PRODUCT	:	CAMERA MODULE
MODEL NO.	:	CM6381-B500BA-E
SUPPLIER	:	TRULY OPTO-ELECTRONICS LTD.
DATE	:	October 27, 2011

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision: 1.2

CM6381-B500BA-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
0.1	2011-05-30	First release	
0.2	2011-06-23	Change drawing	
0.3	2011-08-09	Change drawing	
1.0	2011-08-19	Full spec	
1.1	2011-09-09	Change drawing	
1.2	2011-10-27	Change drawing	

CONTENTS

- KEY INFORMATION
- AUTO-FOCUS SPECIFICATION
- PIN ASSIGNMENT
- ELECTRICAL CHARACTERISTICS
- MECHANICAL DRAWING
- APPEARANCE SPECIFICATION
- IMAGE SPECIFICATION
- RELIABILITY SPECIFICATION
- PRECAUTIONS FOR USING CCM MODULES
- PACKAGE SPECIFICATION
- PRIOR CONSULT MATTER
- FACTORY CONTACT INFORMATION

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

Key Information

Module No.		CM6381-B500BA-E
Module Size		8.50mm×8.50mm×5.00mm
Sensor Type		OV5647
Array Size	QSXGA	2592×1944
Power Supply	Core	1.5V +/- 5%
	Analog	2.6 ~ 3.0V (2.8V typical)
	I/O	1.7~3.0V(1.8V typical)
Lens		1/4 inch 4Plastic+ IR
Focus(F.NO)		2.8
View Angle		65.1°
Image Area		3673.6μm×2738.4μm
Object Distance		10cm-infinity
Sensitivity		600mV/Lux-sec
Pixel Size		1.4μm×1.4μm
IR Cutter		650nm
Sensor Temperature Range	Operating	-30°C to 70°C
	Stable Image	0°C to 50°C
Output Formats		8-/10-bit RGB RAW output
Maximum Image Transfer Rate	QSXGA	15 fps
	VGA	90 fps
	QVGA	120 fps
Max S/N Ratio		34db
Dynamic Range		67 dB @8x gain
Substrate		FPC
IC Package		wafer
Sensor Power Requirement	Active	96 mA
	Standby	20 μA
Dark Current		8 mV/s @50°C junction temperature
Die Dimensions		5520 μm×4700 μm
Package		Antistatic Plastic

Auto-Focus Specification

NO.	Item	Specification
1	Auto-Focus Type	VCM (Voice Coil Motor)
2	VCM Driver	AD5820
3	Power Supply	2.6~3.3 V
4	Rated Current	≤100mA
5	Resistance	28±10%Ω
6	Settling Time	TBD
7	Hysteresis	≤10μm
8	Focusing Range	10cm to infinity
9	Life Time	TBD

Pin Assignment

No.	Name	Pin type	Description
1	STROBE	output	I/O strobe output
2	AF_ GND	Ground	Ground for VCM
3	AF_VDD	Power	Power for VCM
4	AGND	Ground	Ground for analog circuit
5	AVDD	Power	Power for analog circuit
6	DGND	Ground	Ground for digital circuit
7	SIOC	Input	SCCB input clock
8	SIOD	I/O	SCCB data
9	RESET	Input	hardware reset (active low with internal pull-up resistor)
10	NC		
11	DGND	Ground	Ground for digital circuit
12	DGND	Ground	Ground for digital circuit
13	PWDN	Input	Power down, active high with internal pull-down resistor
14	DGND	Ground	Ground for digital circuit
15	DGND	Ground	Ground for digital circuit
16	MDP2	I/O	MIPI TX second data lane positive output
17	MDN2	I/O	MIPI TX second data lane negative output
18	DGND	Ground	Ground for digital circuit
19	MCP	I/O	MIPI clock positive output
20	MCN	I/O	MIPI clock negative output
21	DGND	Ground	Ground for digital circuit
22	MDP1	I/O	MIPI TX first data lane positive output
23	MDN1	I/O	MIPI TX first data lane negative output
24	DGND	Ground	Ground for digital circuit
25	XCLK	Input	System clock input
26	DGND	Ground	Ground for digital circuit
27	DVDD	Power	power for digital core circuit
28	DOVDD	Power	Power for I/O circuit
29	DGND	Ground	Ground for digital circuit
30	ID	I/O	Camera Identification

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

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]	-30°C to +70°C junction temperature
stable image 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 -30°C to +70°C junction temperature stable image temperature

b. image quality remains stable throughout this temperature range

3.DC Characteristics (-30℃<Ta<70℃)

symbol	parameter	min	typ	max	unit
supply					
V_{DD-A}	supply voltage (analog)	2.6	2.8	3.0	V
V_{DD-DO}	supply voltage (digital I/O)	1.7	1.8	3.0	V
V_{DD-D}	supply voltage (digital core)[a]	1.425	1.5	1.575	V
V_{DD-E}	supply voltage (MIPI)	1.425	1.5	1.575	V
internal DVDD, EVDD short to DVDD, DVP output, AVDD = 2.8V, DOVDD = 2.8V					
I_{DD-A}	active (operating) current 2592 x 1944 @ 15 fps[b]		31	45	mA
I_{DD-DO}			65	85	mA
I_{DD-A}	active (operating) current 1080p @ 30fps		32	45	mA
I_{DD-DO}			60	78	mA
I_{DD-A}	active (operating) current 720p @ 60fps		34	45	mA
I_{DD-DO}			58	75	mA
I_{DD-A}	active (operating) current 720p @ 30fps		34	45	mA
I_{DD-DO}			35	48	mA
I_{DD-A}	active (operating) current VGA @ 60fps		34	45	mA
I_{DD-DO}			32	44	mA
I_{DD-A}	active (operating) current VGA @ 30fps		34	45	mA
I_{DD-DO}			20	28	mA
internal DVDD, EVDD short to DVDD, MIPI output, AVDD = 2.8V, DOVDD = 2.8V					
I_{DD-A}	active (operating) current 2592 x 1944 @ 15 fps[c]		31	45	mA
I_{DD-DO}			60	78	mA
I_{DD-A}	active (operating) current 1080p @ 30fps		32	45	mA
I_{DD-DO}			56	73	mA
I_{DD-A}	active (operating) current 720p @ 60fps		34	45	mA
I_{DD-DO}			56	74	mA
I_{DD-A}	active (operating) current 720p @ 30fps		34	45	mA
I_{DD-DO}			32	44	mA
I_{DD-A}	active (operating) current VGA @ 60fps		34	45	mA
I_{DD-DO}			32	44	mA
I_{DD-A}	active (operating) current VGA @30fps		34	45	mA
I_{DD-DO}			20	28	mA

symbol	parameter	min	typ	max	unit
standby current					
$I_{DDS-SCCB}$[d]	standby current		20	50	μA
$I_{DDS-PWDN}$			20	50	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}[e]	output voltage HIGH	1.62			V
V_{OL}[e]	output voltage LOW			0.18	V
serial interface inputs					
V_{IL}[e]	SCL and SDA	-0.5	0	0.54	V
V_{IH}[e]	SCL and SDA	1.26	1.8	2.3	V

a. when internal regulator is bypassed
b. using internal regulator for DVDD and short DVDD with EVDD; DOVDD = 2.8V. The currents are for DVP output.
MIPI output will results 5%-10% lower active current on IDD-DO
c. using internal regulator for DVDD and short DVDD with EVDD; DOVDD = 2.8V. The currents are for DVP output.
MIPI output will results 5%-10% lower active current on IDD-DO
d. external clock is stopped during measurement
e. based on DOVDD = 1.8V

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

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

a. if using the internal PLL

5. Format and frame rate

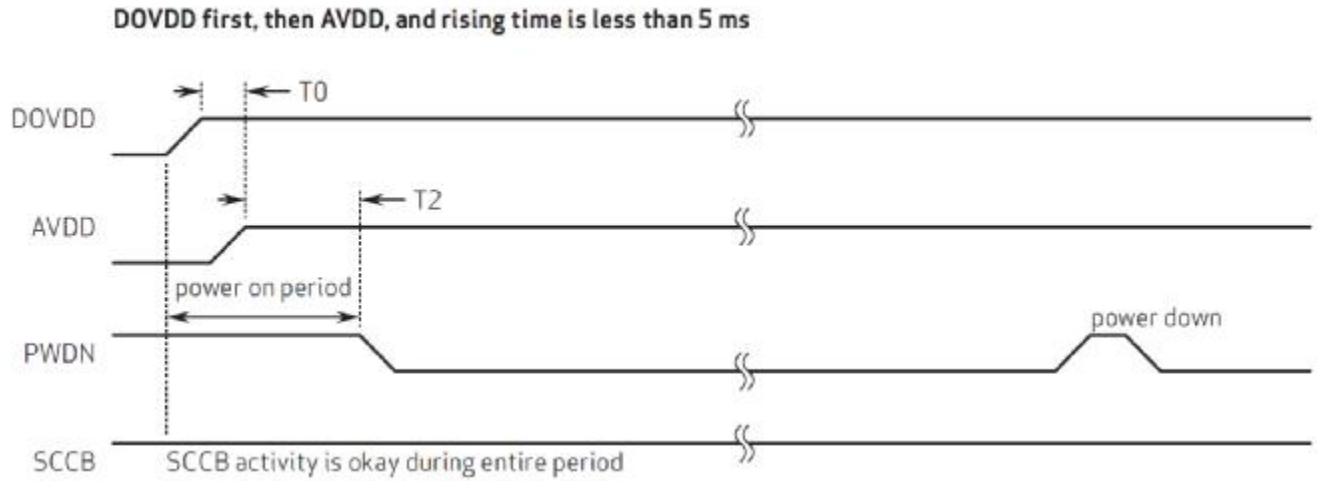
format	resolution	frame rate	scaling method	pixel clock
5 Mpixel	2592x1944	15 fps	full resolution	96 MHz
1080p	1920x1080	30 fps	cropping	96 MHz
960p	1280x960	45 fps	cropping, subsampling/ binning	96 MHz
720p	1280x720	60 fps	cropping, subsampling/ binning	96 MHz
VGA	640x480	90 fps	cropping, subsampling/ binning	48 MHz
QVGA	320x240	120 fps	cropping, subsampling/ binning	24 MHz

6. Power up sequence

Based on the system power configuration (1.8V or 2.8V for I/O power), using external DVDD or internal DVDD, the power up sequence will differ. If 1.8V is used for I/O power, using the internal DVDD is preferred. If 2.8V is used for I/O power, due to a high voltage drop at the internal DVDD regulator, there is a potential heat issue. Hence, for a 2.8V power system, OmniVision recommends using an external DVDD source. Due to the higher power down current when using an external DVDD source, OmniVision strongly recommends cutting off all power supplies, including the external DVDD, when the sensor is not in use in the case of 2.8V I/O and external DVDD.

a. Power up with internal DVDD

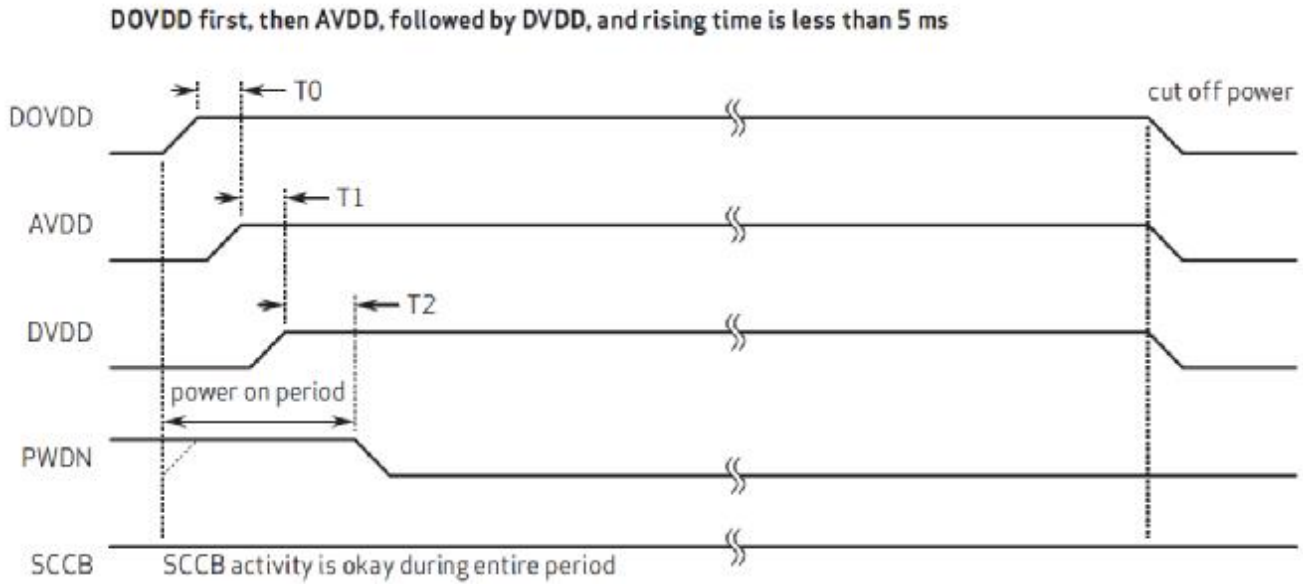
For powering up with the internal DVDD and SCCB access during the power ON period, the following conditions must occur:
1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. PWDN is active high with an asynchronized design (does not need clock)
3. PWDN must go high during the power up period
4. for PWDN to go low, power must first become stable (AVDD to PWDN ≥ 5 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
7. master clock XCLK should provide at least 1 ms before host accesses sensor's registers
8. host can access SCCB bus (if shared) during entire period. 20 ms after PWDN goes low or 20 ms after RESETB goes high if reset is inserted after PWDN goes low, host can access sensor's registers to initialize sensor



Note:
T0 ≥ 0 ms: delay from DOVDD stable to AVDD stable
T2 ≥ 5 ms: delay from AVDD stable to sensor power up stable

b. Power up with external DVDD source

For powering up with an external DVDD source and SCCB 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 ≥ 5 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
8. master clock XVCLK should provide at least 1 ms before host accesses sensor's registers
9. host can access SCCB bus (if shared) during entire period. 20 ms after PWDN goes low or 20 ms after RESETB goes high if reset is inserted after PWDN goes high, host can access sensor's registers to initialize sensor



Note
T0 ≥ 0 ms: delay from DOVDD stable to AVDD stable
T1 ≥ 0 ms: delay from AVDD stable to DVDD stable
T2 ≥ 5 ms: delay from DVDD stable to sensor power up stable

7. Hardware and software standby

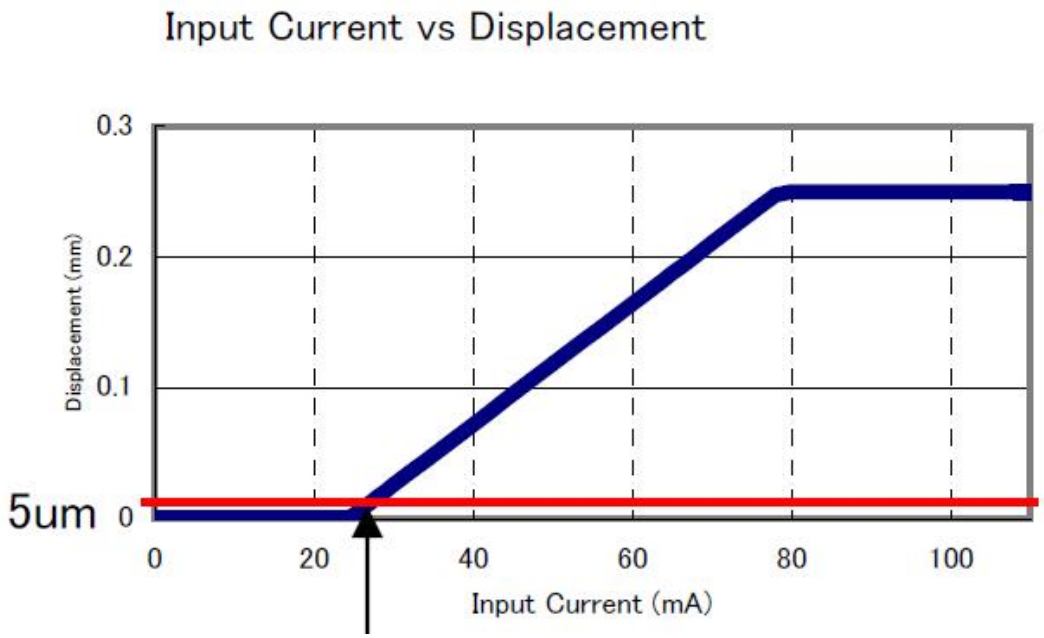
Two suspend modes are available for the OV5647:
• hardware standby
• software standby
To initiate hardware standby mode, the PWDN pad must be tied to high while in MIPI mode. Set register 0x3018[4:3] to
2'b11 before the PWDN pin is set to high. When this occurs, the OV5647 internal device clock is halted and all internal
counters are reset and registers are maintained.
Executing a software standby (0x0100[0]) through the SCCB interface suspends internal circuit activity but does not halt
the device clock. All register content is maintained in both modes.

Note: For more information of sensor please refer to the OV5647 specification.

8. VCM Specification

NO.	Item	Condition	Specification
1	Motor Size	Without terminal	8.5*8.5*3.45 mm
2	Absolute Max Current		≤100mA
3	Moving Tilt	∞→10cm	＜30′
4	Starting Current	Moving direction is upward	≥15mA
5	Hysteresis	At stroke range:0.005 ~ 0.15mm	≤10μm
6	Sensitivity		3.5 ~ 7.0μm/mA
7	Motion Range	Driving Current 100mA	0~0.19 mm with lens
8	Terminal Resistance	20±5℃	28±10%Ω
9	Lens Unit Mass		≤0.15g

Performance Diagram



9. Driver IC Specification

Description

The AD5820 is a single 10-bit DAC with 100mA output current sink capability. It features an internal reference and operates from a single 2.3V to 5.5V supply. The DAC is controlled via a 2-wire (I2C-compatible) serial interface that operates at clock rates up to 400 kHz.

The AD5820's unique and proprietary Slew Rate Control Modes allow the user to customize the output transient response thereby overcoming mechanical ringing associated with reduced form factor voice coil motors (VCMs).

The AD5820 also incorporates a power-on reset circuit, which ensures that the DAC output powers up to 0V and remains there until a valid write takes place. It has a power-down feature that reduces the current consumption of the device to 1µA maximum.

The AD5820 is designed for auto-focus, image stabilization, and optical zoom applications in camera phones, digital still cameras, and camcorders.

The AD5820 also has many industrial applications, such as controlling temperature, light, and movement, over the range −40°C to +85°C without derating.

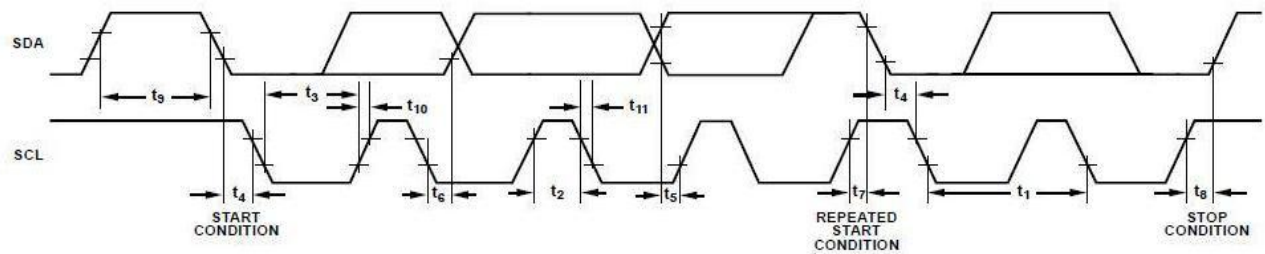
The I2C address for the AD5820 is 0x18h.

Timing Specification

V_{DD} = 2.3 V to 5.5 V. All specifications T_{MIN} to T_{MAX}, unless otherwise noted.

Parameter[1]	B Version Limit at T_{MIN}, T_{MAX}	Unit	Description
f_{SCL}	400	kHz max	SCL clock frequency
t_1	2.5	µs min	SCL cycle time
t_2	0.6	µs min	t_{HIGH}, SCL high time
t_3	1.3	µs min	t_{LOW}, SCL low time
t_4	0.6	µs min	$t_{HD, STA}$, start/repeated start condition hold time
t_5	100	ns min	$t_{SU, DAT}$, data setup time
t_6[2]	0.9	µs max	$t_{HD, DAT}$, data hold time
	0	µs min	
t_7	0.6	µs min	$t_{SU, STA}$, setup time for repeated start
t_8	0.6	µs min	$t_{SU, STO}$, stop condition setup time
t_9	1.3	µs min	t_{BUF}, bus free time between a stop condition and a start condition
t_{10}	300	ns max	t_R, rise time of both SCL and SDA when receiving
	0	ns min	May be CMOS driven
t_{11}	250	ns max	t_F, fall time of SDA when receiving
	300	ns max	t_F, fall time of both SCL and SDA when transmitting
	20 + 0.1 C_b[3]	ns min	
C_b	400	pF max	Capacitive load for each bus line

[1] Guaranteed by design and characterization; not production tested.
[2] A master device must provide a hold time of at least 300 ns for the SDA signal (referred to the $V_{IH\ MIN}$ of the SCL signal) to bridge the undefined region of SCL's falling edge.
[3] C_b is the total capacitance of one bus line in pF. t_R and t_F are measured between 0.3 V_{DD} and 0.7 V_{DD}.

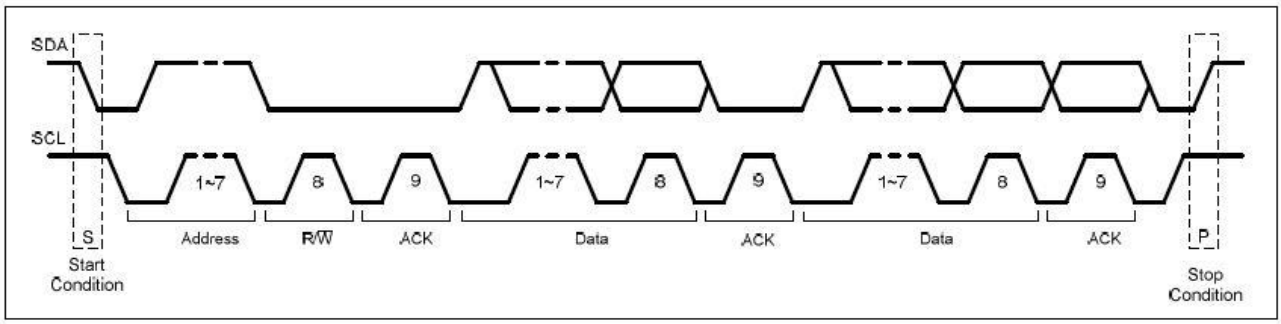


2-Wire Serial Interface Timing Diagram

I2C Bus Operation

The AD5820 is controlled using the industry-standard I2C 2-wire serial protocol. Data can be written to or read from the DAC at data rates up to 400 kHz. After a read operation, the contents of the input register are reset to all zeros.

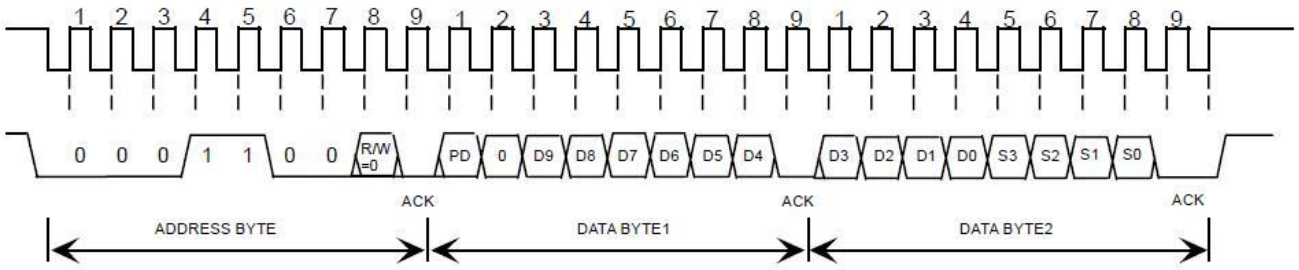
The I2C address is 0x18h.



Complete I2C Data Transfer

Write Operation

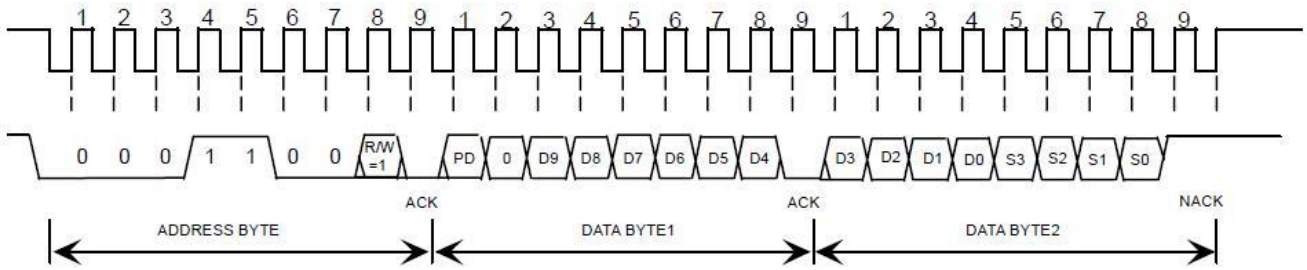
Data is written to the AD5820 high byte first, MSB first, and is shifted into a 16-bit input register. After all data is shifted in, data from the input register is transferred to the DAC register.



Write Operation R/W = 0

Read Operation

During a read operation, data is read in the same bit order.



Read Operation R/W = 1

Data Format

Bit 15, the PD bit is a software power down enable. When set to 1, the output circuitry is disabled and the AD5820 goes into a low power mode. The digital circuitry and I2C interface is still active in this mode. When the PD bit is reset back to zero, the DAC powers up to the value written to the DAC bits at the same time.

Bit 13 to bit 4 are DAC data bits D9 to D0. Bit14 is unused / don't care.

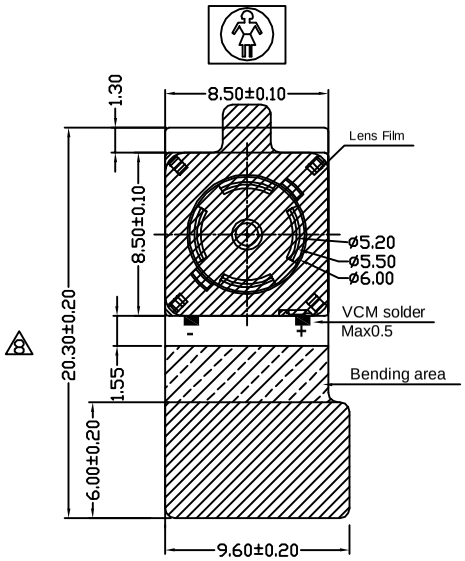
Serial Data Bits	High Byte								Low Byte							
	SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0	SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0
Input Register	R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0
Function	PD	1	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	S3	S2	S1	S0

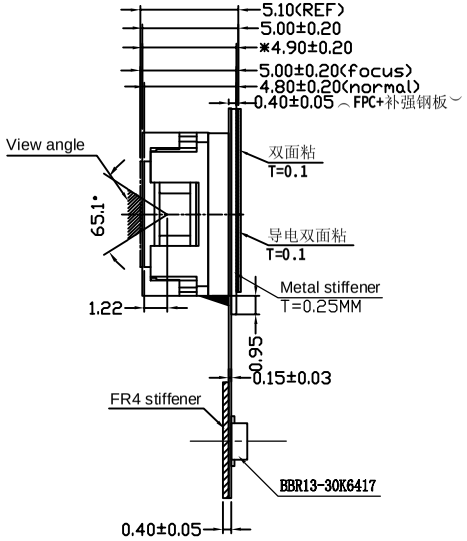
Mechanical Drawing

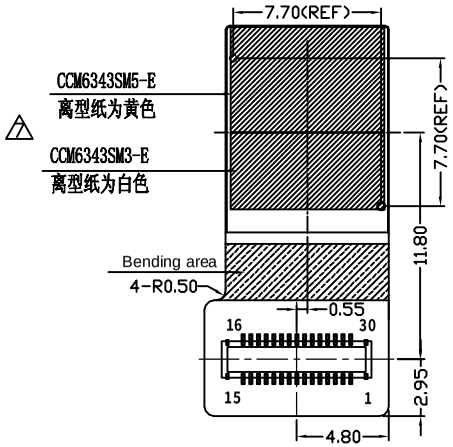
RoHS

Customer No.:

CM6381-B500BA-E Camera Module







备注：

1.带*号尺寸为关键尺寸；

2.VCM Driver为AD5820；

3.马达I2C外部控制;

4.ID接DOVDD拉高。

主要参数(Module Specification)	
焦距(EFL)	3.57
光圈(F.NO)	2.8
视场角(View Angle)	65.1°
畸变(Distortion)	＜1 %
景深(Focusing Range)	10 cm~Infinity
感光芯片(Chip Type)	OV5647
象素(Array Size)	5.0M
镜头类型(lens Size)	1/4INCH 4P+IR

Actuator Specification	
Type	VCM Parameter
Control Mode	IIC
Supply Voltage	2.6V~3.3 V
Coil Resistance	28±10% ohm
Rated Current	≤100mA
Lens Movement	0.30mm(Max)

30PIN DESCRIPTION

PIN NO.	SIGNAL
1	STROBE
2	AF_GND
3	AF_VDD_2.8V
4	AGND
5	AVDD_2.8V
6	DGND
7	SIOC
8	SIOD
9	RESET
10	NC
11	DGND
12	DGND
13	PWDN
14	DGND
15	DGND
16	MDP2
17	MDN2
18	DGND
19	MCP
20	MCN
21	DGND
22	MDP1
23	MDN1
24	DGND
25	XCLK
26	DGND
27	DVDD_1.5V
28	DOVDD_1.8V
29	DGND
30	ID

CUSTOMER APPROVE		AMEND			手机摄像模组
Mechanical	Electrical	NO.	CONTENT	DATE	
		8	更改FP及钢片长度	2011/09/30	
		7	修改FPC长度	20110901	
		6	更换连接器型号	20110815	
		9	增加标示	20111008	

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

TRULY OPTO-ELECTRONICS LTD.

PRODUCT NO.	DRAW NO.	REV
CM6381-B500BA-E		J

DWN 李高阳 20110622	DSN 李高阳 20110622
CHKD 刘铁楠 20110622	APPD 刘铁楠 20110622

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

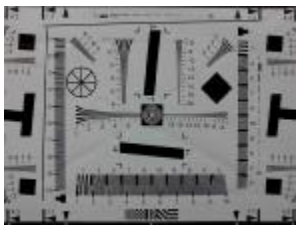
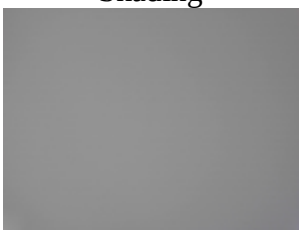
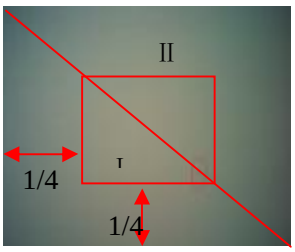
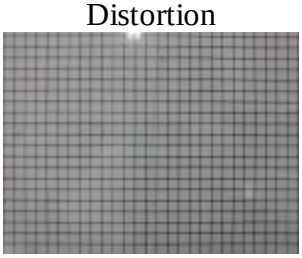
A: The defect can be found in the finished product, or have obvious visual differences from good products, such as crack, defect and dust, or influence image quality, or are appointed by the customer. We will emphasize these items and check all products.

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≥1100 0.7 viewing field ≥900	A
2	Shading 	TBD	A
3	Blemish 	Ⅰ area：Blemish number≤1 Ⅱ area：Blemish number≤4	B
4	Color 	TBD	B
5	Gray Scale 	TBD	B
6	Distortion 	＜1%	B

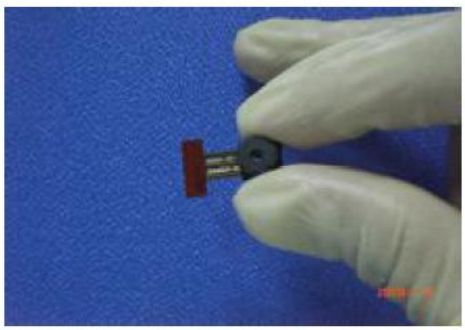
Reliability Specification

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	

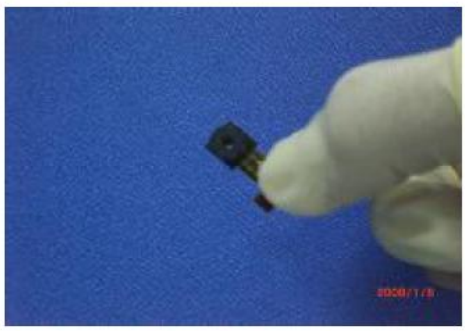
Precautions For Using CCM Modules

Handing Precautions

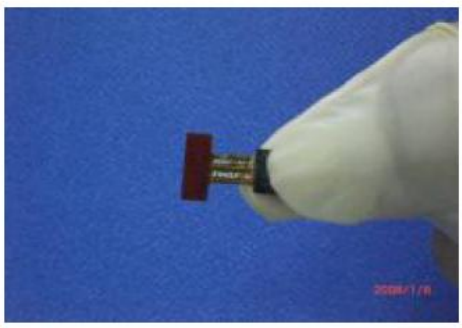
—DO NOT try to open the unit enclosure as there is no user-serviceable component inside. To prevent damage to the camera module by electrostatic discharge, handling the camera module only after discharging all static electricity from yourself and ensuring a static-free environment for the camera module.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



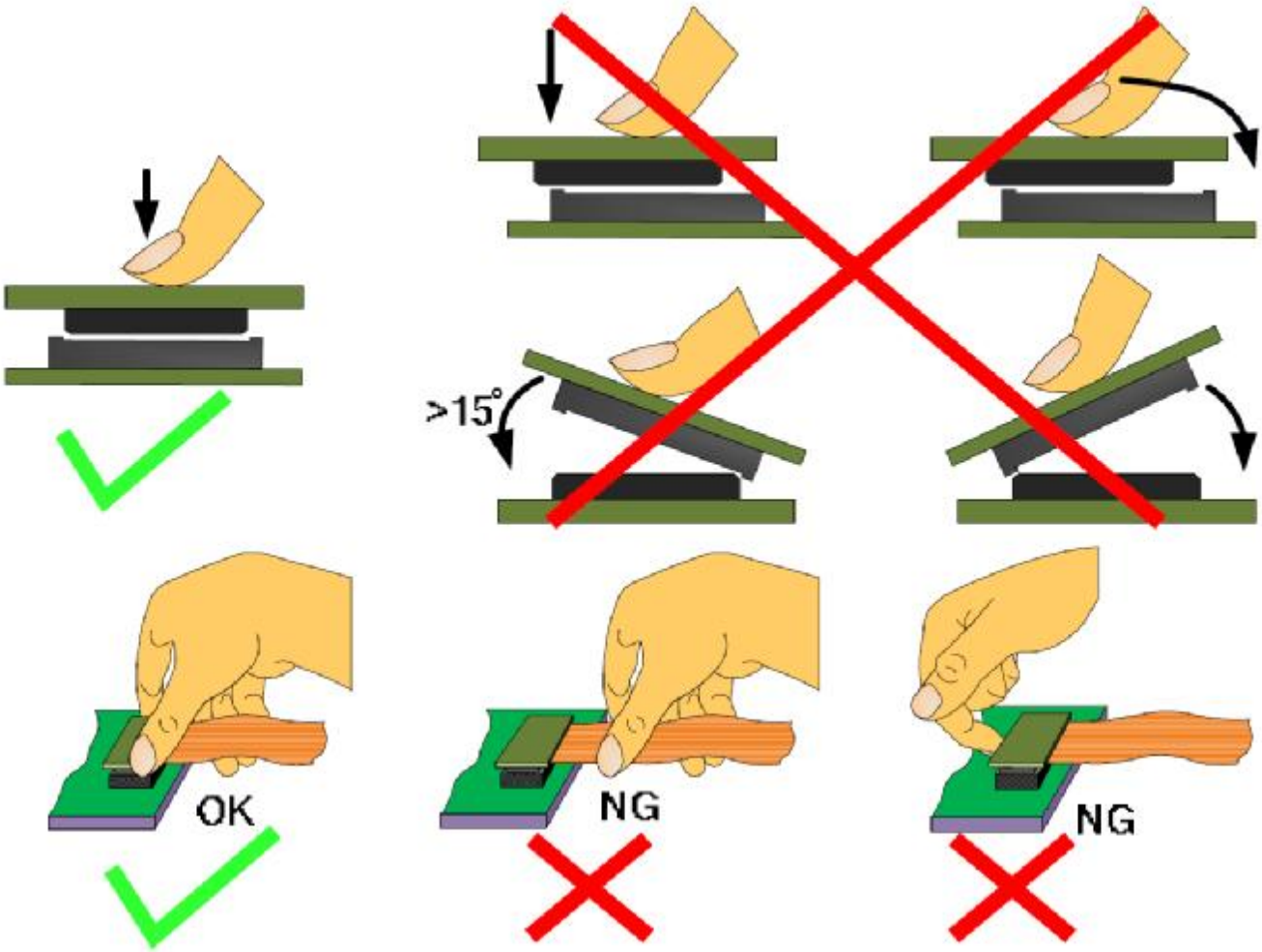
Incorrect



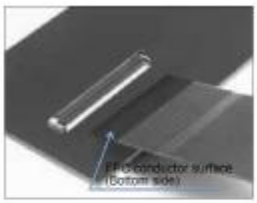
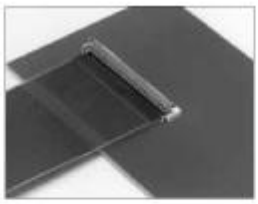
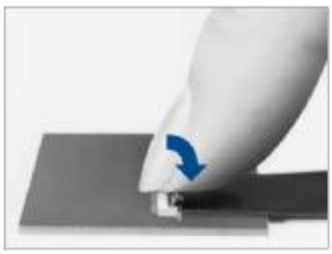
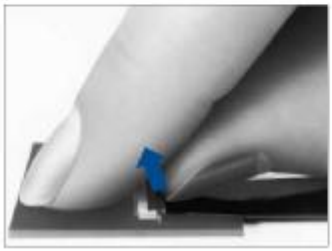
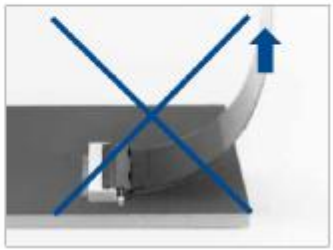
Incorrect

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

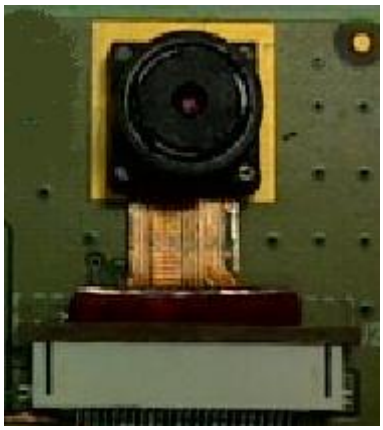


Precaution for assemble the module with ZIF connector:

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.



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 discon-nexion, and so on.

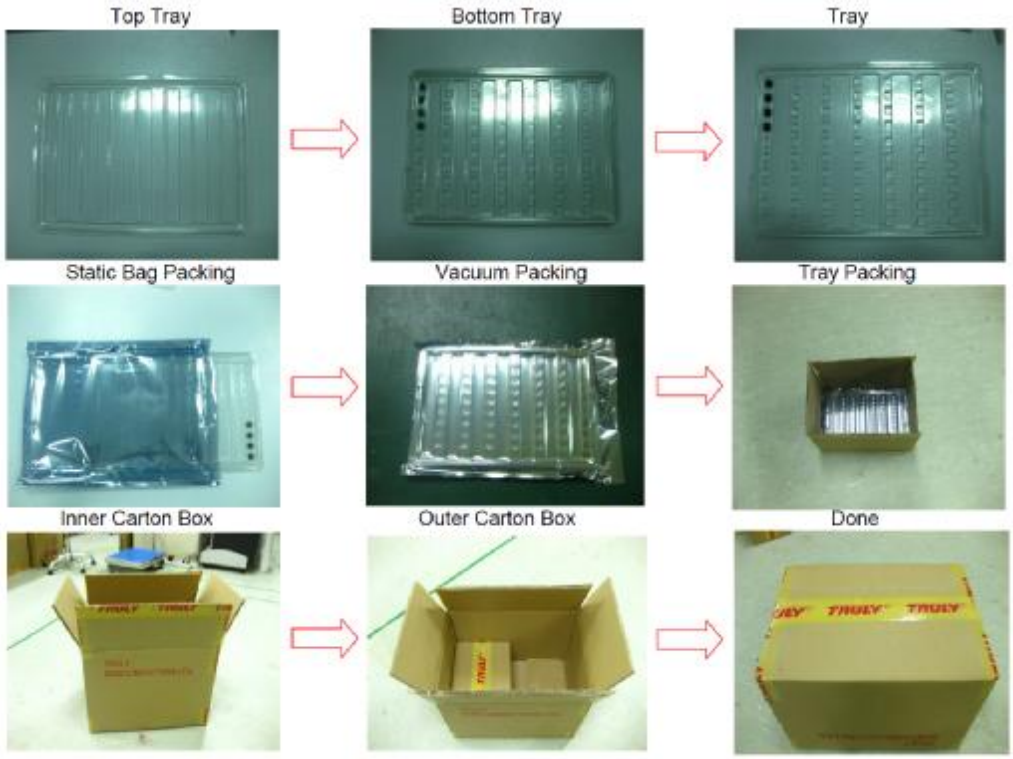
Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

Pakage Specification

Packaging Design One

Product No.	CM6381-B500BA-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

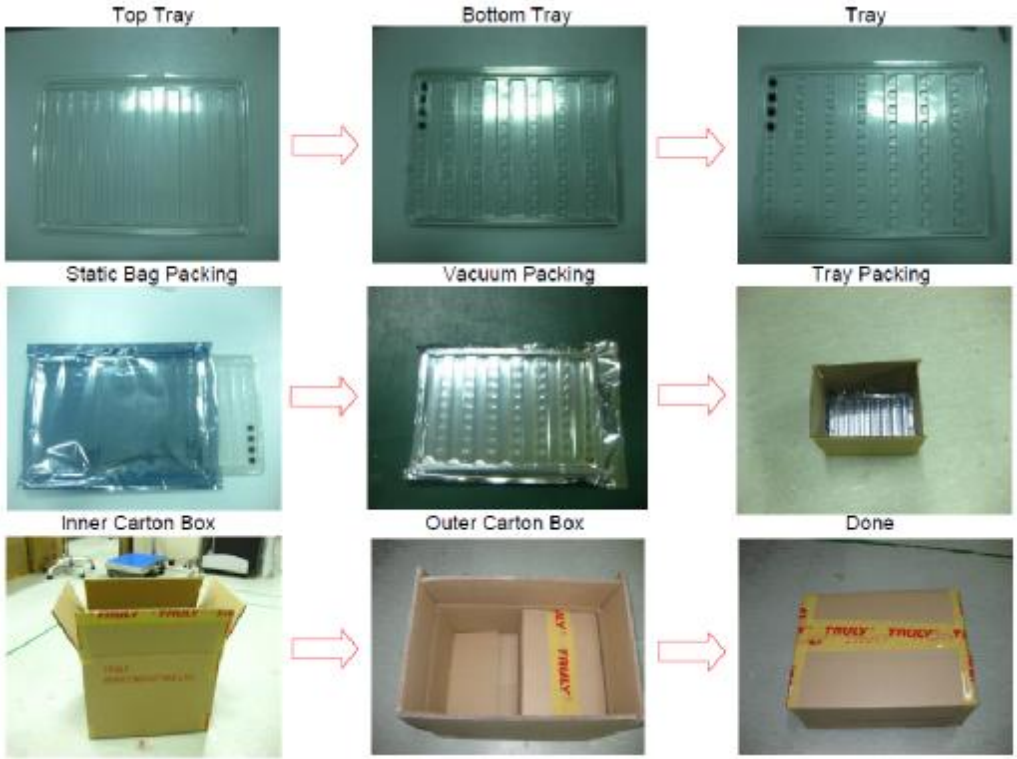
Material for Plastic tray

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

Packaging Design Two

Product No.	CM6381-B500BA-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