AGTechnologies
LCD Displays

Specification

AGO 101J0-NN-N

REVISION STATUS

Revision	Description	Page	Revision Date
1.0	First Revision	--	2018-07-05

1.0 GENERAL SPECIFICATION

1.1 Introduction

The model AGO 101JO-NN-N is a color active matrix thin film transistor (TFT) liquid crystal display without plagiarizer. This model is composed of amorphous silicon TFT as a switching device. This TFT LCD has a 10.1-inch wide (16:9) diagonally measured active display area with WVGA (1024 horizontal by 600 vertical pixel) resolution. Each pixel is divided into Red, Green, Blue dots which are arranged in vertical stripes.

1.2 Features

10.1 inch configuration.

RGB interface

16.7M color by 8 bit R.G.B. signal input RoHS/Halogen Free Compliance

1.3Applications

Mobile

NB

Digital Photo frame

Display terminal for AV application

1.4 General information

Item	Specification	Unit
Screen Size	10.1 inches	Diagonal
Number of Pixel	1024 RGB (H) ×600(V)	Pixels
Display area	222.72(H) x 125.28(V)	mm
Outline Dimension	235.0 x 143.0 x 5.0(Typ)	mm
Display mode	Normally Black	--
Pixel arrangement	RGB Vertical stripe	--
Pixel pitch	0.2175(H) ×0.2088(V)	mm
Back-light	LED Side-light type	--
Surface treatment	Anti - glare	--
Interface	TTL	

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	234.7	235.0	235.3	mm
	Vertical (V)	142.7	143.0	143.3	mm
	Depth (D)	4.7	5.0	5.3	mm
Weig ıt		--	300	320	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

ltem	Symbol	Min	Max	Unit	Note
Power supply voltage	VDD	-0.5	3.96	V	GND=0
	AVDD	--	14.85	V	AGND=0

Note:

1. Stresses above those listed under" Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at indicated in the operational sections(6.1) of this specification.
2. Ta=25±2℃

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-30	80	℃	
Operating temperature	T_{OPR}	-20	70	℃	

Note: If users use the product out off the environmental operation range(temperature and humidity), it will have visual quality concerns.

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min	Type	Max	Unit	Note
White luminance (Center)		YL	Θ=0 Normal Viewing Angle	900	1000		TBD nits	(1)(4)(6)
Response time		T_r		--	10	20	msec	(1)(3)
		T_f		--	20	25		
Contrast ratio		CR		600	800	--	--	(1)(2)
C o l o r Chromaticity (CIE 1931)	white	Wx		0.260	0.310	0.360		(1)(4)
		Wy		0.280	0.330	0.380		
Viewing Angle	Hor.	ΘL	CR 10	80	85	--		(1)(4)
		ΘR		80	85	--		
	Ver.	ΘU		80	85	--		
		ΘD		80	85	--		
Brightness		BUNI	Θ=0	80	--	--	%	(5)
Color gamut (NTSC)		S		--	45	--	%	
Optima View Direction		ALL VIEW						

3.2 Measuring Condition

Measuring surrounding: dark room

LED current IL: 300mA

Ambient temperature: 25±2°C

30min. warm-up time

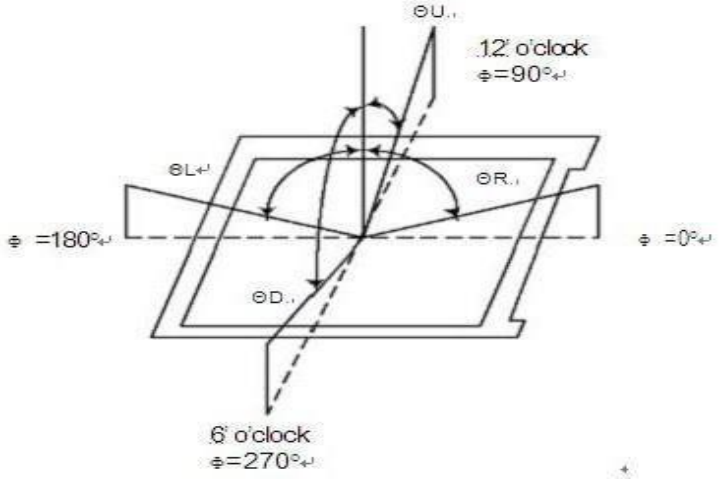
3.3 Measuring Equipment

BM-7 optical characteristics.

Measuring spot size: 20 ~ 21mm

Note (1) Definition of Viewing Angle

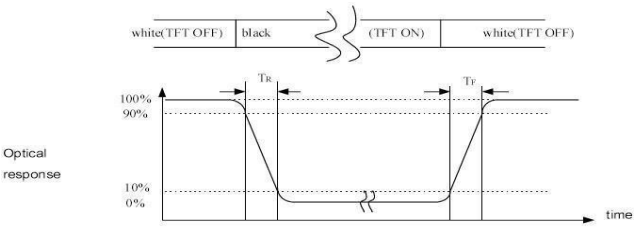
Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o"clock direction and the vertical or 6, 12 o"clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).



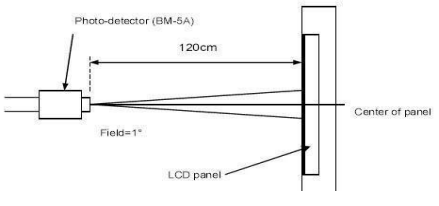
Note (2) Definition of Contrast Ratio(CR):
Measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

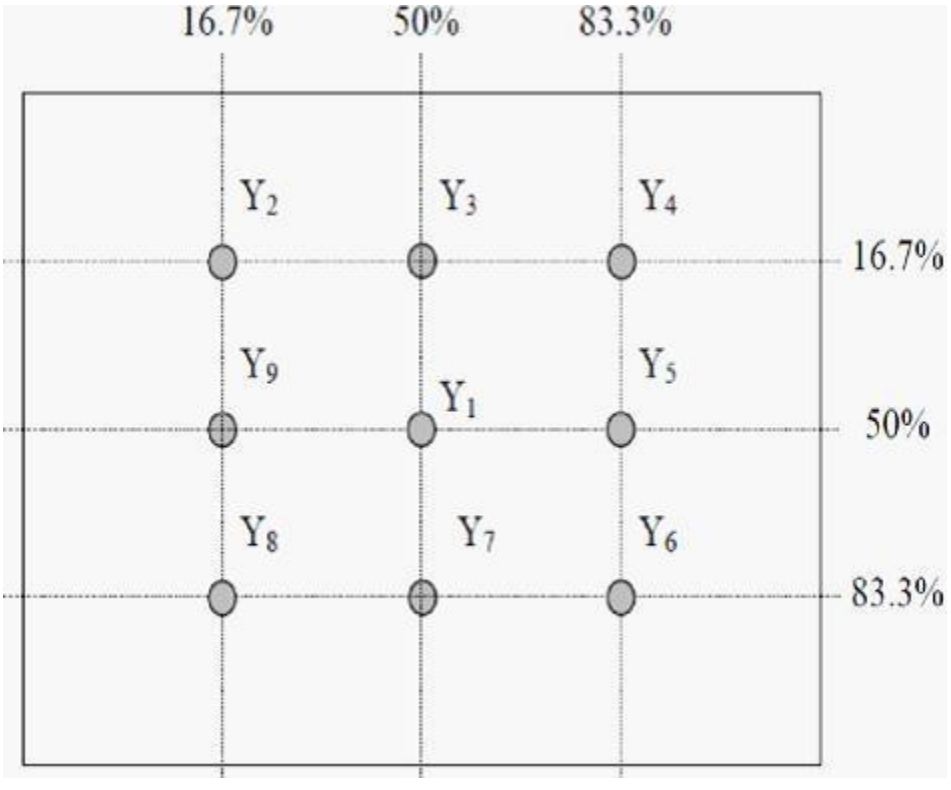
Note (3) Definition of Response Time: Sum of TR and T_F



Note (4) Definition of optical measurement setup

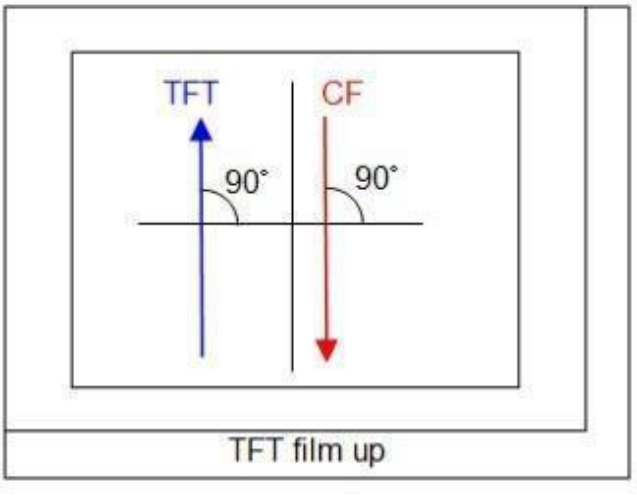


Note (5) Definition of brightness uniformity



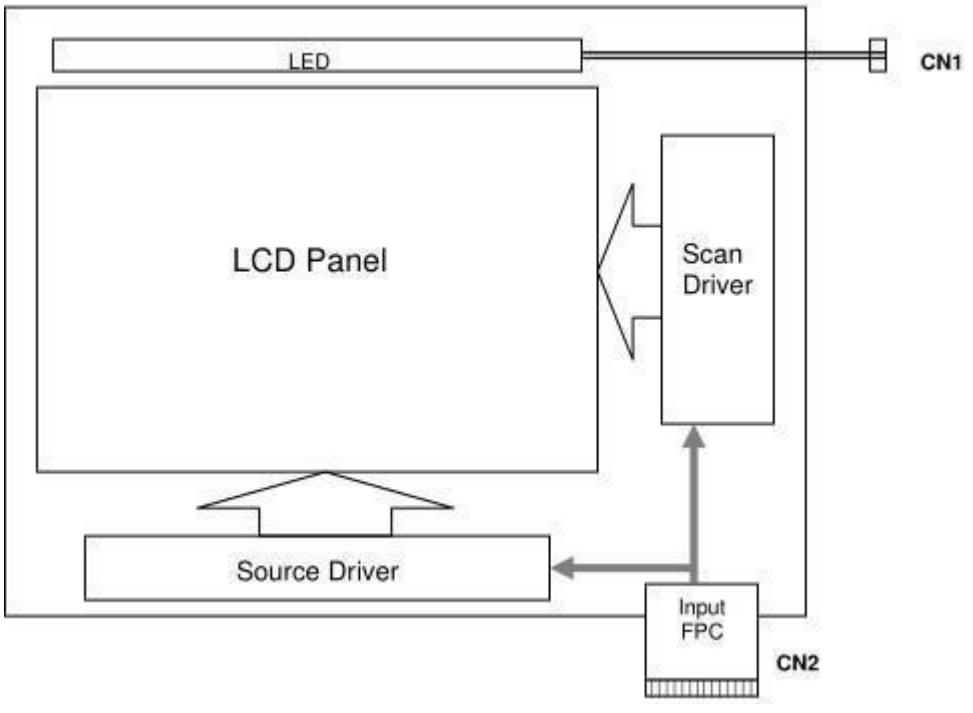
$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\ \%$$

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

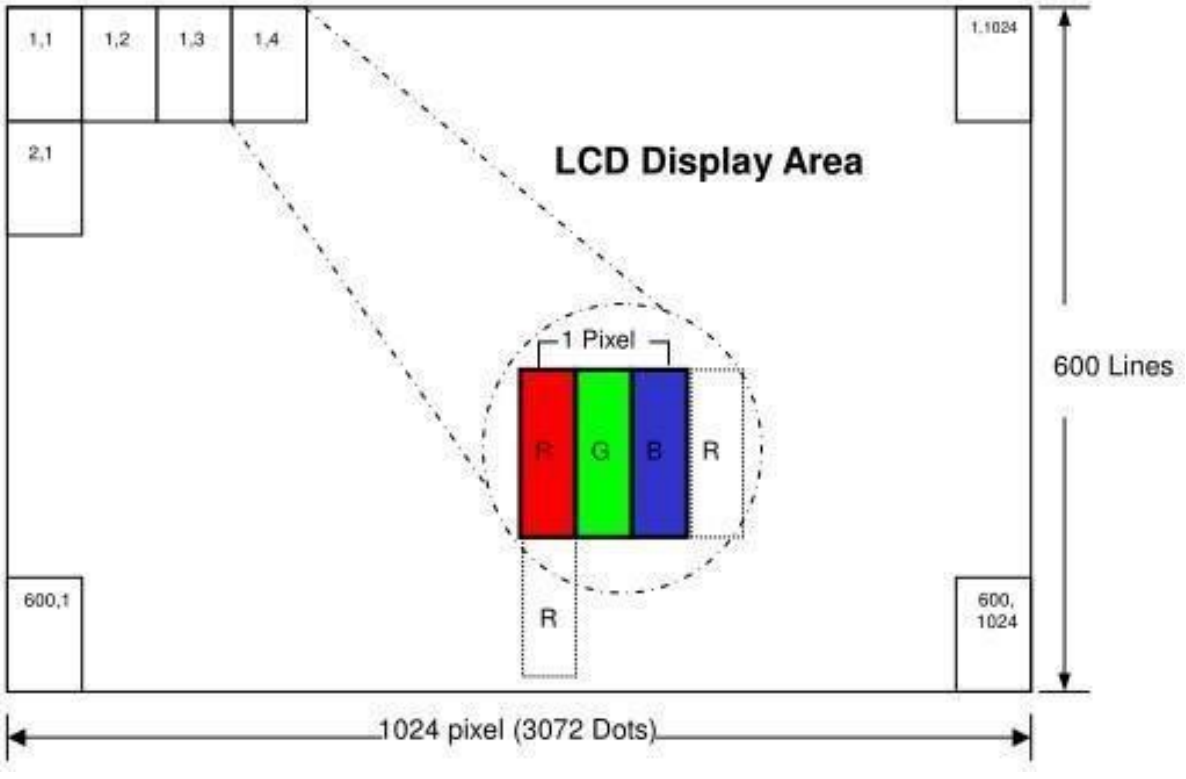


4.0 BLOCK DIAGRAM

4.1 TFT LCD Module



4.2 Pixel Format



5.0 INTERFACE PIN CONNECTION

5.1 TFT LCD Module: FPC Down Connector, (FH28-50S-0.5SH (HIROSE), 50pin,pitch = 0.5mm)

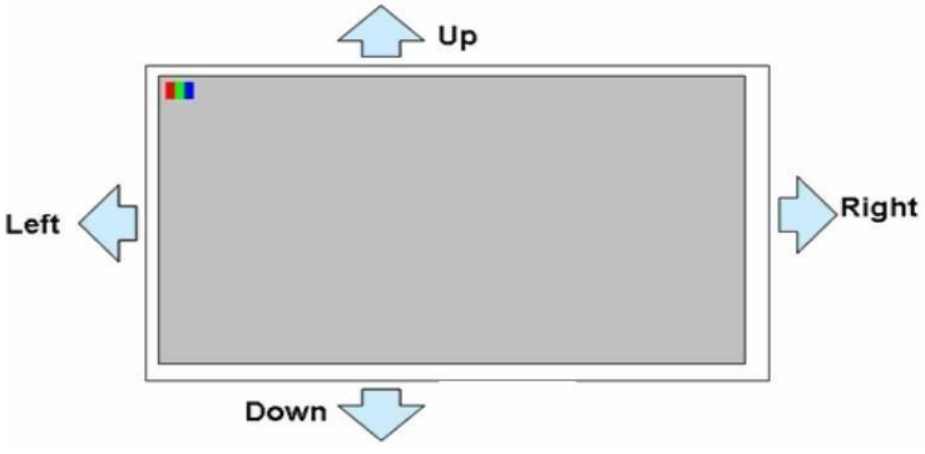
Pin No.	Symbol	Function	Reamrk
1	LED+	Power for LED back-light(Anode)	
2	LED+	Power for LED back-light(Anode)	
3	LED-	Power for LED back-light(Cathode)	
4	LED-	Power for LED back-light(Cathode)	
5	GND	Power Ground	
6	VCOM	Common Voltage	
7	VDD	Digital Power	
8	MODE	DE/SYNC Mode Select. Normally Pull High H :DE mode. L :HSD/VSD mode	
9	DEN	Date Enable signal	
10	VSYNC	Vertical sync input. Negative polarity	
11	HSYNC	Horizontal sync input. Negative polarity	
12	B7	Blue Data Input(MSB)	
13	B6	Blue Data Input	
14	B5	Blue Data Input	
15	B4	Blue Data Input	
16	B3	Blue Data Input	
17	B2	Blue Data Input	
18	B1	Blue Data Input	
19	B0	Blue Data Input(LSB)	
20	G7	Green Data Input(MSB)	
21	G6	Green Data Input	
22	G5	Green Data Input	
23	G4	Green Data Input	
24	G3	Green Data Input	
25	G2	Green Data Input	
26	G1	Green Data Input	
27	G0	Green Data Input(LSB)	
28	R7	Red Data Input(MSB)	

29	R6	Red Data Input	
30	R5	Red Data Input	
31	R4	Red Data Input	
32	R3	Red Data Input	
33	R2	Red Data Input	
34	R1	Red Data Input	
35	R0	Red Data Input(LSB)	

Pin No.	Symbol	Function	Reamrk
36	GND	Power Ground	
37	DCLK	Clock Input	
38	GND	Power Ground	
39	SHLR	Left or Right Display Control	
40	UPDN	Up/Down Display Control	
41	VGH	Positive Power for TFT	
42	VGL	Negative Power for TFT	
43	AVDD	Analog Power	
44	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pullhigh(R=10K ΩC=1μF)	
45	NC	Not Connect	
46	VCOM	External VCOM DC input	
47	DITHB	Dithering setting. DITH=”H” Disable internal dithering function DITH=”L” Enable internal dithering function	
48	GND	Power Ground	
49	NC	Not Connect	
50	NC	Not Connect	

Note 1: SHLR: left or right setting UPDN: up or down setting

SHLR	UPDN	Data Shifting
DVDD	GND	Left Right, Up Down(Default)
GND	GND	Right Left, Up Down
DVDD	DVDD	Left right, Down Up
GND	DVDD	Right Left, Down Up



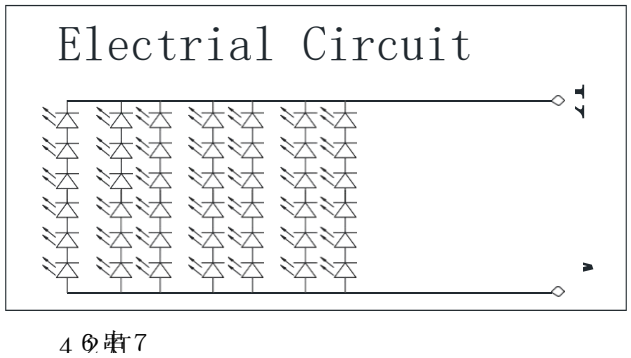
5.2 Back-Light Unit

The backlight system is an edge-lighting type with 42 LED.

The characteristics of the LED are shown in the following tables.

Item	Symbol	Min	Typ	Max	Unit	Note
LED current	IL	--	140	--	mA	
LED voltage	VL	18	18.6	--	V	
Operating LED life time	Hr	--	20000	--	Hour	(1)

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



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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VDD	3.0	3.3	3.6	V	
Analog Power Supply Voltage	AVDD	10.0	10.2	10.5	V	
Gate On Power Supply Voltage	VGH	7	20	35	V	
Gate Off Power Supply Voltage	VGL	-10.3	-10	-9.7	V	
Common Power Supply Voltage	VCOM	3.9	4.2	4.5	V	Note 1
Operation frequency	FCLK	--	--	200	KHZ	

Note 1: Please adjust VCOM to make the flicker level be minimum. Typ VCOM

Note (2): Be sure to apply the power Voltage as the power sequence spec.Note (3): GND=0V

6.2 For 1024RGB x 600 panel

DE mode

DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode
Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd		1024		DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw		1		
	Typ.			—		
	Max.			140		
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode(2)

Vertical input timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

6.3 AC Electrical Characteristics

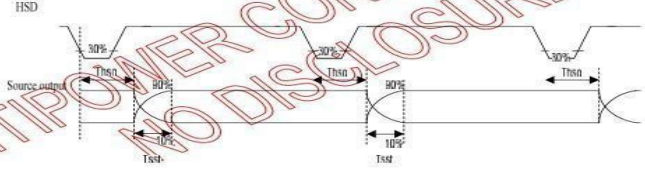
(TA = -20 to 85° C, VDD = 2.3 to 3.6V, AVDD = 8 to 13.5V, GND = AGND = 0V)

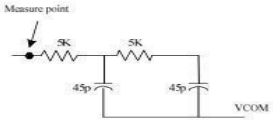
TTL mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	-	-	20	ms
RSTB pulse width	TRST	DCLK = 65MHz	50	-	-	us
DCLK cycle time	Tcph	-	14	-	-	ns
DCLK pulse duty	Tcwh	-	40	50	60	%
VSD setup time	Tvst	-	5	-	-	ns
VSD hold time	Tvhd	-	5	-	-	ns
HSD setup time	Thst	-	5	-	-	ns
HSD hold time	Thhd	-	5	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	Tesu	-	5	-	-	ns
DE hold time	Tehd	-	5	-	-	ns
Output stable time	Tsst	10% to 90% target voltage, CL=90pF, R=10K ohm(Cascade)	-	-	6	us
		Dual gate			3	

Output Timing Table

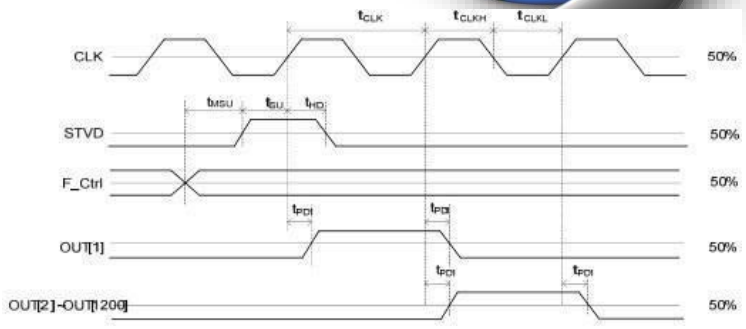
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
DCLK frequency	Fclk	-	65	71	MHz	VDD =2.3~3.6V
DCLK cycle time	Tclk	14.1	15.4		ns	
DCLK pulse duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	64	-	DCLK	
Time from HSD to LD	Thld	-	64	-	DCLK	
Time from HSD to STV	Thstv	-	2	-	DCLK	
Time from HSD to CKV	Thckv	-	20	-	DCLK	
Time from HSD to OEV	Thoev	-	4	-	DCLK	
LD pulse width	Twld	-	10	-	DCLK	
CKV pulse width	Twckv	-	66	-	DCLK	
OEV pulse width	Twoev	-	74	-	DCLK	

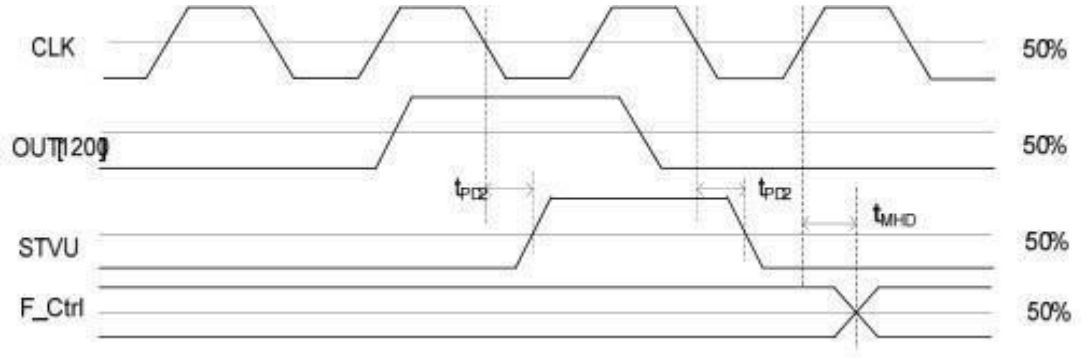




Source Output Timing(Cascade)

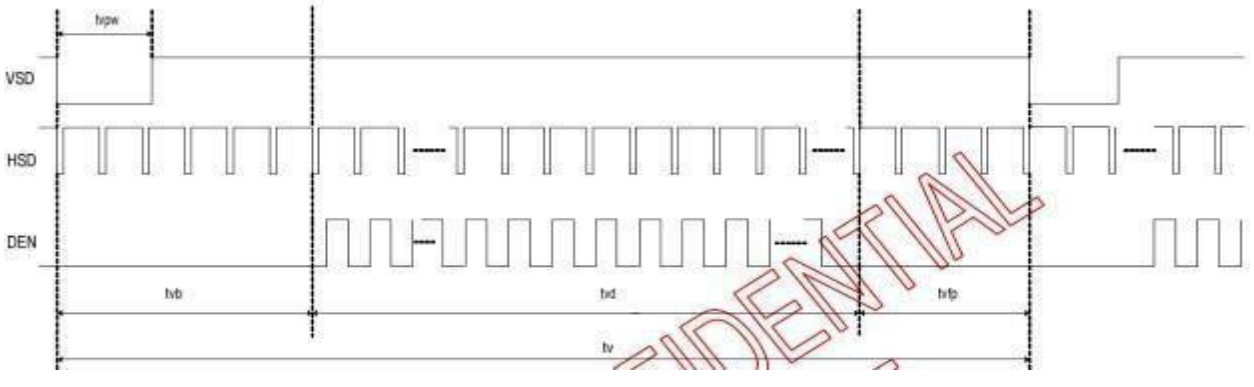
6.4 Timing Waveform



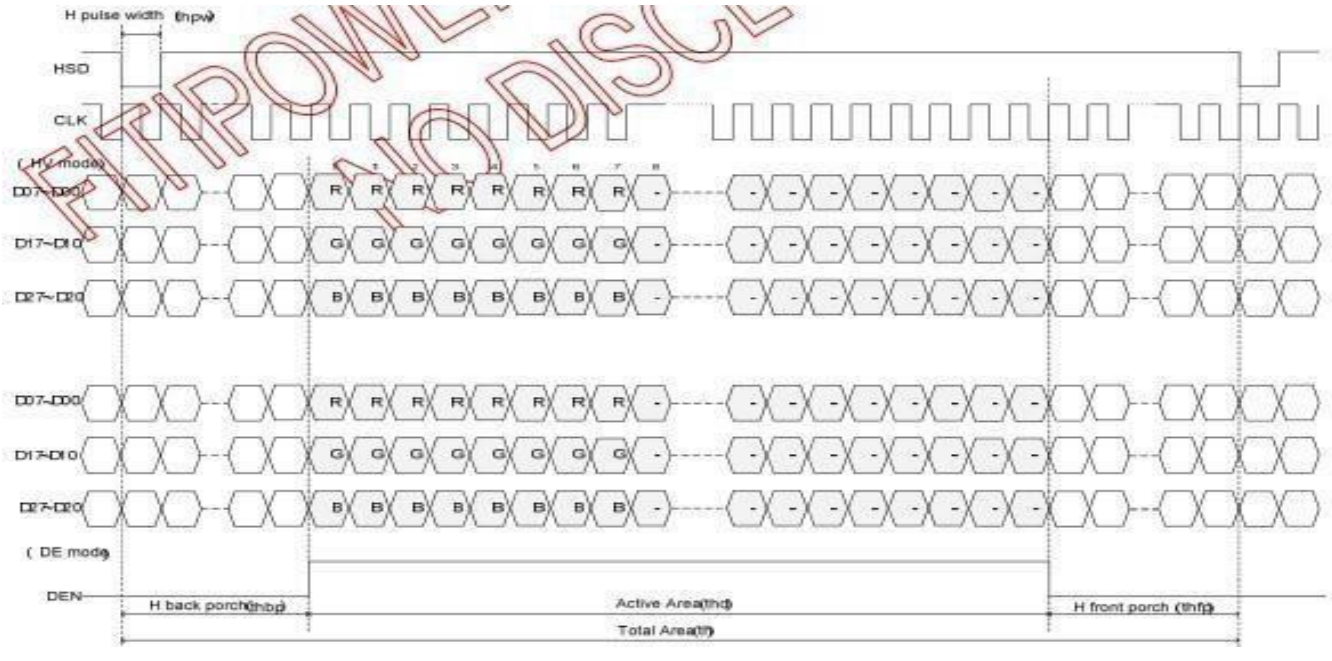


6.4.1 Data Input Format for TTL

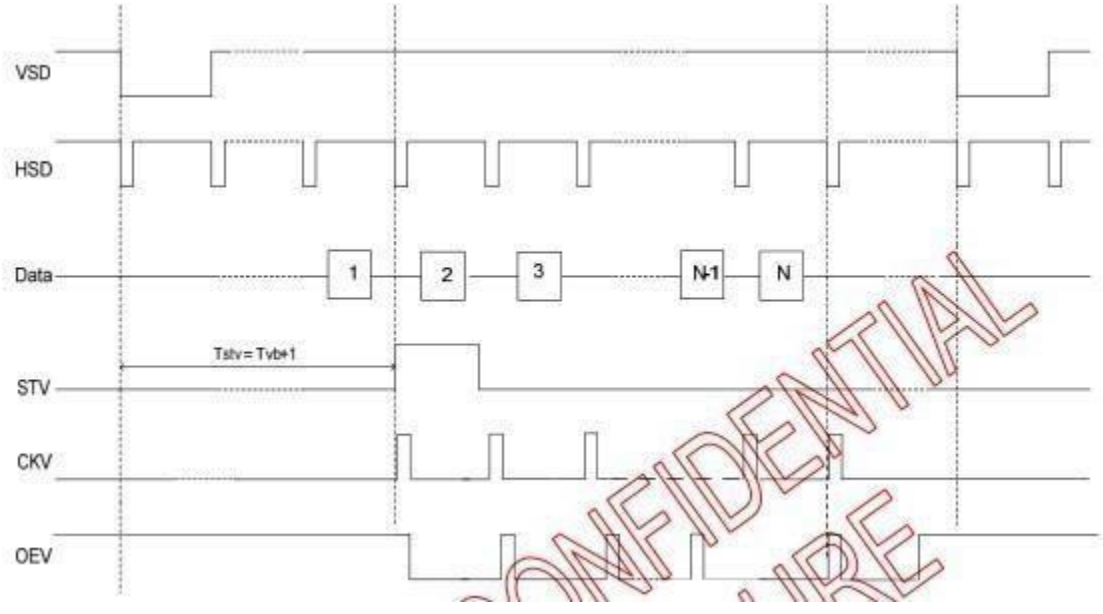
Vertical input timing



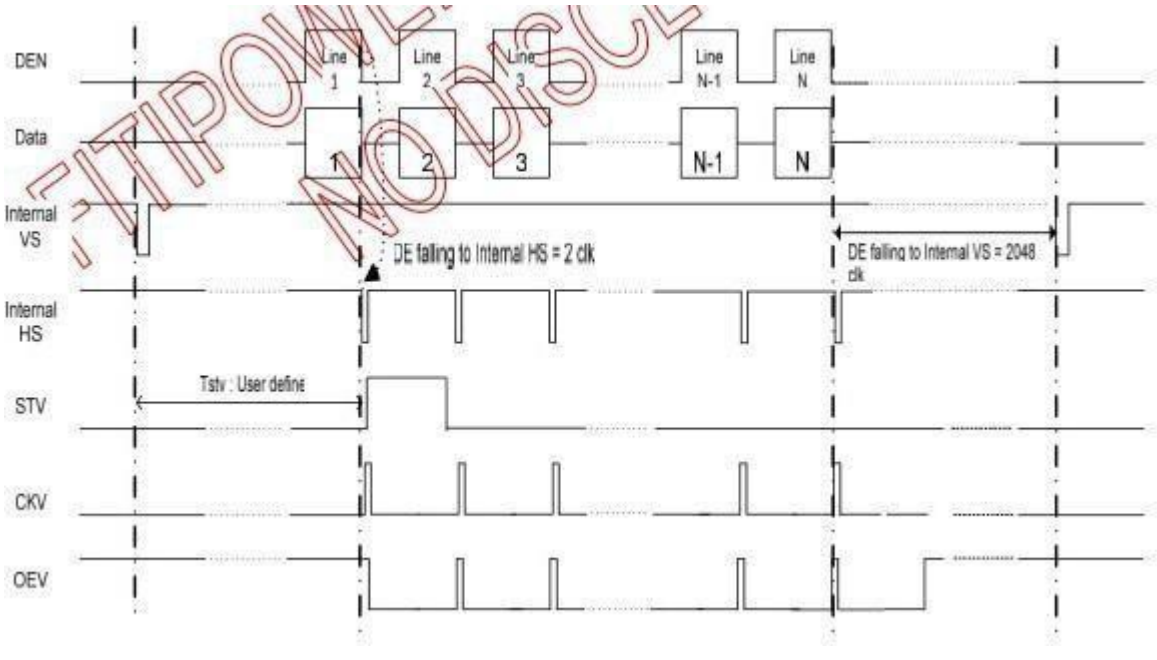
Horizontal input timing



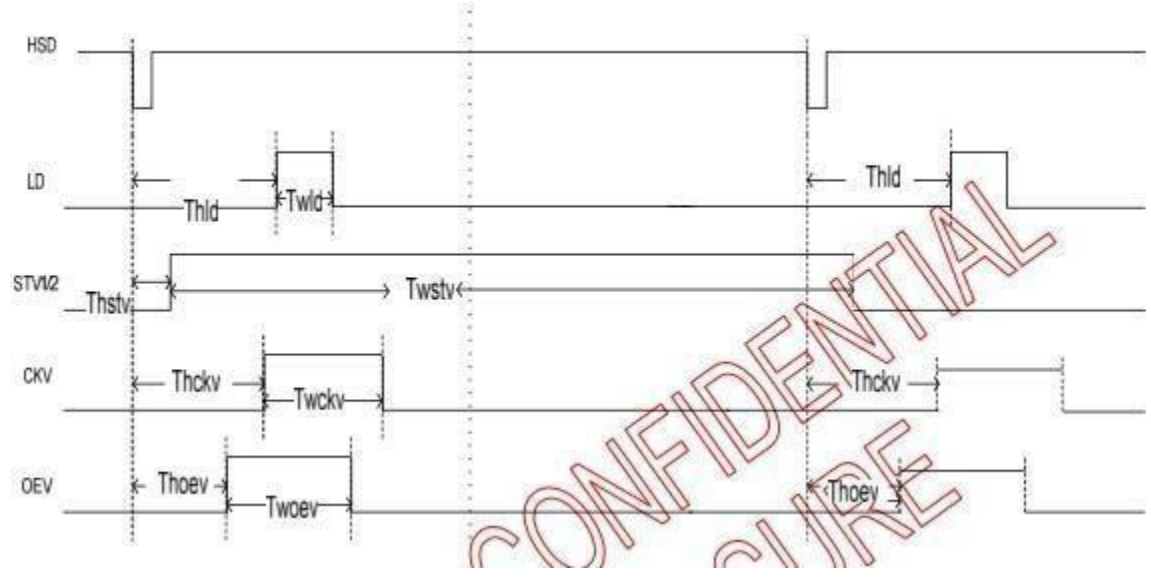
6.4.2 Vertical Timing Diagram HV mode(Cascade)

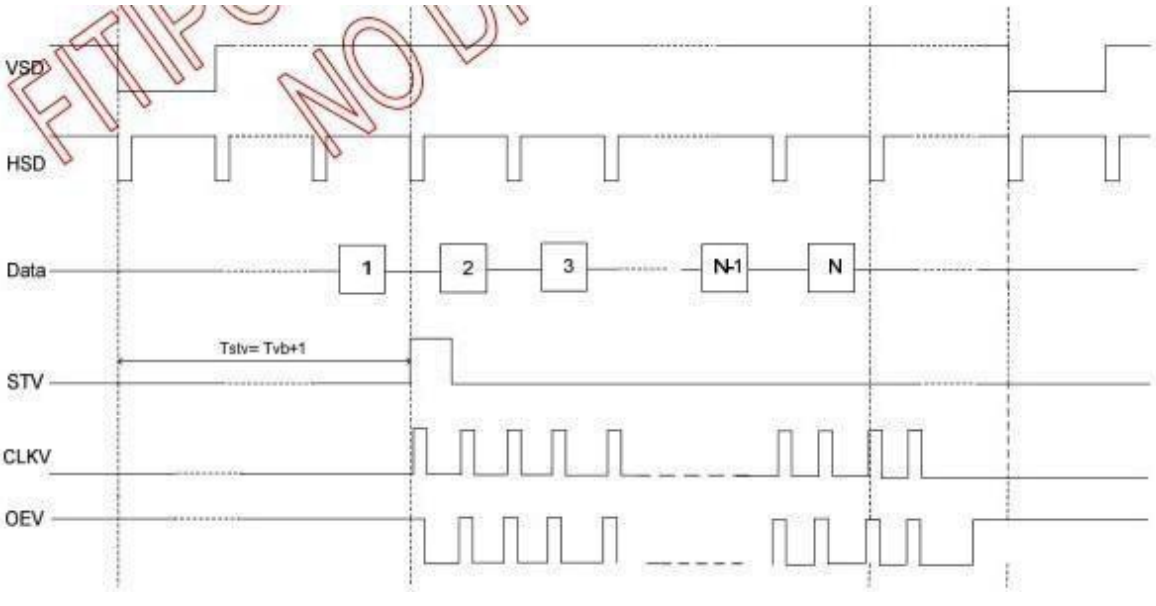


6.4.3 Vertical Timing Diagram DE mode(Cascade)

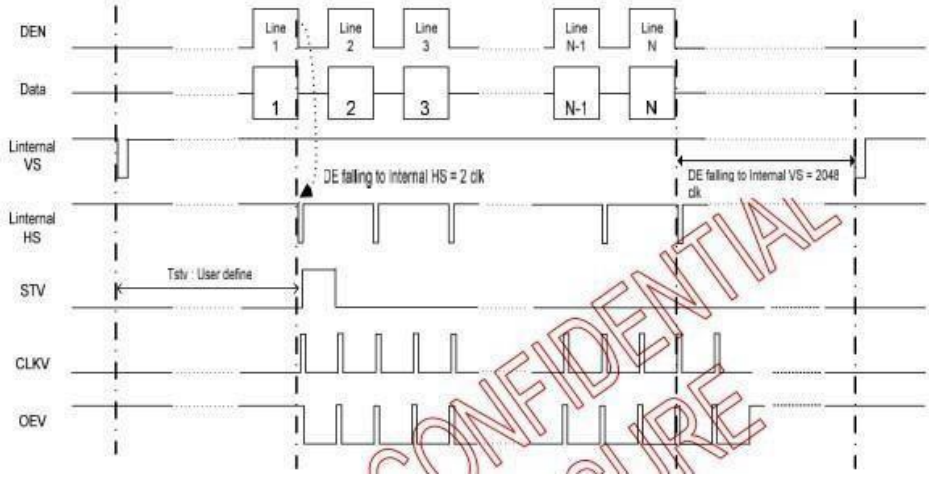


6.4.4Gate output
timingdiagram(Cascade)6.4.5Vertical Timing Diagram HV mode(Dual Gate)

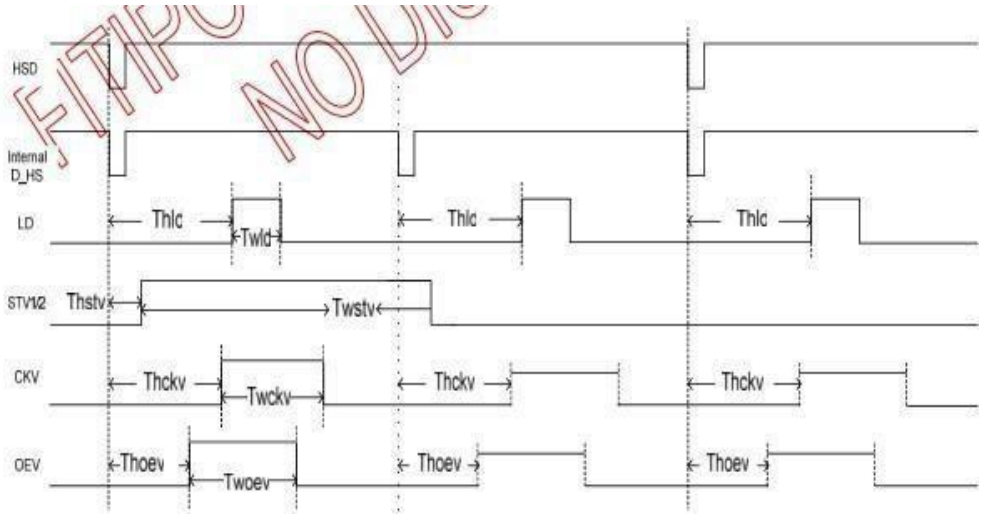




6.4.6Vertical Timing Diagram DE mode(Dual Gate)



6.4.7Gate output timing diagram(Dual Gate)



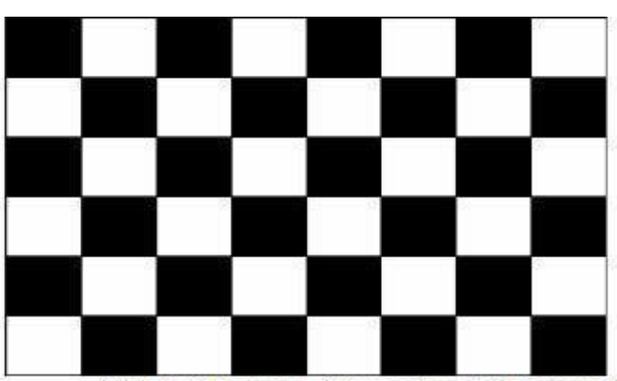
7.0 RELIABILITY TEST ITEMS

No.	Test Item	Conditions	Note
1	High Temperature Storage	Ta=+80℃, 240hrs	
2	Low Temperature Storage	Ta=-30℃, 240hrs	
3	High Temperature Operation	Ta=+70℃, 240hrs	
4	Low Temperature Operation	Ta=-20℃, 240hrs	
5	High Temperature and High Humidity(operation)	Ta=+70℃, 80%RH 240hrs	
6	Thermal cycling Test	-30℃/30 min ~ +80℃/30 min for a total 200 cycles, Start with cold temperature and end with high temperature.	
7	Vibration Test (Non-operation)	● Frequency range:8~33.3Hz ● Stoke：1.3 mm ● Vibration: sinusoidal wave, perpendicular axis(both x, z axis: 2hrs ,y axis: 4hrs). ● Sweep: 2.9G,33.3 Hz -400 Hz ● Cycle time: 15 min	
8	Shock Test (Non-operation)	● Shock level: 980m/s 2 (equal to 100G). ● Waveform: half sinusoidal wave,6ms. ● Number of shocks: ±X,±Y,±Z axes for a total of six shock inputs.	
9	ESD Test	150pF， 330Ω， ±8kV&±15kV air& contact test	1
		200pF， 0Ω， ±200V contact test	2

Note 1: LCD glass and metal bezel

Note 2: IF connector pins

Note 3: Operation with test pattern sustained for 4hrs, then change to gray pattern immediately.



(a) Test Pattern (chess board Pattern)

(b) Gray Pattern

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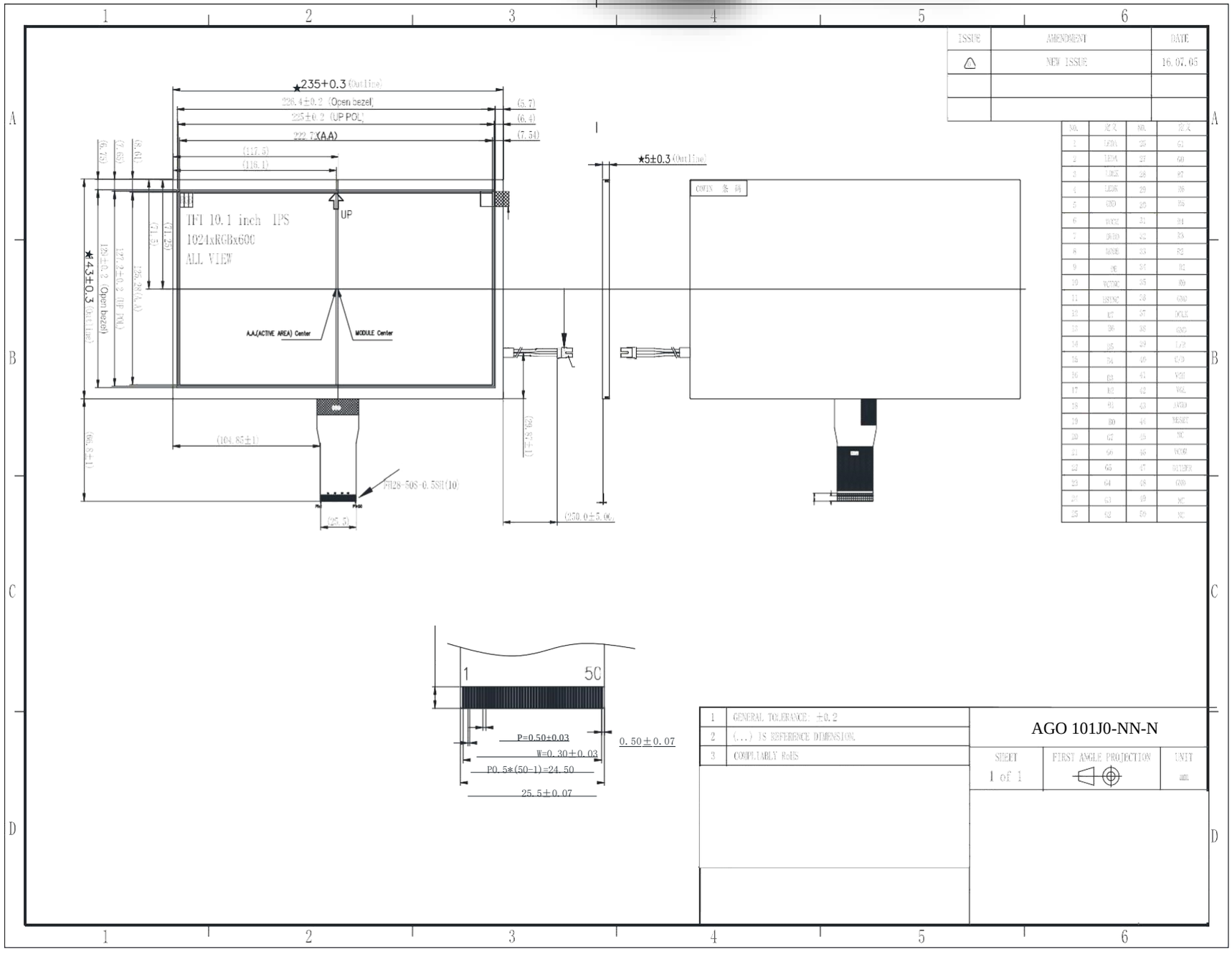
LCD Displays

8.0 Outline dimension

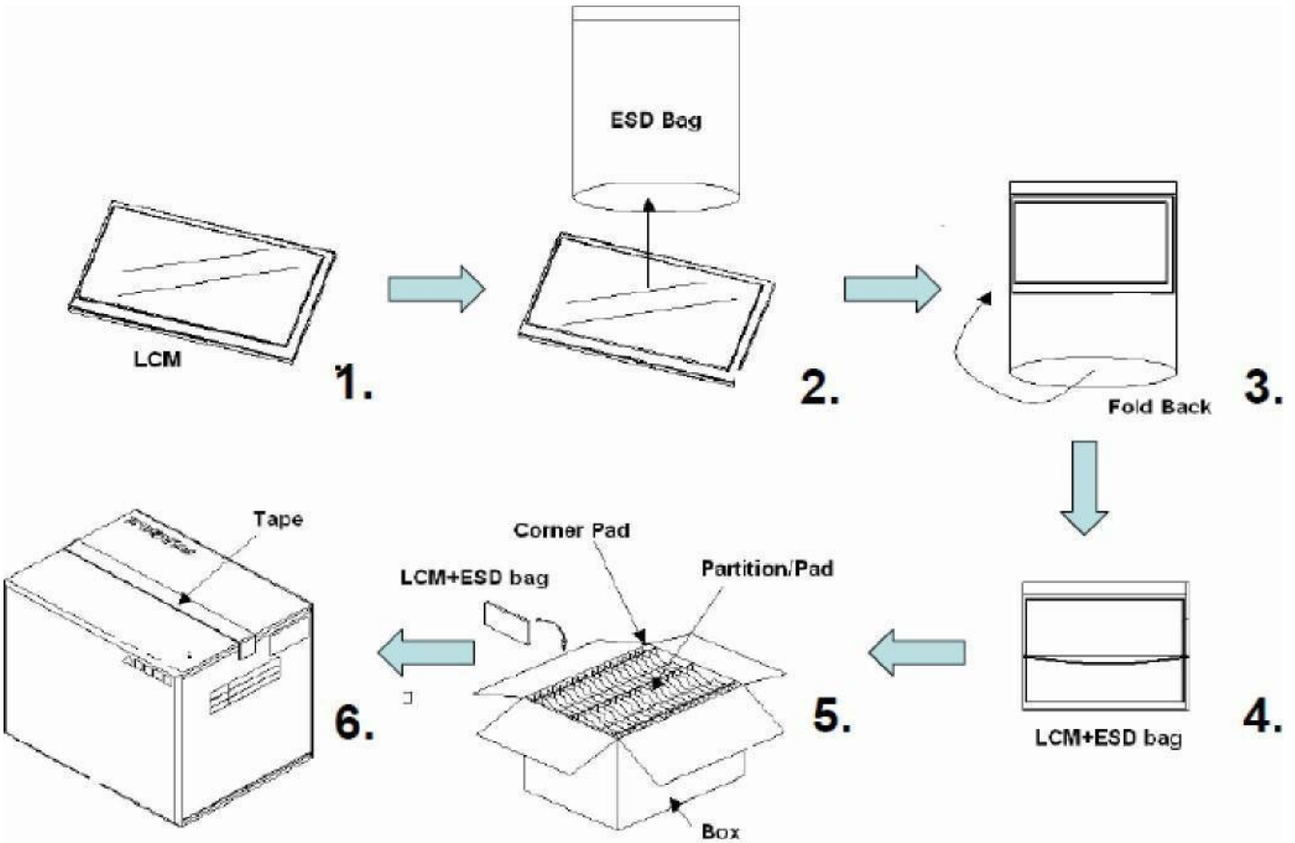


9.0 PACKAGE SPECIFICATION

10.1 Packing form

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Note
AGO 101J0-NN-N	60 pcs/box	383±5 x 373±5 x 275±5	

10.2 Packing assembly drawings



Items	Material	Notice
Box	Corrugated Paper Board	AB Flute
Partition/Pad	Corrugated Paper Board	B Flute
Corner Pad	Corrugated Paper Board	AB Flute
ESD bag	PE	

11.0 GENERAL PRECAUTION

11.1 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.

11.2 Assembly Precaution

11.2.1 Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.

11.2.2. Please design display housing in accordance with the following guide lines.

11.2.2.1Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.

11.2.2.2 Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.

11.2.3 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands.(Polarizer film, surface of LCD panel is easy to be flawed.)

11.2.4 Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module, If pressing rear part is unavoidable, handle the LCD module with care not to damage them.

11.2.5 Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.

11.2.6 Please wipe out drops of adhesives like saliva and water on LCD panelsurface immediately. They might damage to cause panel surface variation and color change.

11.2.7 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

11.3 Disassembling orModification

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

11.4 Breakage of LCD Panel

11.4.1. 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.

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

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

11.4.4. Handle carefully with chips of glass that may cause injury, when the glassis broken.

11.5 Absolute Maximum Ratings and Power Protection Circuit

11.5.1. 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.

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

11.5.3. It's recommended to employ protection circuit for power supply.

11.6 Operation

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

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

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

11.6.4 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.

11.6.5 When cleaning the adhesives, please use absorbent cotton wetted with alittle petroleum benzine or other adequate solvent.

11.7 Static Electricity

11.7.1Protection film must remove very slowly from the surface of LCD moduleto prevent from electrostatic occurrence.

11.7.2. Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.

11.7.3 Persons who handle the module should be grounded through adequate methods.

11.8 Disposal

When disposing LCD module, obey the local environmental regulations.

11.9 Others

11.9.1 A strong incident light into LCD panel might cause display characteristics' changing inferior because of Polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land Strong UV rays.

11.9.2 Please pay attention to a panel side of LCD module not to contact withother materials in pressing it alone.

11.9.3 For the packaging box, please pay attention to the followings:

11.9.3.1 Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.

11.9.3.2 Please do not pile them up more than 6 boxes(They are not designed so) And please do not turn over.

11.9.3.3 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

11.9.3.4 Packing box and inner case for LCDs are made of cardboard, So please pay attention not to get them wet(Such like keeping them in high humidity or wet place can occur getting them wet.)