

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	1/28	
Document No.		Issue date	2023/02/26	Revision	00

Tentative Product Specification

To:

Product Name: K123AWF3 R2

Document Issue Date: 2023/02/26

Customer
<p><u>SIGNATURE</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Please return 1 copy for your confirmation with your signature and comments.</p>

InfoVision Optoelectronics
<p><u>SIGNATURE</u></p> <p>REVIEWED BY CQM</p> <p>_____</p> <p>PREPARED BY FAE</p> <p>_____</p>

Note : 1. Please contact InfoVision Company before designing your product based on this product.
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by IVO for any intellectual property claims or other problems that may result from application based on the module described herein.

FQ-7-30-0-009-03D

IVO InfoVision Optoelectronics (Kunshan) Co.,LTD.

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	2/28
Document No.		Issue date	2023/02/26	Revision	00

Revision	Date	Page	Revised Content/Summary	Remark
00	2023/02/26	--	First issued.	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

IVO Confidential document

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	3/28	
Document No.		Issue date	2023/02/26	Revision	00

CONTENTS

1.0 GENERAL DESCRIPTIONS	4
2.0 ABSOLUTE MAXIMUM RATINGS	6
3.0 OPTICAL CHARACTERISTICS.....	7
4.0 ELECTRICAL CHARACTERISTICS.....	10
5.0 MECHANICAL CHARACTERISTICS	21
6.0 RELIABILITY CONDITIONS	24
7.0 PACKAGE SPECIFICATION	25
8.0 LOT MARK	26
9.0 GENERAL PRECAUTION.....	27

IVO Confidential document

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	4/28
Document No.		Issue date	2023/02/26	Revision	00

1.0 General Descriptions

1.1 Introduction

The K123AWF3 R2 is a Color Active Matrix Liquid Crystal Display. The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a 12.3 inch diagonally measured active display area with FHD resolution (1,920 horizontal by 720 vertical pixels array).

1.2 Features

- Supported FHD Resolution
- LVDS Interface
- Wide View Angle
- Compatible with RoHS Standard

1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	12.3	inch
Active Area (H x V)	292.032 x 109.512	mm
Number of Pixels (H x V)	1,920 x 720	-
Pixel Pitch (H x V)	0.1521 x 0.1521	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally Black	-
Contrast Ratio	(1,200) (Min.)	-
Response Time	25(Typ.) @25°C	ms
Input Voltage	(3.3) (6.5) (-6.5) (Typ.)	V
Power Consumption	(TBD) (Max.) @ White pattern, FV=60Hz	W
Weight	(104.91) (Max.)	g
Outline Dimension (H x V x D)	298.432(H)x120.312(V)x1.029(D)	mm
Electrical Interface (Logic)	LVDS	-
Support Color	16.7M	-
NTSC	(70) (Typ.)	%
Viewing Direction	All	-
Surface Treatment	HC/AG	-
Transmittance	(2.95)(Typ.)	%

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	5/28	
Document No.		Issue date	2023/02/26	Revision	00

1.4 Functional Block Diagram

Figure 1 shows the functional block diagram of the open-cell.

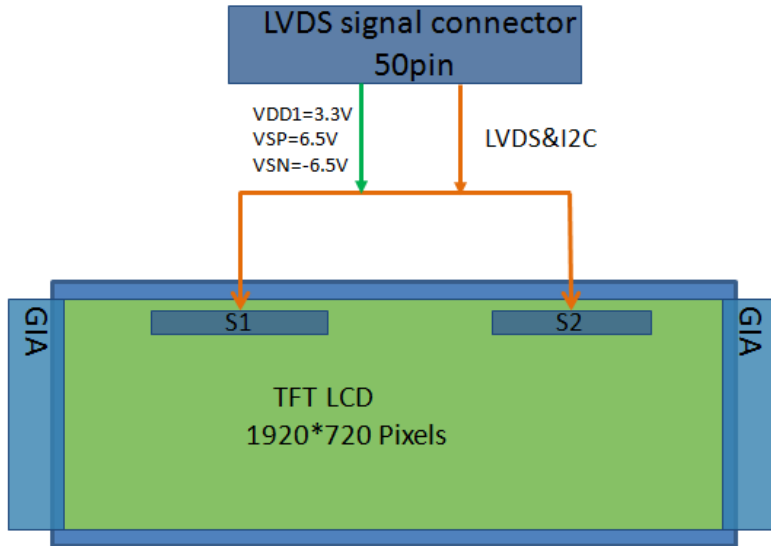


Figure 1 Block Diagram

1.5 Pixel Mapping

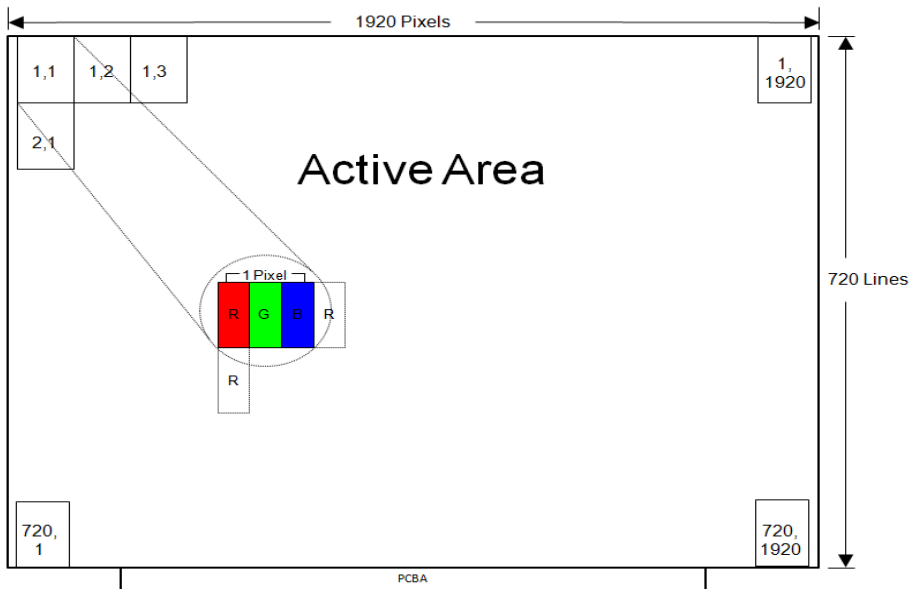


Figure2 Pixel Mapping

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	6/28
Document No.		Issue date	2023/02/26	Revision	00

2.0 Absolute Maximum Ratings

Table 1 Electrical & Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Logic Supply Voltage	V_{DD1}	(-0.3)	(3.6)	V	(1),(2),(3),(4)
	V_{SP}	(-0.3)	(7)	V	
	V_{SN}	(-7.3)	(-0.3)	V	
Logic Input Signal Voltage	V_{Signal}	(-0.3)	(3.6)	V	
Operating Temperature	T_{gs}	(-30)	(85)	°C	
Storage Temperature	T_a	(-40)	(90)	°C	

Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

Note (2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. All the display fineness should be inspected under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55± 10%RH.

Note (3) Unpredictable results may occur when it was used in extreme conditions. T_a = Ambient Temperature, T_{gs} = Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note (4) Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be lower than 57.8°C, and no condensation of water. Besides, protect the module from static electricity.

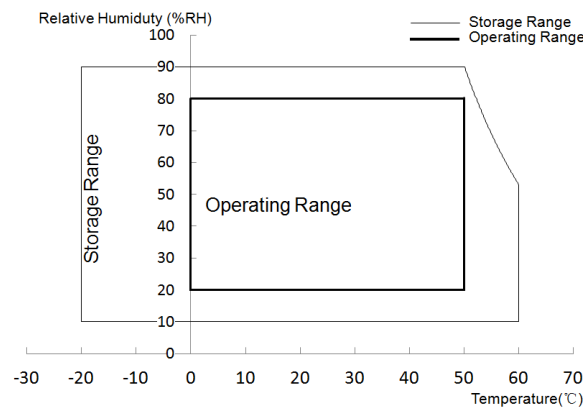


Figure 3 Absolute Ratings of Environment of the open-cell

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	7/28
Document No.		Issue date	2023/02/26	Revision	00

3.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

Table 2 Optical Characteristics

Item	Conditions	Min.	Typ.	Max.	Unit	Note	
Viewing Angle (CR≥10)	Horizontal	θ_{x+}	(80)	(85)	-	degree	(1),(2),(3),(6),(7)
		θ_{x-}	(80)	(85)	-		
	Vertical	θ_{y+}	(80)	(85)	-		
		θ_{y-}	(80)	(85)	-		
Contrast Ratio	Center	(1,200)	(TBD)	-	-	(1),(3),(6),(7) $\theta_x=\theta_y=0^\circ$	
Response Time	Rising + Falling (25°C)	-	(25)	(30)	ms	(1),(4),(6),(7) $\theta_x=\theta_y=0^\circ$	
	Rising + Falling (-20°C)	-	-	(250)			
	Rising + Falling (-30°C)	-	-	(450)			
Transmittance	-	(2.50)	(2.95)	-	%	(1),(5),(7) $\theta_x=\theta_y=0^\circ$	
CF Color Chromaticity (CIE1931)	Red x	Typ. -0.03	(0.642)	Typ. +0.03	-	(1),(5),(7) $\theta_x=\theta_y=0^\circ$	
	Red y		(0.317)		-		
	Green x		(0.283)		-		
	Green y		(0.605)		-		
	Blue x		(0.139)		-		
	Blue y		(0.104)		-		
	White x		(0.303)		-		
	White y		(0.324)		-		
NTSC	-	(65)	(70)	-	%		

Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	8/28
Document No.		Issue date	2023/02/26	Revision
				00

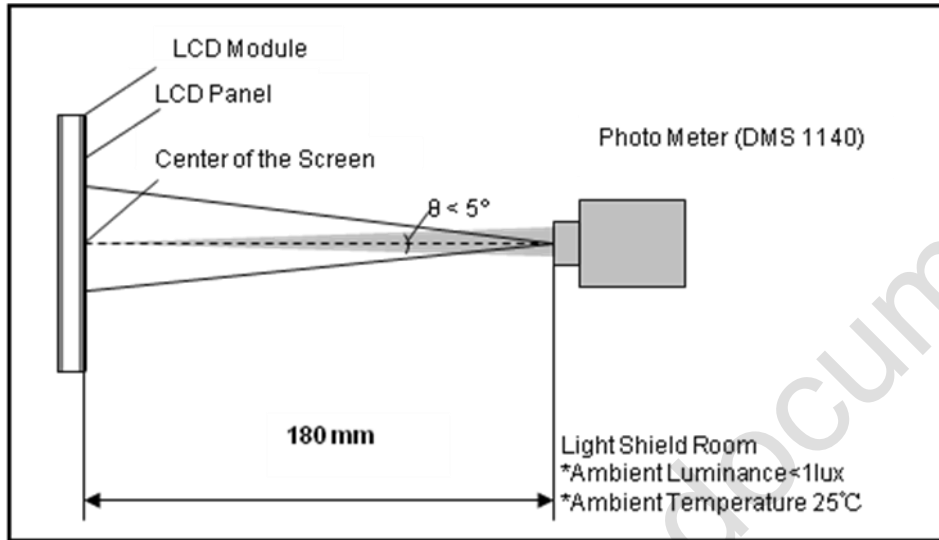


Figure 4 Measurement Setup

Note (2) Definition of Viewing Angle

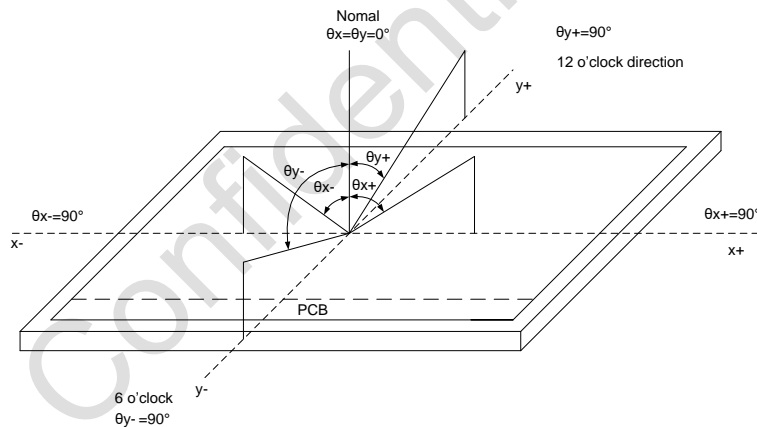


Figure 5 Definition of Viewing Angle

Note (3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression:

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level 255, L0: Luminance of gray level 0

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	9/28	
Document No.		Issue date	2023/02/26	Revision	00

Note (4) Definition of Response Time (T_R , T_F)

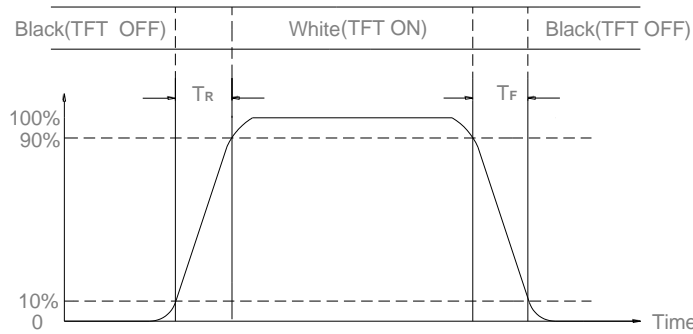


Figure 6 Definition of Response Time

Note (5) C-Light Spectrum

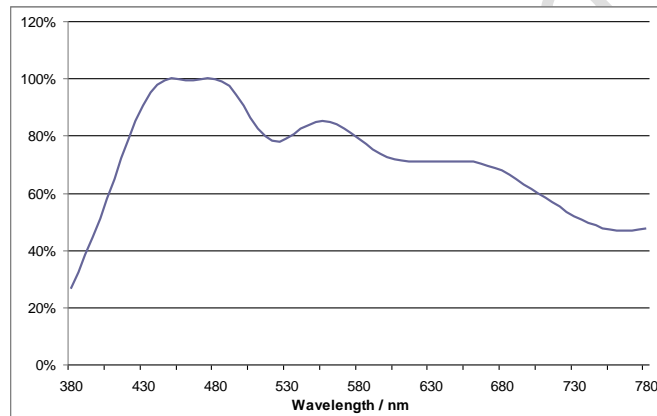


Figure 7 C-Light Spectrum

Note (6) The Back Light Spectrum.

TBD

Figure 8 Back Light Spectrum

Note (7) All optical data are based on IVO given system & nominal parameter & testing machine in this document.

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	10/28
Document No.		Issue date	2023/02/26	Revision	00

4.0 Electrical Characteristics

4.1 Interface Connector

Table 3 Signal Connector Type

Item	Description
Manufacturer / Type	FFSKL05007G50G

Table 4 Signal Connector Pin Assignment

Pin No.	Symbol	Description	Remarks
1	OTP_PVPP	IVO internal use only(EXT Power supply for OTP circuit 7.25V)	-
2	GND	Digital ground	-
3	DA_P_O	LVDS input	-
4	DA_N_O	LVDS input	-
5	GND	Digital ground	-
6	DB_P_O	LVDS input	-
7	DB_N_O	LVDS input	-
8	GND	Digital ground	-
9	DC_P_O	LVDS input	-
10	DC_N_O	LVDS input	-
11	GND	Digital ground	-
12	CLK_P_O	LVDS input	-
13	CLK_N_O	LVDS input	-
14	GND	Digital ground	-
15	DD_P_O	LVDS input	-
16	DD_N_O	LVDS input	-
17	GND	Digital ground	-
18	DA_P_E	LVDS input	-
19	DA_N_E	LVDS input	-
20	GND	Digital ground	-
21	DB_P_E	LVDS input	-
22	DB_N_E	LVDS input	-
23	GND	Digital ground	-
24	DC_P_E	LVDS input	-1
25	DC_N_E	LVDS input	-

IVO InfoVision Optoelectronics (Kunshan) Co.,LTD.

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	11/28	
Document No.		Issue date	2023/02/26	Revision	00

26	GND	Digital ground	-
27	CLK_P_E	LVDS input	-
28	CLK_N_E	LVDS input	-
29	GND	Digital ground	-
30	DD_P_E	LVDS input	-
31	DD_N_E	LVDS input	-
32	GND	Digital ground	-
33	VDD1	Digital power,3.3V	-
34	VDD1	Digital power,3.3V	-
35	VSP	Digital power,6.5V	-
36	NC	NC	-
37	VSN	Digital power,-6.5V	-
38	GND	Digital ground	-
39	TP_I2C_SDA	I2C interface data signal for touch	-
40	TP_I2C_SCL	I2C interface Clock signal for touch	-
41	TP_I2C_INT	Touch screen interrupt line	-
42	TP_EXT_RSTN	TP external reset signal	-
43	BIST_EN	Enable BIST Function	-
44	TP_GPIO[0]	Used for low power wake up gesture function	-
45	PON	SLPIN/SLPOUT hardware control signal	-
46	TP_GPIO[1]	Output touch fail detection	-
47	RESX	Reset pin, D-IC is initialized when this pin is low	-
48	DD_SDI_SDA	I2C interface data signal for OTP	-
49	DD_SCL	I2C interface clock signal for OTP	-
50	FAIL_DET	Fail detection signal output	-

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	12/28
Document No.		Issue date	2023/02/26	Revision	00

4.2 Signal Electrical Characteristics

4.2.1 Signal Electrical Characteristics For LVDS Receiver

Table 5 LVDS Receiver Electrical Characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Positive-going input threshold voltage	V_{TH}	-	-	(90)	mV
Negative-going input threshold voltage	V_{TL}	(-90)	-	-	mV
LVDS differential voltage	$ V_{ID} $	(90)	(350)	(800)	mV
LVDS input common mode voltage	V_{CMLV}	$0.3+ V_{ID} /2$	-	$2.3- V_{ID} /2$	V

Note:(1)Requirement of termination resistance(Ω): 80(Min.)/100(Typ.)/120(Max).

(2)Test conditions: $V_{CMLV}=1.2V$, $V_{DD1}=2.7V\sim 3.6V$

(3)Test condition: Test point is IC pad.

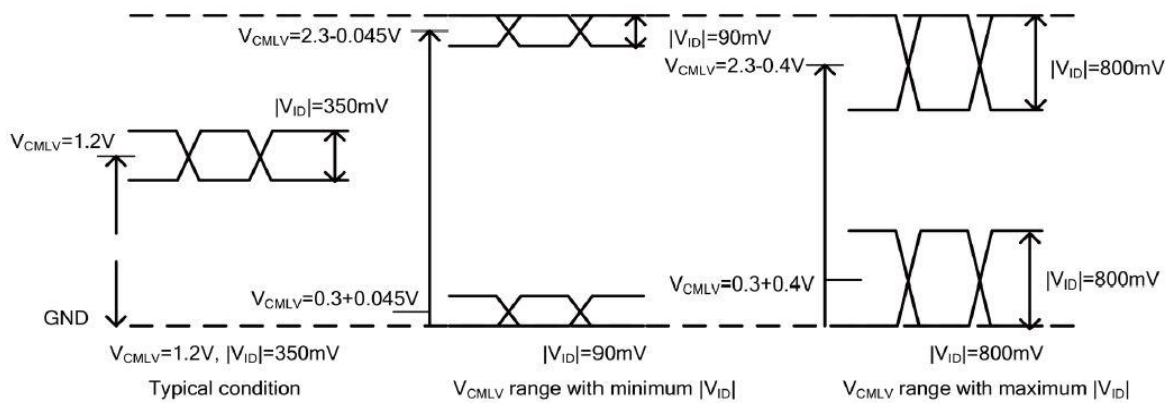


Figure 9 LVDS Receiver Input Signal levels

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	13/28	
Document No.		Issue date	2023/02/26	Revision	00

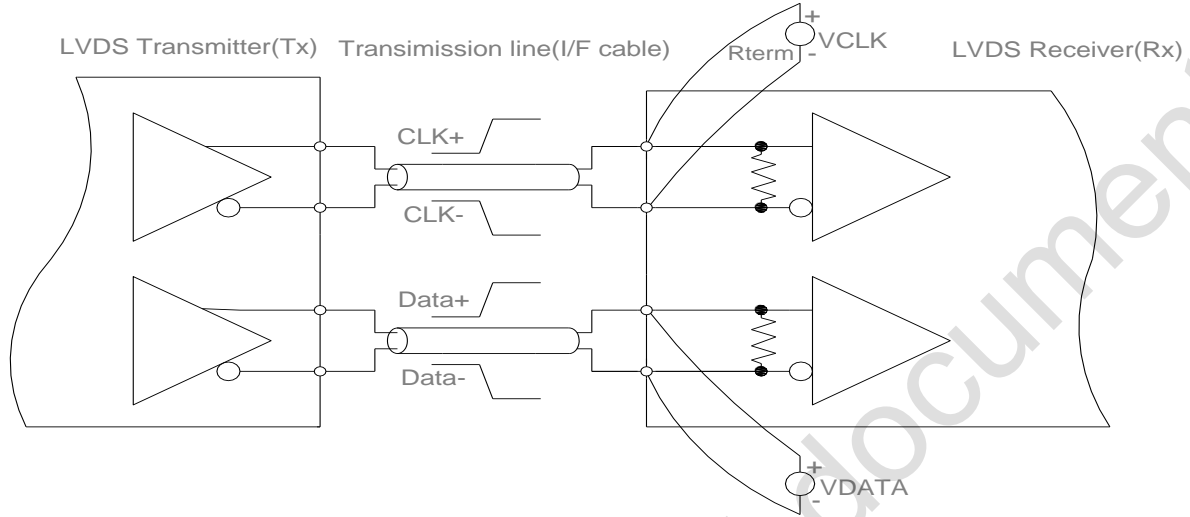


Figure 10 Measurement System

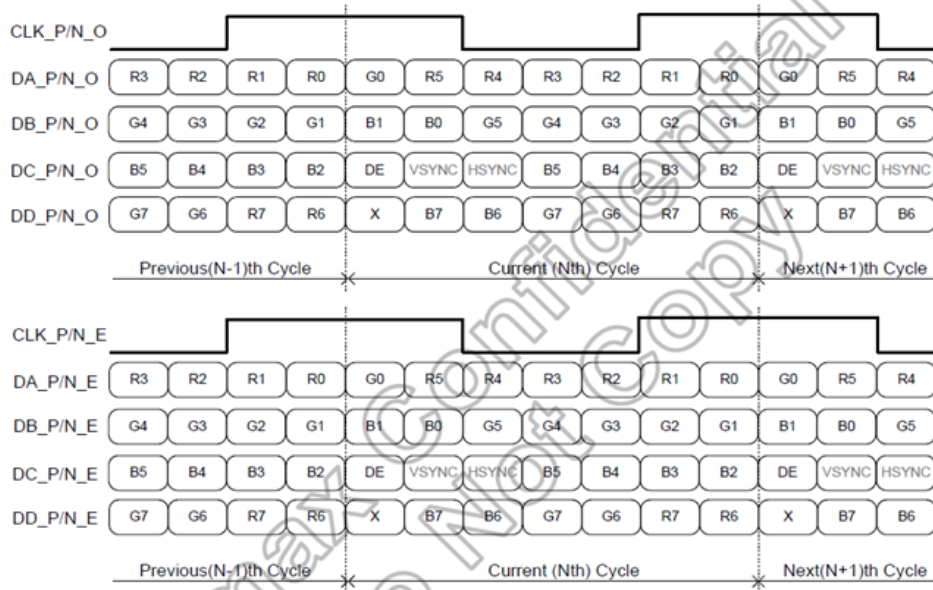


Figure 11 Data Mapping

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	14/28
Document No.		Issue date	2023/02/26	Revision	00

4.2.2 AC Characteristics-1

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	F_{LVDCYC}	-	-	140	MHZ
Clock period	T_{LVDCYC}	7.14	-	-	ns
1 data bit time	UI	-	1/7	-	T_{LVDCYC}
Input data position for bit0	T_{RIP0}	$-T_{EB}$	0	$+T_{EB}$	UI
Input data position for bit1	T_{RIP1}	$1-T_{EB}$	1	$1+T_{EB}$	UI
Input data position for bit2	T_{RIP2}	$2-T_{EB}$	2	$2+T_{EB}$	UI
Input data position for bit3	T_{RIP3}	$3-T_{EB}$	3	$3+T_{EB}$	UI
Input data position for bit4	T_{RIP4}	$4-T_{EB}$	4	$4+T_{EB}$	UI
Input data position for bit5	T_{RIP5}	$5-T_{EB}$	5	$5+T_{EB}$	UI
Input data position for bit6	T_{RIP6}	$6-T_{EB}$	6	$6+T_{EB}$	UI

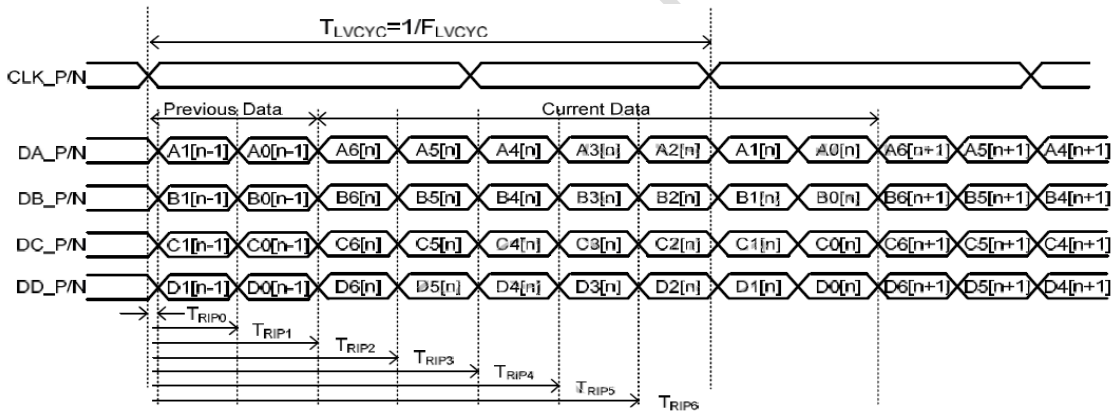


Figure 12 LVDS interface transmission flow

4.2.3 AC Characteristics-2

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Input eye border(LVDS < 100MHZ)	T_{EB}	-	-	0.25	UI
Input eye border(LVDS ≥ 100MHZ)	T_{EB}	-	-	0.2	UI
Input eye width(LVDS < 100MHZ)	T_{EW}	0.5	-	-	UI
Input eye width(LVDS ≥ 100MHZ)	T_{EW}	0.6	-	-	UI
Maximum deviation of input clock frequency during SSC	FDEW	-	-	$\pm 3^{(1)}$	%
Max./Min. modulation frequency of input clock during SSC	FMOD	15	-	200	KHZ

Note: (1) Test system with long cable may affect the SSC performance.

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	15/28	
Document No.		Issue date	2023/02/26	Revision	00

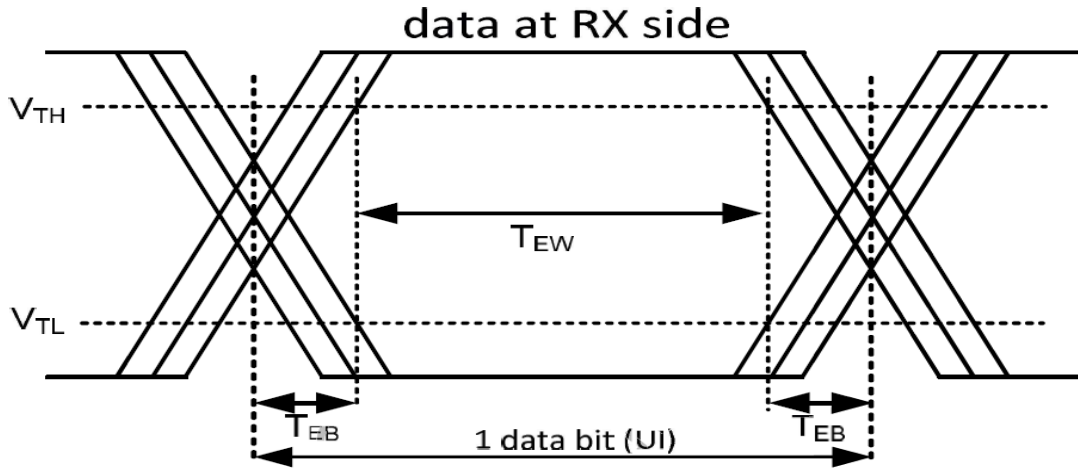


Figure 13 LVDS Input eye diagram

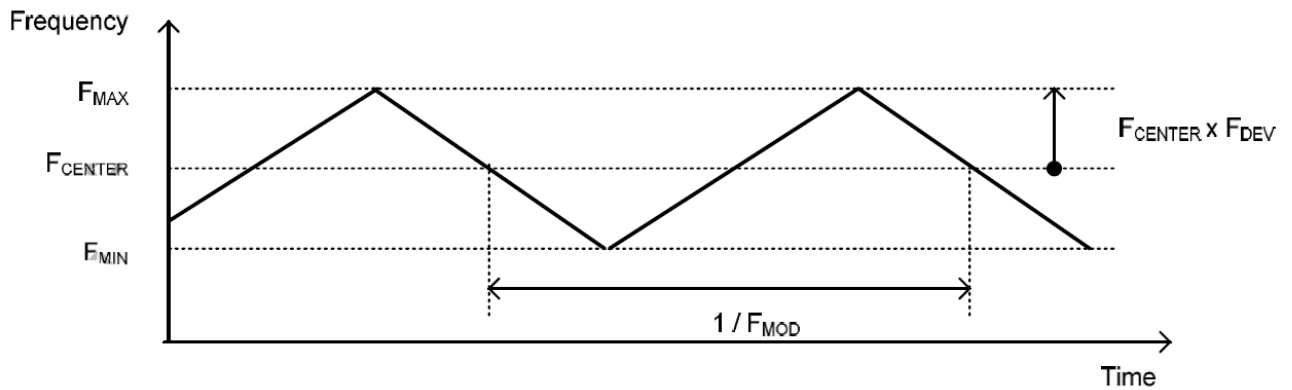
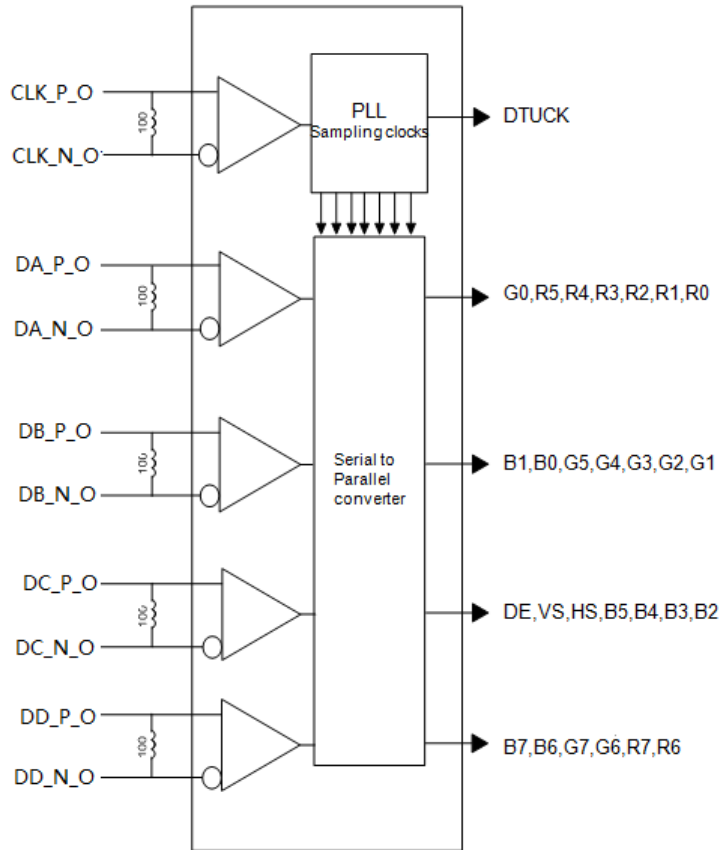


Figure 14 Spread spectrum

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	16/28	
Document No.		Issue date	2023/02/26	Revision	00

4.2.4 LVDS Receiver Internal Circuit

Figure 15 shows the internal block diagram of the LVDS receiver. This LCD module equips termination resistors for LVDS link.



Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	17/28	
Document No.		Issue date	2023/02/26	Revision	00

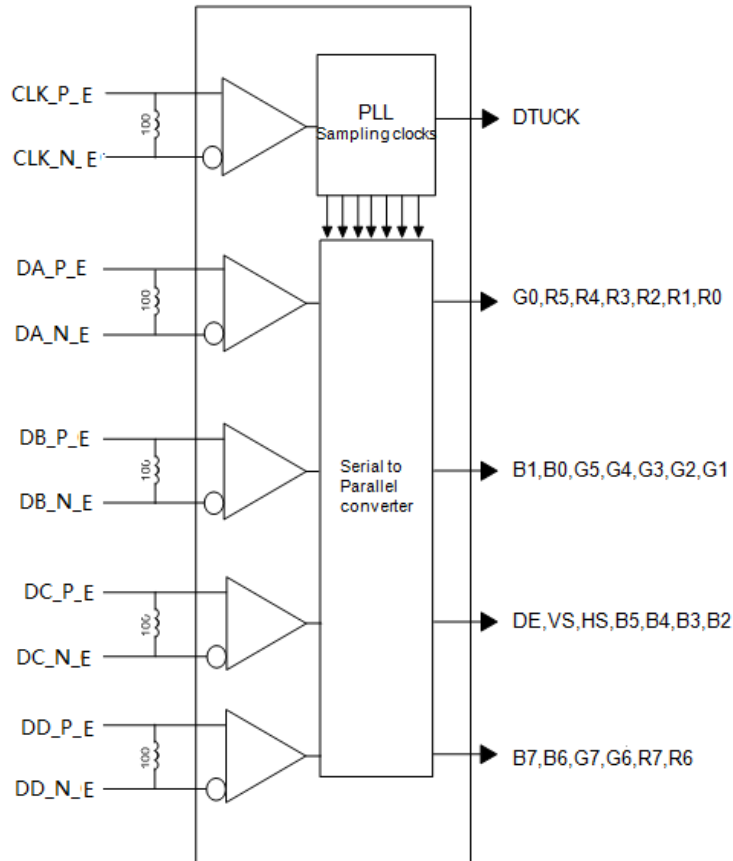


Figure 15 LVDS Receiver Internal Circuit

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	18/28
Document No.		Issue date	2023/02/26	Revision	00

4.3 Interface Timings

Table 6 Interface Timings

Parameter	Symbol	Min.	Typ.	Max.	Unit
H Total Time	HT	1992	2064	2112	Clocks
H Active Time	HA	1920			Clocks
H Front Porch	Thfp	20	56	80	Clocks
H Sync Pulse Width	HSPW	32	32	32	Clocks
H Back Porch	Thbp	20	56	80	Clocks
V Total Time	VT	930	930	930	Lines
V Active Time	VA	720			Lines
V Front Porch	Tvfp	200	200	200	
V Sync Pulse Width	VSPW	2	2	2	
V Back Porch	Tvbp	8	8	8	Lines
Frame Rate	Vsync	60	(60)	-	Hz
Pixel Clock Frequency	Fclk	111.15	115.2	117.85	MHz

Note1: $HT * VT * FV < 140 \text{ MHz}$

Note2: All reliabilities are specified for timing specification based on refresh rate of 60Hz. A1233H R2-P is secured only for function under lower refresh rate;

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	19/28
Document No.		Issue date	2023/02/26	Revision	00

4.4 Input Power Specifications

Input power specifications are as follows.

Table 7 Input Power Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
<i>System Power Supply</i>							
LCD Drive Voltage (Logic)	VDD1	3.0	3.3	3.6	V	(1),(2)	
	VSP	6	6.5	7.0	V		
	VSN	-7.0	-6.5	-6	V		
LCD Current	White Pattern	IVDD1	-	116	-	mA	(1),(3)
		IVSP	-	71	-	mA	
		IVSN	-	76	-	mA	
LCD Power Consumption	PLCD	-	1.34	TBD	W		
Input high level voltage	VIH	All input pad with VDD1		0.7VDD1	VDD1	V	
Input low level voltage	VIL	All input pad with VDD1		0	0.3VDD1	V	
Rush Current	I_{Rush}	-		1	A	(1),(4)	
Allowable Logic/LCD Drive Ripple Voltage	V_{VDD-RP}	-		200	mA	(1)	

Note (1) All of the specifications are guaranteed under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55± 10%RH.

Note (2) All of the absolute maximum ratings specified in the table, if exceeded, may cause faulty operation or unrecoverable damage. It is recommended to follow the typical value.

Note (3) The specified V_{DD} current and power consumption are measured under the $V_{DD1} = 3.3V$, $F_V = 60\text{ Hz}$ condition and White pattern.

Note (4) The figures below is the measuring condition of V_{DD} . Rush current can be measured when T_{RUSH} is 0.5 ms.

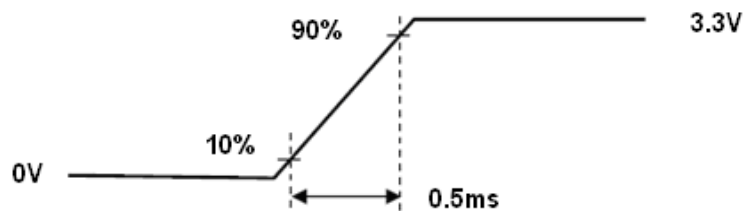


Figure 16 V_{DD} Rising Time

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	20/28	
Document No.		Issue date	2023/02/26	Revision	00

4.5 Power ON/OFF Sequence

Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VDD voltage is off.

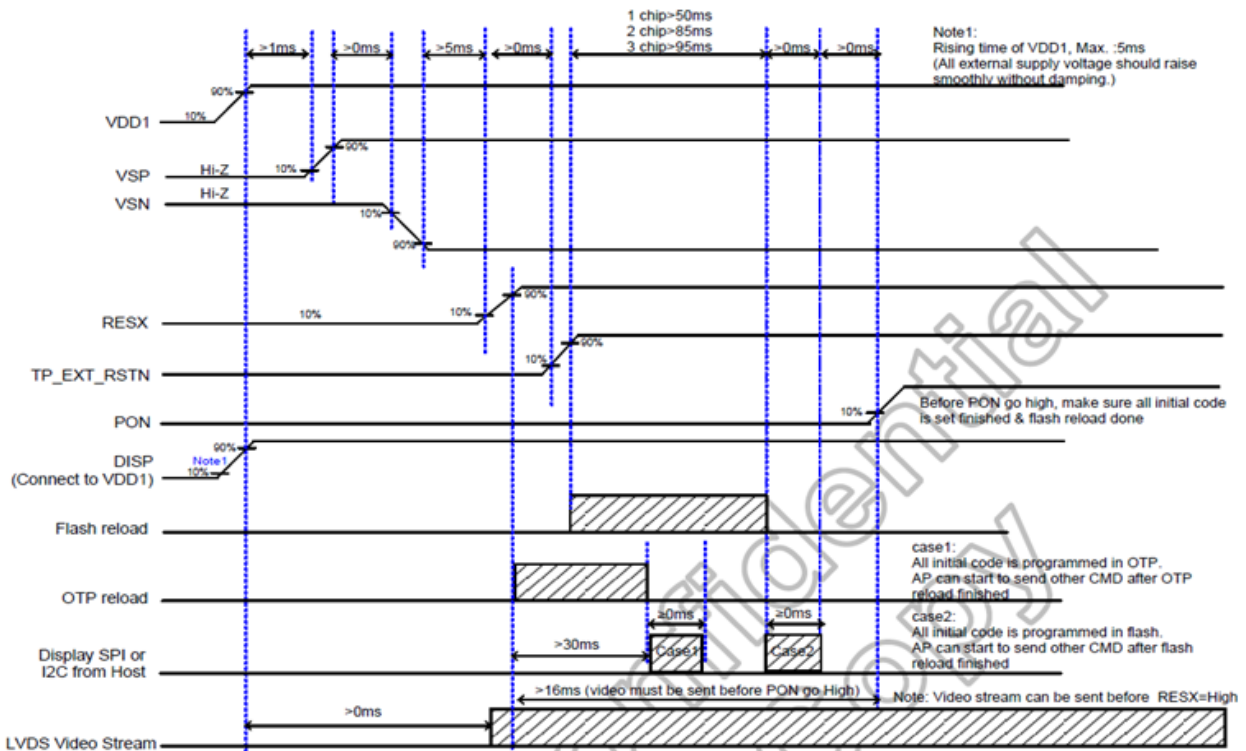


Figure 17 Power on Sequence-3 power mode

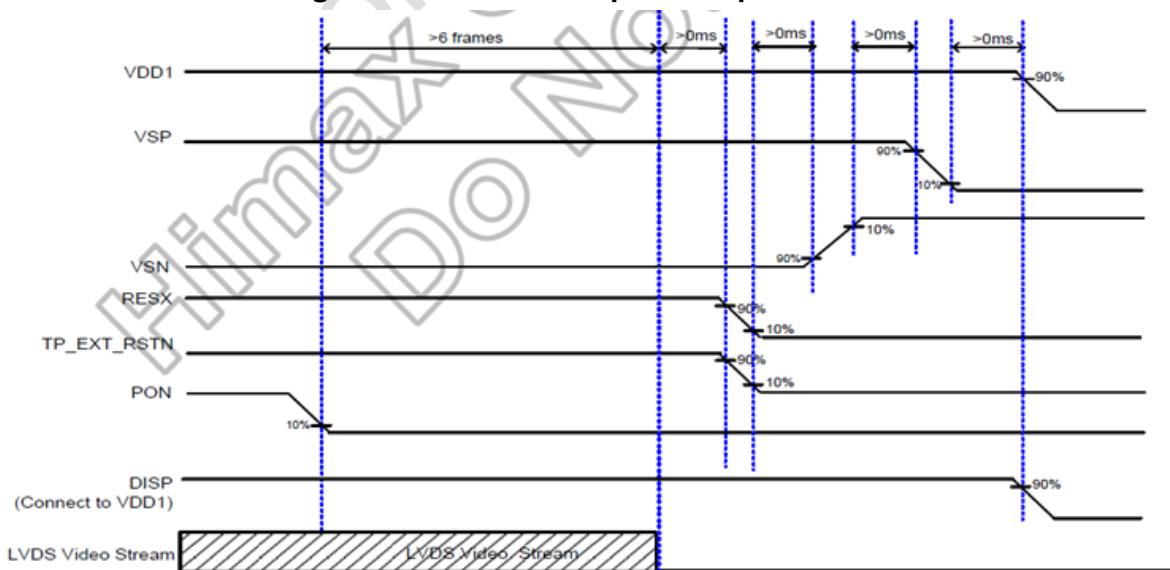
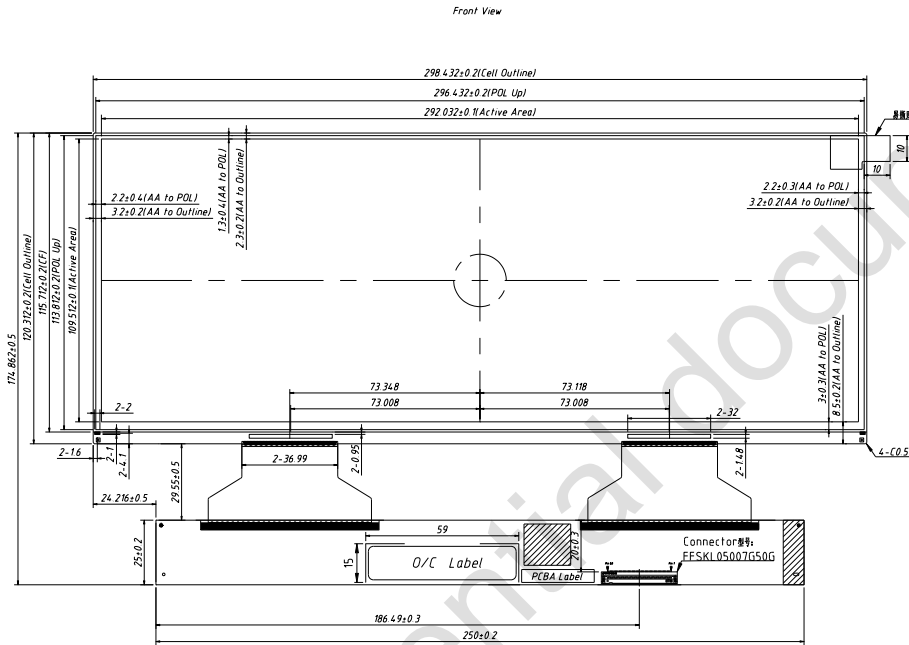


Figure 18 Power off Sequence-3 power mode

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	21/28	
Document No.		Issue date	2023/02/26	Revision	00

5.0 Mechanical Characteristics

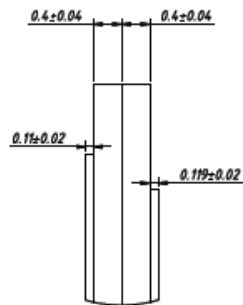
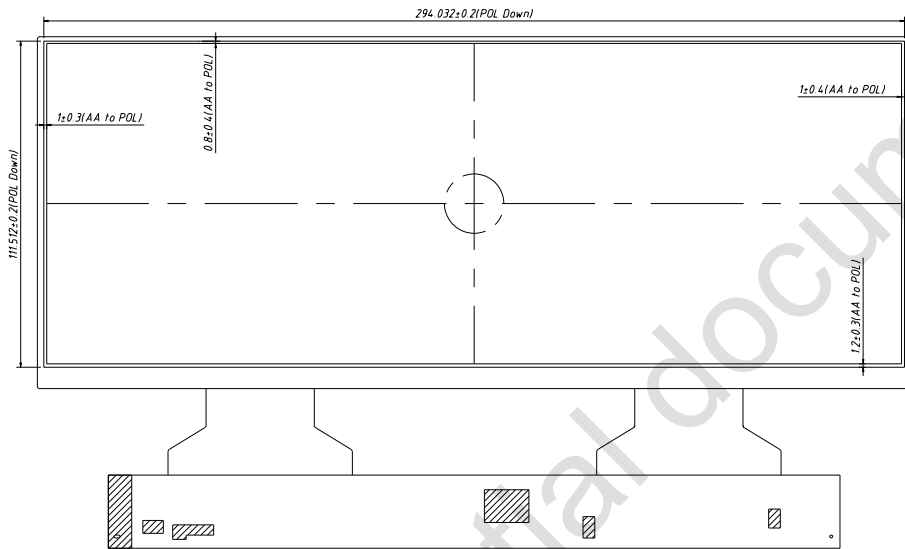
5.1 Outline Drawing



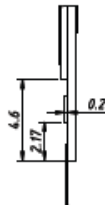
Unit:mm

Figure 19 Reference Outline Drawing (Front Side)

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	22/28
Document No.		Issue date	2023/02/26	Revision	00



Detail A
Scale 20:1



Detail B
Scale 5:1

Unit:mm

Figure 20 Reference Outline Drawing (Back Side)

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	23/28
Document No.		Issue date	2023/02/26	Revision	00

5.2 Dimension Specifications

Table 8 Open-cell Dimension Specifications

Item		Min.	Typ.	Max.	Unit
Width		(298.232)	(298.432)	(298.632)	mm
Height		(174.362)	(174.862)	(175.362)	mm
Thickness	With PCB	-	-	(2.75)	mm
	Without PCB	(0.909)	(1.029)	(1.149)	mm
Weight		-	-	(104.91)	g

Note: Outline dimension measure instrument: Vernier Caliper.

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	24/28	
Document No.		Issue date	2023/02/26	Revision	00

6.0 Reliability Conditions

Table 9 Reliability Condition

Item	Package	Test Conditions	Note
High Temperature/High Humidity Operating Test	Open cell	$T_{gs}=60^{\circ}\text{C}$, 90%RH, 500 hours	(1),(2),(3),(4)
High Temperature Operating Test	Open cell	$T_{gs}=85^{\circ}\text{C}$, 500 hours	
Low Temperature Operating Test	Open cell	$T_a=-30^{\circ}\text{C}$, 500 hours	
High Temperature Storage Test	Open cell	$T_a=90^{\circ}\text{C}$, 500 hours	(1),(3),(4)
Low Temperature Storage Test	Open cell	$T_a=-40^{\circ}\text{C}$, 500 hours	
ESD Test	Open cell	Contact: $\pm 6\text{KV}$, 150pF(330Ohm) Air: $\pm 6\text{KV}$, 150pF(330Ohm)	(1),(2),(5)

Note (1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the IVO document before reliable test. Only check the function of the module after reliability test.

Note (2) The setting of electrical parameters should follow the typical value before reliability test.

Note (3) During the test, it is unaccepted to have condensate water remains. Besides, protect the open-cell from static electricity.

Note (4) The sample must be released for 24 hours under normal conditions before judging.

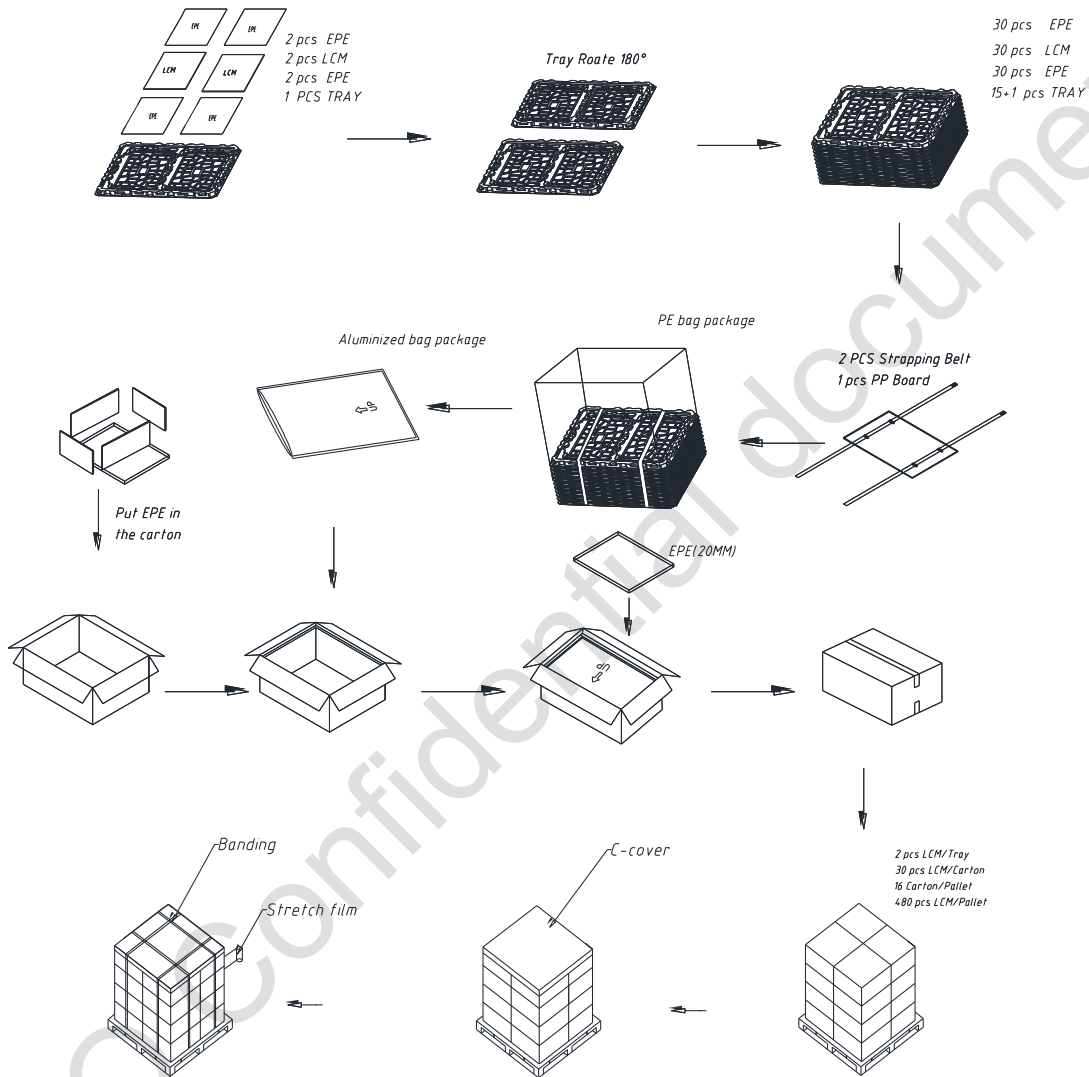
Furthermore, all the judgment must be made under normal conditions. Normal conditions are defined as follow: Temperature: 25°C , Humidity: $55\pm 10\%\text{RH}$. T_a = Ambient Temperature, T_{gs} = Glass Surface Temperature.

Note (5) It could be regarded as pass, when the open-cell recovers from function fault caused by ESD after resetting.

Document Title	K123AWF3 R2 Tentative Product Specification		Page No.	25/28	
Document No.		Issue date	2023/02/26	Revision	00

7.0 Package Specification

Figure 22 Packing Method



IVO InfoVision Optoelectronics (Kunshan) Co.,LTD.

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	26/28
Document No.		Issue date	2023/02/26	Revision	00

8.0 Lot Mark

TBD

IVO Confidential document

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	27/28
Document No.		Issue date	2023/02/26	Revision	00

9.0 General Precaution

9.1 Using Restriction

This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems and any other appliance where performance failure could be life-threatening or lead to be catastrophic.

9.2 Operation Precaution

(1)The LCD product should be operated under normal conditions.

Normal conditions are defined as below:

Temperature: 25°C

Humidity: 55±10%

Display pattern: continually changing pattern (Not stationary)

(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)

(3) It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the open-cell. Besides, smear or spot will remain after condensate water evaporating.

(4) If the absolute maximum rating value was exceeded, it may damage the open-cell.

(5) Do not adjust the variable resistor located on the open-cell.

(6) Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding may be important to minimize the interference.

(7) Image sticking may occur when the panel displayed the same pattern for long time.

(8) Do not connect or disconnect the open-cell in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

(9) Ultra-violet ray filter is necessary for outdoor operation.

9.3 Mounting Precaution

(1) All the operators should be electrically grounded and with Ion-blown equipment turning on when mounting or handling. Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.

(2) It is unacceptable that the material of cover case contains acetic or chloric. Besides, any other material that could generate corrosive gas or cause circuit break by electro-chemical reaction is not desirable.

(3) Do not damage the PCBA. And it is recommended to use packing trays while carrying

(4) The mounting structure should be taken into consideration so that uneven force (ex. Twisted stress) is not applied to the open-cell. The case on which an open-cell is mounted should have sufficient strength so that external force is not transmitted to the open-cell directly.

(5) It is obvious that you should adopt radiation structure to satisfy the temperature specification.

(6) So as to acquire higher luminance, the cable of the power supply should be connected directly

Document Title	K123AWF3 R2 Tentative Product Specification			Page No.	28/28
Document No.		Issue date	2023/02/26	Revision	00

with a minimize length.

(7) A transparent protective film needs to be attached to the surface of the module.

(8) Do not press or scratch the polarizer exposed with anything harder than HB pencil lead. In addition, don't touch the pin exposed with bare hands directly.

(9) Clean the polarizer gently with absorbent cotton or soft cloth when it is dirty.

(10) Wipe off saliva or water droplet as soon as possible. Otherwise, it may cause deformation and fading of color.

(11) Desirable cleaners are IPA (Isopropyl Alcohol) or hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(12) Do not disassemble or modify the open-cell. It may damage sensitive parts in the LCD open-cell, and cause scratches or dust remains. IVO does not warrant the open-cell, if you disassemble or modify the open-cell.

9.4 Handling Precaution

(1) Static electricity will generate between the film and polarizer, when the protection film is peeled off. It should be peeled off slowly and carefully by operators who are electrically grounded and with Ion-blown equipment turning on. Besides, it is recommended to peel off the film from the bonding area.

(2) The protection film is attached to the polarizer with a small amount of glue. When the open-cell with protection film attached is stored for a long time, a little glue may remain after peeling.

(3) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

9.5 Storage Precaution

When storing the open-cell as spares for long time, the following precautions must be executed.

(1) Store them in a dark place. Do not expose to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

9.6 Others

When disposing the LCD open-cell, obey the local environmental regulations.