weeroc

Liroc

SiPM Analogue Read-out Chip for Lidar and Photon Counting Application

Liroc2 is a 64-channel front-end ASIC designed to readout silicon photo-multipliers (SiPM) for LIDAR application.

Liroc2 allows triggering down to 1/3 p.e. and provides low-voltage differential trigger output for each channel with an excellent timing resolution (better than 20ps FWHM) and excellent double-peak separation (100% efficiency on 3 ns separated single photo-electrons). Liroc allows fast single photon counting over 300MHz per channel.

An adjustment of the SiPM high-voltage (gain) is possible using a channel-by-channel 6-bit DAC connected to the ASIC inputs. Channel-by-channel calibration on the trigger threshold is also possible thanks to 7-bit DACs. Liroc can be calibrated using the dark noise of the SiPM.

Liroc2 features a GHz measurement line composed of an RF preamplifier with pole zero cancellation followed by a fast discriminator and low swing LVDS fast driver.

Detector Read-Out	SiPM, SiPM array
Number of Channels	64
Signal Polarity	Positive or Negative (selectable ASIC-wise)
Sensitivity	Trigger on 1/3 of photo-electron
Timing Resolution	Better than 20 ps FWHM on single photo-electron Better than 3ns double-peak separation on single photo-electron
Dynamic Range	Over 300MHz photon counting rate
Packaging & Dimension	BGA 20x20 mm^2 Flip-Chip low inductance packaging technology
Power Consumption	210mW – Supply voltage : 1.2 V
Inputs	64 analogue inputs with independent SiPM HV adjustments
Outputs	64 LVDS triggers
Internal Programmable Features (I^2C)	64 HV adjustment for SiPM (64 x 6 bit), trigger threshold programming (10bits), 64 x 7 bit channel-wise threshold adjustment, ASIC-wise polarity selector, preamp gain adjustment, individual trigger masking and cell powering.

More about Liroc

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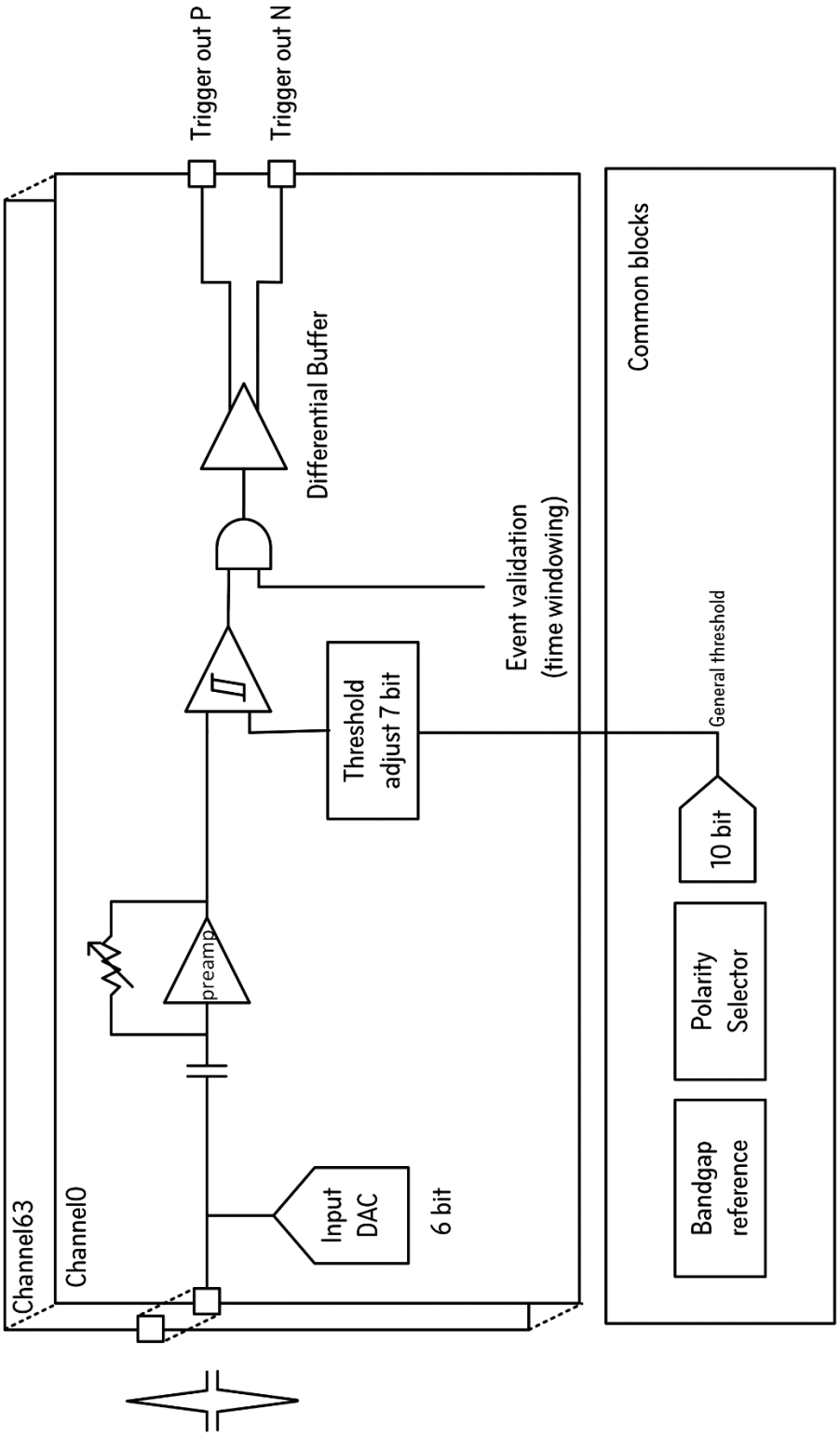
Trigger out P
Trigger out N
Differential Buffer
Event validation
(time windowing)
Common blocks
General threshold
Threshold
adjust 7 bit
10 bit
Polarity
Selector
Bandgap
reference
preamp
Input
DAC
6 bit
Channel63
Channel0