



# DATA IMAGE CORPORATION

## TFT Module Specification

PRELIMINARY

ITEM NO.: FG1004C0DSSWBG01

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	1	14/MAR/12'		17



### 3. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	10.4 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 600(V)	dot
Active Area	211.2(H) x 158.4 (V)	mm
Pixel Pitch	0.264 (H) x 0.264 (V)	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension	236(W) x 176.9(H) x5.6(D)	mm
Surface treatment	Anti-Glare(3H)	
Back-light	LED	
Display mode	Normally white	
Interface	LVDS 6 bits	
Weight	288	g
Viewing direction	6 o'clock (Gray scale inversion direction)	
Our components and processes are compliant to RoHS standard		

### 4. ABSOLUTE MAXIMUM RATINGS

GND= 0V

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	V <sub>DD</sub>	-0.3	+5.0	V	
Logic input voltage	V <sub>IN</sub>	-0.3	+5.0	V	Note1
Operating temperature	T <sub>OPR</sub>	-20	70	°C	
Storage temperature	T <sub>STG</sub>	-30	80	°C	

Note1: V<sub>IN</sub> represent IN0±,IN1±,IN2±,CLK±

### 5. ELECTRICAL CHARACTERISTICS

#### 5.1 Driving TFT LCD

GND=0V, Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
LVDS Differential input high threshold	V <sub>TH</sub>	-	-	+100	mV	V <sub>CMLVDS</sub> =1.2V
LVDS Differential input low threshold	V <sub>TL</sub>	-100	-	-	mV	V <sub>CMLVDS</sub> =1.2V
Differential input voltage	V <sub>ID</sub>	0.1	-	0.6	V	
LVDS input common mode voltage	V <sub>CMLVDS</sub>	V <sub>ID</sub>  /2	-	1.4-( V <sub>ID</sub>  /2)	v	
Input current	I <sub>IN</sub>	-10	-	10	μA	
Supply Voltage	V <sub>DD</sub>	3.0	3.3	3.6	V	
Common Electrode Driving Signal	V <sub>COM</sub>	-	4.36	-	V	Note1
Sync Frequency	F <sub>VD</sub>	-	60	70	Hz	
VDD Power Consumption	I <sub>DD</sub>	-	260	380	mA	Note2

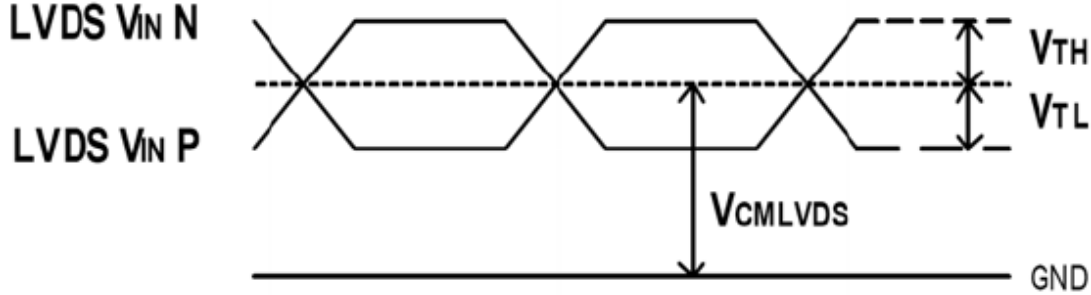


Figure 5.1.1 LVDS DC timing diagram

Note1: The value may be different for different LCM.

Note2: To test the current dissipation, using the "color bar" testing pattern shown as below:

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

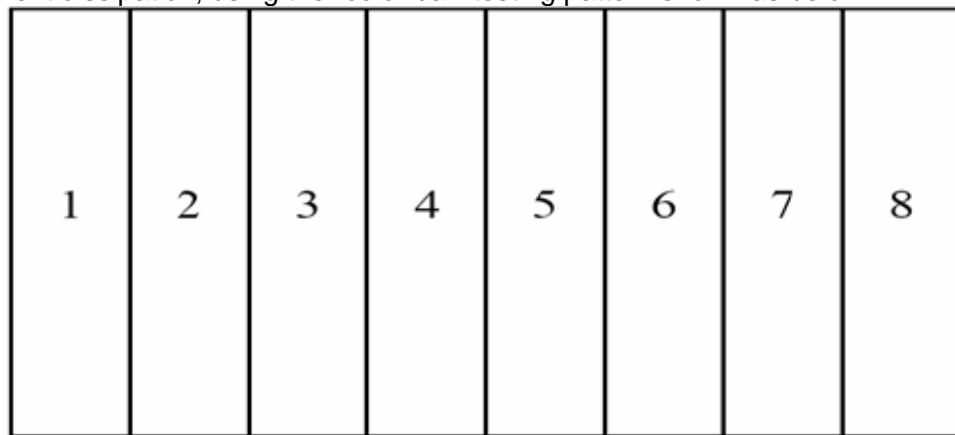


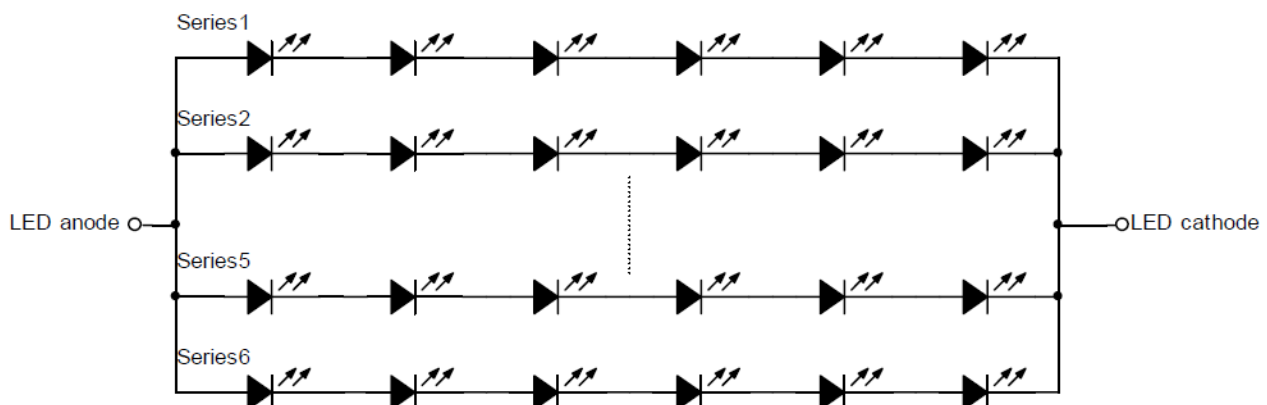
Figure 5.1.2 Current dissipation testing pattern

## 5.2 Driving Backlight

Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Forward Current	IF	-	120.0	-	mA	Note 1
Forward Current Voltage	VF	-	19.2	-	V	
Backlight Power Consumption	WBL	-	2304		mW	

Note 1: The figure below shows the connection of backlight LED.



Note2: One LED: IF =120mA.

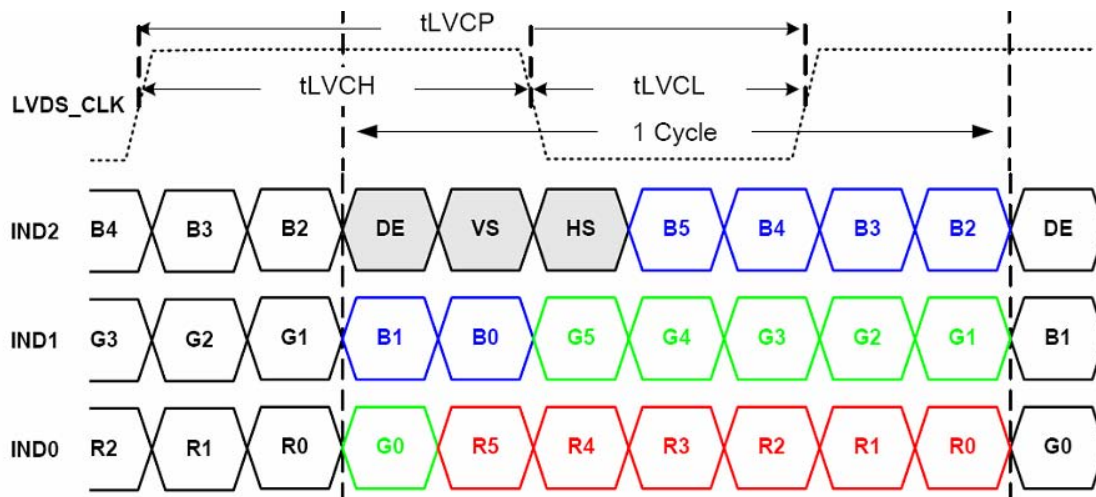
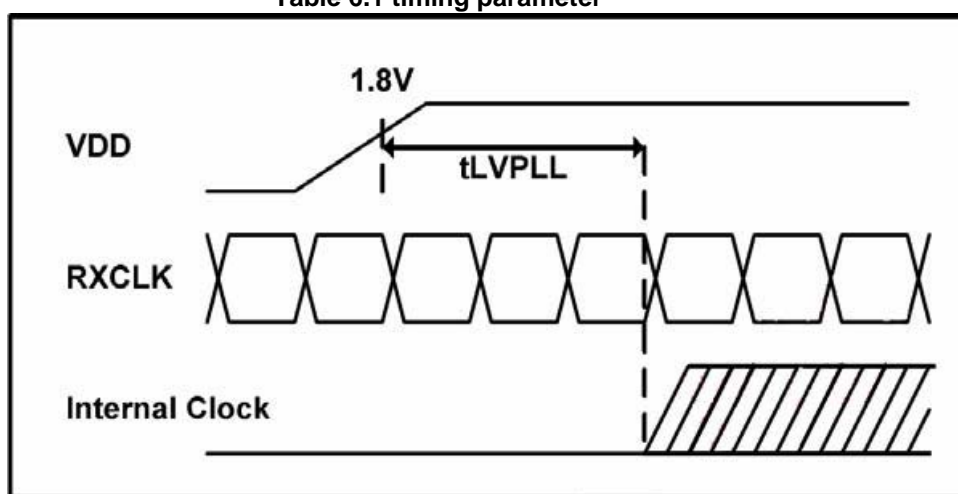
Note3: The Life of LED:20,000hrs.

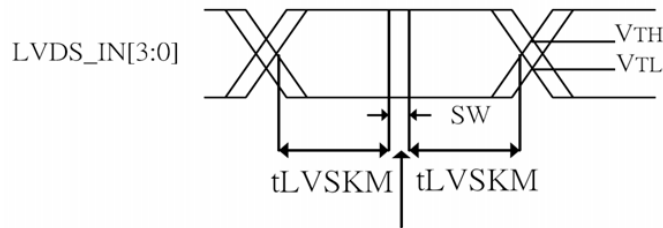
## 6. INTERFACE SPECIFICATIONS

### 6.1 Timing Chart

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Clock period	tLVCP	20	25	31.25	ns	
Clock high time	tLVCH	-	14.29	-	ns	
Clock low time	tLVCL	-	10.71	-	ns	
PLL wake-up time	tLVPLL	-	-	1	ms	
Input skew margin	tLVSKM	400	-	-	ps	f=85MHz

Table 6.1 timing parameter





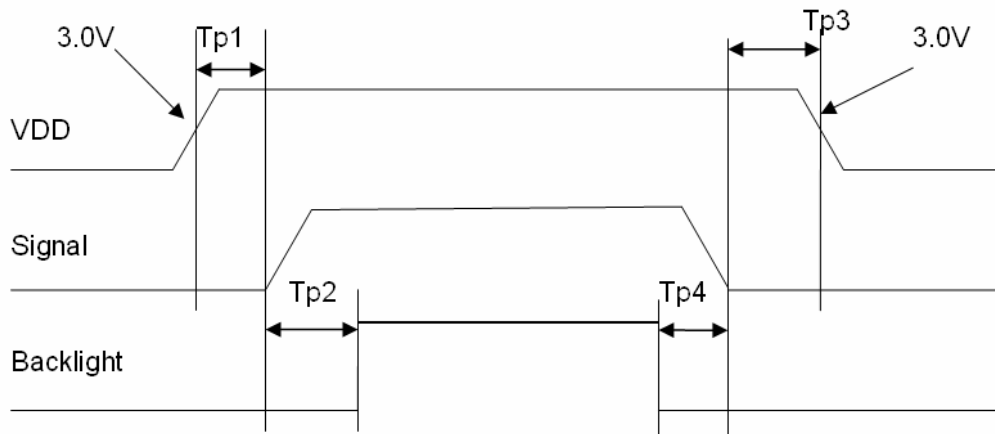
Ideal Strobe Position

SW: Setup and Hold time

**Figure 6.1 Input signal data timing**

## 6.2 Power On/Off Sequence

Item	Symbol	MIN.	TYP.	MAX.	Unit
VDD 3.0V to signal starting	Tp1	0	-	50	ms
Signal starting to backlight on	Tp2	150	-	-	ms
Signal off to VDD 3.0V	Tp3	0	-	50	ms
Backlight off to signal off	Tp4	150	-	-	ms



**Figure 6.2 Interface power on/off sequence**

## 7. OPTICAL CHARACTERISTIC

### 7.1. Specification:

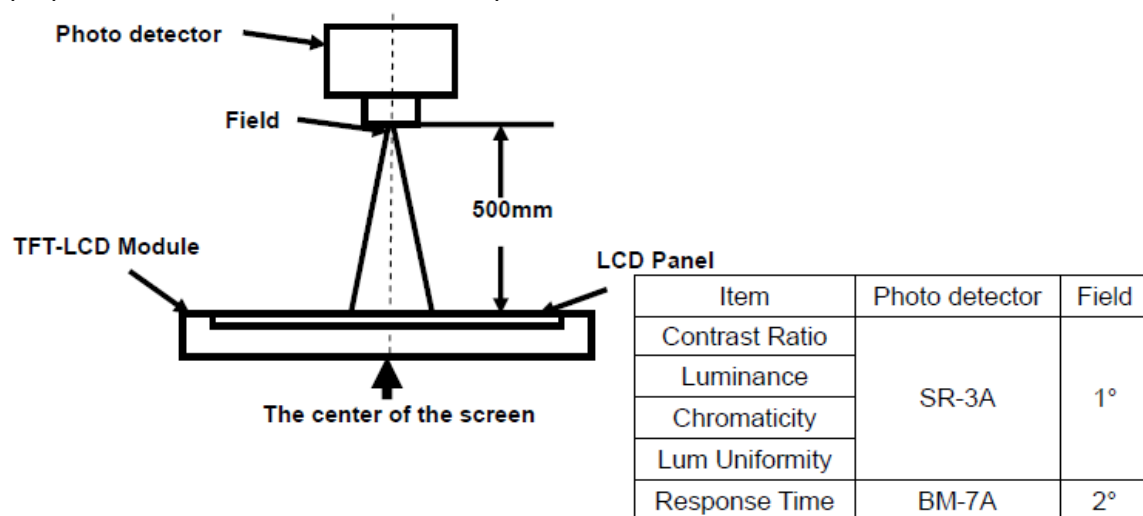
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	$\theta T$	35	45	--	deg	Note 2
		$\theta B-$	55	65	--		
	Vertical	$\theta L$	55	65	--		
		$\theta R$	55	65	--		
Contrast Ratio	CR	Center	300	400	--		Note 1,3
Response time	Rise	$T_{on}$	-	10	15	ms	Note 1,4
	Fall	$T_{off}$	-	15	25	ms	
Brightness Uniformity	B-uni	$\theta x = \theta y = 0^\circ$	70	75	--	%	Note 1,6
Central Luminance	L		350	400	--	cd/m <sup>2</sup>	Note 1,7
Chromaticity	$x_W$	Center $\theta x = \theta y = 0^\circ$	0.259	0.309	0.309	--	Note 1,5
	$y_W$		0.284	0.334	0.384		
	$x_R$		0.550	0.600	0.650		
	$y_R$		0.296	0.346	0.396		
	$x_G$		0.283	0.333	0.383		
	$y_G$		0.516	0.566	0.616		
	$x_B$		0.092	0.142	0.192		
	$y_B$		0.065	0.115	0.165		

Test Conditions:

1. The ambient temperature is  $25 \pm 2^\circ\text{C}$ . Humidity is  $65 \pm 7\%$
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

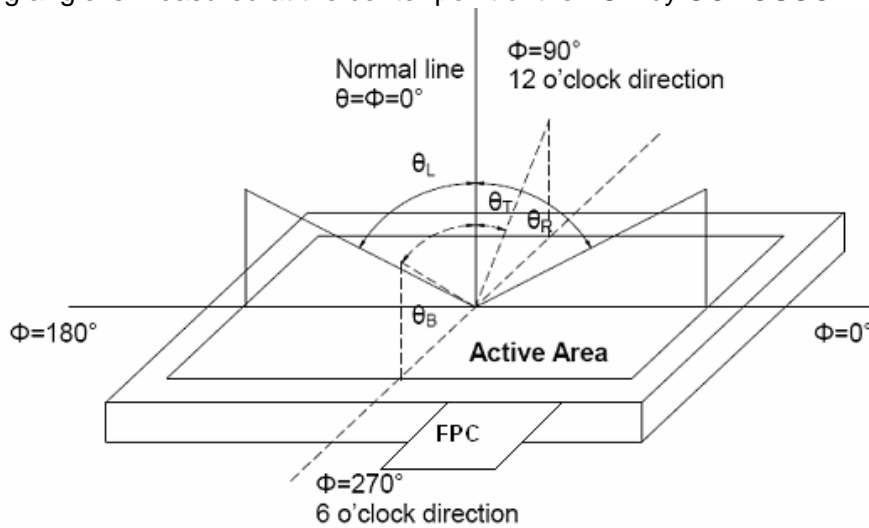


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

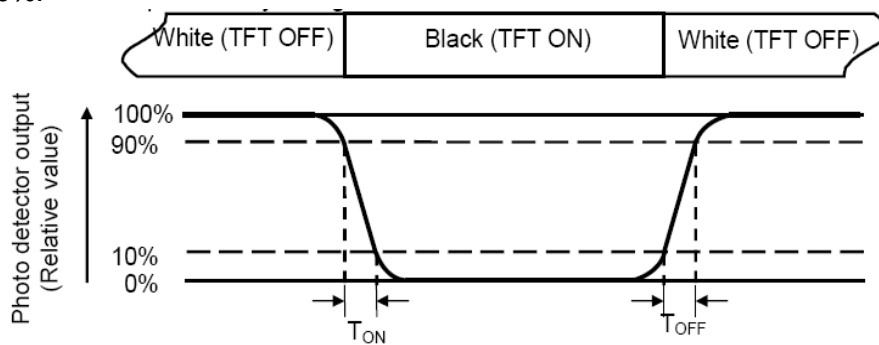
$$CR = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

"White state ":The state is that the LCD should driven by "white".

"Black state": The state is that the LCD should driven by "black".

Note 4: Definition of Response time

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



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

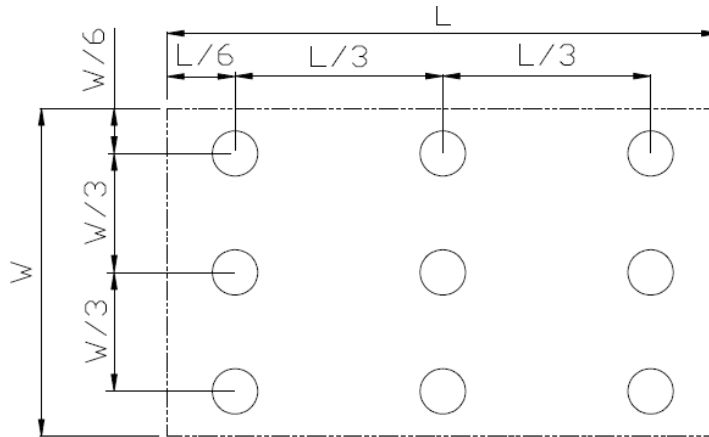


**Note 6: Definition of Luminance Uniformity**

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) =  $L_{min} / L_{max}$

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



**Fig. 2 Definition of uniformity**

$L_{max}$ : The measured maximum luminance of all measurement position.

$L_{min}$ : The measured minimum luminance of all measurement position.

**Note 7: Definition of Luminance :**

Measure the luminance of white state at center point.

## 8. PIN CONNECTIONS

### 8.1 TFT LCD Panel Driving Section

Pin	Name	I/O	Description	Remark
1	VDD	P	Power Supply	
2	VDD	P	Power Supply	
3	GND	P	Ground	
4	GND	P	Ground	
5	IN0-	I	LVDS receiver negative signal channel 0	
6	IN0+	I	LVDS receiver negative signal channel 0	
7	GND	P	Ground	
8	IN 1-	I	LVDS receiver negative signal channel 1	
9	IN 1+	I	LVDS receiver negative signal channel 1	
10	GND	P	Ground	
11	IN 2-	I	LVDS receiver negative signal channel 2	
12	IN 2+	I	LVDS receiver negative signal channel 2	
13	GND	P	Ground	
14	CLK-	I	LVDS receiver negative signal clock	
15	CLK +	I	LVDS receiver positive signal clock	
16	GND	P	Ground	
17	NC	-	No connection	
18	NC	-	No connection	
19	GND	P	Ground	
20	GND	P	Ground	

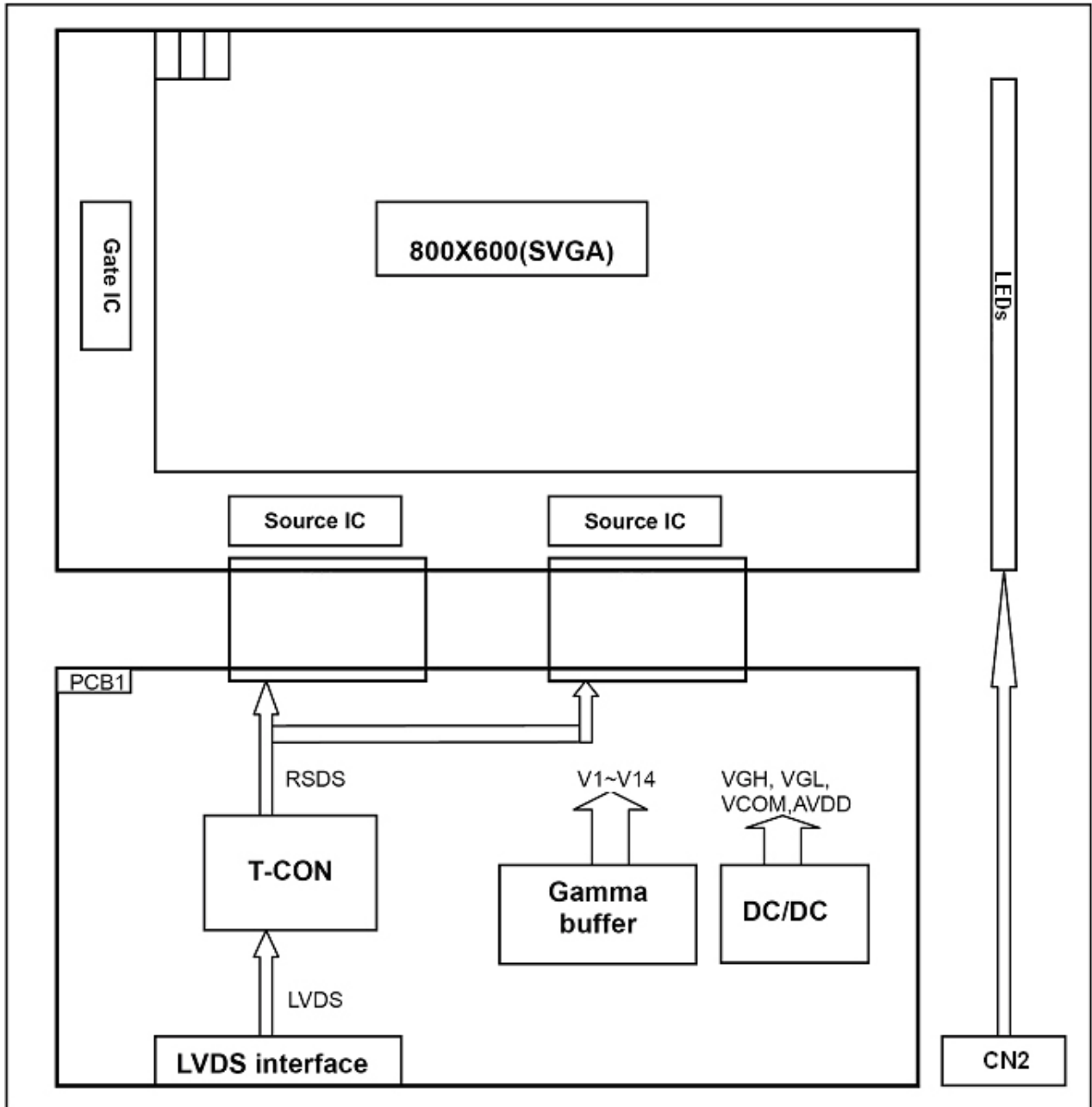
Note: I/O definition:

I--Input O--Output P--Power/Ground

### 8.2 CN2(Backlight Connector)

Pin	Symbol	I/O	Description	Wire Color
1	LEDA	P	LED driving anode (high voltage)	Red
2	LEDK	P	LED driving cathode (low voltage)	White

### 9. BLOCK DIAGRAM



## 10. QUALITY ASSURANCE

### 10.1 Reliability Test

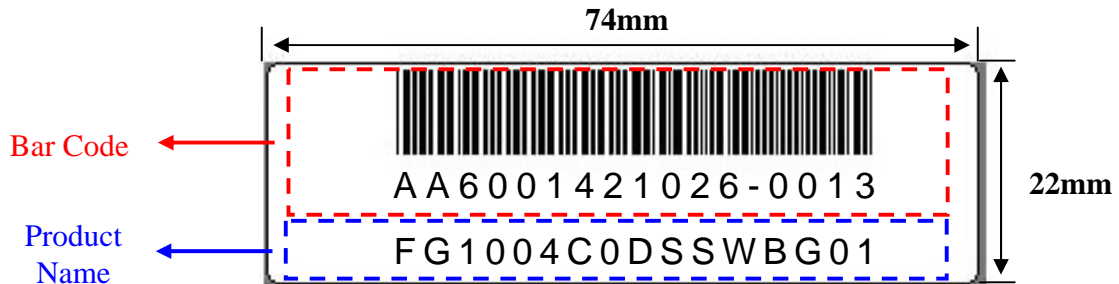
Item	Test Conditions	Remark
High Temperature Operation	Ts = 70°C      240hrs	Note 1 IEC60068-2-2,GB2423.2—89
Low Temperature Operation	Ta = -20°C      240hrs	IEC60068-2-1 GB2423.1—89
High Temperature Storage (non-operation)	Ta = 80°C      240hrs	IEC60068-2-2, GB2423.2—89
Low Temperature Storage (non-operation)	Ta = 30°C      240hrs	IEC60068-2-1 GB2423.1—89
High Temperature and High Humidity Operation	Ta = +60°C, 90% RH max, 240hours	Note2 IEC60068-2-3, GB/T2423.3—2006
Thermal Shock (non-operation)	-20°C 30 min~+70°C 30 min, Change time:5min, 100 Cycles	Start with cold temperature, end with high temperature IEC60068-2-14,GB2423.22—87
Electro Static Discharge (operation)	C=150pF,R=330Ω, Air:±15Kv, Contact:±8Kv, 10times/terminal	IEC61000-4-2 GB/T17626.2—1998
Vibration (non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2hours for each direction of X.Y.Z (6 hours for total)	IEC60068-2-6 GB/T2423.10—1995
Shock (non-operation)	80G 6ms, ±X,±Y,±Z 3 times for each direction	IEC60068-2-27 GB/T2423.5—1995
Package Drop Test	Height:80 cm,1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/2423.8—1995
Package Vibration Test	Random Vibration: 0.015GxG/Hz for 5-200Hz, -6dB/Octave from 200-500Hz 2 hours for each direction of X,Y,Z (6 hours for total)	IEC60068-2-34

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

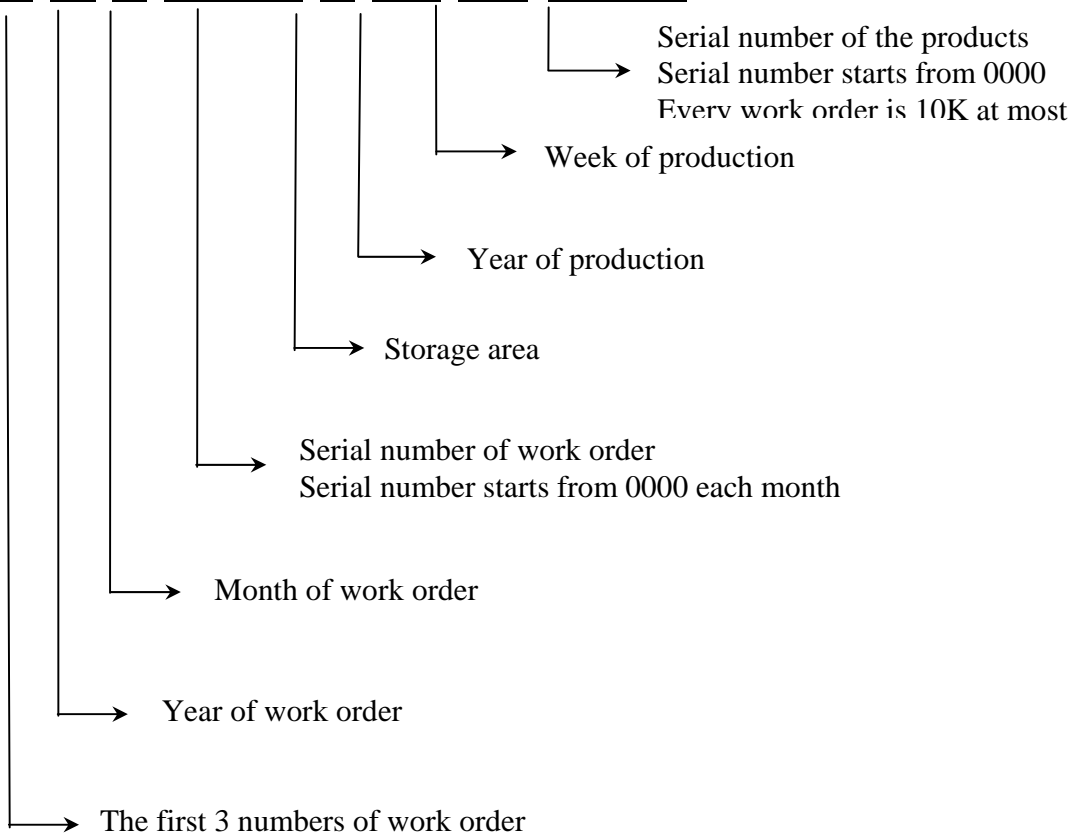
## 11. LCM Product Label Define

### Product Label style:

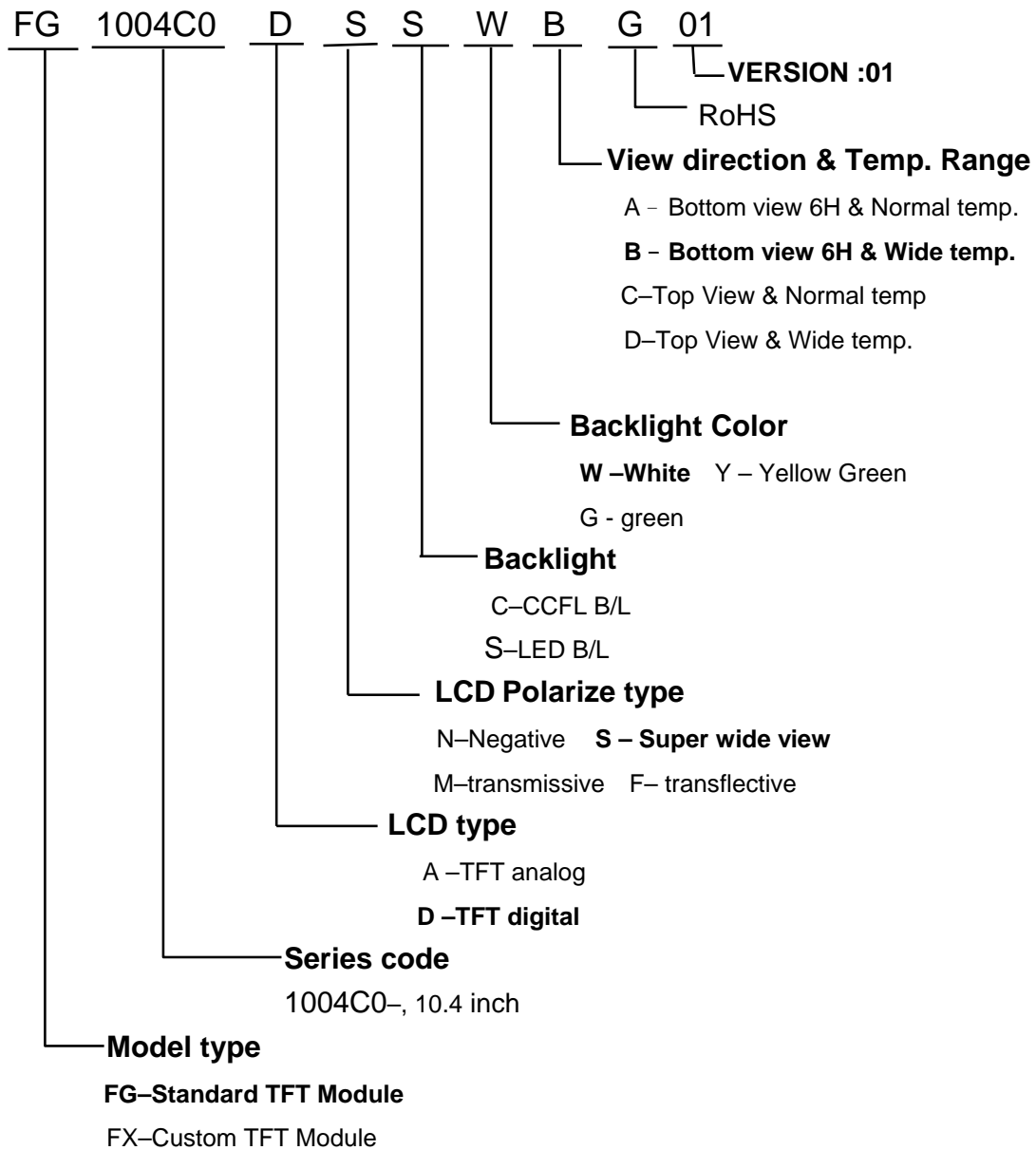


### BarCode Define:

**A A 6 0014 2 10 26-0013**



**Product Name Define:**



## 12. 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.

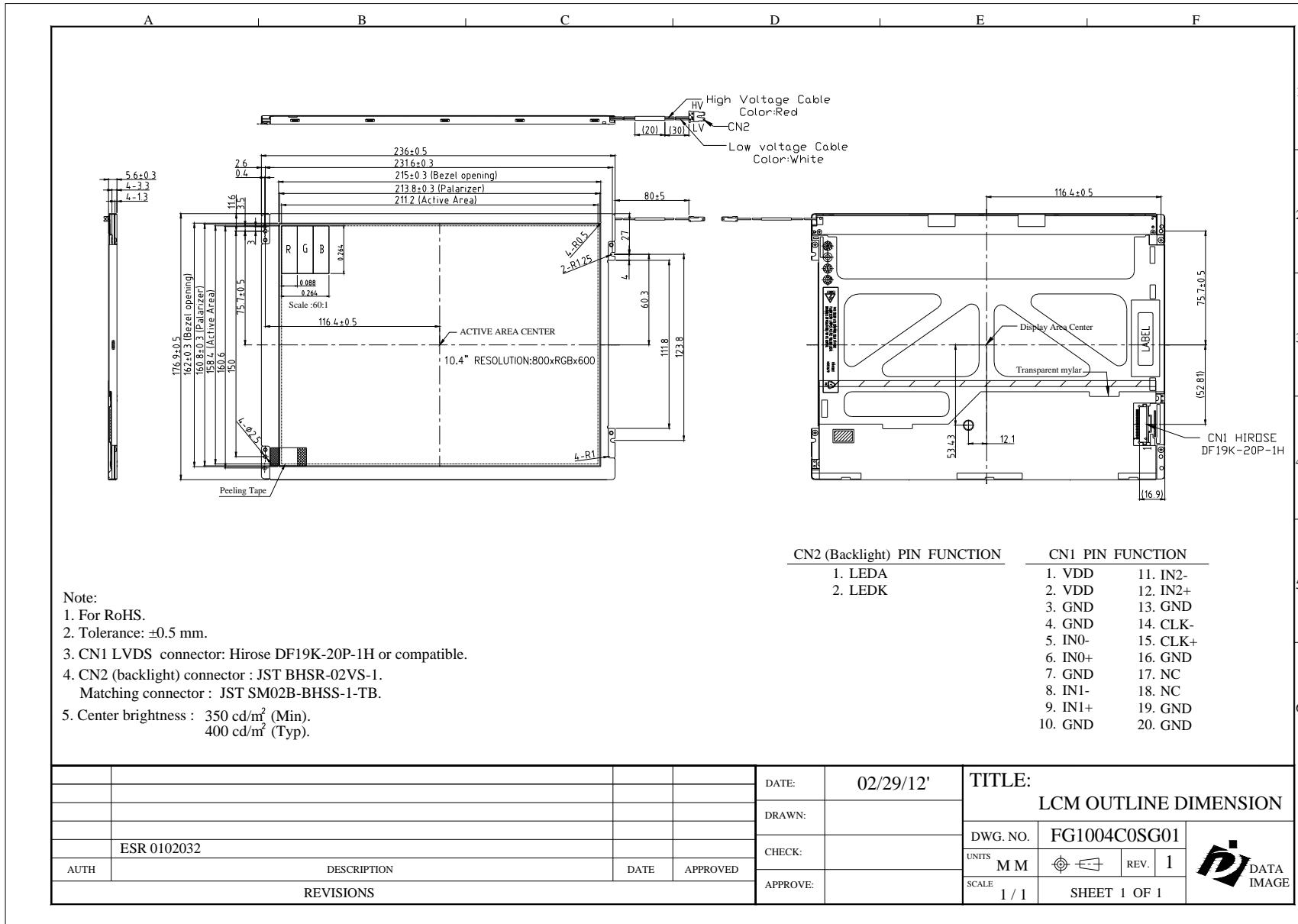
### 5. OTHERS

- (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.

Confidential Document  
**13. OUTLINE DRAWING**







Confidential Document

**14. PACKAGE INFORMATION**  
**TDB**