PRODUCT   :   CAMERA MODULE

MODEL NO.   :   CM6696-B800BA-E

SUPPLIER   :   TRULY OPTO-ELECTRONICS LTD.

DATE   :   January 28, 2012

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision: 1.0

CM6696-B800BA-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:

TRULY OPTO-ELECTRONICS LTD.

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2012-01-28	First release	

CONTENTS

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

Key Information

Module No.		CM6696-B800BA-E
Module Size		8.50mm×8.50mm×5.70mm
Sensor Type		OV8830
Array Size	UXGA	3264×2448
Power Supply	Core	1.14~1.32V(Internal regulator)
	Analog	2.6~ 3.0V
	I/O	1.7~3.0V
Lens		1/3.2 inch 4Plastic+ IR
Focus(F.NO)		2.4 +/- 5%
View Angle		66.1°+/-2°
Image Area		4592μm×3450μm
Object Distance		10cm-infinity
Sensitivity		864mV/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		10-bit RGB RAW
Maximum Image Transfer Rate	8M pixel	24 fps
	EIS1080p	30 fps
	EIS720p	60 fps
S/N Rate		36dB
Dynamic Range		67 dB
IC Package		CSP
Sensor Power Requirement	Active	339mW
	Standby	300 μA
Scan Mode		Progressive
Dark Current		0.26mV/sec @ 50℃
Package		Antistatic Plastic

Auto-Focus Specification

NO.	Item	Specification
1	Auto-Focus Type	VCM (Voice Coil Motor)
2	VCM Driver	DW9714
3	Power Supply	2.8~3.3 V
4	Rated Current	≤80mA
5	Resistance	16±3Ω
6	Settling Time	<30ms
7	Hysteresis	≤±10μm
8	Focusing Range	10cm to infinity

Pin Assignment

No.	Name	Pin type	Description
1	DGND	Ground	Ground for digital circuit
2	DGND	Ground	Ground for digital circuit
3	DGND	Ground	Ground for digital circuit
4	ID_NC		
5	AF_VDD	Power	Power for VCM
6	AF_PWDN	Input	AF Driver IC power down control
7	SDA	I/O	SCCB data I/O
8	DOVDD	Power	power for I/O circuit
9	SCL	Input	SCCB input clock
10	DVDD(NC)		
11	DGND	Ground	Ground for digital circuit
12	PWDN	Input	Power down, active low with internal pull-high resistor 0: Power down mode 1: Normal mode
13	CLK_N	Output	Differential MIPI clock(sub-LVDS, negative)
14	RESET	Input	Reset (active low with internal pull-up resistor) 1: Normal mode 0: Reset mode
15	CLK_P	Output	Differential MIPI clock(sub-LVDS, positive)
16	DGND	Ground	Ground for digital circuit
17	DATA0_N	Output	MIPI TX first data lane negative output
18	MCLK	Input	System input clock
19	DATA0_P	Output	MIPI TX first data lane positive output
20	DGND	Ground	Ground for digital circuit
21	DATA1_N	Output	MIPI TX second data lane negative output
22	FLASH	Output	Strobe control signal
23	DATA1_P	Output	MIPI TX second data lane positive output
24	AVDD	Power	Power for analog circuit
25	VPP(NC)		
26	AGND	Ground	Ground for analog circuit
27	DATA2_N	Output	MIPI TX third data lane negative output
28	DATA3_N	Output	MIPI TX fourth data lane negative output
29	DATA2_P	Output	MIPI TX third data lane positive output
30	DATA3_P	Output	MIPI TX fourth data lane positive output

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

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 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 (-30°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 for 2-lane MIPI up to 1 Gbps/lane)	1.27	1.3	1.32	V
V_{DD-D}^{a}	supply voltage (digital core for 4-lane MIPI up to 700 Mbps/lane)	1.14	1.2	1.32	V
V_{DD-IO}	supply voltage (digital I/O)	1.7	1.8	3.0	V
I_{DD-A}	active (operating) current[b]		60	80	mA
I_{DD-IO}			95	130	mA
$I_{DDS-SCCB}$			300	3000	µA
$I_{DDS-PWDN}$	standby current[c]		300	3000	µA
$I_{DDS-XSHUTDOWN}$			10	30	µA
digital inputs (typical conditions: AVDD = 2.8V, DVDD = 1.2V, DOVDD = 1.8V)					
V_{IL}	input voltage LOW			0.54	V
V_{IH}	input voltage HIGH	1.26			V
C_{IN}	input capacitor			10	pF
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}	SIOC and SIOD	1.28	1.8	3.0	V

a.   using the internal regulator is strongly recommended for minimum power down currents

b.   DVDD is generated by internal regulator. DVDD and EVDD are tied together.

c.   standby current is measured at room temperature with external clock off
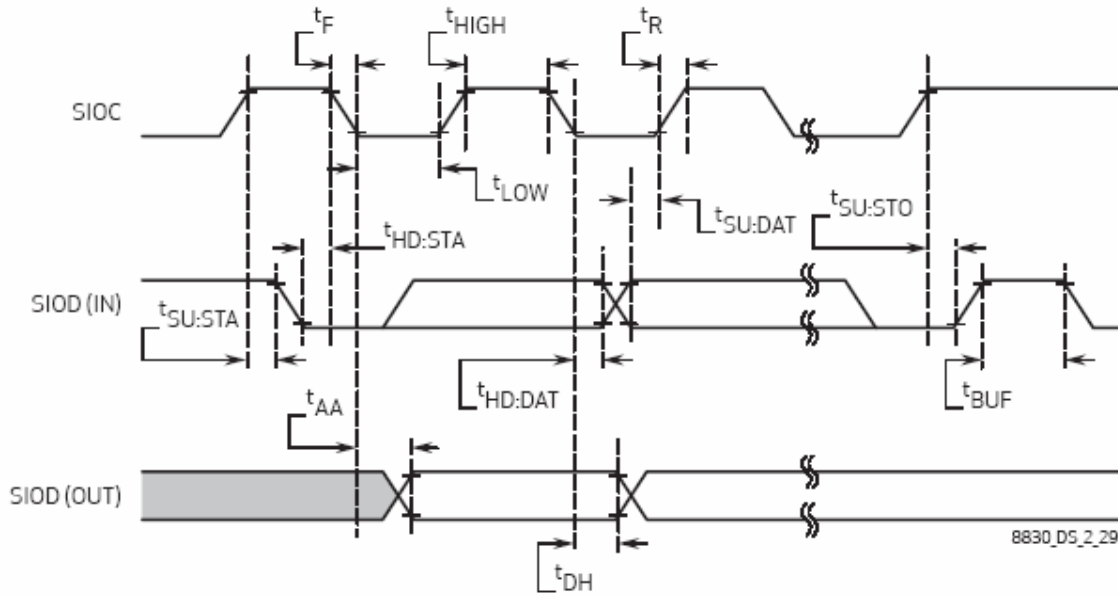
d.   based on DOVDD = 1.8V

TRULY OPTO-ELECTRONICS LTD.

4. Timing characteristics

a. Timing characteristics

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

a.   if using internal PLL

b. SCCB interface timing

table 2-12   SCCB interface timing specifications[ab]

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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%

d.   line/pixel output timing
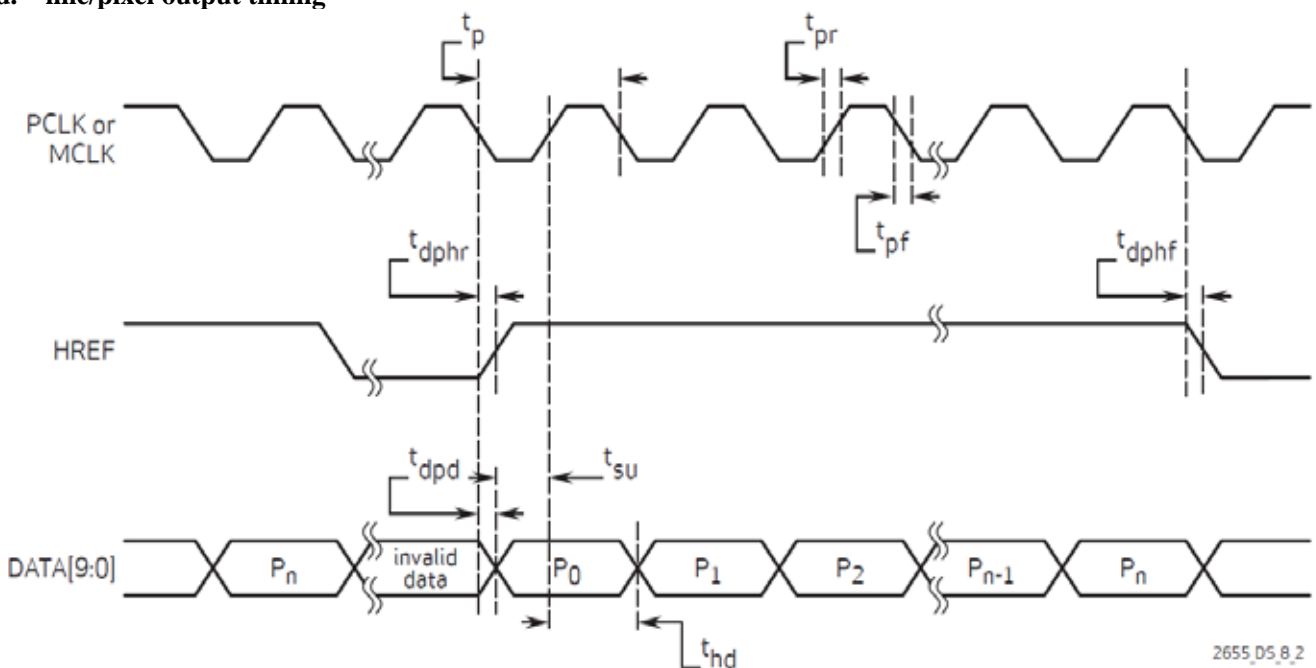
note   n = number of pclks in a line

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 56 MHz, CL = 15pF, and DOVDD = 1.8V

5. Format and frame rate

format[a]	resolution	max frame rate with MIPI	technology
full resolution (see **figure 2-2** and **table 2-3**)	3264x2448	24 fps	full
16:9 6Mpixel	3264x1836	30 fps	crop
EIS1080p (see **figure 2-3** and **table 2-3**)	2112x1188	30 fps	crop+scale 1.5 (3168x1782)
1080p (see **figure 2-2** and **table 2-3**)	1920x1080	30 fps	crop+scale 1.7 (3264x1836)
EIS720p (see **figure 2-3** and **table 2-3**)	1408x792	60 fps	crop+binningx2+scale 1.5 (3238x1822)
720p (see **figure 2-3** and **table 2-3**)	1280x720	60 fps	crop+binningx2+scale 1.25 (3200x1800)
EISQ1080p	1056x594	60 fps	crop+binningx2+scale 1.5 (3168x1782)
Q1080p	960x540	60 fps	crop+binningx2+scale 1.7 (3264x1836)
EISVGA	704x528	60 fps	crop+binningx2+skipx2+scale 1.15 (3238x2428)
VGA (see **figure 2-4** and **table 2-3**)	640x480	90 fps / (200 fps)	crop+binningx2+skipx2+scale 1.27 / (crop+skipx4) (3264x2448)
QVGA	320x240	400 fps	crop+skip

a.   all formats with minimum 4 dummy lines and 4 dummy pixels

6. Power up sequence

The OV8830 can use either the internal regulator or an external power supply to provide digital core 1.2V DVDD. When an external 1.2V is used to provide DVDD power, EXTREG_EN must be pulled to DOVDD which is used to disable the internal regulator to avoid any unstable conflict between the external DVDD and output of the internal regulator. At the same time, the internal regulator must be turned off by a control register.

To avoid any glitch from a strong external noise source, OmniVision recommends controlling XSHUTDOWN or PWDNB by GPIO and tie the other pin to DOVDD.

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

7. Standby and sleep

Two suspend modes are available for the OV2655:
• hardware standby
• SCCB software sleep
To initiate hardware standby mode (see figure 2-7):
1. Set 0x30AB=00 and 0x30AD=0A
2. Set 0x30AE = 27 and 0x363B = 01
3. PWDN pin must be tied to high

table 2-7   power down sequence

case	DVDD	XSHUTDOWN	PWDNB	power down sequence requirement
1	internal	GPIO	DOVDD	Refer to figure 2-13 1. software standby recommended 2. pull XSHUTDOWN low for minimum power consumption 3. AVDD and DOVDD may fall in any order
2	internal	DOVDD	GPIO	Refer to figure 2-14 1. software standby recommended 2. pull PWDNB low for low power consumption 3. pull DOVDD low for minimum power consumption or power off (XSHUTDOWN is connected to DOVDD) 4. pull AVDD low
3	external	GPIO	DOVDD	Refer to figure 2-15 1. software standby recommended 2. pull XSHUTDOWN low for low power consumption 3. cut off DVDD, then it will be in hardware standby state for minimum power consumption 4. pull AVDD and DOVDD low in any order
4	external	DOVDD	GPIO	Refer to figure 2-16 1. software standby recommended 2. pull PWDNB low for low power consumption 3. cut off DVDD, then it will be in hardware standby mode with minimum power consumption 4. pull DOVDD low (XSHUTDOWN connected to DOVDD) 5. pull AVDD low

table 2-8　　power down sequence timing constraints

constraint	label	min	max	unit
enter software standby SCCB command device in software standby mode	t0		when a frame of MIPI data is output, wait for the MIPI end code before entering the software for standby; otherwise, enter the software standby mode immediately	
minimum of EXTCLK cycles after the last SCCB transaction or MIPI frame end	t1	512		EXTCLK cycles
last SCCB transaction or MIPI frame end, XSHUTDOWN falling	t2	512		EXTCLK cycles
XSHUTDOWN falling – AVDD falling or DOVDD falling whichever is first	t3	0.0		ns
AVDD falling – DOVDD falling	t4		AVDD and DOVDD may fall in any order, the falling separation can vary from 0 ns to indefinite	ns
DOVDD falling – AVDD falling	t5			ns
PWDNB falling – DOVDD falling	t6	0.0		ns
XSHUTDOWN falling – external DVDD falling	t7	0.0		ns
external DVDD falling – AVDD falling or DOVDD falling whichever is first	t8	0.0		ns
PWDNB falling – external DVDD falling	t9	0.0		ns

Note:　For more information of sensor please refer to the OV8830 specification.

VCM Specification

NO.	Item	Condition	Specification
1	Motor Size	Without terminal Including sensor space	8.5*8.5*4.2 mm
2	Absolute Max Current		≤100mA
3	Moving Tilt	0～0.26mm	<21′
4	Sensitivity		≤10μm/mA
5	Starting Current	Optical Axis: +Z direction	≥15mA
6	Hysteresis	10mA-80mA-10mA Step by 5mA	≤±10μm
7	Torque (Thread gauge)		≤150gf-cm
8	Rated Stroke	Under 80mA input current and moving direction is upward	≥0.26mm
9	Lens Unit Weight		≤0.09g nominal

Performance Diagram
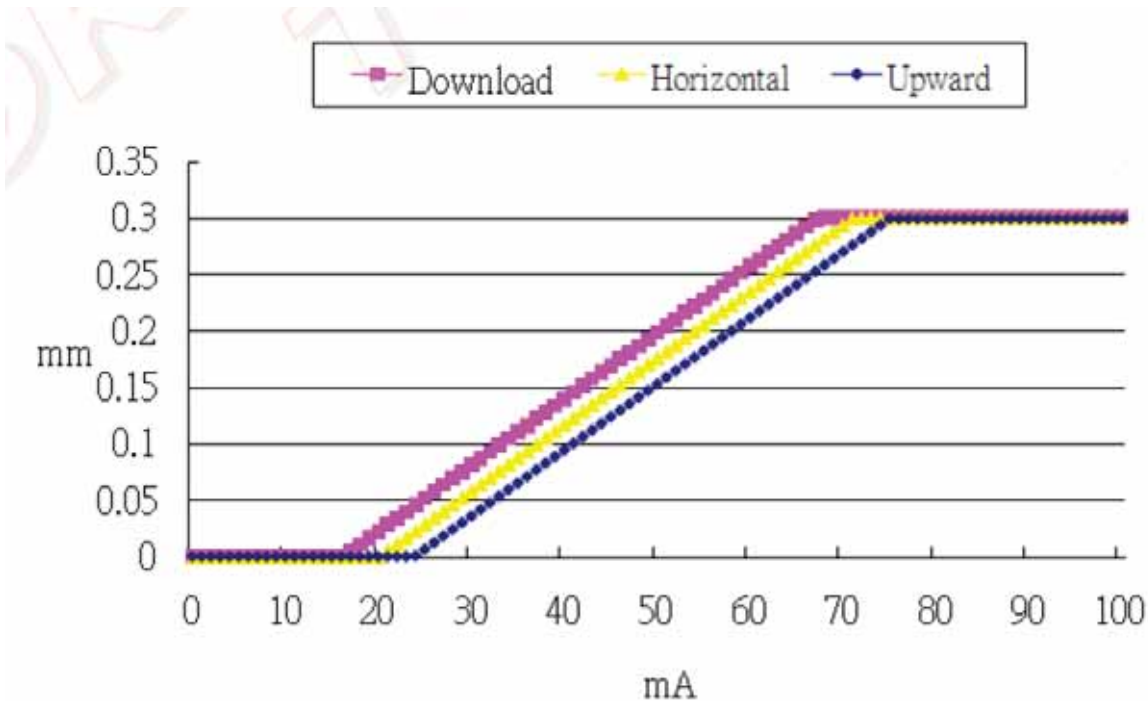
8. Driver IC Specification

Description

The DW9714 is single 10-bit DAC with 120mA output current sink capability. Designed for linear control of voice coil motors, the DW9714 is capable of operating voltage to 3.6V. The DAC is controlled via a I2C serial interface that operates DAC by clock rates up to 400kHz.

The DW9714 incorporates with a power-on reset circuit, power-down function, and exactly matched sense resistor. Power-on reset circuit ensure when supply power up, DAC output is to 0V until valid write-bit value takes place. It has a power down features that reduces the current consumption of the device to 1uA maximum.

The DW9714 is designed for auto focus and optical zoom camera phones, digital still cameras, and camcorders applications.

The I2C address for the DW9714 is 0x18.

IIC Timing Specification

Parameter	Symbol	Min.	Max.	Unit
SCL clock frequency	f_{SCL}	0	400	kHz
Hold time (repeated) START condition.	$t_{HD;STA}$	0.6	-	us
Low period of the SCL clock	t_{LOW}	1.3	-	us
High period of the SCL clock	t_{HIGH}	0.6	-	us
Set-up time for a repeated START condition	$t_{SU;STA}$	0.6	-	us
Data hold time	$t_{HD;DAT}^{(1)}$	-	0.9	us
Data set-up time	$t_{SU;DAT}$	100	-	ns
Rise time of both SDA and SCL signals	t_r	$20+0.1C_b^{(2)}$	300	ns
Fall time of both SDA and SCL signals	t_f	$20+0.1C_b^{(2)}$	300	ns
Set-up time for STOP condition	$t_{SU;STO}$	0.6	-	us
Bus free time between a STOP and START condition	t_{BUF}	1.3	-	us
Capacitive load for each bus line	C_b	-	400	pF
Pulse width of spike suppress	t_{SP}	0	50	ns

(1) A master device must provide a hold time of at least 100ns for the SDA signal to bridge the undefined region of the falling edge of SCL. The maximum $t_{HD;DAT}$ has only to be met if the device does not stretch the LOW period (t_{LOW}) of the SCL signal.
(2) C_b is the total capacitance of one bus line in pF, t_r and t_f are measured between $0.3V_{DD}$ to $0.7V_{DD}$.
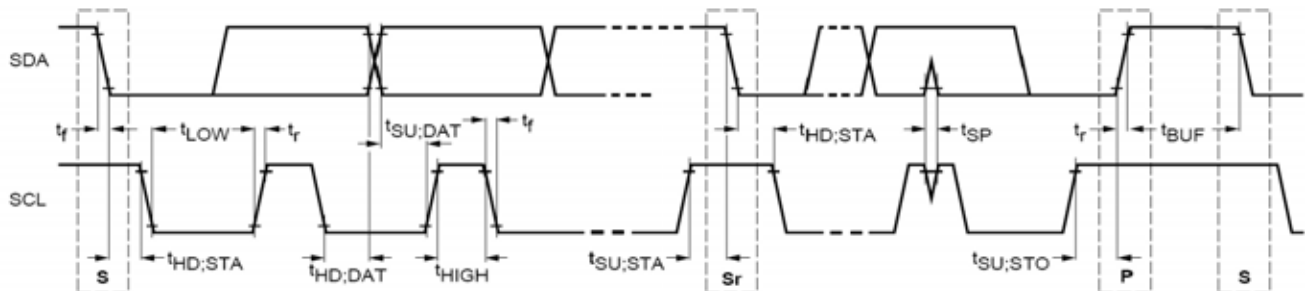
I2C Protocol Specification

■ **Start and Stop condition**
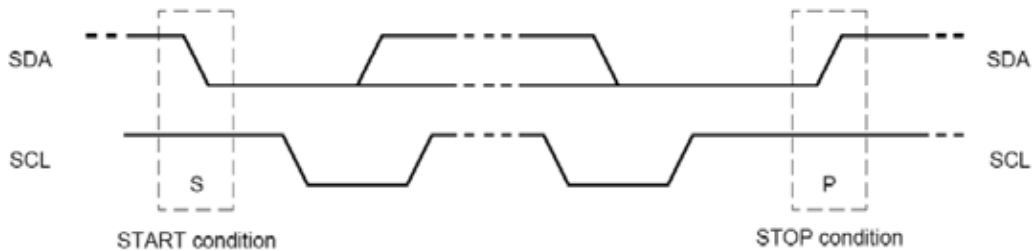
Within the procedure of the I2C-bus, unique situations arise which are defined as START (S) and STOP (P) conditions. A HIGH to LOW transition on the SDA line while SCL is HIGH is one such unique case. This situation indicates a START condition. A LOW to HIGH transition on the SDA line while SCL is HIGH defines a STOP condition.

■ **Complete I2C Data Transfer**
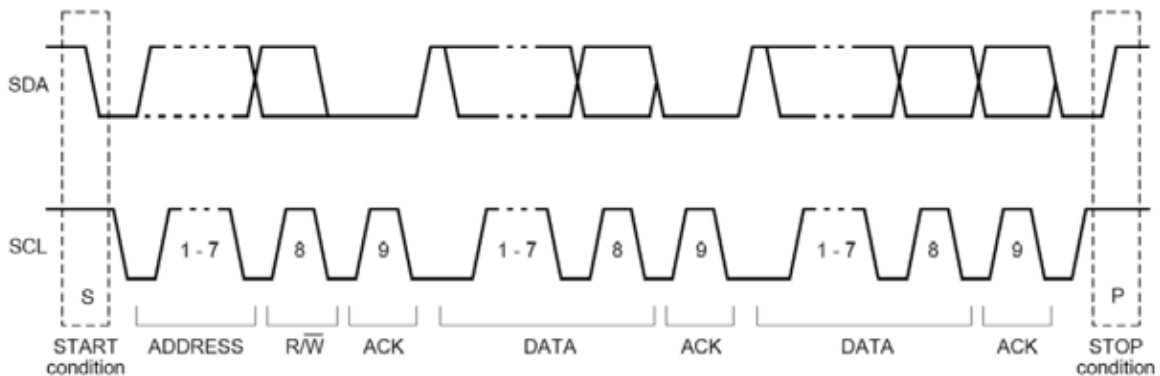
Data transfers follow the format. After the START condition (S), a slave address is sent. A data transfer is always terminated by a STOP condition (P) generated by the master. However, if a master still wishes to communicate on the bus, it can generate a repeated

Electrical Specification

(VDD=2.3 to 3.6V, Vin=1.8V to VDD, Ta= -35 to 85℃, unless otherwise specified. Typical values are at 25℃)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Overall						
Supply Voltage	V_{DD}		2.3		3.6	V
V_{DD} Current	I_{SD}	Shutdown mode	-1		+1	uA
	I_{PD}	Power down mode	-1		+1	uA
	I_Q	Quiescent mode	0.24	-	0.35	mA
Logic input / output (XSD)						
Input current			-1		+1	uA
Low Level Input Voltage	V_{IL}				0.54	V
High Level Input Voltage	V_{IH}		1.26			V
Logic input / output (SCL,SDA)						
Input current			-1		+1	uA
Low Level Input Voltage	V_{IL}				0.54	V
High Level Input Voltage	V_{IH}		1.26			V
Glitch rejection				50		ns
VCM driver						
Current resolution		117.3uA/LSB		10		bits
INL	INL		-4		+4	LSB
DNL	DNL		-1		+1	LSB
Zero code error	ZCE	Zero data loaded to DAC	-1		+1	mA
IOUT compliance voltage [1]		Output current = 100mA	150			mV
Maximum output current	Imax			120[3]		mA
Power on time [2]	TPON			12		ms

(1) The output compliance voltage is guaranteed by design and characterization, not mass production test.
(2) DW9714 requires waiting time of 12ms after power on. During this waiting time, the offset calibration of internal amplifier is operating for minimization of output offset current .
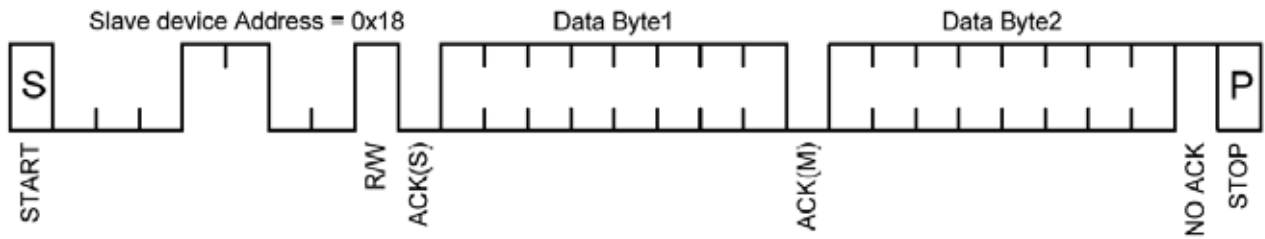(3) Maximum output current can be set 60mA to 140mA.

Register Specification

■ Write Operation
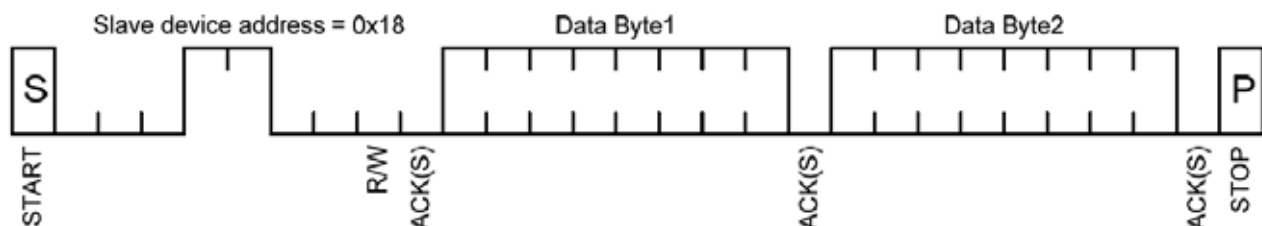
■ Read Operation

Register Format

Byte1								Byte2							
PD	FL AG	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	S3	S2	S1	S0

PD : Power down mode
    1: Power down mode (active high)
    0: Normal operation mode

FLAG : FLAG must keep "L" at writing operation.

D[9:0] : Data input
    Output current = (D[9:0]/1023) X 120mA
    Max current = 120mA +/- 5%

S[3:2] : Codes per step for "Linear slope control"

S[3:2]	Codes per step
0	0 (no SRC) – direct driving
1	1
2	2
3	4

S[1:0] : Step period is determined by S[1:0] and T_SRC[4:0] for "Linear slope control"

SRCT[1:0]	Period [us]
0	Refer "Linear slope control"
1	Refer "Linear slope control"
2	Refer "Linear slope control"
3	Refer "Linear slope control"

Mechanical Drawing

CM6696-B800BA-E Camera Module

RoHS REACH

Customer No.:

主要参数 (Module Specification)

焦距 (EFL)	4.39mm
光圈 (F NO)	2.4±5%
视场角 (View Angle)	66.1°±2°
畸变 (Distortion)	<1%
景深 (Focusing Range)	10 cm~Infinity
感光芯片 (Chip Type)	OV8830
象素 (Array Size)	8.0M
镜头类型 (lens Size)	1/3.2 INCH 4P+IR

镜头保护膜
白油丝印线
弯折区域 T=0.20
φ5.50 (LENS 外径)
φ4.80 (LENS 内径)

20.70±0.20
5.00±0.20
0.80
8.50±0.15
8.50±0.15
5.00±0.20

MEC.69.5°±2°
OPT.66.1°±2°
1.49(REF)
1.67

FR4 补强
CONNECTOR: BBR13-30K6417
0.40±0.05
0.18±0.03(FPC)
T=0.20mm
胶子胶
不锈钢加强板 接地
*5.70±0.20
5.52±0.20（普通拍摄状态）
5.72±0.20（微距拍摄状态）

2-φ0.50(REF)
4-R0.50
8-R0.20
弯折区域
3.85(REF)
7.70(REF)
13.95±0.10
6.30

备注：

1. 带*尺寸为关键尺寸；
2. 未标注圆角为 R0.2
3. FPC整个膀子为弯折区域，'FPC'使用无胶基材；
4. SD 拉低处理，'地址'为 0x20 (write) and 0x21 (read)；
5. PWDN 低电平有效，'RESET' 低电平有效；
6. OTP通过 I2C总线控制 'VPP引脚NC处理'；
7. ID_CAM 引脚 NC 处理；
8. lens 4DP1×2 : VCMWF-653EB

AMEND

		DATE
修改PIN定义及CAM ID指定		20111019
修改PIN定义		20111018
修改影像方向及PIN定义		20111017
更换VCM马达型号		

手机摄像组

DVDD 内供
DOVDD 2.6~3.0V
AVDD 1.7~3.0V
AF_VDD 2.8V~3.3V

CUSTOMER APPROVE

Mechanical	Electrical

TOLERANCE :
DECIMAL
.X ± .30
.XX ± .20
∠ ± 1/4

TRULY OPTO-ELECTRONICS LTD.

PRODUCT NO.	CM6696-B800BA-E	
DWN	王富民 20111019	
CHKD	韦有兴 20111019	DSN 王富民 20111019
CONTENT		APPD 刘铁桶 20111019

UNIT mm SHEET: V1 REV D

30PIN DESCRIPTION

PIN NO.	SIGNAL
1	DGND
2	DGND
3	DGND
4	ID_NC
5	AF_VDD
6	AF_PWDN
7	SDA
8	SCL
9	SCL
10	DVDD(NC)
11	PWDN
12	DOVDD
13	CLK_N
14	RESET
15	CLK_P
16	DGND
17	DATA0_N
18	MCLK
19	DATA0_P
20	DGND
21	DATA1_N
22	FLASH
23	DATA1_P
24	AVDD
25	VRF(NC)
26	AGND
27	DATA2_N
28	DATA3_N
29	DATA2_P
30	DATA3_P

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$\leq$0.08mm,length$\leq$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.
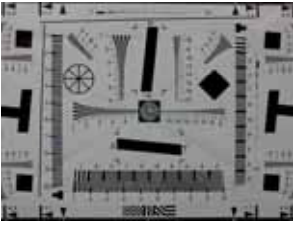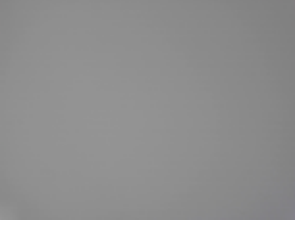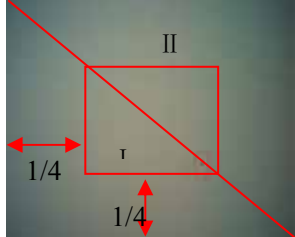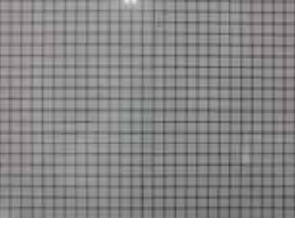
2. Sampling standard
   Referenced standard: GB/T 2828.1-2003/ISO 2859-1:1999 and ANSI/ASQC.4-1993

Image Specification

NO.	Item	Standard	Important Class
1	TV Line 	Center≥1400 0.7 viewing field ≥1000	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.
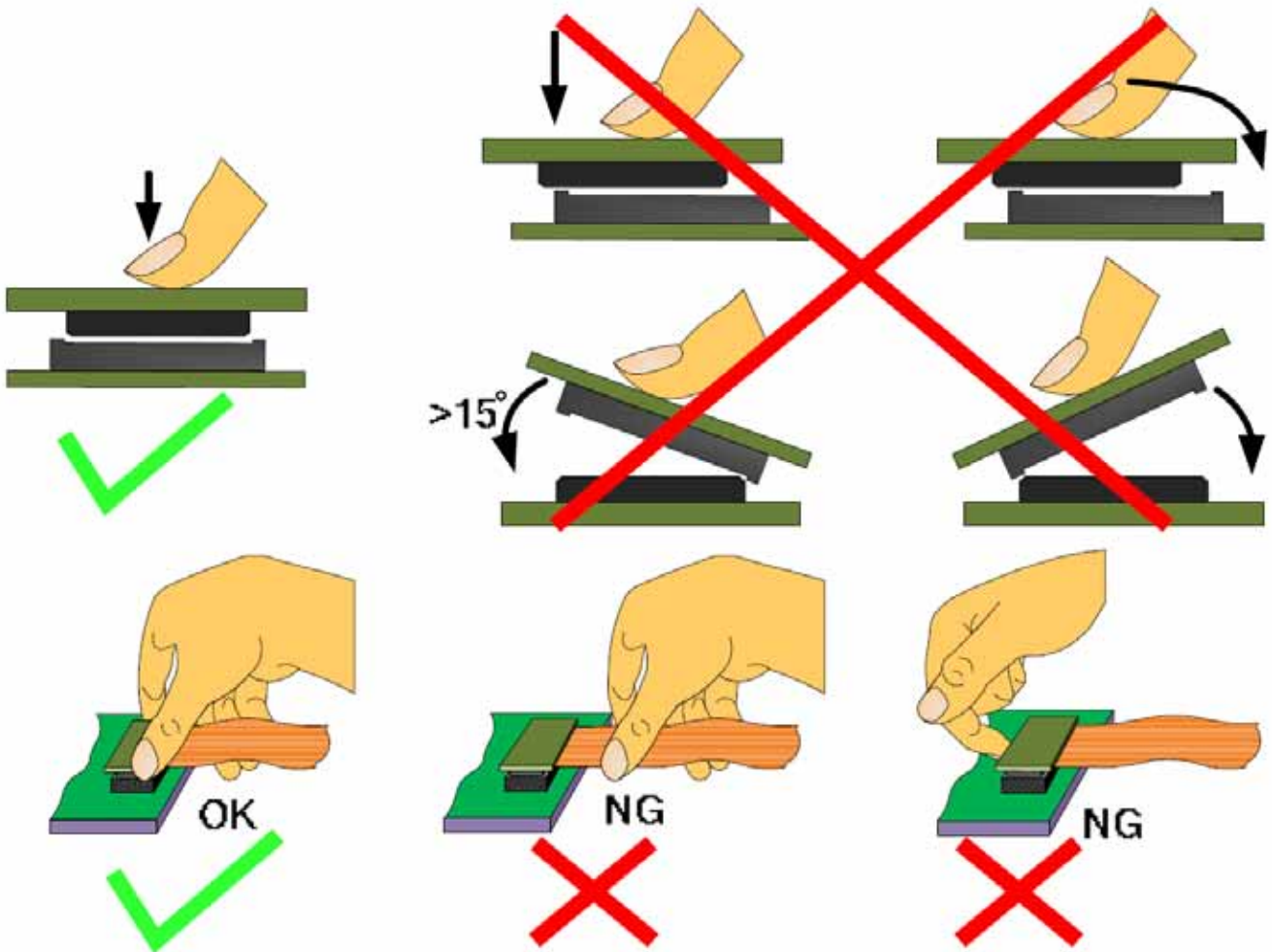
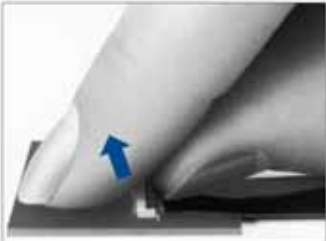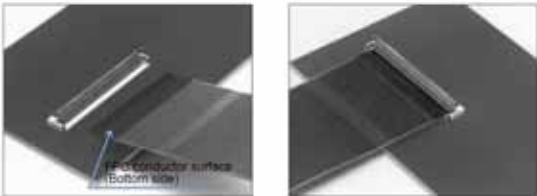—DO NOT twist FPC of CCM.
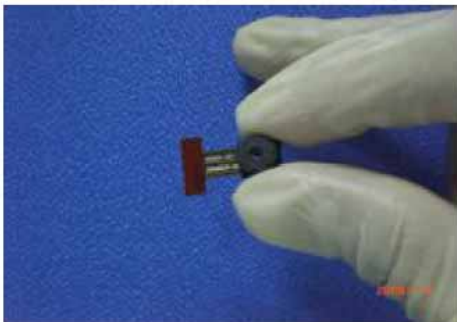
Correct

Incorrect
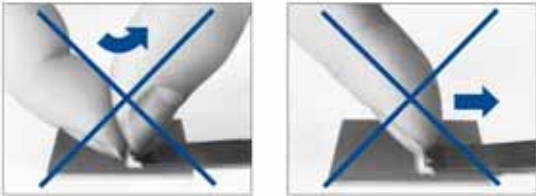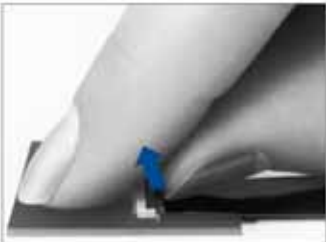

Incorrect

TRULY OPTO-ELECTRONICS LTD.
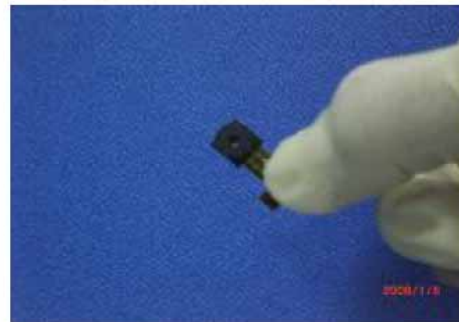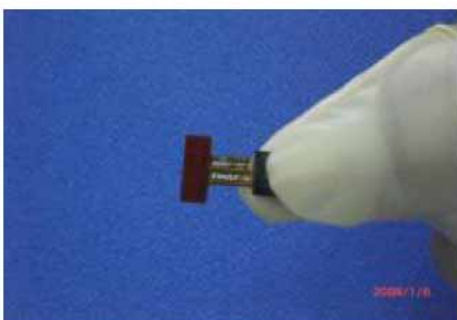
Precaution for assemble the module with BTB connector:

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 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.	CM6696-B800BA-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
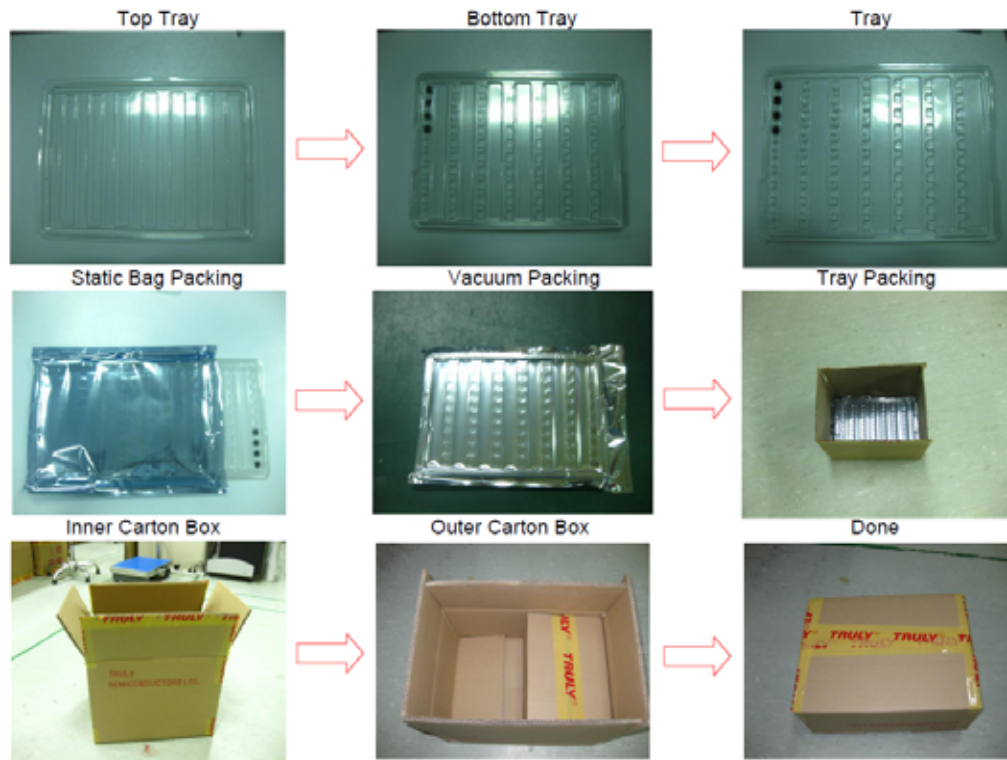
Material for Plastic tray

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

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TRULY OPTO-ELECTRONICS LTD.

Packaging Design Two

Product No.	CM6696-B800BA-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. For Truly standard products, we keep the right to change material, process for improving the product property without notice on our customer.
   For 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