



SPECIFICATION FOR LCD MODULE

MODULE NO: AFD800600A0T-8.0N6WTM-C
VERSION NO.: V1.0

Customer's Approval:

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	SIGNATURE	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

RECORD OF REVISION

Version	Revised Date	Page	Content
V1.0	2013/12/03	--	First Issued

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1. GENERAL DESCRIPTION

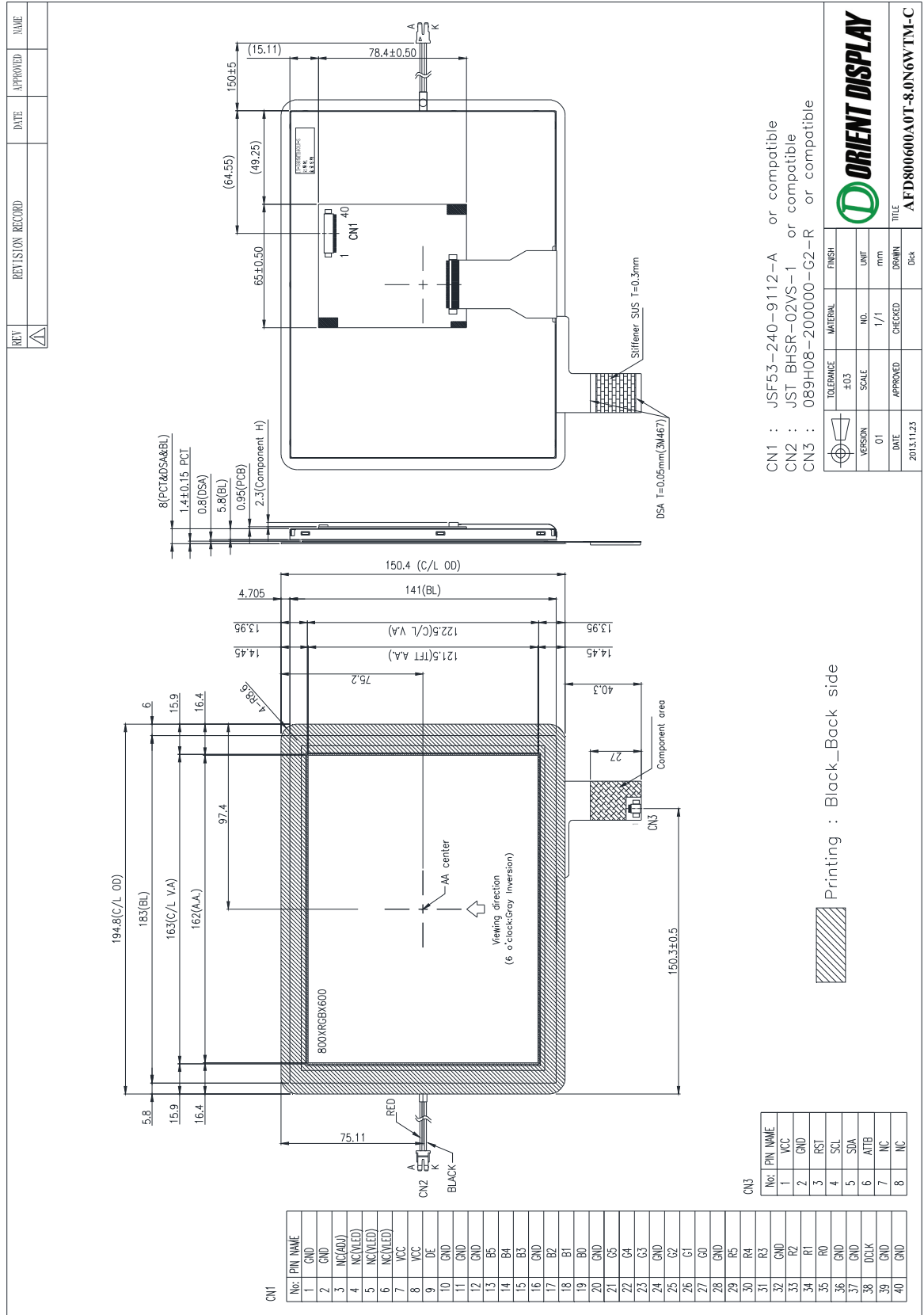
1.1 Description

The specifications is model AFD800600A0T-8.0N6WTM-C is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit, a back light system and projected capacitive touch panel. This TFT LCD has an 8.0 (4:3) inch diagonally measured active display area with SVGA (800 horizontal by 600 vertical pixels) resolution.

1.2 Features:

No.	Item	Specification	Unit
1	Panel Size	8.0"	Inch
2	Number of Pixels	800 (W) x RGB x 600 (H)	Pixels
3	Active Area	162 (W) × 121.5 (H)	mm
4	Pixel Pitch	0.2025 (W) x 0.2025 (H)	mm
5	Outline Dimension	194.8 (W) × 150.4 (H) × 8 (T)	mm
6	Number of Colors	262K	- -
7	Display Mode	TN / Normally White / Transmissive	- -
8	View Direction	6 o'clock(Gray Inversion)	
9	Display Format	RGB vertical stripe	- -
10	Surface Treatment	Clear (7H)	- -
11	Contrast Ratio	500 (Typ.)	- -
12	Luminance (cd/m ²)	420 (Typ.)	cd/m2
13	Interface	RGB 18bit Interface	- -
14	Backlight	White LED	- -
15	Operation Temperature	-20 ~ 70	°C
16	Storage Temperature	-30 ~ 80	°C
17	Weight	TBD	g

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

3.1 TFT LCD Module

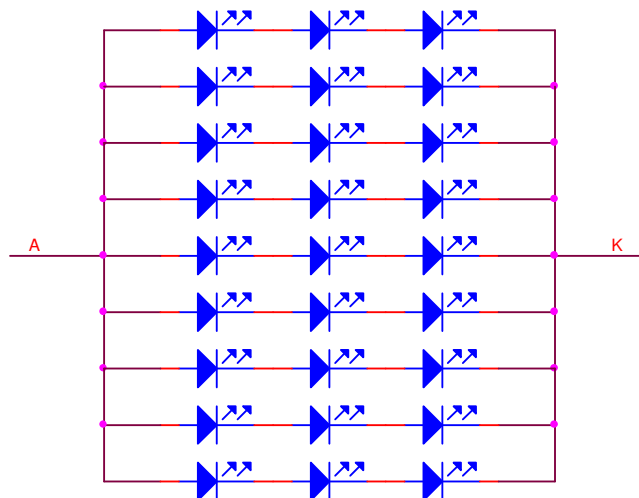
Pin No.	Symbol	I/O	Function	Remark
1	GND	P	Ground	
2	GND	P	Ground	
3	NC	-	No Connect	
4	NC	-	No Connect	
5	NC	-	No Connect	
6	NC	-	No Connect	
7	VCC	P	Power Supply Logic voltage	
8	VCC	P	Power Supply Logic voltage	
9	DE	I	Data Enable Timing Signal	
10	GND	P	Ground	
11	GND	P	Ground	
12	GND	P	Ground	
13	B5	I	Blue data signal (MSB)	
14	B4	I	Blue data signal	
15	B3	I	Blue data signal	
16	GND	P	Ground	
17	B2	I	Blue data signal	
18	B1	I	Blue data signal	
19	B0	I	Blue data signal (LSB)	
20	GND	P	Ground	
21	G5	I	Green data signal (MSB)	
22	G4	I	Green data signal	
23	G3	I	Green data signal	
24	GND	P	Ground	
25	G2	I	Green data signal	
26	G1	I	Green data signal	
27	G0	I	Green data signal (LSB)	
28	GND	P	Ground	
29	R5	I	Red data signal (MSB)	
30	R4	I	Red data signal	
31	R3	I	Red data signal	
32	GND	P	Ground	
33	R2	I	Red data signal	
34	R1	I	Red data signal	
35	R0	I	Red data signal (LSB)	
36	GND	P	Ground	
37	GND	P	Ground	
38	DCLK	I	Data Clock	
39	GND	P	Ground	
40	GND	P	Ground	

NOTE:

1. NC Pin must be floating

3.2 Backlight Unit

Pin No.	Symbol	Function	Remark
1	LEDA	Power Supply for LED backlight	RED
2	LEDK	GND for LED backlight	BLACK



4. ABSOLUTE MAXIMUM RATINGS

4.1 Electrical Absolute Rating

4.1.1 TFT LCD Module

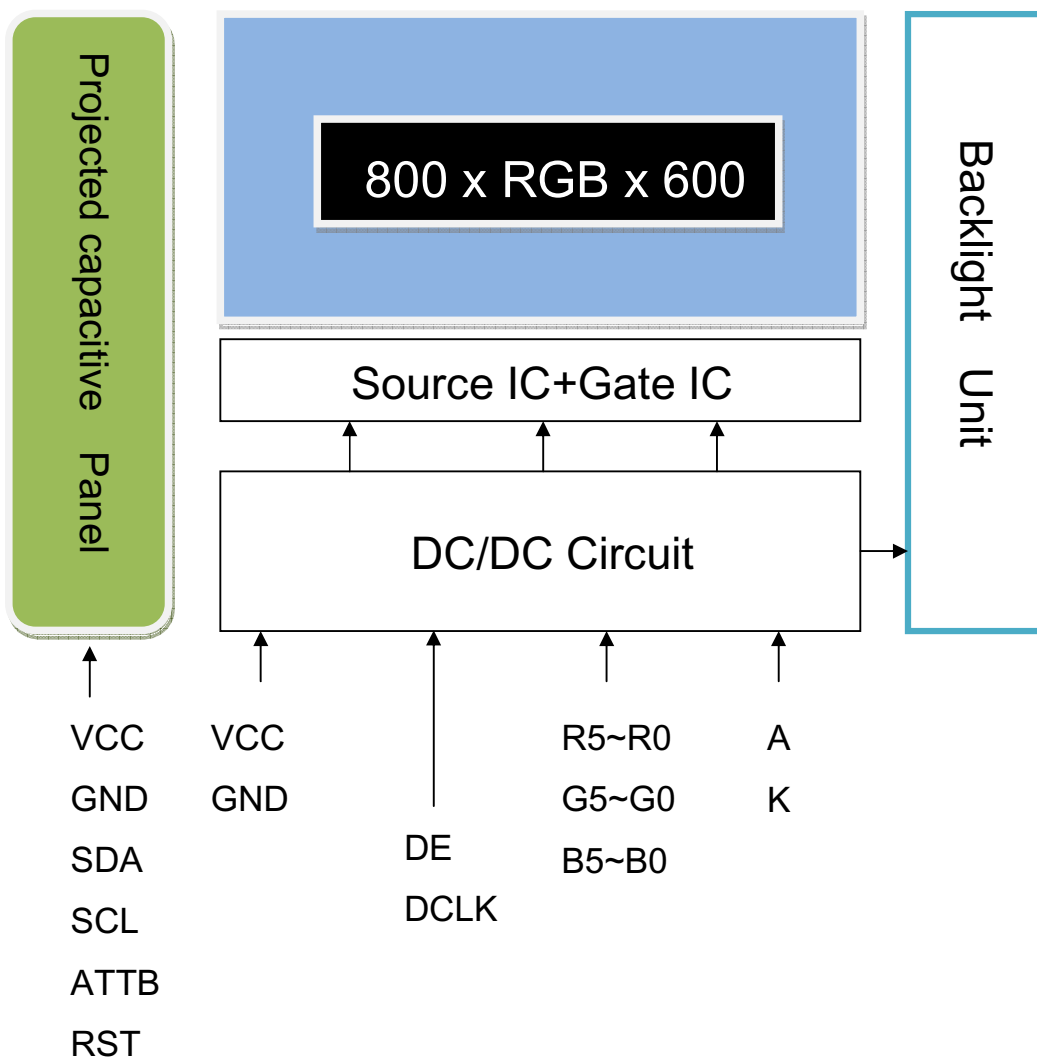
Item	Symbol	Values		Unit	Note
		Min	Max.		
Power supply voltage	VDD	-0.3	4.0	V	

4.1.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Topa	-20		70	°C	Ambient temperature
Storage Temperature	Tstg	-30		80	°C	

5. BLOCK DIAGRAM

5.1 TFT LCD Module



6. Relationship Between Displayed Color and Input

6.1 6 bit

	Color & Gray Scale	Data Signal																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(31)	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(31)	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(31)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 : Low level voltage, 1 :High level voltage

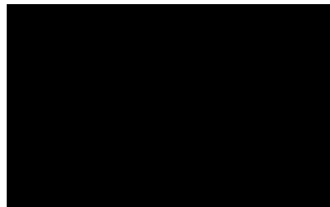
Each basic color can be displayed in 64 gray scales from 6 bit data signals. With the combination of total 18 bit data signals, the 262K-color display can be achieved on the screen.

7. ELECTRICAL CHARACTERISTICS

7.1 TFT LCD Module

Item		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power supply voltage		VCC	3.0	3.3	3.6	V	
Input Voltage for logic	H Level	VIH	0.7xVCC	-	VCC	V	
	L Level	VIL	0	-	0.3xVCC	V	
Digital Current		ICC	-	(120)	(150)	mA	Note1

Note 1: frame =60Hz , Ta=25°C , Display pattern : Black pattern



7.2 Backlight Unit

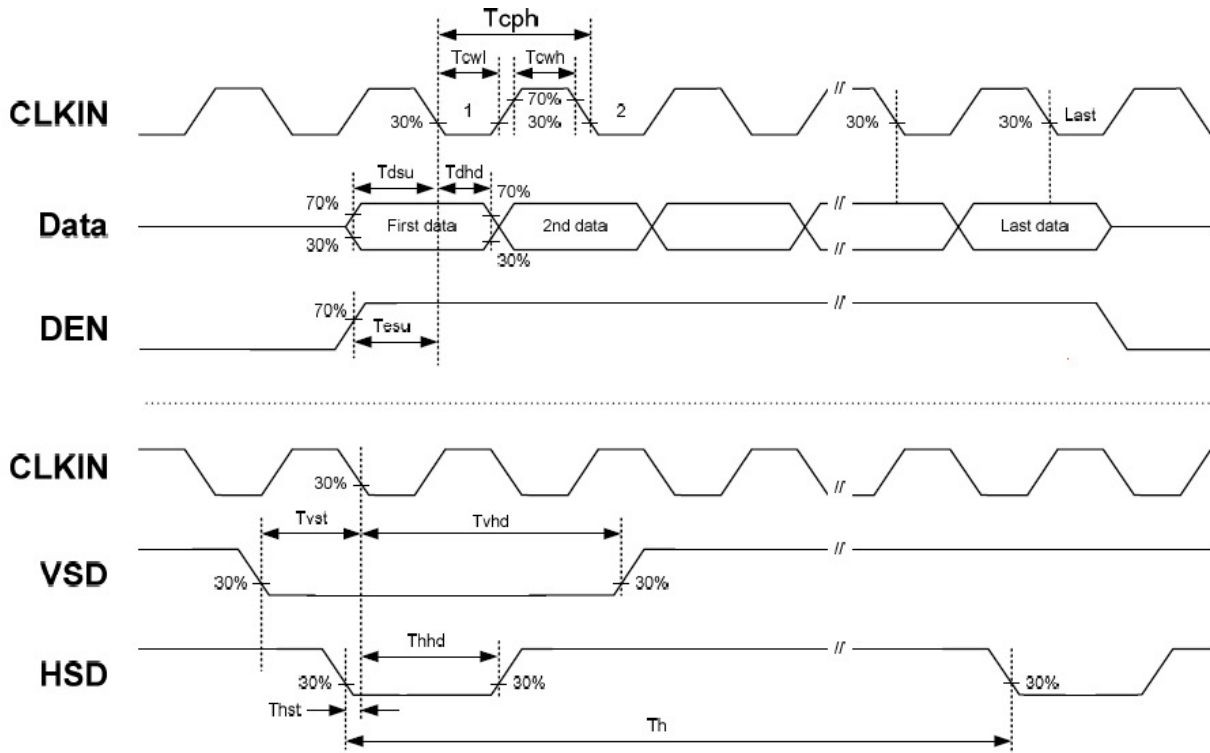
Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	VL	(9.0)	(9.9)	(10.5)	V	
LED Current	IF	-	180	-	mA	3S9P
Power Consumption	PBL	-	1.782	-	mW	
LED Life Time (25°C)	-	(40000)	-	-	hr	(1)

Note (1): The “LED life time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C 60% RH.

7.3 INTERFACE SPECIFICATIONS

7.3.1 AC Timing characteristics

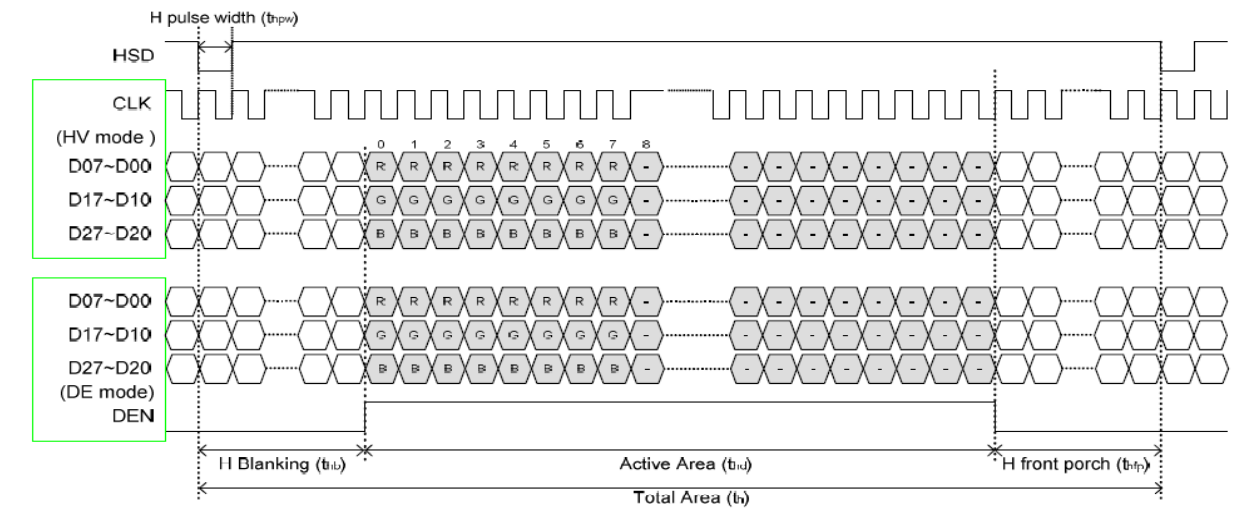
Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
HSYNC	HS setup time	Thst	8	-	-	ns	
	HS hold time	Thhd	8	-	-	ns	
VSYNC	VS setup time	Tvst	8	-	-	ns	
	VS hold time	Tvhd	8	-	-	ns	
Data	Data setup time	Tdsu	8	-	-	ns	
	Data hold time	Tdhd	8	-	-	ns	
DE	DEN setup time	Tvpw	8	-	-	ns	
	DEN hold time	Tvb	8	-	-	ns	



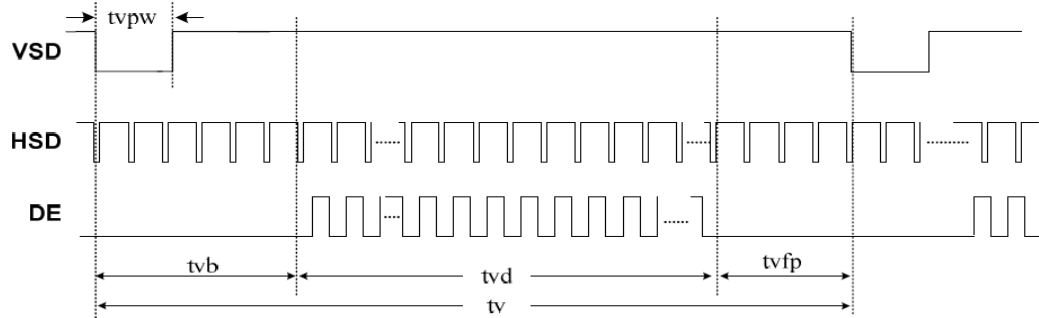
7.3.2 DE Mode Input Timing Table

Signal	Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
DCLK	CLK frequency	Fclk	-	40	50	MHz	
	CLK period	Tcph	20	-	-	ns	
	CLK pulse duty	Tcwh	40	50	60	%	
HSYNC	Horizontal Line	Th	862	1056	1200	CLK	
	HS Display Area	Thd	-	800	-	CLK	
	HS Pulse Width	Thpw	1	-	40	CLK	
	HS Back Porch	Thb	-	46	-	CLK	
	HS Front Porch	Thfp	16	210	354	CLK	
VSYNC	VS Display Area	Tvd	-	600	-	th	
	VS Period Time	Tv	624	635	700	th	
	VS Pulse Width	Tvpw	1	-	20	th	
	VS Back Porch	Tvb	-	23	-	th	
	VS Front Porch	Tvfp	1	12	77	th	

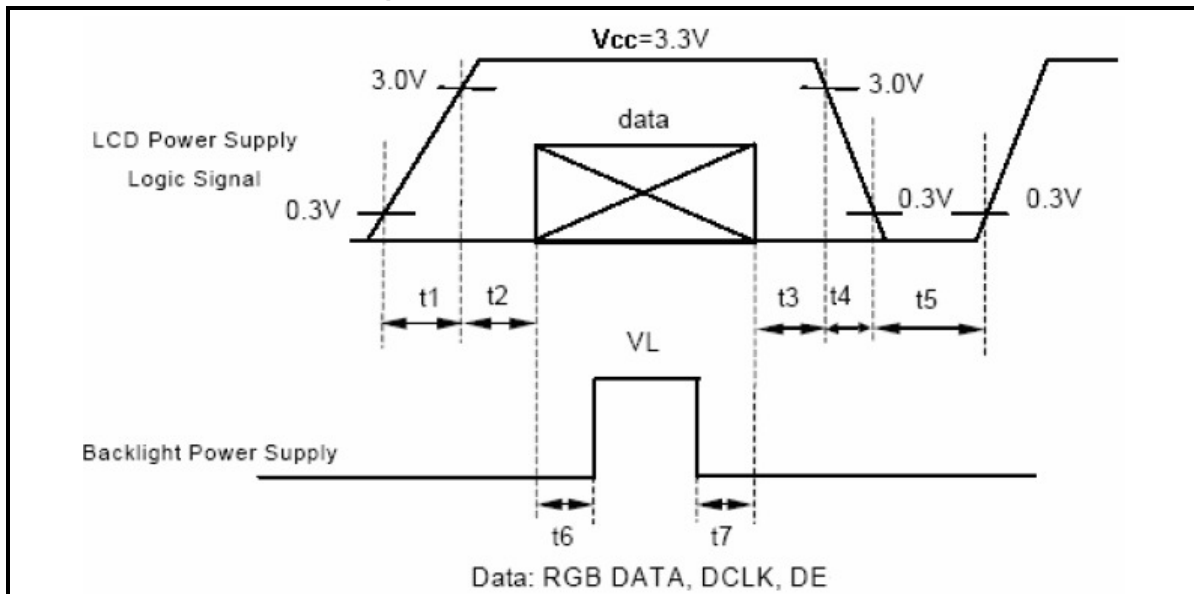
Horizontal input timing



Vertical input timing



7.4 Power On / Off Sequence



$t_1 \leq 10ms : 1 sec \leq t_5$

$50ms \leq t_2 : 200ms \leq t_6$

$0 < t_3 \leq 50ms : 200ms \leq t_7$

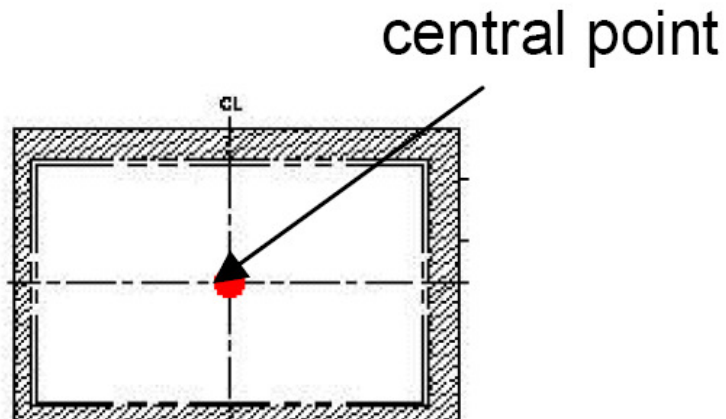
$0 < t_4 \leq 10ms$

8. PROJECTED CAPACITIVE TOUCH PANEL

8.1 Main Feature

Item	Specification	Unit
Screen Size	8.0 inch	Diagonal
Type	Transparent Type Projected Capacitive	--
Input Mode	Human's Finger	--
Figner	10	--
Interface	I2C	--
Cover glass pencil-handness	7H(min) by JIS K5400	--
Report rate	200(Max)	Points/sec
Response time	11(Max)	ms
Point hitting life time	1,000,000 times(Min)	Note1

Note1: Use 8 mm diameter silicon rubber/force 3N to knock on the same point twice per second (no-operating), after test function check pass.



8.2 Pin Assignments and Definitions

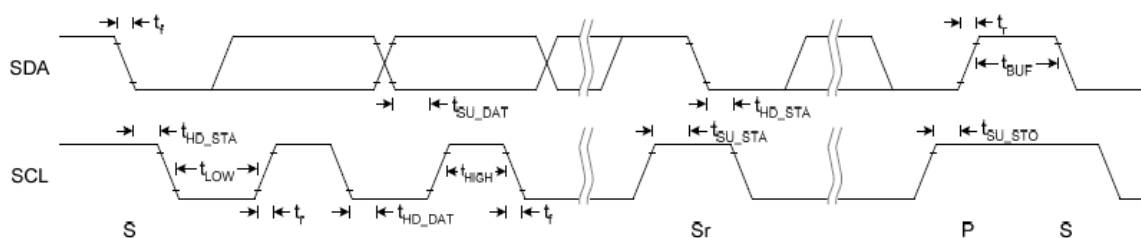
Item	Name	I/O	Unit
1	VCC	P	Power; VCC =3.3V(typ.)
2	GND	P	Power ground
3	RST	I	CTP reset input pin, active low.
4	SCL	I	Clock; 100KHz
5	SDA	I/O	Serial data access
6	ATTB	O	Active low when data output from touch panel
7	NC	-	NO connection
8	NC	-	NO connection

8.3 CTP Electrical Characteristic

Item		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power supply voltage		VCC	2.7	3.3	5.5	V	
Input Voltage for logic	H Level	VIH	0.4xVCC	-	VCC+0.5	V	
	L Level	VIL	-0.3	-	0.2xVCC	V	
Power current		Inormal	-	30	-	mA	
		Isleep	-0	15	-	uA	

8.4 CTP Interface and Data Format

The waveform of I2C fast mode timing



The timing characteristic of I2C fast mode plus

Parameter	Symbol	Specification			
		MIN.	TYP.	MAX.	UNIT
SCL clock frequency	fSCL	0	-	1000	kHz
Low period of the SCL clock	tLOW	0.5	-	-	us
High period of the SCL clock	tHIGH	0.26	-	-	us
Set up time for a repeated START condition	tSU_STA	0.26	-	-	us
Hold time for a repeated START condition. After this period, the first clock pulse is generated	tHD_STA	0.26	-	-	us
Data set up time	tSU DAT	50	-	-	ns
Data hold time	tHD DAT	0	-	-	us
Signal falling time of SDA and SCL	tf	-	-	120	ns
Signal rising time of SDA and SCL	tr	-	-	120	ns
Data set up time	tSU DAT	100	-	-	ns
Data hold time	tHD DAT	0	-	0.9	us
Set up time for STOP condition	tSU_STO	0.26	-	-	us
Bus free time between a STOP and START condition	tBUF	0.5	-	-	us
Capacitive load for each bus line	Cb	-	-	550	pF

8.5 I2C Interface Protocol

8.5.1 Default I2C Address

The default I2C Address of NCB30x1 is 0x55 (7-bit address)

8.5.2 Register Read

For reading the registers value from NCB30x1, the I2C host has to tell the NCB30x1 the “start register address” before reading the corresponding register value

I2C	I2C	Start Reg.	Start Reg.	I2C	I2C	I2C	Value of	Value of		Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Stop	Start	Addr(R)	Reg(a)	Reg(a+1)	...	Reg(a+n)	Stop

8.5.3 Register Write

For writing the registers of NCB30x1, the host has to tell the NCB30x1 the “start register address”. Register value would be written to the register with address starting from the “start register address”

I2C	I2C	Start Reg.	Start Reg.	Value of	Value of		Value of	I2C
Start	Addr(W)	Addr.LB(a)	Addr.HB(a)	Reg(a)	Reg(a+1)	...	Reg(a+n)	Stop

8.6 Register Definitions

NCB30x1 provides an register interface for host to configure device attributes and retrieve information. The registers are listed below.

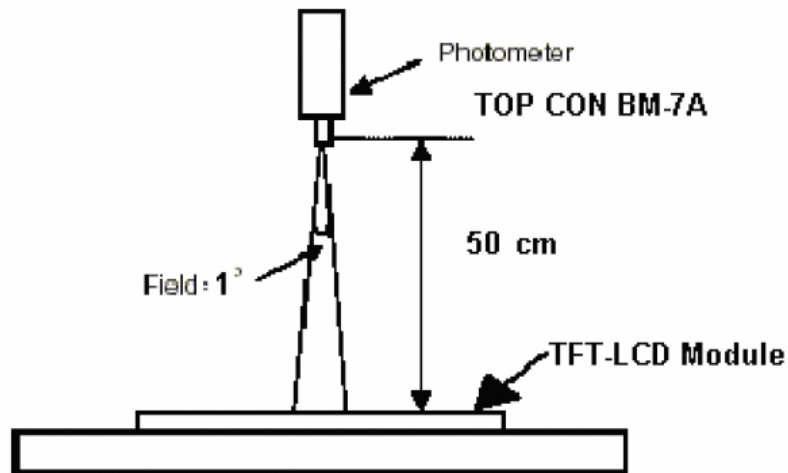
Register Addr	Name	Attribute	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0x00F9	ReportID	R	ReportID for							
0x00FA	Message1	R	Message							
0x00FB	Message2	R	Message							
0x00FC	Message3	R	Message							
0x00FD	Message4	R	Message							
0x00FE	Message5	R	Message							
0x00FF	Message6	R	Message							
0x0100	Message7	R	Message							
0x0101	Reserved	Reserved	Reser							
0x0102	Reset	R/W	Re							
0x0103	BackUpNV	R/W	Backup							
0x0104	Calibrate	R/W	Calibr							
0x0105	ReportAll	R/W	Report Current							
0x0106	Reserved	Reserved	Reser							
0x0107	Diagnostic	R/W	Diagnostic Debug Command							
0x0108	IdleAcqInt	R/W	Idle Acquisition							
0x0109	ActAcqInt	R/W	Active Acquisition							
0x010A	Reserved	Reserved	Reser							
0x010B	Orient	R/W	Reserved					InvertY	InvertX	Switch
0x010C	XRangeLsB	R/W	X Resolution Low							
0x010D	XRangeMsB	R/W	X Resolution High							
0x010E	YRangeLsB	R/W	Y Resolution Low							
0x010F	YRangeMsB	R/W	Y Resolution High							

9. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Brightness		--	Note1, Note 3, ($\theta = 0^{\circ}$; Normal Viewing Angle)	330	420	--	cd/m2
Uniformity		B-uni		70	75	-	%
Contrast Ratio		CR		400	500	--	--
Response Time		Tr		--	10	--	ms
		Tf		--	15	--	ms
Color Chromaticity	White	Wx		0.260	0.310	0.360	--
		Wy		0.280	0.330	0.380	--
View angle	Horizontal	θ x+	Center CR≥10	60	70	--	
		θ x-		60	70	--	
	Vertical	θ Y+		40	50	--	
		θ Y-		60	75	--	
Image sticking		tis	2 hours	--	--	2	Sec

Note : The following optical specifications shall be measured in a darkroom or equivalent state(ambient luminance ≤ 1 lux, and at room temperature). The operation temperature is $25^\circ\text{C} \pm 2^\circ\text{C}$. The measurement method is shown in Note1.

Note1: The method of optical measurement:

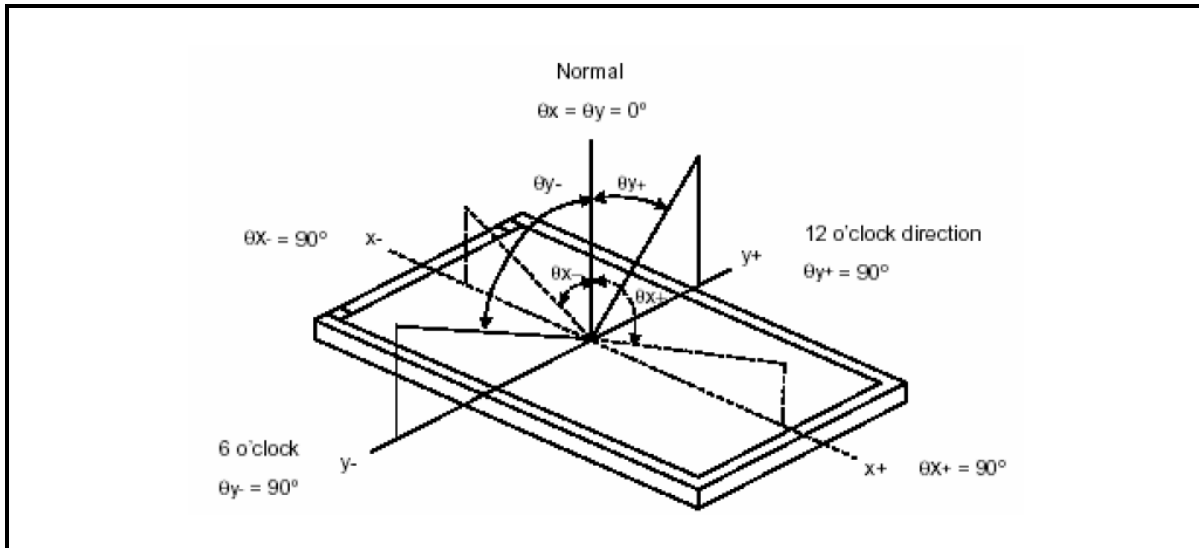


Note2: Measured at the center area of the panel and at the viewing angle of the $\theta x = \theta y = 0^\circ$

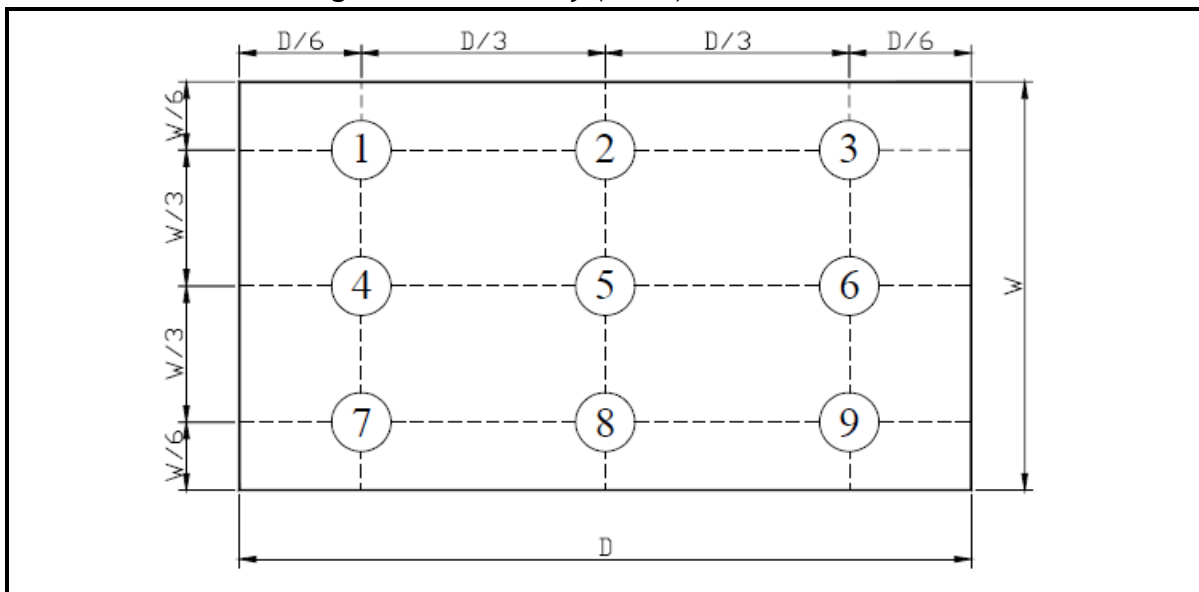
Note3: Definition of Contrast Ratio (CR):

CR = Luminance with all pixels in white state $\div$ Luminance with all pixels in Black state

Note4: Definition of Viewing Angle:



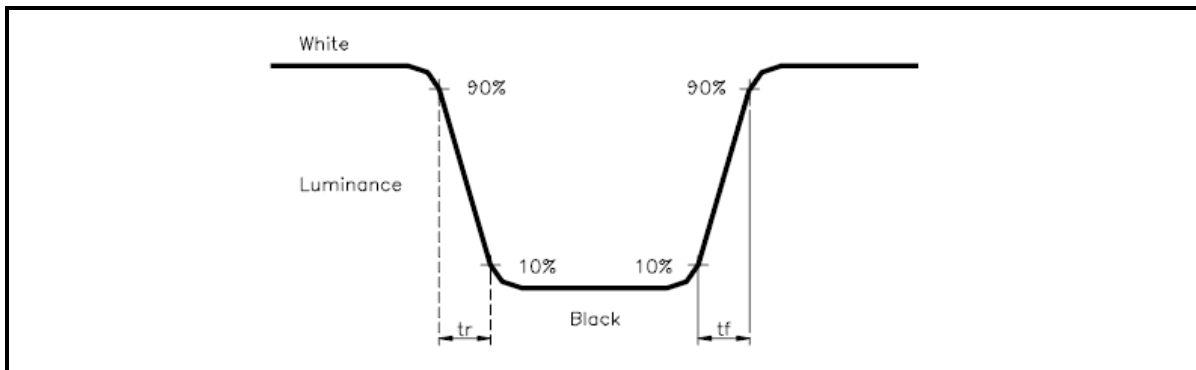
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = (\text{Minimum luminance of 9 points} \div \text{Maximum luminance of 9 points}) \times 100\%$$

Note 6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (T_r)” and the “Falling Time (T_f)” respectively. T_r and T_f are defined as following figure



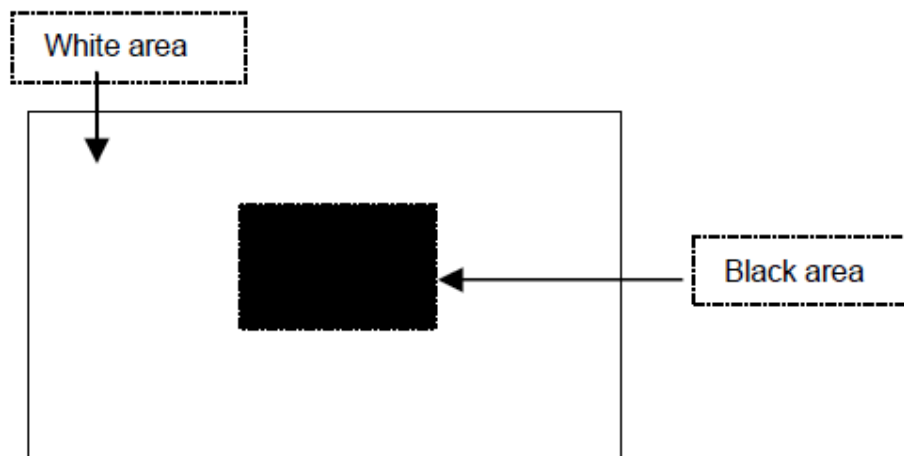
Note 7: Definition of Chromaticity:

The color coordinates (W_x, W_y), (R_x, R_y), (G_x, G_y), and (B_x, B_y) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (t_{is}):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C

Image sticking pattern



10. RELIABILITY

10.1 Test Condition

10.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

10.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

10.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

10.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

10.2 TESTS

No.	ITEM	CONDITION CRITERION
1	High Temperature Storage	80°C, 120 hrs
2	Low Temperature Storage	-30°C, 120 hrs
3	High Temperature Operating	70°C, 120 hrs
4	Low Temperature Operating	-20°C, 120 hrs
5	High Temperature/Humidity Non-Operating	60°C, 90%RH, 120 hrs
6	Temperature Shock Non-Operating	-30°C $\longleftrightarrow$ 80°C (0.5hr each), 25 cycles
7	Vibration Test Non-Operating	Frequency:0 ~ 55 Hz Amplitude:1.5 mm Sweep Time:11min Test Period:6 Cycles for each Direction of X,Y,Z
8	Electro-static Discharge	$\pm 2\text{KV}$, Human Body Mode, 100pF/1500 Ω

Note1: The test sample have recovery time for 24 hours at room temperature before the function check. In the standard conditions, there is no any touch panel function NG issue occurred.

10.3 JUDGMENT STANDARD

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

10.4 INCOMING INSPECTION STANDARDS

No.	Parameter	Criteria														
1	Operating	Display function: No Display malfunction (Major)														
		Contrast ratio (Black, White): Does not meet specified range in the spec. (Major) (Note:3)														
		Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)														
		Point Defect : Active area ≤ 5 dots (Minor) (Note:1)														
		<table><tr><th rowspan="2">Item</th><th>Acceptable number</th><th rowspan="2">Total</th></tr><tr><th>Active Area</th></tr><tr><td>Bright</td><td>2</td><td rowspan="2">5</td></tr><tr><td>Dark</td><td>4</td></tr></table>	Item	Acceptable number	Total	Active Area	Bright	2	5	Dark	4					
		Item		Acceptable number		Total										
			Active Area													
		Bright	2	5												
		Dark	4													
		Non-uniformity: Visible through 5%ND filter. (Minor)														
Foreign material in Black or White spots shape ($W>1/4L$)																
<table><tr><th>Zone Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td>$D>0.5$</td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr><tr><td>$0.3 < D \leq 0.5$</td><td>5</td></tr><tr><td>$D \leq 0.3$</td><td>*</td></tr></table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	$D>0.5$	0	Minor	1.5	$0.3 < D \leq 0.5$	5	$D \leq 0.3$	*				
Zone Dimension	Acceptable number	Class Of Defects	AQL Level													
$D>0.5$	0	Minor	1.5													
$0.3 < D \leq 0.5$	5															
$D \leq 0.3$	*															
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																
Foreign Material in Line or spiral shape ($W \leq 1/4L$) (Note: 4)																
<table><tr><th>L (mm)</th><th>Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td>$L > 5$</td><td>$W > 0.1$</td><td>0</td><td rowspan="3">Minor</td><td rowspan="3">1.5</td></tr><tr><td>$0.5 < L \leq 5$</td><td>$0.03 < W \leq 0.1$</td><td>5</td></tr><tr><td>$L \leq 0.5$</td><td>$W \leq 0.03$</td><td>*</td></tr></table>	L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	$L > 5$	$W > 0.1$	0	Minor	1.5	$0.5 < L \leq 5$	$0.03 < W \leq 0.1$	5	$L \leq 0.5$	$W \leq 0.03$	*
L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level												
$L > 5$	$W > 0.1$	0	Minor	1.5												
$0.5 < L \leq 5$	$0.03 < W \leq 0.1$	5														
$L \leq 0.5$	$W \leq 0.03$	*														
L : Length W : Width * : Disregard																
2	External Inspection (non-operating)	Dimension: Outline (Major)														
		Bezel appearance: uneven (Minor)														
		Scratch on the polarize: (Note:2)														
		<table><tr><th>L (mm)</th><th>Zone W(mm)</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td>--</td><td>$W > 0.1$</td><td>0</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr><tr><td>$L \leq 3$</td><td>$W \leq 0.1$</td><td>3</td></tr></table>	L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level	--	$W > 0.1$	0	Minor	1.5	$L \leq 3$	$W \leq 0.1$	3	
		L (mm)	Zone W(mm)	Acceptable number	Class Of Defects	AQL Level										
		--	$W > 0.1$	0	Minor	1.5										
		$L \leq 3$	$W \leq 0.1$	3												
		L : Length W : Width * : Disregard														
		Dent or bubble on the polarize (Note:2)														
		<table><tr><th>Zone Dimension</th><th>Acceptable number</th><th>Class Of Defects</th><th>AQL Level</th></tr><tr><td>$D \leq 0.3$</td><td>*</td><td rowspan="2">Minor</td><td rowspan="2">1.5</td></tr><tr><td>$D \leq 0.5$</td><td>3</td></tr></table>	Zone Dimension	Acceptable number	Class Of Defects	AQL Level	$D \leq 0.3$	*	Minor	1.5	$D \leq 0.5$	3				
Zone Dimension	Acceptable number	Class Of Defects	AQL Level													
$D \leq 0.3$	*	Minor	1.5													
$D \leq 0.5$	3															
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																

Class of defects	Major	AQL 0.65%	Definition
	Minor	AQL 1.5%	It is a defect that will not result in functioning problem with deviation classified.

Note1:

(a) Bright point defect is defined as point defect of R,G,B with area $>1/2$ pixel respectively

(b) Dark point defect is defined as visible in full white pattern.

(c) Definition of distribution of point defect is as follows:

- minimum separation between dark point defects should be larger than 5mm.
- minimum separation between bright point defects should be larger than 5mm.

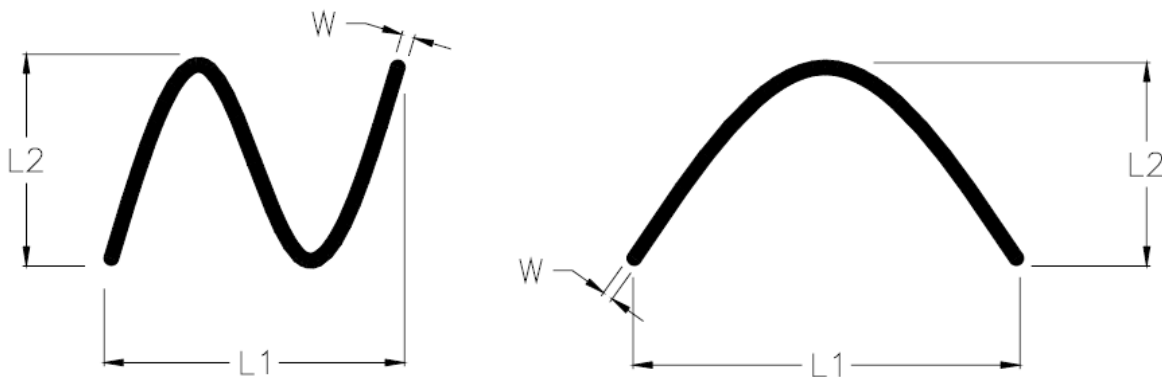
(d) Definition of joined bright point defect and joined dark point defect are as follows:

- Two or more joined bright point defects must be nil.
- Three joined dark point defects must be nil.
- Coupling of one dark and one bright point in junction is counted as one dark and bright spot with 1 pair maximum.
- Two Joined dark point is counted as two dark points with 2 pair maximum.

Note2: The external inspection should be conducted at the distance 30 ± 5 cm between the eyes of inspector and the panel.

Note3: Luminance measurement for contrast ratio is at the distance 50 ± 5 cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note4: W-Width in mm , L-length of Max.(L1,L2) in mm.



10.5 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

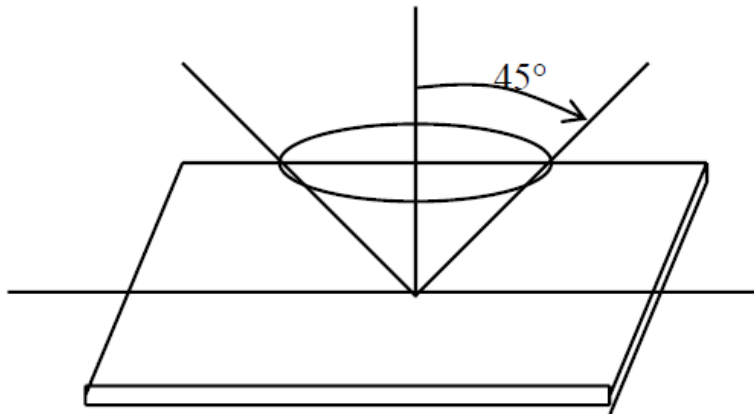
Inspection level: Level II

10.6 Inspection conditions

The LCD shall be inspected under 40W white fluorescent light.

$\theta \leq 45^\circ$ inspection under non-operating condition.

$\theta \leq 5^\circ$ inspection under operating condition



11. PRECAUTION RELATING PRODUCT HANDLING

11.1 SAFETY

- 11.1.1** If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.
- 11.1.2** If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

11.2 HANDLING

- 11.2.1** Avoid any strong mechanical shock which can break the glass.
- 11.2.2** Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 11.2.3** Do not remove the panel or frame from the module.
- 11.2.4** The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)
- 11.2.5** Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 11.2.6** Do not touch the display area with bare hands , this will stain the display area.
- 11.2.7** Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 11.2.8** To control temperature and time of soldering is $280 \pm 10^{\circ}\text{C}$ and 3-5 sec.
- 11.2.9** To avoid liquid (include organic solvent) stained on LCM.

11.3 STORAGE

- 11.3.1** Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 11.3.2** Do not place the module near organics solvents or corrosive gases.
- 11.3.3** Do not crush, shake, or jolt the module.