



## 8.4 inch TFT Display Series



**GDTT084CA**

Dalian Good Display Co., Ltd.

# **SPECIFICATION**

# **FOR**

**Module: GDTT084CA**

Designed by	R&D Checked by	Quality Department by	Approved by

### Revision History

Date	Rev.	Description	Note	Page
2023-09-13	A	First issue	James	

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## 1、 General Specifications

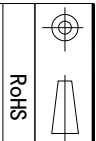
"GDTT084CA" is a TFT-LCD module, featuring a TFT-LCD panel, driver IC, FPC, and a backlight unit. With an expansive 8.4-inch display area, it boasts a resolution of 1024 x (RGB) x 768 pixels, supporting a vibrant color palette of up to 16.7 million colors. Additionally, this product is compliant with ROHS environmental standards and is a standard offering from Good Display.

Item	Contents	Unit	Note
LCD Type	a-Si TFT	-	
Active Screen size	8.4" diagonal	inch	
Display color	16.7M		1
Viewing Direction	Full view	-	
Operating temperature	-30~+80	°C	
Storage temperature	-30~+80	°C	
Module size	199.50 (W) X149.00(H)X9.7(T)	mm	2
Active Area	170.496(W) X 127.872 (H)	mm	
Pixel Pitch	0.1665 (W) X 0.1665(H)	mm	
Resolution	1024(H) X (RGB) X 768(V)	pixels	
Power Supply Voltage	3.3	V	
TFT Controller	HX8290-A-LT*2+HX8695-E-LT*1		
Weight	325	g	
Interface	LVDS		

Note 1: Color tune is slightly changed by temperature and driving voltage.

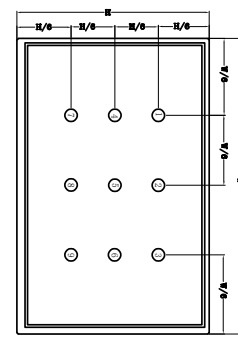
Note 2: Without FPC and Solder.

## 2、 Mechanical drawing

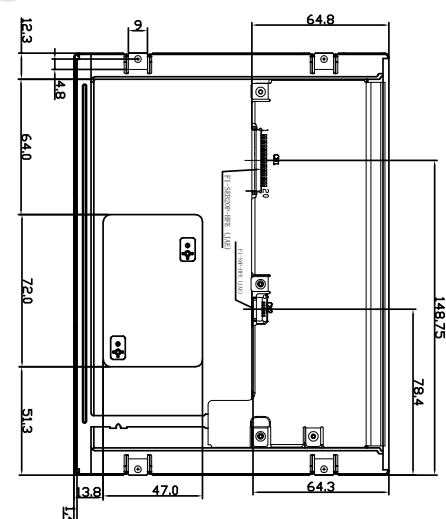
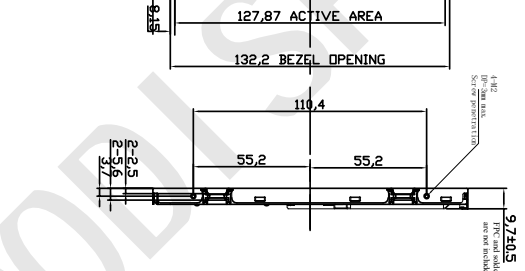
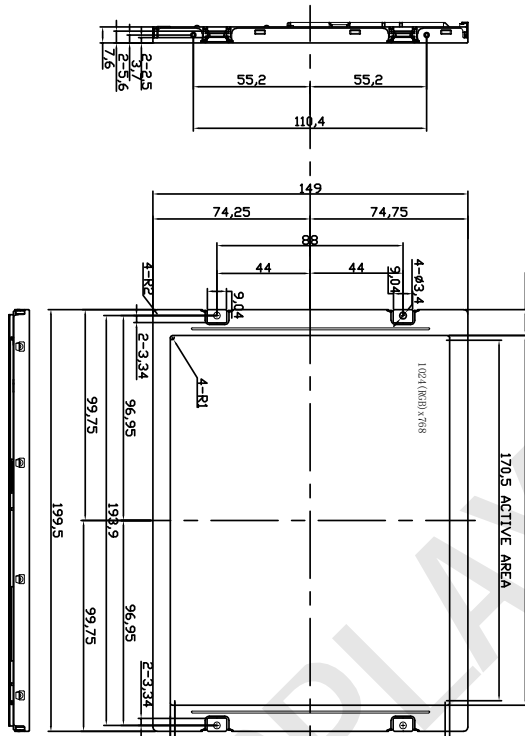


RoHS

- 4. Test Point:**
1. Environment Luminance:  $\leq 0.1 \text{cd/m}^2$
  2. Test Instrument: IM-7
  3. Test Distance: 500 mm
  4. Aperture Diameter:  $7.7(1^\circ)$   $\phi$



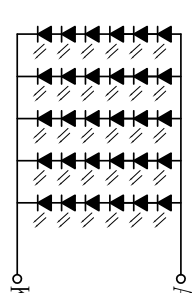
RIGHT VIEW



1. Mechanical Outline (unspecified Tolerances is  $\pm 0.3\text{mm}$ )
2. Electrical-Optical Characteristics ( $T_a = 25^\circ\text{C}$ )
3. Circuit Diagram (LED SMT  $6 \times 5 = 30$  PCS) Color: WHITE

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Forward Voltage	VF		18.0	19.8	V	定电流
Dominant Wave Length	X	0.27	0.31	0.355		IF=300mA
	Y	0.26	0.31	0.36		
Uniformity	Avg	75	85		%	
Module Luminance	Lv	1000	1200		cd/m <sup>2</sup>	

Operating Temperature:  $-30 \sim +80^\circ\text{C}$  Storage Temperature:  $-30 \sim +80^\circ\text{C}$



ISSUE	DATE	DESCRIPTION	REVISER
1	20230606		

TYPE	TFT-LCD	DITBNG MODE	GDTT084CA
CUSTOM NO.	KH059	EDITION	A2
CUSTOM MODEL	8.4"024*768	UNIT	MM
CUST Drawing	SCALE	1:1	CHECK
	PAGE	1/1	DESIGNED
DALIAN GOOD DISPLAY CO LTD, .		DATE	2023-06-06

PN	SYMBOL	(R:Backlight)
1	VL	
2	VL	
3	GND	
4	GND	
5	BLN	
6	V PDM	

Pin	Symbol	Function
1	VCC	VCC
2	VCC	VCC
3	GND	GND
4	GND	GND
5	Link 0-	Link 0-
6	Link 0+	Link 0+
7	GND	GND
8	Link 1-	Link 1-
9	Link 1+	Link 1+
10	GND	GND
11	RIN 2-	RIN 2-
12	RIN 2+	RIN 2+
13	GND	GND
14	CLKIN-	CLKIN-
15	CLKIN+	CLKIN+
16	GND	GND
17	Link 3-	Link 3-
18	Link 3+	Link 3+
19	NC	NC
20	SC	SC

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### 3、 Absolute Maximum Ratings(Ta=25℃)

#### 3.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VCC	-0.3	-	4.0	V	1、 2
	VL	-0.3	-	14.0	V	1、 2
	VPDIM	-0.3	-	14.0	V	1、 2
	BLEN	-0.3	-	14.0	V	1、 2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. VCC >VSS must be maintained.
3. Please be sure users are grounded when handing LCD Module.

#### 3.2 Environmental Absolute Maximum Ratings.

Item	Symbol	Condition	Min.	Max.	Unit
Operating Temperature	TOP	-	-30	80	℃
Storage Temperature	TST	-	-30	80	℃
Humidity	-	TA ≦ 40℃	--	85%	RH

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.  
The phenomenon is reversible.
3. Ta<=40℃:85%RH MAX.  
Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

## 4、Electrical Specifications

### 4.1 Electrical characteristics for LCD(V<sub>SS</sub>=0V ,Ta=25°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VCC	Ta=25°C	3.0	3.3	3.6	V	
Backlight Power supply	VL	Ta=25°C	9.0	12.0	13.2	V	
Input voltage	VIH	Ta=25°C	0.7V CC	-	VCC	V	
	VIL	Ta=25°C	-0.3	-	0.3V CC	V	
Current of power supply	ICC	Ta=25°C	-	180	-	mA	

### 4.2 LED backlight specification(V<sub>SS</sub>=0V ,Ta=25°C)

Item	Symbol	Min	Typ	Max	Unit	Note	
Supply voltage	VL	9.0	12.0	13.2	V		
Supply Current	IL	-	350	-	mA	(VL=12V)PWM=100%	
Power Consumption	PL	-	4.2	-	W	(VL=12V)PWM=100%	
PWM Control Frequency	FPDIM	100	-	300K	Hz		
Backlight ON-OFF	High	BLEN	1.6	-	VL	V	
	Low		0	-	0.8	V	
PWM Control Level	High	VPDIM	1.6	-	VL	V	
	Low		0	-	0.8	V	
Uniformity	Δ Bp	75	80	-	%		
Life Time	time	-	50K	-	Hours	1	

Note 1: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C



### 4.3 Interface signals

#### 4.3.1 CN 1(Interface Signal)

Used connector: 20186-020E-11F (I-PEX) or FI-SEB20P-HFE (JAE)

Corresponding connector: 20197- 20U-F (I-PEX) or FI-S20S[for discrete Wire],  
FI-SE20ME[for FPC] (JAE)

Pin No.	Symbol	I/O	Function
1-2	VCC	P	Power supply
3-4	GND	P	Ground
5	LINK0-	I	LVDS lane0 input
6	LINK0+	I	LVDS lane0 input
7	GND	P	Ground
8	LINK1-	I	LVDS lane1 input
9	LINK1+	I	LVDS lane1 input
10	GND	P	Ground
11	LINK2-	I	LVDS lane2 input
12	LINK2+	I	LVDS lane2 input
13	GND	P	Ground
14	CLKIN-	I	LVDS CLK input
15	CLKIN+	I	LVDS CLK input
16	GND	P	Ground
17	LINK3-	I	LVDS lane3 input
18	LINK3+	I	LVDS lane3 input
19	MODE	-	Not connection
20	SC	I	Scan direction control (Low=Normal, High=Reverse)

#### 4.3.1 CN 2(Backlight)

Backlight-side connector: FI-S6P-HFE (JAE)

Corresponding connector: FI-S6S (JAE)

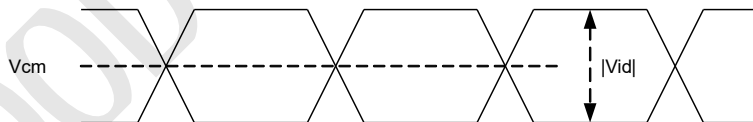
Pin No.	Symbol	I/O	Function
1-2	VL	P	Power supply For BL
3-4	GND	P	Ground
5	BLEN	I	LED driver enable input
6	VPDIM	I	PWM dimming control input

### 4.4 AC Characteristics

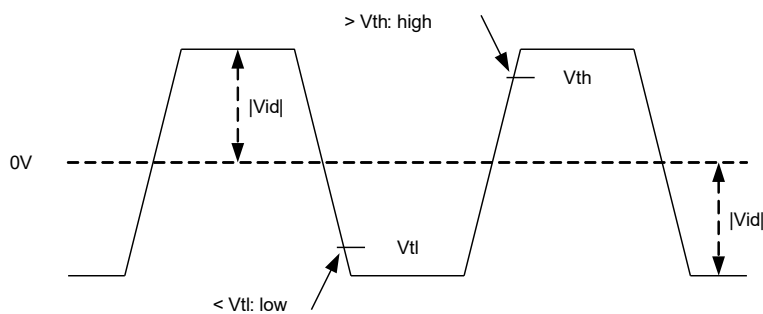
#### 4.4.1 For the digital circuit: LVDS mode

Parameter	Symbol	Condition	Spec			Unit
			Min	Typ	Max	
Differential input high Threshold voltage	Vth	Vcm=1.2V	-	-	+0.1	V
Differential input low Threshold voltage	Vtl	-	-0.1	-	-	V
Differential input common Mode voltage	Vcm	-	1.0	1.2	$1.7 -  V_{id}  / 2$	V
LVDS input voltage	Vinlv	-	0.7	-	1.7	V
Differential input voltage	Vid	-	0.1	-	0.6	V
Differential input leakage Current	Ivleak	-	-10	-	+10	uA

**Single-ended:**  
 LVCLKP(R),  
 LVCLKN(R),  
 LVD [3:0]P(R),  
 LVD [3:0]N(R)



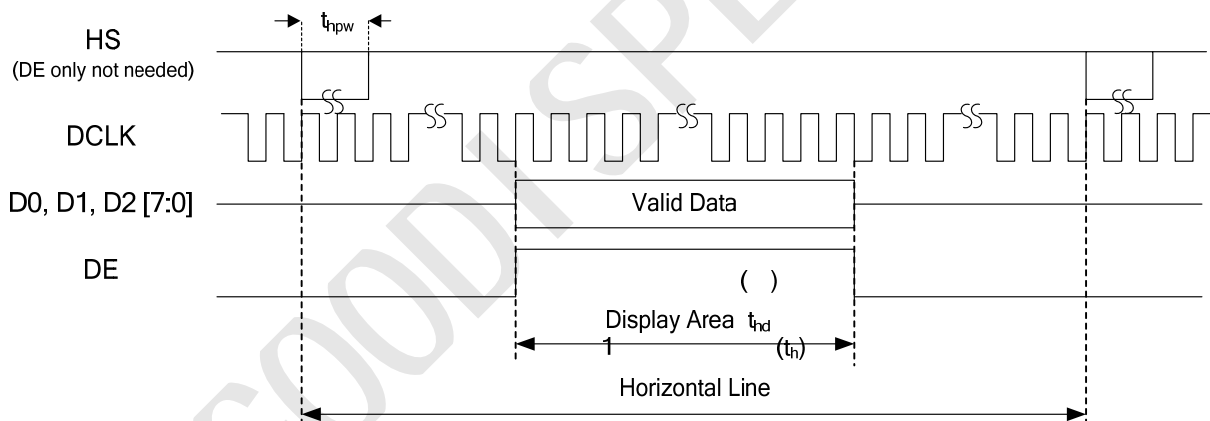
**Differential:**  
 LVCLKP(R)-LVCLKN(R),  
 LVD [3:0]P(R)-  
 LVD [3:0]N(R)



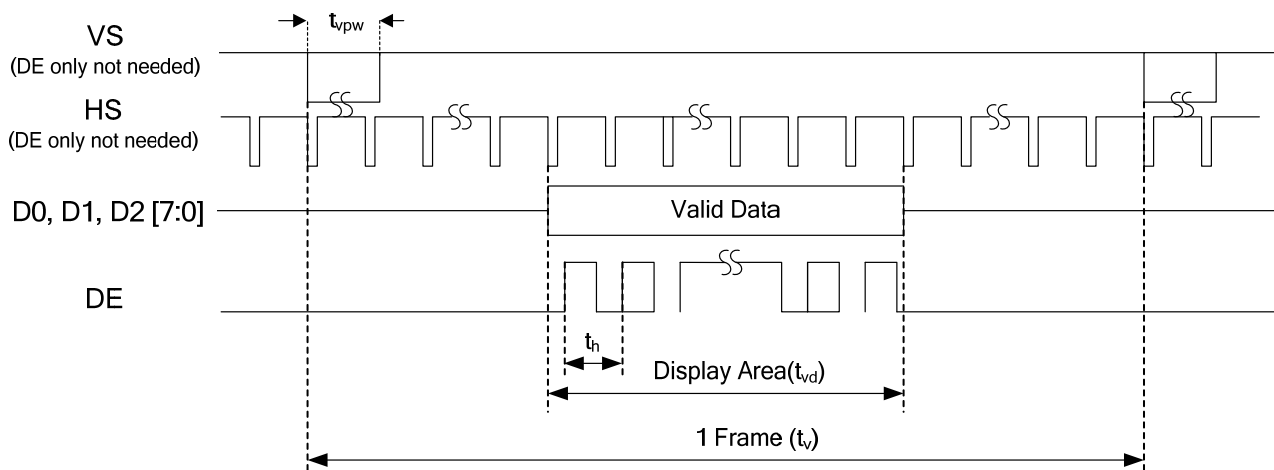
### 4.4.2 Input timing table

Parameter	Symbol	Min	Typ	Max	
DCLK frequency	FDCLK	49	50	73.6	MHz
Horizontal valid data	thd	1024			DCLK
Hsync pulse width	thpw	10	12	255	DCLK
Hsync back porch	thbp	5	16	255	DCLK
Hsync front porch	thfp	24	26	260	DCLK
1 Horizontal line	th	1053	1066	1331	
Vertical valid data	tvd	768			H
Vsync pulse width	tpw	1	3	20	H
Vsync back porch	tvbp	2	5	255	H
Vsync front porch	tvfp	5	8	260	H
1 Vertical field	tv	755	781	921	H
Frame rate	FR	60			Hz

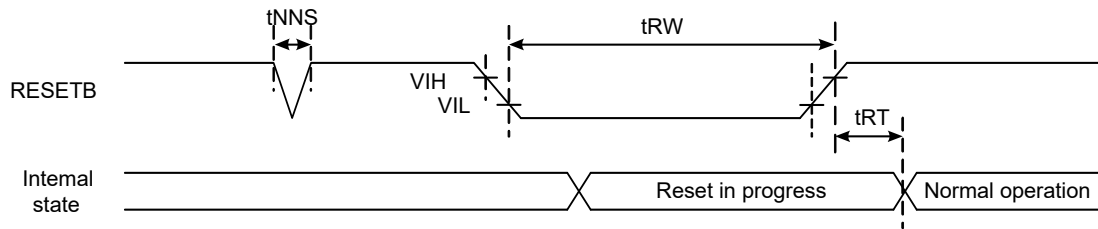
#### • Horizontal



#### • Vertical



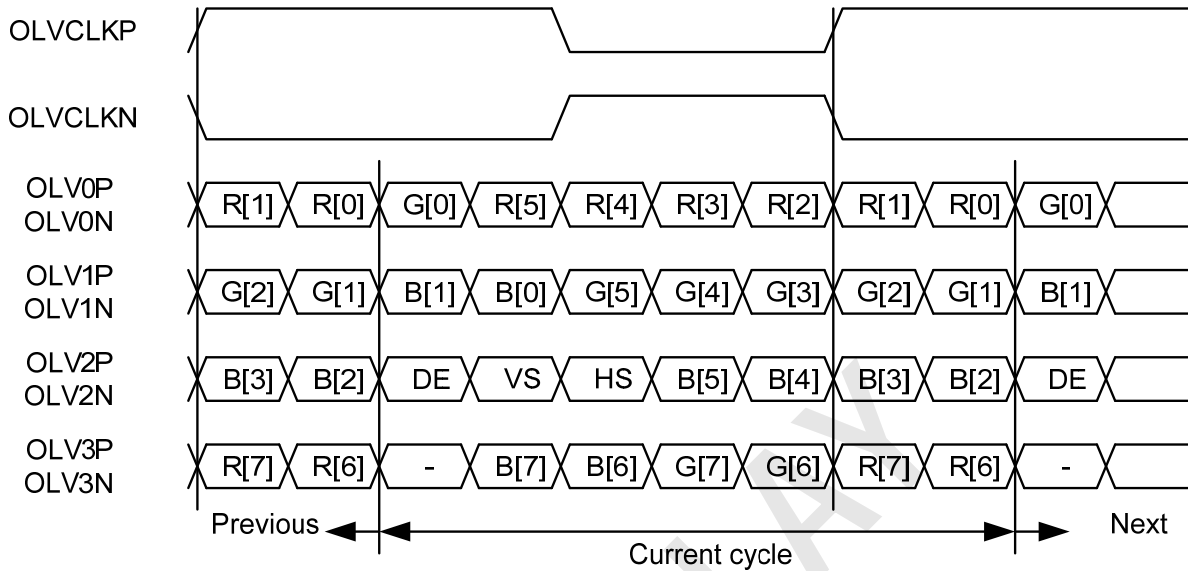
### 4.5 Reset timing



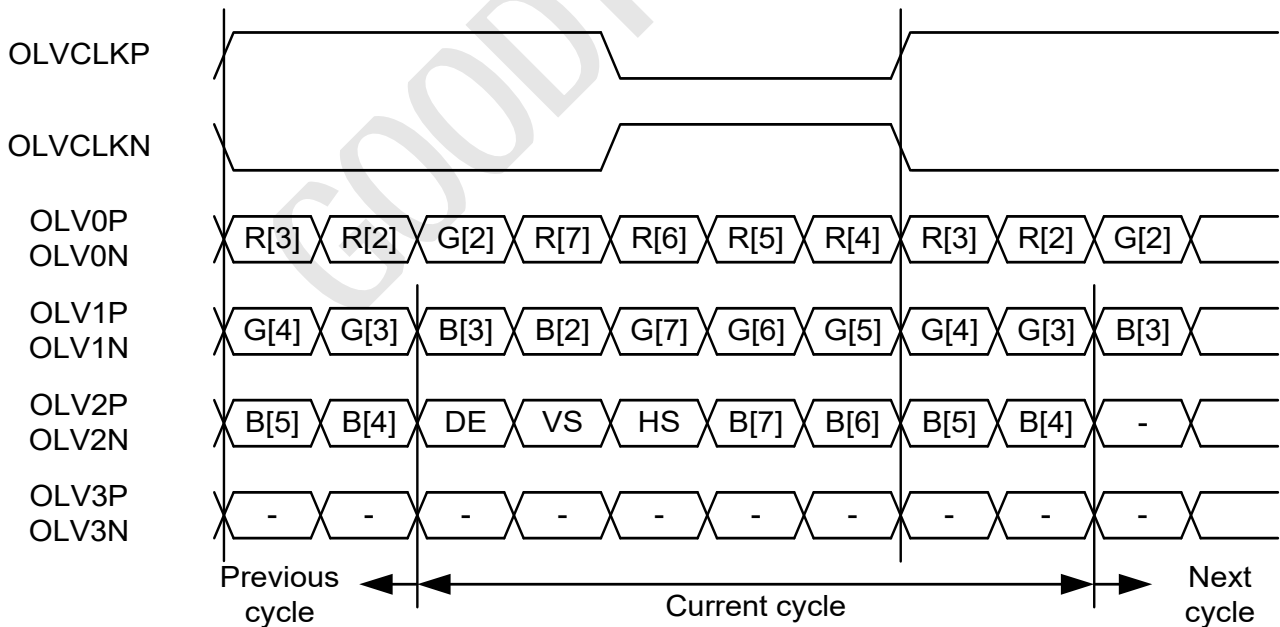
(VCC1=VCC2=VCCIF=2.7V to 3.6V, VSS1=VSS2=VSSA=0V, T<sub>OP</sub>=-40~105°C)

Signal	Parameter	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
RESETB	Reset pulse width	tRW	10	-	-	μs
	Reset complete time	tRT	-	-	5	μs
	Negative spike noise width	tNNS	-	-	100	ns

4.6 LVDS interface data format



8bit mode



6bit mode

## 5. Optical Characteristics

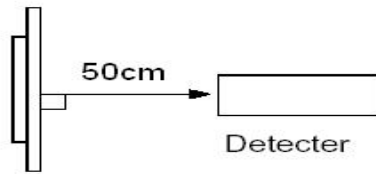
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	$\theta=0^\circ$	1000	1200	-	cd/m <sup>2</sup>	1
Uniformity	$\Delta Bp$	$\Phi=0^\circ$	75	80	-	%	1,2
Viewing Angle	3:00	$Cr \geq 10$	75	80	-	Deg	3
	6:00		75	80	-		
	9:00		75	80	-		
	12:00		75	80	-		
Contrast Ratio	Cr	$\theta=0^\circ$	800	1000	-	-	4
Response Time	$T_r+T_f$	$\Phi=0^\circ$	-	22	25	ms	5
Color of CIE Coordinate	W	x	-0.05	0.302	+0.05	-	1,6
		y		0.326			
	R	x		0.638			
		y		0.319			
	G	x		0.265			
		y		0.577			
	B	x		0.141			
		y		0.091			
NTSC Ratio	S	$\theta=0^\circ$	-	70	-	%	

Note: The parameter is slightly changed by temperature, driving voltage and material

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white.

The brightness is the average value of 9 measured spots. Measurement equipment BM-7( $\Phi 5\text{mm}$ )  
 Measuring condition: - Measuring surroundings: Dark room. - Measuring temperature:  $T_a=25^\circ\text{C}$ . - Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

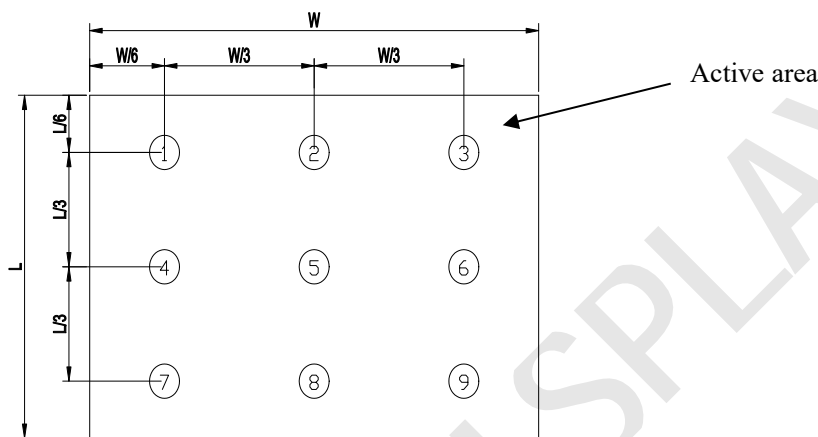


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta B_p = B_p (\text{Min.}) / B_p (\text{Max.}) \times 100 (\%)$$

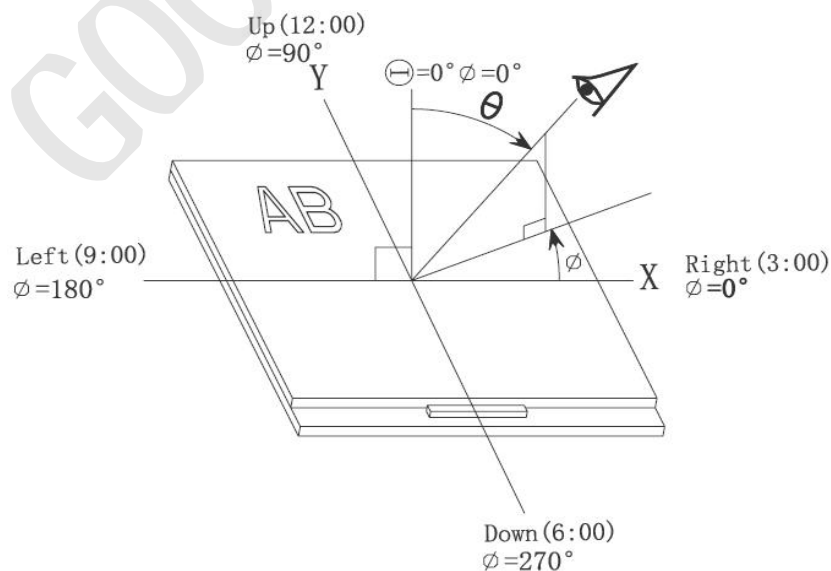
$B_p (\text{Max.})$  = Maximum brightness in 9 measured spots

$B_p (\text{Min.})$  = Minimum brightness in 9 measured spots.

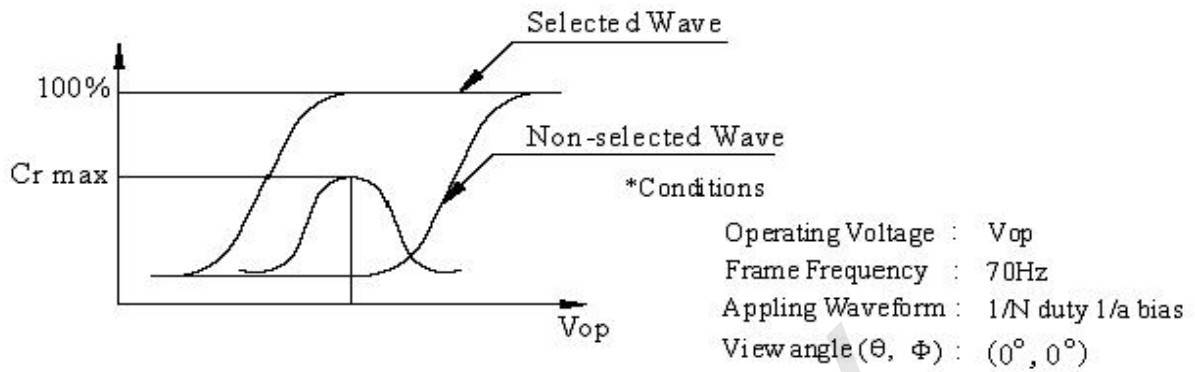


Note 3: The definition of viewing angle:

Refer to the graph below marked by  $\theta$  and  $\phi$



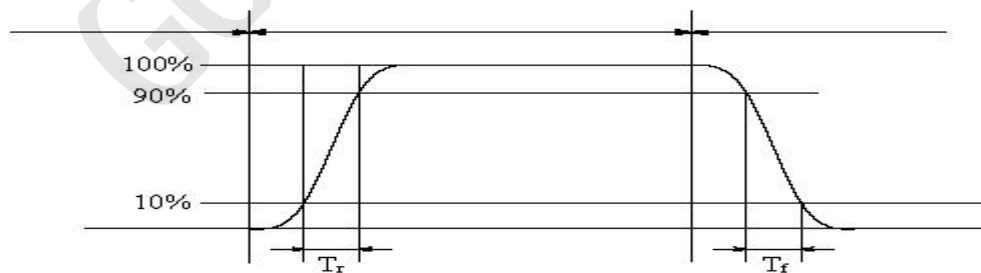
Note 4: Definition of contrast ratio.( Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

Note 5: Definition of Response time. (Test LCD using DMS501):

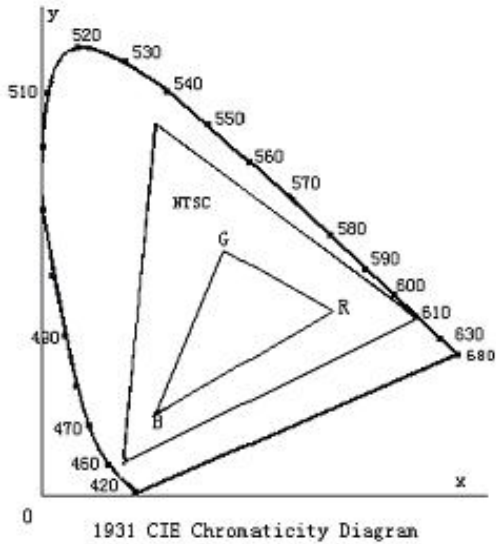
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.Refer to figure as below.



The definition of response time



Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

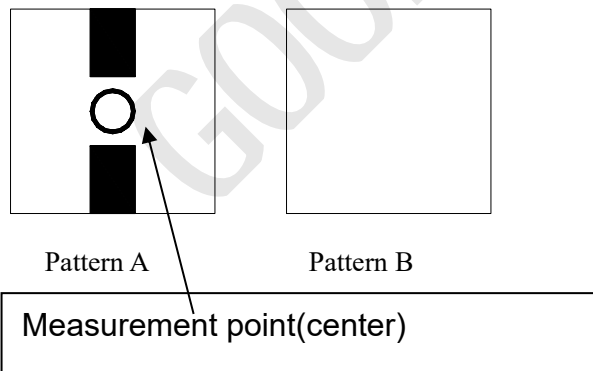


Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness\*100



Electric volume value=3F+/-3Hex

## 6. Reliability Test Items and Criteria

NO	Item	Test Condition	Remark
1	High Temperature Storage	Ta = 80°C 240hrs	Note1,Note3, 4
2	Low Temperature Storage	Ta = 80°C 240hrs	Note1,Note3, 4
3	High Temperature Operation	Ta = 80°C 240hrs	Note1,Note3, 4
4	Low Temperature Operation	Ta = 80°C 240hrs	Note1,Note3, 4
5	Operation at High Temperature/Humidity	+60°C, 90%RH 240hrs	Note3, 4
6	Thermal Shock	-30°C/30 min ~ +80°C/30 min for a total 50 cycles, Start with cold temperature and end with high temperature.	Note3, 4
7	Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
8	Mechanical Shock (NON-OPERATION)	Shock level: 1470 m/s <sup>2</sup> (150G) Waveform: half sinusoidal wave, 2 ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs	
9	Vibration Test (NON-OPERATION)	Vibration level: 9.8 m/s <sup>2</sup> (1.0G) Waveform: sinusoidal Frequency range: 5 to 500 Hz Frequency sweep rate: 0.5 octave /min Duration: one sweep from 5 to 500 Hz in each of three mutually perpendicular axis(each x,y,z axis: 1 hour, total	
10	Package Drop Test	Height:60cm 1 corner, 3 edges, 6 surfaces	
11	CONTACT DISCHARGE (OPERATION)	150pF, 330Ω, 8kV, 10 times at 1 sec interval	
12	SIGNAL PIN DISCHARGE (NON-OPERATION)	200pF, 0Ω, 200V, 10 times at 1 sec interval	

Note 1:  $T_a$  is the ambient temperature of samples.

Note 2:  $T_s$  is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

GOODDISPLAY

## 7.Specification of Quality Assurance

### ■ INSPECTION CRITERION

OUTGOING QUALITY STANDARD	PAGE 1 OF 5
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	
<p>This specification is made to be used as the standard acceptance/rejection criteria for TFT module.</p> <p>1 Sample plan</p> <p>1.1 Lot size: Quantity per shipment lot per model</p> <p>1.2 Sampling type: Normal inspection,Single sampling</p> <p>1.3 Inspection level: II</p> <p>1.4 Sampling table: MIL-STD-105D</p> <p>1.5 Acceptable quality level (AQL)</p> <p style="padding-left: 20px;">Major defect: AQL=0.65</p> <p style="padding-left: 20px;">Minor defect: AQL=1.50</p> <p>2. Inspection condition</p> <p>2.1 Ambient conditions:</p> <p style="padding-left: 20px;">a. Temperature: Room temperature <math>25 \pm 5^{\circ}\text{C}</math></p> <p style="padding-left: 20px;">b. Humidity: <math>(60 \pm 10)\% \text{RH}</math></p> <p style="padding-left: 20px;">c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)</p> <p>2.2 Viewing distance:</p> <p>The distance between the LCD and the inspector' s eyes shall be at least <math>35 \pm 5\text{cm}</math>.</p> <p>2.3 Viewing Angle</p> <p style="padding-left: 20px;">U/D: <math>45^{\circ} / 45^{\circ}</math> , L/R: <math>45^{\circ} / 45^{\circ}</math></p> <div style="text-align: center;"> </div> <p>3. Definition of Inspection Item.</p> <p>3.1 Definition of inspection zone in LCD.</p> <div style="text-align: center;"> </div> <p>Zone A: character/Digit area</p> <p>Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)</p> <p>Zone C: Outside viewing area (invisible area after assembly in customer's product)</p> <p>Fig.1 Inspection zones in an LCD.</p>	

OUTGOING QUALITY STANDARD	PAGE 2 OF 5
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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

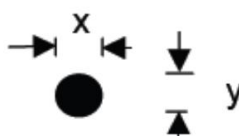
4. Inspection standards

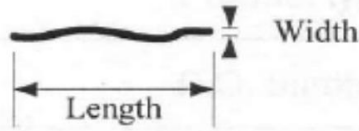
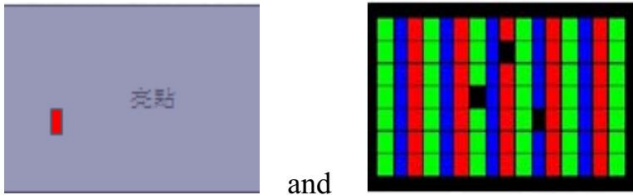
Defects are classified as major defects and minor defects according to the degree of defectiveness defined herein.

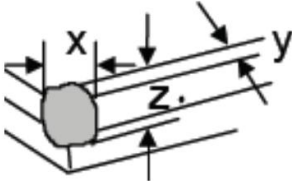
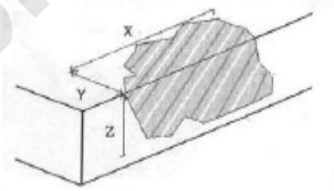
4.1 Major defect

Item No	Items to be inspected	Inspection Standard
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) Line defect 5) Excess power consumption
4.1.2	Missing	Missing function component
4.1.3	Crack	Glass crack

4.2 Minor defect

Item No	Items to be inspected	Inspection standard	
4.2.1	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $\varphi = (x + y) / 2$ 	
		Size $\varphi$ (mm)	Acceptable Quantity
		$\varphi \leq 0.25$ 2mm(min) apart	Ignore
		$0.25 < \varphi \leq 0.50$ 5mm(min) apart	5
		$0.50 < \varphi$	Not allowed

OUTGOING QUALITY STANDARD		PAGE 3 OF 5	
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA			
4.2.2	Line Defect Including Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.06$ and $L \leq 10$	Ignore
		$0.06 < W \leq 0.08$ and $L \leq 10$ 5mm(min) apart	5
		$0.08 < W \leq 0.10$ and $L \leq 5$ 5mm(min) apart	3
4.2.3	Polarizer Dent/Bubble	Size $\phi$ (mm)	Acceptable Quantity
		$\phi \leq 0.30$	Ignore
		Non visible area	Ignore
		$0.30 < \phi \leq 0.50$ 5mm(min) apart	5
		$0.50 < \phi$	Not allowed
4.2.4	Electrical Dot Defect	Bright and Black dot define: 	
		Inspection pattern: Full white, Full black, Red, green and blue screens	
		Item	Acceptable Quantity
		Black dot defect	5
		Bright dot defect	2
Total Dot	5		

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4.2.5	Touch panel chips	 <p>1. Corner chips:</p>	
		Size(mm)	Acceptable Quantity
		$X \leq 3\text{mm}$ $Y \leq 3\text{mm}$ $Z \leq T$	Ignore T: Glass thickness X: Length Y: Width Z: thickness
		 <p>2. Side chips:</p>	
		Size(mm)	Acceptable Quantity
		$X \leq 5\text{mm}$ $Y \leq 3\text{mm}$ $Z \leq T$	Ignore T: Glass thickness X: Length Y: Width Z: thickness

OUTGOING QUALITY STANDARD	PAGE 5 OF 5
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<p>Note:</p> <ol style="list-style-type: none"><li>1. Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.</li><li>2. The distance between black dot defects or black and bright dot defects should be more than 5mm apart. The distance between two bright dot defects should be more than 15mm apart</li><li>3. Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.</li><li>4. Mura is checker by 6% ND filter.</li><li>5. Foreign particle on the surface of the LCM should be ignore.</li></ol> <p>GOODI DISPLAY</p>	



## 8.Package Specification

TBD

GOODDISPLAY

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## 9. Precaution for Using LCD Module

### 9.1 Handling Precautions

- 9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 9.1.2 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.
- 9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 9.1.5 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 alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
  - Water
  - Ketone
  - Aromatic solvents
- 9.1.6 Do not attempt to disassemble the LCD Module.
- 9.1.7 If the logic circuit power is off, do not apply the input signals.
- 9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  - 9.1.8.1 Be sure to ground the body when handling the LCD Modules.
  - 9.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.
  - 9.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  - 9.1.8.4 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.

### 9.2 Storage Precautions

- 9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 9.2.2 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°C ~ 40°C Relatively humidity: ≤80%
- 9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

### 9.3 Transportation Precautions

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