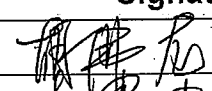
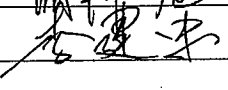


 TIANMA	☒ Final Specification ☐ Product Specification	
	Confidential	Part Number: TM080JDHP96-00
		Version: 2.0

Specification

RFQ Number: TFT-RFQ-P-201610080001
 Customer Part Number: CQXGCQ06LD06AA
 Tianma Part Number: TM080JDHP96-00
 Description: 8"HD

	Department	Name	Signature
Tianma	Integrate Project Manager	Bill Hu	
	Project Management	Felix Li	
Customer			

	☒ Final Specification ☐ Product Specification		
	Standard Product	Part Number: TM080JDHP96-00	Version: 2.0

Revision History

Version	Page	Revision Items	Name	Date
1.0	All	First release	Jara Zhang	2016.04.14
2.0	Page 5	Change CN1 pin assignment Description	Yunlong Guo	2017.7.5
2.0	Page 8	Change DC Characteristics for Panel Driving Description	Yunlong Guo	2017.7.5
2.0	Page 7	Change Operating Temperature	Yunlong Guo	2017.7.5
2.0	Page15	Change Optical Characteristics gammar 2.2 to 2.5	Nianqing Wan	2017.7.5
2.0	Page 22	Update backlight voltage in drawing	Shengen Cui	2017.7.8
2.0	Page 19	Add decay Specification after RA test.	Liqun Hou	2017.8.9
2.0	Page 10	Update note5(add markable for value)	Shengen Cui	2017.8.22
2.0	Page 19	Update note1(add reduction requirement after RA test)	Liqun Hou	2017.8.22
2.0	Page 15	Update NTSC Value	Nianqing Wan	2017.8.22
2.0	Page 15	Update Gammar tolerance	Nianqing Wan	2017.8.22
2.0	Page 15	Add 85 degree contrast ratio	Nianqing Wan	2017.8.22
2.0	Page 15	Add description about ESD operation & non-operation	Liqun Hou	2017.8.22

	☒ Final Specification ☐ Product Specification	
	Standard Product	Part Number: TM080JDHP96-00 Version: 2.0

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1. Features

This is an 8.0-inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) Normally Black technology module, which is composed of a TFT-LCD panel, LCD Driver IC with T-con integrated, FPC and a LED backlight unit. It is designed for Automotive and other high reliability electronic products and complies with the RoHS environmental protection directive.

2. General Specifications

Feature		Spec
Display Spec.	Size	8.0 inch
	Resolution	1280(RGB) x 720
	Interface	One-port LVDS 24 bits VESA
	Color Depth	16.7 M
	Technology Type	a-Si
	Pixel Pitch (mm)	0.138 x 0.138
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black SFT technology
	Surface Treatment (LCD Upper Polarizer)	HC
	Gray Scale Inversion Direction	No gray inversion.
	Viewing Direction	Landscape Mode Optimized
	LCM (W x H x D) (mm)	192.8x116.9x7.0
	Polarizer Sunglass Compatible	Yes
Mechanical Characteristics	Active Area(mm)	176.64 x 99.36
	With /Without Touch Panel	Touch panel not included
	Weight (g)	Typ. (210)g
	LED Configuration	3 parallels 8 serials

Table 2.1 General TFT Specifications

Note 1: Requirements on Environmental Protection: RoHS.

Note 2: The height dimension does not include the length of FPC.

Note 3: LCM weight tolerance: $\pm 10\%$.

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3. Input/output Terminals

3.1CN1 pin assignment

Connector type: FH28D-30S-0.5SH (HIROSE)

PIN NO.	Symbol	P/I/O	Description	Remark
1	NC	N	No connection	
2	RESET	I	Global reset signal	
3	STBYB	I	Standby mode control signal	
4	GND	P	Power Ground	
5	SDA	I/O	Serial Interface address and data input/output. Normally pull low.if not use SPI , floating	
6	SCL	I	Serial Interface clock input , Normally pull low. if not use SPI , floating	
7	CSB	I	Serial Interface chip enable signal CSB=0: Selected CSB=1: Not selected Normally pull high.if not use SPI , floating	
8	GND	P	Power Ground	
9	TB	I	Vertical shift direction (gate output) selection. Normally pull high	
10	RL	I	Horizontal shift direction (source output) selection. Normally pull high	
11	GND	P	Power Ground	
12	LV3P	I	Positive LVDS Differential data input(3)	
13	LV3N	I	Negative LVDS Differential data input(3)	
14	GND	P	Power Ground	
15	CLKP	I	Positive LVDS Differential clock input	
16	CLKN	I	Negative LVDS Differential clock input	
17	GND	P	Power Ground	
18	LV2P	I	Positive LVDS Differential data input(2)	
19	LV2N	I	Negative LVDS Differential data input(2)	
20	GND	P	Power Ground	
21	LV1P	I	Negative LVDS Differential data input(1)	
22	LV1N	I	Negative LVDS Differential data input(1)	
23	GND	P	Power Ground	
24	LV0P	I	Positive LVDS Differential data input(0)	
25	LV0N	I	Negative LVDS Differential data input(0)	
26	GND	P	Power Ground	
27	TPSYNC	N	No connection →TPSYNC(for error detection)	
28	VDD	P	Power supply 3.3+/-0.3V	
29	VDD	P	Power supply 3.3+/-0.3V	
30	VDDOTP	N	Tianma used,must be floating on customer side	

Table 3.1.1 Pin assignment for TFT interface

	☒ Final Specification ☐ Product Specification	
	Standard Product	Part Number: TM080JDHP96-00 Version: 2.0

Note1: All of GND pins should be connected to system ground.

Note2: I/O definition.

I---Input, O---Output, P--- Power/Ground, N--- No connection

Note3: VCOM is DC power supply

Note4:

Scan Control Input		Scanning Direction
TB	RL	
L	H	Bottom →Top, Left →Right
H	L	Top →Bottom, Right →Left
H	H	Top →Bottom, Left →Right
L	L	Bottom →Top, Right →Left

Table 3.1.2 Scan direction Description

The recommended resistance of pull high/low resistor in TB or RL pin is 4.7K ohm.



Figure 4.1.1 Scan direction Description

3.2 CN2 pin assignment (Backlight interface)

Connector type: FH28-10S-0.5SH Hirose

PIN NO.	Symbol
1	A1
2	A2
3	A3
4	NC
5	NTC+
6	NTC-
7	NC
8	C3
9	C2
10	C1

Table 3.2.1 Pin assignment for backlight interface

	☒ Final Specification ☐ Product Specification		
	Standard Product	Part Number: TM080JDHP96-00	Version: 2.0

4. Absolute Maximum Ratings

GND=0V, Ta = 25°C

Item	Symbol	Min	Max	Unit	Remark
Power supply voltage	VDD	-0.3	3.96	V	
Digital I/O signal input	Vio	-0.3	VDD+0.3	V	
Back Light Forward Current	If	-	150	mA	Per chain
Operating Temperature	Top	-40	85	°C	Note
Storage Temperature	Tst	-40	95	°C	

Table 4.1.1 Absolute maximum rating

Note1: The temperature is the surface temperature of module

Note2: If the voltage exceeds its absolute maximum ratings, the LCM maybe damaged. In addition, if the LCM is operated with the absolute maximum ratings for a long time, its reliability drops.

Note3: Functional operation should be restricted under normal ambient temperature.

Note4: For TFT LCD module, 95°C is OK. For TFT LCD with CTP optical bonding, need optical bonding process to guarantee.

Note5: During -40~-30C(ambient) , the operating performance is not guaranteed except no functional damage occur.

5. Electrical Characteristics

5.1 DC Characteristics for Panel Driving

GND=0V

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	3.0	3.3	3.6	V	
Power consumption	Ivdd	-	250	400	mA	VDD=3.3V, white pattern, DCLK=63.7MHz , fv=60Hz Note 1
In-rush current	Ivdd-rush	-	-	1	A	VDD=3.3V Note 1
Control Signal	Vh	0.7*VDD	-	VDD	V	T=25°C
	VI	0	-	0.3*VDD	V	T=25°C
Allowable VDD ripple	VDD-ripple	-	-	100	mV	
Pull low resistor	RIL	200	355	850	KΩ	VDD=3.3V T=25°C
Pull high resistor	RIH	200	355	850		
Differential Input High Voltage(threshold)	Vth	-	-	0.1	V	Note2

	☒ Final Specification ☐ Product Specification		
	Standard Product	Part Number: TM080JDHP96-00	Version: 2.0

Differential Input Low Voltage(threshold)	V _{tl}	-0.1	-	-	V	
Magnitude Differential Input Voltage	V _{id}	0.2	-	0.6	V	
Common Mode Voltage	V _{cm}	1	1.2	1.8- V _{id} /2	V	
Spread Spectrum Clocking Ratio	SSCR	50	-	200	KHz	

Table 5.1.1 LCD module electrical characteristics

Note1: For different LCM, the value may have a bit of difference.

Note2: Refers to the LVDS waveform below

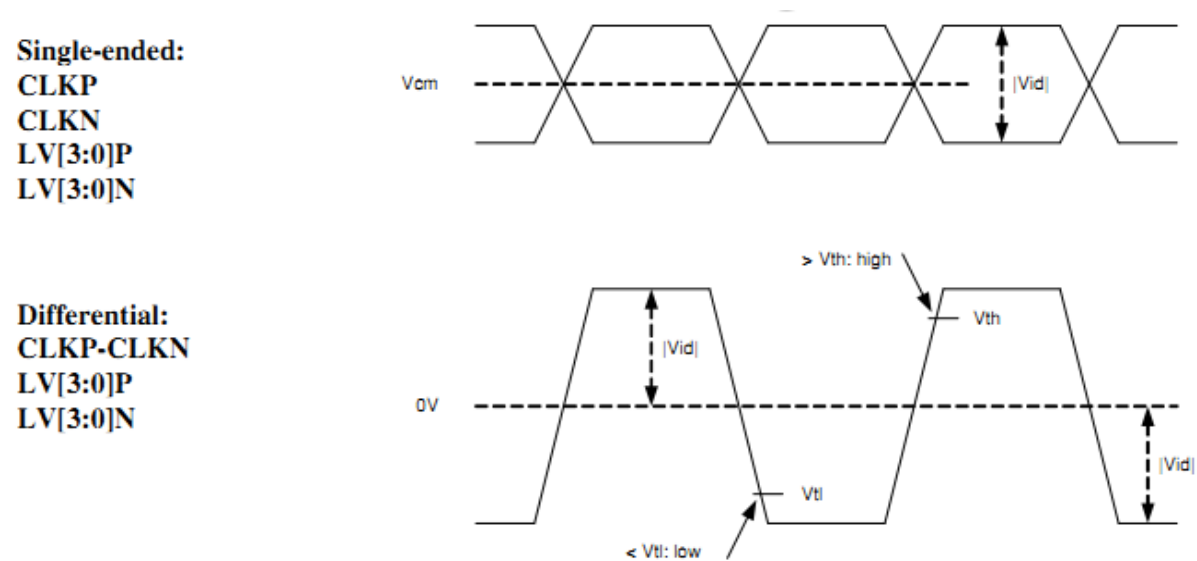


Figure 5.1.2 LVDS waveform

Parameter	Symbol	Min.	Spec. Typ.	Max.	Unit	Condition
Modulation Frequency	SSC _{MF}	-	-	200	Khz	LVDS clock frequency centered at 80MHz.
		-	-	150	Khz	LVDS clock frequency centered at 60MHz.
		-	-	100	Khz	LVDS clock frequency centered at 40MHz.
		-	-	50	Khz	LVDS clock frequency centered at 20MHz.
Modulation Rate	SSC _{MR}	-	-	±5	%	LVDS clock frequency + SSC _{MR} is in the range of 10~85MHz.

Table 5.1.3 SSC limitation of LVDS interface

5.2 DC Characteristics for Backlight Driving

	☒ Final Specification ☐ Product Specification		
	Standard Product	Part Number: TM080JDHP96-00	Version: 2.0

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_{BL}	-	90	108	mA	Note1
Forward Voltage	V_{BL}	21.6	24	25.6	V	Note3
LED Life Time	-	10000	-	-	Hrs	Note2
Backlight Power Consumption	W_{BL}	5.83	6.48	6.91	W	Note3

Table 5.2.1 LED backlight characteristics

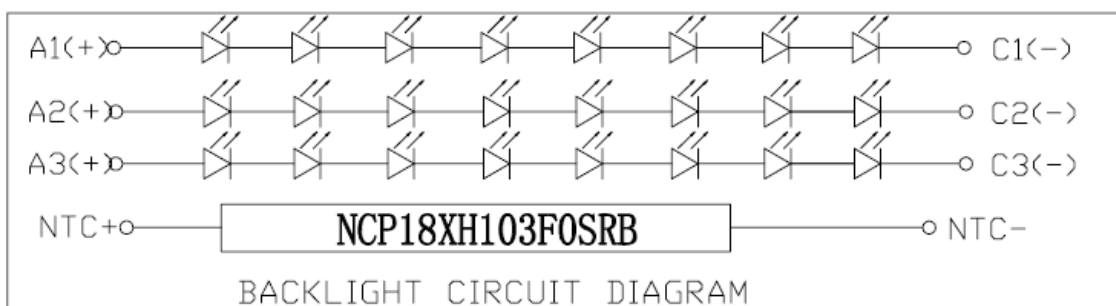


Table 5.2.2 LED backlight characteristics

Note 1: I_{BL} is defined for one channel LED, There are total three LED channels in back light unit Under LCM operating, and the stable forward current should be inputted.

Note 2: It is estimation result based on LED supplier data. Optical performance should be evaluated at $T_a=25^{\circ}\text{C}$ only. Operating life means brightness goes down to 50% of original brightness.

Note 3: Forward voltage and backlight power consumption are measured under typical current ($I_{BL}=90\text{mA}$ each chain).

Note 4: The NTC thermistor Part No. is NCP18XH103F0SRB. NTC thermistor is included in LED circuit. It's used for the LED controlling and the location is in the middle of the LED circuit on backlight FPC

Item	Value	Remarks
Type	NCP18XH103F0SRB	Murata
Resistance Tolerance	$10\text{k}\Omega \pm 1\%$	$T_a=25^{\circ}\text{C}$
Permissive Operating Current	0.31mA	$T_a=25^{\circ}\text{C}$

Table 5.2.3 Thermistor description

Note 5: it is suggested Customer to make sure the LCM module in the system is well heat dissipation. When operating at high temperature, keep panel surface temperature under 85°C or obey the de-rating curve as Figure 5.2.2(for reference).

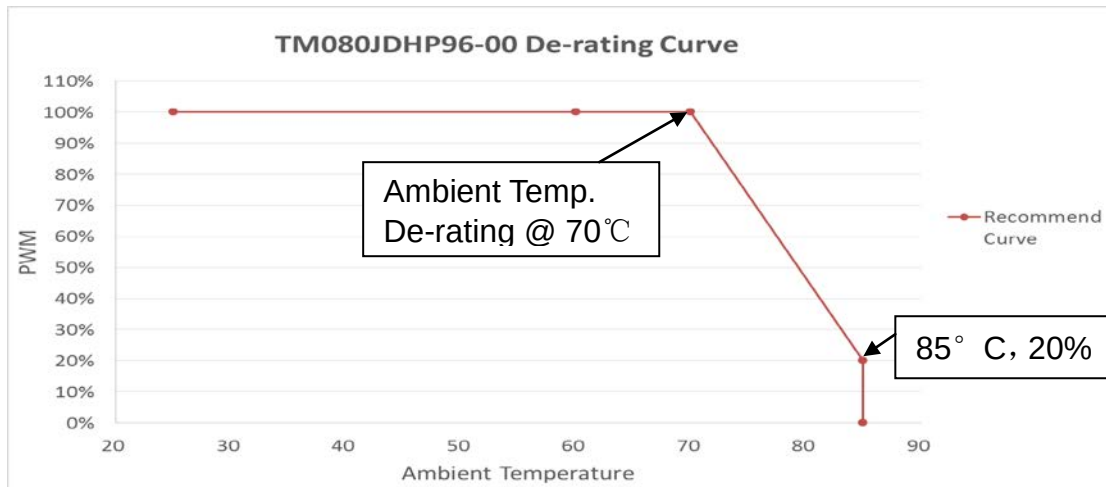


Figure 5.2.3 Backlight Current De-Rating Curve (Tentative)

5.3 Recommended Power ON/OFF Sequence

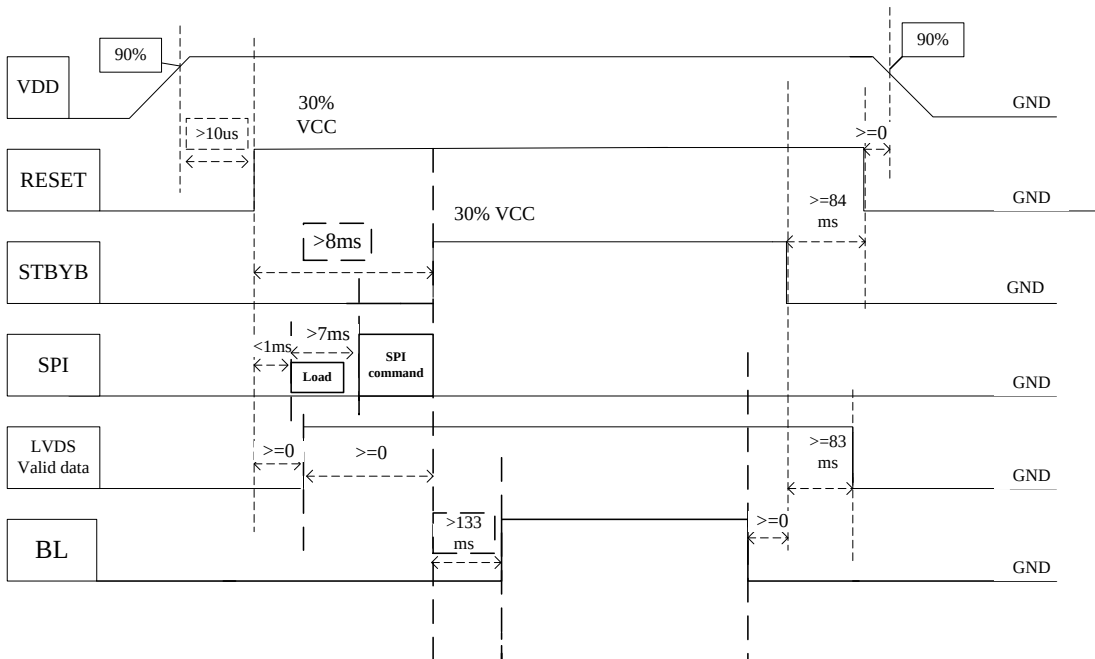


Figure 5.3.1 Power on/off Sequence

Note1: The low level of these signals and analog powers are GND level.

Note2: All of power and signals should be kept GND level before power on.

IF there are remaining voltages on them, LCD might become abnormal.

Note3: BL is the voltage applied to backlight, and it will stay low level before display stability; and it need to be turned off before STBYB off.

Note4: LVDS valid data for all pairs. The valid LVDS signals (clock pair and data pairs in toggling state) should be consistent with panel solution and timing specification.

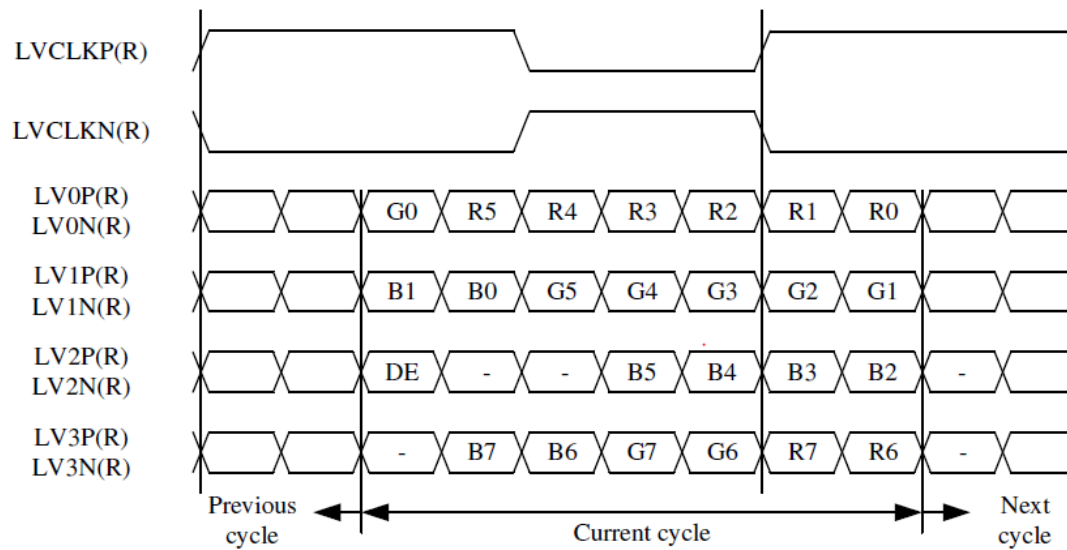


Figure 6.1.1. LVDS, 8-bit, VESA format

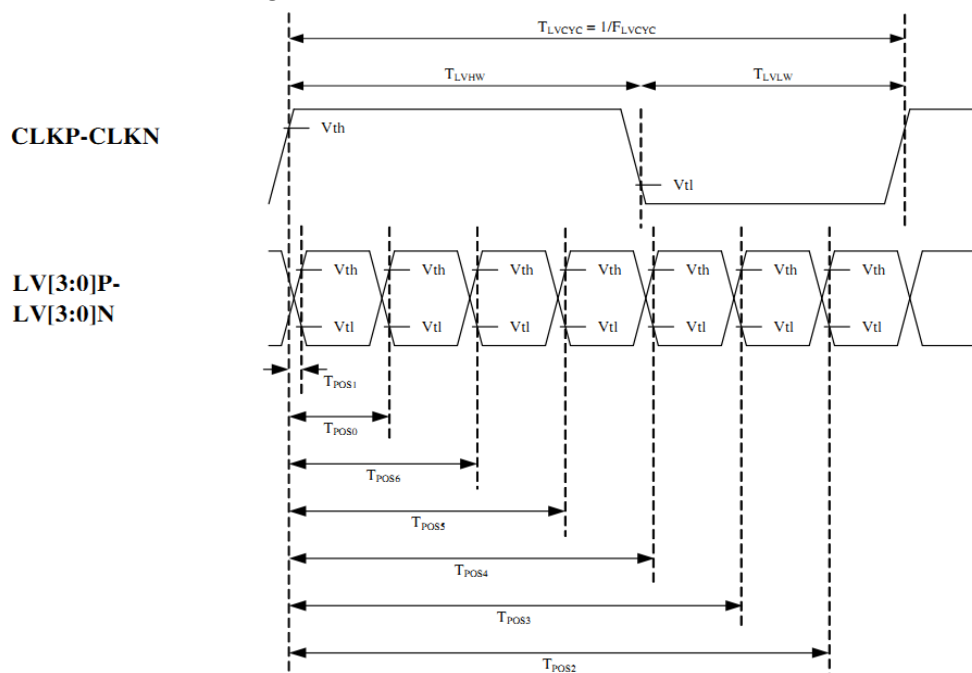
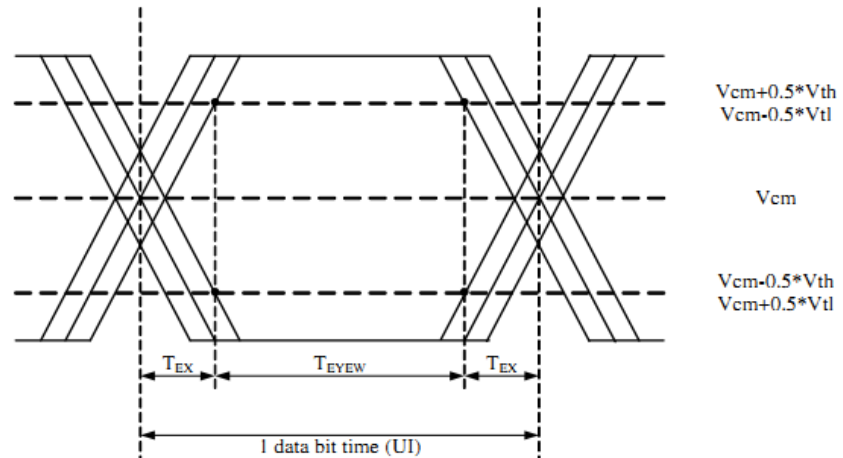


Figure 6.1.2. LVDS input timing

Single-ended:

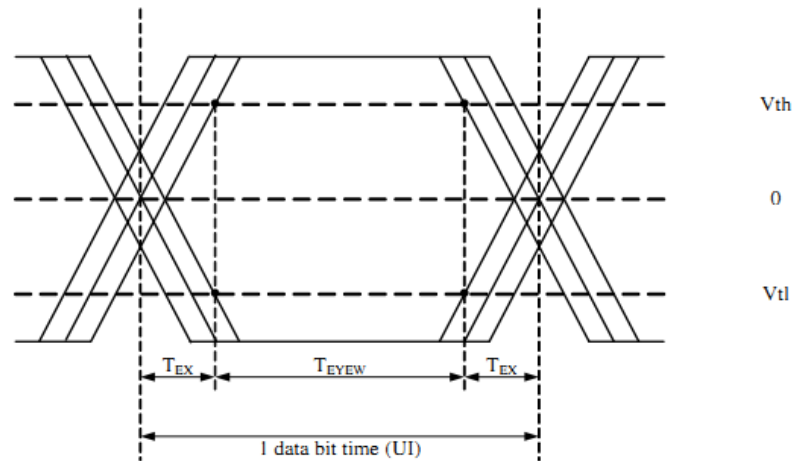
LV[3:0]P,

LV[3:0]N



Differential:

LV[3:0]P-LV[3:0]N



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	FLVCYC	10	-	85	MHz
Clock period	TLVCYC	11.76	-	100	nsec
1 data bit time	UI	-	1/7	-	TLVCYC
Position 1	TPOS1	-0.2	0	0.2	UI
Position 0	TPOS0	0.8	1	1.2	UI
Position 6	TPOS6	1.8	2	2.2	UI
Position 5	TPOS5	2.8	3	3.2	UI
Position 4	TPOS4	3.8	4	4.2	UI
Position 3	TPOS3	4.8	5	5.2	UI
Position 2	TPOS2	5.8	6	6.2	UI
Input eye width	TEYEW	0.6	-	-	UI
Input eye border	TEX	-	-	0.2	UI
LVDS wake up time	TENLVD S	-	-	150	μs

Table 6.1.3. LVDS input timing parameters

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6.2 SPI timing

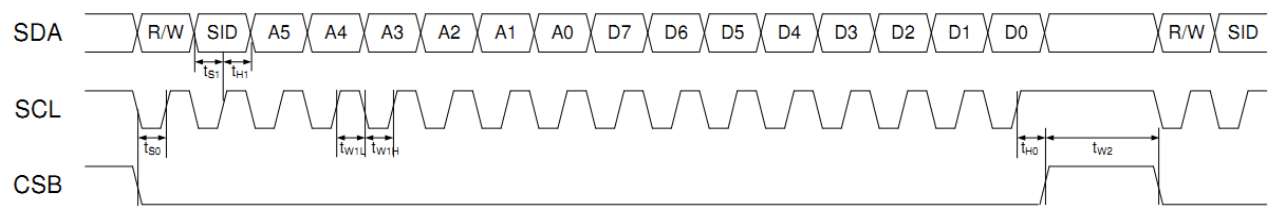


Figure 6.2.1 SPI signal timing

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
SDA Setup Time	t_{s0}	CSB to SCL	60	-	-	ns
	t_{s1}	SDA to SCL	60	-	-	ns
SDA Hold Time	t_{H0}	CSB to SCL	60	-	-	ns
	t_{H1}	SDA to SCL	60	-	-	ns
Pulse Width	t_{W1L}	SCL pulse width	75	-	-	ns
	t_{W1H}	SCL pulse width	75	-	-	ns
	t_{W2}	CSB pulse width	1	-	-	μ s
Clock duty	-	-	40	50	60	%

Figure 6.2.2 SPI signal parameter

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7. Optical Characteristics

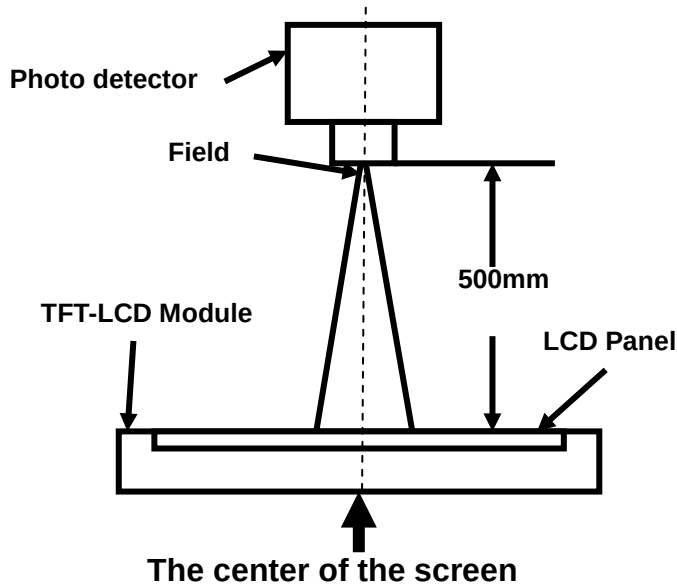
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		U	CR≥10	80	88	--	Degree	--
		D		80	88	--		
		L		80	88	--		
		R		80	88	--		
Contrast Ratio		CR	⊥,25℃	700:1	1000:1	--		Note3 Note6
			⊥,85℃	--	50% value of 25℃	--		
Response Time		Ton+Toff	25℃	--	--	30	ms	Note4
			-20℃	--	--	300		
			-30℃	--	--	500		
Chromaticity	White	x	Backlight is on	0.260	0.300	0.340		Note5
		y		0.290	0.330	0.370		
	Red	x		0.610	0.640	0.670		
		y		0.282	0.312	0.342		
	Green	x		0.282	0.312	0.342		
		y		0.601	0.631	0.661		
	Blue	x		0.128	0.158	0.188		
		y		0.039	0.069	0.099		
Uniformity		White		80	85	--	%	Note1 Note6
NTSC			⊥	68	73	--	%	Note5
Luminance		L		800	1000	--	cd/m ²	Note1 Note7
Flicker		dB	50%Gray pattern			-20		Center of Display.
Gamma		γ		2.2	2.5	2.8		VESA standard Perpendicular
Reflection		SCI	25℃	--	5.5%	6%	%	For Reference

Test Conditions:

1. $I_F = 90\text{mA} \times 3\text{chains} = 270\text{mA}$, the panel surface temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

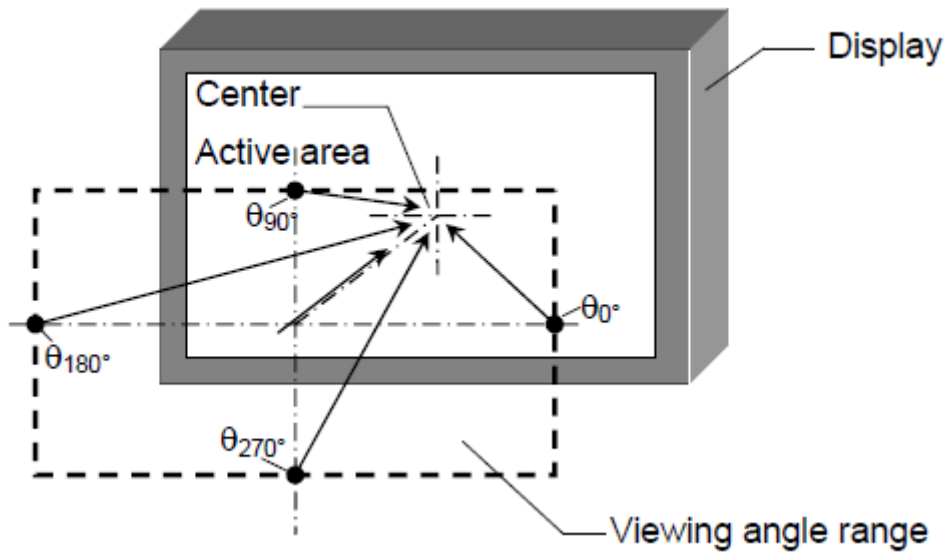
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	DMS 803	3mm
Reflectivity	CM-3600	

Note 2: Definition of viewing angle range and measurement system



FPC at θ₂₇₀°

Note 3: Definition of the contrast ratio

"White state": The state is that the LCD should be driven by V_{white} .

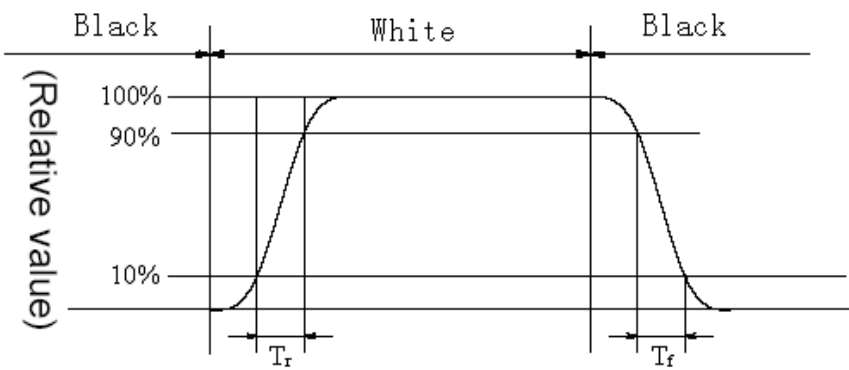
"Black state": The state is that the LCD should be driven by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

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

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Note 4: Definition for Response time
 Ton + Toff
 The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 10% to 90%. And fall time (TOFF) is the time between photo detector output intensity changed from 90% to 10%. Refer to below.

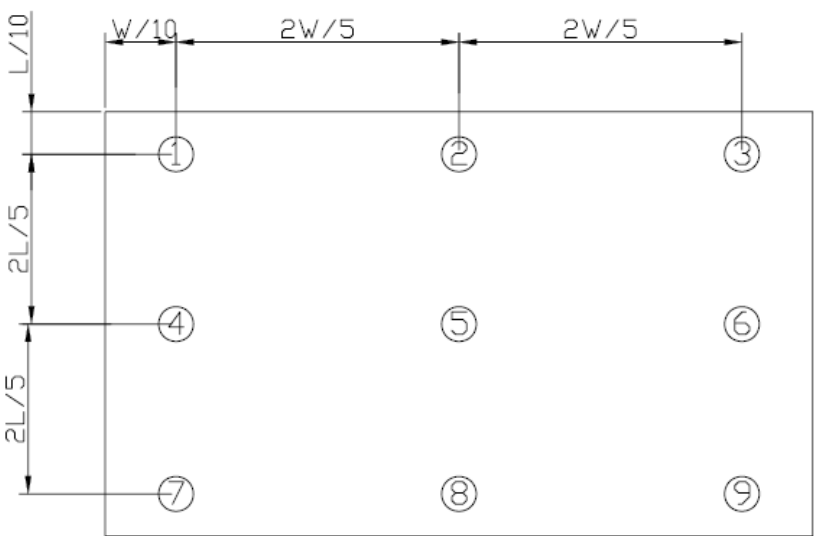


Note 5: Definition of color chromaticity (CIE1931)
 Color coordinates measured at center point of LCD.

Note 6: Contrast ratio against temperature
 CR defines the allowed contrast reduction at the defined temperature based on the CR at room temperature. For example: $CR = (CR@25^{\circ}C - CR@-30^{\circ}C) / CR@25^{\circ}C \times 100\%$

Note 7: Luminance homogeneity
 The luminance uniformity is calculated by using following formula.

$$\text{Luminance uniformity (Lu)} = \frac{\text{Minimum luminance from ① to ⑨}}{\text{Maximum luminance from ① to ⑨}}$$



Note 8: Definition of Luminance:
 Measure the luminance of white state at center point.

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8. Reliability Test

8.1 Content of Reliability Test

No	Test Item	Test condition	Criterion
1	High Temperature Storage	95±2℃ 500H RH≤45% Restore 2H at 25℃ non-operation	Note1, Note2, Note4
2	Low Temperature Storage	-40℃±3℃ 500H Restore 2H at 25℃ non-operation	Note1, Note2, Note4
3	High Temperature Operation	85℃±2℃ 500H RH≤45% Restore 2H at 25℃ operation	Note1, Note2, Note4
4	Low Temperature Operation	-40℃±3℃ 500H Restore 2H at 25℃ operation	Note1, Note2, Note4 , Note5
5	High Temperature & Humidity Operation	60℃±2℃, 90±2%RH 240H operation	Note1, Note2, Note4
6	Thermal Shock	-40℃→ change→+85℃ 30min 30s 30min 100cycle non-operation	Note1, Note2, Note4
7	Vibration Test	Frequency: 8 - 33.3 Hz, Total amplitude: 1.3mm Frequency: 33.3 - 400 Hz, Acceleration: 29.4 m/s ² sweep time: 15 minutes 2 hours each for X and Z directions, 4 hours for Y direction (total 8 hours) Non-operation	Note1, Note2
8	Shock Test	100 x 9.8m/s ² , t=6ms, XYZ directions, Half sin curve, [non-operating],each directions 2 times	Note1, Note2
9	ESD	operation: C=330pF±10%,R=2000Ω±10%, 5 point/panel Air discharge: +/-15KV Contact: +/-8KV non-operation C=150pF±10%,R=330Ω±10%, 5 point/panel Air discharge: +/-15KV Contact discharge: +/-8KV	Note1, Note2, Note3

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10	Image sticking	Burn in : Checkerboard, 1h @+25°C , change to 50% Gray pattern , ≤	Only for reference																		
		<table><tr><td>Level</td><td>描述</td></tr><tr><td>0</td><td>◎ 无</td></tr><tr><td>0.5</td><td>◎○ 正面看不到, 下视角(反转方向)看隐约可见(无轮廓)</td></tr><tr><td>1</td><td>○ 正面看不到, 下视角(反转方向)看隐约可见(1边轮廓可见)</td></tr><tr><td>1.5</td><td>○△ 正面看不到, 下视角(反转方向)看得见</td></tr><tr><td>2</td><td>△ 正视角隐约可见(无轮廓)</td></tr><tr><td>2.5</td><td>△× 正视角看得到(一部分无轮廓)</td></tr><tr><td>3</td><td>× 正视角看得到(有轮廓)</td></tr><tr><td>L2 4</td><td>×× 正视角清楚可见</td></tr></table>		Level	描述	0	◎ 无	0.5	◎○ 正面看不到, 下视角(反转方向)看隐约可见(无轮廓)	1	○ 正面看不到, 下视角(反转方向)看隐约可见(1边轮廓可见)	1.5	○△ 正面看不到, 下视角(反转方向)看得见	2	△ 正视角隐约可见(无轮廓)	2.5	△× 正视角看得到(一部分无轮廓)	3	× 正视角看得到(有轮廓)	L2 4	×× 正视角清楚可见
		Level		描述																	
		0		◎ 无																	
		0.5		◎○ 正面看不到, 下视角(反转方向)看隐约可见(无轮廓)																	
		1		○ 正面看不到, 下视角(反转方向)看隐约可见(1边轮廓可见)																	
		1.5		○△ 正面看不到, 下视角(反转方向)看得见																	
		2		△ 正视角隐约可见(无轮廓)																	
		2.5		△× 正视角看得到(一部分无轮廓)																	
		3		× 正视角看得到(有轮廓)																	
L2 4	×× 正视角清楚可见																				

Note1: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

- 1) Air bubble in the LCD
- 2) Seal leak
- 3) Non-display
- 4) Missing segments
- 5) Glass crack
- 6) CR reduction >50%
- 7) Brightness reduction >50%
- 8) Color coordinate tolerance >0.05

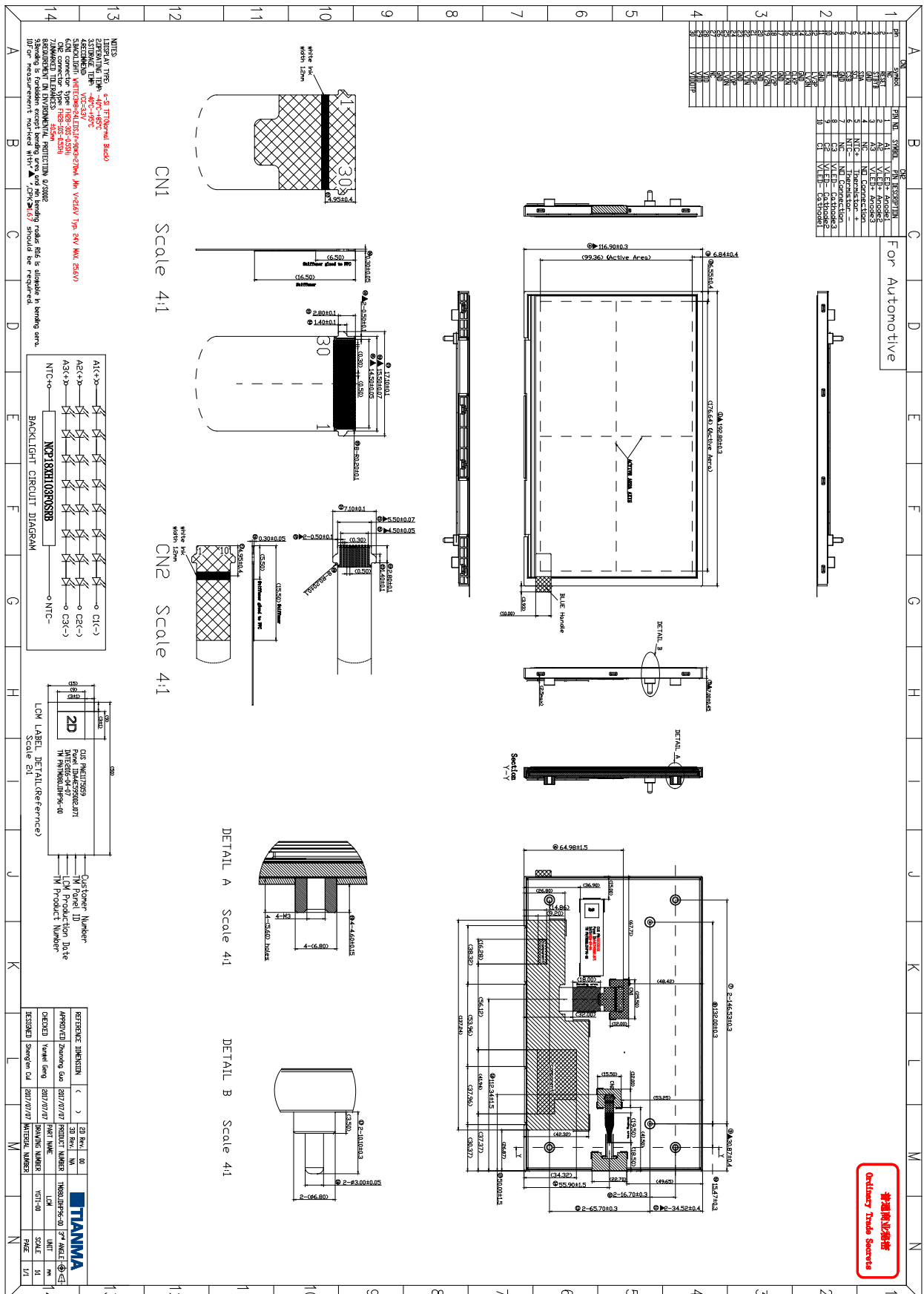
Note2: Use sample for only one reliability test.

Note3: In case of an abnormal display caused by discharge, if it can recover to normal state after reset, it is considered as passing. The use of an ionizer (antistatic blower) is recommended during this test. When removing the protection film from LCM panel, keep a slowly speed (recommend more than one second) and blowing with ionizer toward the peeling face to minimize ESD which may damage the electrical circuit. ESD test should meet Class B level

Note4: For duration test in the chamber

- a. Keep a small distance between each sample and don't place the samples close to the wall or the wick. Don't open the chamber except as necessary.
- b. During the test, avoid moisture condensation on the polarizer.
- c. After taking the samples out of the chamber and returning to room temperature and humidity, wait at least two hours before inspecting and measuring data.

Note5: During -40~-30C(ambient) , the operating performance is not guaranteed except no functional damage occur.



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10. Product Inspection Criteria

10.1 Inspection Conditions

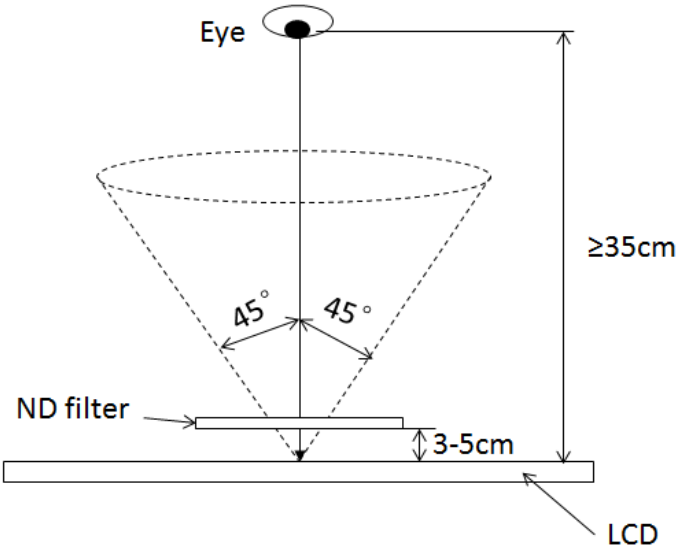
- 10.1.1 Ambient conditions:
- a. Temperature: Room temperature 25±5℃

b. Humidity: (60±10) %RH

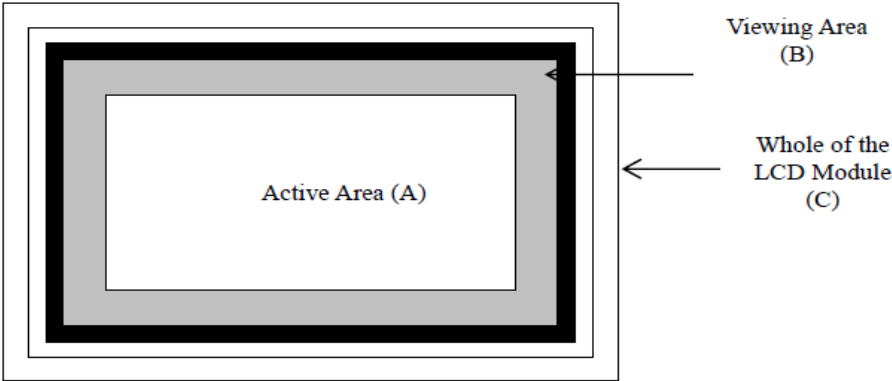
c. Illumination:

light-on 100-200Lux

light-off 800-1200lux
- 10.1.2 Viewing distance
- The distance between the LCD and the inspector's eyes shall be 35cm or more.
- 10.1.3 Viewing Angle
- U/D: 45°/45°, L/R: 45°/45°



- 10.1.4 Light-on condition
- The current of the Backlight should refer to the recommended typical value in this specification.
- 10.1.5 Definition of LCD zone



A-zone:The inside of the Active Area(as defined on the product drawing)

B-zone:The inside of the Viewing Area which is between A-zone and the metal frame

C-zone: Whole of the LCD Module except the zone A and B. (Including FPC& Metal

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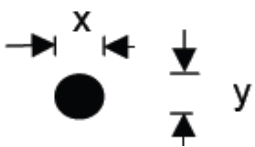
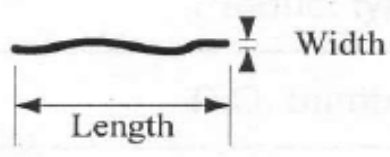
Frame&backside of the LCD Module)

10.2 Cosmetic Inspection Criteria

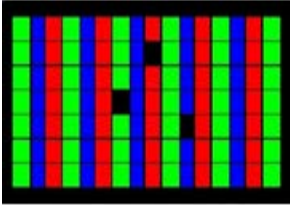
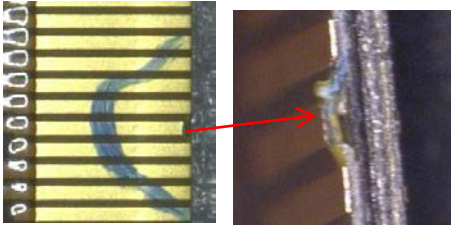
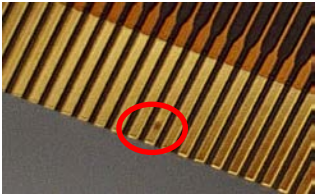
10.2.1 Major defect:

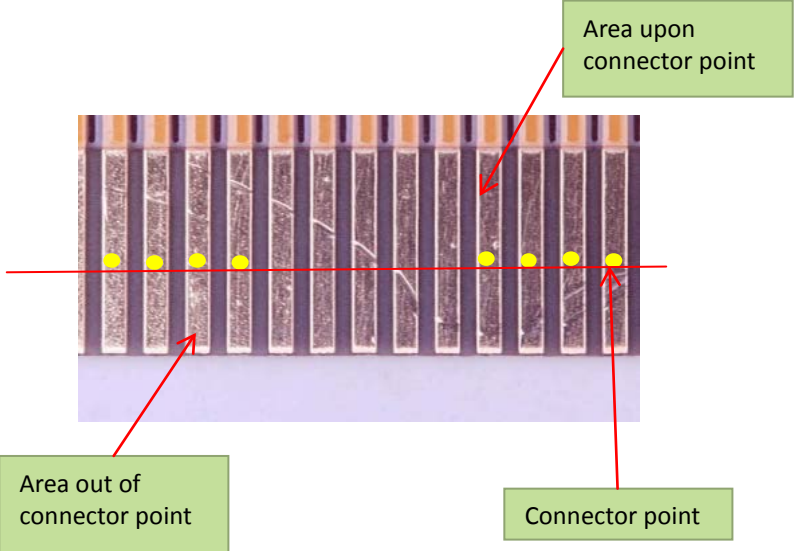
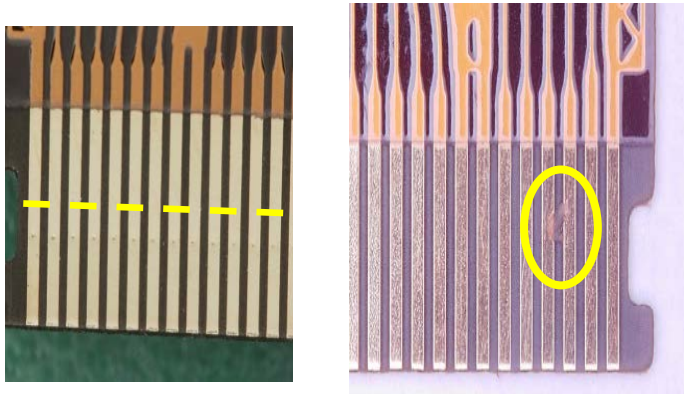
No	Items to be inspected	Inspection standard
1	All functional defects	1) No display 2) Abnormal display 3) Short circuit 4) line defect
2	Missing	Missing function component

10.2.2 Minor defect:

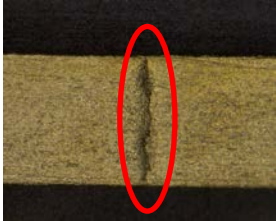
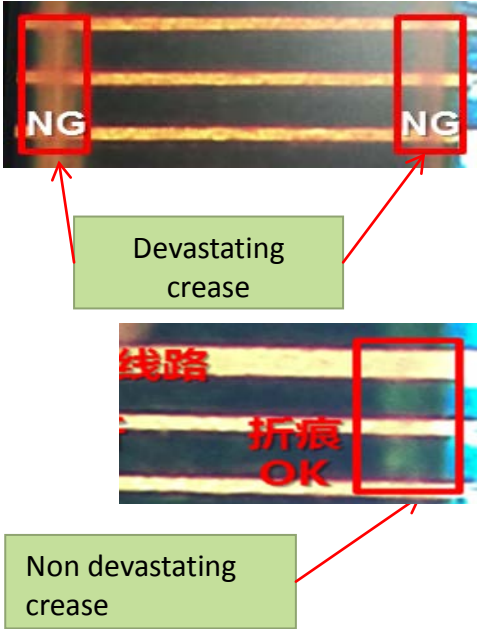
No	Items to be inspected	Inspection standard	
1	White spot, Foreign material spot (Including cell foreign material, Pol foreign material) Polarizer Dent/Bubble Black spot (including BL particle)	For dark/white spot is defined $\varphi = (x + y) / 2$ 	
		Size φ (mm)	Acceptable Quantity
		$\varphi \leq 0.20$	Ignore
		$0.20 < \varphi \leq 0.30$	3
		$0.30 < \varphi$	Not allowed
		Note: The distance of each dot $\geq 10\text{mm}$	
2	Line Defect Including: Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.03$ and $L \leq 3.0$	Ignore
		$0.03 < W \leq 0.05$ and $L \leq 3.0$	2
		$0.05 < W$ or $L > 3.0$	Not allowed
		Note: The distance of each line $\geq 10\text{mm}$	

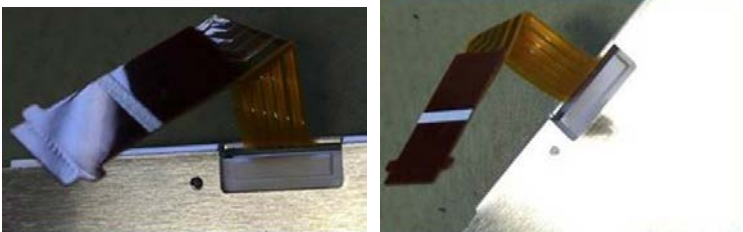
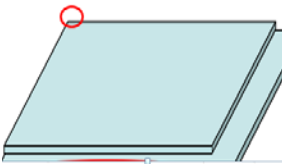
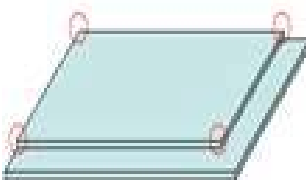
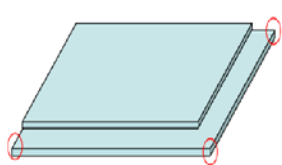
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3	Electrical Dot Defect	Bright and Black dot define:  and 	
		Inspection pattern: Full white、Full black、Red、green and blue screens	
		Item	Acceptable Quantity
		Black dot defect	3
		Bright dot defect	0
		Total Dot	3
		Note: The distance of each dot $\geq 10\text{mm}$	
4	Mura, Yellow Border (variation of film thickness from bonding), Inhomogeneous color of the background inside viewing area (rainbow coloring)	Can't be found through 3% ND filter	Allowed
		Can be found through 3% ND filter	Not allowed
		Note: 1. Inspection pattern: Full white、Full black, and use 3% ND filter (Near module surface, 3~5cm) 2. Inspection environment illumination 100-300Lux	
5	FPC--The tip of the terminal missing		
		Item	Acceptable Quantity
		chip remain on the pin	Not allowed
		debris on the remaining pin	Not allowed
		terminal missing and perk	Not allowed
6	FPC--Dent		
		Item	Acceptable Quantity

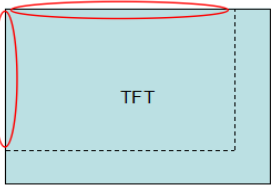
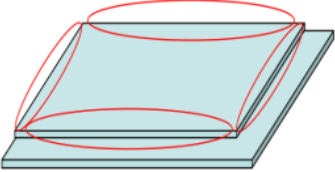
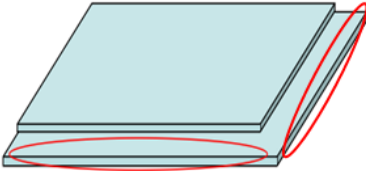
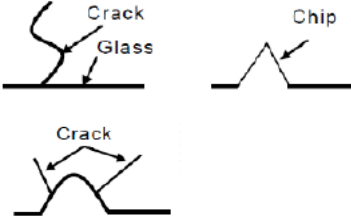
		The dent damage the golden layer to make the copper layer beneath exposed to air	Not allowed
		The width of dent > 1/2 width FPC golden finger	Not allowed
7	FPC--Scratch		
		Item	Acceptable Quantity
		Damage the golden layer to make the copper layer beneath exposed to air, upon the connector point area	Not allowed
		scratch in the area out of the connector point	Ignore
		Debris caused by scratch on the scratch area	Not allowed
8	FPC— contamination		
		Item	Acceptable Quantity
		Conductive contamination exist in pin center to pin terminal	Not allowed
		No moving foreigner contamination between two pins	Allowed

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		Visual inspection FPC pins with contamination and protrusion (except for the dent of contact point)	Not allowed
9	FPC—Crack		
		Item	Acceptable Quantity
		crack within CCD	Not allowed
10	FPC--Warp in the tip of the terminal		
		Item	Acceptable Quantity
		warp in the tip of the terminal	Not allowed
11	FPC circuit bending		
		Item	Acceptable Quantity
		Circuit devastating crease & break off	Not allowed
		Non devastating crease	Allowed

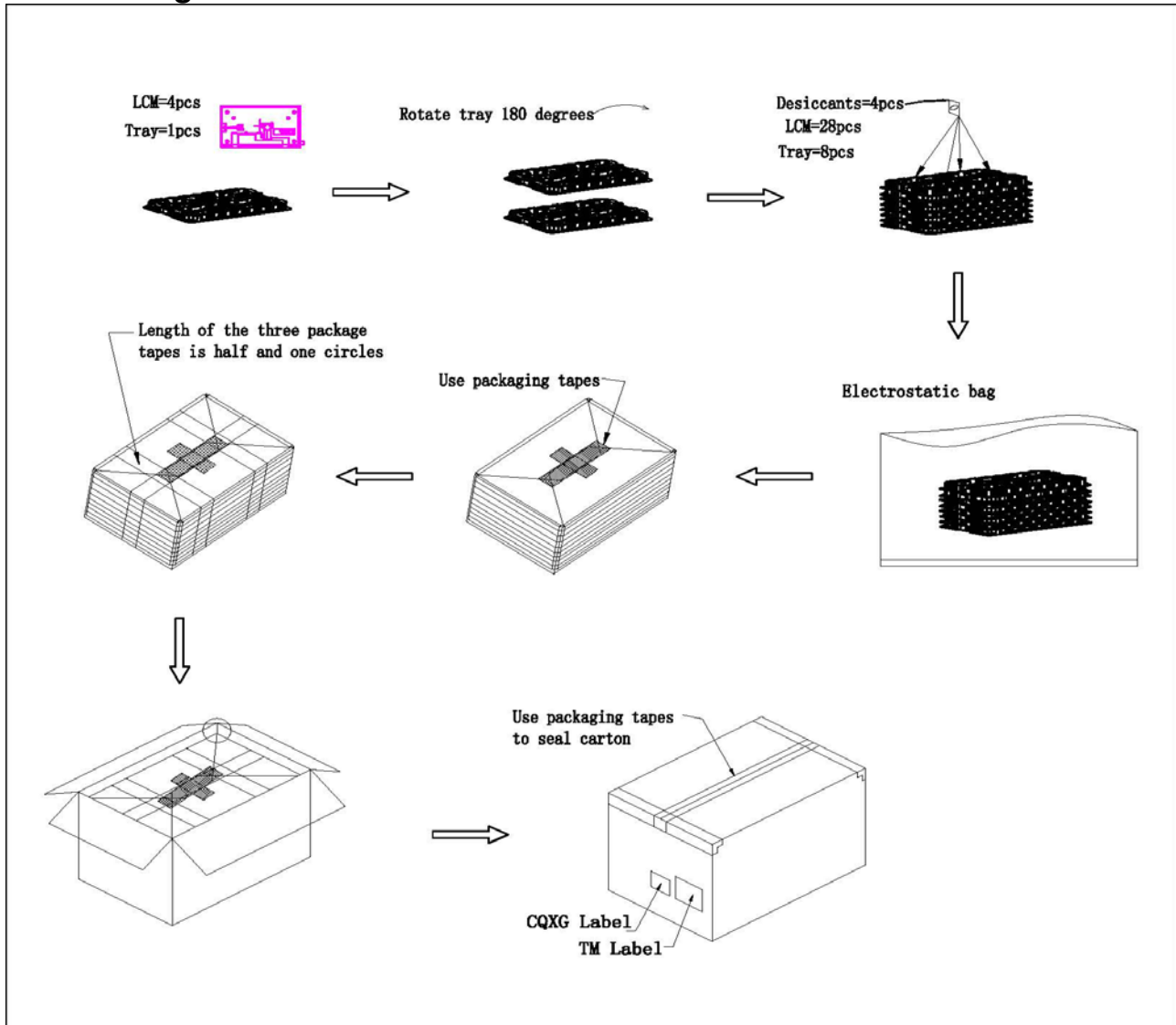
		Note: 1. Inspection with CCD 2. Devastating crease refers to the crease on the FPC that its color is distinguished from normal reign of FPC with CCD inspection and the circuit is covered by the color.	
12	FPC deformation		
		Item	Acceptable Quantity
		FPC deformed as illustration after taken out from package	Not allowed
13	Glass defect— Corner chip	Item	Acceptable Criteria
		TFT Side (Not step area) 	$X \leq 0.7\text{mm}$, $Y \leq 0.7\text{mm}$, $Z \leq T$ (Note: If $Y < 0.3$, it should be follow side fragment criteria)
		CF Side (Not step area) 	$X \leq 1\text{mm}$, $Y \leq 1\text{mm}$, $Z \leq T$ (Note: If $Y < 0.3$, it should be follow side fragment criteria)
		Step area 	$X \leq 3\text{mm}$, $Y \leq 1\text{mm}$, $Z \leq T$
14	Glass defect— Side chip	Item	Acceptable Criteria
		TFT Side (Not step area)	$X \leq 3\text{mm}$, $Y \leq 0.25\text{mm}$, $Z = T$
			$X \leq 3\text{mm}$, $Y \leq 0.6\text{mm}$, $Z < T$

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		CF Side 	$X \leq 5\text{mm}$, $Y \leq 0.6\text{mm}$, $Z = T$
			$X \leq 5\text{mm}$, $Y \leq 0.8\text{mm}$, $Z < T$
		Step area 	$X \leq 5\text{mm}$, $Y \leq 0.3\text{mm}$, $Z \leq T$
15	Glass defect— Crack	“Crack” means a line which is extensibility, 	Not allowed

Note: If any problems or doubts arise with the LCD, the customer and supplier will cooperate and make efforts to solve it with mutual confidence and respect. Issue which is not defined in this criterion shall be discussed with both parties, customer and supplier, for the better solution.

11. Packing Instruction



No	Item	Model (Material)	Dimensions	Quantity
1	LCM module	TM080JDKP96-00	192.8mmX116.9mmX7.0mm	28
2	Carton	Corrugated paper	562mmX362mmX225mm	1
3	Pallet	Box	2(L)x2(W)x4(H)	16

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12. Precautions for Use of LCD Modules

12.1 Handling Precautions

- 12.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 12.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
- 12.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 12.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
- 12.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
- Isopropyl alcohol
 - Ethyl alcohol
- Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
- Water
 - Ketone
 - Aromatic solvents
- 12.1.6 Do not attempt to disassemble the LCD Module.
- 12.1.7 If the logic circuit power is off, do not apply the input signals.
- 12.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
- 1.1.8.1 Be sure to ground the body when handling the LCD Modules.
- 1.1.8.2 Tools required for assembly, such as soldering irons, must be properly grounded.
- 1.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
- 1.1.8.4 The LCD Module is covered with a film to protect the display surface. Be carefully and slowly when peeling off this protective film since static electricity may be generated.

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12.2 Storage precautions

12.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

12.2.2 The LCD modules should be stored under the storage temperature range. the recommend condition is: Temperature : 0℃ ~ 40℃, Relatively humidity: ≤80%, and no more than 1 year..

12.2.3 The LCD modules should be stored in the room without acid, alkali and sulfur compound harmful gas, etc.

12.3 Transportation Precautions

12.3.1The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

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13. Appendix

13.1 The relationship of temperature and resistance for NTC:

TEMP (deg.C)	Resistance (kohm)	TEMP (deg.C)	Resistance (kohm)	TEMP (deg.C)	Resistance (kohm)	TEMP (deg.C)	Resistance (kohm)
-40.000	195.652	2.000	24.988	44.000	5.086	86.000	1.413
-39.000	184.917	3.000	23.951	45.000	4.917	87.000	1.375
-38.000	174.845	4.000	22.963	46.000	4.754	88.000	1.338
-37.000	165.391	5.000	22.021	47.000	4.597	89.000	1.303
-36.000	156.513	6.000	21.123	48.000	4.446	90.000	1.268
-35.000	148.171	7.000	20.267	49.000	4.301	91.000	1.234
-34.000	140.330	8.000	19.450	50.000	4.161	92.000	1.202
-33.000	132.958	9.000	18.670	51.000	4.026	93.000	1.170
-32.000	126.022	10.000	17.926	52.000	3.896	94.000	1.139
-31.000	119.494	11.000	17.214	53.000	3.771	95.000	1.110
-30.000	113.347	12.000	16.534	54.000	3.651	96.000	1.081
-29.000	107.565	13.000	15.886	55.000	3.535	97.000	1.053
-28.000	102.116	14.000	15.266	56.000	3.423	98.000	1.026
-27.000	96.978	15.000	14.674	57.000	3.315	99.000	0.999
-26.000	92.132	16.000	14.108	58.000	3.211	100.000	0.974
-25.000	87.559	17.000	13.566	59.000	3.111	101.000	0.949
-24.000	83.242	18.000	13.049	60.000	3.014	102.000	0.925
-23.000	79.166	19.000	12.554	61.000	2.922	103.000	0.902
-22.000	75.316	20.000	12.081	62.000	2.834	104.000	0.880
-21.000	71.677	21.000	11.628	63.000	2.748	105.000	0.858
-20.000	68.237	22.000	11.195	64.000	2.666	106.000	0.837
-19.000	64.991	23.000	10.780	65.000	2.586	107.000	0.816
-18.000	61.919	24.000	10.382	66.000	2.509	108.000	0.796
-17.000	59.011	25.000	10.000	67.000	2.435	109.000	0.777
-16.000	56.258	26.000	9.634	68.000	2.364	110.000	0.758
-15.000	53.650	27.000	9.284	69.000	2.294	111.000	0.740
-14.000	51.178	28.000	8.947	70.000	2.228	112.000	0.722
-13.000	48.835	29.000	8.624	71.000	2.163	113.000	0.705
-12.000	46.613	30.000	8.315	72.000	2.100	114.000	0.688
-11.000	44.506	31.000	8.018	73.000	2.040	115.000	0.672
-10.000	42.506	32.000	7.734	74.000	1.981	116.000	0.656
-9.000	40.600	33.000	7.461	75.000	1.925	117.000	0.640
-8.000	38.791	34.000	7.199	76.000	1.870	118.000	0.625
-7.000	37.073	35.000	6.948	77.000	1.817	119.000	0.611
-6.000	35.442	36.000	6.707	78.000	1.766	120.000	0.596
-5.000	33.892	37.000	6.475	79.000	1.716	121.000	0.583
-4.000	32.420	38.000	6.253	80.000	1.669	122.000	0.569
-3.000	31.020	39.000	6.039	81.000	1.622	123.000	0.556
-2.000	29.689	40.000	5.834	82.000	1.578	124.000	0.544
-1.000	28.423	41.000	5.636	83.000	1.535	125.000	0.531
0.000	27.219	42.000	5.445	84.000	1.493		
1.000	26.076	43.000	5.262	85.000	1.452		