spatial light modulators. Studies the effect of off-Bragg parameter on optically active Sillenite crystals. The effect of input polarization angle has been also analyzed.

Contents

146. MADHWAL (Devinder)

Development of Conducting Polymer Based White Light Emitting Diode

Supervisor : Prof. P.K. Bhatnagar

Th 19018

Abstract

Develops a simple and cost effective bio-whit polymer based light emitting diode (WPLED) using blue emitting conducting polymer as a host and red and green phosphorescent dyes as guest materials. There is a simple way to enhance the brightness of the conducting polymer based light emitting diode (PLEDs) using a naturally occurring bio molecule also known as “The molecule of life” Deoxyribonucleic acid (DNA) complexed with hexadecy ltrimethylammonimchloride (CTMA). Further incorporated in poly [2-methoxy-5-(2’-ethylhexoxy)-1,4-phenylene vinylene] (MEH-PPV) based orange and poly [9,9-di-n-hexylfluorenyl-2,7-diyl] (PFO) based PLEDs as an electron blocking layer (EBL). This EBL was also used further in our WPLED to improve its performance.

Contents

1. Introduction. 2. Experimental techniques and measuring equipments. 3. Salmon DNA as an electron blocking layer for polymer light emitting diodes. 4. Self trapping mechanism in Green Phosphorescent dye doped polymer light emitting diodes. 5. Development of white polymer light emitting diode using phosphoresent dyes as dopants. 6. Enhanced efficiency of polymer light emitting diodes using DNA electron blocking layer and SWCNT electron transporting layer. 7. Conclusion and future scope of work.

147. MAJUMDAR (Payal)
Analytical Modeling of Single-Layer and Multilayer Planar Transmission Lines.
Supervisor : Prof. A. K. Verma
Th 19083

Abstract

Studies and anlyse the basic line parameter and characteristics of different single-layer and multilayer; planar and non-planar transmission lines so that we can develop analytical models to compute their propagation characteristics in terms of the physical parameters of the lines and development of analytical models for mainly three types of transmission lines namely Coplanar Waveguide (CPW); Coplanar Strip Lines (CPS) and Slotline.

Contents

1. Introduction : Planar transmission lines. 2. Applications of EM-simulators for extraction of line parameters. 3. Conformal mapping technique - An overview. 4. Single layer reduction technique. 5. Analysis and modeling of coplanar waveguide. 6. Analysis and modeling of coplanar strip line. 7. Analysis and modeling of slotline. Conclusions and biblipgrahy.

148. MALIK (Priyanka)
Analytical Modeling and Simulation of Gate Dielectric and Gate Material Engineered Trapezoidal Recessed Channel Mosfet in Sub-100 NM Regime.
Supervisor : Dr. Mridula Gupta
Th 19019

Abstract

The outstanding progress of silicon technologies in the last few

decades has been achieved, to a great extent, through the scaling of MOSFET devices. The continuous reduction of the dimensions of transistors has provided enormous benefits in both digital and analogue applications i.e. higher number of transistors per chip, faster switching speed, improved RF performance. Further it is also well accepted that below the 50nm node although the conventional Si CMOS can be scaled, however, without appreciable performance gains and hence are several technical issues that make proper device scaling increasingly difficult. Suppressing the short-channel effect and the subthreshold leakage current requires tight control of intricate vertical and lateral channel doping profiles involving heavy doping very shallow source/drain junctions and ultrathin gate dielectrics.

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