



CUSTOMER APPROVAL SHEET

Company Name	
MODEL	A060SE02 V5
CUSTOMER APPROVED	

- APPROVAL FOR SPECIFICATIONS ONLY (Spec. Ver. 0.2)
- APPROVAL FOR SPECIFICATIONS AND ES SAMPLE (Spec. Ver. 0.2)
- APPROVAL FOR SPECIFICATIONS AND CS SAMPLE (Spec. Ver. 0.2)
- CUSTOMER REMARK :

AUO PM : Ken CM Chen

P/N : _____

Comment :

1 Li-Hsin Rd. 2. Science-Based Industrial Park
Hsinchu 300, Taiwan, R.O.C.
Tel: +886-3-500-8899
Fax: +886-3-577-2730



Doc. version :	0.1
Total pages :	35
Date :	2010/07/13

Product Specification

6" EPD with touch panel MODULE

Model Name : A060SE02 V5

Planned Lifetime: From 2010/May. To 2011/May.

Phase-out Control: From 2011/Feb. To 2011/May.

EOL Schedule: 2011/May.

< ◆ > Preliminary Specification

< > Final Specification

Note: The content of this specification is subject to change.

© 2010 AU Optronics
All Rights Reserved,
Do Not Copy.

Contents

A. General Information	3
B. Outline Dimension	4
C. Electrical Specifications	5
1. Pin Assignment	5
2. Touch Panel Pin Assignment	9
3. Absolute Maximum Ratings	9
D. Electrical Characteristics	10
E. Input timing AC Characteristics	11
1. Horizontal input timing	11
1.1 Relation ship of input data and source output voltage.....	12
2. Vertical input timing.....	13
3. VCOM voltage definition	14
4. VCOM relationship.....	14
5. Touch panel timing.....	15
F. Power On/Off Characteristics	17
1. Recommended Power On/off Sequence.....	17
G. Optical Specification	18
H. Reliability Test Items	20
I. Packing and Marking	22
1. Packing Form.....	22
2. Module/Panel Label Information	23
3. Carton Label Information.....	23
J. Application Note	24
1. Application Circuit.....	24
2. Touch panel pin assign circuit.....	25
L. Touch Panel Command and Register Map	27
1. I2C Protocol Definition	27
2. Coordinate Register Map	29
3. Sensitivity	29
4. Interrupt Operation Mode	29
5. Power Mode	33
6. Calibration	35
7. Power On/Off Sequence.....	35

A. General Information

This display is a active matrix electrophoretic display (EPD), which comprises a-si TFT substrate, electrophoretic front plane, protective anti-glare top-sheet, driver ICs, and FPC. It is designed for applications such as e-book or e-reader.

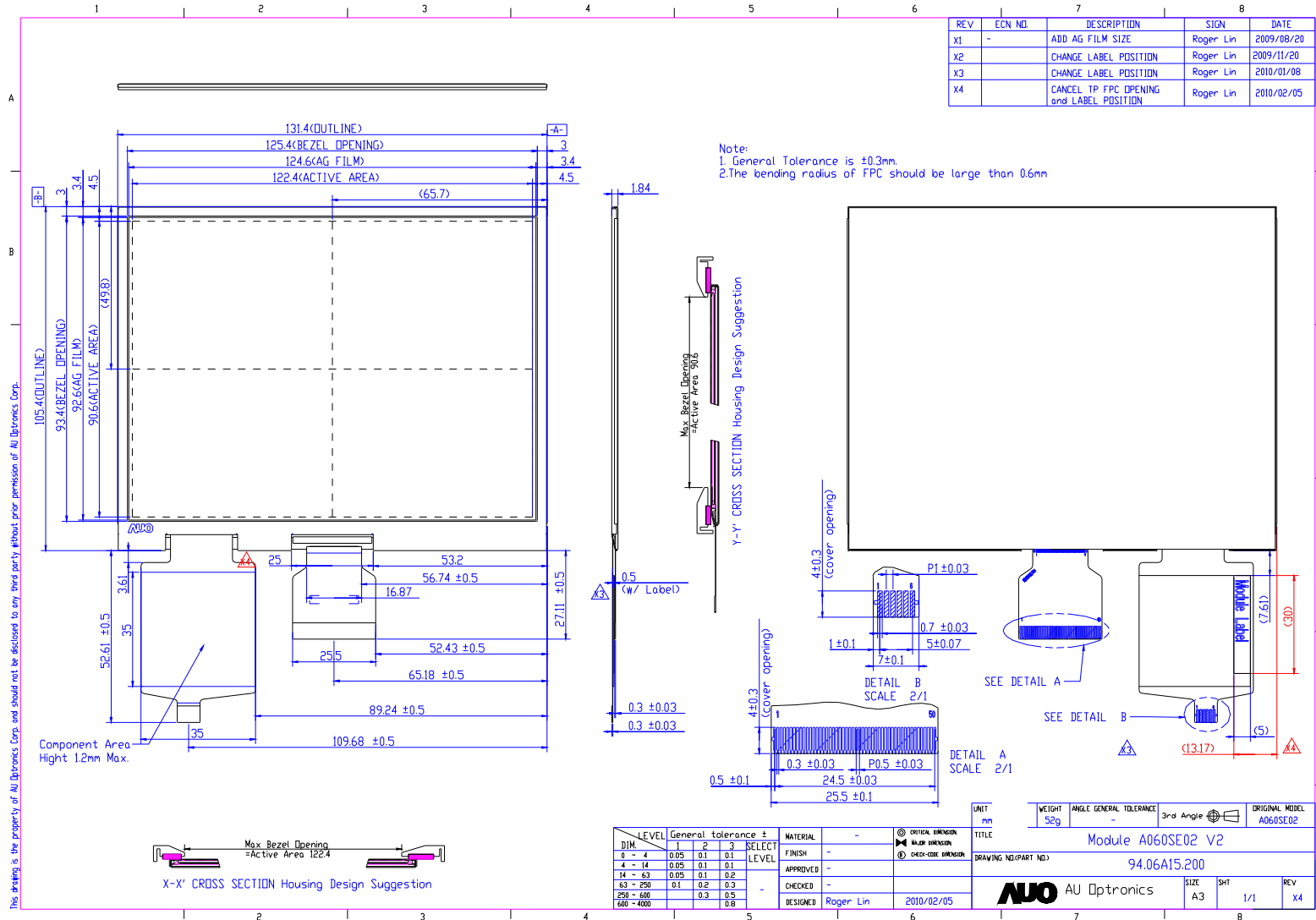
NO.	Item	Unit	Specification	Remark
1	Screen Size	inch	6 (Diagonal)	
2	Display Resolution	dot	800 (H)× 600(V)	
3	Overall Dimension	mm	131.4(H) × 105.39(V) × (1.84) (T)	Note 1
4	Active Area	mm	122.4(H)×90.6(V)	
5	Dot Pitch	mm	0.153 (H)× 0.151(V)	
6	Gray Level	--	8	
7	Weight	g	(52)	
8	Surface Treatment		AG (7.5 ± 2%) Hard coating (3H)	Note 2

Note 1: Not include FPC and label. Refer to next page to get further information.

Note 2: 750 g load force on UNI/JPIA 3H pencil, speed is 3.5mm/s on the AG film and scratch length is 1cm and write 5 handwriting, Scratch no. ≤ 2 is OK



B. Outline Dimension



C. Electrical Specifications

1. Pin Assignment

Recommended connector : FH12-50S-0.5SH.

Pin No.	Symbol	I/O	I/O Structure	Description	Remark
1	Dummy	--	--	Dummy pin	
2	VCOM	O	--	VCOM polarity output signal	
3	VCOM_BOT	I	--	VCOM signal setting pin	
4	VCOMDC	P	Type2	External voltage for VCOMDC power.	
5	VCOMH	P	--	External voltage for VCOM high power.	
6	VCOML	P	--	External voltage for VCOM low power.	
7	RST_N	I	Type 3	Global reset pin. Low reset.	
8	SHD_N	I	Type 3	DC-DC converter shut down pin. "0" : Enable.(Panel shut down; Default) "1" : Disable.	
9	PWR_RDY	O	Type 1	Power ready output. When SHD_N from "1" to "0": PWR_RDY will become "0". When SHD_N from "0" to "1": after 100ms, PWR_RDY will become "1".	Note1
10	VCOMIN_0	I	Type 2	Logic Input for VCOM voltage generate.	
11	VCOMIN_1	I	Type 2	Logic Input for VCOM voltage generate.	
12	YOE	I	Type 3	Vertical output enable pin.	Note2
13	YCLK	I	Type 3	Vertical clock. Input	Note2
14	UD	I	Type 3	Vertical (up/down) scan direction. U/D = "L": Shift up to down. Default U/D = "H": Shift down to up.	

15	YDIOD	I/O	Type 5	Vertical start pulse input/output. These pins are used to input and output shift data. These pins are switched as input or output by setting the UD pin as follow.										
16	YDIOU	I/O	Type 5	<table border="1"> <thead> <tr> <th>UD</th> <th>YDIOU</th> <th>YDIOD</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>Output</td> <td>Input</td> </tr> <tr> <td>H</td> <td>Input</td> <td>Output</td> </tr> </tbody> </table>	UD	YDIOU	YDIOD	L	Output	Input	H	Input	Output	
UD	YDIOU	YDIOD												
L	Output	Input												
H	Input	Output												
17	XDIOL	I/O	Type 5	Horizontal start pulse input/output. These pins are used to input and output shift data. These pins are switched as input or output by setting the SHL pin as follow.										
18	XDIOR	I/O	Type 5	<table border="1"> <thead> <tr> <th>SHL</th> <th>XDIOL</th> <th>XDIOR</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>Input</td> <td>Output</td> </tr> <tr> <td>H</td> <td>Output</td> <td>Input</td> </tr> </tbody> </table>	SHL	XDIOL	XDIOR	L	Input	Output	H	Output	Input	
SHL	XDIOL	XDIOR												
L	Input	Output												
H	Output	Input												
19	LD	I	Type 3	Latch data.										
20	D0	I	Type 3	Data input, First pixel LSB										
21	D1	I	Type 3	Data input, First pixel MSB										
22	D2	I	Type 3	Data input, Second pixel LSB										
23	D3	I	Type 3	Data input, Second pixel MSB										
24	D4	I	Type 3	Data input, Third pixel LSB										
25	D5	I	Type 3	Data input, Third pixel MSB										
26	D6	I	Type 3	Data input, Forth pixel LSB										
27	D7	I	Type 3	Data input, Forth pixel MSB										
28	SHL	I	Type 3	Horizontal (left/right) scan direction. SHL = "L": Shift right to left. SHL = "H": Shift left to right. Default										
29	XCLK	I	Type 3	Horizontal Clock input..	Note3									
30	VREF	C	--	For power setting capacitor connected pin.										
31	VR	P	--	VCOMDC reference voltage										
32	AVDD	C	--	For power setting capacitor connected pin.										
33	C1P	C	--	For charge pump capacitor connected pin.										
34	C1N	C	--	For charge pump capacitor connected pin.										
35	VSS	P	--	Digital ground										
36	VSSA	P	--	Analog ground.										
37	VDD	P	--	Analog power.										
38	VREF_POS	C	--	For power setting capacitor connected pin.										
39	VREF_NEG	C	--	For power setting capacitor connected pin.										

40	VDDX8	P	--	DCDC positive voltage	
41	NVDDX8	P	--	DCDC negative voltage	
42	VDD_DRV	P	--	DCDC power.	
43	ADRVU	O	Type 1	PWM output for DCDC converter.	
44	ADRVD	O	Type 1	PWM output for DCDC converter.	
45	VSS_DRV	P	--	DCDC ground.	
46	VDPS	P	--	External voltage for source positive power.	
47	VDNS	P	--	External voltage for source negative power.	
48	VDPG	C	--	For power setting capacitor connected pin.	
49	VDNG	C	--	For power setting capacitor connected pin.	
50	Dummy	D	--	Dummy pin	

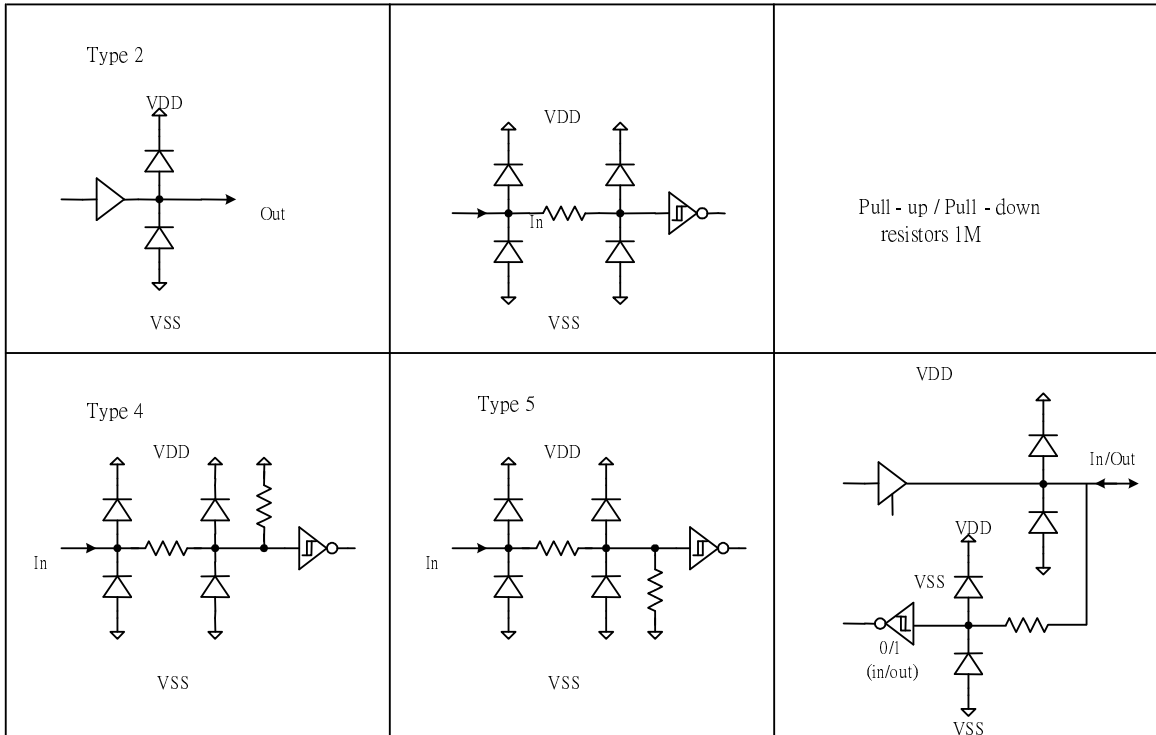
I: Input pin; O:output pin, I/O: Input / Output; P: Power pin; C: capacitor pin; D : Dummy

Note 1: Please reference chapter F

Note 2: Please reference chapter E

Note 3: Please reference chapter E

I/O Pin Structure:



2. Touch Panel Pin Assignment

Pin No.	Symbol	I/O	Description	Remark
1	GND	P	Touch panel ground.	
2	VDD_TP	P	Touch panel power.	
3	TP_INT	O	Touched Interrupt Indicator pin.	
4	IIC_SCL	I	Serial input clock in I2C-Bus interface operation pin.	
5	IIC_SDA	I/O	Serial input/output data in I2C-Bus interface operation pin.	
6	RST_TP	I	Touch panel reset pin.	

3. Absolute Maximum Ratings

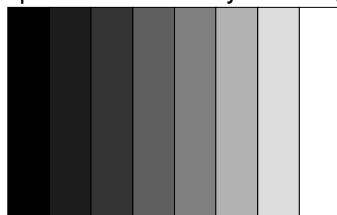
Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power voltage	VDD	VSSA=VSS=0	-0.3	+5.0	V	
Power voltage	VDD_DRV	VSS_DRV=0	-0.3	+5.0	V	
Source voltage	VDPS	VSSA=VSS=0		+20	V	
	VDNS	VSSA=VSS=0	-20		V	
Gate voltage	VDPG	VSSA=VSS=0	-0.3	VDNG+40		
	VDNG	VSSA=VSS=0	VDPG-40	+0.3		
Storage temperature	Tstg	-	-25	70	°C	
Operating	Topa	-	0	50	°C	

D. Electrical Characteristics

1. Panel Power Consumption

Item	Symbol	Condition	Min.	Typical	Max.	Unit
Supply Voltage	VDD	VSSA=VSS=VSS_DRV=0V	--	3.3	--	V
	VDD_DRV	VSSA=VSS=VSS_DRV=0V	--	3.3	--	
Touch Panel Supply Voltage	VDD_TP	VSSA=VSS=VSS_DRV=0V	-	3.3	-	V
Low Level Input Voltage	Vil	Digital input pins	GND	-	0.3xVDD	V
High Level Input Voltage	Vih	Digital input pins	0.7xVDD	-	VDD	V
Operating temperature	T _{op}		-	25	-	°C
Operation Power Dissipation	P	VDD=VDD_DRV=3.3V	--	1.07	2	mA
		VDNS=-15V		0.82	1.5	mA
		VDPS=15V		0.86	1.5	mA
		VDPG=20V		1.23	2	mA
		VDNG=-20V		0.66	1.5	mA
		VCOMH=12V		0.36	1	mA
		VCOML=-18V		0.56	1	mA
Standby Power Dissipation	P	VDD=VDD_DRV=3.3V	--	0.06	0.15	mA
		VDNS=0V		0.02	0.1	mA
		VDPS=0V		0.02	0.1	mA
		VDPG=3.3V		0.02	0.1	mA
		VDNG=0V		0.02	0.1	mA
		VCOMH=0V		0.01	0.1	mA
		VCOML=0V		0.02	0.1	mA
Image Update Time		T=25°C	--	950	1010	ms
		T=10°C	--	2310	2450	ms
		T=0°C	--	2750	3150	ms

*: Typical power consumption measured by following pattern



2. Touch Panel Power Consumption

Mode	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Active	Ptp_a	VDD= 3.0V	-	(9)	-	mA	
Sleep	Ptp_s		-	(1)	-	mA	
Deep Sleep	Ptp_dp		-	(0.7)	-	mA	

E. Input timing AC Characteristics

1. Horizontal input timing

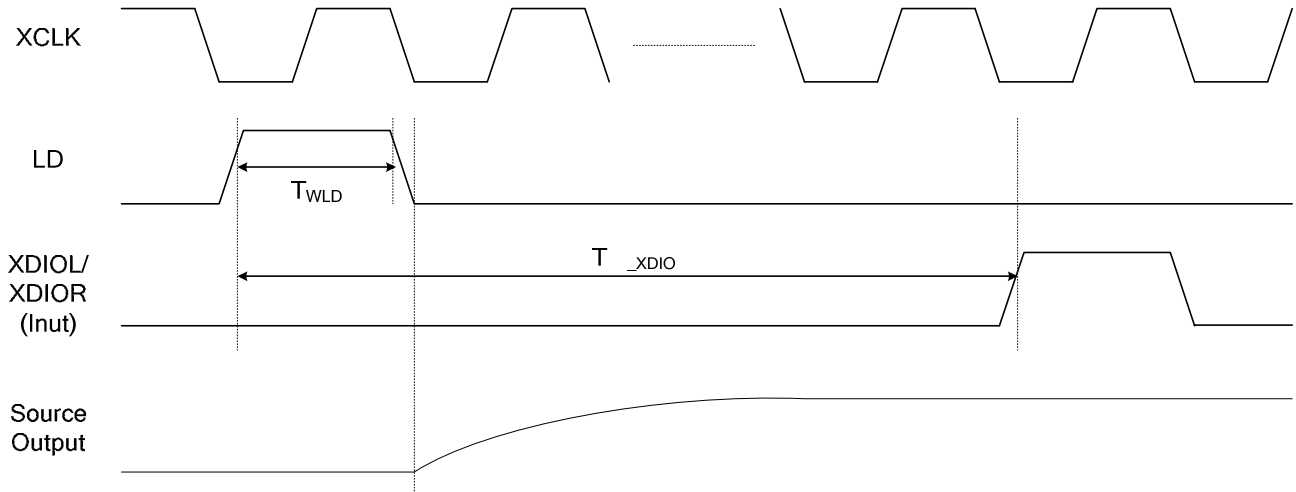


Figure 1: LD input timing

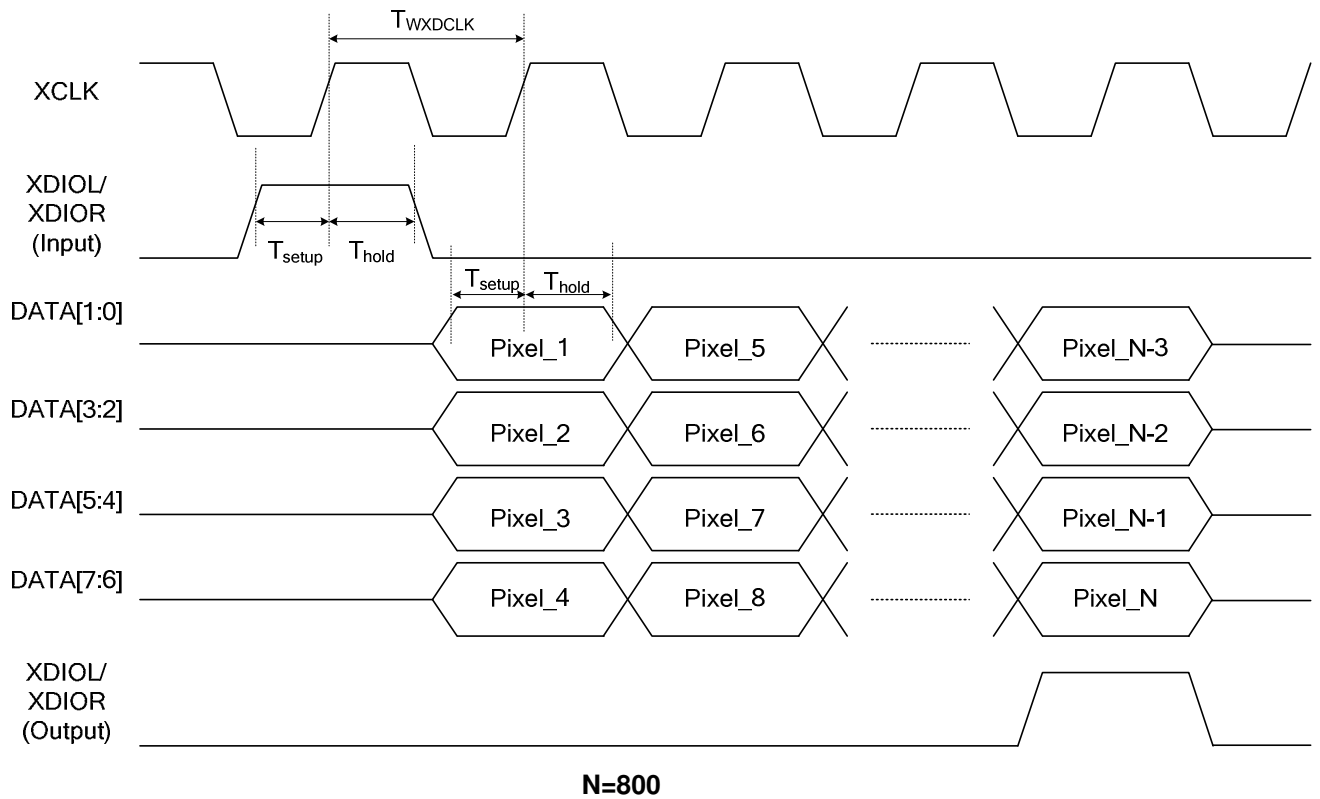


Figure 2: Horizontal data Input timing

(VDD=VDD_DRV=3.3V, VSSA=VSS=VSS_DRV=0V, TA=25°C)

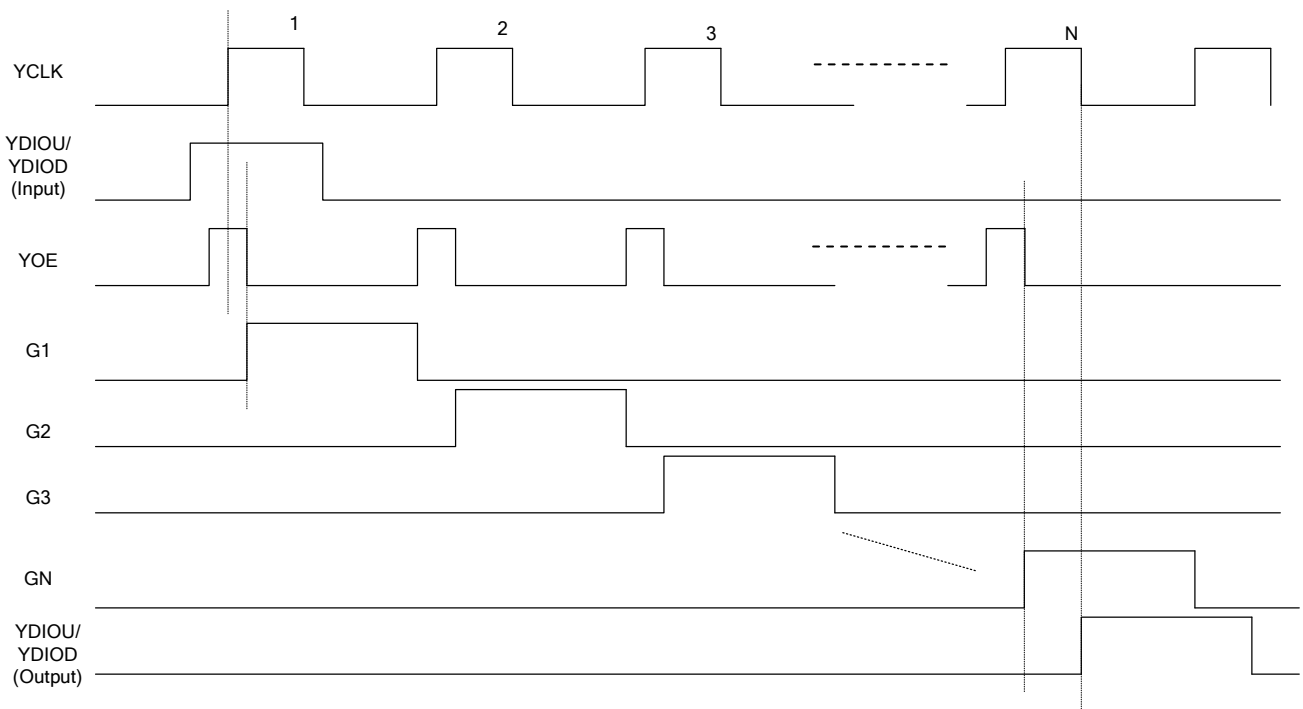
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Clock pulse width	T_{WXDCLK}	13			ns
Data setup time	T_{setup}	2	-	-	ns
Data hold time	T_{hold}	2	-	-	ns
LD pulse width	T_{WLD}	1	-	-	XCLK
Time from LD to XDIOL/XDIOR	T_{LD_DIO}	5	-	-	XCLK

1.1 Relation ship of input data and source output voltage

The source driver output voltage will base on input 2 bits data, and the relationship is as below:

MSB	LSB	Function
0	0	Source output is 0V
0	1	Source output is VDPS(+15V)
1	0	Source output is VDNS(-15V)
1	1	Source output is floating

2. Vertical input timing



N=600

Figure 3: Vertical input timing

3. VCOM voltage definition

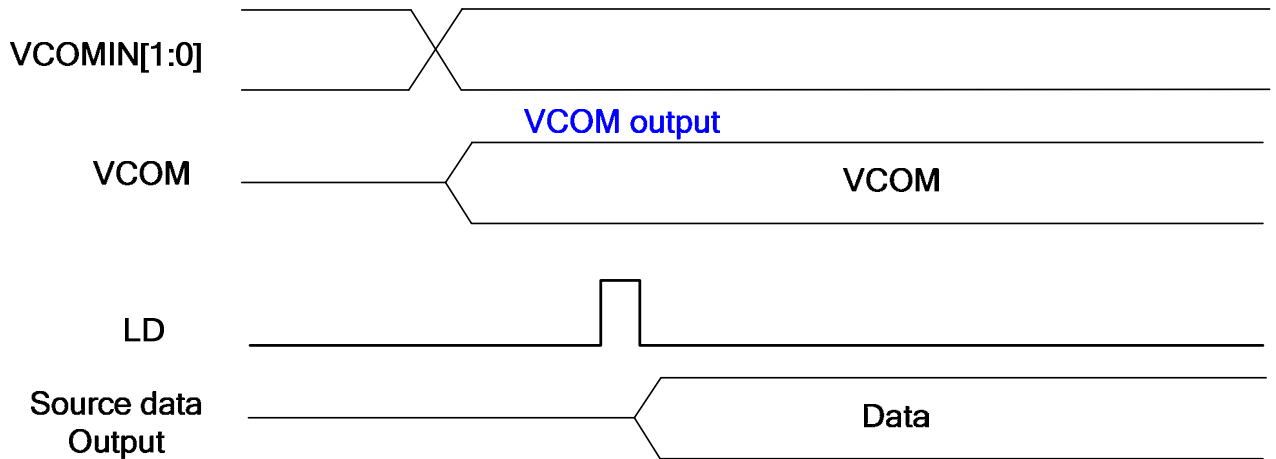
The VCOM output voltage will base on input pins VCOMIN[1:0], and the relationship is as below:

VCOMIN[1 :0]	Function
00	VCOM output is (-VDC) v
01	VCOM output is (VDPS-VDC) v
10	VCOM output is (VDNS-VDC) v
11	VCOM output is floating

4. VCOM relationship

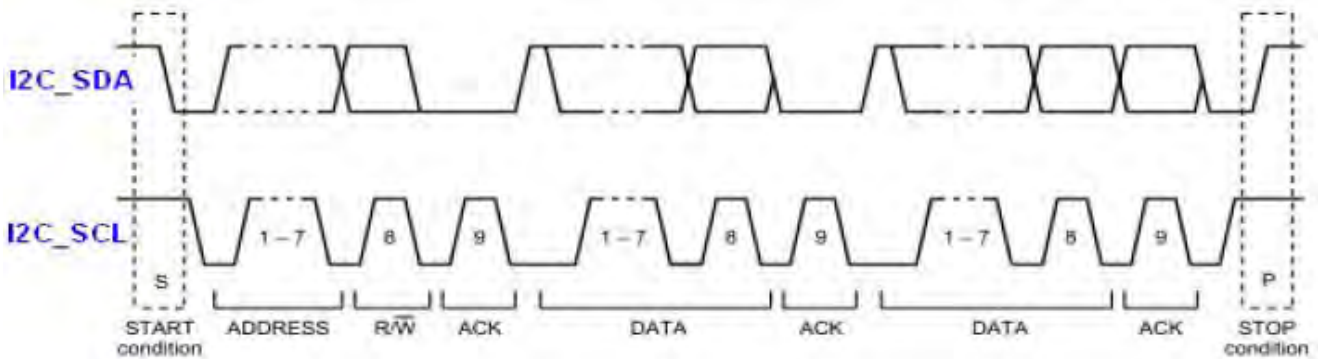
VCOM will change while VCOMIN change

Source output will change while LD signal falling edge.



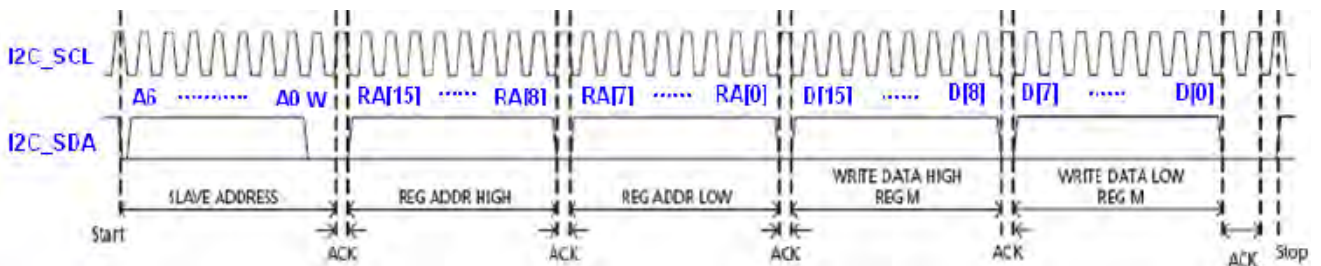
5. Touch panel timing

5.1. I2C Timing Diagram



Note : Slave address is 1001100.

5.2. Register Write Sequence

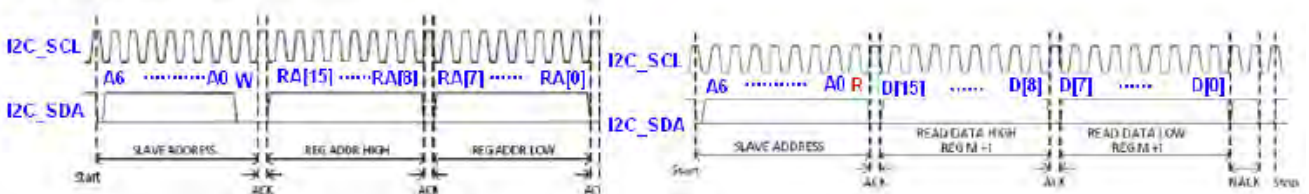


5.3. Register Read Sequence

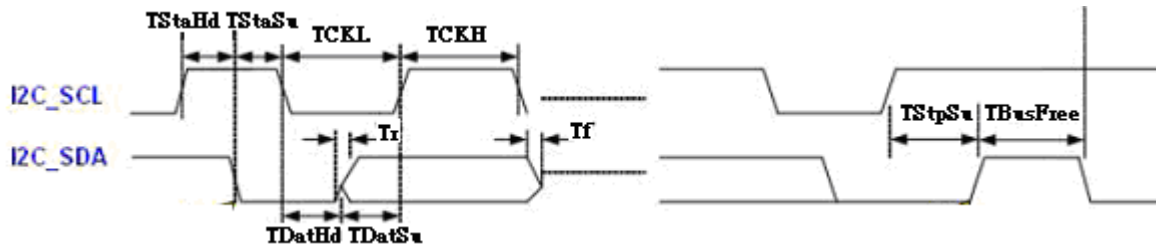


S = start condition
P = stop condition
Sr = restart condition
A = acknowledge
 \bar{A} = no-acknowledge

□ slave to master
■ master to slave



5.4. I2C Timing Characteristics



VDDI=1.65~3.3V, VCI=2.5~3.3V, TA=25°C

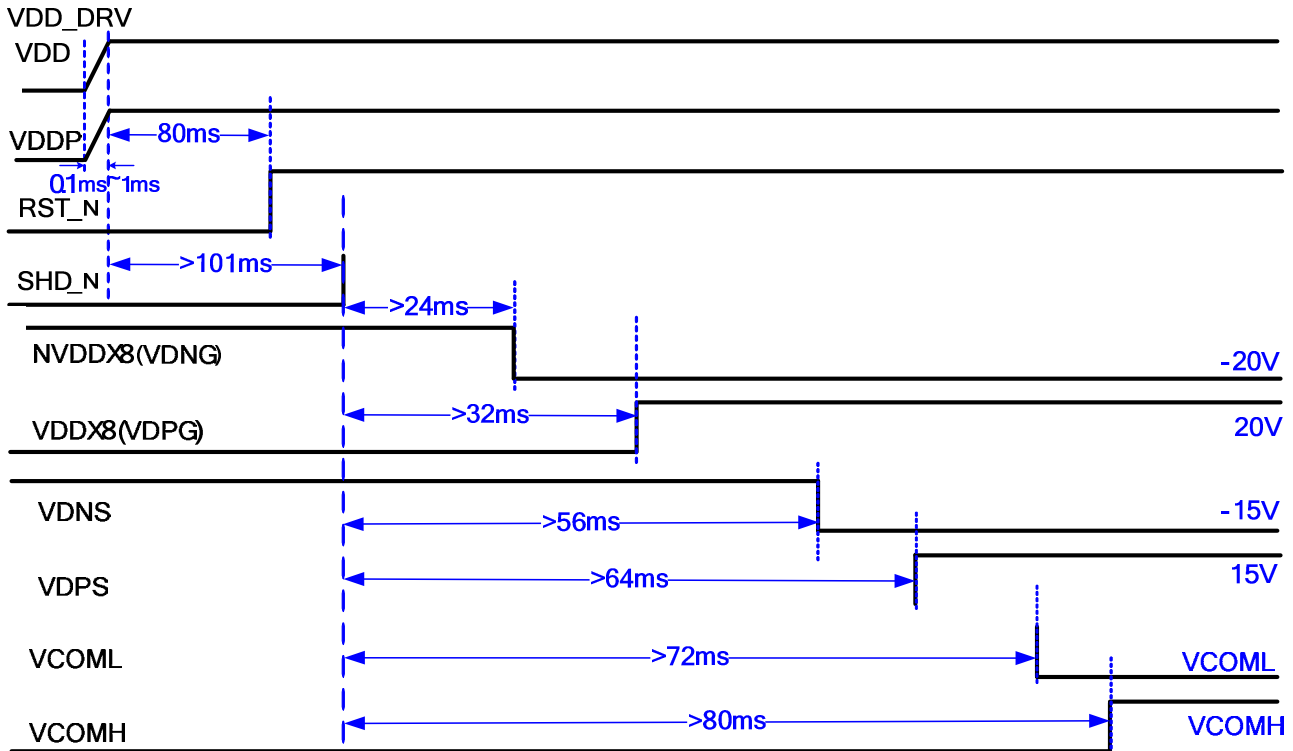
Item	Symbol	Min.	Typ.	Max.	Unit
Working Frequency	Fclk	-	-	400	KHz
I2C Clock Low	TckL	1250	-	-	ns
I2C Clock High	TckH	1250	-	-	ns
I2C Data ring time	Tr	-	-	300	ns
I2C Data falling time	Tf	-	-	300	ns
I2C Data hold time	TDatHd	0	-	-	ns
I2C Data setup time	TDatSu	100	-	-	ns
I2C Start Condition hold time	TStaHd	600	-	-	ns
I2C Start Condition setup time	TStaSu	600	-	-	ns
I2C Stop Condition setup time	TStpSu	600	-	-	ns
I2C Bus free time	TBusFree	1300	-	-	ns

F. Power On/Off Characteristics

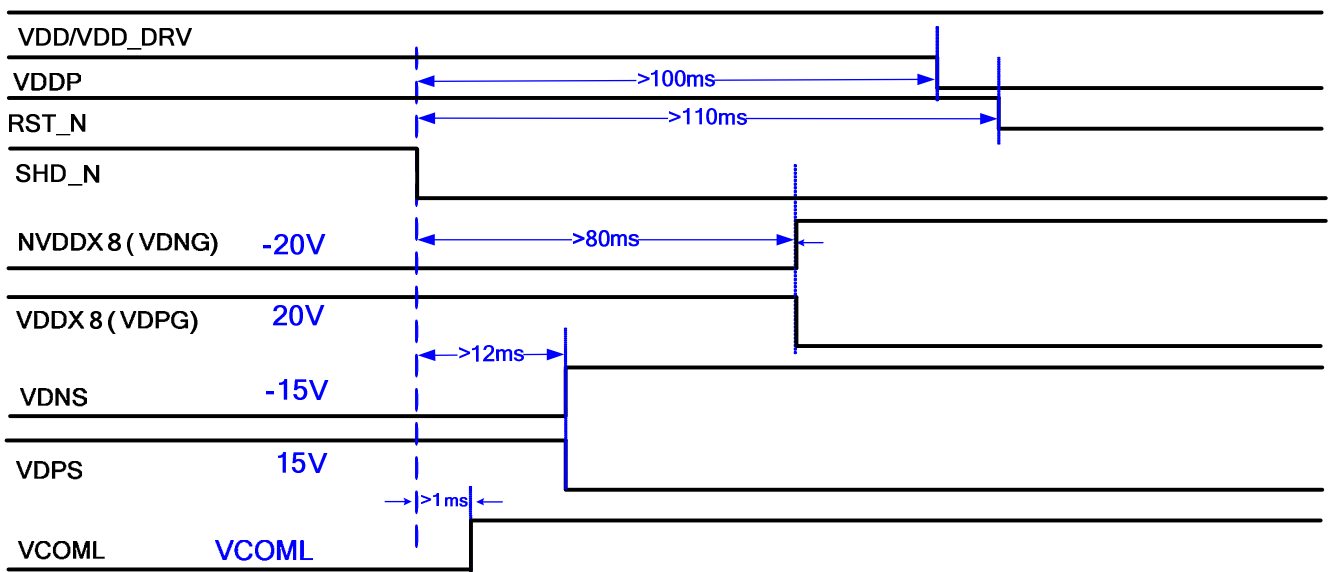
1. Recommended Power On/off Sequence

The suggested power on/off sequence is below:

1. Power on sequence:



2. Power off sequence:



G. Optical Specification

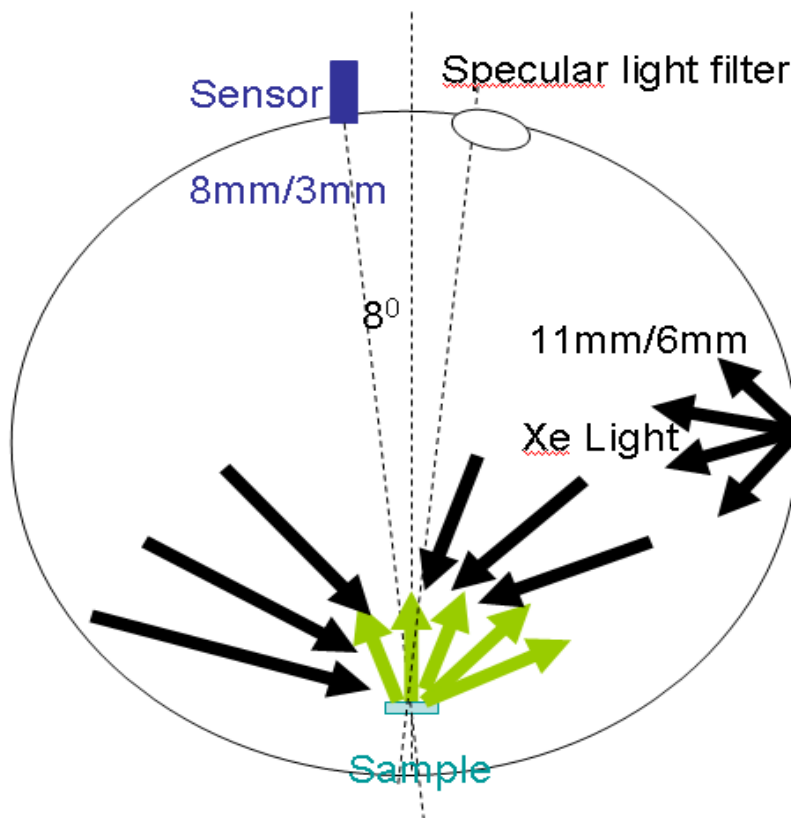
All optical specification is measured under typical condition (Note 1, 2)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Reflectance	R	white	24	26	--	%	Note1,2,3,4
Contrast Ratio	CR	At optimized viewing angle	4	5	--		Note1,2,3,5
Update Time	T	T=25°C T=10°C T=0°C	--	950 2310 2750	1010 2450 3150	ms	Note 3

Note 1. Ambient temperature =25°C

Note 2. Reflectance and contrast ratio are measured by KONICA MINOLTA spectrophotometer CM-2600d.

Note 3: The measurement shall be conducted under AUO specified driving condition, including LUT and TCON codes.



Note 4. Definition of Reflectance:

The Reflectance is expressed as:

$$R = \text{Reflectance Factor}_{\text{white board}} \times (L_{\text{center}} / L_{\text{white board}})$$

L_{center} is the luminance measured at center in a white area. $L_{\text{white board}}$ is the luminance of a standard white board.

Note 5. Definition of contrast ratio:

The contrast ratio (CR) is the ratio between the reflectance in a full white area (Rl) and reflectance in a dark area (Rd).

$$\text{Contrast ratio (CR)} = \frac{Rl}{Rd}$$

H. Reliability Test Items

	Test	Condition	Condition	Remark
1	High-Temperature Operation	Tamb=+50°C, RH=30% for 240hrs	IEC 60068-2-2Bp	Update pattern four times per minute.
2	Low-Temperature Operation	Tamb=0°C for 240hrs	IEC 60068-2-2Ab	Update pattern four times per minute.
3	High-Temperature Storage	Tamb=+70°C, RH=23% for 240hrs	IEC 60068-2-2Bp	
4	Low-Temperature Storage	Tamb=-25°C for 240hrs	IEC 60068-2-2Ab	
5	High-Temperature, High-Humidity Operation	Tamb=+40°C, RH=90% for 168hrs	IEC 60068-2-3CA	Update pattern four times per minute.
6	High-Temperature, High-Humidity Storage	Tamb=+60°C, RH=80% for 240hrs	IEC 60068-2-3CA	
7	Temperature Cycle	1 Cycle : [-25° C 30min] -> [+70° C 30min] : 100 cycles	IEC 60068-2-14	
8	UV Exposure Resistance	Condition: 1120W/m2, 40°C Test Duration: 3 cycles (Definition of 1 cycle: 8 hr at exposure state and 16 Hr at non-exposure state)	IEC 60068-2-5Sa	
9	Package Vibration	1.04G, Frequency : 10 ~ 500HZ Direction : X, Y, Z Duration : 1 hours in each direction		
10	Package Drop Impact	Drop from height of 100 cm on concrete surface. Drop sequence : 1 corner, 3 edges, 6 faces one drop for each.		
11	Electrostatic discharge	Air-mode : +/- 8kV Contact-mode : +/- 4kV	IEC 61000-4-2	
12	Altitude test Operation	700hPa(=3,000m) 48hrs		
13	Altitude test Storage	260hPa(=10,000m) 48hrs		

14	FPC Bonding Strength	Pull the FPC Stiffener part with a force of 500gf in the horizontal and vertical directions		
15	FPC bending Performance	Apply MIT method. Bending rate radius : 1.0mm Weight 500gf, Bending angle : $\pm 135^\circ$ Bending cycle : 20 times		
16	Stylus Tapping	POLYACETAL Pen : Top R0.8mm Load : 300gf Speed : 3 times/sec Total 13,500 times		Pass criteria - no glass breakage or damage to micro-cups.

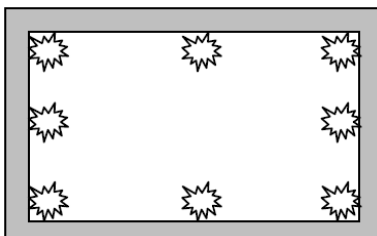
Note 1. In the above conditions, there is no display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.

Note 2. The test modules will be kept at 25°C environment for 4 hours after finish the environmental test and make measurement after AUO specified TCON code and waveform re-driving. The judgement of above tests should satisfy minimum contrast ratio and minimum reflectance.

Note 3. For Item 10, in addition to satisfy minimum contrast ratio and minimum reflectance, the display shall be able to identify 4 gray levels, including Black and White when being driven under AUO specified driving condition at the end of test.

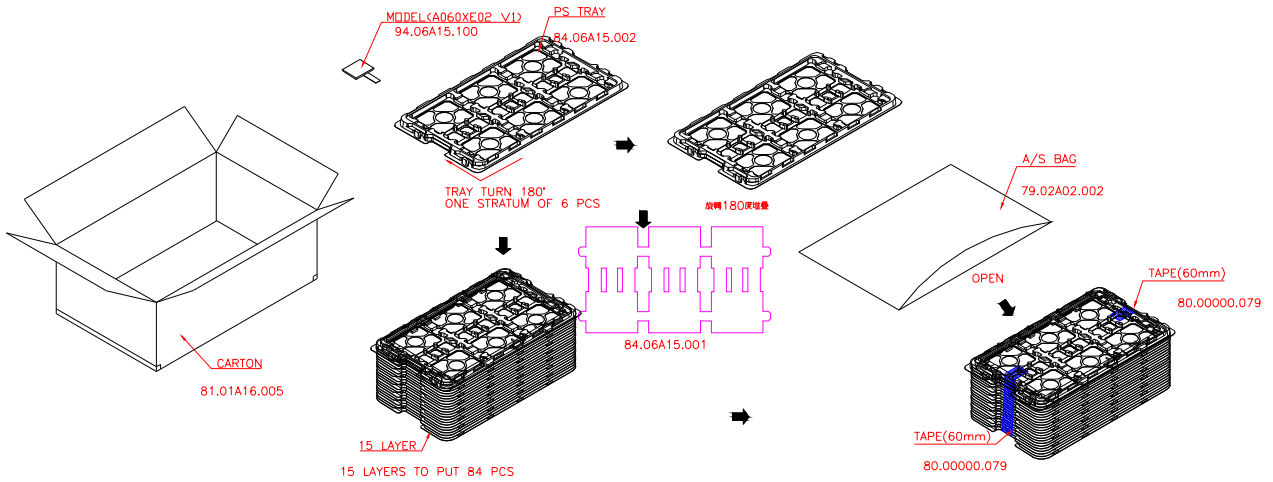
Note 4. ESD testing method.

1. Ambient: 24~26°C, 56~65%RH, atmospheric pressure : 940~960hPa
2. Instruments: Noiseken ESS-2000,
3. Operation System: AUO pattern generator
4. Test Mode: Non-operating mode, test pattern: chess
5. Test Method:
 - a. Contact Discharge: 150pF(330Ω) 1sec, 8 points, 25 times/point
 - b. Air Discharge: 150pF(330Ω) 1sec, 8 points, 25 times/point
6. Test point:

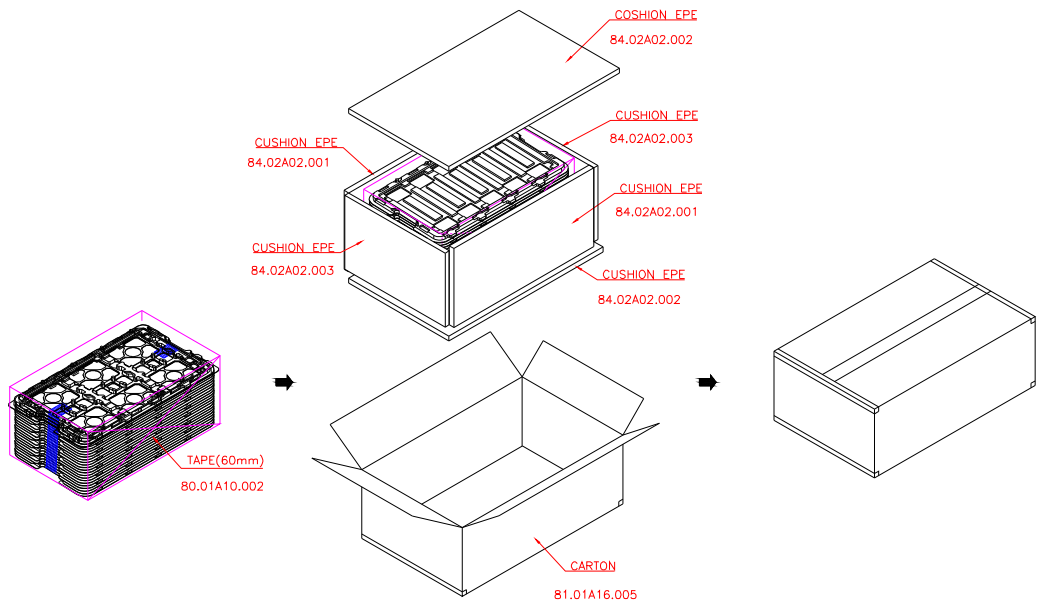


I. Packing and Marking

1. Packing Form



MAX. CAPACITY:84 MODULES
 MAX. WEIGHT:TBD kg
 MEAS. 600 x 353 x 210 mm



2. Module/Panel Label Information

The module/panel (collectively called as the “Product”) will be attached with a label of Shipping Number which represents the identification of the Product at a specific location. Refer to the Product outline drawing for detailed location and size of the label. The label is composed of a 22-digit serial number and printed with code 39/128 with the following definition:

ABCDEFGHIJKLMNQRSTUV

- For internal system usage and production serial numbers.
- AUO Module or Panel factory code, represents the final production factory to complete the Product
- Product version code, ranging from 0~9 or A~Z (for Version after 9)
- Week Code, the production week when the product is finished at its production process

3. Carton Label Information

The packing carton will be attached with a carton label where packing Q'ty, AUO Model Name, AUO Part Number, Customer Part Number (Optional) and a series of Carton Number in 13 or 14 digits are printed. The Carton Number is appearing in the following format:

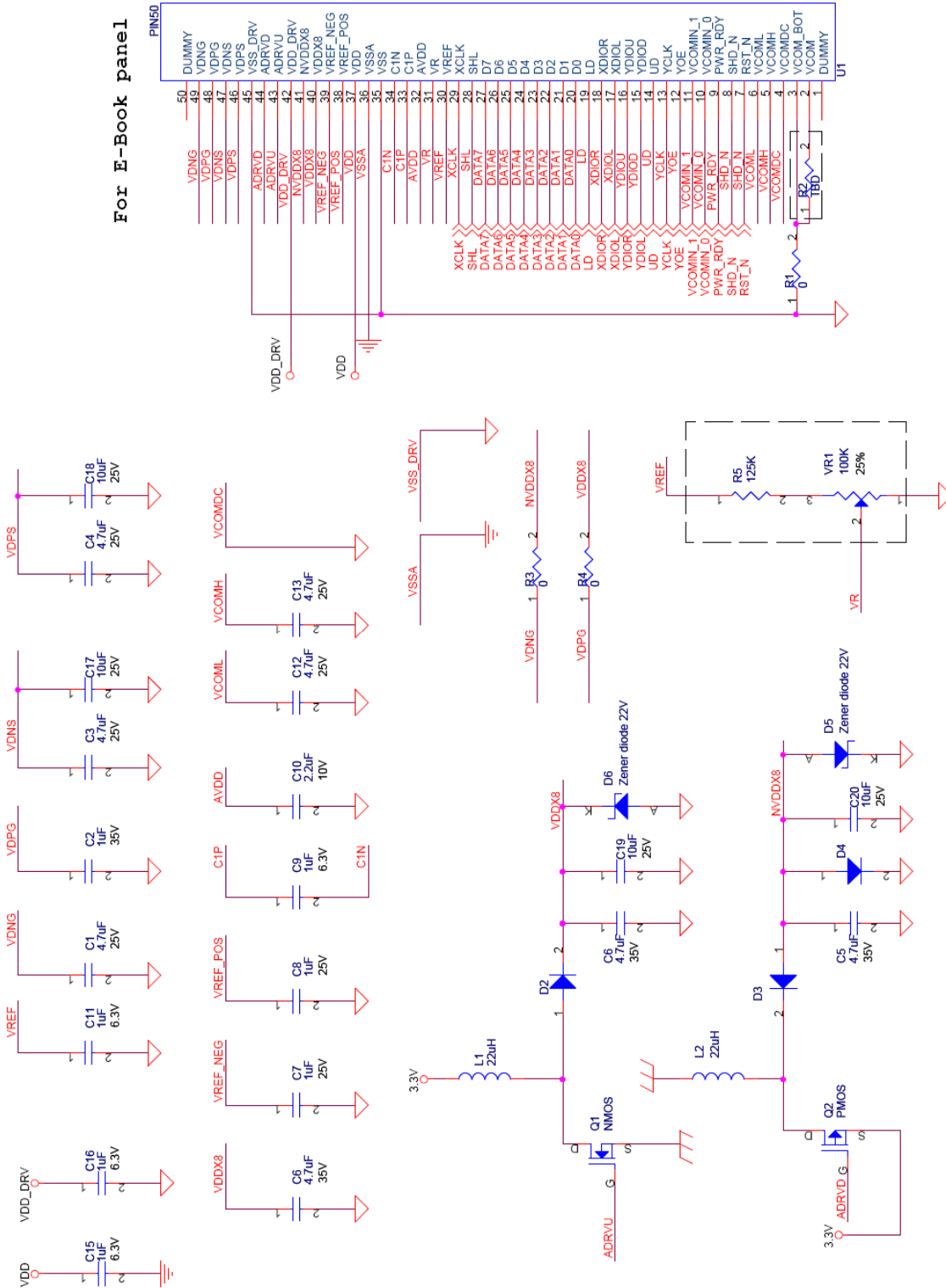
ABC-DEFG-HIJK-LMN

- DEFG appear after first "-" represents the packing date of the carton
- Date from 01 to 31
- Month, ranging from 1~9, A~C. A for Oct, B for Nov and C for Dec.
- A.D. year, ranging from 1~9 and 0. The single digit code represents the last number of the year

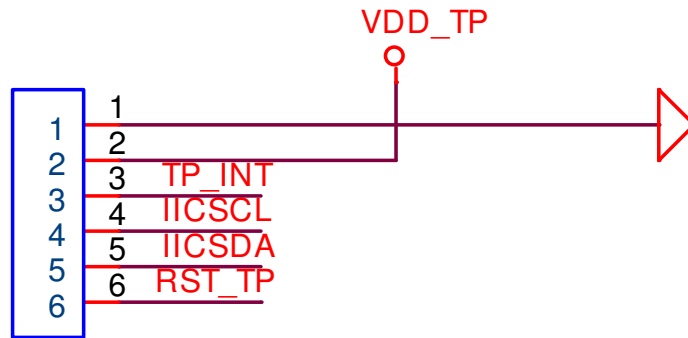
Refer to the drawing of packing format for the location and size of the carton label.

J. Application Note

1. Application Circuit



2. Touch panel pin assign circuit



K. Precautions

1. Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.
2. Adopt measures for good heat radiation. Be sure to use the module within the specified temperature.
3. Avoid dust or oil mist during assembly.
4. Follow the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.
5. Less EMI: it will be more safety and less noise.
6. Please operate module in suitable temperature. The response time & brightness will drift by different temperature.
7. Be sure to turn off the power when connecting or disconnecting the circuit.
8. Display surface never likes dirt or stains.
9. A dewdrop may lead to destruction. Please wipe off any moisture before using module.
10. High temperature and humidity may degrade performance. Please do not expose the module to the direct sunlight and so on.
11. Acetic acid or chlorine compounds are not friends with display module.
12. Static electricity will damage the module, please do not touch the module without any grounded device.
13. Do not disassemble and reassemble the module by self.
14. Be careful do not touch the rear side directly.
15. No strong vibration or shock. It will cause module broken.
16. Storage the modules in suitable environment with regular packing.
17. Be careful of injury from a broken display module.
18. Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity or other function issue.
19. Application under direct sunlight is strongly not recommended as it would result in display performance degradation.
20. It is highly recommended that the display is exposed to an even lighting condition to ensure a good display uniformity.
21. Elimination of light exposure to the display by applying proper means, e.g. lighting shielding cover is suggested when the display is not being used to extend the life performance of the device.
22. Heat isolation or heat sink to control uniformity of panel temperature should smaller than 1°C
23. Any performance degradation or display distortion which can be eliminated by display refreshing should not be regarded as a defect

L. Touch Panel Command and Register Map

1. I2C Protocol Definition

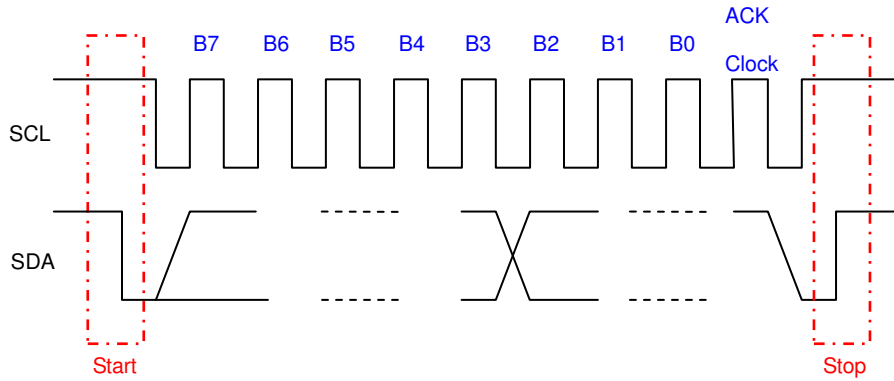


Figure 1. Standard I²C Transaction Unit

The sensor controller supports standard I²C protocol with SCL up to 400KHz. The device address is 0x5C. The chip also provides both single and sequential access. Figure 2 shows the write operation using single or sequential mode. Figure 3 also depicts the standard I2C transaction for single for sequential read mechanism.

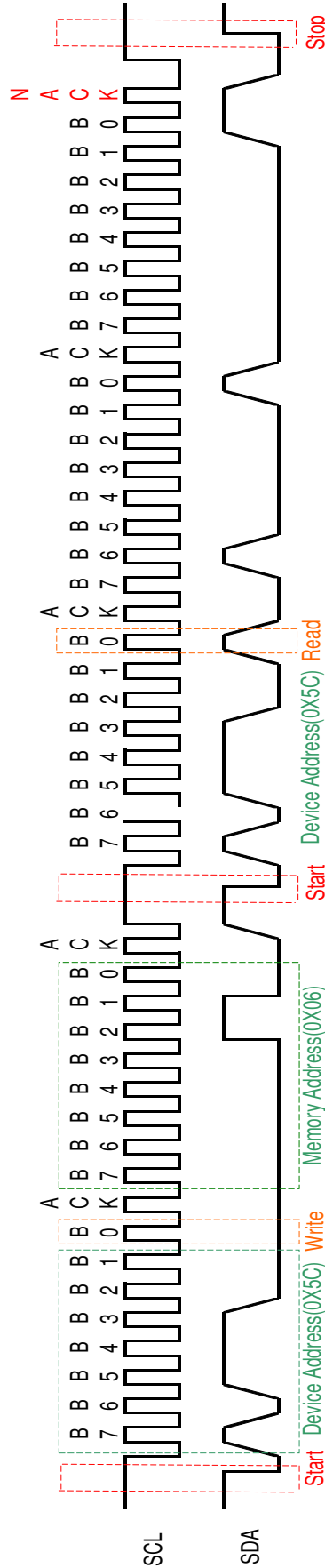
Write Operation										
Single	Start	Device Address (W)	A	Mem Addr	A	Data[0]	A	Stop		
Sequential	Start	Device Address (W)	A	Mem Addr	A	Data[0]	A	Data[1]	A A Data[n] A Stop

Figure 2. Write Operation with Single/Multiply Access

Read Operation										
Single	Start	Device Address (W)	A	Mem Addr	A	Start	Device Address (R)	A	Data[0]	NA Stop
Sequential	Start	Device Address (W)	A	Mem Addr	A	Start	Device Address (R)	A	Data[0]	A A Data[n] NA Stop

Figure 3. Read Operation with Single/Multiply Acce

Suppose the Y[3] raw data is 321. If only Y[3] is read, user should issue the waveform as following:



2. Coordinate Register Map

Addr.	Addr.(HEX)	Description	R/W	B7	B6	B5	B4	B3	B2	B1	B0
0	00	X1 (LSB)	R	X1[7]	X1[6]	X1[5]	X1[4]	X1[3]	X1[2]	X1[1]	X1[0]
1	01	X1 (MSB)	R	0	0	0	0	0	0	X1[9]	X1[8]
2	02	Y1 (LSB)	R	Y1[7]	Y1[6]	Y1[5]	Y1[4]	Y1[3]	Y1[2]	Y1[1]	Y1[0]
3	03	Y1 (MSB)	R	0	0	0	0	0	0	Y1[9]	Y1[8]

- Note:** (1) (X1, Y1) means the touched point
 (2) The coordinate of X1 = X1(LSB) + X1(MSB)*256, Y1 = Y1(LSB) + Y1(MSB)*256
 (3) If no touch, (X1, Y1)=(0,0)

3. Display and Touch Resolution

If screen resolution (blue) is 800x600 , and touch resolution (yellow) is the same (800x600)

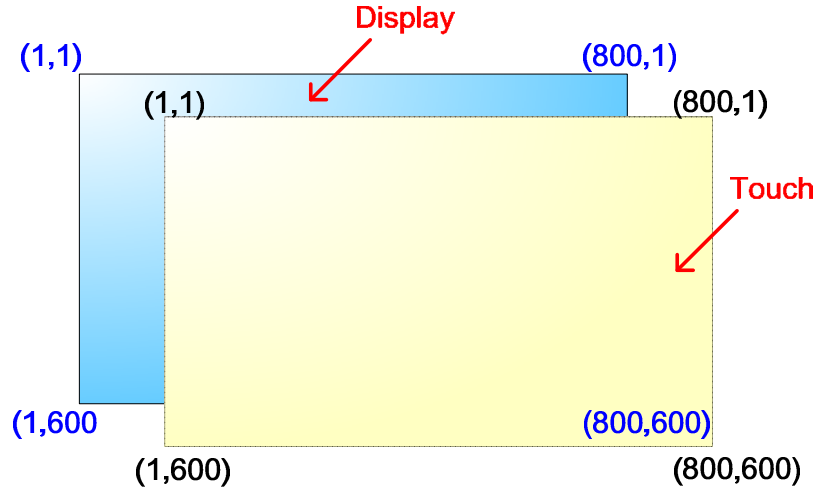
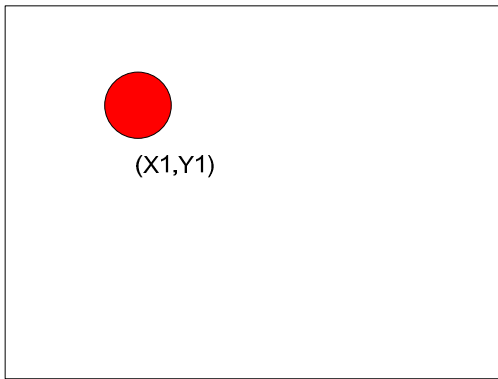


Figure 5 Reference of touched point diagram

4. Single Touch



Single Touching

- First Touch Point (X1, Y1)
- Second Touch Point (X2, Y2)=(0,0)

5. Sensitivity

Addr.	Addr.(HEX)	Description	R/W	B7	B6	B5	B4	B3	B2	B1	B0
111	6F	X_SENSITIVITY (THRESHOLD)	R/W	X_SENSITIVITY[7:0]							
112	70	Y_SENSITIVITY (THRESHOLD)	R/W	Y_SENSITIVITY[7:0]							

Note: (1) The default value for X/Y SENSITIVITY is 0X14

6. Interrupt Operation Mode

This chip should support both polling and interrupt way to get the coordinate and raw data by I2C interface. The figure below depicts the interruption operation.

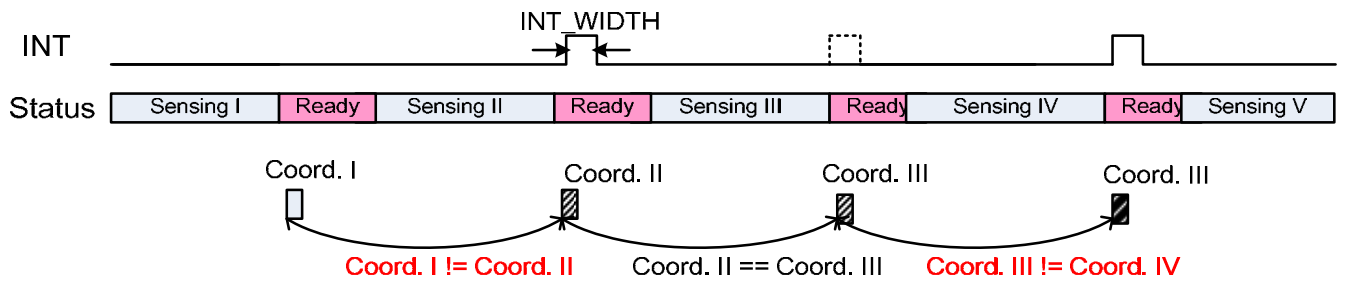


Figure 8: Interruption Flag under Coordinate Compare Mode

6.4 Touch Indicate Mode (INT_MODE[1:0] = [1,0]).

The interrupt will assert when the touch is valid. The interrupt should keep high until the touch is released.

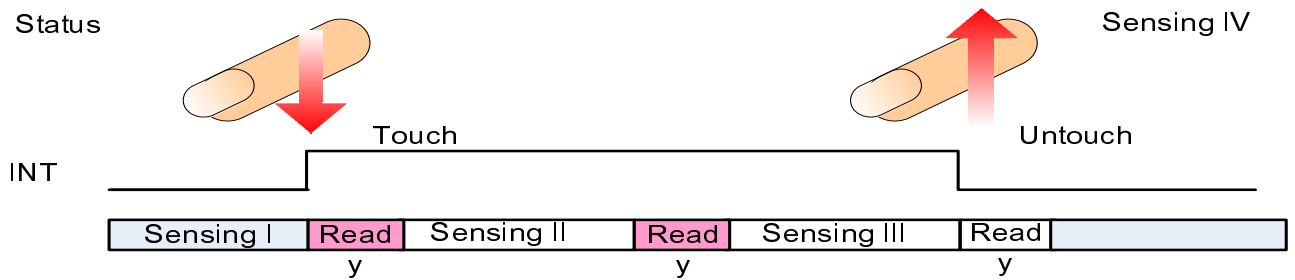


Figure 9: Touch Indicate Mode



7. Power Mode

Addr.	Addr.(HEX)	Description	R/W	B7	B6	B5	B4	B3	B2	B1	B0
115	73	Power Mode	R/W	IDLE PERIOD[3]	IDLE PERIOD[2]	IDLE PERIOD[1]	IDLE PERIOD[0]	0	ALLOW SLEEP	POWER MODE[1]	POWER MODE[0]

The capacitive sensor controller support 3 steps of power saving: Active, Sleep, Deep Sleep, the following section describe relative scan rate and power consumption:

The default value is 0X50

Active Mode:

The scan speed will reach 60Hz, this mode makes full-speed sensing and data process to provide best performance. the Power Mode is '0'.

Sleep Mode:

This mode will lower the scan speed down to 10Hz. Active Mode can enter sleep mode automatically or by command. When the system issues a command to change power mode to '1', the scan rate will switch to 10Hz at next scan cycle. When allow_sleep parameter is given, and user don't touch the screen longer than IDLE_PERIOD ms. the controller should also enter sleep mode directly and change the scan rate to 10 Hz immediately.

When user touches the screen in **active region**, the controller should return to Active mode. besides, when system assert a command to change the power mode to '0', the scan rate should also rise to 60Hz

Deep Sleep Mode:

When the chip enter deep sleep mode, the scan speed will reduce to 1Hz to achieve minimum power consumption. While deep sleep mode, all the registers are accessible during 4 ms, and it start from end of interrupt transition. The figure 13 and figure 14 shows a example to reference.

The only way to leave/enter deep sleep mode is change the power mode by specific command. The power mode is defined as '2'

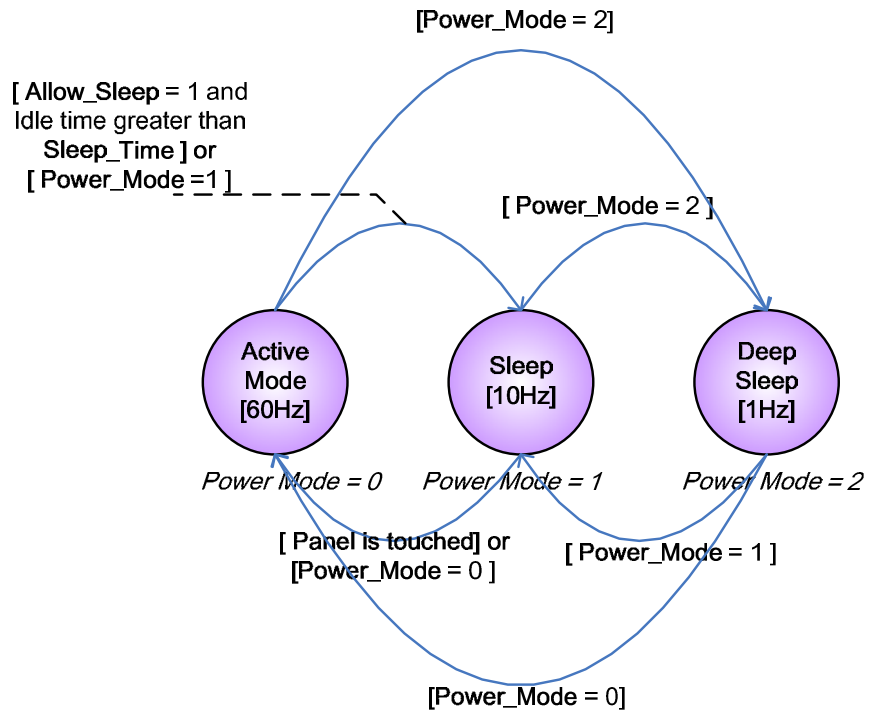


Figure 10 Power Mode Diagram

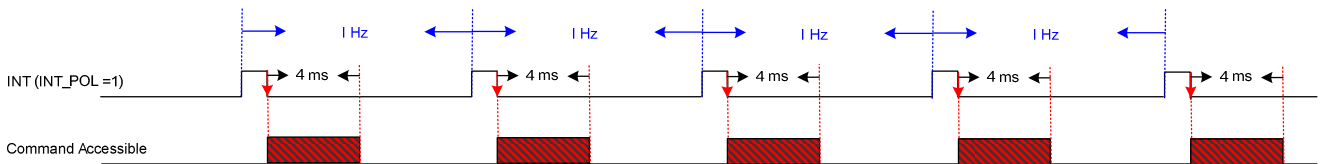


Figure 11 Command Accessible in Deep Sleep Mode (INT_POL=1)

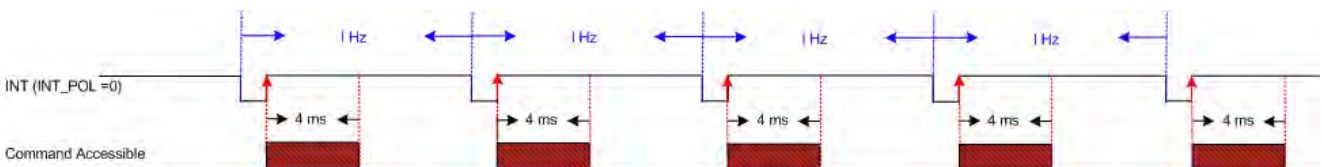


Figure 12 Command Accessible in Deep Sleep Mode (INT_POL=0)

8. Calibration

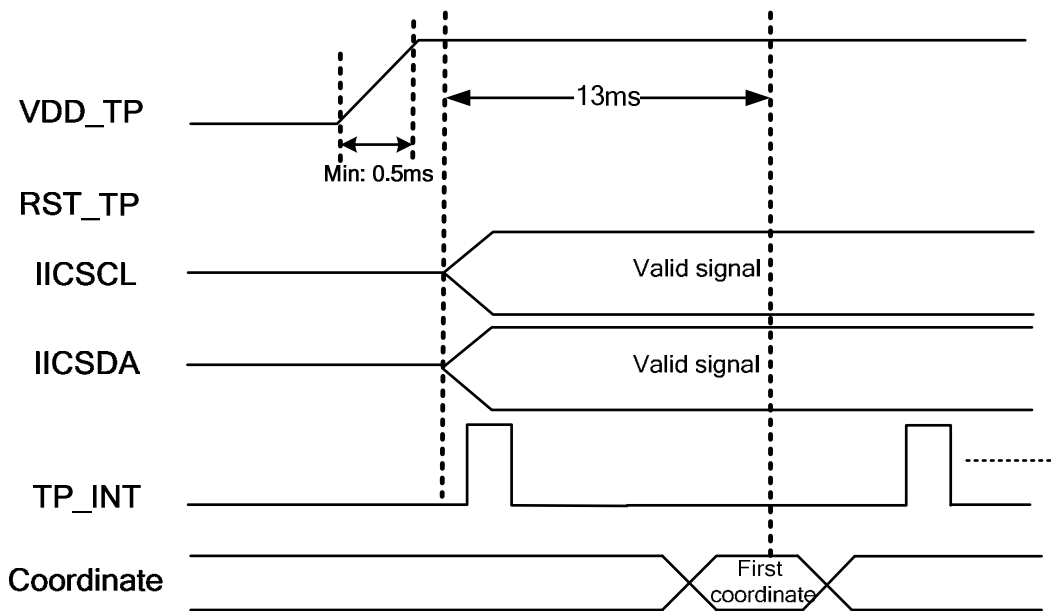
Addr.	Addr.(HEX)	Description	R/W	B7	B6	B5	B4	B3	B2	B1	B0
120	78	Calibration	W	0	0	0	0	0	0	1	1

“Calibration” procedure has to do once after assembly

Set address 0x78 as a 0x03 and wait 500ms, “Calibration” procedure will be done

9. Power On/Off Sequence

9.1 power on sequence



9.2 power off sequence

