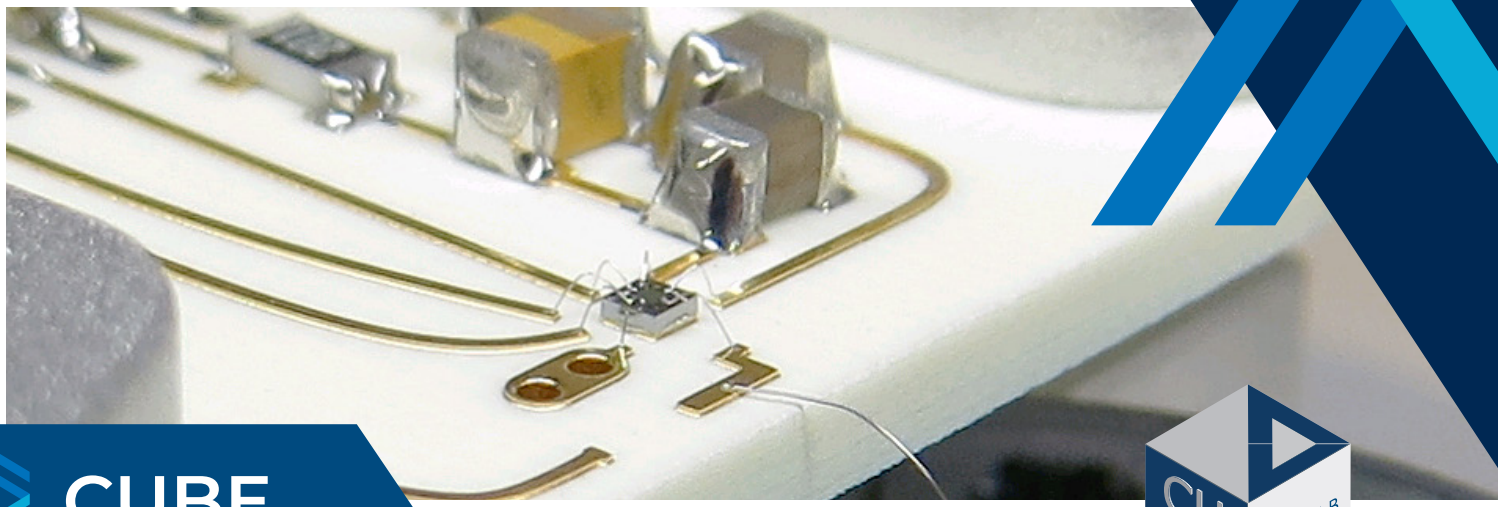
XG LAB
BRUKER NANO ANALYTICS



CUBE

Charge Sensitive Preamplifier for Radiation Detectors

CUBE is a family of monolithic charge sensitive preamplifiers exclusively tailored for radiation detectors. The circuit is designed to offer the best noise performance at short peaking times enabling low dead time and high-count rate measurements with excellent energy resolution.

Main Features

Availability: bare die or on custom assembly.
Physical size: 0.75 mm x 0.75 mm x 0.25 mm.
Detector capacitance compatibility: from <0.25 pF to 10 pF.
Reset mode: pulsed reset or continuous (with external resistor).
Rise time without detector: 7ns.
Power consumption: from 6 mW to 60 mW.
Operation over wide temperature range: 70K to 300K (and above).

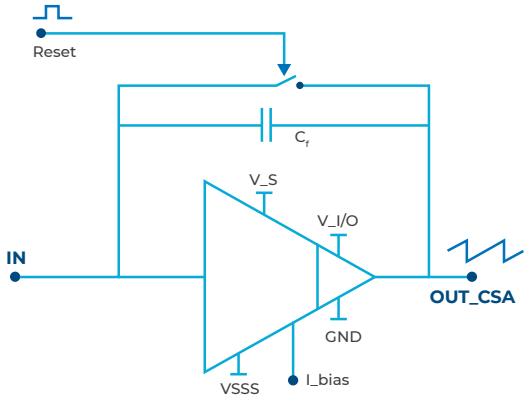


Figure 1. Circuit schematic of the CUBE preamplifier

Advantage of an all-in-one preamplifier

- Superior performance with respect to JFET solution at short peaking time (< 1µs).
- No external component for the preamplifier loop needed.
- Large amplified output signal available.
- Low impedance output to drive up to 30 pF load.
- Small footprint to be placed very close to the sensor.

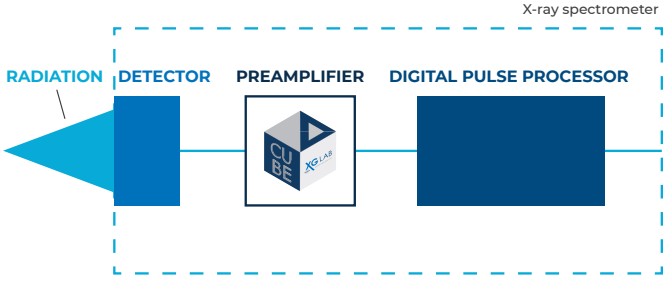


Figure 2. Where the CUBE preamplifier is used

Figure 3. The CUBE preamplifier output

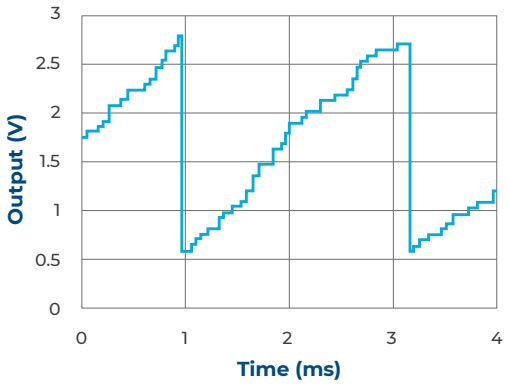
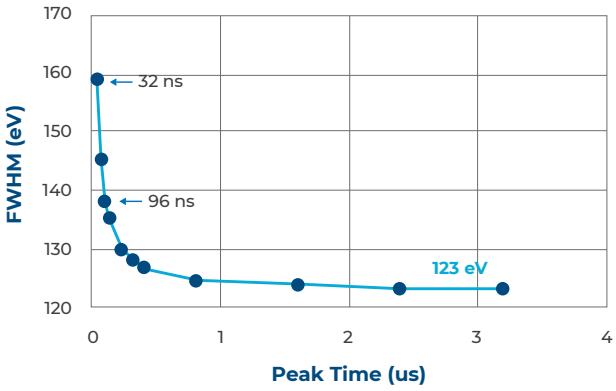


Figure 4. Energy resolution for Mn Kα with CUBE and a 20mm2 SDD



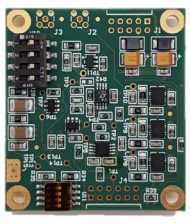
CUBE Family Details

CUBE VERSION	POLARITY	DETECTOR CAPACITANCE	FEEDBACK CAPACITANCE	ENC (CUBE ONLY, 3.6EV/EL)	MAIN FEATURE	POSSIBLE APPLICATIONS
PRE_016	Negative (Electrons)	< 0.25 pF	25 fF	3.3 e- @1us	Very small detector capacitance, best energy resolution	Silicon Drift Detectors (SDD)
PRE_031	Negative (Electrons)	< 0.50 pF	25 fF	3.0 e- @1us	Small detector capacitance, excellent energy resolution, smallest dynamic range.	HpGe, CdTe or CZT
PRE_033	Negative (Electrons)	< 0.25 pF	25 fF	2.4 e- @1us	Very small detector capacitance, best energy resolution	Silicon Drift Detectors (SDD)
PRE_037	Positive (Holes)	< 0.70 pF	25 fF	4.0 e- @1us	Small detector capacitance, excellent energy resolution, smallest dynamic range.	Si-PIN, HpGe, Strip or pixelated detectors, X-ray applications
PRE_038	Positive (Holes)	0.50 pF – 3.00 pF	50 fF	12.3 e- @1us	Intermediate detector capacitance, good resolution, intermediate dynamic range.	Si-PIN, HpGe, Strip or pixelated detectors, X-ray applications
PRE_039	Positive (Holes)	3.00 pF – 10.00 pF	50 fF	20.2 e- @1us	Very large detector capacitance, good resolution, intermediate dynamic range.	Si-PIN, HpGe, Strip or pixelated detectors, X-ray applications
PRE_040	Negative (Electrons)	0.50 pF – 3.00 pF	50 fF	12.4 e- @1us	Small planar or pixelated detector, good resolution, intermediate dynamic range.	HpGe, CdTe or CZT, Strip or pixelated detectors, X-ray applications
PRE_041	Both (selectable)	3.00 pF – 10.00 pF	500 fF	57 e- @1us	Very large dynamic range, lower energy resolution.	HpGe, HpGe cylindrical, CdTe or CZT, Strip, Hard X-ray or Gamma applications
PRE_042	Both (selectable)	0.50 pF – 3.00 pF	500 fF	35.5 e- @1us	Very large dynamic range, lower energy resolution.	HpGe, HpGe cylindrical, CdTe or CZT, Strip, Hard X-ray or Gamma applications

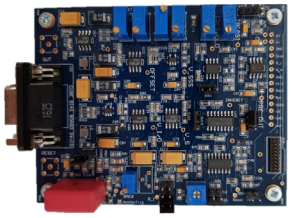
Other tips

Dedicated biasing boards are available or can be designed upon request to ease the integration of CUBE for both industrial or laboratory applications.

TO8 custom flex bias board



High-end configurable bias board



CUBE Bias board for laboratory application. Available in 1CH or 8CH version

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