

Высокоизбирательные резонансно-туннельные кристаллоподобные устройства обработки сигналов

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Results

Nanoelectronic signal processing devices based on crystal-like structures are the newest element base of information and telecommunication systems. Resonant-tunneling crystal-like structures and devices based on them with very high spectral selectivity are proposed. High-performance microwave microstrip signal processing devices are developed. To improve the efficiency crystal-like structures used in the modes conventional tunneling – resonant tunneling. Together, these effects provide maximum decoupling of signals in the passband and stopband. Decoupling of signals is improved from 40 dB to 60 dB with decreasing size of devices about 2 times. The developed devices have such transmission characteristics: bandpass, narrowband, low-frequency, notch. To create a highselective crystal-like devices on the concept of impedance generalized mathematical model of crystal-like structures was developed. This model is characterized by physical clarity and the possibility of synthesis of structures with desired characteristics. Development and experimental investigation of new highselective single- and multi-barrier resonant tunneling structures and devices is fulfilled. The physical and technical bases of resonant-tunneling crystal-like signal processing devices, including the mathematical, physical and computer models for analysis and synthesis of such structures, analytical relationships between the characteristics and design parameters of the structure, patented solutions are developed. The methodology of microstrip resonant-tunneling crystal-like signal processing devices designing is developed.

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