AGH-University of Science and Technology, Kraków

RAPSODI chip : A 2-CHANNEL ASIC FOR SIPM READOUT

ABSTRACT

The circuit is equipped with two independent channels mostly to profit from coincidence mode of operation. This solution gives to the IC the possibility to reduce an influence of DCR on measured signal. Each channel can be switched between three ranges of operation measuring signal coming from up to 10, 100 and 1000 avalanches generated in the SiPM.

The signal from the SiPM is amplified and shaped by a Pole-Zero Cancellation (PZC) circuit, being an integrated part of the preamplifier (A). Next the peak amplitude, proportional to the number of triggered avalanches, is detected by a Peak Detector & Hold (PDH) and converted by 7-bit flash ADC. Digital representation of the acquired data is directly transferred ti acquisition system.

TECHNOLOGY STAGE

- Prototypes of the ASIC available from a MPW run funded by research projects.
- Design of the ASIC carried out using CAD running educational licenses.

POSSIBLE APPLICATIONS

- Low level light intensity measurement.

EXISTING APPLICATIONS

- MICROSNOOPER portable real time meter to detect and identify any type of radiation (FORIMTECH)

SPECIFICATIONS

- Technology: 0.35um standard CMOS
- Power supply: 3.3V
- Dynamic range: about 60 pC
- Internal or external trigger capabilities
- 7-bit digital output

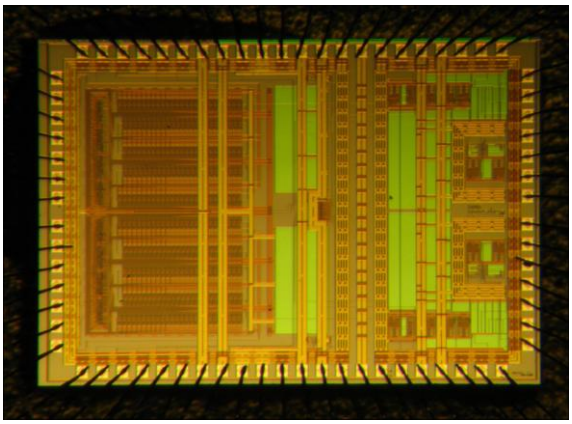

Fig. 1 RAPSODI chip

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ADVANTAGES

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- Digital output (7-bit)
- Coincidence circuit with moderate coincidence window
- Internal or external trigger capabilities

LIMITATIONS

- bare chip
- 15 fC equivalent input noise charge

REFERENCES

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