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Datasheet

Disea

ZW-T050HJDW-01

DE-05-014

DISEA
Customized Display

Disea Electronics Co., LTD

Product Type: 5" TFT LCD Module

LCD Interface: 50PIN TTL

Luminance: 1000 cd/㎡

Module No: ZW-T050HJDW-01

CUSTOMER APPROVED	PREPARE BY	CHECK BY	APPROVED BY
SUPPLIER APPROVED	PREPARE BY	CHECK BY	APPROVED BY

1.0 GENERAL DESCRIPTION

1.1 Introduction

Diseaelec Display model ZW-T050HJDW-01 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit. This TFT LCD has a 5” (15:9) inch diagonally measured active display area with WSVGA (800 horizontal by 480 vertical pixel) resolution.

1.2 Features

- 5” (15:9) inch configuration
- 16.7M color by 8 bit, TTL interface
- ROHS / Halogen Free Compliance

1.3 Applications

- Automotive cluster

1.4 General information

Item	Specification	Unit
Module Outline Dimension	120.7 (H) x 75.9 (V) x5 mm	
Display area	108(H) x 64.8(V)	mm
Number of Pixel	800 RGB (H) x 480(V)	pixels
Pixel pitch	0.135 (H) x 0.135 (V)	mm
Pixel arrangement	RGB stripes ; square pixels	
Display mode	Normally Black	
NTSC	70% by 1931	%
Surface treatment	HC	
Weight	TBD	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

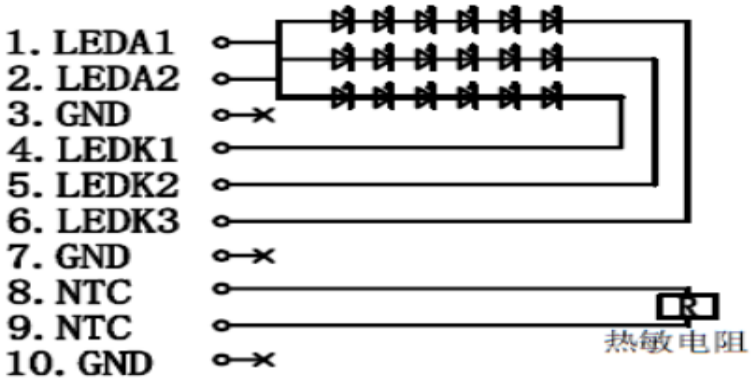
Parameters	Symbol	Min.	Max.	Unit	Note
Power Supply voltage	VDD	-0.3	4.0	V	
	VSP	-0.3	7.3	V	
	VSN	-7.3	0.3	V	
	VGH	-0.3	22	V	
	VGL	-18	0.3	V	

2.12 Backligt Driving Conditions(18 White chips)

Parameters	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage of LED backlight	VL	--	18.6	20.4	V
Current for LED backlight	IL	--	60	--	mA
Luminance		800	1000	--	Cd/m2
LED Life-Time	NA	50000	--	--	Hour

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T_{opa}	-30	85		
Storage Temperature	T_{stg}	-40	90		



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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (With Polarizer)		T (%)	-	2.68	2.98	-		
NTSC		S(%)		-	70	-	%	Color gamut(CF Under C-Light)
Lumin ance				800	1000		Cd/m2	
Contrast		CR		800	-	-		(1)(2)
Response time	25	T_R+T_F		-	22	-	msec	(1)(3)
Color chromaticity (CIE1931)	White	W_x	Θ=0 Normal viewing angle	+/-0.03	0.315	+/-0.03		(1)(4) Color chromaticity (CIE1931) CF Under C-Light
		W_y			0.312			
	Red	R_x			0.650			
		R_y			0.318			
	Green	G_x			0.300			
		G_y			0.584			
	Blue	B_x			0.139			
		B_y			0.082			
Viewing angle	Hor.	Θ_L	CR>100	-	85	-		
		Θ_R		-	85	-		
	Ver.	Θ_U		-	85	-		
		Θ_D		-	85	-		

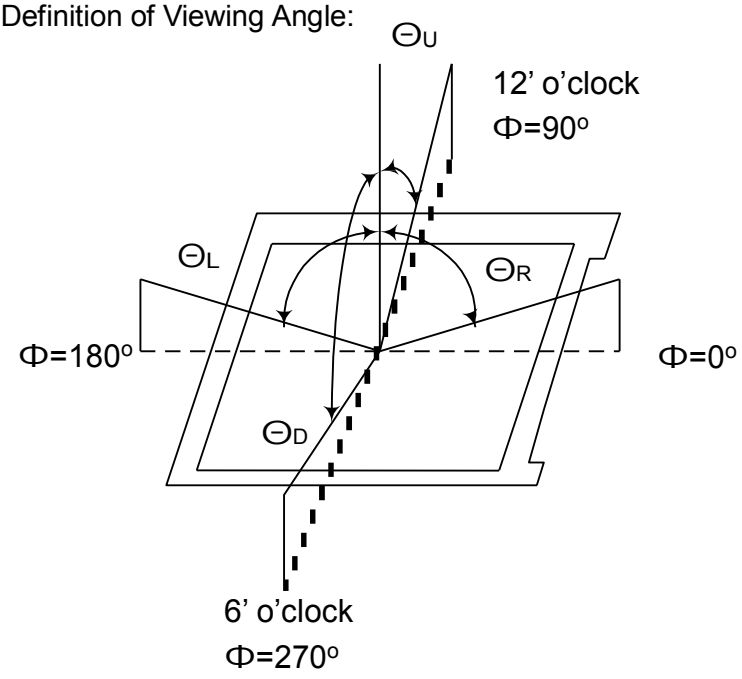
3.2 Measuring Condition

- Measuring surrounding : dark room
- LED current I_L : TBD
- Ambient temperature : 25±2°C
- 15min. warm-up time.

3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size : 20 ~ 21 mm

Note (1) Definition of Viewing Angle:

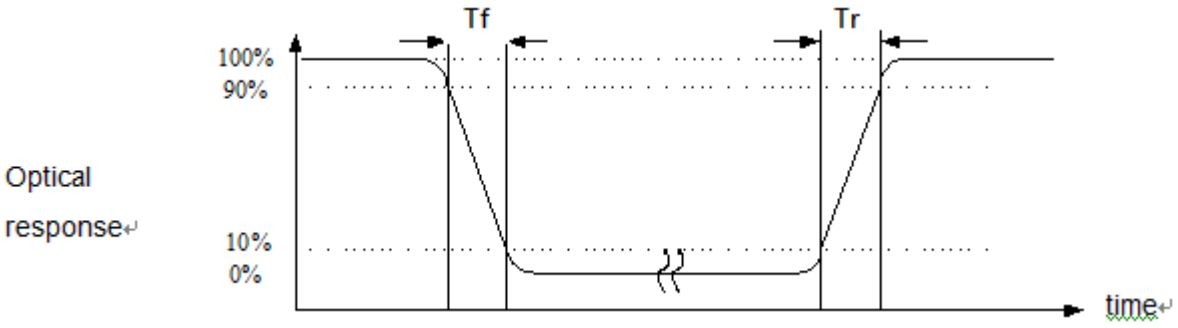


Note (2) Definition of Contrast Ratio (CR) :

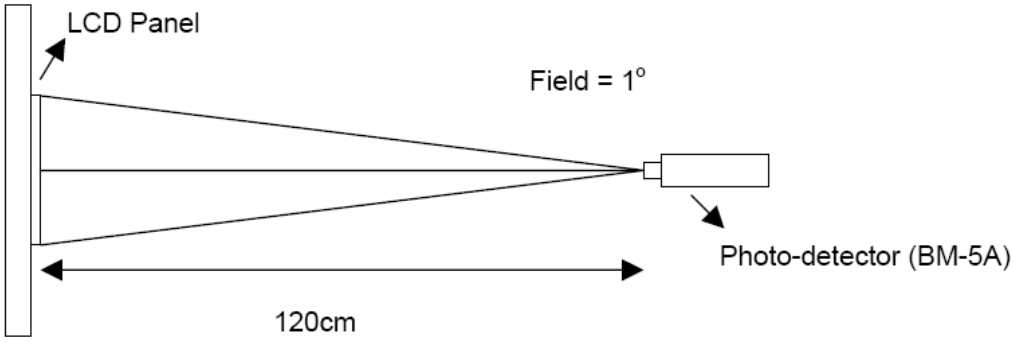
measured at the center point of panel

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

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



Note (4) Definition of optical measurement setup



Note (5) Definition of CM-3700A(Konica Minolta) Measurement specification

■ The Settings of the instrument

A. reflection rate;

B. Measuring the aperture: MAV(8mm);

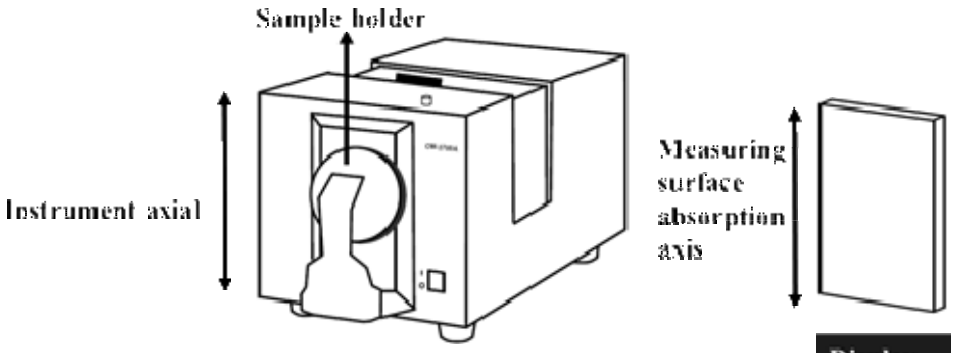
C. Observer perspective: 2˚;

D. Specular light: SCI;

E. The light source: D65.

■ The definition of measurement way

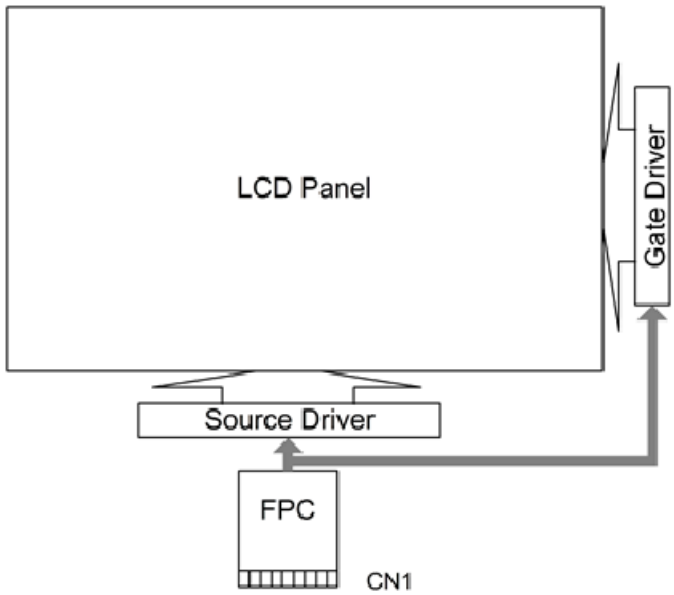
Chromatic meter will display the absorption of shaft and spectral type axial parallel alignment, and placed the sample frame for photometry.



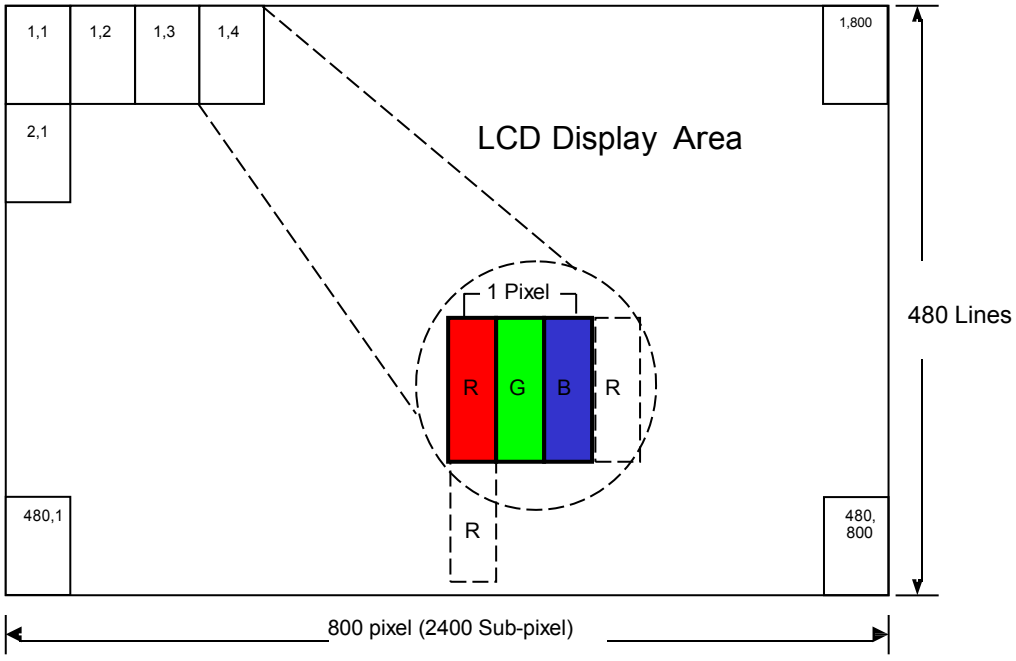
CM-3700A The spectral type chromatic meter

4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



4.3 Relationship Between Displayed Color and Input

	Display	MSB R7	R6	R5	R4	R3	R2	R1	LSB R0	MSB G7	G6	G5	G4	G3	G2	G1	LSB G0	MSB B7	B6	B5	B4	B3	B2	B1	LSB B0	Gray scale Level
Basic color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	Light Blue	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Purple	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
Gray scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
																										L3 L251
		H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L252
	Light	H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L253
		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L254
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	Red L255
Gray scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L2
																										L3 L251
		L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L252
	Light	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L253
		L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L254
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	Green L255
Gray scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
																										L3 L251
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L252
	Light	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L253
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L254
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	Blue L255
Gray scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L2
																										L3 L251
		H	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	L252
	Light	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	L253
		H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	L254
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L255

5.0 INTERFACE PIN CONNECTION

5.1 FPC Pin Assignment:

FPC connector is used for electronics interface. The recommended model is IMSA-12001S-50B-GFN1 manufactured by IRISO.

Pin No.	Symbol	I/O/P	Function	Note
1	GND	P	Digital Ground	
2	VDD	P	Digital Power	
3	NC	-	Not connect	
4	VGL	P	Negative Power for TFT Gate circuit	
5	NC	-	Not connect	
6	VGH	P	Positive Power for TFT Gate circuit	
7	NC	-	Not connect	
8	VSN	P	Power input for source driver and power circuits (Negative voltage)	
9	VSP	P	Power input for source driver and power circuits (Positive voltage)	
10	NC	-	Not connect	
11	GND	P	Digital Ground	
12	DE	I	Data enable signal	
13	HS	I	Horizontal sync input. Negative polarity	
14	VS	I	Vertical sync input. Negative polarity	
15	GND	P	Digital Ground	
16	DCLK	I	Clock input	
17	GND	P	Digital Ground	
18	B7	I	Data Input	
19	B6	I	Data Input	
20	B5	I	Data Input	
21	B4	I	Data Input	
22	B3	I	Data Input	
23	B2	I	Data Input	
24	B1	I	Data Input	
25	B0	I	Data Input	
26	GND	P	Digital Ground	
27	G7	I	Data Input	
28	G6	I	Data Input	

Pin No.	Symbol	I/O/P	Function	Note
29	G5	I	Data Input	
30	G4	I	Data Input	
31	G3	I	Data Input	
32	G2	I	Data Input	
33	G1	I	Data Input	
34	G0	I	Data Input	
35	GND	P	Digital Ground	
36	R7	I	Data Input	
37	R6	I	Data Input	
38	R5	I	Data Input	
39	R4	I	Data Input	
40	R3	I	Data Input	
41	R2	I	Data Input	
42	R1	I	Data Input	
43	R0	I	Data Input	
44	GND	P	Digital Ground	
45	RESET	I	Global reset pin. Normally pull high. H: normal operation. L: the controller is in reset state..	Note 1
46	STBYB	I	Standby mode. Normally pull low. H: normal operation. L: the controller and source driver will turn off..	Note 2
47	BIST	-	Aging mode on/off control. Please connect to GND.	Note 3
48	UPDN	I	Up / Down Display Control	Note 4
49	SHLR	I	Left or Right Display Control.	Note 4
50	GND	P	Digital Ground	

5.2 Backlight FPC Pin Assignment:

Pin No.	Symbol	I/O/P	Function	Note
1	LEDA1	P		
2	LEDA2	P		
3	GND	P		
4	LEDK1	P		
5	LEDK2	P		
6	LEDK3	P		
7	GND	P		
8	NTC	AD/P		
9	NTC	AD/P		
10	GND	P		

I: Input O: Output P: Power

Note1 Global reset pin: Active low to enter reset mode. Suggest connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ, C=0.1μF)

Note: If RC is not added, users must follow the rule, T2 > 50ms on page 18 item 6.5 power on/off sequence.

Note 2 : STBYB, active low.

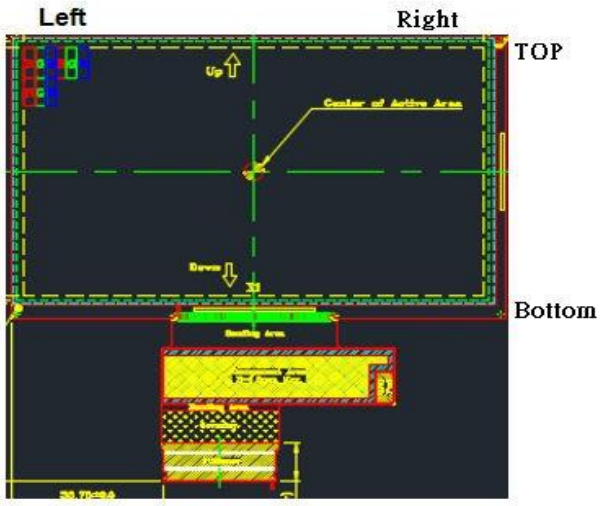
Note 3 : BIST, Please connect to GND.

Note 4 When SHLR =”0”, set right to left scan direction.

When SHLR =”1”, set left to right scan direction.

When UPDN =”1”, set top to bottom scan direction.

When UPDN =”0”, set bottom to top scan direction.



6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	SPEC			Unit
		MIN.	TYP.	MAX.	
Power voltage	VDD	3.0	3.3	3.6	V
	VSP	6.5	6.7	6.9	V
	VSN	-6.5	-6.7	6.9	V
	VGH	14	15	16	V
	VGL	-16	-15	4	V
Input logic high voltage	VIH	0.7VDD	--	VDD	V
Input logic low voltage	VIL	0	--	0.3VDD	V
Current for driver	IVDD	--	--	10	mA
	IVSP	--	--	40	mA
	IVSN	--	--	40	mA
	IVGH	--	--	5	mA
	IVGL	-5	--	--	mA

Note：

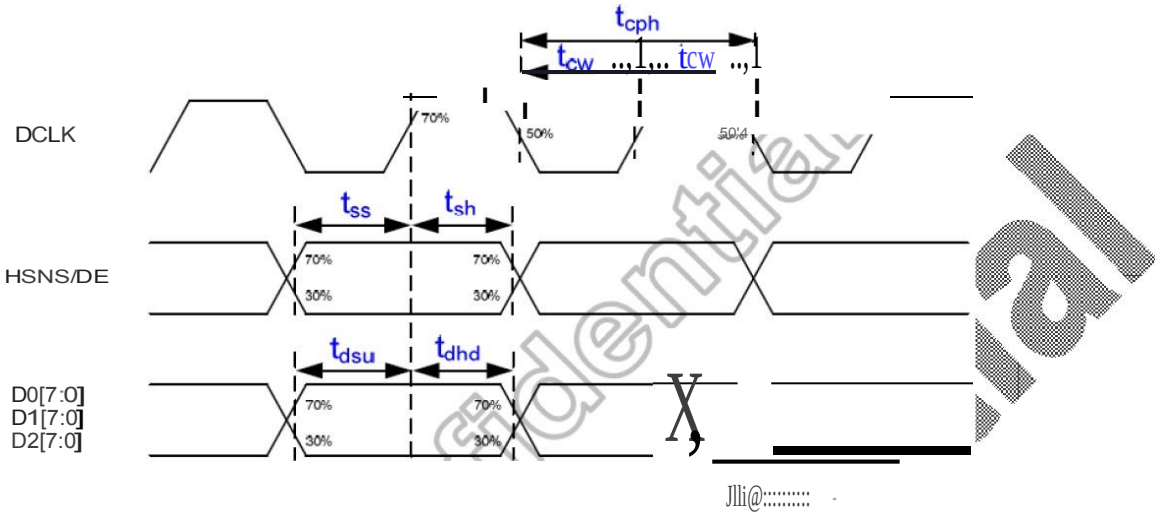
(1)：VGH is TFT Gate operating Voltage.

(2)：VGL is TFT Gate operating Voltage.

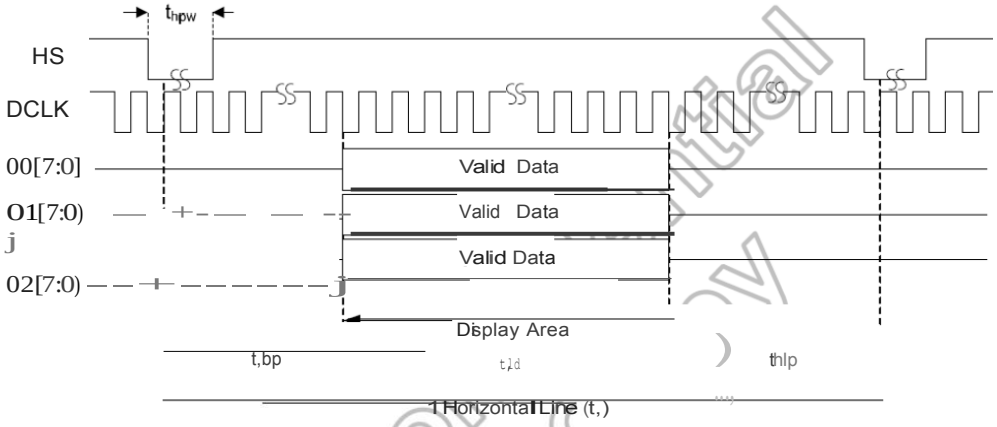
(3)：@ White Pattern & 60Hz。

6.2 Interface Timing

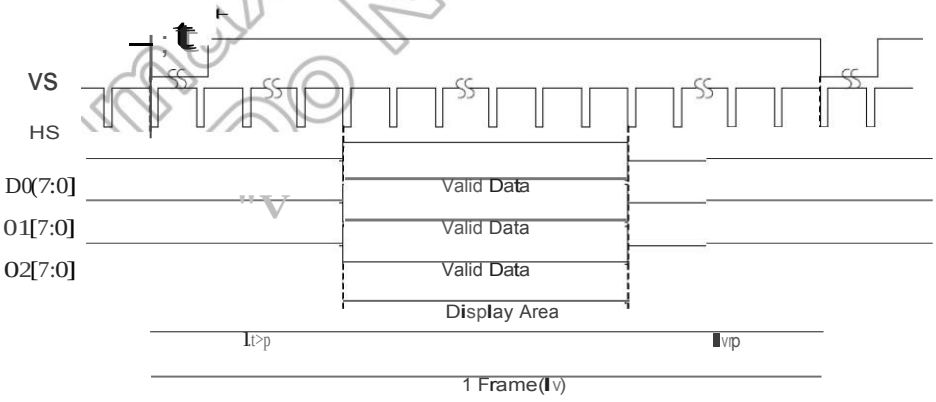
Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	T_{cph}	18.5		39.9	ns	
DCLK pulse duty ratio	T_{cw}	40	50	60	%	
Data setup time	T_{dsu}	8			ns	
Data hold time	T_{dhd}	8			ns	
VS/HS/DE setup time	T_{ss}	8			ns	
VS/HS/DE hold time	T_{sh}	8			ns	
Frame Rate	--	-	60	-	Hz	
DCLK frequency	F_{DCLK}	25.03	27.21	54	MHz	
Horizontal display area	t_{hd}		800		Tcph	
HSD period time	t_h	855	872	1200	Tcph	
HSD back porch	t_{hbp}		16		Tcph	
HSD front porch	t_{hfp}	50	56	250	Tcph	
HSD sync pulse width	t_{hpw}	6	12	254		
Vertical display area	t_{vd}		480		th	
VSD period time	t_v	488	520	750	th	
VSD back porch	t_{vbp}		24		th	
VSD front porch	t_{vfp}	6	16	170	th	
VSD sync pulse width	t_{vpw}	1	3	254	th	



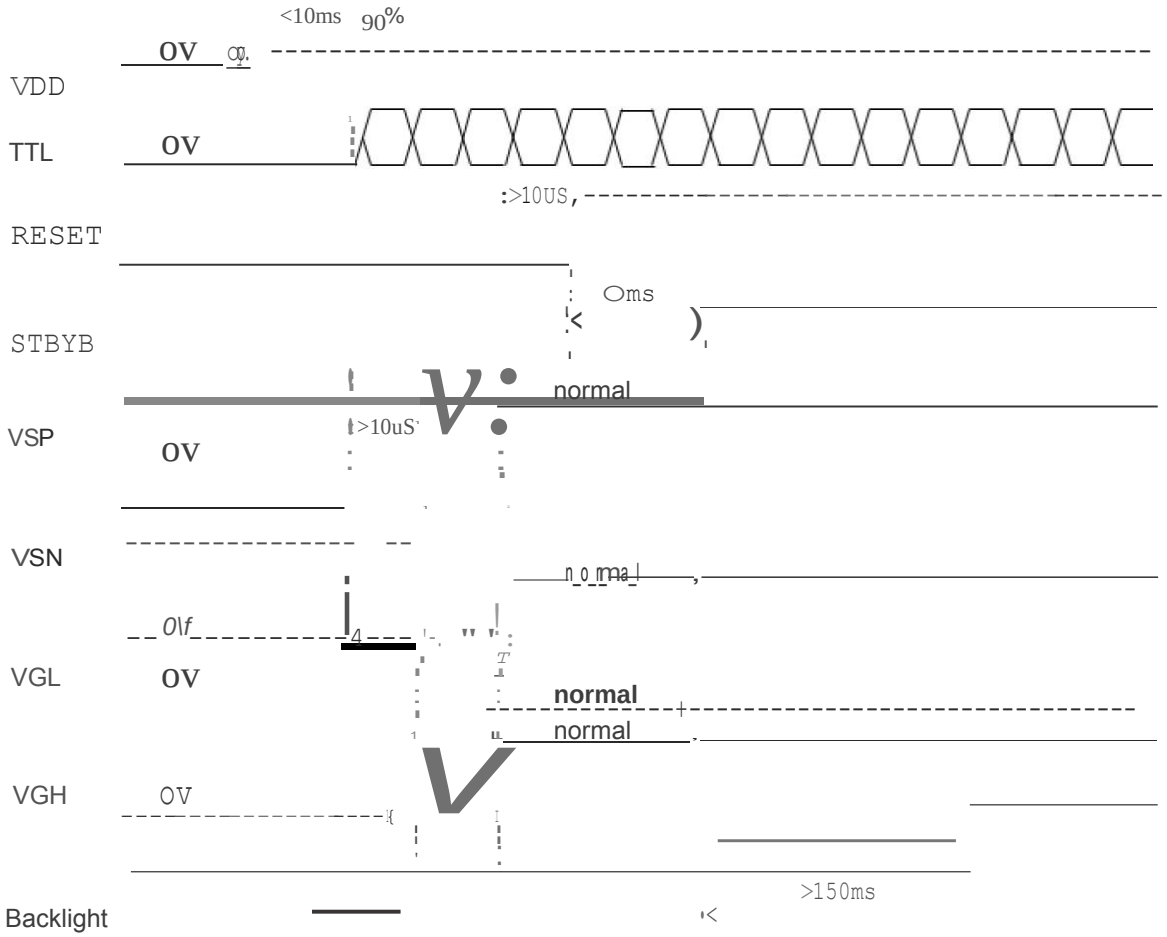
• **Horizontal**

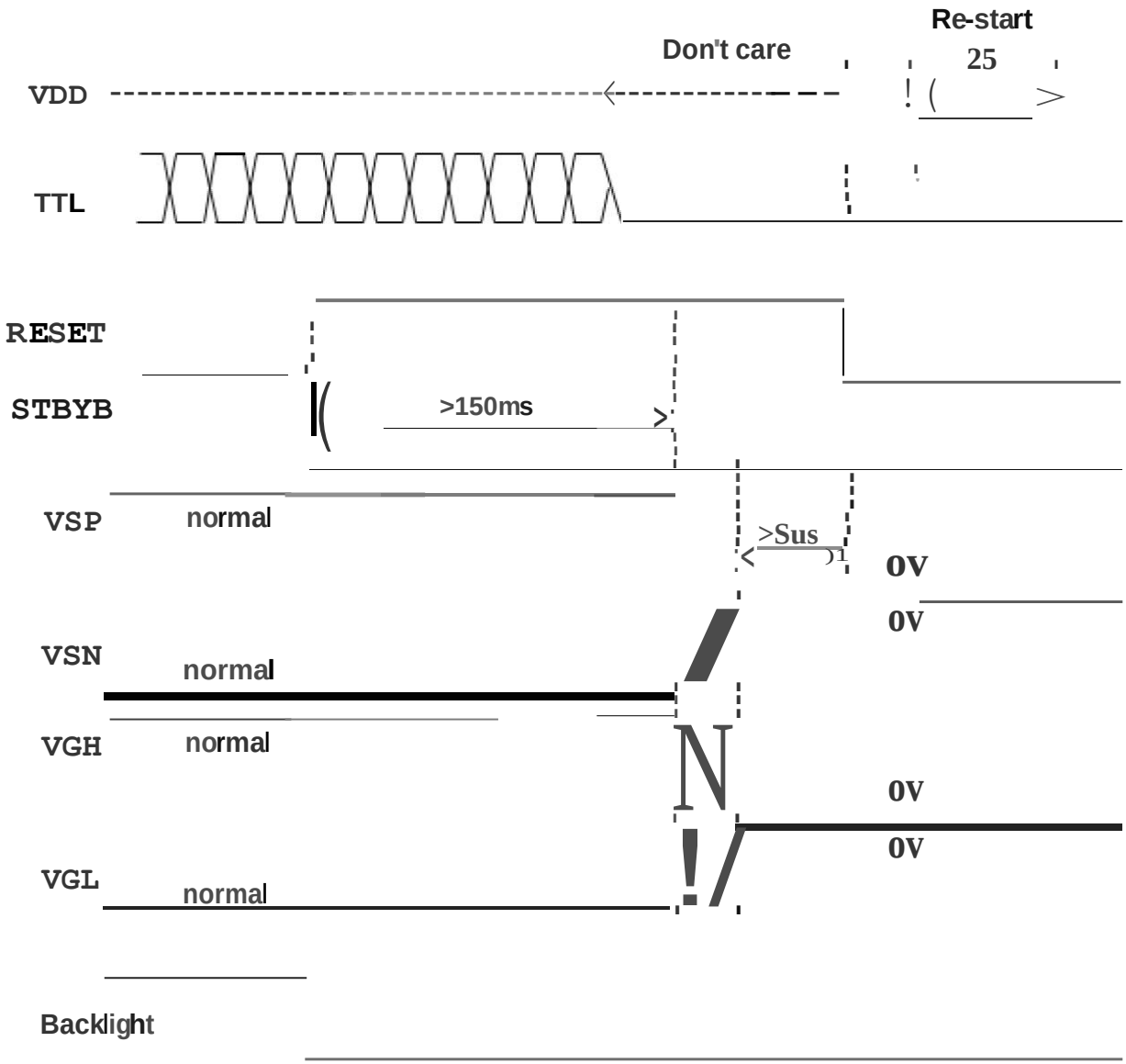


• **Vertical**

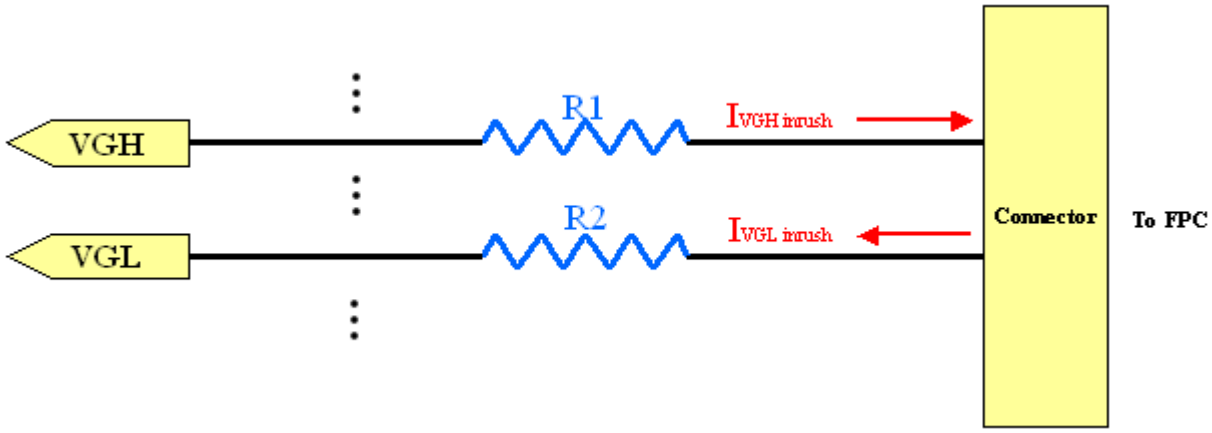


6.4 Power On/Off Sequence




Re-start
Don't care
25
VDD
TTL
RESET
STBYB
>150ms
VSP
normal
>Sus
0V
0V
VSN
normal
VGH
normal
0V
0V
VGL
normal
Backlight

6.5 Reference circuit for inrush current limit resistor of VGH/VGL



Note: R1 = VGH inrush current limit resistor. Tune R1 resistor to make VGH inrush current less than 100mA.

R2 = VGL inrush current limit resistor. Tune R2 resistor to make VGL inrush current less than 100mA.

7.0 RELIABILITY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+90°C, 240hrs	Note 1,2,3
2	Low Temperature Storage	Ta=-40°C, 240hrs	Note 1,2,3
3	High Temperature Operation	Ta=+85°C, 240hrs	Note 1,2,3
4	Low Temperature Operation	Ta=-30°C, 240hrs	Note 1,2,3
5	High Temperature and High Humidity (operation)	Ta=+60°C, 90%RH, 240hrs	Note 1,2,3
6	Thermal Cycling Test (non operation)	-30°C(30min) → +85°C(30min), 100cycles	Note 1,2,3

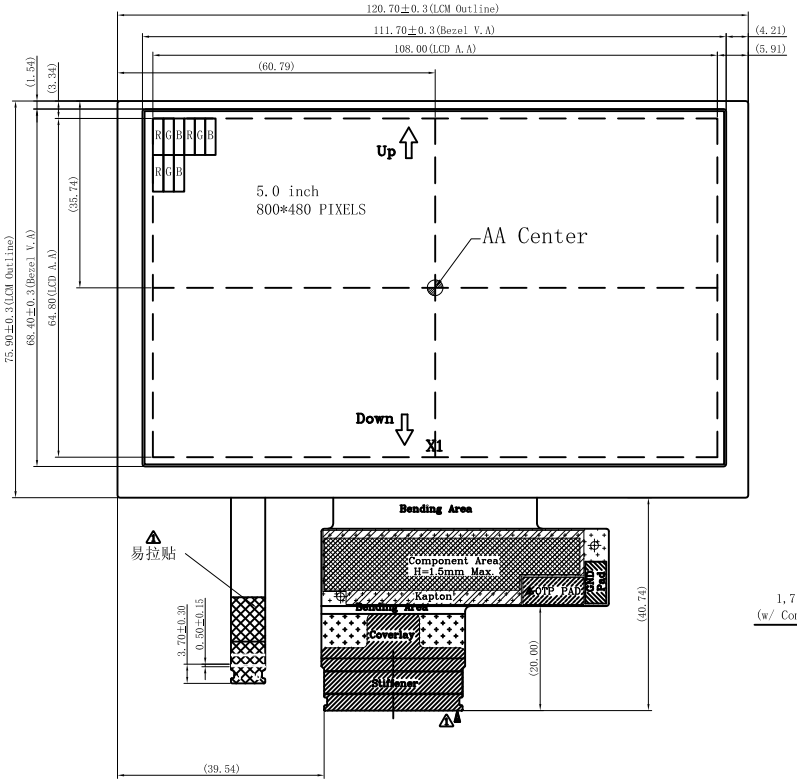
Note1 : There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

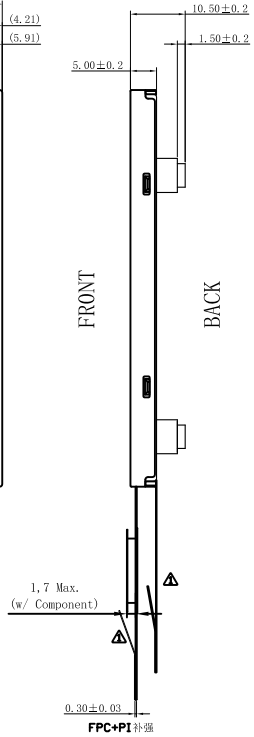
Note2 :The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hour without load. No condensation shall be accepted. The sample shall be free from defects:

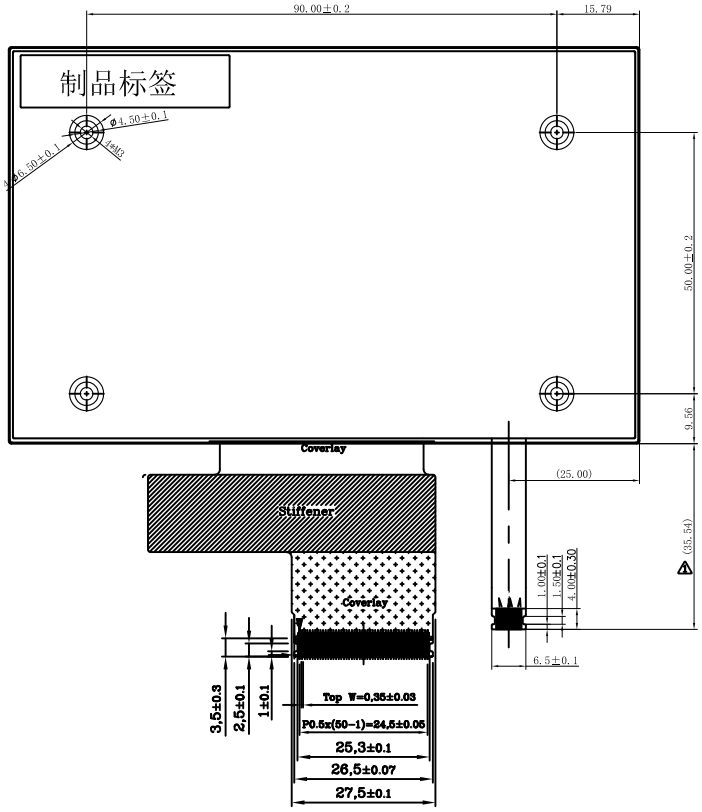
Air bubble in the LCD、Seal leak、Non-display、Missing segments、Glass crack

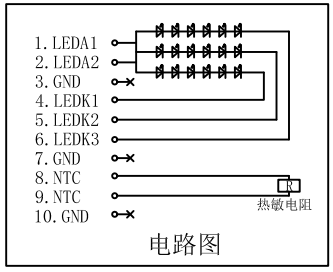
Note3 : The test condition definition panel's surface temperature.

REVISE	Revision note	DATE	NAME
V0	First	2019 05.08	Ray









电路图

DISEA Customized Display		Disea Electronics Co.,LTD
Approved By		
Checked By		SIZE: 5.0 TFT
Drawn By	Ray	DWARING_NO.: ZW-T050HJDW-01
UNIT:mm		CUSTOMER_NO.

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