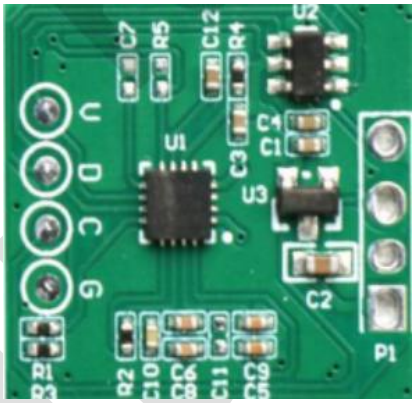
BD4101A-C04

Data Sheet
规格书



BD4101A-C04

BSD Radar Module Specification

盲区检测雷达模块规格书

Description / 功能概述

BD4101A-C04 is a microwave radar sensing module designed for motion detection and presence sensing applications. It detects moving targets by transmitting microwave signals and analyzing reflected echoes.
BD4101A-C04 是一款用于运动检测与人体感应的微波雷达模块，通过发射微波信号并分析目标反射回波，实现对运动目标的检测与识别。

The module integrates a built-in MCU with advanced signal processing and interference suppression algorithms, providing stable and reliable detection performance in various environments.
模块内置 MCU，集成多种信号处理及抗干扰算法，可在复杂环境下实现稳定可靠的检测性能。

It supports flexible configuration via UART interface and is suitable for smart home, security, and lighting applications.
支持 UART 串口配置，适用于智能家居、安防及照明等应用场景。

Features / 产品特性

- Microwave radar sensing technology for motion detection
采用微波雷达技术，实现运动目标检测
- Compact size and low power consumption
尺寸小巧，功耗低
- Strong resistance to environmental interference (temperature, humidity, dust, light)
抗环境干扰能力强（温度、湿度、灰尘、光照等）
- Built-in MCU with digital filtering algorithms
内置 MCU，集成数字滤波算法
- High penetration capability (plastic, glass, thin non-metal materials)
穿透能力强（可穿透塑料、玻璃及薄非金属材料）
- Integrated 50Hz/60Hz power frequency interference suppression
集成 50Hz/60Hz 工频干扰抑制
- Anti-interference design against WiFi and other wireless signals
抗 WiFi 等无线信号干扰设计
- Adjustable detection range via UART interface
支持 UART 串口调节感应距离
- Integrated ambient light sensing function (configurable)
集成感光检测功能（可配置）
- Wide operating voltage range
宽电压工作范围

Applications / 应用领域

The module is designed for motion sensing and presence detection in smart and connected devices.
该模块主要用于运动感应及人体存在检测应用)

Typical applications include:
典型应用包括：

- Smart home devices (switches, panels, door locks, doorbells)
  智能家居设备（开关、面板、门锁、门铃等）

- Smart security systems (intrusion detection, alarm triggering)
  智慧安防系统（入侵检测、报警联动）

- Smart lighting (ceiling lamps, bulbs, panel lights, mirror lights)
  智慧照明（吸顶灯、球泡灯、面板灯、镜灯等）

- IoT sensing and automation systems
  物联网感知与自动化系统

Product Specification / 产品规格

- Electrical & RF Specifications / 电气与射频参数

Parameter / 参数	Min/最小	Typ/典型	Max/最大	Unit/单位
Operating Voltage (VCC) 工作电压（VCC）	3		12	v
Operating Current (ICC) 工作电流（ICC）		0.88 (low power)	9.6 (active mode)	mA
Operating Frequency 工作频率	5.725		5.875	GHz
Output Power (Pout) 发射功率		3		dBm
Detection Range 感应距离	1		13	m
Mounting Height 安装高度		3		m

Detection Radius 感应半径	3		5	m

- **Output Characteristics / 输出特性**

Parameter / 参数	Specification / 指标
Output signal 输出信号	IO / UART
Output voltage 输出电压	0 / 3.3V
Output delay 输出延时	3 S

Functional Characteristics / 功能特性

The module detects motion based on microwave Doppler radar principle. When a moving target enters the detection area, the module outputs a signal to indicate motion.该模块基于微波多普勒雷达原理进行运动检测，当有运动目标进入探测范围时，模块输出信号指示目标存在。

The sensing range and sensitivity can be adjusted via UART interface to meet different application requirements.感应距离及灵敏度可通过 UART 串口进行调节，以适应不同应用需求。

The module integrates digital signal processing and filtering algorithms to reduce false triggering caused by environmental interference.
模块内置数字信号处理及滤波算法，可有效降低环境干扰引起的误触发。

It also supports ambient light sensing function, enabling flexible configuration for day/night operation.
同时支持感光检测功能，可实现昼夜模式灵活配置。

Detection Diagram & Conditions / 探测示意及条件说明

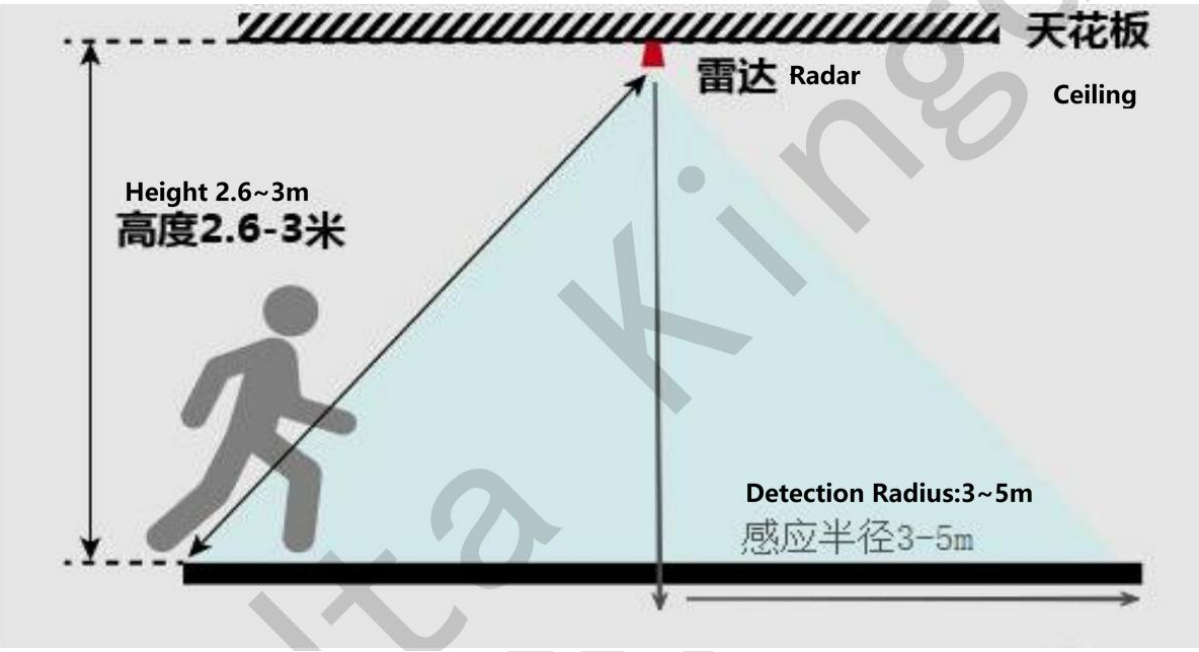


Figure 1. Ceiling-mounted detection pattern/图 1 吸顶安装探测示意图

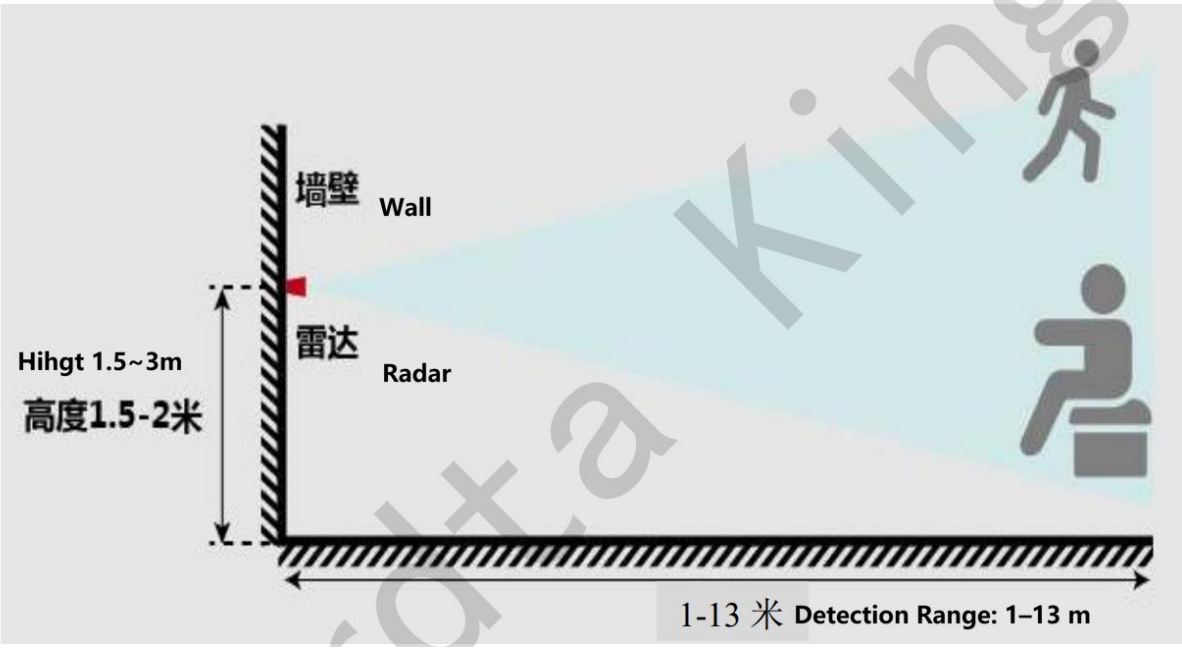


Figure 2. Wall-mounted detection pattern /图 2 壁挂安装探测示意图

Remark/注:

The detection range is based on indoor test conditions with a human target (height 170 cm, weight 65–75 kg, walking speed 1 m/s).

探测距离基于室内测试环境，测试对象为身高约 170cm、体重 65–75kg、行走速度约 1m/s 的人员。

Actual detection performance may vary depending on installation environment and target conditions.

实际使用中，探测效果会因安装环境及目标差异而有所变化

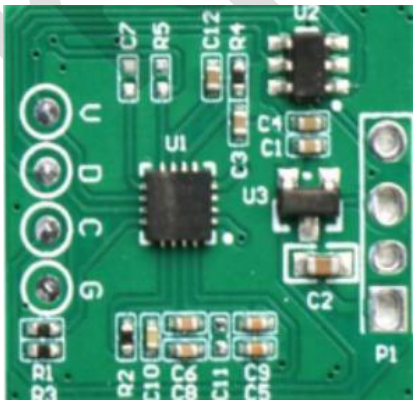
Mechanical Dimensions / 机械尺寸

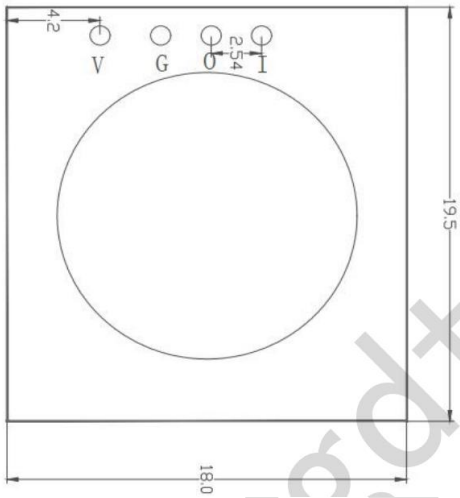
1. Dimensions/外形尺寸

Mechanical dimensions are shown as follows. All dimensions are in millimeters unless otherwise specified.

产品机械尺寸如下，除特别说明外，单位均为毫米。

Size/尺寸: 19.5 × 18 × 1.6 mm





2. Pin Definition / 引脚定义

Pin/引脚	Name/名称	Description/描述
V	VIN	Power Supply Input (4–12V) / 电源输入
G	GND	Ground / 电源地
O	OUT	Digital Output Signal / 电平输出
I	IO	Reserved (Not connected) / 预留引脚（不接）

Installation / 安装说明

• Keep a distance of 2.5–12 mm between antenna and metal surface
天线与金属表面保持 2.5–12 mm 距离

• Avoid direct contact with metal surfaces
避免紧贴或接触金属

• Avoid placing metal, glass, or ceramic materials in front of antenna
天线前方避免金属、玻璃、陶瓷遮挡

• Maintain at least 2 m spacing between multiple modules
多模块安装间距建议 ≥2 m

• Keep away from high-power RF sources (routers, WiFi devices ≥1 m)
避免靠近大功率无线设备（如路由器 ≥1 m）

Notes & Safety Instructions/注意事项

• Use a stable power supply with ripple <100 mV
使用纹波小于 100mV 的稳定电源

• Avoid placing high-current circuits near antenna
避免天线附近存在大电流电路

• Keep antenna away from transformers, rectifiers, and switching components
远离变压器、整流桥、开关器件等干扰源

• Ensure proper installation to avoid false triggering
正确安装以避免误触发或误报