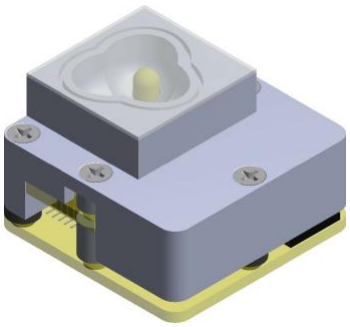
NeoSpectra Micro – SWS62231 Spectral Sensor

General Description

The NeoSpectra Micro is a chip-sized, Near InfraRed (NIR) spectral sensor that delivers the spectral response of the light absorbed by materials for quantification, qualification, and identification. It is designed to be used in different systems as an OEM module for applications that can be enabled by the spectral range 1,350 – 2,500 nm. NeoSpectra Micro's core technology is based on semiconductor Micro Electro Mechanical Systems (MEMS) microfabrication techniques promising unprecedented economies of scale.



The NeoSpectra Micro sensor determines the spectral content of the input light in NIR range between 1,350 – 2,500 nm[a]. With its unique features of size, cost, and scalability it can enable new usage models for different application areas.

Features

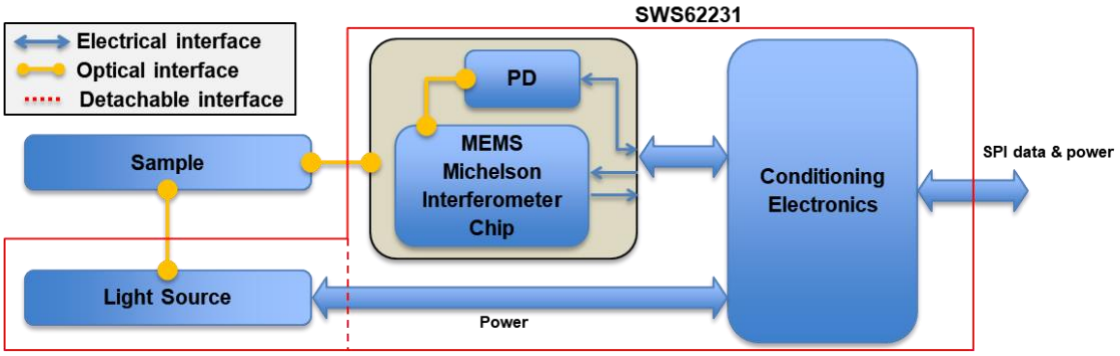
- Low cost embedded NIR spectral sensor solution
- Smallest FT-IR solution with a single photodetector
- Wide spectral ranges at the higher wavelengths end of NIR (λ: 1,350 – 2,500 nm)
- Designed for high volume production with economies of scale
- Fast, on-chip, data processing
- Alignment free optics
- Low power consumption

Applications

NeoSpectra Micro's unique features enable the creation of new usage models ranging from of IoT sensors, to deployment in handheld devices in various application areas, including:

- Food analysis
- Agriculture
- Pharmaceutical
- Oil and gas
- Polymers
- Healthcare
- Industrial
- Chemicals

Block Diagram



[a] Other spectral ranges can be considered upon request.

Interfaces

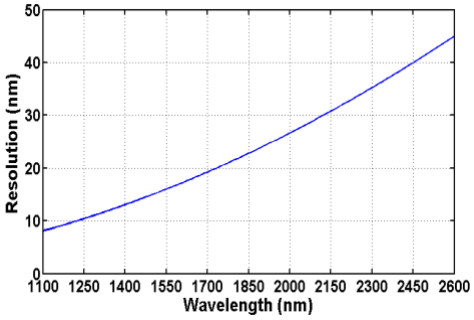
Optical interface	Detachable optical head for diffuse reflectance measurements[b]
Electrical interface	SPI

Specifications

Parameter	Conditions	Value	Units
Wavelength Range	PSD[c]> max PSD/10	1,350 - 2,500	nm
Resolution	At λ=1,550 nm, FWHM criterion	16	nm
		66.6	cm^{-1}
Typical SNR (rms)	2 s Scan time, default optical head, @λ = 2,350 nm	> 2,000:1	-
Temperature	Operation	-5: 40	°C
Wavelength Accuracy	@λ = 1,400 nm; temperature < 40°C	± 1.5	nm
Wavelength Repeatability	@λ = 1,400 nm; absorbance level = 0.5 A.U., Resolution: 16 nm	± 0.15	nm
Dimensions	With default optical head	30 x 30 x 20	mm^3
Voltage	Power supply	3.3	V
	Communication pins	3.3	V
Number of bulbs	Default optical head	Configurable 3 lamps	-
Bulb lifetime	Default optical head	> 10,000 (continuous operation)	hrs
Diameter of collected light beam	Default optical head	2.5	mm

[b] See specification in the table. Other specifications can be considered upon request.
[c] PSD: Power Spectral Density – Single beam spectrum

Specifications and parameters definitions

Parameter	Definition
Wavelength range	The wavelength range is defined as the range where the spectral data is useful. The upper and lower wavelength limits are determined by the wavelength points where the power spectral density reaches one tenth of maximum power spectral density over the range.
Typical SNR	SNR is calculated from the root mean square noise (N_{rms}) , which is the standard deviation of 100 consecutive 100% lines at each wavelength. $SNR = 1/N_{rms}$
Resolution	Resolution is defined as the minimum spacing between two consecutive wavelength (Δλ) / wavenumber (Δν) points that can be fully resolved by the module. Two consecutive lines are fully resolved if separation > Full Width Half Maximum (FWHM) power density of either line. The resolution in wavenumber is constant across the spectral range. The relationship between the resolution in wavelength Δλ, and the resolution in wavenumber Δν is governed by $\Delta\lambda = \Delta\nu\,\lambda^2$. 
Wavelength accuracy	Wavelength accuracy is the difference between the measured wavelength of a wavelength standard (e.g. liquid methylene chloride), and the nominal wavelength reported for that wavelength standard.

Revision History

Revision	Date	Description
1.0	11/12/2017	Initial version

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