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MODEL NO : ET070WS01-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2022-10-21

☐ **Preliminary Specification**

☑ **Final Product Specification**

Customer :_____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

LCD specification: Dots 1024xRGBx600.
As to basic specification of the driver IC, refer to the IC (TBD) specification and data book.
All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

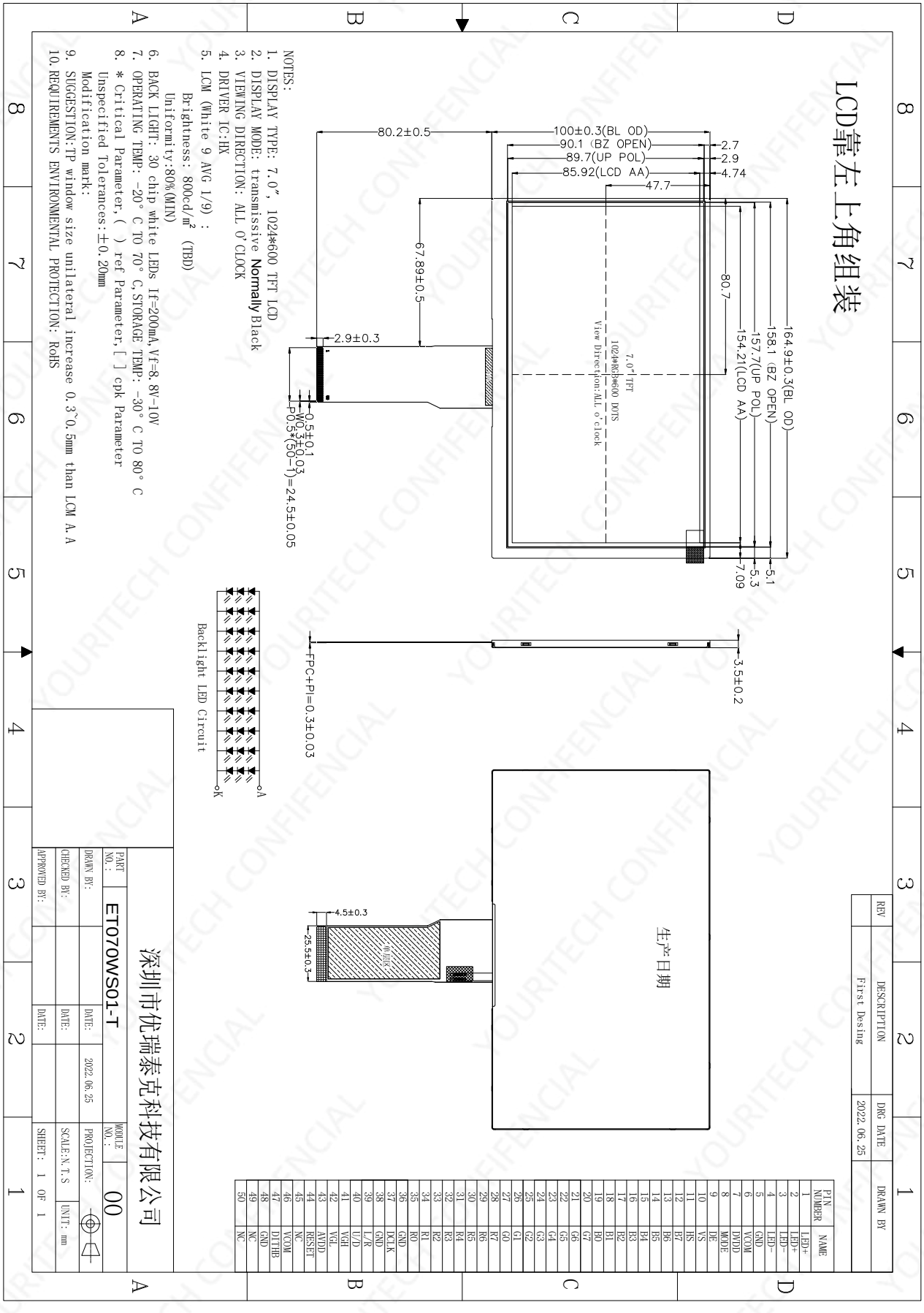
Structure: TFT PANNEL+IC +FPC+BL;
ALL O'CLOCK Type LCD
1024 dot-segment and 600 dot-common outputs;
16.7M Color can be selected by software;
White LED back light;
24bit RGB interface

1.3 Applications:

Motorcycle dashboard
Electric Animation Dashboard
Medical display
Engineering vehicle display
Outdoor highlight equipment

2. LCM General specification

ITEM	Sandard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	1024*3RGB(H)X600(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.1432(W)x 0.1432(H)	mm
Active area	154.2144H) × 85.92 (V)	mm
Viewing direction	ALL O'CLOCK	
TFT Driver IC	TBD	-
TFT interface	24bit RGB Interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	164.90(W) x100.00(H) x3.50(T)	mm
Touch structure	-	-
Touch Driver IC	-	-
Touch Interface	-	-


LCD靠左上角组装
164.9±0.3(BL OD)
158.1 (BZ OPEN)
157.7(UP POL)
154.21(LCD AA)
100±0.3(BL OD)
90.1 (BZ OPEN)
89.7(UP POL)
85.92(LCD AA)
80.2±0.5
67.89±0.5
80.7
47.7
2.7
2.9
4.74
5.1
5.3
7.09
2.9±0.3
0.5±0.1
PWD 3.7±0.03
FPC 0.3*(50-1)=24.5±0.05
FPC+PI=0.3±0.03
3.5±0.2
4.5±0.3
25.5±0.3
7.0" TFT
1024*RGB*600 DOTS
View Direction:ALL o'clock
生产日期
Backlight LED Circuit
A
K
NOTES:
1. DISPLAY TYPE: 7.0", 1024*600 TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL O'CLOCK
4. DRIVER IC:HX
5. LCM (White 9 AVG 1/9) :
Brightness: 800cd/m2 (TBD)
Uniformity:80%(MIN)
6. BACK LIGHT: 30 chip white LEDs If=200mA, Vf=8.8V-10V
7. OPERATING TEMP: -20° C TO 70° C,STORAGE TEMP: -30° C TO 80° C
8. * Critical Parameter,( ) ref Parameter,[ ] cpk Parameter
Unspecified Tolerances:±0.20mm
Modification mark:
9. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS
REV
DESCRIPTION
DRG DATE
DRAWN BY
First Desing
2022.06.25
PIN NUMBER
NAME
1 LED+
2 LED+
3 LED-
4 LED-
5 GND
6 VCOM
7 DVDD
8 MODE
9 DE
10 VS
11 HS
12 B7
13 B6
14 B5
15 B4
16 B3
17 B2
18 B1
19 B0
20 G7
21 G6
22 G5
23 G4
24 G3
25 G2
26 G1
27 G0
28 R7
29 R6
30 R5
31 R4
32 R3
33 R2
34 R1
35 R0
36 GND
37 DCLK
38 GND
39 L/R
40 U/D
41 VGH
42 VGL
43 AVDD
44 RESET
45 NC
46 VCOM
47 DITHB
48 GND
49 NC
50 NC
深圳市优瑞泰克科技有限公司
PART NO.: ET070WS01-T
MODULE NO.: 00
DRAWN BY:
DATE: 2022.06.25
PROJECTION:
CHECKED BY:
DATE:
SCALE:N.T.S
UNIT: mm
APPROVED BY:
DATE:
SHEET: 1 OF 1

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T_{OPR}	-20	+70	°C
LCM Storage Temperature	T_{STG}	-30	+80	°C
Humidity	RH	10	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
TFT OperationFrame rate	Hz	--	60	--	Hz	
Supply Voltage for(DC/DC)	VDD	3.0	3.3	3.6	V	
TFT Gate ON Voltage	VGH	17	18	19	V	Note 2
TFT Gate OFF Voltage	VGL	-6.5	-6	-5.5	V	Note 2
TFT Common Voltage	Vcom	3.0	3.15	3.3	V	Note 1
AVDD	Avdd	--	9.0	--	V	Note 3

Note 1: VCOM value should be adjusted by different condition to optimize Flicker Value.

Note 2: VGH and VGL are the operating voltages of TFT gate.

Note 3: Adjust the contrast, make the color bigger and darker, and make the color smaller and lighter.

4.2 Back-Light Unit Characeristics

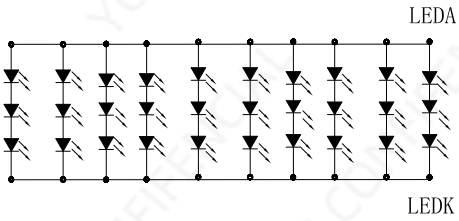
The back-light system is an edge-lighting type with 30 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	8.8	--	10	V	-
Forward current	I_F	--	200	--	mA	-
Luminance(With LCD+CTP)	Lv	--	800	--	cd/m^2	-
LED life time	N/A	--	30,000	--	Hr	Note 1

Note:

(1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

Pin No.	Symbol	LCM Description	remarks
1	LEDA	POWER SUPPLY- FOR BACKLIGHT CATHODE	
2	LEDA	POWER SUPPLY- FOR BACKLIGHT CATHODE	
3	LEDK	POWER SUPPLY+ FOR BACKLIGHT ANODE	
4	LEDK	POWER SUPPLY+ FOR BACKLIGHT ANODE	
5	GND	Power ground	
6	VCOM	Common voltage	
7	DVDD	Power for Digital Circuit 3.3V	
8	MODE	DE/SYNC mode select. MODE=H:DE mode;MODE=L:SYNC mode	
9	DE	Data enable signal in RGB I/F mode 1	
10	VS	Vertical sync. Signal in RGB I/F	
11	HS	Horizontal sync. Signal in RGB I/F	
12~19	B7~B0	8 bit data bus display blue data	
20~27	G7~G0	8 bit data bus display green data	
28~35	R7~R0	8 bit data bus display red data.	
36	GND	Power ground	
37	DCLK	Pixel clock signal in RGB I/F	
38	GND	Power ground	
39	L/R	Left / right selection	
40	U/D	Up/down selection	
41	VGH	Gate ON Voltage	
42	VGL	Gate OFF Voltage	
43	AVDD	Power for Analog Circuit	
44	RESET	Global reser pin	
45	NC	No connection	
46	VCOM	Common Voltage	
47	DITHB	Dithering function. Dithering function. DITHER = H:Enable internal dithering function; DITHER = L:Disable internal dithering function	
48	GND	Power ground	
49	NC	No connection	
50	NC	No connection	

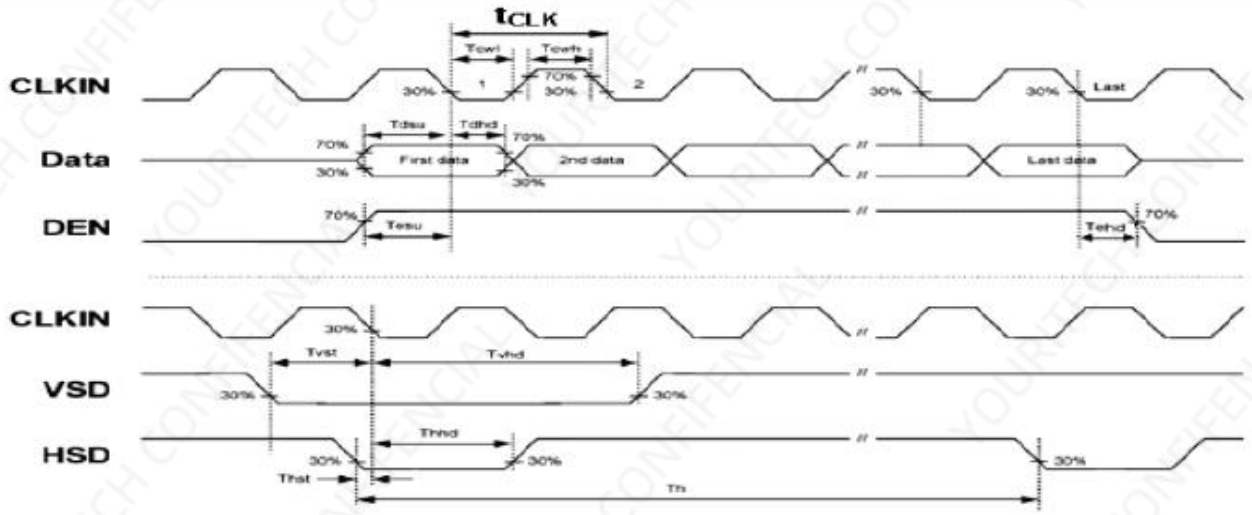
6. Timing Characteristics

6.1 Input Timing Table

	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DE MODE	Dot Clock	1/tCLK	45	51.2	57	MHz	
	DCLK Pulse Duty	Tcwh	40	50	60	%	
	Horizontal Total Time	tH	1324	1344	1364	tCLK	
	Horizontal Effective Time	tHA		1024		tCLK	
	Horizontal Blank Time	tHB	300	320	340	tCLK	
	Vertical Total Time	tV	625	635	645	tH	
	Vertical Effective Time	tVA		600		tH	
	Vertical Blank Time	tVB	25	35	45	tH	
SYNC MODE	Horizontal Total Time	TH	1324	1344	1364	tCLK	
	Horizontal Pulse Width	Thpw		20	-	tCLK	thb + thpw =160DCLK is fixed
	Horizontal Back Porch	Thb		140	-	tCLK	
	Horizontal Front Porch	Thfp	140	160	180	tCLK	
	Horizontal Effective Time	THA		1024		tCLK	
	Vertical Total Time	TV	625	635	645	tH	
	Vertical Pulse Width	Tvpw		3	-	th	tvpw + tvb =23th is fixed
	Vertical Back Porch	Tvb	-	20	-	th	
	Vertical Front Porch	Tvfp	2	12	22	th	
	Vertical Valid	Tvd		600		th	

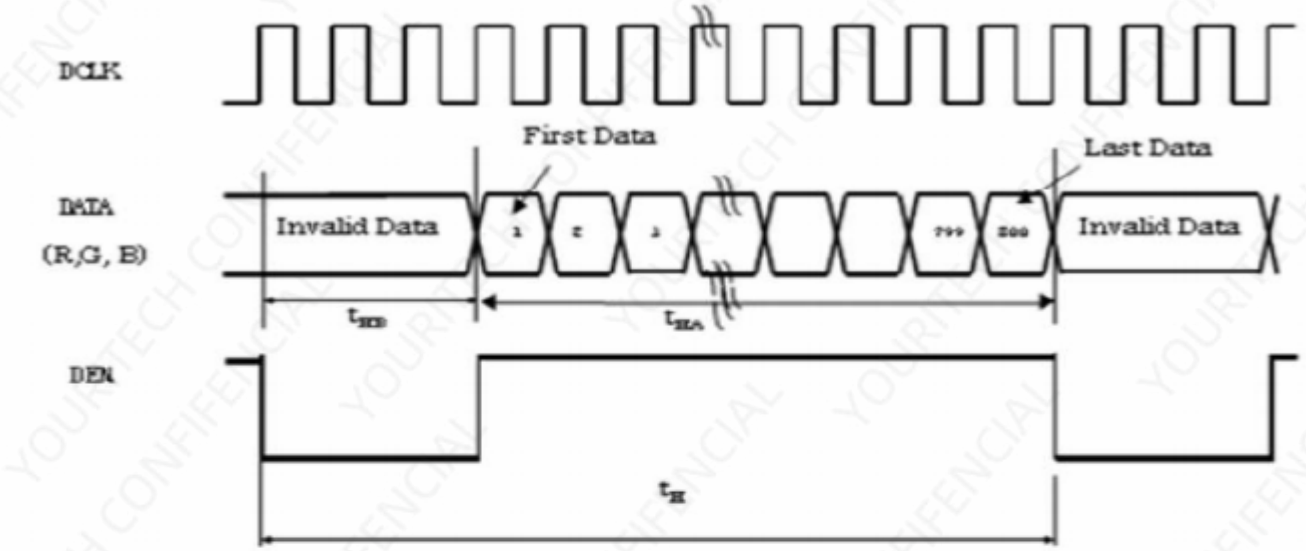
6.2 Input Clock and Data Timing Diagram

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Condition
DVDD Power On Slew Rate	TPOR	-	-	20	ms	From 0V to 90% DVDD
RSTB Pulse Width	TRst	50	-	-	us	DCLK=65MHz
DCLK Cycle Time	Tcph	14	-	-	ns	
DCLK Pulse Duty	Tcwh	40	50	60	%	
VSD Setup Time	Tvst	5	-	-	ns	
VSD Hold Time	Tvhd	5	-	-	ns	
HSD Setup Time	Thst	5	-	-	ns	
HSD Hold Time	Thhd	5	-	-	ns	
Data Setup Time	Tdsu	5	-	-	ns	D0[7:0],D1[7:0],D2[7:0] to DCLK
Data Hold Time	Tdhd	5	-	-	ns	D0[7:0],D1[7:0],D2[7:0] to DCLK
DEN Setup Time	Tesu	5	-	-	ns	
DEN Hold Time	Tehd	5	-	-	ns	

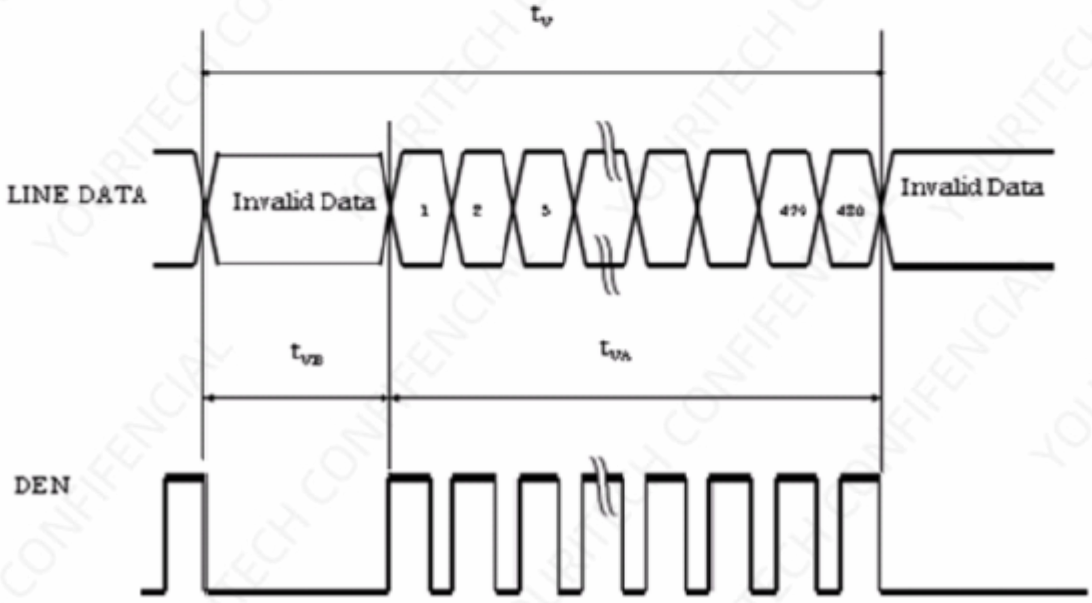


DE Mode

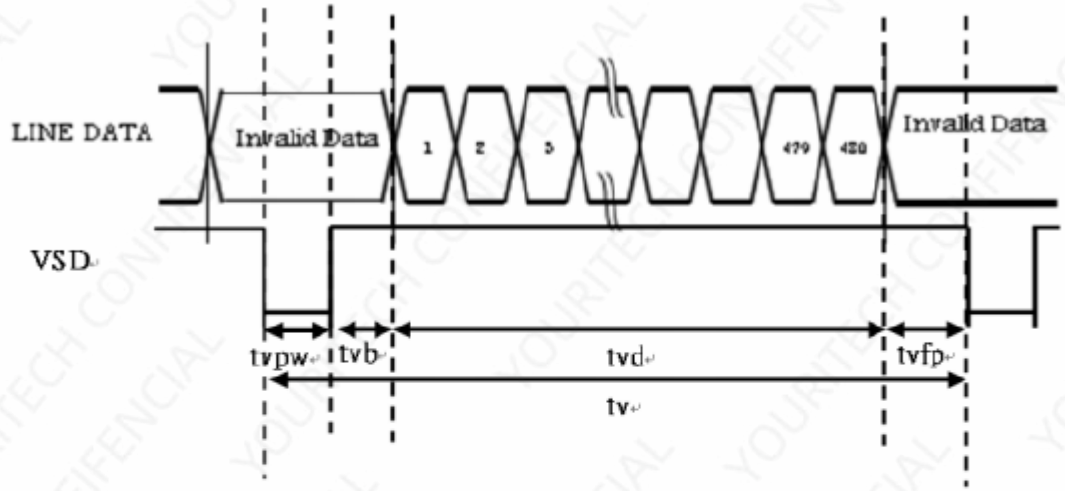
Horizontal timing :



Vertical timing :

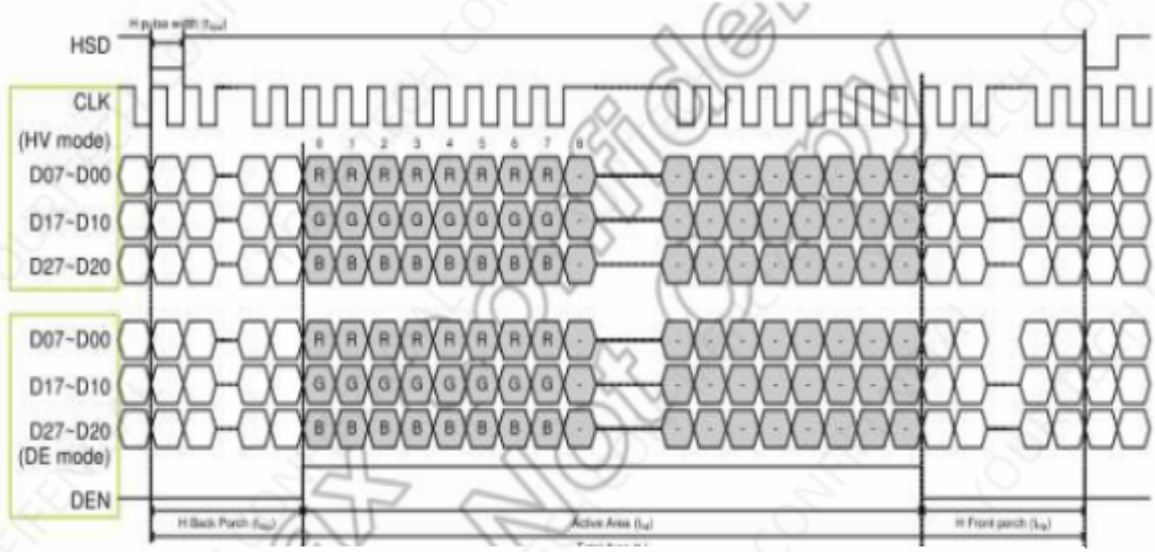


Vertical timing：

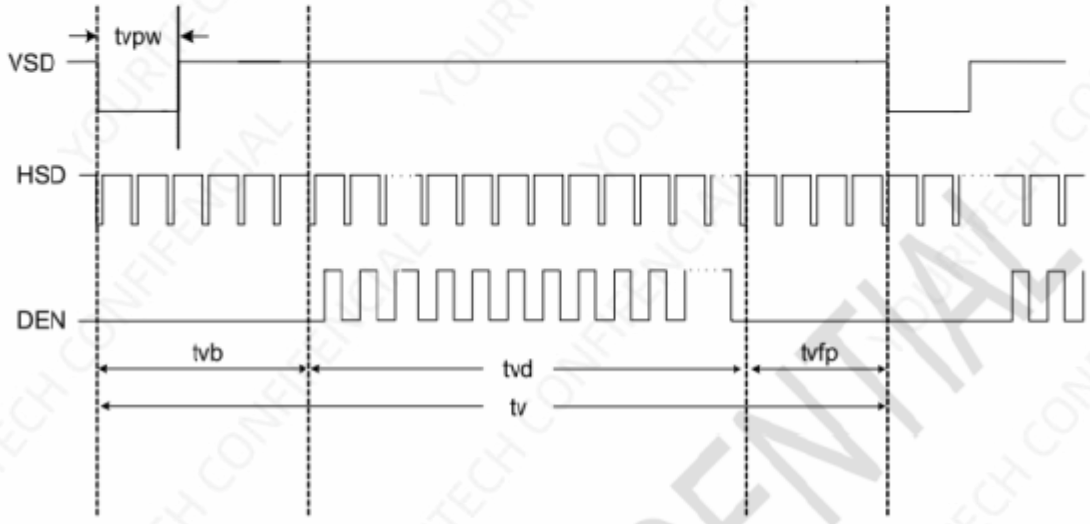


Data Input Format

Horizontal timing：



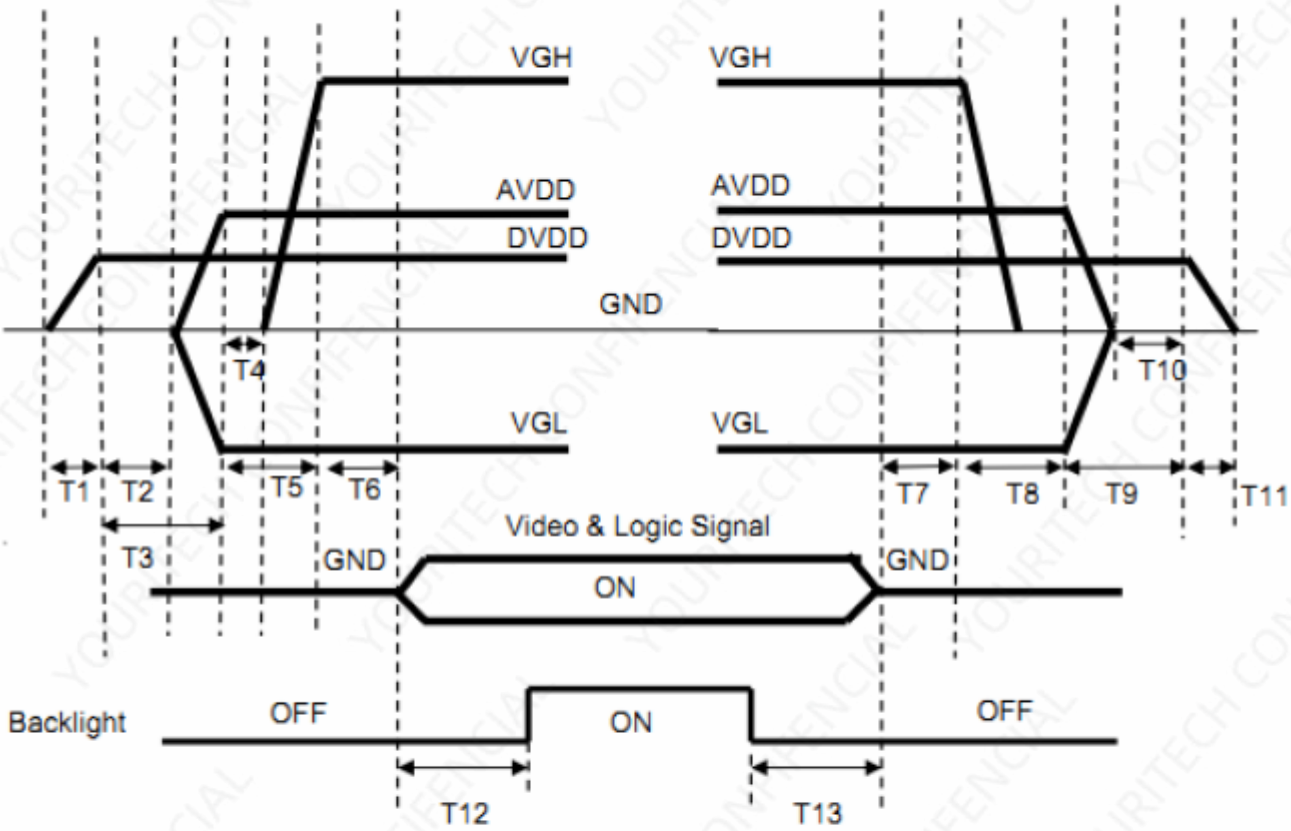
Vertical timing：



6.3 Power、Signal sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight

Power Off：Backlight→Video &Logic Signal→ VGH→AVDD/VGL→DVDD



0<T1≦10ms
T2>0ms
T3>20ms
T4>0ms
T5>10ms
0<T6≦10ms
T12≧200ms

T7>0ms
T8>0ms
T9>0ms
T10>0ms
0<T11≦10ms
T13≧200ms

Reset Input Timing:

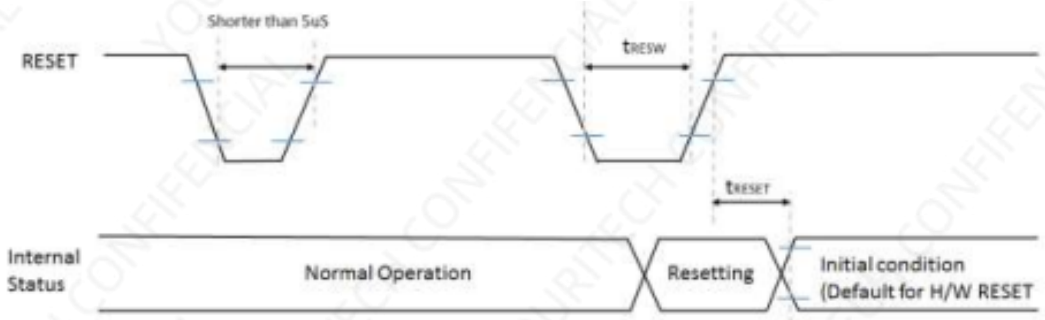


Figure 4-13 Reset Input Timing

Table 4-2 Reset Input Timing

Signal	Symbol	Parameter	Description	Specification			Unit	Notes
				MIN	TYP	MAX		
RESET	tRESW	Reset "L" pulse width		10			uS	1
	tRESET	Reset complete time	When reset applied during Sleep in mode			5	mS	2
			When reset applied during Sleep Out mode			120	mS	5

***Note* 1**: Condition : Ta =25℃

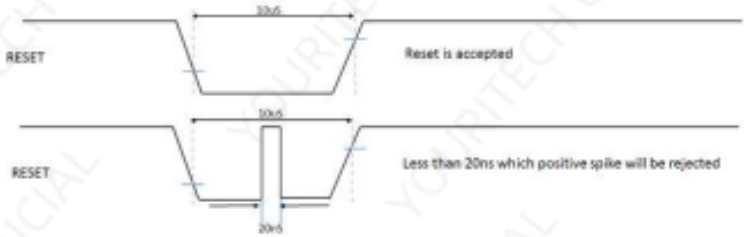
***Note* 2**: Spike due to an electrostatic discharge on RESET line does not cause irregular system reset according to the table below.

RESET Pulse	Action
Less than 5us	Reset Rejected
More than 10uS	Reset
Between 5us and 10uS	Reset Start

***Note* 2**: During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120ms, when Reset Starts in sleep out mode. The display remains the blank state in sleep in mode) and then return to Default condition for H/W RESET.

Note3: During Reset Complete Time, values in OTP memory will be latched to internal register during this period. This loading is done every time when there is H/W RESET complete time (tRESET) within 5ms after a rising edge of RESET.

***Note* 4**: Spike Rejection also applies during a valid reset pulse as shown below:



***Note* 5**: It is necessary to wait 5ms after releasing RESET when sending commands, and Sleep Out command can not be sent within 120ms.

7.Optical Characteristics

Item		Symbol	Condition	Specification			Unit	Remark	Notes
				Min.	Typ.	Max.			
T% (w/o APCF, w/o haze) @ C-light		T%	1.Viewing normal angle θx=θy=0° (Center) 2.At 25°C	4.73	5.27	--	%	Center	All left side data are based on INX' s following condition (at 25 ℃) 1. LC : AAS 2.BLU : under C_light 3.Machine : DMS-900 V LC : Vbright ≧ 5.3V Vdark ≦ 0.3V
Contrast Ratio (w/o WPA)		CR		800	1000	--	--	Center Note (1)	
Response Time (w/o WPA)		Ton+Toff		--	25	35	ms	Center Note (2)	
Viewing Angle	Hor.	θx+	Center CR>10	80	--	--	deg	Note (3)	
		θx-		80	--	--			
	Ver.	θy+		80	--	--			
		θy-		80	--	--			
CF only Chromaticity (CIE1931)	Red	Rx	Viewing normal angle θx=θy=0°	0.594	0.614	0.634	--	--	CF Glass with C-light
		Ry		0.320	0.340	0.360	--	--	
	Green	Gx		0.268	0.288	0.308	--	--	
		Gy		0.513	0.533	0.553	--	--	
	Blue	Bx		0.118	0.138	0.158	--	--	
		By		0.116	0.136	0.156	--	--	
	White	Wx		0.289	0.309	0.329	--	--	
		Wy		0.310	0.330	0.350	--	--	
	NTSC	xy		45	50		%	--	

*Note (1) Definition of Contrast Ratio (CR):

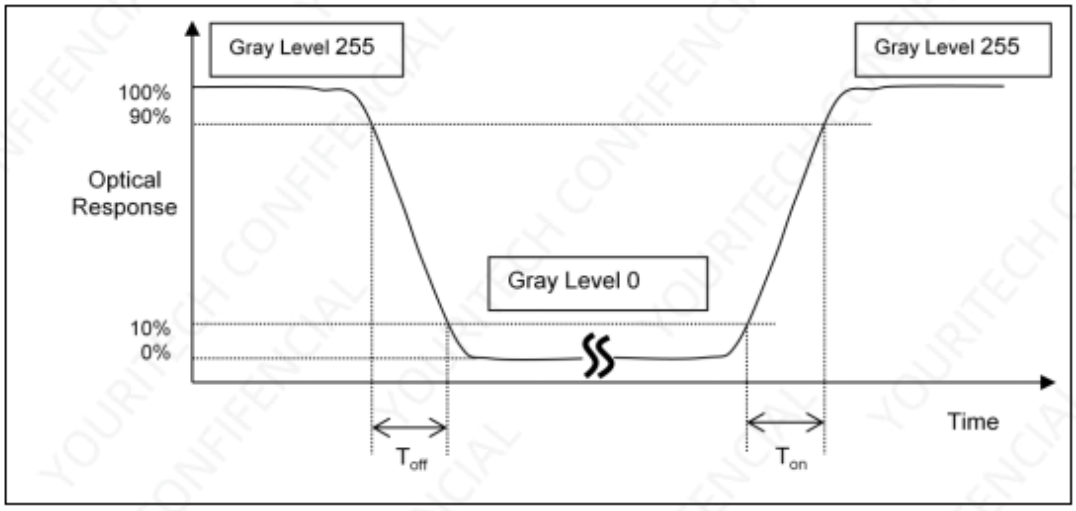
The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

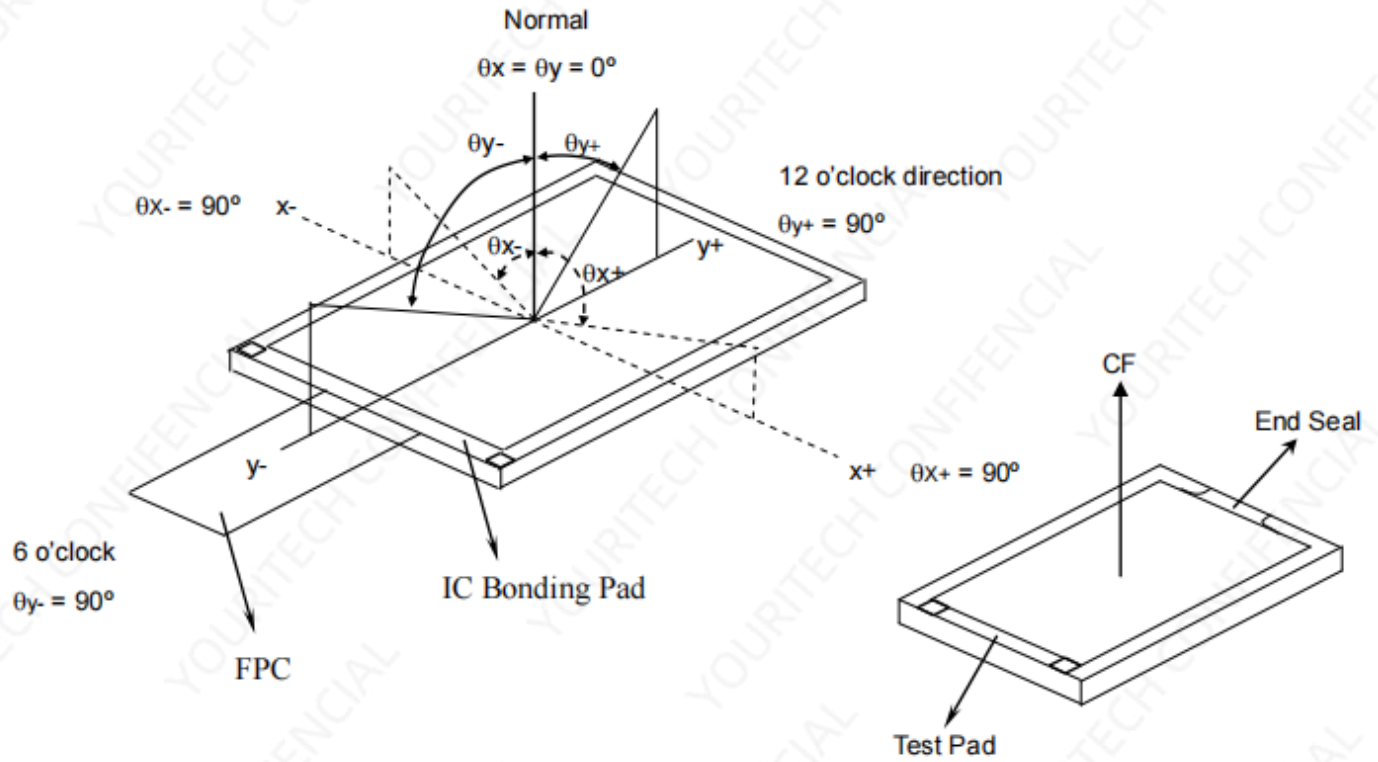
L 255 : Luminance of gray level 255

L 0: Luminance of gray level 0

*Note (2) Definition of Response Time (T_{on}, T_{off}):



*Note(3) Definition of Viewing Angle



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°C / 96H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Tempe. Operating	+70°C / 96H	
4	Low Tempe. Operating	-20°C / 96H	
5	High Temperature /Humidity storage	50°C x 90%RH /96H	
6	Thermal and cold shock	Static state，-20℃（30min）~60℃（30min），50 cycles	

9. Packing Method----TBD

- END -