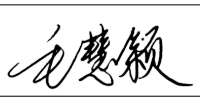
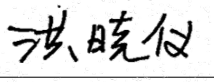
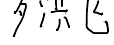
PRODUCT SPECIFICATION

CDTECH Model: **S121IWX10HD-DC20**

CUSTOMER Model: -

Description: **12.1 ” TFT-LCD Module with CTP**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2025.9.10	2025.9.10	2025.9.10

CUSTOMER APPROVAL	SIGNATURE	DATE

Record of Revisions

Version	Revise Date	Description	Page
1.0	2025-9-10	First Release	-

Contents

1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	12.1	inch
Number of Pixels	1280 (H) RGB x 800 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	-
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	297.7 (H) x 200.6 (V) x 9.67 (D)	mm
Active Area	260.35 (H) x 162.72 (V)	mm
Pixel Pitch	0.2034 (H) x 0.2034 (V)	mm
Driver IC	GH8323-i1	-
Operation Temperature	-20~70	℃
Storage Temperature	-30~80	℃

1.2 Touch Panel Information

Item	Specification
Touch Structure	G+G
Bonding Type with LCM	Perimeter Bonding
Driver IC	ILI2511
Interface	I²C
Touch Count Max	10 Points
Surface treatment	-
Surface hardness	6H
I2C slave address	0X82/0X41
Origin of coordinate	Top Left Corner

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	3.6	V	Note 1

Note 1:Permanent damage may occur to the LCD module if beyond this specification.
Functional operation should be restricted to the conditions described under normal operating conditions.

3. Elecrical Characteristics

3.1 Recommended Operating Condition for TFT LCD

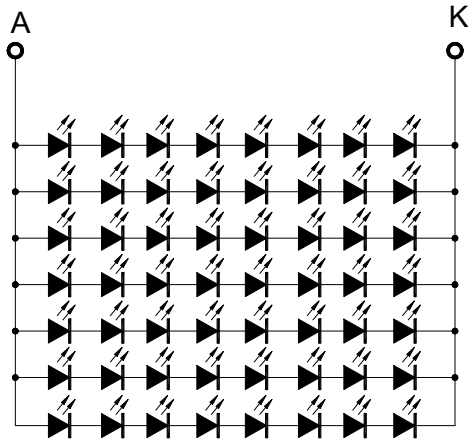
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I_{VDD}	-	280	365	mA	VDD=3.3V（RED）
Logic input voltage	VIH	0.7*VDD	-	VDD	V	
	VIL	GND	-	0.3*VDD	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I_F	-	360	-	mA	
Driving Voltage	V_F	21.6	-	27.2	V	
Power consumption	W_{BL}	7.776	-	9.792	W	
LED Life-Time	N/A	-	50,000	-	Hours	Ta=25℃ Note 1

Note 1:LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :



3.3 Touch Panel

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply voltage	TP_VDD	-	3.3	-	V	
Analog supply current	I_{TP_VDD}	-	100	-	mA	TP_VDD=3.3V
Input high-level voltage	VIH	0.7*TP_VDD	-	TP_VDD	V	
Input low -level voltage	VIL	GND	-	0.3*TP_VDD	V	

4. Interface Pin Assignment

4.1 LCM Pin Assignment

No.	Symbol	Description
1	NC	No connection
2	VDD	Power supply
3	VDD	Power supply
4	NC	No connection
5	NC	No connection
6	NC	No connection
7	GND	Ground
8	Rxin0-	- LVDS differential data input
9	Rxin0+	+ LVDS differential data input
10	GND	Ground
11	Rxin1-	- LVDS differential data input
12	Rxin1+	+ LVDS differential data input
13	GND	Ground
14	Rxin2-	- LVDS differential data input
15	Rxin2+	+ LVDS differential data input
16	GND	Ground
17	RxCLK-	-LVDS differential clock input
18	RxCLK+	+LVDS differential clock input
19	GND	Ground
20	Rxin3-	- LVDS differential data input
21	Rxin3+	+ LVDS differential data input
22	GND	Ground
23	SWDIO(NC)	No connection
24	SWCLK(NC)	No connection
25	GND	Ground
26	NC	No connection
27	NC	No connection
28	LVBIT	6-bit/8-bit input select for LVDS mode.Normally pull high LVBIT: H → Function: 8-bit(default); L → 6-bit
29	NC	No connection
30	GND	Ground
31	LEDK-	Power for LED backlight (Cathode)
32	LEDK-	Power for LED backlight (Cathode)
33	NC	No connection

34	NC	No connection
35	NC	No connection
36	NC	No connection
37	NC	No connection
38	NC	No connection
39	LEDA+	Power for LED backlight (Anode)
40	LEDA+	Power for LED backlight (Anode)

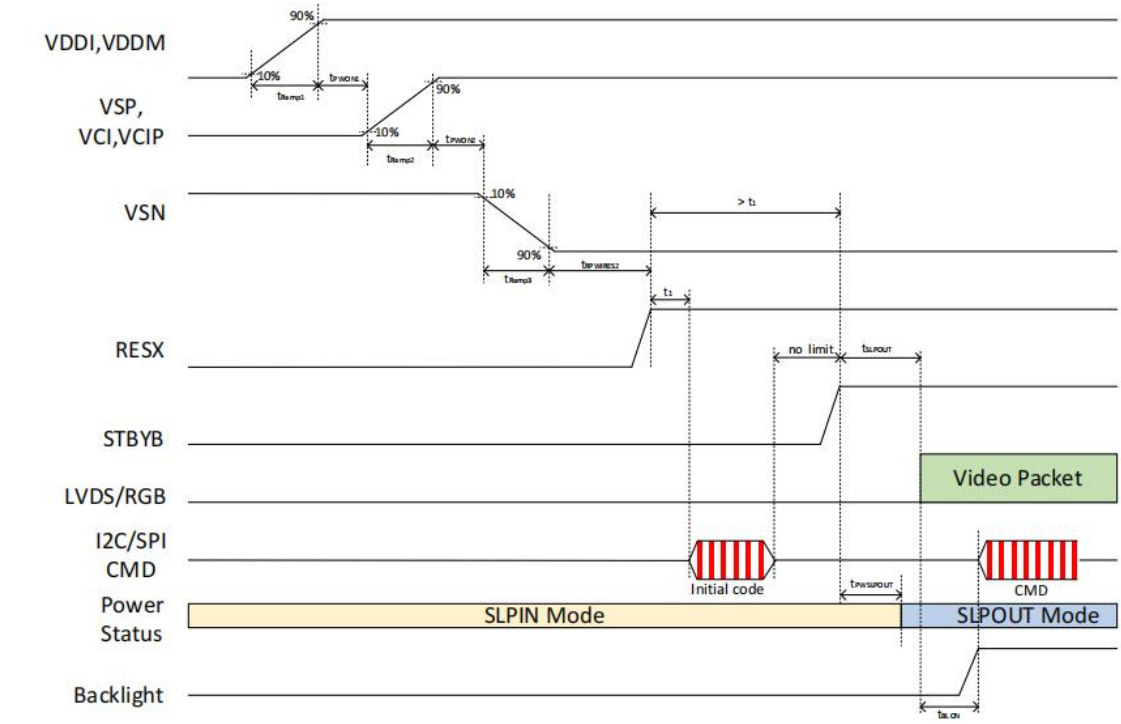
4.2 Touch FPC Pin Assignment

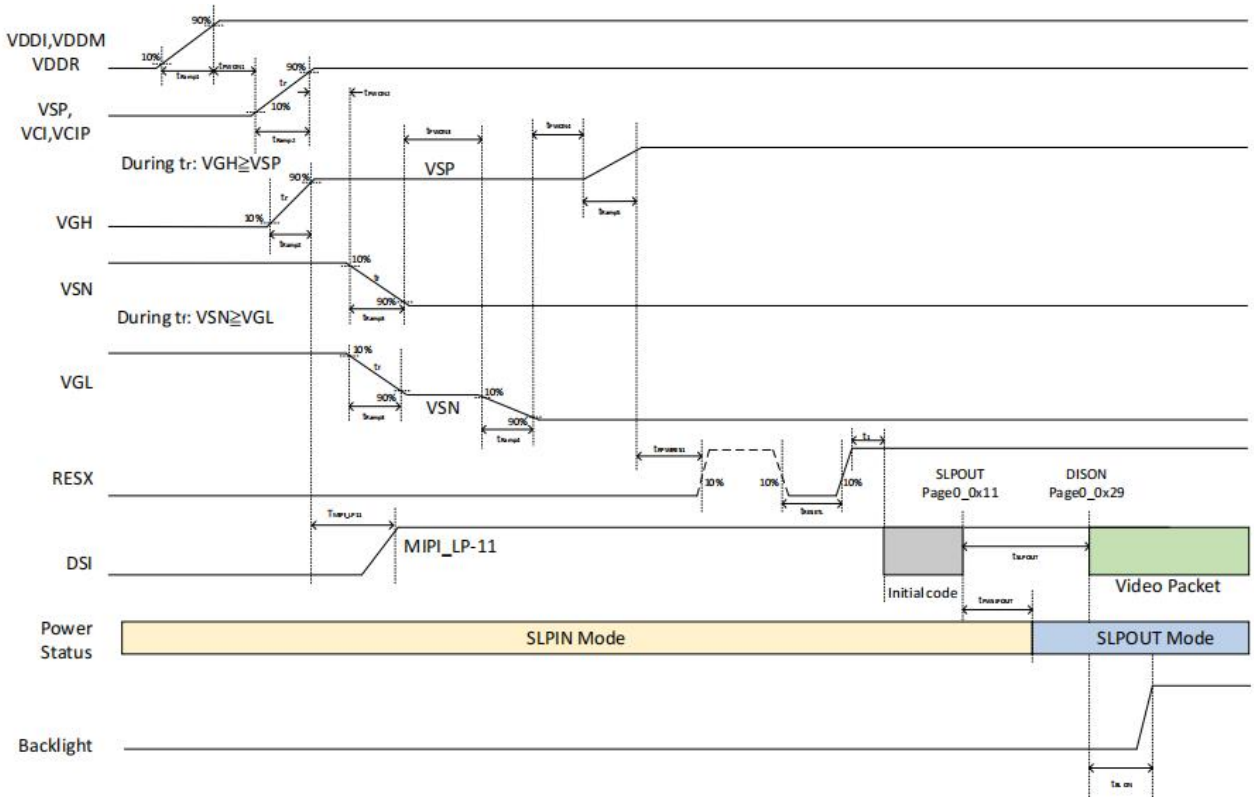
No.	Symbol	Description
1	GND	Ground
2	VDD	Power supply for CTP
3	SCL	I2C clock input for CTP
4	SDA	I2C data input and output for CTP
5	INT	Interrupt signal for CTP
6	RST	Reset Pin for CTP

5. Interface Characteristics

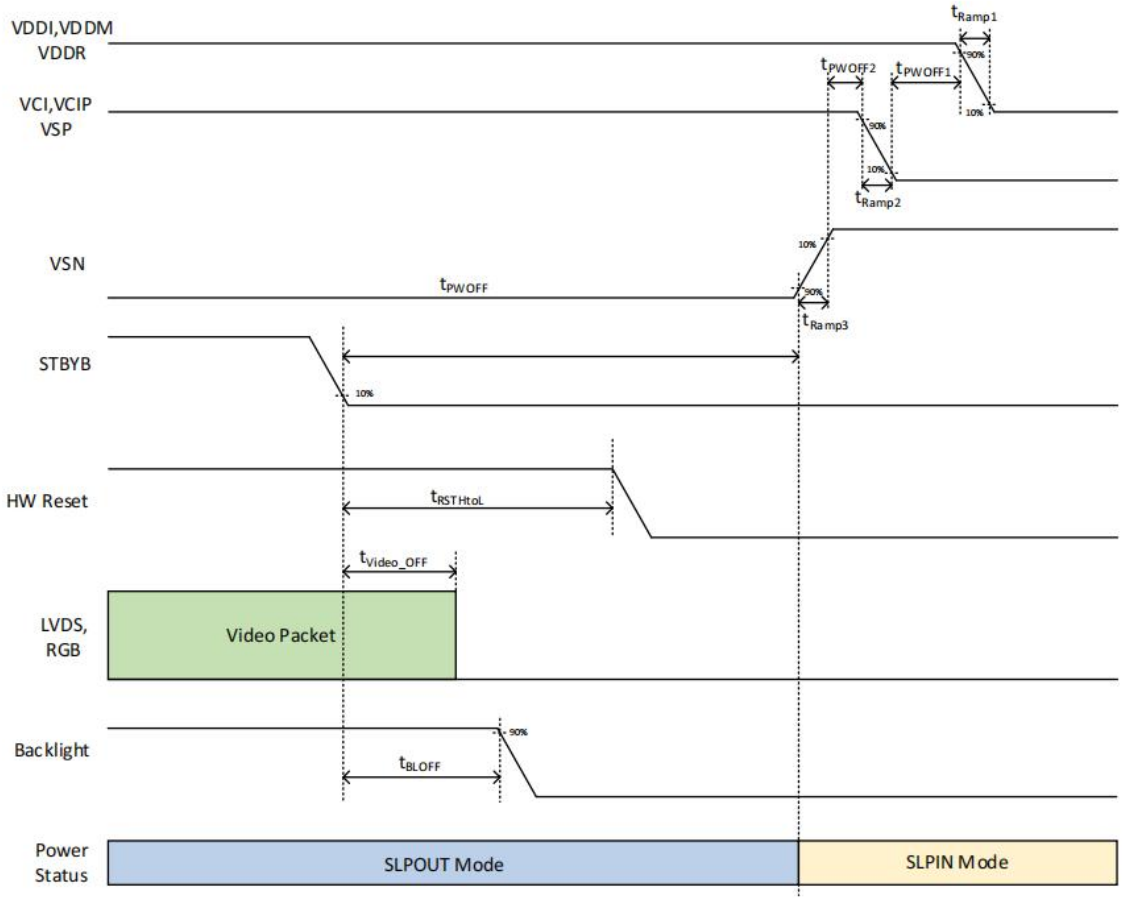
5.1 Power Sequence

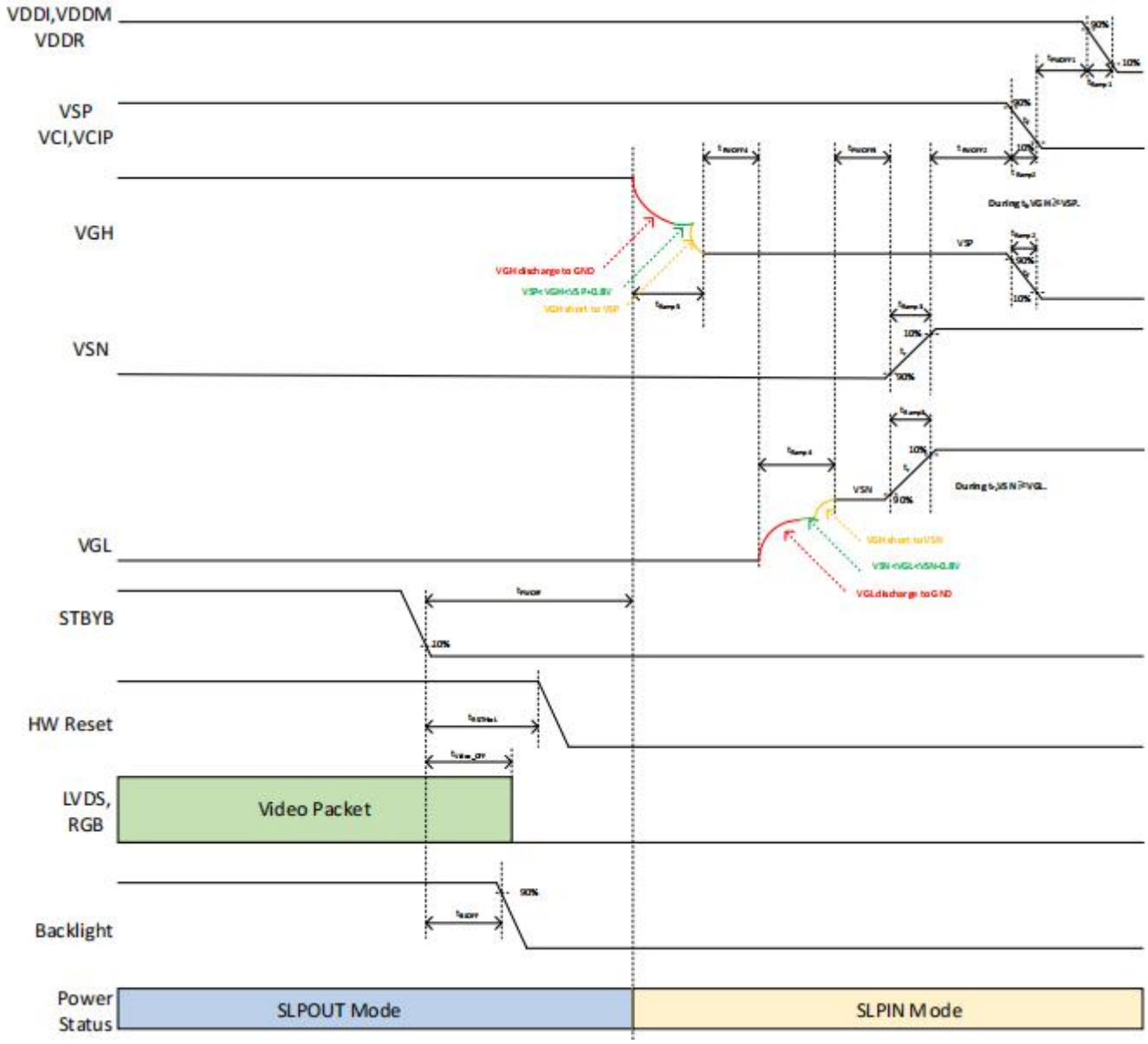
Power on sequence





Power off sequence




VDDI,VDDM
VDDR
VSP
VCI,VCIP
VGH
VSN
VGL
STBYB
HW Reset
LVDS,
RGB
Video Packet
Backlight
Power
Status
SLPOUT Mode
SLPIN Mode

5.2 DC Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Differential input high threshold voltage	Rx_{VTH}	Rx_{VCM}=1.2V	+0.1	0.2	0.3	V
Differential input low threshold voltage	Rx_{VTL}		-0.3	-0.2	-0.1	V
Input voltage range (singled-end)	Rx_{VIN}		0.7	-	1.7	V
Differential input common mode voltage	Rx_{VCM}	|VID|=0.2	1	1.2	1.4	V
Differential input impedance	ZID		80	100	125	ohm
Differential input voltage	|VID|		0.2	-	0.6	V
Differential input leakage current	I_{LCLVDS}		-10	-	+10	uA
LVDS Digital Stand-by Current	I_{STLVDS}	Clock & all Functions are stopped	-	TBD	-	uA

Table 10.3: LVDS DC characteristic

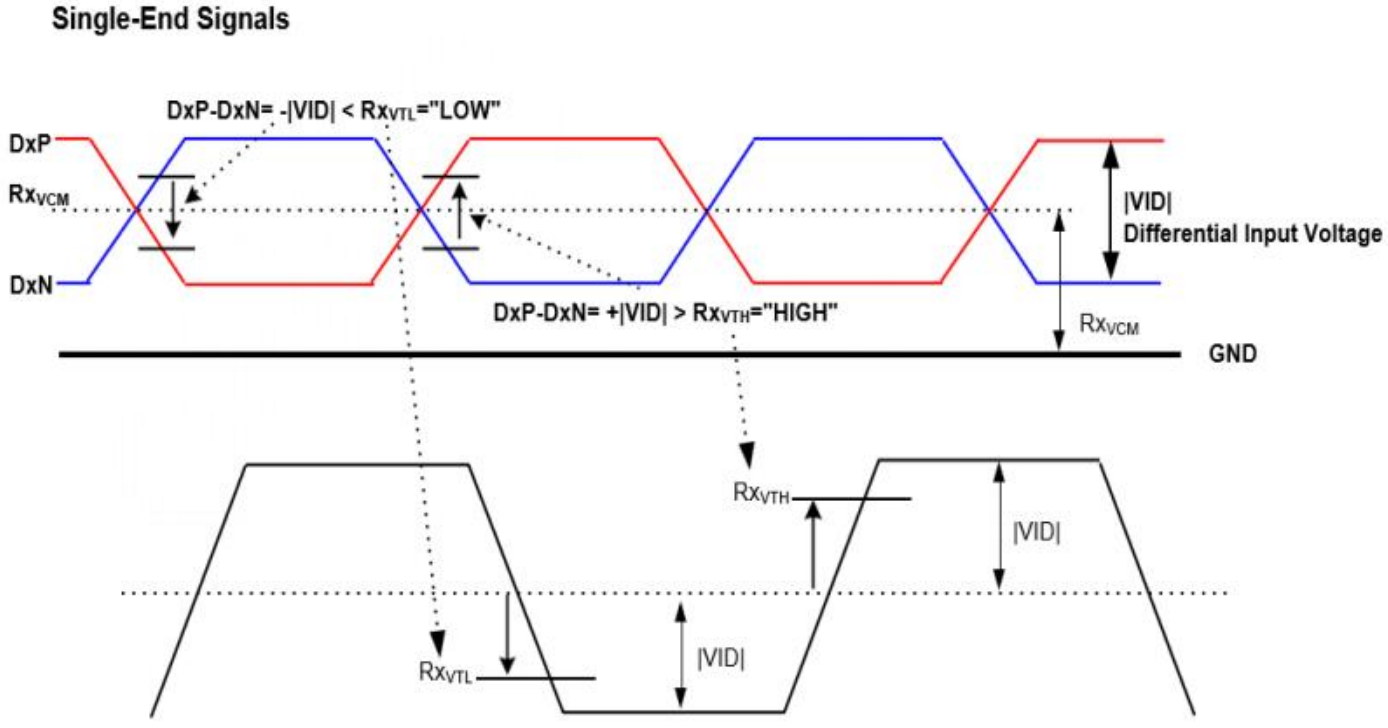


Figure 10.1: LVDS input timings

5.3 AC Characteristics

5.3.1 Reset input timings

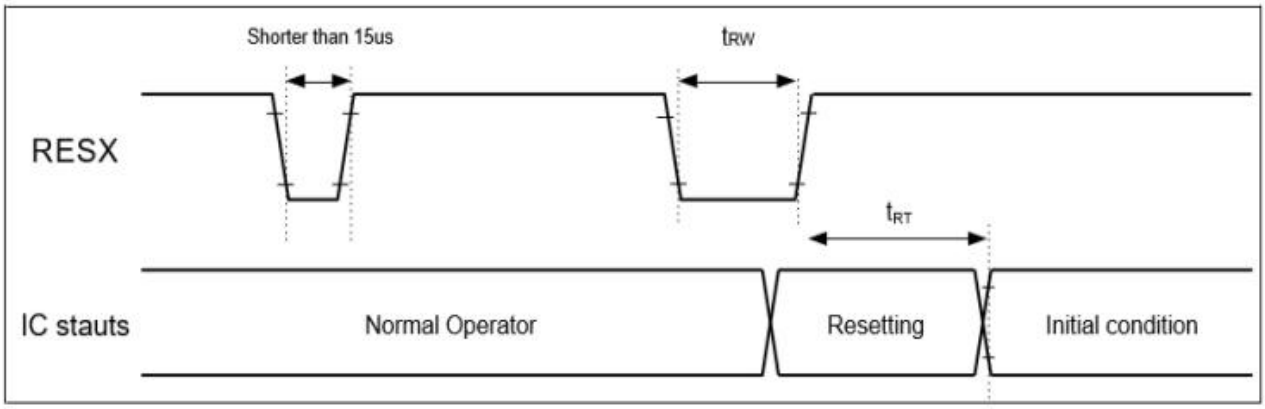


Figure 10.2: Reset input timings

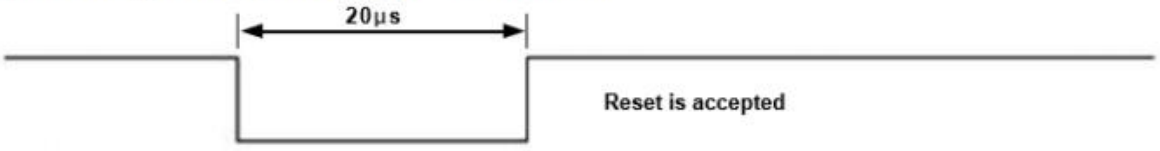
Symbol	Parameter	Related pins	Min.	Max.	Unit
t_{RW}	Reset "L" pulse width(2)	RESX	20	-	µs
t_{RT}	Reset complete time(3)	-	-	5(5)	ms
		-	-	120(6) (7) (8)	ms

Note:

1. The reset complete time also required time for loading ID bytes from OTP to registers. This loading is done every time when there is HW reset complete time (t_{RT}) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 15 µs	Reset Rejected
Longer than 20 µs	Reset
Between 15 µs and 20 µs	Reset Start

3. During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then returns to Default condition for H/W reset.
4. Spike Rejection also applies during a valid reset pulse as shown below:



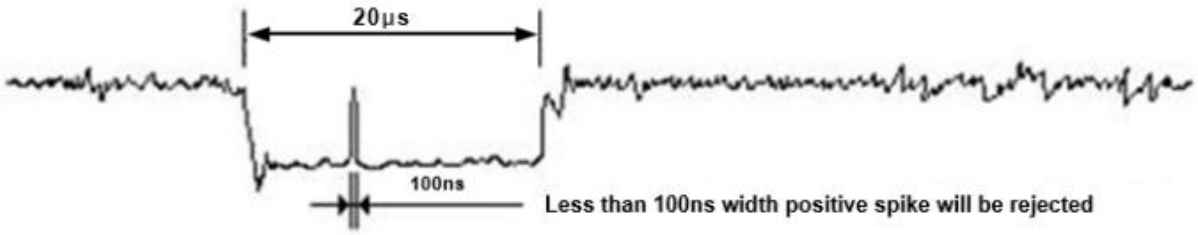
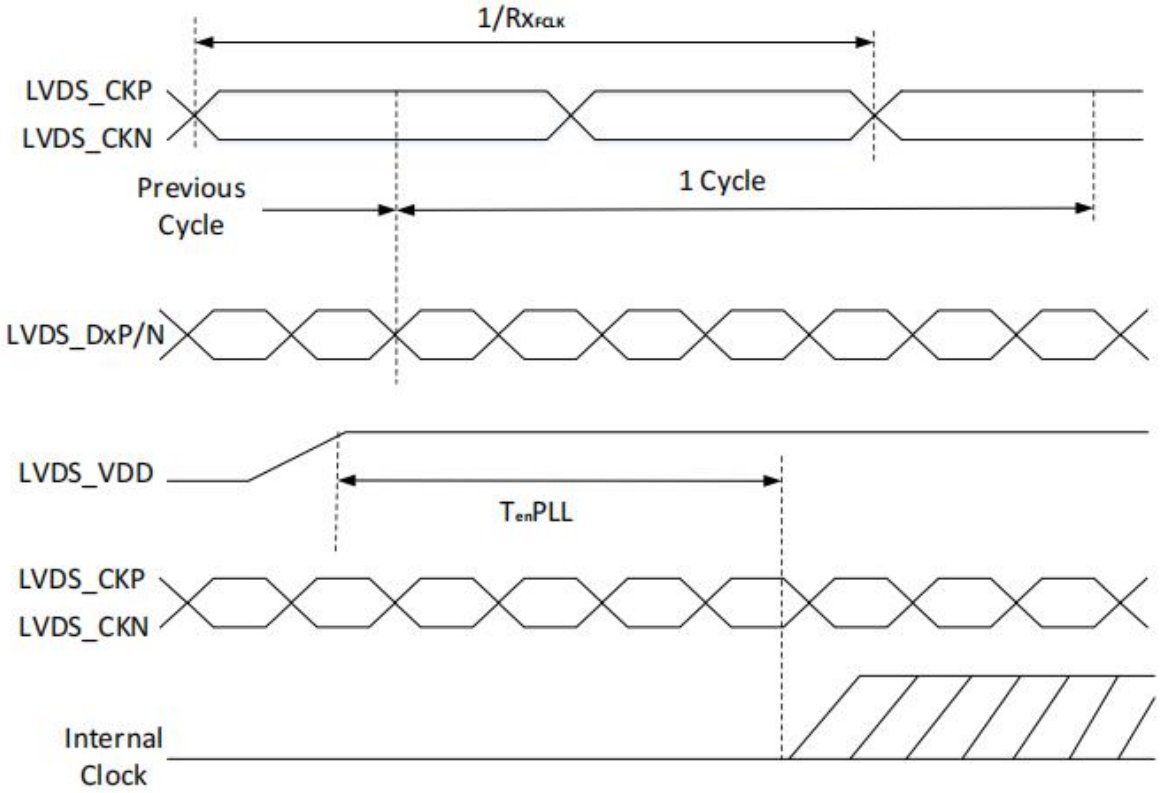


Table 10.4: Reset timings

1. When Reset is applied during Sleep In Mode.
2. When Reset is applied during Sleep Out Mode.
3. is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.
4. After Sleep Out command, it is necessary to wait 120msec then send RESX.

5.3.2 LVDS electronic characteristics



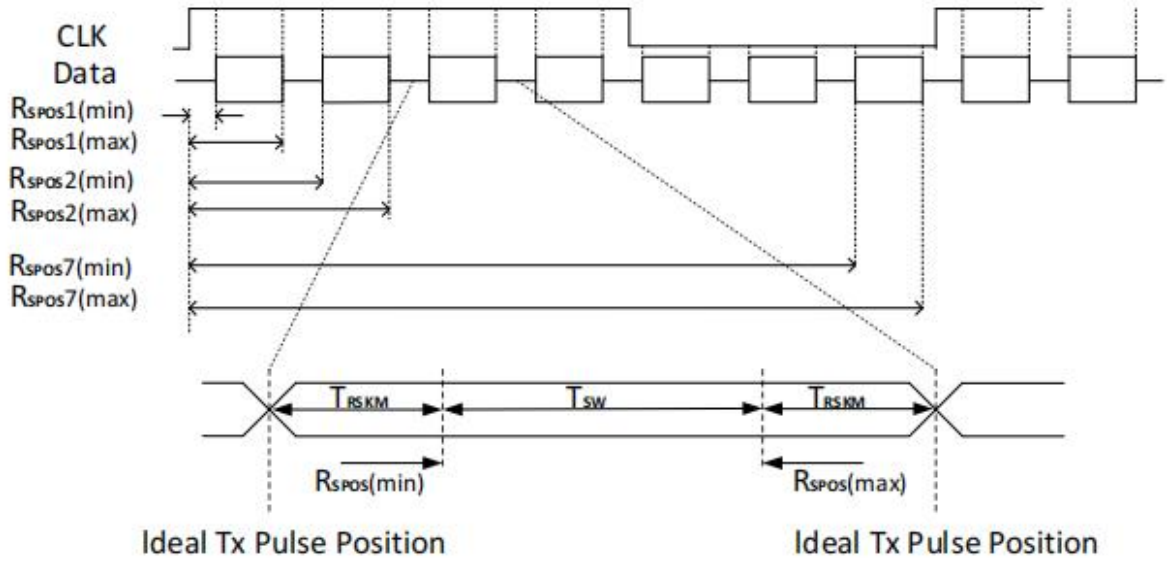


Figure 10.4: LVDS AC characteristics

TSW: Strobe width (Internal data sampling window)

Rspos : Receiver strobe position

TRSKM : Receiver strobe margin

Signal	Symbol	Min.	Typ	Max	Unit	Description
Clock frequency	Rx_{FCLK}	30		TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	50		-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	$4/(7x\ Rx_{FCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7xRx_{FCLK})$	-	ns	
PLL wake-up time	$T_{en}PLL$	-		150	us	

Table 10.6: LVDS AC characteristics

5.4 LVDS interface

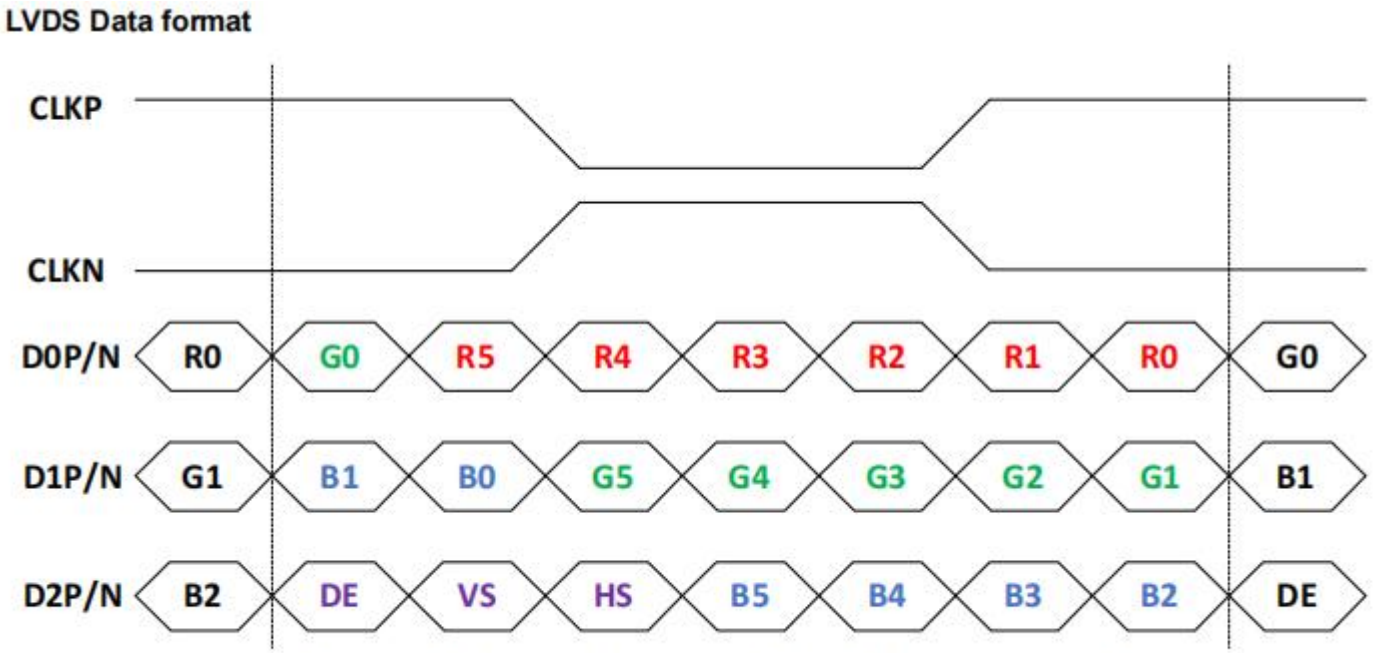


Figure 6.10: 6-bit LVDS input (IM[1:0]=01, LANE[1:0]=10, LVFMT=Don't care)

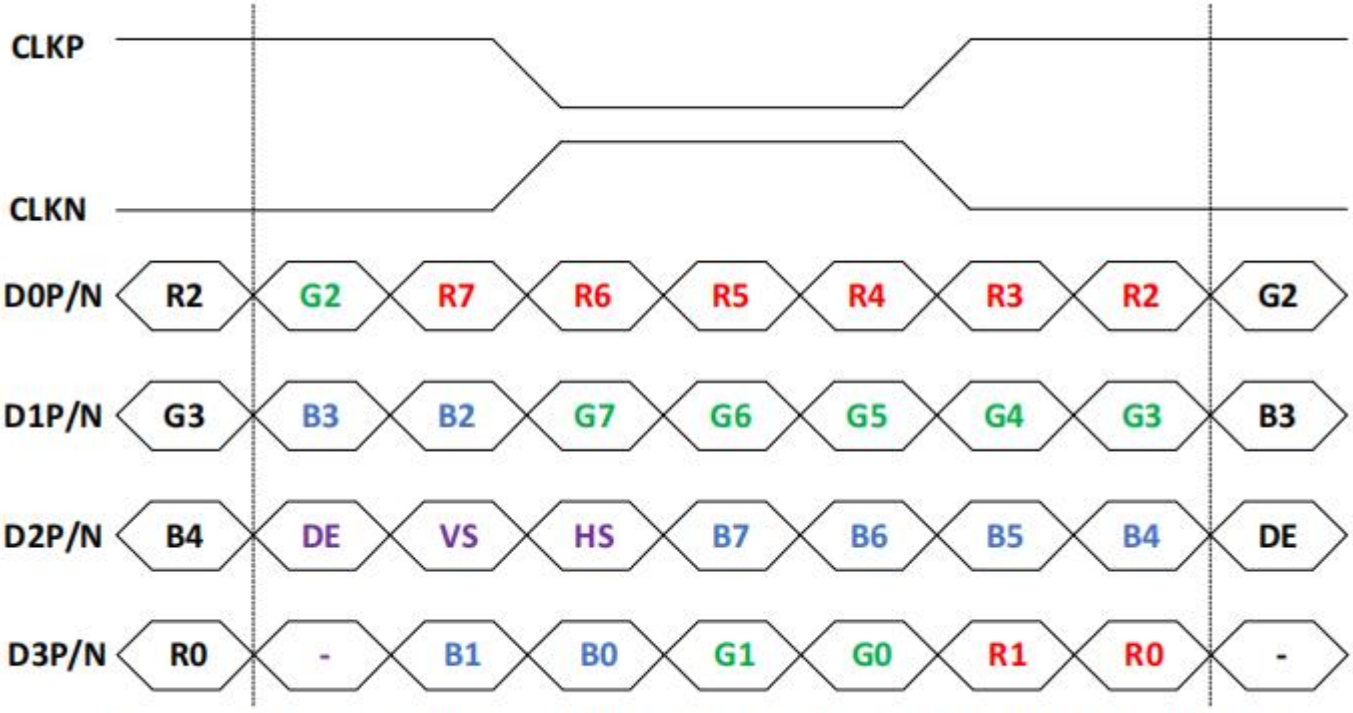


Figure 6.11: 8-bit LVDS input (IM[1:0]=01, LANE[1:0]=11, LVFMT=1(JEIDA))

LVDS Input Timing Table

For 1280RGBx800

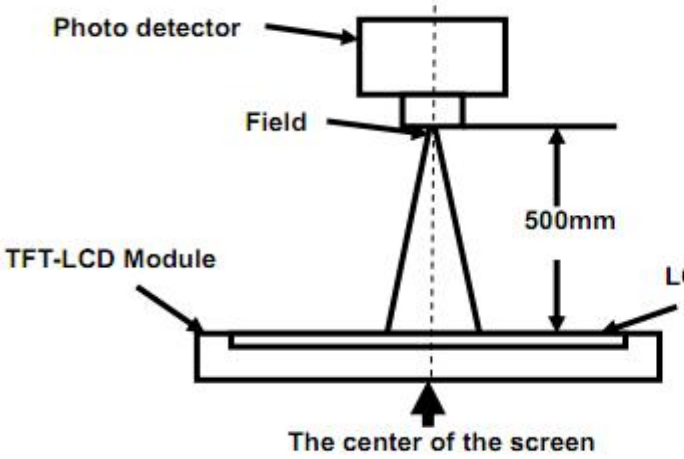
Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)		F_{DCLK}	66.3	72.4	78.9	MHz
HSYNC period time		T_H	1380	1440	1500	DCLK
Horizontal display area		T_{HD}	1280			DCLK
HSYNC pulse width	Min.	T_{HPW}	2			
	Typ.		-			
	Max.		40			
HSYNC back porch(with pulse width)		T_{HFP}	88	88	88	DCLK
HSYNC front porch		T_{HFP}	14	72	132	DCLK
VSYNC period time		T_v	824	838	872	H
Vertical display area		T_{VD}	800			H
VSYNC pulse width	Min.	T_{VPW}	2			H
	Typ.		-			
	Max.		20			
VSYNC back porch(with pulse width)		T_{VBP}	23	23	23	H
VSYNC front porch		T_{VFP}	1	15	49	H

6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	θ_T	Φ=90°(12 o'clock)	-	85	-	deg	Note2
	θ_B	Φ=270°(6 o'clock)	-	85	-	deg	Note2
	θ_L	Φ=180°(9 o'clock)	-	85	-	deg	Note2
	θ_R	Φ=0°(3 o'clock)	-	85	-	deg	Note2
Response Time	T_{ON}	Normal θ=Φ=0°	-	-	15	msec	Note4
	T_{OFF}		-	-	15	msec	Note4
Contrast Ratio	CR		-	1200	-	-	Note1 Note3
Color Chromaticity	W_X		TBD	TBD	TBD	-	Note1 Note5
	W_Y		TBD	TBD	TBD	-	Note1 Note5
Luminance	L		400	450	-	cd/m²	Note1 Note7
Luminance Uniformity	Y_U		70	80	-	%	Note1 Note6
NTSC	-		-	70	-	%	-

Note 1:Definition of optical measurement system

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Fig 1

Note 2: Definition of viewing angle range and measurement system.
viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

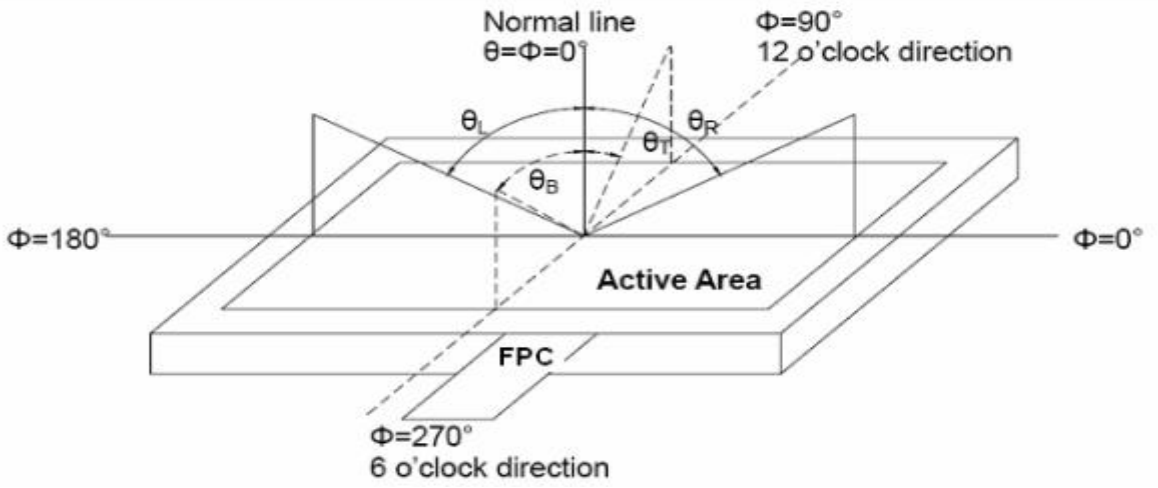


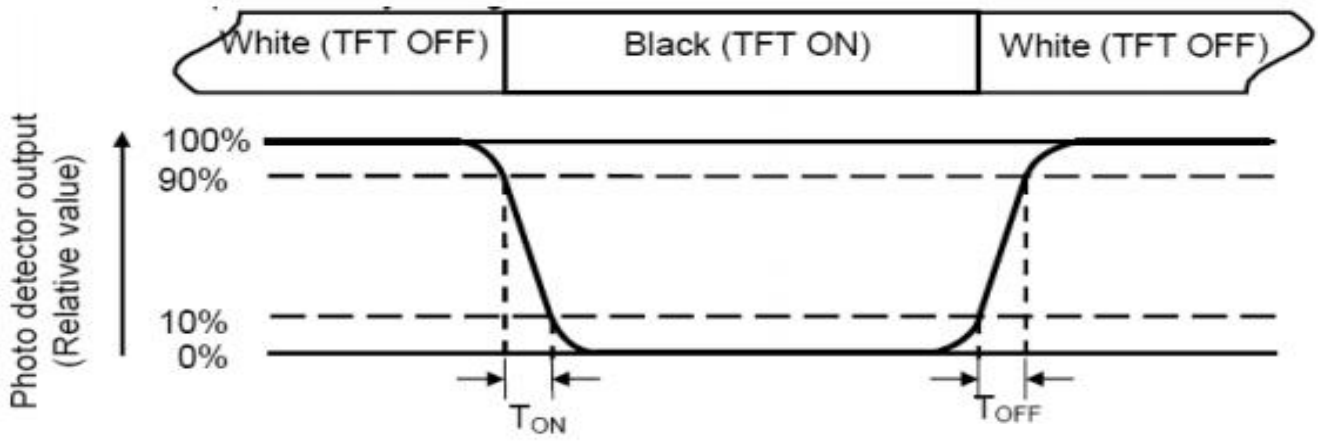
Fig 2　Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: 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.3-a/b

Note 7:Surface luminance is the luminance with all pixels displaying white.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3, ...,Pn)

For more information see FIG.3-a/b

Note 8:

H,V : Active area(see Figure b)

Light spot size ⌀ =5mm(BM-5) or ⌀ =7.7mm (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 SR-3A or BM-7 or compatible (see Figure 1).

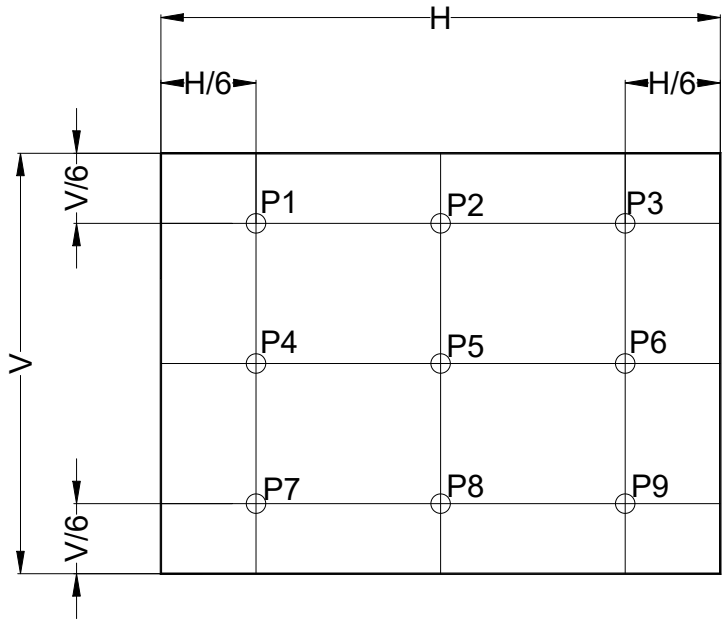


Fig. 3-b Definition of points

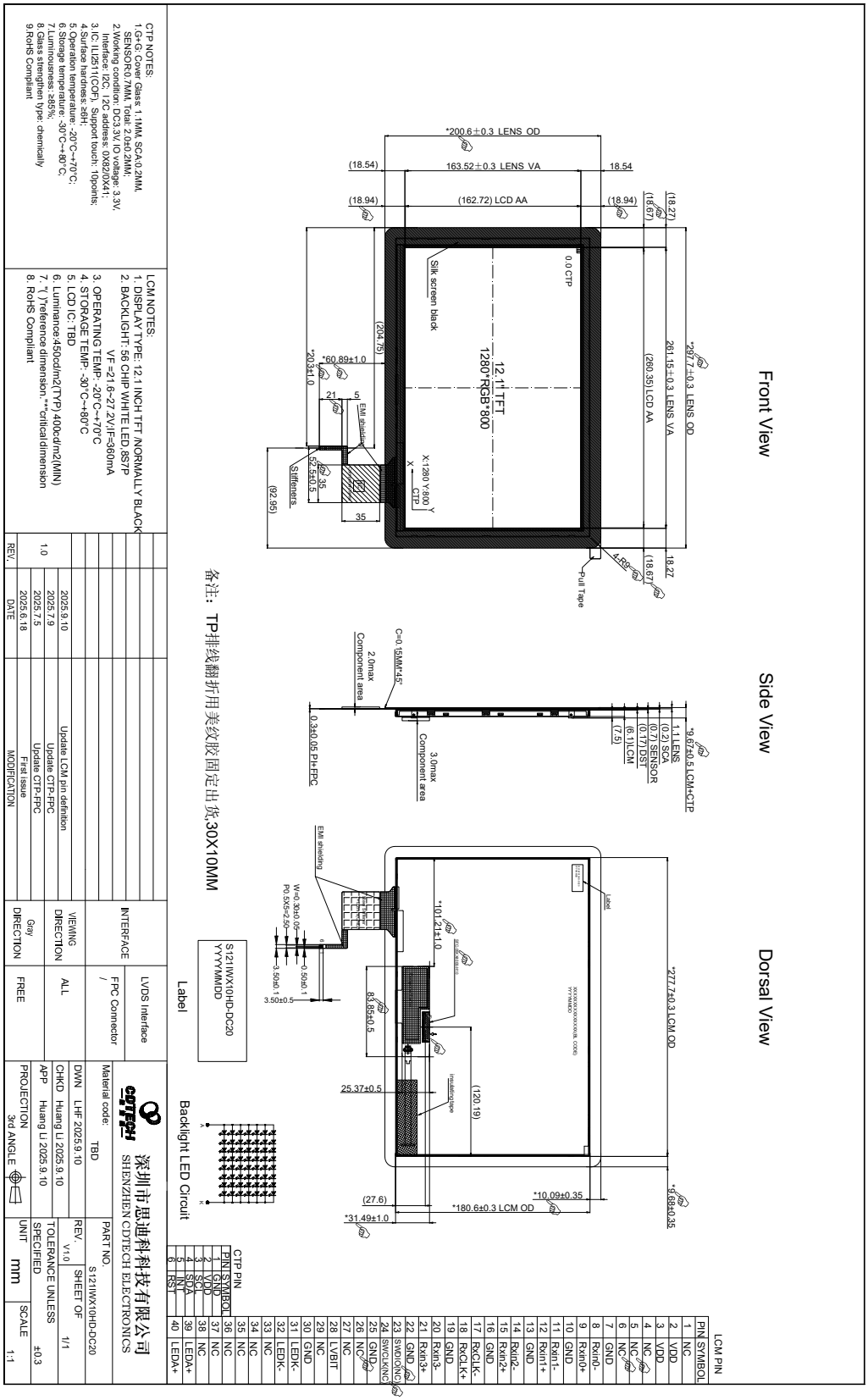
7. Reliability Test Items

Test Item	Test Conditions	
High Temperature Storage	Ta= +80℃	96hrs
Low Temperature Storage	Ta= -30℃	96hrs
High Temperature Operation	Ta= +70℃	96hrs
Low Temperature Operation	Ta= -20℃	96hrs
High Temperature and Humidity Storage	Ta= +60℃, 90% RH	96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +80℃/30 min for 20 cycles Start with cold temperature end with high temperature	
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF	
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.	
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction	
Package Drop Test	Height: 60 cm 1 corner, 3 edges, 6 surfaces	

Notes: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

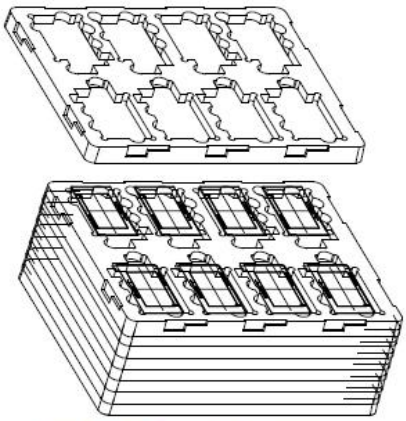
1). Air bubble in the LCD
2). Seal leak or Glass crack
3). Non display or abnormal display
4). Brightness reduction >50%

8. Mechanical Drawing

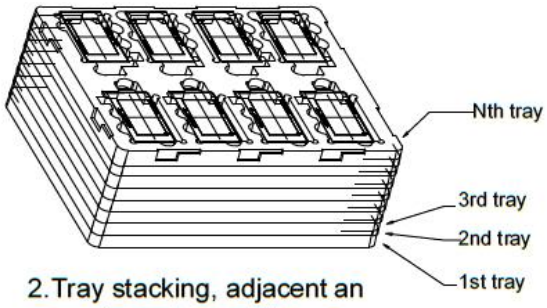


9. Packing

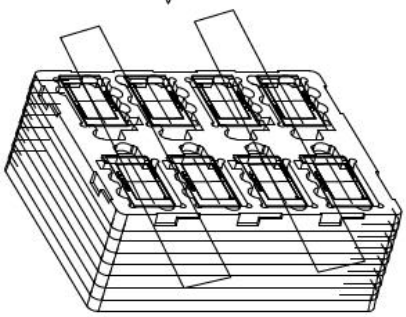
Packing Method



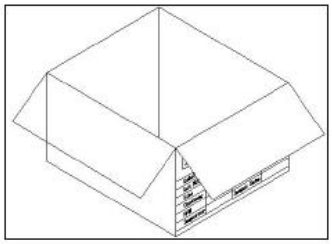
1.Put LCD module into tray cavity



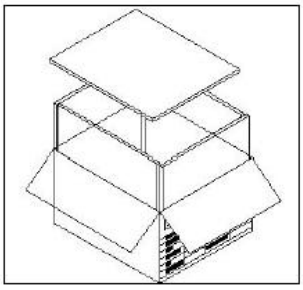
2.Tray stacking, adjacent an upper lower layer with a 180-degree rotation



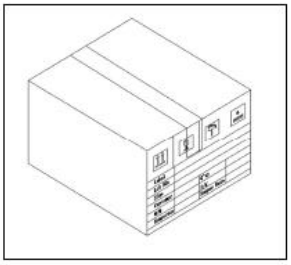
3.Medium Carton: Fix the tray stack with stretch film
Large Carton： Fix the tray stack with stretch film, then place it into a transparent PE antistatic bag



4. put the tray stack into carton



5. 6 sides of white foams inside the box



6. Carton sealing with adhesive tape

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
- Ketene
- 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.

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

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

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

10.1.8.4. 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.

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 Transportation Precautions

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

10.4 Packaging instructions

When the customers using trays, they have to stack the adjacent trays in a 180° staggered to prevent pressure that could cause product damage.