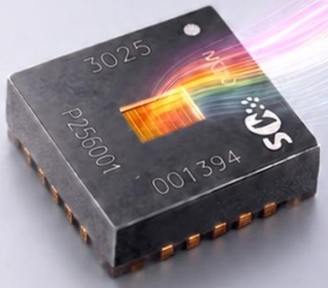
MantiSpectra

MINIATURIZED HYPERSPECTRAL SENSING

Accurate Material Insights. Anywhere.

ChipSense™ is a general-purpose, compact spectral sensor natively designed to uniquely combine key distinctive features to deliver accurate, real-time, non-destructive material analysis across a broad range of products and applications.



ChipSense™ 2.1-16
500–1700 nm · 64 bands
16 channels · 4×4 mm package

Key Features

Rich spectral fingerprint

- InGaAs active layer delivering high photosensitivity across the 500–1700 nm spectral range
- Outperforms silicon and alternative NIR/SWIR solutions limited to narrower wavelength ranges.

Accurate and fast

- Computational Spectroscopy architecture with 64 broad overlapping bands capturing spectrum in a single shot with 16 multi-band photodetectors
- Feature-rich datasets enabling (AI/ML-based) prediction accuracies comparable, for broad features, to high resolution lab-based spectrometers

Reliable and repeatable

- Monolithic integration of photodetectors and filters delivering exceptional sensor uniformity.
- No per-device calibration while ensuring consistent, repeatable measurements.

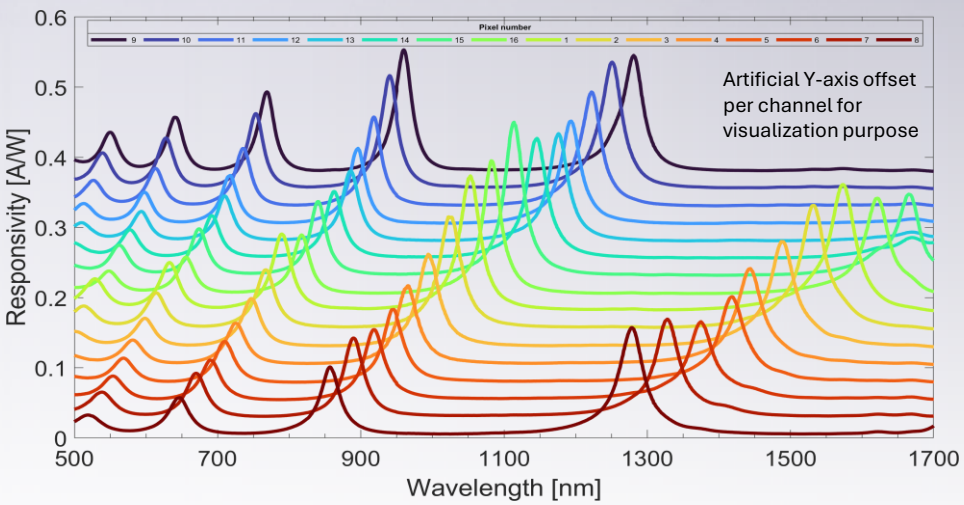
Compact and Scalable

- Small footprint (4x4 mm package, 1.55x1.55 mm die)
- Standard (III-V) solid-state processes
- Externalized supply chain

Versatile and Reusable

- Broad spectral response enabling system-level customization via optical front-end design and signal acquisition modes
- Algorithms and data interpretation fully implemented in software enable sensor reuse across different applications.

Photodetectors Responsivity



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Industrial Quality and Processes Control

Smarter industrial processes through real-time material intelligence, enabling higher quality, improved efficiency, and reduced costs while preventing contamination and adulteration.

- Consistent product quality
- Closed-loop process optimization
- Early identification of contamination and adulteration







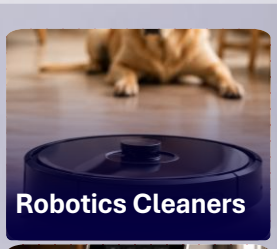


Domestic and Kitchen Appliances

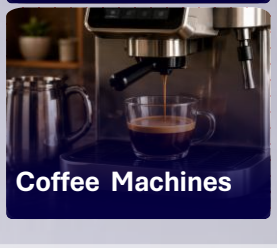
Intelligent appliance experiences through real-time material insights that optimize performance, efficiency, and sustainability.

- Appliance adaptation
- Improved energy efficiency
- Premium User Experience







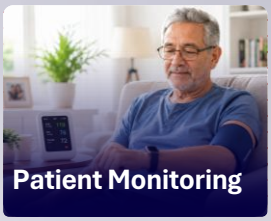


Clinical Diagnostic and Monitoring

Actionable clinical insights through real-time, non-invasive measurement at the Point-of-Care.

- Reduced healthcare cost & time
- Rapid point-of-care diagnostics via tissue and skin analysis
- Remote patient monitoring via accurate biomarkers and vital signs monitoring









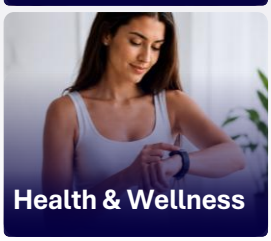
Personal Health And Care

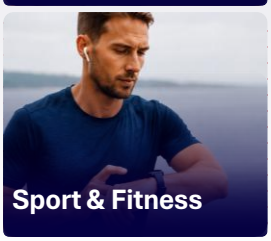
Access rich spectral information of blood and tissue to enable the next generation of wearable and portable health monitoring.

- Skin care analysis
- Effective preventive health and wellness via accurate biomarkers and vital signs monitoring
- Insights on food intake nutrients and quality



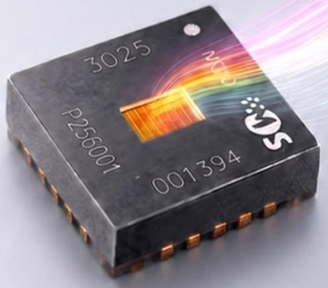






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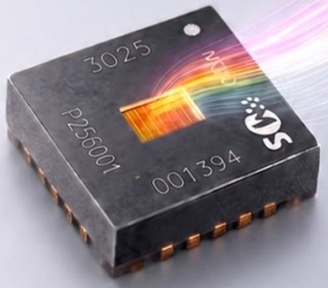


	Parameter	Unit	Specifications	Tolerance
	Wavelength Range	nm	500-1700	
	# Distinct Channels	#	16	
	# Bands per Channel	#	4	± 1
	Tolerance peaks position shift from Nominal Reference per each channel	nm	± 15	
	Highest Peak Responsivity	A/W	0.1	
	Tolerance peaks responsivity wrt Nominal Reference per channel	A/W	± 0.05	
	Minimum distance channel peak from adjacent channel peaks (per each channel)	nm	10	
	FWHM (Full Widht Half Maximum) per peak per channel	nm	60	± 10
	Responsivity Offset (= Ratio minimum responsivity/highest peak) per channel	%	0-13	
	Operating Temperature	°C	5 to 75	
	Thermal tuning	nm/°C	0.16	± 0.05
	Channel physical dimensions	µm	130 x 605	± 5
	Channel Active Area Physical Dimension	µm	120 x 390	± 10
	Chip Carrier		QFN	
*	Chip Carrier dimensions	mm	4.0 x 4.0 x 1.1	± 0.1
	Chip Pins Number	#	20	
	Packaged Chip Exposed Area	mm	1.3 x 0.8	± 0.1
	Weight	g	0.5	± 0.01
	Moisture sensitivity level (MSL)	#	3	
	*Final version 2612 4.0 x 4.0 x 0.9			

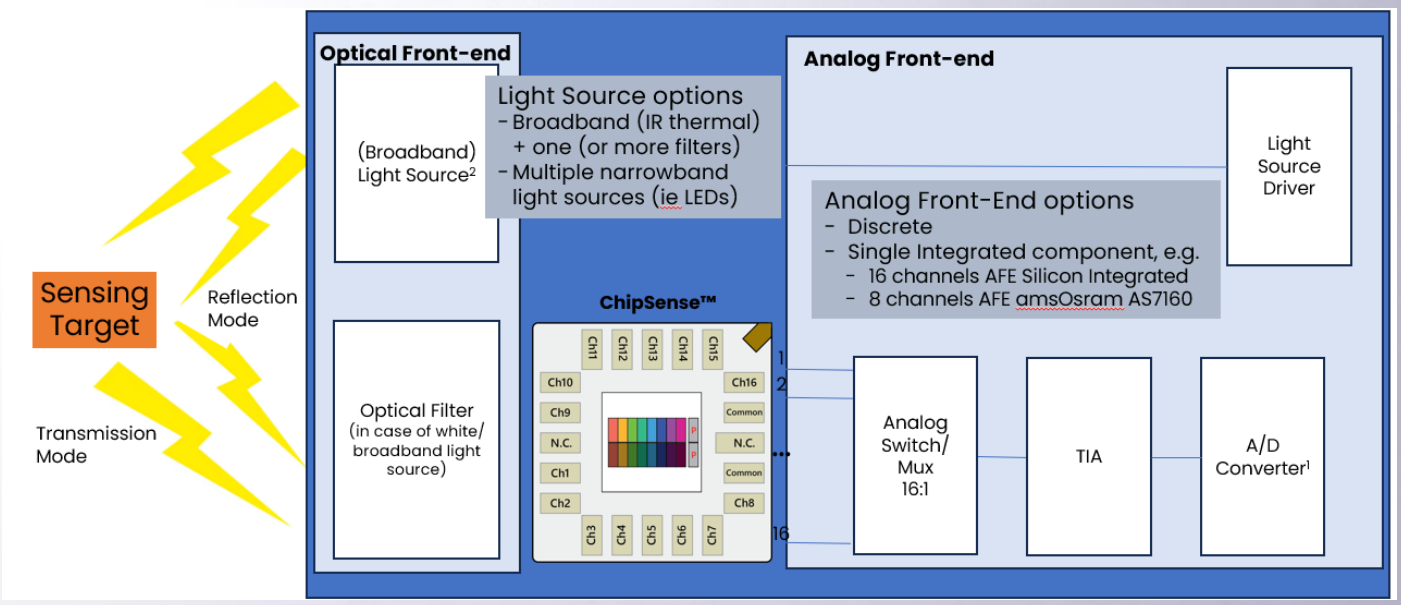
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Sensing Unit Block Diagram Reference Design



Sensing Unit Block Diagram Reference Design options overview

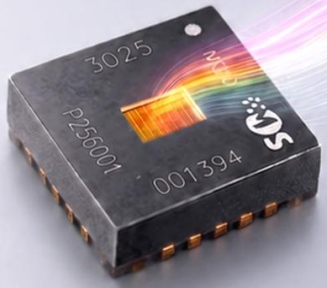
	Component Function/Type	Type	Manufacturer Part Number	Manufacturer
Optical Front-End	Light Source	Mini-halogen lamp	PN 41150-100-1 (= 1150-00 with additional 2 hours pre-bake conditioning)	MGG lamps
	High-pass Optical Filter	850-1700+ nm	30050555 (5mmx7mmx0.5mm)	Hitronics
	Low-Pass Optical Filter	500-950nm	30050584 (5mmx7mmx0.5mm)	Hitronics
Discrete Analog Front-End	ADC	Sigma-Delta 22 bits	MCP3551-E/SN	Microchip
	TIA	Low Noise / 5MΩ Gain	OPA325	Texas Instruments
	Multiplexer	Analog switch	ADG706BRUZ	Analog Devices
Integrated Analog Front-End	Mux + TIA + ADC	8:1 Mux + TIA + ADC	Short-list options under evaluation	

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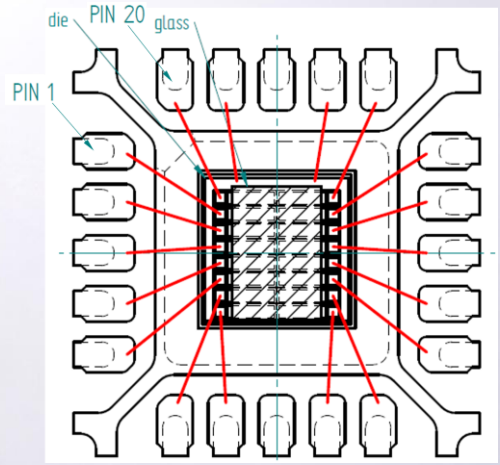
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Pin Diagram

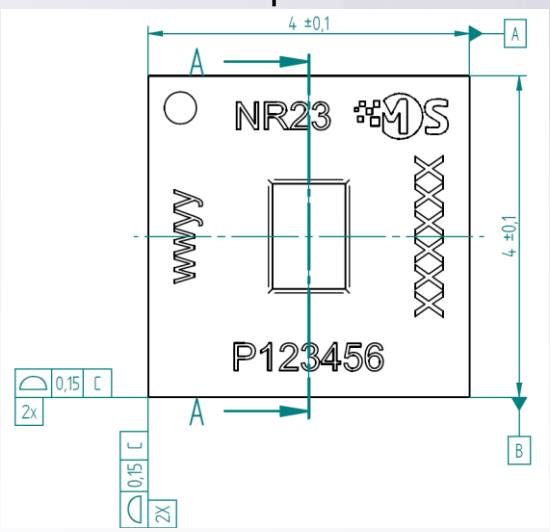


Pin #	Signal
1	PD 10
2	PD 11
3	PD 12
4	PD 13
5	PD 14
6	PD 15
7	PD 16
8	Not used
9	PD 8
10	PD 7
11	PD 6
12	PD 5
13	PD 4
14	PD 3
15	PD 2
16	PD 1
17	GND
18	Not used
19	GND
20	PD 9

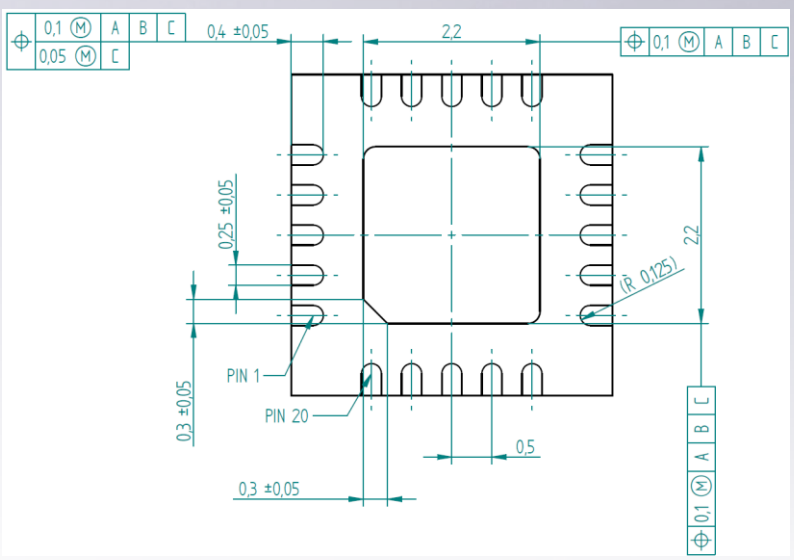
Dimensional Drawing

Dimension	Value [mm]	Tolerance [mm]
Chip width	4.0	± 0.1
Chip height	4.0	± 0.1
Chip thickness	1.1	± 0.1
SMD contact width	0.250	± 0.05
SMD contact pitch	0.500	N.A.
SMD contact length	0.400	± 0.05

Top View



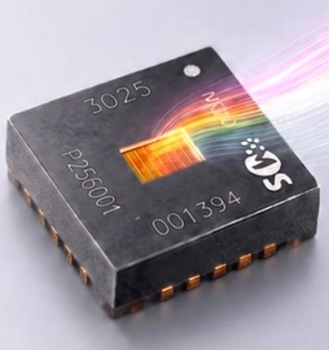
Bottom View



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