BROADCOM®

Data Sheet

Qneo AFBR-S20N1N256

Neat NIR spectrometer designed for industrial integration.

Overview

Start your optical analysis right away with the Qneo. Equipped with an uncooled InGaAs sensor array, the Qneo enables professional measurement between 950 nm and 1700 nm.

On a footprint smaller than a credit card, the Qneo features a rugged setup that combines high resistance in industrial environments and high optical performance.

Part Number	Product Configuration	Wavelength Range	Spectral Resolution typ. (FWHM)
AFBR-S20N1N256	Qneo with 256-pixel sensor	950 nm to 1700 nm	8 nm

Key Features

- High sensitivity
- Low temperature dependency
- Stable long-term performance
- Ultra-compact design
- Powerful onboard electronics

Applications

- Agricultural analysis
- Food safety
- Chemical analysis
- Quality control
- Petro-chemical analysis
- Environmental analysis
- Biomedical applications
- Pharmaceutical analysis
- Process control and monitoring

Specifications	
Focal length	40 mm
Entrance slit	30 µm: 256-pixel sensor version
Dynamic range[1]	12000:1
SNR[2]	Max. > 10,000
Numerical aperture	0.18
Stray light[3]	<0.1 %
Integration time	4 µs to 5 minutes
Detector	Uncooled 256-pixel InGaAs sensor
A/D converter	16-bit
Calibration	Wavelength, sensitivity, nonlinearity, and multiple dark spectra stored in device
Transfer speed to PC	USB 2.0 high-speed
Optical interface	SMA connector
Digital interfaces	USB 2.0 with Type-C connector, SPI, UART
Dimensions (without SMA connector)	60.0 mm × 50.0 mm × 19.0 mm
Weight	70g
Power consumption	5V DC, 30 mA
PC operating system	Windows 7 and above

All values in the table are typical values if not marked with “min., max., <, >”.
Test conditions: Vcc = 5.0V, ambient temperature = 25°C.

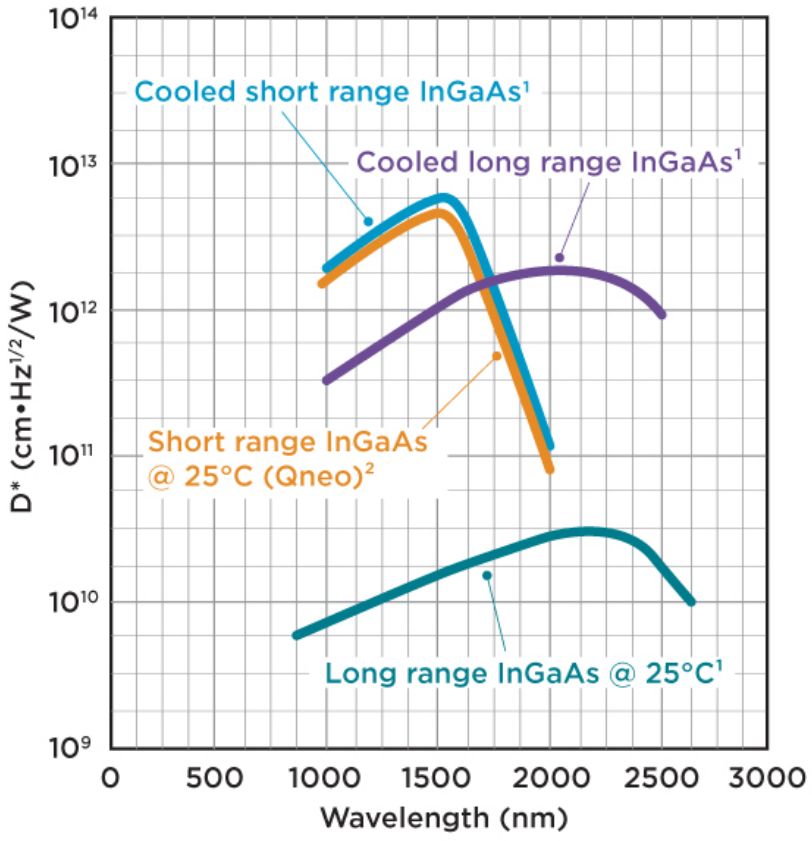
[1] Dynamic range: Dynamic range is calculated as (average sensor saturation value) / (average read out noise at smallest exposure time), only the offset is adjusted for the used spectra.
[2] SNR: measured with a tungsten light source and a selected exposure time to achieve a max signal of 90% to 100% of the sensor saturation value. Max. SNR = max([average value / standard deviation[per pixel). The spectra are averaged over 100 single spectra and only offset is adjusted.
[3] Stray light: Measured with a tungsten light source and a long pass filter of 1400 nm; the spectrum is averaged over 500 single spectra and only offset is adjusted.

Absolute Maximum Ratings					
Parameter	Symbol	Min.	Typ.	Max.	Units
Storage Temperature (non-condensing)	T_S	–25	—	+70	°C
Supply Voltage	V_{CC}	–0.5	—	5.5	V
Data Input Voltage (trigger IO 0–3)	V_I	0.0	—	V_{CC}	V
Data Input Voltage (all other pins)	$V_{O/}$	0.0	—	3.6	V
Data Output Voltage	V_O	0.0	—	3.3	V

The device might get damaged if the maximum ratings are exceeded.

Recommended Operating Conditions					
Parameter	Symbol	Min.	Typ.	Max.	Units
Ambient Operating Temperature	T_C	–15	—	+55	°C
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Trigger IO Input Voltage	V_{IO}	0.0	—	3.3	V
Data Input Voltage	$V_{O/}$	0.0	—	3.3	V

Figure 1. Typical Sensitivity Curve of IR Sensor Arrays (Source: www.hamamatsu.com)



Notes:
1. Reference data from Hamamatsu
2. Data from Broadcom measurement

Application Software

Every Qneo spectrometer includes Waves user software developed for general-purpose spectroscopy applications. Waves includes sophisticated algorithms for data acquisition and evaluation.

Various spectrum evaluation options are available with only a few mouse clicks.

- Take and display series of spectra
- Automatic exposure control with dark spectrum interpolation
- Import most ASCII-based file formats
- Export as ASCII table to almost any numerical analysis software
- Comprehensive tools for displaying and analyzing spectra
- Strip charts for comparing characteristic values between multiple spectra including peak follower in real time
- Graph printing and export to PDF
- Dynamic peak finder (no need to set a threshold level)
- Dark spectrum interpolation
- Transmission, absorption, and reflection measurements

Figure 2. Included User Software

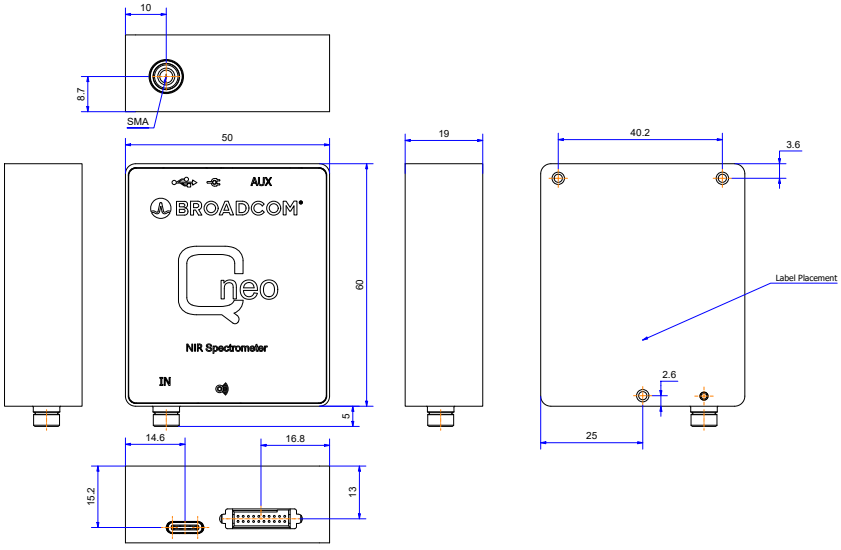
Software Library

A complementary software development kit (SDK) is also included to control the spectrometer and take spectra from your own software. It consists of a Windows DLL library for the .NET framework, documentation, and sample code. The SDK supports various programming languages that can use .NET DLLs, including C#, Visual Basic .NET, C++, Delphi, LabVIEW, Matlab, and Mathematica.

Communication Protocol

The spectrometer can be directly controlled from an embedded microcontroller or other operating systems using the device communication protocol. Just like our application software, the protocol is designed to be both powerful and easy to use.

Figure 3. Qneo Package Outline Drawing



I/O Port

The Qneo includes an auxiliary connector for analog and digital I/O, communication interfaces, and power supply (if USB is not used). The four digital channels can be configured as trigger input, shutter or flash lamp control, process control, or general-purpose I/O pins.

The Qneo supports three trigger modes: software trigger, interval trigger, and external trigger.

Figure 4. Qneo Package Drawing – Back

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For more product information: broadcom.com

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