QCD600B - NIR Free-Running Single-Photon Detector

Overview

QCD600B is a compact free-running single photon detector for near-infrared range. Developed by QuantumCTek Co. Ltd. who has been manufacturing and implementing single photon detectors with InGaAs/InP avalanche photodiodes (APDs) for a long history , the newest QCD600B has advanced photon detecting ability, high reliability and small volume, comparing to similar products. It provides a cost-effective solution for applications with asynchronous photon detection such as laser radar, fluorescence lifetime measurement and so on.

QCD600B is built around a negative feedback APD, combined with specifically designed electronics and thermotics to achieve the holistically improvement of mutual suppression characters such as fast avalanche quenching with low electronic noise, and high detection efficiency with low dark count rate. For single photon of wavelength at 1550 nm, the typical ability of QCD600B consists of a detection efficiency up to 25%, a dark count rate lower than 2000 cps, a saturated count rate more than 200 kcps at 4% after-pulsing rate, and a time jitter of 120 ps.

QCD600B supports customization for specific applications. With a bundled PC-software, users can configure/choose parameters (APD temperature, bias, counting threshold, dead time, etc.) to enhance certain characters (detection efficiency, saturated count rate, etc.), configure the internal time-data convertor to get time-counting data, and configure the operation mode of free running or external-triggered gating.

Applications

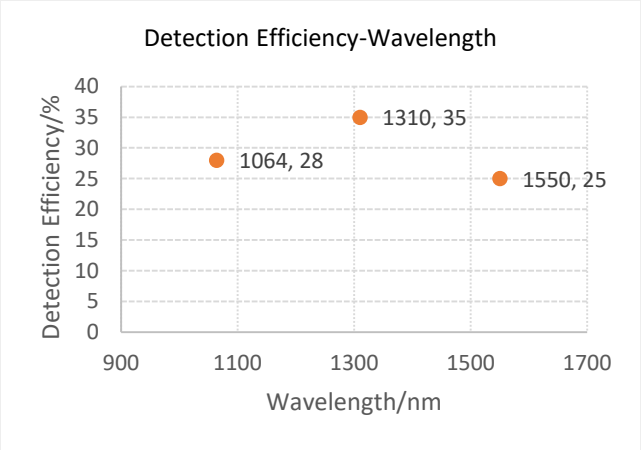
- Eye-safe laser ranging/LiDAR
- Fluorescence lifetime measuring
- Quantum key distributuin/quantum optics
- Single-photon source characterization
- Photoluminescence

Key Benefits

- Free-running
- High detection efficiency
- Low dark counting rate
- Low time jitter
- TDC (optional)

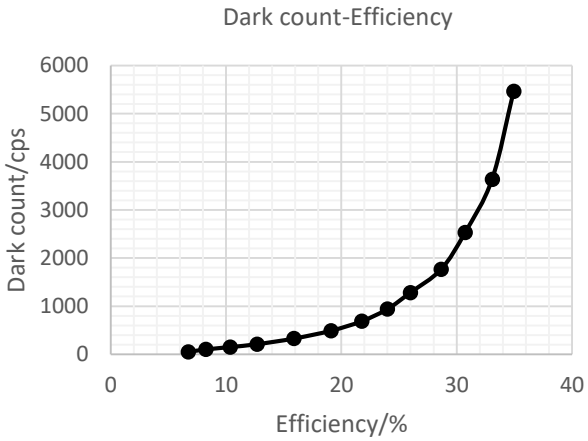
EFFICIENCY

The spectral response range covers 900 nm to 1700 nm, and the typical detection efficiency values of the three wavelengths are shown in the table below.



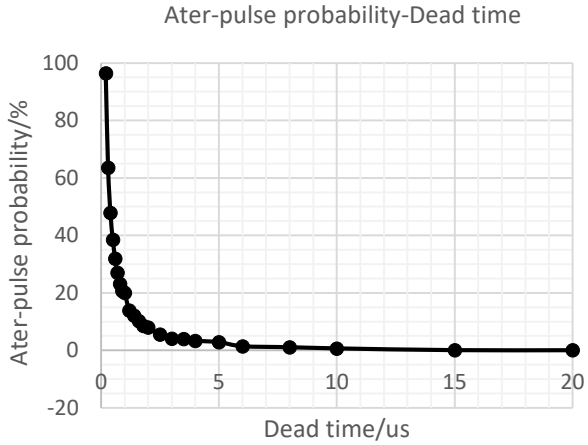
DARK COUNT RATE

The dark count rate can be as low as 250 cps when the detection efficiency is 15%.



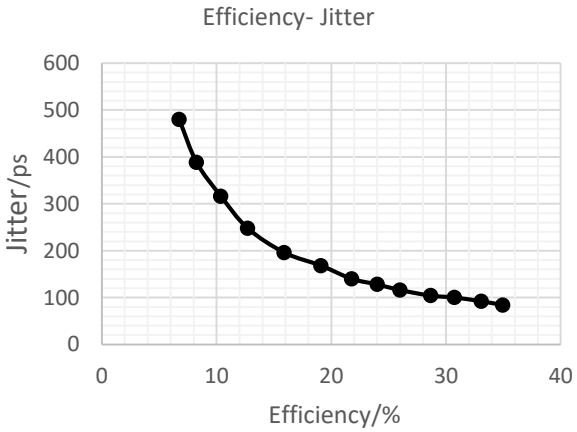
AFTERPULSE PROBABILITY

The dead time is adjustable from 0.1 μs to 60 μs, and the afterpulse probability decreased with the increase of the death time.



TIME JITTER

The higher the detection efficiency, the smaller the time jitter, and the minimum time jitter can be as low as 80 ps.



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SPECIFICATIONS

Parameter		Unit
Wavelength range	900 - 1700	nm
MAX Efficiency @ λ=1550 nm	35	%
Dark count rate@35% efficiency（Typical value）	6000	cps
Afterpulse probability @ 5μs Deadtime（Typical value）	8%	/
Time Jitter@35% efficiency （Typical value）	150	ps
Deadtime range	0.1 – 60	μs
Deadtime step	10	ns
Output signal level	LVTTL	/
Output signal pulse width	15	ns
Output connector	SMA	/
Optical fibre coupling	MMF 62.5	/
Optical connector	FC/UPC	/
Dimensions	116*107.5*80	mm
Weight	1.2	kg
Cooling time	<5	min
Operating Temperature	-10 ~ +35	°C
Storage temperature	-40 ~ +85	°C
Operating Humidity	10 ~ 95	%RH
Channel	1	/
TDC precision (Customizable)	10	ns
Power Supply		
Input voltage	+15V DC	
Peak power	55W	