



Model Name: ZXGL185004

LCD Screen model : QV185FHB-N82

Issue Date : 2023/07/17

() Preliminary Specifications

(*) Final Specifications

Customer Signature:	
ZXGL Part No.:	
Approved By:	Approval By PM Director
Note:	Reviewed By RD Director
	Reviewed By Project Leader
	Prepared By PM



1. GENERAL DESCRIPTION

1.1 OVERVIEW

This specification applies to the 18.5 inch Color TFT-LCD Module 185004. This LCD module has a TFT active matrix type liquid crystal panel 1920x1080 pixels, and diagonal size of 18.5 inch. This module supports 1920x1080 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot. The 185004 has been designed to apply the 8-bit LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Screen Size	18.5	Inch	-
Driver Element	a-Si TFT active matrix	-	-
Pixel Number	1920 x 1080	Pixel	
Pixel pitch	0.071(H) x 0.213 (V)	mm	
Pixel Arrangement	Pixels RGB Vertical stripe	-	
Display Colors	8bit / 16.7 M	Color	
Transmissive Mode	Normally Black	-	
Surface Treatment	Anti-Glare, 3H	-	
Luminance, White	250	cd/m2	
Color Gamut	/	-	
Power Consumption	Total 14.16 W @ cell 2.4 W , BL 11.76W		

2. MECHANICAL SPECIFICATIONS

Item	Min	Typ.	Max	Unit	Note
Module Size	Horizontal(H)	430.6		mm	(1)
	Vertical (V)	254.8		mm	
	Thickness (T)	9.5		mm	
Bezel Area	Horizontal	413.4		mm	
	Vertical	233.4		mm	
Active Area	Horizontal	-	408.96	-	mm
	Vertical	-	230.04	-	mm
Weight	-	/		Kg	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.



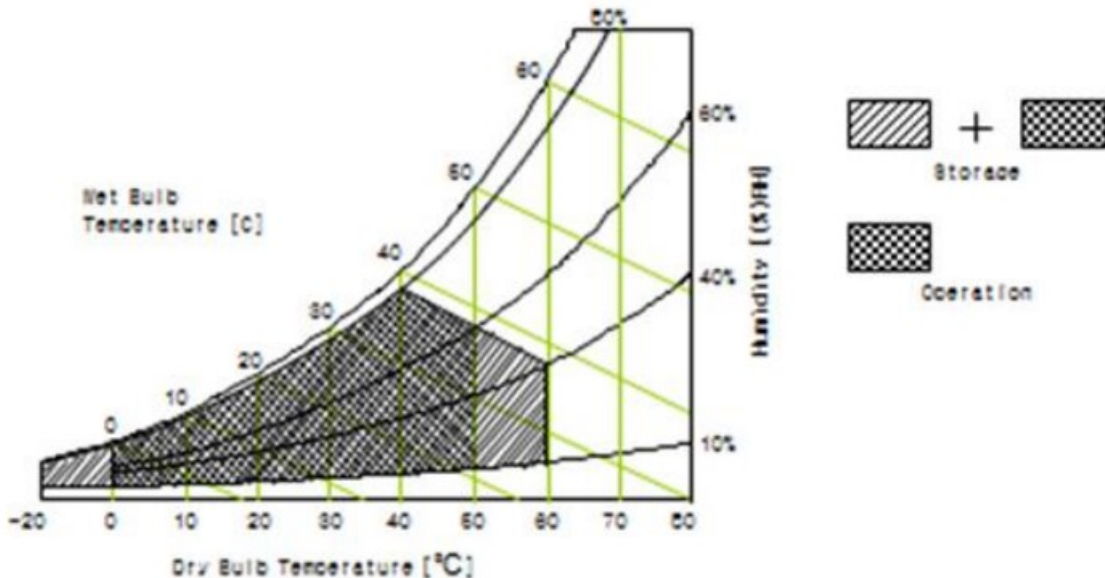
3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in .

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	6.5	V	Ta = 25 °C
Operating Temperature	T _{OP}	0	+50	°C	
Storage Temperature	T _{SUR}	-20	+60	°C	Note 1
	T _{ST}	-20	+60	°C	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	

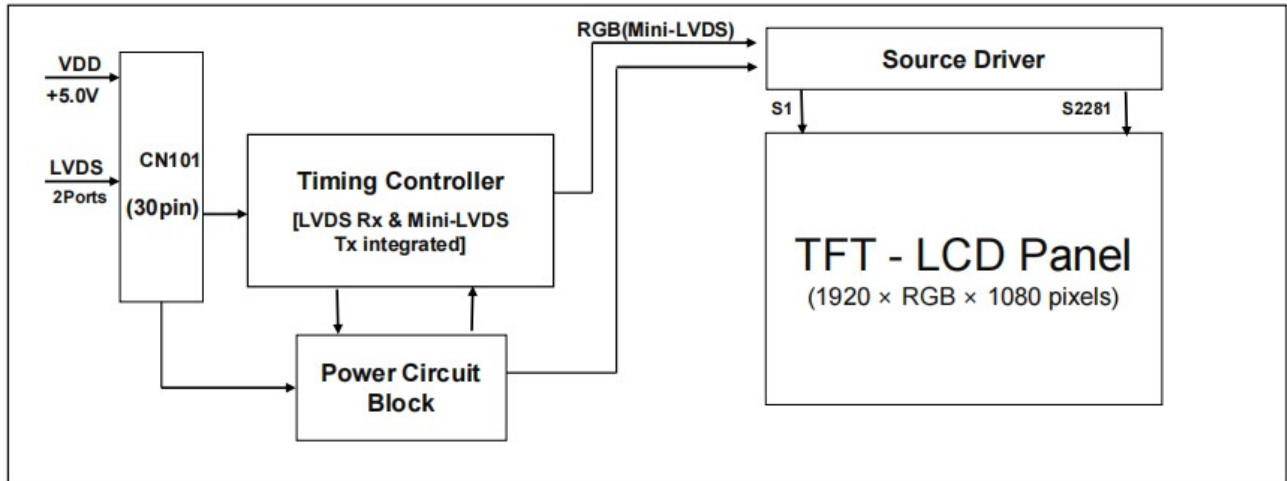
Note 1 : Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 °C max. and no condensation of water.





4. ELECTRICAL SPECIFICATIONS

4.1 FUNCTION BLOCK DIAGRAM



- LVDS interface with 2 pixel / clock
- High-speed response
- Low color shift image quality
- **8-bit** color depth, display 16.7M colors
- Wide viewing angle
- DE (Data Enable) only mode
- iHADS technology is applied for high display quality
- RoHS compliant



4.2 INTERFACE CONNECTIONS

PIN ASSIGNMENT

Pin No	Symbol	Description	Pin No	Symbol	Description
1	RX00-	Negative Transmission data of Pixel 0 (ODD)	16	RXE1+	Positive Transmission data of Pixel 1 (EVEN)
2	RX00+	Positive Transmission data of Pixel 0 (ODD)	17	GNG	Power Ground
3	RX01-	Negative Transmission data of Pixel 1 (ODD)	18	RXE2-	Negative Transmission data of Pixel 2 (EVEN)
4	RX01+	Positive Transmission data of Pixel 1 (ODD)	19	RXE2+	Positive Transmission data of Pixel 2 (EVEN)
5	RX02-	Negative Transmission data of Pixel 2 (ODD)	20	RXEC-	Negative Transmission Clock (EVEN)
6	RX02+	Positive Transmission data of Pixel 2 (ODD)	21	RXEC+	Positive Transmission Clock (EVEN)
7	GND	Power Ground	22	RXE3-	Negative Transmission data of Pixel 3 (EVEN)
8	RXOC-	Negative Transmission Clock (ODD)	23	RXE3+	Positive Transmission data of Pixel 3 (EVEN)
9	RXOC+	Positive Transmission Clock (ODD)	24	GND	Power Ground
10	RX03-	Negative Transmission data of Pixel 3 (ODD)	25	NC	No. Connection
11	RX03+	Positive Transmission data of Pixel 3 (ODD)	26	NC	No. Connection
12	RXE0-	Negative Transmission data of Pixel 0 (EVEN)	27	NC	No. Connection
13	RXE0+	Positive Transmission data of Pixel 0 (EVEN)	28	VDD	Power Supply: +5V
14	GND	Power Ground	29	VDD	
15	RXE1-	Negative Transmission data of Pixel 1 (EVEN)	30	VDD	

Module Panel Connector Information

Item	Description
Manufacturer	/
Type part number	/
Mating housing part number	JAE FI-X30H



4.3 ELECTRICAL CHARACTERISTICS

4.3.1 LCD ELECTRONICS SPECIFICATION

The ambient temperature is Ta = 25 ± 2 °C.

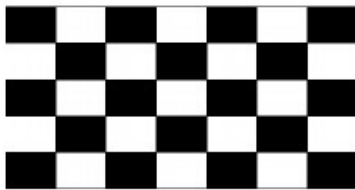
Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	4.5	5.0	5.5	V	
Power Supply Ripple Voltage		VRP			200	mV	
Power Supply Current		IDD	-	480	930	mA	Note 1
Power Consumption		PDD	-	2.4	4.65	Watt	
Rush current		IRUSH	-	-	3.0	A	Note 2
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	-	-	+100	mV	
	Differential Input Low Threshold Voltage	VLVTL	-100	-	-	mV	
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

Note 1 : The supply voltage is measured and specified at the interface connector of LCM.

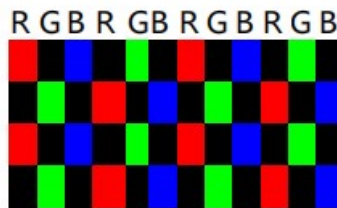
The current draw and power consumption specified is for VDD=5.0V, Frame rate f_v=60Hz and Clock frequency = 74.25MHz.

Test Pattern of power supply current

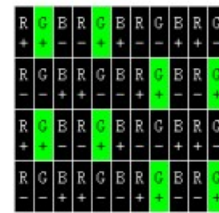
a) Typ : Mosaic 7X5 (L0/L255)



b) Max Skip 1 dot Pattern (L255)



c) Flicker Pattern



Note 2 : The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)



4.3.2 BACKLIGHT UNIT

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
BLU Voltage	U	47.6	49	54	V	
BLU Current	I		240		mA	
BLU Power	P		11.76		W	
BLU lifetime	T	40000			Hrs	(1)

Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at $T_a = 25 \pm 2 \text{ }^\circ\text{C}$ and $I = (240)\text{mA}$ (per chip) until the brightness becomes $\leq 50\%$ of its original value.

Note (3) The module must be operated with constant driving current.

Connector Information

Pin number	Description
1	negative polarity
2	Input voltage Power Supply

Note (1) User’s Mating Connector Part No.:

Connector (wire type): PH2.0-2Pin 1 groups





4.4 LVDS INPUT SIGNAL SPECIFICATIONS

4.4.1 The QV185FHB-N82 is operated by the DE only.

Item		Symbols	Min	Typ	Max	Unit	
Clock	Frequency	1/Tc	60	74.25	78	MHz	
	High Time	Tch	-	4/7Tc	-		
	Low Time	Tcl	-	3/7Tc	-		
Frame Period		Tv	1100	1125	1149	lines	
			48.5	60	63	Hz	
Horizontal Active Display Term		Valid	t _{HV}	-	960	-	t _{CLK}
		Total	t _{HP}	1060	1100	1200	t _{CLK}
Vertical Active Display Term		Valid	t _{VV}	-	1080	-	t _{HP}
		Total	t _{VP}	1100	1125	1149	t _{HP}

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

Symbol	Parameter	Condition	Min	Typ	Max	Unit
F	LVDS Input frequency	-	60	74.25	78	MHz
T _{LVSK}	LVDS channel to channel skew	F=100MHz V _{IC} =1.2V V _{ID} =±400mV	-380	-	+380	ps
F _{LVMOD}	Modulating frequency of input clock during SSC		60	-	85	KHz
F _{LVDEV}	Maximum deviation of input clock frequency during SSC		-3	-	+3	%
T _{CY-CY}	Cycle to Cycle jitter		-	-	100	ps

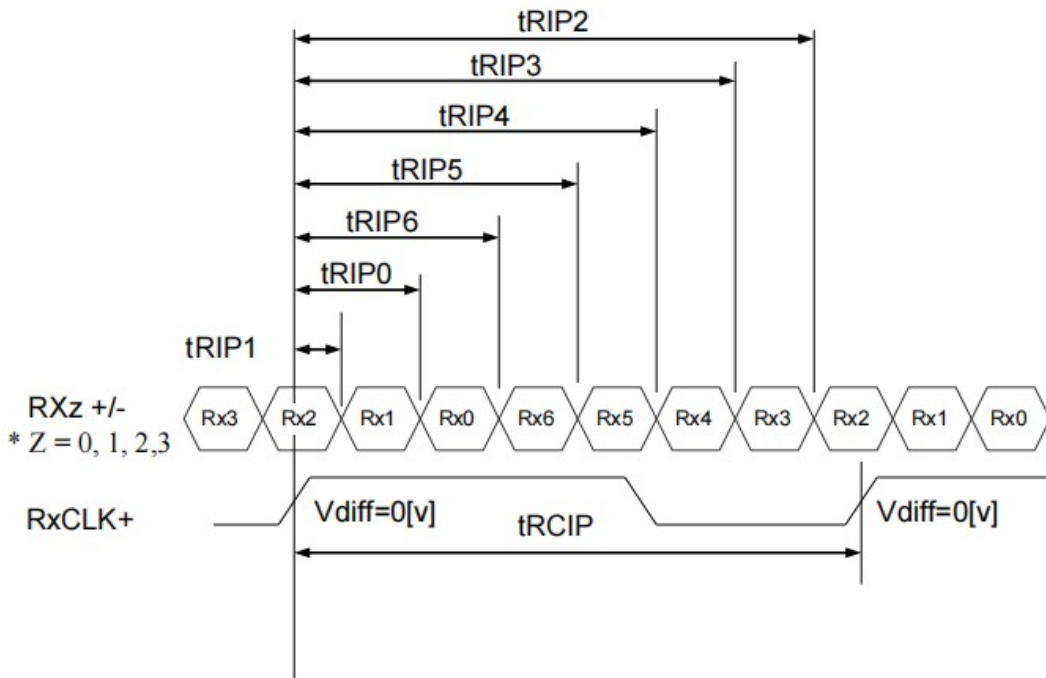


4.4.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in .

<LVDS Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	12.83	13.47	16.66	nsec	
Input Data 0	tRIP1	-0.42	0.0	+0.42	nsec	
Input Data 1	tRIP0	tRCIP/7-0.42	tRCIP/7	tRCIP/7+0.42	nsec	
Input Data 2	tRIP6	2 ×tRCIP/7-0.42	2 ×tRCIP/7	2 ×tRCIP/7+0.42	nsec	
Input Data 3	tRIP5	3 ×tRCIP/7-0.42	3 ×tRCIP/7	3 ×tRCIP/7+0.42	nsec	
Input Data 4	tRIP4	4 ×tRCIP/7-0.42	4 ×tRCIP/7	4 ×tRCIP/7+0.42	nsec	
Input Data 5	tRIP3	5 ×tRCIP/7-0.42	5 ×tRCIP/7	5 ×tRCIP/7+0.42	nsec	
Input Data 6	tRIP2	6 ×tRCIP/7-0.42	6 ×tRCIP/7	6 ×tRCIP/7+0.42	nsec	

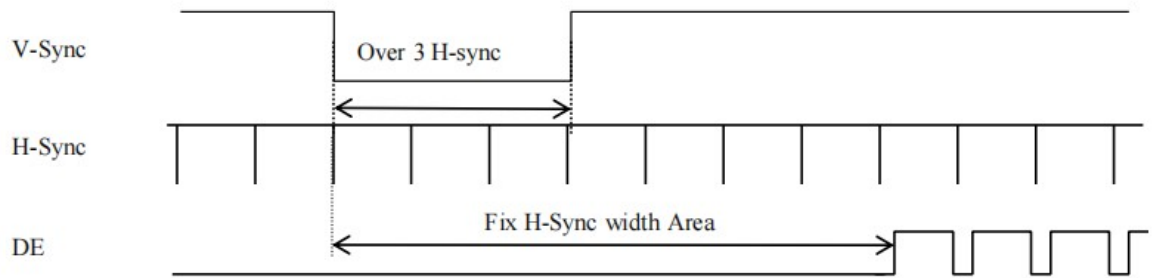


* Vdiff = (RXz+)-(RXz-),.... ,(RXCLK+)-(RXCLK-)



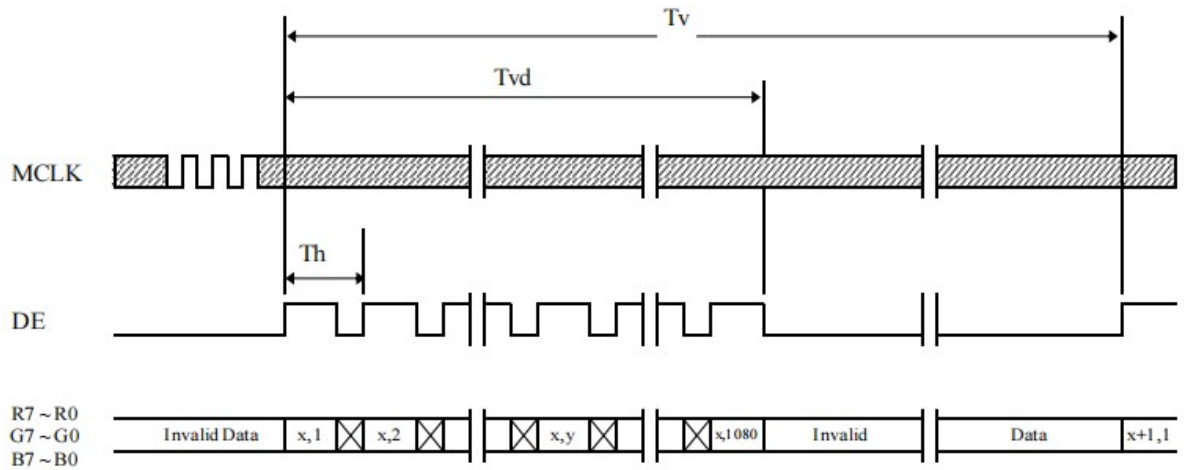
4.4.3 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

Sync Timing Waveforms



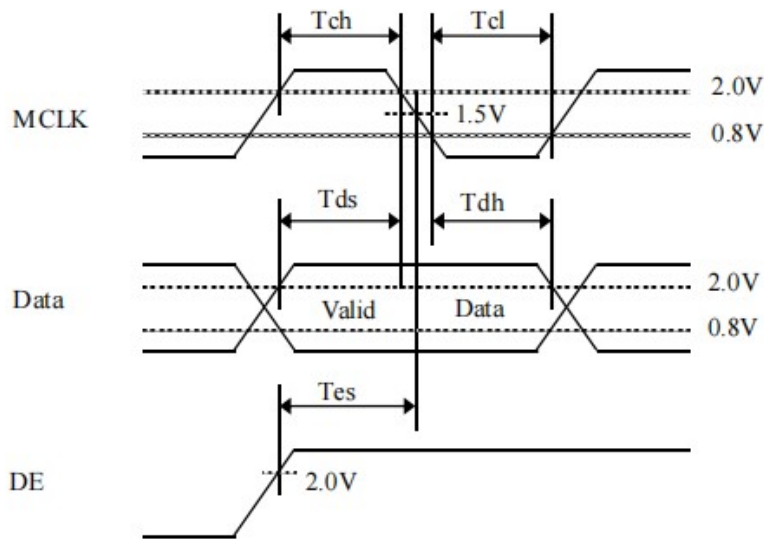
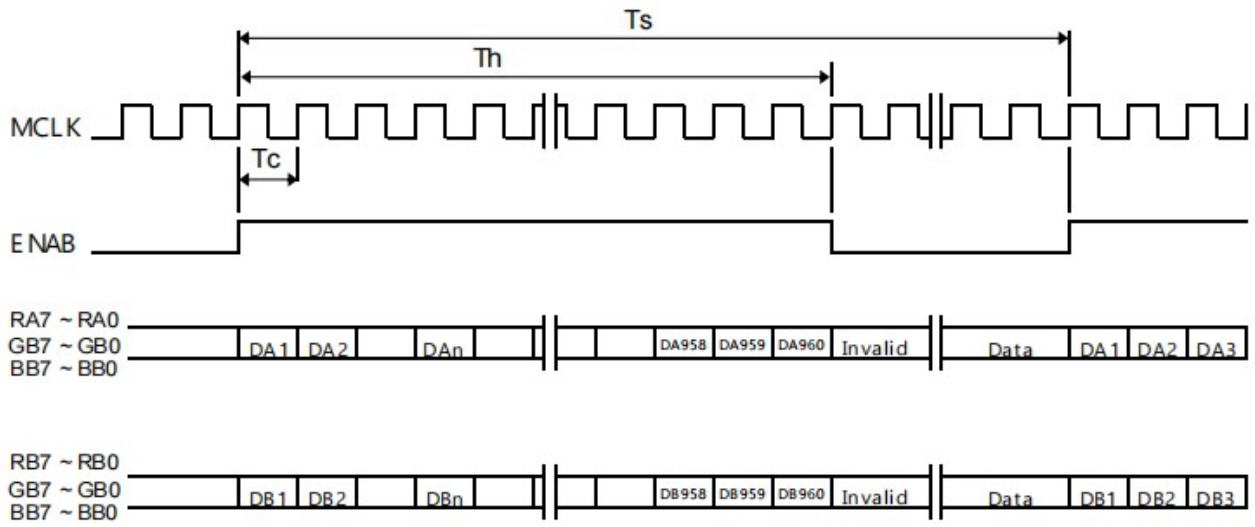
- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

Vertical Timing Waveforms





Horizontal Timing Waveforms





5. OPTICAL CHARACTERISTICS

The test of optical specifications shall be measured in a dark room (ambient luminance \leq 1 lux and temperature $=25\pm 2^{\circ}\text{C}$) with the equipment of Luminance meter system (Goniometer system and PR730) and test unit shall be located at an approximate distance 180cm from the LCD surface at a viewing angle of θ and Φ equal to 0° . We refer to $\theta_{\Phi=0}$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta_{\Phi=90}$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta_{\Phi=180}$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta_{\Phi=270}$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or Φ , the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 5.0V at 25°C . Optimum viewing angle direction is 6 'clock.

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10	80	89		Deg.	Note 1
		Θ_9		80	89		Deg.	
	Vertical	Θ_{12}		80	89		Deg.	
		Θ_6		80	89		Deg.	
Contrast ratio		CR		800:1	1000:1	-		Note 2
Reproduction of color	White	W_x	$\Theta = 0^{\circ}$ (Center) Normal Viewing Angle	TYP. - 0.03	0.297	TYP. + 0.03		Note 3 With BOE YR粉 BLU
		W_y			0.318			
	Red	R_x			0.650			
		R_y			0.338			
	Green	G_x			0.310			
		G_y			0.612			
	Blue	B_x			0.149			
		B_y			0.065			
Color Gamut				67	72	-	%	
Response Time		GTG		-	14	-	ms	Note 4
Gamma Scale				2.0	2.2	2.4		
Luminance, White					250	-	cd/m ²	



Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. The color chromaticity coordinates specified in Table 12 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel. The BLU is used by BOE.
4. Response time T_r shall be measured by switching the signal from " 0 level of gray" to "255 level of gray". And response time T_f shall be measured by switching the signal from " 255 level of gray" to "0 level of gray".

Measured Response Time	Target																
	0	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
Start	0																
	15																
	31																
	47																
	63																
	79																
	95																
	111																
	127																
	143																
	159																
	175																
	191																
	207																
	223																
	239																
255																	

5. Definition of Transmittance (T%) :

Module is with white(L255) signal input

$$\text{Transmittance} = \frac{\text{Luminance of LCD Module}}{\text{Luminance of BLU}} \times 100 \%$$



6. RELIABILITY TEST ITEM

The Reliability test items and its conditions are shown in below.

< Reliability Test Parameters >

No	Test Items	Conditions
1	High temperature storage test	Ta = 60 °C, 240 hrs
2	Low temperature storage test	Ta = -20 °C, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240hrs
4	High temperature operation test	Ta = 60 °C, 240hrs
5	Low temperature operation test	Ta = -5 °C, 240hrs
6	Thermal shock	Ta = -20 °C ↔ 60 °C, 每8hr启动一次



7. MECHANICAL OUTLINE DIMENSION

