DEVELOPMENT OF SILICON MATRIXES AND CHANNELS OF AMPLIFICATION OF SIGNALS FOR A TELESCOPE - SPECTROMETER OF CHARGED PARTICLES*

O.S. Frolov (1,4), A.V. Dudnik (2), A.A. Sadovnichiy (1), I.L. Zaitchevskiy (4), V.A. Shevchenko (3), D.O. Frolov (1)
(1)State Enterprise R&D Institute of Microdevices, Kiev, Ukraine, (2)Kharkov state university, Ukraine, (3)Taras Shevchenko National Kiev University, Ukraine, (4)Polinom&K, Kiev, Ukraine.
shevfis@carrier.kiev.ua

The silicon detectors will widely be used at registration of cosmic rays. If it is required to determine angular distributions of particles, will be used multi-element (for example, matrix) receivers. In the report the outcomes of development of the silicon matrix detector of the format 6x6 units and multichannel systems of preamplification - formation of signals intended for a satellite telescope of charged particles are adduced. The area of a unit of the detector is 0,5 cm^2, depth of a slice is 300-400 microns, concentration of an impurity in a substrate 10^{12} cm^{-3}. The role of effects of ionic drift on a surface of the detector inverse channels, initiation derivation of leakage is analysed. For their supression will be used of a protective dielectric film and guard rings of a special design.

In outcome the level of an electrical noise of a unit matrix makes 5 keV at T=25° C and 10-16 keV at T=40° C. It provides the sure registration of electrons of high energy, that confirms also by analysis of β-spectra. The energy resolution of a unit matrix on a-particles makes about 10 keV. It is possible to lower a degree of influence of a γ-background up to 10^{-5}.

At mining the multiway unit of preamplifiers - shapers of signals it is necessary to take into account as the customary requirements (low noise, fast response time, high volume range etc.), and feature of operation of satellite instrumentation (temperature range, interference on the power supply circuit, low power consumption, high level of a radiation dose). The route of mining of amplifying channels with the purpose are analysed to satisfy with all these requirements. On samples are obtained a input noise of a channel an 10 keV, displacement of a stationary value of component on an output at a temperature variation and loading of a channel < 1 mV, volume range more than 60 dB, power consumption in one channel less than 150 mW.

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