

PRODUCT 产品名称	:	CAMERA MODULE 摄像头模组
MODULE NO. 模组型号	:	COD536-B8BF-E
CUSTOMER 客户	:	Thundersoft



CERT.No.QAC6015231/A
(ISO9001)



CERT.No.QAC6015231
(ISO14001)



SPECIFICATION

产品规格书

Revision 版本: 0.1

If there is no special request from customer, TRULY OPTO-ELECTRONICS LTD. will not reserve the toolings of the product under the following conditions:

如有下列情况，但客户又没有特别的要求，信利光电公司将不储存产品模具：

1. There is no response from customer in two year after TRULY OPTO-ELECTRONICS LTD. submit the samples. 从信利提供样品后，两年内客户没有回应；

2. There is no order in two years after the latest mass production.

在最后一批的批量后2年内没有订单。

And corrected data (including quality records) will be reserved for one year more after tooling is discarded. 相关的数据（包括质量记录）将会被保留一年或更久直到模具放弃。

TRULY OPTO-ELECTRONICS LTD.:

信利光电股份有限公司

Approved by:

审核

Quality Assurance Department: _____

品质部

Technical Department: _____

技术部

CUSTOMER:

客户

Approved by:

审核

Revision history 变更历史			
Revision NO. 版本号	Date 日期	Description 描述	Remark 备注
0.1	2018-06-19	First release	Preliminary

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WRITTEN BY 编写	CHECKED BY 检查	APPROVED BY 核准
李金印	杨生武	王军伟

Key information 关键信息

Module No.		COD536-B8BF-E	备注
Module Size		7.5mm×7.5mm× 5.09mm	模组头部尺寸
Sensor Type		OV8856	
Active Size		3264 x 2448	参考sensor datasheet
Power Supply	Core	1.14~1.26V (1.2Vnominal)	
	Analog	2.6~3.0V(2.8Vnominal)	
	I/O	1.7~1.9V(1.8V nominal)	
Lens Size and Structure		1/4 INCH	
Lens F.NO		2.4±5%	
Lens View Angle		120°	
IR Cutter		648nm	
Object Distance		30CM~Infinity	
Input Clock Frequency		6~27MHz	参考sensor datasheet
Output Formats		10-bit RGB RAW	参考sensor datasheet
Program Contents		AWB, LSC	
Maximum Image Transfer Rate	8MP (full resolution)	30fps	参考sensor datasheet
Pixel Size		1.12μm × 1.12μm	参考sensor datasheet
Sensor Power Requirement	Active	150mW	参考sensor datasheet
	Standby	0.8uW	参考sensor datasheet
IC Package		COB	参考sensor datasheet
Substrate		R-FPC	
Package		Antistatic Plastic	

Pin assignment 引脚定义

No. 序号	Name 命名	Pin type 引脚类型	Description 描述
1	NC	-	No connect
2	NC	-	No connect
3	AVDD	Power	Power supply
4	DGND	Ground	Digital ground
5	RESET	I/O	Digital input
6	DGND	Ground	Digital ground
7	MDP3	Output	MIPI TX data lane 3 positive output
8	MDN3	Output	MIPI TX data lane 3 negative output
9	DGND	Ground	Digital ground
10	MDP1	Output	MIPI TX data lane 1 positive output
11	MDN1	Output	MIPI TX data lane 1 negative output
12	DGND	Ground	Digital ground
13	MDP4	Output	MIPI TX data lane 4 positive output
14	MDN4	Output	MIPI TX data lane 4 negative output
15	DGND	Ground	Digital ground
16	DGND	Ground	Digital ground
17	MDN2	Output	MIPI TX data lane 2 negative output
18	MDP2	Output	MIPI TX data lane 2 positive output
19	DGND	Ground	Digital ground
20	MCN	Output	MIPI TX clock lane negative output
21	MCP	Output	MIPI TX clock lane positive output
22	DGND	Ground	Digital ground
23	MCLK	I/O	Digital input
24	DGND	Ground	Digital ground
25	SCL	I/O	IIC communication clock input
26	SDA	I/O	IIC communication clock input/output
27	NC	-	No connect
28	DOVDD	Power	Power supply
29	AGND	Ground	Analog ground
30	DVDD	Power	Power supply

Electrical characteristics 电气特性

1. Absolute Maximum Ratings

parameter		absolute maximum rating ^a
ambient storage temperature		-40°C to +125°C
supply voltage (with respect to ground)	V _{DD-A}	4.5V
	V _{DD-D}	3V
	V _{DD-IO}	4.5V
electro-static discharge (ESD)	human body model	2000V
	machine model	200V
all input/output voltages (with respect to ground)		-0.3V to V _{DD-IO} + 1V
I/O current on any input or output pin		± 200 mA

- a. exceeding the absolute maximum ratings shown above invalidates all AC and DC electrical specifications and may result in permanent damage to the device. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

2.DC Characteristics

symbol	parameter	min	typ	max ^a	unit
supply					
V _{DD-A}	supply voltage (analog)	2.6	2.8	3.0	V
V _{DD-D}	supply voltage (digital core for 4-lane MIPI up to 1000 Mbps/lane)	1.14	1.2	1.26	V
V _{DD-IO}	supply voltage (digital I/O)	1.7	1.8	1.9	V
I _{DD-A}	active (operating) current ^{b,c} (full 8MP @ 30 fps)		22.5	28	mA
I _{DD-IO}			1.1	2.7	mA
I _{DD-D}			69.2	95	mA
I _{DD-A}	active (operating) current ^{b,c} (1080p @ 60 fps)		22.5	28	mA
I _{DD-IO}			1.1	2.7	mA
I _{DD-D}			48.6	65	mA
I _{DD-A}	active (operating) current ^{b,c} (1632x1224 @ 60 fps)		18	24	mA
I _{DD-IO}			1.1	2.7	mA
I _{DD-D}			38.6	52	mA
I _{DD-A}	active (operating) current ^{b,c} (720p @ 60 fps)		22	28	mA
I _{DD-IO}			1.1	2.7	mA
I _{DD-D}			39.2	53	mA
I _{DD-A}	active (operating) current ^{b,c} (800x600 @ 90 fps)		22	28	mA
I _{DD-IO}			1.1	2.7	mA
I _{DD-D}			36.2	52	mA
I _{DDS-SCCB}	standby current ^{b,d}		800	3000	μA
I _{DDS-XSHUTDN}			1	5	μA
digital inputs (typical conditions: AVDD = 2.8V, DVDD = 1.2V, DOVDD = 1.8V)					
V _{IL}	input voltage LOW			0.54	V
V _{IH}	input voltage HIGH	1.26			V
C _{IN}	input capacitor			10	pF
V _{OH}	output voltage HIGH	1.62			V
V _{OL}	output voltage LOW			0.18	V
serial interface inputs					
V _{IL} ^e	SCL and SDA	-0.5	0	0.54	V
V _{IH}	SCL and SDA	1.28	1.8	3.0	V

a. maximum active current is measured under typical supply voltage

b. power data is based on typical samples and may need adjustments after corner samples test

c. DVDD is provided by external regulator for lower power consumption. DVDD and EVDD are tied together. DOVDD = 1.8V

d. standby current is measured at room temperature with external clock off

e. based on DOVDD = 1.8V

3.Power up sequence

To avoid any glitch from a strong external noise source, OmniVision recommends controlling XSHUTDN.

Whether or not XSHUTDN is controlled by GPIO, the XSHUTDN rising cannot occur before AVDD and DOVDD.

table 3-1 power up sequence

XSHUTDN	power up sequence requirement
GPIO	Refer to figure 3-1 1. DOVDD, AVDD, and DVDD can rise in any order 2. XSHUTDN rising must occur after AVDD, DOVDD and DVDD are stable

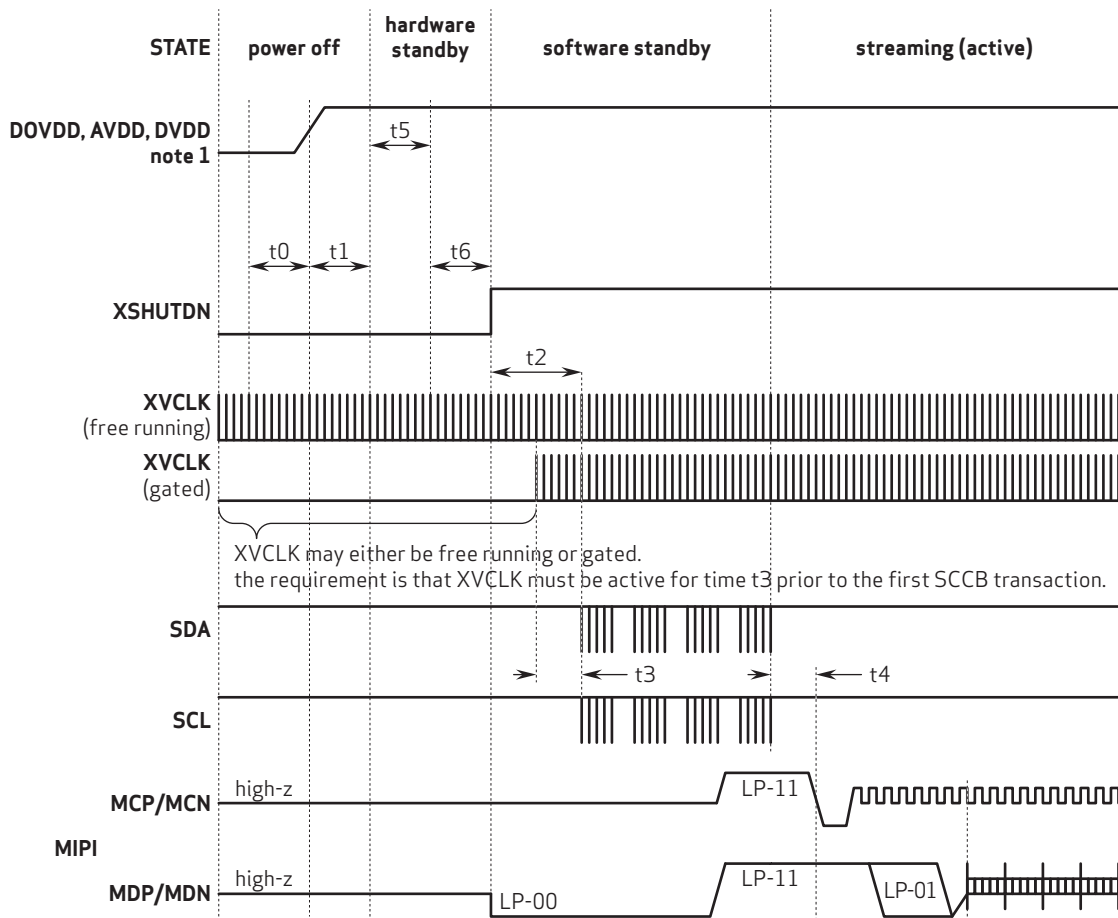
table 3-2 power up sequence timing constraints

constraint	label	min	max	unit
AVDD rising – DOVDD rising	t0 ^a	0	∞	ns
DOVDD rising – AVDD rising	t1 ^a			ns
XSHUTDN rising – first SCCB transaction	t2	8192		XVCLK cycles
minimum number of XVCLK cycles prior to the first SCCB transaction	t3	8192		XVCLK cycles
PLL lock period	t4	0.2		ms
AVDD or DOVDD, whichever is last – DVDD	t5 ^a	0	∞	ns
DVDD – XSHUTDN rising	t6	0	∞	ns

a. only for OV8856, t0, t1, and t5 may rise in any order before XSHUTDN is pulled high

3.Power up sequence

figure 3-1 power up sequence



4.Power down sequence

The digital and analog supply voltages can be powered down in any order (e.g., DOVDD, then AVDD or AVDD, then DOVDD). Similar to the power up sequence, the XVCLK input clock may be either gated or continuous. To avoid bad frames from the MIPI, OmniVision recommends to using group hold to send SCCB sleep command.

table 4-1 power down sequence

XSHUTDN	power down sequence requirement
GPIO	Refer to figure 4-2 1. software standby recommended 2. pull XSHUTDN low for minimum power consumption 3. cut off DVDD, pull AVDD, and DOVDD low in any order

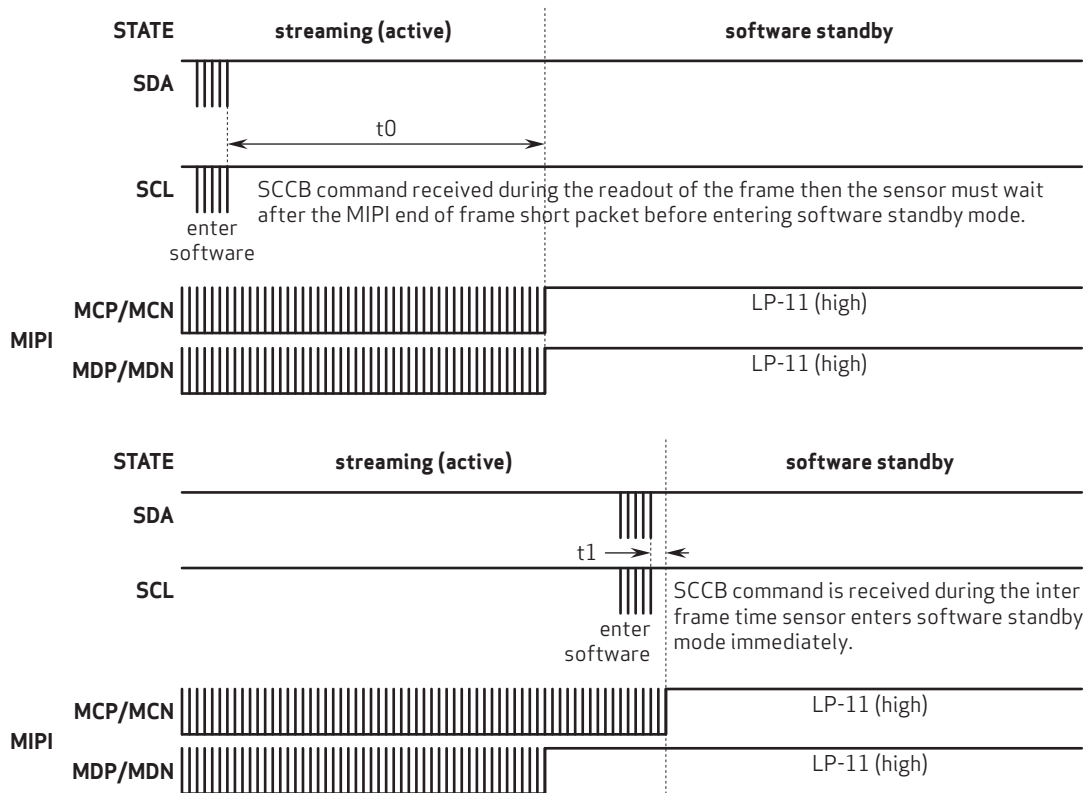
table 4-2 power down sequence timing constraints

constraint	label	min	max	unit
enter software standby SCCB command device in software standby mode	t0	when a frame of MIPI data is output, wait for the MIPI end code before entering the software for standby; otherwise, enter the software standby mode immediately		
minimum of XVCLK cycles after the last SCCB transaction or MIPI frame end	t1	512		XVCLK cycles
last SCCB transaction or MIPI frame end, XSHUTDN falling	t2	512		XVCLK cycles
XSHUTDN falling – AVDD falling or DVDD or DOVDD falling whichever is first	t3 ^a	0.0		ns

a. only for OV8856, DVDD, DOVDD, and AVDD may fall in any order after XSHUTDN is pulled low

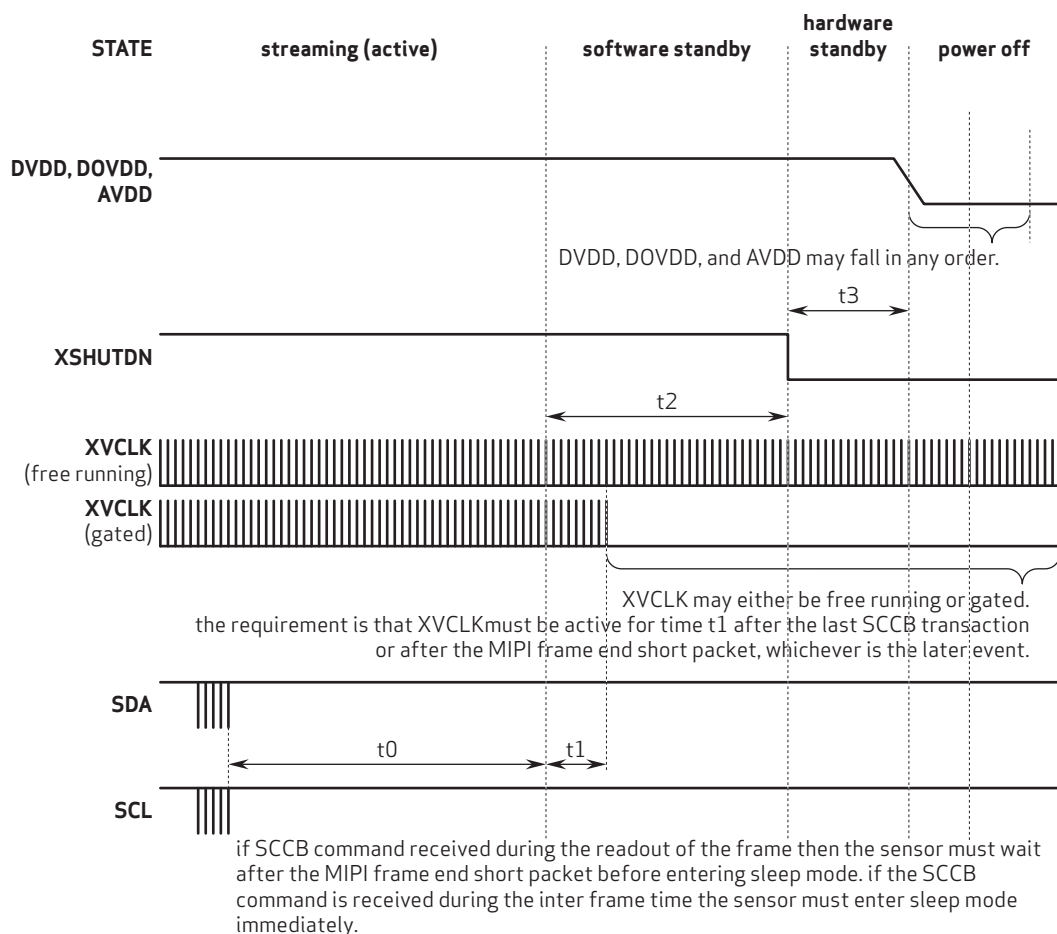
4.Power down sequence

figure 4-1 software standby sequence



4. Power down sequence

figure 4-2 power down sequence



Note: For more information of sensor please refer to the OV8856 specification.

Mechanical drawing 图纸

Customer No.:

COD536-B8BF-E Camera Module

HAZARDOUS SUBSTANCES MANAGEMENT STANDARD
ROHS COMPLIANT
REACH COMPLIANT+HALOGEN FREE
HAZARDOUS SUBSTANCES MANAGEMENT STANDARD
FOR
Ver. ____

30PIN DESCRIPTION

PIN NO. SIGNAL

1	NC
2	NC
3	AVDD
4	DGND
5	RESET
6	DGND
7	MDP3
8	MDN3
9	DGND
10	MDP1
11	MDN1
12	DGND
13	MDP4
14	MDN4
15	DGND
16	DGND
17	MDN2
18	MDP2
19	DGND
20	MCN
21	MCP
22	DGND
23	MCLK
24	DGND
25	SCL
26	SDA
27	NC
28	DQVDD
29	AGND
30	DVDD

Note
1.* Is Critical Dimensions;
2. Sensor IIC address:0x20 for write, 0x21 for read;
3. Power Supply:
AVDD—2.6 to 3.0V(2.8V typical);
DVDD—1.70 to 1.9V (1.8V typical);
DVDD—1.14 to 1.28V (1.2V typical);
4. 软硬板软硬结合处接点, 50mm范围内不能弯折.
5. 引脚连接器: BSC(B0.8)-30DS-0.4Y(G).

主要参数(Main Specification)				
焦距(mm)	1.78			
光圈(f/NO)	2.4±0%			
视角(View angle)	120°			
畸变(T/Distortion)	≤3 %			
景深(Depending Range)	30cm~Infinity			
感光芯片(Chip Type)	OVB866			
像素(Array Size)	8.0M			
镜头类型(Lens Size)	1/4 INVA GPR			
CUSTOMER APPROVE				
Mechanical	Electrical	AMEND		
		Change DIM thickness	20180515	TOLERANCE DECIMAL
		Add module name	20180511	.X ± .30
		Change the length	20180503	.XX ± .20
		First release	20180425	Δ ± 1/4"
		CONTENT	DATE	
模组名称 TRULY OPTO-ELECTRONICS LTD.				
PRODUCT ID:		DRAW NO.	REV	
COD536-B8BF-E		BSPBCAK00063	D	
DWN 薛昌镇 20180515		DSN 薛昌镇 20180515	AAPPD 马亮 20180515	
CHKD 韦有兴 20180515		NOT IN SCALE UNIT mm SHEET 1/1		

Appearance specification 外观规格

NO.	项目 Item	标准 Standard
1	通光孔 The optical aperture	1.通光孔表面保持洁净光泽, 无明显杂物、灰尘、残胶、油渍、可见颗粒等; The surface of the through-hole is kept clean and glossy, and there is no visible debris, dust, residue, etc. 2.通光孔内圈须圆整光滑, 不可有毛屑、缺口等; The inner ring of the optical aperture must be round and smooth. 3.通光孔划伤以不影响模组解析力为准。 The resolution of the optical hole is subject to the resolution of the module.
2	镜室前端面 Top side of Lens	1.无明显脏污、色差、杂质; No obvious smudge color difference. 2.Lens花瓣无缺损、凸起、明显色差、脏污, 镜面不得有胶水残留痕迹; The Lens petals have no defect and prominent color difference stains, the mirror must not have the glue residue trace. 3.划伤、脏污目视不可见。 Scratches are not visible.
3	脖子胶 The neck glue	1. 断胶、欠胶长度不可超出 FPC 宽度的 1/2; The length of the adhesive should not exceed 1/2 of the width of FPC. 2. 点胶宽度不可超过白色直油线; The glue width must not exceed the white straight line. 3. 脖子胶不可出现破孔; No holes in the neck glue. 4. 点胶的高度不可超过 holder 高度的 3/4。 The height of the glue should not exceed 3/4 of the holder height.
4	搭载胶 With glue	1.搭载胶溢胶的尺寸需满足图纸要求; The size of the glue spillway shall meet the requirements of the drawing. 2.搭载胶不可出现破孔。 No holes can be found with glue.
5	双面粘 Double coated tapes	1.粘贴方向不可错; Let's paste the direction.; 2.粘贴后不可超出补强板或 holder (以较大者为界) 边缘, 不可有突起; After pasting, do not exceed the edge of the reinforcing plate or holder;
6	FPC/PCB	1.不可有向内撕裂状尖角, 不得露铜; Do not tear the sharp corners inward, and do not expose the copper. 2.表面不可有明显脏污、划痕; The surface should not have obvious smudge marks. 3.印刷字体、喷码须可辨识; Print font size must be recognized.
7	连接器 connector	1.不可有异物、污渍、变色、变形、焊接不良等; Do not have foreign body stain discoloration deformation welding poor. 2.线路断、凹槽处裂痕不可有 (5 倍放大镜检查); There must be no crack at the broken grooves in the line (5 times magnifying glass).
8	海绵垫 sponge mat	1.要求贴附之后平整, 不得出现翘起、突起等; After the request is attached, flat, no protrusion and so on. 2.贴附方向与要求一致; The attached directions are in accordance with the requirements.

Note:

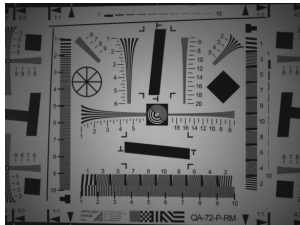
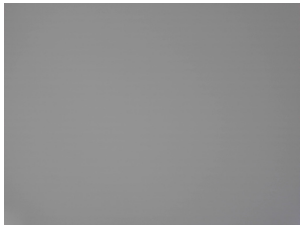
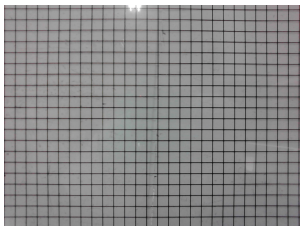
1. Check method 检查方法:

- 1) 人眼距离模组: 30~40cm; Human eye distance module :30~40cm.
- 2) 目视时间: 3~5s; Visual time :3~5s.
- 3) 环境照度: 200-600lux; Ambient illumination :200-600lux.
- 4) 目视角度: 先视线垂直于模组 (呈 90° 角度), 再斜视 45°。 Visual Angle: the first line of sight is perpendicular to the module (at 90 degrees), and then squint 45.

2. Referenced sampling standard 参考抽样标准

GB/T 2828.1-2012/ISO 2859-1:1999 and ANSI/ASQC.4-1993 II

Image specification 影像规格

NO.序号	Item 项目	Shipment Standard 出货标准
1	TVL 解析力 	1 RAW10，内部参数； 2 检测距离：60CM； 3 解析力标准： Center 中心 ≥ 1500 TVL， 0.7 viewing field ≥ 900 TVL
2	Particle 污点 & Blemish 黑团 	Full screen全屏 Particle: Contrast $< 15\%$, Pixel number ≤ 23 污点：对比度 $< 15\%$ ，像素数量 ≤ 23 Blemish: Contrast $< 1.0\%$, Pixel number $\leq 175*175$ 黑团：对比度 $< 1.0\%$ ，像素数量 $\leq 175*175$
3	Distortion 畸变 	TV Distortion $\leq 13\%$

Reliability test conditions 可靠性测试条件

No.	Test item 测试项目	Test condition 测试条件	Judgment 判断
1	Temperature strike cycle [Power off] 冷热循环冲击（断电）	Low temperature 低温:-30°C±2°C for 30 min High temperature 高温:+80°C±2°C for 30 min Cycle 循环:10 times 次	1.Place the test in two hours.放置两小时后测试 2.Function功能: Resolution meet the criterion of variable quantity ≤20% after test 解析力: 解析力变化量≤20%; Shading: meet the criterion of shipment after test 试验后满足出货标准; 3.Appearance外观: Do not exist NG after test 实验后不能出现由实验导致的不良
2	High temperature and high humidity storage 高温高湿存放	Temperature 温度:60°C±2°C Humidity 湿度:90%RH±3% Time 时间:96 hours 小时	
3	Low temperature operating 低温运行	Temperature 温度:-20°C±2°C Time 时间:96 hours 小时	
4	High temperature operating 高温运行	Temperature 温度:70°C±2°C Time 时间:96 hours 小时	
5	Low temperature storage 低温存放	Temperature 温度:-30°C±2°C Time 时间:96 hours 小时	
6	High temperature storage 高温存放	Temperature 温度:80°C±2°C Time 时间:96 hours 小时	
7	ESD test[Power off] 静电试验（断电）	C:150pF R:330Ω Voltage 电压:±2KV Air discharge 空气放电 Cycle 循环:10 times 次	
8	Vibration Test[Packaged] 振动试验（包装）	Frequency 频率:10Hz~55Hz~10Hz Amplitude 振幅:1.5 mm Time: each X,Y,Z directions for 30mins 时间: X,Y,Z 方向各 30 分钟	
9	Dropping test[Packaged] 跌落试验（内部跌落夹具）	Product dropping from 100cm height to smooth marble 将产品固定在跌落工装中，自1.0m 高处跌落到大理石地面上。 Drop style:1 corner,3 arris,6 faces Test times:10 一角三棱六面 共 10 次	

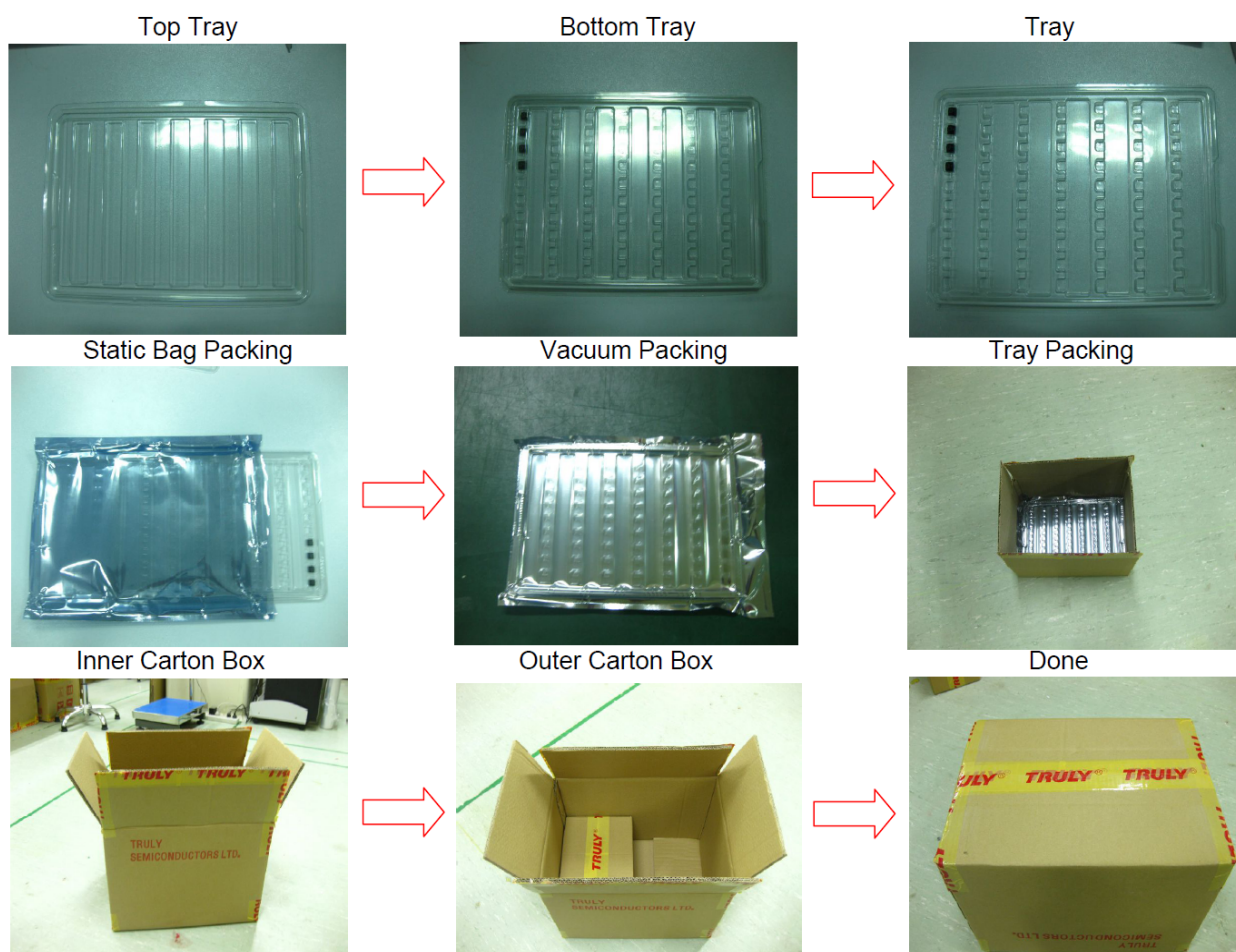
Package specification 包装规格

Packaging Design One 包装设计 1

Quantity/ each box 数量/每箱	1600PCS	Recycle 重复利用	<input type="checkbox"/> YES 是 <input checked="" type="checkbox"/> NO 否
Outer carton box size 外卡通箱尺寸	405mm*290mm*290mm	Material for box 包装材料	<input checked="" type="checkbox"/> paper 纸 <input type="checkbox"/> plastic 塑料
Weight / outer box 外箱重量	According actual weight (Max) 依据实际重量 (最大)	Box type 箱型	<input checked="" type="checkbox"/> new 全新 <input type="checkbox"/> update 更新

There are 40 PCS modules in each plastic tray.每个吸塑有 40 粒模组。

There are 5 plastic trays in each vacuum bag.每个真空袋有 5 个吸塑



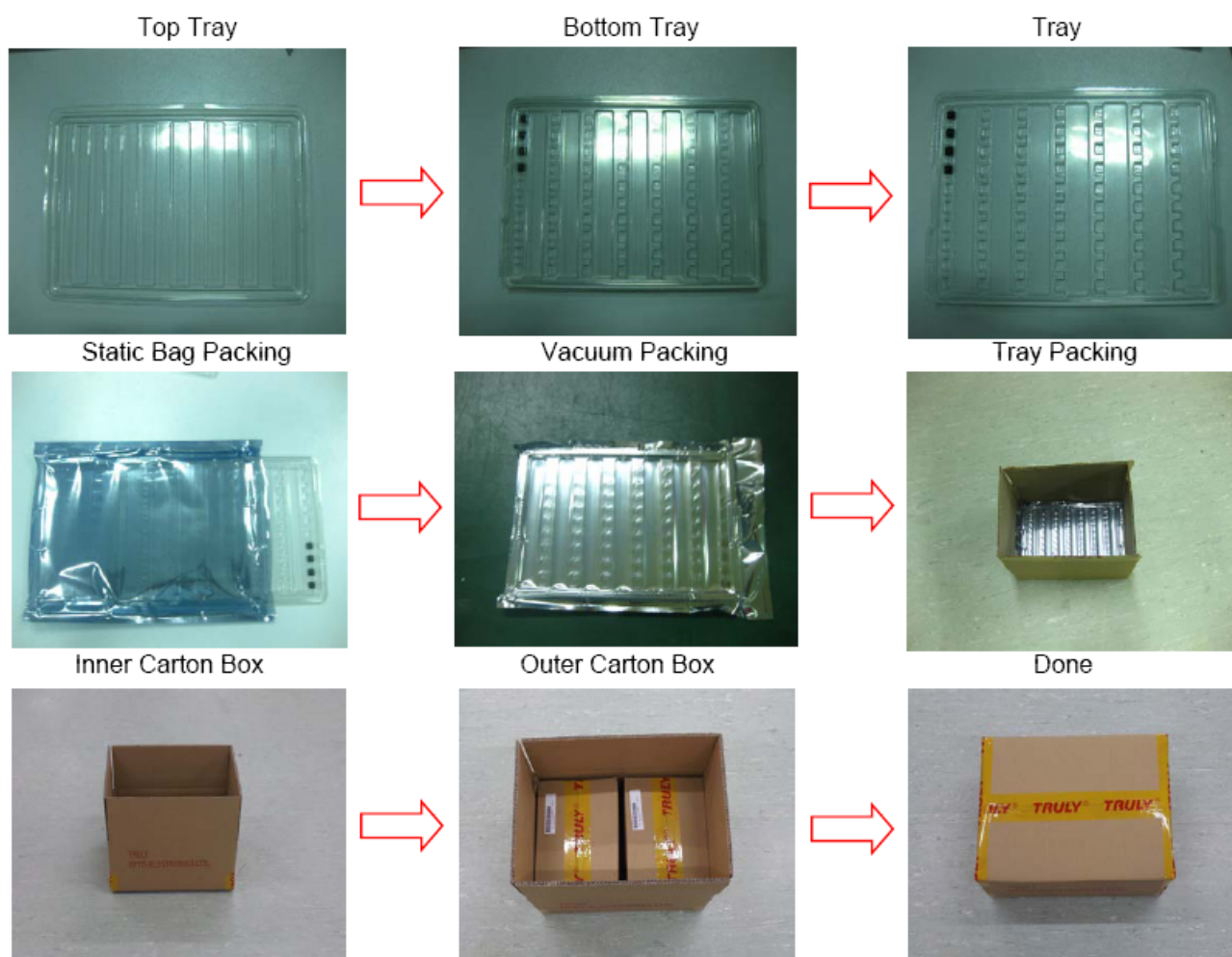
以上包装仅供参考

Packaging Design Two 包装设计 2

Quantity/ each box 数量/每箱	800PCS	Recycle 重复利用	<input type="checkbox"/> YES 是 <input checked="" type="checkbox"/> NO 否
Outer carton box size 外卡通箱尺寸	405mm*290mm*170mm	Material for box 包装材料	<input checked="" type="checkbox"/> paper 纸 <input type="checkbox"/> plastic 塑料
Weight / outer box 外箱重量	According actual weight (Max) 依据实际重量 (最大)	Box type 箱型	<input checked="" type="checkbox"/> new 全新 <input type="checkbox"/> update 更新

There are 40 PCS modules in each plastic tray 每个吸塑有 40 粒模组。

There are 5 plastic trays in each vacuum bag.每个真空袋有 5 个吸塑。



以上图片供参考

Application notes 使用注意事项

Store the products at the temperature and humidity mentioned in the specification in a state of package with carefully not to expose the products to the direct sunlight.

请把包装好的产品存放在规格书中规定的温度和湿度条件下，不要直接暴露于太阳光下。

Finger sacks, gloves and mask to protect the products from fingerprint of stain.

请使用手指套，手套或者保护膜，保护产品不被指纹沾污。

Pay Attention to high voltage and static electricity. 注意高压和静电.

Turn off the power before connect and disconnect the camera module.

请在连接和断开相机模组之前关闭电源。

DO NOT use liquid or aerosol cleaners to clean the lens. 请勿使用液体或气溶胶清洁剂清洁镜头。

DO NOT make any modifications to the camera module. 不要对相机模组进行任何修改。

DO NOT subject the camera module to strong electromagnetic field. 请勿使相机模组受到强电磁场。

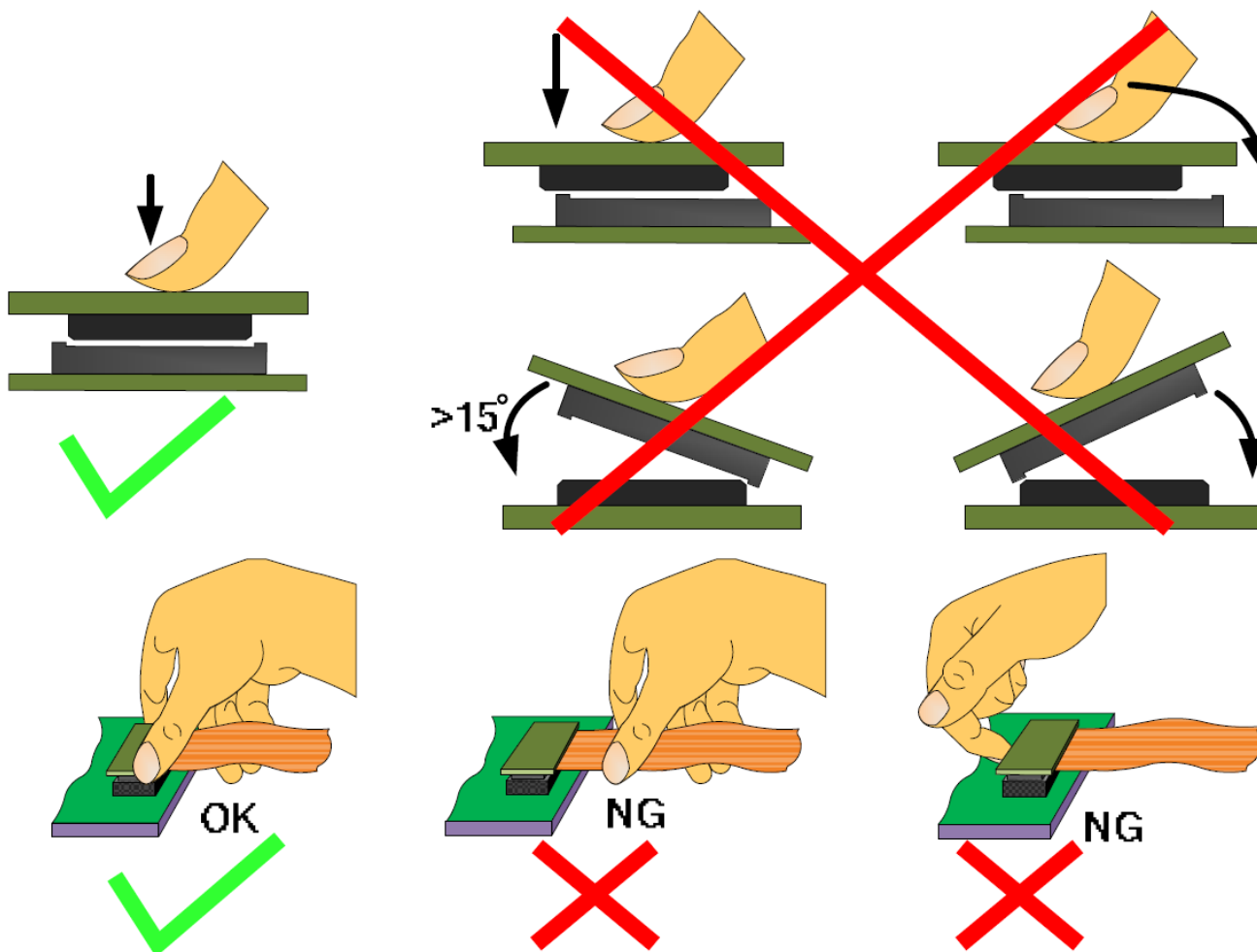
DO NOT twist FPC of CCM. 不要扭转 FPC.



Correct

Incorrect

Incorrect



Limited Warranty 有限责任

Unless agreed between TRULY and customer, TRULY will replace or repair any of its CCM modules which are found to be functionally defective when inspected in accordance with TRULY CCM acceptance standards for a period of one year from date of shipments. Cosmetic/visual defects must be returned to TRULY within 90 days of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of TRULY limited to repair and/or replacement on the terms set forth above. TRULY will not being responsible for any subsequent or consequential events.

除信利和客户之间另有协议外，自生产之日起一年内，根据信利的摄像头产品品质标准，信利将对有功能缺陷的摄像头模组换货或返工。外观/视觉缺陷产品，必须在出货后90天内归还信利。以产品上标识日期为准。信利保修责任仅限于对符合上述规定的货品进行返工和/或换货。对此后发生的任何情况，信利均不承担任何责任。

Storage condition and expiring time 保存条件和保质期

Storage temperature and humidity of warehouse 仓库存储温湿度	23±4℃, 40~75%RH
Expiring time 保质期	1 year

Prior Consult Matter 提前商议事项

- 1 For Truly standard products, we keep the right to change material, process ... for improving the product property without prior notice to our customer.
对于信利的标准产品，我们保留在不通知客户的情况下，为提高产品性能而改变原材料及加工方法等的权利。
- 2 For OEM products, if any changes are needed which may affect the product property, we will consult with our customer in advance.
对于 OEM 产品，如果需要做任何会影响到产品性能的改变，我们会提前和客户商议。
- 3 If you have special requirement about reliability condition, please let us know before you start the test on our samples.
如对可靠性条件有特殊要求，请在测试样品前通知我们。

Factory Contact Information 工厂联系信息

FACTORY NAME: TRULY OPTO-ELECTRONICS LTD.信利光电股份有限公司

FACTORY ADDRESS: Truly Industrial Area, ShanWei City, GuangDong, China

工厂地址：中国广东省汕尾市信利工业城

P.C 邮政编码:516600

URL 网址: <http://www.trulyopto.com>

Dear customer 诚挚的客户：

In order to guarantee the quality of the product that you purchase and our service quality, please sign in the first page in the thirty days after you have received this specification, and you can also write in the first page and send to us if you have any other special requirements. if we haven't received the information about the approval (include the spec, approval form, and others), we would think the customer accept the sample with acquiescence.

为了您所订购的产品品质得到更好的保证，并进一步方便我司后续作业，烦请贵司接到我司此份《规格书》后在 30 个工作日内无论确认与否，请给予回签。如对我司此规格之产品有特殊要求，烦请一并注明。如在 30 个工作日内没有收到贵司加签的相关信息(包括规格书、样品回头纸及其它相关确认信息)，我司将认为贵司对此款送样接受确认。