

TFT-Display Datenblatt

Modell FG1001A0DSSWCG01

Kurzdaten

Hersteller	Data Image
Diagonale	10,1" / 25,6 cm
Format	wide
Auflösung	1280 x 800
Backlight	LED / 250 cd/m ²
Interface	LVDS
Touchscreen	nein
Temperatur	-20... +60°C (Betrieb)



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DATA IMAGE CORPORATION

TFT Module Specification PRELIMINARY

ITEM NO.: FG1001A0DSSWCG01

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Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
	JACK	JOE	GARY	KEN
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	2	27/JUN/12'		20

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	02/MAR/12'			Initial PRELIMINARY
2	27/JUN/12'	3.3	3	1. Add weight and surface treatment
		4.1	4	2. Modify Absolute Maximum Ratings
		4.2	4	3. Modify Typical Operation Conditions
		4.3	6	4. Modify power sequence
		4.4.1	7	5. Add R _{xFLK} typical value
		4.4.3	8	6. Modify DC Electrical Characteristics
		5	10	7. Modify viewing angle θ_B and modify luminance from 240(min.)&300(typ.) to 200(min.)&250(typ.)
		5	10,11	8. Modify test conditions and note6
		6	13	9. Modify Pin assignment
		11	19	10. Modify Outline drawing from rev:1 to rev:2
		7	15	11. Modify Low Temperature Operation and thermal shock test condition
		7	15	12. Remove Package Vibration Test and Package Drop Test

3. GENERAL DESCRIPTIONS

3.1 Introduction

The FG1001A0DSSWCG01 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a timing controller, voltage reference, common voltage, column driver, and row driver circuit. This TFT LCD has a 10.1-inch diagonally measured active display area with WXGA resolution (1280 horizontal by 800 vertical pixel array).

3.2 Features

- 10.1" WXGA TFT LCD Panel
- LED Light-bar Backlight System
- Supported WXGA (H:1280 lines, V:800 pixels) resolution
- Compatible with RoHS Standard

3.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	10.1	Inch
Active Area	216.96(H)x135.6(V)	mm
Outline Dimension	229.46 x 149.1 x 3.4	mm
Display Format	1,280(H) x (R,G,B) x 800(V)	-
Dot Pitch	0.0565(H)x0.1695(V)	mm
Pixel Arrangement	R.G.B. Stripe	-
Display Mode	Normally White , Transmissive	-
Surface treatment	Glare	
Interface	Digital	
View Direction (Gray Inversion)	12 O'Clock	
Weight	207	g

4. OPERATION SPECIFICATIONS

4.1 Absolute Maximum Ratings

(Note 1)

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	DV _{DD}	-0.3	5.0	V	
	AV _{DD}	6.5	13.5	V	
	V _{GH}	-0.3	42	V	
	V _{GL}	-20	0.3	V	
	V _{GH-VGL}	-	40	V	
Operating Temperature	T _{OP}	-20	60	°C	
Storage Temperature	T _{ST}	-30	70	°C	
LED Reverse Voltage	VR	-	5	V	Each LED, Note 2
LED Forward Current	IF	-	20	Ma	Each LED

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 2: VR Conditions: Zener Diode 20mA

4.2 Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V _{DD}	3.0	3.3	3.6	V	Note2
	AV _{DD}	10.8	11	11.2	V	
	V _{GH}	19.7	20	20.3	V	
	V _{GL}	-6.5	-6.8	-7.1	V	
Input signal voltage	V _{COM}	(3.6)	(TBD)	(4.0)	V	
Input logic high voltage	V _{IH}	0.7 DV _{DD}	-	DV _{DD}	V	Note3
Input logic low voltage	V _{IL}	0	-	0.3 DV _{DD}	V	

Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GL}.

Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: LVDS, Reset.

4.2.1 Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	-	TBD	-	V	V _{GH} =20V
	I _{GL}	-	TBD	-	V	V _{GL} =-6.8V
	ID _{VDD}	-	TBD	-	V	DV _{DD} =3.3V
	IA _{VDD}	-	TBD	-	V	AV _{DD} =11V

4.2.2 Backlight Driving Conditions

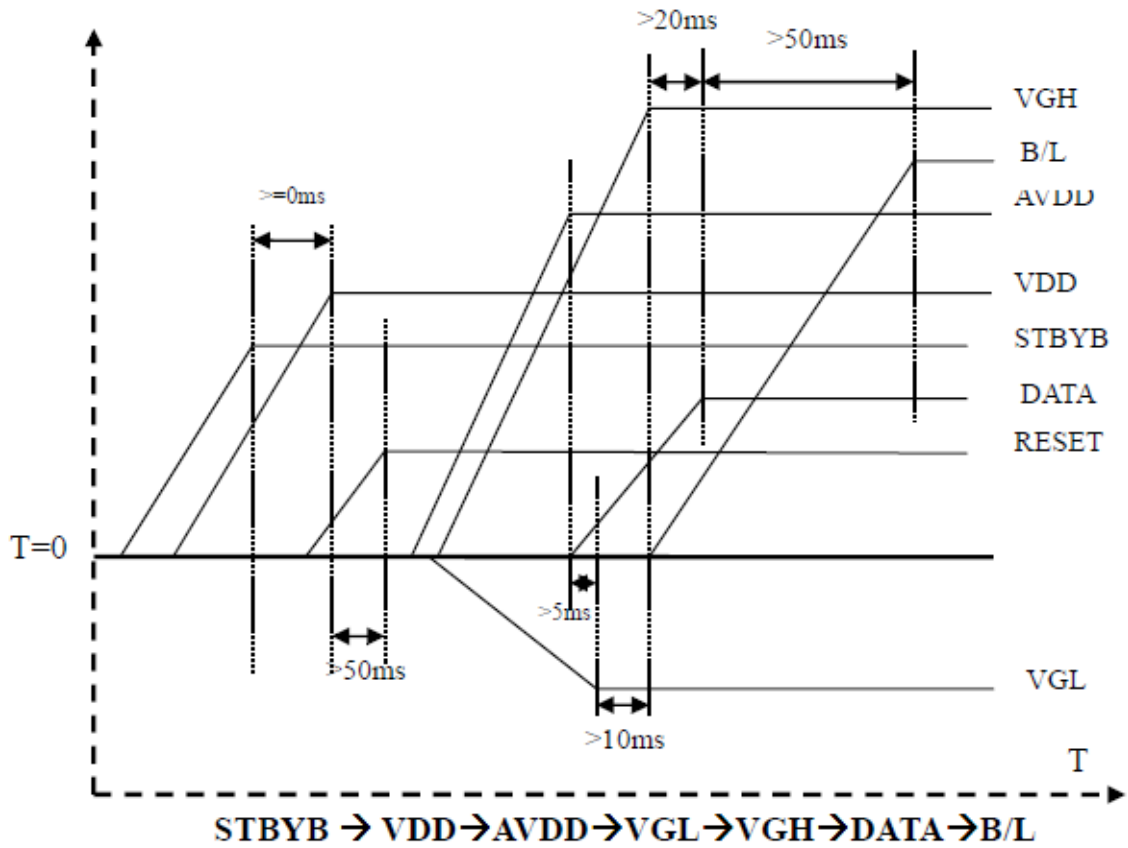
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V _L	-	9.3	10.2	V	Note1
Current for LED backlight	I _L	-	240	250	V	
LED life time	--	-	20,000	-	Hr	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I_L =240mA.

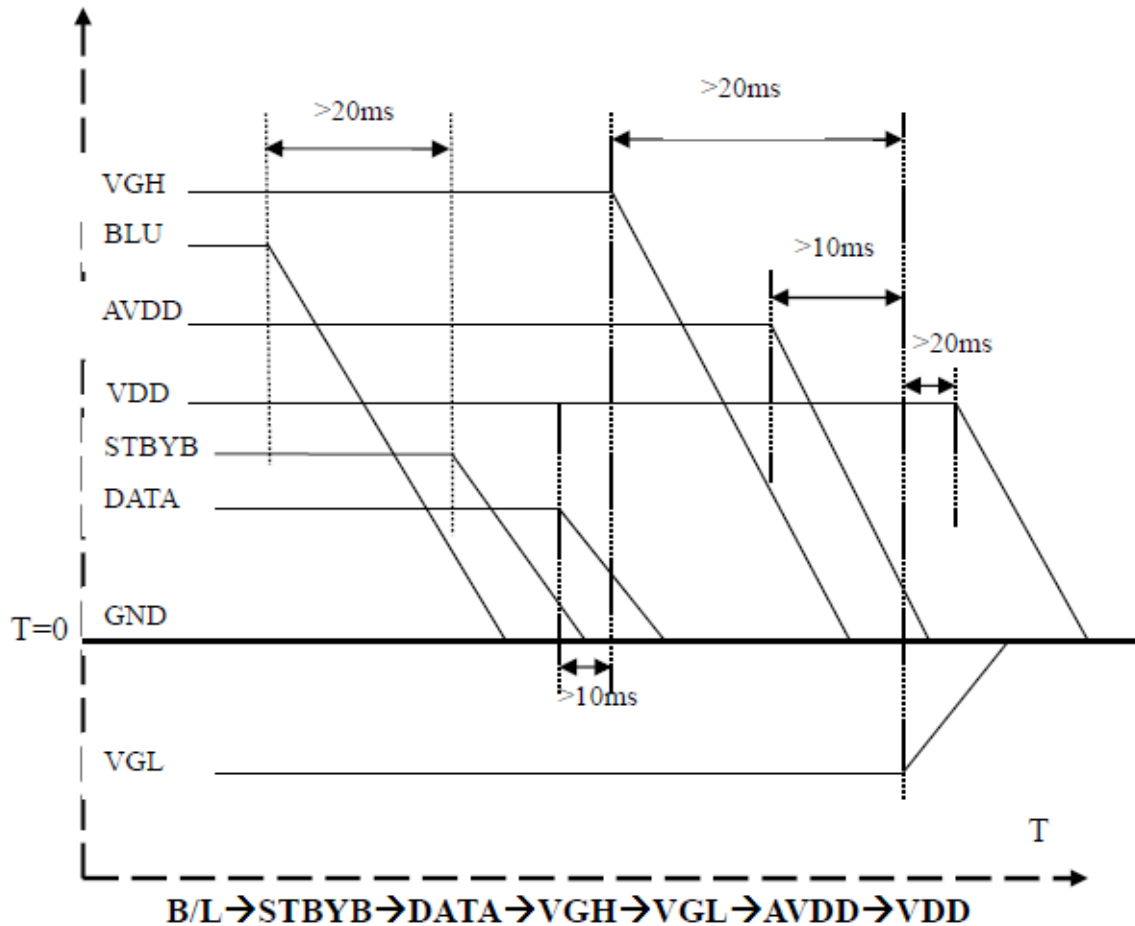
Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I_L =240mA. The LED lifetime could be decreased if operating I_L is lager than 240mA.

4.3 Power Sequence

a. Power on:



b. Power off:

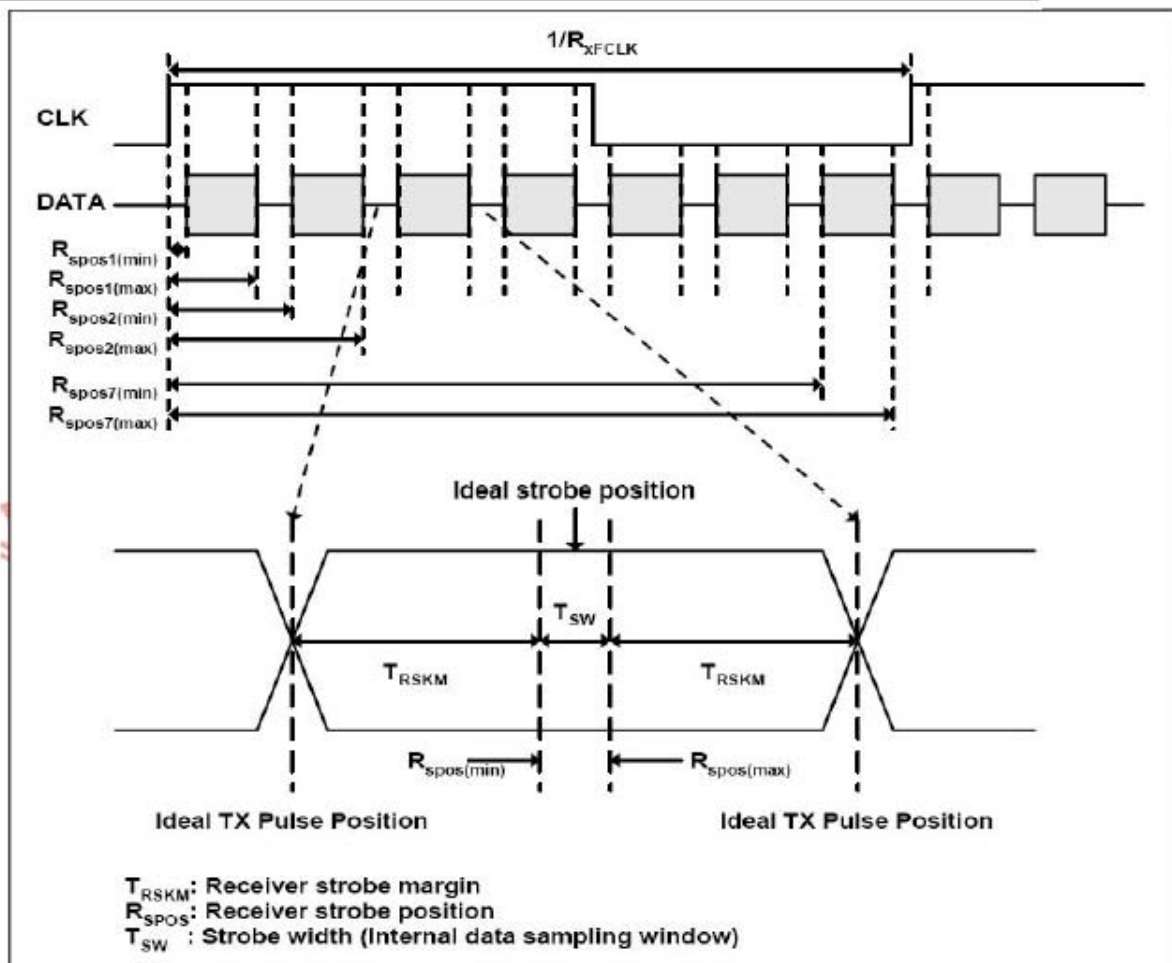
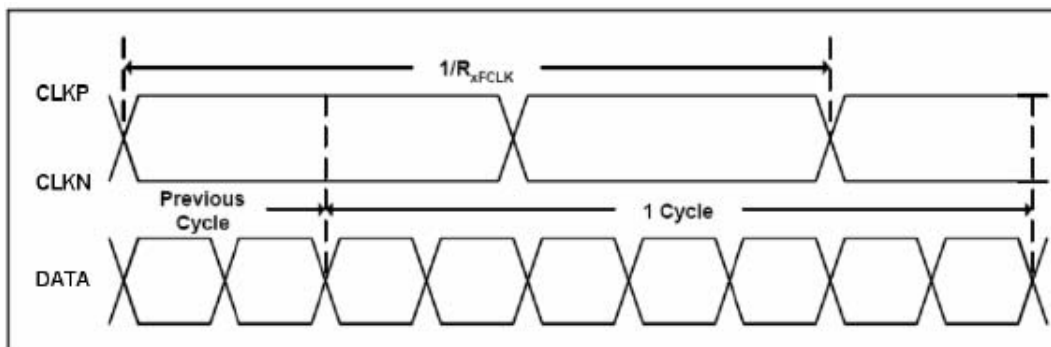


4.4 Timing Characteristics

4.4.1 AC Electrical Characteristics

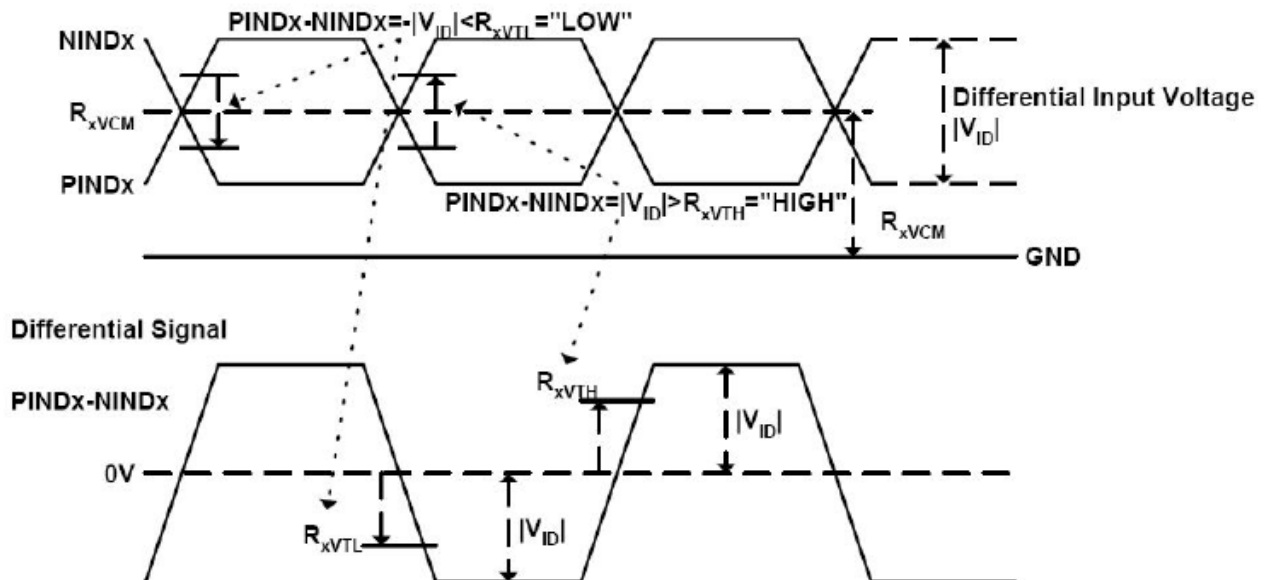
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R _x FCLK	20	72.4	81	MHz	
Input data skew margin	T _{RSKM}	500	-	-	ps	
Clock high time	T _{LVCH}	-	4/(7* R _x FCLK)	-	ns	
Clock low time	T _{LVCL}	-	3/(7* R _x FCLK)	-	ns	

4.4.2 Input Clock and Data Timing Diagram



4.4.3 DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	$R_{xVCM}=1.2V$
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	$VDD-1.2+$ $ V_{ID} /2$	V	
Differential input common mode voltage	R_{xVCM}	$ V_{ID} /2$	-	$VDD-1.2$	V	
Differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$R_{V_{xIz}}$	-10	-	+10	μA	
LVDS digital Operating Current	I_{ddlvds}	-	TBD	TBD	mA	Fclk=81MHz , VDD=3.3V
LVDS digital Standby Current	I_{stlvds}	-	TBD	TBD	μA	Clock & all Functions are stopped

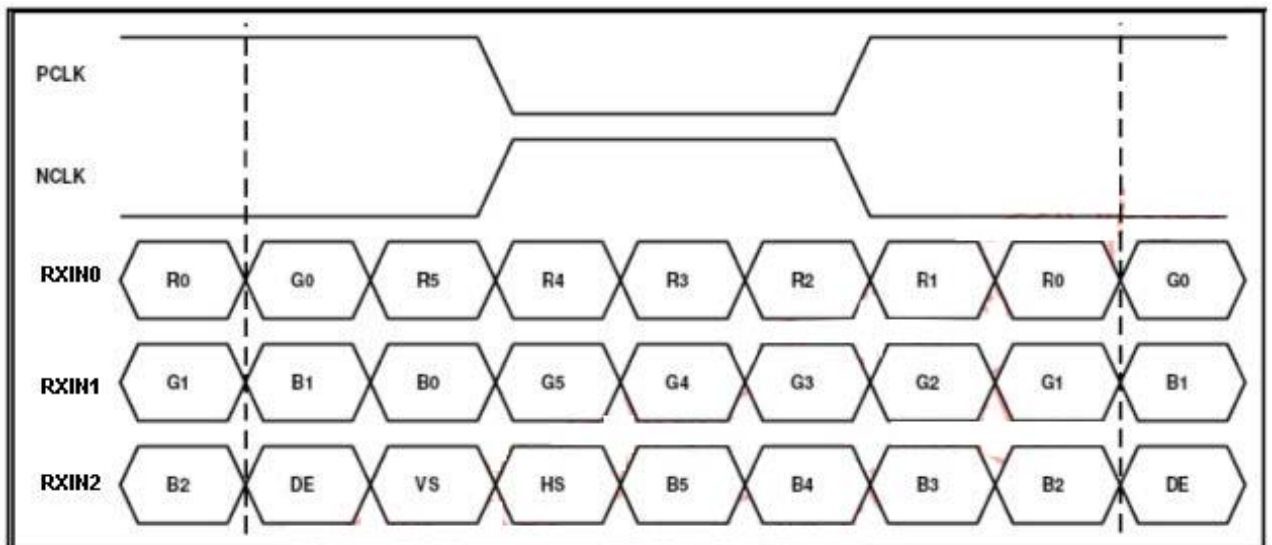
Single-end Signals


4.4.4 Timing

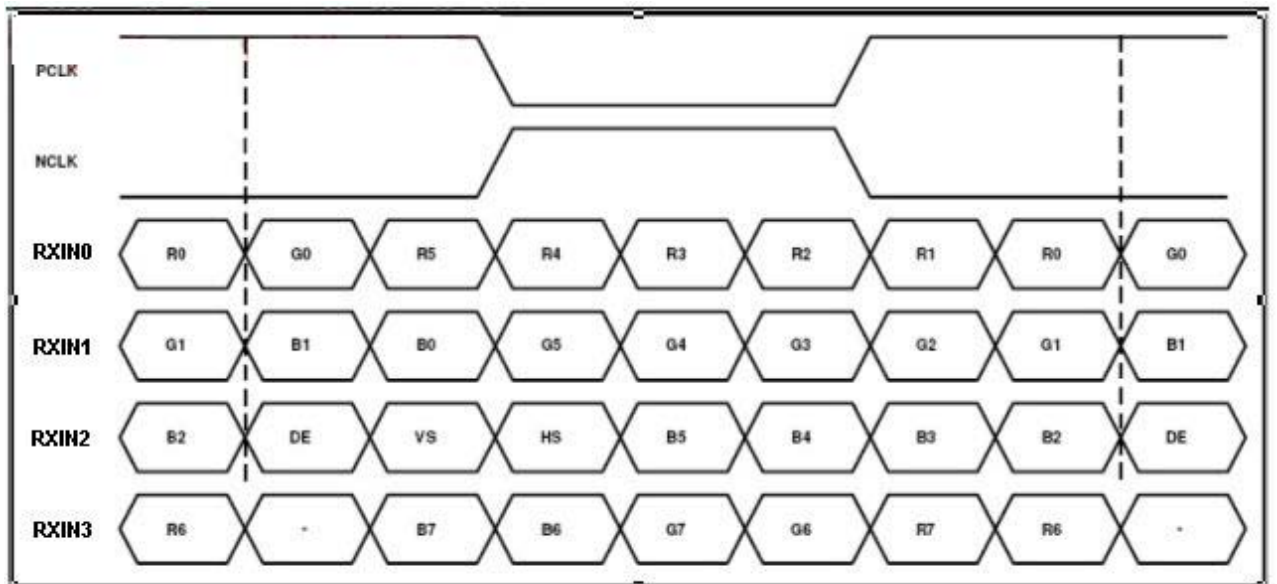
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	66.6	72.4	78.9	MHz	Frame rate=60Hz
Horizontal display area	thd	1280			DCLK	
HS period time	th	1370	1440	1500	DCLK	
HS Blanking	thb	90	160	220	DCLK	
Vertical display area	tvd	800			H	
VS period time	tv	810	838	877	H	
VS Blanking	thb	10	38	77	H	

4.4.5 Data Input Format

6bit LVDS input



8bit LVDS input



5. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle (CR \geq 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	65	75	--	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	65	75	--		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	65	75	--		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	60	70	--		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	
Contrast ratio	CR		500	700	--	--	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	--	Note2,5,6
	W_Y		0.28	0.33	0.38	--	
Luminance	L		200	250	--	cd/m ²	Note6
Luminance uniformity	YU		70	75	--		Note7

Test Conditions:

- $V_{DD}=3.3V$, $I_L=240mA$, the ambient temperature is $25^\circ C$.
- The test systems refer to Note 2.

Note 1: Definition of viewing angle range

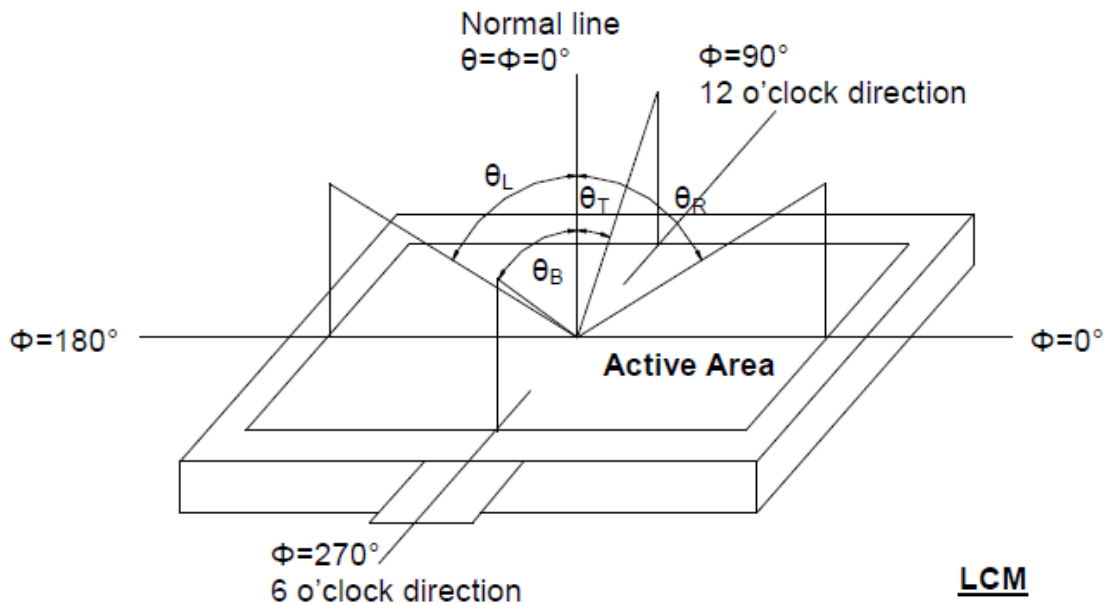


Fig. 5-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

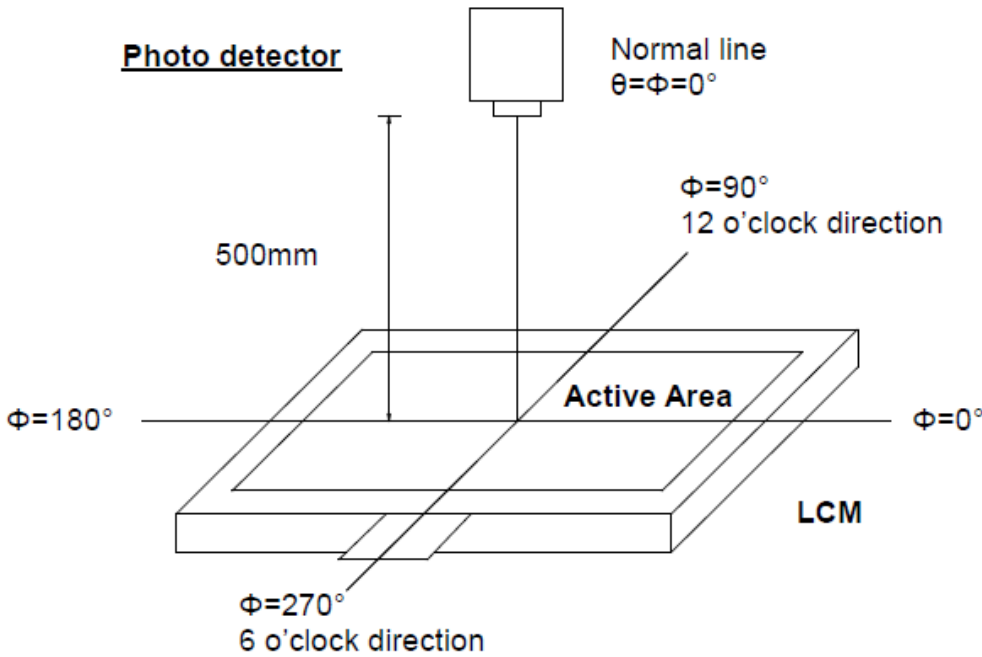


Fig. 5-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

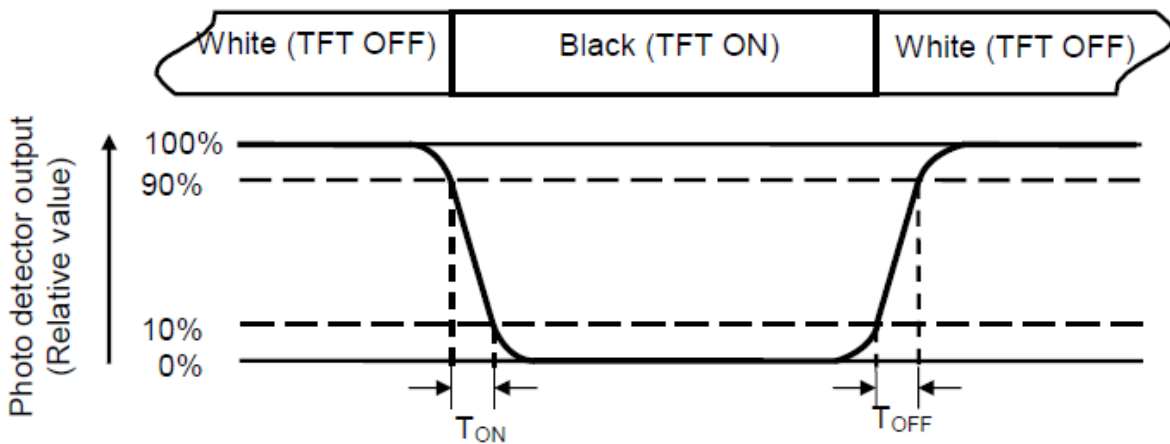


Fig. 5-3 Definition of response time

Note 4: Definition of contrast ratio

$$CR = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.
The LED driving condition is $I_L=240\text{mA}$.

Note 7: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{\min}}{B_{\max}}$$

L-----Active area length W----- Active area width

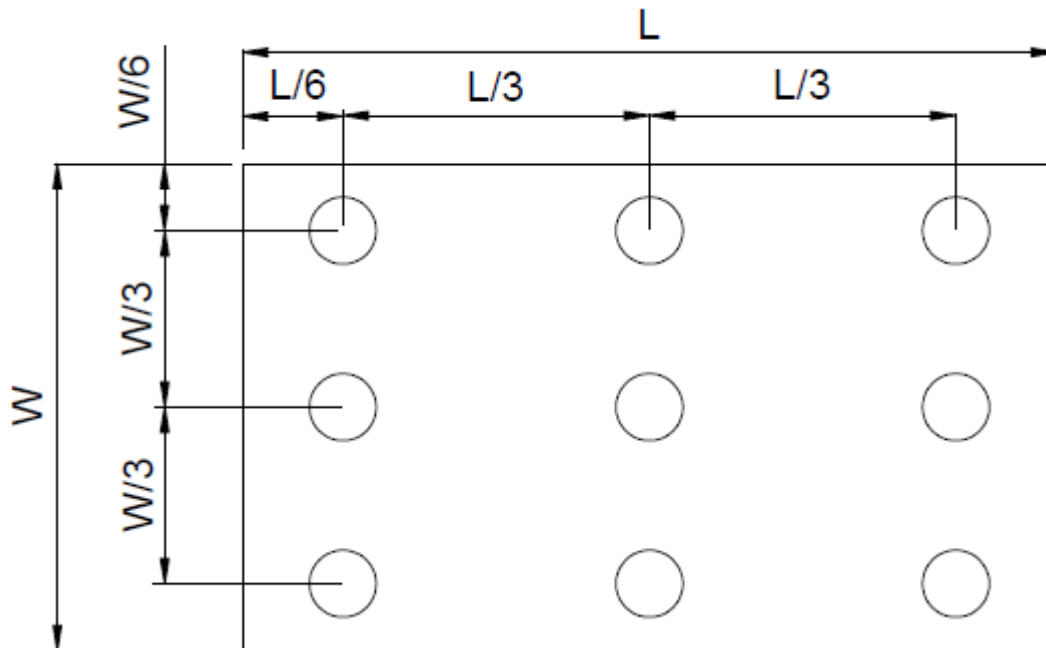


Fig. 5-4 Definition of measuring points

B_{\max} : The measured maximum luminance of all measurement position.

B_{\min} : The measured minimum luminance of all measurement position.

6. PIN ASSIGNMENT

Pin #	Signal Name	I/O	Description	Remarks
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	--	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	
22	GND	P	Ground	
23	NC	--	No connection	
24	NC	--	No connection	
25	GND	P	Ground	
26	NC	--	No connection	
27	DIMO	O	Backlight CABC controller signal output	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note3
34	U/D	I	Vertical inversion	Note3

35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable	Note2
37	CABCEN0	I	CABC H/W enable	Note2
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

Note1: If LVDS input data is 6 bits ,SELB must be set to High;

If LVDS input data is 8 bits ,SELB must be set to Low.

Note2: When CABC_EN="00", CABC OFF.

When CABC_EN="01", user interface image.

When CABC_EN="10", still picture.

When CABC_EN="11", moving image.

When CABC off, don't connect DIMO, else connect it to backlight.

Note3: When L/R="0", set right to left scan diction.

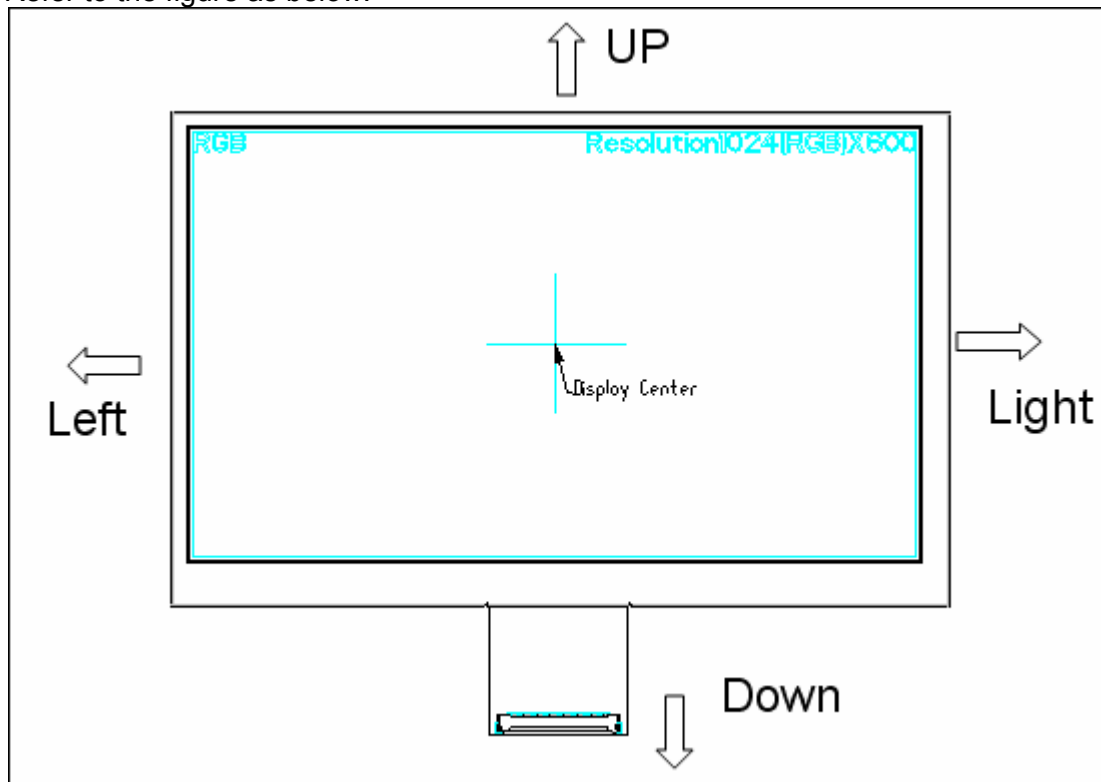
When L/R="1", set left to right scan diction.

When U/D="0", set top to bottom scan diction

When U/D="1", set bottom to top scan direct

Note: Definition of scanning direction.

Refer to the figure as below:



7. RELIABILITY TEST ITEMS

Item	Test Conditions	Remark
High Temperature Storage	Ta = 60°C , 240hrs	Note 1 , Note 4
Low Temperature Storage	Ta = -20°C , 240hrs	Note 1 , Note 4
High Temperature Operation	Ts = 50°C , 240hrs	Note 2 , Note 4
Low Temperature Operation	Ta = -10°C , 240hrs	Note 1 , Note 4
Operate at High Temperature and Humidity	+40°C, 90%RH , 240hrs	Note 4
Thermal Shock	-10°C/30 min ~ +50°C/30 min for a total 100cycles, Start with cold temperature and end with high temperature.	Note 4
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)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.

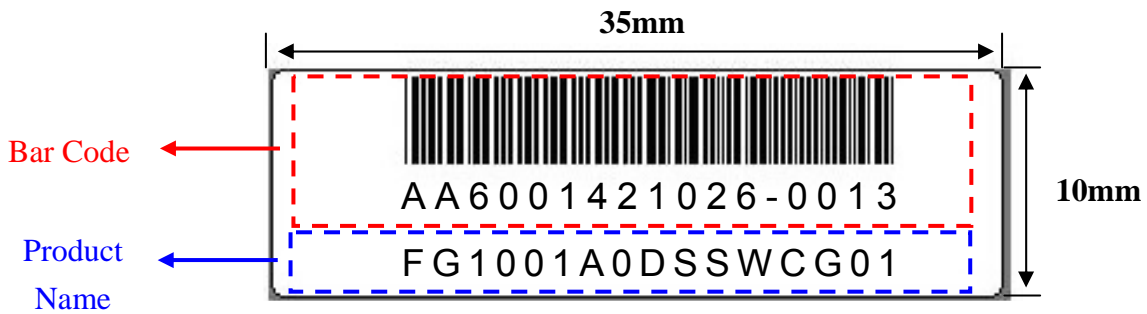
Note 2: Ts is the temperature of panel's surface.

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.

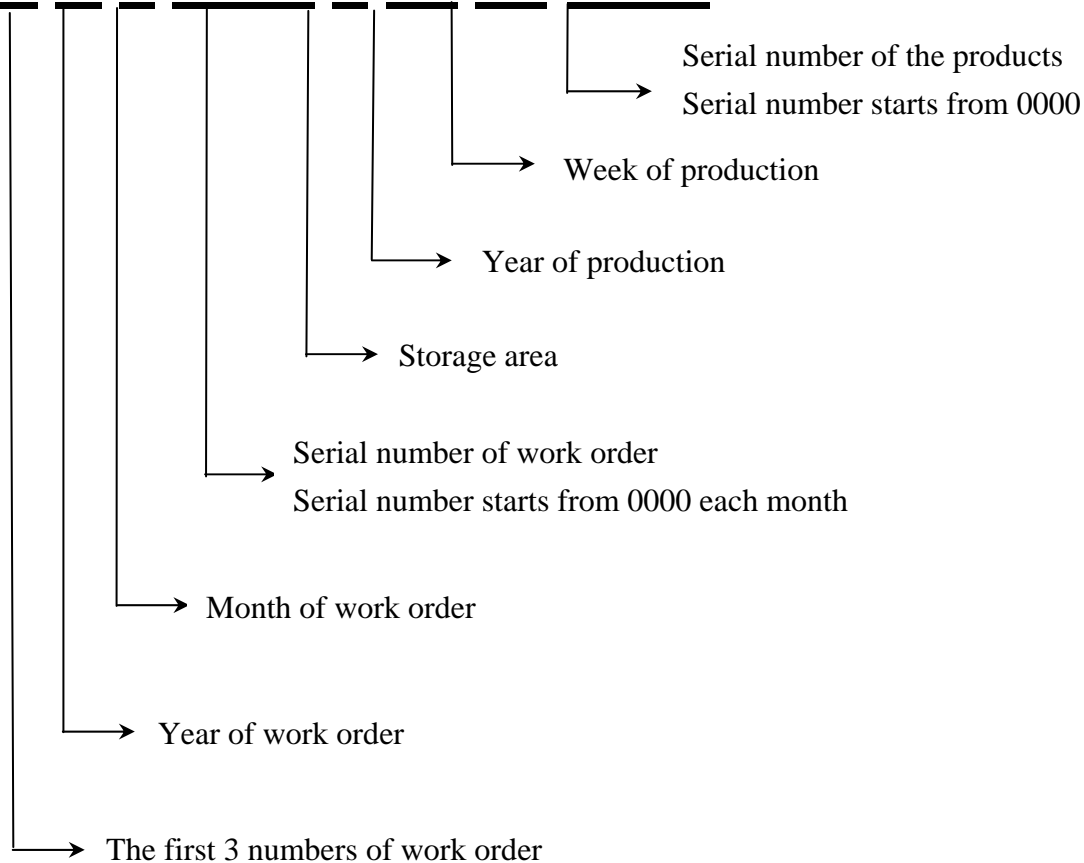
8. LCM PRODUCT LABEL DEFINE

Product Label style:



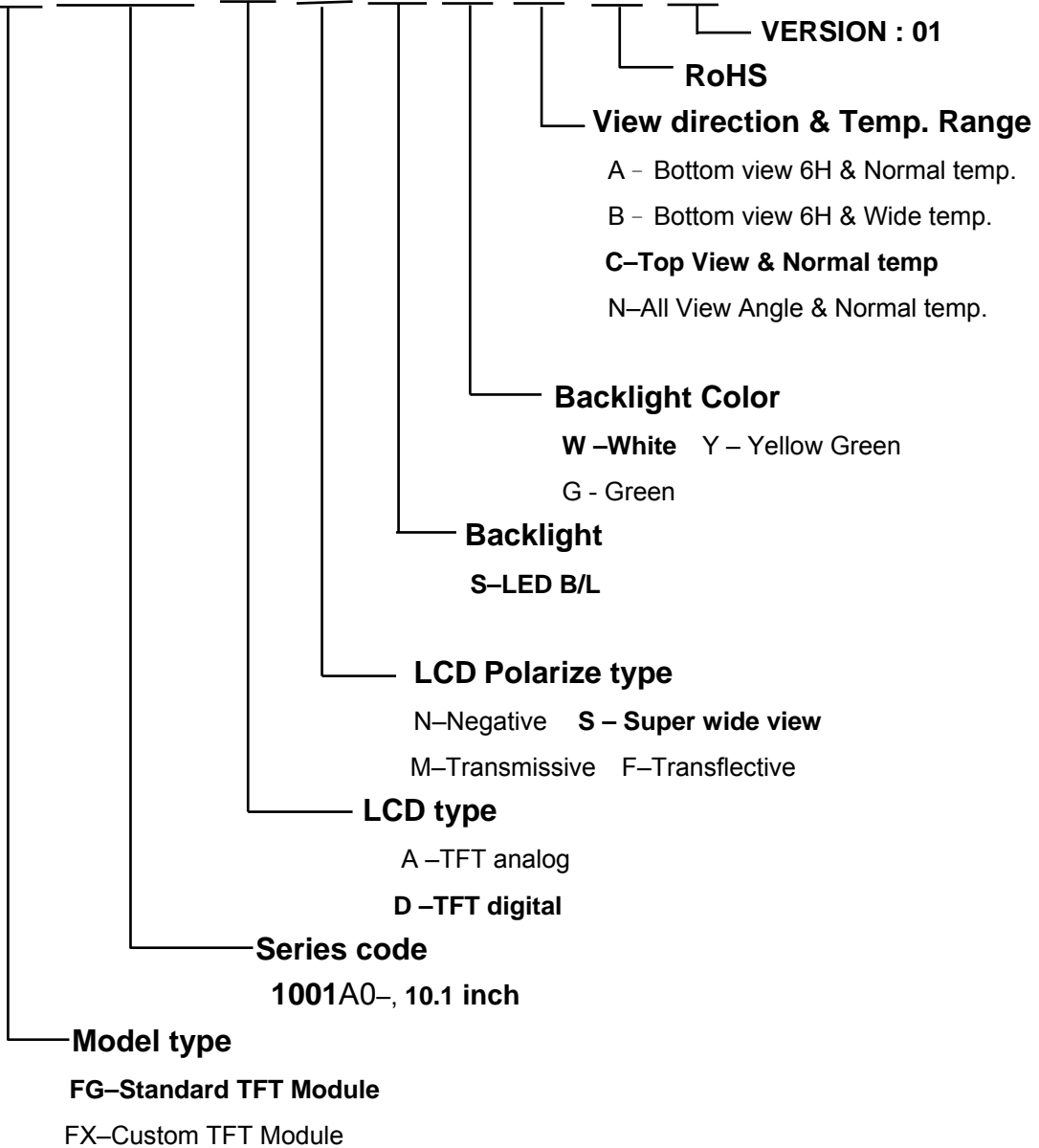
Barcode Define:

AA6001421026-0013



Product Name Define:

FG 1001A0 D S S W C G 01



9. PRECAUTIONS IN USE LCM

1. ASSEMBLY PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5) Do not open the case because inside circuits do not have sufficient strength.
- (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any

parts of the human body.

- (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
 - (3) Only properly grounded soldering irons should be used.
 - (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
 - (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
 - (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.
- ### 4. STORAGE PRECAUTIONS
- (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
 - (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
 - (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

5. OTHERS

- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
 - a. Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
 - b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
 - c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

11. PACKAGE INFORMATION

TBD