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SPECIFICATION

VXT784BZE-01

☐ Preliminary Specification

☐ Final Specification

CUSTOMER:

Made By: **Checked By:** **Approved By:** **Quality:** **Date:** **Note:**	**Approved By:** **Date:** **Note:**

Records of Revision

DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	REMARK
2018-02-26		V01	First Issue	

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Contents

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1. General Specification

Item	Contents	Unit
LCD TYPE	TFT/TRANSMISSIVE	
MODULE SIZE (W*H*T)	67.60*205.78*4.75	MM
ACTIVE SIZE (W*H)	59.40*190.08	MM
NUMBER OF DOTS	400*1280	
DRIVER IC	EK79030AA	
INTERFACE TYPE	MIPI	
TOP POLARIZER TYPE	GLARE	
RECOMMEND VIEWING DIRECTION	ALL	O'CLOCK
GRAY SCALE INVERSION DIRECTION	-	O'CLOCK
BACKLIGHT TYPE	18-CHIP WHITE LED	
TOUCH PANEL TYPE	WITHOUT	

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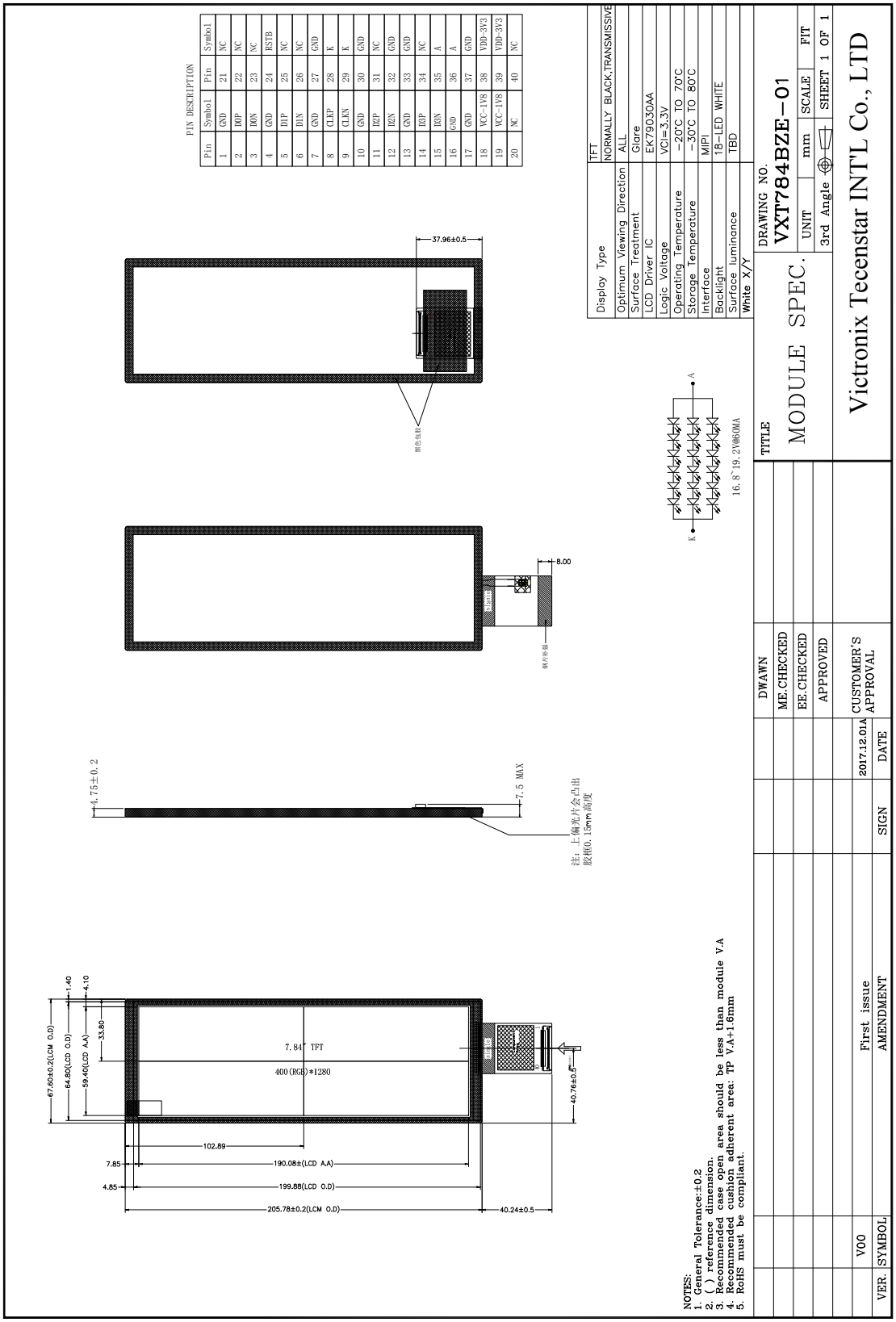
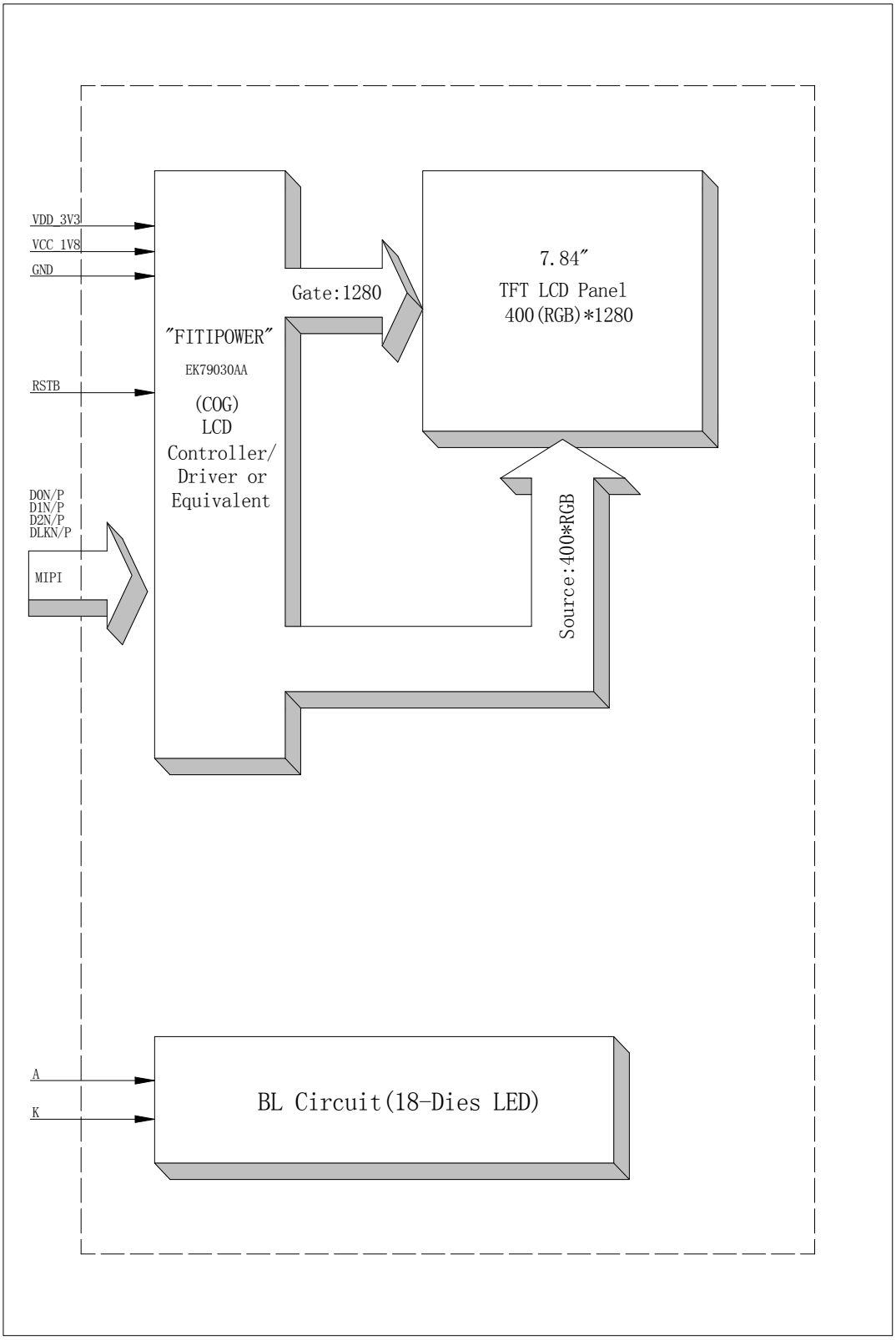
2. Mechanical Drawing



3. Block Diagram



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4. Interface Pin Function

Pin No.	Symbol	Description
1	GND	Power ground
2	D0P	MIPI data negative signal
3	D0N	MIPI data negative signal
4	GND	Power ground
5	D1P	MIPI data negative signal
6	D1N	MIPI data negative signal
7	GND	Power ground
8	DLKP	MIPI clock negative signal
9	DLKN	MIPI clock negative signal
10	GND	Power ground
11	D2P	MIPI data negative signal
12	D2N	MIPI data negative signal
13	GND	Power ground
14	D3P	MIPI data negative signal
15	D3N	MIPI data negative signal
16	GND	Power ground
17	GND	Power ground
18	VCC-1V8	I/O Power supply(1.8v)
19	VCC-1V8	I/O Power supply(1.8v)
20	NC	No connection
21	NC	No connection
22	NC	No connection
23	NC	No connection
24	RSTB	Reset pin.
25	NC	No connection
26	NC	No connection
27	GND	Power ground
28	K	Cathode of LED backlight
29	K	Cathode of LED backlight
30	GND	Power ground
31	NC	No connection
32	GND	Power ground
33	GND	Power ground
34	NC	No connection
35	A	Anode of LED backlight
36	A	Anode of LED backlight
37	GND	Power ground
38	VDD_3V3	Power supply(3.3v)
39	VDD_3V3	Power supply(3.3v)
40	NC	No connection

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5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for logic	VCC	-0.3	5	V
Supply voltage for analog	VDD	-0.3	5	V
Power supply	VGH	12	18	V
Power supply	VGL	-14	-8	V
Supply current (One LED)	I_{LED}		30	mA
Operating temperature	T_{OP}	-20	+70	°C
Storage temperature	T_{ST}	-30	+80	°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.

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6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply voltage for logic	VCC	-	1.8	-	V	
Supply voltage for analog	VDD	-	3.3	3.6	V	
Input Voltage	V_{IL}	0	-	0.2VDD	V	
	V_{IH}	0.8 VDD	-	VDD		
Input leakage Current	I_{LKG}	-		-	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_F	16.8	18	19.2	V	I_L =60mA
Current for LED Backlight	I_L		60		mA	
Power Consumption	P		1.08		W	
LED Life Time		30,000	50,000		Hr	Note

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

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7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	I_L =60mA	320	400	480	Cd/m^2	
Contrast Ratio		CR	θ=0°	700	900			
Response Time		T_{ON}	25℃		30	40	ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle	0.621	0.641	0.661		
		Y_R		0.327	0.347	0.367		
	Green	X_G		0.305	0.325	0.345		
		Y_G		0.599	0.619	0.639		
	Blue	X_B		0.120	0.140	0.160		
		Y_B		0.095	0.115	0.135		
	White	X_W		0.306	0.326	0.346		
		Y_W		0.352	0.372	0.392		
Viewing Angle	Hor.	θ_{X+}	CR≥10		80		Degree	
		θ_{X-}			80			
	Ver.	θ_{Y+}			80			
		θ_{Y-}			80			
Uniformity	Un			-	70	-	%	

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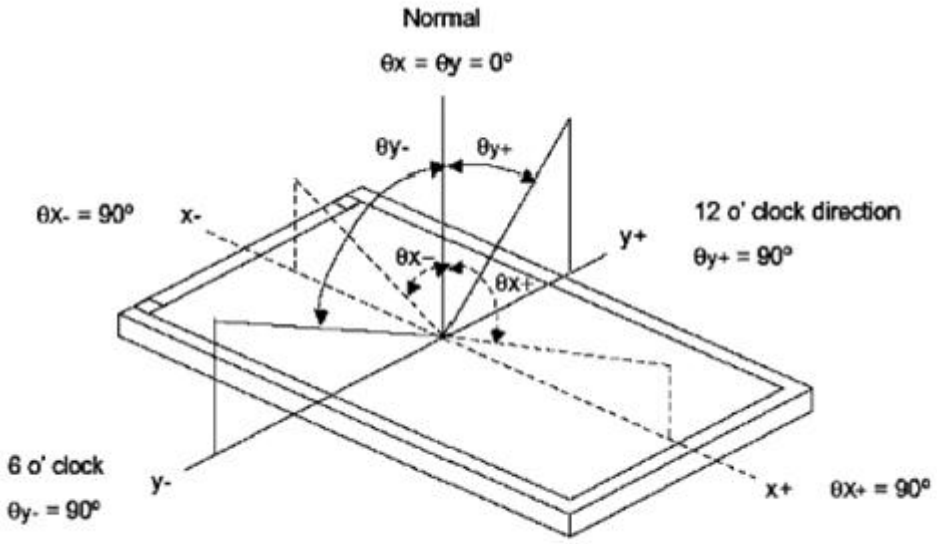
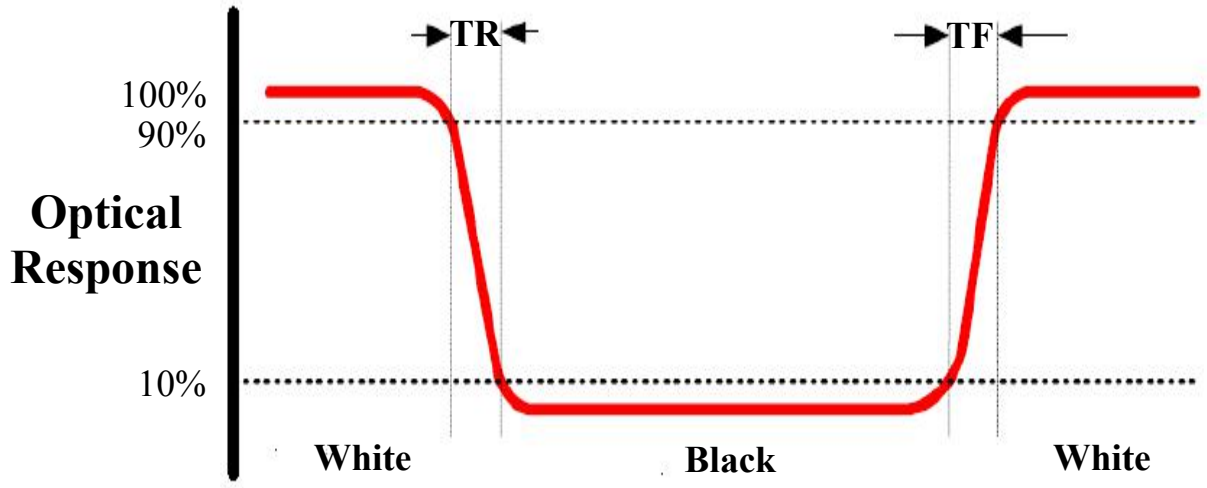
Note 1: Definition of Viewing Angle θx and θy:



Note 2: Definition of contrast ratio CR:

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

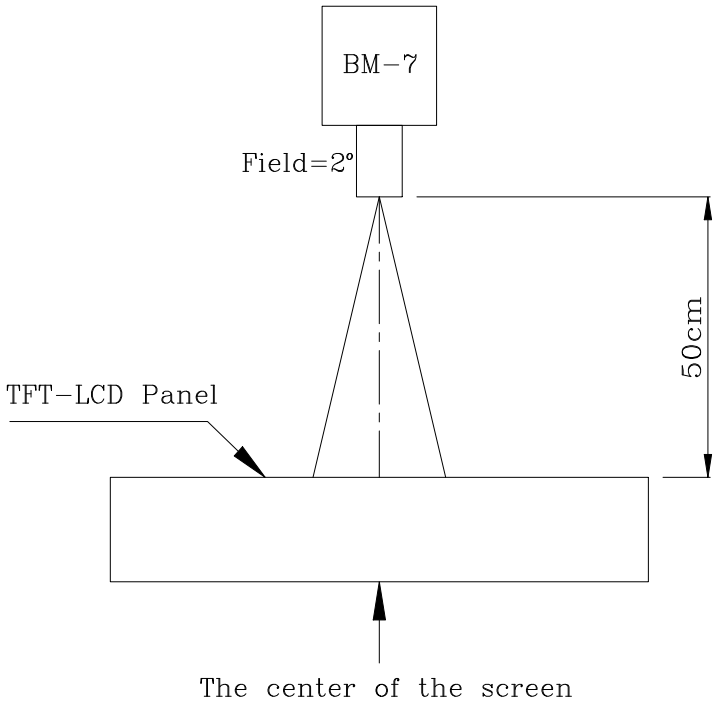
Note 3: Definition of Response Time(Tr,Tf)



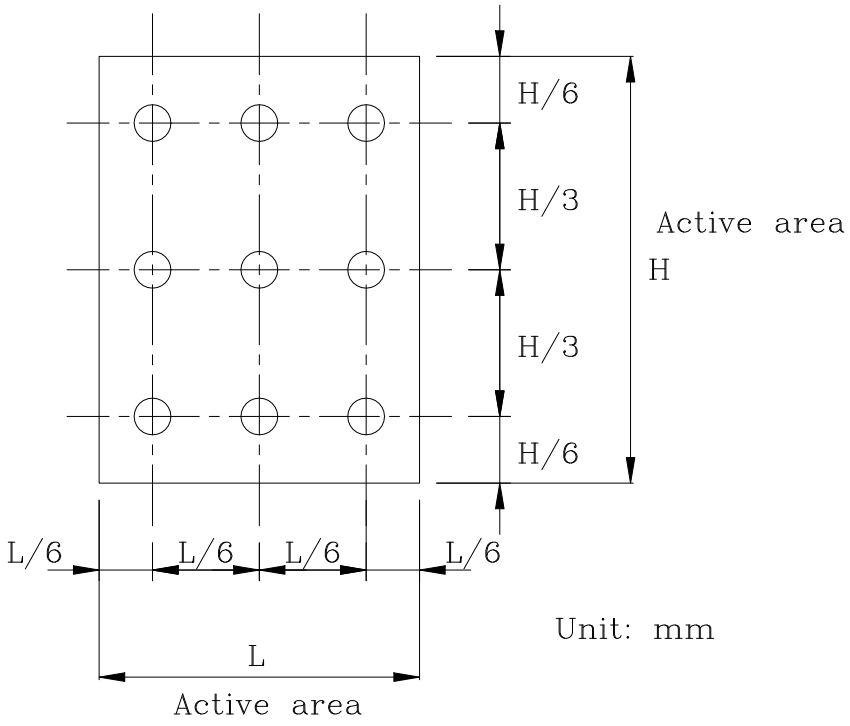
Note 4: Definition of Luminance

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 MIPI Input Timing Table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
MIPI (4 Lane) @Frame rate=60Hz			349		Mbps
MIPI (3 Lane) @Frame rate=60Hz			465		Mbps
DCLK frequency @Frame rate=60Hz	F_{DCLK}		58.2		MHz
HSYNC period time	T_H		744		DCLK
Horizontal display area	T_{HD}		400		DCLK
HSYNC pulse width	T_{HPW}		24	-	DCLK
HSYNC back porch	T_{HBP}		160	-	DCLK
HSYNC front porch	T_{FBP}		160	-	DCLK
VSYNC period time	T_V		1304		H
Vertical display area	T_{VD}		1280		H
VSYNC pulse width	T_{VPW}		2	-	H
VSYNC back porch	T_{VBP}		10	-	H
VSYNC front porch	T_{VFP}		12	-	H

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8.2 MIPI AC Characteristics

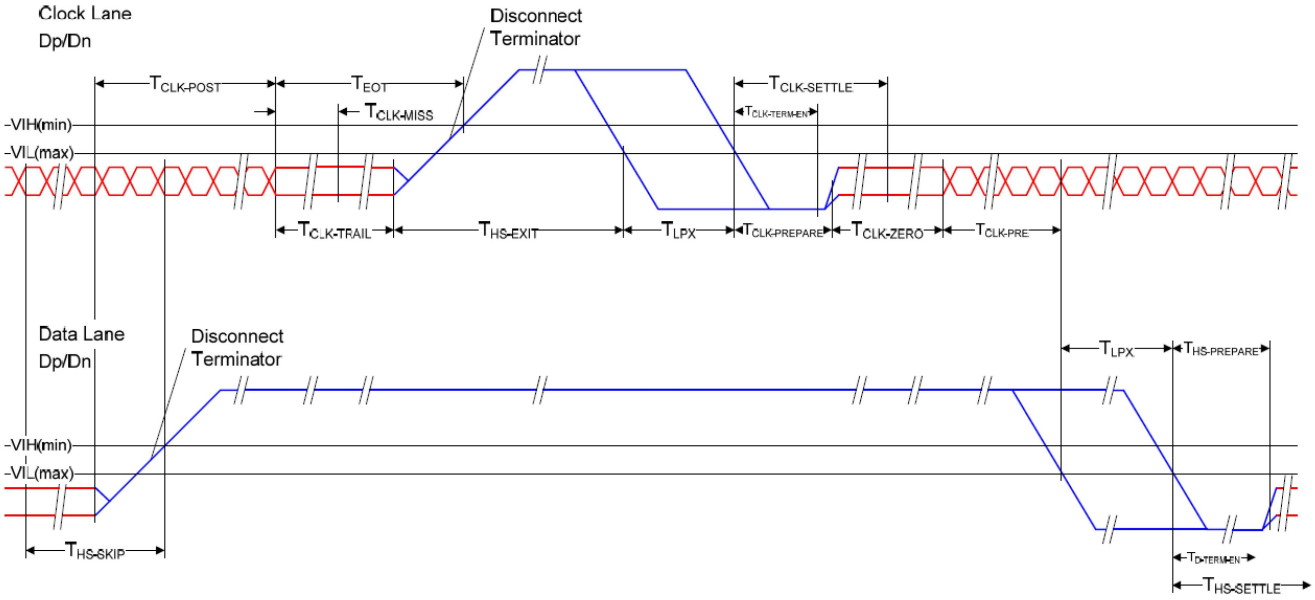

Figure 13.1: Switching the clock lane between clock transmission and low-power mode

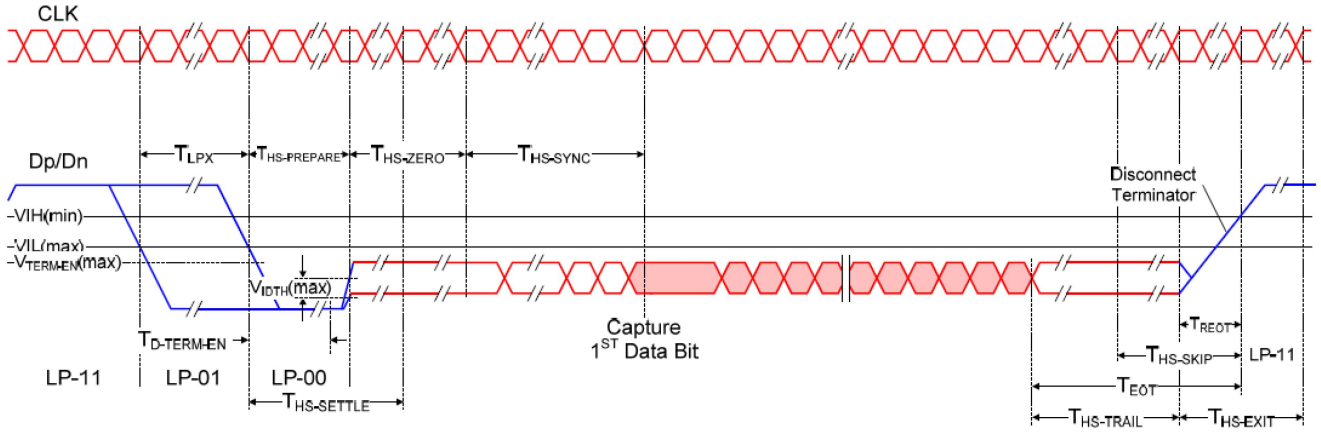

Figure 13.2: Timing of high-speed data transmission in bursts

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9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

Item	Test Conditions	Remark
High temperature storage	Ta=80℃ 240hrs	NOTE1 , NOTE4
Low temperature storage	Ta=-30℃ 240hrs	NOTE1 , NOTE4
High temperature operation	Ta=70℃ 240hrs	NOTE2 , NOTE4
Low temperature operation	Ta=-20℃ 240hrs	NOTE2 , NOTE4
Operate at high temperature and humidity	+60℃, 90%RH 240hrs	NOTE4
Thermal Shock	-20℃/30min~+60℃/30min for a total 100 cycles, start with cold temperature and end with high temperature.	NOTE4
Vibration Test	Frequency range:10~55HZ Stroke:1.5mm Swap:10HZ~55HZ~10HZ 2 hours of each direction of X.Y. Z (6 hours for total)	
Mechanical shock	200G 2ms, ±X, ±Y, ±Z 3 times for each direction	
Package vibration test	Random vibration :1.5G*G/HZ from 10-500 HZ,-6dB/Octave from 200-500HZ of each direction of X.Y. Z (6 hours for total)	
Packing drop test	Height:60cm 1 corner ,3 edges ,6 surfaces	
Electrical Static Discharge	Air: ±4KV 150pF/330Ω 5 times Contact: ±2KV 150pF/330Ω 5 times	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

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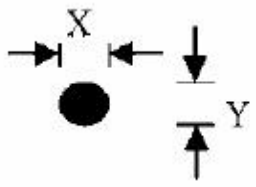
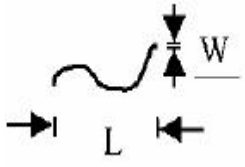
9.2 Inspection Specification

<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>01</td><td>Electrical Testing</td><td>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</td><td>0.65</td></tr>
<tr><td>02</td><td>Black or White spots or Bright spots or Color spots on LCD (Display only)</td><td>2.1 White spots can’t be accepted .Black or color spots on display ≦ 0.20mm, no more than 3 spots.
2.2 Densely spaced: No more than each three black spots within 3mm.</td><td>2.5</td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">LCD and Touch Panel black spots, white spots, contamination (non – display)</td><td>3.1 Round type: As following drawing
Φ = (X+Y) / 2
 

* Densely spaced: No more than two spots within 3mm.
<table>
<tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ≦0.10</td><td>Accept no dense</td></tr>
<tr><td>0.10< Φ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20< Φ≦0.25</td><td>Rejection</td></tr>
<tr><td>0.25< Φ≦0.30</td><td>Rejection</td></tr>
<tr><td>0.30< Φ</td><td>Rejection</td></tr>
</table></td><td>2.5</td></tr>
<tr><td>3.2 Line type: (As following drawing)
 
<table>
<tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>---</td><td>W≦0.02</td><td>Accept no dense</td></tr>
<tr><td>L≦3.0</td><td>0.02<W≦0.05</td><td rowspan="2">2</td></tr>
<tr><td>L≦2.5</td><td>0.03<W≦0.08</td></tr>
<tr><td>---</td><td>0.08<W</td><td>Rejection</td></tr>
</table>
* Densely spaced: No more than two lines within 3mm.</td><td>2.5</td></tr>
</table>

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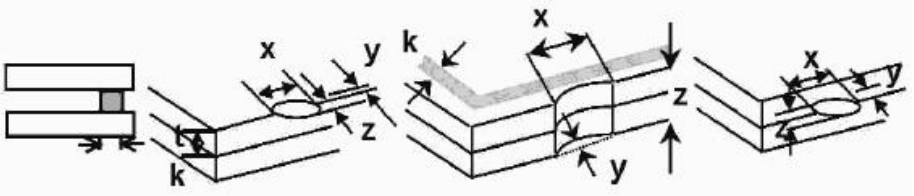
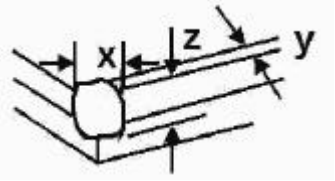
<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th><th>AQL</th></tr>
<tr><td>04</td><td>Polarizer bubbles</td><td>If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction
<table>
<tr><td>Size Φ(mm)</td><td>Acceptable Q'ty</td></tr>
<tr><td>Φ≦0.20</td><td>Accept no dense</td></tr>
<tr><td>0.20< Φ≦0.50</td><td>Rejection</td></tr>
<tr><td>0.50< Φ≦1.00</td><td>Rejection</td></tr>
<tr><td>1.00< Φ</td><td>Rejection</td></tr>
<tr><td>Total Q’ty</td><td>2</td></tr>
</table></td><td>2.5</td></tr>
<tr><td>05</td><td>Scratches</td><td>Follow NO.3 -2 Line Type.</td><td></td></tr>
<tr><td>06</td><td>Chipped glass</td><td>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:
 

<table>
<tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip
6.1.2 Corner crack:
 

<table>
<tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr>
<tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr>
<tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr>
</table>
⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip</td><td>2.5</td></tr>
</table>

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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±10℃ 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.
- Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

11. Packing Method

----TBD

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