

Preliminary Product Brief

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

Qred AFBR-S20R22-1725

Extended NIR Spectrometer Designed for Process Analytics

Overview

Start your optical analysis right away with the Qred. This sophisticated NIR spectrometer is equipped with a cooled InGaAs sensor array with 256 pixels. The Qred enables professional measurement in an extended range from 1700 nm to 2500 nm.

With a compact footprint, the Qred 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-S20R22-1725 ¹	256-pixel sensor	1700 nm to 2500 nm	8 nm

¹ Other configurations are available upon request.

Preliminary Specifications	
Focal Length	50 mm
Entrance Slit	50 μ m
Dynamic Range ²	Min. 5,400:1 Typ. 10,000:1
Numerical Aperture	0.14
Integration Time	6 μ s to 5 minutes
Detector	Cooled 256-pixel InGaAs sensor
A/D Converter	16-bit
Calibration	Wavelength, sensitivity, and multiple dark spectra stored in the device
Optical Interface	SMA connector
Digital Interfaces	USB 2.0 high speed, UART, SPI
Dimensions (without SMA connector)	71.0 mm x 67.0 mm x 27.0 mm
Weight	Typ. 230g
Power Consumption ³	Typ. 0.6A
PC Operating System	Windows 7 and above

² Dynamic range is calculated as (average sensor saturation value) / (average readout noise at the smallest exposure time). Only the offset is adjusted for the used spectra.

³ Test conditions: V_{CC} = 12.0V, ambient temperature = 30°C, sensor temperature = -20°C.

All values in the table are typical if not marked with Min., Max., <, or >.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature (non-condensing)	T_s	-25	—	+70	°C
Supply Voltage	V_{CC}	-0.5	—	13.0	V
Data Input Voltage (trigger I/O 0-3)	V_{Itrig}	0.0	—	5.5	V
Data Input Voltage (all other pins)	V_I	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.	Unit
Ambient Operating Temperature ¹	T_A	-15	—	+30	°C
Supply Voltage ¹	V_{CC}	11.5	12.0	12.5	V
Trigger I/O Input Voltage	V_{Itrig}	0.0	—	3.3	V
Data Input Voltage	V_I	0.0	—	3.3	V

¹ Sensor temperature cooled to -20°C.

Application Software

All Broadcom Q-series spectrometers are supported by complimentary Waves software. Waves includes sophisticated algorithms for data acquisition and evaluation.

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.

I/O Port

The Qred includes an auxiliary connector for analog and digital I/O, communication interfaces, and a 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.