PRODUCT	:	CAMERA MODULE
MODEL NO.	:	CM9380-B800BA-E
SUPPLIER	:	TRULY OPTO-ELECTRONICS LTD.
DATE	:	November 30, 2013

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision:0.1

CM9380-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:

Approved by: Quality Assurance Department:_____ Technical Department:_____	Approved by:

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
0.1	2013-11-30	First release	Preliminary

CONTENTS

WRITTEN BY	CHECKED BY	APPROVED BY
CHEN HUI LIN	LAING XIAOLONG	LIU TIE NAN

Key Information

Module No.		CM9380-B800BA-E
Module Size		8.50mm × 8.56mm × 5.21mm
Sensor Type		OV8865
Array Size		3264× 2448
Power Supply	Core	1.1~1.3 V (typ1.2V)
	Analog	2.6~3.0V (typ2.8V)
	I/O	1.7~3.0V (typ1.8V/2.8V)
	AF_VDD	2.8~3.3V
Lens Size and Structure		1/3.2 inch 4Plastic
Lens F.NO		2.4±5%
Lens View Angle		75.1°
IR Cutter		650nm
Object Distance		10cm~infinity
Input Clock Frequency		6~27MHz
Temperature Range	Operating	-20°C to 70°C
	Stable Image	0°C to 50°C
Output Formats		10-bit RGB RAW
OTP Contents		ID, AWB, LSC.
Maximum Image Transfer Rate	8Mpixel	30fps
	3264x1836	30fps
	2816x1584	30fps
	1632x1224	60fps
	1408x792	60fps
Pixel Size		1.4μm × 1.4μm
IC Package		COB
Substrate		R/FPC
Auto-Focus Type		VCM (Voice Coil Motor)
VCM Driver		BU64241
Package		Antistatic Plastic

Pin Assignment

No.	Name	Pin type	Description
1	DGND	Ground	Digital ground
2	NC	-	No connect
3	NC	-	No connect
4	DGND	Ground	Digital ground
5	NC	-	No connect
6	NC	-	No connect
7	DGND	Ground	Digital ground
8	MDP1	Output	MIPI TX data lane 1 positive output
9	MDN1	Output	MIPI TX data lane 1 negative output
10	DGND	Ground	Digital ground
11	MDP0	Output	MIPI TX data lane 0 positive output
12	MDN0	Output	MIPI TX data lane 0 negative output
13	DGND	Ground	Digital ground
14	MCP	Output	MIPI TX clock lane positive output
15	MCN	Output	MIPI TX clock lane negative output
16	DGND	Ground	Digital ground
17	DOVDD	Power	I/O power
18	DVDD	Power	Core power
19	AGND	Ground	Analog ground
20	AVDD	Power	Analog power
21	AF_VDD	Power	VCM power
22	AF_GND	Ground	VCM ground
23	NC	-	No connect
24	Flash	Output	Flash strobe output
25	ID(DOVDD)	Output	Camera identification, pull up inside of module
26	SCL	Input	SCCB input clock
27	SDA	I/O	SCCB data
28	RESET	Input	Reset and power down(active low with pull down resistor)
29	PWDN	Input	Power down(active low)
30	MCLK	Input	Clock input

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. DC characteristics

V_{DD-A}	supply voltage (analog)	2.6	2.8	3.0	V
V_{DD-D}	supply voltage (digital core for 4-lane MIPI up to 1000 Mbps/lane)	1.1	1.2	1.3	V
V_{DD-IO}	supply voltage (digital I/O)	1.7	1.8	3.0	V
I_{DD-A}	active (operating) current[b]		TBD	TBD	mA
I_{DD-IO}			TBD	TBD	mA
$I_{DD-CORE}$			TBD	TBD	mA
$I_{DDS-SCCB}$	standby current[c]		TBD	TBD	µA
$I_{DDS-PWDN}$			TBD	TBD	µA
$I_{DDS-XSHUTDOWN}$			TBD	TBD	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. maximum active current is measured under typical supply voltage

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

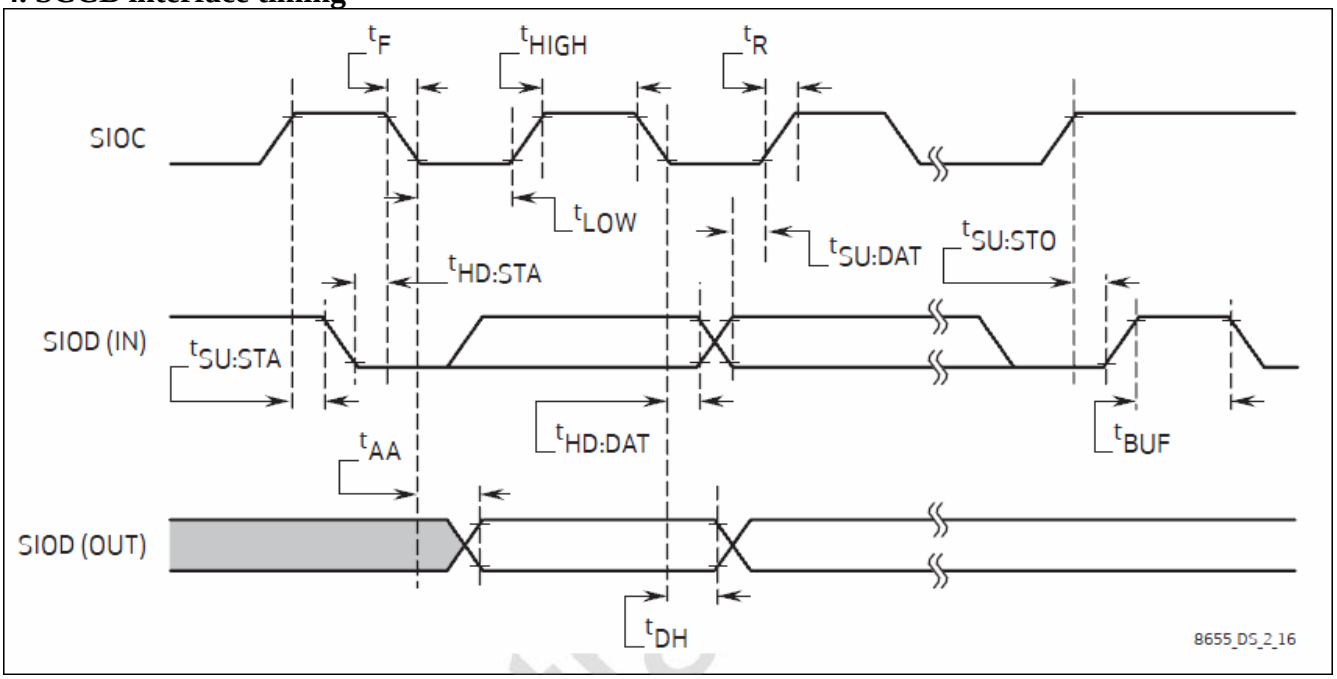
c. standby current is measured at room temperature with external clock off

d. based on DOVDD = 1.8V

3. AC 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			TBD	ns
	clock input duty cycle	45	50	55	%

4. SCCB interface timing



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 and/or of the falling edge signifies 30%, timing measurement shown in the middle of the rising/falling edge signifies 50%, timing measurement shown at the beginning of the rising edge and/or of the falling edge signifies 70%

5. Format and frame rate

resolution	10-bit output	10-bit output MIPI 4 lanes	methodology
3264x2448	30 fps	960 Mbps/lane	full
3264x1836	30 fps	960 Mbps/lane	cropping
2816x1584	30 fps	960 Mbps/lane	cropping
1632x1224	60 fps	960 Mbps/lane	2x2 fast binning
1408x792	60 fps	960 Mbps/lane	2x2 fast binning

6. Power up sequence

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

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

case	XSHUTDOWN	PWDNB	power up sequence requirement
1	GPIO	DOVDD	Refer to figure 2-3 1. DOVDD rising must occur before DVDD rising 2. AVDD rising can occur before or after DOVDD rising 3. AVDD must occur before DVDD 4. XSHUTDOWN rising must occur after AVDD, DOVDD and DVDD are stable
2	DOVDD	GPIO	Refer to figure 2-4 1. AVDD rising occurs before DOVDD rising 2. DOVDD rising occurs before DVDD 3. PWDNB rising occurs after DVDD rising

Power up sequence timing constraints

constraint	label	min	max	unit
AVDD rising – DOVDD rising	t0	0	∞	ns
DOVDD rising – AVDD rising	t1			ns
XSHUTDOWN rising – first SCCB transaction	t2	8192		EXTCLK cycles
minimum number of EXTCLK cycles prior to the first SCCB transaction	t3	8192		EXTCLK cycles
PLL start up/lock time	t4		0.2	ms
entering streaming mode – first frame start sequence (fixed part)	t5		10	ms
entering streaming mode – first frame start sequence (variable part)	t6	delay is the exposure time value		lines
AVDD or DOVDD, whichever is last – DVDD	t7	0	∞	ns
DVDD – PWDNB rising	t8	0	∞	ns
DVDD – XSHUTDOWN rising	t9	0	∞	ns

figure 2-3 power up sequence (case 1)

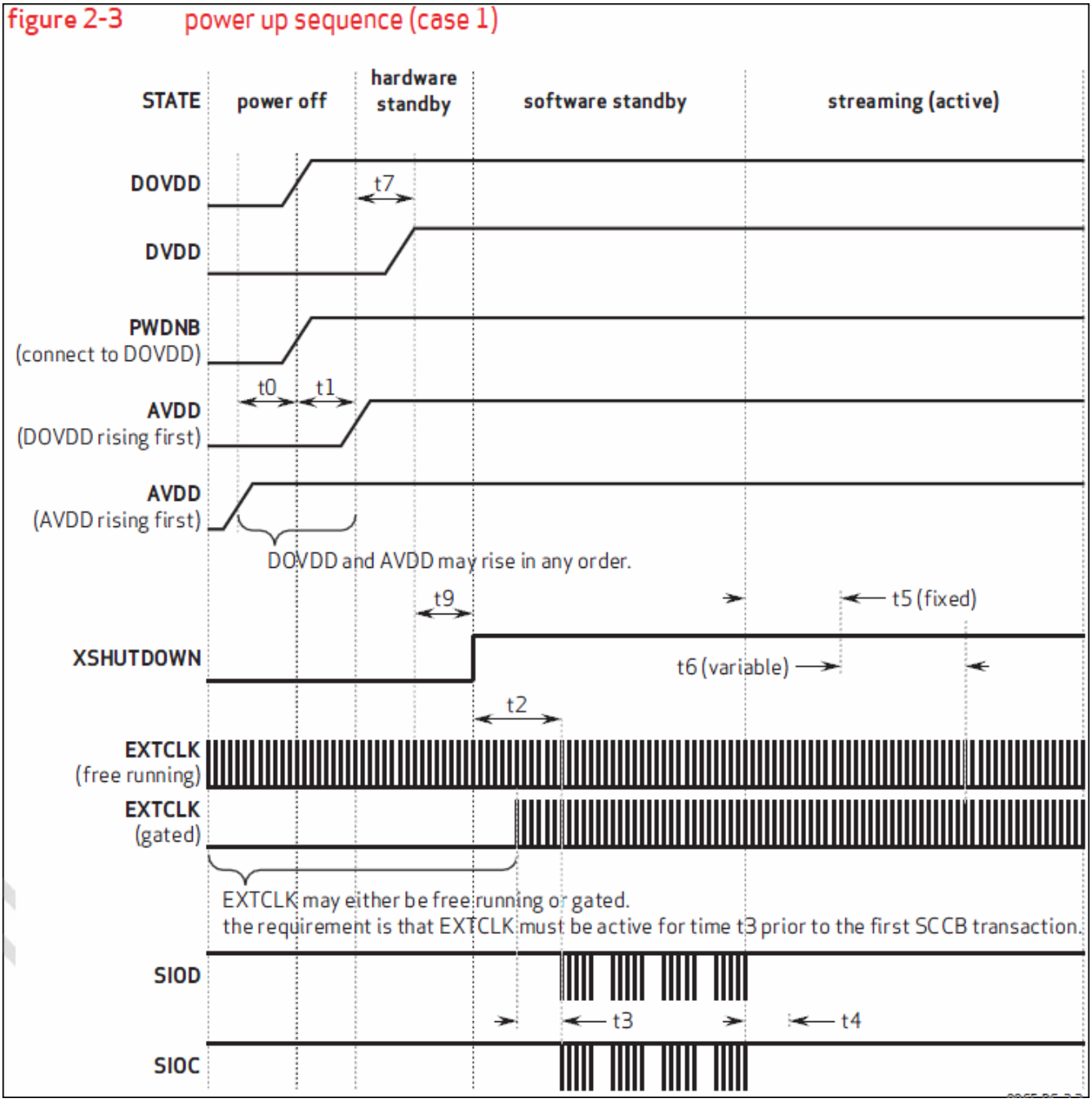
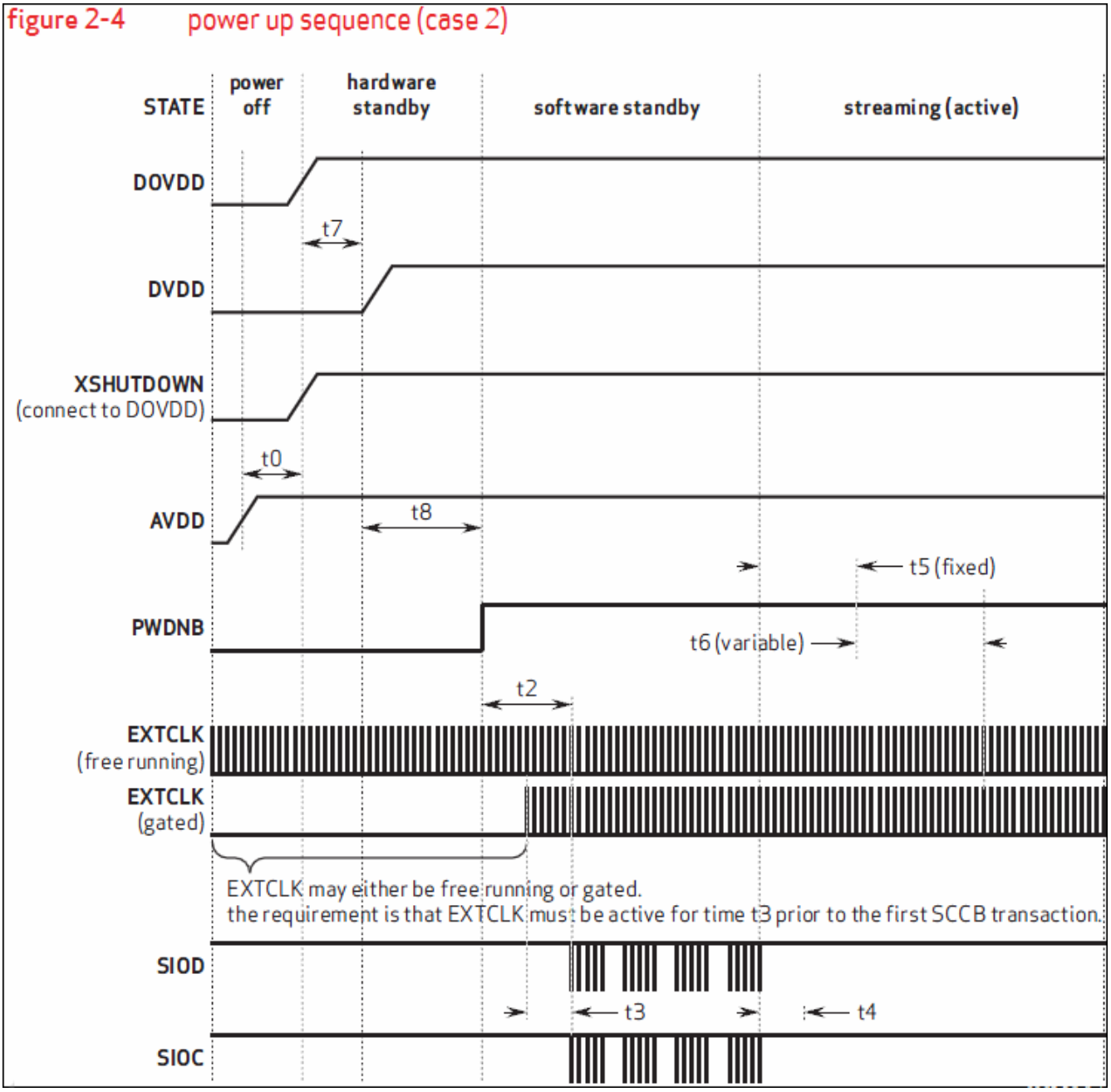


figure 2-4 power up sequence (case 2)



7. Power down sequence

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

case	XSHUTDOWN	PWDNB	power down sequence requirement
1	GPIO	DOVDD	Refer to figure 2-6 1. software standby recommended 2. pull XSHUTDOWN low for minimum power consumption 3. cut off DVDD 4. pull AVDD and DOVDD low in any order
2	DOVDD	GPIO	Refer to figure 2-7 1. software standby recommended 2. pull PWDNB low for minimum power consumption 3. cut off DVDD 4. pull DOVDD low (XSHUTDOWN connected to DOVDD) 5. pull AVDD low

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 infinity		ns
DOVDD falling – AVDD falling	t5			ns
PWDNB falling – DOVDD falling	t6	0.0		ns
XSHUTDOWN falling – DVDD falling	t7	0.0		ns
DVDD falling – AVDD falling or DOVDD falling whichever is first	t8	0.0		ns
PWDNB falling – DVDD falling	t9	0.0		ns

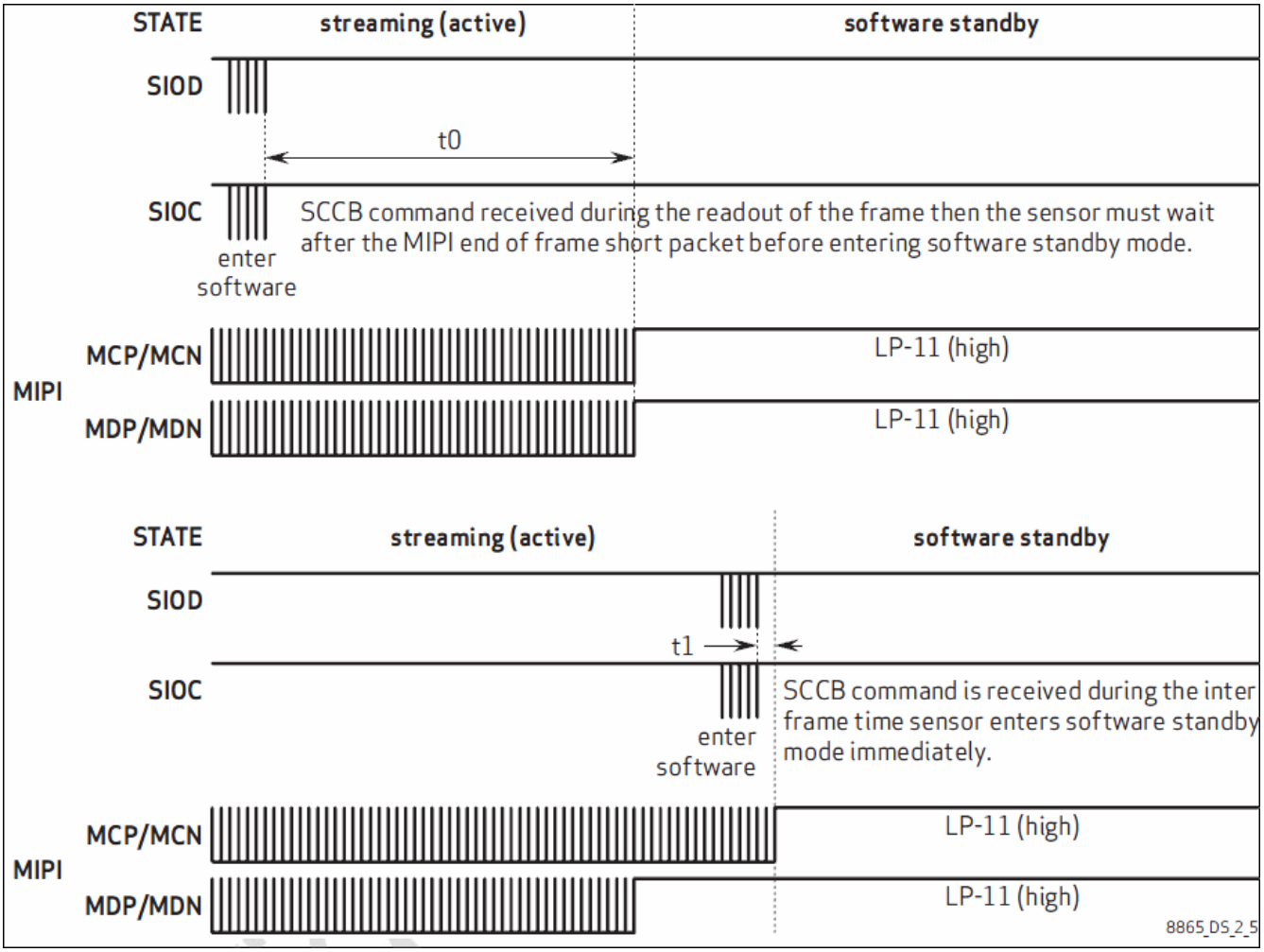

STATE
streaming (active)
software standby
SIOD
t0
SIOC
SCCB command received during the readout of the frame then the sensor must wait after the MIPI end of frame short packet before entering software standby mode.
enter software
MIPI
MCP/MCN
LP-11 (high)
MDP/MDN
LP-11 (high)
STATE
streaming (active)
software standby
SIOD
t1
SIOC
SCCB command is received during the inter frame time sensor enters software standby mode immediately.
enter software
MIPI
MCP/MCN
LP-11 (high)
MDP/MDN
LP-11 (high)
8865_DS_2_5

figure 2-6 power down sequence (case 1)

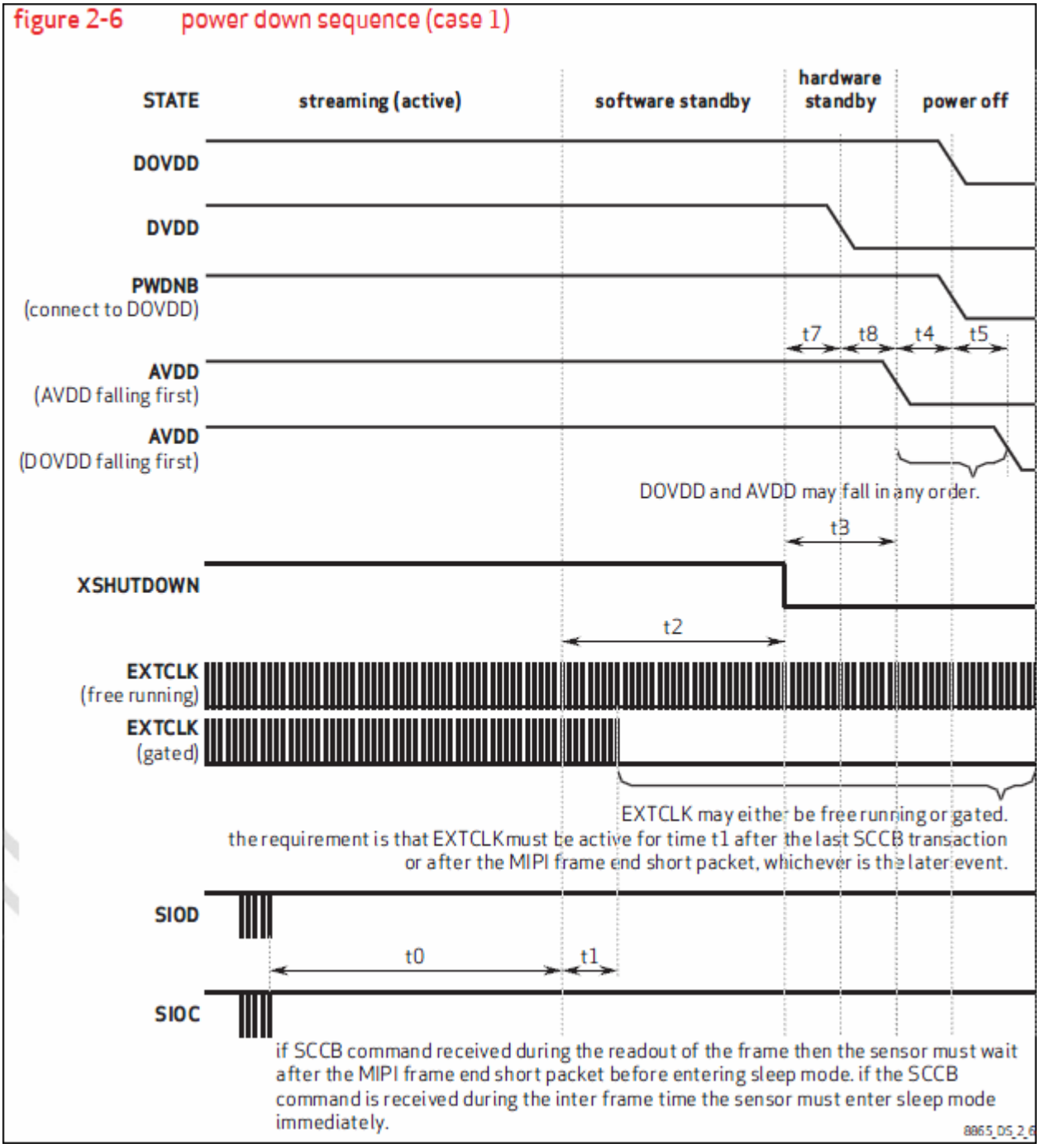
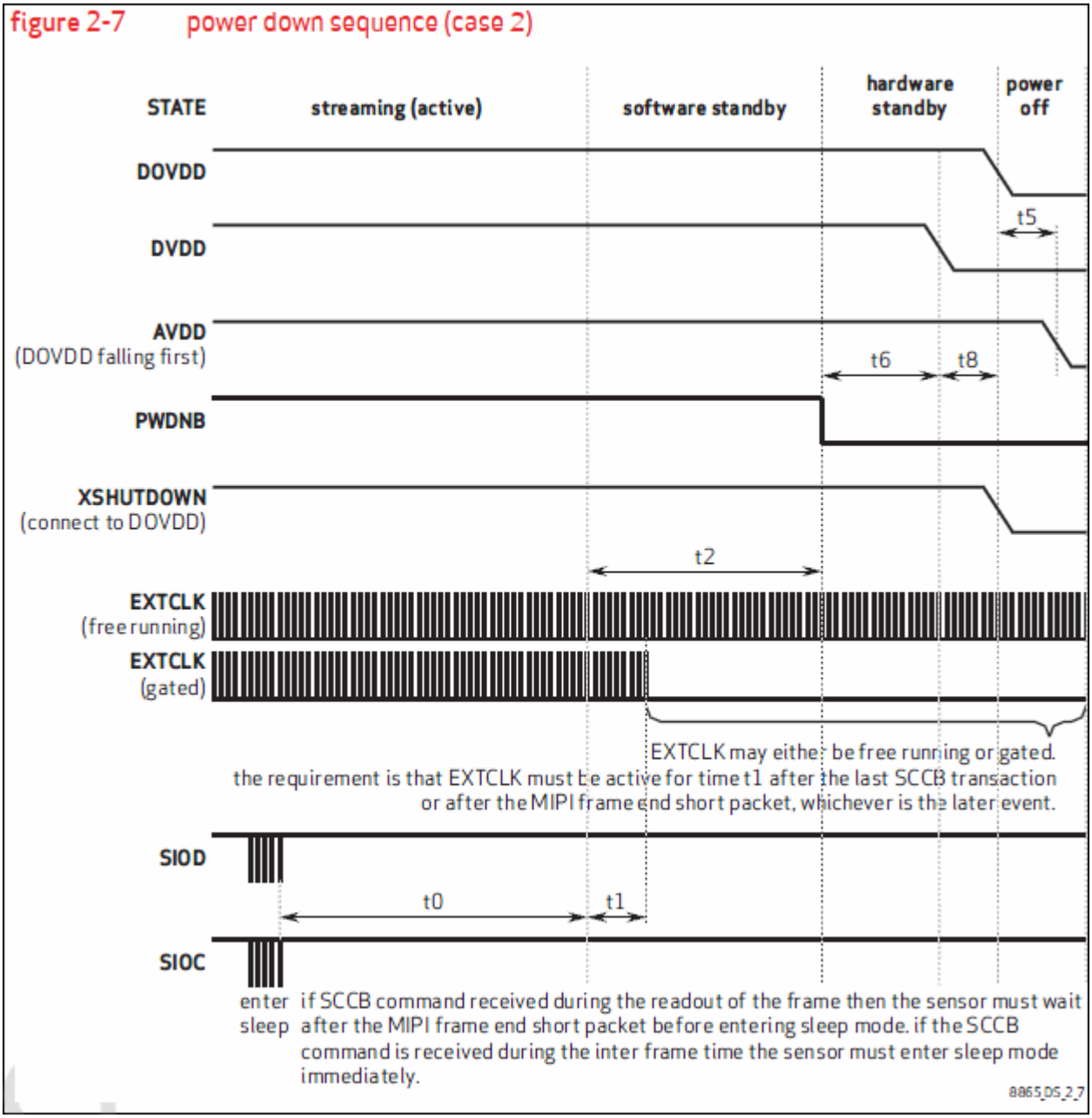


figure 2-7 power down sequence (case 2)



8. Reset

The whole chip will be reset during power up. Manually applying a hardware reset (XSHUTDOWN=0) upon power up is recommended even though the on-chip power up reset is included. The hardware reset is active low with an asynchronized design. The reset pulse width should be greater than or equal to 2 ms.

Power on reset

The power on reset can be controlled from an external pin. Additionally, in this sensor a power on reset is generated after the core power becomes stable.

Software reset

When register 0x0103[0] is configured as 1, all registers are reset to default value.

9. Hardware and software standby

Two suspend modes are available for the OV8865:

- hardware standby
- software standby

Hardware standby
To initiate a hardware standby, the XSHUTDOWN or PWDNB must be tied to low. When this occurs, the OV8865 internal device clock is halted even when the external clock source is still clocking and all internal counters are reset.

Software standby
Executing a software power down (0x0100[0]) through the SCCB interface suspends internal circuit activity, but does not halt the device clock. All register content is maintained in standby mode. During the resume state, registers are restored to their original values.

10. One time programmable memory (OTP)

The OV8865 has a total of 1536 bytes of embedded one time programmable (OTP) memory. The OTP can be programmed through a regular SCCB write and can be read back through a regular SCCB read. The concrete contents of OTP include ID, AWB, LSC.

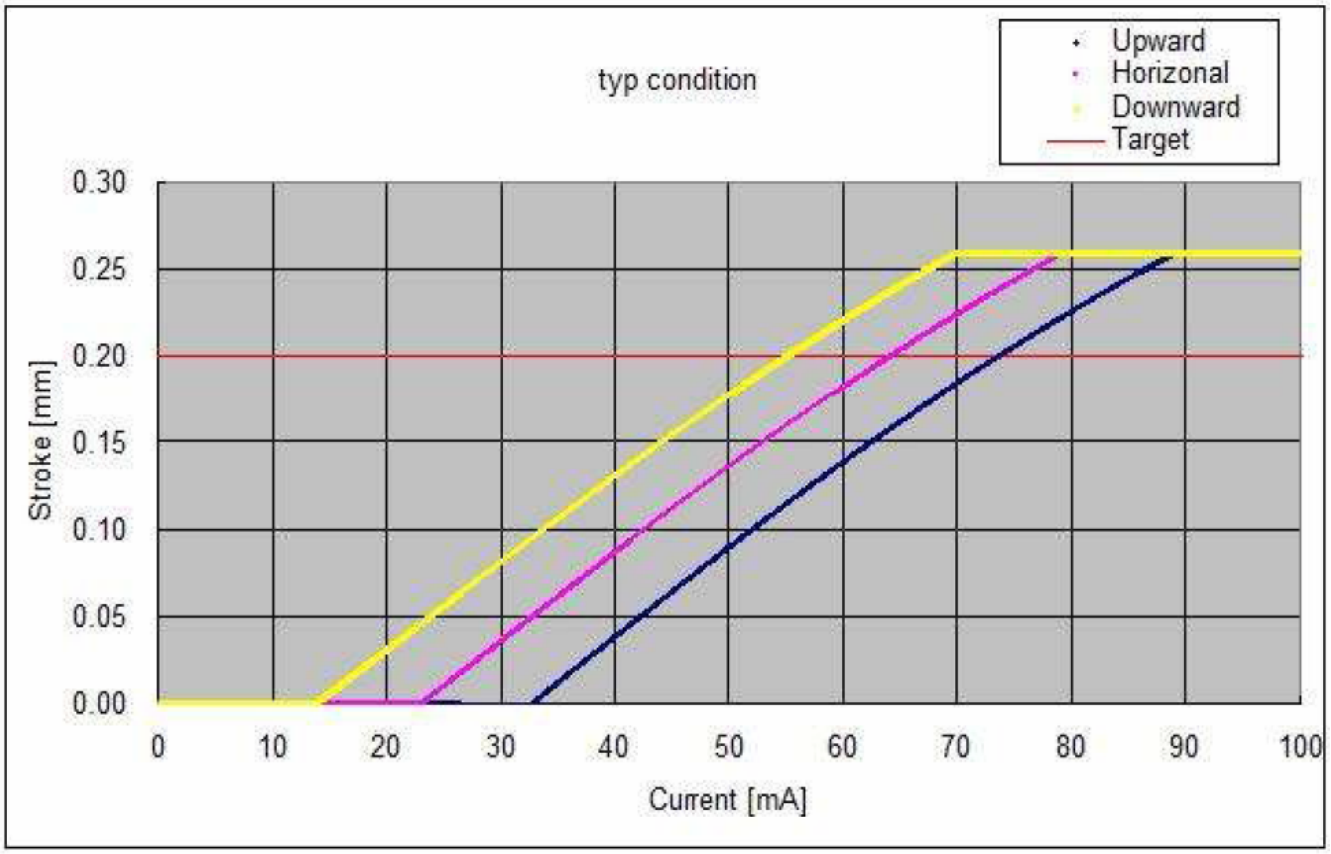
For the detail procedure of load OTP, please contact our FAE for more assistance.

Note: For more information of sensor please refer to the OV8865 specification.

11. VCM specification

NO.	Item	Condition	Specification
1	Motor Size	Without label & terminal	8.5*8.5*3.65mm
2	Rated Current		≤90mA
3	Coil Resistance		10~17ohm
4	Rated Stroke	90mA input current and optical axis is upward	≥0.20mm

Performance Diagram



12. Driver IC Specification

a. Operating Conditions

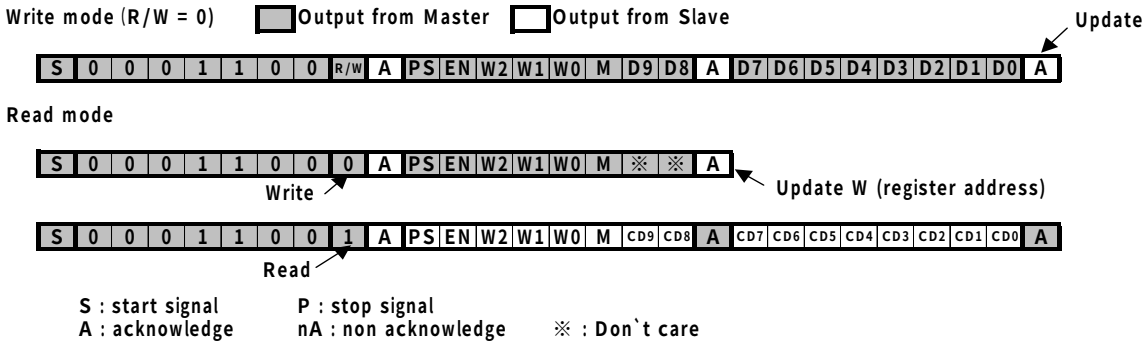
Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VCC	2.3	3.0	4.8	V
Power save input voltage	VPS	0	-	4.8	V
Control input voltage	VIN	0	-	4.8	V
I^2C Bus Frequency	fCLK	-	-	400	kHz
Output current	Iout	-	-	130※4	mA

※4 Must not exceed Pd, ASO.

b. Electrical Characteristics (Unless otherwise specified Ta=25°C,VCC=3.0V)

Parameter	Symbol	Target			Unit	Conditions
		Min.	Typ.	Max.		
Overall						
Circuit current during standby operation	ICCST	-	0	5	μA	PS=0V
Circuit current	ICC	-	0.6	1.0	mA	PS=3V, SCL=400kHz
Power save input						
High level input voltage	VPSH	1.26	-	VCC	V	
Low level input voltage	VPSL	0	-	0.5	V	
Low level input current	IPSL	-10	-	10	μA	VPS=0V
High level input current	IPSH	-10	-	10	μA	VPS=3V
Control input (VIN=SCL, SDA)						
High level input voltage	VINH	1.26	-	VCC	V	
Low level input voltage	VINL	0	-	0.5	V	
Low level output voltage	VINOL	-	-	0.4	V	IIN=+3.0mA (SDA)
High level input current	IINH	-10	-	10	μA	Input voltage=0.9×VIN
Low level input current	IINL	-10	-	10	μA	Input voltage=0.1×VIN
UVLO						
UVLO voltage	VUVLO	1.6	-	2.2	V	
10bit D/A converter(for setting limit voltage)						
Resolution	DRES	-	10	-	Bits	
Differential Nonlinearity	DDNL	-1	-	1	LSB	
Integral Nonlinearity	DINL	-4	-	4	LSB	
Constant-Current Driver block						
Output current resolution	IORES	-	126	-	μA	
Output maximum current	IOMAX	117	130	143	mA	DACcode = 3'h3FF
Zero code offset current	IOOFS	0	1	5	mA	DACcode = 3'h000
Output Voltage	VOUT	-	150	200	mV	Io = 100mA
Maximum applied voltage	VOMAX	-	-	VCC	V	

c. I2C BUS Format (Fast mode:SCL=400kHz)



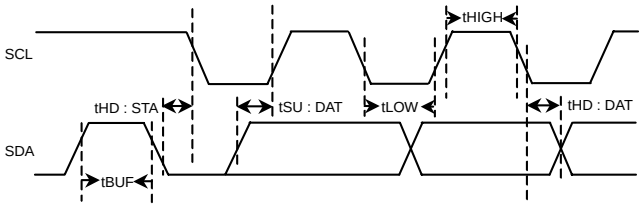
Register name	Setting item	Description
PS	Serial power save	'0' = Standby mode, '1' = Operating mode
EN	OUT pin status	'0' = Hi-impedance, '1' = Constant current sink.
M	Mode select signal	'0' = **ISRC Mode Disabled**, '1' = **ISRC Mode Enabled**
W2W1W0	Register address	'000' = Limit Voltage setting, '001' = Operating parameter setting1
		'010' = Operating parameter setting2, '011' = Operating parameter setting 3
		'100' = Operating parameter setting4
D9～D0	Limit Voltage	Target position DAC code[D9:D0]
	Operating parameter1	Resonance frequency setting[D7:D3], Slew rate speed setting[D1:D0]
	Operating parameter2	VCM un-control current setting1[D9:D0]
	Operating parameter3	VCM un-control current setting2[D9:D0]
	Operating parameter4	Step resolution[D7:D5] (Minimum step resolution = 1LSB@10bit_DAC) Step time setting[D4:D0] (Minimum step time resolution = 50us)

Characteristics of the SDA and SCL bus lines for 2-wire serial interface

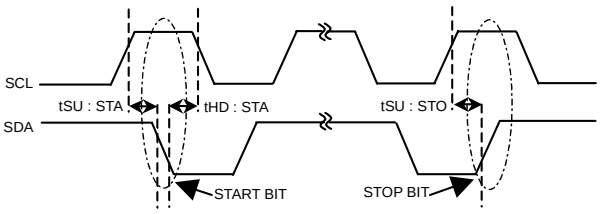
Parameter	Symbol	STANDARD-MODE※6		FAST-MODE※6		Unit
		Min.	Max.	Min.	Max.	
LOW level input voltage	VIL	-0.5	0.5	-0.5	0.5	V
High level input voltage	VIH	1.26	4.8	1.26	4.8	V
Hysteresis of Schmitt trigger inputs	Vhys	-	-	0.15	-	V
LOW level output voltage at 3mA sink current	VOL	0	0.4	0	0.4	V
Pulse width of spikes which must be suppressed by the input filter	tSP	0	50	0	50	ns
Input current each I/O pin with an input voltage between 0.1V and 0.9VIN_{max}	Ii	-10	10	-10	10	uA
SCL clock frequency	fSCL	-	100	-	400	kHz
Hold time (repeated) START condition. After this period, the first clock pulse is generated	tHD;STA	4.0	-	0.6	-	us
LOW period of the SCL clock	tLOW	4.7	-	1.3	-	us
High period of the SCL clock	tHIGH	4.0	-	0.6	-	us
Set-up time for repeated START condition	tSU;STA	4.7	-	0.6	-	us
Data hold time	tHD;DAT	0	3.45	0	0.9	us
Data set-up time	tSU;DAT	250	-	100	-	ns
Set-up time for STOP condition	tSU;STO	4.0	-	0.6	-	us
Bus free time between a STOP and START condition	tBUF	4.7	-	1.3	-	us

※6 STANDARD-MODE and FAST-MODE 2-wire serial interface devices must be able to transmit or receive at that speed.
The maximum bit transfer rates of 100 kbit/s for STANDARD-MODE devices and 400 kbit/s for FAST-MODE devices
This transfer rates is provided the maximum transfer rates, for example it is able to drive 100 kbit/s of clocks with FAST-MODE.

Definition of timing on the 2-wire serial interface

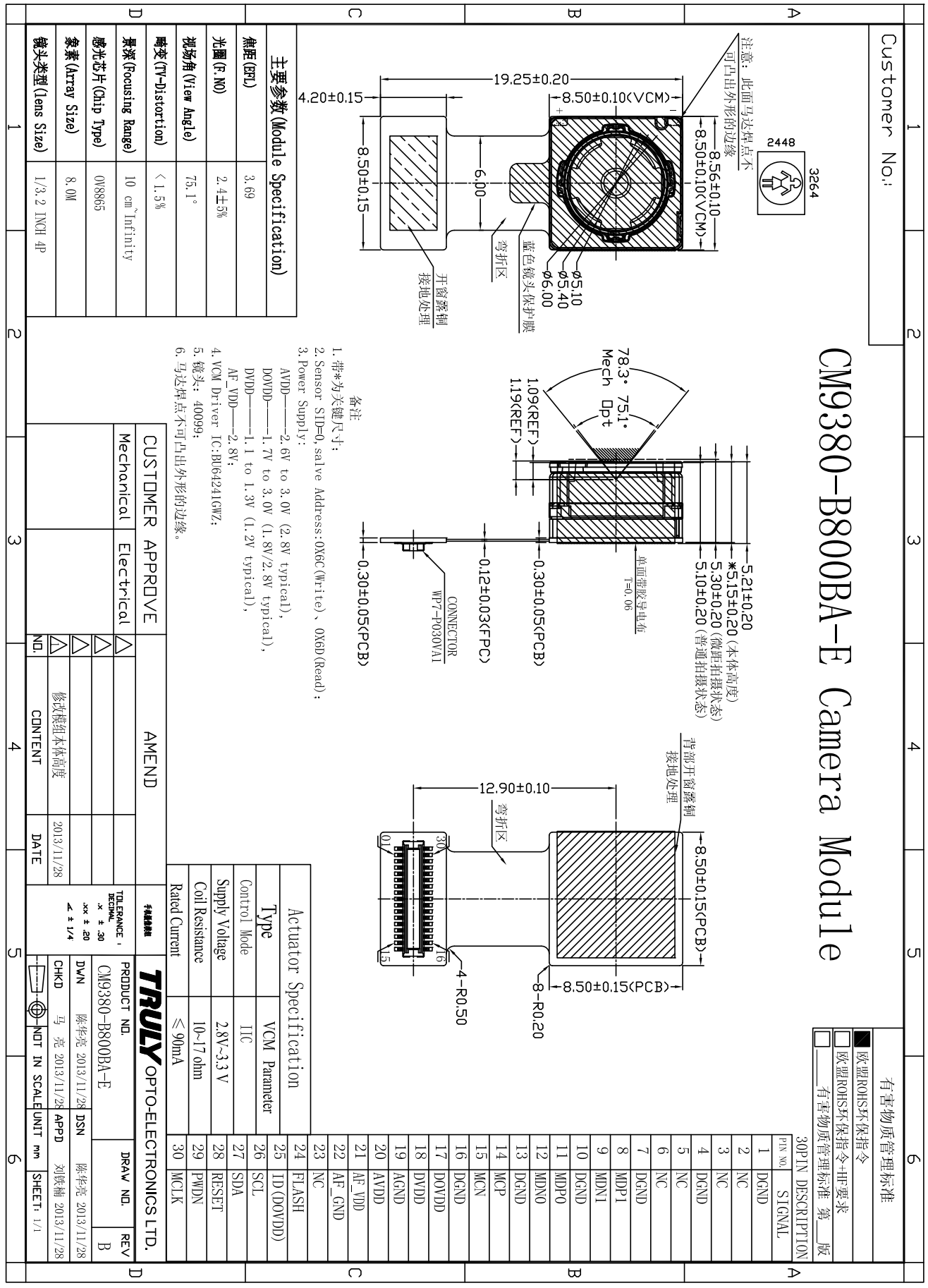


Definition of timing for serial data



Definition of timing for START and STOP bit

Mechanical Drawing



主要参数(Module Specification)	
焦距(EFL)	3.69
光圈(F.NO)	2.4±5%
视场角(View Angle)	75.1°
畸变(TV-Distortion)	<1.5%
景深(Focusing Range)	10 cm~Infinity
感光芯片(Chip Type)	OV8865
象素(Array Size)	8.0M
镜头类型(Lens Size)	1/3.2 INCH 4P

备注
1. 带*为关键尺寸；
2. Sensor SID=0, salve Address:0X6C(Write)、0X6D(Read)；
3. Power Supply:
AVDD——2.6V to 3.0V (2.8V typical),
DOVDD——1.7V to 3.0V (1.8V/2.8V typical),
DVDD——1.1 to 1.3V (1.2V typical),
AF_VDD——2.8V;
4. VCM Driver IC:BU64241GWZ;
5. 镜头：40099;
6. 马达焊点不可凸出外形的边缘。

Actuator Specification	
Type	VCM Parameter
Control Mode	IIC
Supply Voltage	2.8V~3.3 V
Coil Resistance	10~17 ohm
Rated Current	≤ 90mA

PIN NO.	SIGNAL
1	DGND
2	NC
3	NC
4	DGND
5	NC
6	NC
7	DGND
8	MDP1
9	MDN1
10	DGND
11	MDP0
12	MDN0
13	DGND
14	MCP
15	MCN
16	DGND
17	DOVDD
18	DVDD
19	AGND
20	AVDD
21	AF_VDD
22	AF_GND
23	NC
24	FLASH
25	IID(DOVDD)
26	SCL
27	SDA
28	RESET
29	PWDN
30	MCLK

30PIN DESCRIPTION

CUSTOMER APPROVE		AMEND		
Mechanical	Electrical			
			NO.	CONTENT
				修改模组本体高度
			DATE	2013/11/28

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

TRULY OPTO-ELECTRONICS LTD.

PRODUCT NO.	CM9380-B800BA-E	DRAW NO.	REV
			B
DWN	陈华亮 2013/11/28	DSN	陈华亮 2013/11/28
CHK'D	马 亮 2013/11/28	APP'D	刘铁楠 2013/11/28
NOT IN SCALE	UNIT: mm	SHEET: 1/1	

Appearance Specification

NO.	Item	Standard	Importance Class
1	Top side of Lens	1.No obvious impurity and No feeling nick defect and oil impurity on the surface of lens within 1/2 area; 2.there is no chip or crack on the lens at another 1/2 area	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	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
4	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
5	Connector	No dust, fingerprint, and not allows to turning colors, distortion; Solder must be well; No open circuit or short circuit.	A
6	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
7	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.

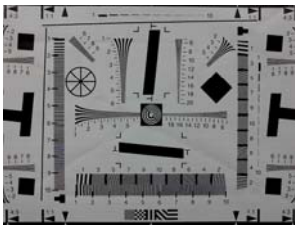
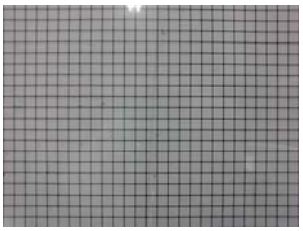
B：The defect can be found in the finished product and has visual difference from the good one, but will not affect customer's aesthetic judgement. Or the defect can not be found in the finished product and will not generate functional problem, but will slightly influence sequential manufacture process 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
1	TV Line 	Center≥1500 0.7 viewing field ≥1200
2	Blemish 	Full screen IC Blemish: Contrast>10%, Pixel number≤4*4 IR Blemish: Contrast>1.0%, Pixel number≤125*125
3	Distortion 	-1.5%<TV Distortion<1.5%

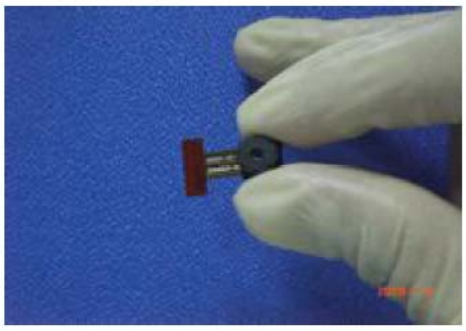
Reliability Specification

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, and meet the criterion of shipment Shading: meet the criterion of shipment after test 2.Appearance: Do not exist 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	

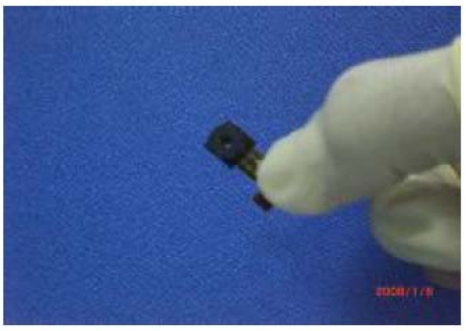
Precautions for Using CCM Modules

Handing Precautions

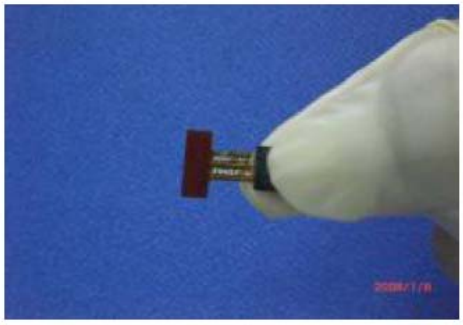
—DO NOT try to open the unit enclosure as there is no user-serviceable component inside. To prevent damage to the camera module by electrostatic discharge, handling the camera module only after discharging all static electricity from yourself and ensuring a static-free environment for the camera module.
—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 the camera module to rain or moisture.
—DO NOT expose the camera module to direct sunlight.
—DO NOT put the camera module in a high temperature environment.
—DO NOT use liquid or aerosol cleaners to clean the lens.
—DO NOT make any charges or modifications to the camera module.
—DO NOT subject the camera module to strong electromagnetic field.
—DO NOT subject the camera module to excessive vibration or shock.
—DO NOT impact or nip the camera 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



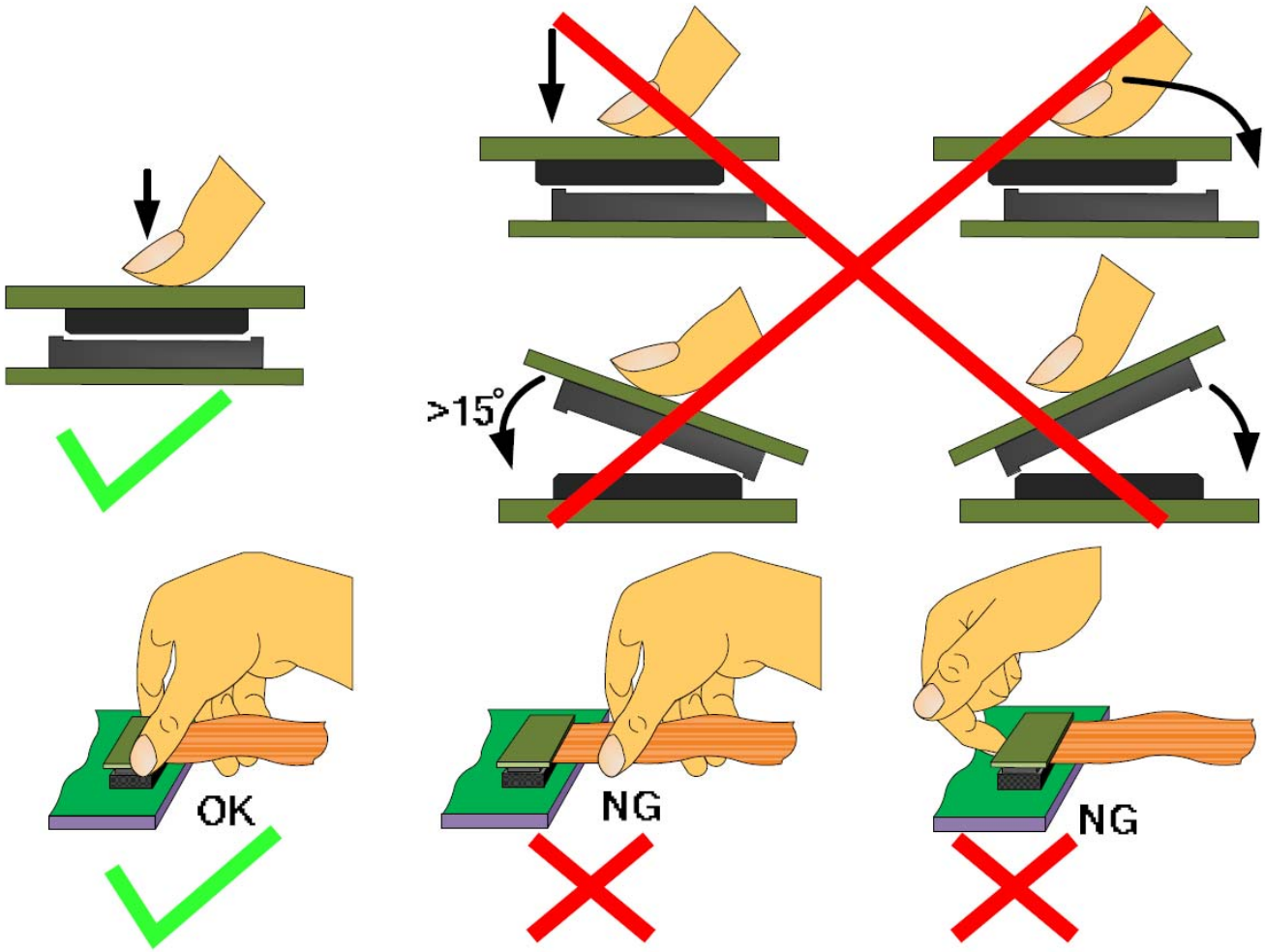
Incorrect



Incorrect

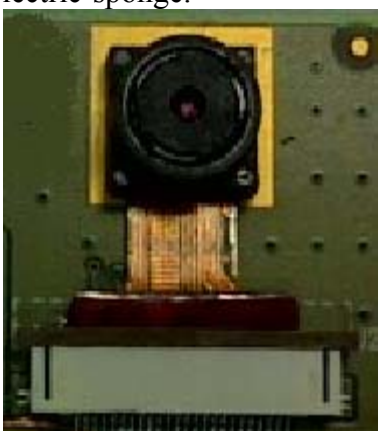
Precaution for assemble the module with BTB connector:

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 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
Non-RoHS product	290°C ~350°C Time: 3-5s	330°C ~350°C Speed: 4-8mm/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: 4-8mm/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 being responsible for any subsequent or consequential events.

Return CCM under warranty

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

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

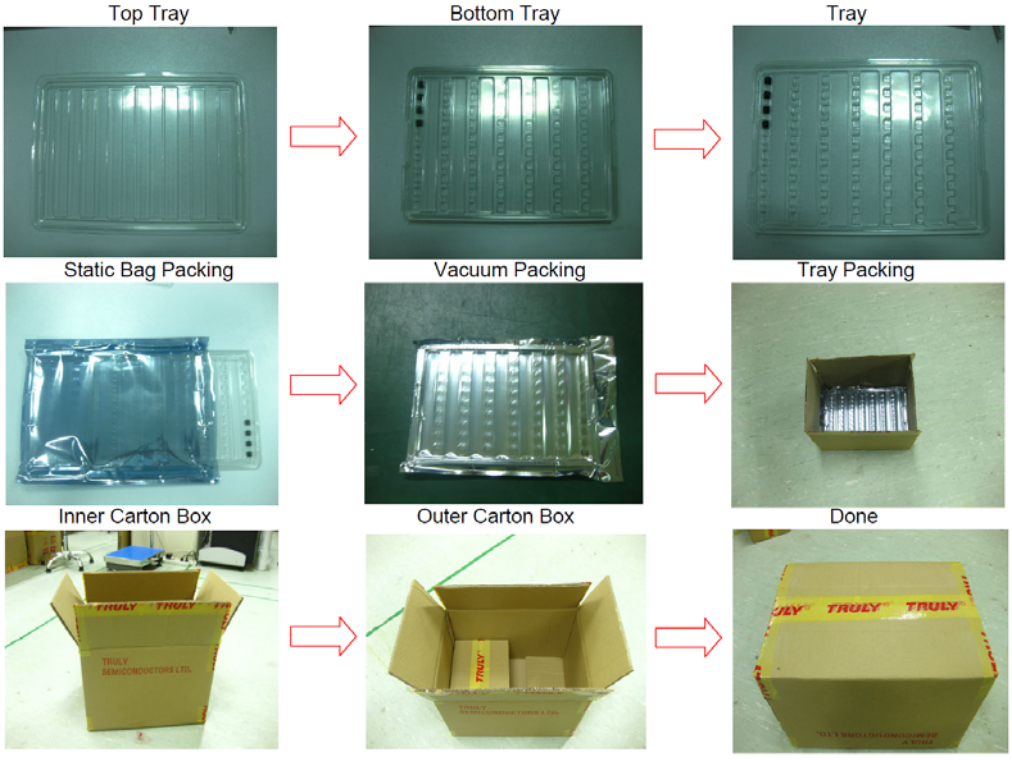
Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

Package Specification

Packaging Design One

Product No.	CM9380-B800BA-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■NO
Quantity/ each box	2000PCS	Material for box	■paper ☐plastic
Outer carton box size	405mm*290mm*290mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	50*10=500PCS 500*4=2000PCS		

Packing Standards:



There are 50PCS modules in each plastic plate.

There are 500PCS modules in each inner carton box.

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

Requirements of outer carton box :

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

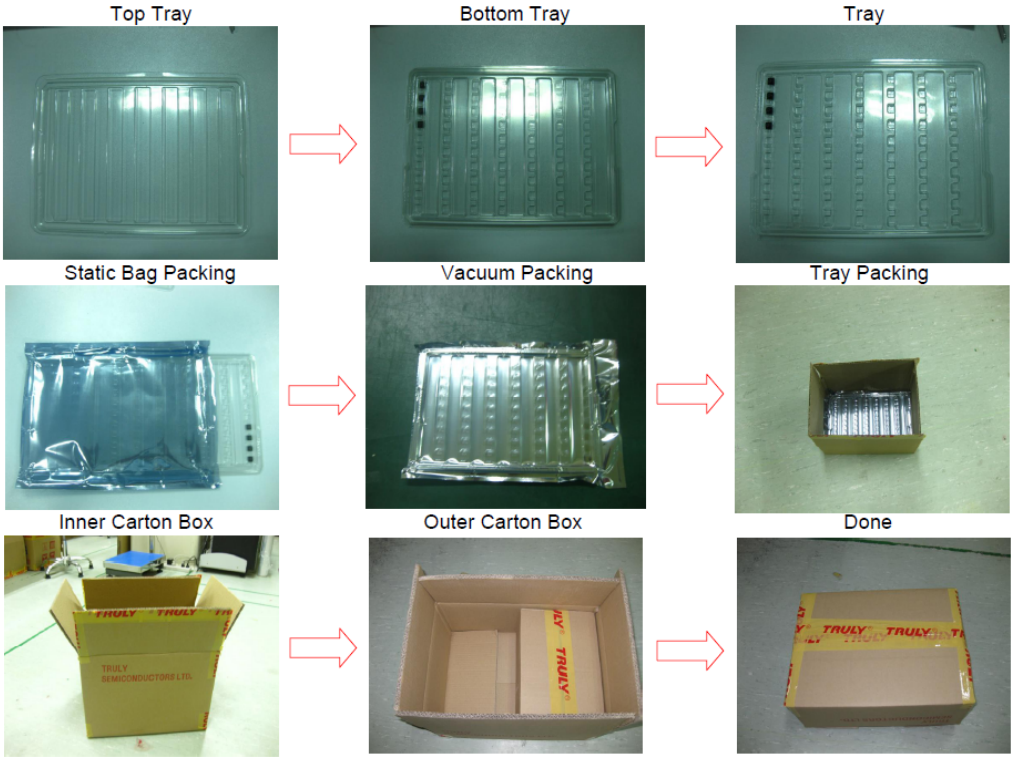
Material for Plastic tray

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

Packaging Design Two

Product No.	CM9380-B800BA-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■NO
Quantity/ each box	1000PCS	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	50*10=500PCS 500*2=1000PCS		

Packing Standards:



There are 50PCS modules in each plastic plate.

There are 500PCS modules in each inner carton box.

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

Requirements of outer carton box :

4. Weight(Max): TBD 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
URL: http://www.trulyopto.com