

深圳市地瓜机器人有限公司

产品规格书

Product Acknowledgment

客户模组型号

Customer's Model Name: D-Robotics RDK™ Stereo Camera GS130WI

样品数量

Sample Quantity:

1PCS

送样日期

Release Date:

2025.10.13

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1. 范围 (Scope)

此份规格书的内容为深圳市地瓜机器人有限公司设计生产的摄像头模组型号为 D-Robotics RDK™ Stereo Camera GS130WI 的基本信息, 它包含模组的主要功能, 质量检查和可靠性试验目的。

The content of this specification document is the basic information of the camera module model D-Robotics RDK™ Stereo Camera GS130WI designed and produced by Shenzhen Di Gu Robot Co., Ltd. It includes the main functions of the module, as well as the purposes of quality inspection and reliability tests.

2. 概要 (Summary)

SC132GS 是一款 Global shutter CMOS 图像传感器, 最高支持 1080H x 1280V@120fps 的传输速率。SC132GS 输出 raw 格式图像, 有效像素窗口为 1080H x 1280V, 支持复杂的片上操作——例如 HDR 模式、支持外触发全局曝光模式、窗口化、水平镜像、垂直倒置等。

SC132GS 可以通过标准的 I2C 接口进行配置。

SC132GS 可以通过 TRIGL 引脚实现外部控制曝光。

SC132GS is a Global shutter CMOS image sensor that supports a maximum transmission rate of 1080H x 1280V @ 120fps. SC132GS outputs raw format images, with an effective pixel window of 1080H x 1280V. It supports complex on-chip operations - such as HDR mode, support for external trigger global exposure mode, windowing, horizontal mirroring, vertical inversion, etc. The SC132GS can be configured via the standard IPC interface. The SC132GS can achieve external control of exposure through the TRIGL pin.

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2.1 概要 (Summary) ICM-42688-P

The ICM-42688-P is a 6-axis MotionTracking device that combines a 3-axis gyroscope, and a 3-axis accelerometer in a small 2.5x3x0.91 mm (14-pin LGA) package. It also features a 2K-byte FIFO that can lower the traffic on the serial bus interface, and reduce power consumption by allowing the system processor to burst read sensor data and then go into a low-power mode. ICM- 42688-P, with its 6-axis integration, enables manufacturers to eliminate the costly and complex selection, qualification, and system level integration of discrete devices, guaranteeing optimal motion performance for consumers.

ICM-42688-P 是一款六轴运动追踪设备，它集成了一个三轴陀螺仪和一个三轴加速度计，且体积小巧。2.5x3x0.91 毫米（14 引脚 LGA）封装。它还配备了一个 2K 字节的 FIFO（先进先出缓冲器），能够降低串行总线接口的传输量，并通过允许系统处理器突发读取传感器数据然后进入低功耗模式来降低功耗。ICM42688-P，凭借其六轴集成功能，使制造商能够省去对分立器件进行昂贵且复杂的选型、认证和系统级集成的步骤，从而为消费者保证最佳的运动性能。

The gyroscope supports eight programmable full-scale range settings from $\pm 15.625\text{dps}$ to $\pm 2000\text{dps}$, and the accelerometer supports four programmable full-scale range settings from $\pm 2\text{g}$ to $\pm 16\text{g}$.

陀螺仪支持八种可编程的满量程范围设置，范围从 ± 15.625 微弧度每秒到 ± 2000 微弧度每秒；加速度计则支持四种可编程的满量程范围设置，范围从 $\pm 2\text{g}$ 到 $\pm 16\text{g}$ 。

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ICM-42688-P also supports external clock input for highly accurate 31kHz to 50kHz clock, that helps to reduce system level sensitivity error, improve orientation measurement from gyroscope data, reduce ODR sensitivity to temperature and device to device variation.

ICM-42688-P 还支持外部时钟输入，可提供高度精确的 31kHz 至 50kHz 时钟，有助于降低系统级灵敏度误差，提高陀螺仪数据的定向测量精度，减少输出数据速率对温度和器件间差异的敏感度。

The device includes industry first 20-bits data format support in FIFO for high-data resolution. This FIFO format encapsulates 19-bits of gyroscope data and 18-bits of accelerometer data for high precision applications. Other industry-leading features include on-chip 16-bit ADCs, programmable digital filters, an embedded temperature sensor, and programmable interrupts. The device features I3CSM, I2C and SPI serial interfaces, a VDD operating range of 1.71 V to 3.6 V, and a separate VDDIO operating range of 1.71 V to 3.6 V.

该设备具备业内首创的 20 位数据格式支持功能，适用于高数据分辨率。这种 FIFO 格式可封装 19 位陀螺仪数据和 18 位加速度计数据，适用于高精度应用。其他行业领先的功能包括片内 16 位 ADC、可编程数字滤波器、嵌入式温度传感器和可编程中断。该设备具有 I3CSM、I2C 和 SPI 串行接口，工作电压范围为 1.71V 至 3.6V，以及独立的 VDDIO 工作电压范围为 1.71V 至 3.6V。

The host interface can be configured to support I3CSM slave, I2C slave, or SPI slave modes. The I3CSM interface supports speeds up to 12.5MHz (data rates up to 12.5Mbps in SDR mode, 25Mbps in DDR mode), the I2C interface supports speeds up to 1 MHz, and the SPI interface supports speeds up to 24 MHz .

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主机接口可配置为支持 I3CSM 从机、I2C 从机或 SPI 从机模式。I3CSM 接口支持高达 12.5MHz 的传输速度（在 SDR 模式下数据速率可达 12.5Mbps，在 DDR 模式下可达 25Mbps），I2C 接口支持高达 1MHz 的传输速度，而 SPI 接口支持高达 24MHz 的传输速度。

By leveraging its patented and volume-proven CMOS-MEMS fabrication platform, which integrates MEMS wafers with companion CMOS electronics through wafer-level bonding, InvenSense has driven the package size down to a footprint and thickness of 2.5x3x0.91 mm (14-pin LGA), to provide a very small yet high performance low cost package. The device provides high robustness by supporting 20,000g shock reliability.

通过利用其拥有专利且经过大规模验证的 CMOS-MEMS 制造平台（该平台通过晶圆级键合将 MEMS 晶圆与配套的 CMOS 电子器件集成在一起），InvenSense 将封装尺寸缩小至 2.5x3x0.91 毫米（14 针 LGA），从而实现了极小的尺寸和极薄的厚度，提供一种体积小且性能高、成本低的封装。该设备通过支持 20,000g 的冲击可靠性，具备了极高的稳定性。

3. 产品特点 (Features)

- ▲ 全局曝光 Global exposure
- ▲ 高光敏度 High light sensitivity
- ▲ 支持高动态输出 Maintain high dynamic output
- ▲ 高信噪比 High signal-to-noise ratio
- ▲ 850 nm/940 nm 近红外增强 850 nm / 940 nm near-infrared enhancement
- ▲ 外部控制曝光及多 sensor 同步 External control exposure and multi-sensor synchronization

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▲ 自动曝光/增益控制, 支持小于一行曝光 Automatic exposure/gain control, supporting exposure of less than one row

▲ LED STROBE LED 闪光灯

▲ 水平/垂直窗口调整 Horizontal/Vertical Window Adjustment

▲ 28x 模拟增益, 32x 数字增益 28x analog gain, 32x digital gain

▲ I2C 接口寄存器编程 I2C Interface Register Programming

▲ 低功耗 Low power consumption

▲ 内置温度传感器 Built-in temperature sensor

3.1 产品特点 (Features) ICM-42688-P

3.11 (陀螺仪特性) GYROSCOPE FEATURES

The triple-axis MEMS gyroscope in the ICM-42688-P includes a wide range of features:

- Digital-output X-, Y-, and Z-axis angular rate sensors (gyroscopes) with programmable full-scale range of ± 15.625 , ± 31.25 , ± 62.5 , ± 125 , ± 250 , ± 500 , ± 1000 , and ± 2000 degrees/sec
- Low Noise (LN) power mode support
- Digitally-programmable low-pass filters
- Factory calibrated sensitivity scale factor
- Self-test

ICM-42688-P 中的三轴微机电系统陀螺仪具备多种特性:

- 数字输出 X 轴、Y 轴和 Z 轴角速度传感器 (陀螺仪), 具有可编程的满量程范围, 分别为 ± 15.625 、 ± 31.25 、 ± 62.5 、 ± 125 、 ± 250 、 ± 500 、 ± 1000 和 ± 2000 度/秒
- 低噪声 (LN) 电源模式支持
- 数字可编程低通滤波器

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- 工厂校准的灵敏度系数
- 自检功能

3.12 (加速度计特性) ACCELEROMETER FEATURES

The triple-axis MEMS accelerometer in ICM-42688-P includes a wide range of features:

- Digital-output X-, Y-, and Z-axis accelerometer with programmable full-scale range of $\pm 2g$, $\pm 4g$, $\pm 8g$ and $\pm 16g$
- Low Noise (LN) and Low Power (LP) power modes support
- User-programmable interrupts
- Wake-on-motion interrupt for low power operation of applications processor
- Self-test

ICM-42688-P 中的三轴微机电系统加速度计具备多种功能特性：

- 数字输出 X 轴、Y 轴和 Z 轴加速度计，具有可编程的满量程范围（ $\pm 2g$ 、 $\pm 4g$ 、 $\pm 8g$ 和 $\pm 16g$ ）
- 支持低噪声（LN）和低功耗（LP）模式
- 用户可编程中断
- 用于使应用处理器低功耗运行的运动唤醒中断
- 自检功能

3.12 (动作特征) MOTION FEATURES

ICM-42688-P includes the following motion features, also known as APEX (Advanced Pedometer and Event Detection – neXt gen)

- Pedometer: Tracks Step Count, also issues Step Detect interrupt
- Tilt Detection: Issues an interrupt when the Tilt angle exceeds 35° for more than a programmable time

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- Raise to Wake/Sleep: Gesture detection for wake and sleep events. Interrupt is issued when either of these two events are detected
- Tap Detection: Issues an interrupt when a tap is detected, along with the tap count
- Wake on Motion: Detects motion when accelerometer data exceeds a programmable threshold
- Significant Motion Detection: Detects Significant Motion if Wake on Motion events are detected during a programmable time window

ICM-42688-P 包含以下运动功能，也被称为 APEX（高级计步器和事件检测——下一代技术）

- 步数计数器：记录步数，同时还会发出步数检测中断信号
- 倾斜检测：当倾斜角度超过 35° 且持续时间超过可设定的时长时，会发出中断信号。
- 唤醒/睡眠提升：用于检测唤醒和睡眠事件的手势识别。当检测到这两种事件中的任何一种时，会发出中断信号。
- 指点检测：当检测到指点动作时会发出中断信号，并同时给出指点次数。
- 动态唤醒：当加速度计数据超过可设定的阈值时，会检测到运动情况
- 重大运动检测：若在可设定的时间窗口内检测到“基于运动的唤醒”事件，则会检测到重大运动情况。

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4.应用 (Application)

- ▲ 机器视觉 Machine vision
- ▲ 条码扫描 Barcode scanning
- ▲ 汽车电子 Automotive electronics
- ▲ 安防监控系统 Security surveillance system
- ▲ 高速摄影系统 High-speed photography system

4.1 应用 (Application) ICM-42688-P

- ▲ 增强现实/虚拟现实控制器 AR/VR Controllers
- ▲ 头戴式显示器 Head Mounted Displays
- ▲ 穿戴 Wearables
- ▲ 体育运动 Sports
- ▲ 机器人学 Robotics

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5. 系统框架 (System framework)

图 1-1 展示了 SC132GS 图像传感器的功能模块图。图 1-2 展示了一个典型的应用示例。

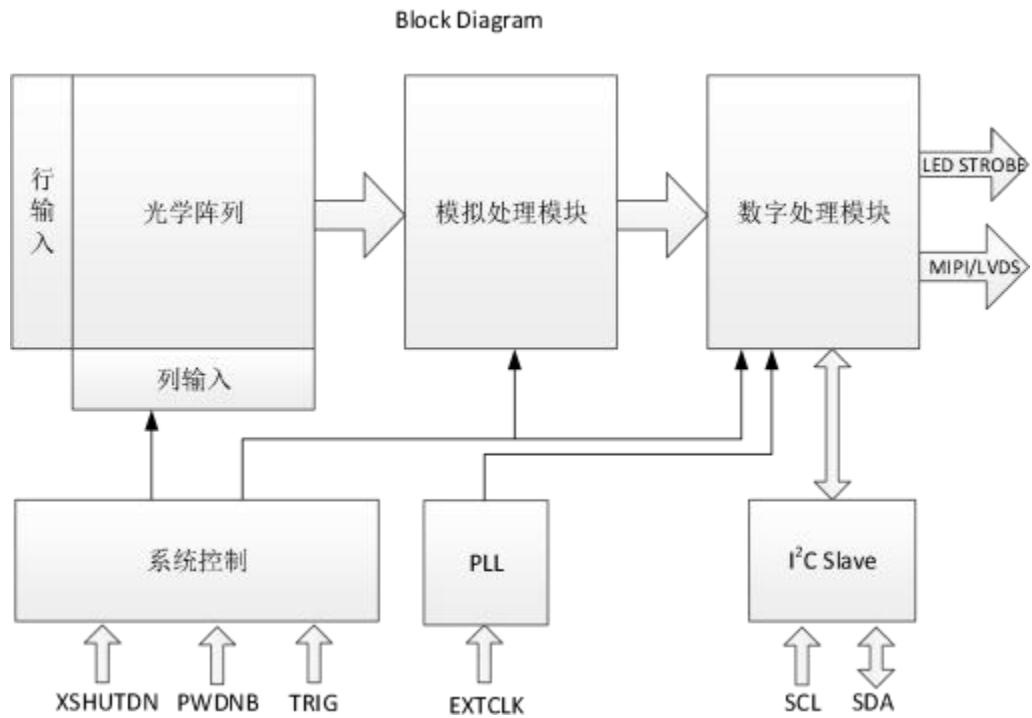


图 1-1 SC132GS 结构图

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6. 摄像头初始化 (Camera initialization)

6.1 上电时序 (Power-on sequence)

DVDD 外部供电 1.2V，上电时序要求如下：

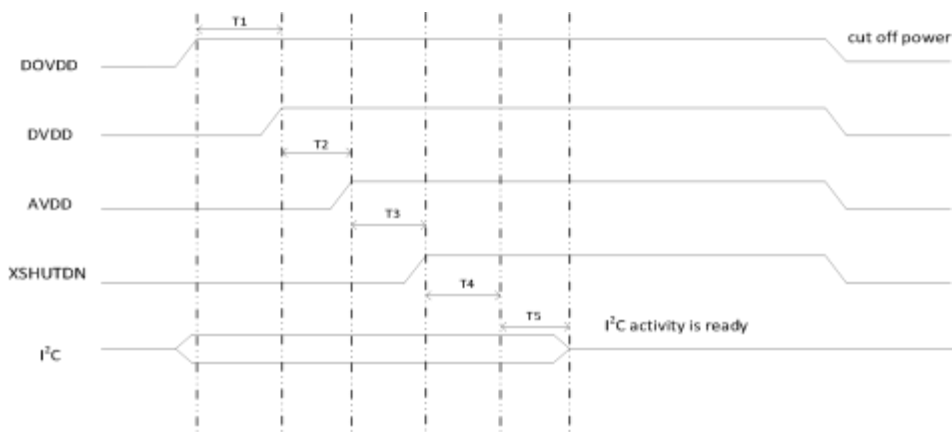


图 1-2 上电时序图

注：T1≥0ms，T2≥0ms，T3≥0ms，T4≥0ms，T5≥2ms。

表 1-1 引脚上电状态表

引脚名称	是否内置上下拉	电源稳定并且XSHUTDN 为低	XSHUTDN 为高
TRIGS	NO	HIGH-Z	LOW
FSYNC	NO	HIGH-Z	LOW
LEDSTROBE	NO	HIGH-Z	LOW
GPIO	NO	HIGH-Z	LOW

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6.2. I2C 时序 (I2C timing)

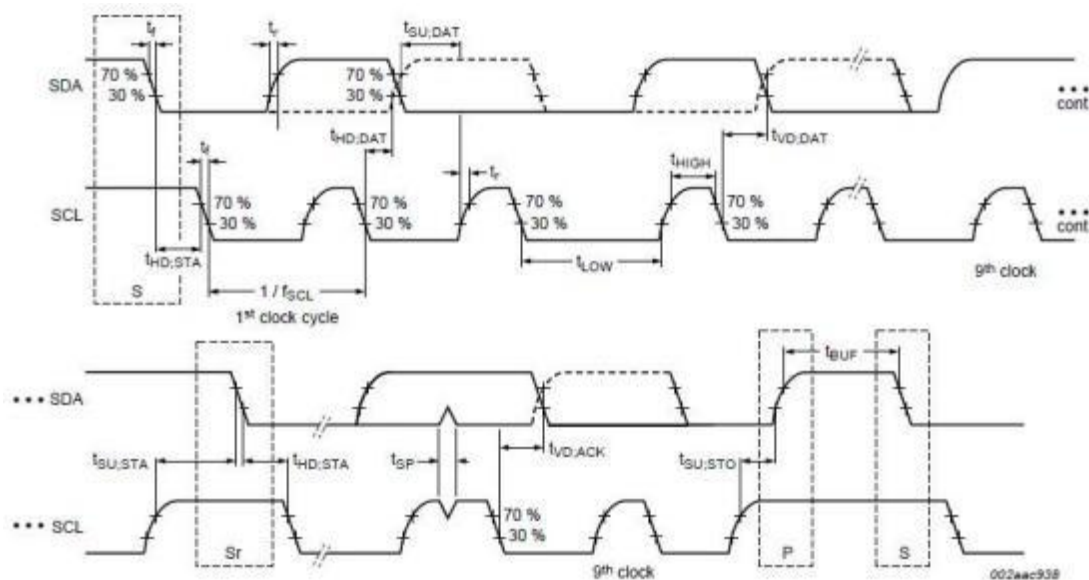


图 1-3 I2C 接口时序

表 1-5 I2C 接口时序详细参数

Symbol	Parameter	Standard-mode		Fast-mode		Unit
		Min	Max	Min	Max	
f_{SCL}	SCL clock frequency	0	100	0	400	kHz
$t_{HD,STA}$	hold time (repeated) START condition	4.0	-	0.6	-	μs
t_{LOW}	LOW period of the SCL clock	4.7	-	1.3	-	μs
t_{HIGH}	HIGH period of the SCL clock	4.0	-	0.6	-	μs
$t_{SU,STA}$	set-up time for a repeated START condition	4.7	-	0.6	-	μs
$t_{HD,DAT}$	data hold time	0	-	0	-	μs
$t_{SU,DAT}$	data set-up time	250	-	100	-	ns
t_r	rise time of both SDA and SCL signals	-	1000	20	300	ns
t_f	fall time of both SDA and SCL signals	-	300	20	300	ns
$t_{SU,STO}$	set-up time for STOP condition	4.0	-	0.6	-	μs
t_{BUF}	bus free time between a STOP and START condition	4.7	-	1.3	-	μs
$t_{VD,DAT}$	data valid time	-	3.45	-	0.9	μs
$t_{VD,ACK}$	data valid acknowledge time	-	3.45	-	0.9	μs

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t_{SP}	pulse width of spikes that must be suppressed by the input filter	-	-	0	50	ns
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6.21 I2C 时序特性分析 (I2C TIMING CHARACTERIZATION)

ICM-42688-P

Typical Operating Circuit of section 4.2, VDD = 1.8 V, VDDIO = 1.8 V, TA=25 °C, unless otherwise noted.

Parameters	Conditions	Min	Typical	Max	Units	Notes
I²C TIMING		FC FAST-MODE PLUS				
f_{SCL} , SCL Clock Frequency				1	MHz	1
$t_{HD,STA}$, (Repeated) START Condition Hold Time		0.26			μ s	1
t_{LOW} , SCL Low Period		0.5			μ s	1
t_{HIGH} , SCL High Period		0.26			μ s	1
$t_{SU,STA}$, Repeated START Condition Setup Time		0.26			μ s	1
$t_{HD,DAT}$, SDA Data Hold Time		0			μ s	1
$t_{SU,DAT}$, SDA Data Setup Time		50			ns	1
t_r , SDA and SCL Rise Time	C_b bus cap. from 10 to 400 pF			120	ns	1
t_f , SDA and SCL Fall Time	C_b bus cap. from 10 to 400 pF			120	ns	1
$t_{SU,STO}$, STOP Condition Setup Time		0.5			μ s	1
t_{BUF} , Bus Free Time Between STOP and START Condition		0.5			μ s	1
C_b , Capacitive Load for each Bus Line			< 400		pF	1
$t_{VD,DAT}$, Data Valid Time				0.45	μ s	1
$t_{VD,ACK}$, Data Valid Acknowledge Time				0.45	s	1

Table 5. I²C Timing Characteristics

Notes:

- Based on characterization of 5 parts over temperature and voltage as mounted on evaluation board or in sockets

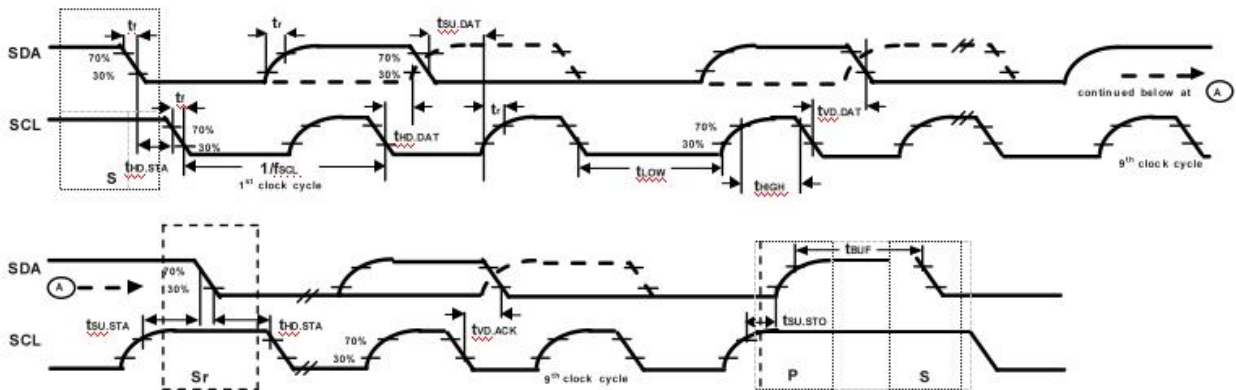


Figure 1. I²C Bus Timing Diagram

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6.3 电性特性 (Electrical properties)

表 3-1 绝对最大额定值

项目	符号	绝对最大额定值	单位
模拟电源电压	V _{AVDD}	-0.3~3.0	V
I/O 电源电压	V _{DOVDD}	-0.3~2.2	V
数字电源电压	V _{DVDD}	-0.3~1.4	V
I/O 输入电压	V _I	-0.3~V _{DOVDD} +0.3	V
I/O 输出电压	V _O	-0.3~V _{DOVDD} +0.3	V
工作温度	T _{OPR}	-30~+85	°C
最佳工作温度	T _{SPEC}	-20~+60	°C
贮存温度	T _{STG}	-40~+85	°C

表 3-2 直流电气特性(AVDD=2.5V, DOVDD=1.8V MIPI 下测试)

项目	符号	最小值	典型值	最大值	单位
电源					
模拟电源电压	V _{AVDD}	2.4	2.5	2.6	V
I/O 供电电压	V _{DOVDD}	1.7	1.8	1.9	V
数字电源	V _{DVDD}	1.14	1.2	1.26	V
电流 (工作电流: 线性模式 MIPI 4-lane output)					
模拟电源电流	I _{AVDD}	- *	24	24.9	mA
数字电源电流	I _{DVDD}	-	57.4	62	mA
I/O 电源电流	I _{DOVDD}	-	0.5	0.6	mA
电流 (待机电流)					
模拟电源电流	I _{AVDD}	-	7800	-	μA
数字电源电流	I _{DVDD}	-	2300	-	μA
I/O 电源电流	I _{DOVDD}	-	200	-	μA
总功耗(*)	Power	-	22620	-	μW
数字输入					
输入低电平	V _{IL}	-	-	0.3 x DOVDD	V
输入高电平	V _{IH}	0.7 x DOVDD	-	-	V
输入电容	C _{IN}	-	-	10	pF
数字输出 (25pF 标准负载)					
输出高电平	V _{OH}	0.9 x DOVDD	-	-	V

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输出低电平	V_{OL}	-	-	$0.1 \times DOVDD$	V
PC 接口输入 (SCL 和 SDA)					
输入低电平	V_{IL}	-0.5	0	$0.3 \times DOVDD$	V
输入高电平	V_{IH}	$0.7 \times DOVDD$	$DOVDD$	$DOVDD+0.5$	V

注：工作电流&待机电流：电流典型值：工作电压 2.8V/1.8V/1.2V； $T_j=25^{\circ}\text{C}$ ；最大模拟增益；亮度输出值 100 LSB

电流最大值：工作电压 2.9V/1.9V/1.26V； $T_j=80^{\circ}\text{C}$ ；最大模拟增益；亮度输出值 100 LSB

6.31 电气规格、直流电气特性 (ICM-42688-P)

Typical Operating Circuit of section 4.2, VDD = 1.8 V, VDDIO = 1.8 V, $T_A=25^{\circ}\text{C}$, unless otherwise noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	NOTE S
SUPPLY VOLTAGES						
VDD		1.71	1.8	3.6	V	1
VDDIO		1.71	1.8	3.6	V	1
SUPPLY CURRENTS						
Low-Noise Mode	6-Axis Gyroscope + Accelerometer		0.88	0.95	mA	2, 3
	3-Axis Accelerometer		0.28	0.35	mA	2, 3
	3-Axis Gyroscope		0.73	0.85	mA	2, 3
Full-Chip Sleep Mode	At 25°C		7.5	10	μA	2, 3
TEMPERATURE RANGE						
Specified Temperature Range	Performance parameters are not applicable beyond Specified Temperature Range	-40		+85	$^{\circ}\text{C}$	1

Table 3. D.C. Electrical Characteristics

Notes:

1. Guaranteed by design.
2. Derived from validation or characterization of parts, not guaranteed in production.
3. MIN/MAX or MAX specs are derived from characterization data based 3σ calculation.

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6.32 A. 电气特性 (A.C. Electrical Characteristics)

Typical Operating Circuit of section 4.2, VDD = 1.8 V, VDDIO = 1.8 V, TA=25° C, unless otherwise noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	NOTES
SUPPLIES						
Supply Ramp Time	Monotonic ramp. Ramp rate is 10% to 90% of the final value	0.01		3	ms	1
Power Supply Noise			10		mV peak-peak	1
TEMPERATURE SENSOR						
Operating Range	Ambient	-40		85	°C	1
25°C Output			0		LSB	3
ADC Resolution	Output in two's complement format		16		bits	2
ODR	With Filter	25		8000	Hz	2
Room Temperature Offset	25°C	-5		5	°C	3
Stabilization Time				14000	µs	2
Sensitivity	Untrimmed		132.48		LSB/°C	1
Sensitivity for FIFO data			2.07		LSB/°C	1
POWER-ON RESET						
Start-up time for register read/write	From power-up			1	ms	1
I²C ADDRESS						
I²C ADDRESS	AP_AD0 = 0		1101000			
	AP_AD0 = 1		1101001			
DIGITAL INPUTS (FSYNC, SCLK, SDI, CS)						
VIH, High Level Input Voltage		0.7*VDDIO			V	
VIL, Low Level Input Voltage				0.3*VDDIO	V	
CI, Input Capacitance			< 10		pF	
DIGITAL OUTPUT (SDO, INT1, INT2)						
VOH, High Level Output Voltage	RLOAD=1 MΩ;	0.9*VDDIO			V	
VOL1, LOW-Level Output Voltage	RLOAD=1 MΩ;			0.1*VDDIO	V	1
VOL.INT, INT Low-Level Output	OPEN=1, 0.3			0.1	V	

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Voltage	mA sink Current					
Output Leakage Current	OPEN=1		100		nA	
tINT, INT Pulse Width	int_pulse_duration= 0 , 1 (100us, 8us) ;	8		100	μs	
I2C I/O (SCL, SDA)						
VIL, LOW-Level Input Voltage		-0.5 V		0.3*VDDIO	V	1
VIH, HIGH-Level Input Voltage		0.7*VDDIO		VDDIO + 0.5 V	V	
Vhys, Hysteresis			0.1*VDDIO		V	
VOL, LOW-Level Output Voltage	3 mA sink current	0		0.4	V	
IOL, LOW-Level Output Current	VOL=0.4 V VOL=0.6 V		3 6		mA mA	
Output Leakage Current			100		nA	
tof, Output Fall Time from VIHmax to VILmax	Cb bus capacitance in pf	20+0.1Cb		300	ns	
INTERNAL CLOCK SOURCE						
Clock Frequency Initial Tolerance	CLKSEL=`2b00 or gyro inactive; 25°C	-3		+3	%	1
	CLK_SEL=`2b01 and gyro active; 25°C	-1		+1	%	1
Frequency Variation over Temperature	CLK_SEL=`2b00 or gyro inactive; -40°C to +85°C			±3	%	1
	CLK_SEL=`2b01 and gyro active; -40°C to +85°C			±2	%	1
EXTERNAL CLOCK SOURCE						
Clock Frequency		31	32	50	kHz	1

Table 4. A.C. Electrical Characteristics

Notes:

1. Expected results based on design, will be updated after characterization. Not guaranteed in production.
2. Guaranteed by design.
3. To be Production tested.

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7. 摄像头模组规格 (Camera module specification)

项目 (Item)	规格 (Specification)	
模组型号 (Module No.)	D-Robotics RDK™ Stereo Camera GS130WI	
基板 (Substrate)	PCB	
模组尺寸 (Module size)	100*29*12mm	
芯片型号 (Sensor Type)	SC132GS-CP3NN00	
IMU	ICM-42688-P	
有效像素阵列 (Array Element)	1080H×1280V	
像素尺寸 (Pixel Size)	2.7 μ m×2.7 μ m	
电源需求 (Power Supply)	模拟电源 (AVDD)	2.5V
	数字电源 (DVDD)	1.2V
	输入输出 (I/O)	1.8V
温度范围 (Temperature Range)	工作温度范围 (Working temperature range)	-30~+85°C
	最佳工作温度范围 Optimum operating temperature range	-20°C~+60°C
最大传输帧频 (Max Frame rate)	1080H x 1280V@10bit 120fps 1080H x 1280V@10bit < 60fps (HDRC on) 1080H x 1280V@10bit 120fps (HDRC off)	
输出格式 (Output Formats)	RAW RGB/RAW MONO	
封装形式 (Encapsulation mode)	PLCC	

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8. 摄像头镜头规格 (Camera LENS specification)

项目 (Item)	规格 (Specification)
镜头尺寸 (Lens size)	1/4"
镜片结构 (Lens Construction)	2G+4P+IR
光圈数 (F/No)	2.0±5%
焦距 (EFL)	1.75±5%
视场角 (Optical FOV)	D:157.2° H:115.6° V:96.8°

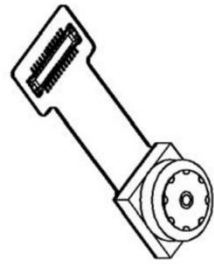
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10. 包装规范 (Packaging Specification)

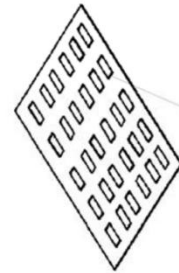
由 Autodesk 教育版产品制作

ROHS
Pb Free

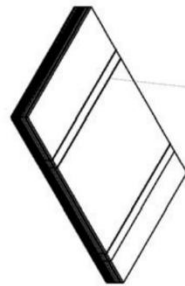
Date	Rev	Sym	Revisions	Signed
2012-07-31	A		First Release	
2013-04-17	B		增加防静电与出货标识位置示意图	



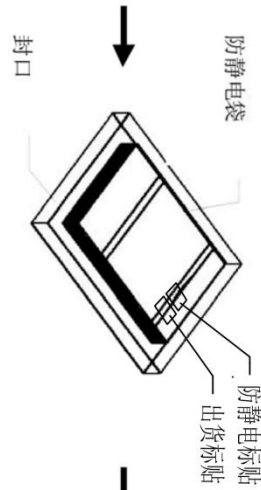
STEP1: 主产品示意图



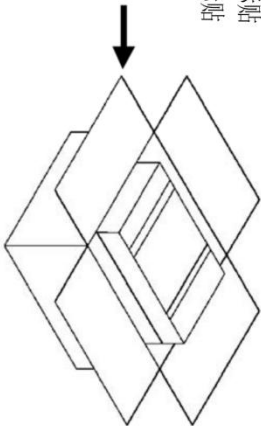
STEP2: 单盘悉数盒



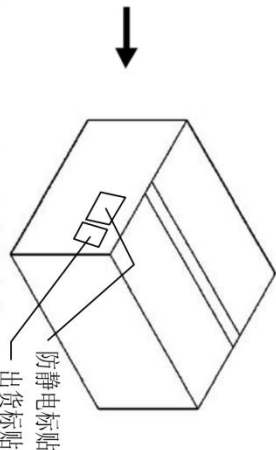
STEP3: 1 叠 = 8 个满盘



Step4: 将打包好的盘子装入到防静电袋中并抽真空



Step5: 将 5 袋装放入一大箱



Step6: 打包出货

- 备注:
1. 包装箱部分:
- 1.1 于出货包装时所有包装箱不足箱部份需塞入填充物避免碰撞损坏;
 - 1.2 好品出货包装时,若同一批号中,有尾数不满一箱时,应使用特制的尾数箱单独包装出货;若客户有特殊要求,以客户需求为准。
 - 1.3 工程批只需以防静电袋抽真空,不需大箱包装出货。
 - 1.4 产品型号及编码不同时,需分开包装

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TITLE: 3rd ANGLE 包装流程图

UNLESS OTHERWISE SPECIFIED		MODEL:	DRAWN:	陈凤珍
GENERAL TOLERANCE:		PART NO.:	CHECKED:	陈凤珍
LEVEL	TOLERANCE	TYPE		
DIM.	3	H0.03	±0.03	±0.1
	3-50	H0.05	±0.05	±0.1
	50-100	H0.05	±0.05	±0.15
	100-150	H0.08	±0.08	±0.15
	150-200	H0.08	±0.1	±0.2
	200-300	H0.08	±0.1	±0.2
	300-400	H0.08	±0.1	±0.2
	400-500	H0.08	±0.1	±0.2
	500-600	H0.08	±0.1	±0.2
	600-700	H0.08	±0.1	±0.2
	700-800	H0.08	±0.1	±0.2
	800-900	H0.08	±0.1	±0.2
	900-1000	H0.08	±0.1	±0.2
	1000-1500	H0.08	±0.1	±0.2
	1500-2000	H0.08	±0.1	±0.2
	2000-3000	H0.08	±0.1	±0.2
	3000-4000	H0.08	±0.1	±0.2
	4000-5000	H0.08	±0.1	±0.2
	5000-6000	H0.08	±0.1	±0.2
	6000-7000	H0.08	±0.1	±0.2
	7000-8000	H0.08	±0.1	±0.2
	8000-9000	H0.08	±0.1	±0.2
	9000-10000	H0.08	±0.1	±0.2
	10000-15000	H0.08	±0.1	±0.2
	15000-20000	H0.08	±0.1	±0.2
	20000-30000	H0.08	±0.1	±0.2
	30000-40000	H0.08	±0.1	±0.2
	40000-50000	H0.08	±0.1	±0.2
	50000-60000	H0.08	±0.1	±0.2
	60000-70000	H0.08	±0.1	±0.2
	70000-80000	H0.08	±0.1	±0.2
	80000-90000	H0.08	±0.1	±0.2
	90000-100000	H0.08	±0.1	±0.2
	100000-150000	H0.08	±0.1	±0.2
	150000-200000	H0.08	±0.1	±0.2
	200000-300000	H0.08	±0.1	±0.2
	300000-400000	H0.08	±0.1	±0.2
	400000-500000	H0.08	±0.1	±0.2
	500000-600000	H0.08	±0.1	±0.2
	600000-700000	H0.08	±0.1	±0.2
	700000-800000	H0.08	±0.1	±0.2
	800000-900000	H0.08	±0.1	±0.2
	900000-1000000	H0.08	±0.1	±0.2
	1000000-1500000	H0.08	±0.1	±0.2
	1500000-2000000	H0.08	±0.1	±0.2
	2000000-3000000	H0.08	±0.1	±0.2
	3000000-4000000	H0.08	±0.1	±0.2
	4000000-5000000	H0.08	±0.1	±0.2
	5000000-6000000	H0.08	±0.1	±0.2
	6000000-7000000	H0.08	±0.1	±0.2
	7000000-8000000	H0.08	±0.1	±0.2
	8000000-9000000	H0.08	±0.1	±0.2
	9000000-10000000	H0.08	±0.1	±0.2
	10000000-15000000	H0.08	±0.1	±0.2
	15000000-20000000	H0.08	±0.1	±0.2
	20000000-30000000	H0.08	±0.1	±0.2
	30000000-40000000	H0.08	±0.1	±0.2
	40000000-50000000	H0.08	±0.1	±0.2
	50000000-60000000	H0.08	±0.1	±0.2
	60000000-70000000	H0.08	±0.1	±0.2
	70000000-80000000	H0.08	±0.1	±0.2
	80000000-90000000	H0.08	±0.1	±0.2
	90000000-100000000	H0.08	±0.1	±0.2
	100000000-150000000	H0.08	±0.1	±0.2
	150000000-200000000	H0.08	±0.1	±0.2
	200000000-300000000	H0.08	±0.1	±0.2
	300000000-400000000	H0.08	±0.1	±0.2
	400000000-500000000	H0.08	±0.1	±0.2
	500000000-600000000	H0.08	±0.1	±0.2
	600000000-700000000	H0.08	±0.1	±0.2
	700000000-800000000	H0.08	±0.1	±0.2
	800000000-900000000	H0.08	±0.1	±0.2
	900000000-1000000000	H0.08	±0.1	±0.2
	1000000000-1500000000	H0.08	±0.1	±0.2
	1500000000-2000000000	H0.08	±0.1	±0.2
	2000000000-3000000000	H0.08	±0.1	±0.2
	3000000000-4000000000	H0.08	±0.1	±0.2
	4000000000-5000000000	H0.08	±0.1	±0.2
	5000000000-6000000000	H0.08	±0.1	±0.2
	6000000000-7000000000	H0.08	±0.1	±0.2
	7000000000-8000000000	H0.08	±0.1	±0.2
	8000000000-9000000000	H0.08	±0.1	±0.2
	9000000000-10000000000	H0.08	±0.1	±0.2
	10000000000-15000000000	H0.08	±0.1	±0.2
	15000000000-20000000000	H0.08	±0.1	±0.2
	20000000000-30000000000	H0.08	±0.1	±0.2
	30000000000-40000000000	H0.08	±0.1	±0.2
	40000000000-50000000000	H0.08	±0.1	±0.2
	50000000000-60000000000	H0.08	±0.1	±0.2
	60000000000-70000000000	H0.08	±0.1	±0.2
	70000000000-80000000000	H0.08	±0.1	±0.2
	80000000000-90000000000	H0.08	±0.1	±0.2
	90000000000-100000000000	H0.08	±0.1	±0.2
	100000000000-150000000000	H0.08	±0.1	±0.2
	150000000000-200000000000	H0.08	±0.1	±0.2
	200000000000-300000000000	H0.08	±0.1	±0.2
	300000000000-400000000000	H0.08	±0.1	±0.2
	400000000000-500000000000	H0.08	±0.1	±0.2
	500000000000-600000000000	H0.08	±0.1	±0.2
	600000000000-700000000000	H0.08	±0.1	±0.2
	700000000000-800000000000	H0.08	±0.1	±0.2
	800000000000-900000000000	H0.08	±0.1	±0.2
	900000000000-1000000000000	H0.08	±0.1	±0.2
	1000000000000-1500000000000	H0.08	±0.1	±0.2
	1500000000000-2000000000000	H0.08	±0.1	±0.2
	2000000000000-3000000000000	H0.08	±0.1	±0.2
	3000000000000-4000000000000	H0.08	±0.1	±0.2
	4000000000000-5000000000000	H0.08	±0.1	±0.2
	5000000000000-6000000000000	H0.08	±0.1	±0.2
	6000000000000-7000000000000	H0.08	±0.1	±0.2
	7000000000000-8000000000000	H0.08	±0.1	±0.2
	8000000000000-9000000000000	H0.08	±0.1	±0.2
	9000000000000-10000000000000	H0.08	±0.1	±0.2
	10000000000000-15000000000000	H0.08	±0.1	±0.2
	15000000000000-20000000000000	H0.08	±0.1	±0.2
	20000000000000-30000000000000	H0.08	±0.1	±0.2
	30000000000000-40000000000000	H0.08	±0.1	±0.2
	40000000000000-50000000000000	H0.08	±0.1	±0.2
	50000000000000-60000000000000	H0.08	±0.1	±0.2
	60000000000000-70000000000000	H0.08	±0.1	±0.2
	70000000000000-80000000000000	H0.08	±0.1	±0.2
	80000000000000-90000000000000	H0.08	±0.1	±0.2
	90000000000000-100000000000000	H0.08	±0.1	±0.2
	100000000000000-150000000000000	H0.08	±0.1	±0.2
	150000000000000-200000000000000	H0.08	±0.1	±0.2
	200000000000000-300000000000000	H0.08	±0.1	±0.2
	300000000000000-400000000000000	H0.08	±0.1	±0.2
	400000000000000-500000000000000	H0.08	±0.1	±0.2
	500000000000000-600000000000000	H0.08	±0.1	±0.2
	600000000000000-700000000000000	H0.08	±0.1	±0.2
	700000000000000-800000000000000	H0.08	±0.1	±0.2
	800000000000000-900000000000000	H0.08	±0.1	±0.2
	900000000000000-1000000000000000	H0.08	±0.1	±0.2
	1000000000000000-1500000000000000	H0.08	±0.1	±0.2
	1500000000000000-2000000000000000	H0.08	±0.1	±0.2
	2000000000000000-3000000000000000	H0.08	±0.1	±0.2
	3000000000000000-4000000000000000	H0.08	±0.1	±0.2
	4000000000000000-5000000000000000	H0.08	±0.1	±0.2
	5000000000000000-6000000000000000	H0.08	±0.1	±0.2
	6000000000000000-7000000000000000	H0.08	±0.1	±0.2
	7000000000000000-8000000000000000	H0.08	±0.1	±0.2
	8000000000000000-9000000000000000	H0.08	±0.1	±0.2
	9000000000000000-10000000000000000	H0.08	±0.1	±0.2
	10000000000000000-15000000000000000	H0.08	±0.1	±0.2
	15000000000000000-20000000000000000	H0.08	±0.1	±0.2
	20000000000000000-30000000000000000	H0.08	±0.1	±0.2
	30000000000000000-40000000000000000	H0.08	±0.1	±0.2
	40000000000000000-50000000000000000	H0.08	±0.1	±0.2
	50000000000000000-60000000000000000	H0.08	±0.1	±0.2
	60000000000000000-70000000000000000	H0.08	±0.1	±0.2
	70000000000000000-80000000000000000	H0.08	±0.1	±0.2
	80000000000000000-90000000000000000	H0.08	±0.1	±0.2
	90000000000000000-100000000000000000	H0.08	±0.1	±0.2
	100000000000000000-150000000000000000	H0.08	±0.1	±0.2
	150000000000000000-200000000000000000	H0.08	±0.1	±0.2
	200000000000000000-300000000000000000	H0.08	±0.1	±0.2
	300000000000000000-400000000000000000	H0.08	±0.1	±0.2
	400000000000000000-500000000000000000	H0.08	±0.1	±0.2
	5000			