



晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-19201080LTZQW-00H
APPROVED BY	
DATE	

☐ Preliminary Specification

☒ Formal Specification

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2025/03/20	--	New Release	Jack

1. General Descriptions

1.1 Introduction

AM-19201080LTZQW-00H is a color active matrix thin film transistor (TFT)liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 21.5 (16:9) inch diagonally measured active display area with Full WU (1920 horizontal by 1080 vertical pixel) resolution.

1.2 Features

21.5 (16:9 diagonal) inch configuration

Dual LVDS interface with 2 Pixel/Clock

1920x3x1080 dots panel with16.7 M colors

LED Backlight with dual lightbar High brightness

Gamma correction

RoHS&Reach Compliance

1.3 Applications

Desktop Type of PC& Workstation Use

Multimedia applications and Others AV system

1.4 General information

Items	Specifications	Unit
Outline Dimension	495.6 x 292.2x 8.05 (Typ.)	mm
Display Area	476.64(H) x 268.11(V)	mm
Number of Pixel	1920 RGB(H) x 1080(V)	pixels
Pixel Pitch	0.24825(H) x 0.24825(V)	mm
Pixel Arrangement	RGB Vertical stripe	
Display Mode	Normally Black	
Surface treatment	Haze25%, Hard-Coating(3H)	
Possible Display Type	Landscape and Portrait Enabled	
Weight	700(Typ)	g
Back-light	single LED (Double-Light type)	
Power Consumption	OC:5.5(Max),Backlight:37(max)	W

1.5 Mechanical Information

item		Min	Typ	Max	Unit
Module Size	Horizontal(H)	494.8	495.6	496.4	mm
	Verical(V)	291.4	292.2	293.0	mm
	Depth(D)	7.55	8.05	8.55	mm

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Item	symbol	Min	Max	Unit	Note
Power supply voltage	VDD	VSS-0.3	5.5	V	GND=0
Logic supply voltage	VIN	VSS-0.3	VDD+0.3	V	GND=0
Operating temperature	T _{op}	-20	+80	°C	
Storage temperature	T _{st}	-30	+80	°C	
Liquid crystal clear point	T _{LC}	--	104.9	°C	Typ

2.1.2 Back Light Unit

Item	symbol	Min	Typ	Max	Unit	Note
Forward voltage	V _f	50.0	56.0	60.0	V	(1)(2)(3)
Foreard current	I _f	-	330		mA	(1)(2)(3)
Power consumption	PBL	-	37.0		W	Dual lightbar

Note:

(1)Permanent damage may occur to the LCD module if beyond this specification.Functional operation should be restricted to the conditions described under normal operating conditions.

(2)Ta=25±2°C

(3)Test Condition:LED current 330mA

2.2 Environment Absolute Rating

Item	symbol	Min	Max	Unit	Remarks
Operating Temperature	T _{opa}	-20	+80	°C	
Storage Temperature	T _{stg}	-30	+80	°C	

3.1 Optical specification

Item	Symbol	Temp	Min	Typ.	Max	Unit	Condition
Response Time	Tr+Rf	25°C	-	14	25	msec	$\theta=0^\circ, \Phi=0^\circ$ (Note 1,3)
Contrast Rate	Cr	25°C	700	1000	--	--	$\theta=0^\circ, \Phi=0^\circ$ LED:ON,LIGHT:OFF(Note1,2)
Brightness	YL	25°C	900	1000		Cd/m2	(IL=330*2mA)(Note1,4)
Visual angle range front and rear	θ	25°C	(ΘL)85 (ΘR)85			De-gree	$\theta=0^\circ$, CR ≥ 10 ,LED:ON ,LIGHT:OFF(Note1,2)
Visual angle range left and right	θ	25°C	(ΘU)85 (ΘD)85			De-gree	$\theta=90^\circ$, CR ≥ 10 ,LED:ON ,LIGHT:OFF(Note1,4)
Brightness uniformity	BUNI		75			%	$\theta=0$ (Note5,7)
Visual angle			free			Note	

Item	Symbol	Min	Typ	Max	Conditions
Red	XR	0.607	0.637	0.667	Reference: LCD Panel,CIE(x,y) chromaticity (Note 1,4)
	YR	0.320	0.350	0.380	
Green	XG	0.266	0.296	0.326	
	YG	0.590	0.620	0.650	
Blue	XB	0.120	0.150	0.180	
	YB	0.020	0.050	0.080	
White	XW	0.270	0.300	0.330	
	YW	0.320	0.350	0.380	

3.2 Measuring Condition

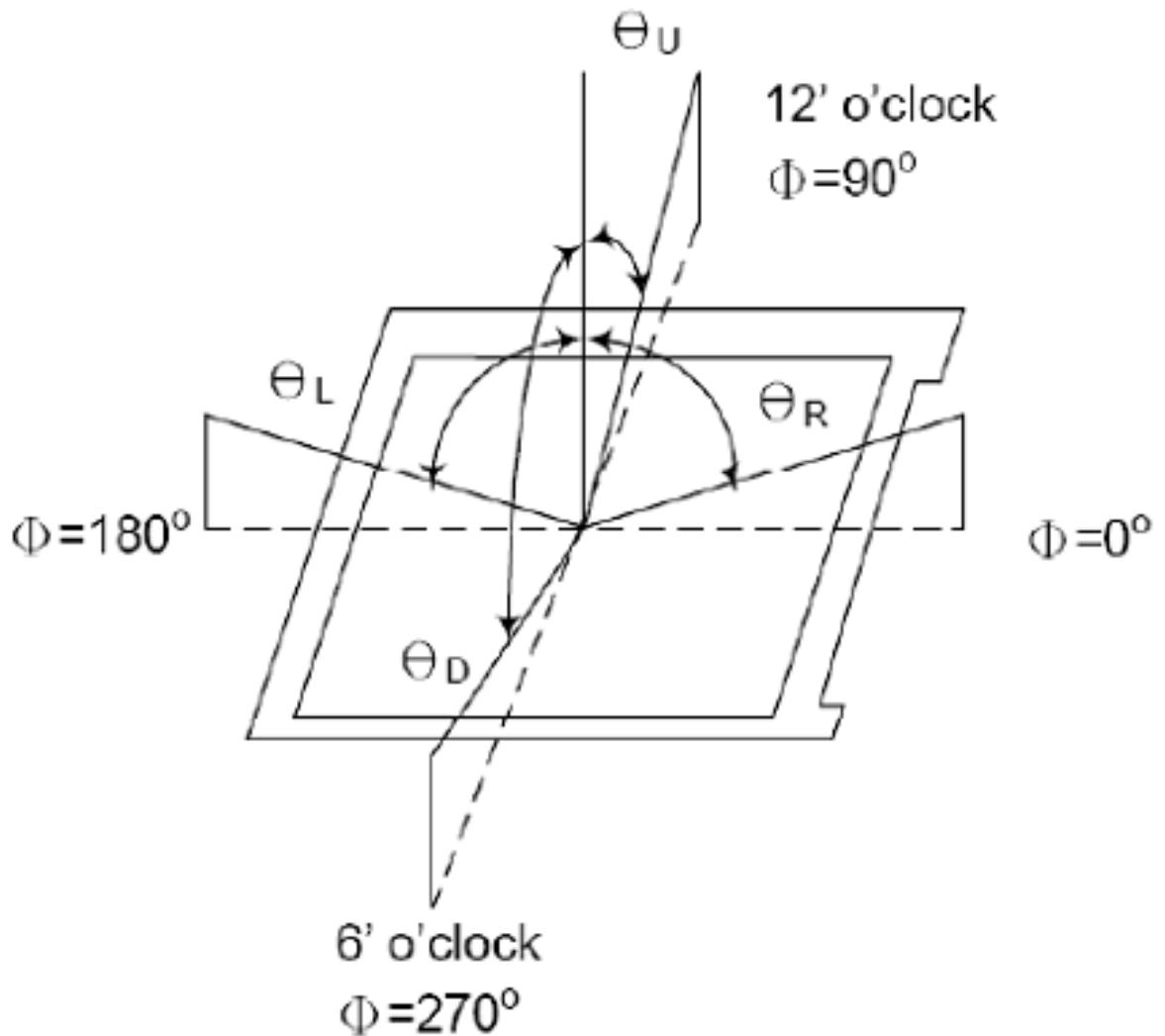
1. Measuring surrounding: dark room ,LED current IL : 330mA
2. Ambient temperature: 25±2°C
3. 15min. warm-up time.

3.3 Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Measuring spot size:20~21mm

Note (1) Definition of Viewing Angle :

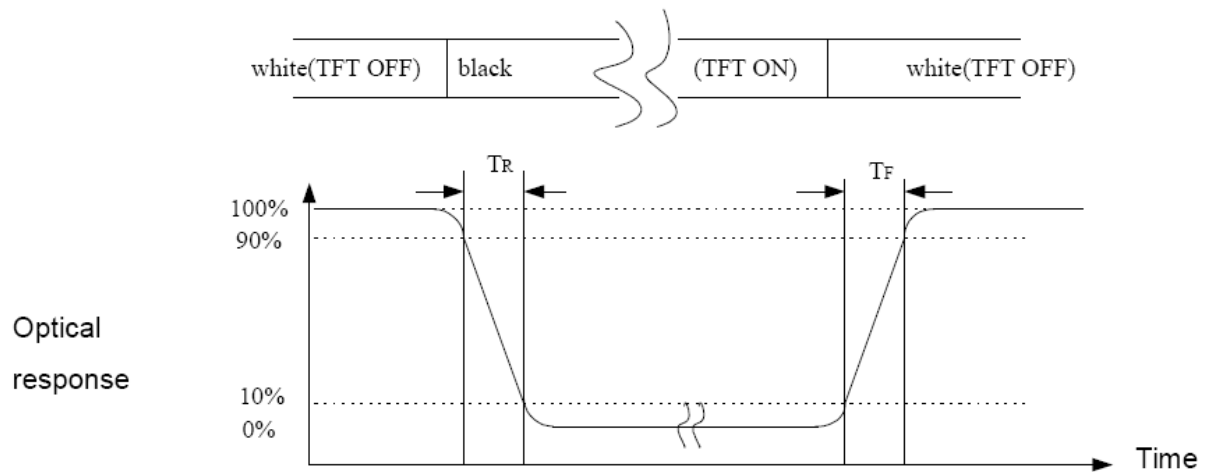


Note (2) Definition of Contrast Ratio(CR) :

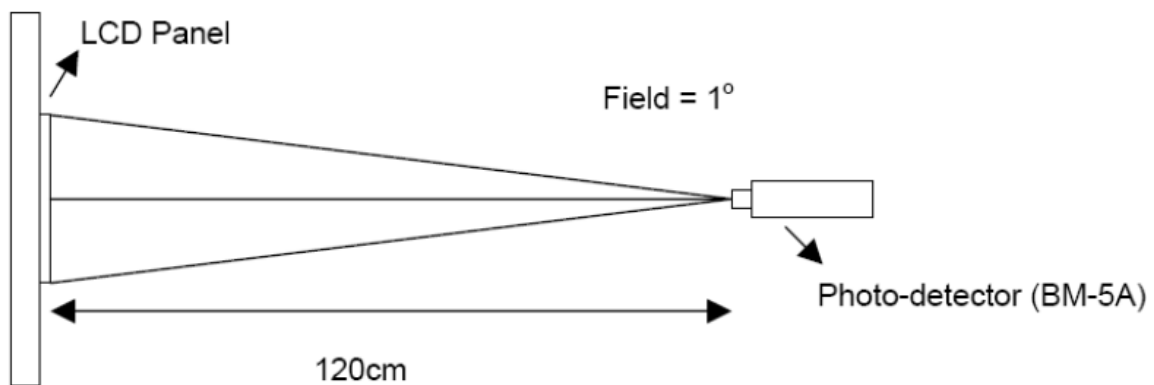
Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels White}}{\text{Luminance with all pixels Black}}$$

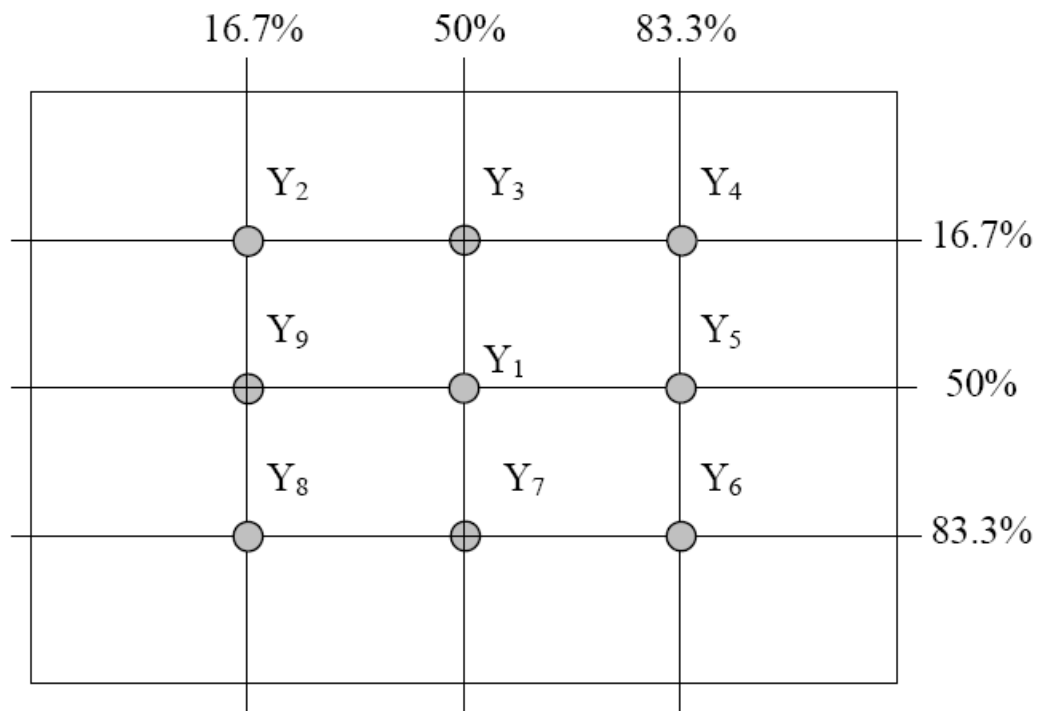
Note(3) Definition of Response Time : Sum of TR and TF



Note (4) Definition of optical measurement setup



Note (5) Definition of brightness uniformity



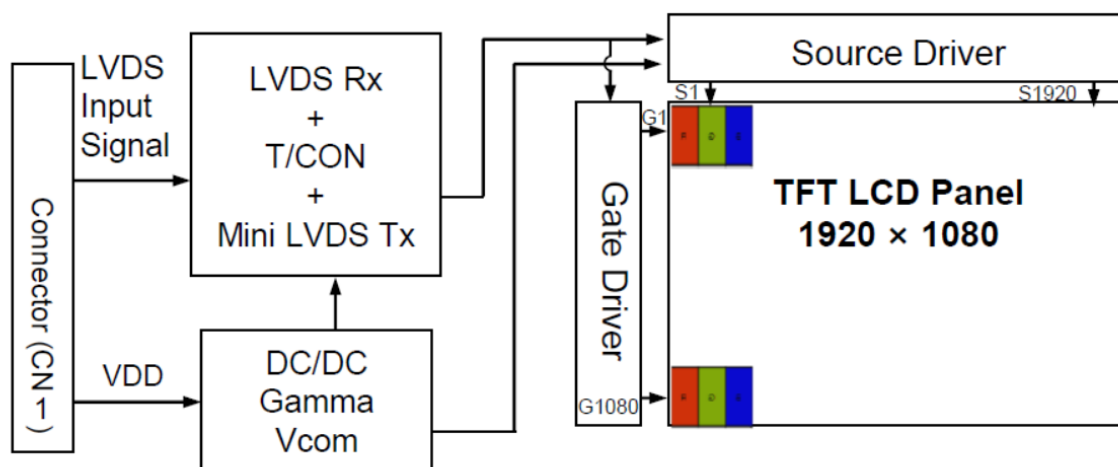
$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

Note (6) Rubbing Direction (The different Rubbing Direction will cause the different optimal view direction).

Note (7) Measured at the brightness of the panel when all terminals of LCD panel are electrically open.

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module



5.0 Interface Connections

5.1 Input Conn PIN Assignment LCM Connector:UJU IS100-L30O-C23 or MSBKT2407P30 Use Side Connector JAE FI-X30E

Pin No	Symbol	I/O	Function	Remark
1	RXO0-	I	- LVDS differential data input	
2	RXO0+	I	+ LVDS differential data input	
3	RXO1-	I	- LVDS differential data input	
4	RXO1+	I	+ LVDS differential data input	
5	RXO2-	I	- LVDS differential data input	
6	RXO2+	I	+ LVDS differential data input	
7	GND	P	Ground	
8	RXOC-	I	- LVDS differential data input	
9	RXOC+	I	+ LVDS differential data input	
10	RXO3-	I	- LVDS differential data input	
11	RXO3+	I	+ LVDS differential data input	
12	RXE0-	I	- LVDS differential data input	
13	RXE0+	I	+ LVDS differential data input	
14	GND	P	Ground	
15	RXE1-	I	- LVDS differential data input	
16	RXE1+	I	+ LVDS differential data input	
17	GND	P	Ground	
18	RXE2-	I	- LVDS differential data input	
19	RXE2+	I	+ LVDS differential data input	
20	RXEC-	I	- LVDS differential data input	
21	RXEC+	I	+ LVDS differential data input	
22	RXE3-	I	- LVDS differential data input	
23	RXE3+	I	+ LVDS differential data input	
24	GND	P	Ground	
25	NC	--	Not connected	
26	NC	--	Not connected	

27	NC	--	Not connected	
28	VDD	P	Power Supply +5V	
29	VDD	P	Power Supply +5V	
30	VDD	P	Power Supply +5V	

6.0 ELECTRICAL CHARACTERISTICS

Item	Symbol	Min	Type	Max	Unit	Note
Power supply voltage	VDD	4.5	5.0	5.5	V	(1)
Power Supply Current	I _{dd}		0.7	1.2	A	(3)
Rush Current	I _{rush}	--	--	3.0	A	(2)
Permissible input ripple Voltage	V _{RF}	--	--	0.3	A	VDD=5V
High level differential input threshold voltage	V _{IH}	-		+100	mV	
Low level differential input threshold voltage	V _{IL}	-100			mV	
Differential input Voltage	V _{ID}	200		600	mV	
Power consumption	P _{oc}		3.5	5.4	w	

6.1: Back-Light Unit

CN LED Power Source (BHSR-02VS-1) or equivalent

Mating connector:(SBHT-002T-P0.5) or equivalent

The characteristics of the LED are shown in the following tables

Item	symbol	Min	Typ	Max	Unit	Note
LED current	I _L	-	330	-	mA	(2)Dual lightbar
LED voltage	V _L	50.0	56.0	60	V	
Operating LED life time	Hr	50000	-	-	Hour	(1)(2)

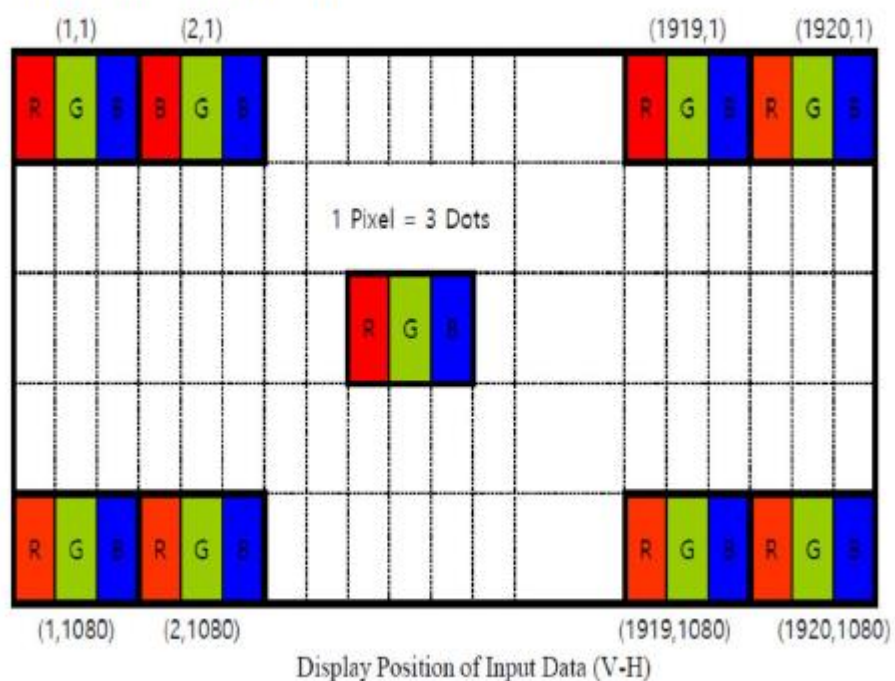
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical I_L value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I_L=330mA. The LED lifetime could be decreased if operating I_L is larger than 330mA. The constant current driving method is suggested.

6.2 LVDS Characteristics

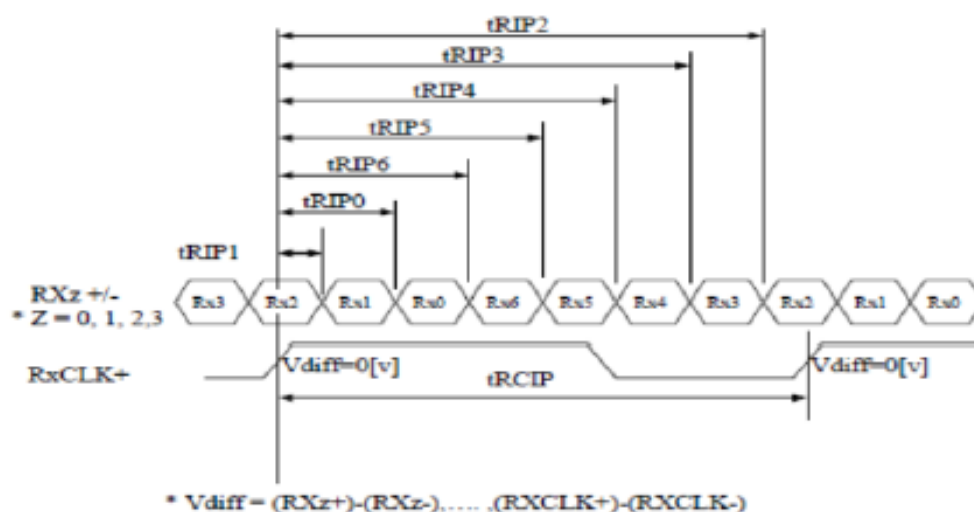
Item		Symbol	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	63	74.25	88	MHz
	High time	-	-	4/7Tc	-	
	Low time	-	-	3/7Tc	-	
Frame Period		TV	1100	1125	1200	line
			55	60	65	Hz
			15.38	16.67	18.18	ms
Vertical Display Period		Tvd	-	1080	-	line
One line scanning period		Th	1050	1100	1120	clocks
Horizontal Display Period		Thd	-	960	-	clocks

6.3: DATA INPUT FORMAT



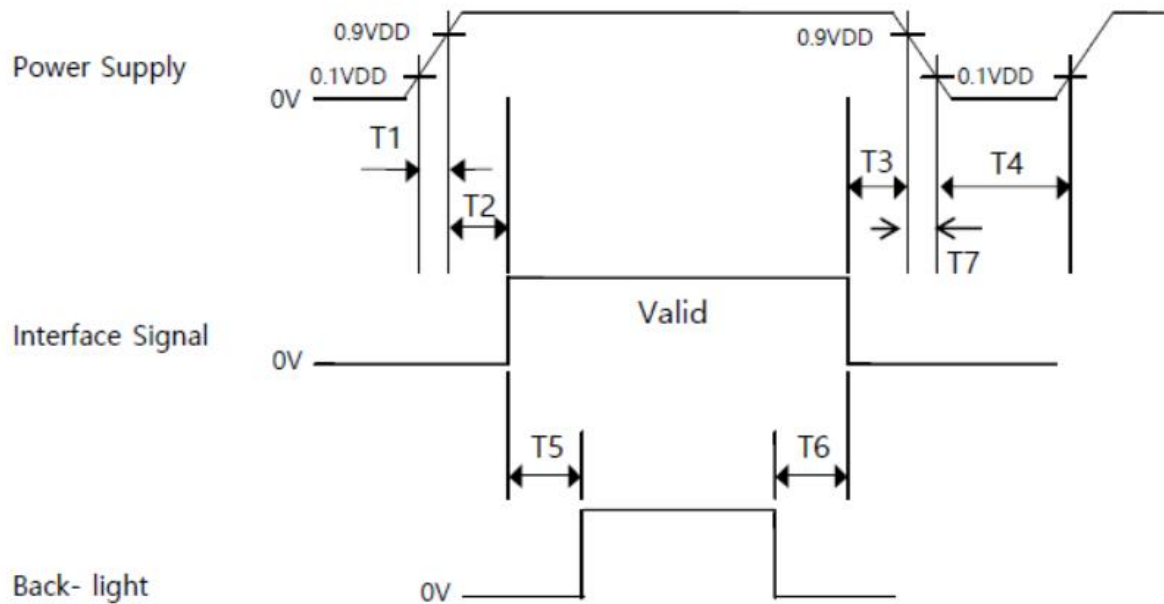
6.4 Interface Timing Parameter

Item	Symbol	Min	Typ	Max	Unit
CLKIN Period	tRCIP	10.76	13.46	16.15	nsec
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec
Input Data 2	tRIP6	2xtRCIP/7-0.4	2 x tRCIP/7	2 x tRCIP/7+0.4	nsec
Input Data 3	tRIP5	3xtRCIP/7-0.4	3 x tRCIP/7	3 x tRCIP/7+0.4	nsec
Input Data 4	tRIP4	4xtRCIP/7-0.4	4 x tRCIP/7	4 x tRCIP/7+0.4	nsec
Input Data 5	tRIP3	5xtRCIP/7-0.4	5 x tRCIP/7	5 x tRCIP/7+0.4	nsec
Input Data 6	tRIP2	6xtRCIP/7-0.4	6 x tRCIP/7	6 x tRCIP/7+0.4	nsec



● 6.5 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



- $0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$
- $0 \leq T2 \leq 50 \text{ ms}$
- $0 \leq T3 \leq 50 \text{ ms}$
- $1 \text{ sec} \leq T4$
- $200 \text{ ms} \leq T5$
- $200 \text{ ms} \leq T6$

7.0 Reliability test items

NO.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80℃,240hrs	Inspection after 2~4 hours storage at room temperature, the sample shall be free from defects 1. Air bubble in the LCD 2. Sealleak 3. non-display 4. missing segments 5. glass crack 6. current idd is twice higher than initial value.
2	Low Temperature Storage	Ta=-30℃,240hrs	
3	High Temperature Operation	Ta=+80℃,240hrs	
4	Low Temperature Operation	Ta=-20℃,240hrs	
5	High Temperature and High Humidity(Operation)	Ta=+60℃90% RH,240hrs	
6	Thermal cycling Test (non operation)	-20℃(30min)→+60℃ (30min),100cycles	
7	Electrostatic discharge	200V 200pf(0ohm) 1time/each terminal	
8	Vibration	1. Random: 1.04 Grms,5~500HZ, X/Y/Z,30min/each direction 2. Sine: Freq.Range:8~33.3hz Stoke:1.3mm Sweep:2.9G,33.3~ 400HZ X/Z:2hr,Y:4hr,cyc:15min	
9	Shock	100G,6ms,±X, ±Y, ±Z 3 times for each direction	JIS C7021,A-10 (Condition)
10	Vibration(with carton)	Random:0.015G ^{1/2} /HZ,5 ~200HZ -6dB/octave,200~400HZ XYZ each dirction:2hr	
11	Drop (with carton)	Height:60cm 1corner,3edges,6surfaces	JIS Z0202

Note:

1. There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.
2. the test samples should be applied to only one test item.
3. for damp proof test, Pure water(resistance>10M ohm)should be used
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part
5. Failure Judgment Criterion : Basic Specification,Electrical Characteristic, Mechanical Characteristic,Optical Characteristic

8.0 GENERAL PRECAUTION

8.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life threatening or otherwise catastrophic.

8.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display.

HannStar does not warrant the module, if customers disassemble or modify the module.

8.3 Breakage of LCD Panel

8.3.1. If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

8.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

8.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

8.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

8.4 Electric Shock

8.4.1. Disconnect power supply before handling LCD module.

8.4.2. Do not pull or fold the LED cable.

8.4.3. Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

8.5 Absolute Maximum Ratings and Power Protection Circuit

8.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

8.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

8.6 Operation

8.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

8.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

8.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

8.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

8.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

8.7 Mechanism

Please mount LCD module by using mouting holes arranged in four corners tightly.

8.8 Static Electricity

8.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

8.8.2. Because LCD module use CMOS-IC on circuit board and it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

TFT-LCD panel :

9.1 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

9.2 Disposal

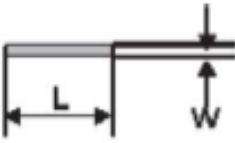
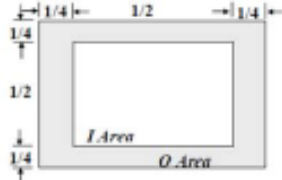
When disposing LCD module, obey the local environmental regulations.

10. Package Specification

10.1 Packing format

11. Visuals Specification

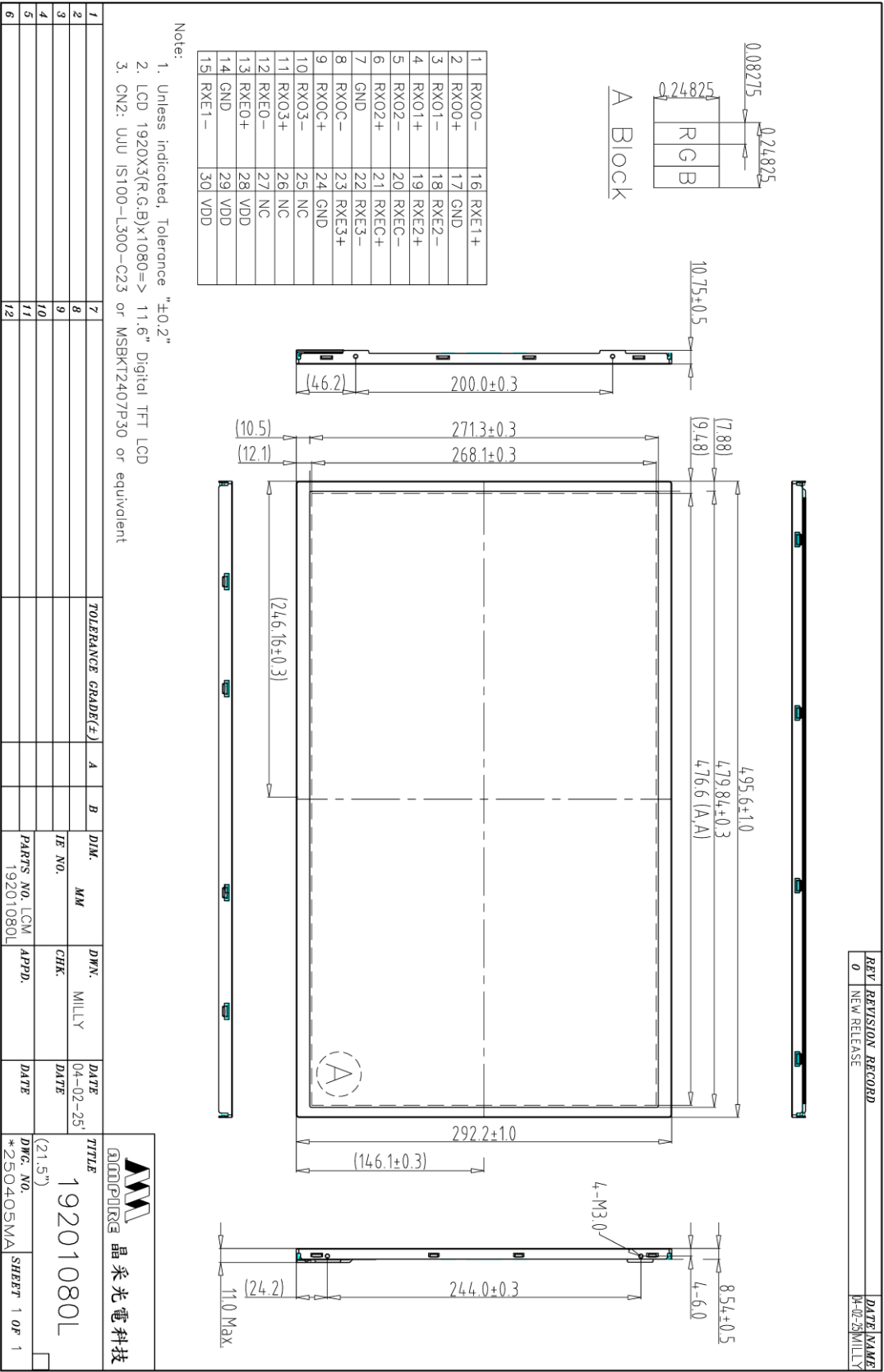
(1) Note:

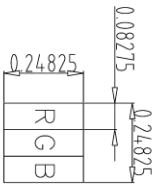
General	1. Customer identified anomalies not defined within this inspection standard shall be reviewed by LowKey, and an additional standard shall be determined by mutual consent. 2. This inspection standard about the image quality shall be applied to any defect within the effective viewing area and shall not be applicable to outside of the area. 3. Inspection conditions Luminance : 500 Lux min. Inspection distance : 300 mm. Temperature : $25 \pm 5^{\circ}\text{C}$ Direction : Directly above		
Definition of inspection item	Dot defect	Bright dot defect	The dot is constantly "on" when power applied to the LCD, even when all "Black" data sent to the screen. Inspection tool: 5% Transparency neutral density filter. Count dot: If the dot is visible through the filter. Don't count dot: If the dot is not visible through the filter.  dot defect
		Black dot defect	The dot is constantly "off" when power applied to the LCD, even when all "White" data sent to the screen.
		Adjacent dot	Adjacent dot defect is defined as two or more bright dot defects or black dot defects.  dot defect
	External inspection	Bubble, scratch (foreign Particle polarizer, Cell, Backlight)	Visible operating (all pixels "Black" or "White") and non operating.
		Appearance inspection	Does not satisfy the value at the spec.
	Others	LED wires	Damaged to the LED wires, connector, pin, functional failure or appearance failure.
Definition of Size	Definition of circle : $d = (a + b) / 2$  definition of linear size  definition Area I/O 		

(2)standard

Classification		Inspection item		Judgment Standard	
Defect (in LCD glass)	Dot defect	Area		I	O
		Bright dots(Note: Visible under:ND5%) 1:D≤0.15mm:No count); D>0.15mm acceptable: 2		N≤3	
		Dark dots (0.15mm<D≤0.3mm), D>0.3mm Not allowable		N≤4	
		Bright dot-2Adjacent		N≤0	
		Dark dot-2Adjacent		N≤4	
		Dark or bright dots-3 and more Adjacent(note6)		N≤0	
		Total bright and dark dots		N≤6	
		Minimum distance between bright dots		15mm	
		Minimum distance between dark dots		5mm	
		Minimum distance between bright and bright dots		5mm	
	Other	White dot ,dark dot (circle)	Size (mm)	Acceptable number	
			d≤0.2	Neglected	
			0.2mm<D≤0.3mm	N≤4	
			0.3mm<D≤0.4mm	N≤2	
			D>0.4mm	Not allowable	
Visual defect		Foreign partial	Circular foreign material: dark/bright sport	Visible under:ND5% 1:D≤0.2mm:No count 2:0.2mm<D≤0.5mm,N≤3 3:D>0.5mm:Not allowable	
			Linear foreign material: bright or dark line	Invisible under ND5% 0.1mm<W≤0.3mm, 0.3mm<L≤5mm,N≤3 Visible under ND5% 0.03mm≤w≤0.1mm, 0.3mm≤L≤3mm,N≤2	
		Polarizer	Linear scratch	1:BM:No Count 2:Pixel area 0.05mm≤w≤0.2mm, 1.0mm≤L≤5.0mm,N≤3	
			Bubble peeling	1:BM:No Count 2:Pixel area 0.2mm≤D<0.5mm,N≤4	
		Mura & leak		ND5%	

12. OUTLINE DIMENSION



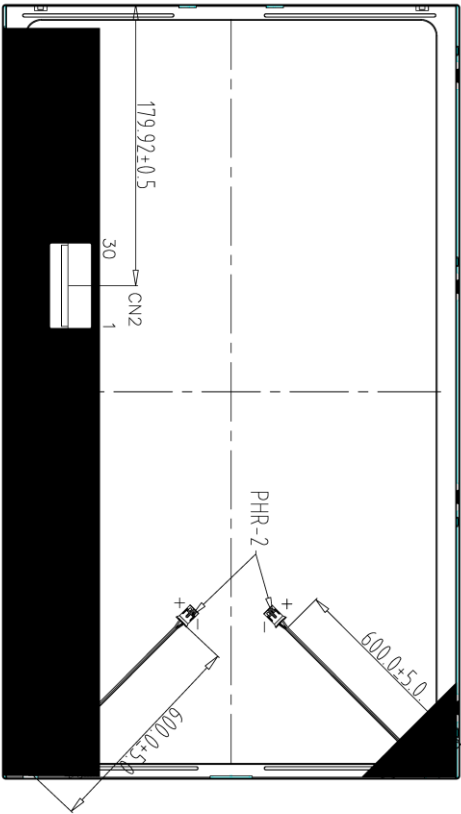


A Block

1	RX00-	16	RXE1+
2	RX00+	17	GND
3	RX01-	18	RXE2-
4	RX01+	19	RXE2+
5	RX02-	20	RXEC-
6	RX02+	21	RXEC+
7	GND	22	RXE3-
8	RX0C-	23	RXE3+
9	RX0C+	24	GND
10	RX03-	25	NC
11	RX03+	26	NC
12	RXE0-	27	NC
13	RXE0+	28	VDD
14	GND	29	VDD
15	RXE1-	30	VDD

Note:

1. Unless indicated, Tolerance "±0.2"
2. LCD 1920X3(R.G.B)×1080=> 11.6" Digital TFT LCD
3. CN2: UUJ IS100-L300-C23 or MSBKT2407P30 or equivalent



1	7	TOLERANCE GRADE(±)	A	B	DIM.	DWN.	DATE	TITLE
2	8				JE NO.	CHK.	DATE	19201080L
3	9							(21.5")
4	10				PARTS NO.	APD.	DATE	DWG. NO.
5	11				19201080L			*250406MA
6	12							SHEET 1 OF 1