



SOON ELECTRONIC CO., LTD.

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# SON1303

## Integrated Heart Rate Sensor

### Product Specification

VERSION 1.0

## Description

**SON1303** is the highly integrated pulse meter module using PPG reflective method to measure human heart beat. The module integrate the receiver and transmitter chip and with built-in the double green LED. The receiver parts built-in photo diode inside and low noise pre-amplifier With built-in optical filter It is used in smartphone, tablet PCs and wearable device.

## Features

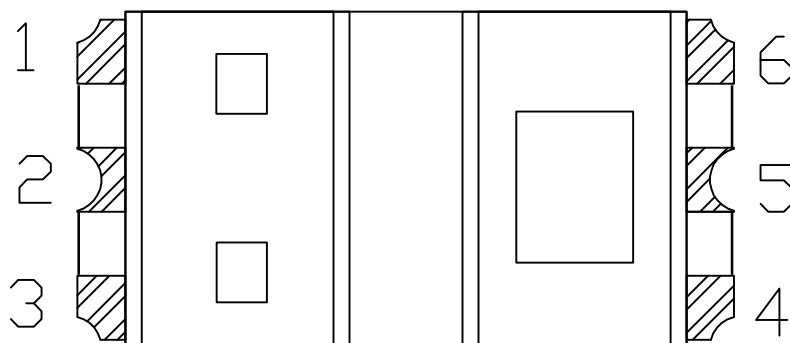
- Heart rate sensor with on chip Photo Detector and green LED in a single module
- Small form factor (4.1x2x1.05 mm)
- Single Power
- High sensitivity
- Double green LED Peak wavelength: 570nm
- Receiver parts Peak sensitivity wavelength : 570 nm
- Receiver parts With built-in optical filter
- Crystal-less
- Core  $V_{DD}$  : 2.3 to 6 V
- Average current at 3.0V, based on power-saving mode.

## Applications

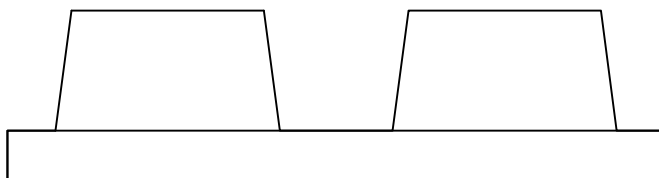
- Wearable device
- Smartphone
- Tablet PCs

## Physical Appearance

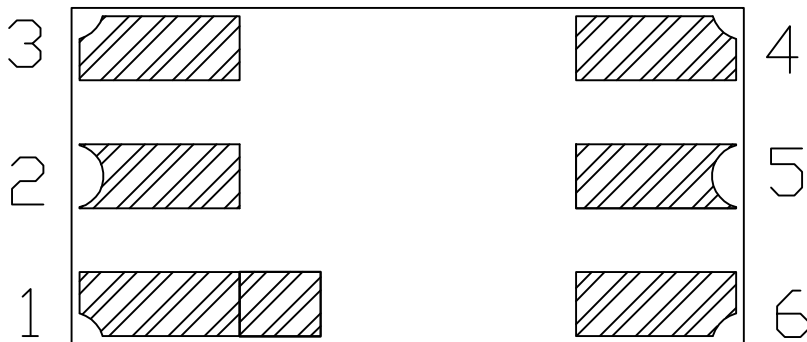
TOP VIEW



SIDE VIEW

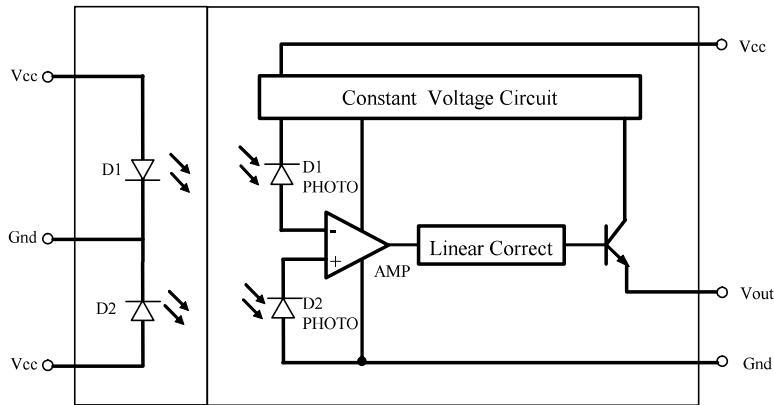


BOTTOM VIEW



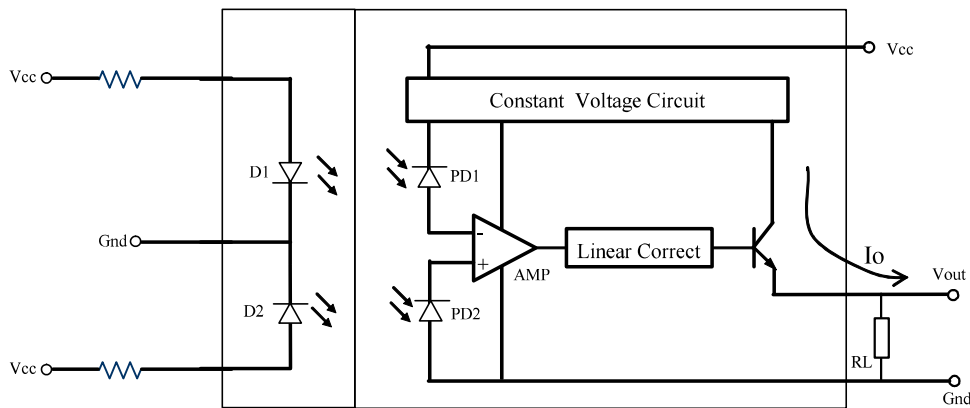
## Hardware Specifications

### Block Diagram



SON1303 Functional Block Diagram

### Converting Photocurrent to Voltage



- The output voltage ( $V_{OUT}$ ) is the product of photocurrent ( $I_O$ ) and loading resistor ( $R_L$ )
- The value of the loading resistor should be chosen properly to obtain the maximum output voltage under the maximum ambient light

$$V_{OUT(max)} = I_{O(max)} \times R_L < V_{J(sat)}$$

**SON1303 Pin Description**

Pin No.	Name
1	LED+
2	LED-
3	LED+
4	VCC+
5	GND
6	VOUT

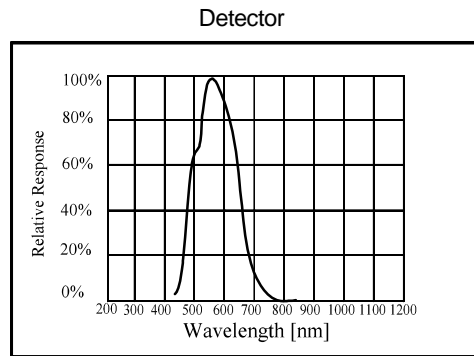
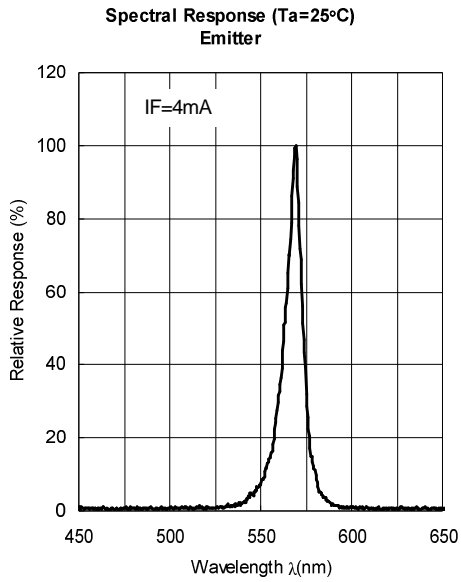
**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Rating	Unit
Emitter			
LED2 Forward Current (Continuous)	IF	20	mA
LED1 Forward Current (Continuous)	IF	20	mA
Reverse Voltage (Continuous)	VR	4	V
Detector			
Supply voltage	V <sub>CC</sub>	-0.7 to 7	V
Output voltage	V <sub>OUT</sub>	≤ V <sub>CC</sub>	V
Output current	I <sub>O</sub>	5	mA
Storage temperature	T <sub>S</sub>	-40 to +100	°C
Operating temperature	T <sub>A</sub>	-30 to +85	°C
Soldering temperature(10 s)	T <sub>sol</sub>	260	°C
Electrostatic discharge, HBM	ESD	>8	KV

**Electro-optical Characteristics**(V<sub>CC</sub>=3V, T<sub>A</sub>=25°C, unless otherwise specified.)

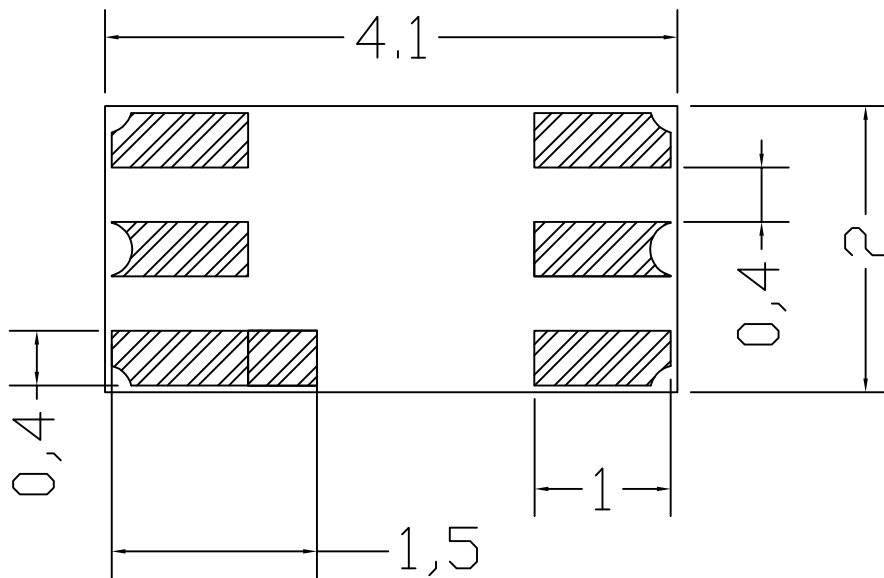
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Emitter						
Forward Voltage	V <sub>F</sub>	IF=4mA	—	—	2.3	V
Reverse Current	IR	VR=4V	—	—	100	μA
Peak Wavelength	λ <sub>P</sub>		—	570	—	nm
Detector						
Peak Spectral Response	λ <sub>PR</sub>		-	570	-	nm
Current Consumption	I <sub>CC</sub>			I <sub>O</sub> × 1.02		
Photocurrent(1)	I <sub>O1</sub>	Ev=10Lux	3.5	5	6.5	uA
Photocurrent(2)	I <sub>O2</sub>	Ev=100Lux	35	50	65	uA
Dark current	I <sub>DARK</sub>	Ev=0 Lux	-	-	90	nA
Saturation Output Voltage	V <sub>O(sat)</sub>	Ev=100Lux, R <sub>LOAD</sub> =75KΩ	2.2	2.35	-	V
Temperature Coefficient	T <sub>C</sub>	T=20 °C~80 °C, Ev=100Lux	-	0.2	-	%/°C
Power Supply Rejection Ratio	$\frac{\Delta I_O}{\Delta V_{CC} \times I_O}$	V <sub>CC</sub> =1.8~6.5V, Ev=100Lux	-	8	-	%/V

## Electrical and optical characteristic curves



Spectral Response with IR-filter Coating

## Package Outline



Package of Dimension (Unit: mm)