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TFT | CHARACTER | UWVD | FSC | SEGMENT | CUSTOM | REPLACEMENT

TFT Display Module

Part Number

E43RG34827LW2M300-R

Overview:

- 4.3-inch TFT: 480x272 (105.4x67.15)
- 8/16/18/24- bit RGB Interface
- 16.7M colors
- 3.3V
- White LED back-light
- Transmissive/ Normally White
- 4-wire Resistive Touch Panel
- 300 NITS
- Controller: ILI6480B
- RoHS Compliant

Description

This is a color active matrix TFT (Thin Film Transistor) LCD (Liquid Crystal Display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 4.3" TFT-LCD contains 480x272 pixels and can display up to 16.7M colors

Features

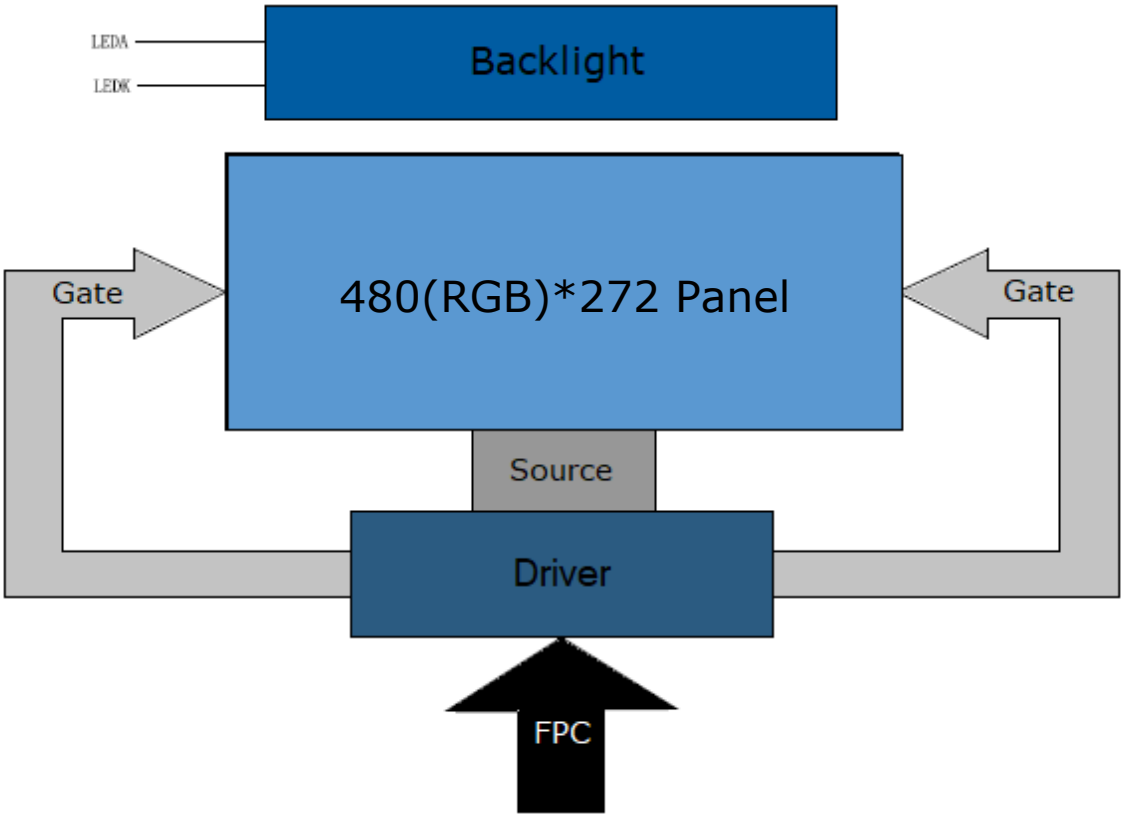
Low Input Voltage: 3.3V (TYP)
Display Colors of TFT LCD: 16.7M colors
TFT Interface: 8/16/18/24-bit RGB

General Information Items	Specification	Unit	Note
	Main Panel		
Display area (AA)	95.04(H) *53.86(V) (4.3 inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	480(RGB)*272	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.066 (H) x 0.198 (V)	mm	-
Viewing angle	12:00	o'clock	-
TFT Controller IC	ILI6480B	-	-
Display mode	Transmissive/ Normally White	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

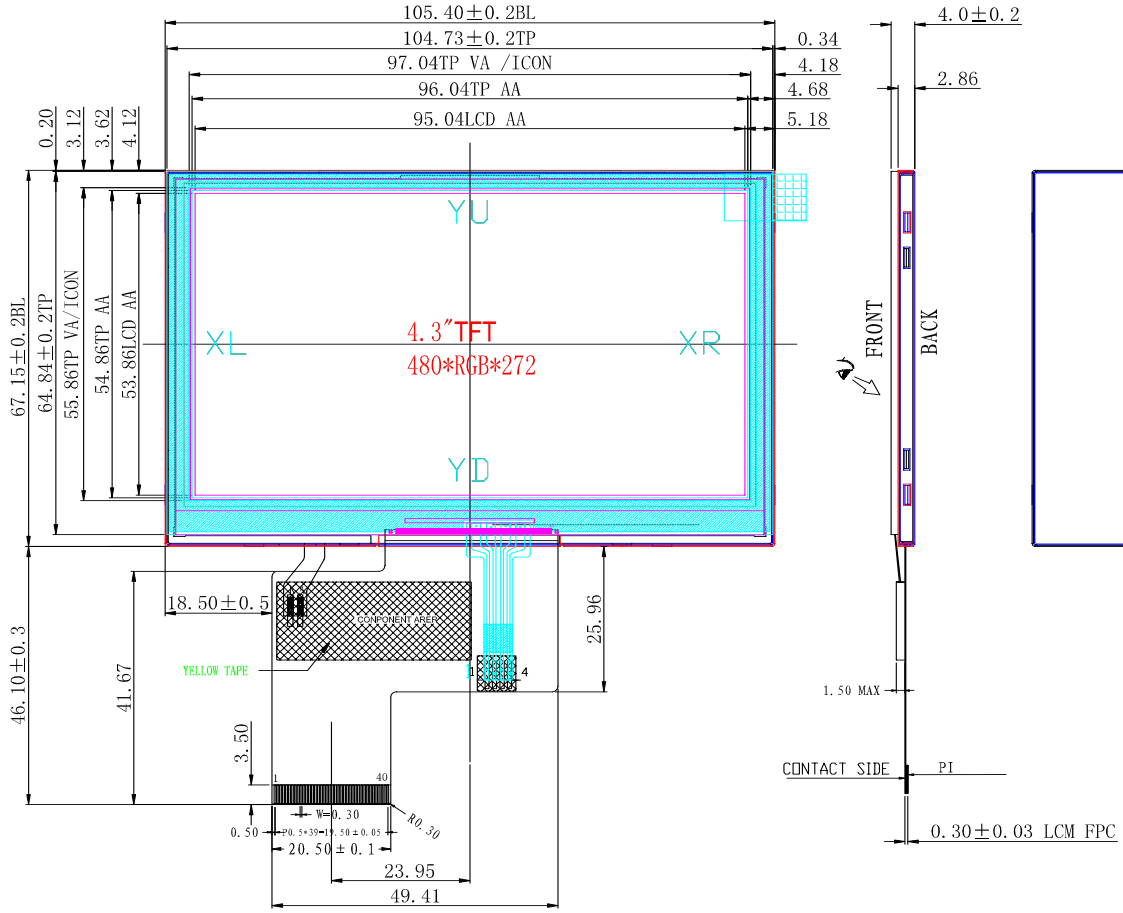
Mechanical Information

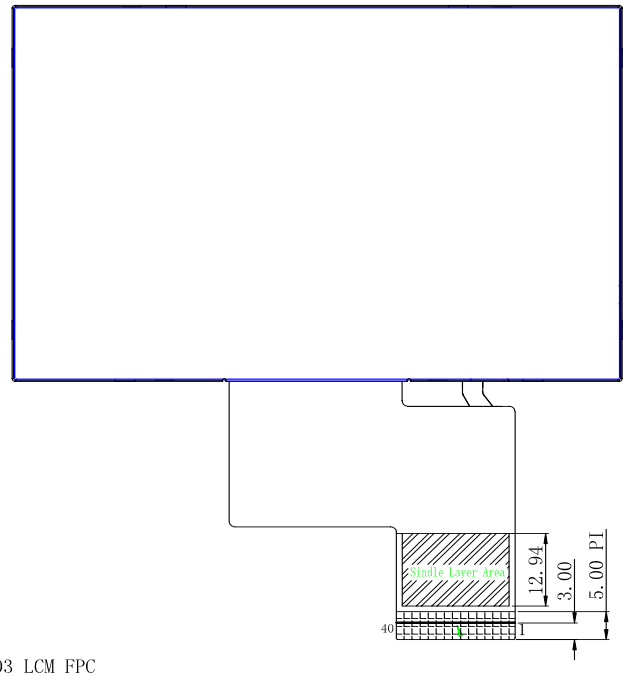
Item		Min	Typ.	Max	Unit	Note
Module size	Horizontal(H)		105.4		mm	-
	Vertical(V)		67.15		mm	-
	Depth(D)		4.0		mm	-
Weight			TBD		g	-

1. Block Diagram



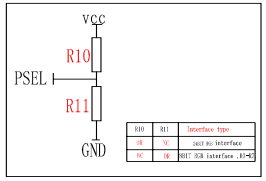
2. Outline Dimensions



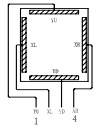


Pin	Name
1	VLED-
2	VLED+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	PCLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	XR(X+)
38	YD(Y-)
39	XL(X-)
40	YU(Y+)

Interface set in FPC

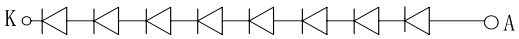


TP Circuit



NOTES:

1. DISPLAY TYPE: 4.3", TFT-LCD, 65K/262K/16.7M COLORS
2. DISPLAY MODE: T/M NORMALLY WHITE
3. VIEWING DIRECTION: 12:00
4. DRIVER IC: ILI6480B (COG)
5. INTERFACE: 24BIT-RGB
6. VCI: 3.3V(TYP)
7. OPERATING TEMP: -20°C TO 70°C
   STORAGE TEMP: -30°C TO 80°C
8. BACK LIGHT: LED WHITE, 8 LED, 20mA, 25.6±0.3V
9. RoHS COMPLIANT.



B/L Circuit

ReV.	Revision content description	Date

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TOLERANCE( )		DRAWING NAME	E43RG34827LW2M300-R	
TOLERANCE UNLESS OTHERWISE SPECIFIED	X.X±0.3 X.XX±0.2	Drawn		Unit
Scale 1:1		Checked		mm
		Approve		Page 1/1

3. Input Terminal Pin Assignment

Recommended TFT Connector: FH12S-40S-0.5SH(55) | Recommended RTP Connector: FH33-4S-1SH(10)

NO.	Symbol	Description	I/O
1	LEDK	Cathode pin of backlight	P
2	LEDA	Anode pin of backlight	P
3	GND	Ground	P
4	VDD	Supply voltage (3.3V)	P
5	R0	Red data input	I
6	R1	Red data input	I
7	R2	Red data input	I
8	R3	Red data input	I
9	R4	Red data input	I
10	R5	Red data input	I
11	R6	Red data input	I
12	R7	Red data input	I
13	G0	Green data input	I
14	G1	Green data input	I
15	G2	Green data input	I
16	G3	Green data input	I
17	G4	Green data input	I
18	G5	Green data input	I
19	G6	Green data input	I
20	G7	Green data input	I
21	B0	Blue data input	I
22	B1	Blue data input	I
23	B2	Blue data input	I
24	B3	Blue data input	I
25	B4	Blue data input	I
26	B5	Blue data input	I
27	B6	Blue data input	I
28	B7	Blue data input	I
29	GND	Ground	P
30	PCLK	Clock signal. Latching data at rising edge.	I
31	DISP	Standby setting for testing. Connect to VDDIO in normal operation mode. Connect to ground for standby mode.	I
32	HYSYNC	Horizontal sync input. Negative polarity.	I
33	VSYNC	Vertical sync input. Negative polarity.	I
34	DE	Data input enable. Active high to enable the data input bus under “DE mode”	I
35	NC		
36	GND	Ground	P
37	XR(NC)	Touch panel right glass terminal	
38	YD(NC)	Touch panel bottom film terminal	
39	XL(NC)	Touch panel left glass terminal	
40	YU(NC)	Touch panel top film terminal	

4. LCD Optical Characteristics

4.1 Optical Specifications

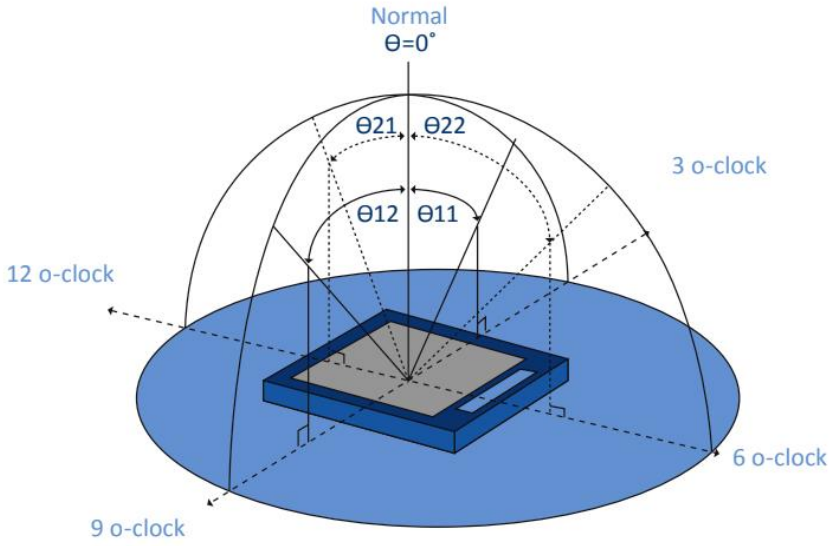
Item		Symbol	Condition	Min	Typ.	Max	Unit	Note
Contrast Ratio		CR	Θ = ϕ = 0 Normal viewing angle	400	500	--		(2)
Transmittance		T (%)		--	6.26	--	%	(3)
Response time	Rising	TR		--	10	20	msec	(4)
	Falling	TF		--	15	30		
Color gamut		S(%)		--	40	--	%	(5)
Color Filter Chromaticity	White	W_X		0.26	0.31	0.36		(5)
		W_Y		0.28	0.33	0.38		
Viewing angle	Hor.	ΘL	ϕ=180˚ (9 o'clock)	60	70	--		(1)(6)
		ΘR	ϕ=0˚ (3 o'clock)	60	70	--		
	Ver.	ΘU	ϕ=90˚ (12 o'clock)	40	50	--		
		ΘD	ϕ=270˚ (6 o'clock)	60	70	--		
Option View Direction		12:00						(1)(6)

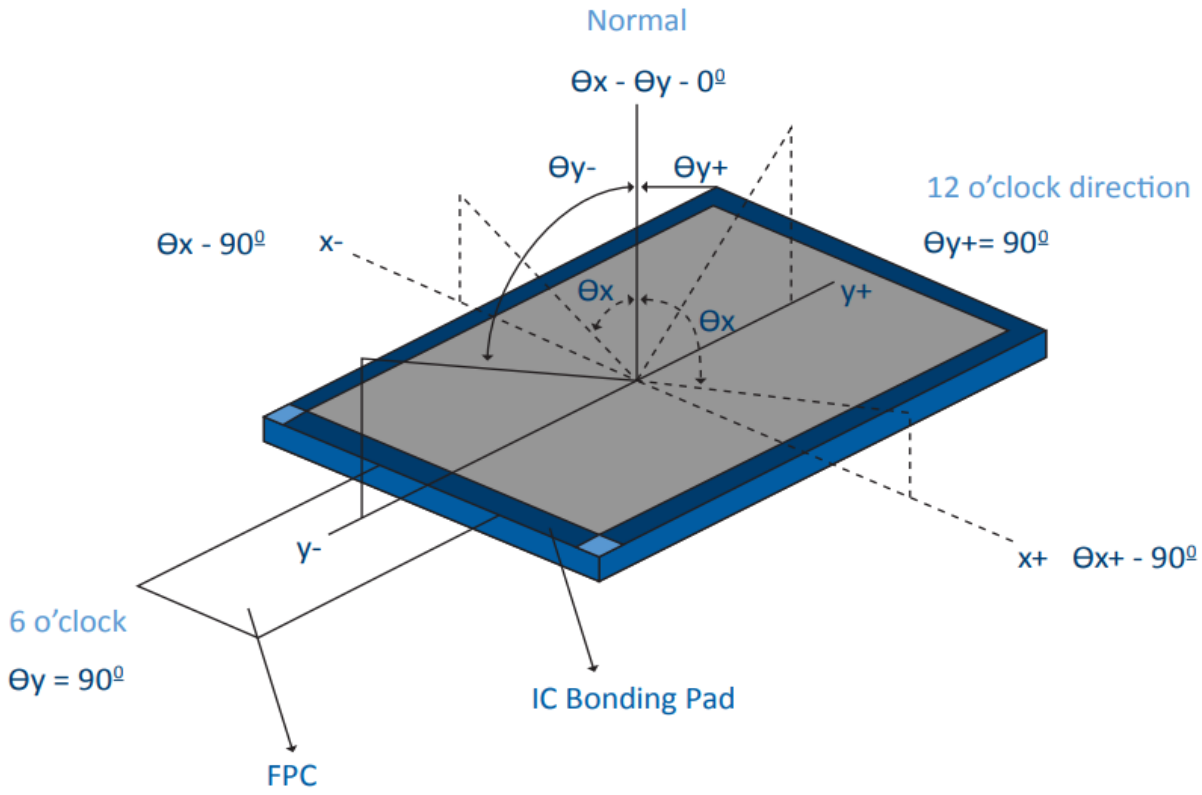
4.2 Measuring Condition

VDD = 3.3V, IL = 20mA (Backlight current)
Ambient temperature: 25 ± 2℃
15min. warm-up time

Optical Specification Reference Notes:

(1) Definition of Viewing Angle: The viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3,9 o'clock direction and the vertical or 6,12 o'clock direction with respect to the optical axis which is normal to the LCD surface.

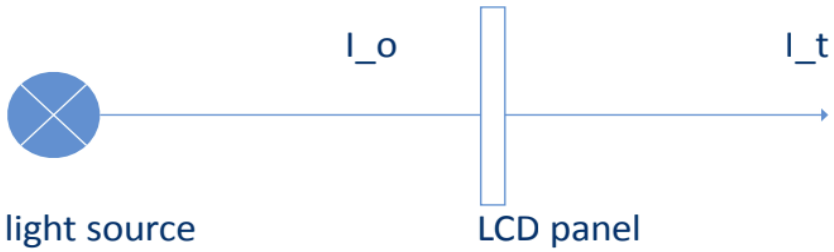




(2) Definition of Contrast Ratio (Cr): measured at the center point of panel. The contrast ratio (Cr) measured on a module, is the ratio between the luminance (Lw) in a full white area (R=G=B=1) and the luminance (Ld) in a dark area (R=G=B=0).

$$Cr = \frac{Lw}{Ld}$$

(3) Definition of transmittance (T%): The transmittance of the panel including the polarizers is measured with electrical driving.

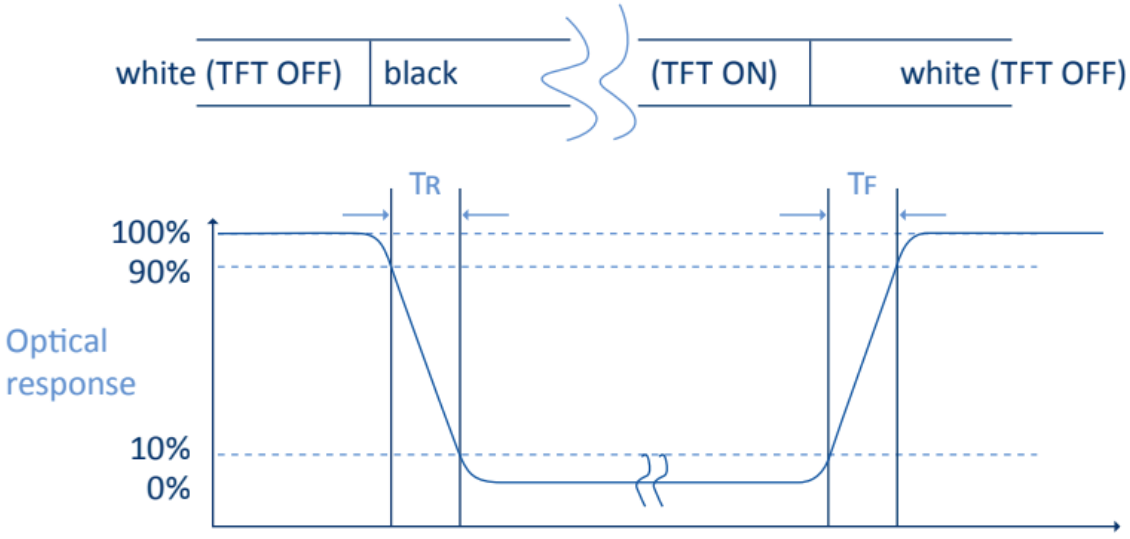


The transmittance is defined as:

$$Tr = \frac{It}{Io}\ x\ 100\%$$

Io = the brightness of the light source.
It = the brightness after panel transmission

(4) Definition of Response Time (Tr, Tf): The rise time 'Tr' is defined as the time for luminance to change from 90% to 10% as a result of a change of the electrical condition. The fall time 'Tf' is defined as the time for luminance to change from 10% to 90% as a result of a change of the electrical condition.



(5) Definition of Color Gamut: Measuring machine CFT-01. NTSC's Primaries: R(x,y,Y),G(x,y,Y), B(x,y,Y). FPM520 of Westar Display Technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

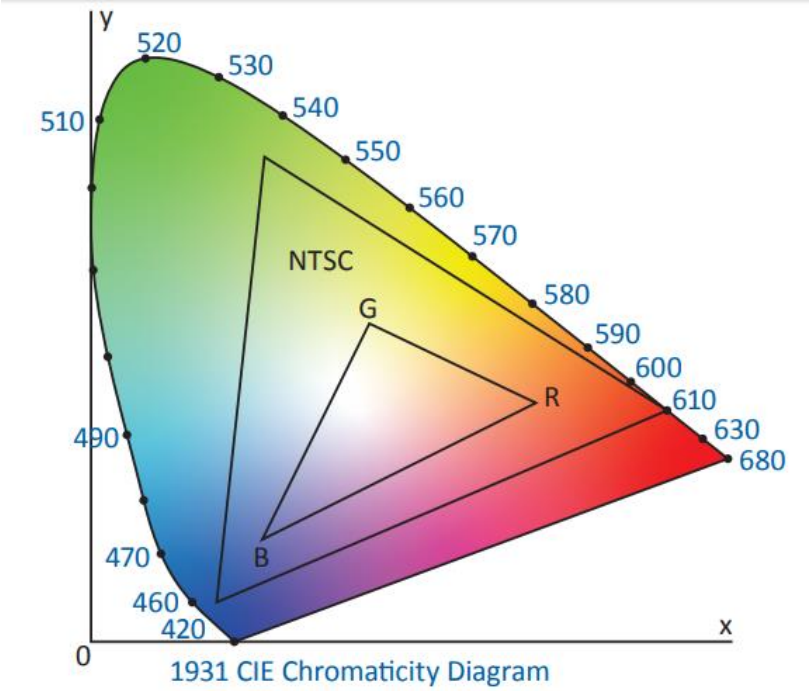
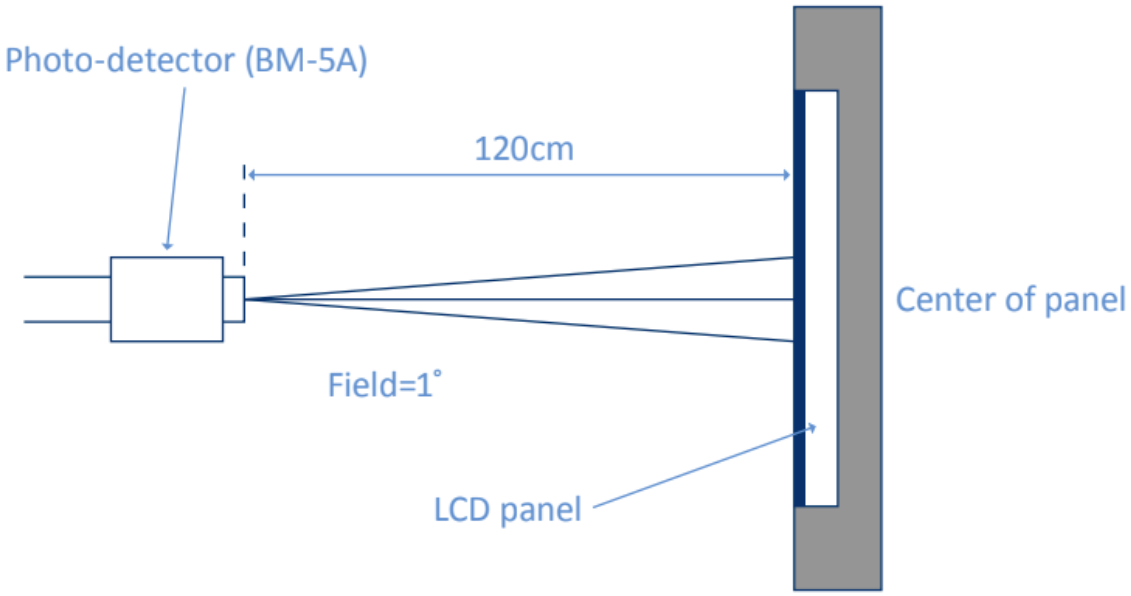


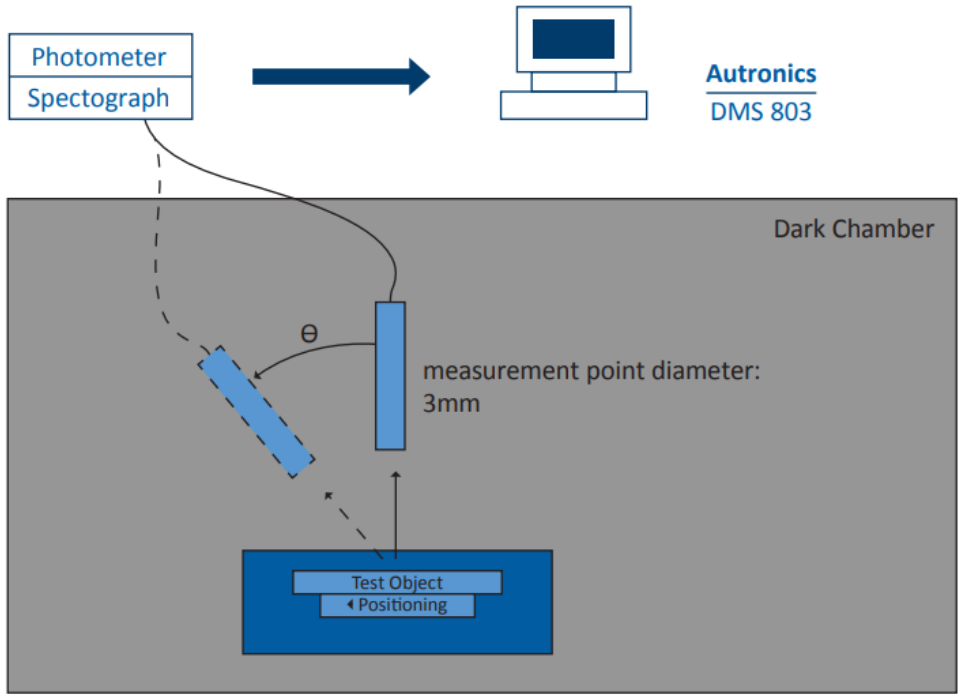
Fig. 1931 CIE chromacity diagram

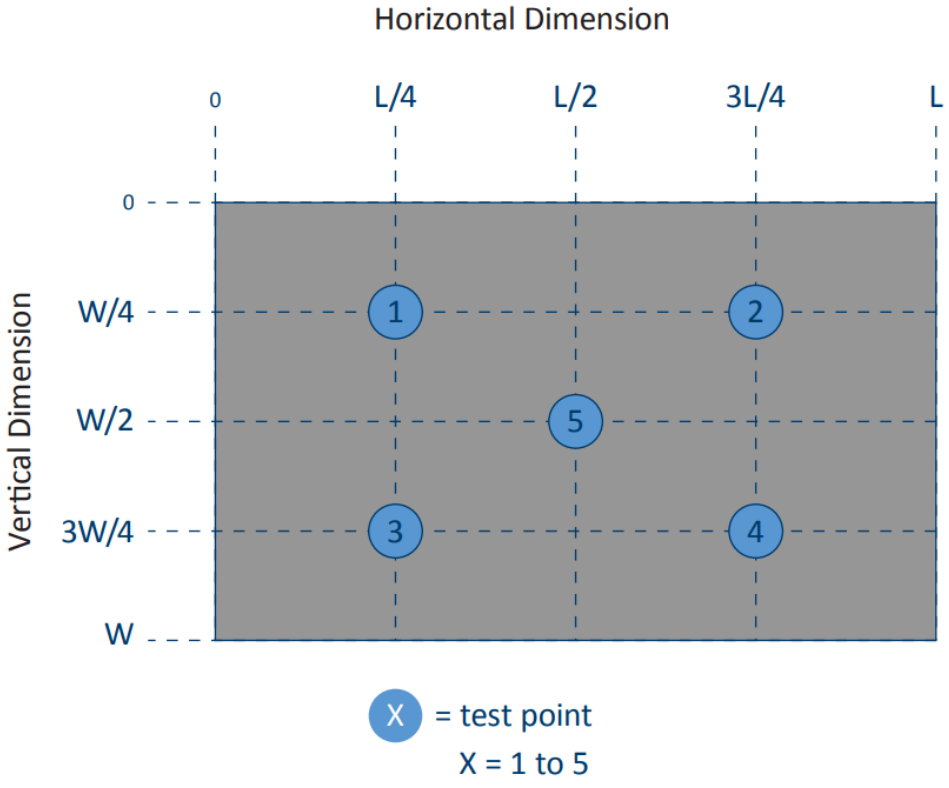
Color gamut: $S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$

(6) Definition of Optical Measurement Setup:



(6) Optical Measurement Setup Continued:
The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes.





5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min	Max	Unit
Digital Supply Voltage	VDD	--	4.6	V
Interface Operation Voltage	VDDIO	--	VDD	V
Operating temperature	T_{OP}	-20	+70	℃
Storage temperature	T_{ST}	-30	+80	℃

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3.3	4.2	V	
Interface Operation Voltage	VDDIO	1.8	3.3	4.2	V	
Normal Mode Current Consumption	IDD	--	25	--	mA	
Level input voltage	VIH	0.7 VDDIO		VDDIO	V	
	VIL	GND		0.3 VDDIO	V	
Level output voltage	VOH	VDDIO-0.4			V	
	VOL	GND		GND+0.4	V	

5.3 LED Backlight Characteristics

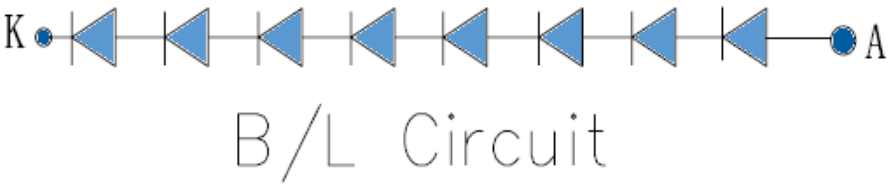
Item	Symbol	Min	Typ.	Max	Unit	Note
Forward Current	IF	15	20	--	mA	
Forward Voltage	VF	--	25.6	--	V	
LCM Luminance	LV	300	--	--	cd/m2	Note 3
LED lifetime	Hr	50000	--	--	hour	Note1 & 2
Uniformity	AVg	80	--	--	%	Note 3

The back-light system is edge-lighting type with 8 chips White LED

Note 1: LED lifetime (Hr) can be defined as the time in which it continues to operate under the condition:

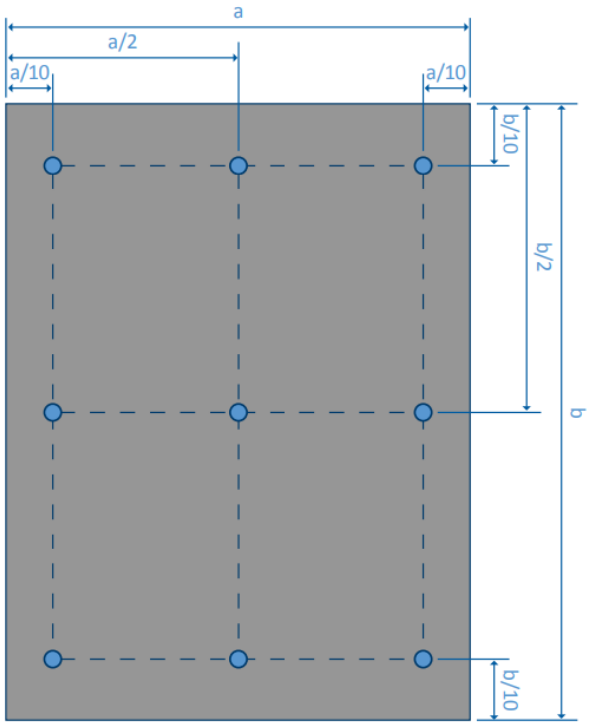
Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED lifetime" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=20mA. The LED lifetime could be decreased if operating IL is larger than 20mA. The constant current driving method is suggested.



B/L Circuit

Note 3: Luminance Uniformity of these 9 points is defined as below:



$$\text{Luminance} = \frac{\text{(Total Luminance of 9 points)}}{9}$$

$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points(1-9)}}{\text{maximum luminance in 9 points(1-9)}}$$

6. AC Characteristic

6.1 Input Signal Characteristics

Parameters	Symbol	Min	Typ.	Max	Unit	Condition
VDD power source slew time	TPOR	--	--	20	ms	From 0V to 99%VDD
GRB pulse width	tRSTW	10	50	--	us	R=10kΩ, C=1uF
DCLK clock time	Tclk	33.3	--	--	ns	DCLK=30MHz
DCLK clock low period	Tcwl	40	--	60	%	
DCLK clock high period	Tcwh	40	--	60	%	
Clock rising time	Trck	9	--	--	ns	
Clock falling time	Tfck	9	--	--	ns	
HSD width	Thwh	1	--	--	DCLK	
HSD period time	Th	55	60	65	us	
HSD setup time	Thsu	12	--	--	ns	
HSD hold time	Thhd	12	--	--	ns	
VSD width	Tvwh	1	--	--	Th	
VSD setup time	Tvsu	12	--	--	ns	
VSD hold time	Tvhd	12	--	--	ns	
Data setup time	Tdasu	12	--	--	ns	
Data hold time	Tdahd	12	--	--	ns	
DE setup time	Tdesu	12	--	--	ns	
DE hold time	Tdehd	12	--	--	ns	
Source output setting time	Tssf	--	--	TBD	us	10% to 90% CL=60pF, RL=2kΩ
Gate output setting time	Tgst	--	--	TBD	ns	10% to 90% CL=60pF
VCOM output setting time	Tcst	--	--	TBD	us	10% to 90% CL=40nF, RL=50Ω
Time from VSD to 1st line data input	Tvs	3	8	31	Th	HV mode By HDL[4:0] setting

Table 6.1: AC Input Signal Timing Characteristics

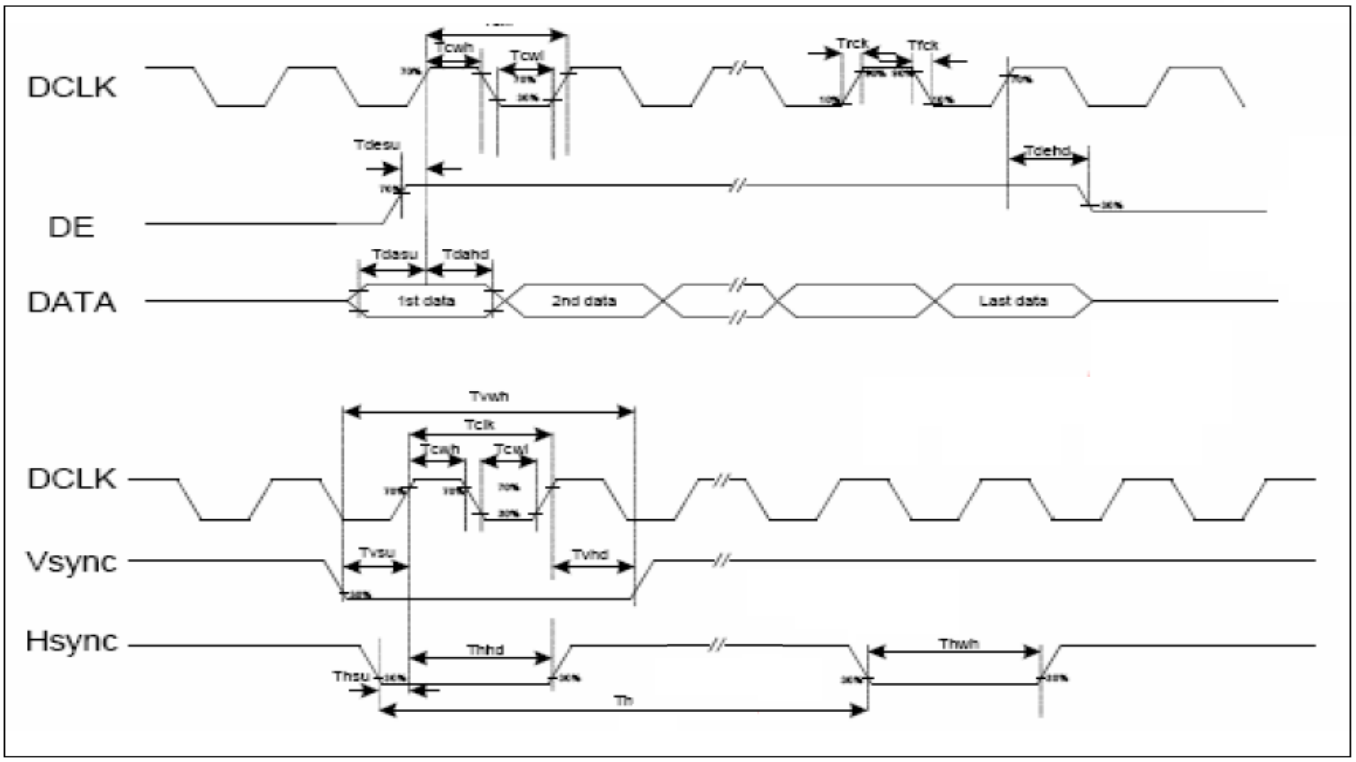


Figure 6.1: Clock and Data Input Waveforms

Vertical Input Timing:

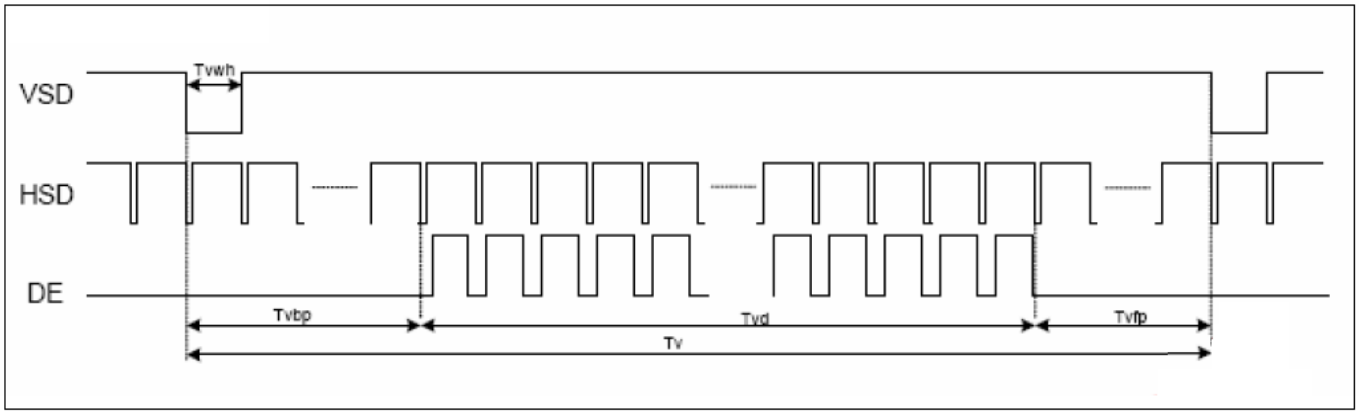


Figure 6.2: Vertical Input Timing Waveforms

Serial 8-bit RGB Mode Timing:

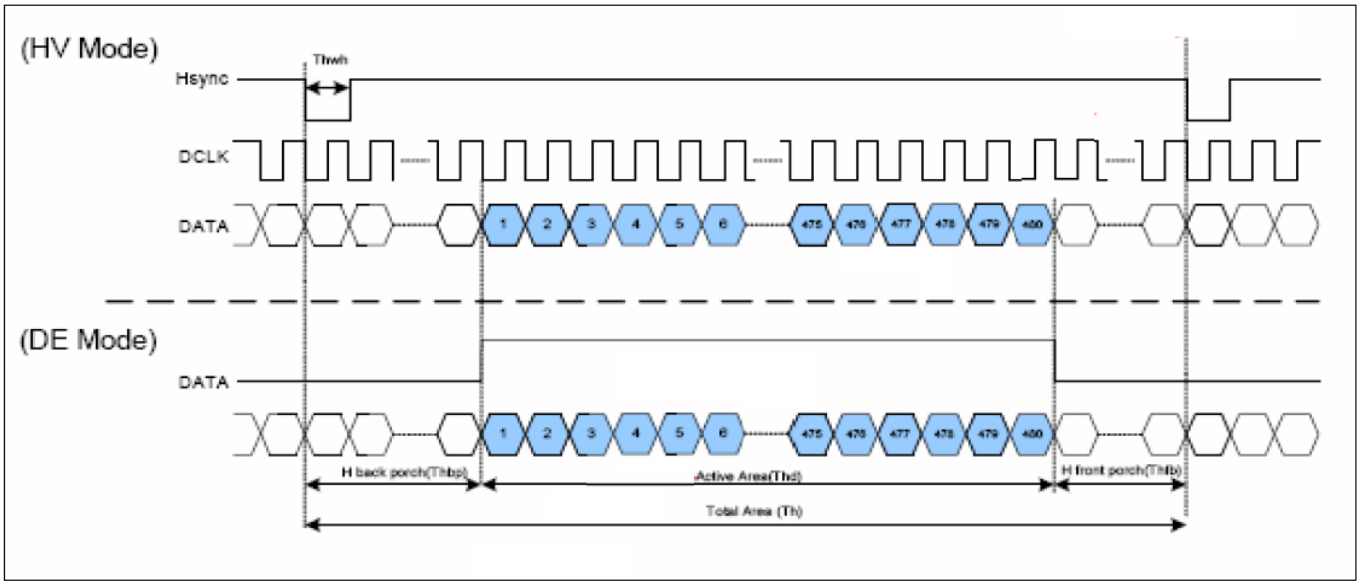


Figure 6.3: 8-bit Serial RGB Mode Timing Waveforms

Parameters	Symbol	Min	Typ.	Max	Unit	Condition
DCLK frequency	Fclk	24	27	30	MHz	
DCLK cycle time	Tclk	83	110	200	ns	
DCLK pulse duty	Tcwh	40	50	60	%	
Time from HSD to source output	Thso	--	13	--	DCLK	
Time from HSD to gate output	Thgo	--	27	--	DCLK	
Time from HSD to gate output off	Thgz	--	3	--	DCLK	
Time from HSD to VCOM	Thvc	--	12	--	DCLK	

Table 6.2: Horizontal and Vertical Input Timing Characteristics

Parallel and Serial RGB Mode Timing:

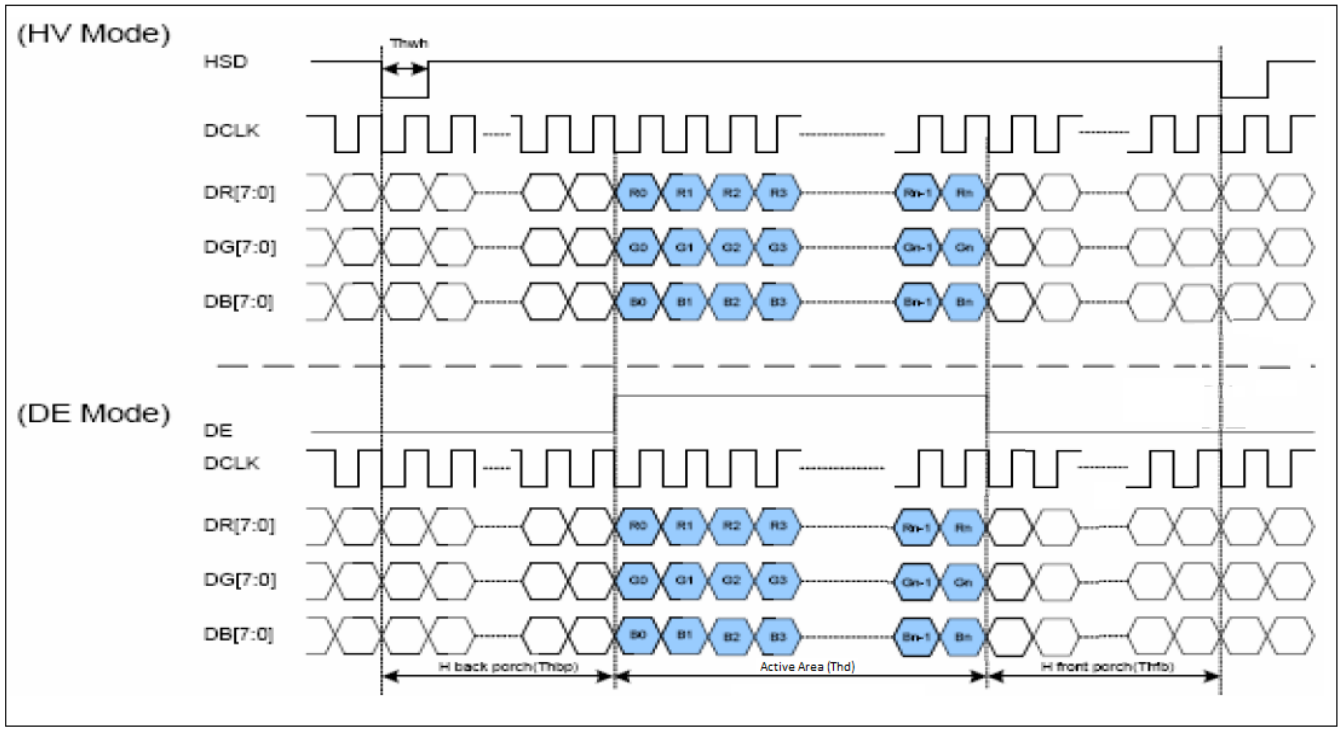


Figure 6.4: Parallel and Serial RGB Mode Timing Waveforms

Parameters	Symbol	Min	Typ.	Max	Unit	Condition
DCLK frequency	flck	5	9	12	MHz	
VSD period time	Tv	277	288	400	H	
VSD display area	Tvd	272	272	272	H	
VSD back porch	Tvb	3	8	31	H	
VSD front porch	Tvfp	2	8	97	H	
HSD period time	Th	520	525	800	DCLK	
HSD display area	Thd	480	480	480	DCLK	
HSD back porch	Thbp	36	40	255	DCLK	
HSD front porch	Thfp	4	5	65	DCLK	

Table 6.3: Parallel RGB Input Timing Characteristics

Parameters	Symbol	Min	Typ.	Max	Unit	Condition
DCLK frequency	flck	--	27	--	MHz	
VSD period time	Tv	277	288	400	H	
VSD display area	Tvd	272	272	272	H	
VSD back porch	Tvb	3	8	31	H	
VSD front porch	Tvfp	2	8	97	H	
HSD period time	Th	--	1728	--	DCLK	
HSD display area	Thd	1440	1440	1440	DCLK	
HSD back porch	Thbp	--	120	--	DCLK	
HSD front porch	Thfp	--	168	--	DCLK	

Table 6.4: Serial RGB Input Timing Characteristics

6.2 Reset Timing

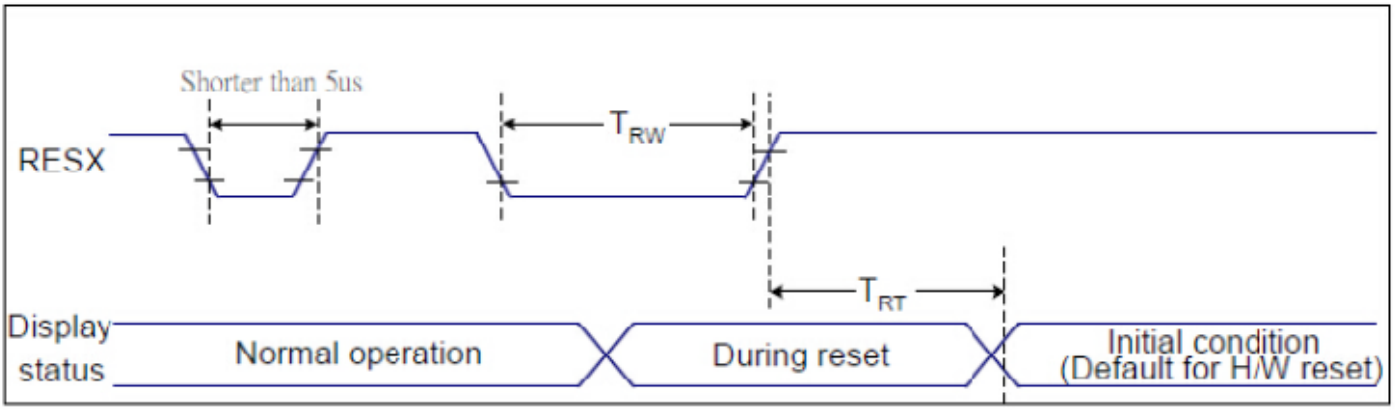


Figure 6.5: Reset Timing Diagram

Related Pins	Symbol	Parameter	Min	Max	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1,5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

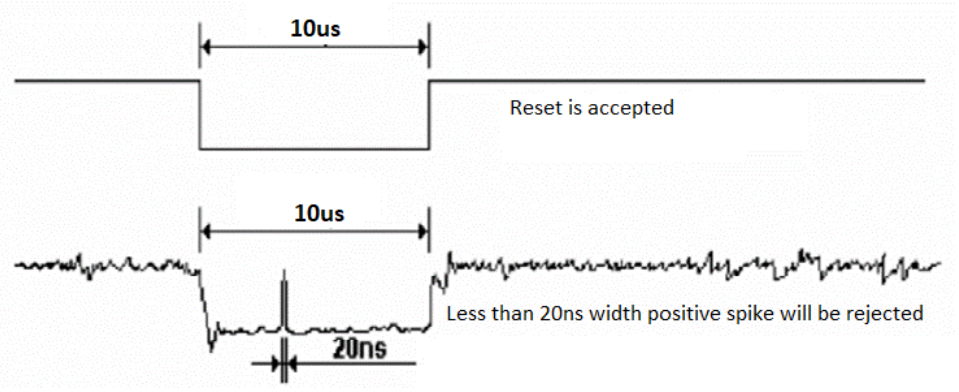
1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not because irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9 us	Reset starts

3. 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 Hardware Reset.

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



5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5ms after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120ms.

7. Cautions and Handling Precautions

7.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.
2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.
5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
8. Protect the module from static; it may cause damage to the CMOS ICs.
9. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
10. Do not disassemble the module.
11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
12. Pins of I/F connector shall not be touched directly with bare hands.
13. Do not connect, disconnect the module in the “Power ON” condition.
14. Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

7.2 Storage and Transportation.

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
2. Do not store the TFT-LCD module in direct sunlight.
3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.