Proximity Sensing Module

BMS31M001
User Guide

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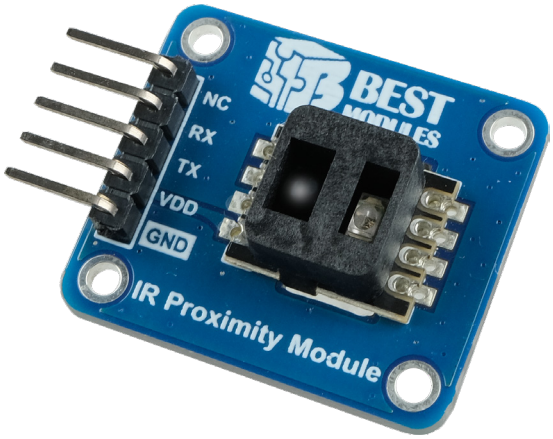
Contents

Introduction

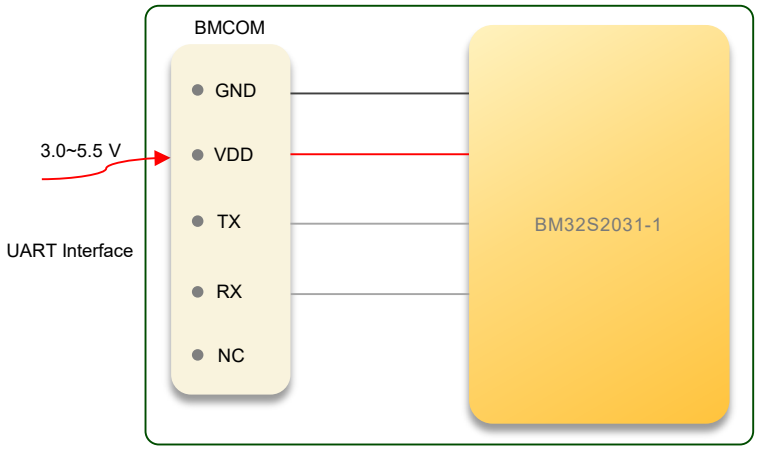
The BMS31M001 is a proximity sensing module from Best Modules. It includes an integrated second-generation proximity sensing module, the BM32S2031-1, which is also from Best Modules. The detection principle of the module is implemented by infrared detection. The module has a detection distance of up to 100cm. The detection distance can be adjusted by triggered threshold for proximity sensing and transmitted current for IR emission diode. In addition, the module has a distance learning function. The module also provides two user selectable output modes, namely I/O and UART types. The module uses the BMCOM interface and UART communication method to achieve functions such as distance learning and obtain IR sensing status. The module is suitable for use in foam machine, automatic faucet and other products.



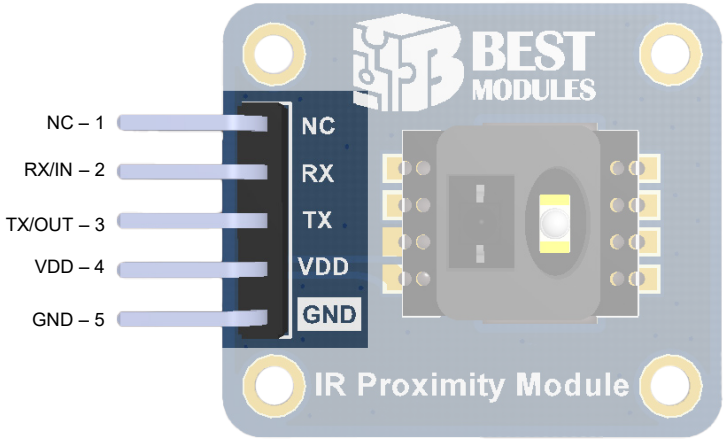
Features

- Operating voltage: 3.0V~5.5V
- Operating current: 2.7mA @ 5V
- Standby current: 25μA @ 5V (I/O type, detection cycle time of 0.5s)
- Integrated second-generation proximity sensing module: BM32S2031-1
- Operating mode: UART mode or I/O mode
- Detection distance: 1~100cm
- Detection distance adjustment methods:
  - 164-step adjustable trigger threshold for proximity sensing
  - 64-step adjustable current for IR emission diode driving
  - 1st-stage/2nd-stage adjustable gain for the internal OPA
- Distance learning function, which can be used to adjust the detection distance
- Communication interface:
  - BMCOM×1 (NC, RX, TX, VDD, GND)
  - Communication method: UART (baud rate: 9600bps)
- Provides Arduino Lib support
- Module size: 26.82mm×23.30mm×10.2mm

Block Diagram



Pin Description



BMCOM pins:

Pin	Function	Operating Mode	Description
1	NC	—	—
2	RX	UART	UART receiving data line
	IN	I/O	Distance learning key input
3	TX	UART	UART transmitting data line
	OUT	I/O	Level output
4	VDD	UART, I/O	Positive power supply
5	GND	UART, I/O	Negative power supply, ground

Technical Specifications

Recommended Operation Conditions

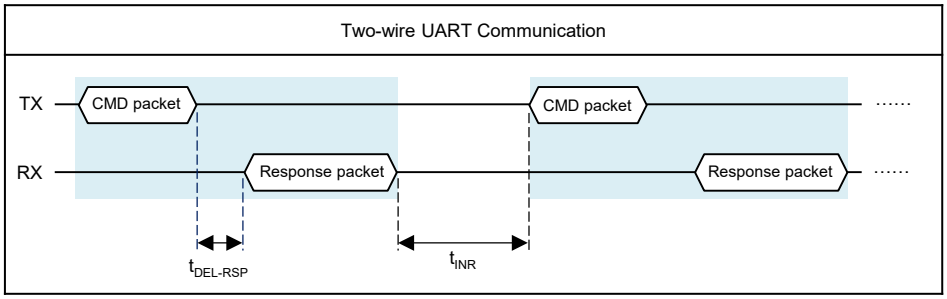
Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{DD}	Operating Voltage	—	3.0	—	5.5	V
I_{DD}	Operating Current	V_{DD}=5V	—	2.7	—	mA
I_{STB}	Standby Current	V_{DD}=5V, I/O mode, the detection cycle time is 0.5s	—	2.7	—	mA
	Detection Distance	V_{DD}=5V	1	—	100	cm

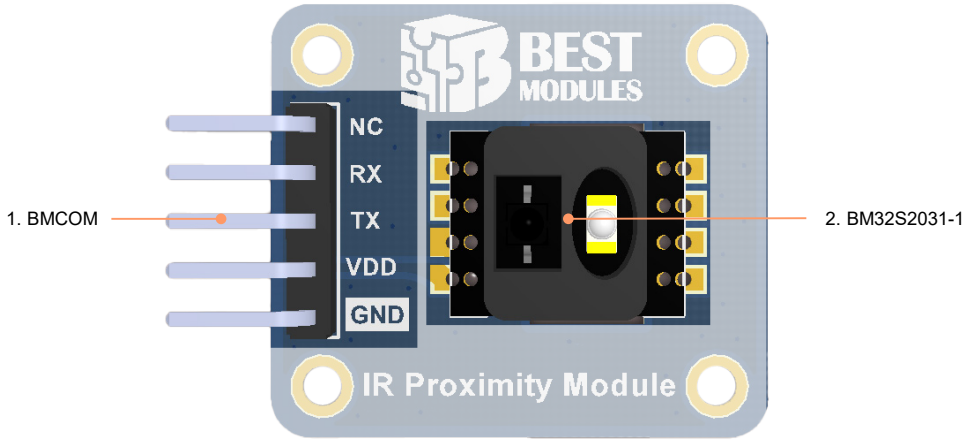
Timing Specifications

Ta=25°C

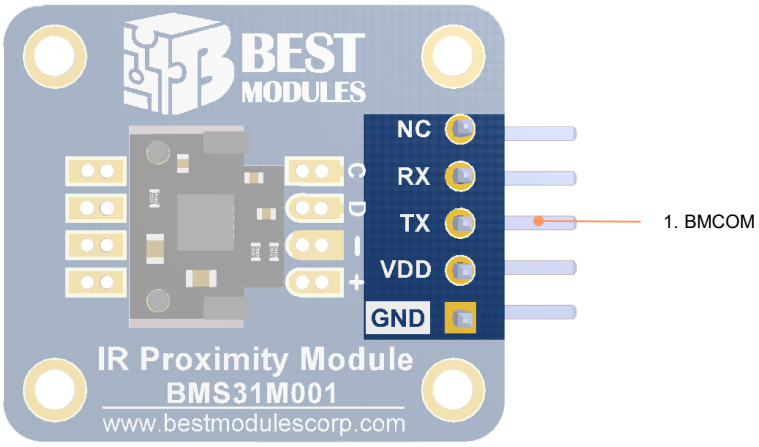
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{DEL-RSP}$	Response Delay Time	V_{DD}=5V	—	—	1	ms
t_{INR}	Interval Time	V_{DD}=5V	10	—	—	ms
	Response Delay Time of Setting Storage	V_{DD}=5V	—	—	40	ms
	Distance Learning Time	V_{DD}=5V	3000	—	—	ms
	Module Reset Time	V_{DD}=5V	70	—	—	ms



Hardware Overview

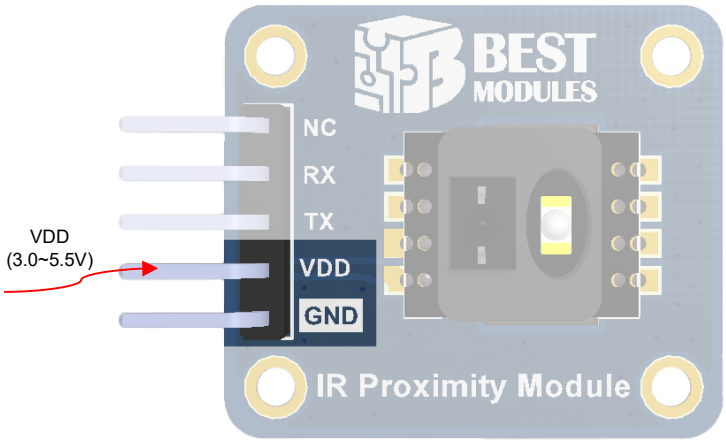


PCBA Front View



PCBA Back View

Power Supply



- BMCOM pin: provided by the VDD input, 3.0V~5.5V

Second-generation Proximity Sensing Module: BM32S2031-1

- The BM32S2031-1 is a second-generation IR proximity sensing module from Best Modules.
- When an object enters the detection range, the reflected energy of the infrared signal will change. Proximity is determined by detecting changes in reflection. The BM32S2031-1, which integrates active infrared emission, reception and optical mechanisms, is designed for object detection applications. It includes a long sensing distance (up to 100cm) and a distance learning function.

Communication Interface

- Communication method: UART
- UART baud rate: 9600bps
- Communication logic reference voltage: 3.0V~5.5V
- Communication protocol: Refer to the BM32S2031-1 Datasheet

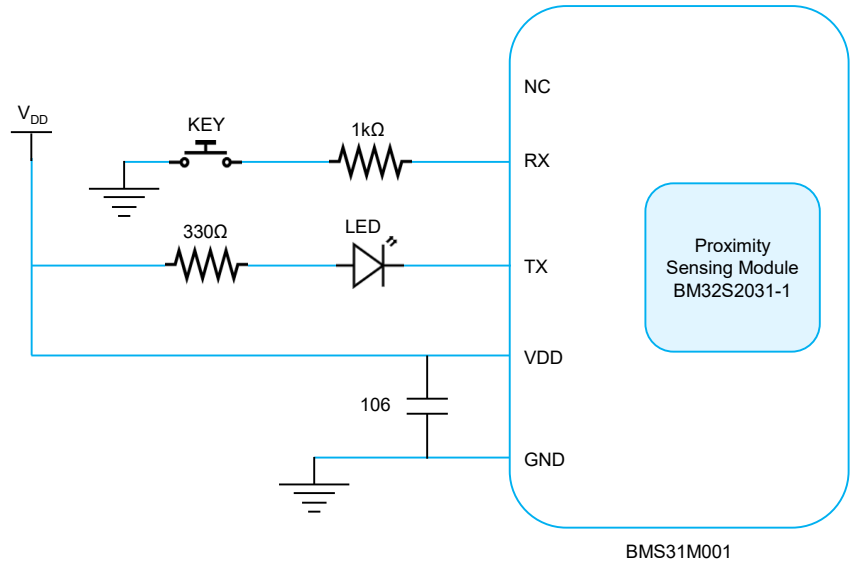
Operating Mode Switch

- I/O Mode: The module operates in the I/O mode by default after power-on. Switching from the UART mode to the I/O mode is implemented by sending a “Module Reset command” from the master.
- UART Mode: When the master has sent any command to the module after power-on, the module will enter the UART mode.

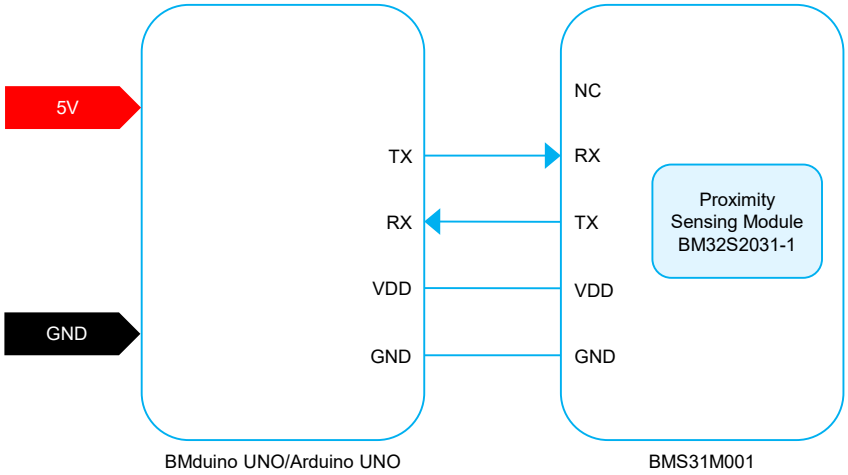
Distance Learning Function

- I/O Mode:
  - ♦ Environment setup: The circuit connection can be implemented according to the I/O mode application circuit. An obstacle is placed above and parallel to the IR transmit-receive module. The vertical distance between the obstacle and the IR transmit-receive module is the learning distance. Here the learning distance ranges from 1 to 100cm.
  - ♦ Operating process:
    - – Start distance learning: press KEY and release it after 0.5 seconds.
    - – Complete distance learning: When the LED indicator is on, this indicates that the distance learning procedure has completed.
- UART Mode:
  - ♦ Environment setup: The circuit connection can be implemented according to the UART mode application circuit. An obstacle is placed above and parallel to the IR transmit-receive module. The vertical distance between the obstacle and the IR transmit-receive module is the learning distance. Here the learning distance ranges from 1 to 100cm.
  - ♦ Operating process:
    - – Start distance learning: The master sends commands to the module to enter the distance learning mode.
    - – Complete distance learning: After the module distance learning has completed, it automatically responds to the master to inform it whether the distance learning was successful. Responding with a success frame indicates a successful distance learning. Responding with a failure frame indicates a failed distance learning.

Application Circuit

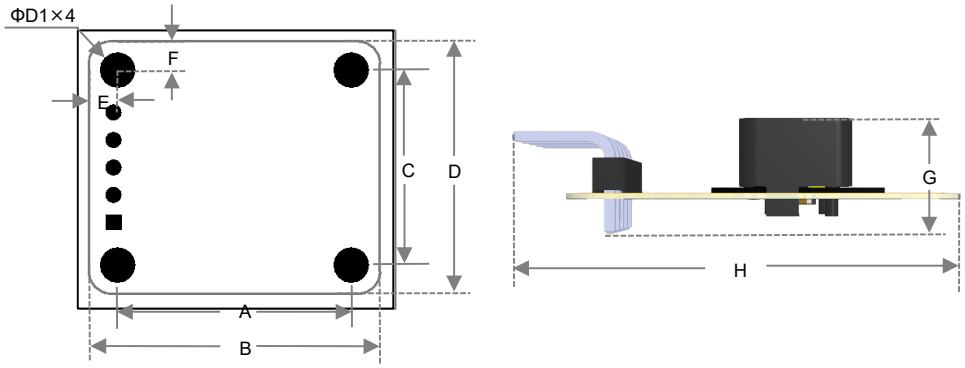


I/O Mode Connection Diagram



UART Mode Connection Diagram

Dimensions



Dimension Information

No. \ Unit	mm	inch
A	21.52	0.847
B	26.82	1.056
C	18.00	0.709
D	23.30	0.917
E	2.65	0.104
F	2.65	0.104
G	10.20	0.402
H	31.82	1.253
ΦD1	2.20	0.087

Dimension List