PRODUCT	:	CAMERA MODULE
MODEL NO.	:	CM6128-B200SF-E
SUPPLIER	:	TRULY OPTO-ELECTRONICS LTD.
DATE	:	Step 08, 2012

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision: 1.1

CM6128-B200SF-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	2011-03-11	First release	
1.1	2012-09-08	Modified / Update some SPEC.	

CONTENTS

WRITTEN BY	CHECKED BY	APPROVED BY
WANG FU MIN	WEI YOU XING	LIU TIE NAN

Key Information

Module No.		CM6128-B200SF-E
Module Size		6.50mm × 6.50mm × 4.35mm
Sensor Type		OV2659
Array Size	UXGA	1632 × 1212
Power Supply	Core	1.5VDC +/-5%
	Analog	2.6~3.0V
	I/O	1.7~3.0V(Typical 2.8V)
Lens		1/5 inch 3Plastic+ IR
Focus(F.NO)		2.8
View Angle		62°
Object Distance		60cm-infinity
Image Area		2856μm × 2121μm
Sensitivity		960 mV/Lux-sec
Pixel Size		1.75μm × 1.75μm
IR Cutter		650nm
Temperature Range	Operating	-20°C to 70°C
	Stable Image	0°C to 50°C
Output Formats(8-bit)		YUV(422)/YCbCr422 GBR422 RGB565/555 8-/10-bit raw RGB data
Maximum Image Transfer Rate	UXGA(1600×1200)	15 fps
	SVGA (800×600)	30 fps
	720P(1280×720)	30 fps
	1366x768	24 fps
Max S/N Ratio		36 dB
Dynamic Range		66 dB @ 8×gain
IC Package		47-pin CSP3
Sensor Power Requirements	Active	142mW (using 1.8V DOVDD)
	Standby	30μA
Shutter		rolling shutter
Scan Mode		Progressive
Maximum Exposure Interval		1228 × t_{ROW}
Gamma Correction		Programmable
Dark Current		4 mV/s @ 60°C junction temperature
Package		Antistatic Plastic

Pin Assignment

No.	Name	Pin type	Description
1	D0	I/O	DVP data output port 0
2	AVDD	Power	Power for analog circuit/sensor array
3	D1	I/O	DVP data output port 1
4	AGND	Ground	Ground for analog circuit
5	D2	I/O	DVP data output port 2
6	DVDD	Power	Power for digital core
7	D3	I/O	DVP data output port 3
8	RESET	Input	Reset (active low with internal pull-up resistor)
9	D4	I/O	DVP data output port 4
10	DOVDD	Power	Power for I/O circuit
11	D5	I/O	DVP data output port 5
12	PWDN	Input	Power down (active high with internal pull-down resistor)
13	D6	I/O	DVP data output port 6
14	SIO_C	Input	SCCB input clock
15	D7	I/O	DVP data output port 7
16	SIO_D	I/O	SCCB data
17	D8	I/O	DVP data output port 8
18	DGND	Ground	Ground for digital circuit
19	D9	I/O	DVP data output port 9
20	VSYNC	I/O	DVP VSYNC output
21	DGND	Ground	Ground for digital circuit
22	HSYNC	I/O	DVP HREF output
23	MCLK	Input	System input clock
24	PCLK	I/O	DVP PCLK output
25	DGND	Ground	Ground for digital circuit
26	DGND	Ground	Ground for digital circuit
27	DGND	Ground	Ground for digital circuit
28	NC		
29	DGND	Ground	Ground for digital circuit
30	NC		

Sensor Electrical Characteristics

1. Absolute Maximum Ratings

parameter		absolute maximum rating[a]
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
peak solder temperature (10 second dwell time)		245°C

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. Functional temperature

parameter	range
operating temperature[a]	-20°C to +70°C junction temperature
stable operating temperature[b]	0°C to +50°C junction temperature

a. sensor functions but image quality may be noticeably different at temperatures outside of stable image range
b. image quality remains stable throughout this temperature range

3.DC Characteristics (-20°C < TJ < 70°C)

symbol	parameter	min	typ	max	unit
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)	1.7	1.8	3.0	V
I_{DD-A}	active (operating) current		25	30	mA
I_{DD-IO}[b]			40	50	mA
$I_{DDS-SCCB}$	standby current[c]		30	75	μA
$I_{DDS-PWDN}$			30	75	μA
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}[d]	SIOC and SIOD	-0.5	0	0.54	V
V_{IH}[c]	SIOC and SIOD	1.26	1.8	2.3	V

a. using the internal regulator is strongly recommended for minimum power down currents
b. active current is based on sensor resolution at full size and full speed
c. standby current is based on room temperature
d. based on DOVDD = 1.8V.

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

symbol	parameter	min	typ	max	unit
ADC parameters					
B	analog bandwidth		30		MHz
DLE	DC differential linearity error		0.5		LSB
ILE	DC integral linearity error		1		LSB
	settling time for hardware reset			<1	ms
	settling time for software reset			<1	ms
	settling time for resolution mode change			<1	ms
	settling time for register setting			<300	ms

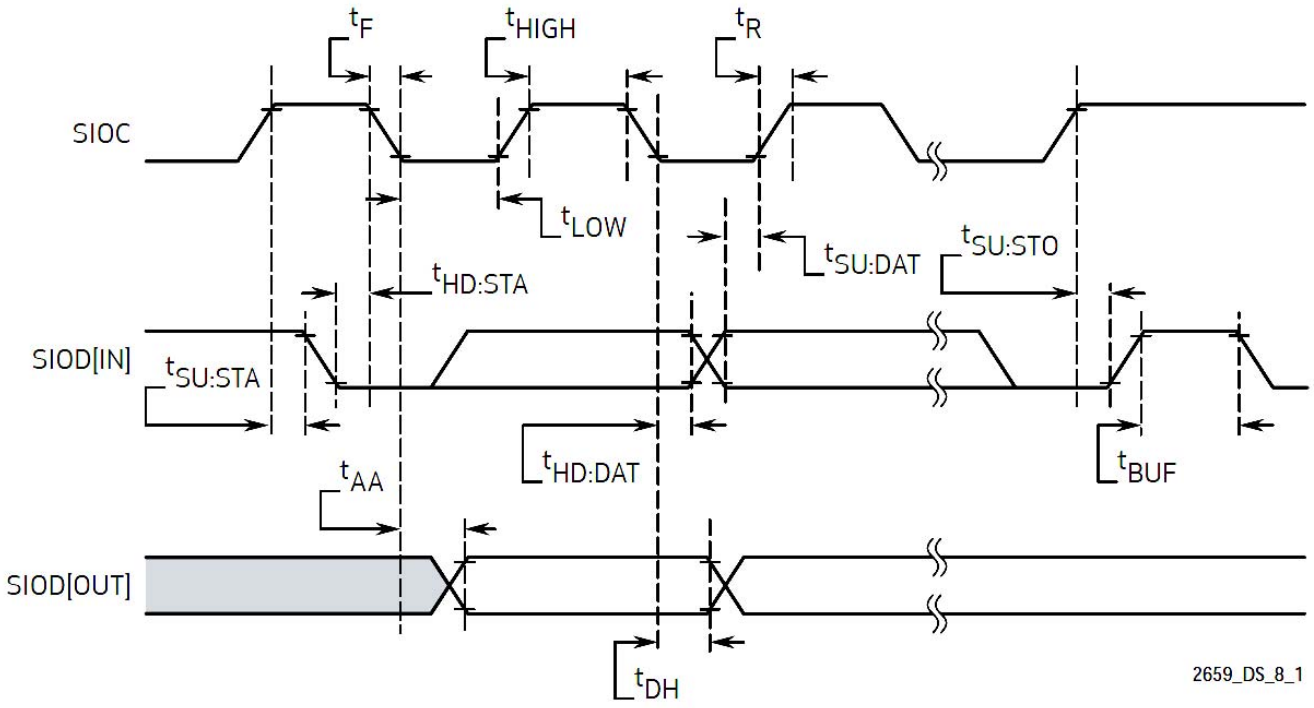
5. Timing Characteristics

a. Timing Characteristics

symbol	parameter	min	typ	max	unit
oscillator and clock input					
f_{OSC}	frequency (XVCLK)	6	24	27(54[a])	MHz
t_r, t_f	clock input rise/fall time			5 (10[b])	ns

a. If using the internal clock pre-scaler.
b. If using the internal PLL.

b. SCCB interface timing

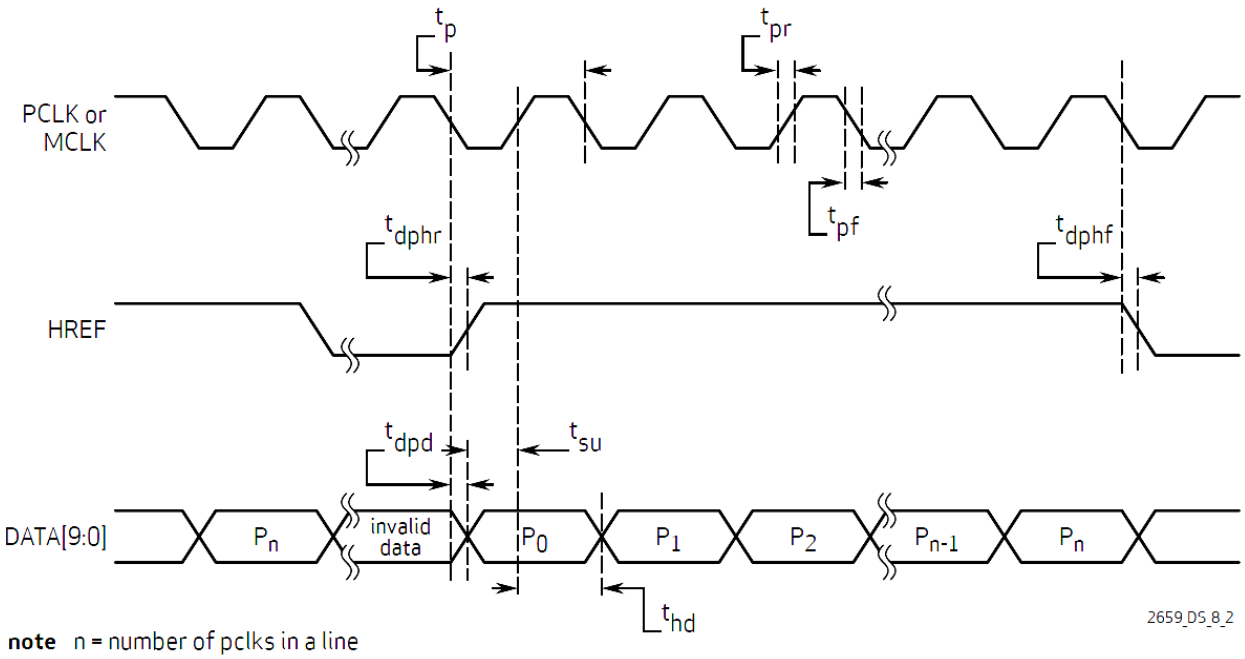


SCCB interface timing specifications[ab]

symbol	parameter	min	typ	max	unit
f_{SIOC}	clock frequency			400	KHz
t_{LOW}	clock low period	1.3			μs
t_{HIGH}	clock high period	0.6			μs
t_{AA}	SIOC low to data out valid	0.1		0.9	μs
t_{BUF}	bus free time before new start	1.3			μs
$t_{HD:STA}$	start condition hold time	0.6			μs
$t_{SU:STA}$	start condition setup time	0.6			μs
$t_{HD:DAT}$	data in hold time	0			μs
$t_{SU:DAT}$	data in setup time	0.1			μs
$t_{SU:STO}$	stop condition setup time	0.6			μs
t_R, t_F	SCCB rise/fall times			0.3	μs
t_{DH}	data out hold time	0.05			μs

a. SCCB timing is based on 400KHz mode
b. timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 10%, timing measurement shown in the middle of the rising/falling edge signifies 50%, timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 90%

c. Line/pixel output timing



note n = number of pclks in a line

pixel timing specifications[a]

symbol	parameter	min	typ	max	unit
t_p	PCLK period[b]		13.89		ns
t_{pr}	PCLK rising time[b]		1.33		ns
t_{pf}	PCLK falling time[b]		2.41		ns
t_{dphr}	PCLK negative edge to HREF rising edge		1		ns
t_{dphf}	PCLK negative edge to HREF negative edge		1		ns
t_{dpd}	PCLK negative edge to data output delay	0		4	ns
t_{su}	data bus setup time	5	7		ns
t_{hd}	data bus hold time	5	7		ns

a. timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 10%, timing measurement shown in the middle of the rising/falling edge signifies 50%, timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 90%

b. PCLK running at 72 MHz, CL = 10pF, and DOVDD = 2.8V

6. Format and frame rate

format	resolution	frame rate	scaling method	parallel port data rate (RAW/YUV)
UXGA	1600x1200	15 fps	full	36/72 MHz
SVGA	800x600	30 fps	down sampling	24/48 MHz
VGA	640x480	30 fps	scaling	24/48 MHz
400x300	400x300	30 fps	subsample	18/36 MHz
200x150	200x150	30 fps	subsample	18/36 MHz
720p	1280x720	30 fps	cropping	36/72 MHz
1366x768	1366x768	24 fps	cropping	36/72 MHz

7. Power up sequence

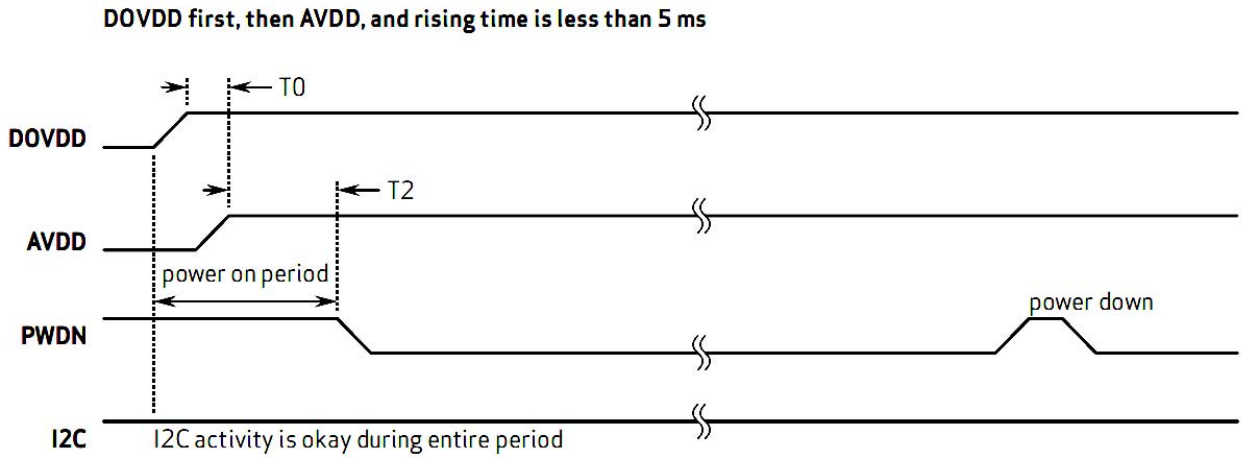
Based on the system power configuration (1.8V or 2.8V for I/O power, using external DVDD or internal DVDD, requiring access to the I2C during power up period or not), the power up sequence will differ. If 1.8V is used for I/O power, using the internal DVDD is preferred.

a. power up with internal DVDD and I2C access during power up period

For powering up with the internal DVDD and I2C access during the power ON period, the following conditions must occur:

1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. PWDN is active high with an asynchronized design (does not need clock)
3. PWDN must go high if I2C is accessed during the power up period
4. for PWDN to go low, power must first become stable (AVDD to PWDN ≥ 1 ms)
5. RESETB is active low with an asynchronized design
6. state of RESETB does not matter during power up period once DOVDD is up

power up timing with internal DVDD and I2C access during power up period



Note:

T0 ≥ 0 ms: delay from DOVDD stable to AVDD stable

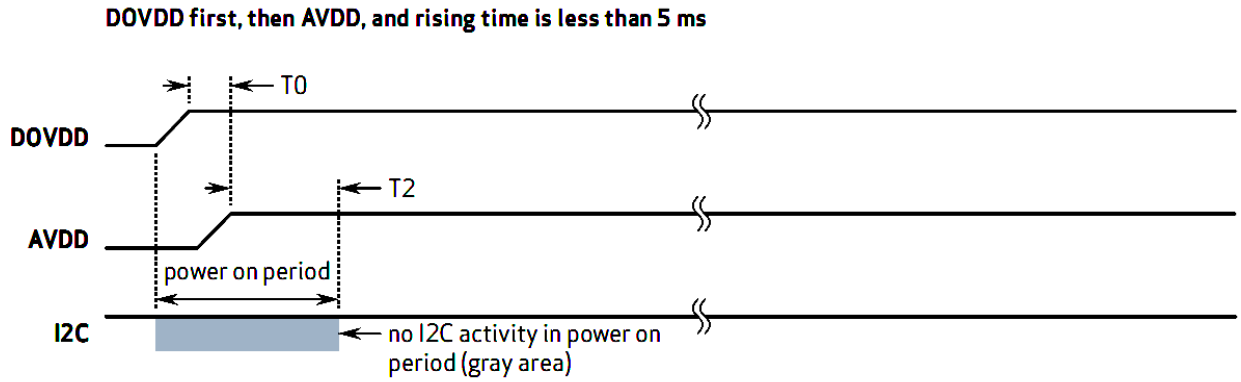
T2 ≥ 1 ms: delay from AVDD stable to sensor power up stable

b. power up with internal DVDD and no I2C access during power up period

For powering up with the internal DVDD and no I2C access during the power ON period, the following conditions must
occur:

1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. PWDN is not required if there is no I2C access during the power up period
3. no I2C activity is allowed during the power up period
4. RESETB is active low with an asynchronized design
5. state of RESETB does not matter during power up period once DOVDD is up

power up timing with internal DVDD and no I2C access during power up period



Note:

T0 ≥ 0 ms: delay from DOVDD stable to AVDD stable

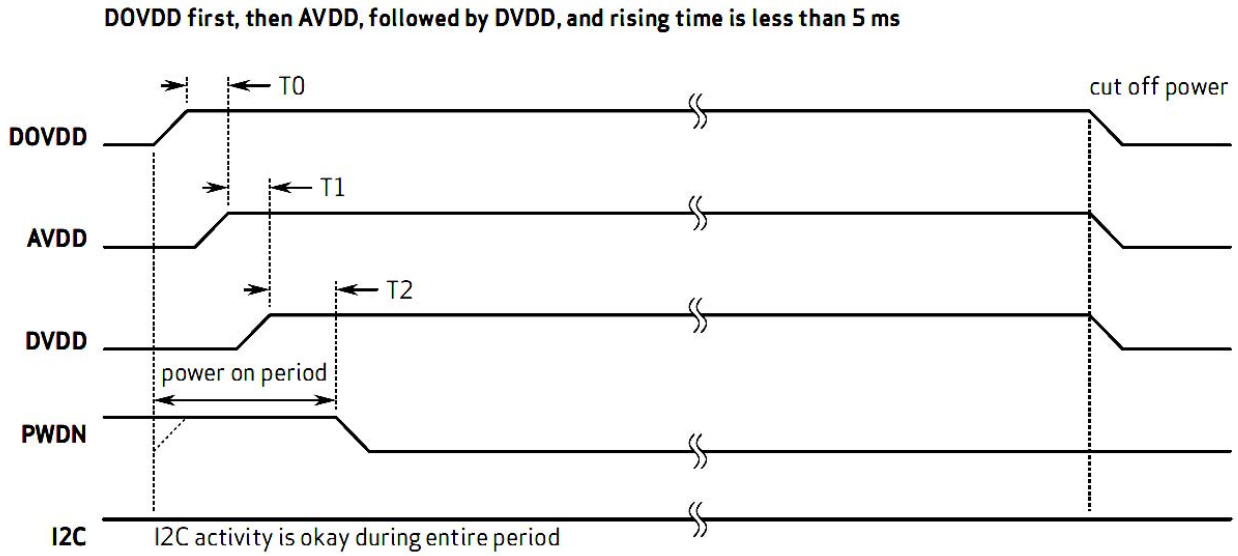
T2 ≥ 1 ms: delay from AVDD stable to sensor power up stable

c. power up with external DVDD source and I2C access during power up period

For powering up with an external DVDD source and I2C access during the power ON period, the following conditions must occur:

1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. when AVDD and DVDD are turned ON, make sure AVDD becomes stable before DVDD becomes stable
3. PWDN is active high with an asynchronized design (does not need clock)
4. for PWDN to go low, power must first become stable (DVDD to PWDN ≥ 1 ms)
5. all powers are cut off when the camera is not in use (power down mode is not recommended
6. RESETB is active low with an asynchronized design
7. state of RESETB does not matter during power up period once DOVDD is up

power up timing with external DVDD source and I2C access during power up period



Note:

T0 ≥ 0 ms: delay from DOVDD stable to AVDD stable

T1 ≥ 0 ms: delay from AVDD stable to DVDD stable

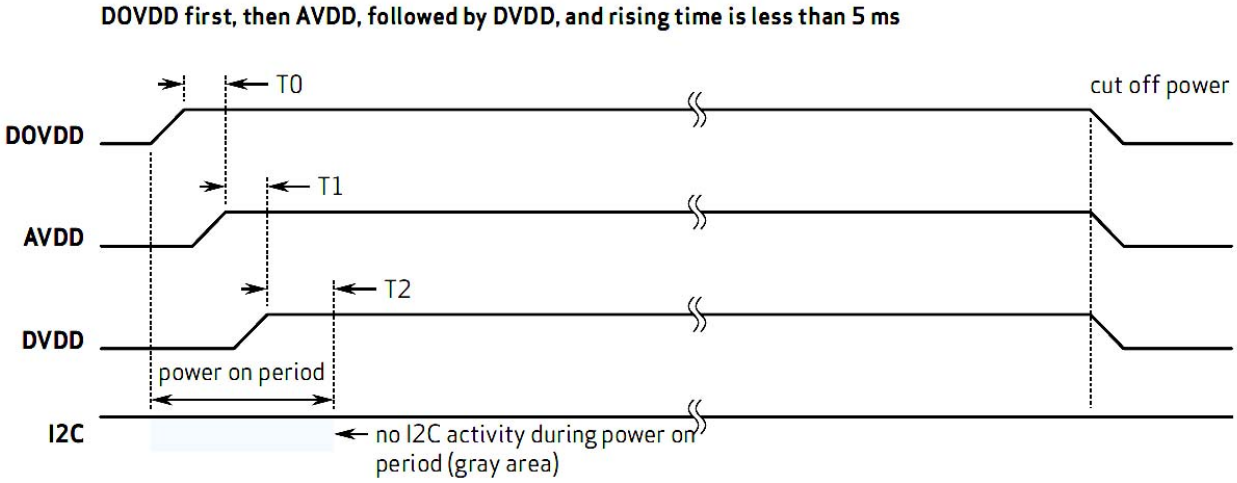
T2 ≥ 1 ms: delay from DVDD stable to sensor power up stable

d. power up with external DVDD and no I2C access during power up period

For powering up with an external DVDD source and no I2C access during the power ON period, the following conditions must occur:

1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. when AVDD and DVDD are turned ON, make sure AVDD becomes stable before DVDD becomes stable
3. all powers are cut off when the camera is not in use (power down mode is not recommended
4. RESETB is active low with an asynchronized design
5. state of RESETB does not matter during power up period once DOVDD is up

power up timing with external DVDD source and I2C access during power up period



Note:

T0 ⩾ 0 ms: delay from DOVDD stable to AVDD stable

T1 ⩾ 0 ms: delay from AVDD stable to DVDD stable

T2 ⩾ 1 ms: delay from DVDD stable to sensor power up stabl

8. hardware standby and software standby

Two suspend modes are available for the OV2659:

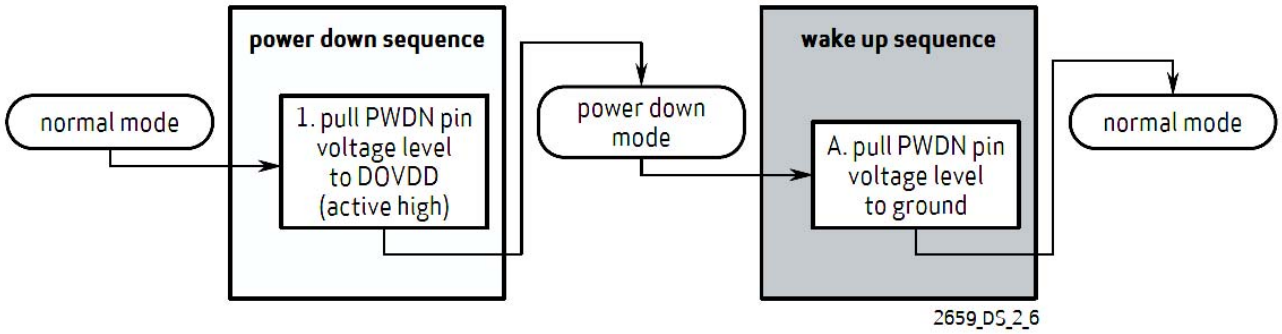
• hardware standby

• software standby

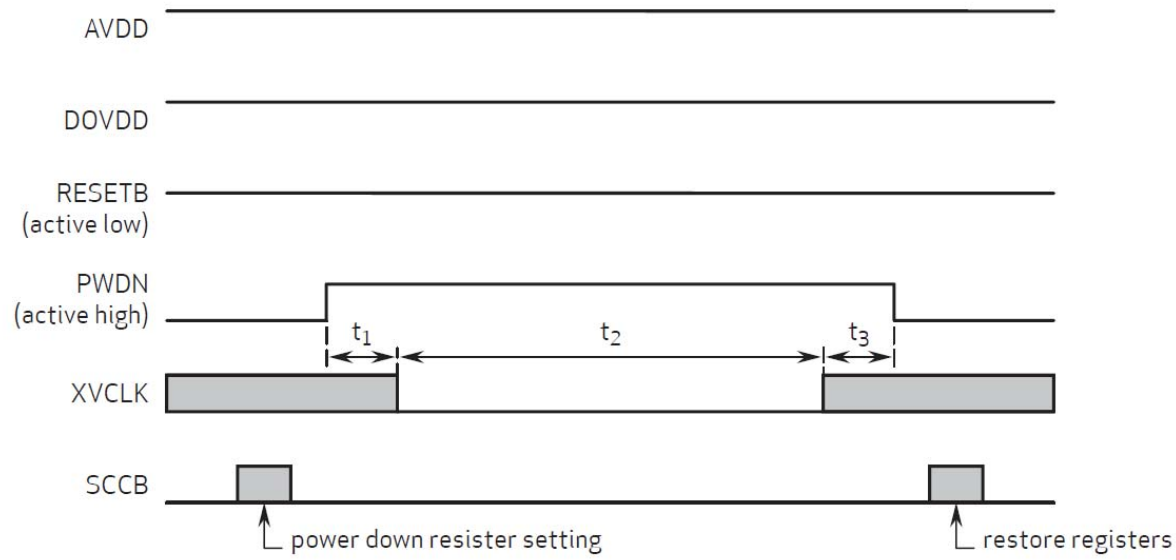
a. hardware standby

To initiate hardware standby mode, PWDN pin must be tied to high

power down/ wake up sequence



power down timing diagram



Note:
t1: XVCLK should keep more than 0.1ms after PWDN is pulled high
t2: power down period should last more than 1 VSYNC period
t3: XVCLK should come more than 0.1ms before PWDN is pulled low

When this occurs, the OV2659 internal device clock is halted and all internal counters are reset and registers are maintained.

b. software standby control

Executing a software standby through the SCCB interface suspends internal circuit activity but does not halt the device clock. All register content is maintained in standby mode.

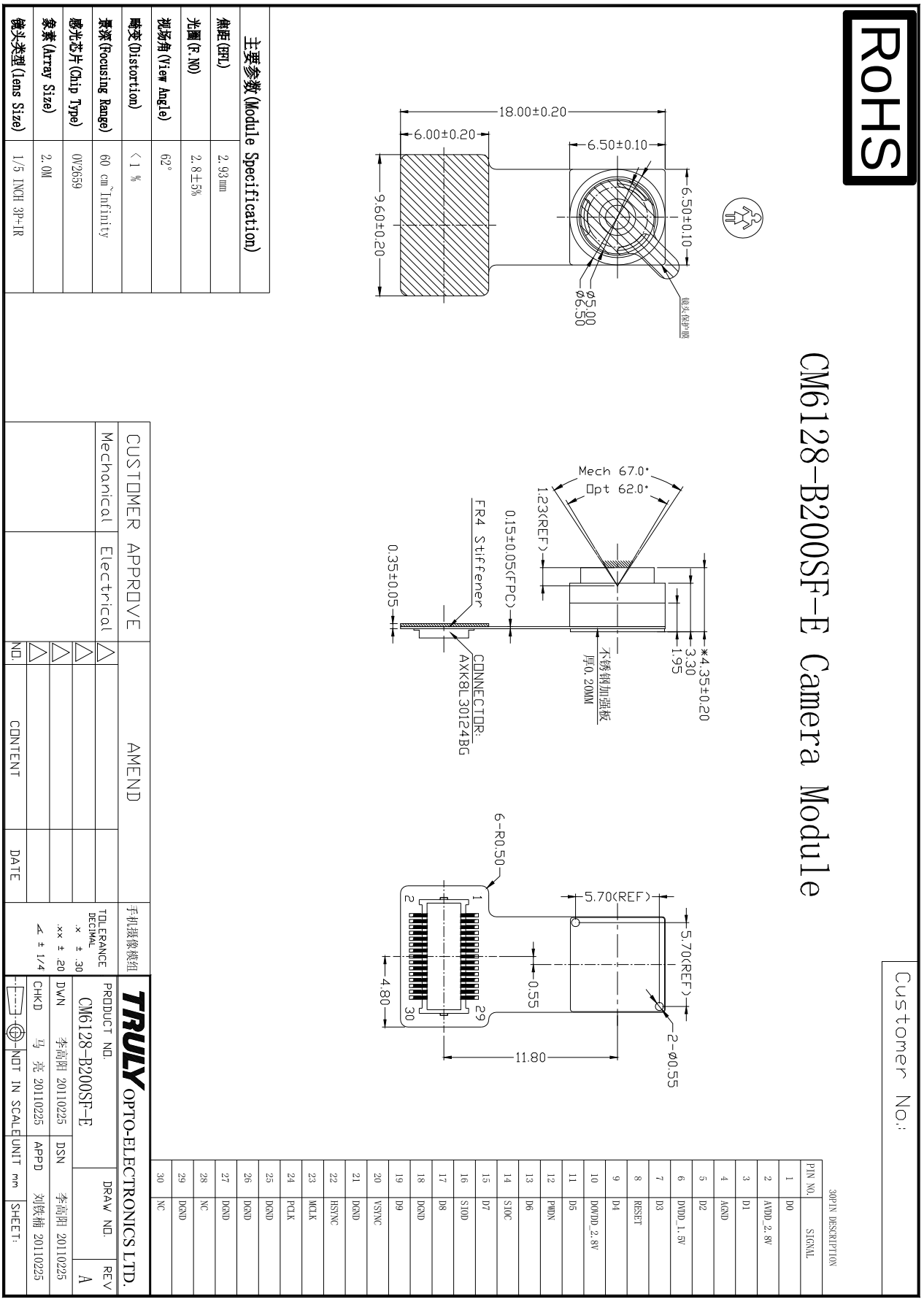
software standby control

address	register name	default value	R/W	description
0x0100	SOFTWARE STANDBY	0x00	RW	Bit[0]: Software standby 0: Software standby 1: Streaming

Note:

For more information of sensor please refer to the OV2659 specification.

Mechanical Drawing



主要参数(Module Specification)	
焦距(EFL)	2.93mm
光圈(F.NO)	2.8±5%
视场角(View Angle)	62°
畸变(Distortion)	<1 %
聚焦(Focusing Range)	60 cm~Infinity
感光芯片(Chip Type)	OV2659
像素(Array Size)	2.0M
镜头类型(Lens Size)	1/5 INCH 3P+IR

PIN NO.	SIGNAL
1	D0
2	AVDD_2.8V
3	D1
4	AGND
5	D2
6	DVDD_1.5V
7	D3
8	RESET
9	D4
10	DOVDD_2.8V
11	D5
12	PWDN
13	D6
14	SIOC
15	D7
16	SIOD
17	D8
18	DGND
19	D9
20	VSYNC
21	DGND
22	HSYNC
23	MCLK
24	PCLK
25	DGND
26	DGND
27	DGND
28	NC
29	DGND
30	NC

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; No feeling defect; 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.

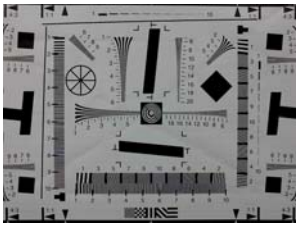
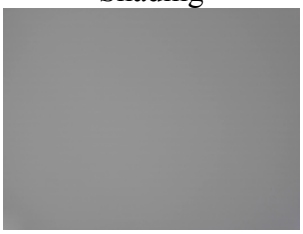
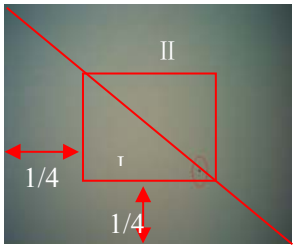
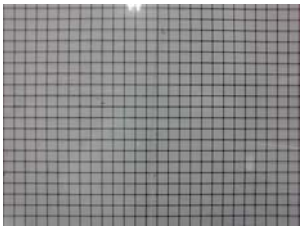
B：The defect can be found in the finished product and has visual difference from the good one, but will not affect customer's aesthetic judgement. Or the defect can not be found in the finished product and will not generate functional problem, but will slightly influence sequential manufacture process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

C：Check method:distance 30cm, visual vertical or 45°reflection.

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≥700 0.7 viewing field ≥600	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 Blemish: particle size＜0.6mm	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

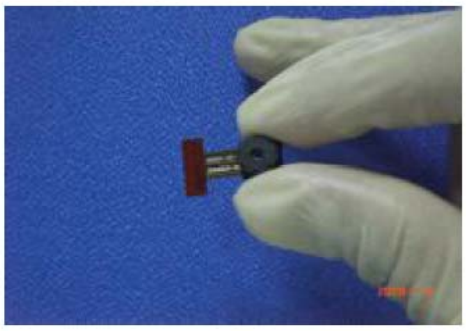
Reliability Specification

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 corner,3 arris,6 faces Test times:10	

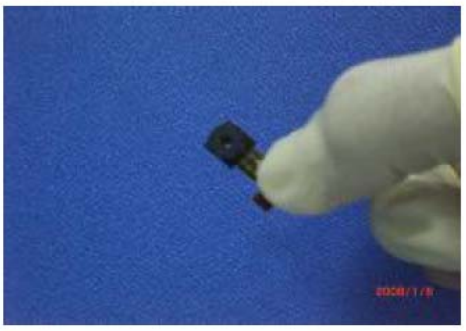
Precautions For Using CCM Modules

Handing Precautions

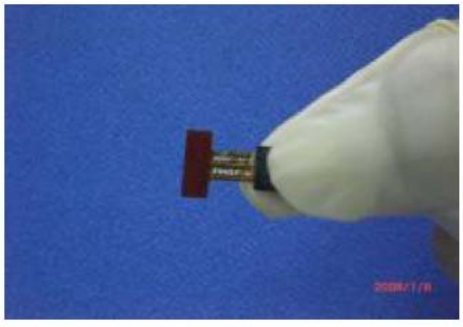
—DO NOT try to open the unit enclosure as there is no user-serviceable component inside. To prevent damage to the camera module by electrostatic discharge, handling the camera module only after discharging all static electricity from yourself and ensuring a static-free environment for the camera module.
—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



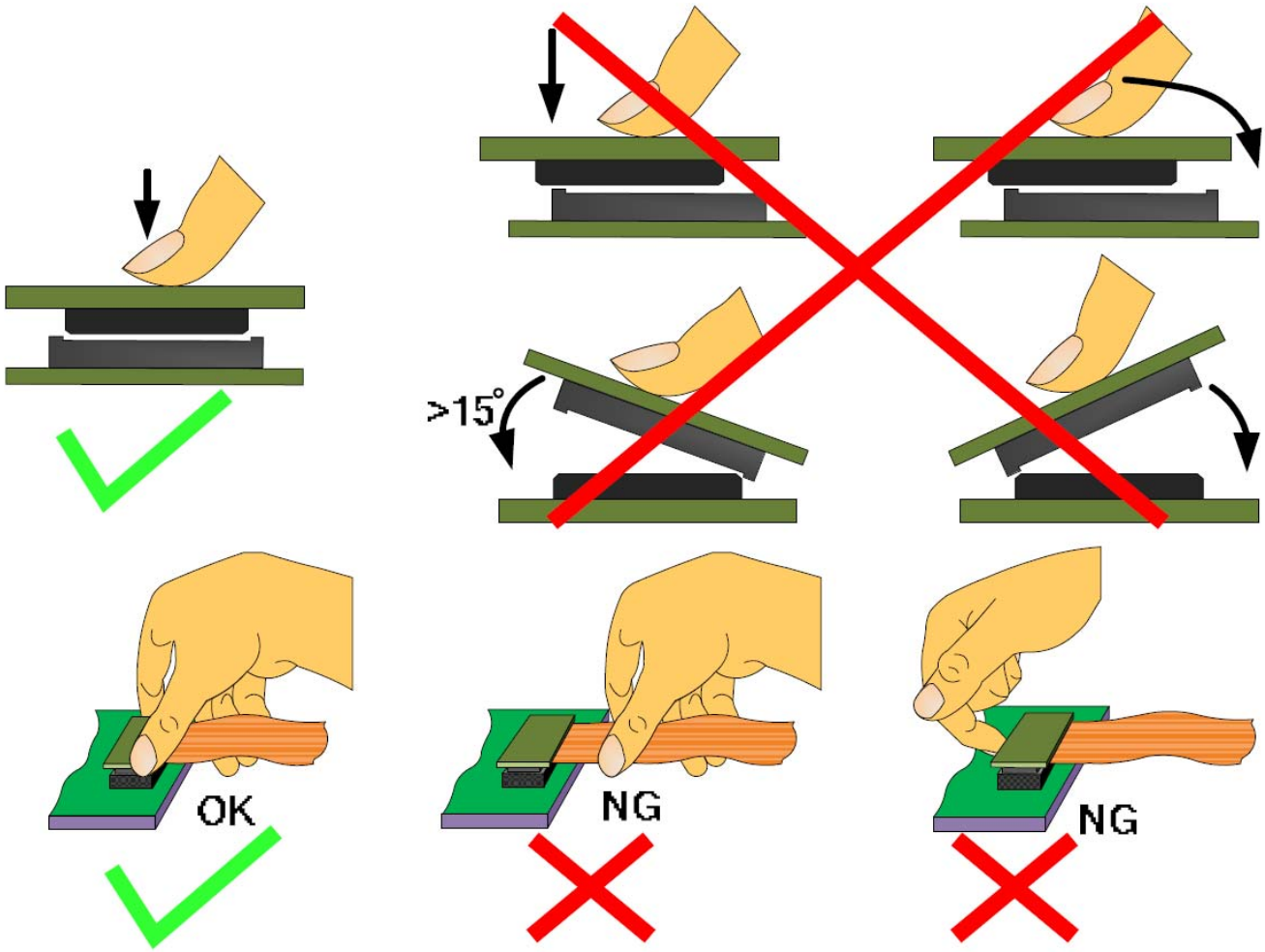
Incorrect



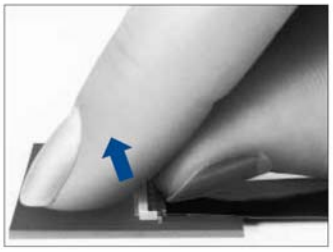
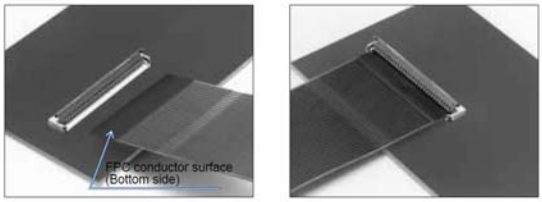
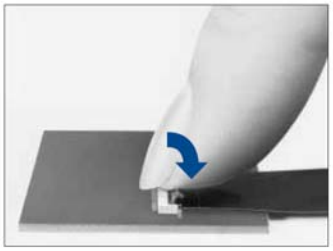
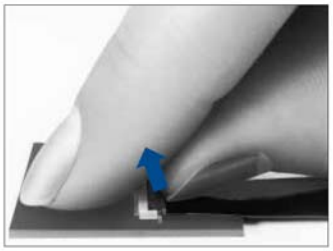
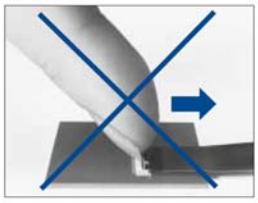
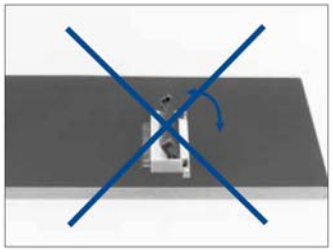
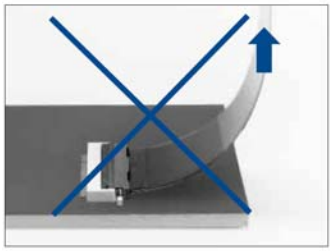
Incorrect

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

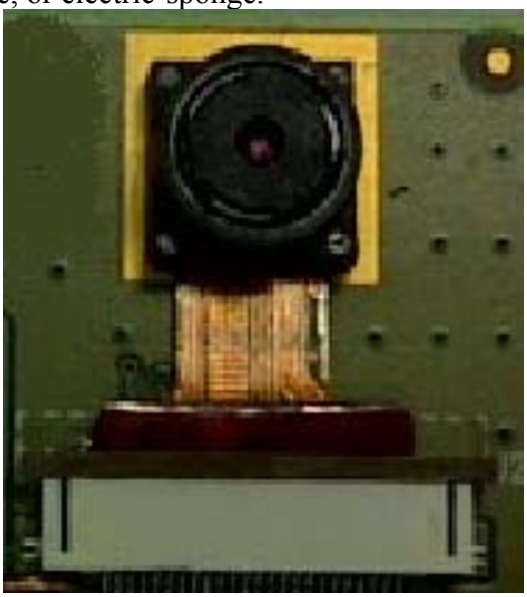


Precaution for assemble the module with ZIF connector:

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.



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 turnup.
-FPC is lacerated or disconnexion, and so on.

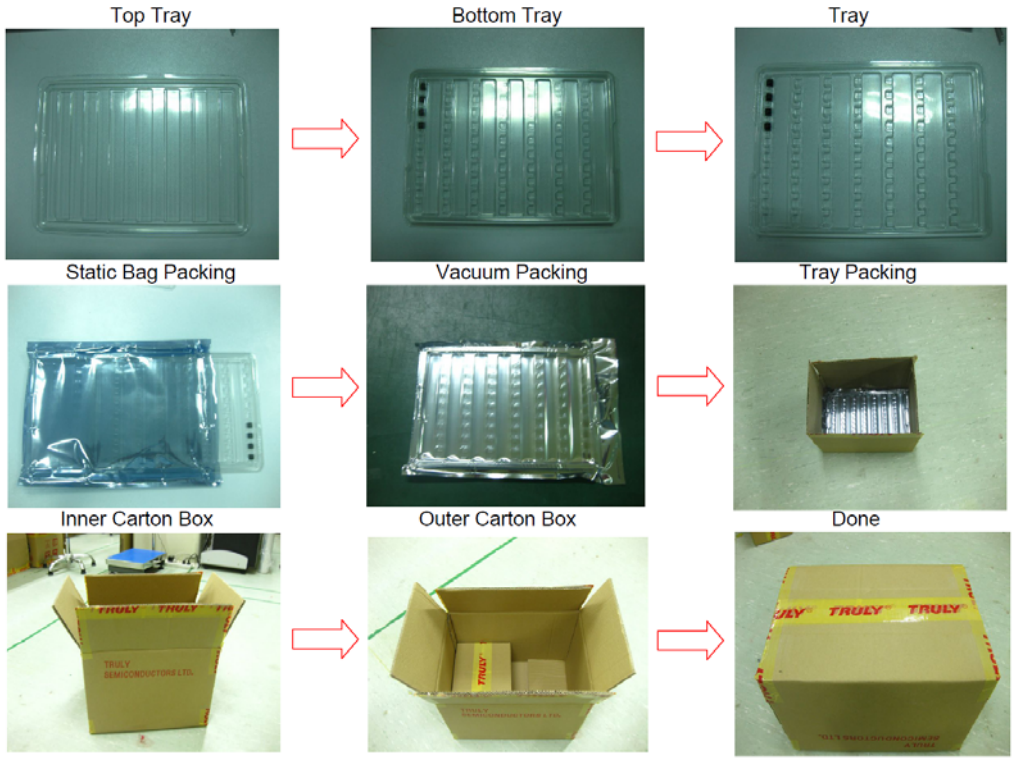
Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

Package Specification

Packaging Design One

Product No.	CM6128-B200SF-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■ NO
Quantity/ each box	3600PCS	Material for box	■ paper ☐ plastic
Outer carton box size	405mm*290mm*290mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	90PCS * 10 = 900PCS 900PCS * 4 = 3600PCS		

Packing Standards:



There are 90PCS modules each plastic plate.

There are 900PCS 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

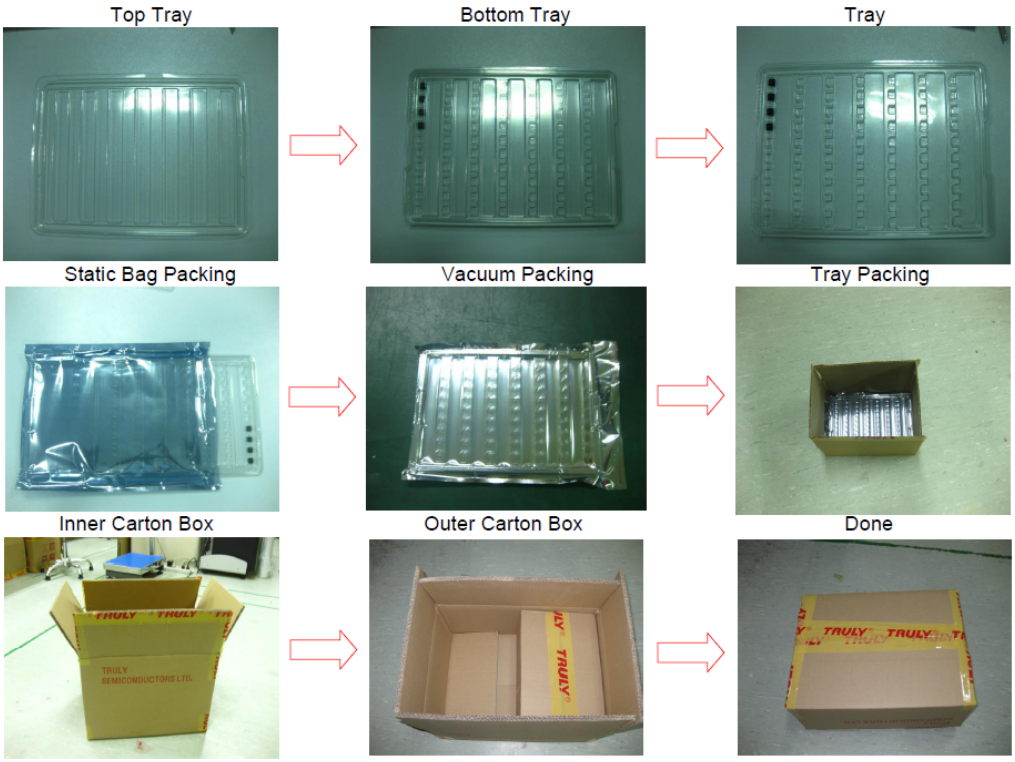
Material for Plastic tray

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

Packaging Design Two

Product No.	CM6128-B200SF-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■ NO
Quantity/ each box	1800PCS	Material for box	■ paper ☐ plastic
Outer carton box size	405 mm *290 mm *170 mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	90PCS * 10 = 900PCS 900PCS * 2 = 1800PCS		

Packing Standards:



There are 90PCS modules each plastic plate.

There are 900PCS 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