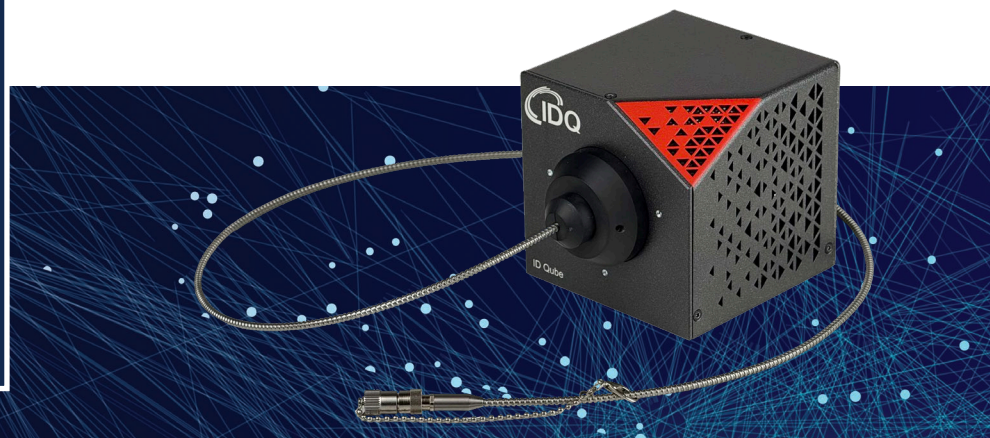

# ID Qube Ultra Low Noise

## NIR Single Photon Detection
## Compact, cost effective, noise < 200 Hz

*Synchronous and Asynchronous*
*Single-Photon Detection at Telecom Wavelengths*

The ID Qube Ultra Low Noise is a cost-effective and compact solution delivering precise and reliable single photon detection, with high detection efficiency, precise timing jitter and low detector noise. Available in two models:

- **The ID Qube NIR Free-Running** model, for applications in which asynchronous photon detection is essential, such as photon correlation or time of flight measurements.
- **The ID Qube NIR Gated** model, for applications in which synchronous photon detection is essential, such as quantum communication and QKD.

All models offer a gate input port connector, dedicated to avoiding saturation or undesired detections. The cooled InGaAs/InP avalanche photodiode and associated electronics have been designed to achieve especially low afterpulsing and the lowest dark-count rate for such a package.

Get the best out of your photonic experiments and applications with the ID Qube NIR ULN!

## KEY FEATURES

- **Compact, cost effective and dependable performance**
- **Fast gated** (up to 100 MHz) and **free-running**
- **Ultra-low noise** (<200 cps at 10%)
- **Low jitter** (<200 ps, typically <150 ps)
- **Fibre-coupled optical input**
- **Broadband detection** (900–1700 nm)

## APPLICATIONS

- QKD and quantum communication
- Quantum optics and computing
- Single-photon source characterisation
- Fluorescence lifetime imaging
- Failure analysis of integrated circuits
- VIS, NIR and MIR spectroscopy

## ID Qube-NIR-*XX*-*YY*-*ULN*

- ***XX*** : **GAT** *(Gated model)* or **FR** *(Free running model)*
- ***YY*** : **FS** *(Freespace model)* or **MMF** *(Fibre coupled model, compatible with SMF and MMF FC/PC couplers)*

# SPECIFICATIONS

| ID Qube NIR ULN | | | | |
|---|---|---|---|---|
| **Wavelength range** | 900 nm to 1700 nm | | | |
| **Deadtime range** | 100 ns to 80 µs, in 100 ns steps | | | |
| **Output pulse format** | LVTTL or NIM | | | |
| **Output pulse width** | 10 ns | | | |
| **Optical coupling** | Optical fibre (MMF62.5) | | | |
| **Efficiency range [1] calibrated at λ = 1550 nm** | 10%, 15%, 20%, 25% | | | |
| **Extended efficiency range [2]** | 30%, 35% | | | |
| **Timing jitter @ 25% efficiency level** | Maximum 200 ps (150 ps typical) | | | |
| **Noise performance @ efficiency level [3]** | 10% | 15% | 20% | 25% |
| **ULN model (Max. dark count rate)** | < 200 Hz | < 500 Hz | < 800 Hz | < 1'200 Hz |
| **Gate-in max frequency** | 100 MHz (Gated model) / 1 MHz (Free-running model) | | | |
| **Gate-in min pulse duration** | 3 ns (Gated model) / 500 ns (Free-running model) | | | |
| **Gate-in voltage range** | -2 V to 3 V | | | |
| **Gate-in coupling** | 50 Ω DC | | | |
| **Gate-in threshold voltage range** | -2 V to 2 V, in 1 mV steps | | | |
| **Output connector** | SMA | | | |
| **Operating temperature** | +10°C to +35°C, max. 60% humidity | | | |
| **Dimensions (W x H x L)** | 133 mm x 95 mm x 95 mm | | | |
| **Weight** | 1 kg | | | |
| **Cooling time @ power-on** | < 5 minutes | | | |
| **Power supply** | 100-240 VAC ; 1.4 A ; 50-60 Hz | | | |
| **Storage temperature** | +5°C to +50°C, max. 60% humidity | | | |

Supplied Accessories:

- +12V, 60 W, AC/DC power adapter, with AC power cord
- Region adapted power cord
- 1.8 m USB cable
- Optical fibre cleaner
- Optical table mechanical adapter (M4 taps)
- 4 x Adhesive rubber feet

Notes:

(1) Additional efficiency levels can be calibrated on demand.

(2) The extended detection range is provided without guarantees of the device's noise performance. Above 25% efficiency, ID Qube devices start exhibiting non negligible afterpulsing, and detector dark counts can rise significantly. However, detector timing jitter has also been observed to improve with increasing detection efficiency.

(3) Dark count rate measured in free running mode with a 80 µs deadtime.

Photonic Solutions Ltd
Edinburgh
EH14 4AP
+44 131 664 8122
www.photonicsolutions.co.uk