

# Model Name: 185005

LCD Screen model : GV185FHB-N10

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 185005. 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 185005 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	0.213(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	1000	cd/m2	
Color Gamut	/	-	
Power Consumption	Total 24.16 W @ cell 3 W , BL 21.16W		

## 2. MECHANICAL SPECIFICATIONS

Item	Min	Typ.	Max	Unit	Note
Module Size	Horizontal(H)	430.37		mm	(1)
	Vertical (V)	254.6		mm	
	Thickness (T)	11.2		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 .

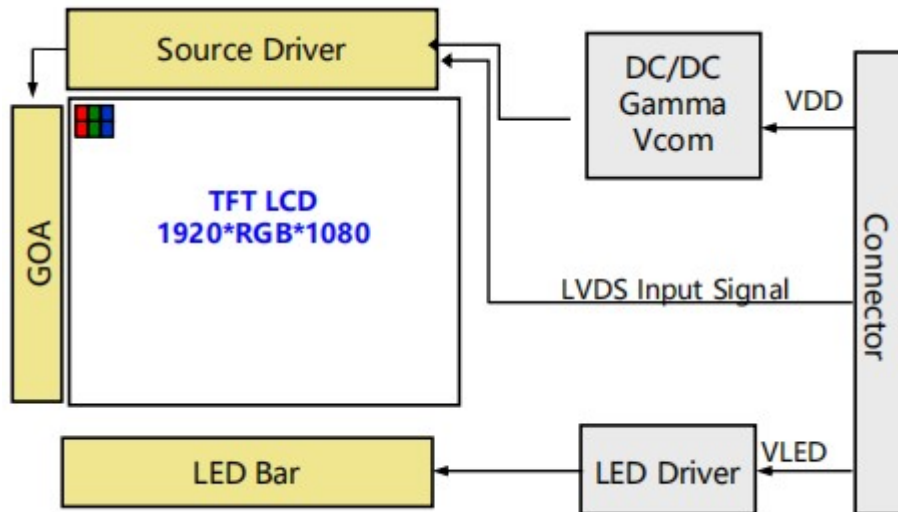
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Back-light Power Supply Voltage	$HV_{DDOUT}$	-	-	-	V	Ta = 25 °C Note 1&2
Back-light LED Current	$I_{HVDD}$	-	-	-	mA	
Back-light LED Reverse Voltage	$V_R$	-	-	-	V	
Power Supply Input Voltage	VCC	-0.3	-	7	V	
Operating Temperature	$T_{OP}$	-20	-	70	°C	Environment Temperature
Storage Temperature	$T_{ST}$	-30	-	80	°C	
Heat Release Requirement	Trls	15			°C	Note3

Note:

- These range above is maximum value not the actual operating temperature . Actual Operating temperature is no more than **40°C** and temperature refers to the LCM surface temperature ;
- BOE is not responsible for product problems beyond the use conditions.
- When the ambient temperature is T °C, the surface temperature of Panel can not exceed (T+15)°C.

## 4. ELECTRICAL SPECIFICATIONS

### 4.1 FUNCTION BLOCK DIAGRAM



- LED back-light
- LVDS interface
- RoHS Compliant
- 16.7M color depth

## 4.2 INTERFACE CONNECTIONS

## PIN ASSIGNMENT

The electronics interface connector is IS100-L30R-C23 (UJU) or equivalent

The LED connector is CI4205M2HRD-NH or equivalent.

The connector interface pin assignments are listed in Table 6 and 7.

<Table 6. Pin Assignments for the Interface Connector>

Pin No.	Symbol	Description	remark
1	RxOIN0-	LVDS data input	
2	RxOIN0+	LVDS data input	
3	RxOIN1-	LVDS data input	
4	RxOIN1+	LVDS data input	
5	RxOIN2-	LVDS data input	
6	RxOIN2+	LVDS data input	
7	VSS	Ground	
8	RxOCLKIN-	LVDS clock input	
9	RxOCLKIN+	LVDS clock input	
10	RxOIN3-	LVDS data input	
11	RxOIN3+	LVDS data input	
12	RxEIN0-	LVDS data input	
13	RxEIN0+	LVDS data input	
14	VSS	Ground	
15	RxEIN1-	LVDS data input	
16	RxEIN1+	LVDS clock input	
17	VSS	Ground	
18	RxEIN2-	LVDS clock input	
19	RxEIN2+	LVDS clock input	
20	RxECLKIN-	LVDS clock input	
21	RxECLKIN+	LVDS clock input	
22	RxEIN3-	LVDS clock input	
23	RxEIN3+	LVDS clock input	
24	VSS	Ground	
25	SCL	I2C BUS	Only BOE use
26	SDA	I2C BUS	Only BOE use
27	WP	EEPROM write EN	Only BOE use
28	VCC	Power supply(5V)	
29	VCC	Power supply(5V)	
30	VCC	Power supply(5V)	

## Module Panel Connector Information

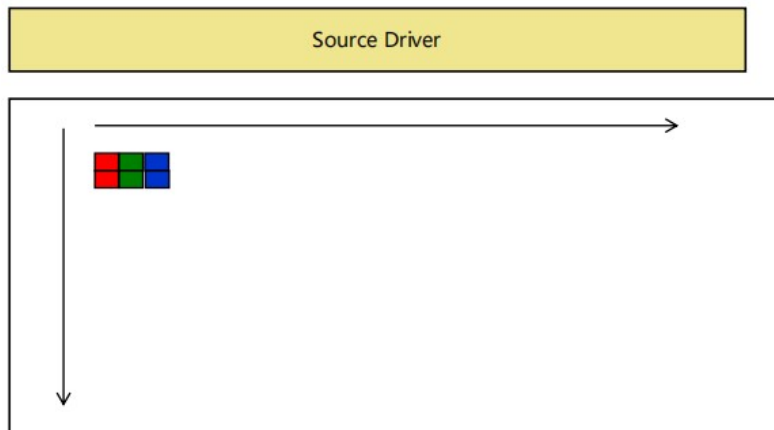
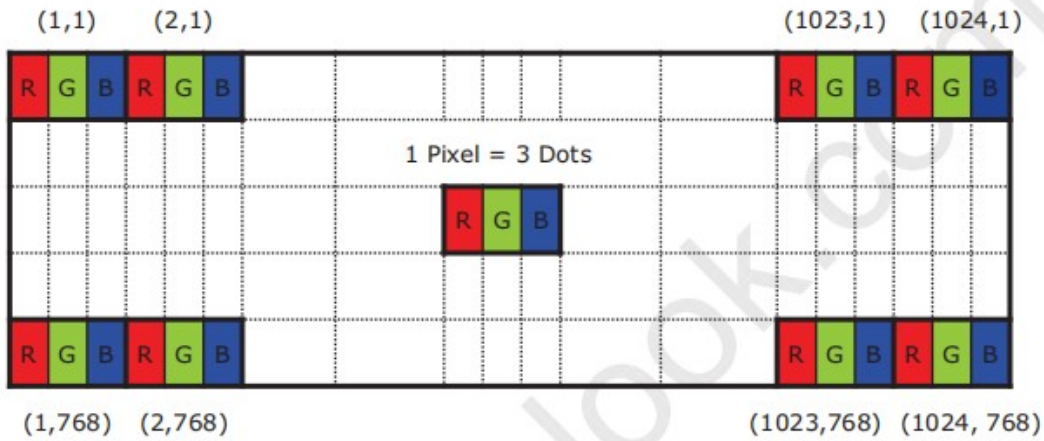
Item	Description
Manufacturer	/
Type part number	/
Mating housing part number	JAE FI-X30H

4.3 ELECTRICAL CHARACTERISTICS

4.3.1 LCD ELETRONICS SPECIFICATION

The ambient temperature is  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$ .

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	



4.3.2 BACKLIGHT UNIT

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
BLU Voltage	U	42	46	52	V	
BLU Current	I		230*2		mA	
BLU Power	P		21.16		W	
BLU lifetime	T	30000			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  $I = (460)\text{mA}$  (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 2 groups



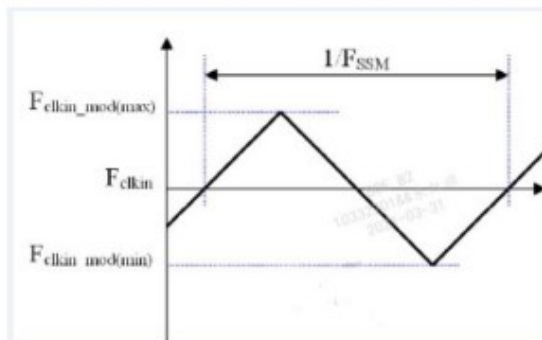
4.4 LVDS INPUT SIGNAL SPECIFICATIONS

4.4.1 The GV185FHB-N10 is operated by the DE only.

Item	Symbols	Min	Typ	Max	Unit	Note	
DCLK	Period	tCLK	9.5	-	25	ns	Note 1
	Frequency	-	40	-	105	MHz	
Hsync	Period	tHP	990	1040	-	tCLK	
	Horizontal Valid	tHV	-	960	-	tCLK	
	Horizontal Blank	tHB	30	80	-	tCLK	
	Frequency	fH	45	60	75	KHz	
Vsync	Period	tVP	1100	1125	1138	tHP	
	Vertical Valid	tVV	-	1080	-	tHP	
	Vertical Blank	tVB	30	45	58	tHP	
	Frequency	fV	45	60	75	Hz	
LVDS Receiver clock	Input spread spectrum ratio	SSr	-	1.5	2	%	Note 2
	spread spectrum modulation frequency	Fssm	-	-	100	KHZ	

Note 1: The DCLK range at last line of V-blanking should be set in 0-H-active/2.

Note 2: The SSGG(spread Spectrum Clock Generator) is defined as following figure:

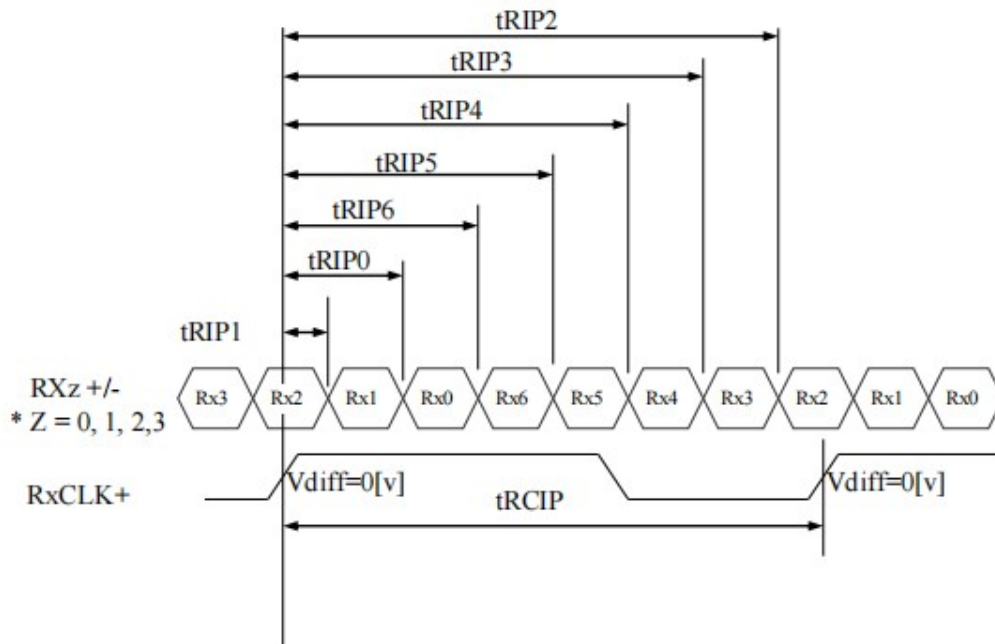


4.4.2 LVDS Rx Interface Timing Parameter

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

<LVDS Rx Interface Timing Specification>

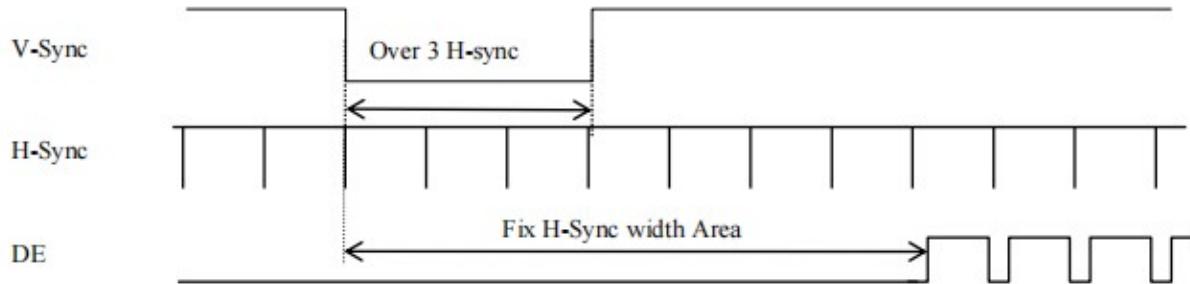
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	9.5	-	25	nsec	
Input Data 0	tRIP1	-0.4	0.0	0.4	nsec	
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP6	2 × tRCIP/7-0.4	2 × tRCIP/7	2 × tRCIP/7+0.4	nsec	
Input Data 3	tRIP5	3 × tRCIP/7-0.4	3 × tRCIP/7	3 × tRCIP/7+0.4	nsec	
Input Data 4	tRIP4	4 × tRCIP/7-0.4	4 × tRCIP/7	4 × tRCIP/7+0.4	nsec	
Input Data 5	tRIP3	5 × tRCIP/7-0.4	5 × tRCIP/7	5 × tRCIP/7+0.4	nsec	
Input Data 6	tRIP2	6 × tRCIP/7-0.4	6 × tRCIP/7	6 × tRCIP/7+0.4	nsec	



\*  $V_{diff} = (RXz+) - (RXz-), \dots, (RXCLK+) - (RXCLK-)$

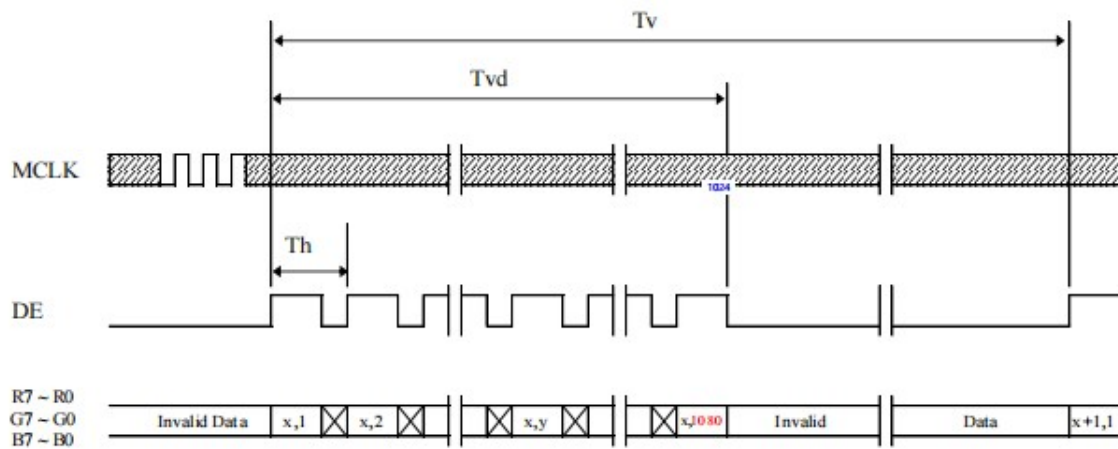
4.4.3 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

Sync Timing Waveforms

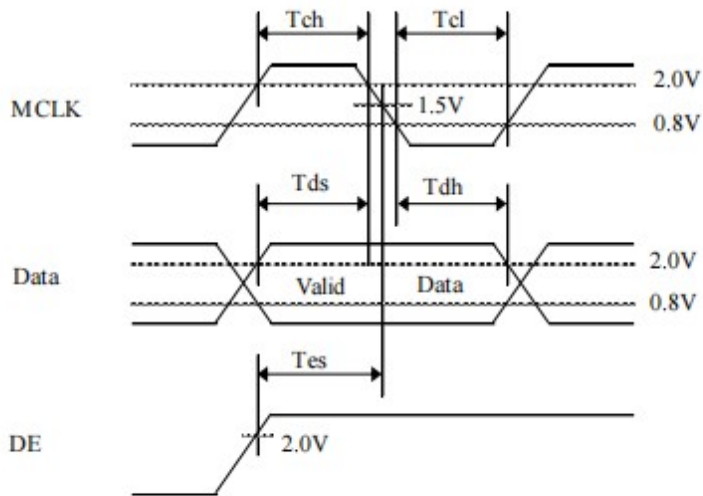
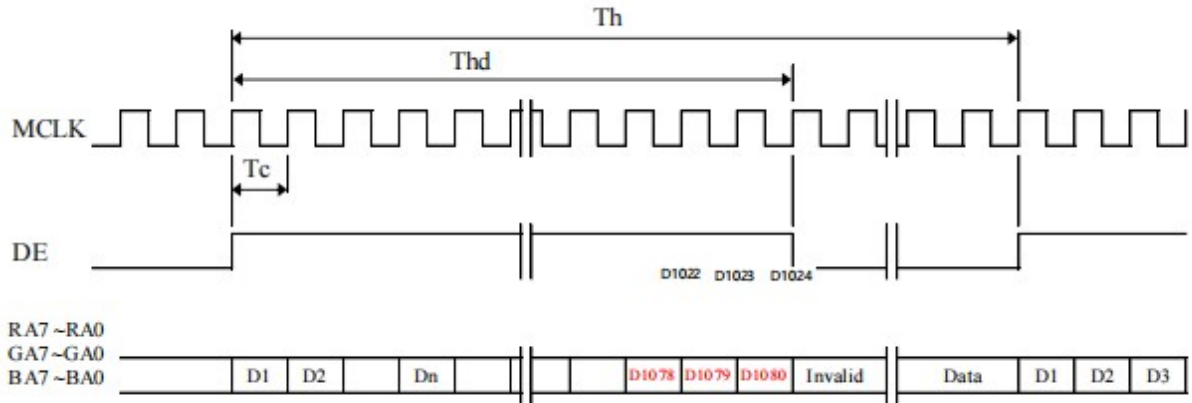


- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

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  $\theta$  and  $\Phi$  equal to  $0^\circ$ . 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  $\theta$  and/or  $\Phi$ , 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  $25^\circ\text{C}$ . Optimum viewing angle direction is 6 'clock.

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	$\Theta_3$	CR > 10	80	85	-	Deg.	Note 1
		$\Theta_9$		80	85	-	Deg.	
	Vertical	$\Theta_{12}$		80	85	-	Deg.	
		$\Theta_6$		80	85	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	_____	1200	-		Note 2
Luminance of White	Center	$Y_w$	$\Theta = 0^\circ$		1000	-	cd/m <sup>2</sup>	Note 3
White Luminance uniformity	9 Points	$\Delta Y_9$		80	85	-	%	Note 4
Color Gamut	NTSC	CIE1931	$\Theta = 0^\circ$	65	70	-	%	Note 5
Reproduction of color	White	$W_x$	$\Theta = 0^\circ$	Typ	0.286	Typ		
		$W_y$		-0.05	0.296			+0.05
Response Time		Tr+Td	Ta= 25° C $\Theta = 0^\circ$	-	30	35	ms	Note 6

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- Notes :
1. 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 (see FIGURE 1).
  2. Contrast measurements shall be made at viewing angle of  $\Theta = 0$  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. (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Luminance of white is defined as luminance values of center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display. The luminance is measured by CS2000/CA310 when the LED current is set at 60mA.
4. The White luminance uniformity on LCD surface is then expressed as :  $\Delta Y = \frac{\text{Minimum Luminance of 9 Points}}{\text{Maximum Luminance of 9 Points}}$  (See FIGURE 2).
5. The color chromaticity coordinates specified in Table 5. 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.
6. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is  $T_r$ , and 90% to 10% is  $T_d$ .

## 6. RELIABILITY TEST ITEM

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

< Reliability Test Parameters >

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 80°C, 240 hrs	
2	Low temperature storage test	Ta = -30°C, 240 hrs	
3	High temperature operation test	Ta = 70°C, 240 hrs	
4	Low temperature operation test	Ta = -20°C, 240 hrs	
5	High temperature & high humidity operation test	Ta = 60 °C, 90%RH, 240 hrs	
6	Thermal shock	Ta = -20 °C ↔ 7 0°C (0.5 hr), 1hour/Cycle,100 cycle	Non-operation
7	ESD test	C=150pF, R=330Ω, Air: ±15KV, Contact: ±8KV,100point	
8	Vibration Test (Non-operation)	1.5G,10~200Hz,30min/AXIS ; X,Y,Z directions ; Wave : random	

Note : After the reliability test, the product only guarantee function normally without any fatal defect (non-display, line defect, abnormal display etc ). All the cosmetic specification is judged before the reliability test.

7. MECHANICAL OUTLINE DIMENSION

