

DATA IMAGE CORPORATION

TFT Module Specification

Preliminary

ITEM NO.: FG0700Z0DSSWNG01

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1	23/Nov/11'			Initial Preliminary

3. APPLICATION

DVD player, Car TV, UMPC, POS

4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	1024(H) x (R,G,B) x 600(V)	dot
Active Area	153.6(W) × 90.0(H) mm	mm
Dot Pitch	0.05(W) × 0.15(H) mm	mm
Pixel Configuration	Stripe	
Outline Dimension	165.75(W) x 105.39(H) x 3.4 (D)	mm
Surface treatment	Hard Coating	
Back-light	LED	
Display mode	Normally Black	
Interface	LVDS	

5. ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	VDD	-0.3	5.0	V	Ta=25°C
	AVDD	6.5	13.5	V	
	VGH	-0.3	42.0	V	
	VGL	-20	0.3	V	
	VGH-VGL	-	40	V	
Operating temperature	Top	-10	60	°C	
Storage temperature	Tst	-20	70	°C	-
LED Reverse Voltage	VR	-	5	V	Each LED
LED Forward Current	IF	-	35	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.

6. ELECTRICAL CHARACTERISTICS

6.1 Operating Conditions

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power voltage	VDD	3.0	3.3	3.6	V	Note2
	AVDD	10.3	10.5	10.7	V	
	V _{GH}	19.7	20.4	21.1	V	
	V _{GL}	-9.7	-9	-8.3	V	
Input signal voltage	V _{COM}	TBD	TBD	TBD	V	Note4
Input logic high voltage	V _{IH}	0.7VDD	-	VDD	V	Note3
Input logic low voltage	V _{IL}	0	-	0.3VDD	V	

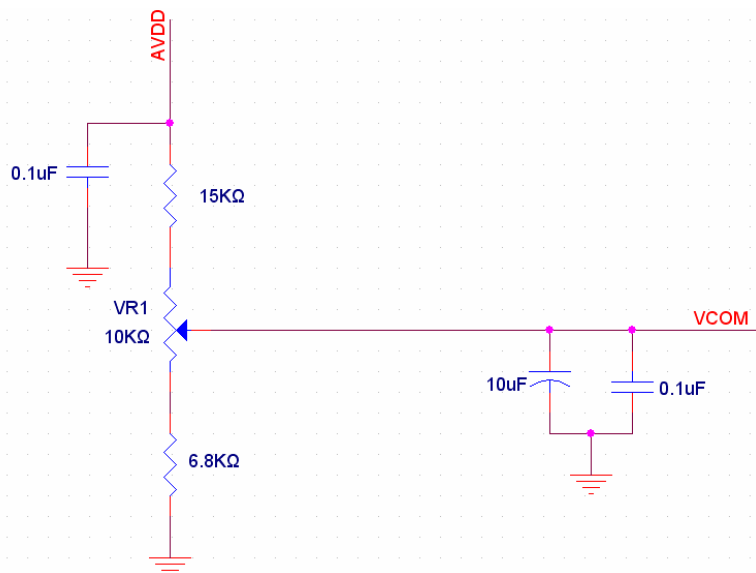
Note 1: Be sure to apply VDD and VGL to the LCD first, and then apply VGH.

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

Note 3: LVDS, Reset.

Note 4: Typ. VCOM is only a reference value, it must be optimized according to each LCM.

Be sure to use VR;



6.2 Current Consumption

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Current for Driver	I _{GH}	-	TBD	TBD	mV	V _{GH} =20.4V
	I _{GL}	-	TBD	TBD	mV	V _{GL} =-9V
	I _{VDD}	-	TBD	TBD	mV	VDD=3.3V
	I _{AVDD}	-	TBD	TBD	mV	AVDD=10.5V

6.3 Backlight Driving Consumption

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED voltage	V _L	-	9.3	10.2	V	Note 1
LED current	I _L	-	160	200	mA	
LED life time	-	-	20000	--	hr	Note 2

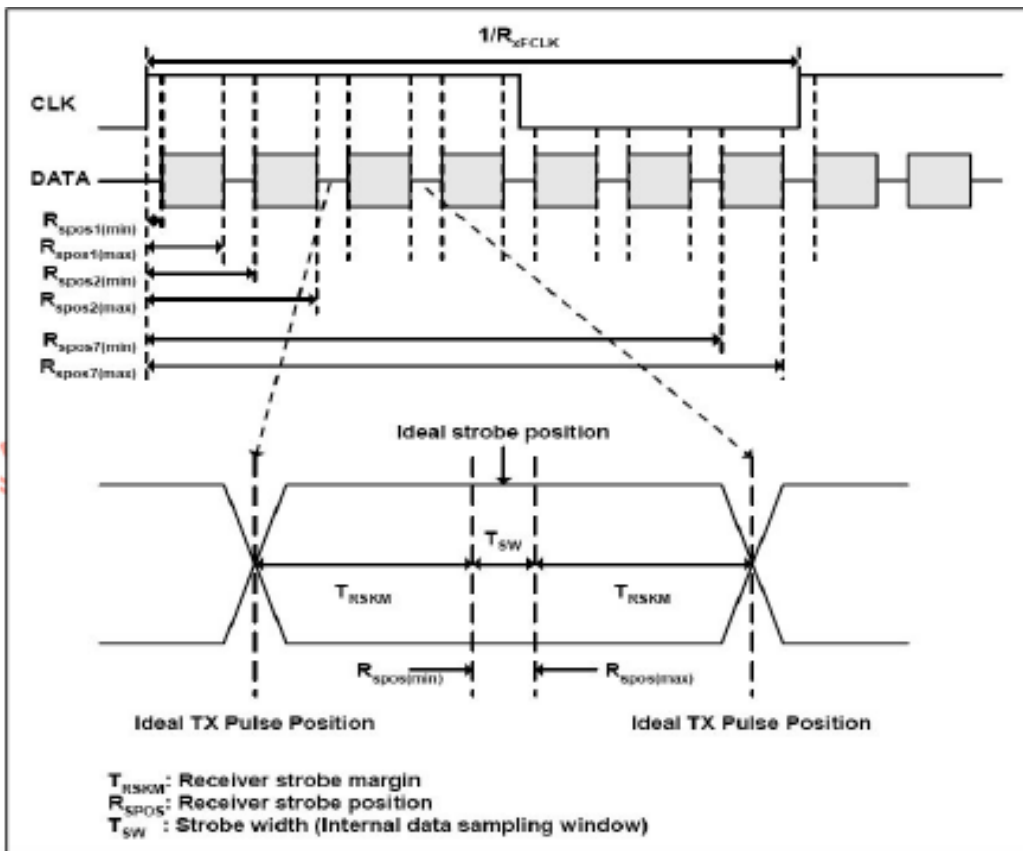
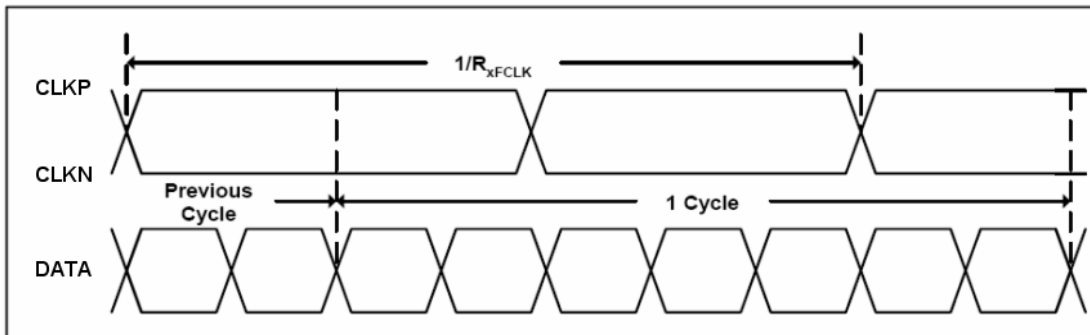
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I_L =160mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=160\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 160mA.

7. INPUT SIGNAL CHARACTERISTICS

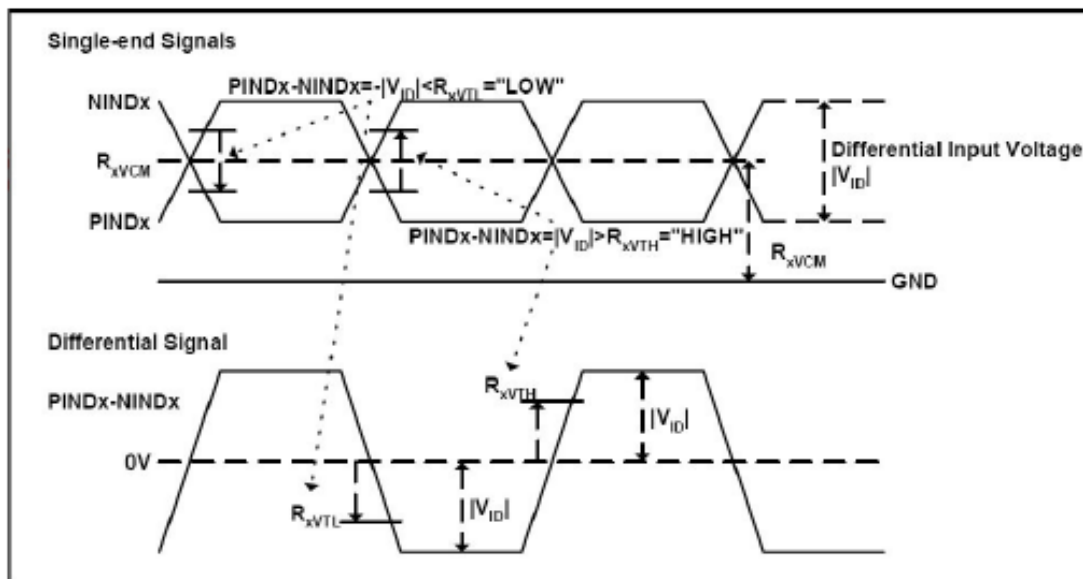
7.1 AC Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency	R_{XFCLK}	20	-	71	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7 * R_{Xfclk})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7 * R_{Xfclk})$	-	ns	



7.2 DC Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
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	-	2.4	v	
Differential input common mode voltage	R_{xVCM}	$ V_{ID} /2$	-	$2.4- V_{ID} /2$	v	
Differential voltage	$ V_{ID} $	0.2	-	0.6	v	
Differential input leakage current	RV_{xliz}	-10	-	+10	uA	



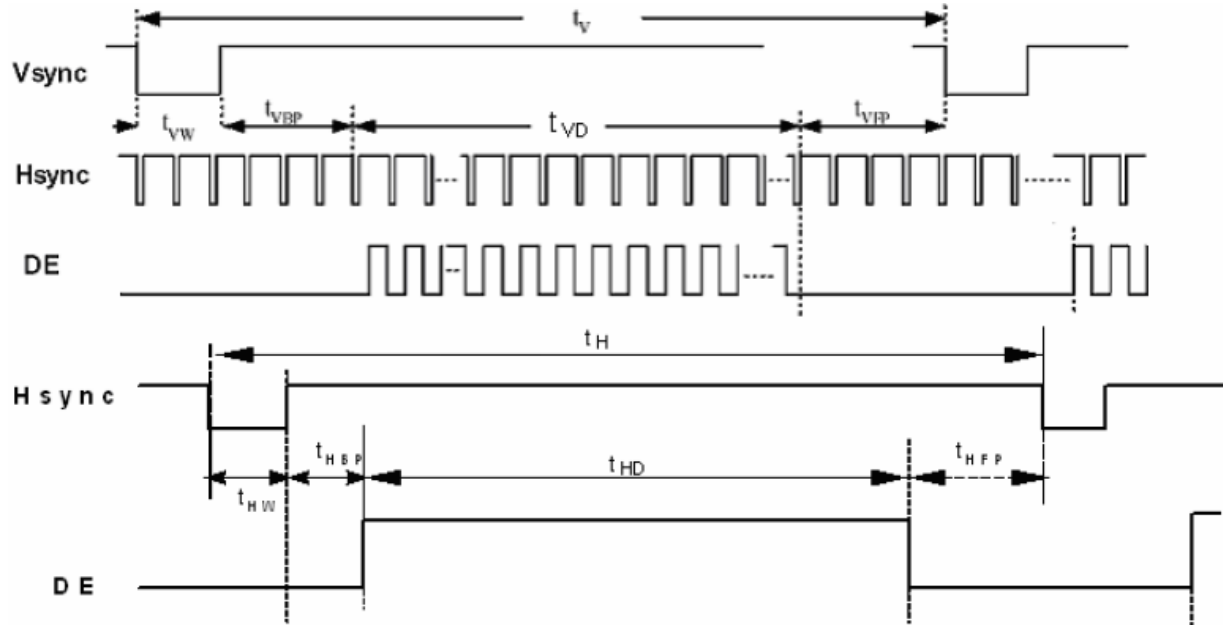
7.3 Timing Table

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock Frequency	Fclk	44.9	51.2	63	MHz	Frame rate=60Hz
Horizontal display area	thd	1024			DCLK	
HS period time	th	1200	1344	1400	DCLK	
HS Pulse Width	thw	1	-	140	DCLK	
HS Width + Back Porch	thw + thbp	160	160	160	DCLK	
HS front porch	thfp	16	160	216	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	624	635	750	H	
VS Pulse Width	twv	1	-	20	H	
VS Width + Back Porch	twv + tvb	23	23	23	H	
VS front porch	tvfp	1	12	127	H	



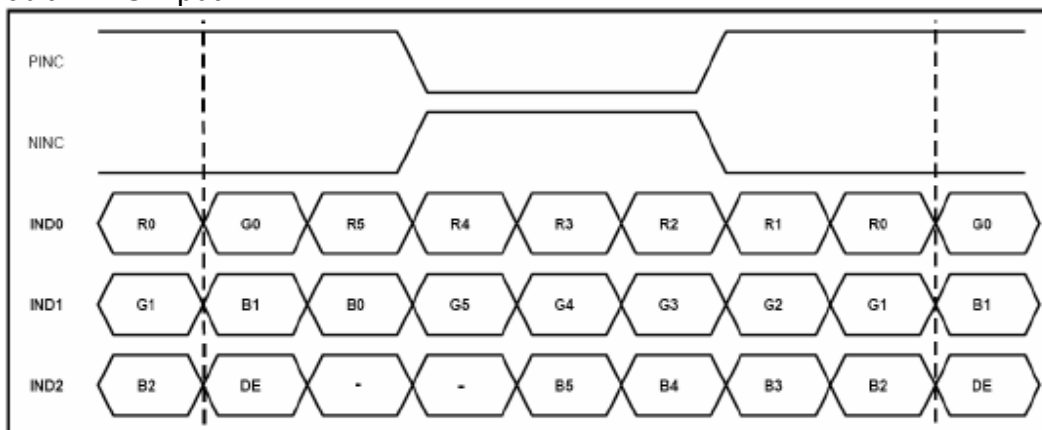
DATA
IMAGE

Confidential Document

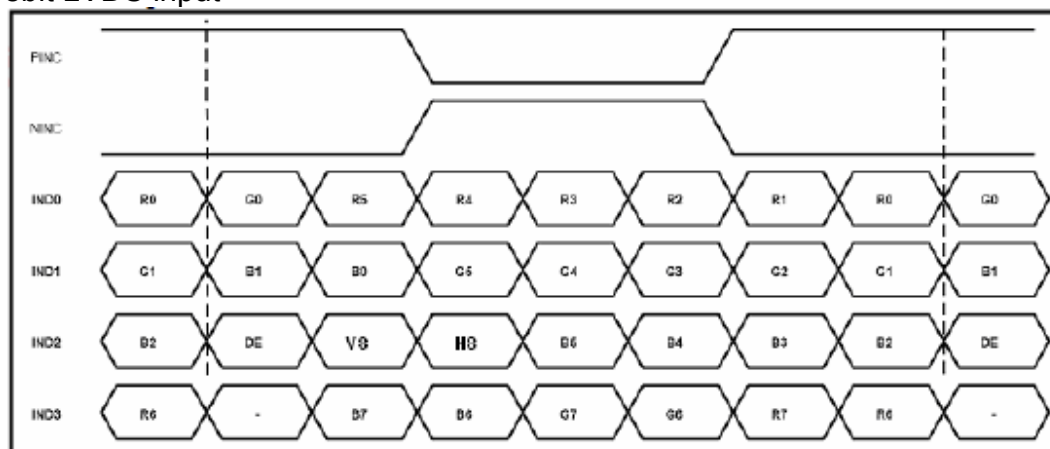


7.4 Data Input Format

6bit LVDS input



8bit LVDS input



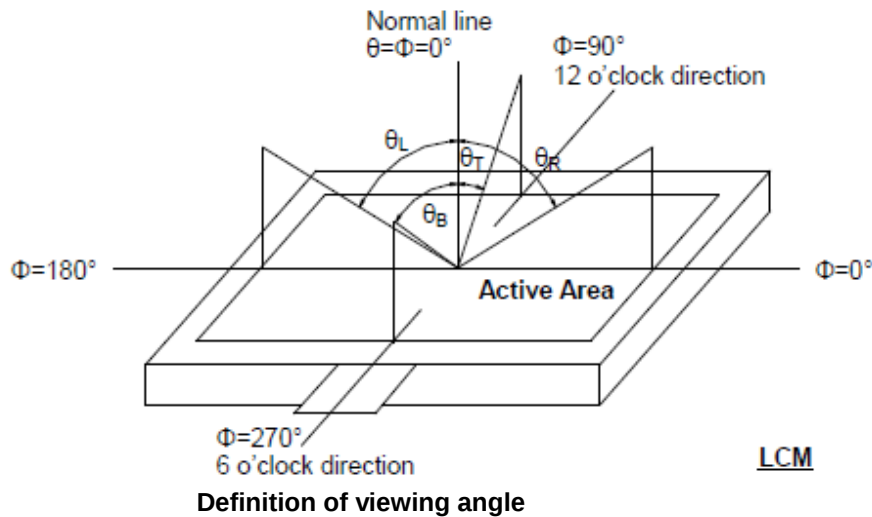
8. OPTICAL CHARACTERISTIC

Parameter	Symbol	Condition	MIN.	Typ.	MAX.	Unit	Remark
Viewing angle (CR≥10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	75	85	-	degree	Note1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	75	85	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	75	85	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	75	85	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	30	60	msec	Note 2
	T_{OFF}						Note 3
Contrast ratio	CR		600	800	-	-	Note 4
Color chromaticity	W_X		(0.26)	(0.31)	(0.36)	-	Note 2
	W_Y		(0.29)	(0.34)	(0.39)	-	Note 5 Note 6
Luminance	L		250	300	-	cd/m ²	Note 6
Luminance uniformity	Y_U		70	80	-	%	Note 7

Test Conditions :

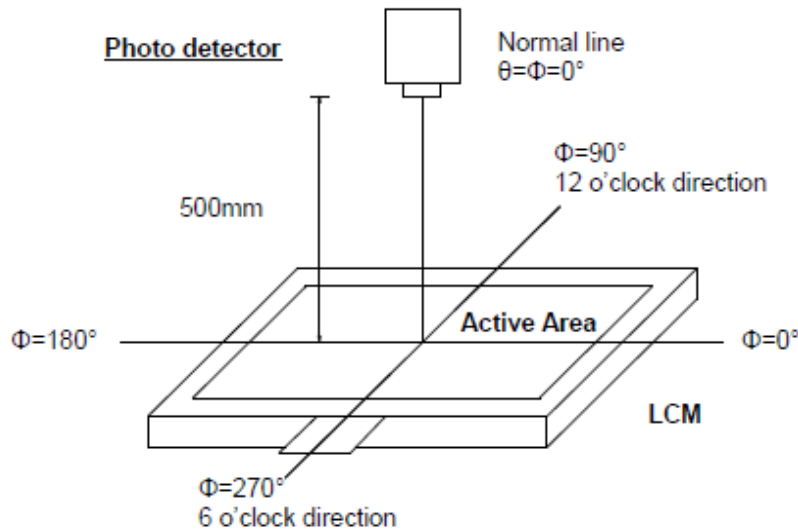
- $V_{DD}=3.1V$, $I_L=160mA$ (Backlight current) , the ambient temperature is $25^\circ C$.
- The test systems refer to Note 2.

Note 1: Definition of viewing angle range



Note 2: Definition of optical measurement system.

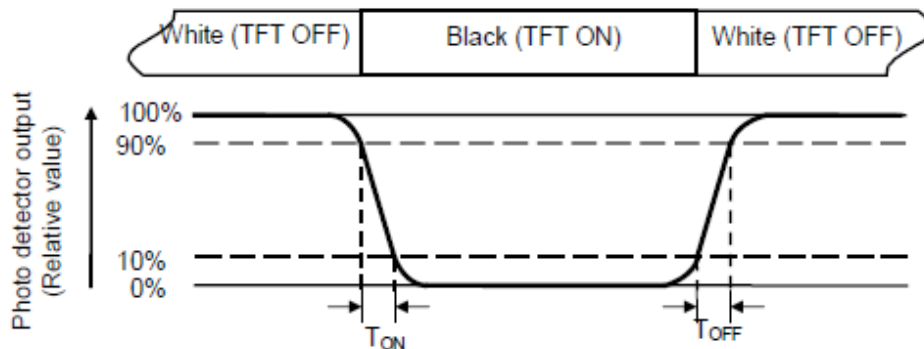
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. The tests are measured by Photo detector TOPCON BM-7A, (Field of view: 1° /Height: 500mm.)



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%



Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

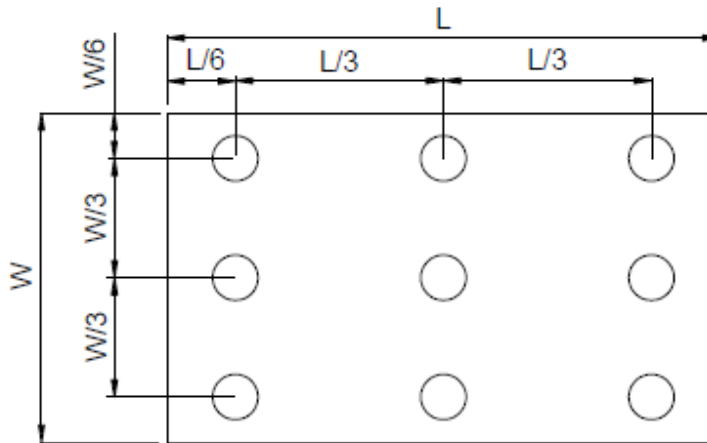
Note 6: Definition of luminance:

Measured at the center area of the panel when LCD panel is driven at “white” state. The LED driving condition is IL=160mA .

Note 7: Definition of Luminance Uniformity Active area is divided into 9 measuring areas (Refer to Definition of measuring points). 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



Definition of measuring points

Bmax: The measured maximum luminance of 9 measurement position.

Bmin: The measured minimum luminance of 9 measurement position.

9. PIN CONNECTIONS

Pin No	Symbol	Description	Remark
1	VCOM	Common Voltage	
2	VDD	Power Voltage for digital circuit	
3	VDD	Power Voltage for digital circuit	
4	NC	No connection	
5	Reset	Global reset pin	
6	STBYB	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	Ground	
8	RXIN0-	- LVDS differential data input	
9	RXIN0+	+ LVDS differential data input	
10	GND	Ground	
11	RXIN1-	- LVDS differential data input	
12	RXIN1+	+LVDS differential data input	
13	GND	Ground	
14	RXIN2-	- LVDS differential data input	
15	RXIN2+	+LVDS differential data input	
16	GND	Ground	
17	RXCLKIN-	- LVDS differential data input	
18	RXCLKIN+	+ LVDS differential data input	
19	GND	Ground	
20	RXIN3-	- LVDS differential data input	
21	RXIN3+	+ LVDS differential data input	
22	GND	Ground	
23	NC	No connection	
24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	DIMO	Backlight CABC controller signal output	
28	SELB	6bit/8bit mode select	Note 1
29	AVDD	Power for Analog Circuit	
30	GND	Ground	
31	LED-	LED Cathode	
32	LED-	LED Cathode	
33	L/R	Horizontal inversion	Note 3
34	U/D	Vertical inversion	Note 3
35	VGL	Gate OFF Voltage	
36	CABCEN1	CABC H/W enable	Note 2
37	CABCEN0	CABC H/W enable	Note 2
38	VGH	Gate ON Voltage	

39	LED+	LED Anode	
40	LED+	LED Anode	

Note 1: 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.

Note 2: 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.

Note 3: When L/R=" 0" , set right to left scan direction.

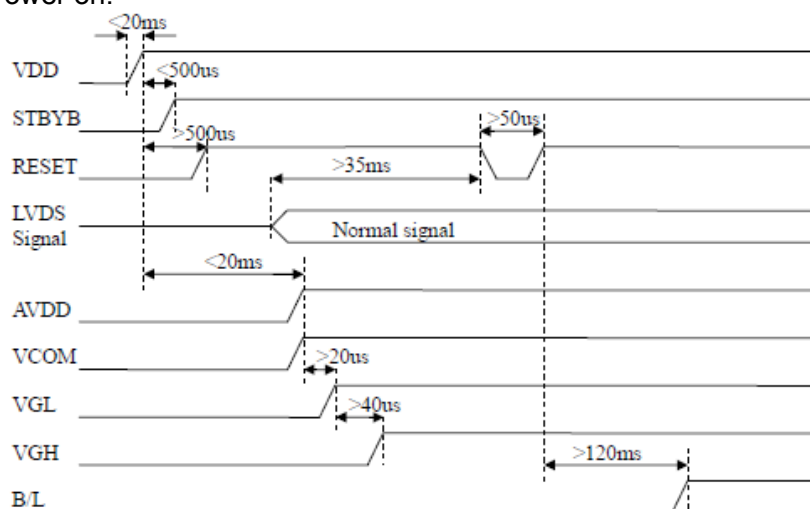
When L/R=" 1" , set left to right scan direction.

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

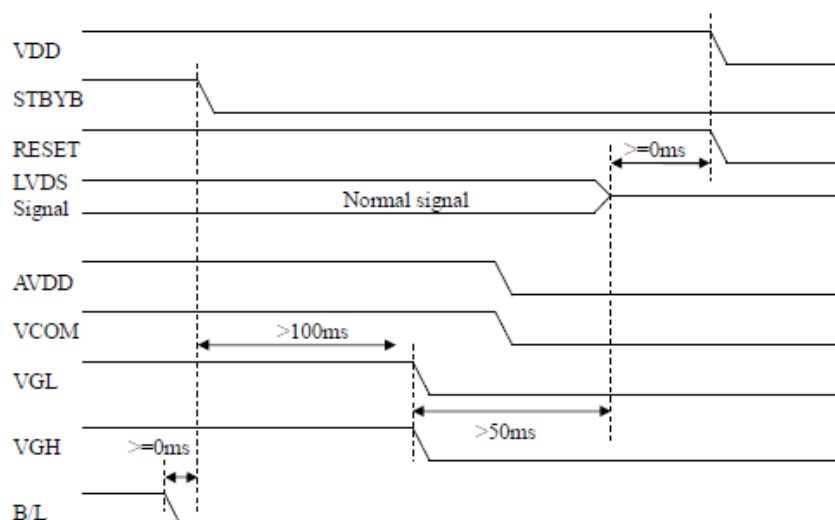
When U/D=" 1" , set bottom to top scan direction.

9.1 power ON/OFF sequence:

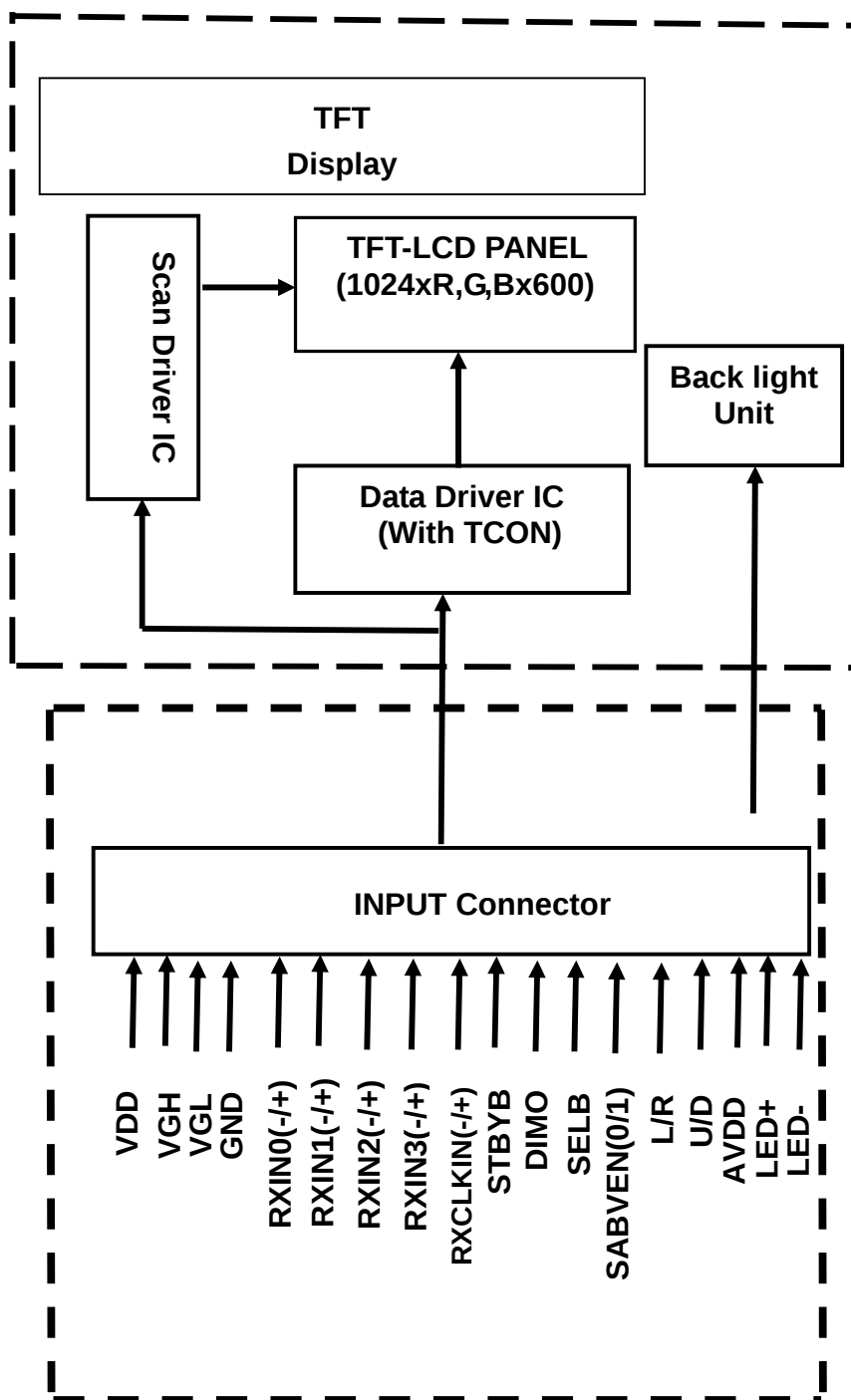
Power on:



Power off:



10. BLOCK DIAGRAM



11. QUALITY ASSURANCE

11.1 Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

Reliability Test Item & Level		Test Level
No.	Test Item	
1	High Temperature Storage Test	Ta=70°C,240hrs
2	Low Temperature Storage Test	Ta=-20°C,240hrs
3	High Temperature Operation Test	Ts=60°C,240hrs
4	Low Temperature Operation Test	Ta=-10°C,240hrs
5	High Temperature and High Humidity (No operation)	T=40°C,90%RH,240hrs
6	Thermal Cycling Test (No operation)	-20°C → +25°C → +70°C, 100 Cycles 30 min 5 min 30 min
7	Vibration Test (No operation)	Frequency :10 ~ 55 Hz Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z
8	Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω

Note 1: Ta is the ambient temperature of samples.

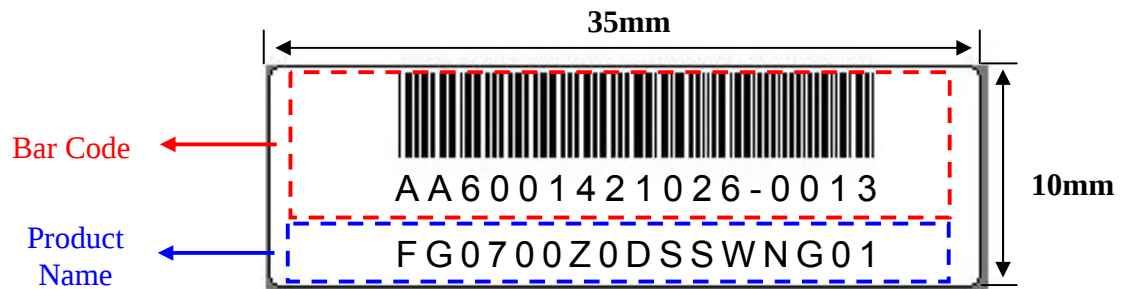
Note 2: Ts is the temperature of panel's surface.

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.

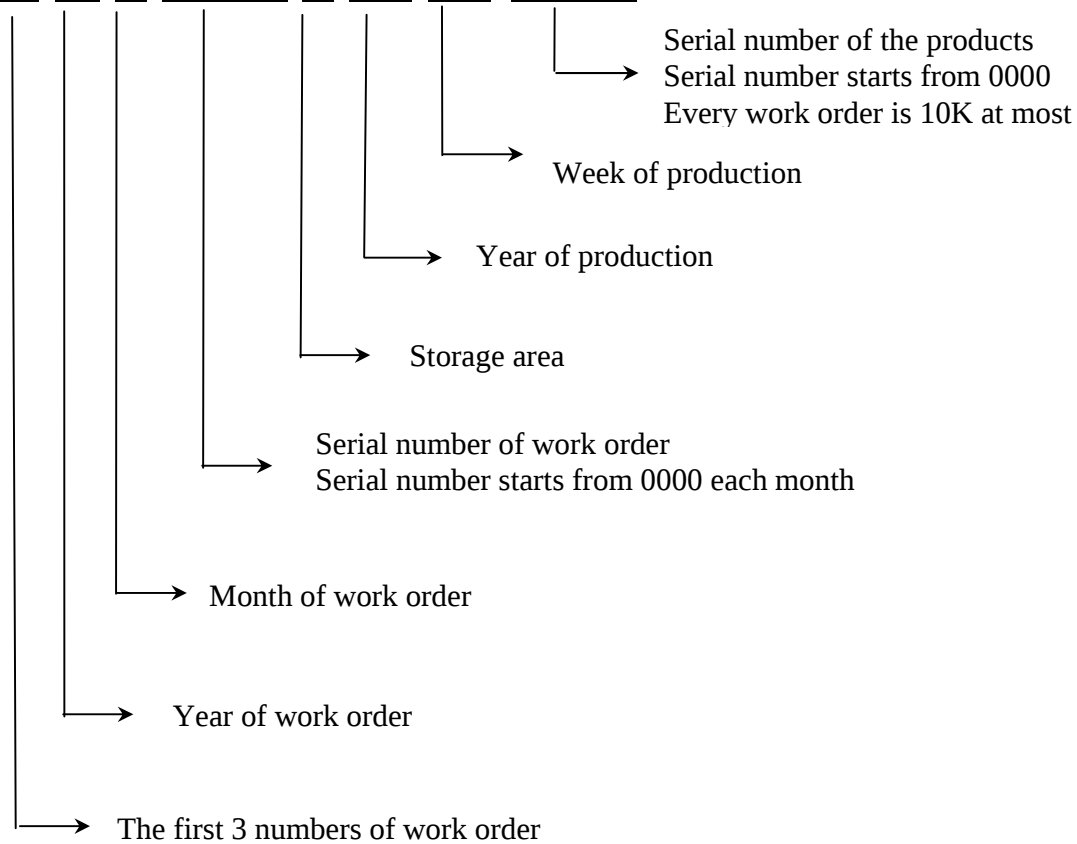
12. LCM PRODUCT LABEL DEFINE

Product Label style:

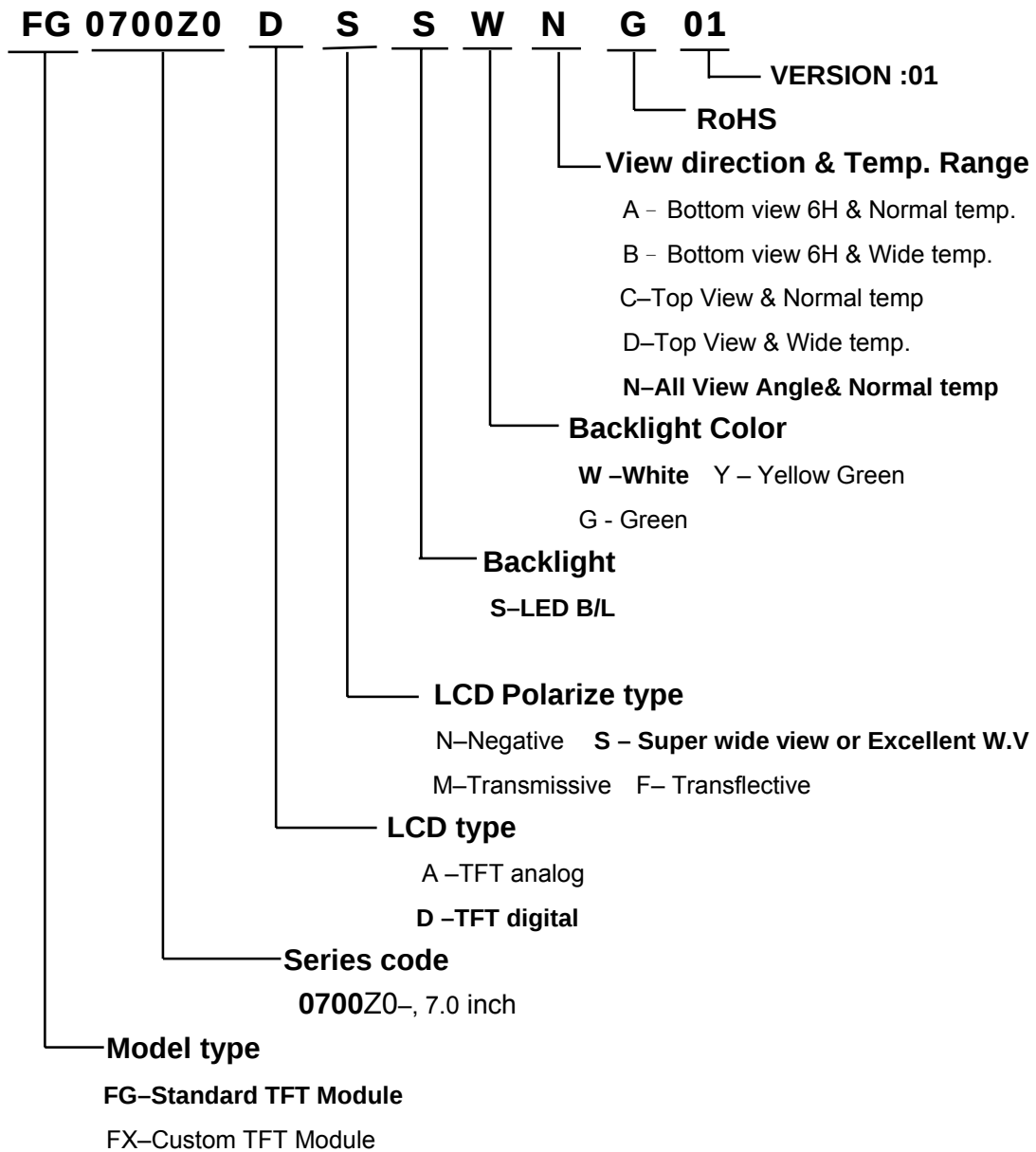


BarCode Define:

A A 6 0014 2 10 26-0013



Product Name Define:



13. 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.

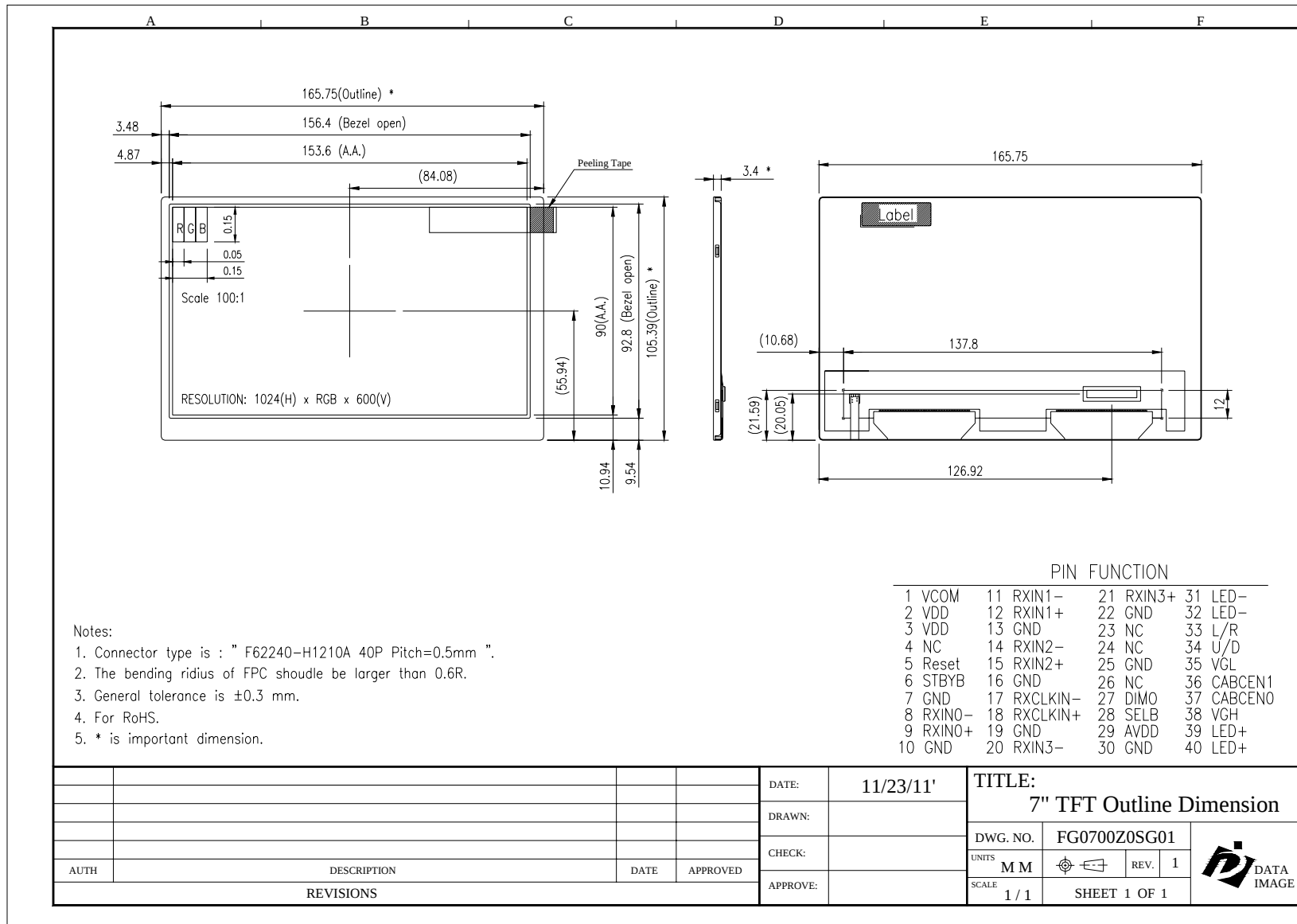
5. OTHERS

- (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.

14. OUTLINE DRAWING



16. PACKAGE INFORMATION

TBD