PRODUCT	**:**	CAMERA MODULE
MODEL NO.	**:**	CM6484-B300SF-E
SUPPLIER	**:**	TRULY OPTO-ELECTRONICS LTD.
DATE	**:**	February 11, 2012

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision: 1.0

CM6484-B300SF-E

If there is no special request from customer, TRULY OPTO-ELECTRONICS LTD. will not reserve the tooling of the product under the following conditions:
1.There is no response from customer in two years after TRULY OPTO-ELECTRONICS LTD. submit the samples；
2.There is no order in two years after the latest mass production.
And correlated data (include quality record) will be reserved one year more after tooling was discarded.

TRULY OPTO-ELECTRONICS LTD.: CUSTOMER:

Quality Assurance Department:_____
Approved by:

Technical Department:_____

Approved by:

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2012-02-11	First release	

CONTENTS

WRITTEN BY	CHECKED BY	APPROVED BY
LIU XUE NA	WEI YOU XING	LIU TIE NAN

Key Information

Module No.		CM6484-B300SF-E
Module Size		8.00mm x 8.00mm x 4.30mm
Sensor Type		OV3660
Array Size	QXGA	2048 x 1536
Power Supply	Core	1.5VDC +/-5%
	Analog	2.6~3.0 VDC (2.8V typical)
	I/O	1.8V / 2.8V
Lens		1/5 inch 4Plastic+ IR
Focus(F.NO)		2.4
View Angle		66.2 °
Image Area		2912 µm x 2167.2 µm
Object Distance		40cm~161 cm
Sensitivity		670 mV/Lux-sec
Pixel Size		1.4µm x 1.4µm
IR Cutter		650+/-10nm
Sensor Temperature Range	Operating	-20 ° C to 70 ° C
	Stable Image	0 ° C to 50 ° C
Output Formats		8-/10-bit RAW, RGB and YCbCr
Maximum Image Transfer Rate	QXGA	120 fps
	XGA	45 fps
S/N Rate		34 dB
Dynamic Range		70 dB
Substrate		FPC
Sensor Power Requirement	Active	98 mA
	Standby	20 µA
Fixed Pattern Noise		1% of $V_{peak\text{-}to\text{-}peak}$
Scan Mode		Progressive
Package		Antistatic Plastic

Pin Assignment

No.	Name	Pin type	Description
1	AGND	Ground	Ground for analog circuit
2	SIO-D	I/O	SCCB data
3	AVDD	Power	Power for analog circuit
4	SIO-C	Input	SCCB input clock
5	DGND	Ground	Ground for digital circuit
6	VSYNC	I/O	Video output vertical signal
7	DGND	Ground	Ground for digital circuit
8	HREF	I/O	Video output horizontal signal
9	DVDD	Reference	Power for digital core
10	MCLK	Input	System input clock/scan clock input
11	PWDN	Input	Power down（active high with pull down resistor）
12	DOVDD	Power	Power for I/O circuit
13	PCLK	I/O	Image output clock
14	Y0	I/O	Image date output [0]
15	RESET	Input	Reset (active low with internal pull-up resistor)
16	Y1	I/O	Image date output [1]
17	Y9	I/O	Image date output [9]
18	Y8	I/O	Image date output [8]
19	Y7	I/O	Image date output [7]
20	Y6	I/O	Image date output [6]
21	Y5	I/O	Image date output [5]
22	Y4	I/O	Image date output [4]
23	Y3	I/O	Image date output [3]
24	Y2	I/O	Image date output [2]

Electrical Characteristics

1. Absolute Maximum Ratings

Parameter		Absolute maximum rating
Supply voltage (with respect to ground)[b]	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 or output pin		±200mA

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.

b. For negative voltage with respect to ground, V_{DD-A} (-4.5V), V_{DD-C} (-3V), V_{DD-IO} (-4.5V)

2. DC Characteristics (-20℃<Ta<70℃)

Symbol	Parameter	Min	Type	Max	Unit
Power Supply					
V_{DD-A}	Supply voltage (analog)	2.6	2.8	3.0	V
V_{DD-D}[a]	Supply voltage (digital core)	1.425	1.5	1.575	V
V_{DD-IO}	Supply voltage (digital I/O)	1.71	1.8	3.0	V
Internal DVDD,DOVDD=1.8V					
I_{DD-A}	Active (operating) current		28		mA
I_{DD-IO}[b,c]			70		mA
$I_{DDS-SCCB}$[d]	Standby current		20		mA
$I_{DDS-PWDN}$[d]			20		mA
Po	Active (operating) power consumption			TBD	mW
$P_{DDS-SCCB}$	Standby power consumption			TBD	μW
$P_{DDS-PWDN}$				TBD	μW
External DVDD,DOVDD=2.8V					
I_{DD-A}	Active (operating) current		28		mA
I_{DD-D}[b,c]			64		mA
I_{DD-IO}			6		mA
$I_{DDS-SCCB}$	Standby current		40		μA
$I_{DDS-PWDN}$			40		μA
Po	Active (operating) power consumption			TBD	mW
$P_{DDS-SCCB}$	Standby power consumption			TBD	μW
$P_{DDS-PWDN}$				TBD	μW

External DVDD,DOVDD=1.8V					
I_{DD-A}	Active (operating) current		28		mA
I_{DD-D}[b,c]			64		mA
I_{DD-IO}			4		mA
$I_{DDS-SCCB}$	Standby current		40		μA
$I_{DDS-PWDN}$			40		μA
Po	Active (operating) power consumption			TBD	mW
$P_{DDS-SCCB}$	Standby power consumption			TBD	μW
$P_{DDS-PWDN}$				TBD	μW

Symbol	Parameter	Min	Type	Max	Unit
Digital inputs (Typical conditions: AVDD = 2.8V, DVDD = 1.5V, 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
Digital outputs(Standard loading 25 pF)					
V_{OH}	Output voltage high	1.62			V
V_{OL}	Output voltage low			0.18	V
Serial interface inputs					
V_{IL}	SCL and SDA	-0.5	0	0.54	V
V_{IH}	SCL and SDA	1.26	1.8	3.0	V

a. Using the internal DVDD regulator is strongly recommended for minimum power down current.
b. Active current is based on sensor resolution at full size and at full speed in compression format. For smaller sizes such as 720p or below preview, the total active current will be about half.
c. DOVDD active current is based on loading of 10pF and typical compression format output PCLK (48MHz). For YUV output with higher PCLK, or higher loading, DOVDD current can go up.
d. At room temperature and typical supply voltages.
e. Based on DOVDD = 1.8V.

3. AC Characteristics (T_A=25℃, V_{DD-A}=2.8V)

Symbol	Parameter	Min	Type	Max	Unit
ADC parameters					
B	Analog bandwidth		30		MHz
DLE	DC differential linearity error		0.5		LSB
ILE	DC integral linearity error		1		LSB
	Setting time for hardware reset			<1	ms
	Setting time for software reset			<1	ms
	Setting time for resolution mode change			<1	ms
	Setting time for register setting			<300	ms

4. Timing Characteristics

Symbol	Parameter	Min	Type	Max	Unit
Oscillator and clock input					
f_{OSC}	Frequency(XVCLK)[a]	6	24	54	MHz
t_r, t_f	Clock input rise/fall time[b]			5 (10[c])	ns
F_{PCLK}	Parallel port output pixel clock		48[d]	96[e]	MHz

a. For input clock range 6~27MHz, the OV3660 can tolerate input clock jitter up to 1ns, for input clock range to 54MHz, the OV3660 can tolerate input clock jitter up to 500ps.
b. If the PLL is bypassed, the delay from input clock to output clock is approximately 4~5ns.
c. If using the internal PLL.
d. Typical PCLK is 48 MHz when sensor output is smaller size (VGA YUV or below) or full size compression.
e. 96 MHz is for sensor RAW data output at 15fps or YUV output at 7.5fps. For higher speeds such as 5 megapixel YUV @ 15fps, OmniVision recommends using the MIPI two-lane interface.

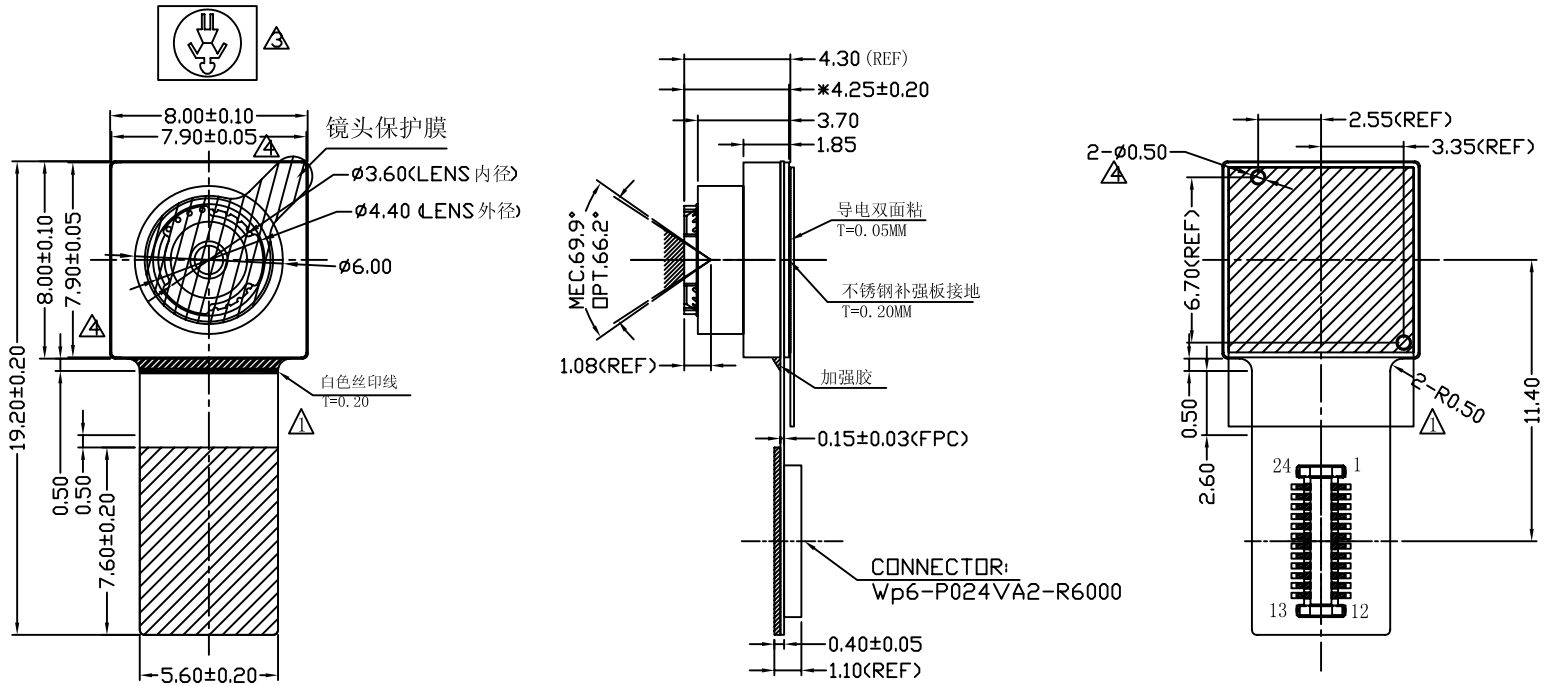
Note: For more information of sensor please refer to the OV3660 specification.

Mechanical Drawing

RoHS

Customer No.: 2370189

CM6484-B300SF-E Camera Module



24PIN DESCRIPTION

P/No.	Define
1	AGND
2	SIO-D
3	AVDD
4	SIO-C
5	DGND
6	VSYNC
7	DGND
8	HREF
9	DVDD
10	MCLK
11	PWDN
12	DOVDD
13	PCLK
14	Y0
15	/RESET
16	Y1
17	Y9
18	Y8
19	Y7
20	Y6
21	Y5
22	Y4
23	Y3
24	Y2

主要参数(Module Specification)	
焦距(EFL)	2.79mm
光圈(F.NO)	2.4
视场角(View Angle)	66.2°
畸变(Distortion)	< 1 %
景深(Focusing Range)	40CM~161CM
感光芯片(Chip Type)	OV3660
象素(Array Size)	3.0M
镜头类型(lens Size)	1/5INCH 4P+IR

备注:
1. 带*尺寸为关键尺寸;
2. 未标注圆角为R=0.20;
3. FPC使用新日铁：MB12-16-12REQ
⚠ 4. 镜头为:KT:P5BV;
⚠ 5. OV3660 CSP Type;

DVDD(1.5V+/-5%)
AVDD(2.6V~3.0V)
DOVDD(1.8V/2.8V)

OTP烧录信息	
烧录地址	烧录信息
3D05	02
3D06	03
3D07	02

CUSTOMER APPROVE		AMEND		
Mechanical	Electrical	NO.	CONTENT	DATE
		4	更改Holder尺寸	20110714
		3	更改影像方向	20110629
		2	更改影像方向	20110629
		5	去除FPC上的接地银膜	20110919

TOLERANCE DECIMAL
.x ± .30
.xx ± .20
∠ ± 1/4

TRULY OPTO-ELECTRONICS LTD.

PRODUCT NO.	DRAW NO.	REV
CM6484-B300SF-E		F

DWN	罗芳文 20110919	DSN	罗芳文 20110919
CHKD	马 亮 20110919	APPD	刘铁楠 20110919
NOT IN SCALE		UNIT mm	SHEET:

Appearance Specification

NO.	Item	Standard	Importance Class
1	Top side of Lens	No obvious impurity and oil impurity on the front of lens within the half area; The defect(unfeeling) limitation: width≤1mm, length≤2mm, the defect number≤2; No feeling defect; The width of defects and gaps on the outside of Lens≤0.3mm. Others are unlimited.	A
2	Screw glue	Normally screw glue shall be symmetrical distributed around lens circle side. Particular circs, glue distribution must not disturb customer's assembly operation.	A
3	Holder	No obvious impurity and distortion of outline. The width and length of defect is unlimited, the depth≤0.1mm and ≤1/4 of the thickness of Holder.	B
4	Sealed glue	Sealed glue distributing between holder and FPC must be symmetrical and smooth. Not allow glue leakage and asymmetric thickness. After holder assembly, the thickness distance between one side and its opposite side shall be less than 0.2mm. Excess glue over the holder shall not make the outside dimension be out of control.	A
5	FPC/PCB	Edge defect limitation: width≤1/2H (H is minimum.)、length≤1mm、defect numbers per edge≤2(No tearing gap inby edge for FPC); Edge outshoot limitation (width≤0.3mm, length≤1mm). No obvious impurity and crease on the surface. If there was shield film on the surface, the spot size of the film shall be less than 0.3mm×1mm and no line is exposed. If it was not be cleaned and did not influence the total thickness, it would be permitted. Label and mark shall be clear enough to be discerned.	A
6	Connector	No dust, fingerprint, and not allows to turning colors, distortion; Solder must be well; No open circuit or short circuit	A

7	Gold finger	No dust, fingerprint, and not allows to turning colors, burned, unsmoothed and peeled; No open circuit or short circuit; The defect width shall be smaller than 20% of gold finger's width. No copper/nickel exposed in defect. Numbers of defected pin shall be less than 3. The defect limitation:width≤0.08mm,length≤5mm.	A
8	Stiffener	Holder anchor pole length overtopping the steel plate shall be less than 0.2mm. No dust, rust and deep scratch on the steel surface without Double coated tapes.	B
9	Double coated tapes	Adhered direction shall be right. Not allows to excess steel plate edge. No alveoli and stick. Not allows to peel glue and rip protective paper when tear the protective paper.	B
10	Protective film	No dust in the glue side. Not allows to float or drop.	B

Remark:

1. The definition of the appearance importance class

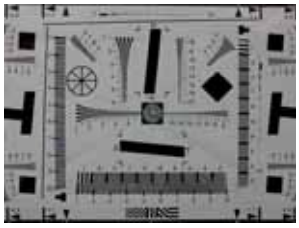
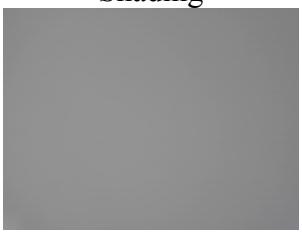
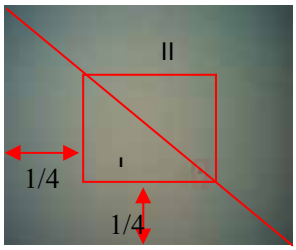
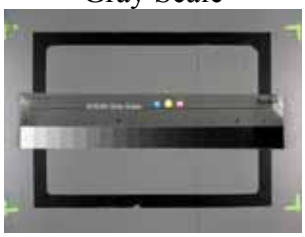
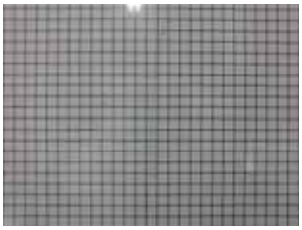
A：The defect can be found in the finished product, or have obvious visual differences from good products, such as crack, defect and dust, or influence image quality, or are appointed by the customer. We will emphasize these items and check all products.

B：The defect can be found in the finished product and has visual difference from the good one, but will not affect customer's aesthetic judgement. Or the defect can not be found in the finished product and will not generate functional problem, but will slightly influence sequential manufacture process or condition. We will supervise these items in the manufacturing process and check products selectively.

2. Sampling standard

Referenced standard: GB/T 2828.1-2003/ISO 2859-1:1999 and ANSI/ASQC.4-1993 Ⅱ

Image Specification

NO.	Item	Standard	Important Class
1	TV Line 	Center≥900 0.7 viewing field ≥700	A
2	Shading 	The lighteness of 90% viewing area ≥ 40% of center lighteness(Lens correction Shading [Turn off]); The lighteness of 90% viewing area ≥ 60% of center lighteness(Lens correction Shading [Turn on])	A
3	Blemish 	Ⅰ area：Blemish number≤1 Ⅱ area：Blemish number≤4	B
4	Color 	Color distortion ratio of center±15%	B
5	Gray Scale 	Margin of two near scales' brightness≥6	B
6	Distortion 	＜1%	B

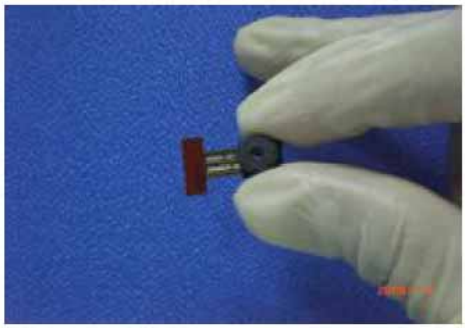
Reliability Specification

No.	Test item	Test condition	Judgment
1	Temperature strike cycle [Power off]	Low temperature:-30°C±2℃ for 30 min High temperature:+80°C±2℃ for 30 min Cycle:10 times	1.Function： Resolution: difference<20% after test Shading: difference<20% after test 2.Appearance: Do not exit NG after test
2	High temperature and high humidity storage	Temperature:60°C Humidity:90%RH Time:96 hours	
3	Low temperature operating	Temperature:-20°C±2℃ Time:96 hours	
4	High temperature operating	Temperature:70°C±2℃ Time:96 hours	
5	Low temperature storage	Temperature:-30°C±2℃ Time:96 hours	
6	High temperature storage	Temperature:80°C±2℃ Time:96 hours	
7	ESD test [Power off]	C:150pF R:330Ω Voltage:±2KV Air discharge: Cycle:10 times	
8	Vibration Test [Packaged]	Frequency:10Hz~55Hz~10Hz Amplitude:1.5 mm Times: each X,Y,Z directions for 30mins	
9	Dropping test [Packaged]	Product dropping from 150cm height to smooth marble Drop style:1 coner,3 arris,6 faces Test times:10	

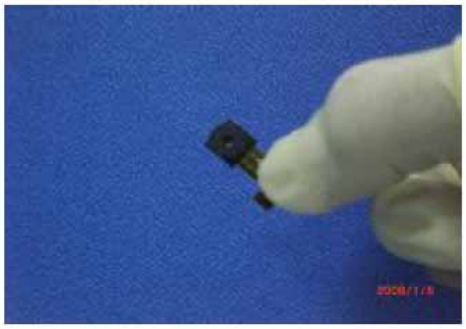
Precautions For Using CCM Modules

Handing Precautions

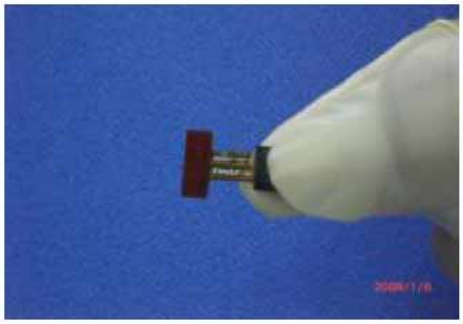
—DO NOT try to open the unit enclosure as there is no user-serviceable component inside. To prevent damage to the camera module by electrostatic discharge, handling the camera module only after discharging all static electricity from yourself and ensuring a static-free environment for the camera module.
—DO NOT touch the top surface of the lens.
—DO NOT press down on the lens.
—DO NOT try to focus the lens.
—DO NOT put the camera module in a dusty environment.
—To reduce the risk of electrical shock and damage to the camera module, turn off the power before connect and disconnect the camera module.
—DO NOT drop the camera module more than 60 cm onto any hard surface.
—DO NOT expose camera module to rain or moisture.
—DO NOT expose camera module to direct sunlight.
—DO NOT put camera in a high temperature environment.
—DO NOT use liquid or aerosol cleaners to clean the lens.
—DO NOT make any charges or modifications to camera module.
—DO NOT subject camera module to strong electromagnetic field.
—DO NOT subject the camera module to excessive vibration or shock.
—DO NOT Impact or nip CCM module with speculate things
—DO NOT alter, modify or change the shape of the tab on the metal frame.
—DO NOT make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
—DO NOT damage or modify the pattern writing on the printed circuit board.
—Absolutely DO NOT modify the zebra rubber strip (conductive rubber) or heat seal connector
—Except for soldering the interface, DO NOT make any alterations or modifications with a soldering iron.
—DO NOT twist FPC of CCM.



Correct



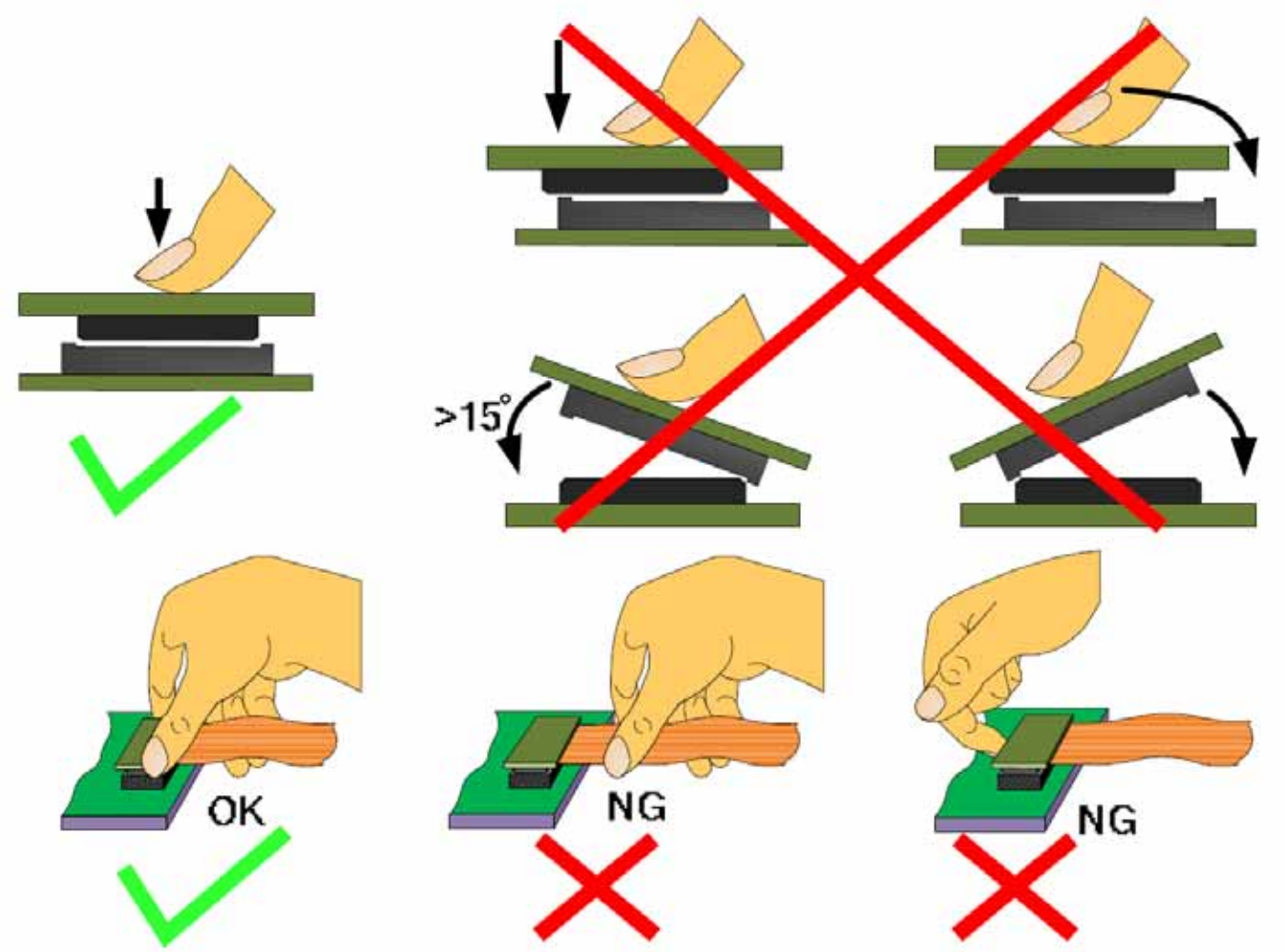
Incorrect



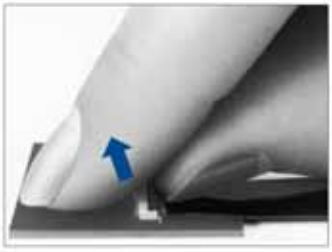
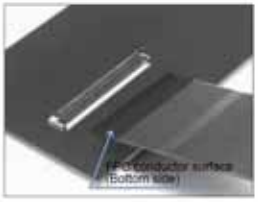
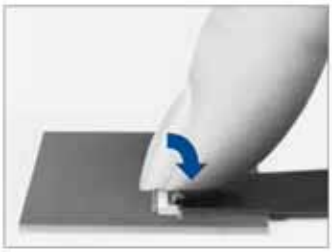
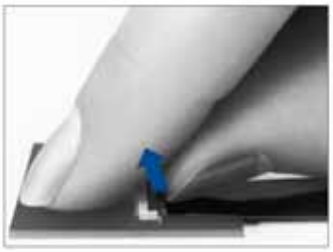
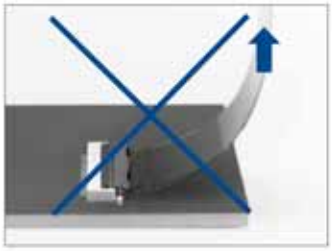
Incorrect

Precaution for assemble the module with BTB connector:

Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows

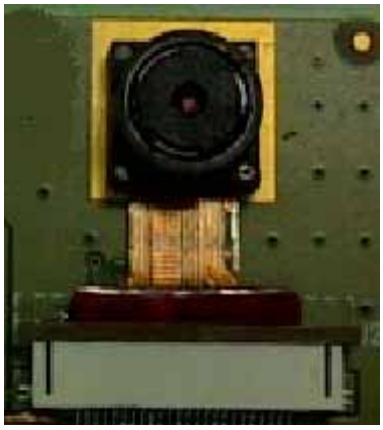


Precaution for assemble the module with ZIF connector:

Operation	Precautions
1. FPC/FFC Termination procedure. Connector installed on the board. 1) Lift up the actuator. Use thumb or index finger.  2) Assure that the FPC/FFC is fully inserted parallel to mounting surface, with the exposed conductive traces facing down.   3) Rotate down the actuator until firmly closed. It is critical that the inserted FPC/FFC is not moved and remains fully inserted. Should the FPC/FFC be moved, open the actuator and repeat the process, starting with Step 1 above.  **2. FPC/FFC Removal** 1) Lift up the actuator. 2) Carefully remove the FPC/FFC. 	1) Do not apply excessive force or use any type of tool to operate the actuator.   2) The connector will assure reliable performance when the actuator is open to 130° maximum. Do not exceed this angle, as this may cause permanent damage to the connector.  3) Application of excessive force to the inserted FPC/FFC may cause damage to connector and may affect the reliability of electrical connection. If specific application requires continuous or repeated pull or bend of the inserted FPC/FFC, assure that the forces are NOT transmitted directly to the connector. 

Precaution for assembling the module to terminal unit

The temperature of running module is high base on the high-integrated sensor. In order to enhance the heat dissipation and reduce the noise infection from high temperature, TRULY recommend that the module's backside should be touched with rigid material directly, like as PCB or metal. If necessary, it's recommended the module backside is affixed with the materials which can transfer heat, like as electric-fabric, electric-adhesive, or electric-sponge and so on.



Precaution for soldering the CCM:

	Manual soldering	**Machine drag soldering**	**Machine press soldering**
No ROHS product	290°C ~350°C. Time: 3-5S.	330°C ~350°C. Speed: 4-8 mm/s.	300°C ~330°C. Time: 3-6S. Press: 0.8~1.2Mpa
ROHS product	340°C ~370°C. Time: 3-5S.	350°C ~370°C. Speed: 4-8 mm/s.	330°C ~360°C. Time: 3-6S. Press: 0.8~1.2Mpa

(1) If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the lens surface with a cover during soldering to prevent any damage due to flux spatters.
(2) The CCM module and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

Other precautions

For correct using please refer to the relative criterions of electronic products.

Limited Warranty

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 be responsible for any subsequent or consequential events.

Return CCM under warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are:

-Holder is apart from module.
-Holder or Connector is anamorphic.
-Connector is turn up.
-FPC is lacerated or discon-nexion, and so on.

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

Package Specification

Packaging Design One

Product No.	CM6484-B300SF-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■ NO
Quantity/ each box	TBD	Material for box	■ paper ☐ plastic
Outer carton box size	405mm*290mm*290mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	TBD		

Packing Standards:

There are TBD modules each plastic plate.

There are TBD modules each inner carton box..

There are 4 inner carton boxes in each outer carton box.

Requirements of outer carton box :

1. Weight(Max): 0.75 Kg
2. Height (Max): 0.29 M
3. Prohibition: Box made by log

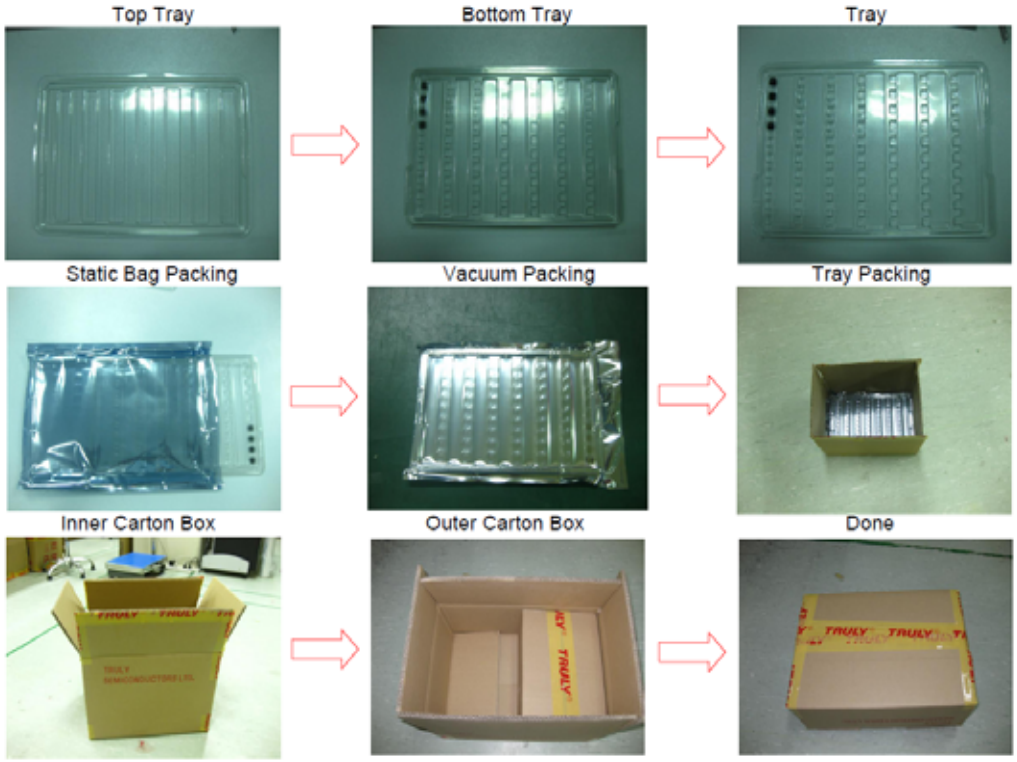
Material for Plastic tray

It is made of antistatic polystyrene which has no chemical pollution. Surface resistivity : 10^6 ohm/sq

Packaging Design Two

Product No.	CM6484-B300SF-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■ NO
Quantity/ each box	TBD	Material for box	■ paper ☐ plastic
Outer carton box size	405 mm *280 mm *170 mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	TBD		

Packing Standards:



There are TBD modules each plastic plate.

There are TBD modules each inner carton box..

There are 2 inner carton boxes in each outer carton box.

Requirements of outer carton box :

4. Weight(Max): 0.65 Kg
5. Height (Max): 0.17 M
6. Prohibition: Box made by log

Material for Plastic tray

It is made of antistatic polystyrene which has no chemical pollution. Surface resistivity : 10^6 ohm/sq

PRIOR CONSULT MATTER

1.①For Truly standard products, we keep the right to change material, process for improving the product property without notice on our customer.
②For OEM products, if any change needed which may affect the product property, we will consult with our customer in advance.
2. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

FACTORY CONTACT INFORMATION

FACTORY NAME: TRULY OPTO-ELECTRONICS LTD.
FACTORY ADDRESS: Truly Industrial Area, ShanWei City, GuangDong, China
FACTORY PHONE: 86-0660-3380061 FAX: 86-0660-3371772