

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS1010I07-L-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

- ☒ Approved Product Specification only
- ☐ Approved Product Specification and Samples

<u>Prepared By</u>	<u>Checked By</u>	<u>Approved By</u>

Contents

目录

1. General Description	3
2. Features	3
3. Outline Dimension	4
4. Absolute Maximum Ratings	5
5. Electrical Characteristics	5
6. Module Function Description	7
7. Electro-Optical Characteristics	13
8. Records Of Version	16

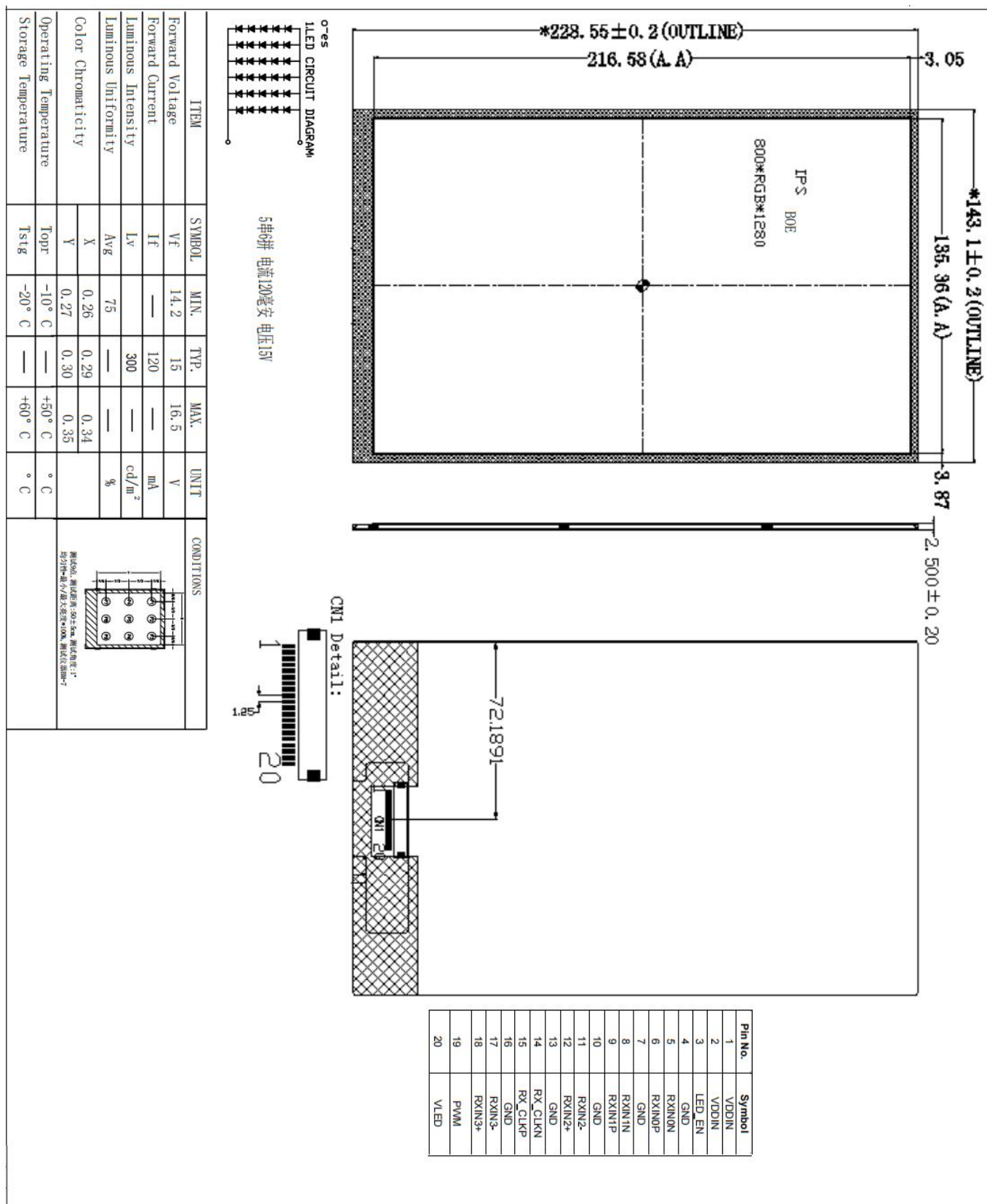
1. General Description

LS1010I07-L-V1 is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs and a backlight unit. The following table describes the features of this LCM.

2. Features

No.	Item	Specification	Unit
1	Panel Size	10.1	inch
2	Number of Pixels	800 × 3(RGB) × 1280	pixels
3	Active Area	135.36(H) × 216.58(V)	mm
4	Pixel Pitch	0.1692(H) × 0.1692(V)	mm
5	Outline Dimension	143.1(H) × 228.55(V) × 2.50(D)	mm
6	Pixel arrangement	RGB Vertical stripe	-
7	Display Mode	IPS with Normally Black	-
8	Viewing Direction	ALL Viewing Direction	-
9	Display Color	16.7M	-
10	Surface Treatment	Anti-Glare and Hard-coating 3H	-
11	Interface	LVDS	-
12	Backlight	White LED	-
13	Drive IC	--	-
14	Operation Temperature	- 10~50	°C
15	Storage Temperature	-20~60	°C
16	Luminance (cd/m ²)	300(Typ.)	nit

3. Outline Dimension



4. Absolute Maximum Ratings

AGND=GND=0V, Ta = 25 °C

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	VDD-VSS	-0.5	5.0	V	
	VDD3-VSS	-0.5	13.5	V	
	VCI-VSS	-0.3	42	V	

5. Electrical Characteristics

AGND=GND=0V, Ta = 25°C

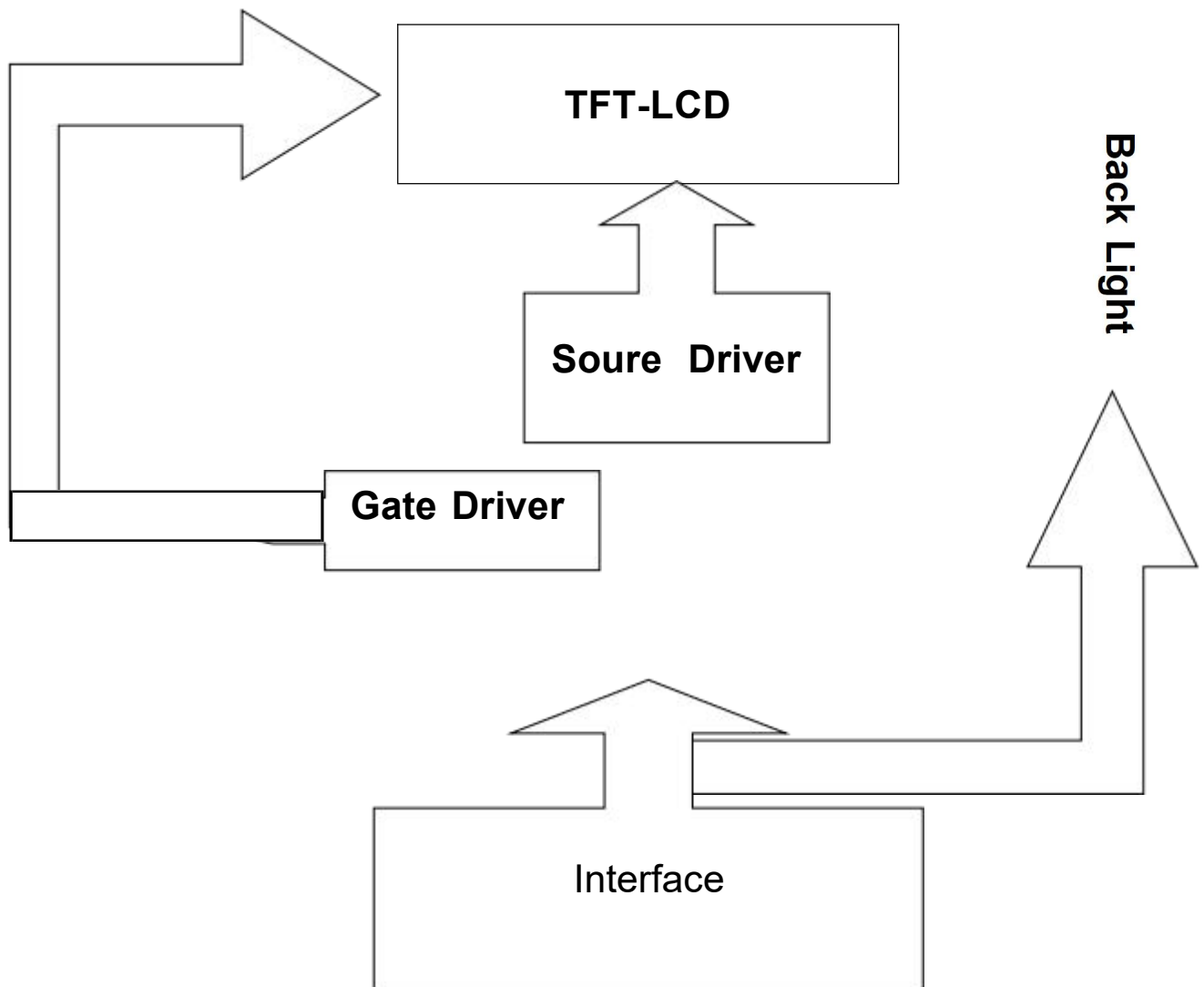
Item		Symbol	Values			Unit	Remark
			Min.	Typ.	Max.		
Digital Supply Voltage		VDD	3.0	3.3	3.6	V	-
Power IC provides voltage		AVEE	-6	-5	-4.5	V	-
		AVDD	4.5	5.5	6.0	V	-
Driver IC provides voltage internally		VGH	9	-	20	V	-
		VGL	-20	-	-9	V	-
Input Signal Voltage	Low Level	VIL	0	-	0.3*VDD	V	-
	High Level	VIH	0.7*VDD	-	VDD	V	

5.1 BACKLIGHT UNIT

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Forward voltage	VF	14.2	15	16.5	V	IF=20mA/1-chip
Forward current	IF	-	120	-	mA	
PWM Signal Voltage	PWM_h	2.0	3.3	3.6	V	-
PWM Signal Voltage	PWM_l	0	-	0.5	V	-
Output PWM frequency	PWM_f	-	200	1000	Hz	-
LED enable Voltage	EN_h	2.6	3.3	3.6	V	-
	EN_l	0	-	0.4	V	-

6. Module Function Description

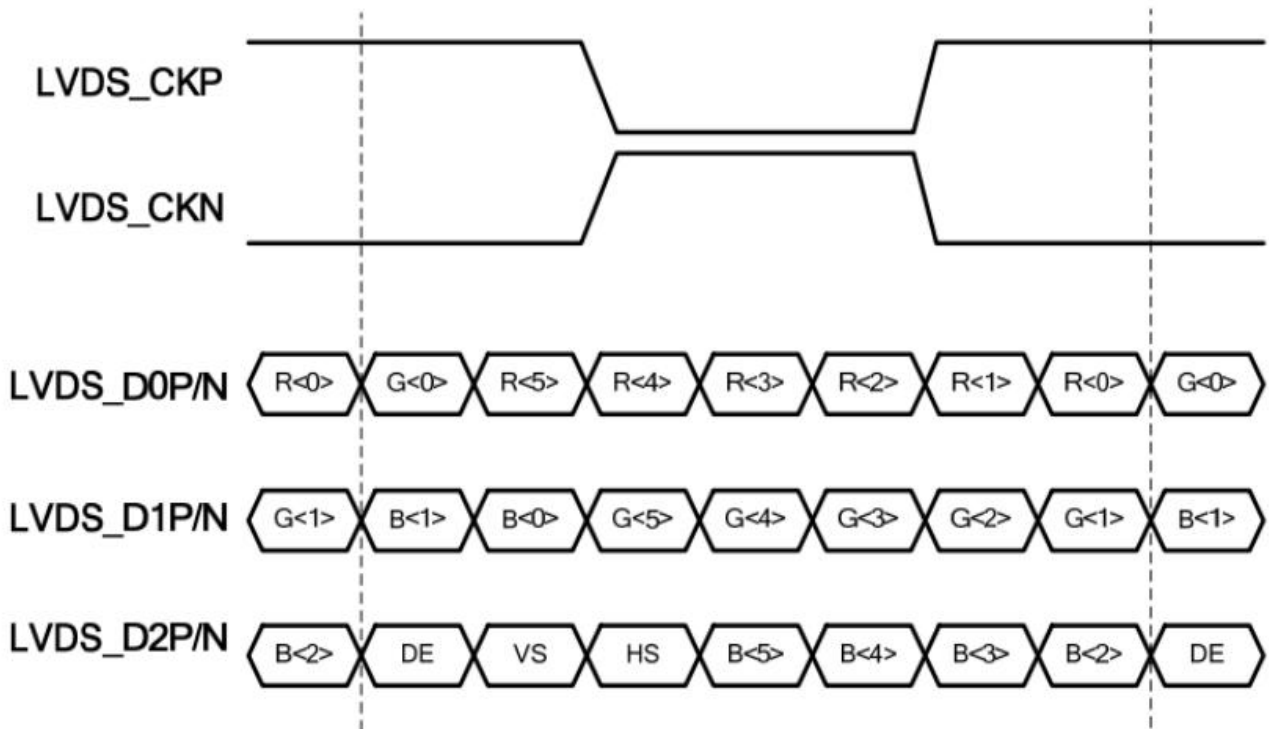
6- 1. Block Diagram Of LCM



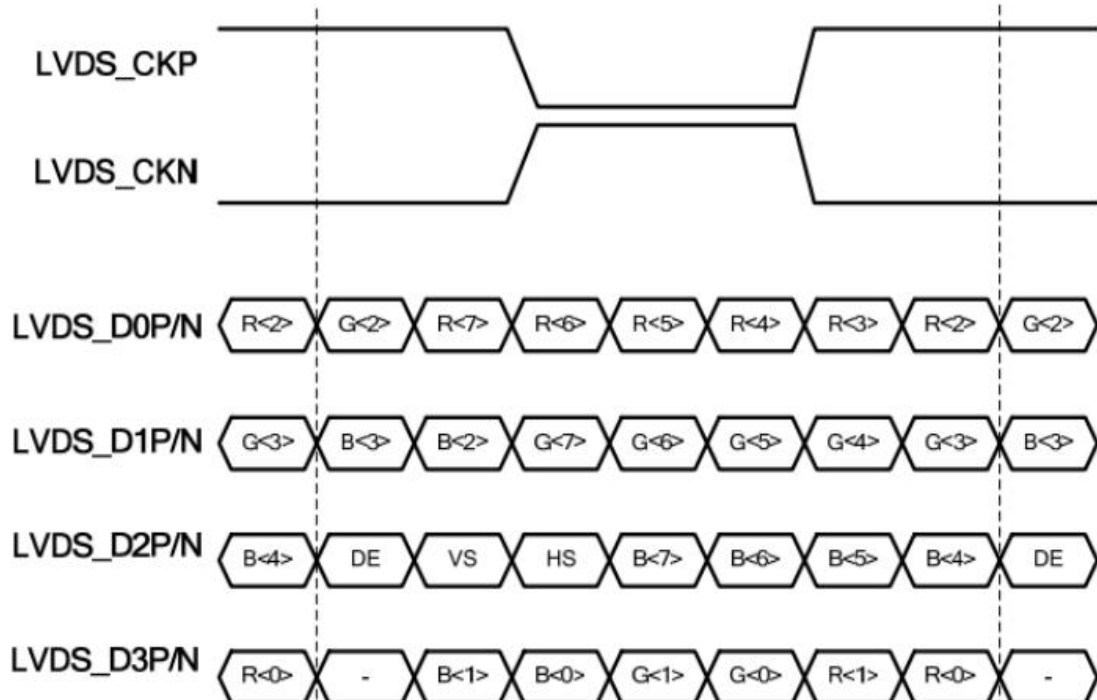
6-2. Pin Description

Pin No.	Symbol	I/O	Function	Remark
1	VDDIN	P	Power supply VDDIN=3.3V	
2	VDDIN	P	Power supply VDDIN=3.3V	
3	LED_EN	I	Backlight Enable Signal,3.3V~5V.	
4	GND	P	Ground	
5	RXIN0N	I	-LVDS differential data	
6	RXIN0P	I	+LVDS differential data	
7	GND	P	Ground	
8	RXIN1N	I	-LVDS differential data	
9	RXIN1P	I	+LVDS differential data	
10	GND	P	Ground	
11	RXIN2-	I	-LVDS differential data	
12	RXIN2+	I	+LVDS differential data	
13	GND	P	Ground	
14	RX_CLKN	I	-LVDS differential clock input	
15	RX_CLKP	I	+LVDS differential clock input	
16	GND	P	Ground	
17	RXIN3-	I	-LVDS differential data	
18	RXIN3+	I	+LVDS differential data	
19	PWM	I	Backlight brightness:apply 0.7V to 1.4V DC voltage signal	
20	VLED	P	Power supply VLED=5~12V(Typ.)	

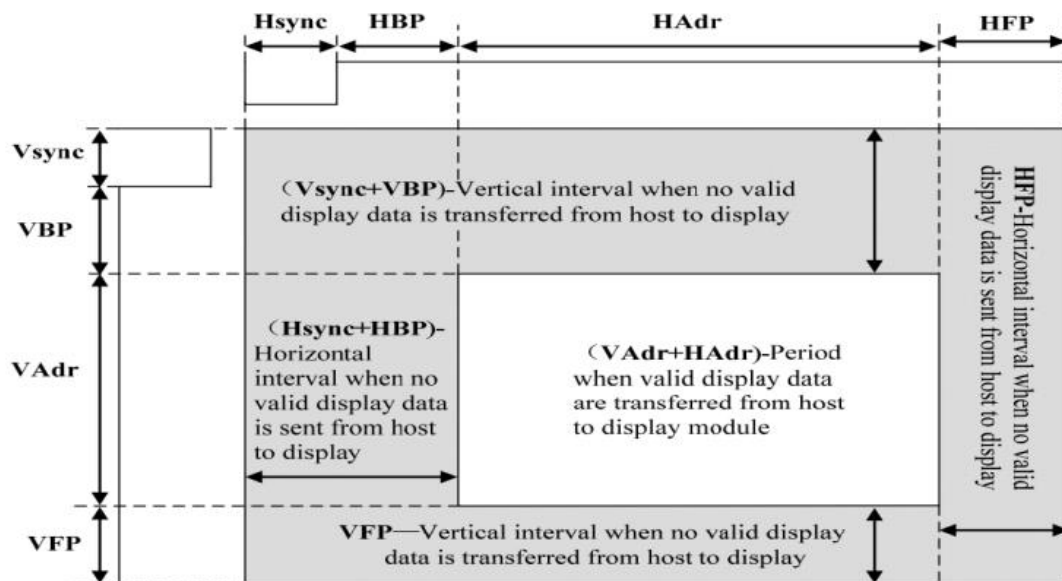
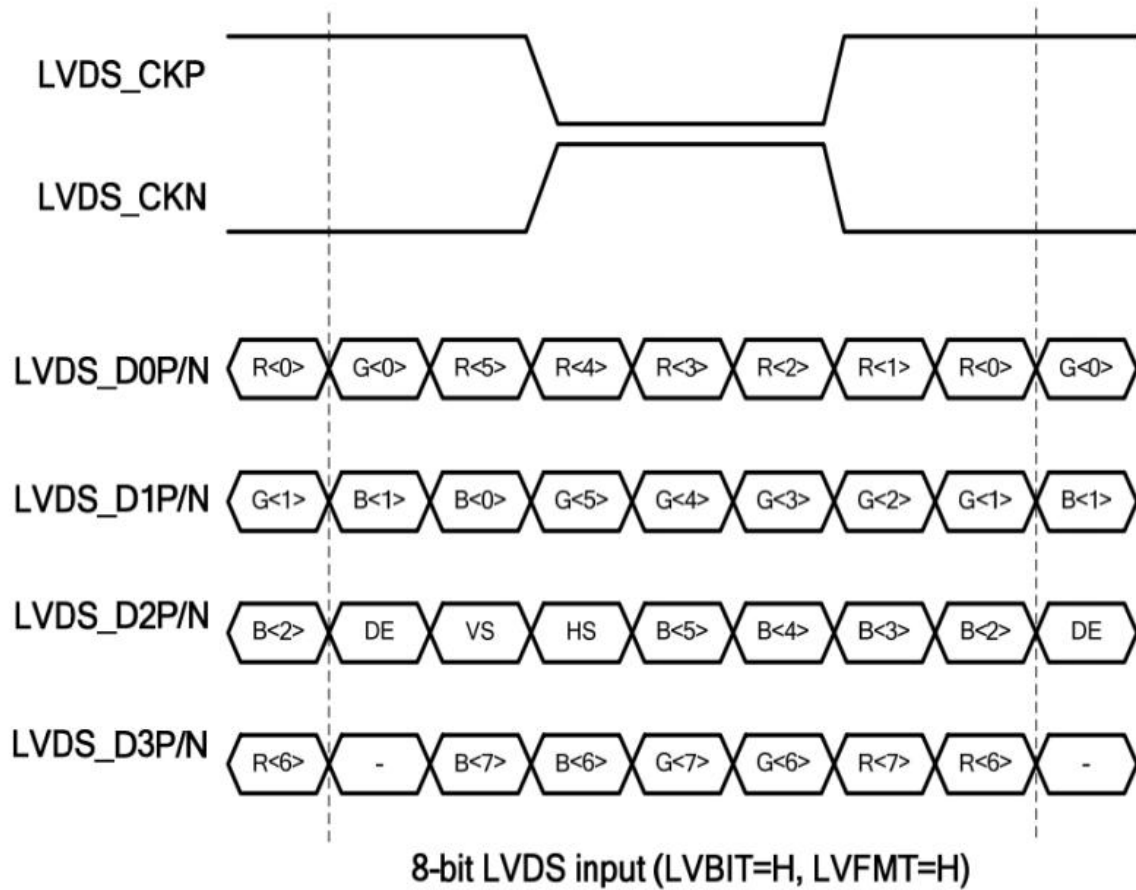
6-3 Timing Characteristics



6-bit LVDS input (LVBIT=L, LVFMT=Don't care)



8-bit LVDS input (LVBIT=H, LVFMT=L)

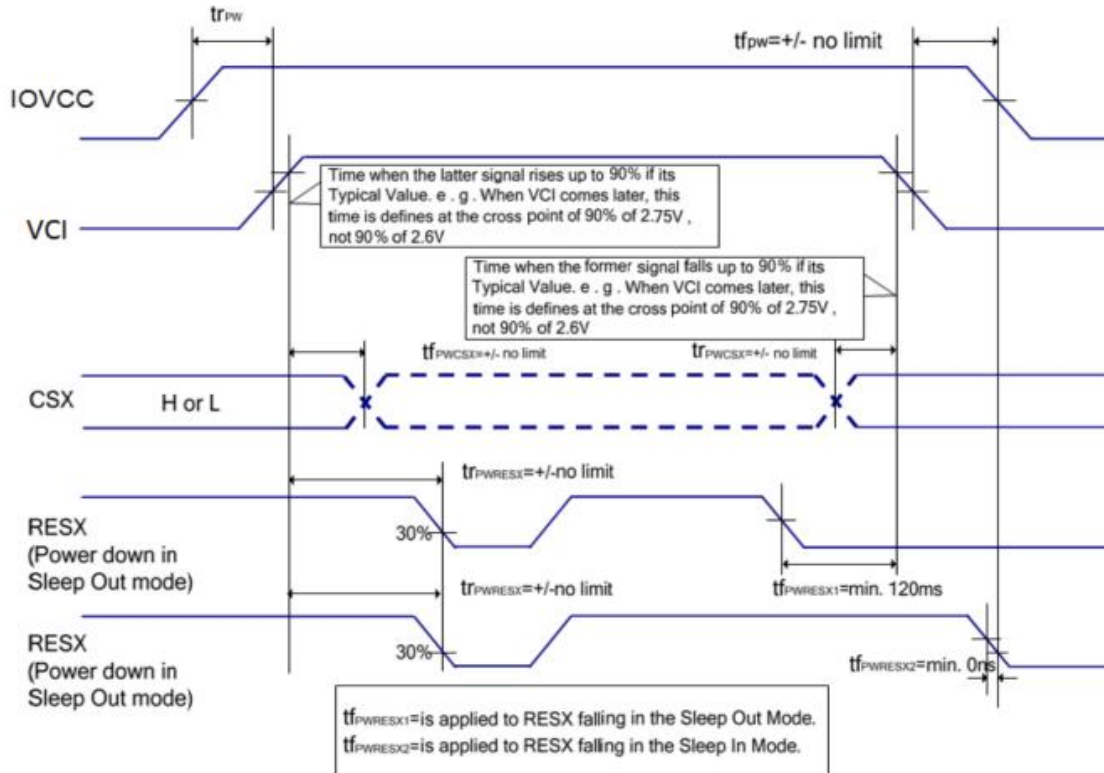


Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
DCLK frequency	F _{DCLK}	-	60	-	MHz	-
HSYNC period time	T _H	-	920	-	DCLK	-
Horizontal display area	T _{HD}	-	800	-	DCLK	-
HSYNC pulse width	T _{HPW}	-	24	-	DCLK	-
HSYNC back porch	T _{HBP}	-	24	-	DCLK	-
HSYNC front porch	T _{FBP}	-	72	-	DCLK	Data to DCLK
VSYNC period time	T _V	-	1304	-	ns	Data to DCLK
Vertical display area	T _{VD}	-	1280	-	ns	-
VSYNC pulse width	T _{VPW}	-	2	-	ns	-
VSYNC back porch	T _{VBP}	-	10	-		
VSYNC front porch	T _{VFP}	-	12	-		

Frequency=(Frame rate) x T_H x T_V x 24bits

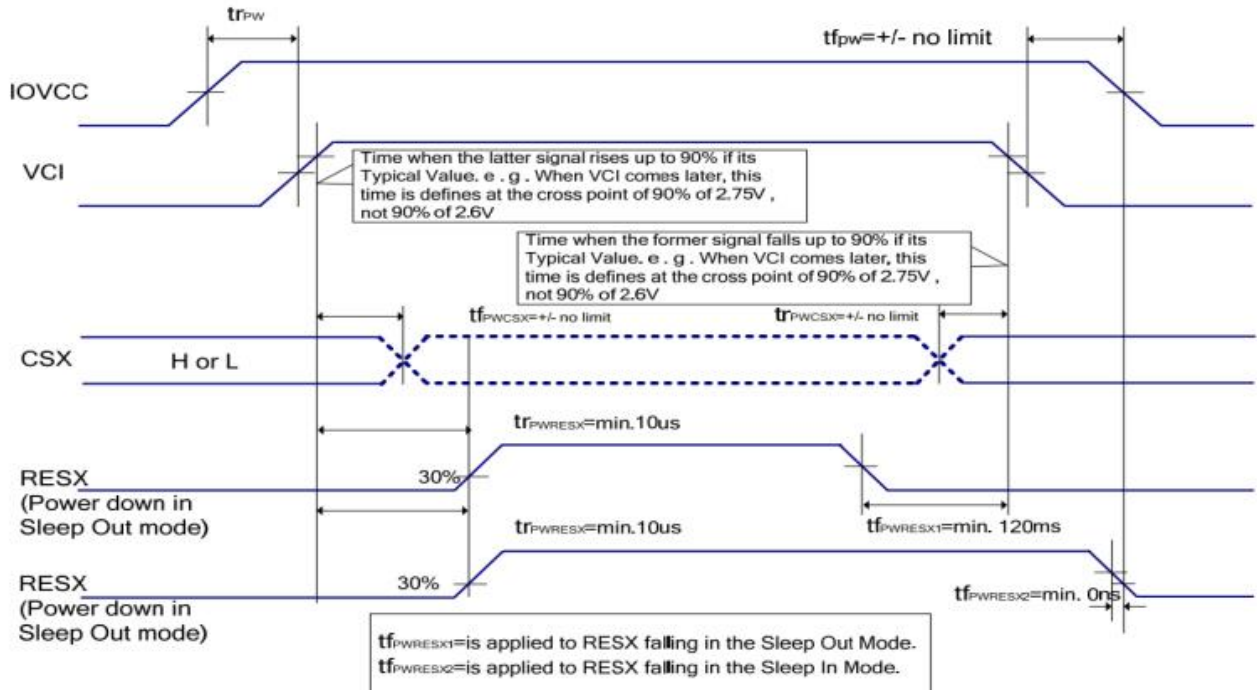
Case 1 – RESX line is held high or unstable by host at power on

If RESX line is held High or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and IOVCC have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



Case 2 – RESX line is held low or unstable by host at power on

If RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for minimum 10sec after both VCI and IOVCC have been applied.



7. Electro-Optical Characteristics

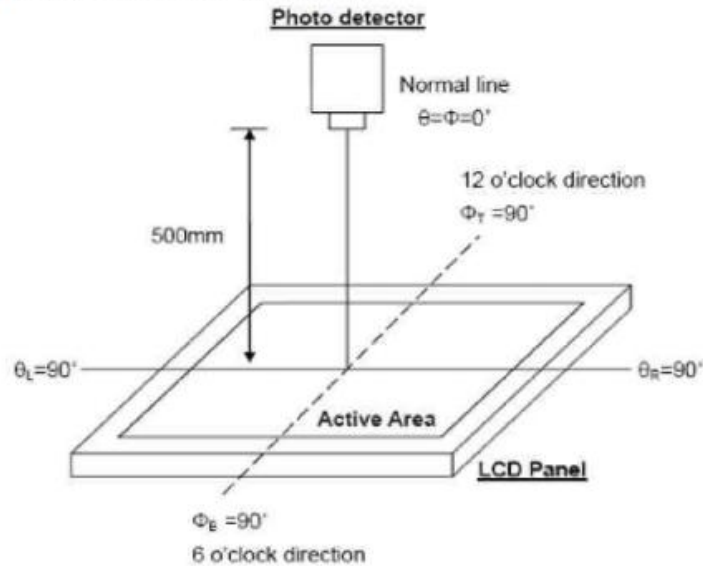
Light source :c-light(with normal polarizer)

Item		Symbol	Condition	Values			Unit	Remark
				Min.	Typ.	Max.		
Viewing angle		Θ_u	$CR \cong 10$	80	85	-	degree	Note2
		Θ_D		80	85	-		
		Θ_L		80	85	-		
		Θ_R		80	85	-		
Response time		$T_{ON}+T_{OFF}$	$\theta=\phi =0^\circ$ Normal viewing angle	-	30	35	ms	Note1 Note3
Contrast ratio		CR		600	800	-	-	Note1 Note4
Luminance		L			300	350	cd/m ²	
Luminance uniformity		YU		75	-	-	%	
Color chromaticity (CIE1931)	White	Wx		0.276	0.296	0.316		Note1 Note5
		Wy		0.302	0.322	0.342		
	Red	Rx		0.601	0.621	0.641		
		Ry		0.294	0.314	0.334		
	Green	Gx		0.252	0.272	0.292		
		Gy		0.560	0.580	0.600		
	Blue	Bx		0.121	0.141	0.161		
		By		0.093	0.113	0.133		
NTSC					60%			

Test Conditions:

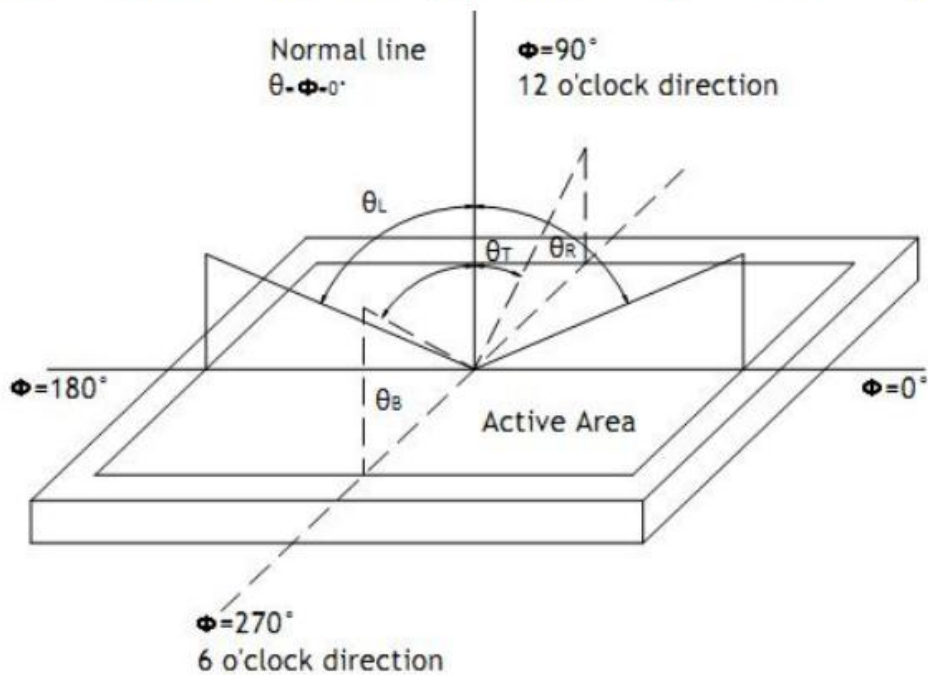
- 1.Measuring surrounding:dark room
- 2.The ambient temperature is $25\pm 2^\circ\text{C}$.
- 3.The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

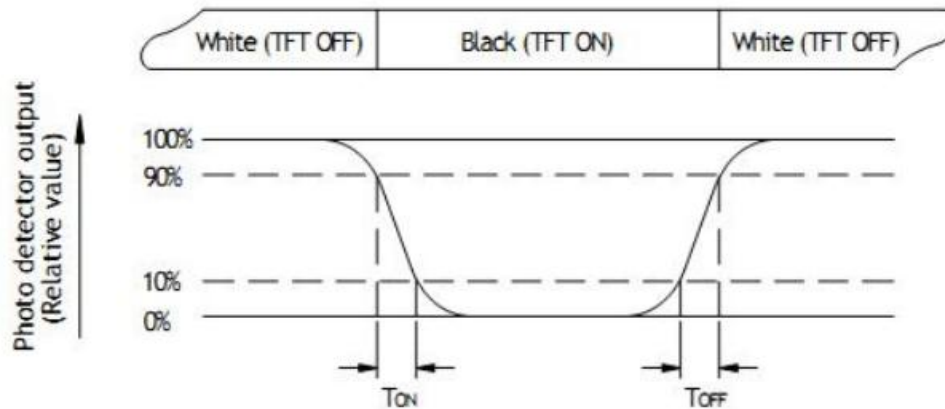


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

"White state ": The state is that the LCD should drive by V_{white} .

"Black state": The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: All input terminals LCD panel must be ground while measuring the center area of the panel.

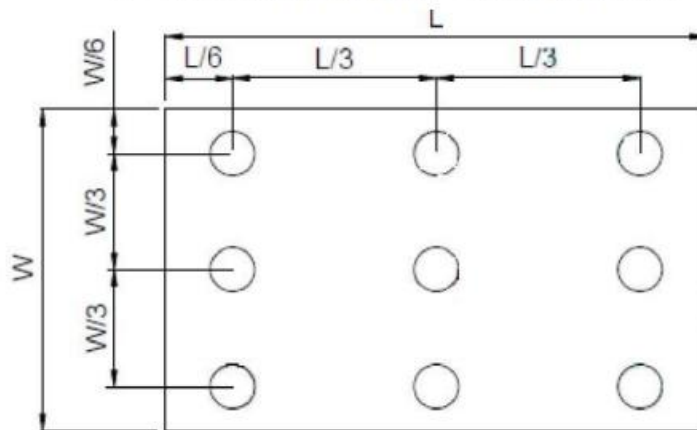
The LED driving condition is $I_L = 20\text{mA}$ of which each LED module is 3 LED serial.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\text{min}} / L_{\text{max}}$$

L----Active area length, W---- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

Note8: Definition of Luminance

Measure the luminance of white state at center point.

8.Records Of Version

Version	Revise Date	Page	Content
00		ALL	New released