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Optical Bonding

In-house Manufacturing

Cover glass

System solutions

OEM Solutions

Custom Display

Production Custom designs Installation

Mechanical design



Project No. 项目编号	ET070WS10-TC
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 1024*RGBx600Dots 7.0”TFT LCD+CG

客户确认Customer Approval	
项目负责人Project Manager	
品质主管Director of Quality	
采购工程师Purchasing Engineer	

PREPARED BY	CHECKED BY	APPROVED BY

1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by YOURITECH TECHNOLOGY CO., LTD. This LCD module should be designed for mobile phone use.

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+CG

ALL O'CLOCK Type LCD

1024 dot-segment and 600 dot-common outputs;

16.7M Color can be selected by software;

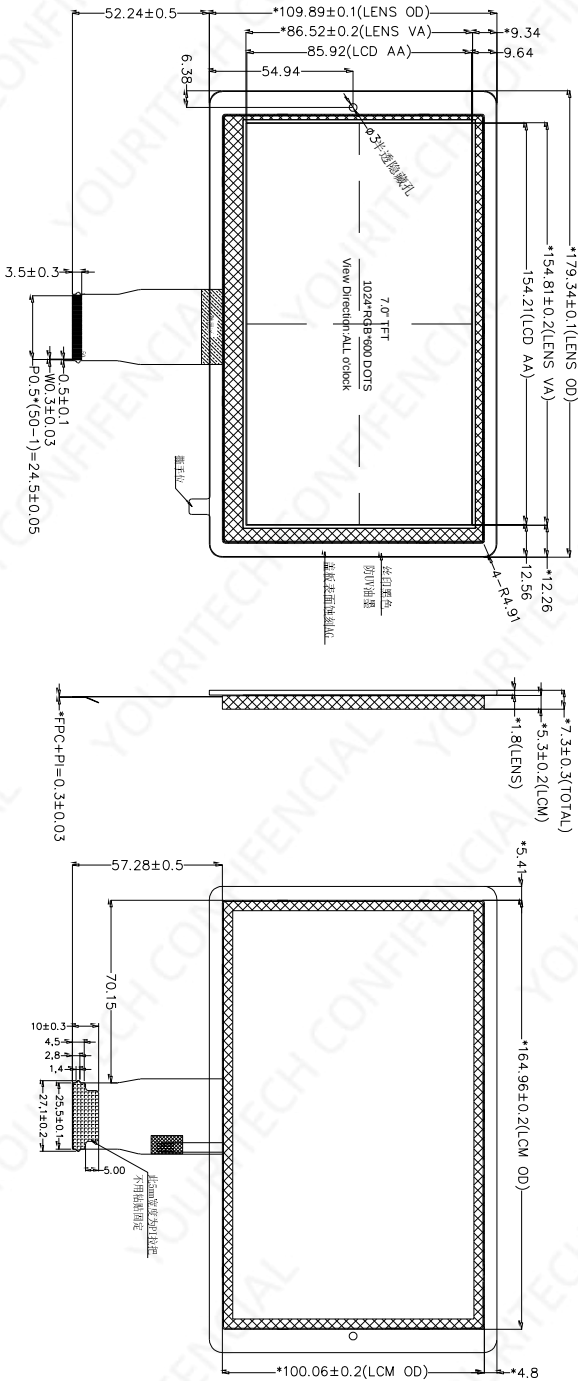
White LED back light;

24bit RGB interface

2. LCM General specification

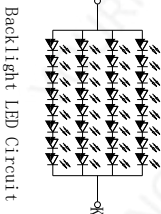
ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	1024*3RGB(H)X600(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.1506(W)x 0.1432(H)	mm
Active area	154.21H) × 85.92 (V)	mm
Viewing direction	ALL O'CLOCK	--
TFT Driver IC	TBD	--
TFT interface	24bit RGB Interface	--
Approx. Weight	TBD	g
LCM Size(W*H*T)	164.96(W) x100.06(H) x5.30(T)	mm
LCM+CG Size(W*H*T)	179.34(W) x 109.89(H) x7.30(T)	mm
Touch structure	--	--
Touch Driver IC	--	--
Touch Interface	--	--

LCD靠左上角组装



NOTES:

1. DISPLAY TYPE: 7.0", 1024*600 TFT LCD
2. DISPLAY MODE: transmissive Normally Black
3. VIEWING DIRECTION: ALL 0° CLOCK
4. DRIVER IC:HX
5. LCM (White 9 AVG 1/9) :
Brightness: 1000cd/m²
Uniformity: 80% (MIN)
6. BACK LIGHT: 32 chip white LEDs If=160mA, Vf=22.4V~25.6V
7. OPERATING TEMP: -30° C TO 80° C, STORAGE TEMP: -30° C TO 85° C
8. * Critical Parameter, () ref Parameter, [] cpk Parameter
Unspecified Tolerances: ±0.20mm
9. Modification mark:
10. SUGGESTION:TP window size unilateral increase 0.3~0.5mm than LCM A.A
10. REQUIREMENTS ENVIRONMENTAL PROTECTION: RoHS



PIN No. SYMBOL	
1	LED A
2	LED B
3	LED C
4	LED D
5	LED E
6	VCCM
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	SHLR
40	UPDN
41	VGL
42	AVDD
43	AVDD
44	RESET
45	NC
46	VCOM
47	DTHB
48	GND
49	NC
50	NC

PART NO.:		MODULE NO.:		00		Mobile:	
DRAWN BY:		LJU		DATE: 2024.03.27		PROJECTION: 1:1	
CHECKED BY:				DATE:		SCALE: N.T.S	
APPROVED BY:				DATE:		SHEET: 1 OF 1	

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-30	+80	°C
LCM Storage Temperature	T _{STG}	-30	+85	°C
CG Operating Temperature & Humidity (20% ~ 90%RH)	T _{OPR}	-30	+80	°C
CG SStorage Temperature & Humidity (20% ~ 90%RH)	T _{STG}	-30	+85	°C
Humidity	RH	--	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	3.3	V	
TFT Gate ON Voltage	VGH	16.5	17	17.5	V	Note 2
TFT Gate OFF Voltage	VGL	-7.5	-7	-6.5	V	Note 2
TFT Common Voltage	Vcom	3.0	3.3	4.7	V	Note 1
AVDD	Avdd	--	9.6	--	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 Characteristics

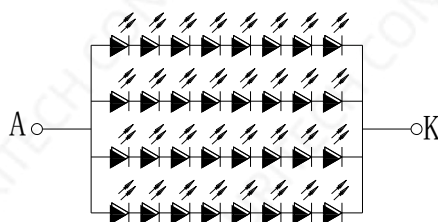
The back-light system is an edge-lighting type with 32 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V_F	22.4	--	25.6	V	-
Forward current	I_F	--	160	--	mA	-
Luminance(With LCD+CG)	L_v	--	1000	--	cd/m ²	-
LED life time	N/A	--	20,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at $I_L=40\text{mA/LED}$. The LED life time could be decreased if operating I_L is larger than 45mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

Pin No.	Symbol	LCM Description	remarks
1	LED A	POWER SUPPLY+ FOR BACKLIGHT ANODE	
2	LED A	POWER SUPPLY+ FOR BACKLIGHT ANODE	
3	LED K	POWER SUPPLY- FOR BACKLIGHT CATHODE	
4	LED K	POWER SUPPLY- FOR BACKLIGHT CATHODE	
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	B7	Blue data	
13	B6	Blue data	
14	B5	Blue data	
15	B4	Blue data	
16	B3	Blue data	
17	B2	Blue data	
18	B1	Blue data	
19	B0	Blue data	
20	G7	Green data	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	
24	G3	Green data	
25	G2	Green data	
26	G1	Green data	
27	G0	Green data	
28	R7	Red data	
29	R6	Red data	
30	R5	Red data	
31	R4	Red data	
32	R3	Red data	
33	R2	Red data	
34	R1	Red data	
35	R0	Red data	

36	GND	Power ground	
37	DCLK	Pixel clock signal in RGB I/F	
38	GND	Power ground	
39	SHLR	Source output shift horizontal direction select: ‘H’ : S[1]->S[2]->.....>S[1920] (Default) ‘L’ : S[1920]->S[1919]->.....>S[1]	
40	UPDN	Gate output shift vertical direction select: ‘H’ : Scan Up to Down ‘L’ : Scan Down to Up	
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	

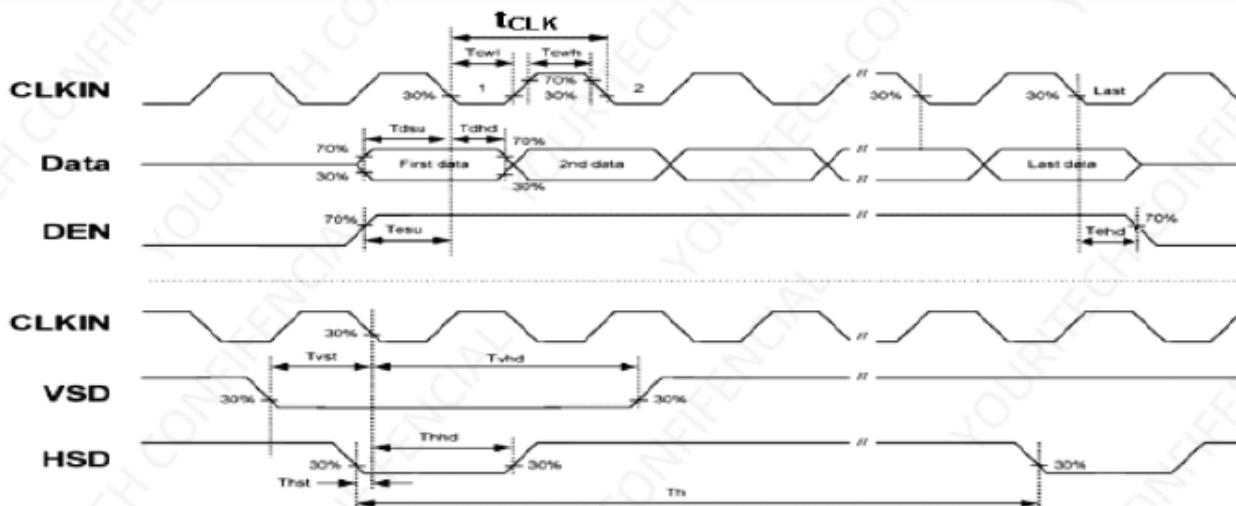
6. Timing Characteristics

6.1 Input Timing Table

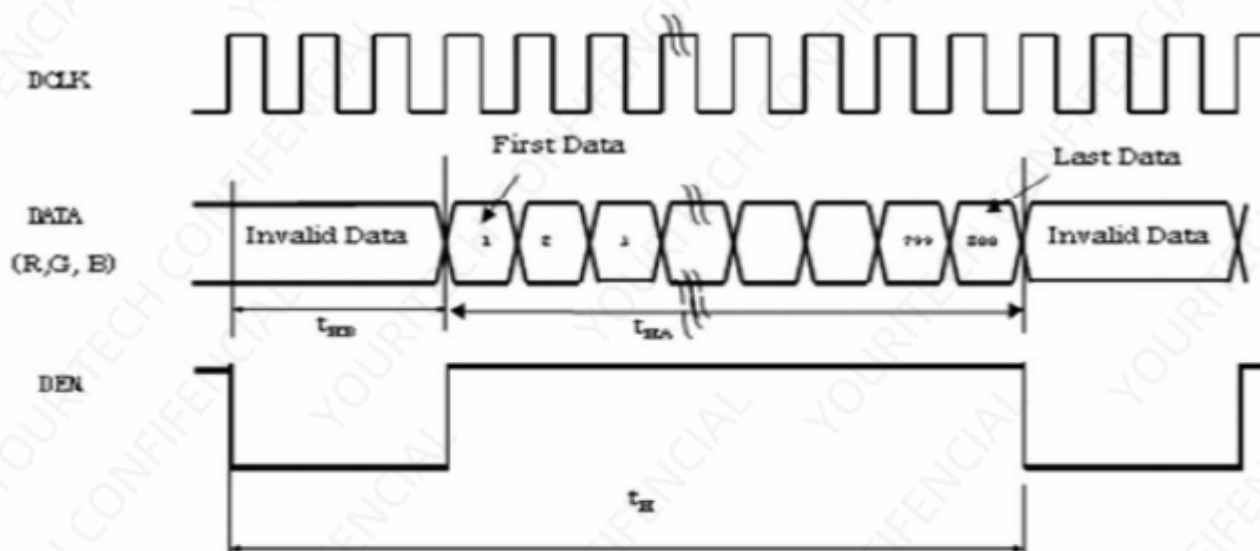
	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DE MODE	Dot Clock	1/tCLK	45	51.2	57	MHz	
	DCLK Pulse Duty	T _{cwh}	40	50	60	%	
	Horizontal Total Time	t _H	1324	1344	1364	tCLK	
	Horizontal Effective Time	t _{HA}	1024			tCLK	
	Horizontal Blank Time	t _{HB}	300	320	340	tCLK	
	Vertical Total Time	t _V	625	635	645	tH	
	Vertical Effective Time	t _{VA}	600			tH	
	Vertical Blank Time	t _{VB}	25	35	45	tH	
SYNC MODE	Horizontal Total Time	T _H	1324	1344	1364	tCLK	
	Horizontal Pulse Width	T _{hpw}		20	-	tCLK	t _{hb} + t _{hpw} = 160DCLK is fixed
	Horizontal Back Porch	T _{hb}		140	-	tCLK	
	Horizontal Front Porch	T _{hfp}	140	160	180	tCLK	
	Horizontal Effective Time	T _{HA}	1024			tCLK	
	Vertical Total Time	T _V	625	635	645	tH	
	Vertical Pulse Width	T _{vpw}		3	-	tH	t _{vpw} + t _{vb} = 23t _H is fixed
	Vertical Back Porch	T _{vb}	-	20	-	tH	
	Vertical Front Porch	T _{vfp}	2	12	22	tH	
	Vertical Valid	T _{vd}	600			tH	

6.2 Input Clock and Data Timing Diagram

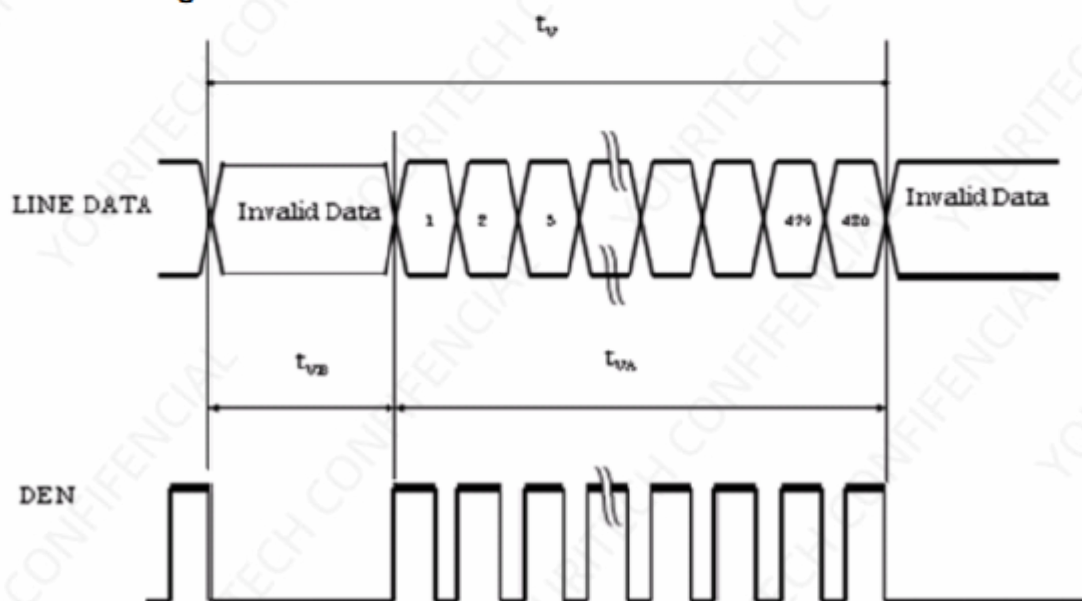
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
DVDD Power On Slew Rate	TPOR	-	-	20	ms	From 0V to 90% DVDD
RSTB Pulse Width	TRst	50	-	-	us	DCLK=65MHz
DCLK Cycle Time	T _{cph}	14	-	-	ns	
DCLK Pulse Duty	T _{cwh}	40	50	60	%	
VSD Setup Time	T _{vst}	5	-	-	ns	
VSD Hold Time	T _{vhd}	5	-	-	ns	
HSD Setup Time	T _{hst}	5	-	-	ns	
HSD Hold Time	T _{hhd}	5	-	-	ns	
Data Setup Time	T _{dsu}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
Data Hold Time	T _{dhd}	5	-	-	ns	D0[7:0], D1[7:0], D2[7:0] to DCLK
DEN Setup Time	T _{esu}	5	-	-	ns	
DEN Hold Time	T _{ehd}	5	-	-	ns	



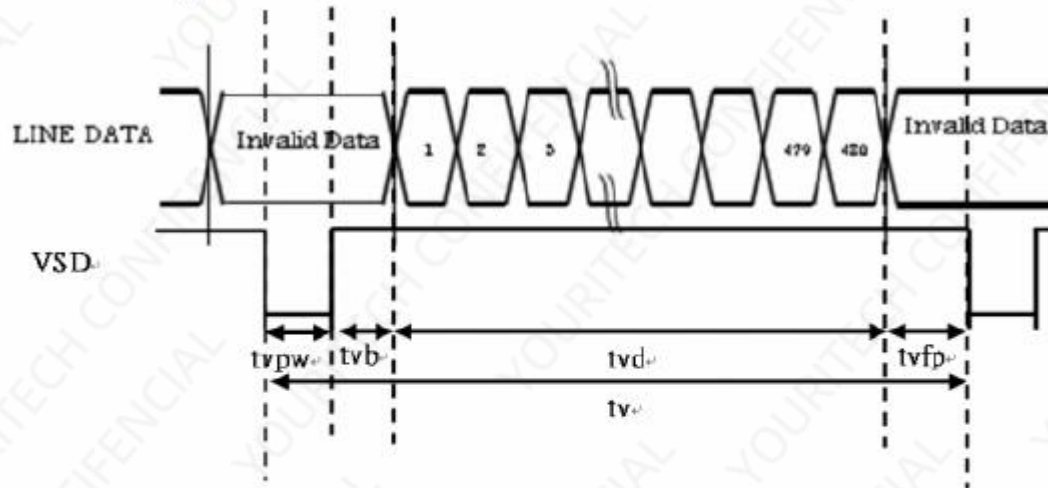
DE Mode
Horizontal timing :



Vertical timing :

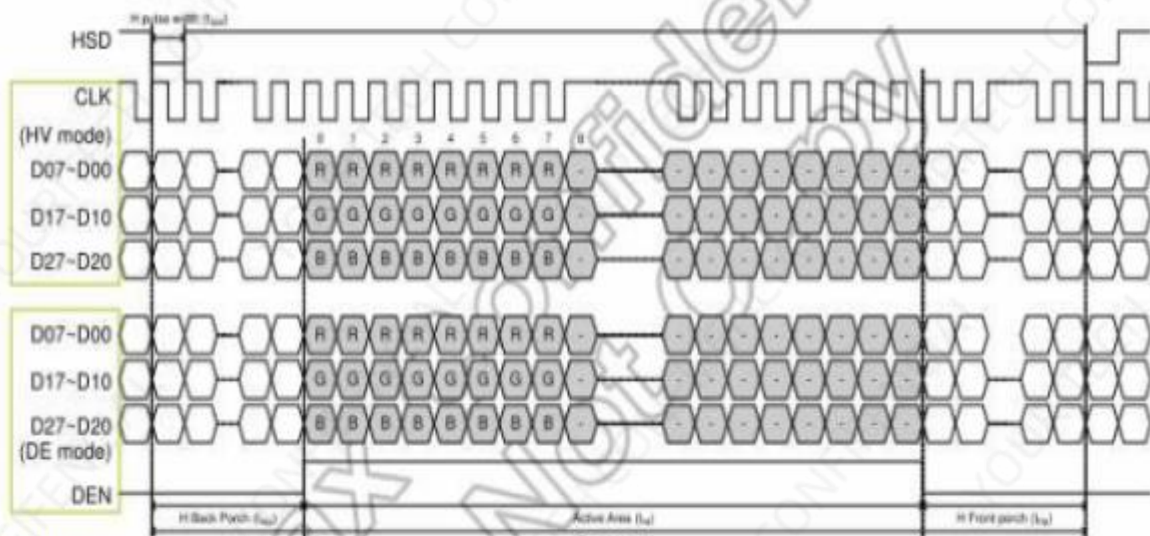


Vertical timing :

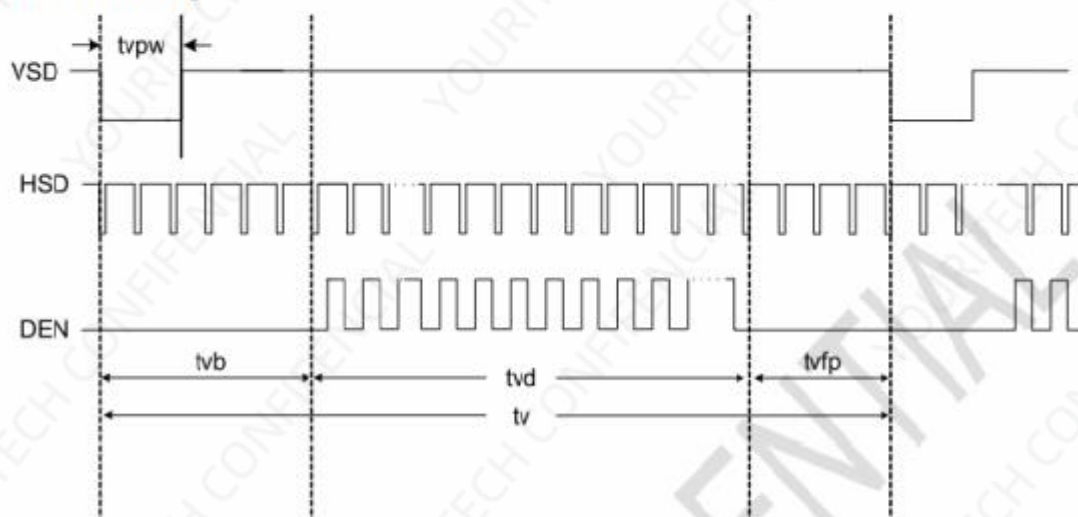


Data Input Format

Horizontal timing :



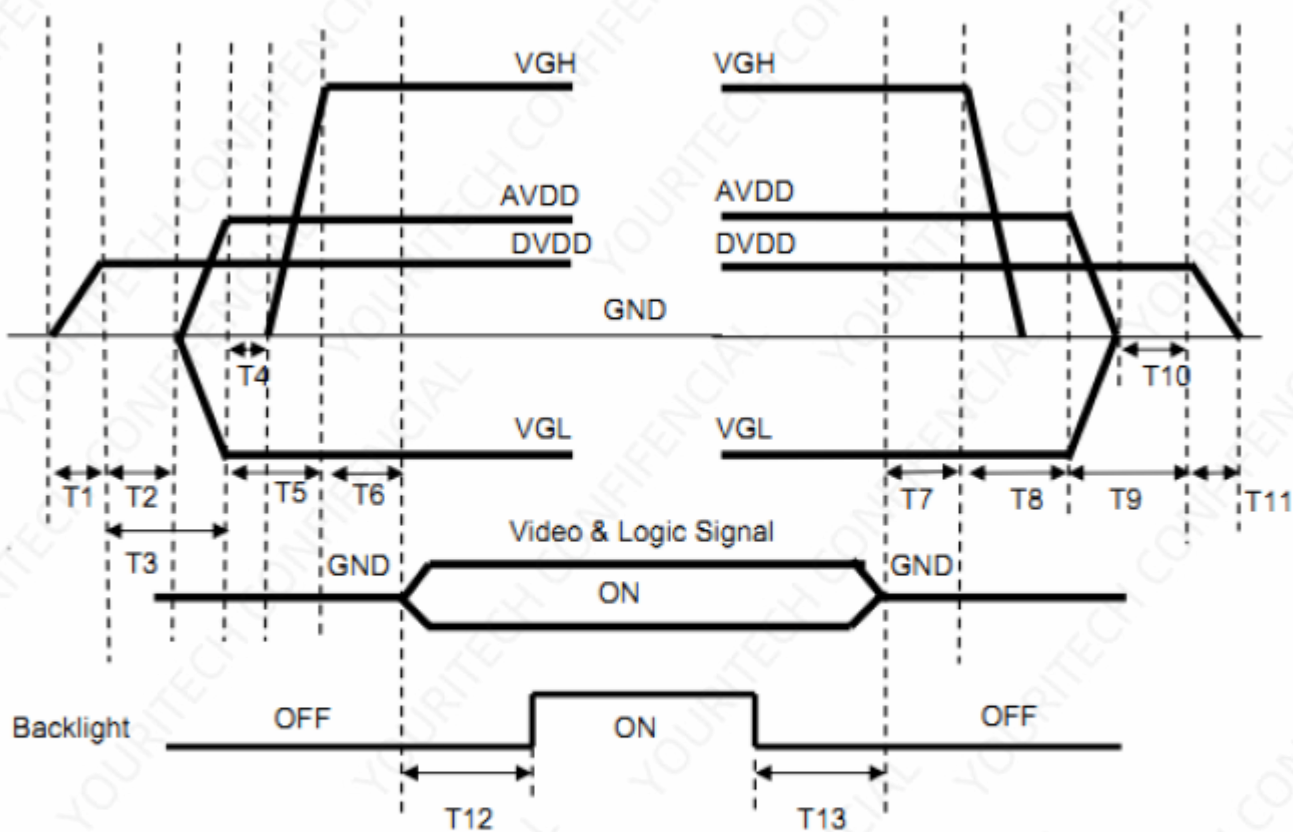
Vertical timing :



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



$0 < T1 \leq 10\text{ms}$
 $T2 > 0\text{ms}$
 $T3 > 20\text{ms}$
 $T4 > 0\text{ms}$
 $T5 > 10\text{ms}$
 $0 < T6 \leq 10\text{ms}$
 $T12 \geq 200\text{ms}$

$T7 > 0\text{ms}$
 $T8 > 0\text{ms}$
 $T9 > 0\text{ms}$
 $T10 > 0\text{ms}$
 $0 < T11 \leq 10\text{ms}$
 $T13 \geq 200\text{ms}$

Reset Input Timing:

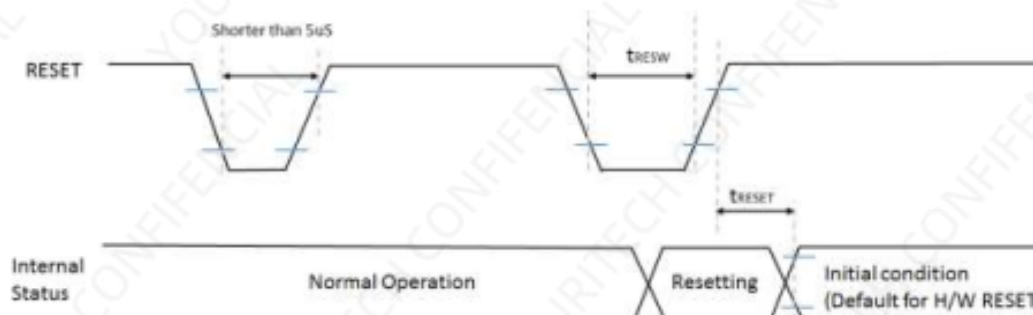


Figure 4-13 Reset Input Timing

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 $\theta_x=\theta_y=0^\circ$ (Center) 2.At 25°C	4.73	5.27	--	%	Center	All left side data are based on INX' s following condition (at 25 °C) 1. LC : AAS 2.BLU : under C_light 3.Machine : DMS-900 V LC : Vbright $\geq$ 5.3V Vdark $\leq$ 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.	θ_{x+}	Center CR>10	80	--	--	deg	Note (3)	
		θ_{x-}		80	--	--			
	Ver.	θ_{y+}		80	--	--			
		θ_{y-}		80	--	--			
CF only Chromaticity (CIE1931)	Red	Rx	Viewing normal angle $\theta_x=\theta_y=0^\circ$				--	--	CF Glass with C-light
		Ry					--	--	
	Green	Gx					--	--	
		Gy					--	--	
	Blue	Bx					--	--	
		By					--	--	
	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):

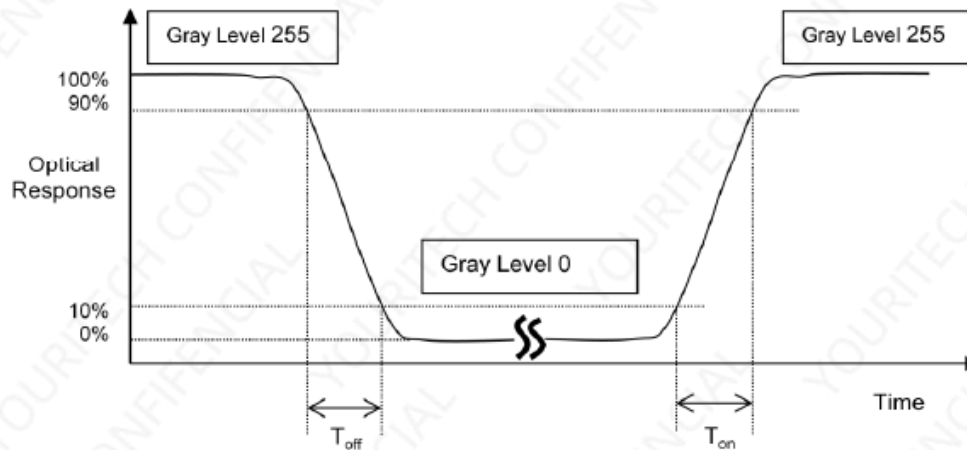
The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

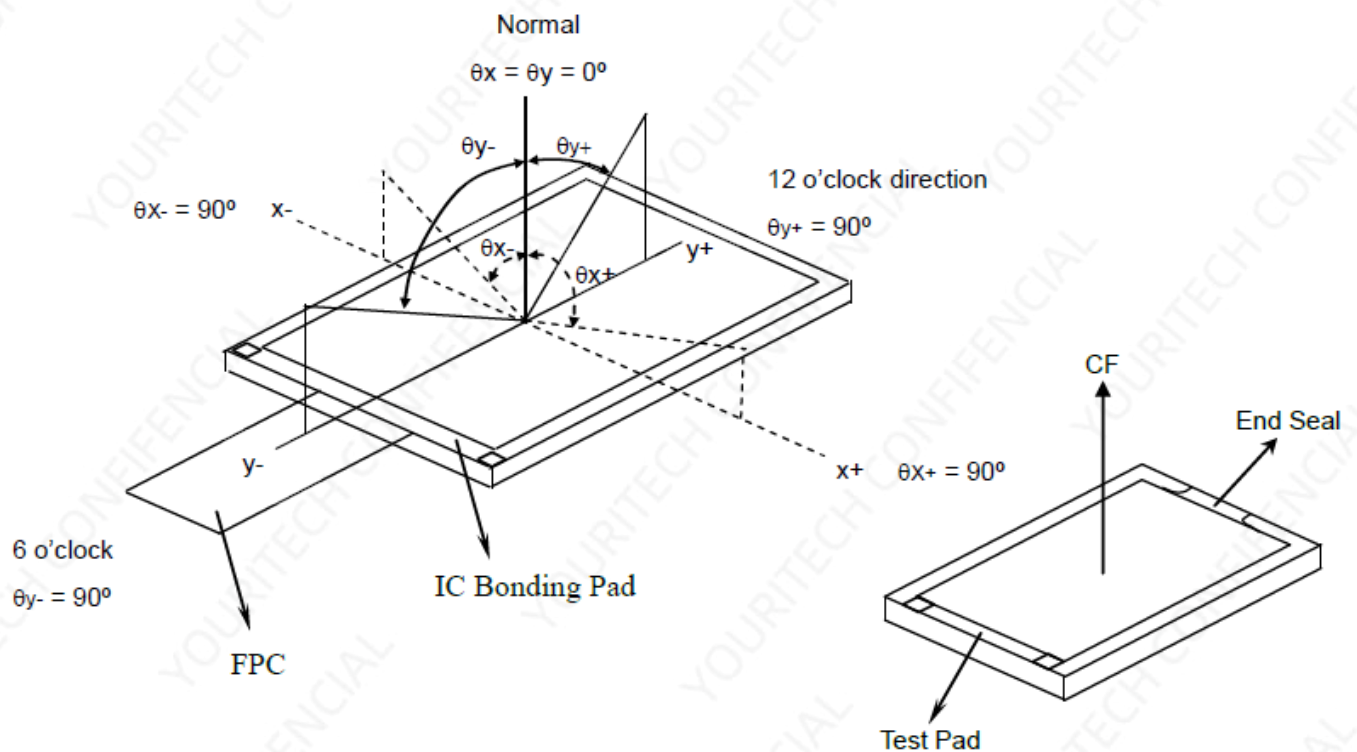
L 255 : Luminance of gray level 255

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	+85°C / 96H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Temp. Operating	+80°C / 96H	
4	Low Temp. Operating	-30°C / 96H	
5	High Temperature / Humidity storage	60°C x 90%RH / 96H	
6	Thermal and cold shock	Static state, -30°C (30min) ~80°C (30min), 50 cycles	

9. Packing Method----TBD

- END -