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Installation

Mechanical design



SPECIFICATION

Customer: _____

Model Name: ET101WU10-J

Date: 2021/03/05

Version: V0

☒ Preliminary Specification

☐ Final Specification

For customer's Acceptance

APPROVED BY	Comment

APPROVED BY	Reviewed BY	Prepared BY

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- 2 -

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Contents

1. General Specifications.....	4
2. Pin Assignment.....	5
3. Operation Specifications.....	7
3.1 Absolute Maximum Rating.....	7
3.2 Typical Operation Conditions.....	8
3.3 Current Consumption.....	9
3.4 Backlight Driving Conditions.....	8
3.5 Power Sequence.....	10
3.6 LVDS Signal Timing Characteristics.....	11
3.6.1 Ac Electrical characteristics.....	11
3.6.2 Data Input Format.....	12
3.6.3 LVDS Data Input Format.....	13
4. Optical Specifications.....	14
5. Reliability Test Items.....	18
6. General Precautions.....	19
6.1. Safety.....	19
6.2. Handling.....	19
6.3. Static Electricity.....	19
6.4. Storage.....	19
6.5. Cleaning.....	19
7. Mechanical Drawing.....	20
8. Package	21
8.1. Packaging Material Table.....	21
8.2. Packaging Drawing.....	22

1. General Specifications

NO	Item	Specification	Remark
1	LCD Size	10.1 inch (Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1920(H) x 3(RGB) x 1200(V)	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.03764(H)×RGB×0.11292(V)	
6	Active area	216.8064(H)*135.504(V)	
7	Module size	228.47(W) x149.3(H) x4.6 (D)mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	MIPI	
11	Backlight power consumption	5200	mW
12	Panel power consumption	660(Typ.)	mW
13	Weight	TBD	

Note 1: Refer to Mechanical Drawing

2. Pin Assignment

TFT LCD Panel Driving Section

FPC Connector is used for the module electronics interface. The recommended model is FH34SRJ-45S-0.5SH(50) (HRS) or equivalent.

Pin No. Symbol I/O Function Remark

Pin No.	Symbol	Description	I/O
1	VLEDIN	LED POWER SUPPLY	P
2	VLEDIN	LED POWER SUPPLY	P
3	VLEDIN	LED POWER SUPPLY	P
4	I2C_SDA	OTP_SDA	I
5	I2C_SCL	OTP_SCL	I
6	AGING	H,BIST;L NORMAL mode;	I
7	ID	ID Pin (1.8V拉高或拉低)	I
8	ADDR	1.8V拉高或拉低(预留)	I
9	GND	Power Ground	P
10	GND	Power Ground	P
11	GND	Power Ground	P
12	DSI_D3N	MIPI data pair 3 negative signal	I
13	DSI_D3P	MIPI data pair 3 positive signal	I
14	GND	Power Ground	P
15	DSI_D0N	MIPI data pair 0 negative signal	I
16	DSI_D0P	MIPI data pair 0 positive signal	I
17	GND	Power Ground	P
18	DSI_CLKN	MIPI data pair CLK negative signal	I
19	DSI_CLKP	MIPI data pair CLK positive signal	I
20	GND	Power Ground	P

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Pin No.	Symbol	Description	I/O
21	DSI_D1N	MIPI data pair 1 negative signal	I
22	DSI_D1P	MIPI data pair 1 positive signal	I
23	GND	Power Ground	P
24	DSI_D2N	MIPI data pair 2 negative signal	I
25	DSI_D2P	MIPI data pair 2 positive signal	I
26	GND	Power Ground	P
27	STBYB	Timing control	I
28	SCL	SCL for Bridge IC (1.8V)	I
29	SDA	SDA for Bridge IC (1.8V)	I
30	LED_PWM	Backlight LED Driver PWM (1.8V)	I
31	Bridge_EN	Bridge_EN	I
32	VDD_OTP	OTP Power supply VDD OTP=8.6V	P
33	VDDIN	3.3V	P
34	VDDIN	3.3V	P

3. Operation Specifications

3.1. Absolute Maximum Ratings

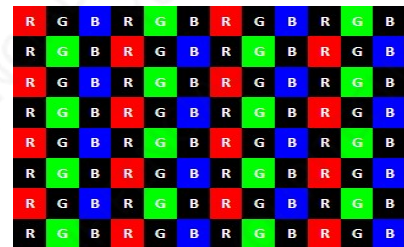
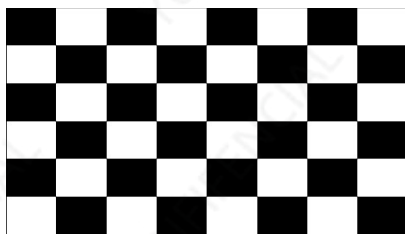
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

Parameter		Symbol	Min.	Max.	Unit	Remarks
Power Supply	LCD Module	VDD	VSS-0.3	3.6	V	Ta = 25 °C
Operating Temperature		T _{OP}	-20	+70	°C	
Storage Temperature		T _{ST}	-30	+80	°C	
Operating Ambient Humidity		H _{OP}	10	90	%RH	
Storage Humidity		H _{ST}	10	90	%RH	

3.2. Typical Operation conditions

Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Power Supply Voltage		VDD	3.0	3.3	3.6	V	
		VRP			300	mV	Ripple
Power Supply Current		IDD	-	300	360	mA	Note 1
Power Consumption		PLCD	-	1	1.2	W	
Rush current		IRUSH	-	-	3.0	A	Note 2
CMOS Interface	Input Voltage	VIH	2.7		3.3	V	
		VIL	0		0.5	V	
	Output Voltage	VOH	2.7		3.3	V	
		VOL	0		0.5	V	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
 The current draw and power consumption specified is for VDD=3.3V, Frame rate f_v
 and Clock frequency = 490MHz. Test Pattern of power supply current
 a) Typ : Mosaic 8 x 6 Pattern(L0/L255) b) Max : skip subPixel(L255)



2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

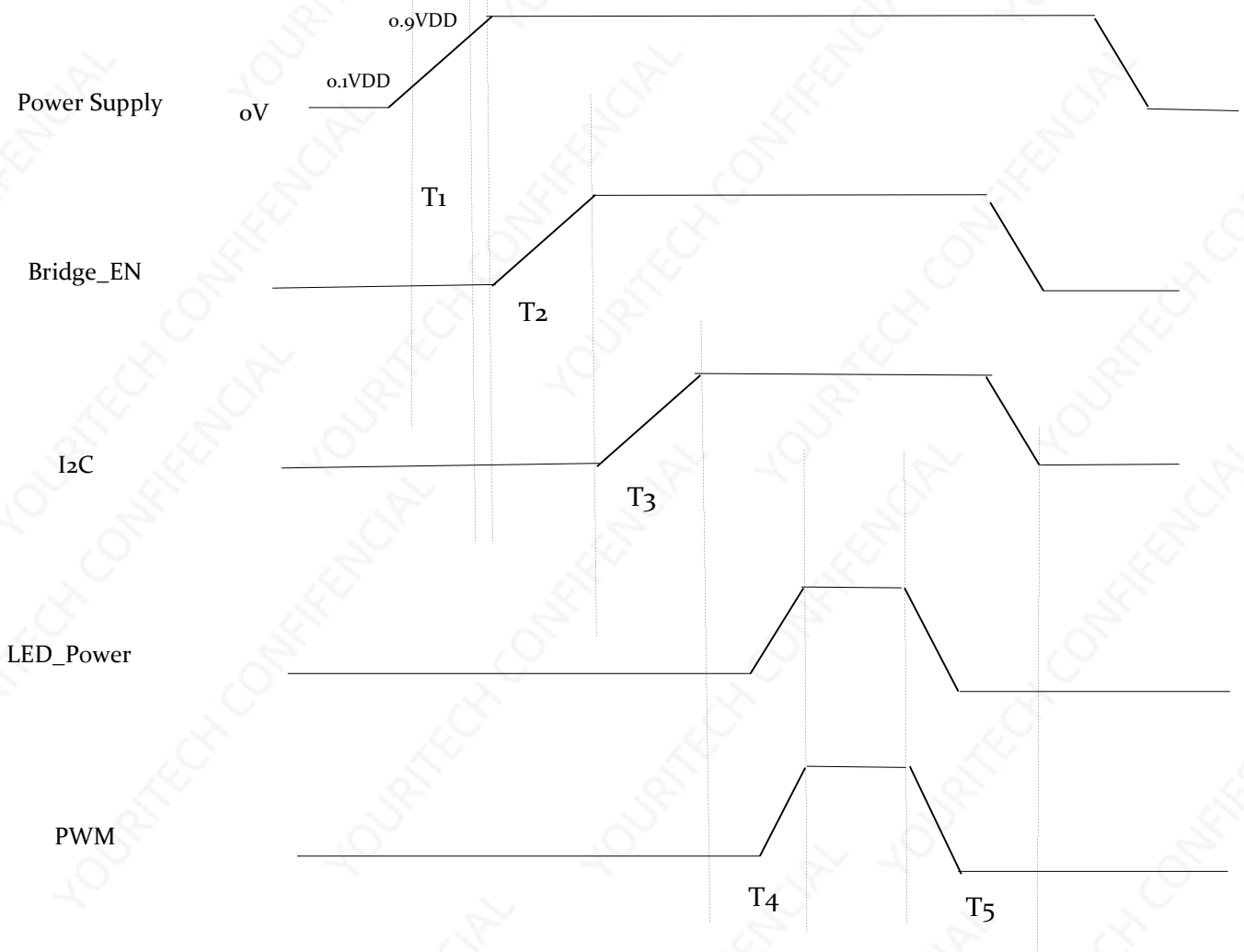
3.3. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max		
Voltage for LED backlight	VL	-	(23)	(24.5)	V	Note1
Current for LED backlight	IL	-	(220)	-	mA	
LED life time	-	-	20,000	-	Hr	Note2

Note1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =220mA.

Note1: The LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃、60±20%RH and IL =220mA.The LED lifetime could be decreased if operating IL is lager than 220mA

3.4. Power Sequence



$0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$

$T2: 10 \text{ ms}$

$T3: 10 \text{ ms}$

$200 \text{ ms} \leq T4$

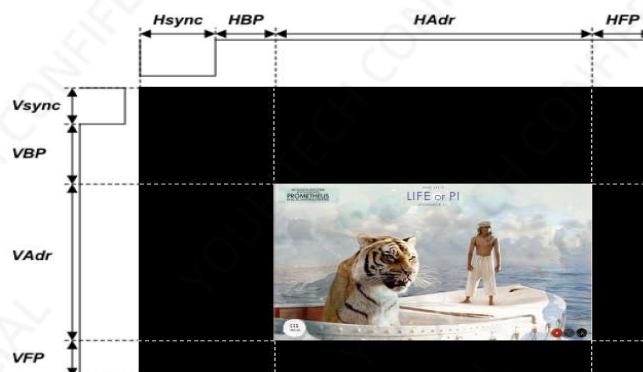
$200 \text{ ms} \leq T5$

3.5. LVDS Signal Timing Characteristics

3.5.1. Ac Electrical characteristics

< Table5. MIPI Timing Parameter >

ITEM			SYMBOL	min	typ	max	UNIT
LCD	Frame Rate		-	-	60	-	Hz
	Pixels Rate		-	156.8	156.8	159.9	MHz
Timing	Mipi CLK	Frequency	fCLK	490	490	498	MHz
		Period	Tclk	2.01	2.04	2.04	ns
	Horizontal	Horizontal total time	tHP	1343	1343	1366	t _{CLK}
		Horizontal Active time	tHadr	1200			t _{CLK}
		Horizontal Pulse Width	tHsync	1	1	1	t _{CLK}
		Horizontal Back Porch	tHBP	32	32	32	t _{CLK}
		Horizontal Front Porch	tHFP	110	110	133	t _{CLK}
		Vertical	Vertical total time	tvp	1946	1946	1951
	Vertical Active time		tVadr	1920			t _H
	Vertical Pulse Width		tVsync	1	1	1	t _H
	Vertical Back Porch		tVBP	14	14	14	t _H
	Vertical Front Porch		tVFP	11	11	16	t _H
	Bit Rate			TX SPD (MBPS)	980	980	995
Lane				-	4	-	Lane



3.5.2. Power Sequence

INITIALIZATION SEQUENCE NUMBER	INITIALIZATION SEQUENCE DESCRIPTION
Init seq 1	Power on
Init seq 2	After power is applied and stable, the DSI CLK lanes MUST be in HS state and the DSI data lanes MUST be driven to LP11 state
Init seq 3	Set EN pin to Low
Wait 10 ms ⁽¹⁾	
Init seq 4	Tie EN pin to High
Wait 10 ms ⁽¹⁾	
Init seq 5	Initialize all CSR registers to their appropriate values based on the implementation (The SN65DSI8x is not functional until the CSR registers are initialized)
Init seq 6	Set the PLL_EN bit (CSR 0x0D.0)
Wait 10 ms ⁽¹⁾	
Init seq 7	Set the SOFT_RESET bit (CSR 0x09.0)
Wait 10 ms ⁽¹⁾	
Init seq 8	Change DSI data lanes to HS state and start DSI video stream
Wait 5 ms ⁽¹⁾	
Init seq 9	Read back all registers and confirm they were correctly written
Init seq 10	Write 0xFF to CSR 0xE5 and CSR 0xE6 to clear the error registers
Wait 1 ms ⁽¹⁾	
Init seq 11	Read CSR 0xE5 and CSR 0xE6. If CSR 0xE5 and CSR 0xE6 != 0x00, then go back to step #2 and re-initialize

(1) Minimum recommended delay. It is fine to exceed these.

注：1) CSR registers, PLL_EN,SOFT_RESET都是寄存器，上电时需要通过I2C配置。Data的状态由处理器进行控制。

2) Sequence 9,10,11, 这些是IC监测到错误后重新启动时的初始化流程，如果需要可以不设置。

3) 背光PWM时序需与LED_Power同时上电。

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max		
Viewing angle (CR≥10)	θ_L	$\Phi=180^\circ$	70	80	-	degree	Note1
	θ_R	$\Phi=0^\circ$	70	80	-		
	θ_T	$\Phi=90^\circ$	70	80	-		
	θ_B	$\Phi=270^\circ$	70	80	-		
Response time	Ton	Normal $\theta = \Phi = 0^\circ$	-	10	20	msec	Note3
	Toff		-	15	30	msec	Note3
Contrast ratio	CR		700	1000	-	-	Note4
Color chromaticity	Wx		0.26	0.31	0.36	-	Note2 Note5
	Wy		0.28	0.33	0.38	-	Note6
Luminance	L		-	1000	-	Cd/m2	Note6
Luminance uniformity	Yu		70	75	-	%	Note7
NTSC Ratio	NTSC	CIE1931		72		%	Note8

Test Conditions:

1. $V_{DD}=3.3V, I_{BL}=220mA$ (Backlight current),the ambient temperature is $25^\circ C$.
2. The test systems refer to Note2.

Note 1: Definition of viewing angle range

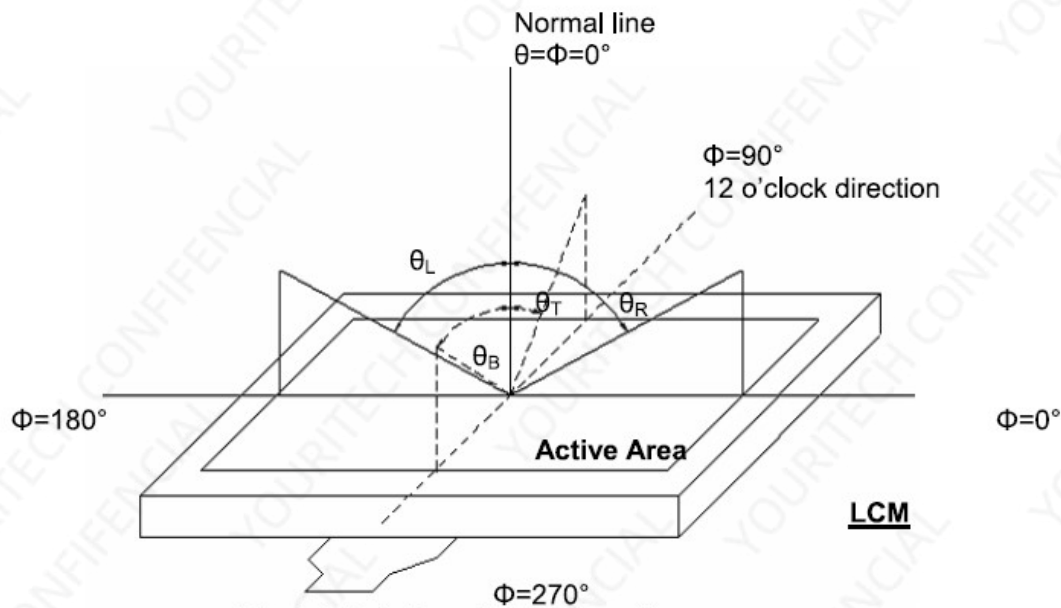


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

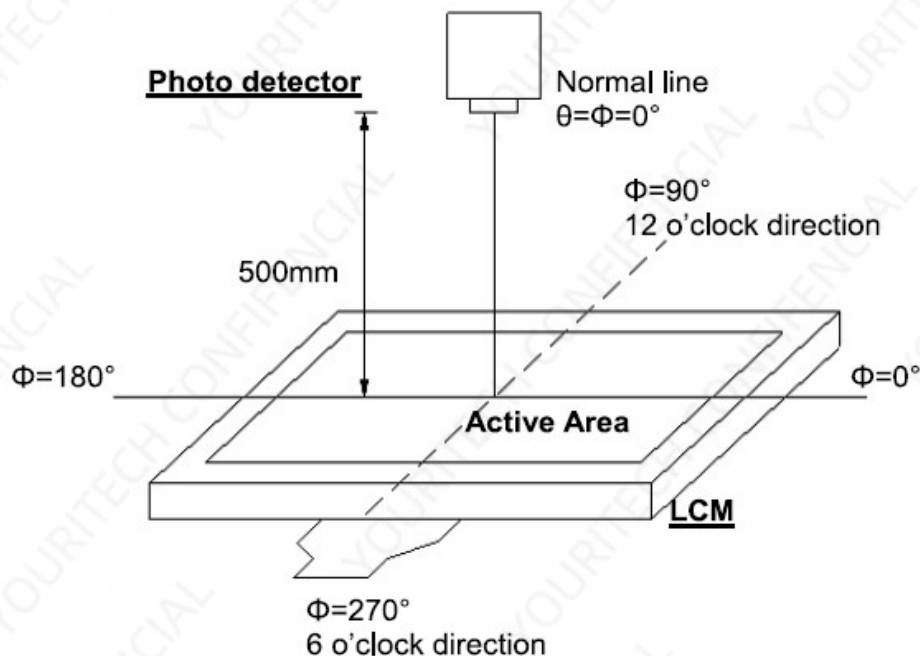


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detect output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

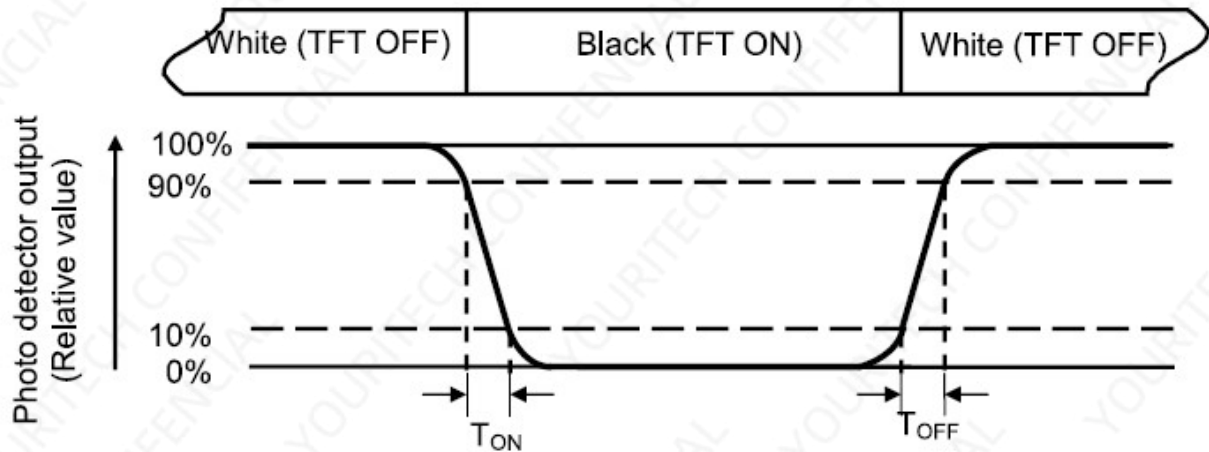


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=220\text{mA}$.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

L——Active area length W—— Active area width

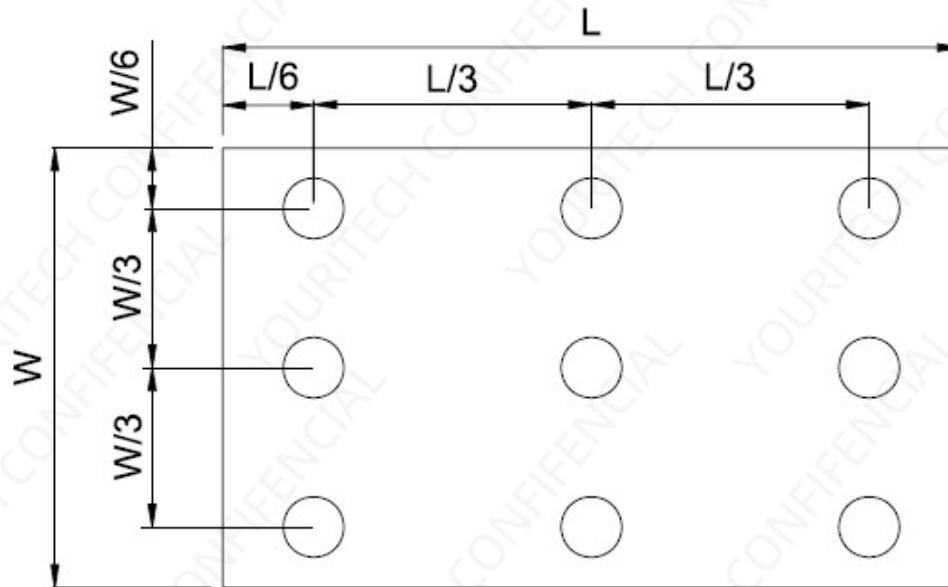


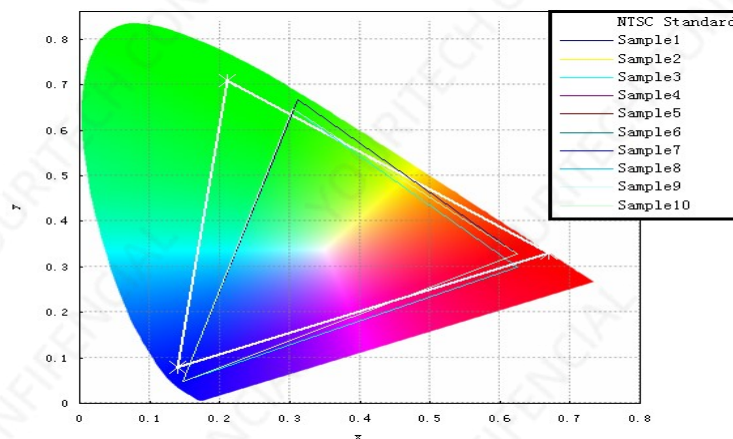
Fig. 4-4 Definition of measuring points

$B_{\max}$: The measured maximum luminance of all measurement position.

$B_{\min}$: The measured minimum luminance of all measurement position.

Note 8: Definition of Color of CIE Coordinate and NTSC Ratio.

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



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5. Reliability Test Items

No	Test Items	Conditions
1	High temperature storage test	80°C 240hr
2	Low temperature storage test	-30°C 240hr
3	Low temperature operation test	-20°C 240hr
4	High temperature operation test	70°C 240hr
5	High temperature & high humidity (operation test)	60°C 90%RH 240hr
6	Thermal Shock Test	-40°C~85°C 0.5hr/cycle 100cycle
7		
8		
9		
10		
...		

6. General Precautions

6.1. 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.

6.2. Handling

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

6.3. Static Electricity

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

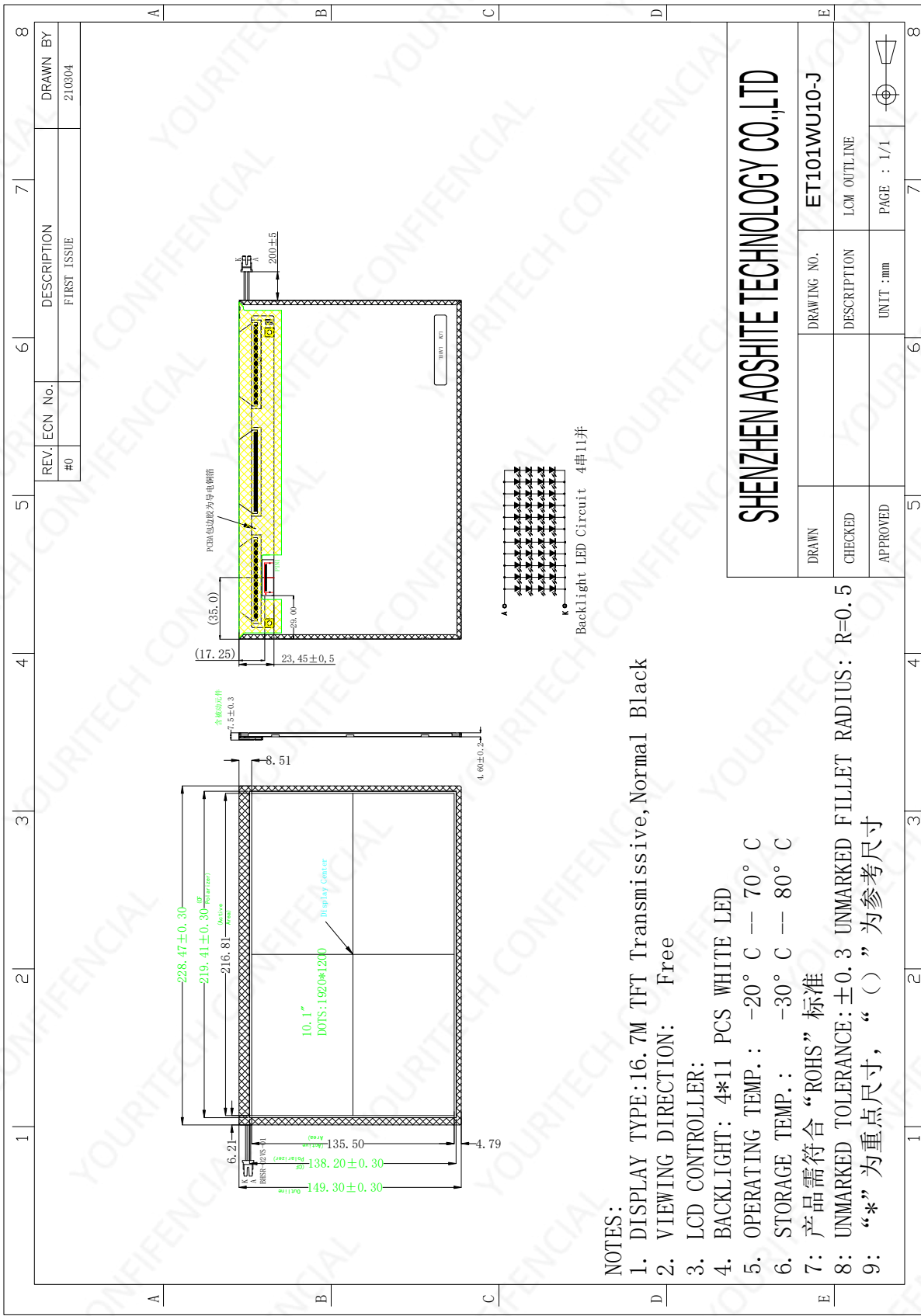
6.4. Storage

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

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7. Mechanical Drawing



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8.1. Packaging Material Table

No.	Item	Model (Material)	Dimensions(m m)	Unit weight (kg)	Quantity	Remark
1	LCM Module	ET101WU10-J	TBD	TBD	40pcs	
2	Partition	BC Corrugated paper	TBD	TBD	1est	
3	Corrugated Paper	BC Corrugated paper	TBD	TBD	4pcs	
4	Corrugated Bar	BC Corrugated paper	TBD	TBD	4pcs	
5	Dust-Proof Bag	PE	TBD	TBD	1pcs	
6	A/S Bag	PE	235*155*0.2	0.002	40pcs	
7	Carton	Corrugated paper	590*360*210	TBD	1pcs	
8	Total weight	TBD				

8.2 . Packaging Drawing

