

SPECIFICATION FOR CTP+LCD MODULE

Part No.: JT320TM004-V1

Customer No.:

Date: 2026-4-28

Jutouch			Customer
Prepared	Checked	Approved	Approved

Record of Revision

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1 General Specifications

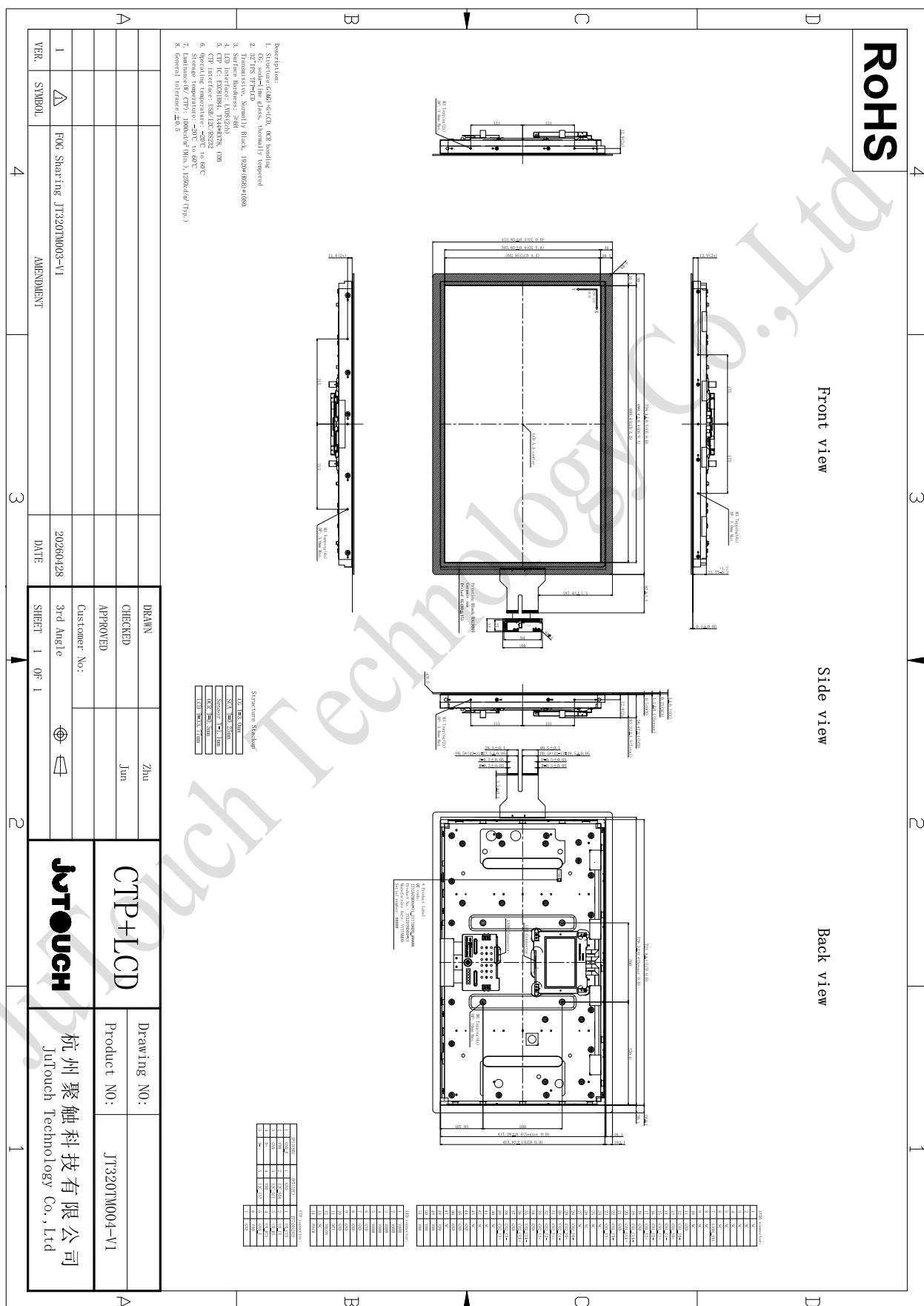
1.1 Definition

The specification is used for capacitive touch module with TFT LCD & Backlight Unit.

1.2 Features and General Description

General	Specification	Unit	Note
Module Size	32	inch	diagonal
Structure	G+G+LCD, OCR Bonding		
Resolution	1920(RGB) × 1080		
Display Mode	Normally Black. Transmissive		
Pixel Pitch	0.3637(W) × 0.3637(H)	mm	
Pixel Arrangement	RGB Vertical stripe		
Viewing Direction	ALL	O'clock	
Outline Dimensions	795.4(W) × 435.85(H) × 63.32(D)	mm	
Viewing Area	699.4(W) × 393.85(H)		
Active Area	698.4(W) × 392.85(H)	mm	
LCD Interface	LVDS(2ch)		
CTP Interface	USB / I2C / RS232		
CTP IC	EXC81H84		
Touch Point	10		
Surface Hardness	6	H	
Surface Treatment	Etched AG(Gloss: 80 ± 15)		

5



3 Pin assignment

3.1 LCD Pin assignment

LVDS connector: JAE FI-RTE51SZ-HF / P-two 187059-5122 or compatible

Pin	Symbol	Description	Note
1	NC	No connection (for test only. Do not connect)	(1)
2	NC	No connection (for test only. Do not connect)	(1)
3	NC	No connection (for test only. Do not connect)	(1)
4	NC	No connection (for test only. Do not connect)	(1)
5	NC	No connection (for test only. Do not connect)	(1)
6	NC	No connection (for test only. Do not connect)	(1)
7	LVDS_SEL	Open/High(3.3V) for NS, Low(GND) for JEIDA	(2)(3)
8	NC	No connection (for test only. Do not connect)	(1)
9	NC	No connection (for test only. Do not connect)	(1)
10	NC	No connection (for test only. Do not connect)	(1)
11	GND	Ground	
12	CH1_Y0-	LVDS Channel 1, Signal 0-	
13	CH1_Y0+	LVDS Channel 1, Signal 0+	
14	CH1_Y1-	LVDS Channel 1, Signal 1-	
15	CH1_Y1+	LVDS Channel 1, Signal 1+	
16	CH1_Y2-	LVDS Channel 1, Signal 2-	
17	CH1_Y2+	LVDS Channel 1, Signal 2+	
18	GND	Ground	
19	CH1_CLK-	LVDS Channel 1, Clock-	
20	CH1_CLK+	LVDS Channel 1, Clock+	
21	GND	Ground	
22	CH1_Y3-	LVDS Channel 1, Signal 3-	
23	CH1_Y3+	LVDS Channel 1, Signal 3+	
24	NC	No connection (for test only. Do not connect)	(1)
25	NC	No connection (for test only. Do not connect)	(1)
26	NC	No connection (for test only. Do not connect)	(1)
27	NC	No connection (for test only. Do not connect)	(1)
28	CH2_Y0-	LVDS Channel 2, Signal 0-	
29	CH2_Y0+	LVDS Channel 2, Signal 0+	
30	CH2_Y1-	LVDS Channel 2, Signal 1-	
31	CH2_Y1+	LVDS Channel 2, Signal 1+	

32	CH2_Y2-	LVDS Channel 2, Signal 2-	
33	CH2_Y2+	LVDS Channel 2, Signal 2+	
34	GND	Ground	
35	CH2_CLK-	LVDS Channel 2, Clock-	
36	CH2_CLK+	LVDS Channel 2, Clock+	
37	GND	Ground	
38	CH2_Y3-	LVDS Channel 2, Signal 3-	
39	CH2_Y3+	LVDS Channel 2, Signal 3+	
40	NC	No connection (for test only. Do not connect)	(1)
41	NC	No connection (for test only. Do not connect)	(1)
42	NC	No connection (for test only. Do not connect)	(1)
43	NC	No connection (for test only. Do not connect)	(1)
44	GND	Ground	
45	GND	Ground	
46	GND	Ground	
47	NC	No connection (for test only. Do not connect)	(1)
48	LCD_VDD	LCD Power supply, +12V DC Regulated	
49	LCD_VDD	LCD Power supply, +12V DC Regulated	
50	LCD_VDD	LCD Power supply, +12V DC Regulated	
51	LCD_VDD	LCD Power supply, +12V DC Regulated	

Note :

- (1) Please leave this pin unoccupied. It cannot be connected with any signal (Low/GND/High).
- (2) Input control signal threshold voltage definition

LVDS_SEL	Symbol	Min.	Typ.	Max.	Unit
Input High Threshold Voltage	VIH	2.7	-	3.6	V
Input Low Threshold Voltage	VIL	0	-	0.6	V

- (3) LVDS data format selection

LVDS_SEL	Mode
H or OPEN	NS
L	JEIDA

LED connector: CI0114M1HRL-NH(CviLux)

Pin	Symbol	Description
1	VDDDB	BLU Power Supply Voltage
2	VDDDB	BLU Power Supply Voltage
3	VDDDB	BLU Power Supply Voltage
4	VDDDB	BLU Power Supply Voltage
5	VDDDB	BLU Power Supply Voltage
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	DET	BLU state detection
12	VBLON	BLU On-Off control
13	NC	No connection
14	PDIM	External PWM

Note :

(1) DET status

DET	BLU state
0 ~ 0.8V	Normal
2	Abnormal

Recommend pull high R > 10K ohm, pull high voltage VDD = 3.3V

(2) input control signal threshold voltage definition

Item	Symbol	Min.	Typ.	Max.	Unit
Input High Threshold Voltage	VIH	2	-	5.5	V
Input Low Threshold Voltage	VIL	0	-	0.8	V

(3) VBLON

Mode selection

VBLON	Note
H or OPEN	BL On
L	BL Off

(4)) Please leave this pin unoccupied. It cannot be connected by any signal (Low/GND/High).

(5) PDIM

PWM Dimming range:



External PWM function dimming ratio 0%~100%, Judge condition as below:

- (1) Backlight module must be lighted ON normally
- (2) All protection function must work normally.
- (3) Uniformity and flicker could be guaranteed at External PWM function dimming ratio 5%~100%

3.2 CTP Pin assignment

USB connector: JP1

Pin	Symbol	Description
1	GND_E	Ground
2	VDD	CTP Power Supply : 5V
3	GND	Ground
4	D+	CTP USB data port plus
5	D-	CTP USB data port minus

I2C connector: JP5

Pin	Symbol	Description
1	GND	Ground
2	I2C_SDA	CTP I2C SDA signal
3	I2C_SCL	CTP I2C SCL signal
4	VDD	CTP Power Supply : 5V
5	I2C_INT	CTP I2C INT signal

RS232 connector: JP5

Pin	Symbol	Description
1	UR_CTS	CTP RS232 CTS signal
2	UR_TX	CTP RS232 TX signal
3	UR_RX	CTP RS232 RX signal
4	UR_RTS	CTP RS232 RTS signal
5	GND_E	Ground
6	VDD	CTP Power Supply : 5V
7	GND	Ground

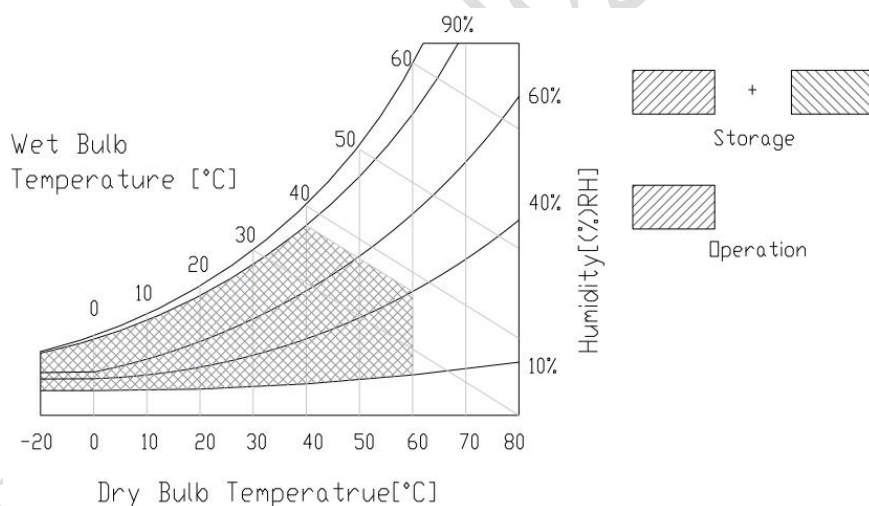
4 Absolute Maximum Rating

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	LCD_VDD	-0.3	14	[Volt]	Note 1
Input Voltage of Signal	Vin	-0.3	4	[Volt]	Note 1
Operating Temperature	TOP	-20	+60	[°C]	Note 2
Operating Humidity	HOP	10	90	[%RH]	Note 2
Storage Temperature	TST	-20	+60	[°C]	Note 2
Storage Humidity	HST	10	90	[%RH]	Note 2
Panel Surface Temperature	PST		65	[°C]	

Note 1. Duration:50 msec.

Note 2. Maximum Wet-Bulb should be 39°C and No condensation. The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.



5 Electrical Characteristic

5.1 LCD Input power

Item		Symbol	Min.	Typ.	Max	Unit	Note
Power Supply Input Voltage		LCD_VDD	10.8	12	13.2	V	(1)
Power Supply Input Current	Black pattern	I_{DD}	-	0.39	0.47	A	(2)
	White pattern		-	0.78	0.94	A	
Power Consumption	Black pattern	P_C	-	4.68	5.64	Watt	
	White pattern		-	9.36	11.28	Watt	
Inrush Current		I_{RUSH}	--	--	3	A	(3)

Note :

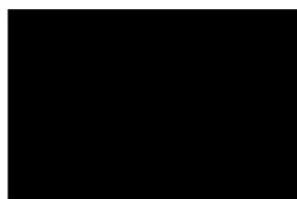
(1) The ripple voltage should be fewer than 5% of LCD_VDD.

(2) Test Condition:

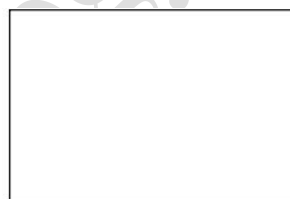
1) LCD_VDD = 12.0V, 2) Fv = 60Hz, 3) Fclk= 74.25MHz, 4) Temperature = 25℃

5) Power dissipation check pattern. (Only for power design)

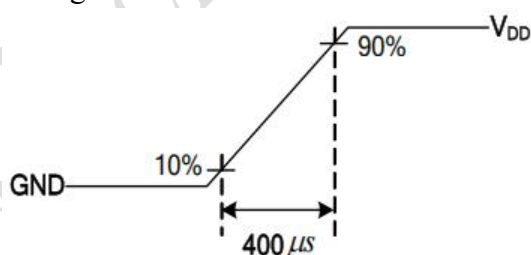
a. Black pattern



b. White pattern



(3) Measurement condition : Rising time = 400us



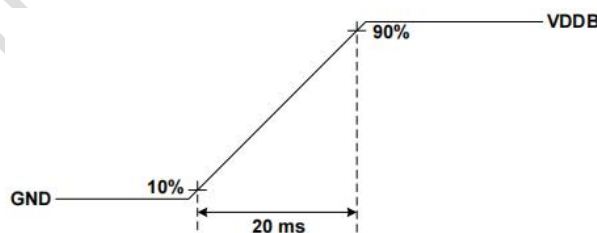
5.2 Backlight Specification

5.2.1 Electrical specification

	Item	Symbol	Condition	Min	Typ	Max	Unit	Note
1	Power Supply Input Voltage	V _{DDB}	-	22.8	24	25.2	V	-
2	Power Supply Input Current	I _{DDB}	V _{DDB} =24V	-	2.48	-	A	(1)
3	Power Consumption	P _{DDB}	V _{DDB} =24V	-	60	69.6	Watt	(1)
4	Inrush Current	I _{RUSH}	V _{DDB} =24V	-	-	6	A	(2)
5	Control signal voltage	V _{Signal}	V _{DDB} =24V	2	-	5.5	V	-
				0	-	0.8		(3)
6	Control signal current	I _{Signal}	V _{DDB} =24V	-	-	1.5	mA	-
7	External PWM Duty ratio (input duty ratio)	D_EPWM	V _{DDB} =24V	0	-	100	%	(4)
8	External PWM Frequency	F_EPWM	V _{DDB} =24V	120	-	960	Hz	(4)
9	DET status signal	DET	V _{DDB} =24V	Open Collector			V	(5)
				0	-	0.8	V	(5)
10	Input Impedance	R _{in}	V _{DDB} =24V	300			Kohm	-
11	LED MTTF	LED_MTTF	-	50,000	-	-	Hr	(6)(7)

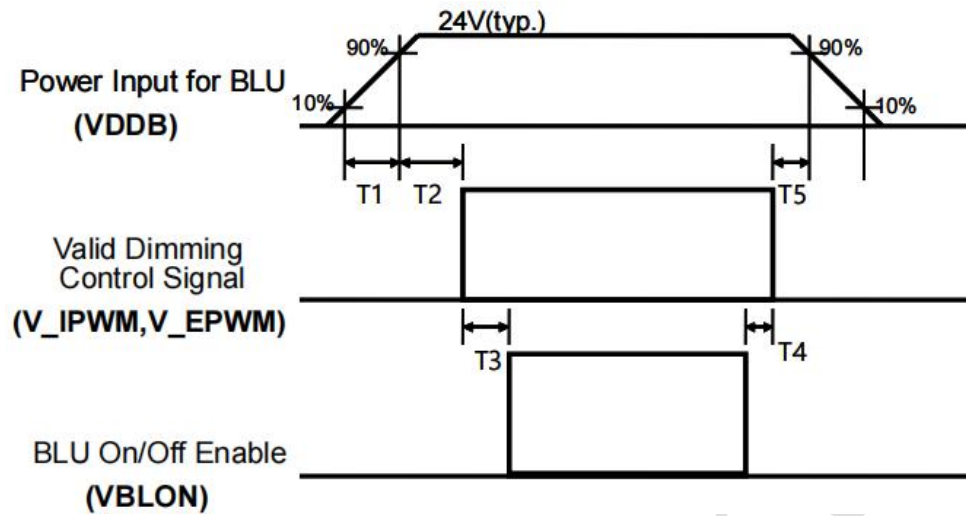
Note :

- (1) Dimming ratio= 100%, (Ta=25±5℃, Turn on for 45minutes)
- (2) MAX input current while DB turn on, measurement condition V_{DDB} rising time=20ms(V_{DDB}: 10%~90%)

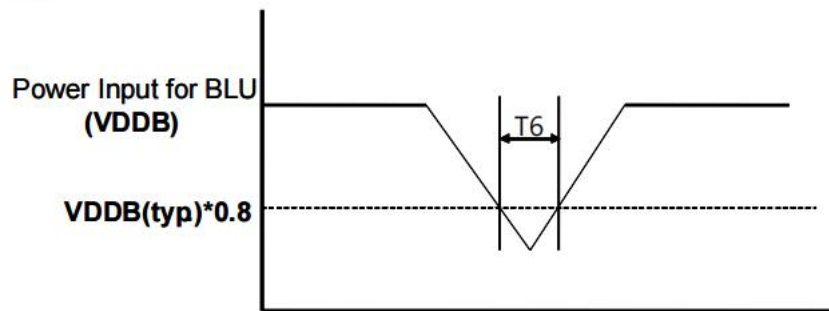


- (3) When BLU off (V_{DDB} = 24V , V_{BLON} = 0V) , I_{DDB} (max) = 0.1A
- (4) Less than 5% dimming control is functional well and no backlight shutdown happened
- (5) Normal: 0~0.8V ; Abnormal : Open collector
- (6) LED MTTF is defined as the time which luminance of LED is 50% compared to its original value.
[Operating condition: Continuous operating at Ta = 25±2℃, for single LED only]
- (7) MTTF is a reference index, it is not representative of warranty.

5.2.2 Power Sequence for Backlight



Dip condition



Parameter	Min	Typ	Max	Units
T1	20	-	-	ms
T2	250	-	-	ms
T3	200			ms
T4	0	-	-	ms
T5	0	-	-	ms
T6		-	1000	ms ^{*1}

Note 1. T6 describes VDDB dip condition and VDDB couldn't lower than 10% VDDB.

5.3 Signal Timing Specification

5.3.1 Timing table

Timing Table (DE only Mode)

Signal	Item	Symbol	Min.	Typ.	Max	Unit
Vertical Section	Period	Tv	1120	1125	1480	Th
	Active	Tdisp (v)	1080			2160
	Blanking	Tblk (v)	40	45	400	Th
Horizontal Section	Period	Th	1030	1100	1325	Tclk
	Active	Tdisp (h)	960			
	Blanking	Tblk (h)	70	140	365	Tclk
Clock	Frequency	Fclk=1/Tclk	53	74.25	82	MHz
Vertical Frequency	Frequency	Fv	47	60	63	Hz
Horizontal Frequency	Frequency	Fh	60	67.5	73	KHz

Note :

(1) Display position is specific by the rise of DE signal only.

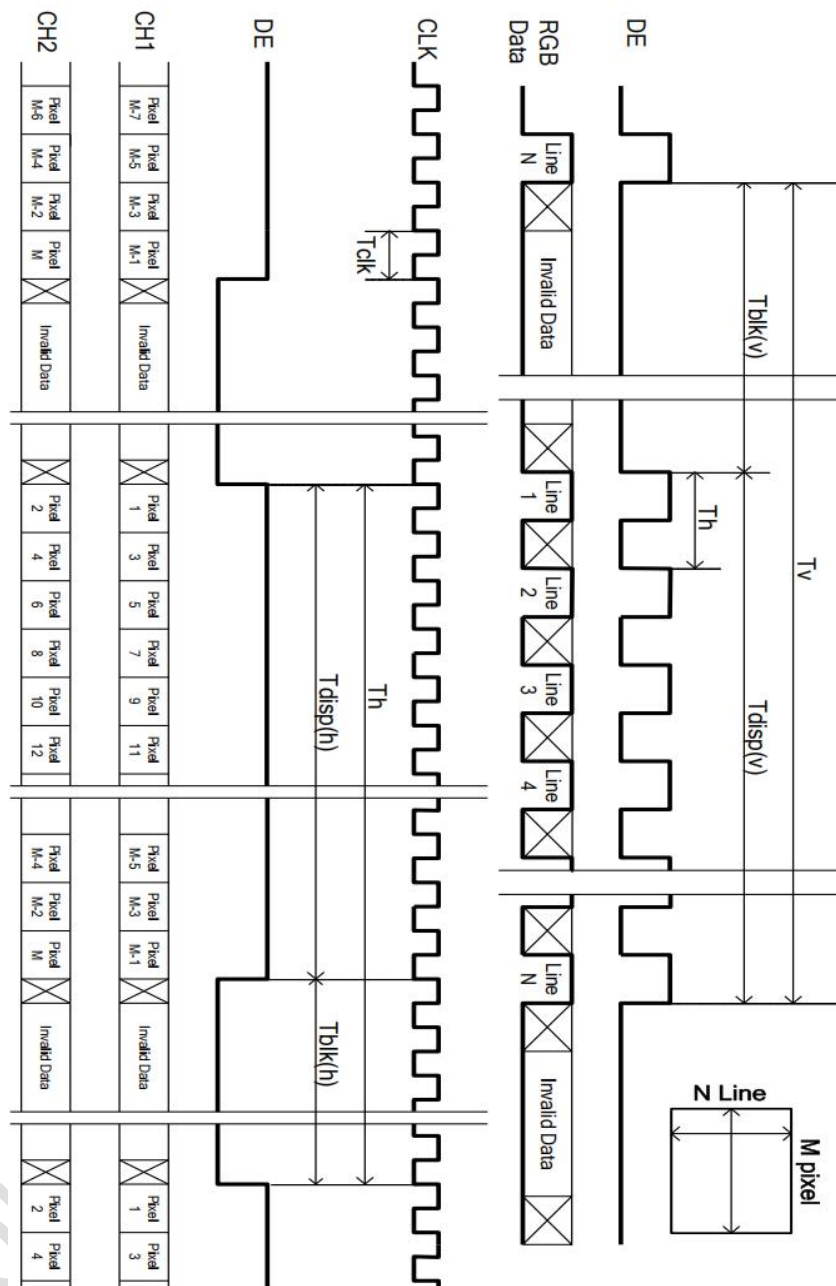
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.

(2) Vertical display position is specified by the rise of DE after a “Low” level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise of 1st DE is displayed at the top line of screen.

(3) If a period of DE “High” is less than 1920 DCLK or less than 1080 lines, the rest of the screen displays black.

(4) The display position does not fit to the screen if a period of DE “High” and the effective data period do not synchronize with each other.

5.3.2 Signal Timing Waveform

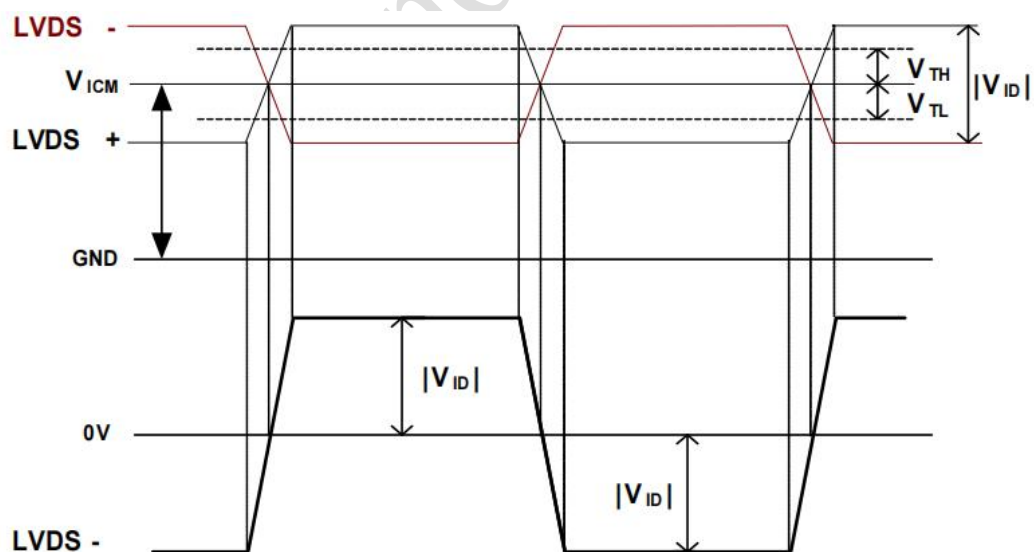


5.4 LVDS Spec

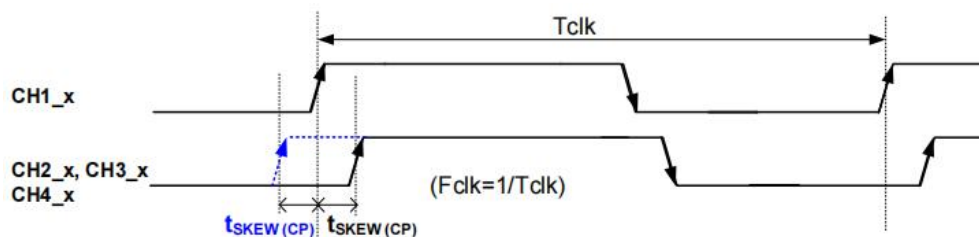
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
LVDS Interface	Input Differential Voltage	$ V_{ID} $	200	400	600	mV _{DC}	(1)
	Differential Input High Threshold Voltage	V_{TH}	+100	--	+300	mV _{DC}	(1)
	Differential Input Low Threshold Voltage	V_{TL}	-300	--	-100	mV _{DC}	(1)
	Input Common Mode Voltage	V_{ICM}	1.1	1.25	1.4	V _{DC}	(1)
	Input Channel Pair Skew Margin	$t_{SKEW (CP)}$	-500	--	+500	ps	(2)
	Receiver Clock : Spread Spectrum Modulation range	Fclk_ss	Fclk -3%	--	Fclk +3%	MHz	(3)
	Receiver Clock : Spread Spectrum Modulation frequency	Fss	30	--	200	KHz	(3)
	Receiver Data Input Margin Fclk = 85 MHz Fclk = 65 MHz	tRMG	-0.4 -0.5	--	0.4 0.5	ns	(4)

Note :

(1) $V_{ICM} = 1.25V$

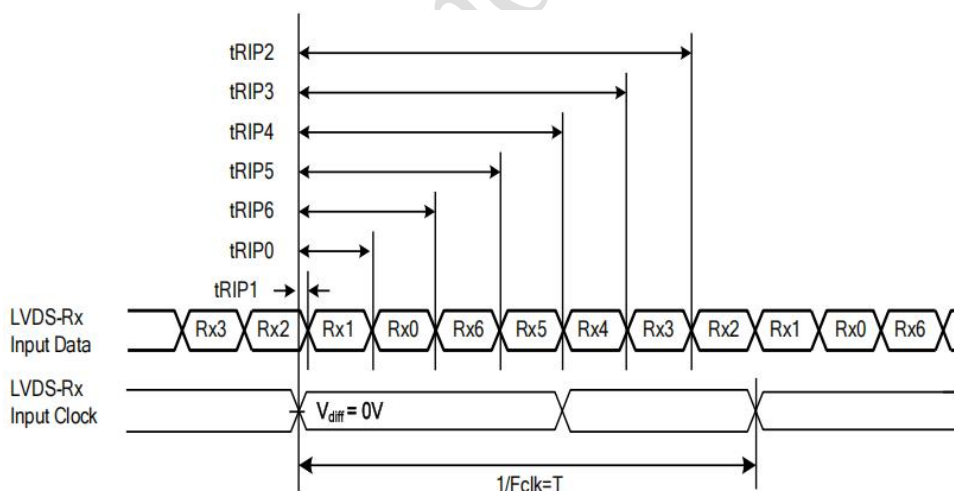


(2) Input Channel Pair Skew Margin

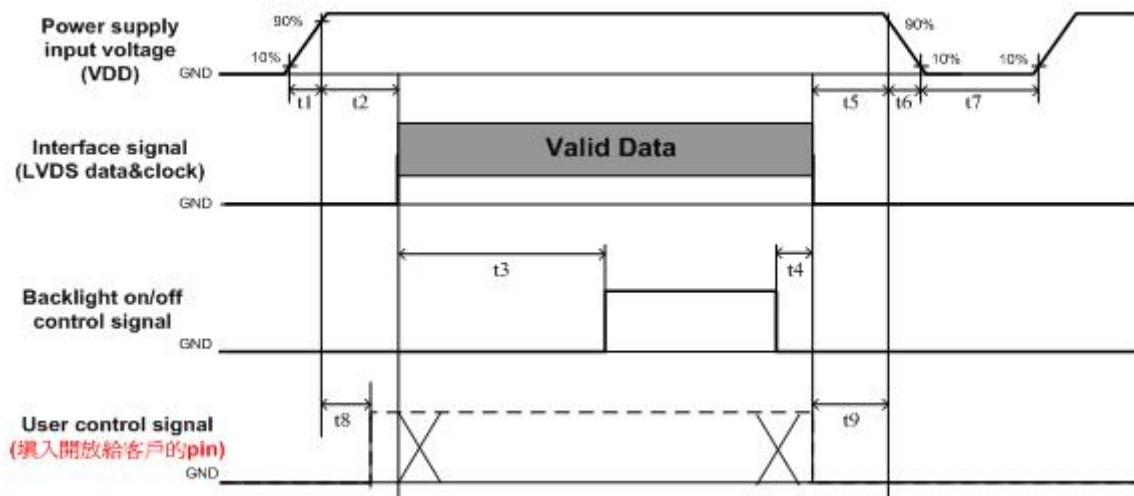


The diagram shows a triangular waveform for the frequency F_{clk} . The peak of the triangle is at $F_{clk_ss(max)}$ and the trough is at $F_{clk_ss(min)}$. The horizontal axis represents time, and the period of the frequency deviation is labeled $1/F_{ss}$.

Parameter	Symbol	Rating			Unit	Note
		Min	Type	Max		
Input Clock Frequency	Fclk	Fclk (min)	--	Fclk (max)	MHz	T=1/Fclk
Input Data Position0	tRIP1	- tRMG	0	tRMG	ns	
Input Data Position1	tRIP0	T/7- tRMG	T/7	T/7+ tRMG	ns	
Input Data Position2	tRIP6	2T/7- tRMG	2T/7	2T/7+ tRMG	ns	
Input Data Position3	tRIP5	3T/7- tRMG	3T/7	3T/7+ tRMG	ns	
Input Data Position4	tRIP4	4T/7- tRMG	4T/7	4T/7+ tRMG	ns	
Input Data Position5	tRIP3	5T/7- tRMG	5T/7	5T/7+ tRMG	ns	
Input Data Position6	tRIP2	6T/7- tRMG	6T/7	6T/7+ tRMG	ns	



5.5 Power Sequence for LCD



Parameter	Values			Unit
	Min.	Type.	Max.	
t1	0.4	---	30	ms
t2	40	---	---	ms
t3	640	---	---	ms
t4	0 ^{*1}	---	---	ms
t5	0	---	---	ms
t6	---	---	--- ^{*2}	ms
t7	1000	---	---	ms
t8	20 ^{*3}	---	50	ms
t9	0	---	---	ms

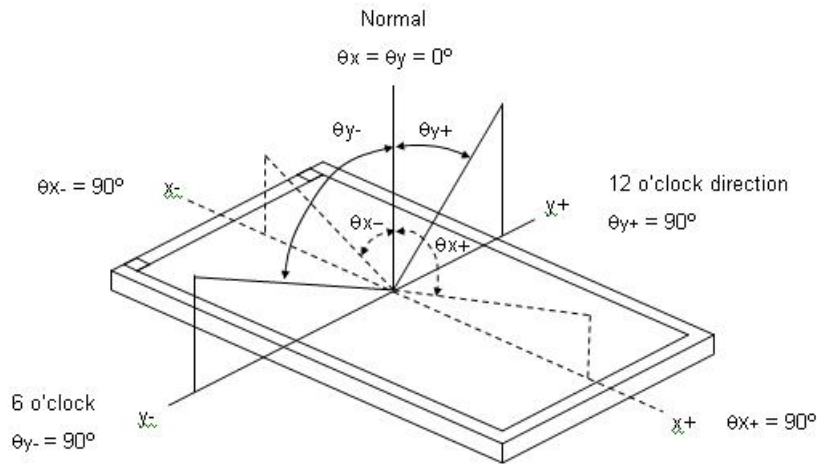
Note :

- (1) t4=0 : concern for residual pattern before BLU turn off.
- (2) t6 : voltage of VDD must decay smoothly after power-off. (Customer system decide this value)
- (3) When user control signal is N.C. (no connection), opened in Transmitted end, t8 timing spec can be negligible.

6 Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Horizontal	θ_{X+}	$CR \geqslant 10$	85	89	-	Deg.	(1), (5)
		θ_{X-}		85	89	-	Deg.	
	Vertical	θ_{Y+}		85	89	-	Deg.	
		θ_{Y-}		85	89	-	Deg.	
Luminance (W/ CTP)		L _v	$\theta_X=0^\circ, \theta_Y=0^\circ$	1000	1250	-	nit	(4), (5)
Uniformity	9 points	$\Delta Y9$		75	-	-	%	(5), (6)
Contrast ratio		CR		3200	4000	-		(2), (5)
Color Chromaticity (CIE 1931)	White	W _x	$\theta_X=0^\circ, \theta_Y=0^\circ$ R=G=B=255 Gray scale	Typ-0.03	0.280	Typ+0.03	-	(1), (5)
		W _y			0.290		-	
	Red	R _x			-		-	
		R _y			-		-	
	Green	G _x			-		-	
		G _y			-		-	
	Blue	B _x			-		-	
		B _y			-		-	
Response Time	T _R +T _F			-	8	10	ms	(3)

Note (1) Definition of Viewing Angle (θ_x, θ_y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

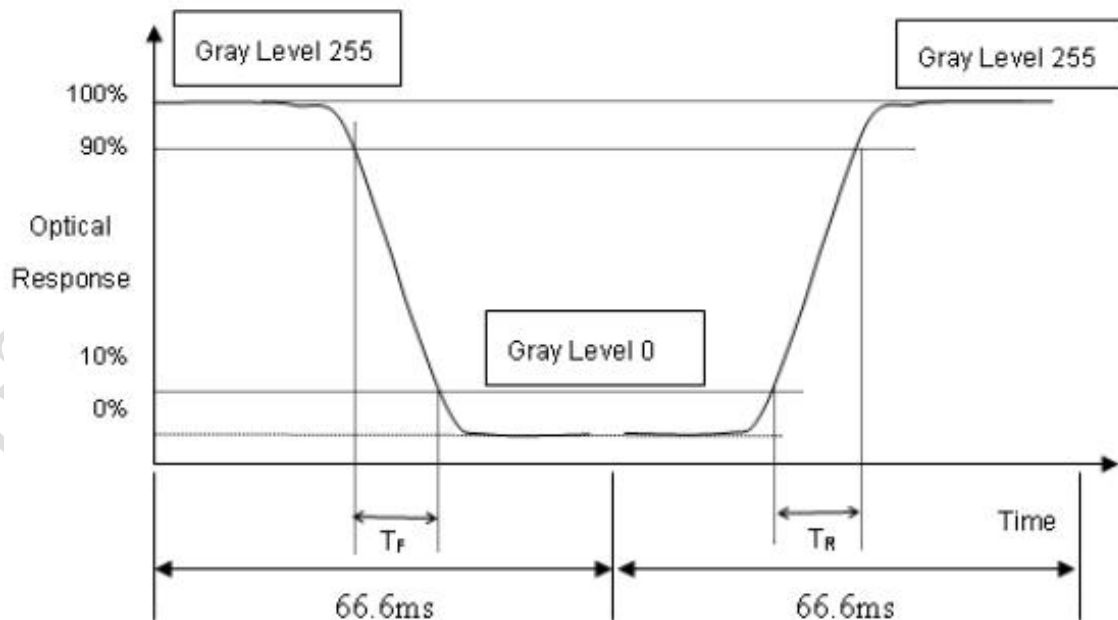
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R, T_F):



Note (4) Definition of Luminance of White (LC):

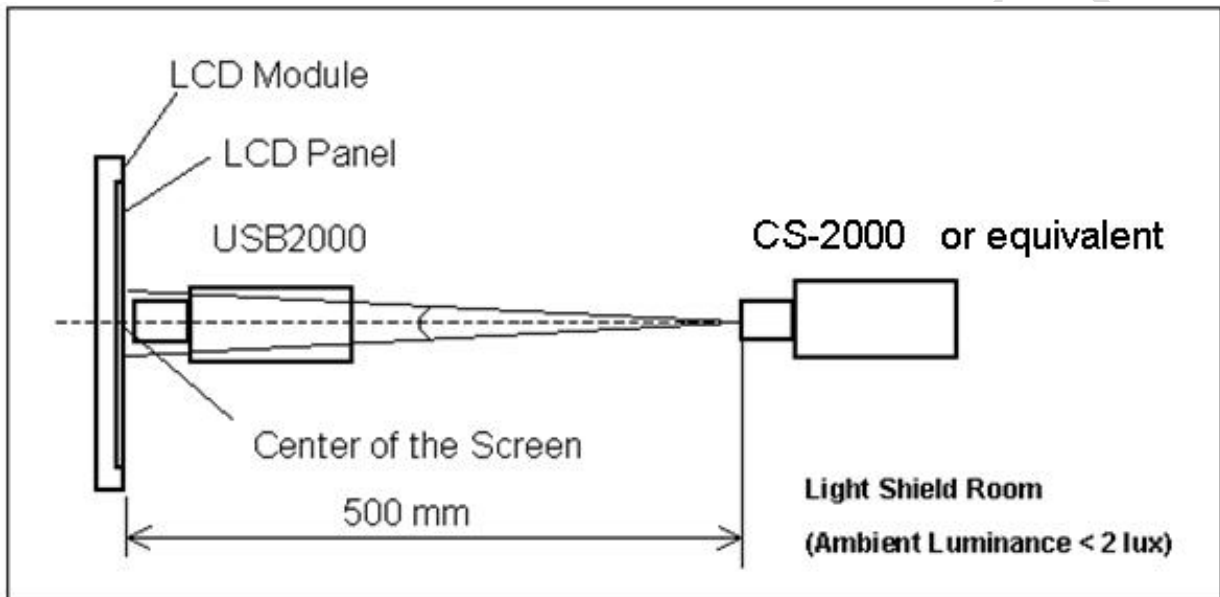
Measure the luminance of gray level 255 at center point

$LC = L(5)$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

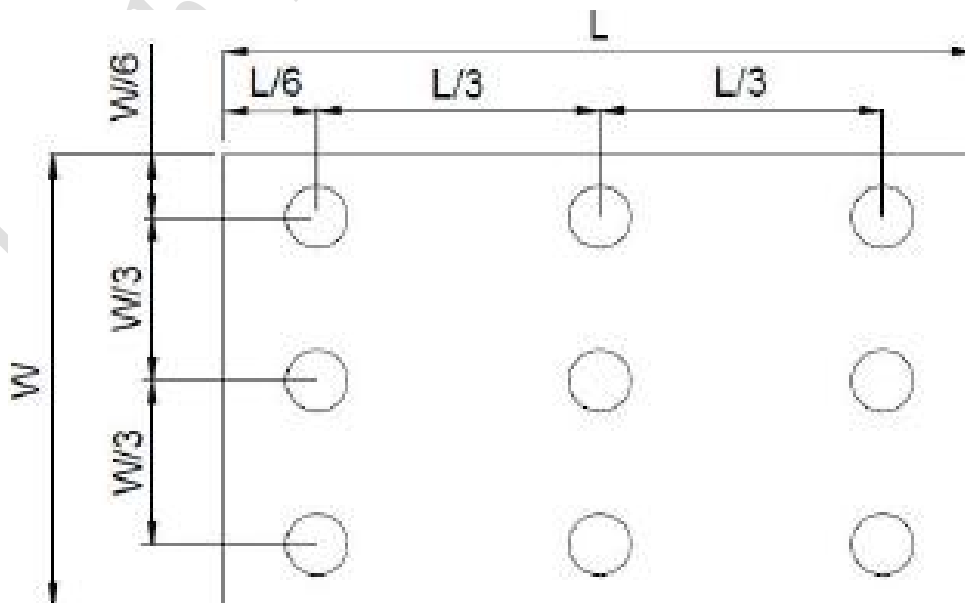
The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.



Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 255 at 9 points

$\delta W = (\text{Minimum} [L(1) \sim L(9)] / \text{Maximum} [L(1) \sim L(9)]) * 100\%$



7 Reliability Test

Test Item	Condition
High Temperature Storage Test	60°C, 240 hours
Low Temperature Storage Test	-20°C, 240 hours
High Temperature Operation Test	60°C, 240 hours
Low Temperature Operation Test	-20°C, 240 hours
High temperature & high humidity operation Test	60°C , 75%RH, 240 hours

Note 1: There should be no condensation on the surface of panel during test.

Note 2: At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note 3: In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

8 Appearance Inspection

8.1 Inspection Sampling Method:

Unless there is other agreement, the sampling plan for incoming inspection shall follow GB2828.1-2012.

- (1) Lot size: Quantity per shipment as one lot (different model as different lot).
- (2) Sampling type: Normal inspection, single sampling.
- (3) Sampling level: Level II.

8.2 Inspection Conditions

The environmental condition and visual inspection shall be conducted as below:

- (1) Light: 800~1400Lux;
- (2) Vision requirement: Naked or corrected vision of at least 1.0 and no color blindness;
- (3) Inspection background: black and white board is used as the background below the product;
- (4) Inspection distance: 30~40cm from human eyes to the measured surface;
- (5) Inspection Angle: the detected surface is 90 degree from to line of sight, and the measured Object should be rotated 45 degree from side to side;
- (6) Inspection time: 5~10s;

8.3 Inspection equipment

Secondary elements, calipers, feelers, filinka, petroleum ether, ND filter

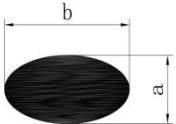
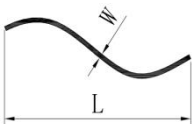
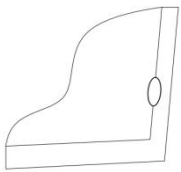
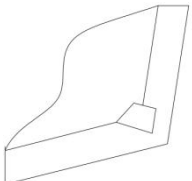
8.4 Defect code comparison table

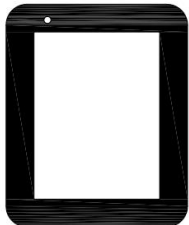
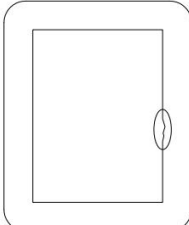
Code	Name (Unit)	Code	Name (Unit)
N	Number	D	Diameter (mm)
L	Length (mm)	H	Depth (mm)
W	Width (mm)	S	Distance (mm)
S	Area (mm ²)		

8.5 Inspection precautions

- (1) Inspectors must wear finger gloves and electrostatic bracelets.
- (2) Place the inspected product in front of the inspector, and hold the edge of the product with both hands carefully. Do not bend the product.

8.6 Inspection items and standards

Items	Standard	Conclusion	Inspection tools
Dot (white, black, heterochromatic)  $D=(a+b)/2$	$D \leq 0.3$	Ignore, dense density is not allowed	Visual inspection
	$0.3 < D \leq 0.8$	The distance with another dot is more than 10 mm, Transparent areas : $N \leq 5$, Ink areas : $N \leq 6$	
	$D > 0.8$	Not allow	
Linear defects (fibers/foreign bodies/ scratches, etc.) 	$W \leq 0.08$	Ignore, dense density is not allowed	Visual inspection
	$0.08 < W \leq 0.2$	$L \leq 15$, the distance with another scratch or impurity is more than 5mm Transparent areas : $N \leq 5$, Ink areas : $N \leq 5$	
	$W > 0.2, L > 15$	Not allow	
Bubble	According to the point standard		Visual inspection
Edge broken loss 	1. The sensor edge creaks, without damaging the line. The function test is OK for reception, and the front side is not visible after fitting. 2. Edge creak on front of cover plate: NG. 3. Back $X < 0.5\text{mm}$; $Y < 0.5\text{mm}$; $Z < 1/3\text{GT}$ (GT= glass thickness), without affecting the functionality of the product, each side is allowed three		Visual inspection
Corner broken loss 			

Items	Standard	Conclusion	Inspection tools
Creak	Creaks found at any location are not allowed		Visual inspection
Size	Meet the requirements of finished product inspection drawings		
Ink pinhole 	$D \leq 0.2$	Ignore, dense density is not allowed	
	$0.2 < D \leq 0.3$	$N \leq 6$ $DS \geq 10\text{mm}$, Repair with a paint pen of the same color as the cover plate	
Ink sawtooth 	$W \leq 0.2\text{mm}$	Ignore, dense density is not allowed	
Newton's rings	No more than 1/6 of the display area, light up invisible. If there are special requirements, the limited sample shall prevail.		
FPC 	1. Oxidation, breakage, residual glue, coating peeling, cracking and other phenomena of FPC gold fingers are not allowed. 2. Less components, false welding, deformation are not allowed.		
Color	Consistent with the sample, no serious color difference		
Mura/Waving/ Hot spot	Not visible through 5% ND filter		

9 Notices

9.1 Cautions for storage

Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less. Don't expose the products to the direct sunlight or stresses.

9.2 Cautions for operation

- (1) Do not put a heavy, hard or sharp object on the product.
- (2) Do not bend the product in order to assure the reliability.
- (3) Do not put one product on the other. Otherwise, the product to may be scratched or be changed.
- (4) Do not oile the touch panel, Do not put heavy goods on the touch panel.
- (5) Do not use any organic solvent acid or alkali solution to clean the surface of the product. Please use dry clothes or soft clothes with ethanol to clean the surface.

9.3 Cautions for operation

Light transmission is an important factor for the product. So, please wear clean finger sacks, gloves and mask to protect the products from fingerprint or stain attach, and also must ensure the area where your finger touches is outside the view area when handing the panel.

9.4 Others

- (1) Please note that dew gathering in the panel due to abrupt temperature or humidity change, etc. Which may cause deterioration of performance.
- (2) When this product was built into the package, if there is vulcanization material such as vulcanized rubber which has a possibility of generating the salutation gas near the package since abnormalities will be caused to wring of the product and it will become the cause if functional degradation, please give a constitutional cations.
- (3) Cation for product safety set

Although full care is taken to ensure product quality, failure modes such as degradation, short circuits, or open circuits might be caused, Therefore, to design a product set, please study the effects of any single failure of the panel in advance and consider the safety of product configuration.

Quality function livers for on year, outward appearance haves non-color variation in six months.