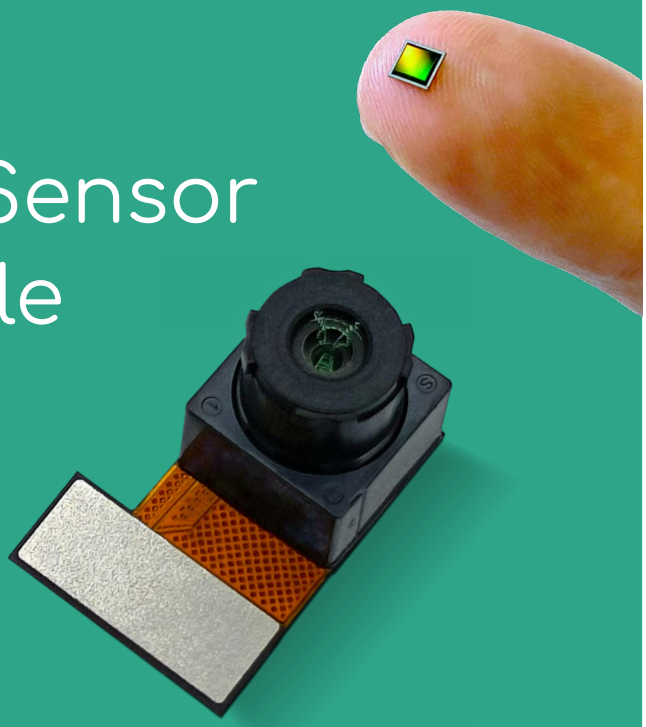
S1 & S1-M VIS Spectral Image Sensor & Camera Module



Spectricity's spectral image sensors embed the power of spectral imaging into the form factor of a standard image sensor, and brings laboratory spectroscopy to consumer spaces.

Description

The S1 VIS is a miniaturised 15-channel multispectral image sensor. The sensor integrates Spectricity's patented FP Precision Filter technology in a mosaic pattern on a CMOS image sensor. The S1-M VIS embeds this in a compact camera module for easy integration.

The S1 VIS operates in the visible range with 15 independent color channels covering 400 nm to 700 nm, providing an SVGA (864 x 648 pixels) image format.

The S1-M VIS module integrates the sensor with special designed optics for maximum light performance and accurate band responses while providing easy data connection via a standard MIPI interface.

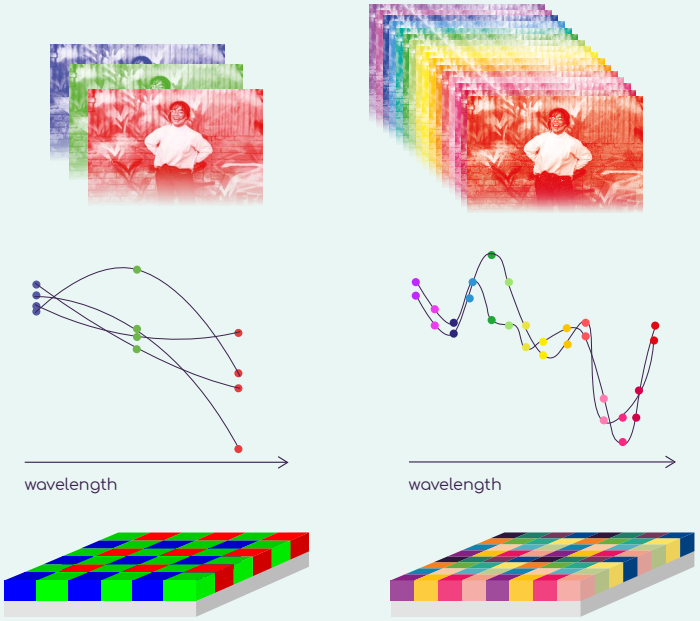
Key features

- **Thin package (7mm) and wide FOV (77°)**
- **Large visible spectral range**
- **High spectral resolution: 15 channels**
- **High frame rate: 30fps**
- **High stability due to full CMOS integration**

RGB v.s. MSI sensors

Standard RGB image sensor
3 color images

Spectricity multispectral image sensor
Many color images



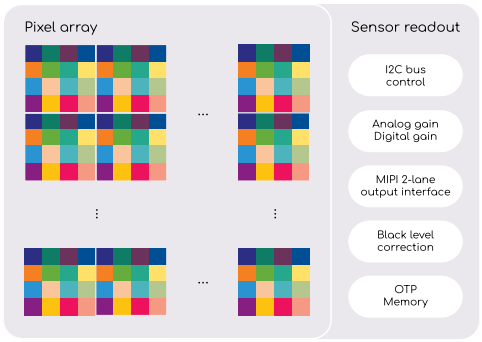
Markets & applications

The sensor can be used in a wide variety of fields such as smartphones, tablets, AR/VR glasses, IoT devices, security cameras and handheld devices.

Key applications are:
- Advanced auto white balancing (AWB)
- Accurate color imaging
- Cosmetics, skin tone, hair tone
- Skin care & skin health (sun damage, melanoma, inflammations, wound care, ...)
- Food and Agriculture
- Security and Surveillance
- Material identification and segmentation
- Face authentication

Product specification

Parameters		Specifications
Spectral range		400 - 700 nm
Number of spectral channels		15 visible
Spatial resolution		SVGA (864x648)
Frame rate		30fps
FoV	S1-M	77° (after correction)
F-number	S1-M	2
Dimensions	S1	1/5" optical format
	S1-M	7mm x 7mm x 7mm

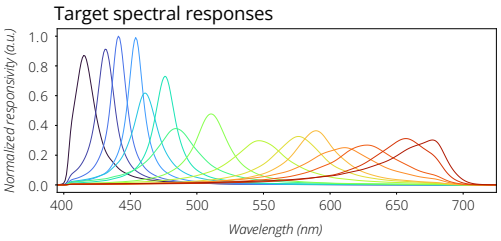


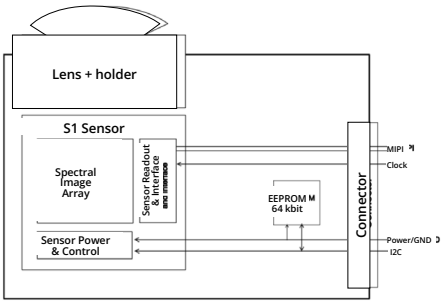
Sensor and readout

The S1 sensor image array consists of 864 x 648 pixels, in a 4x4 CFA pattern. It can be controlled by I2C bus and provides its image data over a 2 lane D-PHY.

Advanced spectral corrections and spectral demosaicing reference algorithms are available by Spectricity, to turn sensor output data into corrected, ground truth spectra. These can be used together with provided calibration data to achieve part-to-part repeatable data in a user's application.

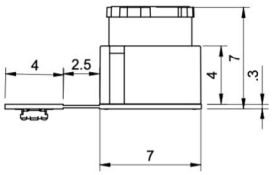
The S1 sensor has several operating modes, but nominally can run at 30 frames per seconds at the full resolution. Each S1-M module is spectrally calibrated at the factory with the calibration factors stored on the EEPROM of the module

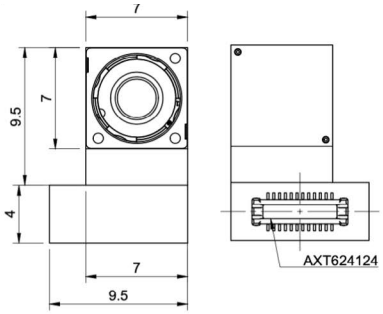


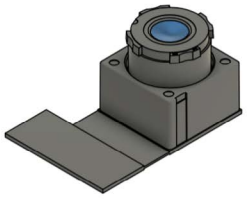


Module mechanical information

The S1-M module includes a specially designed lens that is optimized for accurate spectral responses of the S1 sensor while maintaining a broad FoV.
The lens housing is combined with a PCB and flex cable with a mounted a board to board connector for managing the MIPI data connection , I2C control signals, synchronization clock, DC power and ground connection.







S1-EVK2b

Spectricity provides an evaluation kit for **plug'n'play evaluation** and **application development**. A small camera module connects to a user's PC through an NVIDIA Jetson™ platform (provided with the evaluation kit). Simple GUI software enables sensor evaluation, collecting data, and simple training of the sensor.