



# CDTech(H.K.)Electronics Limited

## Product Specification

<b>Model Name</b>	S070BWS52HP
<b>Description</b>	7.0" WSVGA 1024(RGB)x600 Dots
<b>Date</b>	2019/07/17
<b>Version</b>	2.0

<b>Approved by/Date</b>	<b>Check by/Date</b>	<b>Prepared by/Date</b>
ZHP 2019/07/17	HZX 2019/07/17	Yigui.Han 2019/07/17

<b>Customer Approval</b>	
<b>Date</b>	

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## 1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2019/06/28	First Release.	Yigui.Han
2.0	2019/07/17	Update conductive cloth to copper foil	Yigui.Han

## 2. General Specifications

	Feature	Spec
Characteristics	Size	7 inch
	Resolution	1024(horizontal)*600(Vertical)
	Interface	RGB
	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)	163.52*96.72*2.6
	Active Area(mm)	154.21 x85.92
	With /Without TSP	Without 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
1-2	LED+	LED Anode
3-4	LED-	LED Cathode
5	GND	Ground
6	VCOM	Common Voltage
7	DVDD	Power Voltage for digital circuit
8	MODE	DE / SYNC mode select under TTL mode. Normally pull high H : DE mode. L : HSD/VSD mode.
9	DE	Data enable input. Active high to enable the input data bus under "DE Mode."
10	VS	Vertical sync input. Negative polarity.
11	HS	Horizontal sync input. Negative polarity.
12-19	B7-B0	Data bus
20-27	G7-G0	Data bus
28-35	R7-R0	Data bus
36	GND	Ground
37	DCLK	Dot clock signal input. Latching input data at its rising edge.
38	GND	Ground
39	L/R	Horizontal inversion (Note 2)
40	U/D	Vertical inversion (Note 2)
41	VGH	Gate ON Voltage
42	VGL	Gate oFF Voltage Power supply
43	AVDD	Power for Analog Circuit
44	RESET	Global reset pin
45	NC	No connection
46	VCOM	Common Voltage
47	DITHB	Dithering function enable control
48	GND	Ground
49	NC	No connection
50	NC	No connection

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

## 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	9.1	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	

### 5.2 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	$I_F$	-	200	-	mA	
Forward Voltage	$V_F$	9.0	9.6	10.2	V	
Backlight Power consumption	$W_{BL}$	-	1.92	-	W	
LED Lifetime		-	30000	-	Hrs	

Note 1: Each LED:  $I_F = 20$  mA,  $V_F = 3.2 \pm 0.2$  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.

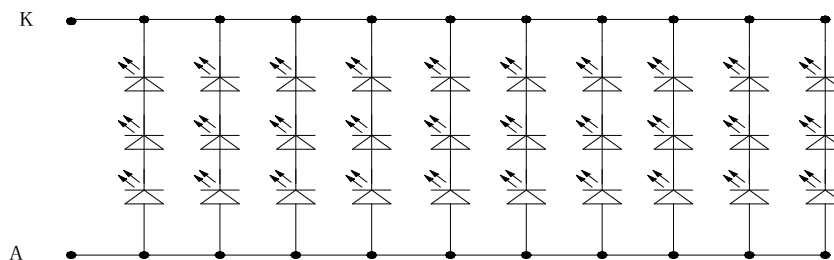
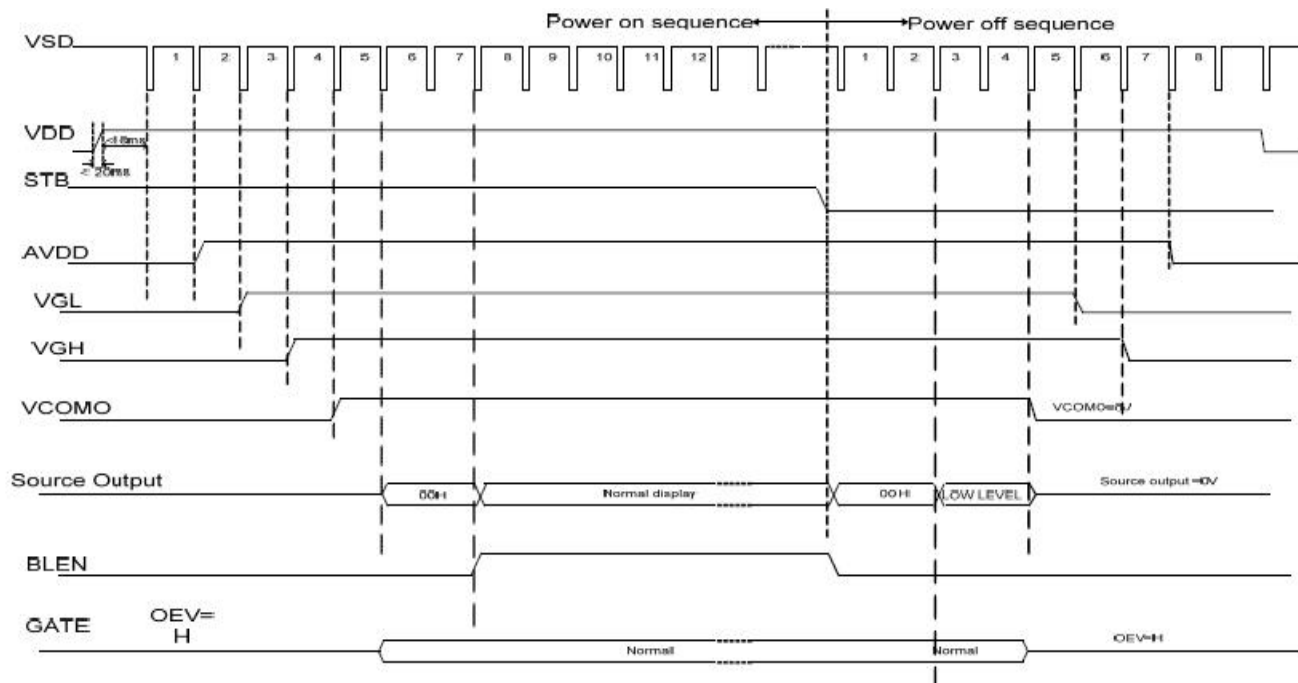


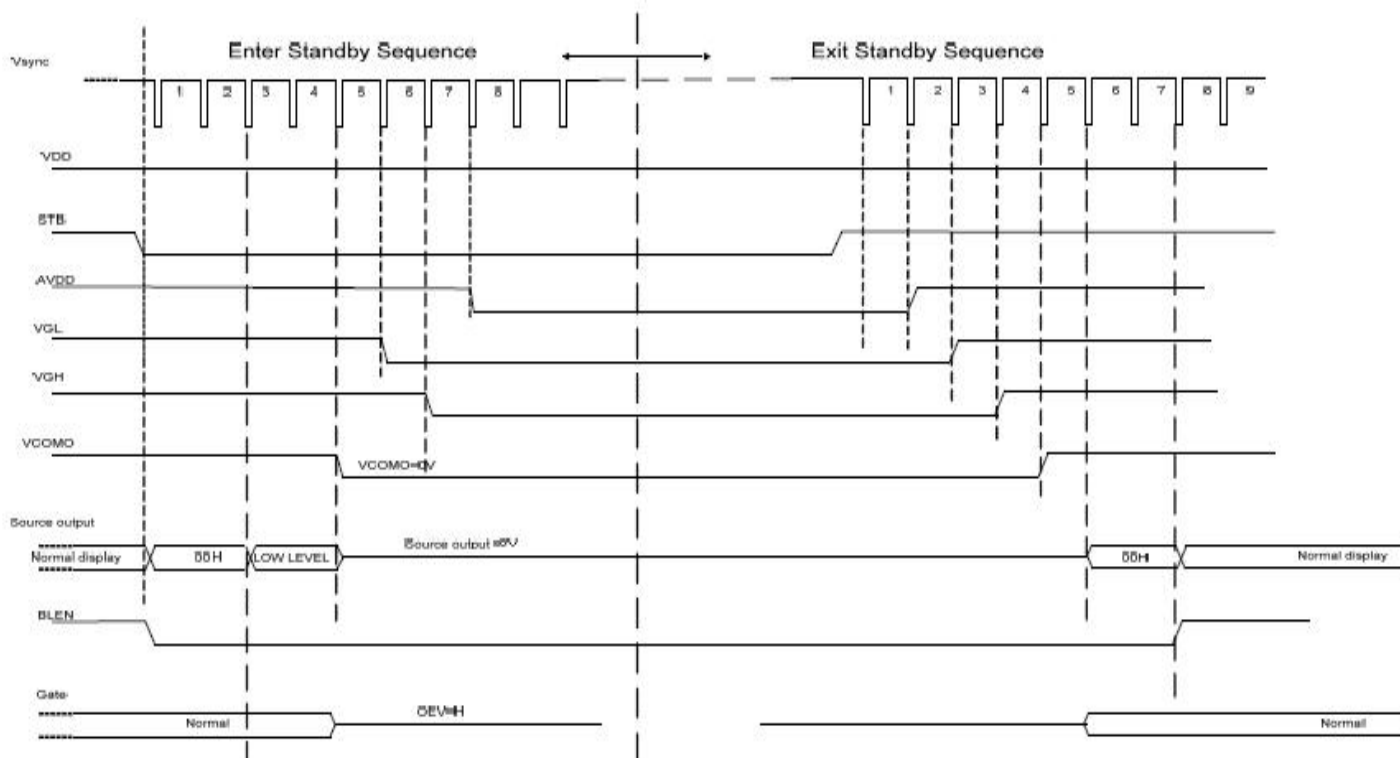
Figure: LED connection of backlight(Constant Current)

## 6. Interface Timing

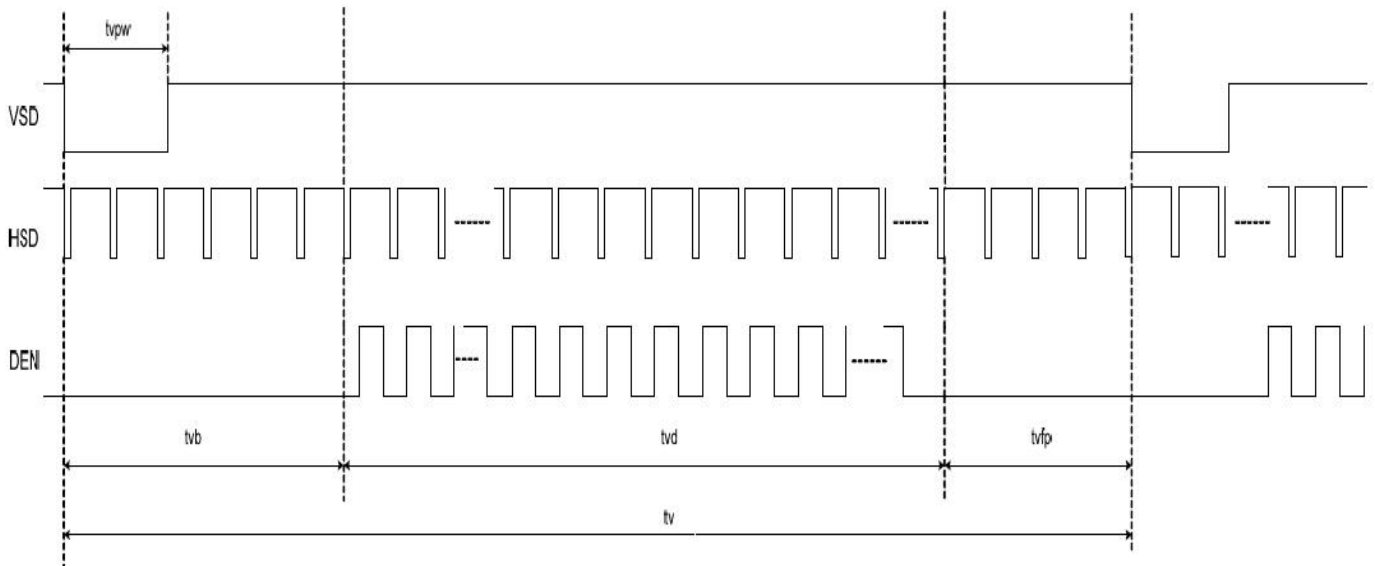
### 6.1 Power-On/Off Timing Sequence



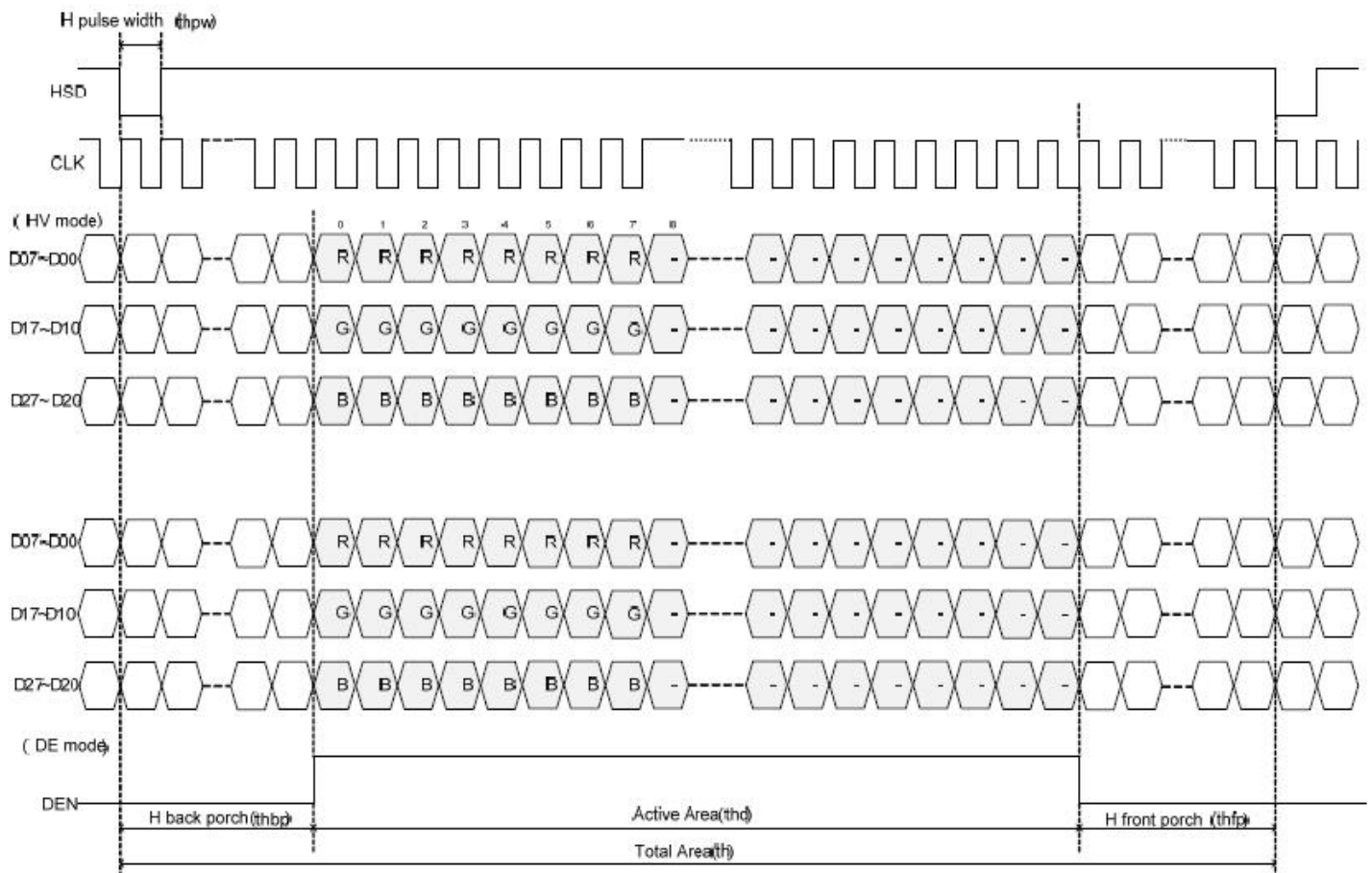
### 6.2 Enter /Exit Standby timing chart



## 6.3 Vertical input timing



## 6.4 Horizontal input timing





## 6.5 AC Electrical Characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	$T_{hst}$	8	-	-	ns
HS hold time	$T_{hhd}$	8	-	-	ns
VS setup time	$T_{vst}$	8	-	-	ns
VS hold time	$T_{vhd}$	8	-	-	ns
Data setup time	$T_{dsu}$	8	-	-	ns
Data hold time	$T_{dhd}$	8	-	-	ns
DE setup time	$T_{esu}$	8	-	-	ns
DE hold time	$T_{ehd}$	8	-	-	ns
VDD Power On Slew rate	$T_{POR}$	-	-	20	ms
RSTB pulse width	$T_{Rst}$	10	-	-	us
CLKIN cycle time	$T_{cph}$	20	-	-	ns
CLKIN pulse duty	$T_{owh}$	40	50	60	%
Output stable time	$T_{sst}$	-	-	6	us

ITEM	SYMBOL	CONDITION	MIN	TYPE	MAX	UNIT	NOTE
Gate On Power Current	IVGH	VGH = 18V	--	0.5	1	mA	Note1
Gate Off Power Current	IVGL	VGL = -8V	--	0.5	1	mA	Note1
Digital Power Current	IDVDD	DVDD = 3.3V	--	30	45	mA	Note1
Analog Power Current	IAVDD	AVDD = 9.6V	--	35	45	mA	Note1
Total Power Consumption	PC		--	447	604	mW	Note1

Note 1: Typ. specification : Gray-level test Pattern

Max. specification : White test Pattern



256 gray pattern



White Pattern

## 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.	Mhz
		44.9	51.2	63	
1 Horizontal Line	th	1200	1344	1400	DCLK
HSYNC pulse width	thpw	Min.	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

## 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		600	800	-	-	FIG.2	Note1
Surface luminance	LV	$\theta = 0^\circ$	600	700	-	cd/m <sup>2</sup>	FIG.2	Note2
Luminance uniformity	Yu	$\theta = 0^\circ$	75	-	-	%	FIG.2	Note3
NTSC	-	$\theta = 0^\circ$	-	50	-	%	FIG.2	Note5
Viewing angle	$\theta_T$	Center CR $\geq$ 10	-	85	-	deg	FIG.3	Note6
	$\theta_B$		-	85	-	deg	FIG.3	
	$\theta_L$		-	85	-	deg	FIG.3	
	$\theta_R$		-	85	-	deg	FIG.3	
Chromaticity	Red	$R_X$	0.569	0.599	0.629	-	FIG.2 CIE1931	Note5
		$R_Y$	0.308	0.338	0.368	-		
	Green	$G_X$	0.269	0.299	0.329	-		
		$G_Y$	0.520	0.550	0.580	-		
	Blue	$B_X$	0.109	0.139	0.169	-		
		$B_Y$	0.101	0.131	0.161	-		
	White	$W_X$	0.266	0.296	0.326	-		
		$W_Y$	0.288	0.318	0.348	-		

### 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 based 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.

$$YU = \frac{\text{Minimum surface luminance with all white pixels } (P_1, P_2, P_3, \dots, P_n)}{\text{Maximum surface luminance with all white pixels } (P_1, P_2, P_3, \dots, P_n)}$$

### 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 (Tf) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

**Note5. Definition of color chromaticity (CIE1931)**

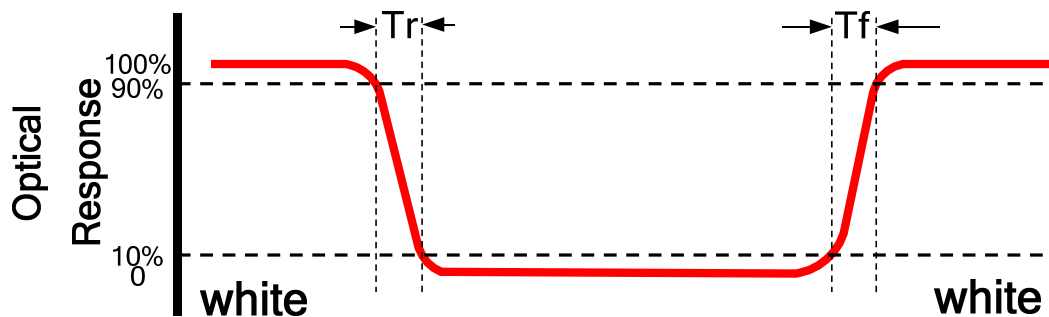
CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

**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≤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).

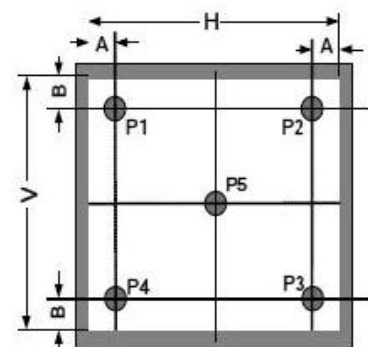


Figure a

Size : 5" < S ≤ 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).

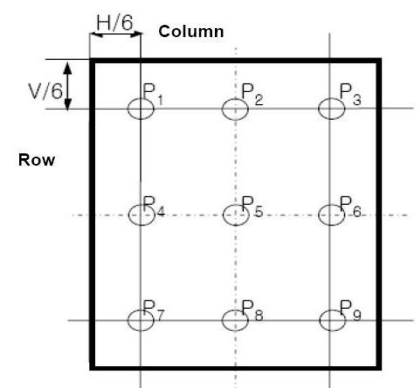


Figure b

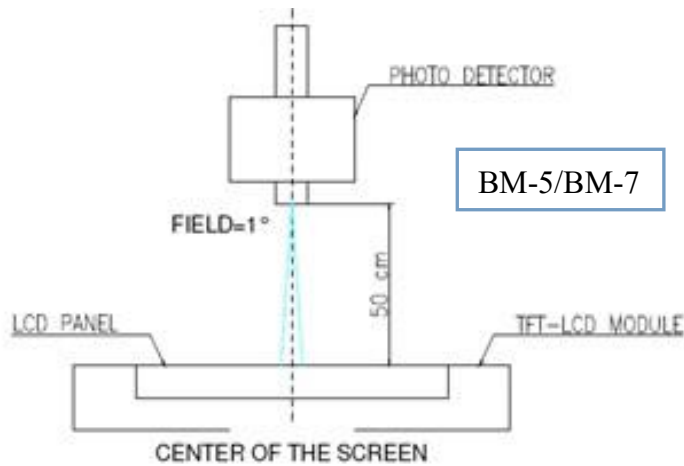
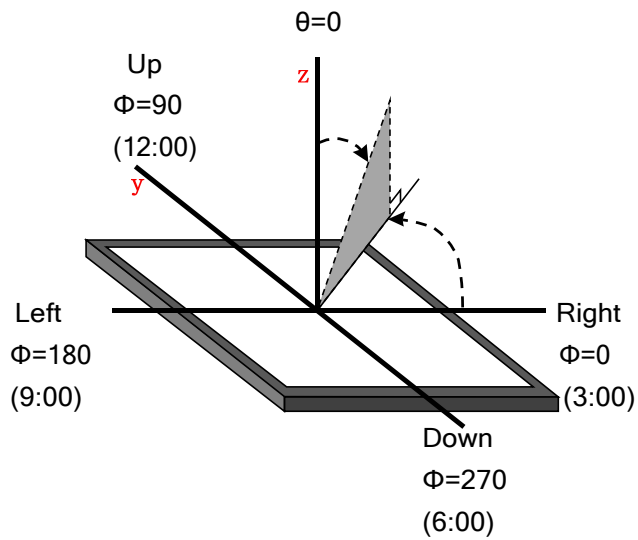


Figure c

FIG.3.The definition of viewing angle



## 8. Environmental / Reliability Tests

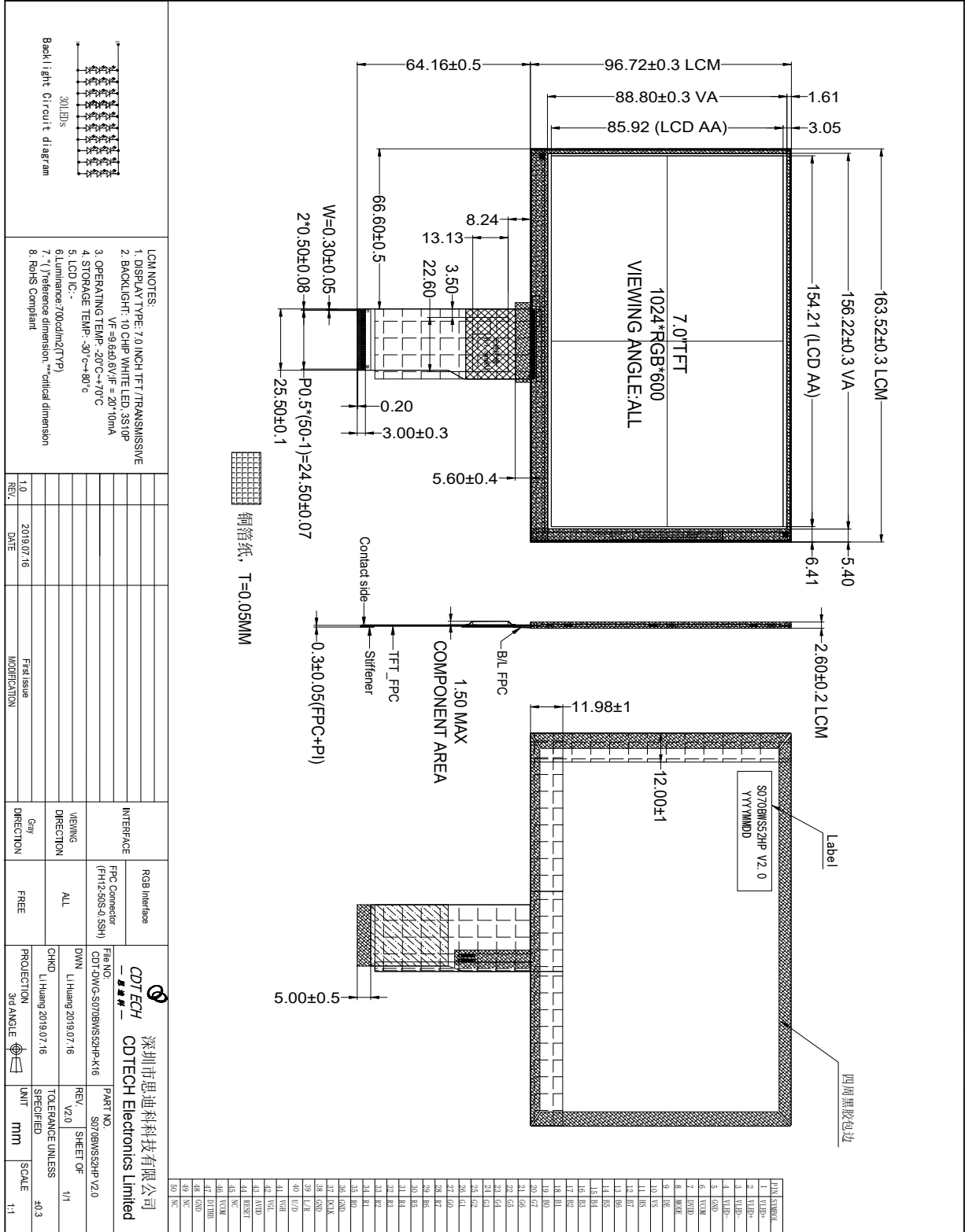
No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70°C, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20°C, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80°C, 120hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30°C, 120hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60°C, 90% RH max120 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.

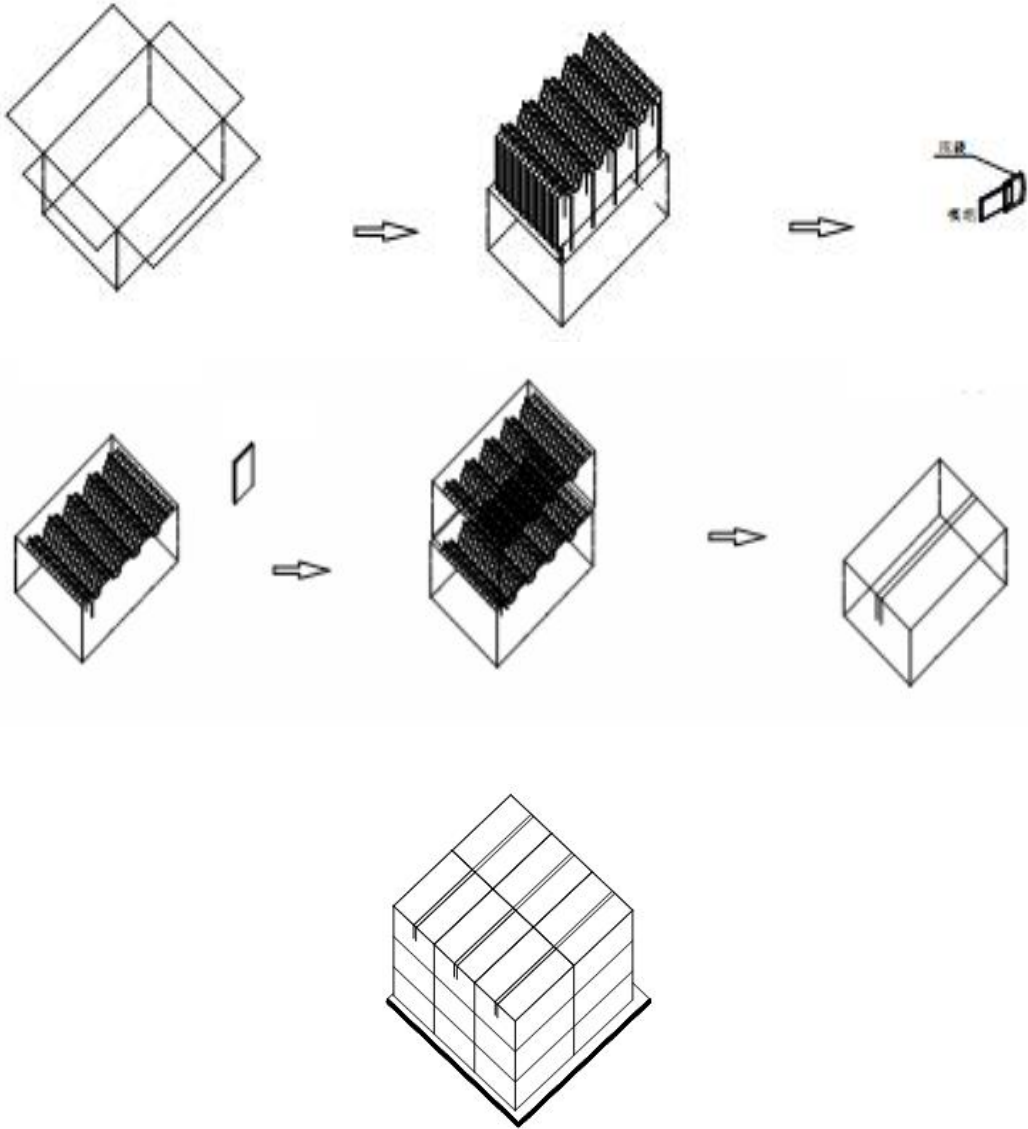
3. The size of sample is 5pcs.

## 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 should avoid excessive press, water, damp and sunshine.