

ABSTRACTS

ELECTRONIC ENGINEERING MATERIALS

Production of Quantum-Sized Heterostructures Based on GaN

E.N.Vigdorovich, Ju.N.Sveshnikov

A two-step MOCVD-hydride method of fabricating GaN layers has been investigated. Some issues of doping the layers by donor and acceptor impurities have been studied. The laws of the influence of technological modes on the growth rate, structure and the functional characteristics of the quantum-sized heterostructures based on GaN with multiple quantum wells have been determined.

MICROELECTRONIC DEVICES AND SYSTEMS

Photoelectrical Processes of Five-Diode Vertical Integrated Spectrum-Selective Photocell

V.I.Khainovskii, E.A.Ignatjeva, V.V.Uzdovskii

The distributions of the electrical potential in the bulk of the five-diode vertically integrated photo-receiving structure have been studied. The spectral photosensitivities of five regions of the conductivity different types have been obtained. The photo relaxation times for the above mentioned regions have been found.

Injected Photodiodes Based on Low-Resistance ZnS Crystals

V.V.Losev

The results of the experimental investigation of Ni-n-n⁺-In fabricated from the low-resistance ZnS:Al (n⁺-area) have been presented. A compensated high-resistance n-layer was obtained by thermodiffusion of Ag. The photodiodes have the injecting amplification of photo current at 1-10V direct biases. The peculiarities of the dependence of current across diodes on the thickness of n-layer in darkness and in UV-light have been revealed. The photosensitivity has the maximum in the narrow spectral range near the fundamental absorption.

Peculiarities of Movement of Charged Particles in HF Field at Amplitude Modulation of Source Voltage of Mass Quadrupole Filter

A.V.Malcev

Some features of the ions movement in a quadrupole field at the amplitude modulation of the source voltage applied to the opposite electrodes of the mass filter have been considered. The influence of amplitude modulation depth and the modulation frequency value on the diagram of stability and movement of ions and the mass-analyzer resolution has been investigated.

CIRCUIT ENGINEERING AND DESIGN

Application of Compilation Approach to Analog Circuits Simulation

D.V.Boulakh

A new way of the analog circuit simulation software construction has been described. The time comparison between the traditional SPICE-like simulator and the compilation one has been executed.

Automation of Standard Cell Libraries Development Based on Cadence Parameterized Cells

T.Y.Krupkina, V.V.Losev, N.N.Muhanuk, M.G.Putrya

The trends in development of the scientific-educational programs in designing microelectronic devices have been considered, and the significance of involving students and PhD. post-graduates in scientific projects has been underlined. The problems of the standard cell libraries development have been investigated, the automation approaches based on the parametric cells and the application of the optimization methods have been proposed. The prototype of the inverter standard cell, created in accordance with the above theoretical basis, has been presented.

INTEGRATED RADIOELECTRONIC DEVICES

Peculiarities of Designing Digital Antenna Arrays

V.I.Oreshkin, K.S.Lyalin, J.V.Chikounova

Some problems arising in designing digital antenna array (or Smart Antenna) have been considered. The results of study on the influence of DAC (digital-to-analog converter) parameters on the system characteristics have been presented, the modeling for the purpose to find out the influence of gas-phase scattering on the set forth antenna beam pattern has been performed.

Development of Chip Attenuator for Surface Assembling Based on Resistive Structures

V.D.Sadkov, B.N.Utkin

The topology of the chip attenuators and adapt-attenuators of attenuation broad range for surface assembling, based on the distributed resistive structures, has been proposed, and their calculation has been executed. The results of the calculations and of the experimental studies both on real samples of the developed items and on their large-scale models have been presented.

MEASUREMENT METHODS AND TECHNOLOGY

Peculiarities, Methods and Advantages of Integral Method for Investigation of Nanosized Crystallite Textures in Electron Microscopy. II. Method Practical Implementation

S.K.Maksimov

The advantages of realization of the textures electron-graphic studies (EDST) within the framework of the electron-microscopy studies (EMS), turning it, essentially, to a new method with unique locality, self-descriptiveness and resolution, have been noted. It is distinguished by the precision control of projection axes, permits to combine in the same experiment and for the same volume the electron-graphic and electron-microscopy studies, to select the volumes to be investigated based not only on the peculiarities of EMS patterns, but, also, on EDTS, etc. It has been indicated that the experimenter, relying on the laws and proposed methods, is able to develop the options of the investigations responding to the object being studied and to his own skills.

Investigation of Surface Modification Influence on Frequency Properties of Micro Resonator

V.D.Verner, G.N.Gaidukov, P.S.Pagin

The influence of hetero-layer on the elastic constants and surface tension in nanoelectric-mechanical systems has been considered. The quantitative comparison of these effects on an example of a silicon resonator has been performed. It has been shown that the presented results are within the range of possible experimental observation.

Application of Programmable Array Logic for Correlation Processing of Noise-Like Hydro-Acoustic Signals

I.N.Burdinsky

A measurement board based on the FPGA technology, that allows the highly accurate real-time processing of hydro-acoustic navigational and control signals, has been designed. The results of the experiments in a real-life environment have been presented.

BRIEF REPORTS

Influence of Mode of Silicon Anode Oxide Films Formation under Galvanostatic Condition on Phosphor Content in Them

L.P.Milseshko

It has been found that while anodizing silicon of p-type in 1.5 M H_3PO_4 solution in ethylene glycol with addition of 1 M H_2O at constant current density $5mA/cm^2$, the quantity of the introduced phosphor into anode oxide films (AOF) is proportional to the forming voltage value. Moreover, the dependence of the N_p phosphor concentration in AOF on the U_f formation voltage in the range

of 74 – 288 V is approximated by the expression $N_p = 1.4 \cdot 10^{18} U_{\phi} - 2.5 \cdot 10^{18}$ with the correlation coefficient equal to 0.982. An assumption about the PO_4^{3-} concentration increase in the AOF gel-layer according to the anode potential value has been made.

∞ -Continuous Four-Parameters Compact Model of Field-Effect Transistor

V.N.Biryukov

A four-parameter static mathematical model of a field-effect transistor, continuous with all its derivatives, has been proposed. The specific feature of the model is the application of physical parameters effectively determined by the least-squares method.

Lobe Sensor For Angular Coordinates of Solar Energy Installation

E.V.Bathirev, Htein Lin Oo

The principles of constructing the goniometric tracking solar energy installation, consisting of the antenna system, have been presented. The goniometric sensor measures a spatial error between the axis and the direction at the object (the Sun). The principle of forming the lobe direction-finding characteristic of the antenna system and the possibility of precise tracking the Sun using the extrapolation of angular position of the Sun and the drive have been demonstrated.

Gaussian Pulse Generator for Ultra-Wide Band Transceivers

A.V.Gureev, S.E.Voronin

A new circuit of the Gaussian pulse formation, which allows obtaining a signal of not less than 200 ps duration, has been presented.

Computer Simulation of Identification Procedures for Dynamic Objects

V.M.Troyanovsky

The problems of identification of the dynamic objects weight function and verification of the algorithms created for solving the problem have been considered.

The program tools and modeling results have been described.

Object-Oriented Diagnostic Expert System «MALEX»

A.L.Ezdaikov

The peculiarities of the structure and the specifics of using the object-oriented expert system MALEX have been considered. The main distinctions of these systems from the standard expert ones have been presented.

CONFERENCES. EXHIBITIONS.

Choice of Tactics and Strategy of Electronic Devices Production

V.D.Verner, A.A.Reznev, A.N.Saurov

The analysis of the exhibition «Productronika – 2007» exposition, that is one of the leading exhibitions of the technological equipment for production of electronic technology items, has been performed.