

# BS312



## BS312

PROD Model:BS412

Window Size:3\*4mm

Sensing Distance:12M(Lens SB-F-02) See lens selection for different distances

Sensing Angle:120° (horizontal direction)

Working Voltage: 2.2-3.7V

Static Power Consumption: <12uA

## Overview

It is a low power pyroelectric infrared sensor(PIR) for motion detection . Using the MCU for communication,when the RS412 performs continuous motion sensing,the MCU does not need to be activated, it only activates the external MCU when motion is detected. Motion detection results are sent out via the output interrupt signal.The algorithm for motion detection is programmable and can be changed by external MCU configuration, The PIR signal is converted into a 14-bit digital value on the chip, and then enters the motion algorithm detection unit. All signal processing is digital and supports motion detection result output and raw data output.

## Feature

- ★ Power supply voltage range 1.6V-5.5V
- ★ Programmable detection standard and working mode
- ★ Digital signal processing
- ★ Ultral low power consumption
- ★ Power supply voltage measurement
- ★ Temperature measurement
- ★ Fast and stable power-on

## Datasheet

### 1.Technical data

| Description             | Symbol          | Min  | Typical | Max                  | Unit | Remarks |
|-------------------------|-----------------|------|---------|----------------------|------|---------|
| V <sub>DD</sub> voltage | V <sub>DD</sub> | -0.3 |         | 5.5                  | V    | 25°C    |
| Analog pin voltage      |                 | -0.3 |         | V <sub>DD</sub> +0.3 | V    | 25°C    |
| Digital pin voltage     |                 | -0.3 |         | V <sub>DD</sub> +0.3 | V    | 25°C    |
| Storage temperature     |                 | -30  |         | 80                   | °C   |         |

## 2. Operating Conditions ( $T_{AMB} = +25^{\circ}\text{C}$ Typical $V_{DD}=3\text{V}$ )

| Description                                | Conditions                   | Symbol    | Min          | Typical | Max         | Unit               |
|--|------------------------------|-----------|--------------|---------|-------------|--------------------|
| <b>Operating temperature</b>               |                              |           |              |         |             |                    |
| Operating temperature range                |                              |           | -20          |         | +70         | $^{\circ}\text{C}$ |
| <b>Operating Voltage</b>                   |                              |           |              |         |             |                    |
| Supply voltage                             |                              | $V_{DD}$  | 1.6          |         | 5.5         | V                  |
| <b>Supply current</b>                      |                              |           |              |         |             |                    |
| Supply current, $V_{PIR}$ regulator on     | $V_{DD}=3\text{V}$ , no load | $I_{DD1}$ |              | 6       | 8           | $\mu\text{A}$      |
| Supply current, $V_{PIR}$ regulator off    | $V_{DD}=3\text{V}$ , no load | $I_{DD}$  |              | 3       | 5           | $\mu\text{A}$      |
| <b>Input parameter SERIN</b>               |                              |           |              |         |             |                    |
| Input low voltage                          |                              | $V_{IL}$  |              |         | 0.2         | $V_{DD}$           |
| Input high voltage                         |                              | $V_{IH}$  | 0.8          |         |             | $V_{DD}$           |
| Input Current                              | $V_{SS}<V_{IN}<V_{DD}$       | $I_{IN}$  | -1           |         | 1           | $\mu\text{A}$      |
| Digital clock low time                     |                              | $t_L$     | 200          |         |             | ns                 |
| Digital clock high time                    |                              | $t_H$     | 200          |         |             | ns                 |
| Data Bit Write Time                        |                              | $t_{BW}$  | $2/F_{CLK}$  |         | $5/F_{CLK}$ | $\mu\text{s}$      |
| Write timeout                              |                              | $t_{WL}$  | $16/F_{CLK}$ |         |             | $\mu\text{s}$      |
| <b>Data input and output pins INT/DOCI</b> |                              |           |              |         |             |                    |
| Input low voltage                          |                              | $V_{IL}$  |              |         | 0.2         | $V_{DD}$           |
| Input high voltage                         |                              | $V_{IH}$  | 0.8          |         |             | $V_{DD}$           |
| Output current high                        | $V_{OL}>(V_{DD}-1\text{V})$  | $I_{OH}$  |              |         | -200        | $\mu\text{A}$      |
| Output current low                         | $V_{OL}<1\text{V}$           | $I_{OL}$  | 200          |         |             | $\mu\text{A}$      |
| Input capacitance                          |                              |           |              | 5       |             | pF                 |
| Force read setup time                      |                              | $T_{FR}$  | $2/F_{CLK}$  |         |             |                    |
| Interrupt clear time                       |                              | $t_{CL}$  | $2/F_{CLK}$  |         |             |                    |
| Digital clock low time                     |                              | $t_L$     | 200          |         | $t_{RA}$    | ns                 |
| Digital clock high time                    |                              | $t_H$     | 200          |         |             | ns                 |
| Read timeout                               |                              | $t_{RA}$  | $4/F$        |         |             | $\mu\text{s}$      |
| <b>Unit</b>                                |                              |           |              |         |             |                    |
| Description                                | Conditions                   | Symbol    | Min          | Typical | Max         | Unit               |

| <b>Supply voltage measurement</b>                                  |  |           |                                   |                      |                      |          |
|--|--|-----------|-----------------------------------|----------------------|----------------------|----------|
| Resolution   |  |           | 590                               | 650                  | 720                  | μV/count |
| ADC output range   |  |           | 2 <sup>13</sup>                   | 2 <sup>14</sup> -511 |                      | Counts   |
| <b>Temperature measurement (requires single point calibration)</b> |  |           |                                   |                      |                      |          |
| Resolution   |  |           |                                   | 80                   |                      | Counts/K |
| ADC output range   |  |           | 511                               |                      | 2 <sup>14</sup> -511 | Counts   |
| Value at 300K  |  |           | 6700                              | 8200                 | 9900                 | Counts   |
| <b>Oscillator and Filter</b>                                       |  |           |                                   |                      |                      |          |
| Filter cutoff frequency  |  |           | $F_{CLK} * 1.41 / 2048 / PI$      |                      |                      | Hz       |
| HPF cutoff frequency   |  |           | $F_{CLK} / 16 * 1.41 / 2048 / PI$ |                      |                      | Hz       |
| On-chip oscillator frequency                                       |  | $F_{OSC}$ | 56                                | 64                   | 74                   | kHz      |
| System clock   |  | $F_{CLK}$ |                                   | $F_{OSC}/2$          |                      |          |