PHOENIX DISPLAY
INTERNATIONAL, INC.

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SPECIFICATION FOR LCD MODULE

CUSTOMER	
PART NUMBER	PDI080WUM-NLO
DESCRIPTION	8.0" 1200 X (RGB) X 1920
VERSION	V1
ISSUE DATE	11-Jan-19

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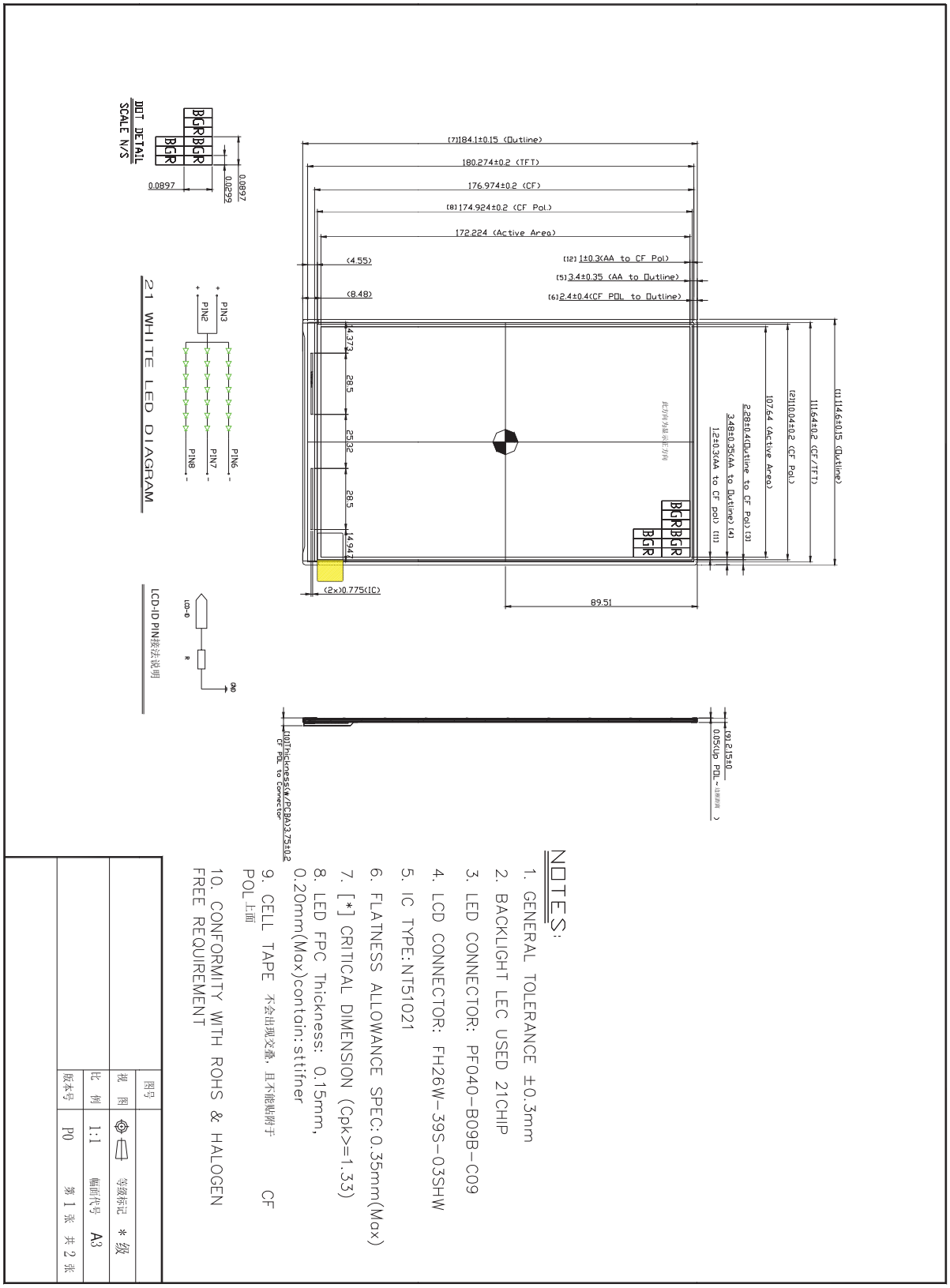
1 General Characteristics

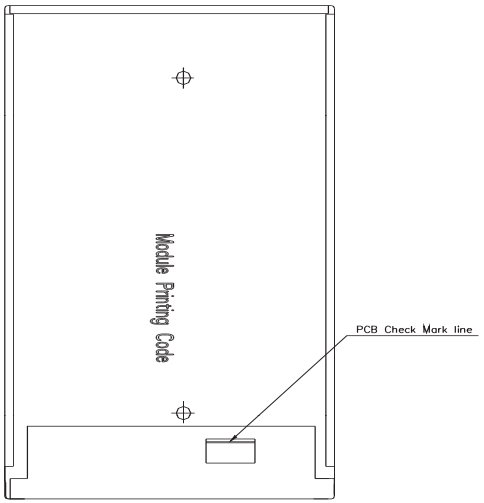
ITEM	Specification	Unit
LCD Type	a-Si TFT,Transmissive,Normally Black,IPS	-
LCD Size	8.0	inch
Resolution (W x H)	1200x (RGB) ×1920	pixel
LCM size	114.6(H) x 184.1(V) x 2.15(D)	mm
Active Area	107.64 (H) x 172.224 (V)	mm
Dot Pitch	0.0299(H)x 0.0897(V)	mm
Viewing Direction	ALL o'clock	-
Color Depth	16.7M	-
Pixel Arrangement	RGB-stripe	-
Backlight Type	18 LEDs，120mA	-
Surface Treatment	Clear	-
Interface Type	MIPI	-
Input Voltage	3.3	V
With/Without TP	Without	-
Weight	TBD	g

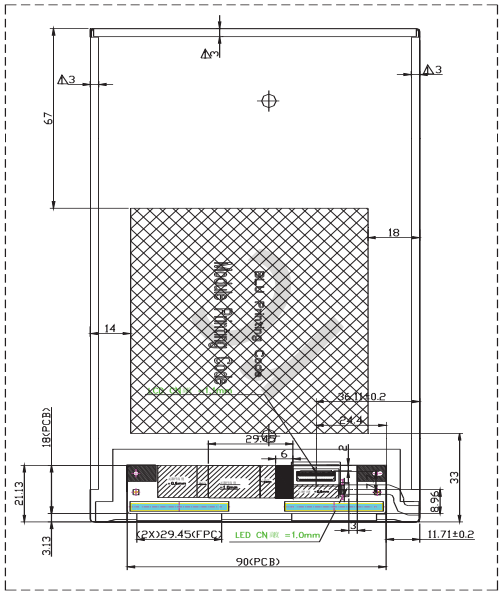
Note 1: RoHS compliant

Note 2: LCM weight tolerance: ± 5%.

2 Product drawings







NOTES:

1. GENERAL TOLERANCE ±0.3mm
2. BACKLIGHT LEC USED 21CHIP
3. LED CONNECTOR: PF040-B09B-C09
4. LCD CONNECTOR: FH26W-39S-03SHW
5. IC TYPE: NT51021
6. FLATNESS ALLOWANCE SPEC: 0.35mm(Max)
7. [*] CRITICAL DIMENSION (Cpk>=1.33)
8. LED FPC Thickness: 0.15mm, 0.20mm(Max)contain: sttifner
9. CELL TAPE 不会出现交叠 且不能粘附于 CF POL上面
10. CONFORMITY WITH ROHS & HALOGEN FREE REQUIREMENT

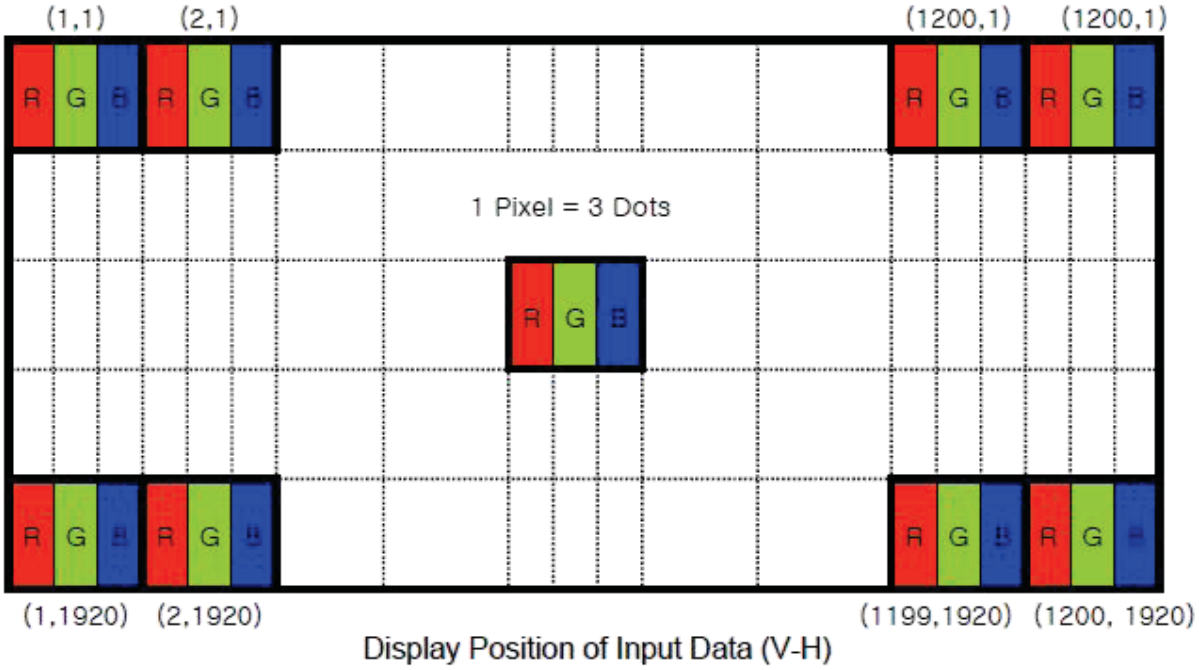
	视 图		等级标记	* 级
	比 例	1:1	幅面代号	A3
	版本号	P0	第 2 张 共 2 张	

3 Interface description

PIN NO.	Symbol	description
1-4	VCC	Power supply(3.3V).
5-6	NC	No connect
7	LED_PWMIN	PWM input
8	LED_PWMOUT	PWM output
9-10	NC	No connect
11	GND	Ground. (0V)
12	D0+	MIPI input data pair D0+
13	D0-	MIPI input data pair D0-
14	GND	Ground. (0V)
15	D1+	MIPI input data pair D1+
16	D1-	MIPI input data pair D1-
17	GND	Ground. (0V)
18	CLK+	MIPI input clock pair CLK+
19	CLK-	MIPI input clock pair CLK-
20	GND	Ground. (0V)
21	D2+	MIPI input data pair D2+
22	D2-	MIPI input data pair D2-
23	GND	Ground. (0V)
24	D3+	MIPI input data pair D3+
25	D3-	MIPI input data pair D3-
26-27	GND	Ground. (0V)
28	ID	ID PIN(pull down to GND with 0ohm)
29	STBYB	Standby mode select
30-32	LB1-LB3	LED-
33-37	NC	No connect
38-39	LED_vout	LED+

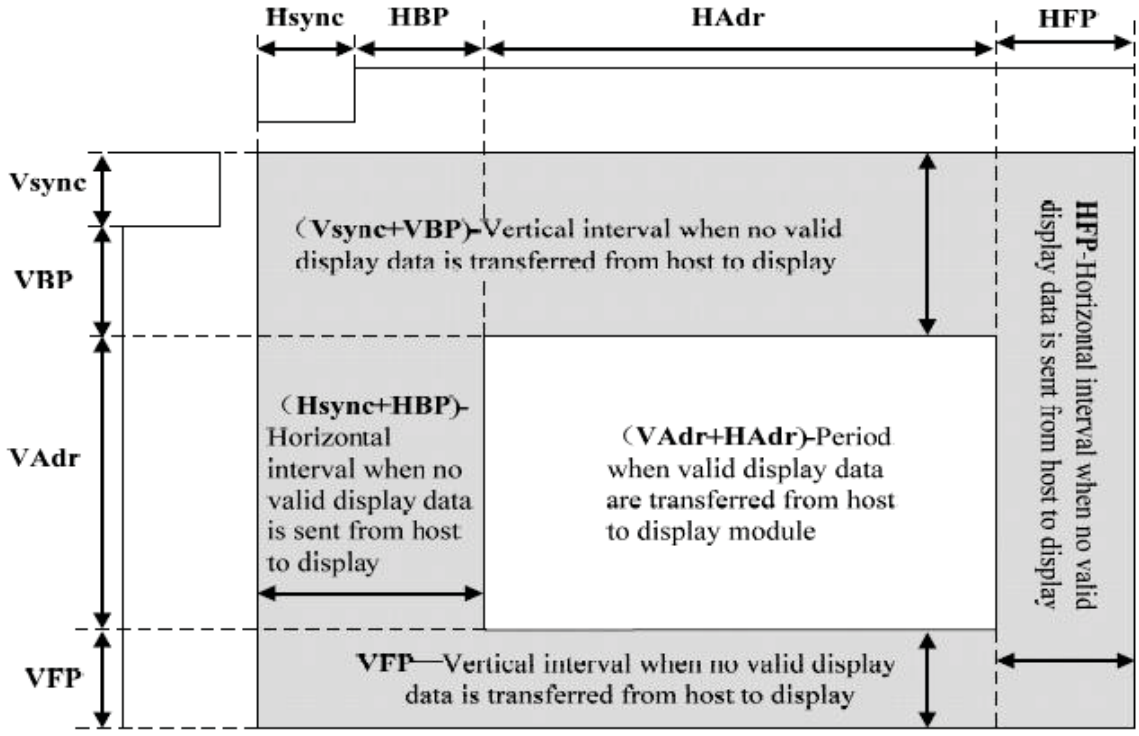
4 Interface timing

4.1 Data input format



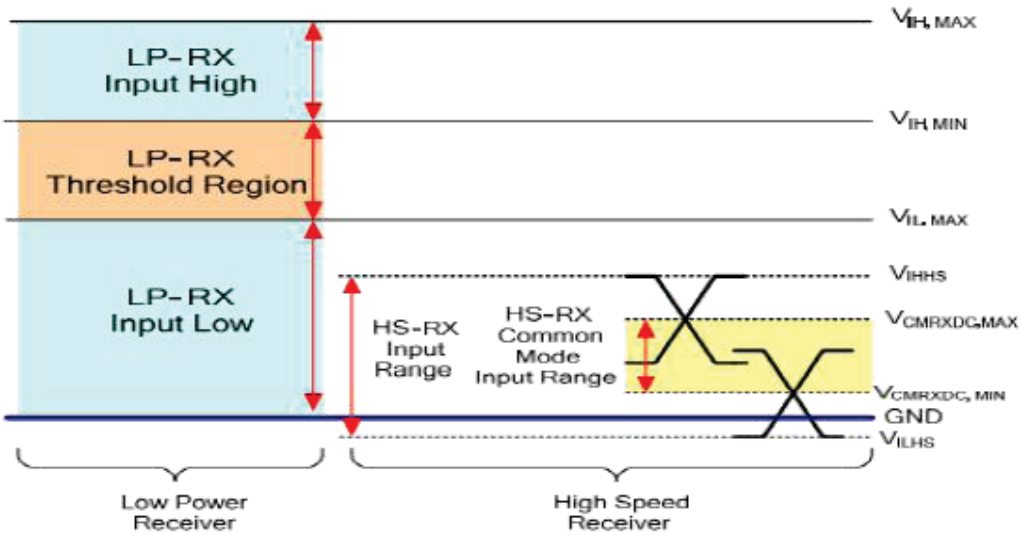
Display Position of Input Data (V-H)

4.2 Signal timing



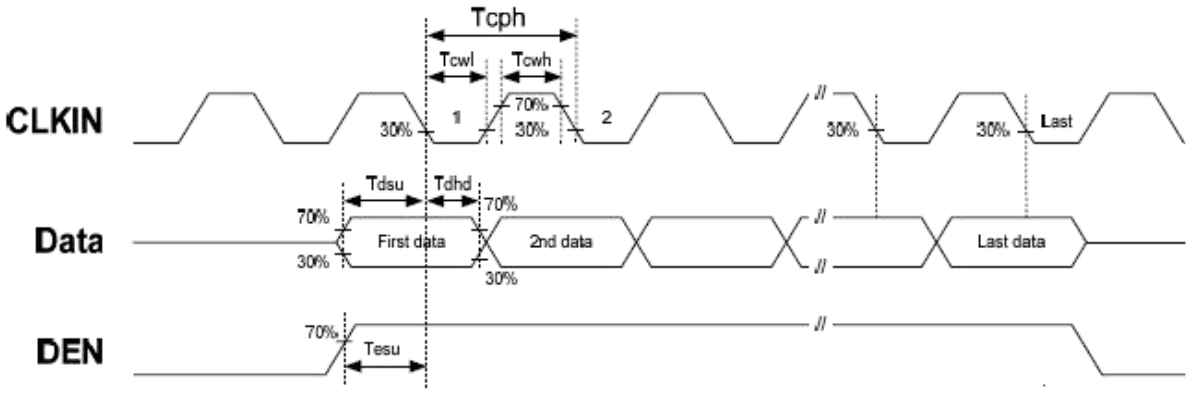
ITEM			SYNBOL	min	typ	max	UNIT
LCD	Frame Rate		-	-	60	-	Hz
	Pixels Rate		-	156.8	156.8	159.9	MHz
Timing	DCLK	Frequency	fCLK	490	490	498	MHz
		Period	Tclk	2.01	2.04	2.04	ns
	Horizontal	Horizontal total time	tHP	1343	1343	1366	t_{CLK}
		Horizontal Active time	tHadr		1200		t_{CLK}
		Horizontal Pulse Width	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	t_H
		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
Differential Swing			VDswing	400	500	-	mV
Bit Rate			TX SPD (MBPS)	980	980	995	Mbps
Pixel Fomat				-	24	-	Data bit/ pixel
Lane				-	4	-	Lane

4.3 MIPI Rx interface timing parameter



Item		Parameter	Min.	Typ.	Max.	Unit
HS_RX	Common-mode voltage HS receive mode	VCMRX(DC)	155	—	330	mV
	Differential input high threshold	VIDTH	—	—	70	mV
	Differential input low threshold	VIDTL	70	—	—	mV
	Single-ended input high voltage	VIHHS	—	—	460	mV
	Single-ended input low voltage	VILHS	-40	—	—	mV
	Differential input impedance	ZID	60	75	95	Ω
LP_RX	Logic 1 input voltage	VIH	1100	1200	1300	mV
	Logic 0 input voltage. not in ULPState	VIL	-150	—	150	mV

4.4 Signal timing wave forms of interface signal



5 Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNIT
Power supply voltage	VDD	-0.3	5.0	V
Operating Temperature	TOP	-20	+60	° C
Storage Temperature	TST	-20	+60	° C
Humidity	RH	-	90%(Max 60° C)	RH

6 Electrical Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Power supply voltage	DVDD	3.0	3.3	3.6	V
Power supply Current	IDD	-	115	121	mA

7 Backlight Characteristics

Parameter			Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage		V_F	-	3	3.2	V	-
LED Forward Current		I_F	-	21	-	mA	-
LED Power Consumption		P_{LED}	-	1.32	1.41	W	Note 1
LED Life-Time		N/A	15,000	-	-	Hour	IF = 21mA Note 2
LED Forward Voltage of every LED string		V_{LED}	-	21	22.4	V	
LED Forward Current of every LED string		I_{LED}	-	21	-	mA	
PWMIN Control Level	PWMIN High Level	V_{PMIH}	0.7x VDD	-	VDD	V	
	PWMIN Low Level	V_{PMIL}	0.0	-	0.3xVDD	V	
PWMOUT Control Level	PWMIOUT High Level	V_{PMOH}	VDD-0.4	-	-	V	
	PWMOUT Low Level	V_{PMOL}	-	-	GND +0.4	V	
PWM Control Frequency		F_{PWM}	0.1	-	30	KHz	
PWM duty Ratio		Duty	5%	-	100%	%	

Note:

1.The LED life time is defined as the module brightness decrease to 50% original brightness at Ta=25°C, 60%RH ±5 %.

2. The life time of LED will be reduced if LED is driven by high current, high ambient temperature and humidity conditions.

3. Typical operating life time is an estimated data.

4. Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded .Functional operation should be restricted to the conditions described under normal operating conditions.

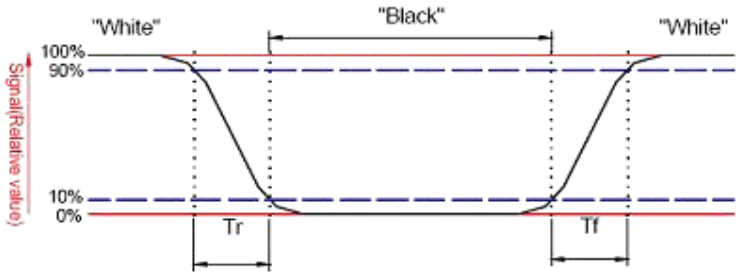
8 LCD Optical specifications

Item	Symbol	Condition	Specification			Unit	Remark
			Min	Typ	Max		
Response time (By Quick)	Tr+Tf	-	-	25		ms	Note 2
Contrast ratio	CR	-	700	900	-	-	Note 3
Surface luminance	Lv	θ= 0°	330	390	-	Cd/m^2	Note 4
Luminance uniformity	Yu	θ= 0°	70	-	-	%	Note 6
Viewing angle	Top	CR≧10	75	80	-	Deg.	Note 7
	Bottom	CR≧10	75	80	-		
	Left	CR≧10	75	80	-		
	Right	CR≧10	75	80	-		
CIE(x,y) chromaticity	Wx	θ= 0°	Typ -0.04	0.300	Typ +0.04		Note 5
	Wy			0.320			
	Rx			0.629			
	Ry			0.343			
	Gx			0.327			
	Gy			0.599			
	Bx			0.150			
	By			0.085			

Note 1: Ambient temperature = 25°C.

Note 2: Definition of response time:

The output signals of TRD-100 are measured when the input signals are changed to “White” (falling time) and from “White” to “Black” (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.



Note 3: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

Measured at the center area of the LCD.

Note 4:Definition of surface luminance

Surface luminance is the luminance with all pixels displaying white

Note 5: For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on

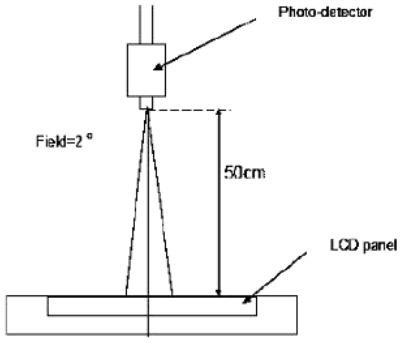


Figure A

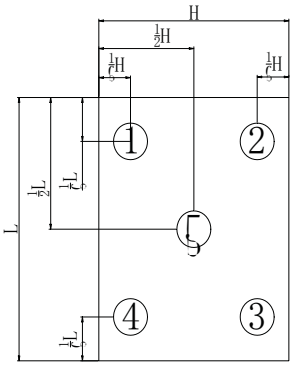


Figure B

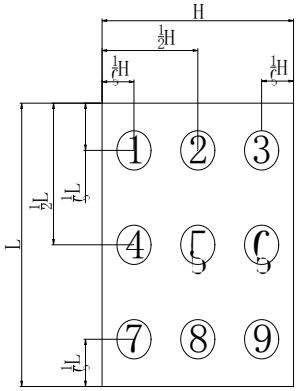


Figure C

Note 6:Definition of Luminance Uniformity

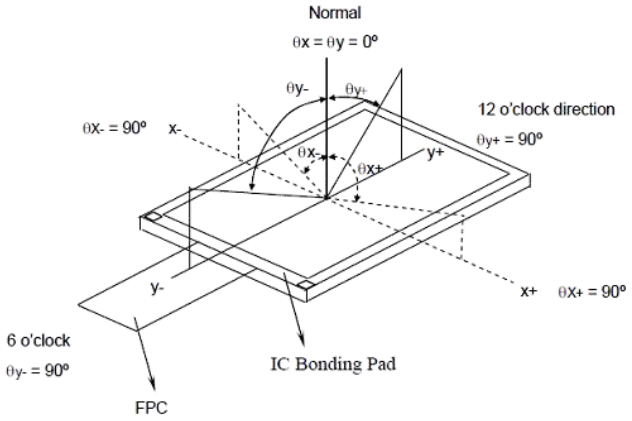
Active area is divided into 5 or 9 measuring areas,Every measuring point is placed at the center of each measuring area

Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

Luminance Uniformity (Yu)= (Bmin/Bmax)x100%

Note 7: Definition of viewing angle



9 RELIABILITY TEST

NO.	TEST ITEM	TEST CONDITION	INSPECTION AFTER TEST
1	High Temperature Storage	60±2°C/96 hours	Inspection after 2~4 hours storage at room temperature and humidity. The condensation is not accepted. The sample shall be free from defects: 1. Air bubble in the LCD 2. Seal leak 3. Non-display 4. Missing segments 5. Glass crack
2	Low Temperature Storage	-20±2°C/96 hours	
3	High Temperature Operating	60±2°C/96 hours	
4	Low Temperature Operating	-20±2°C/96 hours	
5	Temperature Cycle	-20±2°C ~ 25~ 60± 2°C × 10 cycles (30 min.) (5min.) (30min.)	
6	Damp Proof Test	60°C ±5°C × 90%RH/96 hours	
7	Vibration Test	Frequency 10Hz~55Hz Stroke: 1.5mm Sweep: 10Hz~150 Hz~10Hz 2 hours For each direction of X, Y, Z	
8	Packing Drop Test	Height: 50 cm 1 corner, concrete floor	
9	Electrostatic Discharge Test	C=150pF, R=330 Ω Air: ±8KV 150pF/330Ω 30 times Contact: ±4KV,20 times	

10 Suggestions for using LCD modules

10.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated, clean it with soft cloth. If the LCM is severely contaminated, use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer. The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don’t disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
- Be sure to ground the body when handling the LCD modules.
- Tools required for assembling, such as soldering irons, must be properly grounded.
- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

10.2 Storage

1. Store in an ambient temperature of 5 to 45 C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.