

Specification
For
LCD Module
CFAF240320L-T

MODULE: CFAF240320L-T

CUSTOMER: _____

REV	DESCRIPTION	DATE
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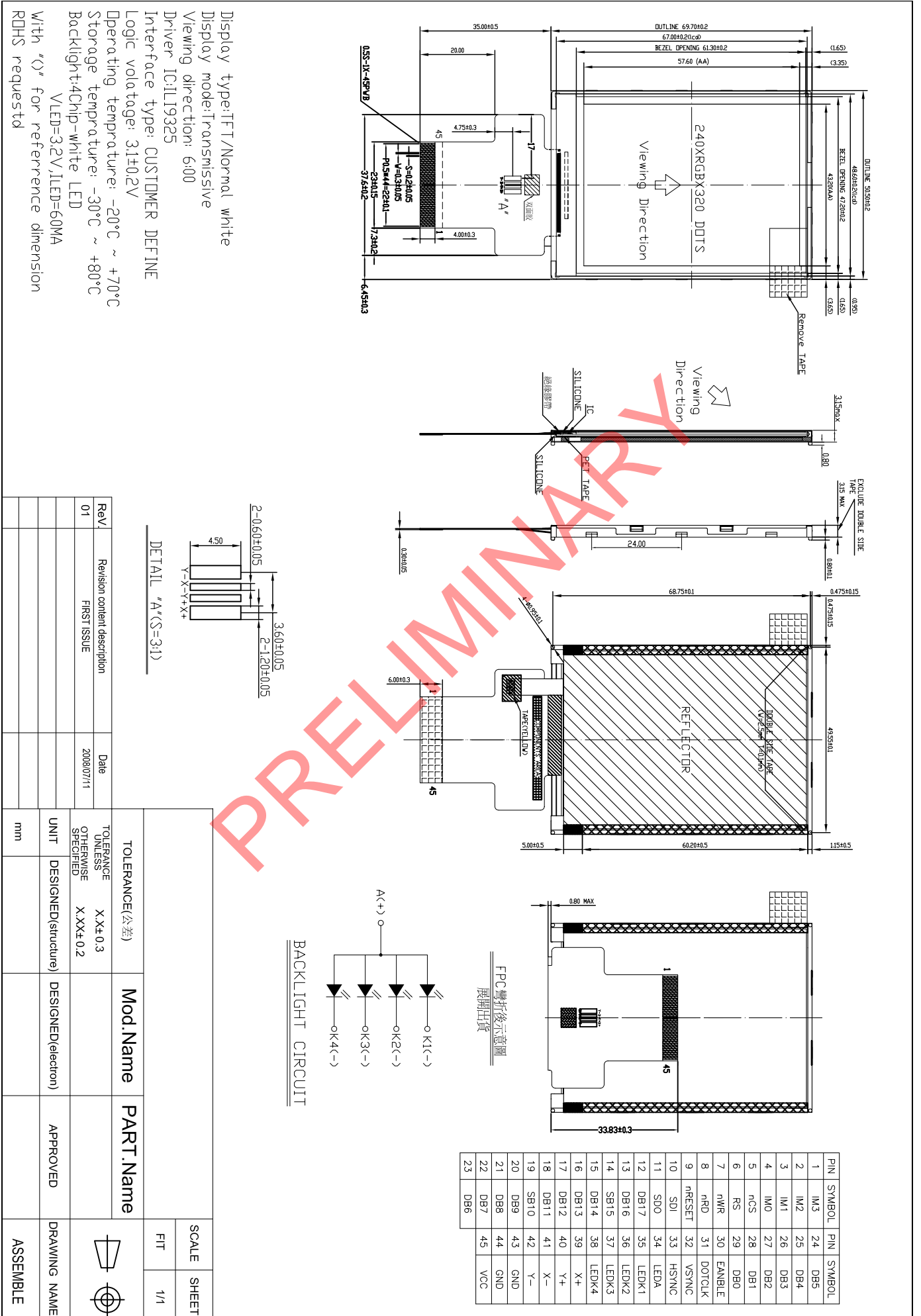
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PRELIMINARY

1 General Specifications

Item	Standard Value	Unit
Display Pattern	<input checked="" type="checkbox"/> Graphic <input type="checkbox"/> Character <input type="checkbox"/> Segment <input type="checkbox"/> _____ <input type="checkbox"/> with ICON	/
Color	<input type="checkbox"/> Mono. <input type="checkbox"/> Grayscale <input checked="" type="checkbox"/> _262K_____	/
Module Dimension (W x H x T)	50.5(W) × 69.7(H) × 3.15 (T)	mm
Viewing Area (W x H)	\	mm
Active Area (W x H)	43.2(W)X57.6(H)	mm
Character Size (W x H)	\	mm
Character Pitch (W x H)	\	mm
Pixel Format	2.8”TFT 240(RGB)X320	/
Pixel pitch	0.18(W)X0.18(H)	mm
LCD Type	<input type="checkbox"/> TN, Positive <input type="checkbox"/> TN, Negative <input type="checkbox"/> HTN, Positive <input type="checkbox"/> HTN, Negative <input type="checkbox"/> STN, Yellow-Green <input checked="" type="checkbox"/> STN, Gray <input type="checkbox"/> STN, Blue <input type="checkbox"/> FSTN, Positive <input type="checkbox"/> FSTN, Negative <input type="checkbox"/> _____ <input type="checkbox"/> FM LCD <input type="checkbox"/> Color STN <input checked="" type="checkbox"/> TFT	/
Polarizer Type	<input type="checkbox"/> Transflective <input checked="" type="checkbox"/> Transmissive <input type="checkbox"/> Reflective <input type="checkbox"/> Anti-Glare	/
View Direction	<input type="checkbox"/> 1 2H <input checked="" type="checkbox"/> 6H	
LCD Controller & Driver	ILI9325(or Equivalent)	/
LCD Driving Method	\	/
Interface Type	Serial <input type="checkbox"/> I ² C <input type="checkbox"/> 4-line SPI <input type="checkbox"/> 3-line SPI <input type="checkbox"/> _____ Parallel <input type="checkbox"/> 6800 <input checked="" type="checkbox"/> 8080 <input type="checkbox"/> 4-bit <input type="checkbox"/> customer define	/
Backlight Type	<input checked="" type="checkbox"/> LED <input type="checkbox"/> Bottom <input checked="" type="checkbox"/> Single Side <input type="checkbox"/> Dual Side <input type="checkbox"/> _____ <input type="checkbox"/> EL <input type="checkbox"/> CCFL	/
Backlight Color	<input type="checkbox"/> Yellow-Green <input checked="" type="checkbox"/> White <input type="checkbox"/> Amber <input type="checkbox"/> Blue <input type="checkbox"/> Red <input type="checkbox"/> _____	/
EL/CCFL Driver type	<input type="checkbox"/> Build-in <input type="checkbox"/> External	/
DC-DC Converter	<input checked="" type="checkbox"/> Build-in <input type="checkbox"/> External	/
Operation Temperature	OT= -20°C ~ +70°C	/
Storage Temperature	ST= -30°C ~ +80°C	/

2 Mechanical Diagram



4 I/O Terminal

4.1 Pin Description(See Datasheet of LCD Driver for detail)

		Select the MPU system interface mode																																																																								
1-4	IM3-IM0	<table border="1"> <thead> <tr> <th>IM3</th> <th>IM2</th> <th>IM1</th> <th>IM0</th> <th>MPU-Interface Mode</th> <th>DB Pin in use</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Setting invalid</td> <td></td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>Setting invalid</td> <td></td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>i80-system 16-bit interface</td> <td>DB[17:10], DB[8:1]</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>i80-system 8-bit interface</td> <td>DB[17:10]</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>ID</td> <td>Serial Peripheral Interface (SPI)</td> <td>SDI, SDO</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>*</td> <td>Setting invalid</td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>Setting invalid</td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>Setting invalid</td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>i80-system 18-bit interface</td> <td>DB[17:0]</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>i80-system 9-bit interface</td> <td>DB[17:9]</td> </tr> <tr> <td>1</td> <td>1</td> <td>*</td> <td>*</td> <td>Setting invalid</td> <td></td> </tr> </tbody> </table> <p>When the serial peripheral interface is selected, IM0 pin is used for the device code ID setting.</p>	IM3	IM2	IM1	IM0	MPU-Interface Mode	DB Pin in use	0	0	0	0	Setting invalid		0	0	0	1	Setting invalid		0	0	1	0	i80-system 16-bit interface	DB[17:10], DB[8:1]	0	0	1	1	i80-system 8-bit interface	DB[17:10]	0	1	0	ID	Serial Peripheral Interface (SPI)	SDI, SDO	0	1	1	*	Setting invalid		1	0	0	0	Setting invalid		1	0	0	1	Setting invalid		1	0	1	0	i80-system 18-bit interface	DB[17:0]	1	0	1	1	i80-system 9-bit interface	DB[17:9]	1	1	*	*	Setting invalid	
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1	1	*	*	Setting invalid																																																																						
5	nCS	A chip select signal. Low: the ILI9325 is selected and accessible High: the ILI9325 is not selected and not accessible Fix to the DGND level when not in use.																																																																								
6	RS	A register select signal. Low: select an index or status register High: select a control register Fix to either IOVcc or DGND level when not in use.																																																																								
7	nWR	A write strobe signal and enables an operation to write data when the signal is low. Fix to either IOVcc or DGND level when not in use.																																																																								
8	nRD	A read strobe signal and enables an operation to read out data when the signal is low.																																																																								
9	nRESET	Initializes the ILI9325 with a low input. Be sure to execute a power-on reset after supplying power.																																																																								
10	SDI	SPI interface input pin. The data is latched on the rising edge of the SCL signal.																																																																								
11	SDO	SPI interface output pin. The data is outputted on the falling edge of the SCL signal. Let SDO as floating when not used.																																																																								
12-29	DB17-DB0	An 18-bit parallel bi-directional data bus for MPU system interface mode 8-bit I/F: DB[17:10] is used. 9-bit I/F: DB[17:9] is used. 16-bit I/F: DB[17:10] and DB[8:1] is used. 18-bit I/F: DB[17:0] is used. 18-bit parallel bi-directional data bus for RGB interface operation 6-bit RGB I/F: DB[17:12] are used. 16-bit RGB I/F: DB[17:13] and DB[11:1] are used. 18-bit RGB I/F: DB[17:1] are used. Unused pins must be fixed either IOVcc or DGND level.																																																																								
30	EANBLE	Data ENEABLE signal for RGB interface operation. Low: Select (access enabled) High: Not select (access inhibited) The EPL bit inverts the polarity of the ENABLE signal.																																																																								
31	DOTCLK	Dot clock signal for RGB interface operation. DPL = "0": Input data on the rising edge of DOTCLK DPL = "1": Input data on the falling edge of DOTCLK Fix to the IOVcc level when not in use																																																																								

32	VSYNC	Frame synchronizing signal for RGB interface operation. VSPL = "0": Active low. VSPL = "1": Active high. Fix to the IOVcc level when not in use.
33	HSYNC	Line synchronizing signal for RGB interface operation. HSPL = "0": Active low. HSPL = "1": Active high.
34	LEDA	Power supply anode input for backlight.
35	LEDK1	Power supply cathode input for backlight.
36	LEDK2	Power supply cathode input for backlight
37	LEDK3	Power supply cathode input for backlight.
38	LEDK4	Power supply cathode input for backlight
39	X+	Touch Panel output pin.
40	Y+	Touch Panel output pin.
41	X-	Touch Panel output pin.
42	Y-	Touch Panel output pin.
43	GND	Ground pin, connected to 0 V
44	GND	Ground pin, connected to 0 V
45	VCC	Power supply

5 Electro-optical Specifications

5.1 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply voltage	VCC-GND	-0.3	4.6	V
Input voltage	V _I	GND-0.3	VCC+0.3	V

5.2 Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	VCC-GND	3.0	3.1	3.3	V
Supply current	I _{VCC}	-	9	-	mA
Input High Voltage	V _{IH}	0.8VCC	-	VCC	V
Input Low Voltage	V _{IL}	-0.3VCC	-	0.2VCC	V
Output High Voltage	V _{OH}	0.8VCC	-	-	V
Output Low Voltage	V _{OL}	-	-	0.2VCC	V

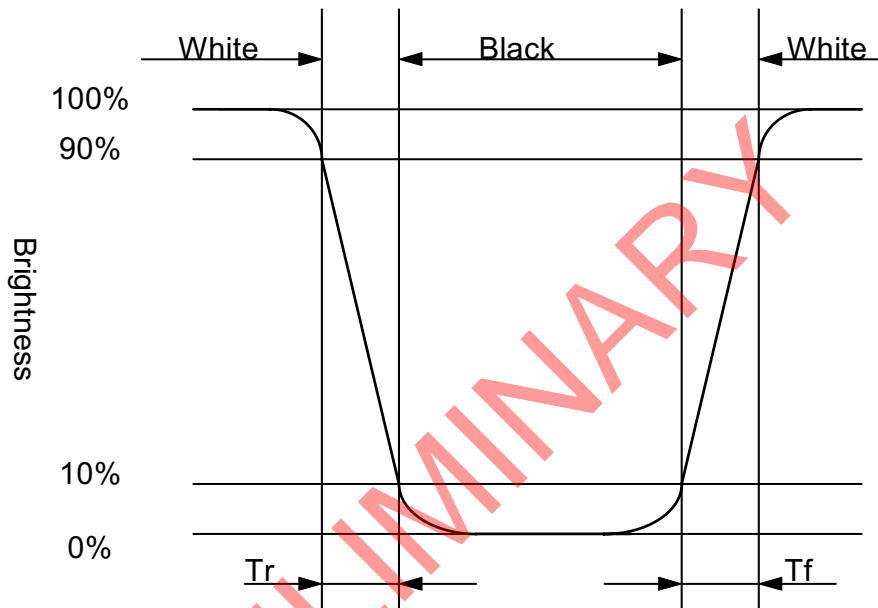
5.3 Optical Characteristics

T_a = 25°C

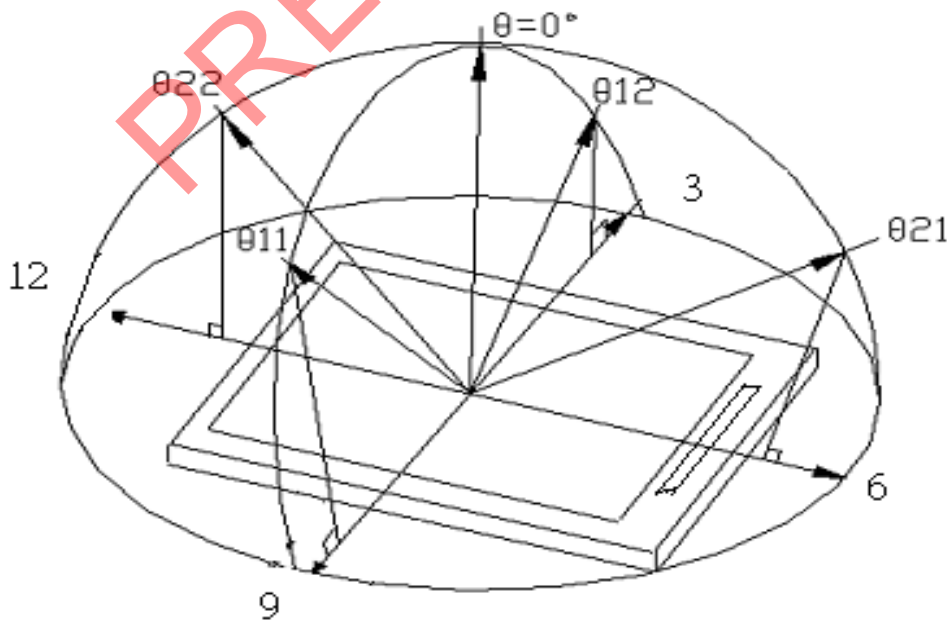
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks	
Viewing Angle	Horizontal	CR ≥ 10	45	50	---	deg	Note 6-1	
	Vertical		θ 21	10	15	---		deg
			θ 22	30	35	---		deg
Brightness	L	θ = 0°	300	350	---	cd/m ²		
Contrast Ratio	CR	At optimized Viewing angle	300	350	---		Note 6-2	
Response time	Rise	θ = 0°	---	15	20	ms	Note 6-3	
	Fall		---	20	30	ms		
Transmission Ratio	T	θ = 0°	6.66	7.16	---	%		
NTSC			58			%		

Color Coordinate (CIE) (Color Filter vendor provide Color Coordinate data)							
Red	Xr	$\theta = 0^\circ$	0.598	0.628	0.658	---	w/o polarizer
	Yr	$\theta = 0^\circ$	0.298	0.328	0.358	---	
Green	Xg	$\theta = 0^\circ$	0.257	0.287	0.317	---	
	Yg	$\theta = 0^\circ$	0.532	0.562	0.598	---	
Blue	Xb	$\theta = 0^\circ$	0.107	0.137	0.167	---	
	Yb	$\theta = 0^\circ$	0.096	0.126	0.156	---	
White	Xw	$\theta = 0^\circ$	0.276	0.306	0.336	---	
	Yw	$\theta = 0^\circ$	0.302	0.332	0.367	---	

*Note (2) Definition of Response Time (TR, TF):

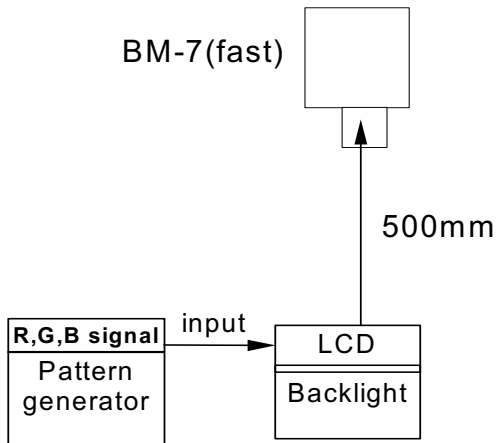


*Note(3) Definition of Viewing Angle



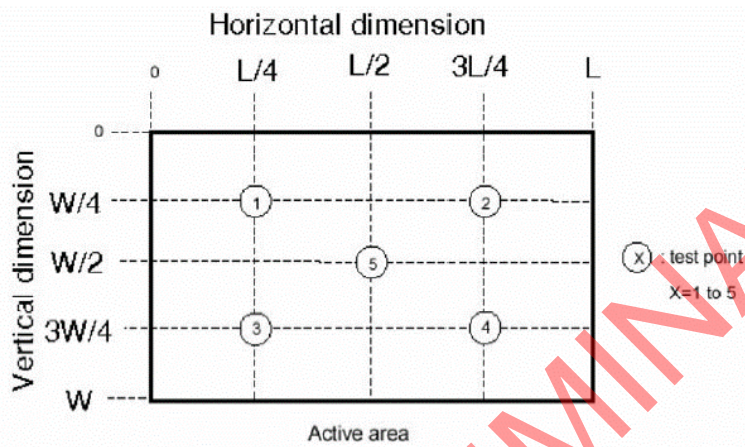
*Note (4) Measurement Set-Up:

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 in a windless room.

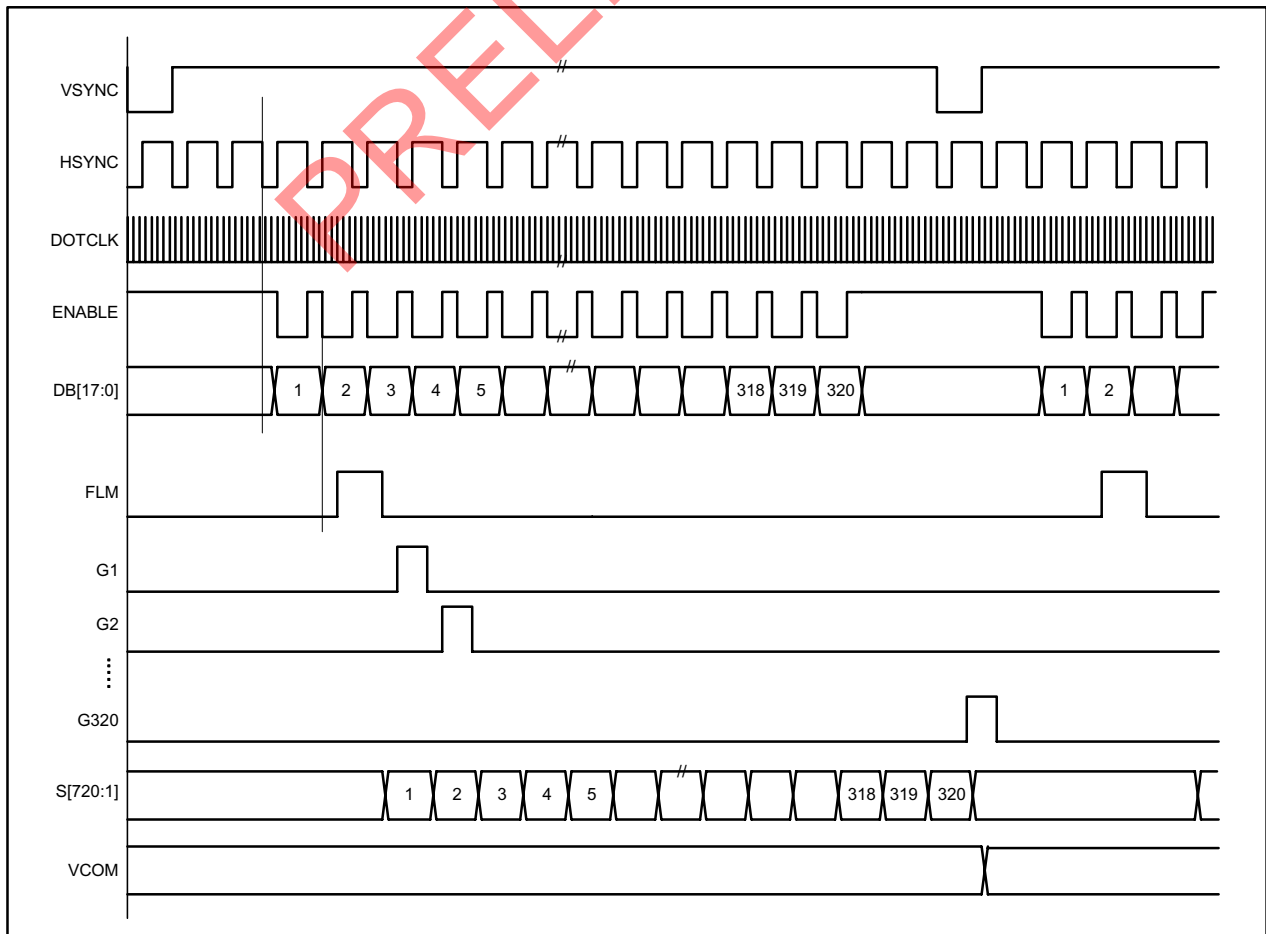


Caution: 1. Environmental illumination ≤ 1 lux
 2. Before test CR, Vcom voltage must be adjusted carefully to get the best CR.

*Note (5)



5.4 Timing Characteristics



6 Accessory

6.1 Quality Units

6.1.1 Inspection Standard

See Data sheet of Inspection Standard for detail.

6.1.2 Reliability Test

6.1.2.1 Standard Specifications for Reliability

6.1.2.1.1 Test method

There should be no existing conspicuous failure of functions and appearance in LCD after the following tests.

NO	Item	Description
1	Low Temperature Operating	The sample should be allowed to stand at $(-20\pm 2)^{\circ}\text{C}$ for 96 Hours under driving condition.
2	High Temperature Operating	The sample should be allowed to stand at $(70\pm 2)^{\circ}\text{C}$ for 96 Hours under driving condition.
3	Low Temperature Storage	The sample should be allowed to stand at $(-30\pm 3)^{\circ}\text{C}$ for 96 Hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 24 hours
4	High Temperature Storage	The sample should be allowed to stand at $(80\pm 2)^{\circ}\text{C}$ for 96Hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 24 hours
5	Moisture resistance	The sample should be allowed to stand at $(40\pm 2)^{\circ}\text{C}$, $(90\pm 2)\% \text{RH}$ for 96Hours under no-load condition excluding the polarizer, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours
6	Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: T _{STL} for 30 minutes -> normal temperature for 5 minutes -> T _{STH} for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours

6.1.2.1.2 Testing Conditions and Inspection Criteria:

For the final test, the testing sample must be stored at room temperature for 24 hours, after the tests listed above; Standard specifications for Reliability have been executed in order to ensure stability.

NO	Item	Inspection Criteria
1	Current Consumption	The current consumption should be under double of initial test.
2	Contrast	The contrast must be larger than half of initial test.
3	Appearance	Appearance defects should not happen.

6.1.2.2 Life Time:

Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ($25\pm 10^{\circ}\text{C}$), normal humidity ($45\pm 20\% \text{RH}$), and in area not exposed to direct sunlight. Definition on the termination of life time is deterioration of contrast ratio by one fifth against initial value or human eyes can not recognize each dots.

6.2 Precautions For Use

6.2.1 Handling Precautions

- A. No mechanical SHOCK!
 - LCD may be broken because it is made of glass.
- B. DO NOT SCRATCH!
 - Polarizer is a soft material and can easily be scratched.
- C. No DC VOLTAGE TO LCD!
 - The electric characteristics of LCD deteriorates.
 - Please control DC content inside driving circuits.
- D. Wash your hands or clothes if you touch liquid crystal.
 - Liquid crystal may be leaked when LCD is broken.
 - Never tastes it if your hands or clothes touch it, please immediately wash using soap.
- E. WEAR GLOVES while handling
 - It is preferable to wear gloves to avoid damaging the LCD.
 - Please do not touch electrodes with bare hands or make them dirty.
- F. SLOWLY PEEL OFF protective film!
 - Static electricity may be charged.
- G. KEEP AWAY from extreme HEAT, HUMIDITY and direct SUNLIGHT!
 - LCD deteriorates.

6.2.2 Installation Precautions

- A. The LCD shall be installed flat, without twisting or bending.
- B. The display window size should be the same as the effective viewing area.
- C. The LCD screen may be cleaned with a soft cloth or cotton pad. Methanol, or Isopropyl Alcohol may be used, but insure that all solvent residue is removed.

6.2.3 Operation Precautions

- A. The LCD shall be operated within the limits specified, or it will shorten the LCD's life, and/or harm display images.
- B. The driving conditions must be supply to optimize viewing angle and contrast.
- C. Operation of the LCD at temperature below the limit specified may cause image degradation and/or bubbles. It may also change the characteristics of the liquid crystal. This phenomenon may not recover. The LCD shall be operated within the temperature limits specified.
- D. Control DC content inside driving circuits or the LCD's life will shorten.

6.2.4 Storage Precautions

- A. The LCD shall be stored within the temperature and humidity limits specified.
- B. Store in a dark area, and protected the LCD from direct sunlight or fluorescent light.
- C. The LCD should be packaged to prevent damage.
- D. Water may cause damage or discoloration of the polarizer. Clean any condensation or moisture from any source immediately.

Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizers.

7.0 Packing

TS8026L 模块

盖一层珍珠棉后
旋转180°叠加

最上一层空托盘
每层托盘装15PCS产品
共装15层产品，托盘共16层。

上盖下垫一层纸板，并用胶纸粘好。

胶布

纸箱(L)390 X(宽)340X(高)160]
 装箱模块总数：15X15=225PCS

胶布

产品标签

Rev.	Revision content description	Date	Mod. Name		PART. Name		SCALE	SHEET
A	FIRST ISSUE	2008/07/21					FIT	5/5
			UNIT	DESIGNED	CHECKED	APPROVED	DRAWING NAME	
			mm				Packaging	