

RAK1903 WisBlock Ambient Light Sensor Datasheet

Overview

Description

The RAK1903 WisBlock Sensor module, part of the RAK Wireless Wisblock series, is a single-chip ambient light sensor, measuring the intensity of light in the visible range. The precise spectral response and strong IR rejection of the device enables the RAK1903 module to accurately measure the intensity of light as seen by human eyes regardless of light sources. The strong IR rejection also aids in maintaining high accuracy when the industrial design requires to mount the sensor under dark glass due to aesthetics reasons. The RAK1903 module is designed for systems that create light-based experiences for humans. It's an ideal replacement for photodiodes, photoresistors, or other ambient light sensors with less visible range matching and IR rejection.

Features

- **Measurement range:** 0.01 to 83865 lux
- Optical filtering to match human eye
- **Typical power consumption:** 1.8 uA
- **Module size:** 0 x 10 mm

Specifications

Overview

Mounting

The RAK1903 module can be mounted on the slots: A, B, C, or D of the WisBase board. Figure 1 shows the mounting mechanism of the RAK1903 on a WisBase module, such as the RAK5005-O.

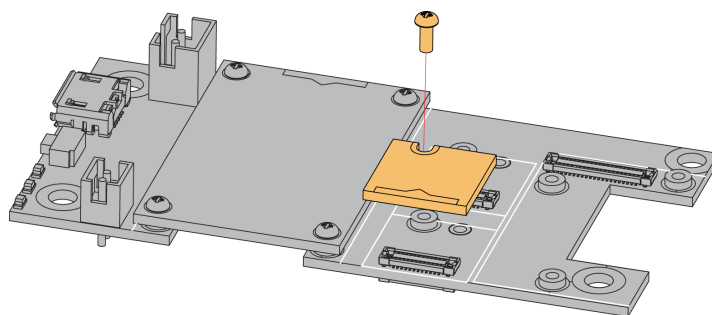


Figure 1: RAK1903 WisBlock Sensor Mounting

Hardware

Chipset

Vendor	Part number
TI	OPT3001DNPR

Pin Definition

The RAK1903 WisBlock Sensor module comprises a standard WisIO connector. The WisIO connector allows the RAK1903 module to be mounted on a WisBlock baseboard, such as RAK5005-O. The pin order of the connector the definition of the pinout are shown in Figure 2. Note, only the I2C related pins, interrupt pins, VDD and GND are connected to this module.

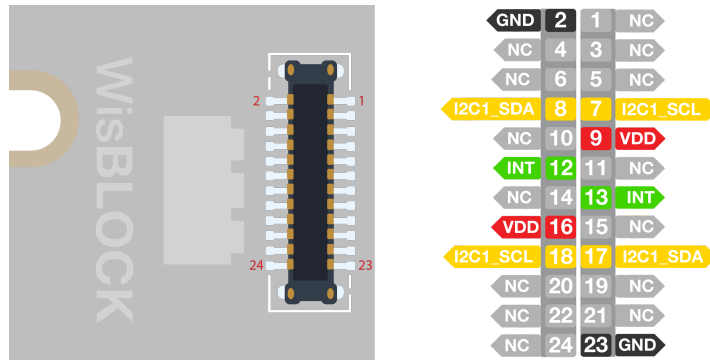


Figure 2: RAK1903 WisBlock Sensor connector pinout

The pin12 or pin13 are connected to the INT of OPT3001DNPR (See Figure 4). The device has an interrupt reporting system that allows the Controller connected to the I2C bus to go to sleep until a user-defined event occurs. Alternatively, this mechanism can also be used with any system that can take advantage of a single digital signal that indicates whether the light is above or below the levels of interest.

Sensors

Ambient Light Sensor

Parameter	Test Condition	Min.	Typ.	Max.	Unit
Peak irradiance spectral responsibility			550		nm
Resolution (LSB)	Lowest full-scale range, RN[3:0] = 0000b		0.01		lux
Full-scale illuminance			83865.6		lux
Measurement output result	0.64 lux per ADC code 2620.90 lux full-scale (RN[3:0] = 0110) 2000 lux input	2812	3125	3437	ADC codes
		1800	2000	2200	lux
Relative accuracy between gain ranges			0.2%		
Infrared response (850 nm)			0.2%		
Light source variation (incandescent, halogen, fluorescent)	Bare device no cover glass		4%		
Linearity	Input luminance > 40 lux Input luminance < 40 lux		2% 5%		
Measured drift across temperature	Input luminance = 2000 lux		0.01		%/°C
Dark condition, ADC output	0.01 lux per ADC code		0 0	3 0.03	ADC codes lux
Half-power angle	50% of full-power reading		47		degrees

Electrical Characteristics

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
V _{DD}	Power supply for the module	1.6		3.6	V
I _{shut}	Shutdown current	-	0.4	-	uA
I _{DD}	Active VDD=3.6V	-	3.7	-	uA

Mechanical Characteristics

Board Dimensions

Figure 3 shows the dimensions and the mechanic drawing of the RAK1903 module.

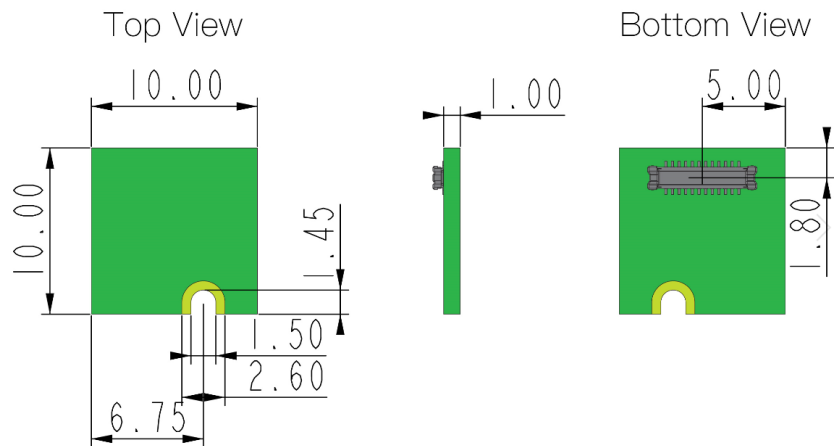


Figure 3: RAK1903 WisBlock Sensor Mechanic Drawing

WisConnector PCB Layout

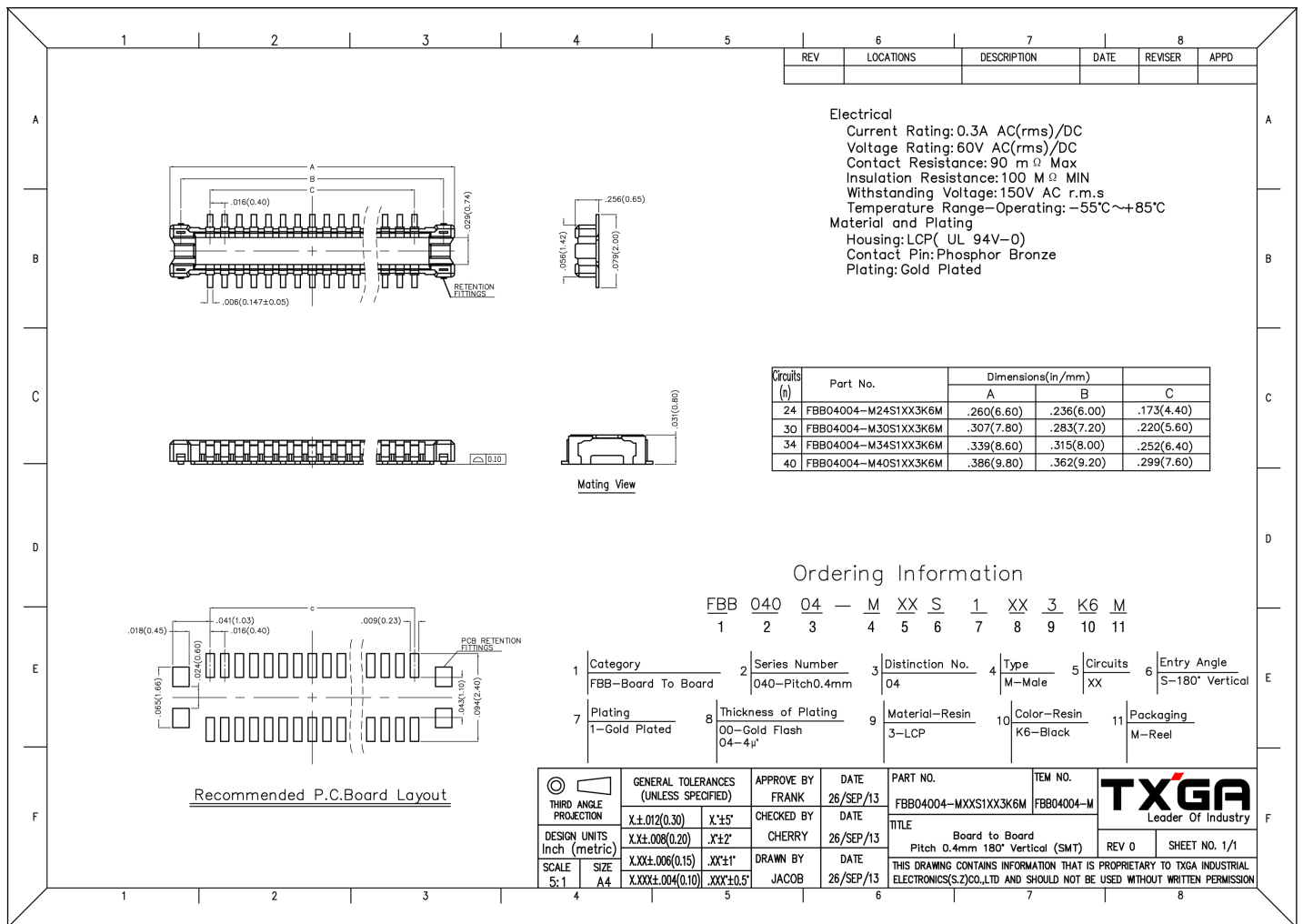
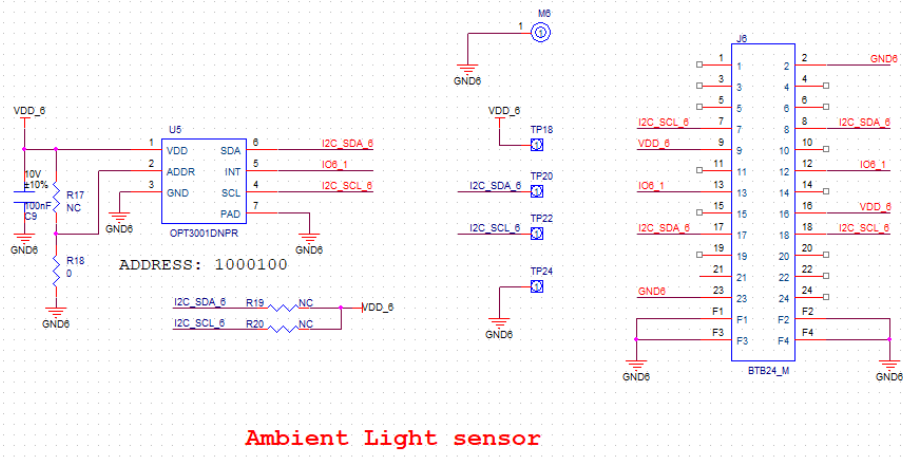


Figure 4: WisConnector PCB footprint and recommendations

Schematic Diagram

The Figure 5 shows the schematic of the RAK1903 module.



Ambient Light sensor

Figure 5: RAK1903 WisBlock Sensor schematics

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