

QCD600B - NIR Free-Running Single-Photon Detector

Overview

QCD600B is a compact NIR free-running single photon detector that provides a cost-effective solution for asynchronous single photon detection applications.



The product uses the negative feedback InGaAs/InP single photon avalanche diode (NFAD) as the core device to quench the avalanche current quickly and suppress the afterpulsing effect. The detector works in free-running mode that suits for applications with uncertain photon arrival time such as LiDAR and fluorescence lifetime measurements. Moreover, it offers an external gate input port connector dedicated to control whether it is in Geiger mode and avoid saturation or undesired detections. The InGaAs/InP avalanche diode is cooled by thermo electric cooler (TEC) to achieve low dark count rates, and the afterpulse probability is further suppressed by adjusted dead time. The device is fibre-coupled with MMF62.5 and compatible with SMF.

The product can integrate TDC function and use USB2.0 interface for data communication. With special control software, it can realize flexible configuration of various parameters and real-time output of time count distribution data. It is a single photon detector with high performance and low cost which supports a variety of application requirements.

Applications

- LiDAR
- Fluorescence lifetime measurements
- Single photon imaging
- Quantum communication
- Quantum optics
- OTDR

Key Benefits

- Compact and cost effective
- High detection efficiency (35%@1550 nm)
- Low dark count rate (250 cps@15%)
- Low time jitter (min 80 ps)
- High count rate (up to 4 Mcps)
- TDC functions

QCD600B stores the configured parameters that have been calibrated before delivery, and supports automatic loading of configuration parameters upon power-on. At the wavelength of 1550 nm, the maximum detection efficiency can be up to 35%. The dark count rate can be as low as 250 cps when the detection efficiency is 15%. The time jitter can be as low as 80 ps. The dead time can be adjusted from 0.1 μ s to 60 μ s, and the maximum saturation count rate can be up to 4 Mcps. At the same time, the USB interface and special control software can be used to adjust configuration parameters such as cooling temperature, bias voltage, discrimination threshold, and dead time, making the product suitable for more application scenarios.

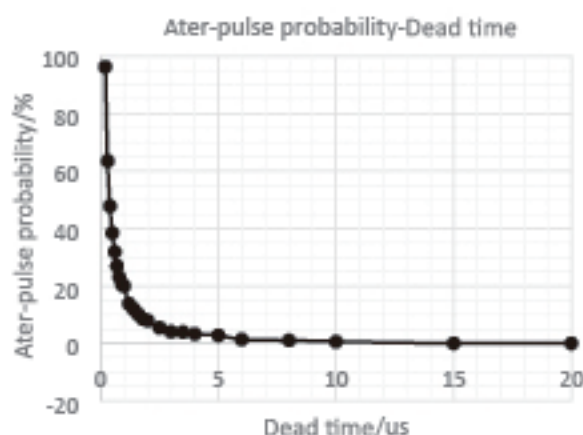
EFFICIENCY

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.

Wavelength (nm)	Detection Efficiency (%)
1550	25
1310	35
1064	33

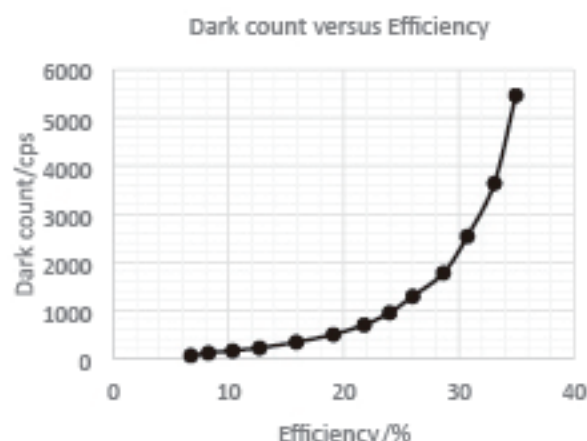
AFTERPULSE PROBABILITY

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



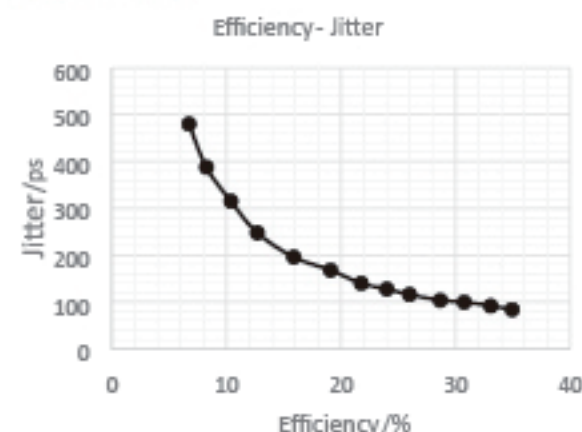
DARK COUNT RATE

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



TIME JITTER

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



SPECIFICATIONS

Parameter			Unit
Product model	QCD 600B-H	QCD 600B-S	
Wavelength range	900 - 1700		nm
Photon detection efficiency	35	25	%
Dark count rate (Typical)	4	2	kcps
Afterpulse probability@Deadtime	10	5	%
Time Jitter	150	100	ps
Deadtime range	0.1 – 60		μs
Deadtime step	10		ns
Output signal level	LVTTTL		/
Output signal pulse width	15		ns
Output connector	SMA		/
Optical fibre coupling	MMF 62.5		/
Optical connector	FC/UPC		/
Dimensions	116*107.5*70		mm
Weight	1.2		kg
Cooling time	<3		min
Operating Temperature	-10 ~ +30		°C
Storage temperature	-40 ~ +85		°C
Operating Humidity	10 ~ 95		%RH
Channel	1		/
TDC precision (Customizable)	10	0.1	ns
Power Supply			



Input voltage	+15V DC
Peak power	55W

QCD600B NIR Free-

Product Brochure