

Rockchip

RMSL312-3104

Datasheet

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目录

Warranty Disclaimer	3
Chapter 1 模组简介	4
1.1 3D 摄像机模组结构图.....	4
1.2 3D 摄像机模组基本规格.....	5
Chapter 2 部件规格	6
2.1 关键器件参数	6
2.2 接口定义	7
Chapter 3 机构特征	8
3.1 模组结构图	8
Chapter 4 电气性能	9
4.1 推荐工作条件	9
4.2 MIPI 接口电气特性	9
Chapter 5 应用指南	11
5.1 组装建议	11

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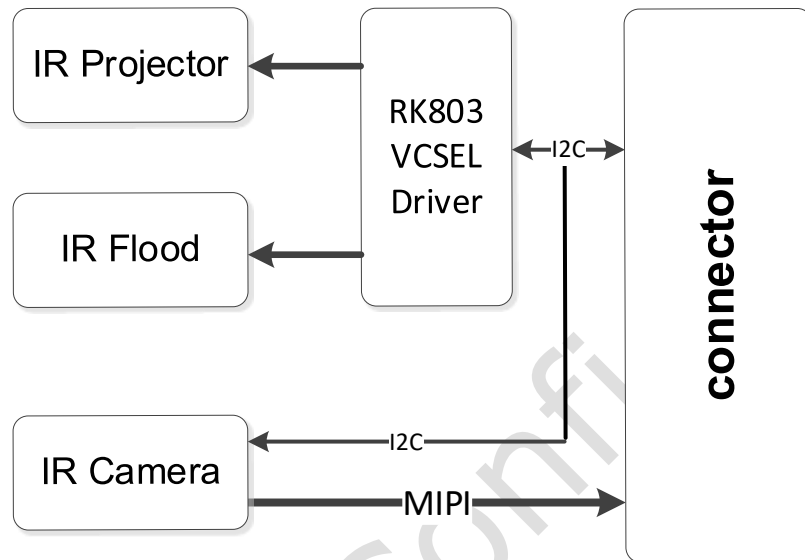
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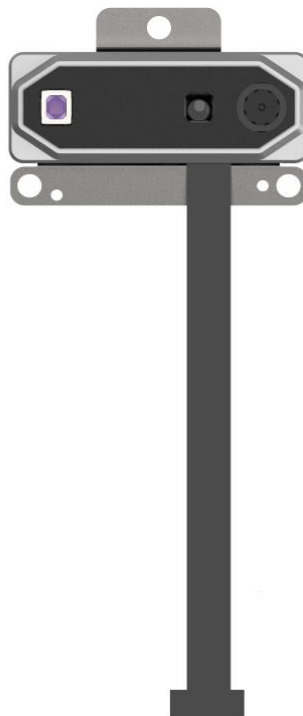
Chapter 1 模组简介

RMSL312-3104 是一款成熟的全功能 3D 结构光 MIPI 模组。内置 940nm 红外散斑投射器，30 万像素全局曝光的红外摄像头以及红外照明光源。可广泛适用于门锁、门禁安防，刷脸支付等产品应用。

1.1 3D 摄像机模组结构图



光学部分由散斑投射器，红外泛光灯和红外摄像头组成，支持 DEPTH, IR 图像同时输出，可以适应多类工作场景。RK803 是 VCSEL 驱动 IC，可高效驱动泛光源和投射器。



1.2 3D 摄像机模组基本规格

模组	项目	规格	注释
散斑投射器	激光器类型	VCSEL	
	激光波长	940 nm(Typ.)	940±10 nm@50℃
	发光角	H78°,V76°	
	输出管脚	16 Pin	B To B
红外摄像头模组	传感器	1/6" CMOS Sensor	
	有效像素	0.3M	480H*640V Pixels
	接口类型	MIPI	
	模组类型	FF	
	可视角	80.1° ±3° (OPT)	H54°,V68°
	输出管脚	20 Pin	B To B
成品	基线	28mm	
	推荐工作温度	0℃-60℃	
	工作湿度	0~90%RH	
	对外接口	MIPI	
	输入电源电气要求	3.6V@1A	
	模组尺寸 (长 x 宽 x 高)	41mmx15.2mmx8.24mm	

Chapter 2 部件规格

为了对人像产品更加友好，垂直方向的 FOV 大于水平方向，RMSL312-3104 中的红外摄像头是纵向放置，下列表格中水平与垂直 FOV 是遵循图像传感器、镜头的习惯填写。

2.1 关键器件参数

2.1.1 VCSEL参数

波长	940±10 nm
工作电压	1.6V-2.3V
推荐工作温度	0°C~+60°C
NTC	YES

2.1.2 IR传感器参数

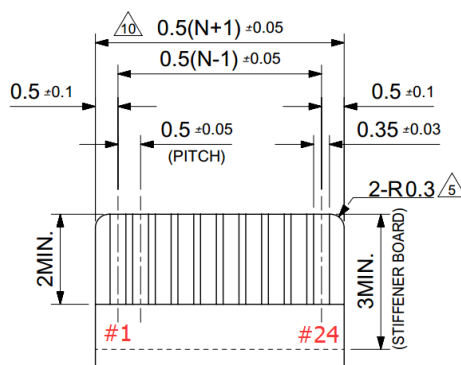
传感器尺寸	1/6"
分辨率	480(H)×640(V) 0.3 Megapixel CMOS image sensor
工作温度	-40°C~+85°C

2.2 接口定义

模组对外接口为 MIPI，连接座为通用 0.5mm 单排金手指。PIN 脚定义如下图：

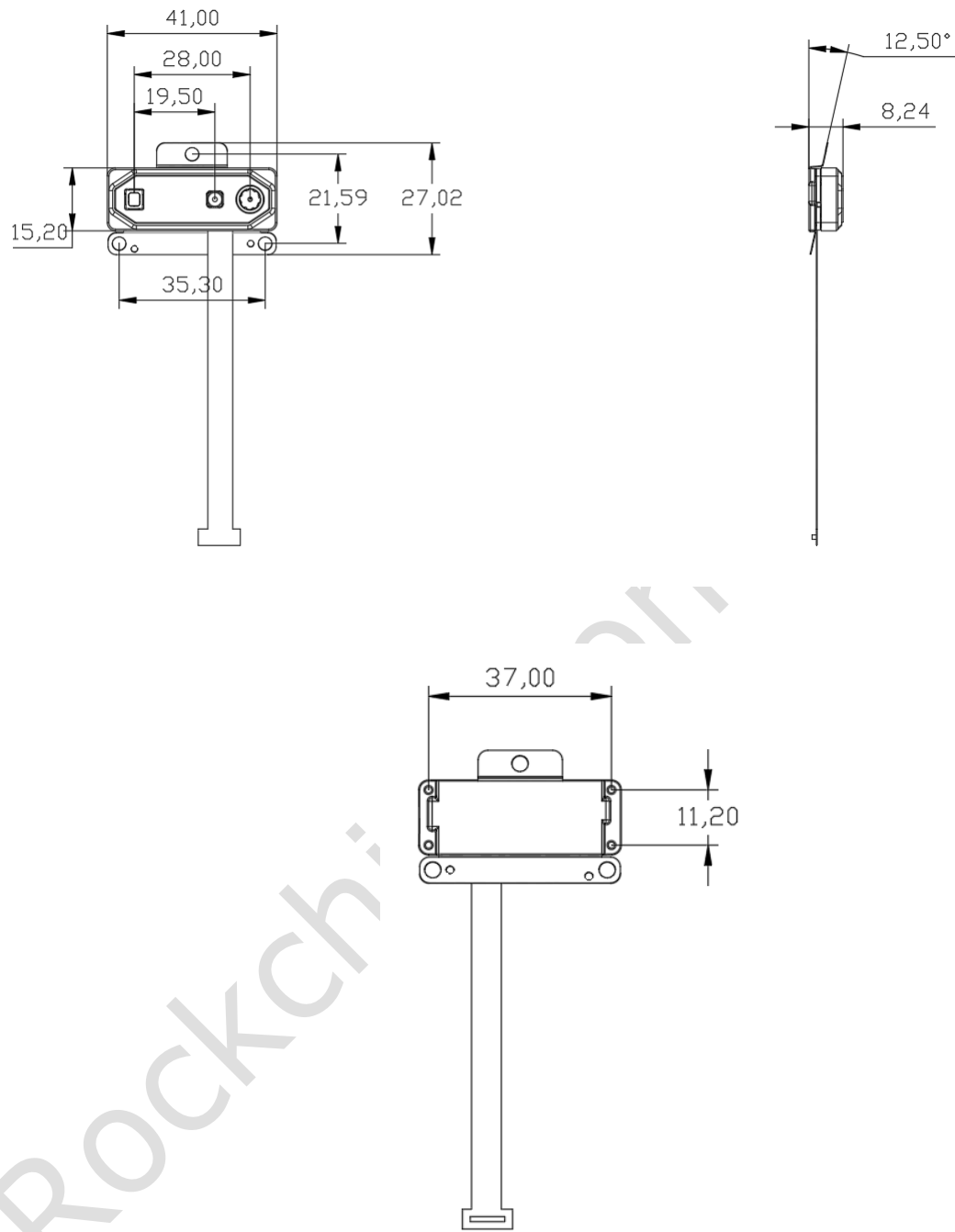
Pin	Pin Name	Power domain	Type	Description
1	MIPI_D0N_IR	—	O	MIPI data lane 0 negative output
2	MIPI_D0P_IR	—	O	MIPI data lane 0 positive output
3	MIPI_D1N_IR	—	O	MIPI data lane 1 negative output
4	MIPI_D1P_IR	—	O	MIPI data lane 1 positive output
5	MIPI_CLKN_IR	—	O	MIPI clock lane negative output
6	MIPI_CLKP_IR	—	O	MIPI clock lane positive output
7	GND	—	—	Ground
8	IR_CAM_MCLK	1.8V	I	Sensor Referenced Clock input
9	PRO_C_ITO_STATE	1.8V	I/O	ITO protection status detection(GPIO)
10	I2C_SCL_AP	1.8V	I/O	I2C clock (for IR camera&RK803&EEPROM)
11	I2C_SDA_AP	1.8V	I/O	I2C data (for IR camera&RK803&EEPROM)
12	CAM_PWREN	1.8V/3.3V	I	Camera Power enable
13	IR_CAM_FSIN/VSYN	1.8V	I/O	Frame sync input/vertical sync output
14	IR_CAM_STROBE_AP	1.8V	O	IR Camera frame exposure output indicator
15	IR_CAM_RST_AP	1.8V	I	IR camera reset
16	RK803_EN2_PRO	1.8V	I	RK803 CC2(Projector) power enable
17	RK803_EN1_Flood	1.8V	I	RK803 CC1(Flood) power enable
18	GND	—	—	Ground
19	GND	—	—	Ground
20	GND	—	—	Ground
21	VCC_SYSIN	—	P	Power Input (3.3V~5.5V typ=3.6V@1A)
22	VCC_SYSIN	—	P	
23	VCC_SYSIN	—	P	
24	VCC_SYSIN	—	P	

通用 0.5mm 单排金手指脚位顺序和尺寸如下：（Top Layer）



Chapter 3 机构特征

3.1 模组结构图



Chapter 4 电气性能

4.1 推荐工作条件

参数	符号	最小值	典型值	最大值	单位
VCC_IN 供电电压范围	VCC_IN	3.3	3.6	5.5	V
VCC_IN 峰值电流			TBD	1	A

4.2 MIPI 接口电气特性

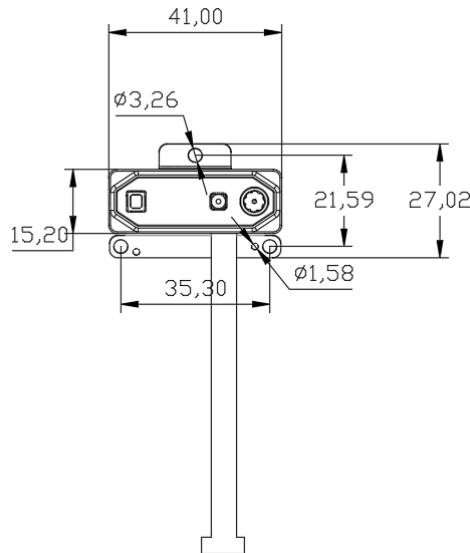
Parameters	Symbol	Min	Typ	Max	Units
Input signal voltage range	V_i	-50	NA	1350	mV
Input leakage current	I_{leak}	-10	NA	10	uA
Ground	V_{gndsh}	-50	NA	50	mV
Maximum transient output voltage level	$V_{oh(absmax)}$	-0.15	NA	1.45	V
Maximum transient time above $V_{oh(absmax)}$	$t_{Voh(absmax)}$	NA	NA	20	ns
HS transmit differential output voltage magnitude	$ V_{od} $	140	200	270	mV
Change in differential output voltage magnitude between logic states	$\Delta V_{od} $	NA	NA	14	mV
Steady-state common-mode output voltage	V_{cmtx}	150	200	250	mV
Change in steady-state common-mode output voltage between logic states	$\Delta V_{cmtx}(1,0)$	NA	NA	5	mV
HS output high voltage	V_{ohhs}	NA	NA	360	mV
Single-ended output impedance	Z_{os}	40	50	62.5	Ω
Single-ended output impedance mismatch	ΔZ_{os}	NA	NA	10	Ω
Output low-level SE output	V_{ol}	-50	NA	50	mV
Output high-level SE output	V_{oh}	1.1	1.2	1.3	V
Single-ended output impedance	Z_{olp}	110	NA	NA	Ω
Single-ended output impedance mismatch driving opposite level	$\Delta Z_{olp}(01,10)$	NA	NA	20	%
Single-ended output impedance mismatch driving same level	$\Delta Z_{olp}(00,11)$	NA	NA	5	%
Differential input high voltage threshold	V_{idth}	NA	NA	70	mV
Differential input low voltage	V_{idtl}	-70	NA	NA	mV

Parameters	Symbol	Min	Typ	Max	Units
threshold					
Single ended input high voltage	Vihhs	NA	NA	460	mV
Single ended input low voltage	Vilhs	-40	NA	NA	mV
Input common mode voltage	Vcmrxd	70	NA	330	mV
Differential input impedance	Zid	80	NA	125	Ω
Input low voltage	Vil	NA	NA	550	mV
Input high voltage	Vih	880	NA	NA	mV
Input hysteresis	Vhyst	25	NA	NA	mV
Input low fault threshold	Vilf	NA	NA	200	mV
Input high fault threshold	Vihf	450	NA	NA	mV

Chapter 5 应用指南

5.1 组装建议

RMSL312-3104 结构光模组的尺寸和组装孔位的示意图：



在上图中，3- $\Phi 3.26\text{mm}$ 孔为螺钉装配孔，可使用 M3.0 螺钉进行装配定位。其余要求如下：

1. 镜片要求：
 - a. 波长 900-1000nm 透过率大于 92%，入射角 0-35 度（这是假定模组与保护镜片平行放置，如果模组与 TP 镜片有倾斜角度，该角度需要小于 20 度，最好 TP 镜片可以镀该波段增透膜）。
 - b. 材料可为 PMMA 或者光学玻璃。
 - c. 透过波前要求：小于 $1/4 \lambda$ @任意 $\Phi 5\text{mm}$ 通光区域。
2. 密封要求：模组与锁体外壳之间采用防水泡棉密封。
3. 安装建议：按照上图 3 个孔位安装，接口朝下，安装过程尽可能减少对模组前盖的受力，防止壳体变形。建议增加垫圈并控制安装扭力。
4. 散热建议：模组为间歇式工作，依靠模组结构散热即可，需保证无其他热源对模组进行加热。