

MODEL NO : P1330FHF1MA00**MODEL VERSION: A****SPEC VERSION : 1.2****ISSUED DATE: 2021-03-11**

- ☒ Preliminary Specification
☐ Final Product Specification

Customer : _____

Approved by	Notes

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This technical specification is subjected to change without notice

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Record of Revision

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1. General Specifications

Feature		Spec
Display Spec.	Size	13.3inch
	Resolution	1920×1080
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.153*0.153
	Display Mode	Transmissive, Normally Black
	Surface Treatment	HC
	Viewing Direction	All
Mechanical Characteristics	LCM (W x H x D) (mm)	308.00*186*9.20mm
	Active Area(mm)	293.76*165.24
	With /Without TSP	Without TSP
	Matching Connection Type	CN1: DF81-40S-0.4H CN2: FH34SRJ-10S-0.5SH(50)
	LED Numbers	56
	Weight (g)	TBD
Electrical Characteristics	Interface	LVDS 2 port
	Color Depth	16.7 M
	Driver IC	RM91M39FN*6

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002+HF

Note 3: LCM weight tolerance: ± 5%

2. Interface

2.1 Input / Output Terminals for LCD

Matching connector: DF81-40S-0.4H

Pin No.	Symbol	I/O	Description	Remarks
1	GND	P	Ground	-
2	DA0-	I	Pixel data A0	-
3	DA0+	I	Pixel data A0	-
4	GND	P	Ground	-
5	DA1-	I	Pixel data A1	-
6	DA1+	I	Pixel data A1	-
7	GND	P	Ground	-
8	DA2-	I	Pixel data A2	-
9	DA2+	I	Pixel data A2	-
10	GND	P	Ground	-
11	CKA-	I	Pixel clock A	-
12	CKA+	I	Pixel clock A	-
13	GND	P	Ground	-
14	DA3-	I	Pixel data A3	-
15	DA3+	I	Pixel data A3	-
16	GND	P	Ground	-
17	DB0-	I	Pixel data B0	-
18	DB0+	I	Pixel data B0	-
19	GND	P	Ground	-
20	DB1-	I	Pixel data B1	-
21	DB1+	I	Pixel data B1	-
22	GND	P	Ground	-
23	DB2-	I	Pixel data B2	-
24	DB2+	I	Pixel data B2	-
25	GND	P	Ground	-
26	CKB-	I	Pixel clock B	-
27	CKB+	I	Pixel clock B	-
28	GND	P	Ground	-
29	DB3-	I	Pixel data B3	-
30	DB3+	I	Pixel data B3	-
31	GND	P	Ground	-
32	GND	P	Ground	-
33	GND	P	Ground	-
34	NC	-	NC	-
35	VCC	P	Power supply	-
36	VCC	P	Power supply	-
37	VCC	P	Power supply	-

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38	NC	-	NC	-
39	NC	-	NC	-
40	NC	-	NC	-

Note1: All GND and VCC terminals should be used without any non-connected lines.

Note2: Twist pair wires with 100Ω (Characteristic impedance) should be used between LCD panel signal processing board and LVDS transmitter.

Note3 : Please add the FPC connector type and matched one if necessary.

Note4 : I——Input, O——Output, P——Power/Ground

2.2 Input / Output Terminals for Backlight(CN2)

Matching connector: FH34SRJ-10S-0.5SH(50)

Pin No.	Symbol	I/O	Description	Remarks
1	A1	P	LED Anode1	-
2	A2	P	LED Anode2	-
3	A3	P	LED Anode3	-
4	A3	P	LED Anode4	-
5	NC	N	No connect	-
6	NC	N	No connect	-
7	K1	P	LED Cathode 1	-
8	K2	P	LED Cathode 2	-
9	K3	P	LED Cathode 3	-
10	K4	P	LED Cathode 4	-

3. Absolute Maximum Ratings

GND=0V					
Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	0.3	4.5	V	
BL_POWER Input	VCC_LED+	-0.3	28	V	
Operating Temperature	Top	-20	70	°C	
Storage Temperature	Tst	-30	80	°C	

Table 3 Absolute Maximum Ratings

Note1:

Ta means the ambient temperature.

It is necessary to limit the relative humidity to the specified temperature range.

Condensation on the module is not allowed.

4. Electrical Characteristics

4.1 Driving TFT LCD Panel

(Ta= 25°C)

Parameter	Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage	VCC	3.2	3.3	3.4	V	-
Power supply current	ICC	-	TBD	TBD	mA	at VCC= 3.3V
Permissible ripple voltage	VRPC	-	-	100	mVpp	for VCC Note3, Note4,
Differential input threshold voltage	High	VTH	-	100	mV	at VCM= 1.2V Note5,6
	Low	VTL	-100	-	mV	
Input differential voltage	VID	100	-	600	mV	-
Differential input common mode voltage	VCM		1.2	VCC-0.4- VID /2	V	-
Terminating resistance	RT	-	100	-	Ω	-

Note1: Checkered flag pattern [by IEC 61747-6];

Note2: Pattern for maximum current;

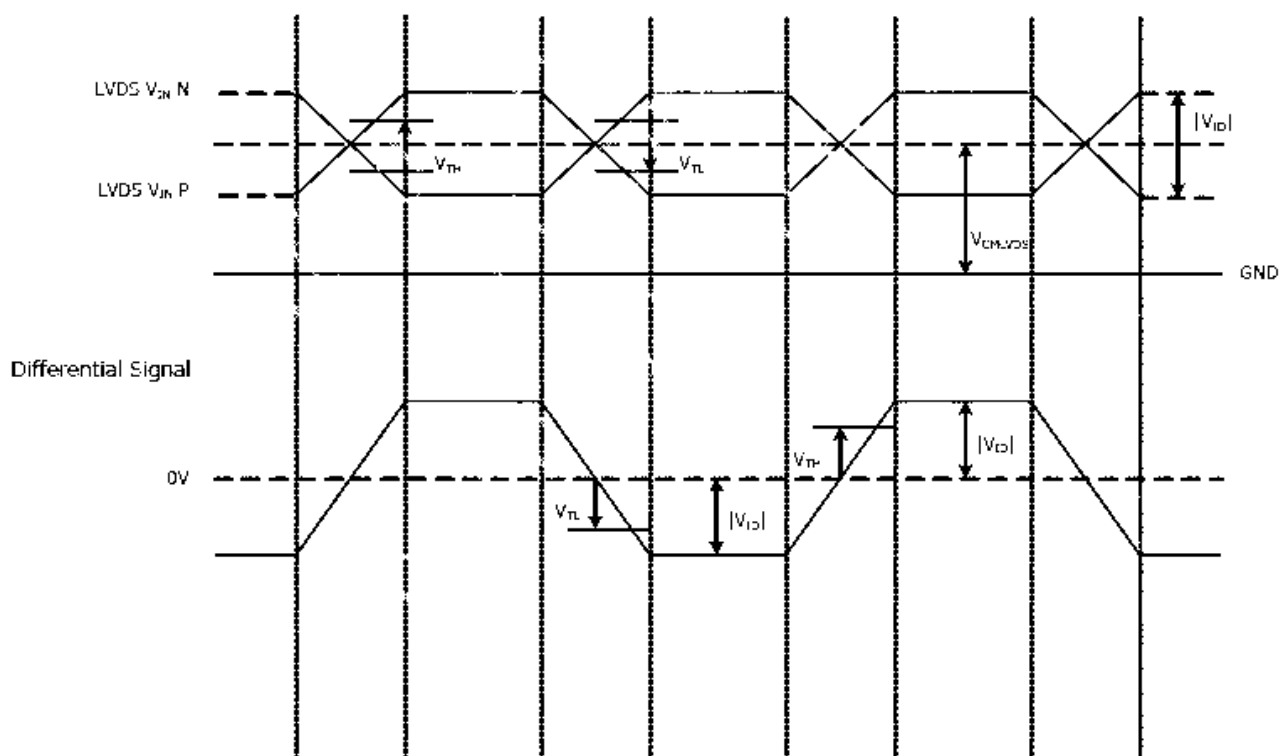
Note3: The permissible ripple voltage includes spike noise;

Note4: The load variation influence does not include;

Note5: Common mode voltage for LVDS receiver;

Note6: DC characteristics (LVDS receiver part).

Single-End



4.2 Backlight Unit Driving Condition

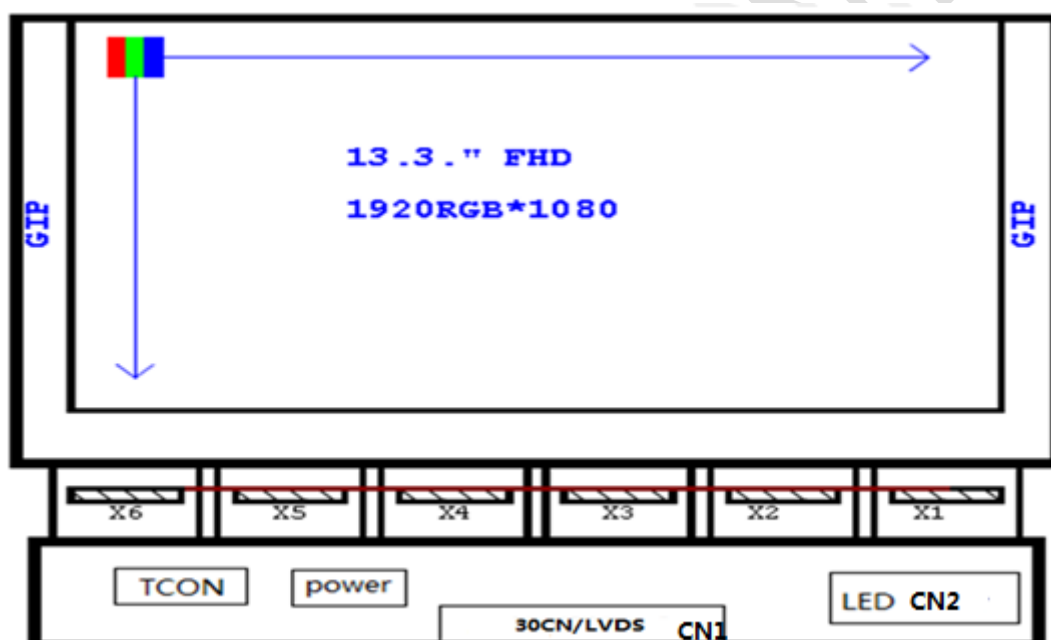
ND=0V, Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Voltage	VLED		20.3		V	Note 1
Forward Current	I _F	-	640	-	mA	
Backlight Power Consumption	WBL	-		-	W	
Life Time	-	-	50000	-	Hrs	Note 2

Table 4.2 LED backlight characteristics

Note 1: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4.3 BLOCK DIAGRAM



5. Timing Chart

5.1 Timing Characteristics

(Note1, Note2, Note3)

Parameter		Symbol	min.	typ.	max.	Unit	Remarks
CLK	Frequency	1/tc		TBD		MHz	
	Duty	-	-			-	-
	Rise time, Fall time	-				ns	
DATA	CLK-DATA	Setup time	-	-			ns
		Hold time	-				ns
	Rise time, Fall time		-				ns
DE	Horizontal	Cycle	th		TBD		μs
					TBD		CLK
		Display period	thd	1920			CLK
	Vertical (One frame)	Cycle	tv		TBD		ms
					TBD		H
		Display period	tvd	1080			H
	CLK-DE	Setup time	-	-			ns
		Hold time	-				ns
	Rise time, Fall time		-				ns

Note1: Definition of parameters is as follows.

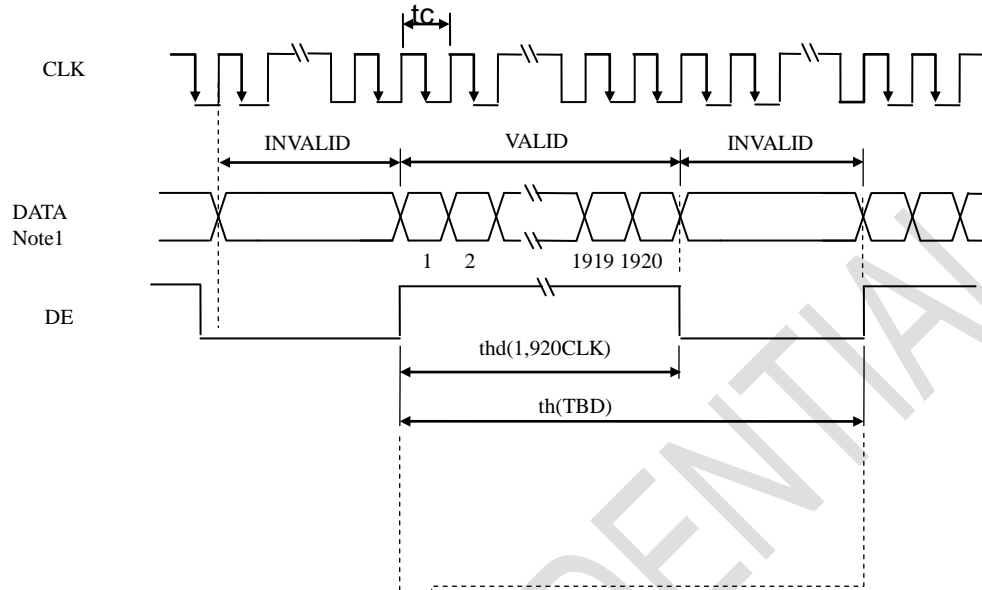
tc= 1CLK, th= 1H

Note2: See the data sheet of LVDS transmitter.

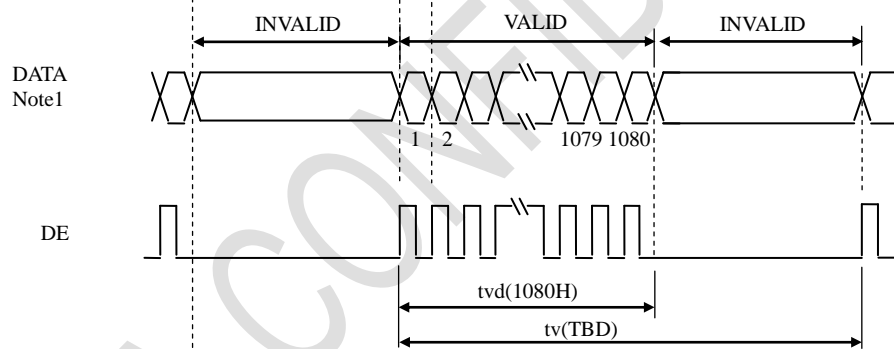
Note3: Vertical cycle (tv) should be specified in integral multiple of Horizontal cycle (th).

5.2 Input Signal Timing Chart

Horizontal timing



Vertical timing

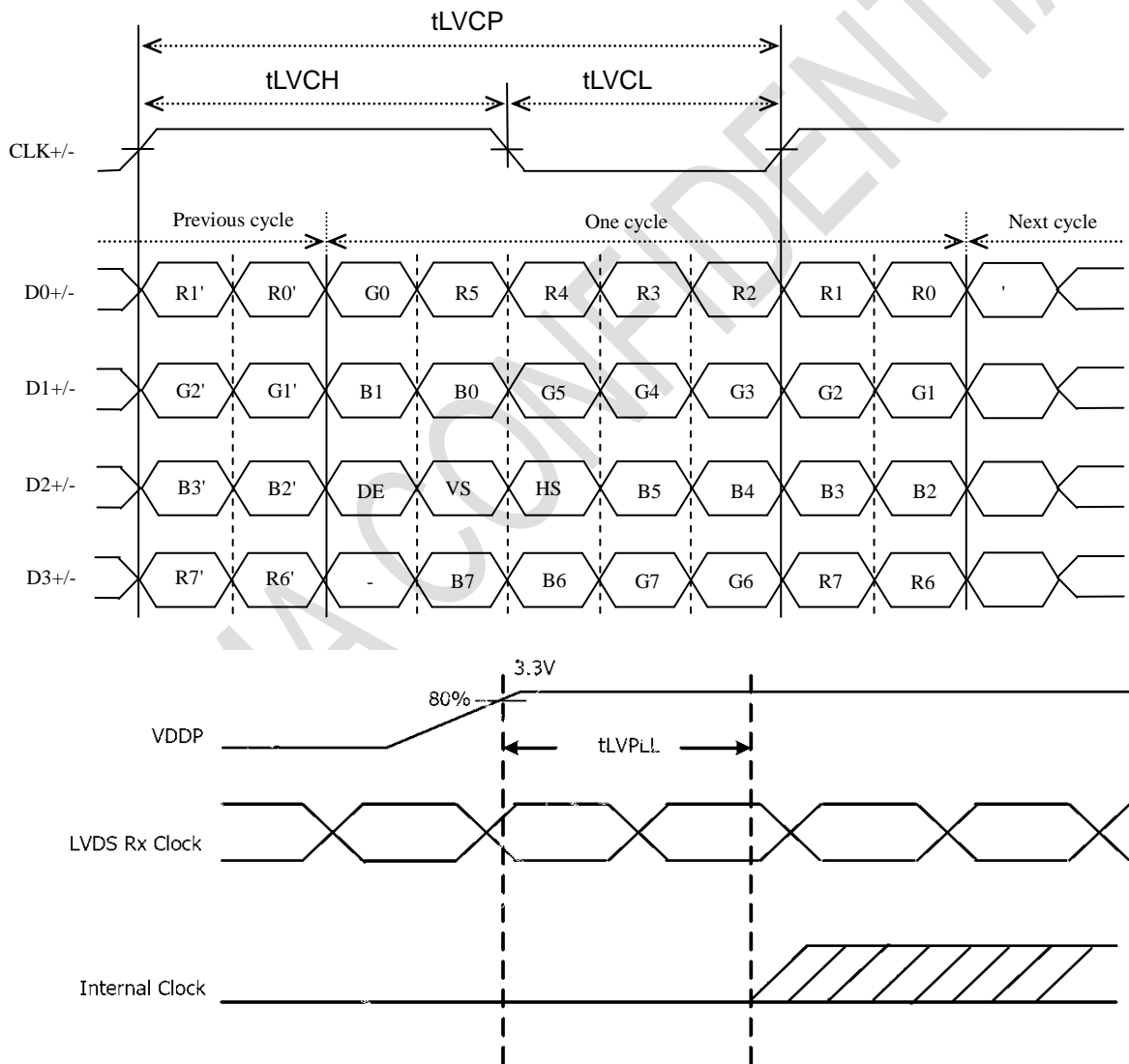


Note1: DATA = R0-R7, G0-G7, B0-B7

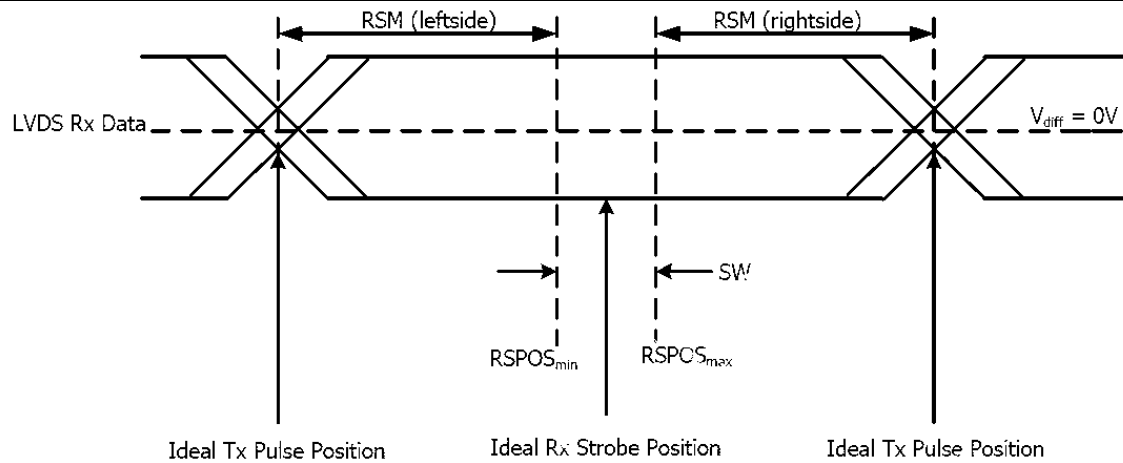
5.3 Input Data Mapping

Input data signal: 8-bit

Parameter	Symbol	Conditions	min	typ	max	Unit
Clock Period	tLVCP		9.5	T	25	ns
Clock Frequency	1/tLVCP		40		105	MHz
Clock High Time	tLVCH			4T/7		ns
Clock Low Time	tLVCL			3T/7		ns
PLL Wake-Up Time	tLVPLL				1	ms
Strobe Width	tSW	VCM=1.2 VID =400mV @65MHz	200			ps
Receiver Strobe Margin	tRSM		400			ps



LVDS Receiver Phase-Locked Loop Wake-Up Time



Definitions:

RSM Receiver Skew Margin

RSPOS Receiver Strobe Position

SW Strobe Width (Setup and Hold Time; Internal data sampling window)

LVDS Receiver Input Skew Margin

5.4 POWER ON/OFF SEQUENCE

TBD

6. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR ≥ 10		88	-	Degree	Note2
		θB			88	-		
		θL			88	-		
		θR			88	-		
Contrast Ratio		CR	θ=25°		1000	-	-	Note1,3
Response Time		T _{ON}	25℃	-	25	35	ms	Note 4
		T _{OFF}						
Chromaticity	White	x	Backlight is on	0.242	0.292	0.342	-	-
		y		0.250	0.300	0.350		
	Red	x		0.593	0.643	0.693	-	
		y		0.293	0.343	0.393		
	Green	x		0.269	0.319	0.369	-	
		y		0.576	0.626	0.676		
	Blue	x		0.099	0.149	0.199	-	
		y		0.019	0.069	0.119		
Uniformity		U	-	75		-	%	Note1,5
NTSC		-	-	-	72	-	%	
Luminance		-	-		1000			

Test Conditions:

1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 (Excluding viewing angle and response time test).
3. Viewing Angle and Response Time test method follow the normal LCD test method.

Note 1: (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 (Excluding Uniformity test). All input terminals LCD panel must be ground when measuring the center area of the panel.

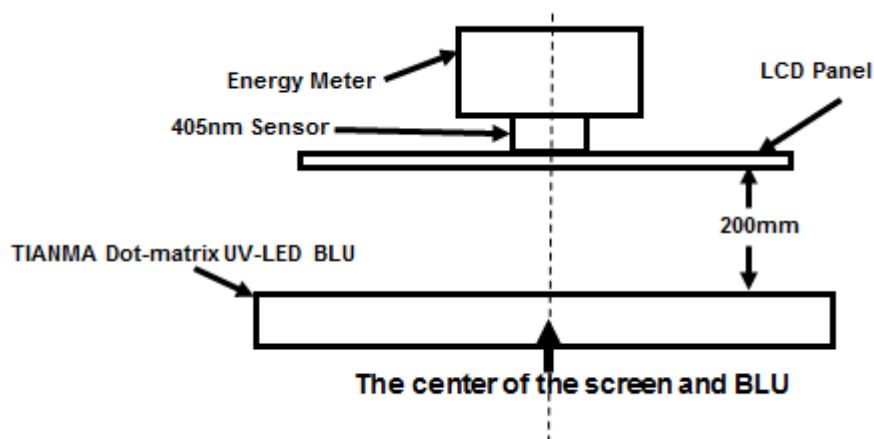


Fig.1

(2) Test instrument and recipe.

As shown in the Fig.1, all optics are measured under a collimating dot-matrix LED backlight, which emitting a wave of 405nm. Energy meter AccuMAX™-XS-405 is used to measure the following mentioned energy value, the LCD panel is 200mm away from the UV-LED surface. The transmissive energy value of LCD at white state is 2mW/cm².(Fig.1)

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD.(Fig.2)

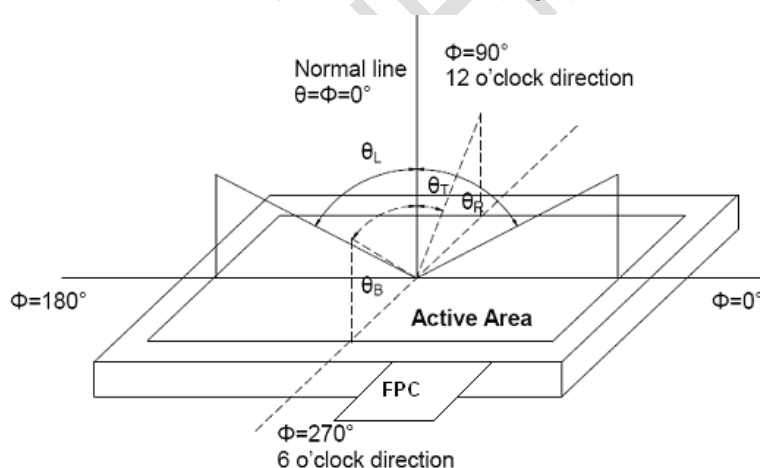


Fig.2

Note 3: Definition of contrast ratio

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

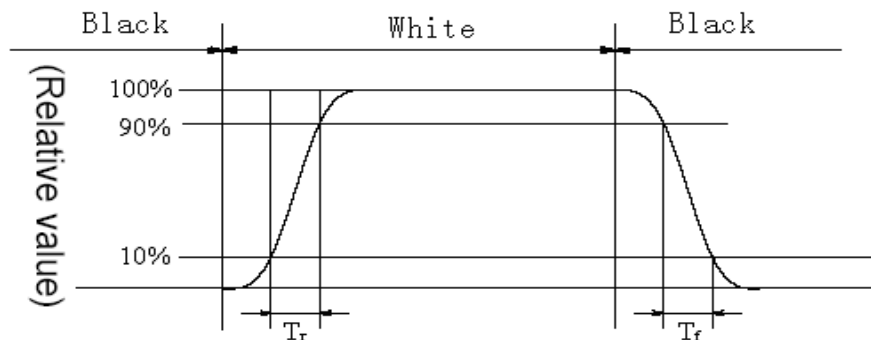
"White state ": The state is that the LCD should be driven by V_{white}.

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

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

Note 4: 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 detector output intensity changed from 10% to 90%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 90% to 10%.

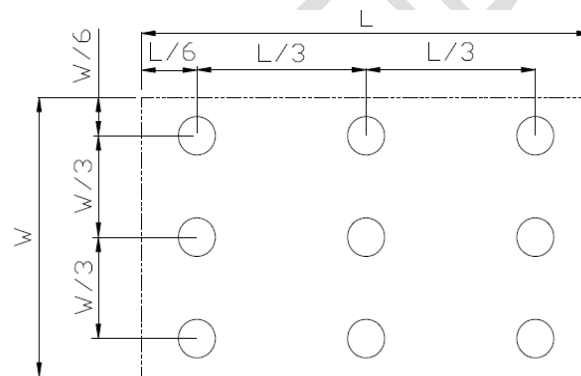


Note 5: Definition of Energy Uniformity

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

$$\text{Energy Uniformity (U)} = E_{\min} / E_{\max}$$

L-----Active area length W----- Active area width



E_{\max} : The measured Maximum Energy value of all the measurement positions.

E_{\min} : The measured Minimum Energy value of all the measurement positions.

Note 6: Definition of transmittance:

$$\text{Transmittance} = \frac{\text{Energy value measured when LCD is on the "White" state}}{\text{Energy value measured from BLU}}$$

7. Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts=70℃,240H	IEC60068-2-1:2007,GB 2423.2-2008
2	Low Temperature Operation	Ta=-20℃,240H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=80℃,240H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-30℃,240H	IEC60068-2-1:2007 GB2423.1-2008
5	Operation at High Temperature and Humidity	60℃90%RH/240H	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	'-20℃/30min、70℃/30min 100cycles、1H/Cycle, 5min	IEC60068-2-14:1984,G B2423.22-2002
7	Electro Static Discharge (operation)	C=150pF,R=330Ω; Contact:±4Kv, 5times; Air:±8KV,5times;	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz ~ 55Hz ~ 10Hz 2hours for each direction of X.Y.Z (6 hours total)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Shock (non-operation)	60G 6ms, ±X,±Y,±Z 3 times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995

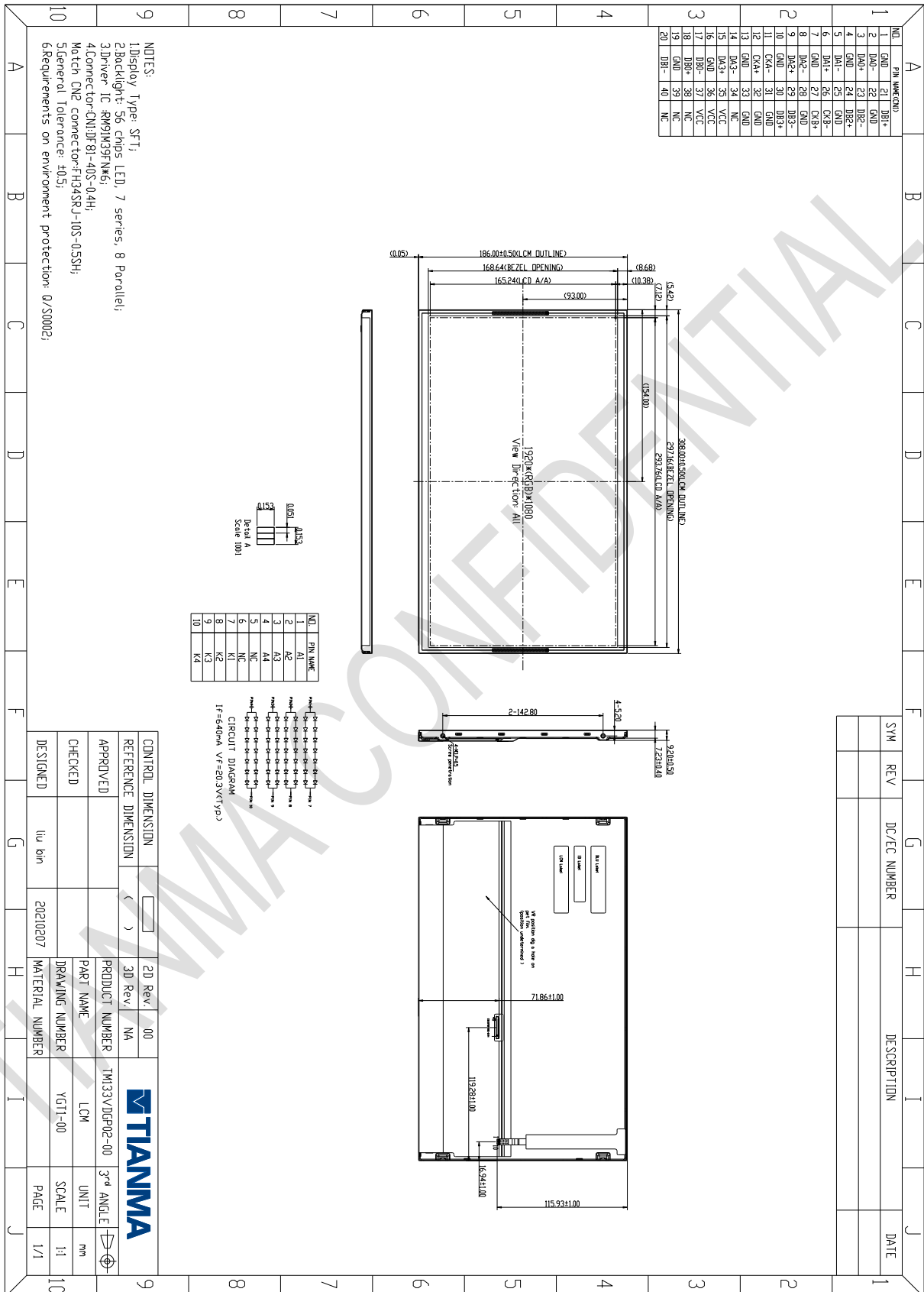
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

Note4: 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.

8. Mechanical Drawing



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9. Packing Drawing

TBD

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10. Precautions for Use of LCD Modules

1.1 Handling Precautions

1.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

1.1.2 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.

1.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

1.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

1.1.5 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

1.1.6 Do not attempt to disassemble the LCD Module.

1.1.7 If the logic circuit power is off, do not apply the input signals.

1.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

1.2 Storage precautions

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

1.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

1.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

1.3 Transportation Precautions

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