PRODUCT : CAMERA MODULE

MODEL NO. : CM7945-B1200BA-E

SUPPLIER : TRULY OPTO-ELECTRONICS LTD.

DATE : Aug 7, 2013

CERT. No. 946535
ISO9001
TL9000

SPECIFICATION

Revision: 1.1

CM7945-B1200BA-E

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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.

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Quality Assurance Department:________________

Technical Department:________________

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REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2013-3-14	First release	Preliminary
1.1	2013-8-7	Modify Mechanical Drawing	

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WRITTEN BY	CHECKED BY	APPROVED BY
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Key Information

Module No.		**CM7945-B1200BA-E**
Module Size		8.50mm × 8.50mm × 5.30mm
Sensor Type		OV12830
Array Size		4256 × 3016
Power Supply	Core	1.27~1.32V for 2-lane MIPI up to 1 Gbps/lane 1.14~1.26V for 4-lane MIPI up to 700 Mbps/lane
	Analog	2.6~3.0V
	I/O	1.7~3.0V
	AF_VDD	2.8~3.3V
Lens Size and Structure		1/3.2 inch 5Plastic
Lens F.NO		2.2±5%
Lens View Angle		74.0°
IR Cutter		640nm
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,BLC
Maximum Image Transfer Rate	12.8Mpixel	24fps
	1080p	30fps
	720p	60fps
Pixel Size		1.1µm × 1.1µm
Sensitivity		600mV/Lux-sec
Max S/N Ratio		35dB
Dynamic Range		66.6dB@8x gain
Sensor Power Requirement	Active	296mW
	Standby	400µW
	XSHUTDOWN	5µW
IC Package		COB
Substrate		R/FPC
Package		Antistatic Plastic

Auto-Focus Specification

NO.	Item	Specification
1	Auto-Focus Type	VCM (Voice Coil Motor)
2	VCM Driver	DW9714A
3	Power Supply	2.8~3.3V
4	Rated Current	≤100mA
5	Resistance	10~17Ω
6	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(UP)	I/O	Camera identification
5	AF_VDD	Power	Power for VCM
6	AF_PWDN	Input	Power down of AF Driver IC
7	SDA	I/O	SCCB data I/O
8	DOVDD	Power	Power for I/O circuit
9	SCL	Input	SCCB input clock
10	DVDD	Power	Digital logic power
11	DGND	Ground	Ground for digital circuit
12	PWDN	Input	Power down (active low with internal pull up resistor)
13	MCN	Output	Differential MIPI clock(sub-LVDS, negative)
14	NC	-	-
15	MCP	Output	Differential MIPI clock(sub-LVDS, positive)
16	DGND	Ground	Ground for digital circuit
17	MDN0	Output	MIPI TX first data lane negative output
18	MCLK	Input	System input clock
19	MDP0	Output	MIPI TX first data lane positive output
20	DGND	Ground	Ground for digital circuit
21	MDN1	Output	MIPI TX second data lane negative output
22	FLASH	Output	Strobe control signal
23	MDP1	Output	MIPI TX second data lane positive output
24	AVDD	Power	Power for analog circuit
25	RESET	Input	Reset (active low with pull up resistor)
26	AGND	Ground	Ground for analog circuit
27	MDN2	Output	MIPI TX third data lane negative output
28	MDN3	Output	MIPI TX fourth data lane negative output
29	MDP2	Output	MIPI TX third data lane positive output
30	MDP3	Output	MIPI TX fourth data lane positive output

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

symbol	parameter	min	typ	max	unit
supply					
V_{DD-A}	supply voltage (analog)	2.6	2.8	3.0	V
V_{DD-D}	supply voltage (digital core for 2-lane MIPI up to 1 Gbps/lane)	1.27	1.3	1.32	V
V_{DD-D}	supply voltage (digital core for 4-lane MIPI up to 700 Mbps/lane)	1.14	1.2	1.26	V
V_{DD-IO}	supply voltage (digital I/O)	1.7	1.8	3.0	V
I_{DD-A}	active (operating) current		57	85	mA
I_{DD-D}			90	135	mA
I_{DD-IO}			16	24	mA
$I_{DDS-SCCB}$	standby current[a]		700	3500	µA
I_{DDX-A}	XSHUTDOWN current		0.47	5	µA
I_{DDX-D}			0.45	5	µA
I_{DDX-IO}			1.5	8	µA
digital inputs (typical conditions: AVDD = 2.8V, DVDD = 1.2V, DOVDD = 1.8V, EVDD = 1.2V)					
V_{IL}	input voltage LOW			0.54	V
V_{IH}	input voltage HIGH	1.26			V
C_{IN}	input capacitor			10	pF

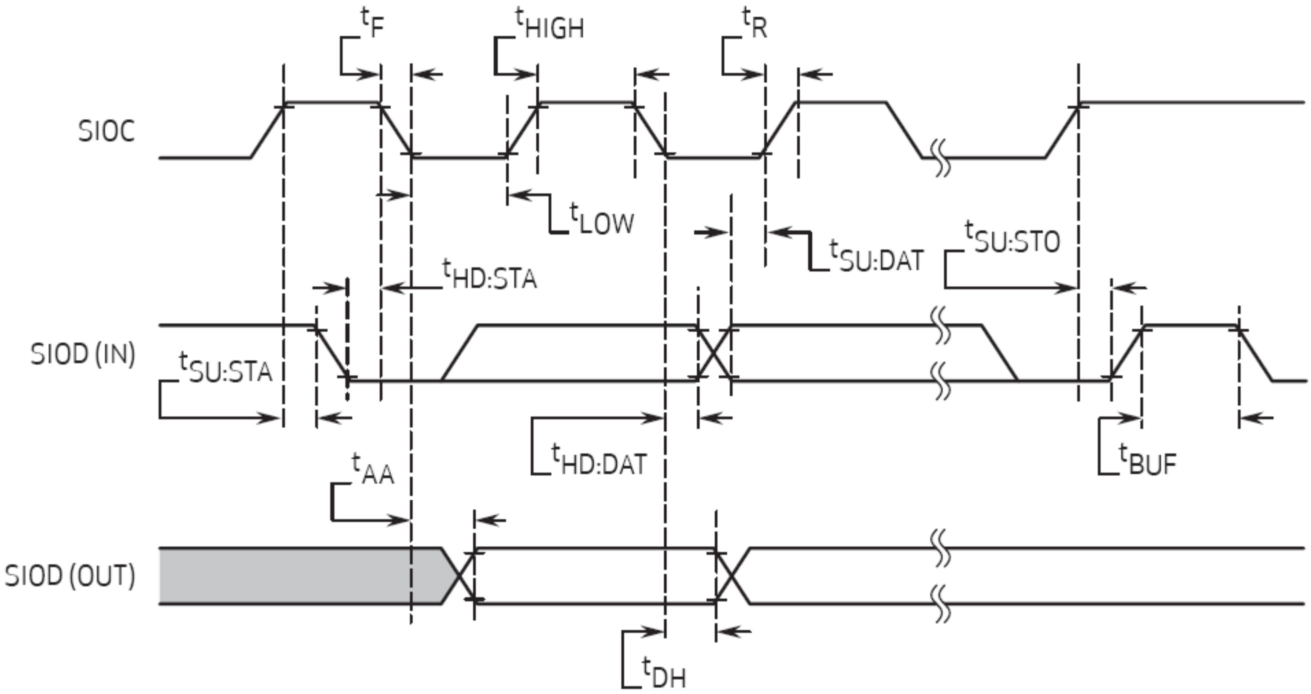
digital outputs (standard loading 25 pF)					
V_{OH}	output voltage HIGH	1.62			V
V_{OL}	output voltage LOW			0.18	V
serial interface inputs					
V_{IL} [b]	SIOC and SIOD	-0.5	0	0.54	V
V_{IH}	SIOC and SIOD	1.28	1.8	3.0	V

a. standby current is measured at room temperature
b. based on DOVDD = 1.8V

3. AC characteristics

symbol	parameter	min	typ	max	unit
inputs					
f_{CLK}	input clock frequency	6	12	27	MHz
t_{CLK}	input clock period		83		ns
$t_{CLK:DC}$	clock duty cycle	45	50	55	%

4. SCCB interface timing


t_{F}
t_{HIGH}
t_{R}
SIOC
t_{LOW}
$t_{SU:DAT}$
$t_{SU:STO}$
$t_{HD:STA}$
SIOD (IN)
$t_{SU:STA}$
$t_{HD:DAT}$
t_{BUF}
t_{AA}
SIOD (OUT)
t_{DH}

SCCB interface timing specifications[ab]

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

a. SCCB timing is based on 400kHz mode

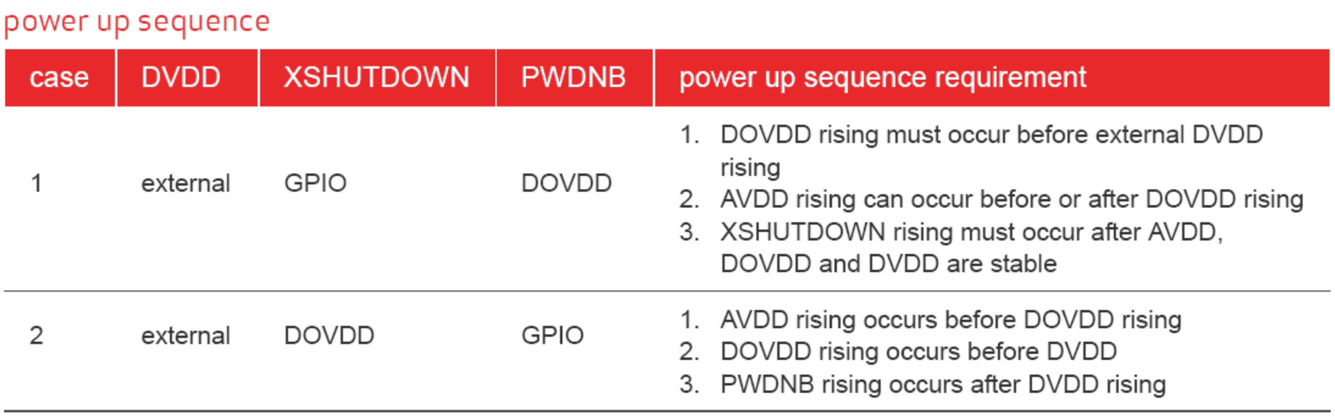
b. timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 10%, timing measurement shown in the middle of the rising/falling edge signifies 50%, timing measurement shown at the beginning of the rising edge or/and of the falling edge signifies 90%

5. Format and frame rate

format	resolution	max frame rate with MIPI	methodology
full resolution	4224x3000	24 fps	full
12 Mpixel	4000x3000	24 fps	cropping
4224x2376	4224x2376	30 fps	cropping
EIS1080p	2112x1188	30 fps	cropping+binning
1080p	1920x1080	30 fps	cropping+binning
EIS720p	1536x864	60 fps	cropping+binning+scaling
720p	1280x720	60 fps	cropping+binning+scaling
VGA	640x480	120 fps	cropping + 2 x binning + scaling
QVGA	320x240	240 fps	cropping + 2 x binning + scaling

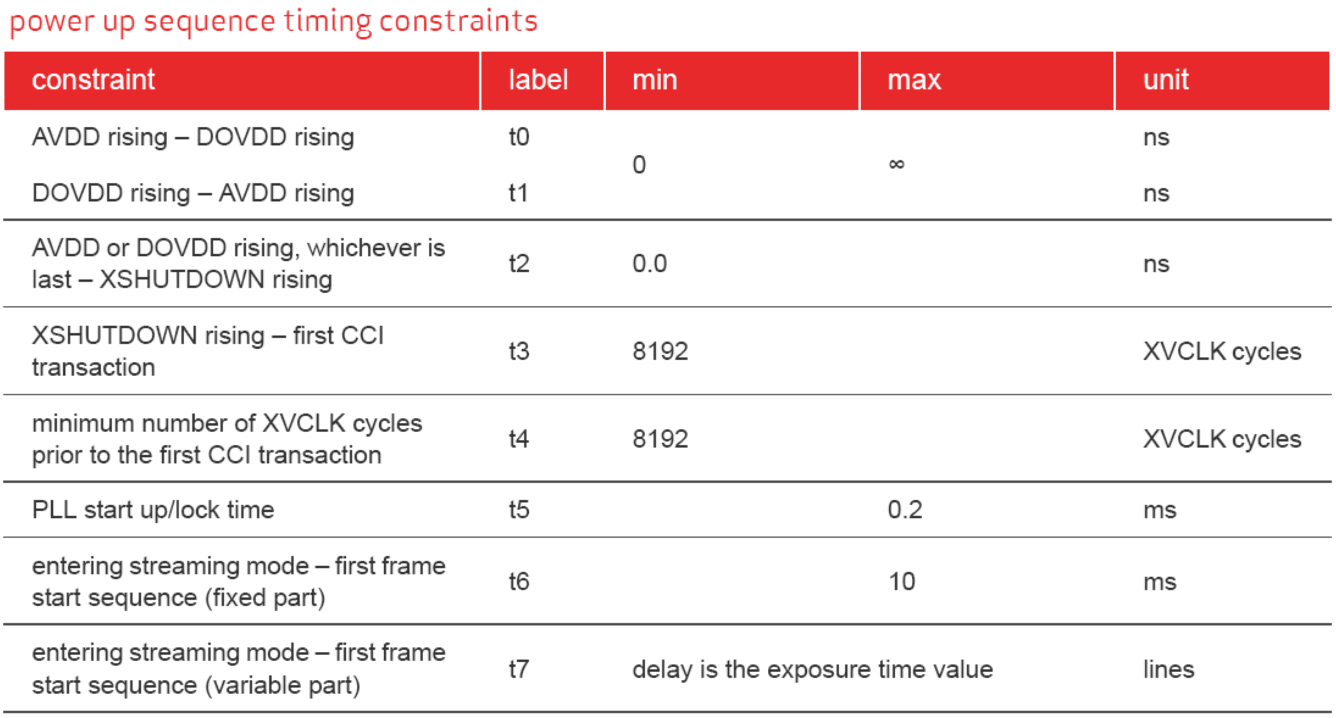
6. Power up sequence

The OV12830 uses an external power supply to provide digital core 1.2V or 1.3V DVDD, depending on the MIPI configuration.
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.



power up sequence

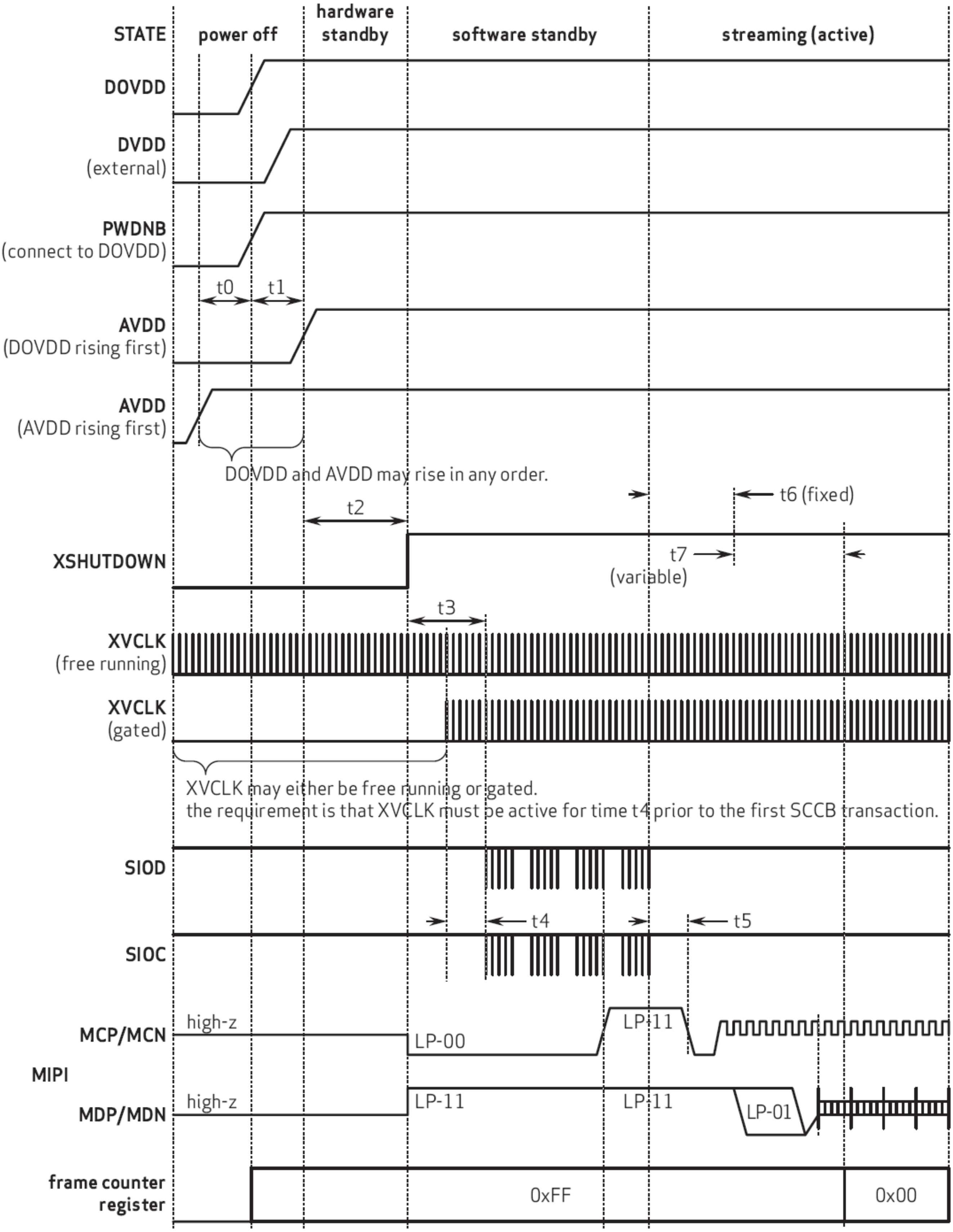
case	DVDD	XSHUTDOWN	PWDNB	power up sequence requirement
1	external	GPIO	DOVDD	1. DOVDD rising must occur before external DVDD rising 2. AVDD rising can occur before or after DOVDD rising 3. XSHUTDOWN rising must occur after AVDD, DOVDD and DVDD are stable
2	external	DOVDD	GPIO	1. AVDD rising occurs before 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
AVDD or DOVDD rising, whichever is last – XSHUTDOWN rising	t2	0.0		ns
XSHUTDOWN rising – first CCI transaction	t3	8192		XVCLK cycles
minimum number of XVCLK cycles prior to the first CCI transaction	t4	8192		XVCLK cycles
PLL start up/lock time	t5		0.2	ms
entering streaming mode – first frame start sequence (fixed part)	t6		10	ms
entering streaming mode – first frame start sequence (variable part)	t7	delay is the exposure time value		lines

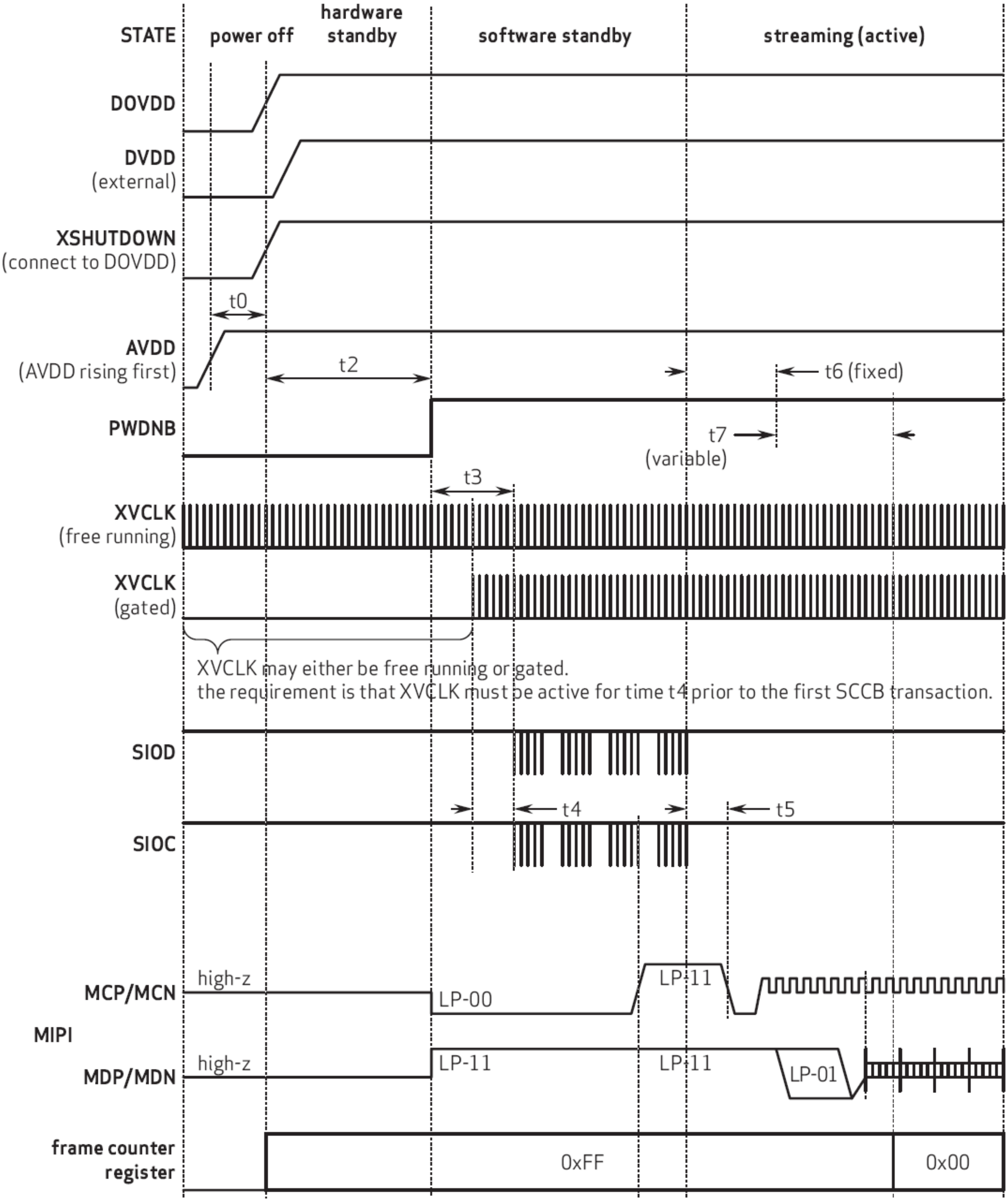
power up sequence (case 1)


STATE
power off
hardware standby
software standby
streaming (active)
DOVDD
DVDD (external)
PWDNB (connect to DOVDD)
t0
t1
AVDD (DOVDD rising first)
AVDD (AVDD rising first)
t2
t6 (fixed)
XSHUTDOWN
t7 (variable)
t3
XVCLK (free running)
XVCLK (gated)
SIOD
t4
t5
SIOC
high-z
LP-00
LP-11
MCP/MCN
MIPI
high-z
LP-11
LP-11
LP-01
MDP/MDN
frame counter register
0xFF
0x00

DOVDD and AVDD may rise in any order.

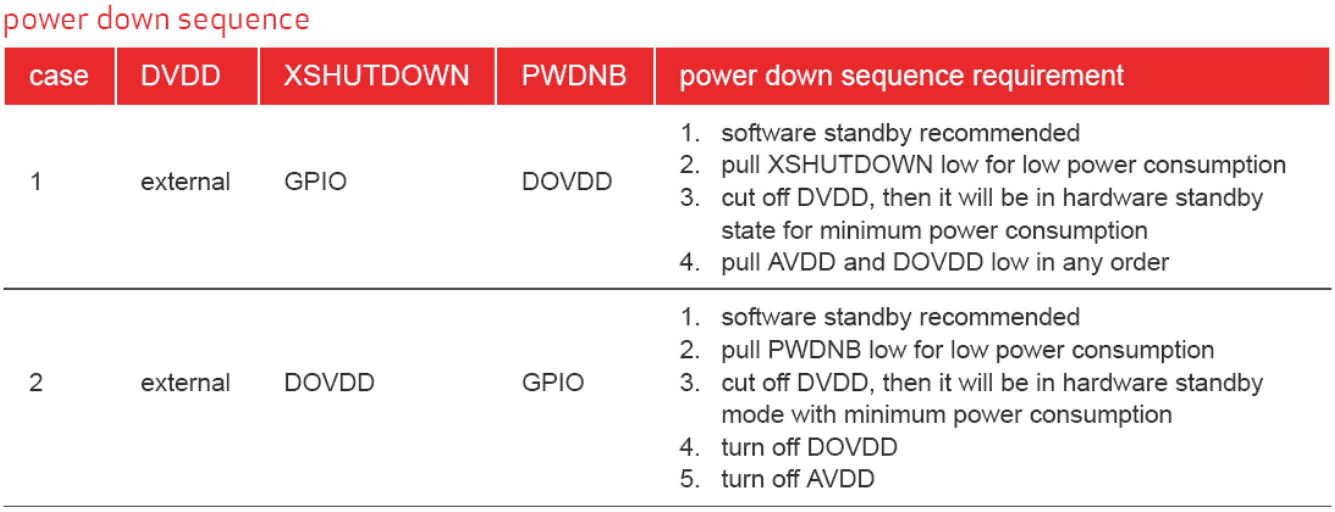
XVCLK may either be free running or gated.
the requirement is that XVCLK must be active for time t4 prior to the first SCCB transaction.

power up sequence (case 2)


STATE
power off
hardware standby
software standby
streaming (active)
DOVDD
DVDD (external)
XSHUTDOWN (connect to DOVDD)
t0
AVDD (AVDD rising first)
t2
t6 (fixed)
PWDNB
t7
(variable)
t3
XVCLK (free running)
XVCLK (gated)
XVCLK may either be free running or gated.
the requirement is that XVCLK must be active for time t4 prior to the first SCCB transaction.
SIOD
t4
t5
SIOC
MCP/MCN
MIPI
MDP/MDN
high-z
LP-00
LP-11
high-z
LP-11
LP-11
LP-01
frame counter register
0xFF
0x00

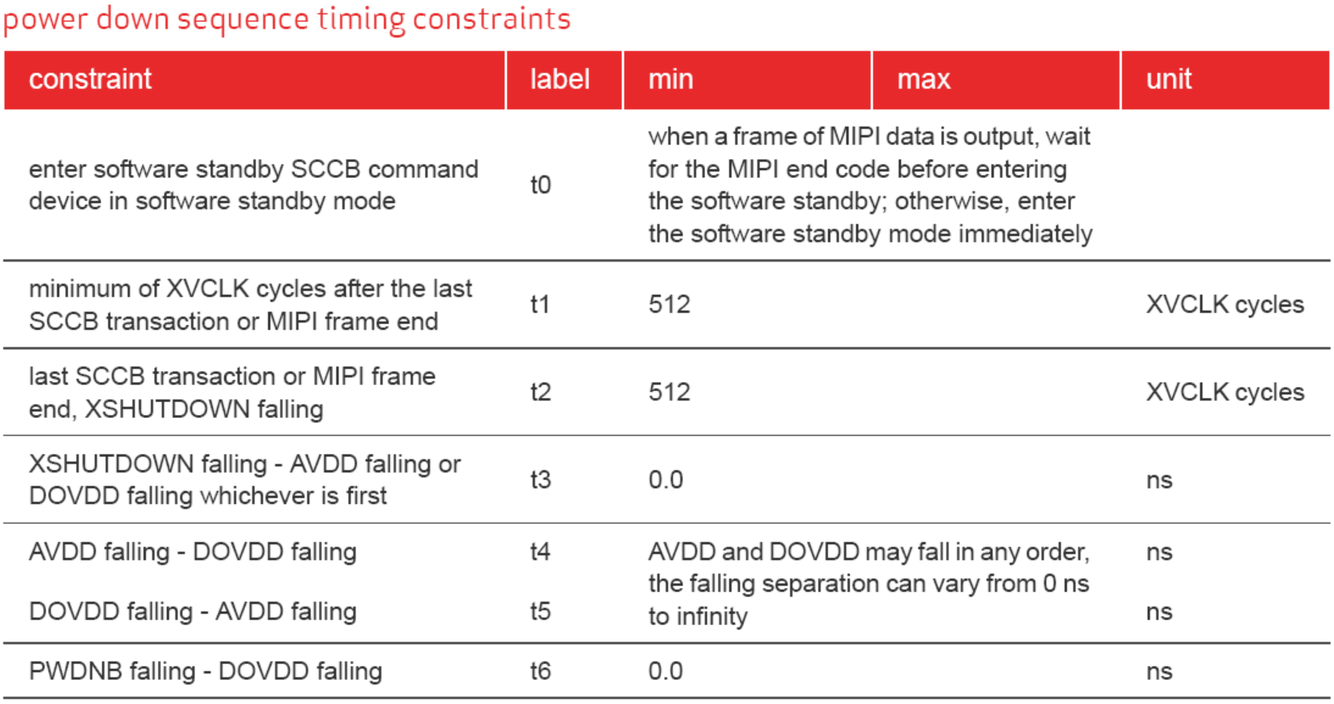
7. Power down sequence

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. If the SCCB command to exit streaming is received while a frame of MIPI data is being output, then the sensor must wait to the MIPI frame end code before entering software standby mode.
If the SCCB command to exit streaming mode is received during the inter frame time, then the sensor must enter software standby mode immediately.
Power down cases 1~2 corresponds to power up sequences 1~2, respectively.



power down sequence

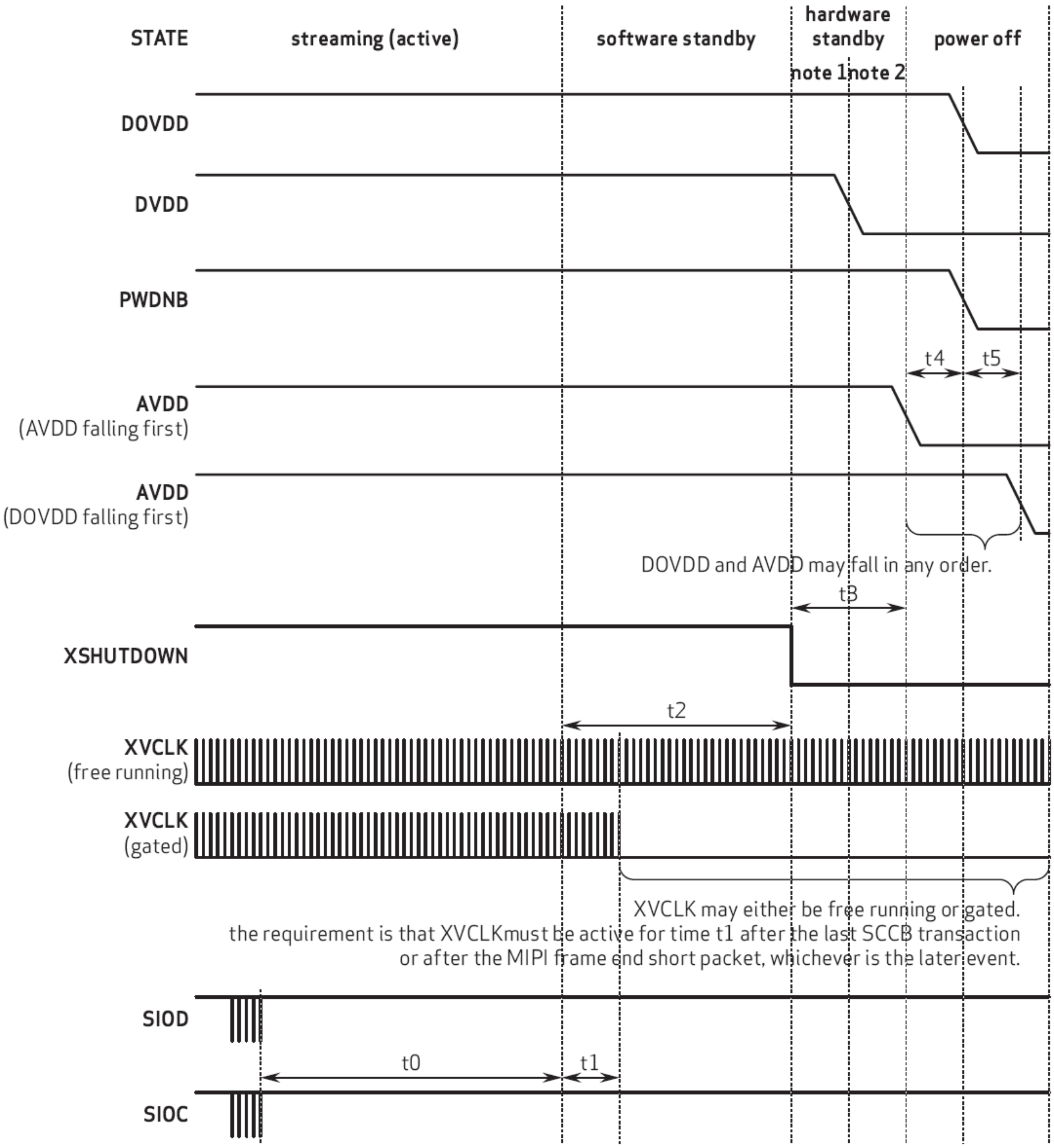
case	DVDD	XSHUTDOWN	PWDNB	power down sequence requirement
1	external	GPIO	DOVDD	1. software standby recommended 2. pull XSHUTDOWN low for low power consumption 3. cut off DVDD, then it will be in hardware standby state for minimum power consumption 4. pull AVDD and DOVDD low in any order
2	external	DOVDD	GPIO	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. turn off DOVDD 5. turn off AVDD



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 standby; otherwise, enter the software standby mode immediately		
minimum of XVCLK cycles after the last SCCB transaction or MIPI frame end	t1	512		XVCLK cycles
last SCCB transaction or MIPI frame end, XSHUTDOWN falling	t2	512		XVCLK 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

power down sequence (case 1)


STATE
streaming (active)
software standby
hardware standby
power off
note 1
note 2
DOVDD
DVDD
PWDNB
t4
t5
AVDD (AVDD falling first)
AVDD (DOVDD falling first)
t3
XSHUTDOWN
t2
XVCLK (free running)
XVCLK (gated)
SIOD
t0
t1
SIOC

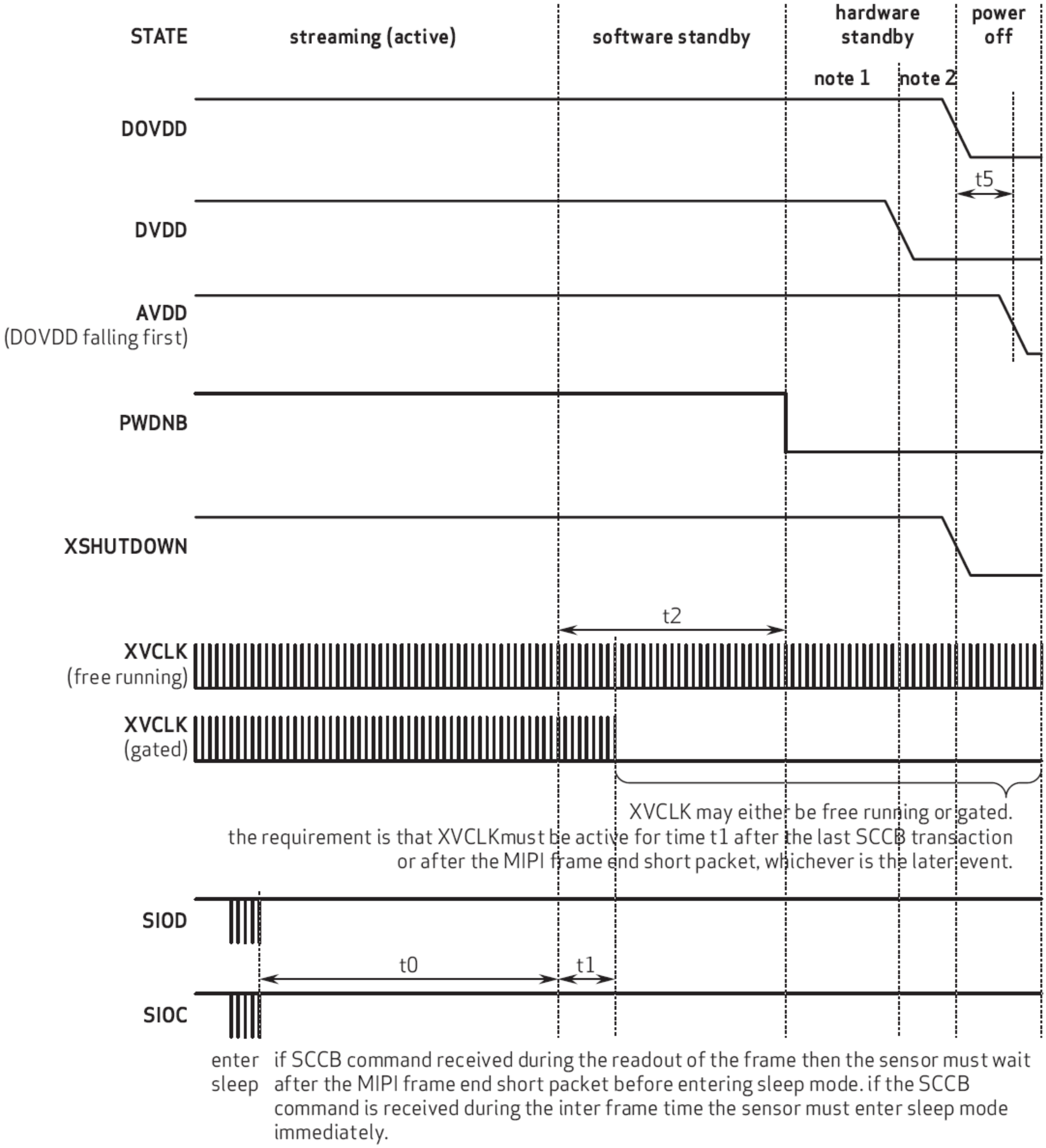
DOVDD and AVDD may fall in any order.

XVCLK may either be free running or gated.
the requirement is that XVCLKmust be active for time t1 after the last SCCB transaction or after the MIPI frame end short packet, whichever is the later event.

if SCCB command received during the readout of the frame then the sensor must wait after the MIPI frame end short packet before entering sleep mode. if the SCCB command is received during the inter frame time the sensor must enter sleep mode immediately.

note 1 with low power consumption
note 2 with minimum power consumption

power down sequence (case 2)


STATE
streaming (active)
software standby
hardware standby
power off
note 1
note 2
DOVDD
t5
DVDD
AVDD
(DOVDD falling first)
PWDNB
XSHUTDOWN
t2
XVCLK
(free running)
XVCLK
(gated)
SIOD
t0
t1
SIOC
enter sleep

XVCLK may either be free running or gated.
the requirement is that XVCLKmust be active for time t1 after the last SCCB transaction
or after the MIPI frame end short packet, whichever is the later event.

if SCCB command received during the readout of the frame then the sensor must wait after the MIPI frame end short packet before entering sleep mode. if the SCCB command is received during the inter frame time the sensor must enter sleep mode immediately.

note 1 with low power consumption
note 2 with minimum power consumption

8. Reset

The OV12830 sensor includes a XSHUTDOWN pad (pad 24) that forces a complete hardware reset when it is pulled low (GND). The OV12830 clears all registers and resets them to their default values when a hardware reset occurs. Reset requires ~2ms settling time.

Power ON reset generation
The power on reset can be controlled from XSHUTDOWN pin. Additionally, inside this chip, a power on reset is generated after core power becomes stable.

9. Hardware and software standby

Two suspend modes are available for the OV12830:

- hardware standby
- software standby

Hardware standby
To initiate a hardware standby, the PWDNB pad (pad 28) must be tied to low. When this occurs, the OV12830 internal device clock is halted and all internal counters are reset and registers are maintained.

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

10. One time programmable memory (OTP)

The OV12830 supports a maximum of 4K bits of one-time programmable (OTP) memory to store chip identification and manufacturing information. The OTP can be controlled through the SCCB. The concrete contents of OTP include ID, AWB,LSC,BLC.

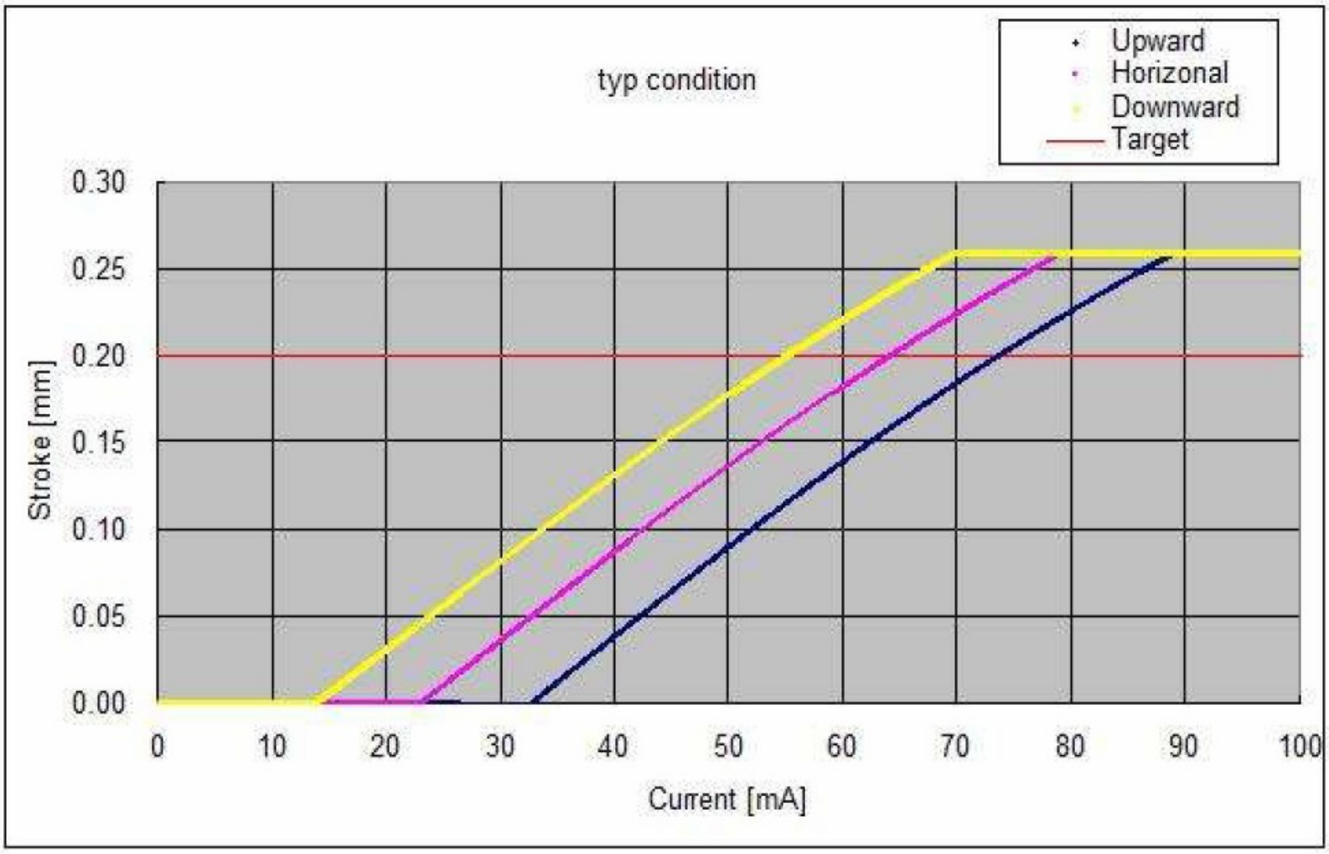
For the detail procedure of load OTP, please contact our FAE for more assistance.

Note: For more information of sensor please refer to the OV12830 specification.

11. VCM specification

NO.	Item	Condition	Specification
1	Motor Size	Without label & terminal	8.5*8.5*3.65mm
2	Dynamic Tilt	Maximum absolute value of Difference in Tilt of Lens Holder between tilt at < 200 [um] Stroke and unpowered condition (Static Tilt)	≤12min
3	Sensitivity	Gradient of line by connecting end points at 30um and 200um	3~7μm/mA
4	Starting Current	The zero crossing point of line by connecting end points at 30um and 120um	22~42mA
5	Hysteresis	Difference in stroke after round trip movement, between 0~200um	≤±10μm
6	Rated Stroke	90mA input current and optical axis is upward	≥0.20mm

Performance Diagram



11. Driver IC Specification

The DW9714A is single 10-bit DAC with 120mA output current sink capability. Designed for linear control of voice coil motors, the DW9714A 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 DW9714A 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 DW9714A is 0x18.

a. Absolute maximum ratings

Symbol	Parameter	Min.	Max.	Unit
V_{DD}	Power supply voltage	-0.3	4.5	V
V_{IN}	Control input voltage	-0.3	VDD+0.3	V
V_{hbm}	Human body model		2	KV
V_{mm}	Machine model		200	V

Note. Continuous Power Dissipation (Ta=25℃)
0.8mm×1.20mm WLCSP, 100℃/W

b. Recommended Operating condition

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{DD}	Power supply voltage	2.3	2.8	3.6	V
V_{IN}	Control input voltage	1.8	2.8	V_{DD}	V
SCL	I2C bus transmission rate			400	kHz

c. Electrical Specification

(VDD=2.3 to 3.6V, Vin=1.8V to VDD, Ta=-40 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
VDD 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
Low Level Output Voltage	V_{OL}	I_{IN}=3mA(SDA)			0.4	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	I_{MAX}		115	120(3)	125	mA
Power on time(2)	T_{PON}			12		ms

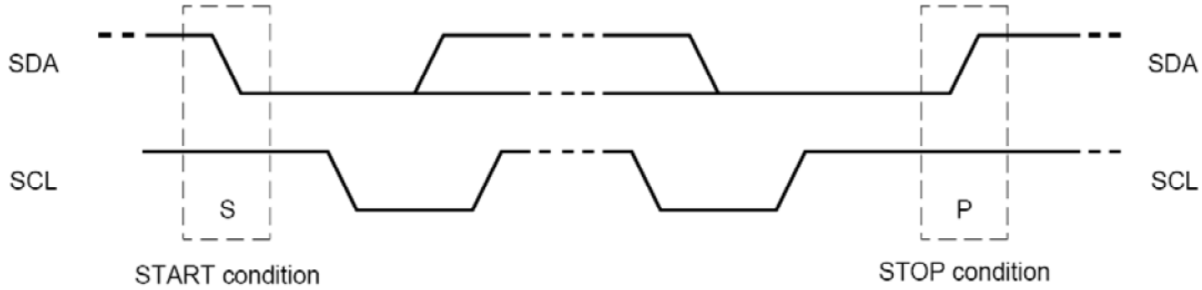
(1)The output compliance voltage is guaranteed by design and characterization, not mass production test.

(2)DW9714A 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 130mA.

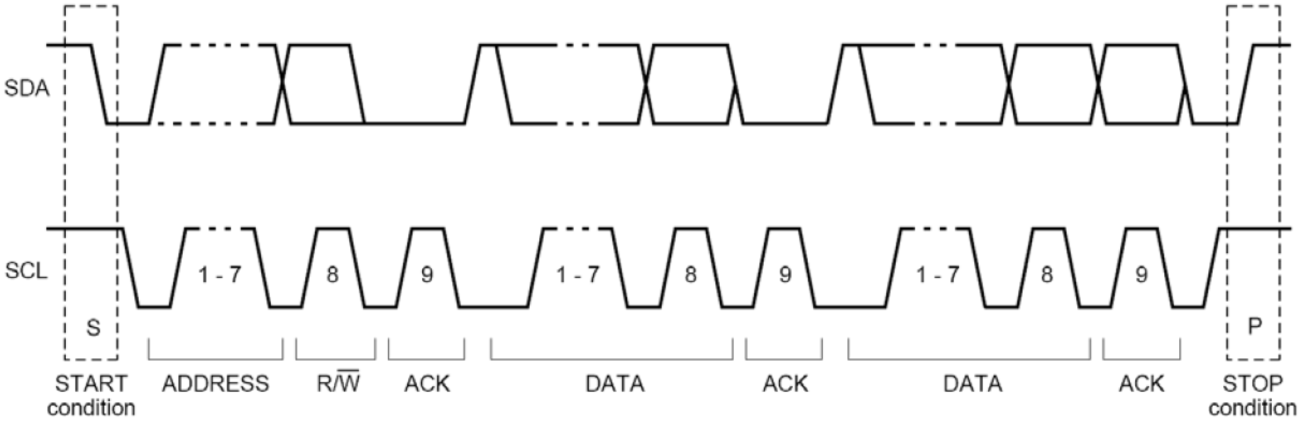
d. I2C Protocol

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



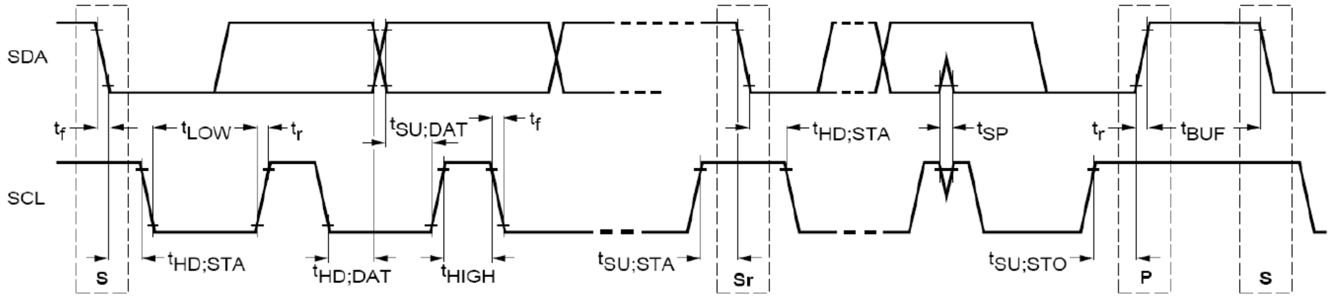
Data transfers follow the format. After the START condition (S), a slave address is sent. A data transfer is always terminated by a STOP condition (P) generated by the master. However, if a master still wishes to communicate on the bus, it can generate a repeated.

I2C timing

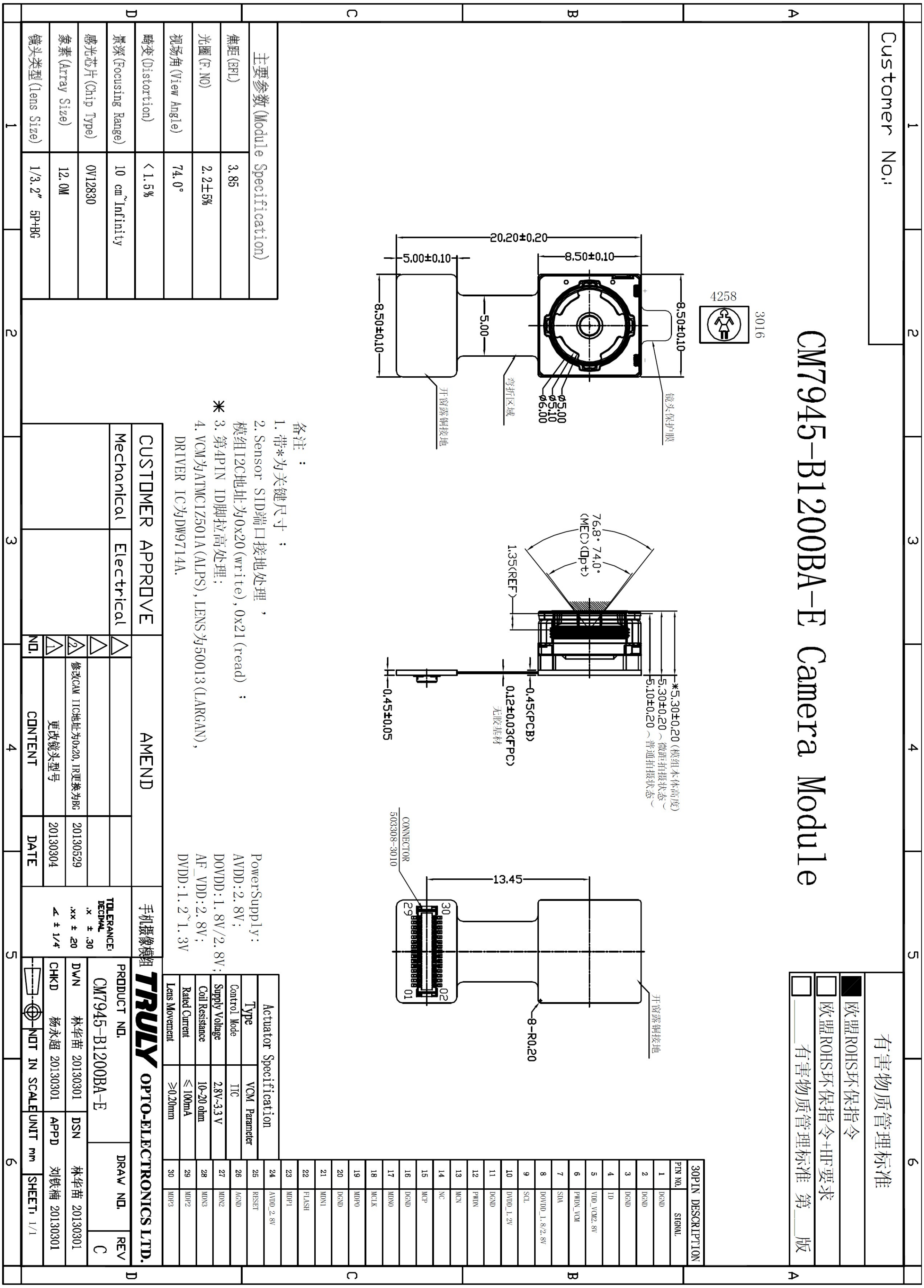
Parameter	Symbol	Min.	Max.	Unit
SCL clock frequency	f_{SCL}	0	400	kHz
Hold time (repeated) START condition.	t_{HD};STA	0.6	-	us
Low period of the SCL clock	t_{LOW}	1.3	-	us
High period of the SCL clock	t_{HIGH}	0.6	-	us
Set-up time for a repeated START condition	t_{SU};STA	0.6	-	us
Data hold time	t_{HD};DAT(1)	-	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) Cb 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}.



Mechanical Drawing


Customer No:
CM7945-B1200BA-E Camera Module
4258
3016
20.20±0.20
5.00±0.10
8.50±0.10
8.50±0.10
5.00
8.50±0.10
镜头保护膜
弯折区域
开窗露铜接地
Ø5.00
Ø5.10
Ø6.00
76.8°74.0°
(MEC)(Opt)
1.35(REF)
*5.30±0.20（模组本体高度）
5.30±0.20（微距拍摄状态）
5.10±0.20（普通拍摄状态）
0.45(PCB)
0.12±0.03(FPC)
无胶基材
0.45±0.05
CONNECTOR
503308-3010
13.45
30
29
02
01
开窗露铜接地
8-R0.20
A B C D
1 2 3 4 5 6

有害物质管理标准

■ 欧盟ROHS环保指令

□ 欧盟ROHS环保指令+HF要求

□ ___有害物质管理标准 第___版

主要参数(Module Specification)	
焦距(EFL)	3.85
光圈(F.NO)	2.2±5%
视场角(View Angle)	74.0°
畸变(Distortion)	<1.5%
景深(Focusing Range)	10 cm~Infinity
感光芯片(Chip Type)	OV12830
象素(Array Size)	12.0M
镜头类型(lens Size)	1/3.2" 5P+BG

备注：

1. 带*为关键尺寸；
2. Sensor SID端口接地处理，
模组I2C地址为0x20(write),0x21(read)；

* 3. 第4PIN ID脚拉高处理;

4. VCM为ATMC1Z501A(ALPS),LENS为50013(LARGAN),
DRIVER IC为DW9714A.

PowerSupply:
AVDD:2.8V;
DOVDD:1.8V/2.8V;
AF_VDD:2.8V;
DVDD:1.2~1.3V

Actuator Specification	
Type	VCM Parameter
Control Mode	IIC
Supply Voltage	2.8V~3.3 V
Coil Resistance	10~20 ohm
Rated Current	≤100mA
Lens Movement	≥0.20mm

30PIN DESCRIPTION	
PIN NO.	SIGNAL
1	DGND
2	DGND
3	DGND
4	ID
5	VDD_VCM2.8V
6	PWDN_VCM
7	SDA
8	DOVDD_1.8/2.8V
9	SCL
10	DVDD_1.2V
11	DGND
12	PWDN
13	MCN
14	NC
15	MCP
16	DGND
17	MDN0
18	MCLK
19	MDP0
20	DGND
21	MDN1
22	FLASH
23	MDP1
24	AVDD_2.8V
25	RESET
26	AGND
27	MDN2
28	MDN3
29	MDP2
30	MDP3

CUSTOMER APPROVE

Mechanical	Electrical

AMEND		
NO.	CONTENT	DATE
△	更改镜头型号	20130304
△	修改CAM IIC地址为0x20,IR更换为BG	20130529
△		
△		

手机摄像模组 TRULY OPTO-ELECTRONICS LTD.

TOLERANCE: DECIMAL .x ± .30 .xx ± .20 ∠ ± 1/4	PRODUCT NO. CM7945-B1200BA-E	DRAW NO.	REV C
	DWN 林华苗 20130301	DSN 林华苗 20130301	
	CHKD 杨永超 20130301	APPD 刘铁楠 20130301	
	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	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
7	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
8	Protective film	No dust in the glue side. Not allows to float or drop.	B

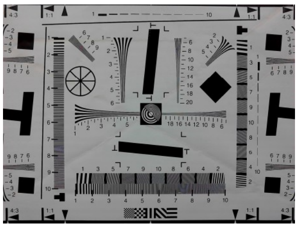
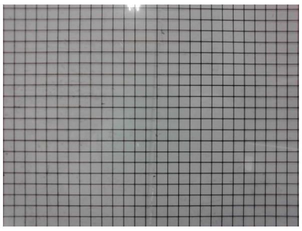
Remark:

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≥2000 0.7 viewing field ≥1500
2	Blemish	Full screen IC Blemish: Contrast>10%, Pixel number≤4*3 IR Blemish: Contrast>1.0%, Pixel number≤155*155
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 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.

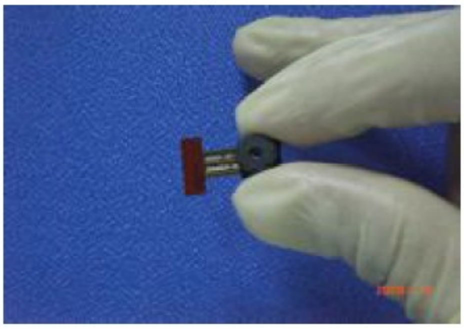
—DO NOT make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

—DO NOT damage or modify the pattern writing on the printed circuit board.

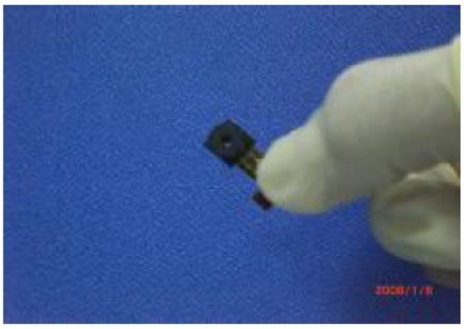
—Absolutely DO NOT modify the zebra rubber strip (conductive rubber) or heat seal connector

—Except for soldering the interface, DO NOT make any alterations or modifications with a soldering iron.

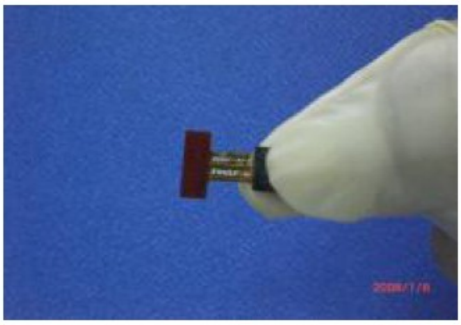
—DO NOT twist FPC of CCM.



Correct



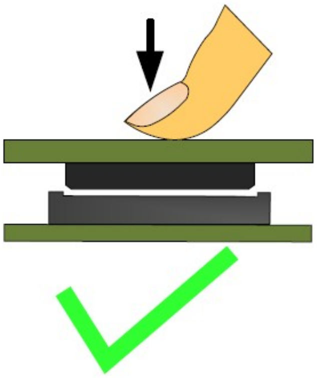
Incorrect

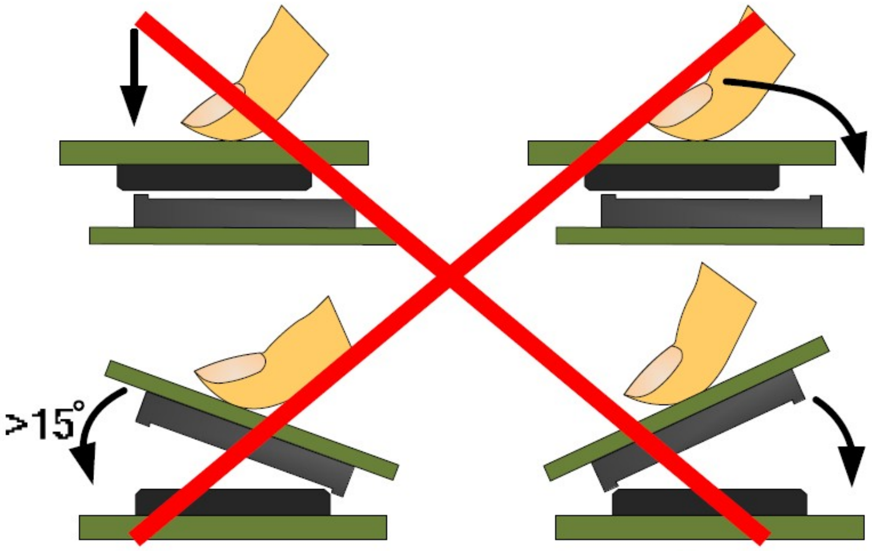


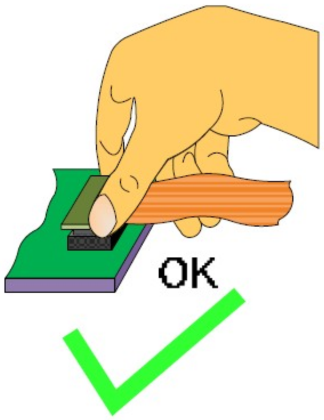
Incorrect

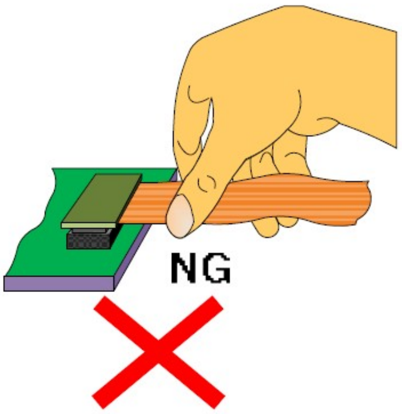
Precaution for assemble the module with BTB connector:

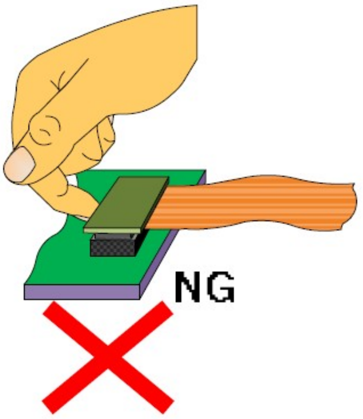
Please note the position of the male and female connector position, don’t assemble or assemble like the method which the following picture shows











Precaution for 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 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.

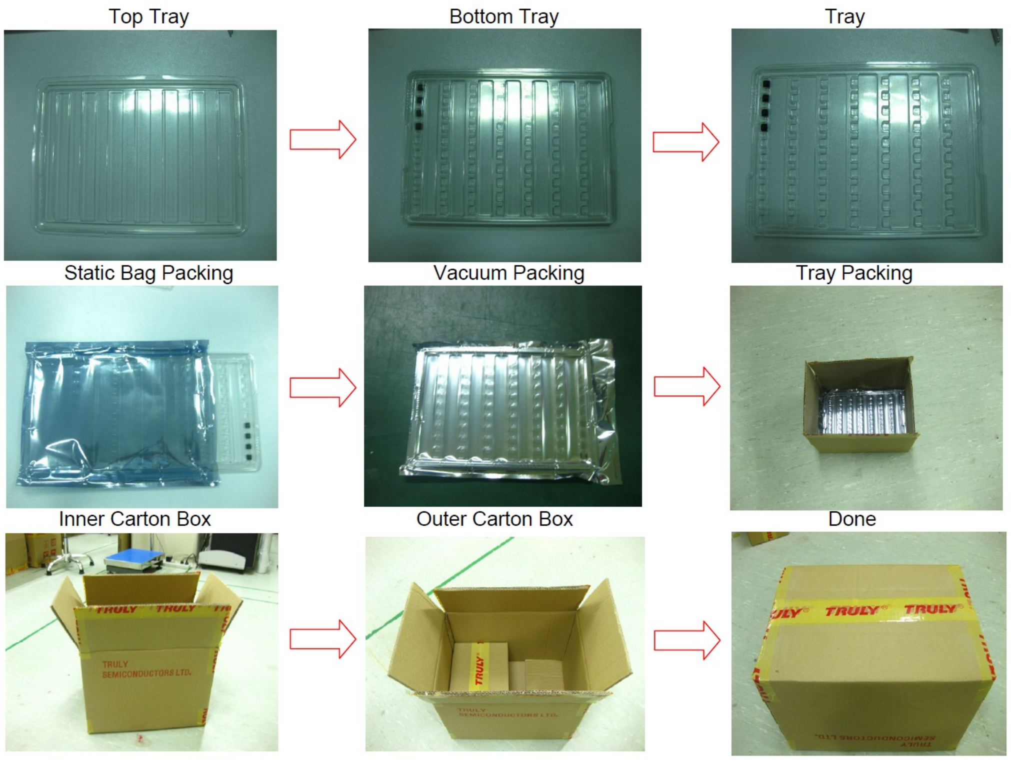
Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

Package Specification

Packaging Design One

Product No.	CM7945-B1200BA-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■NO
Quantity/ each box	2400PCS	Material for box	■paper ☐plastic
Outer carton box size	405mm*290mm*290mm	Box type	■new ☐update
Quantity / inner box * Quantity / outer box	60PCS * 10 = 600PCS 600PCS * 4 = 2400PCS		

Packing Standards:


Top Tray
Bottom Tray
Tray
Static Bag Packing
Vacuum Packing
Tray Packing
Inner Carton Box
Outer Carton Box
Done

There are 60PCS modules in each plastic plate.

There are 600PCS 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): 0.75 Kg
2. Height (Max): 0.29 M
3. Prohibition: Box made by log

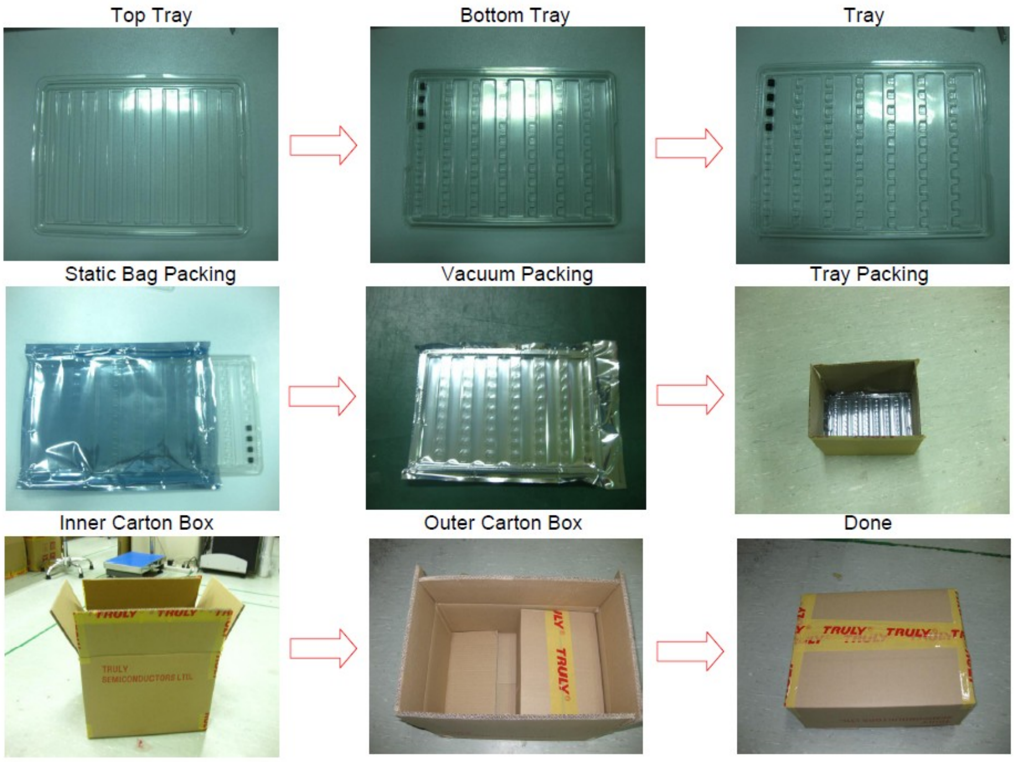
Material for Plastic tray

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

Packaging Design Two

Product No.	CM7945-B1200BA-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY OPTO-ELECTRONICS LTD.	Recycle	☐YES ■NO
Quantity/ each box	1200PCS	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	60PCS * 10 = 600PCS 600PCS * 2 = 1200PCS		

Packing Standards:


Top Tray
Bottom Tray
Tray
Static Bag Packing
Vacuum Packing
Tray Packing
Inner Carton Box
Outer Carton Box
Done

There are 60PCS modules in each plastic plate.

There are 600PCS 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): 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