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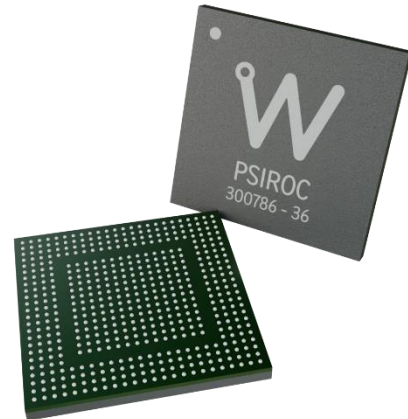
Psiroc

PIN Diodes, Silicon Strips and GEMs Read-Out Chip

Psiroc is a 64-channel front-end ASIC designed to readout PIN diodes, silicon strips and GEMs, handling detector capacitances ranging from 0 up to few hundreds of pF.

Psiroc allows triggering down to 0.5 fC and provides dual-gain energy measurement with excellent Signal-to-Noise Ratio on the high gain (SNR over 10 for 0.5 fC) and large dynamic range on the low gain. For input signals over few pC a channel-wise ToT output is also available. Psiroc can be programmed to output the shapers HG/LG, individual triggers or ToT signals (two output pins per channels). The preamplifier gain is adjustable from 125 mV/pC up to 8 V/pC.

Charge measurement is done with peak detectors but those can be used in a track & hold fashion thanks to an internal delay cell. Analog data are outputted on two multiplexed analog output and can be read-out with an external ADC. Shapers shaping time can be adjusted from 20 ns to 3 μ s with a step of 20 ns up to 300 ns and a step of 200 ns up to 3 μ s.



Detector Read-Out	PIN Diodes, Silicon strips, GEMs
Number of Channels	64
Signal Polarity	Positive, negative
Sensitivity	Trigger on 0.5 fC on both polarity
Timing Resolution	< 150 ps RMS @ $Q_{in} = 4$ fC ; Cd/Cf = 20p/1p (pa gain = 1 V/pC)
Dynamic Range	Up to 5 pC with low gain charge measurement and up to 100 pC with ToT
Packaging & Dimension	BGA 20x20 mm ²
Power Consumption	350 mW – Supply voltage : 1.2 V
Inputs	64 analogue inputs
Outputs	2 outputs per channel, either : <ul style="list-style-type: none">• 64 LVDS triggers• 2 x 64 TTL triggers• 64 TTL triggers and 64 analog outputs 2 multiplexed analogue outputs 3 NOR64 trigger outputs
Internal Programmable Features	3 trigger threshold tuning (10bits), channel-by-channel gain and shaping time adjustment ($\tau = 20$ ns to 3 μ s), individual trigger masking and cell powering.

More about Psiroc

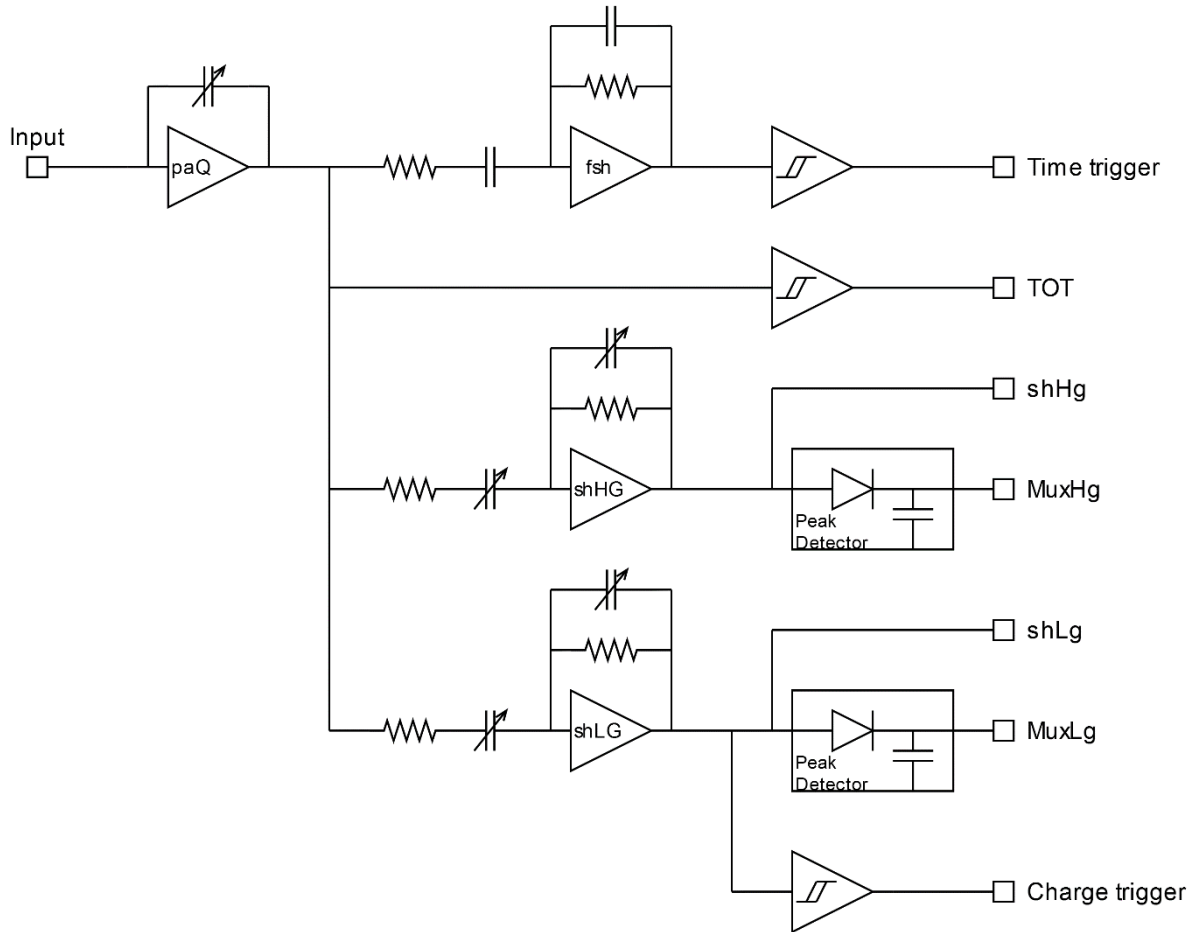
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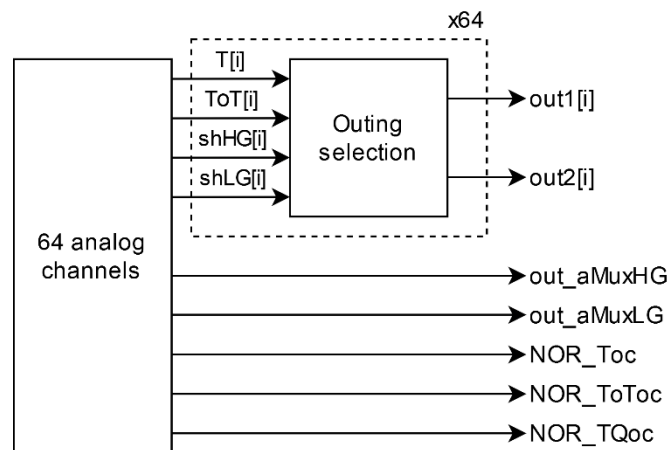
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Simplified schematic of one channel. paQ – Charge preamplifier ; shHG – High Gain Shaper ; shLG – Low Gain shaper ; fsh – fast shaper



outing schematic