INNOLUX DISPLAY CORPORATION

LCD MODULE

SPECIFICATION

Customer: _____

Model Name: CT022TN05 V.7(Raggie-T2)

Spec. No.: C022-05-TT-01

Date: 2007/9/27

Version: 1.0

□ **Preliminary Specification**

■ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Record of Revision

Version	Revise Date	Page	Content
1.0	2007/9/27	All	Initial release

Contents

1. General Specifications

1.1. Description

The CT022TN05 V.7 is a color active matrix Thin Film Transistor (TFT) Liquid Crystal Display (LCD) that uses amorphous silicon (a-Si) TFT as a switching device. This module is composed of a single 2.2 inches transmissive type main TFT-LCD Panel and a resistive touch screen display. The resolution of the panel is 176 x 220 pixels and can display 262K/65K color.

1.2. Features

-TM type for main TFT-LCD panel
-Resistive type touch panel
-One backlight with 4 white LED
-80/68 system 8/9/16/18 bits Parallel Bus
-Full, Still, Partial, Sleep modes are available

1.3. Application

-Display terminals for cellular phone

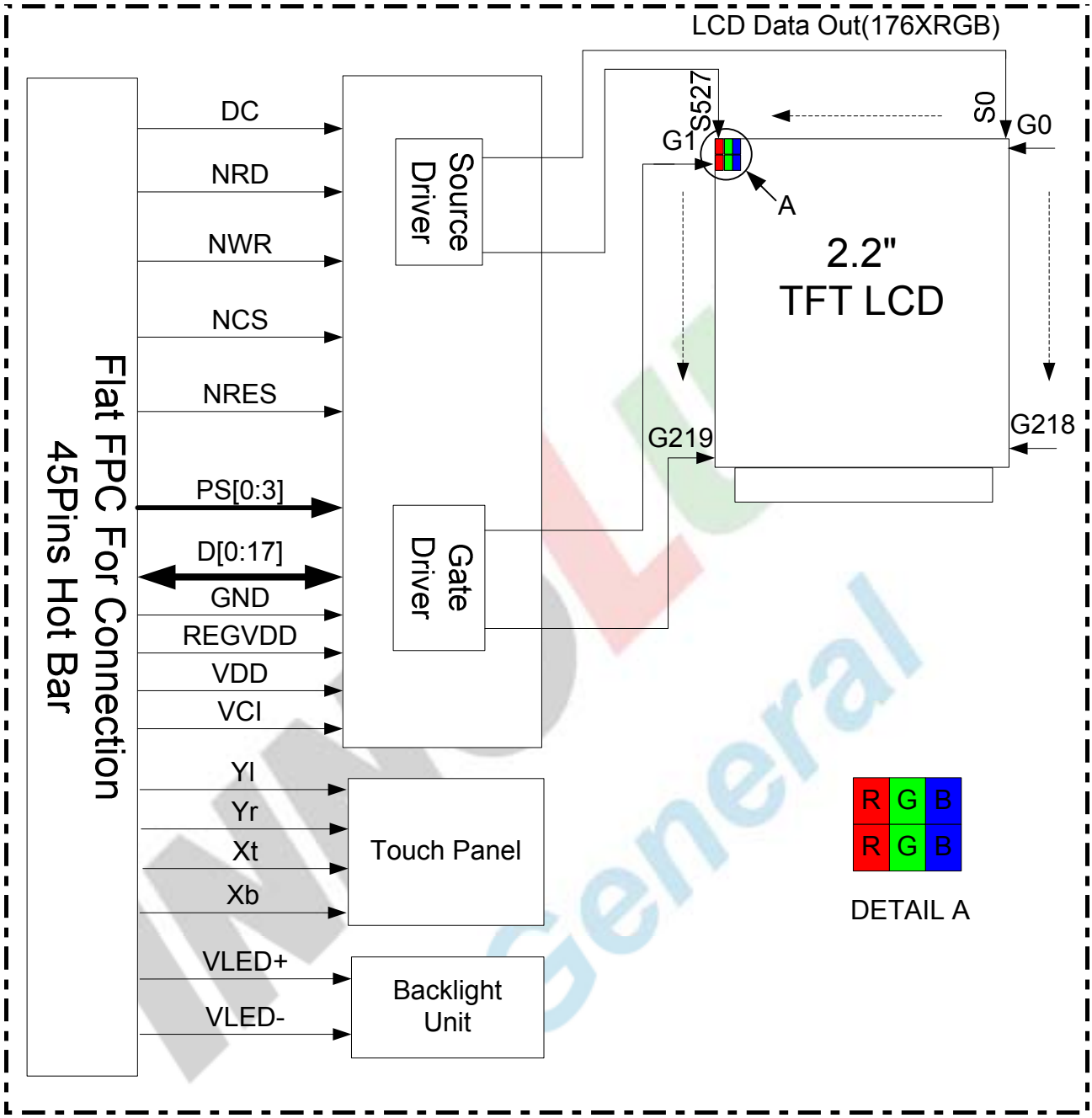
1.4. General Specification

No.	Item	Specification	Unit	Remark
1	LCD Size	2.2	inch	-
2	Panel Type	a-Si TFT active matrix	-	-
3	Touch Panel Type	4-wire Analog Resistive	-	-
4	Resolution	176 x RGB x 220	pixel	-
5	Display Mode	Normally white, Transmissive	-	-
6	Display Number of Colors	262K/65K	-	-
7	Viewing Direction	9 o'clock	-	Note 1
8	Contrast Ratio	300	-	-
9	Luminance	160	cd/m^2	Note 2
10	Module Size	42.30(W) x 57.50(L) x 3.65(T)	mm	Note 1
11	Panel Active Area	34.848(W) x 43.56(L)	mm	Note 1
12	Touch Panel Active Area	35.848(W) x 44.56(L)	mm	Note 1
13	Touch Panel View Area	37.85(W) x 46.36(L)	mm	Note 1
14	Pixel Pitch	0.198(W) x 0.198(L)	mm	-
15	Weight	14	g	-
16	Driver IC	SSD1287	-	-
17	Driver IC RAM Size	176 x 18 x 220	bit	-
18	Light Source	4 white LEDs	-	-
19	Interface	80/68 system 8/9/16/18bits Parallel Bus	-	-
20	Operating Temperature	-20~70	℃	-
21	Storage Temperature	-30~80	℃	-

Note 1: Refer to mechanical drawing.

Note 2: Measured with touch panel attached.

2. Block Diagram



3. Pin Assignments

Pin No.	Symbol	I/O	Function	Remark
1	GND	P	Ground	-
2	VLED-	-	LED cathode	-
3	VLED+	-	LED anode	-
4	PS2	I	Interface selection	Note 1
5	PS1	I	Interface selection	Note 1
6	PS3	I	Interface selection	Note 1
7	VCI	P	Analog supply voltage	-
8	VDD	P	Logic supply voltage	-
9	REGVDD	I	Input to enable internal voltage regulation	Note 3
10	DC	I	Parallel Interface, Data or Command.	-
11	NRD	I	6800 system : E (enable signal) 8080 system : Read strobe signal (Low: active)	Note 2
12	NWR	I	6800 system : RW (indicates read cycle when High, write cycle when Low) 8080 system : Write strobe signal (Low: active)	Note 2
13	NCS	I	Chip select signal (Low: active)	-
14	NRES	I	System Reset :connect to VDD when not used(Low: active)	-
15	PS0	I	Interface Selection	Note 1
16	D0	I/O	Data Bus (bit0)	-
17	D1	I/O	Data Bus (bit1)	-
18	D2	I/O	Data Bus (bit2)	-
19	D3	I/O	Data Bus (bit3)	-
20	D4	I/O	Data Bus (bit4)	-
21	D5	I/O	Data Bus (bit5)	-
22	D6	I/O	Data Bus (bit6)	-
23	D7	I/O	Data Bus (bit7)	-
24	D8	I/O	Data Bus (bit8)	-
25	D9	I/O	Data Bus (bit9)	-
26	D10	I/O	Data Bus (bit10)	-
27	D11	I/O	Data Bus (bit11)	-
28	D12	I/O	Data Bus (bit12)	-
29	D13	I/O	Data Bus (bit13)	-
30	D14	I/O	Data Bus (bit14)	-
31	D15	I/O	Data Bus (bit15)	-
32	D16	I/O	Data Bus (bit16)	-

33	D17	I/O	Data Bus (bit17)	-
34	N/A	I	Dummy Pin	-
35	GND	P	Ground	-
36	N/A	I	Dummy Pin	-
37	GND	P	Ground	-
38	N/A	I	Dummy Pin	-
39	N/A	I	Dummy Pin	-
40	GND	P	Ground	-
41	Yl	-	Touch Panel Signal	-
42	Xb	-	Touch Panel Signal	-
43	Yr	-	Touch Panel Signal	-
44	Xt	-	Touch Panel Signal	-
45	GND	P	Ground	-

Note1: Interface setting and data bus setting

PS3	PS2	PS1	PS0	Interface Mode	Data bus
1	0	1	1	16-bit 6800 parallel interface	D[17:10],D[8:1]
1	0	1	0	8-bit 6800 parallel interface	D[8:1]
1	0	0	1	16-bit 8080 parallel interface	D[17:10],D[8:1]
1	0	0	0	8-bit 8080 parallel interface	D[8:1]
0	1	1	1	18-bit 6800 parallel interface	D[17:0]
0	1	1	0	9-bit 6800 parallel interface	D[8:0]
0	1	0	1	18-bit 8080 parallel interface	D[17:0]
0	1	0	0	9-bit 8080 parallel interface	D[8:0]

Note2: In 80 system: NWR is Active low in write strobe.
NRD is Active low in read strobe.

Note3: Connect to VDD if system VDD>1.95V or system VDD<1.65V, internal VDD regulator will be enabled.
Connect to GND if system VDD is 1.65V ~ 1.95V, Internal VDD regulator will be disabled.

4. Electrical Specifications

4.1. Absolute Maximum Rating

(T_a=+25℃)

Item		Symbol	Values		Unit	Remark
			Min.	Max.		
TFT Module	Logic Supply Voltage	VDD	-0.3	+4.0	V	Note 1
	Analog Supply Voltage	VCI	-0.3	+5.0	V	Note 1
Backlight Unit	Current	I_B	-	30	mA	Note 2
	Power Consumption	P_{BL}	-	480	mW	Note 2

Note1: Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is applied. Functional operation should be restricted to the conditions described under normal operating conditions.

Note2: Without LED driver IC, please refer to (4.3)

4.2. Typical Operation Conditions

4.2.1. DC Characteristics

(T_a=+25℃)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Logic Supply Voltage	VDD	1.4	-	1.65	V	REGVDD Connect VDD
		1.65	-	1.95	V	REGVDD Connect GND
		1.95	2.8	3.3	V	REGVDD Connect VDD
Analog Supply Voltage	VCI	2.5	2.8	3.3	V	Note
Input High Voltage	V_{IH}	0.8VDD	-	VDD	V	Note
Input Low Voltage	V_{IL}	0	-	0.2VDD	V	Note
Output High Voltage	V_{OH}	0.9VDD	-	VDD	V	Note
Output Low Voltage	V_{OL}	0	-	0.1VDD	V	Note
Frame Frequency	f_{FRAME}	-	60	-	Hz	-

Note: To prevent IC latch up or DC operation in LCD panel, the power on/off sequence should follow the driver IC specification.

4.2.2. Current Consumption

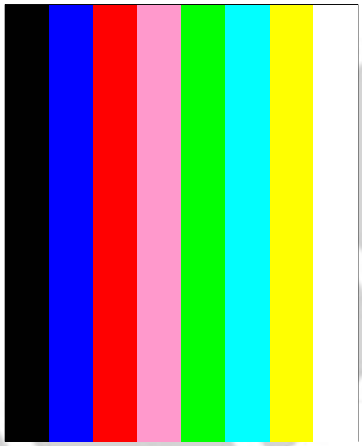
Item	Symbol	Values		Unit	Remark
		Typ.	Max.		
MCU Interface (80/68 system 8/9/16/18bits Parallel Bus)					
Still Mode	VDD	50	100	uA	Note1
	VCI	2.3	3	mA	
Sleep Mode	VDD	1	10	uA	Note1,Note2
	VCI	100	150	uA	

Note1: Test Condition

Typ: VDD=2.8V
VCI=2.8V
Display Pattern: 8 Color Bar
Frame Rate=60Hz at Line Inversion
Operating Temperature: 25℃

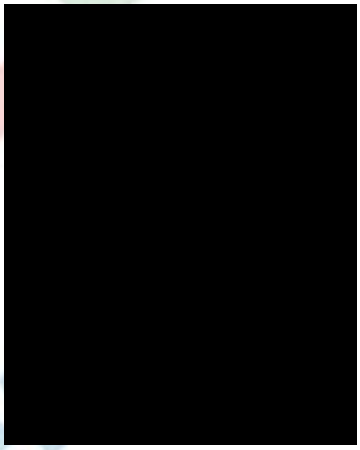
Max: VDD=3.3V
VCI=3.3V
Display Pattern: All Pixel Black
Frame Rate=60Hz at Line Inversion
Operating Temperature: 25℃

Typ. current check pattern:



8-Color Bar

Max. current check pattern:



Black

Note2: In the Sleep mode, all the internal display operations are suspended except for the R-C oscillator.

4.3. Backlight Unit

The backlight system is an edge lighting type with 4 white LEDs.

(T_a=+25℃)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current	I_B	-	15	-	mA	Note 1
Power Consumption	P_{BL}	-	180	-	mW	Note 2

Note1: 4LEDs are connected in serial.

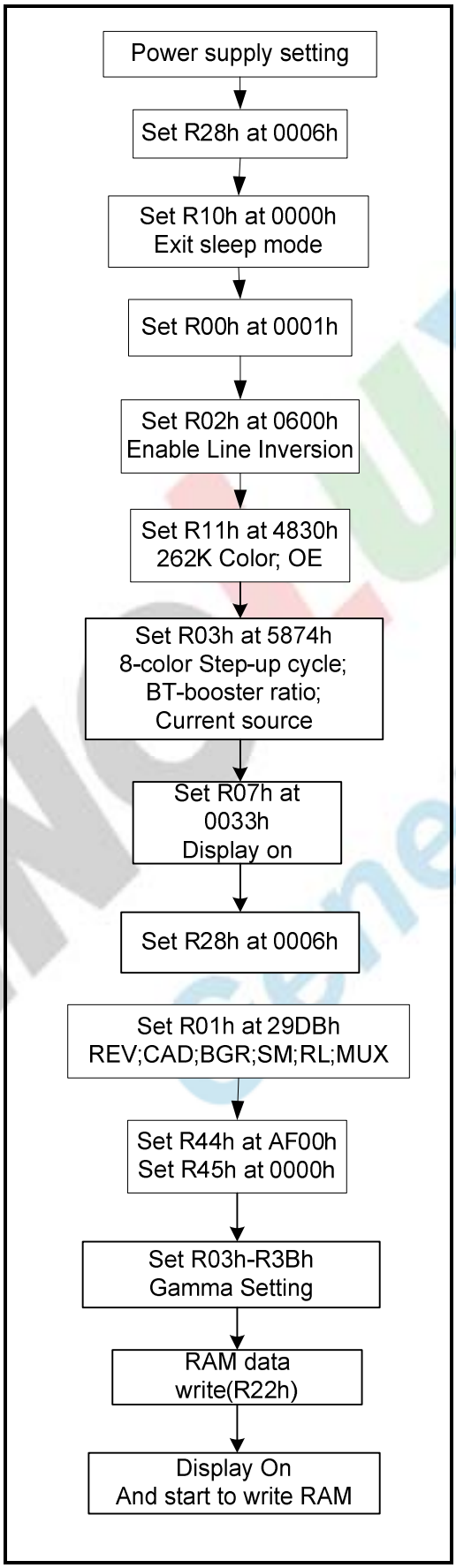
Note2: Where I_B= 15mA, P_{BL} = I_B x (VLED+ - VLED-)

4.4. Instruction List

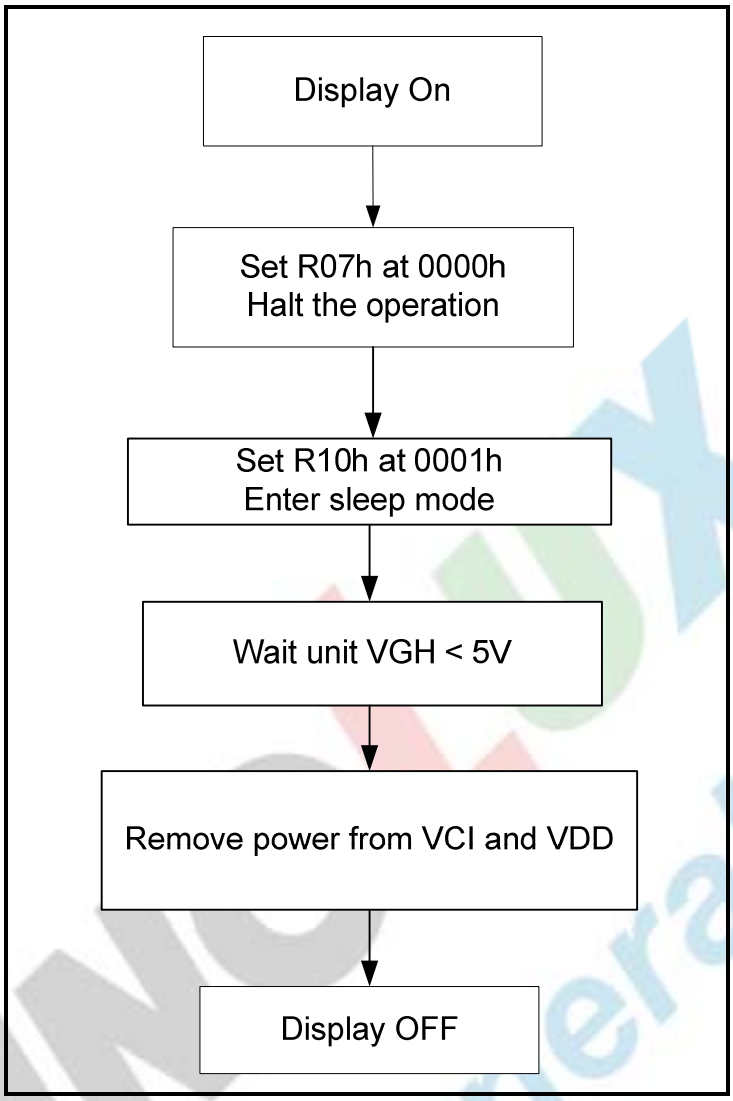
Register	Function Description	Value	Remark
R00h	Oscillator turn on or off	0x0001	-
R10h	Leave sleep mode	0x0000	-
R02h	LCD Driving waveform control	0x0600	-
R11h	Entry mode	0x6830	-
R03h	Power control 1	0x5874	-
R07h	Display control	0x0033	-
R0Ch	Frame cycle control	0x0004	-
R0Dh	Power control 2	0x000b	-
R0Bh	Frame cycle control	0xd308	-
R0Eh	Power control 3	0x3200	-
R01h	Driver output control	0x29db	-
R4Eh	RAM address set(X address)	0x0000	-
R4Fh	RAM address set(Y address)	0x0000	-
R0Fh	Gate scan position	0x0000	-
R16h	Horizontal porch	0xaf08	-
R17h	Vertical porch	0x0002	-
R1Eh	Power control 4	0x0038	-
R44h	Horizontal RAM address position	0xaf00	-
R45h	Vertical RAM address position(Start address)	0x0000	-
R46h	Vertical RAM address position(End address)	0x00db	-
R30h	Gamma control 1	0x0000	-
R31h	Gamma control 2	0x0507	-
R32h	Gamma control 3	0x0303	-
R33h	Gamma control 4	0x0105	-
R34h	Gamma control 5	0x0404	-
R35h	Gamma control 6	0x0002	-
R36h	Gamma control 7	0x0707	-
R37h	Gamma control 8	0x0501	-
R3Ah	Gamma control 9	0x0704	-
R3Bh	Gamma control 10	0x0007	-

4.5. Instruction Setting Flow

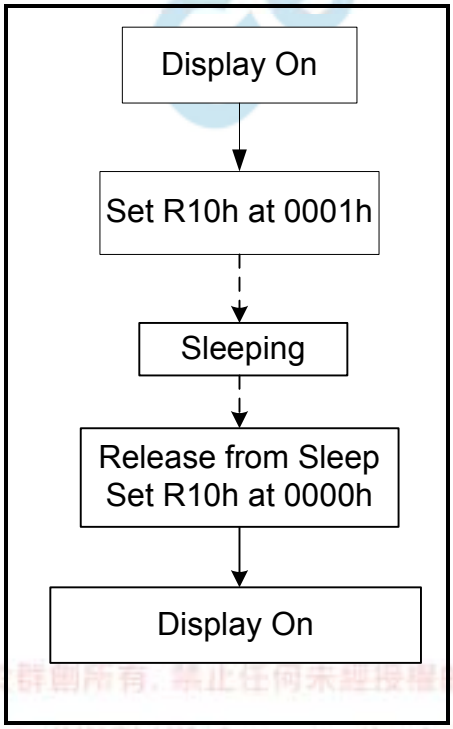
4.5.1 Display On Sequence



4.5.2 Display Off Sequence



4.5.3 Sleep Mode Display Sequence



4.6. Display RAM Data Format and input Bus

4.6.1. Mapping for Writing an Instruction

		Hardware pins																	
Interface	**Cycle**	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
18bits		IB15	IB14	IB13	IB12	IB11	IB10	IB9	IB8	x	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0	x
16bits		IB15	IB14	IB13	IB12	IB11	IB10	IB9	IB8	-	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0	-
9bits	1st	-	-	-	-	-	-	-	-	-	IB15	IB14	IB13	IB12	IB11	IB10	IB9	IB8	x
	2nd	-	-	-	-	-	-	-	-	-	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0	x
8bits	1st	-	-	-	-	-	-	-	-	-	IB15	IB14	IB13	IB12	IB11	IB10	IB9	IB8	-
	2nd	-	-	-	-	-	-	-	-	-	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0	-

Remark: x Don't care bits

- Not connected pins

4.6.2 Mapping for Writing Pixel Data:

			Hardware pins																	
Interface	**Color mode**	**Cycle**	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
18bits	262K		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
16bits	262K	1st	R5	R4	R3	R2	R1	R0	x	x	-	G5	G4	G3	G2	G1	G0	x	x	-
		2nd	B5	B4	B3	B2	B1	B0	x	x	-	R5	R4	R3	R2	R1	R0	x	x	-
		3rd	G5	G4	G3	G2	G1	G0	x	x	-	B5	B4	B3	B2	B1	B0	x	x	-
	262K	1st	R5	R4	R3	R2	R1	R0	x	x	-	G5	G4	G3	G2	G1	G0	x	x	-
		2nd	x	x	x	x	x	x	x	x	-	B5	B4	B3	B2	B1	B0	x	x	-
	262K	1st	R5	R4	R3	R2	R1	R0	x	x	-	G5	G4	G3	G2	G1	G0	x	x	-
		2nd	B5	B4	B3	B2	B1	B0	x	x	-	x	x	x	x	x	x	x	x	-
	65K		R4	R3	R2	R1	R0	G5	G4	G3	-	G2	G1	G0	B4	B3	B2	B1	B0	-
9bits	262k	1st	-	-	-	-	-	-	-	-	-	R5	R4	R3	R2	R1	R0	G5	G4	G3
		2nd	-	-	-	-	-	-	-	-	-	G2	G1	G0	B5	B4	B3	B2	B1	B0
8bits	262k	1st	-	-	-	-	-	-	-	-	-	R5	R4	R3	R2	R1	R0	x	x	-
		2nd	-	-	-	-	-	-	-	-	-	G5	G4	G3	G2	G1	G0	x	x	-
		3rd	-	-	-	-	-	-	-	-	-	B5	B4	B3	B2	B1	B0	x	x	-
	65K	1st	-	-	-	-	-	-	-	-	-	R4	R3	R2	R1	R0	G5	G4	G3	-
		2nd	-	-	-	-	-	-	-	-	-	G2	G1	G0	B4	B3	B2	B1	B0	-

Remark: x Don't care bits

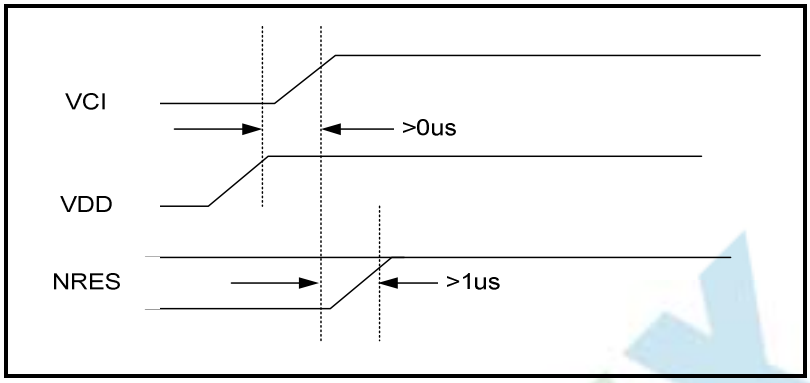
- Not connected pins

4.6.3 Mapping for Writing pixel Data in generic mode:

		Hardware pins																	
Interface	**Color mode**	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
18bits RGB	262k	RR5	RR4	RR3	RR2	RR1	RR0	GG5	GG4	GG3	GG2	GG1	GG0	BB5	BB4	BB3	BB2	BB1	BB0

4.7. Timing Characteristic (80/68-series 8/9/16/18bits Parallel Interface)

4.7.1 Power On Timing Characteristic

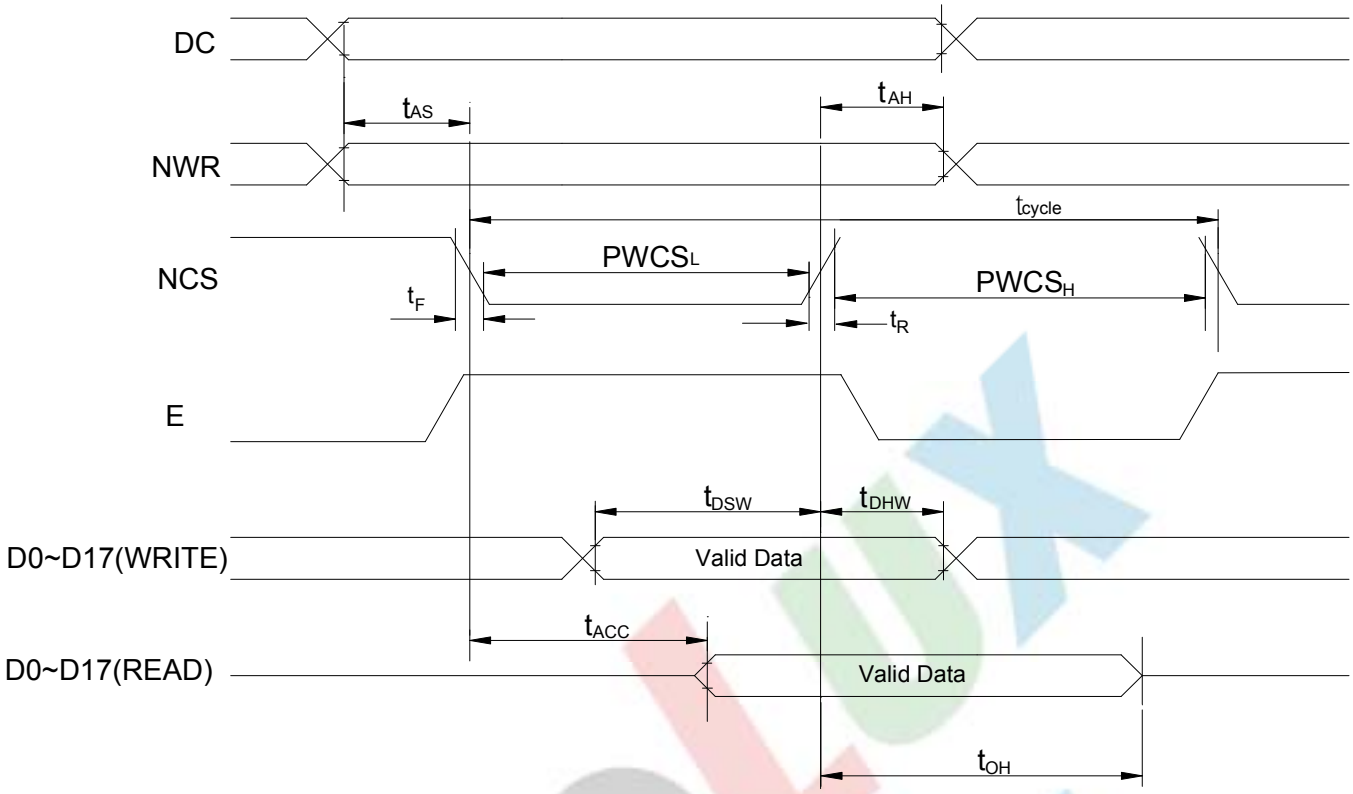


Characteristics	Symbol	Min	Typ	Max	Units
VDD rising edge to VCI	tp	0	-	-	μsec
VCI rising edge to NRES	tp-res	1	-	-	μsec

4.7.2 Parallel 6800 Timing Characteristics

(T_a =+25℃,VDD=1.4V to 3.3V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time(write cycle)	100	-	-	ns
t_{cycle}	Clock Cycle Time(read cycle)	1000	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Data Setup Time	5	-	-	ns
t_{DHW}	Data Hold Time	5	-	-	ns
t_{ACC}	Data Access Time	250	-	-	ns
t_{OH}	Output Hold Time	100	-	-	ns
$PWCS_L$	Pulse Width/CS low(write cycle)	50	-	-	ns
$PWCS_H$	Pulse Width/CS High(write cycle)	50	-	-	ns
$PWCS_L$	Pulse Width/CS low(write cycle)	500	-	-	ns
$PWCS_H$	Pulse Width/CS High(write cycle)	500	-	-	ns
t_R	Rise time	-	-	4	ns
t_F	Fall time	-	-	4	ns



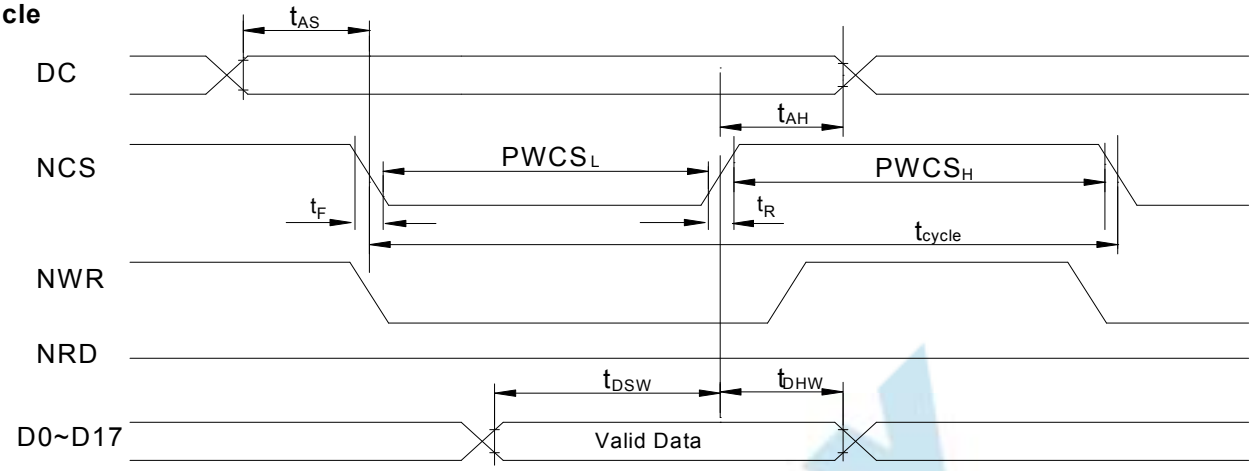
Note: In 6800 system : E indicates NRD as enable signal.
NWR indicates read cycle when High, write cycle when Low.
Refer to Pin Assignments

4.7.2 Parallel 8080 Timing Characteristics

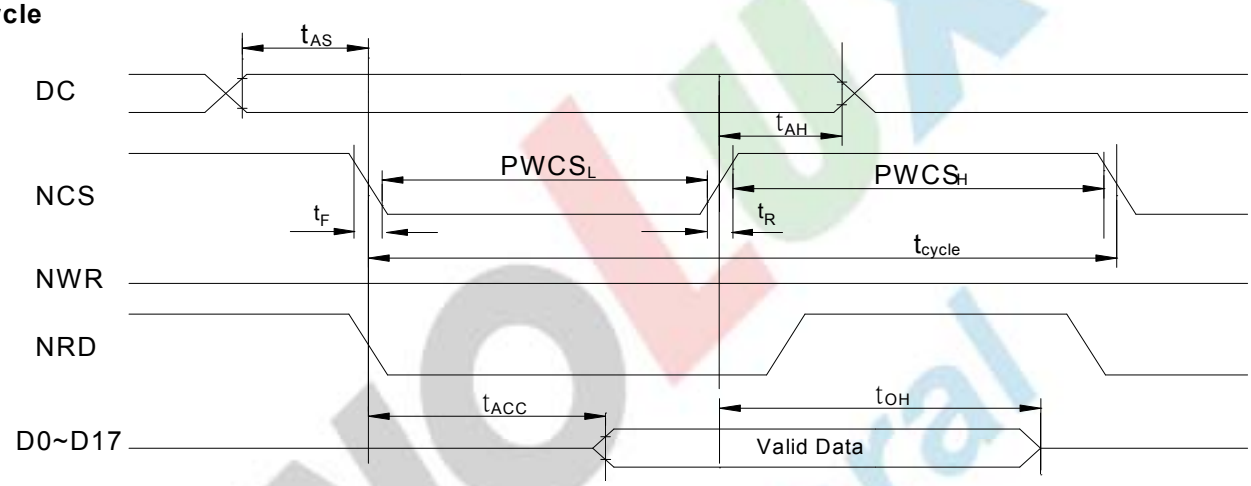
(T_a =+25℃,VDD=1.4V to 3.3V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time(write cycle)	100	-	-	ns
t_{cycle}	Clock Cycle Time(read cycle)	1000	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Data Setup Time	5	-	-	ns
t_{DHW}	Data Hold Time	5	-	-	ns
t_{ACC}	Data Access Time	250	-	-	ns
t_{OH}	Output Hold Time	100	-	-	ns
$PWCS_L$	Pulse Width/CS low(write cycle)	50	-	-	ns
$PWCS_H$	Pulse Width/CS High(write cycle)	500	-	-	ns
$PWCS_L$	Pulse Width/CS low(write cycle)	50	-	-	ns
$PWCS_H$	Pulse Width/CS High(write cycle)	500	-	-	ns
t_R	Rise time	-	-	4	ns
t_F	Fall time	-	-	4	ns

Write Cycle



Read Cycle



5. Touch Panel Specifications

5.1. Electrical Characteristics

Item	Value			Unit	Remark
	Min.	Typ.	Max.		
Linearity	-1.5	-	1.5	%	After environment and life test
Terminal Resistance	200	-	900	Ω	X(Film side)
	200	-	900	Ω	Y(Glass side)
Insulation resistance	20	-	-	MΩ	DC 25V 1min
Operating Voltage	-	5	7	V	DC

5.2. Optical Characteristics

Item	Value			Unit	Remark
	Min.	Typ.	Max.		
Response Time	-	-	10	ms	100kΩ pull-up
Light Transparency	80	-	-	%	-

5.3. Mechanical Characteristics

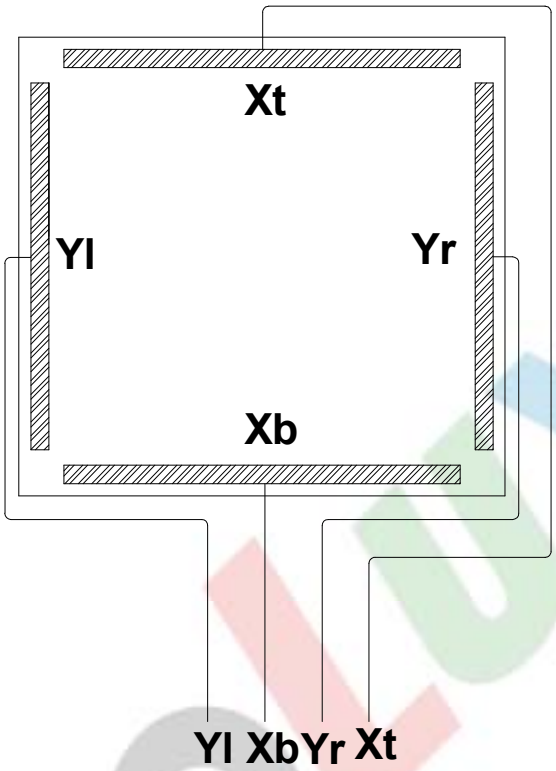
Item	Value			Unit	Remark
	Min.	Typ.	Max.		
Active Force	-	-	80	gf	Note1
Surface Hardness	3	-	-	H	-
Pen Sliding Durability	100,000	-	-	time	Note 2
Hitting Durability	1,000,000	-	-	time	Note 3

Note 1: Do not operate it with a thing except a polyacetal pen (tip R0.8mm or less) or a finger, especially those with hard or sharp tips such as a ball point pen or a mechanical pencil.

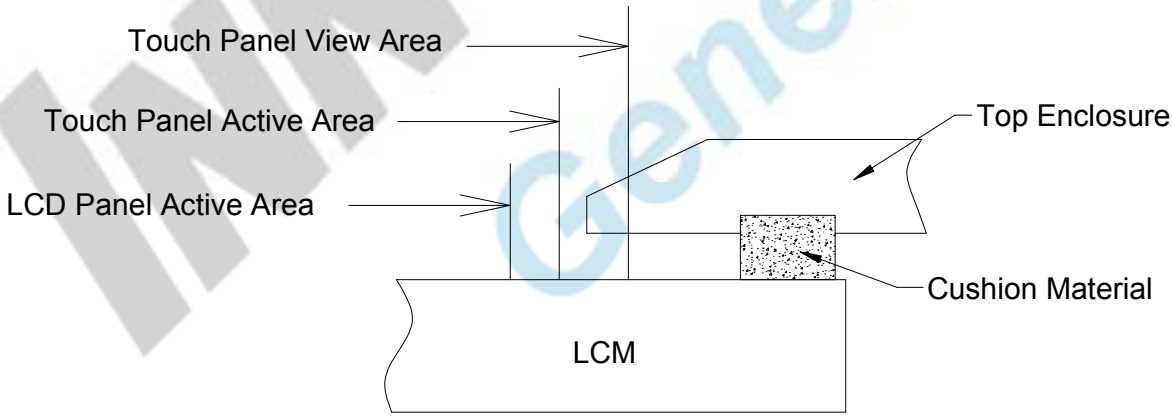
Note 2: Measurement for surface area.
-Scratch 100,000 times straight line on the film with a stylus change every 20,000 times.
-Force: 250gf.
-Speed: 150mm/sec.
-Stylus: R0.8 polyacetal tip.

Note 3: Hit 1,000,000 times on the film with a R0.8mm tip and R8mm tip.
-Force: 250gf.
-Speed: 3times/sec.

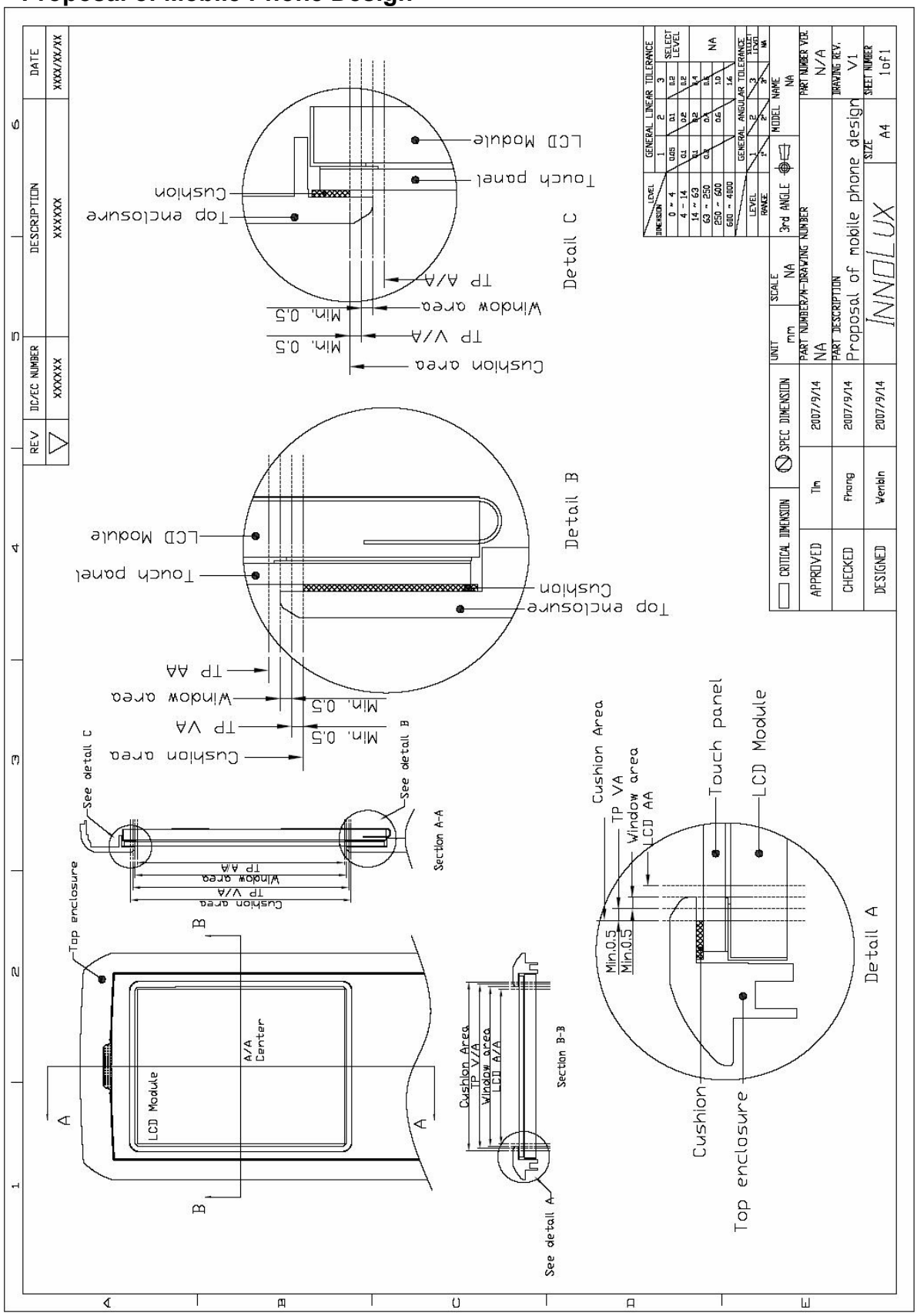
5.4. Touch Panel Circuit Block



5.5. Mounting Condition Example



5.6 Proposal of Mobile Phone Design



Note 1:"Top enclosure" is the top case of mobile phone.
Note 2:"Window Area" is the opening area of top enclosure of the mobile phone, we suggest customers design it following the drawing and there should be no defect in the LCD module within the area.
Note 3:"Cushion Area" is the cushion customer use between top enclosure and LCM, we suggest customers design it following the drawing and the cushion should not press the TP V/A.

6. Optical Specifications

(T_a=+25℃, VCI=+2.8V, VDD=+1.8V, I_B=15mA)

Item		Symbol	Condition	Values			Unit	Remark
				Min.	Typ.	Max.		
Viewing Angle Range	Left	θ_L	CR≧10	45	50	-	degree	Note 1,2
	Right	θ_R		15	20	-		
	Top	θ_T		40	45	-		
	Bottom	θ_B		40	45	-		
Response Time		T_{on} +T_{off}	Normal θ=Φ=0°	-	30	45	ms	Note 2,3
Contrast Ratio		CR	Normal θ=Φ=0°	200	300	-	-	Note 2,4
Luminance		L	Normal θ=Φ=0°	130	160	-	cd/m^2	Note 2,5
Color Chromaticity (CIE1931)	White	W_x	Normal θ=Φ=0°	0.25	0.30	0.35	-	Note 2,6
		W_y		0.26	0.31	0.36		
	Red	R_x		0.51	0.56	0.61		
		R_y		0.28	0.33	0.38		
	Green	G_x		0.30	0.35	0.40		
		G_y		0.51	0.56	0.61		
	Blue	B_x		0.09	0.14	0.19		
		B_y		0.02	0.07	0.12		
Color Gamut		NTSC	CIE1931	-	50	-	%	-
Luminance Uniformity		U_L	Normal θ=Φ=0°	75	80	-	%	Note 2,7
Flicker		-	-	No Visible			-	Note 8
Crosstalk		-	-	No Visible			-	Note 9

Note 1: Definition of viewing angle range

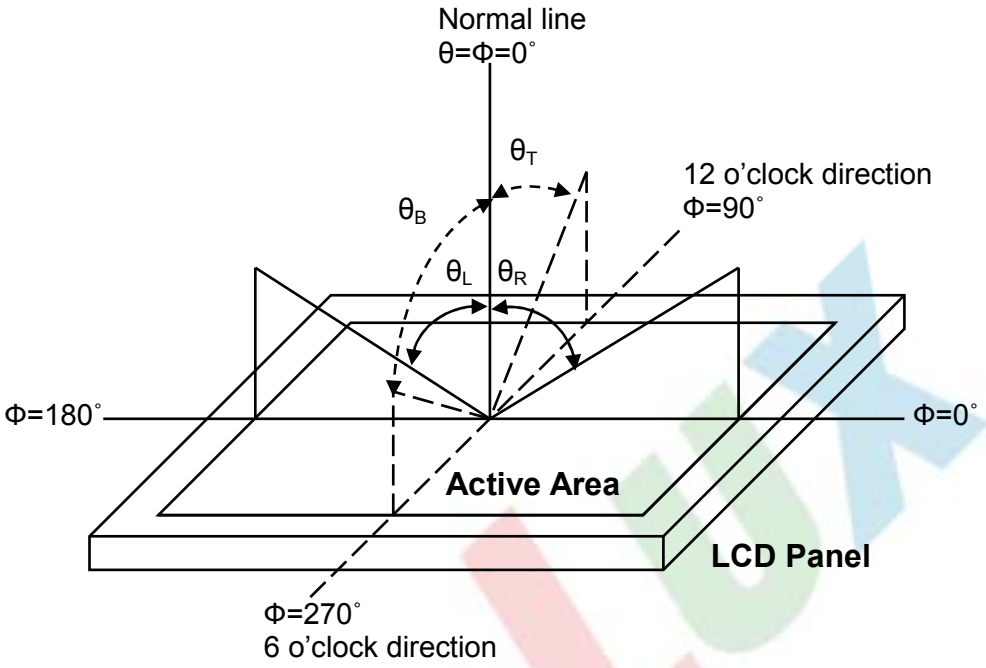


Fig. 1 Definition of viewing angle

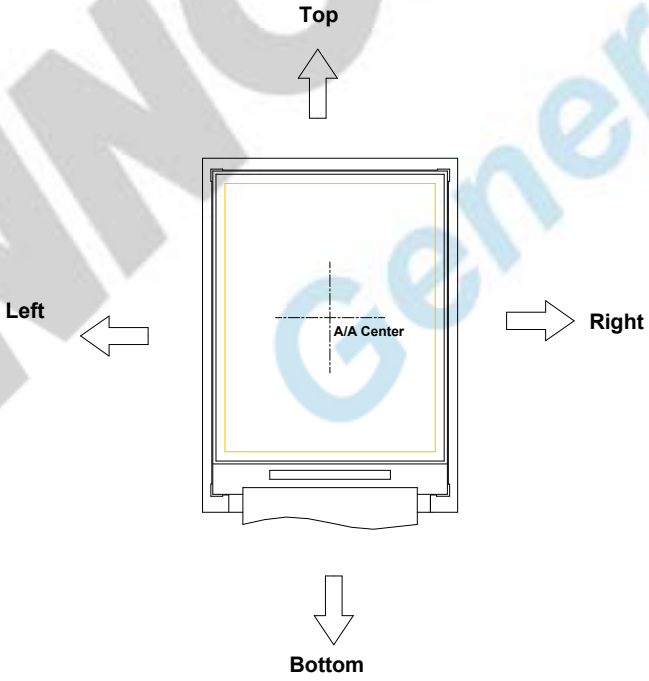


Fig. 2 Definition of viewing angle for display

Note 2: Definition of optical measurement system

The optical characteristics should be measured in a dark room and with ambient temperature T_a=+25℃.After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.(Equipment: Photo detector TOPCON BM-5A or BM-7 /Field of view: 1° /Height: 500mm.)

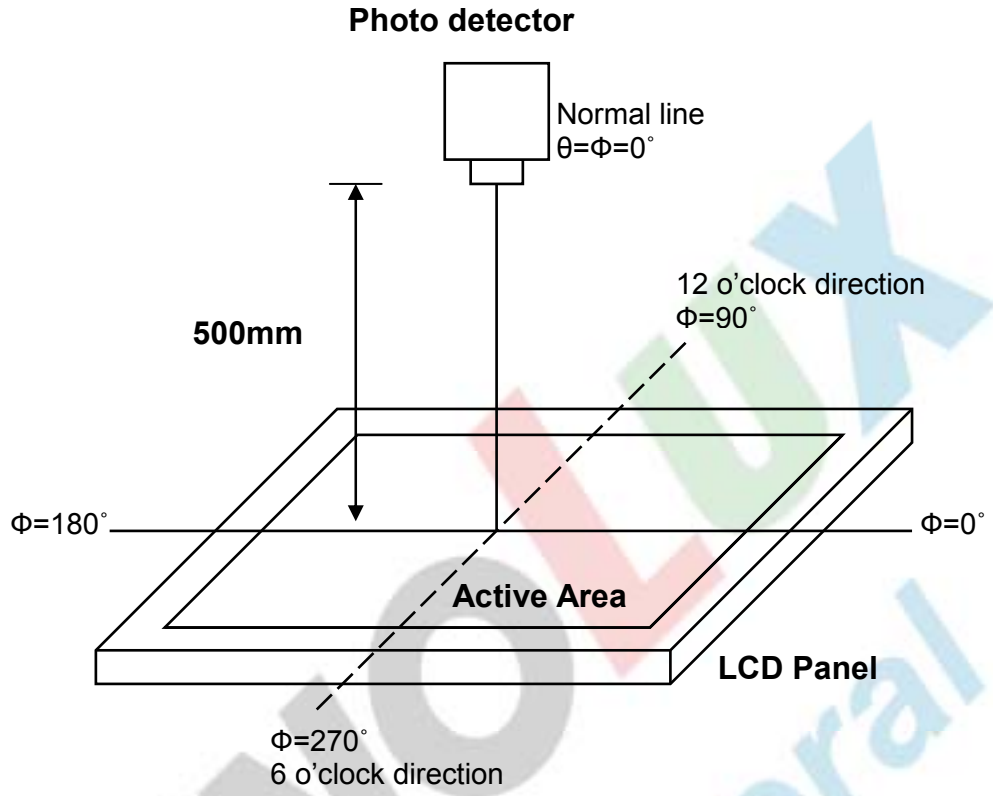


Fig. 3 Optical measurement system setup

Note 3: Definition of response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{on}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{off}) is the time between photo detector output intensity changed from 10% to 90%.

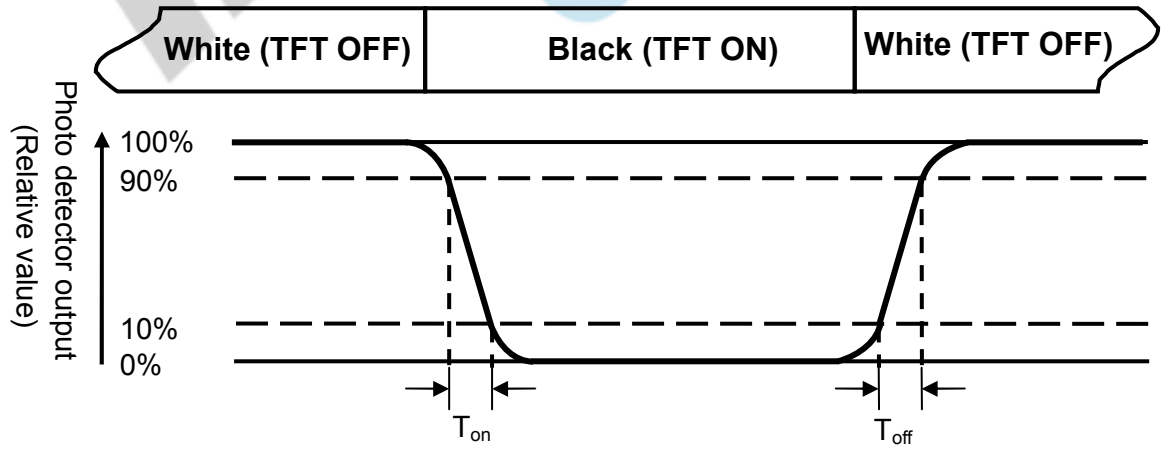


Fig. 4 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of luminance

Measured at the center area of the panel when LCD panel is driven at “white” state.

Note 6: Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD when panel is driven at “White”, “Red”, “Green” and “Blue” state respectively.

Note 7: Definition of luminance uniformity

To test for uniformity, the tested area is divided into 3 rows and 3 columns. The measurement spot is placed at the center of each box.

$$\text{Luminance Uniformity } (U_L) = \frac{L_{min}}{L_{max}}$$

L-------Active area length W----- Active area width

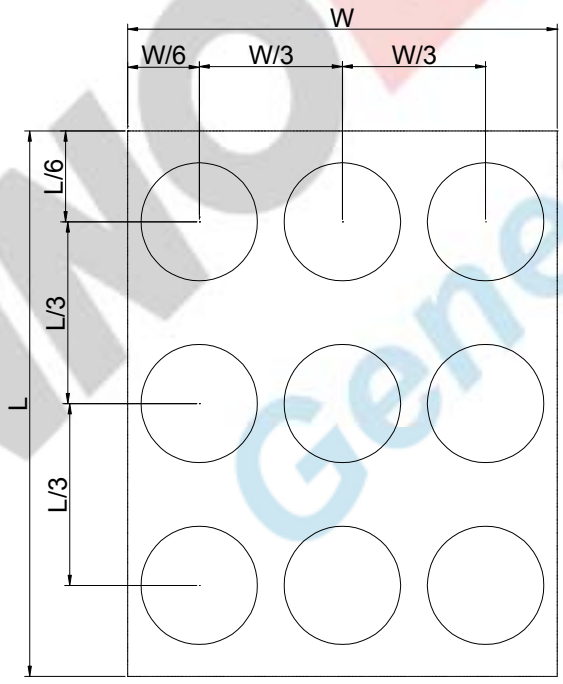


Fig. 5 Definition of luminance uniformity

L_{max} : The measured maximum luminance of all measurement position.

L_{min} : The measured minimum luminance of all measurement position.

Note 8: Definition of Flicker

Flicker is the pattern usually used to describe the visual sensation produced by a rapidly varying light intensity. There should be no visible flicker in normal direction of the display when the following figure is loaded.

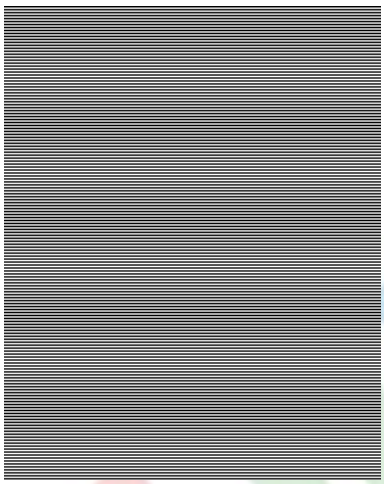


Fig.6 Flicker checker pattern

Note9: Definition of crosstalk

There should be no visible in normal direction of the display when the following figures are loaded.

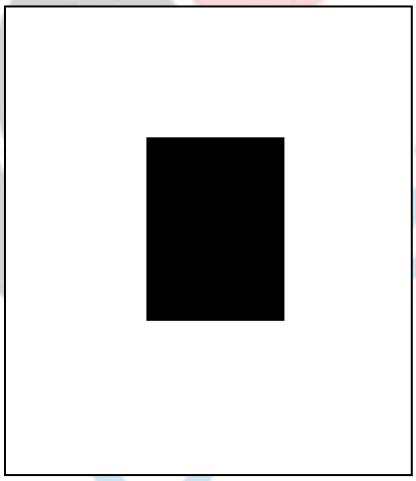


Fig.7 Crosstalk checker pattern

7. Reliability Test Items

Test Items	Test Conditions	Remark
High Temperature Storage	+80℃±3℃ for 240 hours	-
Low Temperature Storage	-30℃±3℃ for 240 hours	-
High Temperature Operation	+70℃±3℃ for 240 hours	-
Low Temperature Operation	-20℃±3℃ for 240 hours	-
Operate at High Temperature and Humidity	+60℃±3℃, 90%±3%RH max. for 240 hours	-
Thermal Shock	-30℃/0.5h ~ +80℃/0.5h for a total 100 cycles, Start with cold temp and end with high temp	-
Vibration Test	Frequency range:10~55Hz Stoke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	-
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	-
Package Vibration Test	Random Vibration : 0.015G^2/Hz from 5-200Hz, -6dB/Octave from 200-500Hz 1 hour for each direction of X. Y. Z. (3 hours for total)	-
Package Drop Test	Height :72cm(Weight≦10kg); 60cm(Weight>10kg) 1 corner, 3 edges, 6 surfaces	-
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	-

Note1: During the display practical test under normal operation condition, there shall be no change, which may affect display function.

Note2: Before function check, the test sample requires 2 hours stored at room temperature.

8. Handling Precautions

8.1. Safety

8.1.1. The liquid crystal in the LCD is poisonous. **DO NOT** put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

8.2. Handling

8.2.1. The LCD and touch panel is made of plate glass. **DO NOT** subject the panel to mechanical shock or to excessive force on its surface.

8.2.2. **Do not** handle the product by holding the flexible pattern portion in order to assure the reliability

8.2.3. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.

8.2.4. Provide a space so that the panel does not come into contact with other components.

8.2.5. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.

8.2.6. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.

8.2.7. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.

8.2.8. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

8.3. Static Electricity

8.3.1. Ground soldering iron tips, tools and testers when they are in operation.

8.3.2. Ground your body when handling the products.

8.3.3. Power on the LCD module **BEFORE** applying the voltage to the input terminals.

8.3.4. **DO NOT** apply voltage which exceeds the absolute maximum rating.

8.3.5. Store the products in an anti-electrostatic bag or container.

8.4. Storage

8.4.1. Store the products in a dark place at +25℃±10℃ with low humidity (65%RH or less).

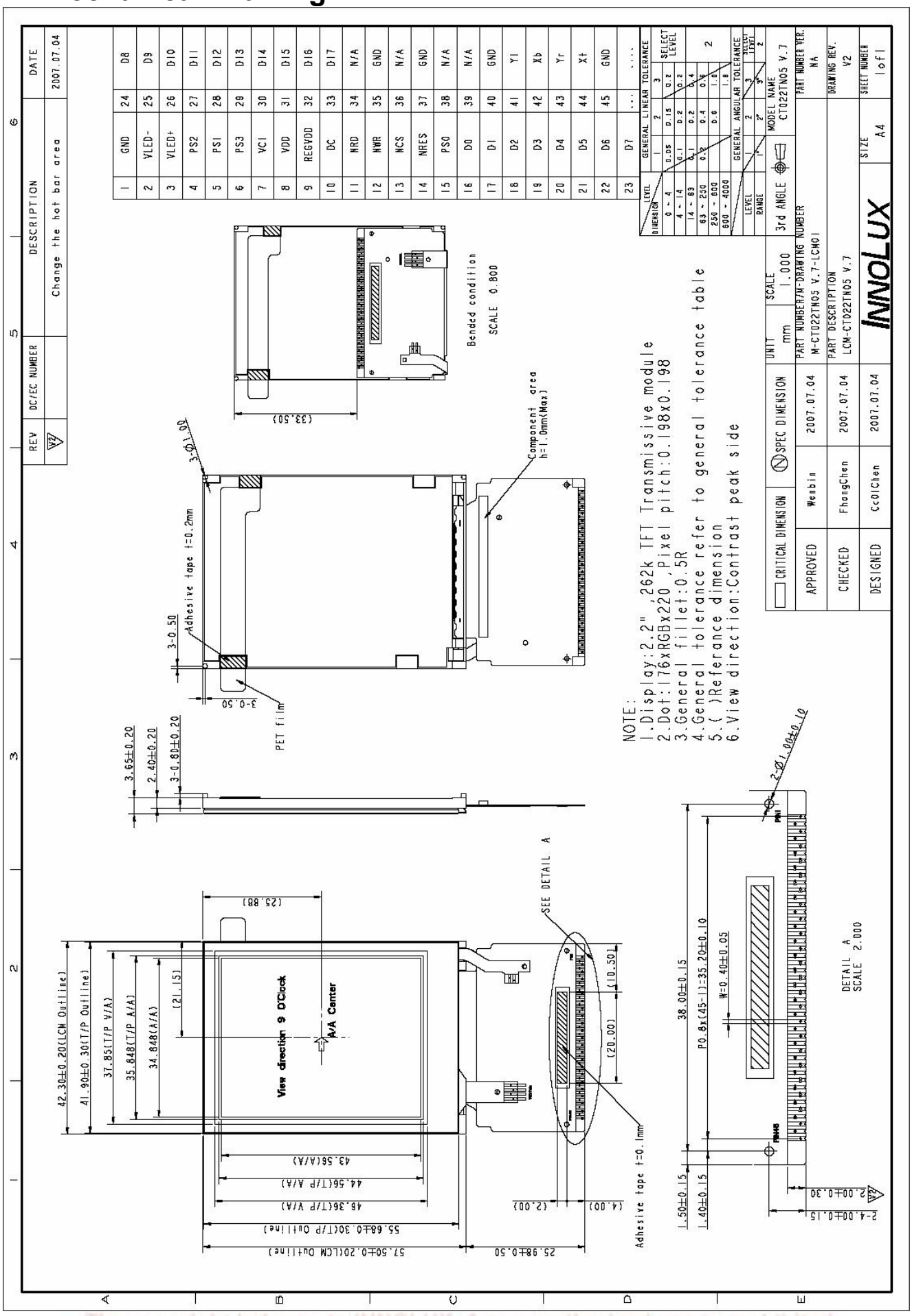
8.4.2. **DO NOT** store the products in an atmosphere containing organic solvents or corrosive gas.

8.5. Cleaning

8.5.1. **DO NOT** wipe the touch panel with dry cloth, as it may cause scratch.

8.5.2. Wipe off the stain on the product by using soft cloth moistened with ethanol. **DO Not** allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. **Do not** use any organic solvent or detergent other than ethanol.

9. Mechanical Drawing



1	GND	24	D8	1	GND	24	D8	1	GND	24	D8	1	GND	24	D8	1	GND	24	D8	1	GND	24	D8	1	GND	24	D8
2	VLED-	25	D9	2	VLED-	25	D9	2	VLED-	25	D9	2	VLED-	25	D9	2	VLED-	25	D9	2	VLED-	25	D9	2	VLED-	25	D9
3	VLED+	26	D10	3	VLED+	26	D10	3	VLED+	26	D10	3	VLED+	26	D10	3	VLED+	26	D10	3	VLED+	26	D10	3	VLED+	26	D10
4	PS2	27	D11	4	PS2	27	D11	4	PS2	27	D11	4	PS2	27	D11	4	PS2	27	D11	4	PS2	27	D11	4	PS2	27	D11
5	PS1	28	D12	5	PS1	28	D12	5	PS1	28	D12	5	PS1	28	D12	5	PS1	28	D12	5	PS1	28	D12	5	PS1	28	D12
6	PS3	29	D13	6	PS3	29	D13	6	PS3	29	D13	6	PS3	29	D13	6	PS3	29	D13	6	PS3	29	D13	6	PS3	29	D13
7	VCI	30	D14	7	VCI	30	D14	7	VCI	30	D14	7	VCI	30	D14	7	VCI	30	D14	7	VCI	30	D14	7	VCI	30	D14
8	VDD	31	D15	8	VDD	31	D15	8	VDD	31	D15	8	VDD	31	D15	8	VDD	31	D15	8	VDD	31	D15	8	VDD	31	D15
9	REGVDD	32	D16	9	REGVDD	32	D16	9	REGVDD	32	D16	9	REGVDD	32	D16	9	REGVDD	32	D16	9	REGVDD	32	D16	9	REGVDD	32	D16
10	DC	33	D17	10	DC	33	D17	10	DC	33	D17	10	DC	33	D17	10	DC	33	D17	10	DC	33	D17	10	DC	33	D17
11	NRD	34	N/A	11	NRD	34	N/A	11	NRD	34	N/A	11	NRD	34	N/A	11	NRD	34	N/A	11	NRD	34	N/A	11	NRD	34	N/A
12	NWR	35	GND	12	NWR	35	GND	12	NWR	35	GND	12	NWR	35	GND	12	NWR	35	GND	12	NWR	35	GND	12	NWR	35	GND
13	NCS	36	N/A	13	NCS	36	N/A	13	NCS	36	N/A	13	NCS	36	N/A	13	NCS	36	N/A	13	NCS	36	N/A	13	NCS	36	N/A
14	NRES	37	GND	14	NRES	37	GND	14	NRES	37	GND	14	NRES	37	GND	14	NRES	37	GND	14	NRES	37	GND	14	NRES	37	GND
15	PS0	38	N/A	15	PS0	38	N/A	15	PS0	38	N/A	15	PS0	38	N/A	15	PS0	38	N/A	15	PS0	38	N/A	15	PS0	38	N/A
16	D0	39	N/A	16	D0	39	N/A	16	D0	39	N/A	16	D0	39	N/A	16	D0	39	N/A	16	D0	39	N/A	16	D0	39	N/A
17	D1	40	GND	17	D1	40	GND	17	D1	40	GND	17	D1	40	GND	17	D1	40	GND	17	D1	40	GND	17	D1	40	GND
18	D2	41	Y1	18	D2	41	Y1	18	D2	41	Y1	18	D2	41	Y1	18	D2	41	Y1	18	D2	41	Y1	18	D2	41	Y1
19	D3	42	Xb	19	D3	42	Xb	19	D3	42	Xb	19	D3	42	Xb	19	D3	42	Xb	19	D3	42	Xb	19	D3	42	Xb
20	D4	43	Yr	20	D4	43	Yr	20	D4	43	Yr	20	D4	43	Yr	20	D4	43	Yr	20	D4	43	Yr	20	D4	43	Yr
21	D5	44	Xt	21	D5	44	Xt	21	D5	44	Xt	21	D5	44	Xt	21	D5	44	Xt	21	D5	44	Xt	21	D5	44	Xt
22	D6	45	GND	22	D6	45	GND	22	D6	45	GND	22	D6	45	GND	22	D6	45	GND	22	D6	45	GND	22	D6	45	GND
23	D7	...	....	23	D7	...	....	23	D7	...	....	23	D7	...	....	23	D7	...	....	23	D7	...	....	23	D7	...	....

LEVEL / DIMENSION	GENERAL LINEAR TOLERANCE 1	2	3	SELECT LEVEL
0 - 4	0.05	0.15	0.2	2
4 - 14	0.1	0.2	0.2	
14 - 63	0.1	0.2	0.4	
63 - 250	0.2	0.4	0.6	
250 - 600	0.2	0.4	0.6	
600 - 4000		0.6	1.0	

GENERAL ANGULAR TOLERANCE LEVEL	1	2	3	SELECT LEVEL
RANGE	1°	2°	3°	2

10. Package Drawing

10.1. Packing Material Per Carton

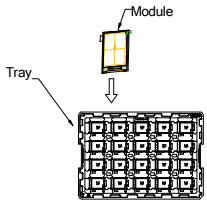
No.	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	CT022TN05 V.7	42.3(W)x57.5(L)x 3.65(T)	0.014	320	-
2	Tray	PET	343x243x18	0.10	32	Anti-static
3	Empty Tray	PET	343x243x18	0.10	4	Anti-static
4	DUST-PROOF BAG	PE	----------	0.03	4	-
5	Small box	CORRUGATED PAPER	351x253x109	0.32	4	-
6	Carton	CORRUGATED PAPER	530x355x255	0.85	1	-
7	Total weight	10.33 Kg ± 3%				

10.2. Packing Specification and Quantity

	Module/Tray (pcs)	Module/Carton (pcs)	Carton/Floor (pcs)	Module/Floor (pcs)	Floor/Pallet	Module/pallet (pcs)
Quantity	10	320	6	6X320=1920	5	5X1920=9600

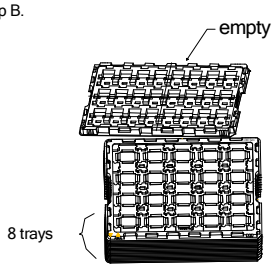
10.3. Illustration

Step A.



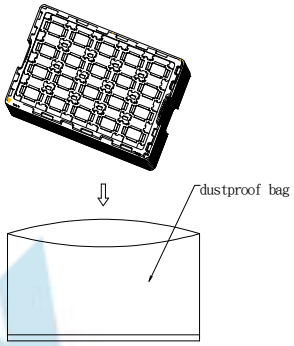
Put products into the trays.
The top surface of product is face to us.
There are 10 pcs modules in a tray.

Step B.



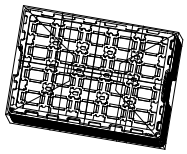
There are total 320 modules in a box.
Note: Every second tray turn 180 degrees to stack up.
The upmost tray of all should be keeped empty.

Step C.



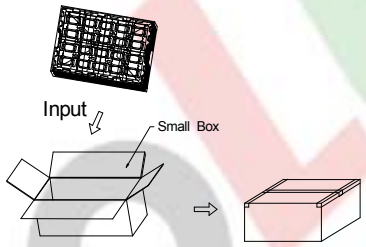
Put trays into this bag.

Step D.



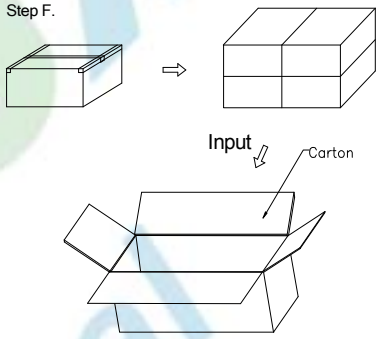
Seal the bag.

Step E.



Pack the trays using Small Box,
then sealed the box with tape.

Step F.

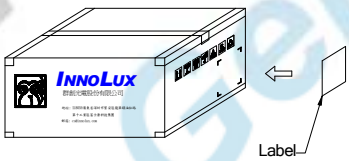


Load 4 Small Boxs with 2 floors,and input to the carton.

Step G.

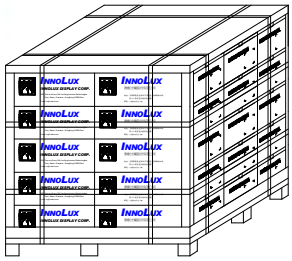
Seal carton.

Step H.



Paste the label on outer caton

Step J.



Put the 30 loaded packages on a pallet.
There are 6 packages on a storey, 5 stores on a pallet.

Lable

INNOLUX DISPLAY

Customer Name:

Customer P/N:

Box ID:

Model No:

Quantity:

MFG Date:

QC:

INNOLUX QA DISPLAY
OQC
DATE
PASS