



Product Specification

Model Name	KD070BWS45HD-DC35
Description	7.0" WSVGA 1024(RGB)x600 Dots
Date	2022/03/31
Version	1.0

Approved by/Date	Check by/Date	Prepared by/Date
ZHP 2022/03/31	HL 2022/03/31	ZWF 2022/03/31

Customer Approval	
Date	



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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2022/03/31	First Release.	ZWF

2. General Specifications

	Feature	Spec
Characteristics	Size	7 inch
	Resolution	1024(horizontal)*600(Vertical)
	Interface	LVDS
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.150*0.143
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	LCD Driver IC	EK79001HN+EK73215BCGA
	Viewing Direction	Full view
Mechanical	LCM (W x H x D) (mm)	165.00*100.00*7.47
	Active Area(mm)	154.21 x85.92
	With /Without TSP	With CTP
	Weight (g)	TBD
	LED Numbers	30 LEDs

Note 1: Requirements on Environmental Protection: RoHs

Note 2: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

LCD PIN-MAP

No.	Symbol	Description
1	VCOM	Common Voltage
2	VDD	Power Voltage for digital circuit
3	VDD	Power Voltage for digital circuit
4	NC	No connection
5	RESET	Global reset pin
6	STBYB	Standby mode Normally pulled high STBYB=1,normal operation STBYB=0,timing contrller,source Driver will turn off,all output are High-Z
7	GND	Ground
8	RXIN0-	-LVDS differential data input
9	RXIN0+	+LVDS differential data input
10	GND	Ground
11	RXIN1-	-LVDS differential data input
12	RXIN1+	+LVDS differential data input
13	GND	Ground
14	RXIN2-	-LVDS differential data input
15	RXIN2+	+LVDS differential data input
16	GND	Ground
17	RXCLKIN-	-LVDS differential clock input
18	RXCLKIN+	+LVDS differential clock input
19	GND	Ground
20	RXIN3-	-LVDS differential data input
21	RXIN3+	-LVDS differential data input
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	GND	Ground
26	NC	No connection
27	DIMO	Backlight CABC controller signal output
28	SELB	6bit/8bit mode select (Note 1)
29	AVDD	Power for Analog Circuit
30	GND	Ground
31	LED-	LED Cathode



32	LED-	LED Cathode
33	L/R	Horizontal inversion (Note 2)
34	U/D	Vertical inversion (Note 2)
35	VGL	Gate oFF Voltage Power supply
36	NC	No connection
37	NC	No connection
38	VGH	Gate ON Voltage
39	LED+	LED Anode
40	LED+	LED Anode

Note 1: if LVDS input data is 6bit,selb must be set to high;

if LVDS input data is 8bit,selb must be set to low;

Note 2: when L/R=0 set right to left scan direction

when L/R=1 set left to right scan direction

when U/D=0 set top to bottom scan direction

when U/D=1 set bottom to top scan direction

CTP PIN-MAP

Pin	Signal	Description
1	GND	Ground
2	DP+	Data+ input
3	DN-	Data- input
4	VDD5V	Power supply

4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	VDD	-0.3	-	5	V	-
Operating Temperature	TOPR	-20	-	70	°C	-
Storage Temperature	TSTG	-30	-	80	°C	-

5. Electrical Characteristics

5.1 Driving TFT LCD Panel

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply for LCD	VDD	3.0	3.3	3.6	V	
	AVDD	9.0	9.8	10.5	V	
	VGH	16.0	18.0	20	V	
	VGL	-7.5	-6.0	-5.0	V	
	VCOM	2.9	3.25	3.5	V	

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply for LCD	I _{VDD}	25	45	60	mA	
	I _{AVDD}	20	35	50	mA	
	I _{VGH}	0.8	1	1.2	mA	
	I _{VGL}	0.8	1	1.2	mA	
	I _{VCOM}	5	10	15	mA	

5.2 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	200	-	mA	
Forward Voltage	V_F	8.1	-	10.2	V	
Backlight Power consumption	W_{BL}	1.62	-	2.04	W	
LED Lifetime		-	50000	-	Hrs	

Note 1: Each LED: $I_F = 20\text{ mA}$, $V_F = 2.7\text{-}3.4\text{V}$.

Note 2: Optical performance should be evaluated at $T_a = 25^\circ\text{C}$ only.

Note 3: 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.

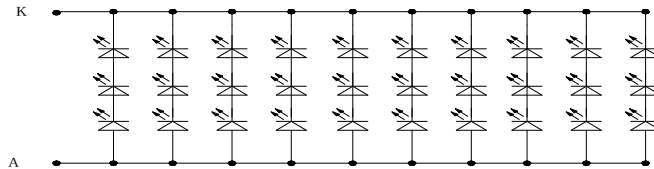


Figure: LED connection of backlight(Constant Current)

5.3 CTP Electrical Characteristics

FPC Design	Item	Description	Remark
COF	IC solution on TP Model	ILI2511	
	Touch Count Max	5 point	
	Display Resolution	1024*600	
	Interface Type	USB	
	Origin of Coordinate	Top left corner	

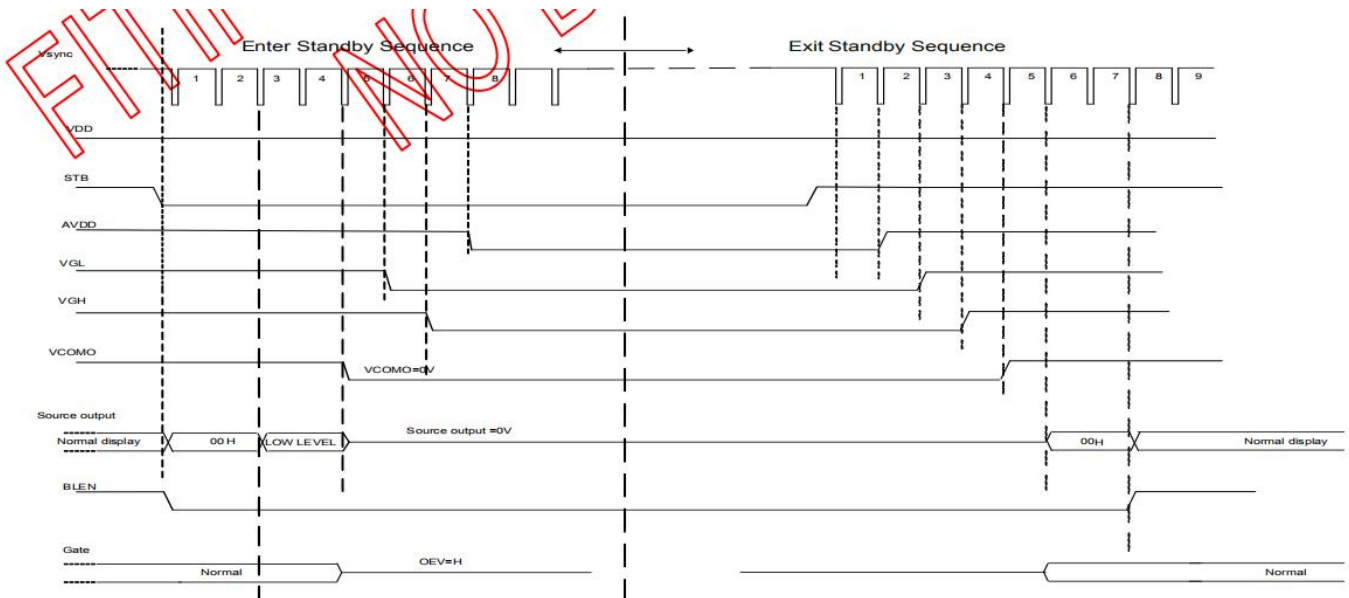
Parameter	Min	Typ	Max	Unit
Power Voltage VDD	-	5	-	V

6. Interface Timing

6.1 Power sequence



Power On/Off timing chart

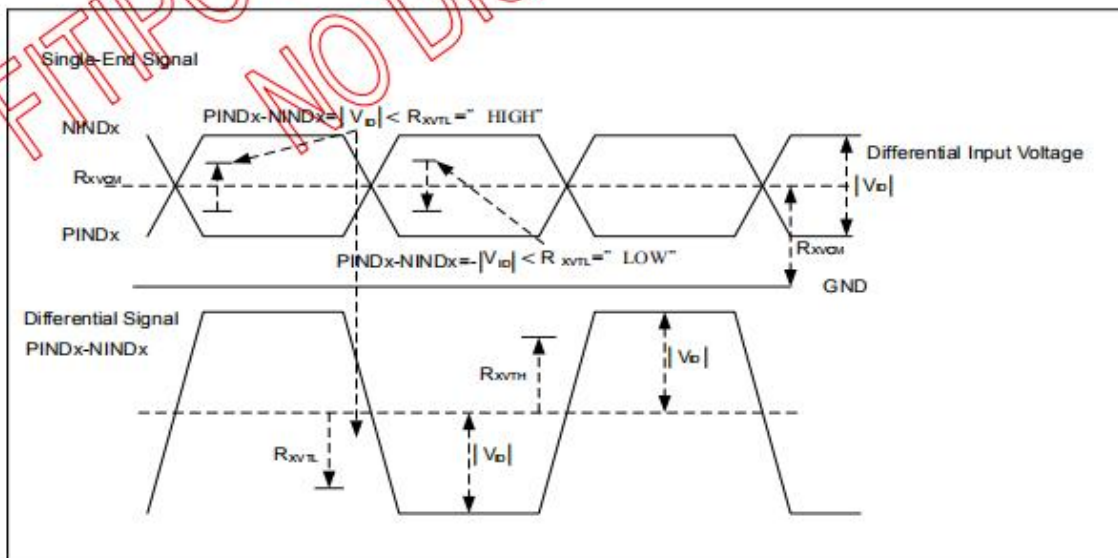


Enter and Exit Standby Mode timing chart

6.2 Timing Characteristics

LVDS DC characteristic

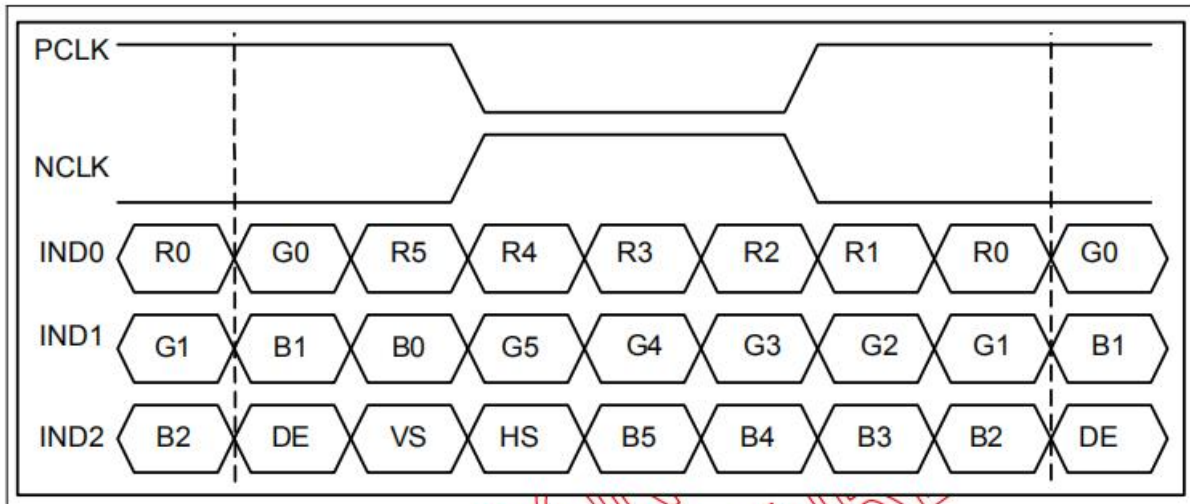
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	RxVTH			+0.1V	V	RxVCM=1.2V
Differential input low threshold voltage	RxVTL	-0.1			V	
Input voltage range(single-end)	RxVIN	0		2.4	V	
Differential input common mode voltage	RxVCM	$ V_{ID} /2$		$2.4 - V_{ID} /2$	V	
Differential input voltage	$ V_{ID} $	0.2		0.6	V	
Differential input leakage current	RxVTH	-10		+10	μ A	
LVDS Digital Operating Current	Iddlvds	-	40(TBD)	50	mA	Fclk=65Mhz, VDD=3.3V
LVDS Digital Standby Current	Istlvds	-	10(TBD)	50	μ A	Clock & all functions are stop



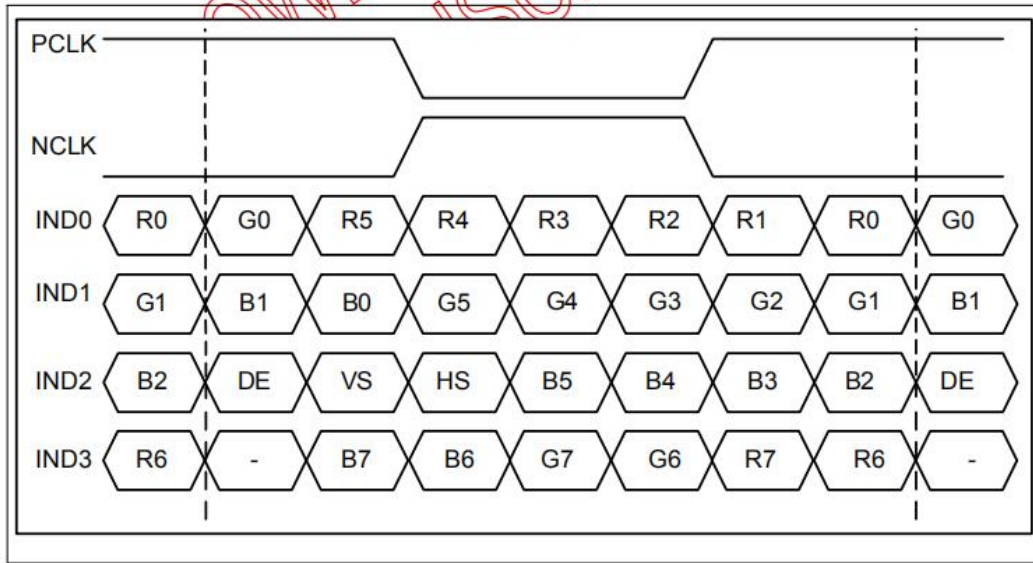
LVDS DC Characteristic

LVDS mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK		20	-	71	MHz
Input data skew margin	TRSKM	$V_{ID} = 400\text{mV}$ $R_{xVCM} = 1.2\text{V}$ $R_{xFCLK} = 71\text{MHz}$	500			ps
Clock High Time	TLVCH			$4/(7 * R_{xFCLK})$		ns
						ns
Clock Low Time	TLVCL			$3/(7 * R_{xFCLK})$		ns
PLL wake-up-time	TenPLL				150	us



6-bit LVDS Input Timing chart



8-bit LVDS Input Timing chart

7. Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time	Tr+Tf	-	-	30	40	ms	FIG.1	Note4
Contrast Ratio	CR		500	800	-	-	FIG.2	Note1
Surface luminance	LV	$\theta = 0^\circ$	350	400	-	cd/m ²	FIG.2	Note2
Luminance uniformity	Yu	$\theta = 0^\circ$	70	80	-	%	FIG.2	Note3
NTSC	-	$\theta = 0^\circ$	-	50	-	%	FIG.2	Note5
Viewing angle	θ_T	Center (θ)	-	85	-	deg	FIG.3	Note6
	θ_B		-	85	-	deg	FIG.3	
	θ_L		-	85	-	deg	FIG.3	
	θ_R		-	85	-	deg	FIG.3	
Chromaticity	Red	R_X	0.549	0.599	0.649	-	FIG.2 CIE1931	Note5
		R_Y	0.288	0.338	0.388	-		
	Green	G_X	0.249	0.299	0.349	-		
		G_Y	0.500	0.550	0.600	-		
	Blue	B_X	0.089	0.139	0.189	-		
		B_Y	0.081	0.131	0.183	-		
	White	W_X	0.275	0.325	0.375	-		
		W_Y	0.310	0.360	0.410	-		

Note1. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

$$\text{Contrast ratio} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON' s BM-5 or BM-7 photo detector or compatible.

Note2. Definition of surface luminance.

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

L_v = Average Surface Luminance with all white pixels($P_1, P_2, P_3, \dots, P_n$)

Note3. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance.For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

Note4. 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_r) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_f) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. Angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers’ s ConoScope or DMS series Instruments or compatible.

FIG.1. The definition of response Time

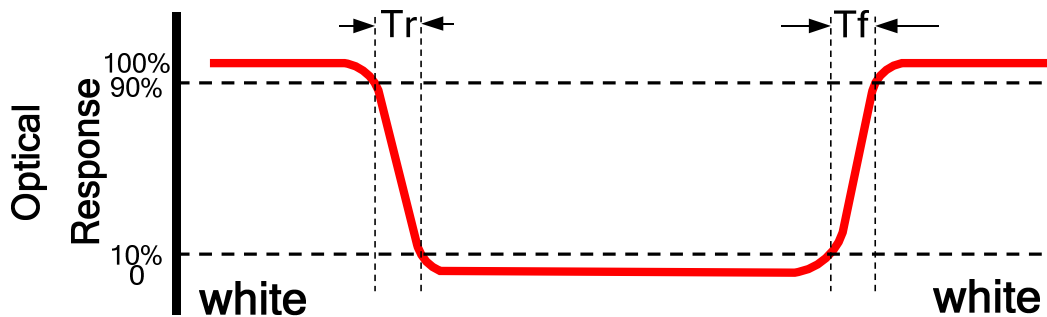


FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

Size : $S \leq 5"$ (see Figure a) A : 5 mm B : 5 mm
H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure a.

measurement instrument : TOPCON’s luminance meter BM-5 or BM-7 or compatible (see Figure c).

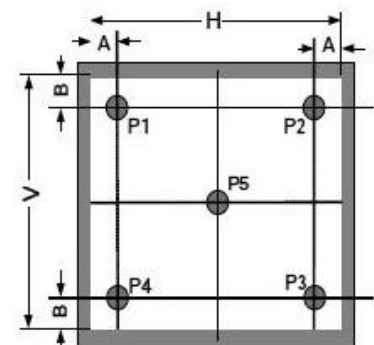


Figure a

Size : $5" < S \leq 12.3"$ (see Figure b) H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure b.

measurement instrument : TOPCON’s luminance meter BM-5 or BM-7 or compatible (see Figure c).

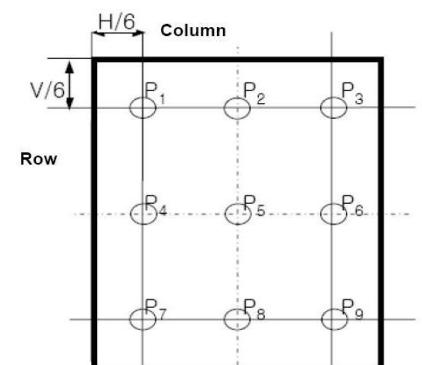


Figure b

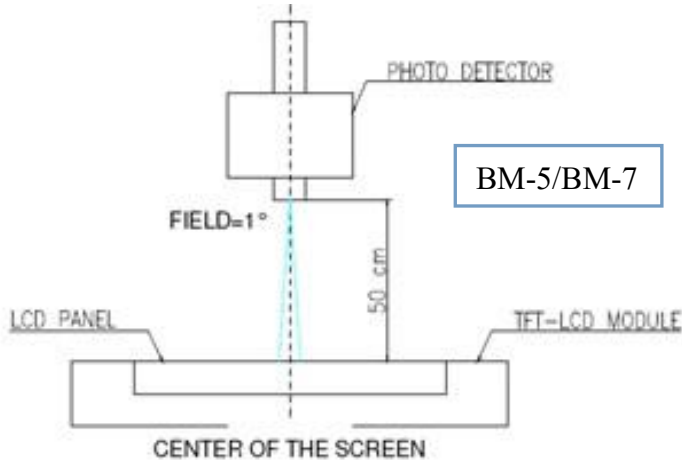
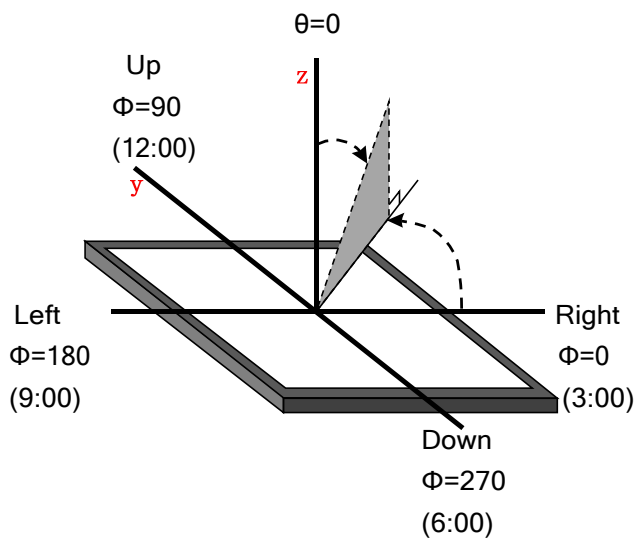


Figure c

FIG.3.The definition of viewing angle



8. Environmental / Reliability Tests

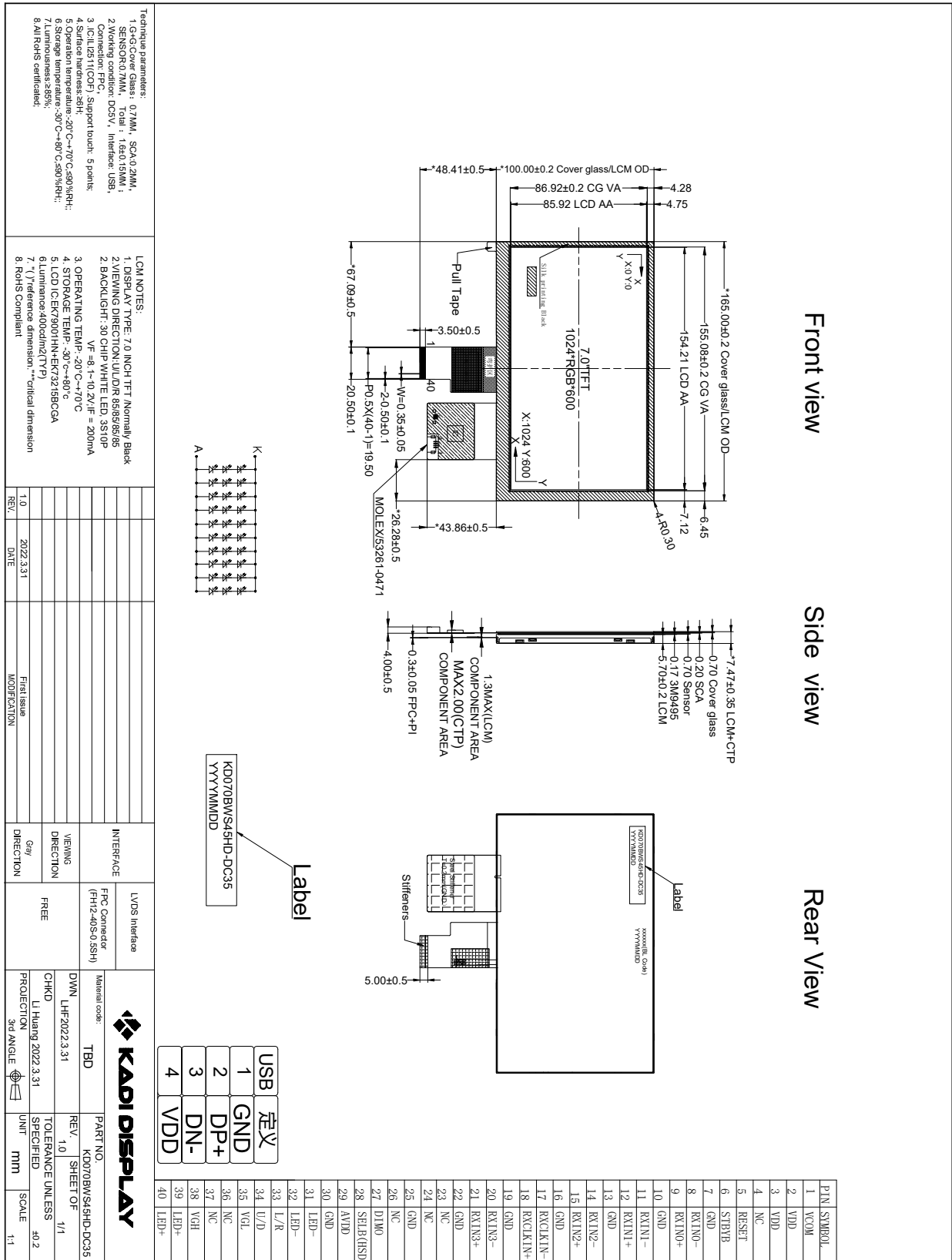
No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70°C, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20°C, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80°C, 96hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30°C, 96hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60°C, 90% RH max,96 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-20°C 30 min ~ +60°C 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Discharge (Operation) Static	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15°C ~ 35°C, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. Ts is the temperature of panel's surface.

2. Ta is the ambient temperature of sample.

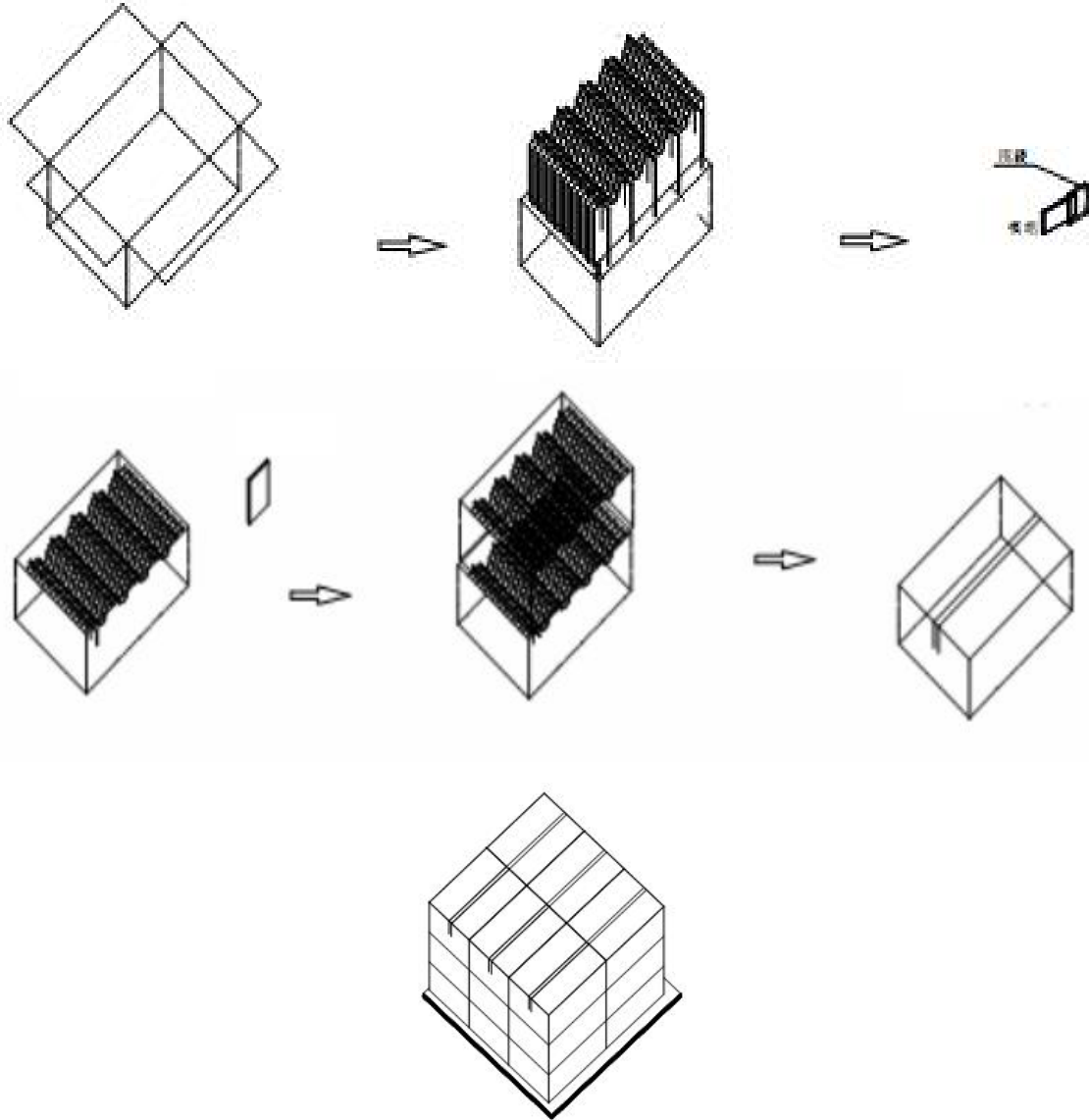
3. The size of sample is 5pcs.

9. Mechanical Drawing



10. Packing

Packing Method



11. Precautions for Use of LCD modules

11.1 Handling Precautions

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

11.1.2. 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.

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

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

11.1.5. 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
- Ketene

11.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

11.1.8.4. 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.

11.2 Storage Precautions

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

11.2.2. 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°C ~ 40°C Relatively humidity: ≤80%

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

11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also



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should avoid excessive press, water, damp and sunshine.