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Datasheet

Disea

ZW-T062HWH-02

DE-05-012

Disea Electronics Co., LTD

PRODUCT SPECIFICATIONS

For Customer: _____   ☐ : APPROVAL FOR SPECIFICATION

Customer Model No. _____   ☐ : APPROVAL FOR SAMPLE

Module No.:   ZW-T062HWH-02   Date : 2015-08-27

Table of Contents

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT
GZH	JOHN		Dmjiang

2. Revision Record

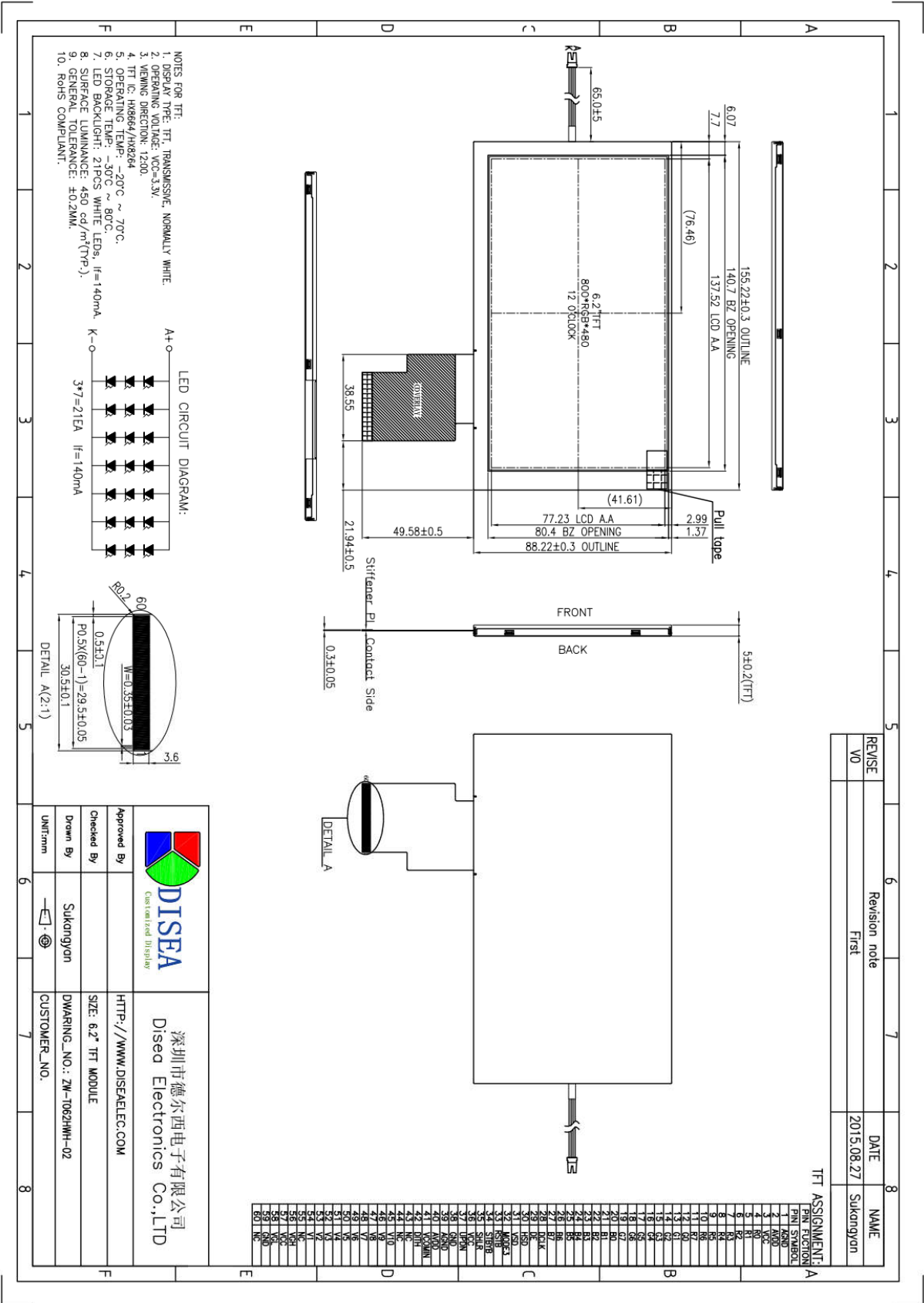| Date	Rev.No.	Page	Revision Items	Prepared
2015-08-27	V0		The first release	ZHP

3. General Specifications

ZW-T062HWH-02 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a backlight unit. The 6.2" display area contains 800X480 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT/Transmissive/Normally white	-	
Display color	16.7M		
Viewing Direction	12:00	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	155.22x88.22x5.0	mm	
Active Area(W×H)	137.52X77.23	mm	
Number of Dots	800x480	dots	
Controller	GATE: HX8664 SOURCE :HX8264	-	
Power Supply Voltage	3.3	V	
Backlight	21pcs-LEDs (white)	pcs	
Weight	---	g	
Interface	24-BIT RGB	-	

Note 1:   Color tune is slightly changed by temperature and driving voltage.

Note 2:   Without FPC and Solder.

4.Outline Drawing

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5. Absolute Maximum Ratings(Ta=25℃)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	-0.5	5.0	V	1，2
	AV_{DD}	-0.5	15.0	V	
	V_{GH}	-0.3	42.0	V	
	V_{GL}	VGH-42	0.3	V	
	V_{GH}-V_{GL}	-	40.0	V	

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. V_{CC} >V_{SS} must be maintained.

5.2 Typical operation conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	3.0	3.3	3.6	V	
	AVDD	9.9	10	10.1	V	
	VGH	12	15	23	V	
	VGL	-12	-7.0	-5	V	
Input signal voltage	VCOM	-	3.4	-	V	
Input logic high voltage	VIH	0.7 VDD	-	VDD	V	

5.3 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.

   The phenomenon is reversible.

3. Ta<=40℃:90%RH MAX.

   Ta>=40℃:Absolute humidity must be lower than the humidity of 90%RH at 40℃.

6. Electrical Specifications

6.1 Electrical characteristics(Vss=0V ,Ta=25℃)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	Ta=25℃	3.0	3.3	3.6	V	
Input voltage	'H'	V_{IH}	V_{DD}=3.3V	$0.8V_{DD}$	-	V_{DD}	V	
	'L'	V_{IL}	V_{DD}=3.3V	0	-	$0.2V_{DD}$	V	
Current Consumption		I_{CC1}	Normal mode	-	20	30	mA	1
		I_{CC2}	Sleep mode	-	0.05	0.1	mA	1
Clock Frequency		f_{CLK}	-	-	30	50	MHz	

Note:

   1: Tested in 1×1 chessboard pattern.

6.2 Gamma Correction Reference Voltage Setting
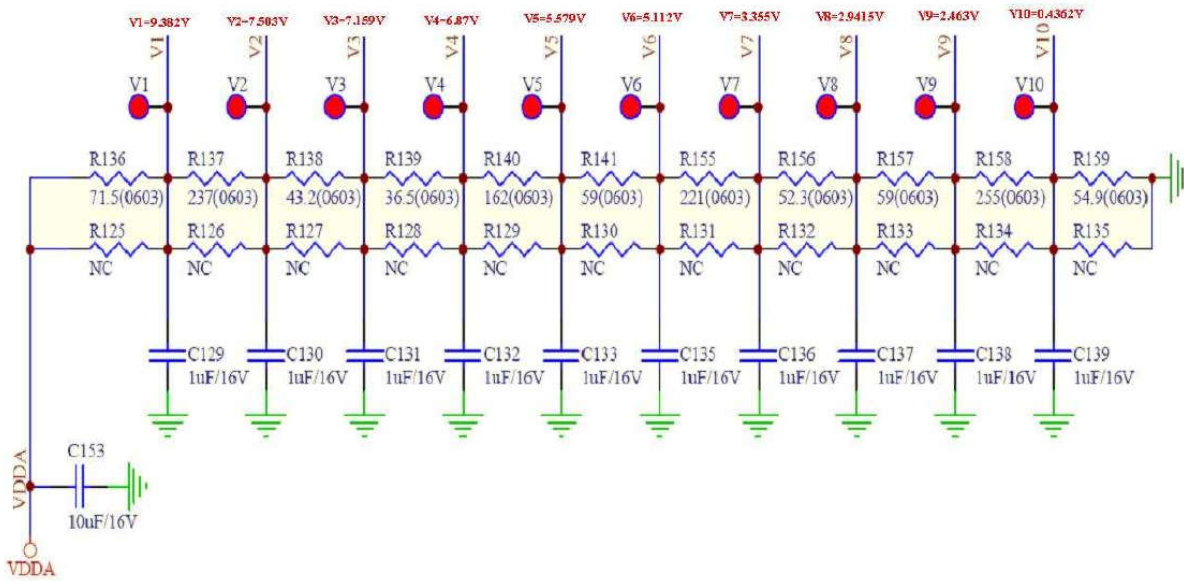
6.3 Timing Chart

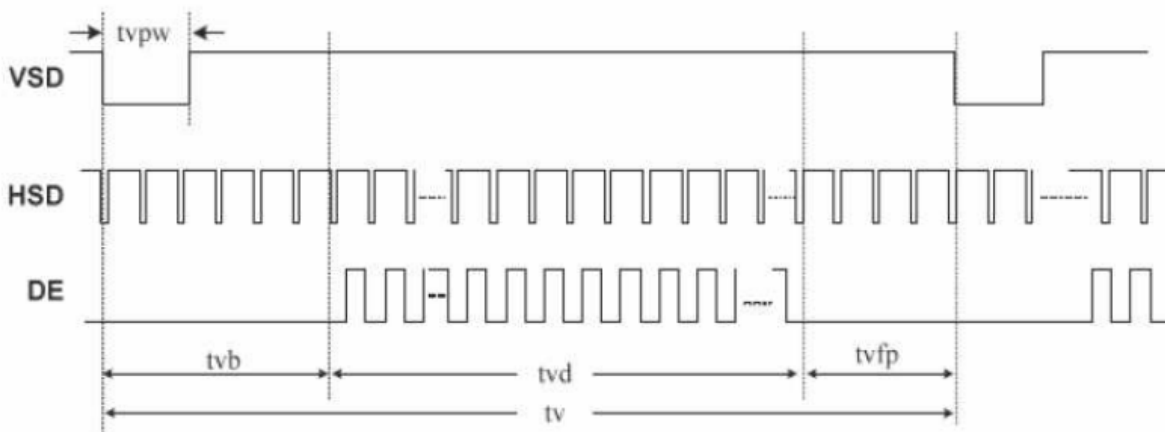| Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	25			ns	
DCLK frequency	fclk		30	40	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		928		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		88		Tcph	
HSD front porch	thfp		40		Tcph	
Vertical display area	tvd		480		th	
VSD period time	tv		525		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		32		th	
VSD front porch	tvfp		13		th	
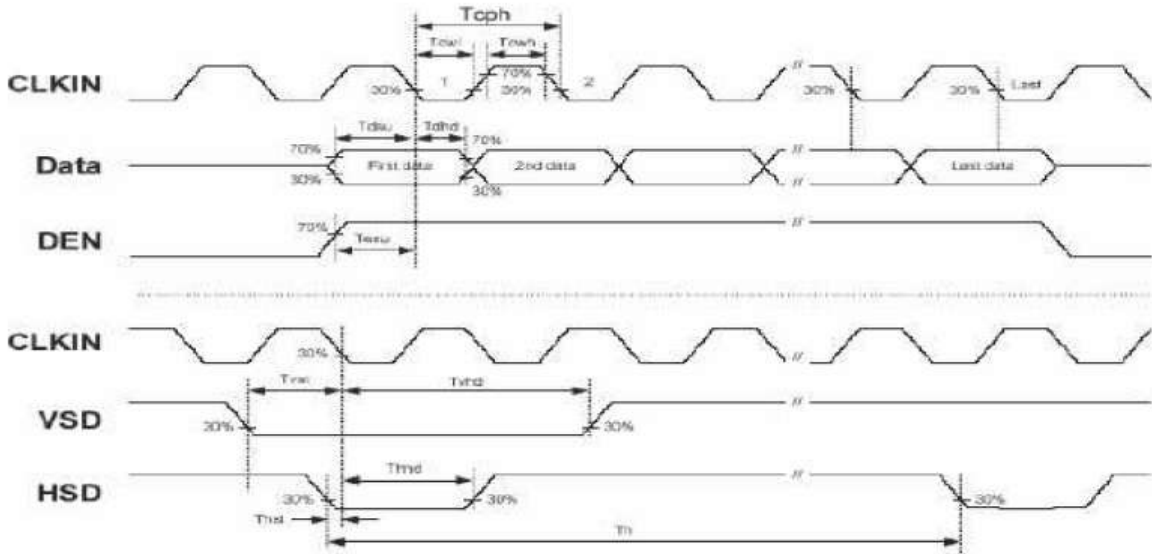
Sampling clock timing

Horizontal input timing
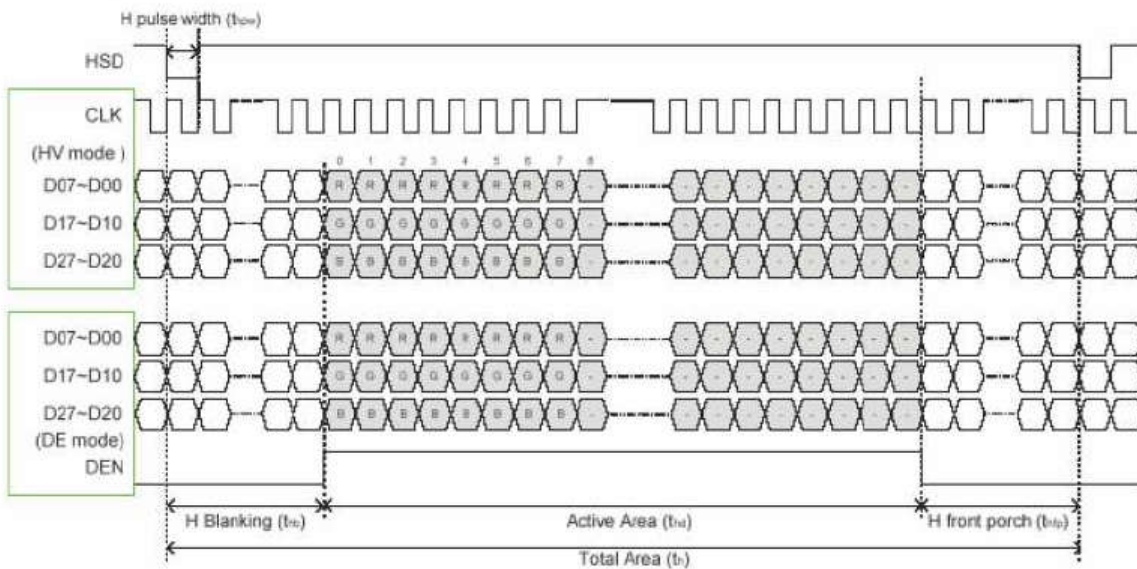
Vertical input timing

6.4 LED backlight specification(VSS=0V ,Ta=25℃)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	Vf	If=20X7mA	8.0	9.0	10.5	V	
Uniformity	△Bp	If=20X7mA	75			%	
Luminance for LCD	Lv	If=20X7mA	350	450		Cd/m2	
Life Time	T	If=20X7mA	20000	30000		Hours	
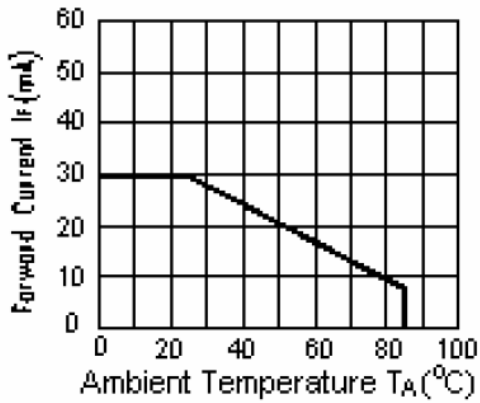
6.5 Interface signals

Pin No.	Symbol	I/O	Function
1	AGND	P	Ground.
2	AVDD	P	Power for Analog Circuit
3	VCC	P	Power for Digital Circuit
4-11	R0-R7	I	Red data input
12-19	G0-G7	I	Green data input
20-27	B0-B7	I	Blue data input
28	DCLK	I	Clock input
29	DE	I	Data Enable
30	HSD	I	Hsync signal input
31	VSD	I	Vsync signal input
32	MODE3	I	DE/SYNC mode select .normally pull high H:DE mode.L:HSD/VSD mode
33	RSTB	I	Reset
34	STBYB	I	Standby Mode Select;H:normal operation, L:standby mode
35	SHLR	I	Source right or left sequence control.SHLR="L",shift left:last data=S1<-S2…S1200=first data SHLR="H",shift right:first data=S1->SS2…S1200=last data
36	VCC	P	Power for Digital Circuit
37	UPDN	I	gate up or down scan control. UPDN="L" , DOWN shift : G1->G2…->G480 ; UPDN="H", up shift: G1<-G2…<-G480
38-39	GND	P	Power ground
40	AVDD	P	Power for Analog Circuit
41	VCOMIN	I	VCOM input
42	DITH	I	Dithering Setting. H:6bit Resolution,L:8bit Resolution
43-44	NC	-	No connection
45-54	V10-V1	I	Gamma Voltage 10-1
55	NC	-	No connection
56	VGH	I	Positive power for scan driver
57	VCC	P	Power for Digital Circuit
58	VGL	I	Negative power for scan driver
59	GND	P	Power ground
60	NC	-	No connection

7.Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		$\theta=0°$ $\Phi=0°$	350	450	-	Cd/m²	1
Uniformity	△Bp			75	-	-	%	1,2
Viewing Angle	3:00		Cr≥10	55	65	-	Deg	3
	6:00			45	55	-		
	9:00			55	65	-		
	12:00			55	65	-		
Contrast Ratio	Cr		$\theta=0°$ $\Phi=0°$	300	500		-	4
Response Time	T_r			-	10	-	ms	5
	T_f			-	10	-	ms	
Color of CIE Coordinate	W	x	$\theta=0°$ $\Phi=0°$	-0.05	0.28	+0.05	-	1,6
		y			0.33		-	
	R	x			0.51		-	
		y			0.34		-	
	G	x			0.31		-	
		y			0.56		-	
	B	x			0.15		-	
		y			0.14		-	
NTSC Ratio	S			50	60	-	%	

Note: The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 (Φ5mm)

Measuring condition:
- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25 ℃.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.
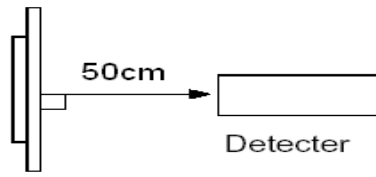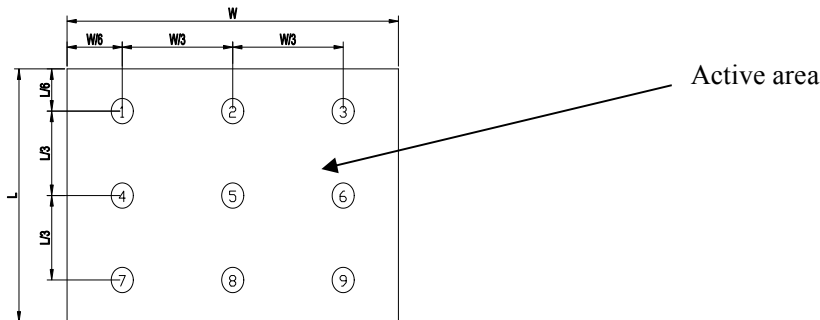
Note 2: The luminance uniformity is calculated by using following formula.

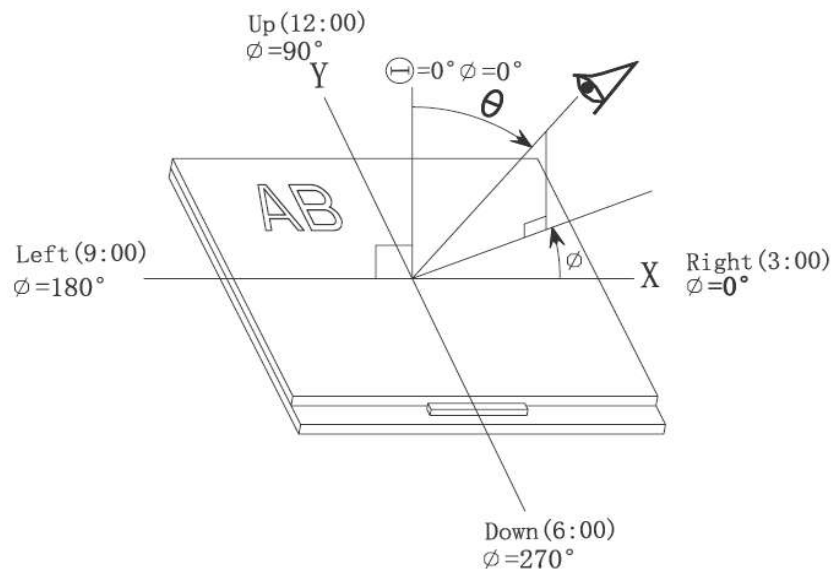$\angle Bp = Bp \,(Min.) \, / \, Bp \,(Max.) \times 100 \,(\%)$

Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.
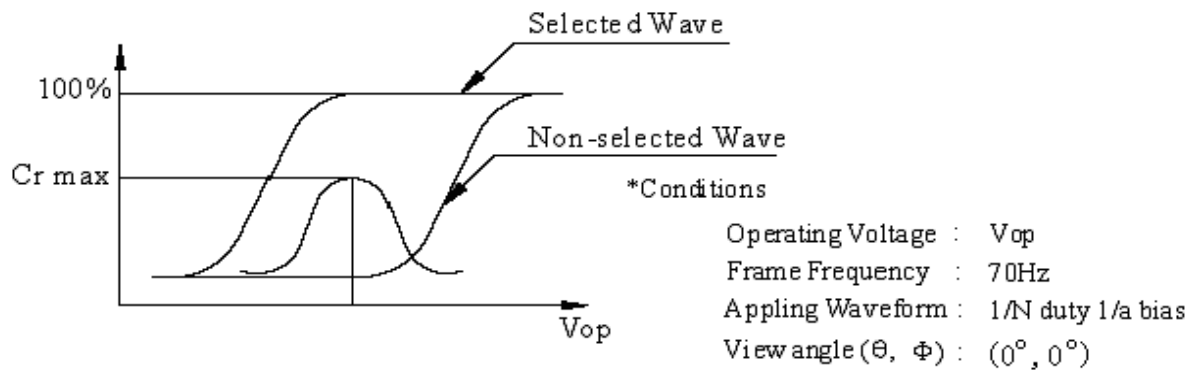

Active area

Note 3: The definition of viewing angle:

*Refer to the graph below marked by ϑ and Φ*

Note 4: Definition of contrast ratio.(Test LCD using DMS501)

Selected Wave

Non-selected Wave

100%

Cr max

Vop

*Conditions

Operating Voltage	:	Vop
Frame Frequency	:	70Hz
Appling Waveform	:	1/N duty 1/a bias
View angle (Θ, Φ)	:	(0°, 0°)

$$Contrast\ ratio(Cr) = \frac{Brightness\ of\ selected\ dots}{Brightness\ of\ non-selected\ dots}$$

Note 5: Definition of Response time. (Test LCD using DMS501):

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.

100%
90%

10%

T_r T_f
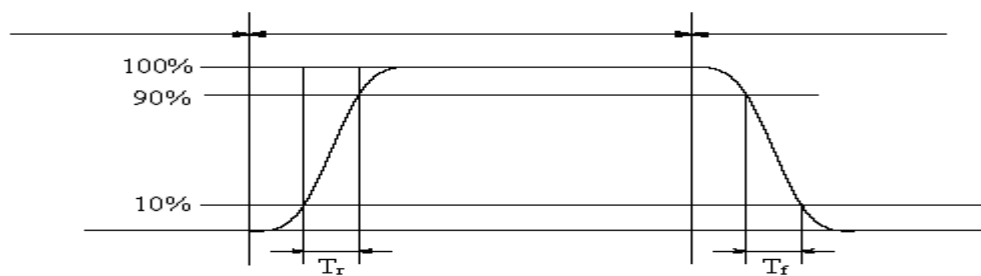
The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.
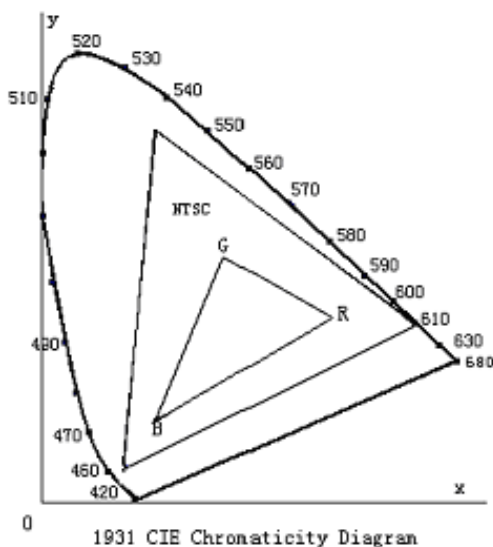
Color gamut:

$$S = \frac{area\ of\ RGB\ triangle}{area\ of\ NTSC\ triangle} \times 100\%$$

1931 CIE Chromaticity Diagram

Note 7: Definition of cross talk.
*Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100*
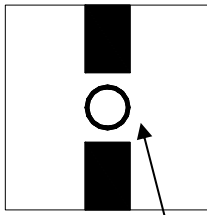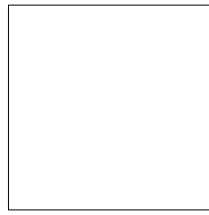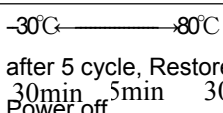
Pattern A   Pattern B

Measurement point(center)

Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±2℃ 96H Restore 2H at 25℃ Power off	Note 1 Note 2 Note 3 Note 4
2	Low Temperature Storage	-30℃±2℃ 96H Restore 2H at 25℃ Power off	
3	High Temperature Operation	80℃±2℃ 96H Restore 2H at 25℃ Power on	
4	Low Temperature Operation	-30℃±2℃ 96H Restore 4H at 25℃ Power on	
5	High Temperature/Humidity Storage	60℃±2℃ 90%RH 96H Power off	
6	Temperature Cycle	−30℃ ←————→ 80℃ after 5 cycle, Restore 2H at 25℃ 30min 5min 30min Power off	
7	Vibration Test	10Hz~150Hz, 100m/s2, 120min	Not allowed cosmetic and electrical defects.

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

Note 1:Ta is the ambient temperature of samples.

Note 2:Ts is the temperature of panel's surface.

Note 3:In the standard condition,there shall be no practical problem that may after the display function.After the reliability test,the product only guarantees operation,but don't guarantee all of the cosmetic specification.

Note4:Before cosmetic and function test,the product must have enough recovery time,at least 2 hours at room temperature.
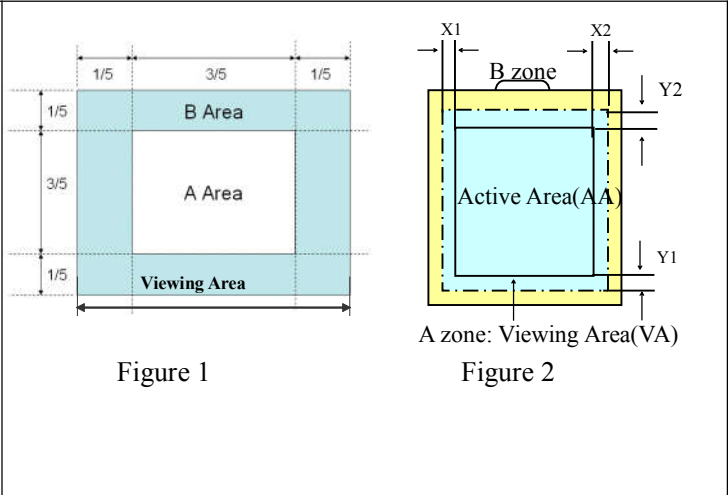
9 Quality level

9.1 Classification of defects

Major defects (MA): A major defect refers to a defect that may substantially degrade usability for product applications, including all functional defects(such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

Minor defects (MI): A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

9.2 Definition of inspection range

For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1). A area : center of viewing area B area : periphery of viewing area C area : Outside viewing area For other defects, dividing two areas to make a judgment (according figure 2). A zone : Inside Viewing area B zone : Outside Viewing area X1(A.A~V.A): 2mm X2(A.A~V.A): 2mm Y1(A.A~V.A): 2mm Y2(A.A~V.A): 2mm	 Figure 1 Figure 2

9.3 Inspection items and general notes

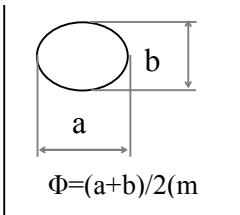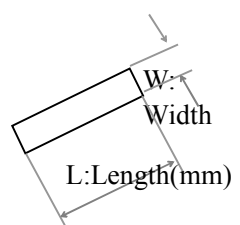|		
General notes	Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and our company. Viewing area should be the area which our company guarantees. Limit sample should be prior to this Inspection standard. Viewing judgment should be under static pattern. Inspection conditions Inspection distance: 250 mm (from the sample) Temperature : 25±5 ℃ Inspection angle : 45 degrees in 6 o'clock direction (all defects in viewing area should be inspected from this direction)	
Inspection items	Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble	The color of a small area is different from the remainder. The phenomenon doesn't change with voltage
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage
	Polarizer defect	Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass
	Dot defect (TFT LCD)	The pixel appears bright or dark abnormally when display

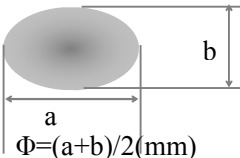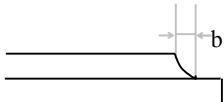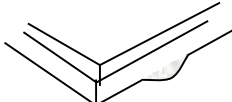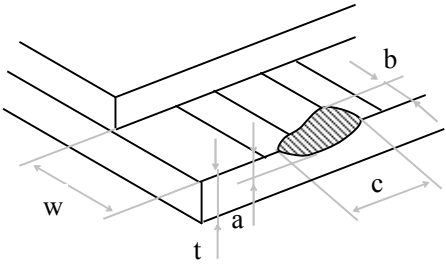| Functional defect	No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction
Glass defect	Glass crack, Shaved corner of glass, Surplus glass
PCB defect	Components assembly defect

9.4 Outgoing Inspection level
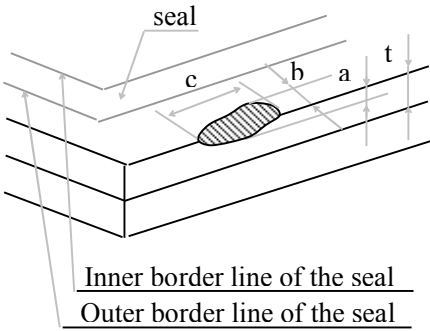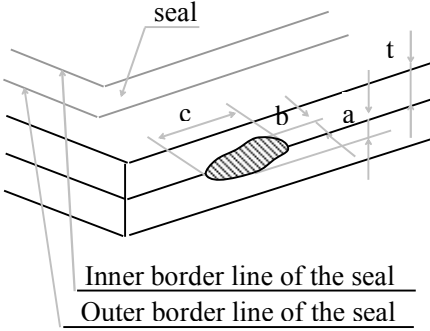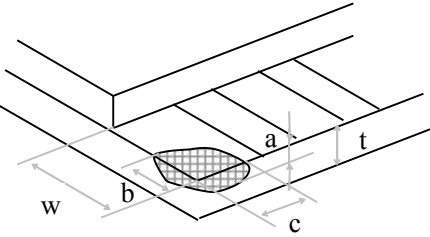
Outgoing Inspection standard	Inspection conditions	Inspection				
		Min.	Max.	Unit	IL	AQL
Major Defects	See 9.3 general notes	See 9.5			II	0.65
Minor Defects	See 9.3 general notes	See 9.5			II	0.65
Note：Sampling standard conforms to GB2828						
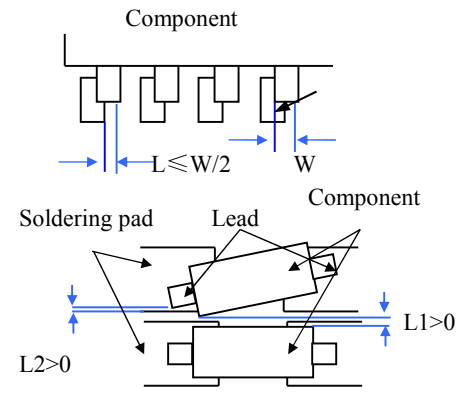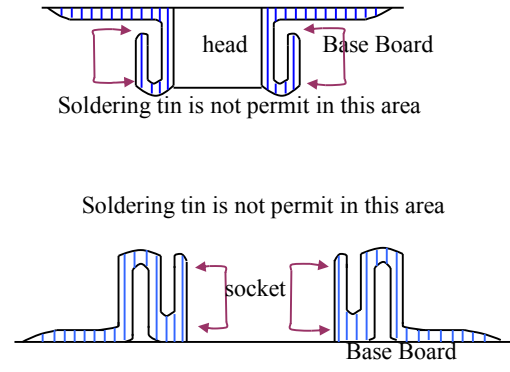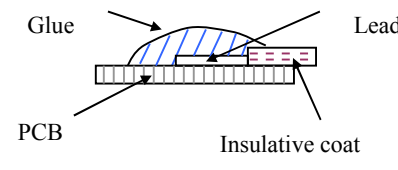
9.5 Inspection Items and Criteria

Inspection items			Judgment standard			
			Category		Acceptable number	
					A zone	B zone
1	Black spot, White spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass	$\Phi=(a+b)/2(m$	A	$\Phi<=0.10$	Neglected	Neglected
			B	$0.10<\Phi<=0.2$	1	
			C	$0.2<\Phi$	0	
			D	-	-	
			Total defective point(B,C)		1	
2	Black line, White line, and Particle Between Polarizer and glass, Scratch on glass	W: Width L:Length(mm)	A	$W<=0.02$	Neglected	Neglected
			B	$0.02<W<=0.03$ $L<=1.0$	1	
			C	$0.03<W<=0.05$ $L>1.0$	0	
			D	$0.05<W, 1.0<L$	0	
			Total defective point(B,C)		1	
3	Bright spot		any size		none	none
4	Contrast		A	$\Phi<0.2$	Neglected	Neglecte

			B	0.2<Φ<=0.3	2	d
	variation	Φ=(a+b)/2(mm)	C	0.3<Φ<=0.4	1	
			D	0.4<Φ	0	
			Total defective point(B,C)		3	
5	Bubble inside cell		any size		none	none
6	Polarizer defect (if Polarizer is used)	Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.	Refer to item 1 and item 2.			
		Bubble, dent and convex	A	Φ<=0.1	Neglected	Neglected
			B	0.1 <Φ<=0.2	1	
			C	0.2 <Φ	0	
7	Surplus glass	Stage surplus glass	B<=0.3mm			
		Surrounding surplus glass	Should not influence outline dimension and assembling.			
8	Open segment or open common		Not permitted			
9	Short circuit		Not permitted			
10	False viewing direction		Not permitted			
11	Contrast ratio uneven		According to the limit specimen			
12	Crosstalk		According to the limit specimen			
13	Black /White spot(display)		Refer to item 1			
14	Black /White line(display)		Refer to item 2			

Inspection items			Judgment standard		Acceptable number
			Category(application: B zone)		
15	Glass defect crack	ⅰ）The front of lead terminals	A	a≤ t, b≤1/5W, c≤3mm	Max.3 defects allowed
			B	Crack at two sides of lead terminals should not cover patterns and alignment mark	
		ⅱ）Surrounding crack–non-contact side		b < Inner borderline of the seal	
		ⅲ）Surrounding crack– contact side		b < Outer borderline of the seal	
		ⅳ）Corner	A	a <= t, b <= 3.0, c <= 3.0	
			B	Glass crack should not cover patterns u and alignment mark and patterns.	

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Inspection items			Judgment standard
			Category(application: B zone)
16	PCB defect	Component soldering: No cold soldering、short、open circuit、burr、tin ball The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1); the sheet component deviation: Pin deviates from the pad and contact with the near components is not permitted（Pic.2）	
		lead defect: The lead lack must be less than 1/3 of its width; The lead burr must be less than 1/3 of the seam; Impurities connect with the near leads is not permitted	
		Connector soldering: Soldering tin is at contact position of the plug and socket is not permitted No foundation is scald Serious cave distortion on plug and socket contact pin is not permitted	
		Glue on root of the speaker receiver and motor lead: The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.	

10. Precautions for Use of LCD Modules

10.1 Handling Precautions

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

10.1.2 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.

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

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

10.1.5 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   — Ketone   — Aromatic solvents

10.1.6 Do not attempt to disassemble the LCD Module.

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

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

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

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

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

  d. 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.

10.2 Storage precautions

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

10.2.2 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℃ ～ 40℃

Relatively humidity: ≤80%

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

10.3 *The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.*

END

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