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SPECIFICATION

VXTB60MJN-02

☐ Preliminary Specification

☐ Final Specification



VICTRONIX COMPANY LIMITED

CUSTOMER:

Made By:

Checked By:

Approved By:

Quality:

Date:

Note:

Approved By:

Date:

Note:

Records of Revision

[illegible]

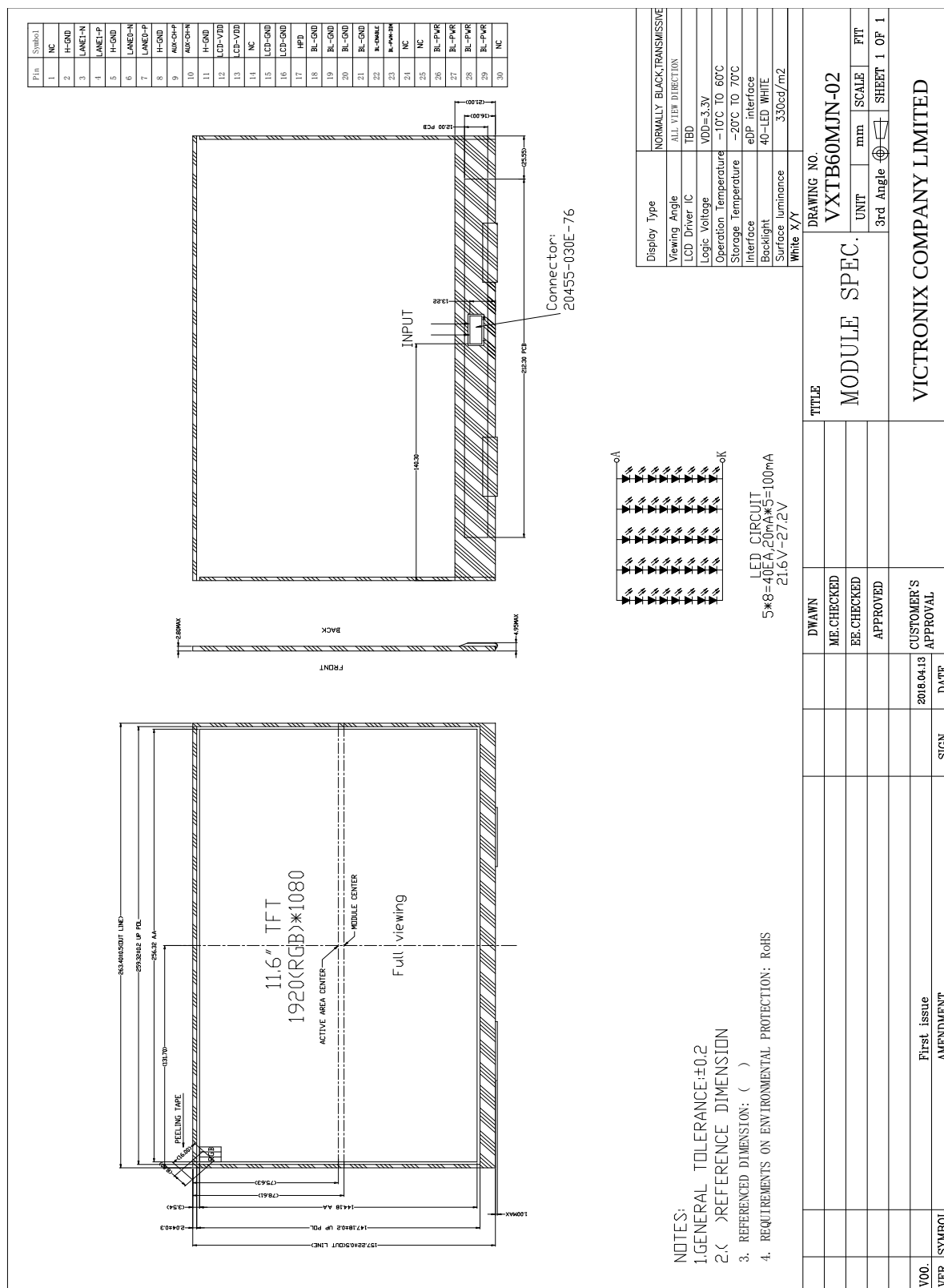
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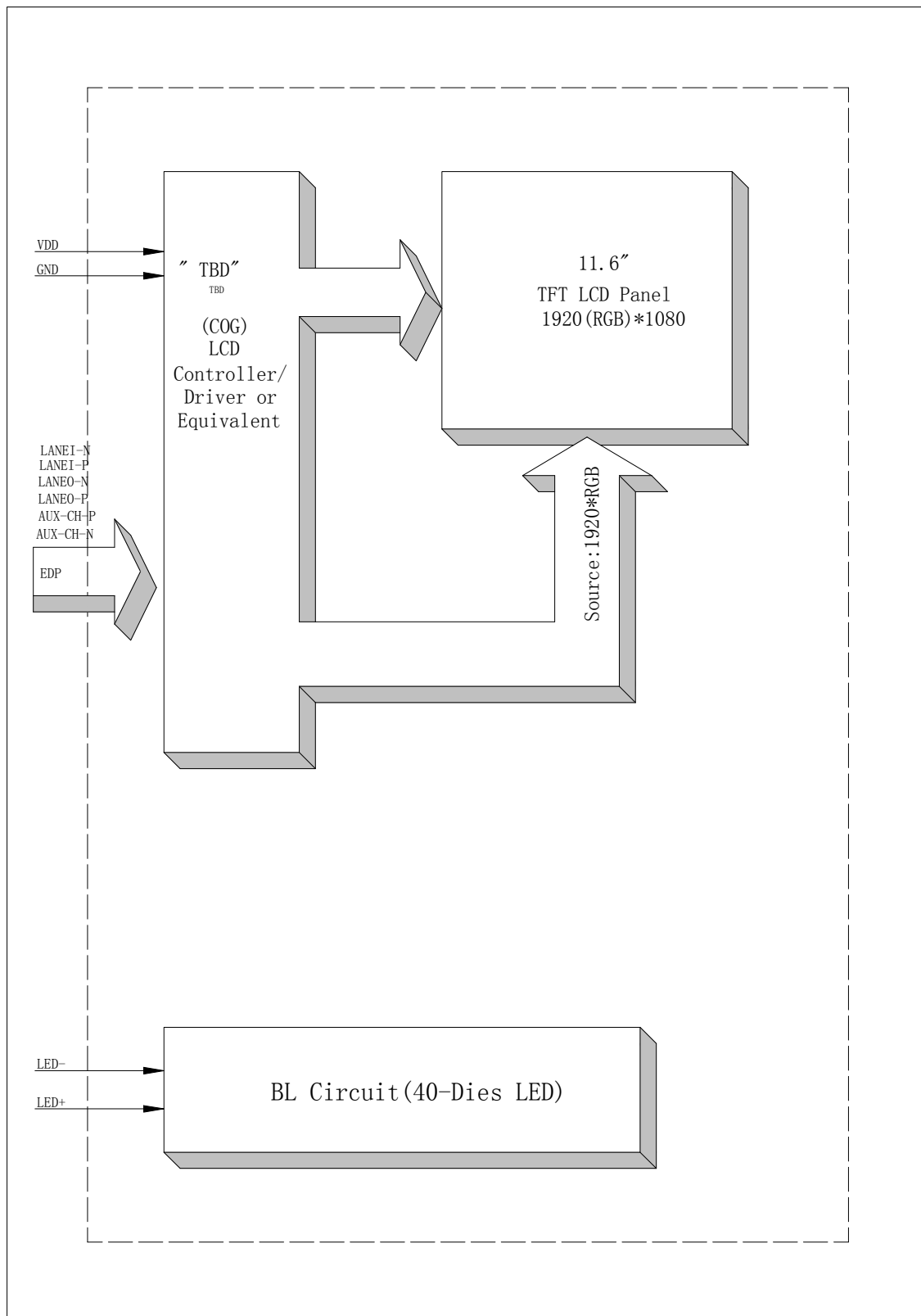
1. General Specification

Item	Contents	Unit
LCD TYPE	NOPMALLY BLACK /TRANSMISSIVE	
MODULE SIZE (W*H*T)	263.40*157.22*2.80	MM
ACTIVE SIZE (W*H)	256.32*144.18	MM
PIXEL PITCH (W*H)	0.1335*0.1335	MM
NUMBER OF DOTS	1920*1080	
DRIVER IC	TBD	
INTERFACE TYPE	EDP	
TOP POLARIZER TYPE	Anti-glare	
RECOMMEND VIEWING DIRECTION	All angle of view	O'CLOCK
GRAY SCALE INVERSION DIRECTION	-	O'CLOCK
BACKLIGHT TYPE	40-CHIP WHITE LED	
TOUCH PANEL TYPE	WITHOUT	

2. Mechanical Drawing



3. Block Diagram



4. Interface Pin Function

Pin No.	Symbol	Description
1	NC	NO CONNECT
2	H-GND	High Speed Ground
3	LANEI-N	Complement Signal Link Lane 1
4	LANEI-P	True Signal Link Lane 1
5	H-GND	High Speed Ground
6	LAENO-N	Complement Signal Link Lane 0
7	LAENO-P	True Signal Link Lane 0
8	H-GND	High Speed Ground
9	AUX-CH-P	True Signal Auxiliary Channel
10	AUX-CH-N	Complement Signal Auxiliary Channel
11	H-GND	High Speed Ground
12	LCD-VDD	LCD logic and driver power(3.3V)
13	LCD-VDD	LCD logic and driver power(3.3V)
14	NC	NO CONNECT
15	LCD-GND	LCD logic and driver ground
16	LCD-GND	LCD logic and driver ground
17	HPD	HPD signal pin
18	BL-GND	Backlight ground
19	BL-GND	Backlight ground
20	BL-GND	Backlight ground
21	BL-GND	Backlight ground
22	BL-ENABLE	Backlight ON/OFF
23	BL-PWM-DIM	System PWM
24	NC	NO CONNECT
25	NC	NO CONNECT
26	BL-PWR	Backlight power
27	BL-PWR	Backlight power
28	BL-PWR	Backlight power
29	BL-PWR	Backlight power
30	NC	NO CONNECT

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	LCD-VDD	-0.3	4	V
Supply voltage for logic	LCD-VDD	-0.5	4	V
Supply current (One LED)	I _{LED}		30	mA
Operating temperature	T _{OP}	-10	+60	°C
Storage temperature	T _{ST}	-20	+70	°C

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	LCD-VDD	3.0	3.3	3.6	V	
Supply Voltage for Logic	LCD-VDD	3.0	3.3	3.6	V	
Input leakage Current	I _{LKG}	-		-	μA	
Input Voltage	VI	-0.3	-	1.5	V	

6.2 Backlight Driving Conditions

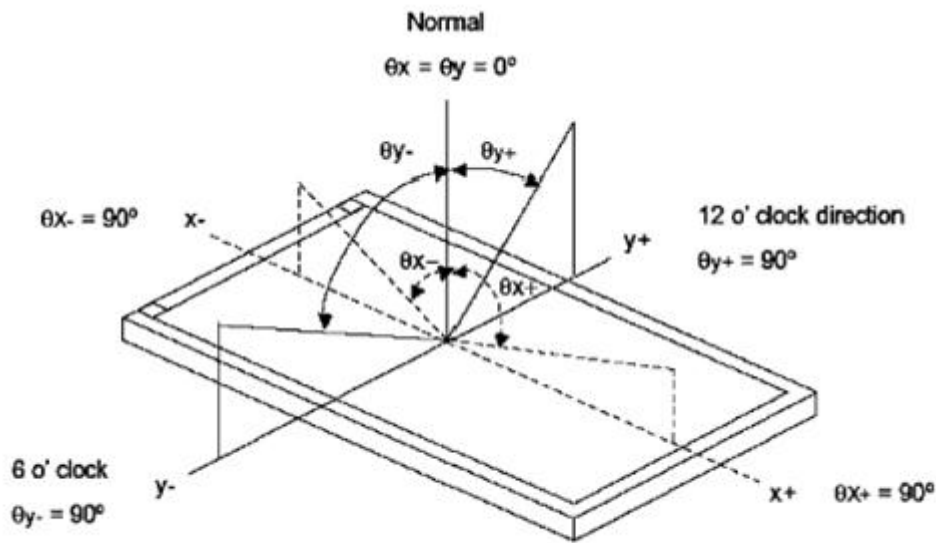
Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	VF	21.6	26	27.2	V	IL =100mA
Current for LED Backlight	IL		100		mA	
Brightness Control frequency		200		2000	HZ	
ADJ input voltage	VIH	3.0		3.3	V	
ADJ input voltage	VIL	0		0.3	V	
DUTY RATIO		10		100	%	
Power Consumption	P		2.6		W	
LED Life Time		30000	50000		HR	NOTE

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

7.Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	$I_L = 100\text{mA}$	264	330	396	Cd/m^2	
Contrast Ratio		CR	$\theta = 0^\circ$	700	1000			
Response Time		T_{ON}	25°C		25		ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle					
		Y_R						
	Green	X_G						
		Y_G						
	Blue	X_B						
		Y_B						
	White	X_W						
		Y_W						
Viewing Angle	Hor.	θ_{X+}	$CR \geq 10$	80	89		Degree	
		θ_{X-}		80	89			
	Ver.	θ_{Y+}		80	89			
		θ_{Y-}		80	89			
Uniformity	Un			70	75		%	

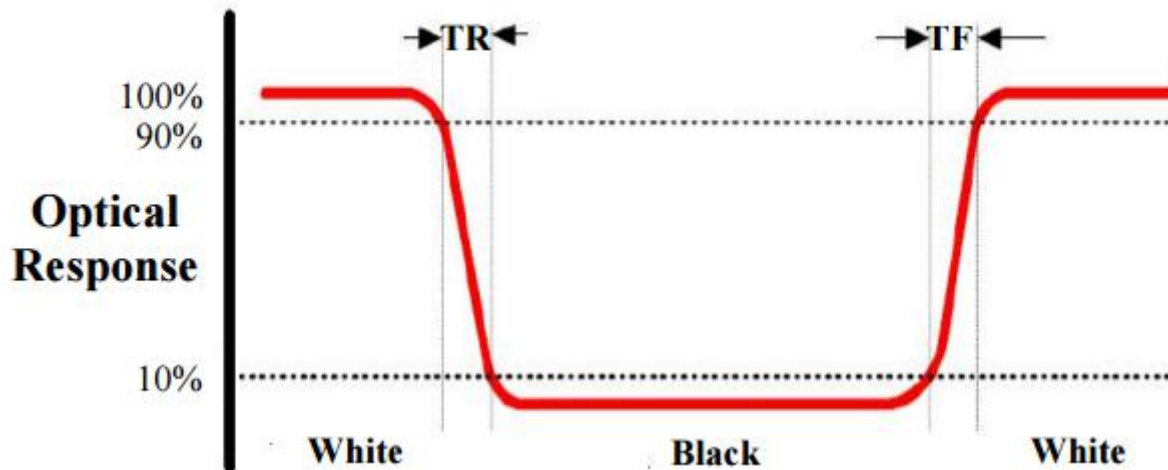
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

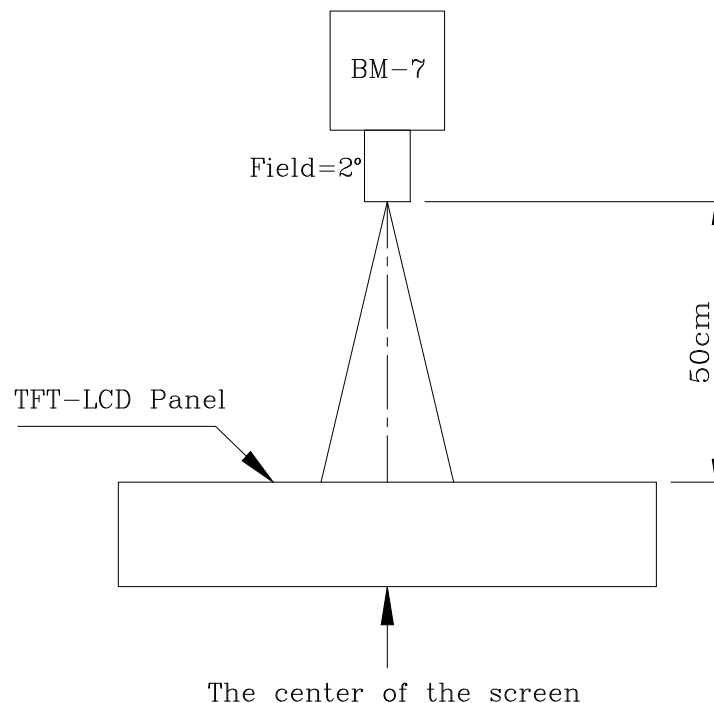
Note 3: Definition of Response Time(T_r , T_f)



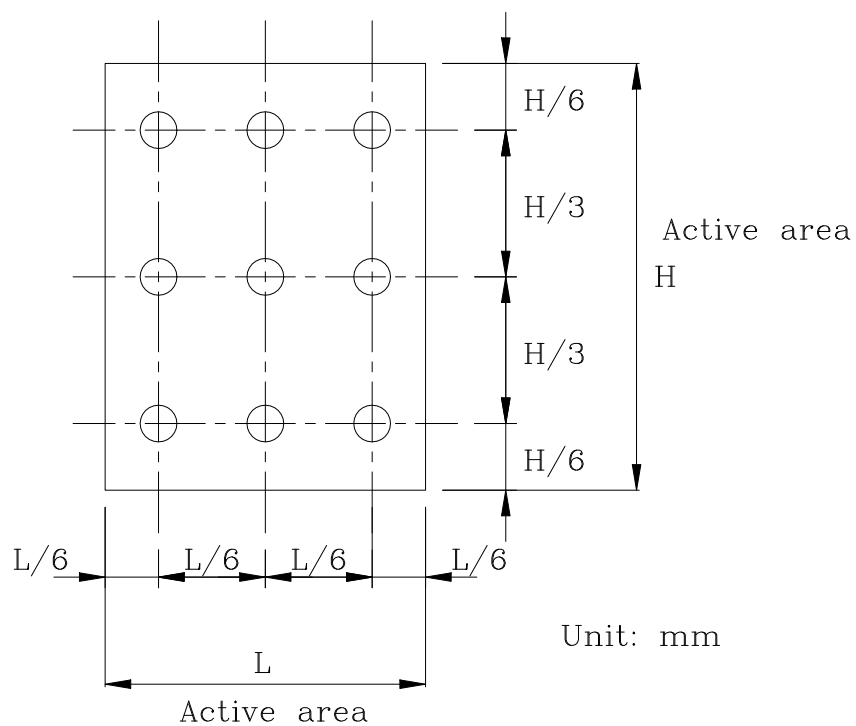
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field= 2° (As measuring “black” image, field= 2° is the best testing condition)



②The Brightness Test Point Setup



8. Timing Characteristics

8.1 EDP INTERFACE

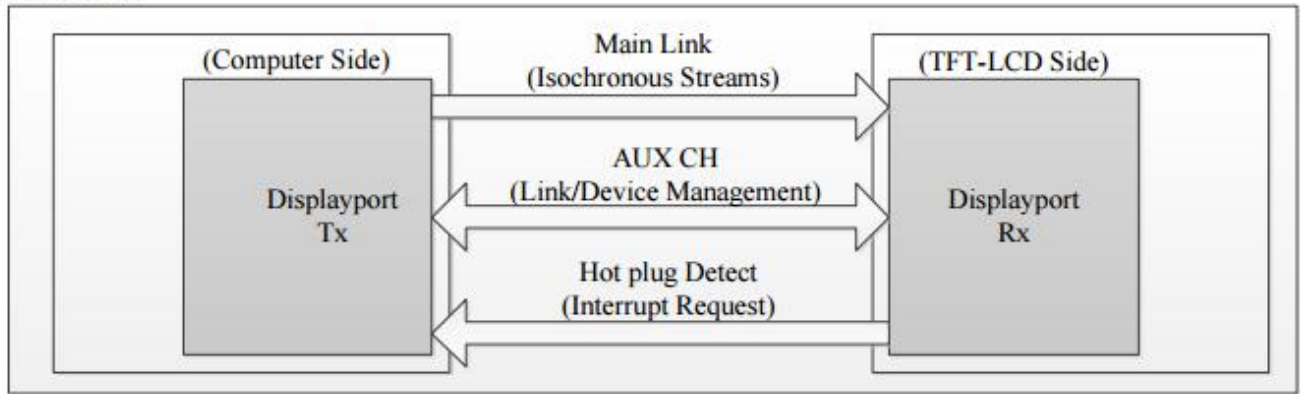


Fig.4-2-1 DP architecture

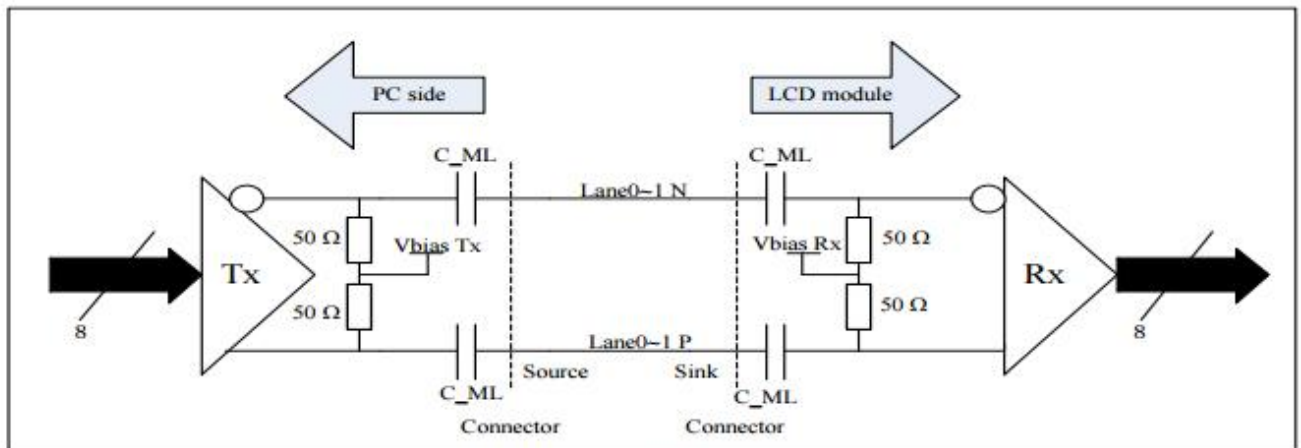


Fig.4-2-2 Main Link differential pair

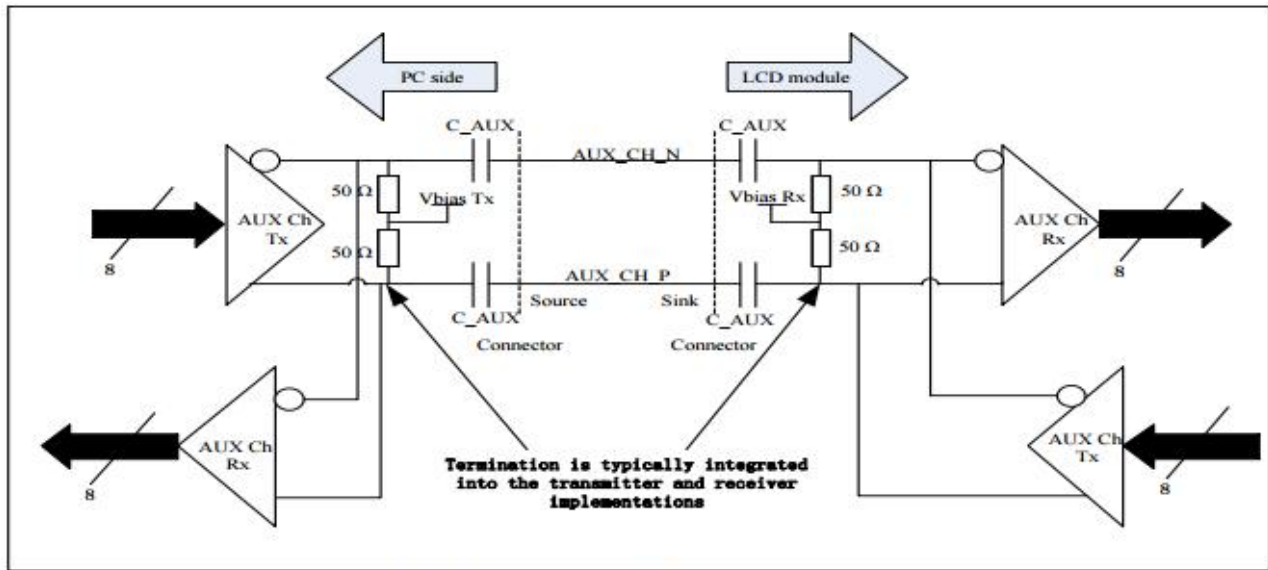


Fig.4-2-3 AUX Link differential pair

Lane0	Lane1
R0-7:0	R1-7:0
G0-7:0	G1-7:0
B0-7:0	B1-7:0
R2-7:0	R3-7:0
G2-7:0	G3-7:0
B2-7:0	B3-7:0
R4-7:0	R5-7:0
G4-7:0	G5-7:0
B4-7:0	B5-7:0

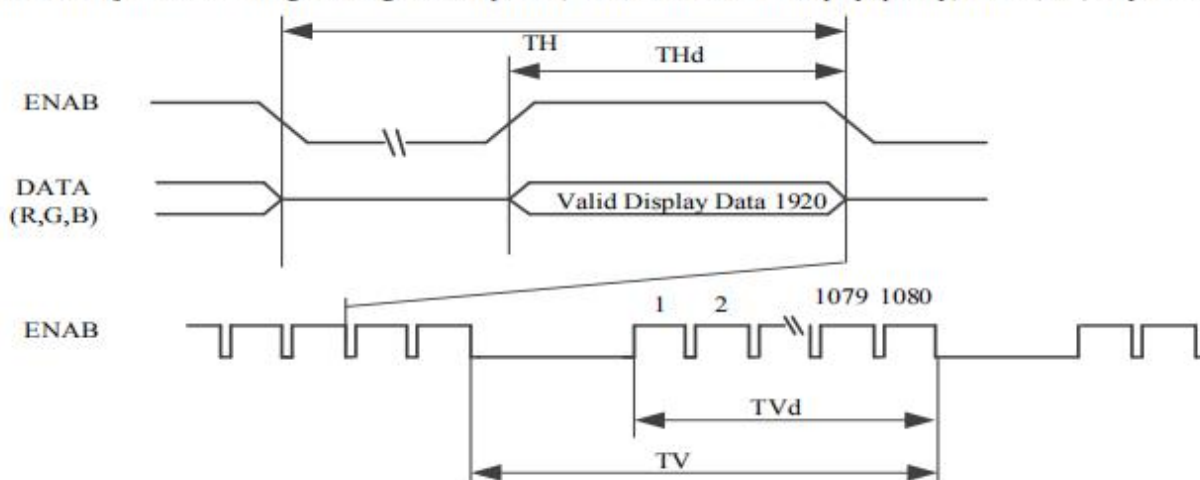
Fig.4-2-4 eDP 2lane 8bit input data mapping

8.2 Timing characteristics of input signals

VDD=+3.0V~+3.6, Ta=-10°C~+60°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	$1/T_C$	-	138.5	-	MHz
Data enable signal	Horizontal period	TH	-	2080	-	clock
			-	15.02	-	μs
	Horizontal period (High)	THd	-	1920	-	clock
	Vertical period	TV	-	1111	-	line
			-	16.685	-	ms
	Vertical period (High)	TVd	-	1080	-	line

[Note 7-1-1] In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.



8.2.1 Input data signals and display position on the screen



Display position of input data(V·H)

9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20℃, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80℃, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30℃, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 20 Cycle	Start with cold temperature, End with high temperature, IEC60068-214:1984, GB/2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
8	Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z (6 hours for total)	IEC60068-2-6:1982 GB/T2423.101995
9	Mechanical Shock (Non Op)	Half Sine Wave60G 6ms, ±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80cm, 1corner,3 edges,6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1:Ts is the temperature of panel's surface.

Note2:Ta is the ambient temperature of samples.

9.2 Testing Conditions and Inspection Criteria

For the final test, the testing sample must be stored at room temperature for 24 hours. After the tests listed in Table 9.2, standard specifications for reliability will be executed in order to ensure stability.

No.	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

9.3 MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ($25\pm5^{\circ}\text{C}$), normal humidity ($50\pm10\%$ RH), and in area not exposed to direct sun light.
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10. General Precautions

10.1. Safety

- Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

10.2. Handling

- The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
- The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
- To avoid contamination on the display surface, do not touch the module surface with bare hands.
- Keep a space so that the LCD panels do not touch other components.
- Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
- Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
- Do not leave module in direct sunlight to avoid malfunction of the ICs.

10.3. Static Electricity

- Be sure to ground module before turning on power or operating module.
- Do not apply voltage which exceeds the absolute maximum rating value.

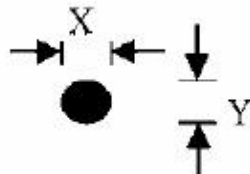
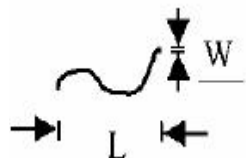
10.4. Storage

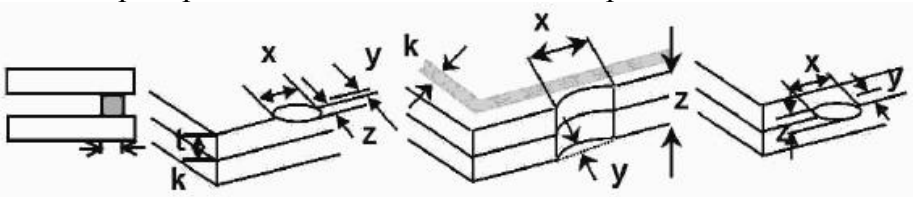
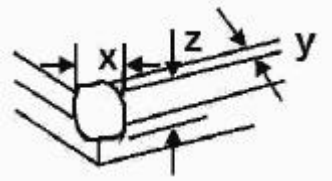
- Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
- Do not store the module in surroundings containing organic solvent or corrosive gas.
- Store the module in an anti-electrostatic container or bag.

10.5. Cleaning

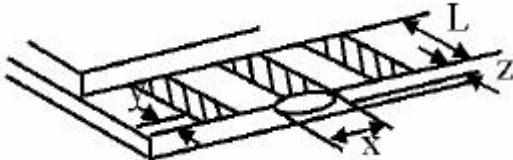
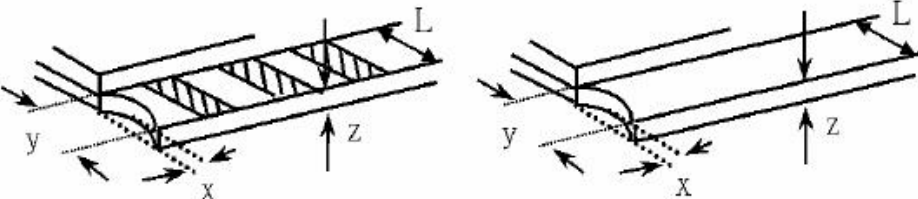
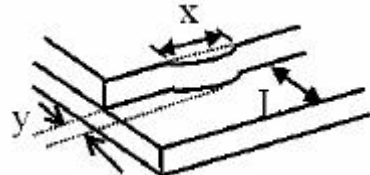
- Do not wipe the polarizer with dry cloth. It might cause scratch.

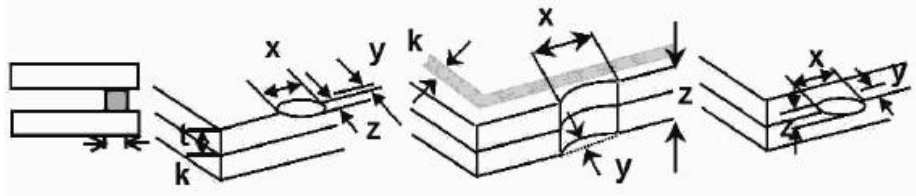
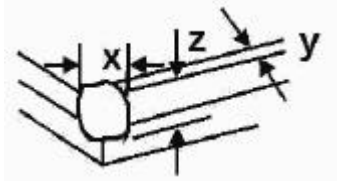
10.6 Inspection Specification

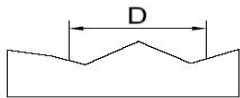
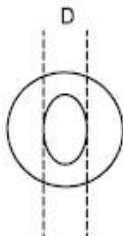
NO.	Item	Criterion	AQL																										
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	0.65																										
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 White and black or color spots on display $\leq 0.25\text{mm}$, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	2.5																										
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table><thead><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr></thead><tbody><tr><td>$\Phi \leq 0.10$</td><td>Accept no dense</td></tr><tr><td>$0.10 < \Phi \leq 0.20$</td><td>2</td></tr><tr><td>$0.20 < \Phi \leq 0.25$</td><td>2</td></tr><tr><td>$0.25 < \Phi \leq 0.30$</td><td>1</td></tr><tr><td>$0.30 < \Phi$</td><td>0</td></tr></tbody></table> * Densely spaced: No more than two spots within 3mm. 3.2 Line type: (As following drawing)  <table><thead><tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr></thead><tbody><tr><td>---</td><td>$W \leq 0.02$</td><td>Accept no dense</td></tr><tr><td>$L \leq 3.0$</td><td>$0.02 < W \leq 0.05$</td><td rowspan="2">2</td></tr><tr><td>$L \leq 2.5$</td><td>$0.03 < W \leq 0.08$</td></tr><tr><td>---</td><td>$0.08 < W$</td><td>Rejection</td></tr></tbody></table> * Densely spaced: No more than two lines within 3mm.	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.08$	---	$0.08 < W$	Rejection	2.5
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$0.10 < \Phi \leq 0.20$	2																												
$0.20 < \Phi \leq 0.25$	2																												
$0.25 < \Phi \leq 0.30$	1																												
$0.30 < \Phi$	0																												
Length(mm)	Width(mm)	Acceptable Q'ty																											
---	$W \leq 0.02$	Accept no dense																											
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$L \leq 2.5$	$0.03 < W \leq 0.08$																												
---	$0.08 < W$	Rejection																											

NO.	Item	Criterion			AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	Size Φ (mm)	Acceptable Q'ty	2.5
			$\Phi \leq 0.20$	Accept no dense	
			$0.20 < \Phi \leq 0.50$	3	
			$0.50 < \Phi \leq 1.00$	2	
			$1.00 < \Phi$	0	
			Total Q'ty	3	
05	Scratches	Follow NO.3 -2 Line Type.			
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels:			2.5
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	
		$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	
		⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 6.1.2 Corner crack:			
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	
		$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	
		⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip			

NO.	Item	Criterion	AQL
08	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
10	Bezel	Bezel must comply with product specifications.	2.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	2.5 2.5 2.5 2.5 0.65 0.65
12	FPC	12.1 FPC terminal damage $\leq 1/2$ FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leq 1/2$ alignment area and can not affect the function , we judge accept.	2.5 2.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC.	2.5 0.65

NO.	Item	Criterion	AQL																
07	Glass crack	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad:  <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>$y \leq 0.5\text{mm}$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</td></tr></table> 7.2.2 Non-conductive portion:  <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>$y \leq L$</td><td>$x \leq 1/8a$</td><td>$0 < z \leq t$</td></tr></table> ⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged. 7.2.3 Substrate protuberance and internal crack  <table><tr><td>y: width</td><td>x: length</td></tr><tr><td>$y \leq 1/3L$</td><td>$X \leq a$</td></tr></table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq a$	2.5
		y: Chip width	x: Chip length	z: Chip thickness															
		$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$															
		y: Chip width	x: Chip length	z: Chip thickness															
$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		

NO.	Item	Criterion	AQL												
14	Touch Panel Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels:  <table> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$Z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 14.1.2 Corner crack:  <table> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	2.5
z: Chip thickness	y: Chip width	x: Chip length													
$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													
z: Chip thickness	y: Chip width	x: Chip length													
$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													

NO.	Item	Criterion	AQL										
15	Touch Panel(Fish eye、dent and bubble on film)	<table> <tr> <th>SIZE(mm)</th> <th>Acceptable Q'ty</th> </tr> <tr> <td>$\Phi \leq 0.2$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.2 < D \leq 0.4$</td> <td>5</td> </tr> <tr> <td>$0.4 < D \leq 0.5$</td> <td>2</td> </tr> <tr> <td>$0.5 < D$</td> <td>0</td> </tr> </table>  	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	2.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dense												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	0												
16	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$) , it is acceptable.	2.5										
17	Touch Panel Linearity	Less than 2.5% is acceptable.	2.5										
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	2.5										
19	General appearance	19.1 Pin type must match type in specification sheet. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 0.65										

- Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

11. Handling Precaution

11.1 Handling of LCM

- Avoid external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance, do not lick or swallow. When the liquid is attaching to your hand, skin, cloth, etc., wash it thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should wear protections whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface, be careful when peeling off this protective film since static electricity may be generated.

11.2 Storage

- Store it in an ambient temperature of $25\pm 10^{\circ}\text{C}$, and in a relative humidity of $50\pm 10\%\text{RH}$. Don't expose to sunlight or fluorescent light.
- Store it in a clean environment, free from dust, active gas, and solvent.
- Store it in anti-static electricity container.
- Store it without any physical load.

11.3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: no higher than $280\pm 10^{\circ}\text{C}$ and less than 3 sec during hand soldering.
- Rewiring: no more than 2 times.

12. Packing Method

-----TBD

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