

---

# Measurement Device for Determining Accumulated Dose of Radiation by MOSFET-Sensors

© V.V. Andreev, A.A. Stolyarov, I.V. Solovev

Bauman Moscow State Technical University (Kaluga branch)

Kaluga, 248000, Russia

*The article describes measurement device for determining absorbed dose of radiation. A possibility of using Metal-Oxide-Semiconductor Field Effect Transistor as compact radiation sensors is shown. The article presents a determination method of the absorbed dose using the threshold voltage shift due to irradiation. Methods of improving the thermal stability of the measured characteristics have been considered.*

**Keywords:** radiation, absorbed dose, threshold voltage, MOSFET-sensor.

## REFERENCES

- [1] Perevertailo V.L. *Tekhnologiya i konstruirovaniye v elektronnoy apparature — Technology and Designing in Electronic Equipment*, 2010, no. 5–6, pp. 22–29.
- [2] Andreev V.V., Bondarenko G.G., Lychaguin A.A., Stolyarov A.A. *Fizika i khimiya obrabotki materialov — Physics and Chemistry of Material Treatment*, 2006, no. 6, pp. 19–23.
- [3] Andreev V.V., Bondarenko G.G., Mihal'kov A.M., Stolyarov A.A., Solov'ev I.V. Improvement of Injection and Radiation Stability of Nanosize Dielectric Films of MOS Devices. *Inorganic Materials: Applied Research*, 2011, vol. 2, no. 5, pp. 425–427.
- [4] Andreev V.V., Stolyarov A.A., Vasyutin M.S., Mikhalkov A.M. *Vestnik MGTU im. N.E. Bauman. Seriya Priborostroeniye — Herald of the Bauman Moscow State Technical University. Instrument Engineering Series*, 2010, pp. 118–127.
- [5] Holmes-Siedle A. The Space-Charge Dosimeter: general principles of a new method of radiation detection. *Nucl. Inst. And Meth.*, 1974, vol. 121, pp. 169–179.
- [6] Holmes-Siedle A., Adams L. *Handbook of Radiation Effects*. Oxford, Oxford University Press, 2002, 644 p.
- [7] Titse W., Shenk K. *Semiconductor circuitry*. Moscow, DMK Press Publ., 2008, 832 p.
- [8] Mitchell J.P. Radiation-Induced Space-Charge Buildup in MOS Structures. *IEEE Transactions on Electron Devices*, 1967, no. 11, pp. 764–774.

**Andreev V.V.** (b. 1963) graduated from Bauman Moscow Higher Technical School in 1988. Dr. Sci. (Eng.), Professor of the Design and Production of Electronic Apparatus Department of Bauman Moscow State Technical University (Kaluga Branch). Author of more than 160 publications. Area of work and research interests covers instrumentation, micro- and nanoelectronics, condensed matter physics, control methods. e-mail: andreev@bmstu-kaluga.ru.

---

---

**Stolyarov A. A.** (b. 1956) graduated from Bauman Moscow Higher Technical School in 1979. Dr. Sci. (Eng.), Professor, deputy director of the Kaluga Branch of Bauman MSTU. Area of work and research interests covers instrumentation, micro- and nanoelectronics, condensed matter physics, control methods. e-mail: alalstol@mail.ru.

**Solovev I.V.**, postgraduate of Bauman Moscow State Technical University, Kaluga Branch. Area of work and research interests covers instrumentation, micro- and nanoelectronics, condensed matter physics, control methods. e-mail: solo1511@yandex.ru.