

# DATA IMAGE CORPORATION

## TFT Module Specification

Preliminary

ITEM NO.: FG07A0I0DSSWPG01

### Table of Contents

1. COVER & CONTENTS .....	1
2. RECORD OF REVISION .....	2
3. GENERAL SPECIFICATIONS .....	3
4. ABSOLUTE MAXIMUM RATINGS .....	3
5. ELECTRICAL CHARACTERISTICS .....	3
6. INPUT SIGNAL TIMING .....	5
7. OPTICAL CHARACTERISTIC .....	9
8. PIN CONNECTIONS .....	12
9. BLOCK DIAGRAM .....	15
10. QUALITY ASSURANCE .....	17
11. LCM PRODUCT LABEL DEFINE .....	21
12. PRECAUTIONS IN USE LCM .....	23
13. OUTLINE DRAWING .....	24
14. PACKAGE INFORMATION.....	25

Customer Companies	QA Approved	DQA Check	R&D Approved	R&D Check
				
Customer Approved by	Version:	Issued Date:	Total Pages:	Prepared
	1	03/AUG/17'	25	



### 3. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 480(V)	dot
Active Area	152.4(H) x 91.44(V)	mm
Pixel Pitch	0.1905 (H) x 0.1905 (V)	mm
Pixel Configuration	R.G.B Vertical Stripe	
Outline Dimension	165(W) x 104(H) x 8.4 <sub>MAX.</sub> (D)	mm
Back-light	LED	
Display mode	Normally Black	
Weight	165 MAX.	g
View Angle direction	All	

Our components and processes are compliant to RoHS standard

### 4. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	V <sub>CC</sub>	-0.3	4.5	V	GND=0
	V <sub>GH</sub>	-0.3	V <sub>GL</sub> +35.0		
	V <sub>GL</sub>	-15	0.3		AGND=0
	A <sub>VDD</sub>	-0.3	14.5		
	V <sub>COM</sub>	4.0	6.0		
Logic Signal Input Level	V <sub>I</sub>	-0.3	4.5		
Operating Temperature	T <sub>opa</sub>	-30	85	°C	
Storage Temperature	T <sub>stg</sub>	-40	95		

Note 1 : Permanent damage may occur to the LCD module if beyond this specification.  
 Functional operation should be restricted to the conditions described under normal operating conditions.

### 5. ELECTRICAL CHARACTERISTICS

#### 5.1 Operating Conditions

GND=AGND=0V

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	
	V <sub>GH</sub>	-	19	-		
	V <sub>GL</sub>	-	-10	-		
	A <sub>VDD</sub>	-	12.4	-		
V <sub>COM</sub>	V <sub>COM</sub>	-	5.5	-		
Input signal voltage	V <sub>iH</sub>	0.7* V <sub>CC</sub>	-	V <sub>CC</sub>		Note1
	V <sub>iL</sub>	0	-	0.3* V <sub>CC</sub>		
Current of power supply	I <sub>VCC</sub>	-	15	-	mA	V <sub>CC</sub> =3.3V, white pattern
	I <sub>AVDD</sub>	-	20	-		A <sub>VDD</sub> =12.5V, white pattern
	I <sub>VGH</sub>	-	0.25	-		V <sub>GH</sub> =19V, white pattern

	$I_{VGL}$	-	0.50	-		VGL=-10V, white pattern
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Note 1 : HSYNC, VSYNC, DE, Digital Data

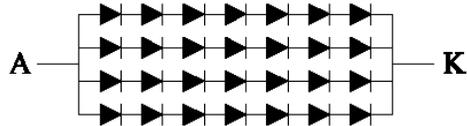
Note 2 : Be sure to apply the power voltage as the power sequence spec

Note 3 : GND=AGND=0V

### 5.2 Backlight Driving Consumption

Ta=25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED voltage	$V_L$	-	21.3	-	V	
LED current	$I_L$	-	160	-	mA	
LED dice Life Time		30000			hr	Note1



IF: 160mA(Typ.) ; VF: 21.3V(Typ.)

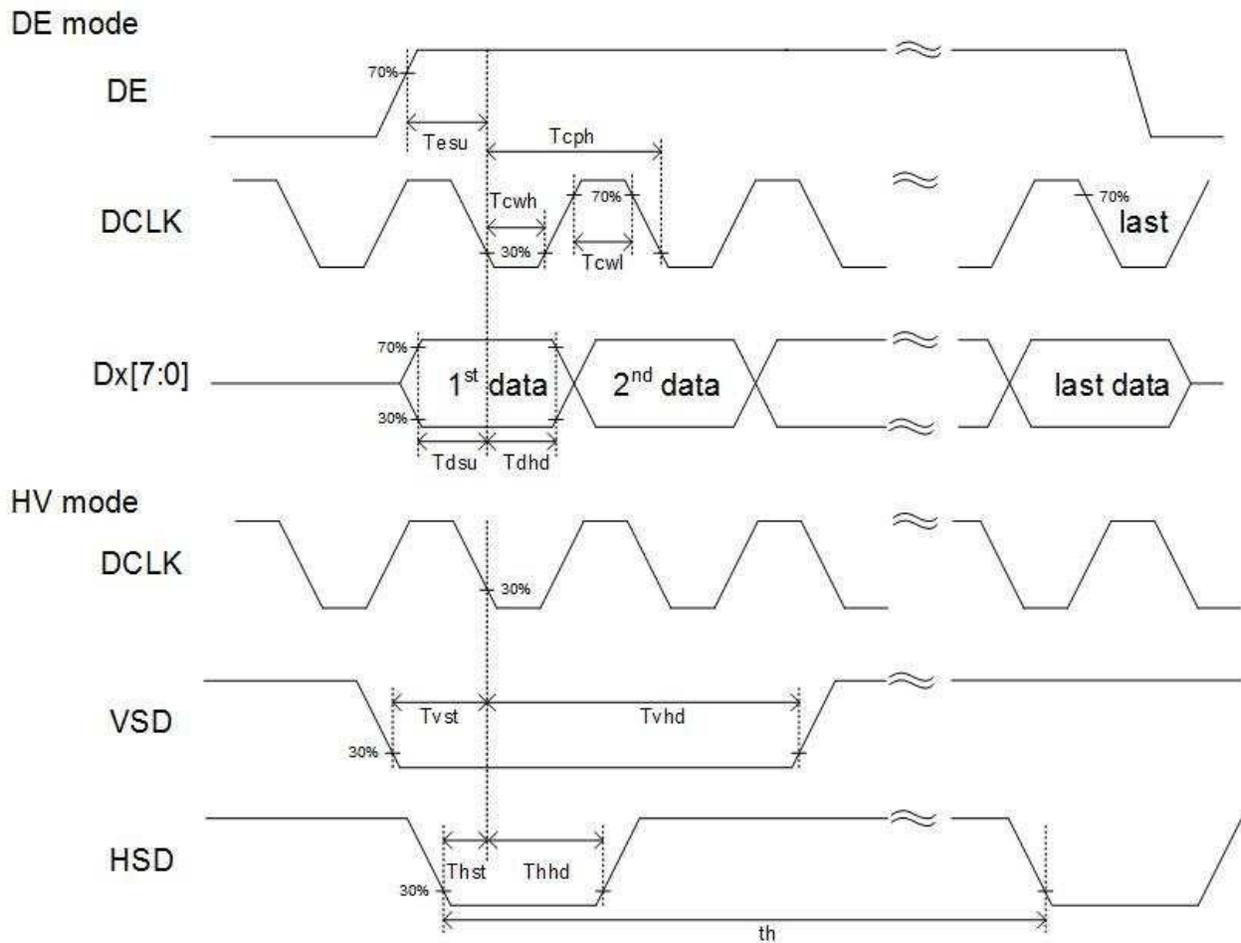
Note 1 : The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C. and IL=160mA. The LED lifetime could be decreased if operating IL is larger than 160mA. The constant current driving method is suggested.

## 6. INPUT SIGNAL TIMING

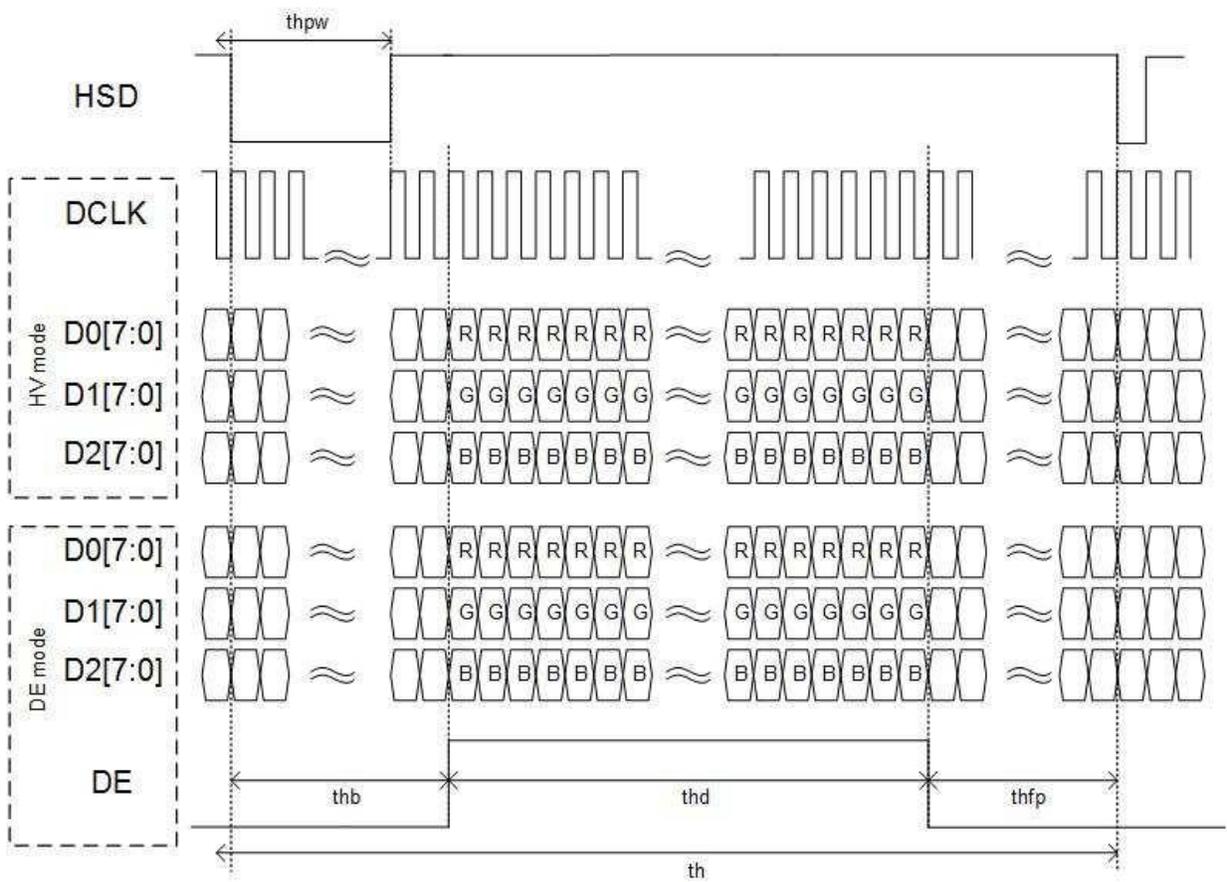
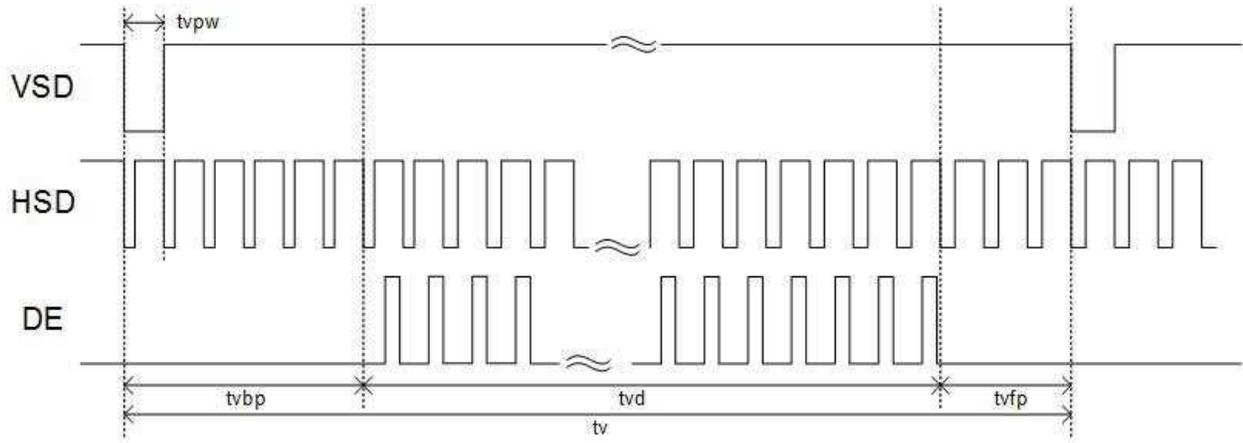
### 6.1 Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
DCLK cycle time	Tcph	20		220	ns		
DCLK pulse duty	Tcwh	35	50	65	%		
VSD setup time	Tvst	8			ns		
VSD hold time	Tvhd	8					
HSD setup time	Thst	8					
HSD hold time	Thhd	8					
Data setup time	Tdsu	8					
Data hold time	Tdhd	8					
DE setup time	Tesu	8					
DE hold time	Tehd	8					
DCLK frequency	fclk	28	30	32		MHz	
Horizontal display area	thd	1800				Tcph	
HSD period time	th	899	902	915			
HSD pulse width	thpw	5	10	15			
HSD back porch	thb	32					
HSD front porch	thfp	52	60	68			
Vertical display area	tvd	480			th		
VSD period time	tv	546	555	564			
VSD pulse width	tvpw	6	10	14			
VSD back porch	tvb	5					
VSD front porch	tvfp	55	60	65			

## 6.2 Timing Diagram of Interface Signal Input

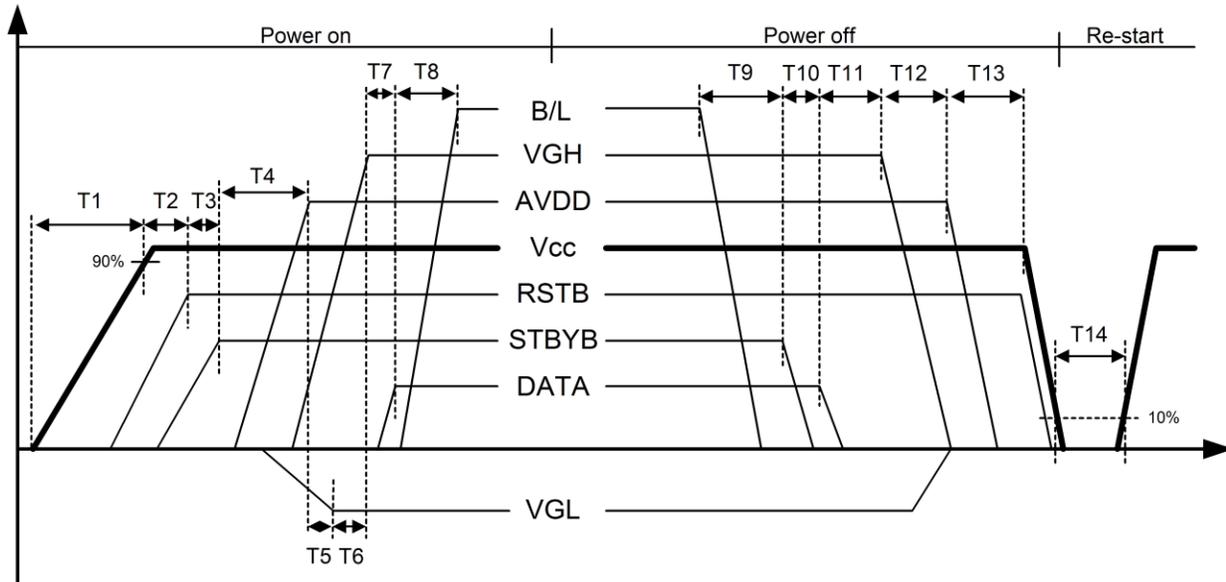


**Input clock and data timing diagram**



**Data Input Format**

### 6.3 Power Sequence



Item	Min.	Typ.	Max.	Unit
T1	-	-	20	ms
T2	1	-	-	
T3	1	-	-	
T4	50	-	-	
T5	32	-	-	
T6	16	-	-	
T7	16	-	-	
T8	32	-	-	
T9	32	-	-	
T10	32	-	-	
T11	50	-	-	
T12	16	-	-	
T13	32	-	-	
T14	1000	-	-	

### 7. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle	Horizontal	$\theta_{x+}$	Center CR $\geq$ 10	80	85	--	deg	Note 1,4
		$\theta_{x-}$		80	85	--		
	Vertical	$\theta_{y+}$		80	85	--		
		$\theta_{y-}$		80	85	--		
Contrast Ratio		CR	at optimized viewing angle	700	1000	--		Note 1,3
Response time		Tr + Tf	Center $\theta_x=\theta_y=0^\circ$	--	30	40	ms	Note 1,6
Uniformity		B-uni	$\theta_x=\theta_y=0^\circ$	70	80	--	%	Note1,5
Brightness		L	$\theta_x=\theta_y=0^\circ$	750	1000	--	cd/m <sup>2</sup>	Note 1,2
Chromaticity		$x_W$	Center $\theta_x=\theta_y=0^\circ$	Typ. -0.05	0.313	Typ. +0.05		Note 1,7
		$y_W$			0.329			
		$x_R$			TBD			
		$y_R$			TBD			
		$x_G$			TBD			
		$y_G$			TBD			
		$x_B$			TBD			
		$y_B$			TBD			

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance $\leq$ 1 lux, and at room temperature).

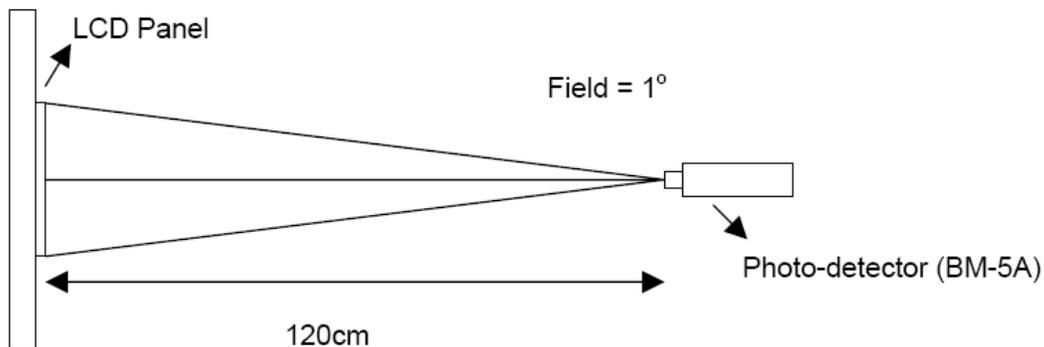
The operation temperature is 25°C $\pm$ 2°C.

LED current IL=160mA

15min warm-up time.

The measurement method is shown in Note1.

Note1: The method of optical measurement:

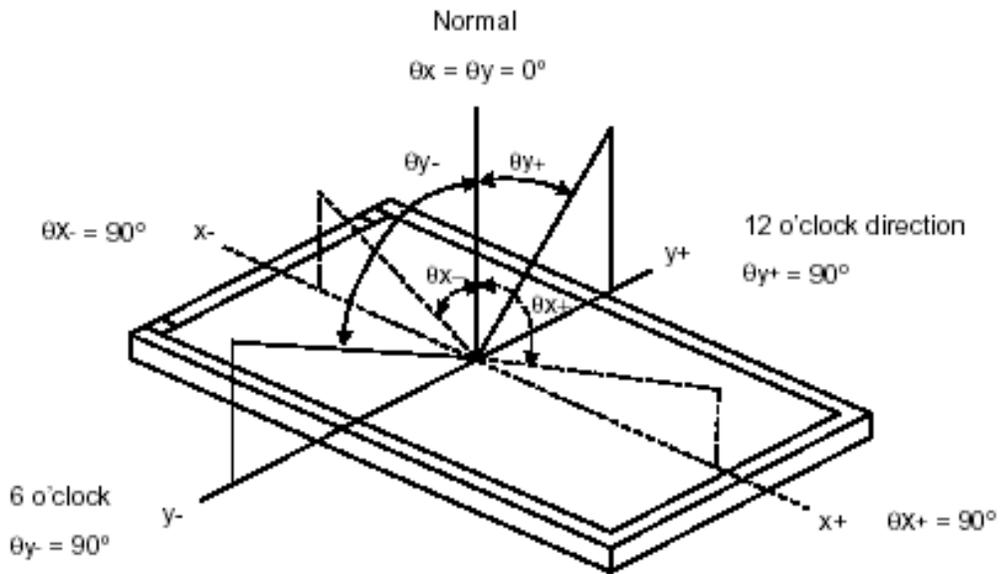


Note2: Measured at the center area of the panel and at the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

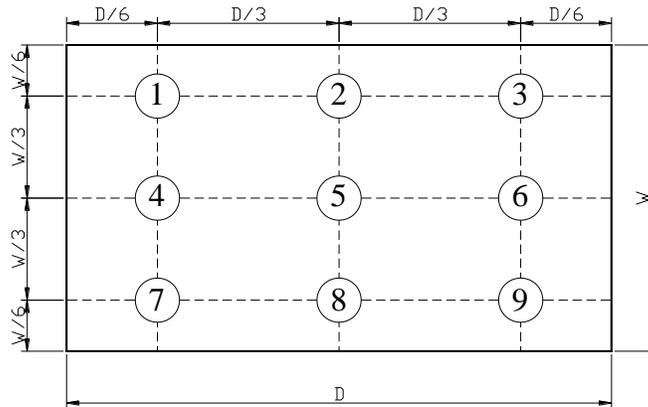
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



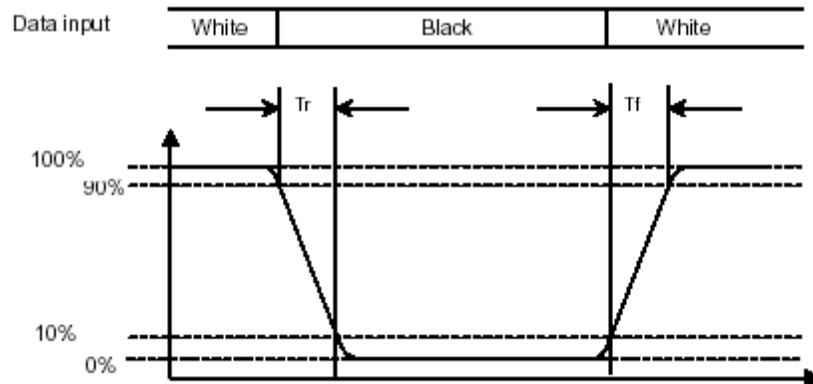
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad (\text{Note 5}).$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time ( $T_r$ )” and the “Falling Time ( $T_f$ )” respectively.  $T_r$  and  $T_f$  are defined as following figure.



Note 7: Definition of Chromaticity:

The color coordinates  $(x_W, y_W)$ ,  $(x_R, y_R)$ ,  $(x_G, y_G)$ , and  $(x_B, y_B)$  are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

## 8. PIN CONNECTIONS

### 8.1 LCM FPC Pin Function

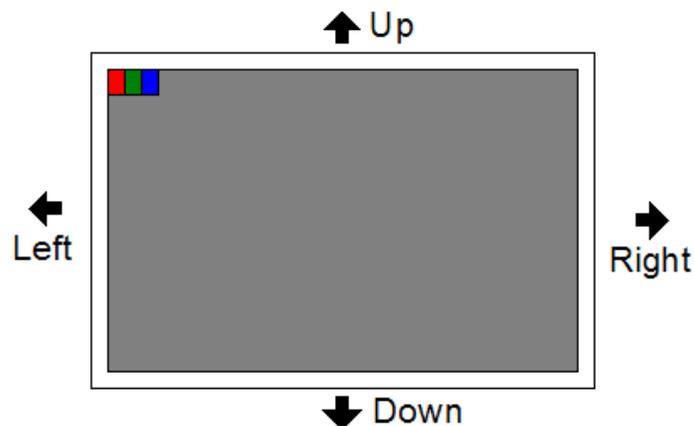
FPC matching connector : Hirose FH52-60S-0.5SH

Pin No	Symbol	Function	Remark
1	AGND	Analog Ground	
2	AVDD	Analog Power	
3	VCC	Digital Power	
4	R0	Data Input(LSB)	
5	R1	Data Input	
6	R2	Data Input	
7	R3	Data Input	
8	R4	Data Input	
9	R5	Data Input	
10	R6	Data Input	
11	R7	Data Input(MSB)	
12	G0	Data Input(LSB)	
13	G1	Data Input	
14	G2	Data Input	
15	G3	Data Input	
16	G4	Data Input	
17	G5	Data Input	
18	G6	Data Input	
19	G7	Data Input(MSB)	
20	B0	Data Input(LSB)	
21	B1	Data Input	
22	B2	Data Input	
23	B3	Data Input	
24	B4	Data Input	
25	B5	Data Input	
26	B6	Data Input	
27	B7	Data Input(MSB)	
28	DCLK	Clock Input	
29	DE	Data enable signal	
30	HSD	Horizontal sync input, Negative polarity	
31	VSD	Vertical sync input Negative polarity	
32	MODE	DE/SYNC mode select, normally pull low H : HV mode L : DE mode	
33	RSTB	Global reset pin, Normally pull high H : normal operation L : the controller is in reset state Suggest to connecting with an RC(10KΩ, 0.1μF) reset circuit for stability	
34	STBYB	Standby mode. Normally pull low. H: normal operation. L: the controller and source driver will turn off. Suggest to connecting with an RC (10KΩ, 0.47μF) reset circuit for stability	
35	SHLR	Left or Right Display Control. Note1	
36	VCC	Digital Power	

37	UPDN	Up / Down Display Control. Note1	
38	GND	Digital Ground	
39	AGND	Analog Ground	
40	AVDD	Analog Power	
41	VCOM	For external VCOM DC input	
42	N/C	Not connect	
43	BIST	Aging mode on/off control. Please float this pin.	
44	N/C	Not connect	
45	N/C		
46	N/C		
47	N/C		
48	CSB	Serial communication chip selection. Please float this pin	
49	SCL	Serial communication clock pin. Please float this pin	
50	SDO	Serial communication data out pin. Please float this pin	
51	SDI	Serial communication data pin. Please float this pin	
52	N/C	Not connect	
53	VPP_T	Power supply for trim function. Please float this pin	
54	N/C	Not connect	
55	N/C		
56	VGH	Positive Power for TFT	
57	VCC	Digital Power	
58	VGL	Negative Power for TFT	
59	GND	Digital Ground	
60	N/C	Not connect	

Note1 : SHLR and UPDN control function

SHLR	UPDN	Data shifting
H	H	Left→Right, Up→Down
L	H	Right→Left, Up→Down
L	L	Right→Left, Down→Up
H	L	Left→Right, Down→Up

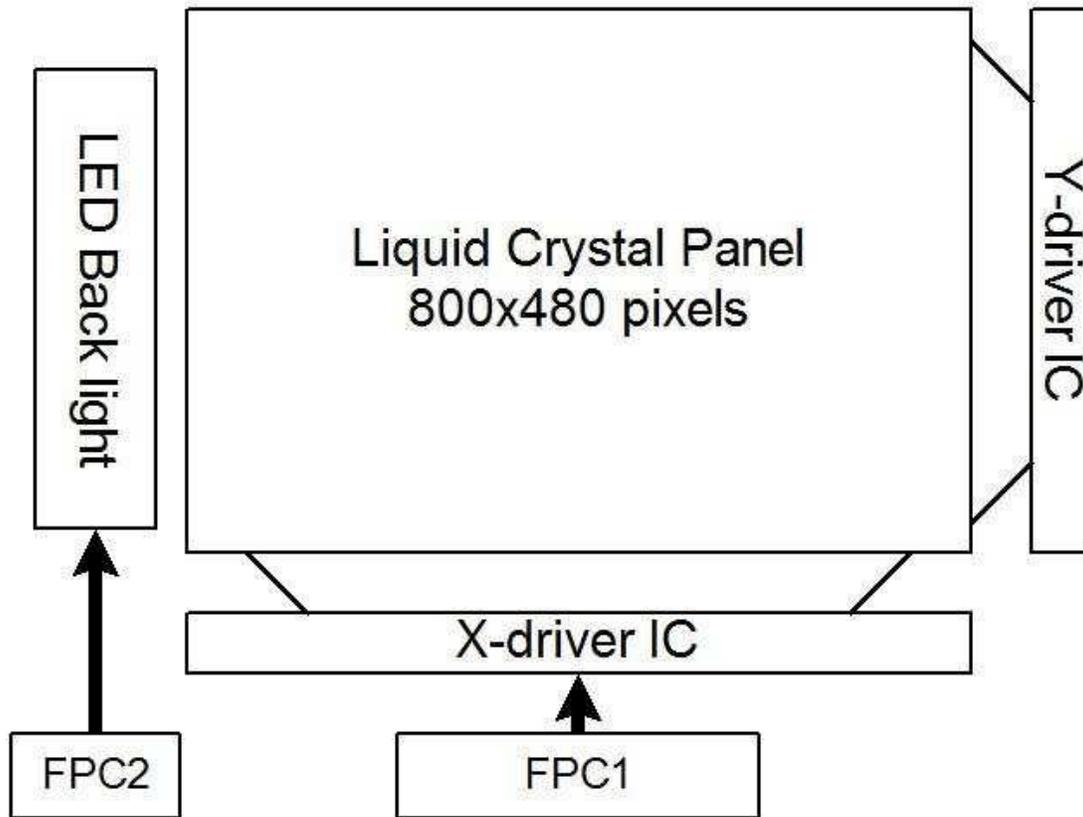


**8.2 B/L Pin Define**

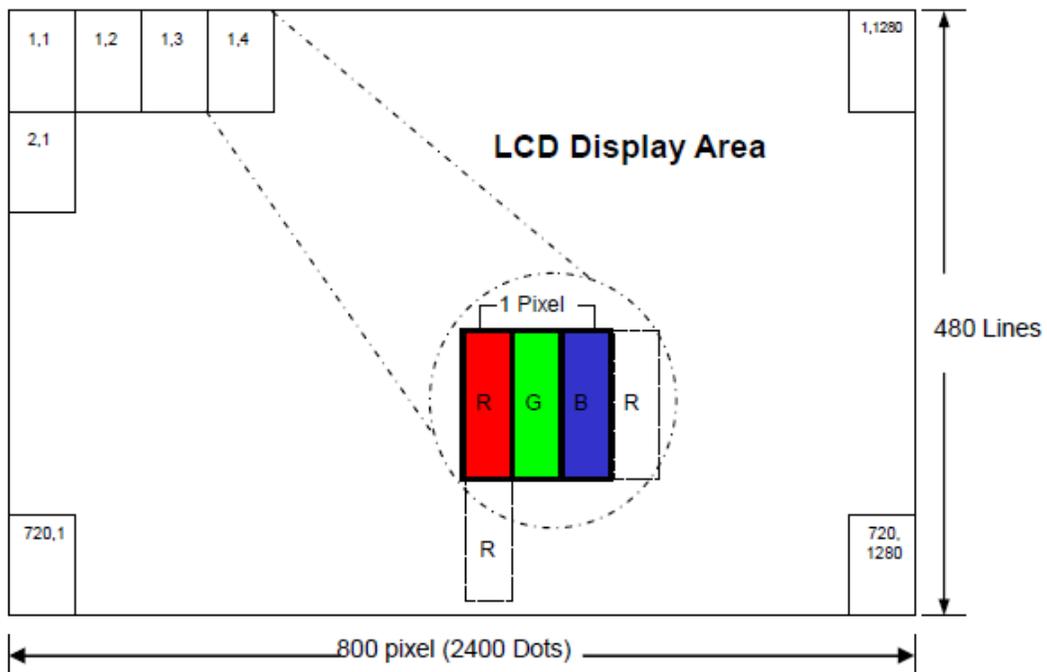
FPC matching connector : FH19SC-10S-0.5SH

Pin No	Symbol	Function	Remark
1	A	Anode	
2	A		
3	A		
4	NC	No Connect	
5	K1	Cathode 1	
6	K2	Cathode 2	
7	K3	Cathode 3	
8	K4	Cathode 4	
9	NC	No Connect	
10	NC		

### 9. BLOCK DIAGRAM



### Pixel Format



**Relationship Between Displayed Color and Input**

	Display	MSB				LSB				MSB				LSB				Gray scale Level								
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0		B7	B6	B5	B4	B3	B2	B1	B0
Basic color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	Light Blue	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Purple	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-	
Gray scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251
	Light	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L252
		H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L253
		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L254
Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	Red L255	
Gray scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251
	Light	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L252	
		L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L253	
		L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L254	
Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	Green L255		
Gray scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251
	Light	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L252
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	L	L253
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L254
Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	Blue L255	
Gray scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L1	
		L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L2	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251	
	Light	H	H	H	H	H	H	L	L	H	H	H	H	H	L	L	H	H	H	H	H	L	L	L	L252	
		H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	L	L253	
		H	H	H	H	H	H	H	L	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	L254	
White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L255		

## 10. QUALITY ASSURANCE

### 10.1 Test Condition

#### 10.1.1 Temperature and Humidity (Ambient Temperature)

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

Humidity :  $65 \pm 5\%$

#### 10.1.2 Operation

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

#### 10.1.3 Container

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

#### 10.1.4 Test Frequency

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

#### 10.1.5 Test Method

No.	Reliability Test Item & Level	Test Level	Remark
1	High Temperature Storage Test	T=95°C,1000hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-40°C,1000hrs	IEC68-2-1
3	High Temperature Operation Test	T=85°C,1000hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-30°C,1000hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,1000hrs	IEC68-2-3
6	Thermal Cycling Test	-40°C → +85°C,1000hrs 30 min	IEC68-2-14
7	Vibration Test	1.Random: 1.04G, 5~500Hz, XYZ, 30min/each direction 2.Sine: Freq. Range: 8~33.3Hz, Stoke: 1.3mm Sweep: 2.9G, 33.3~400Hz X/Z: 2hrs, Y:4hrs	IEC68-2-6
8	Shock test	Half-Sine, 100G, 6ms, ±XYZ, 1time	IEC68-2-27
9	Drop test(with carton)	Drop height condition, basis on the product weight and Follow QB100-0027 1 corner, 3 edges, 6 surfaces	IEC68-2-32
10	Vibration (with carton)	Random: 0.015G <sup>2</sup> /Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ each direction 2hrs	IEC68-2-32
11	ESD test	±200V,200pF(0_) 1 time/each termina	IEC61000-4-2

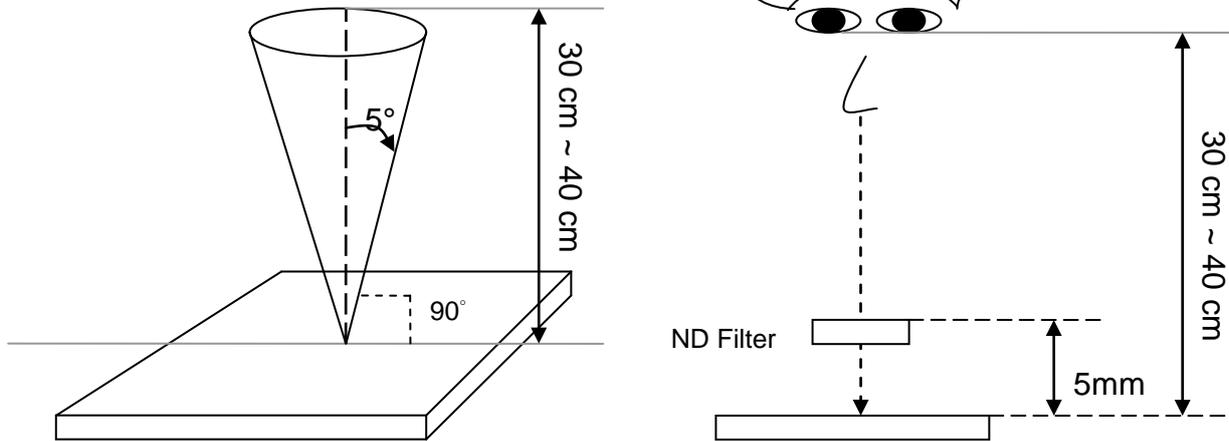
## 10.2 Inspection condition

### 10.2.1 Inspection conditions

10.2.1.1 Inspection Distance:  $35 \pm 5$  cm

10.2.1.2 View Angle:

- (1) Inspection under operating condition :  $\pm 5^\circ$
- (2) Inspection under non-operating condition :  $\pm 45^\circ$



10.2.1.3 Environment conditions:

Ambient Temperature :		$25 \pm 5^\circ\text{C}$
Ambient Humidity :		$65 \pm 5\%$
Ambient Illumination	Cosmetic Inspection	More than 600lux
	Functional Inspection	300 ~ 800lux

10.2.2 Definition of applicable Zones



### 10.3 Inspection Parameters

No.	Parameter	Criteria																							
1	Operating	Display function: No Display malfunction (Major)																							
		Contrast ratio (Black, White): Does not meet specified range in the spec. (Major) (Note:3)																							
		Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)																							
		Point Defect (Red, green, blue, dark): Active area $\leq 2$ dots (Minor)(Note:1)																							
		<table border="1"> <thead> <tr> <th>Item</th> <th>Acceptable number</th> <th>Total</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td>Bright</td> <td></td> <td rowspan="2">2</td> <td rowspan="4">Minor</td> <td rowspan="4">1.5</td> </tr> <tr> <td>Dark</td> <td></td> </tr> <tr> <td>Adjacent Bright</td> <td>0</td> <td>0</td> </tr> <tr> <td>Adjacent Dark</td> <td>1</td> <td>1</td> </tr> <tr> <td colspan="5" style="text-align: center;">distance <math>\geq 50</math>mm</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Class Of Defects	AQL Level	Bright		2	Minor	1.5	Dark		Adjacent Bright	0	0	Adjacent Dark	1	1	distance $\geq 50$ mm				
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Non-uniformity: Visible through 6%ND filter white, R, G, B and gray 50%pattern. (Minor)																									
Foreign material in Black or White spots shape ( $W > 1/4L$ ) (Note: 5)																									
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$L$ : Length $W$ : Width * : Disregard																									
2	External Inspection (non-operating)	Dimension: Outline (Major)																							
		Bezel appearance: uneven (Minor)																							
		Polarizer flaw or leak out resin : Defect is defined as active area.																							
		Scratch on the polarize (Note:2)																							
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Dent and spots shape on the polarize (Note:2): (Note: 5)																									
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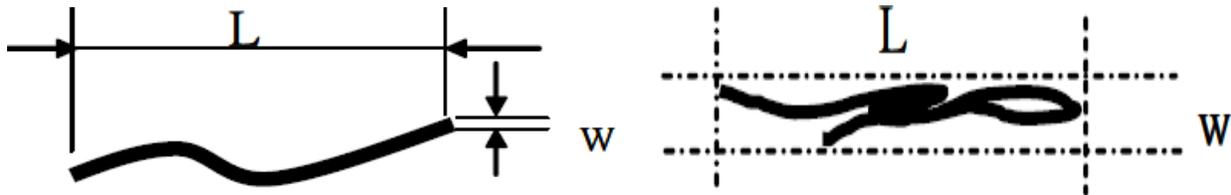
Class of defects	Major	AQL 0.65	Definition
			Minor
			It is a defect that will not result in functioning problem with deviation classified.

Note:1.(a)Bright point defect is defined as point defect of R,G,B with area >1/2 dot respectively  
 (b)Dark point defect is defined as visible in full white pattern.  
 (c)The point defect must under 2% ND Filter visible .

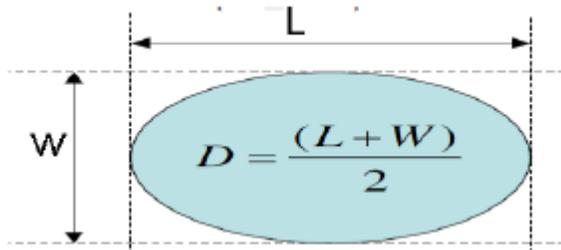
Note:2 The external inspection should be conducted at the distance  $35 \pm 5$ cm between the eyes of inspector and the panel .

Note:3 Luminance measurement for contrast ratio is at the distance  $50 \pm 5$ cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note:4 W-Width in mm , L-length of Max.(L1,L2) in mm.



Note:5 Spot Foreign Material ( $W \geq L/4$ )



#### 10.4 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

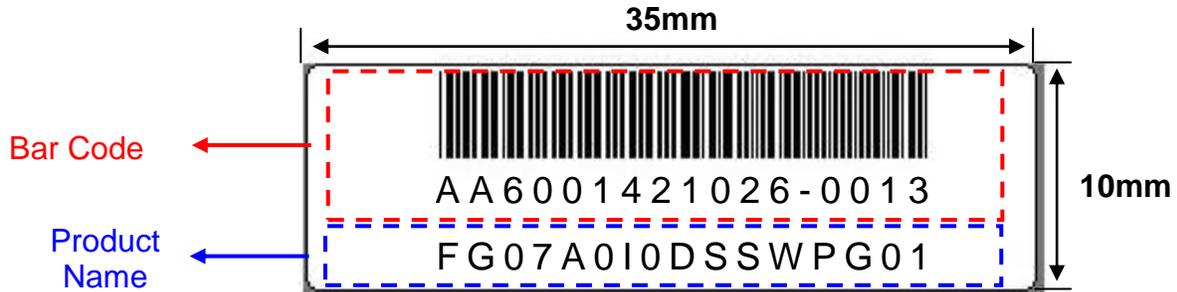
Sampling type: normal inspection, single sampling

Sampling table: ISO2859

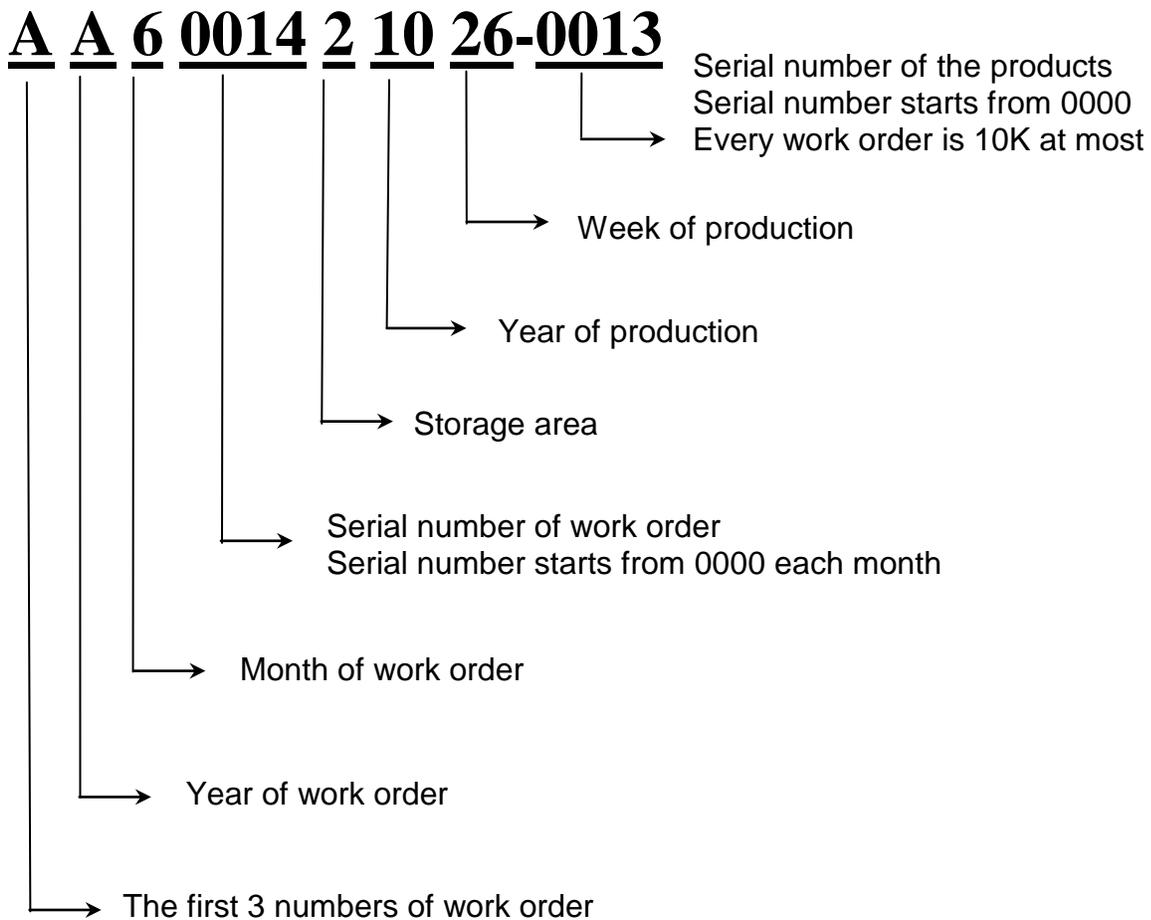
Inspection level: Level II

## 11. LCM PRODUCT LABEL DEFINE

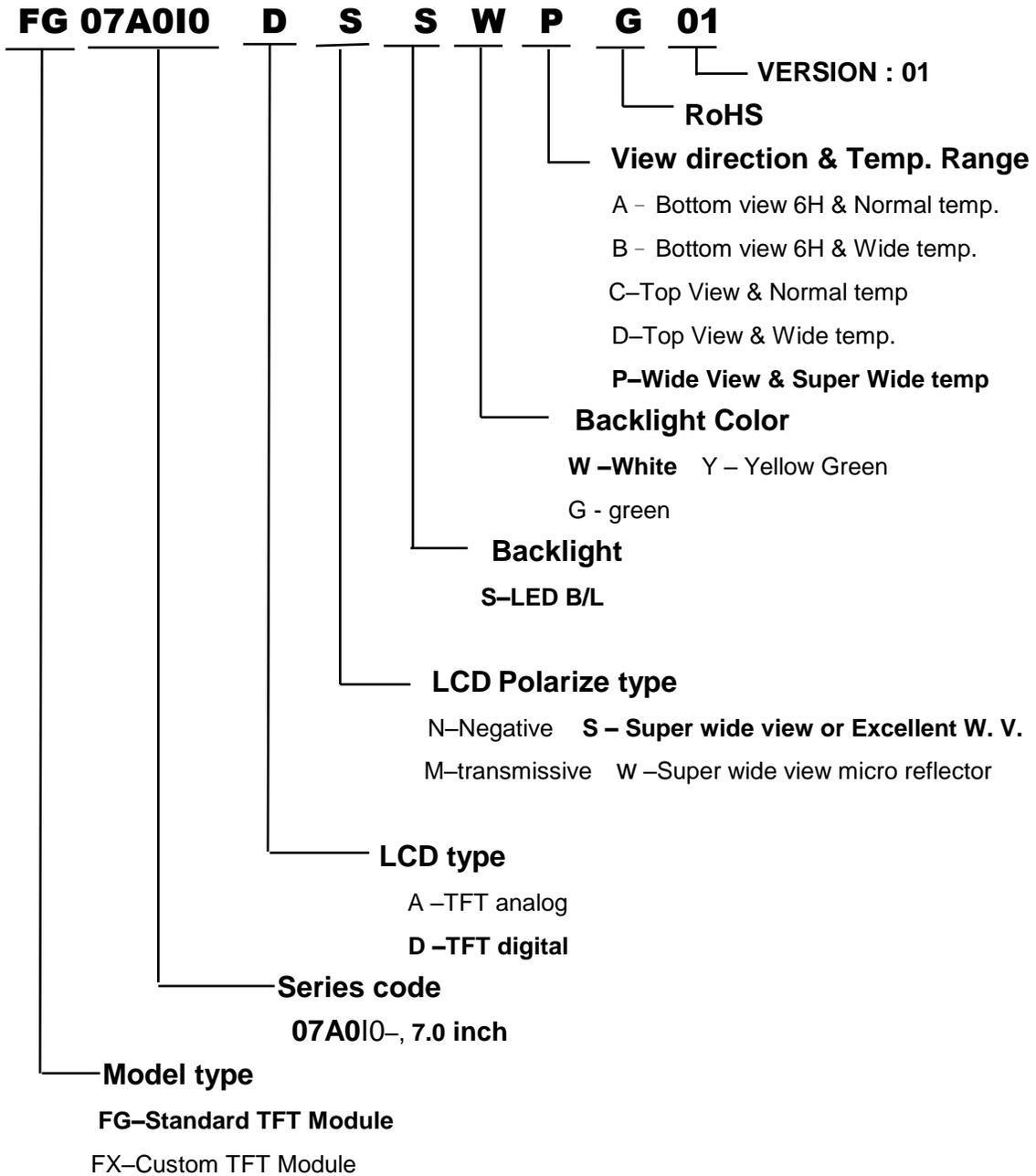
### Product Label style:



### BarCode Define:



**Product Name Define:**



## 12. PRECAUTION FOR USING 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

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.

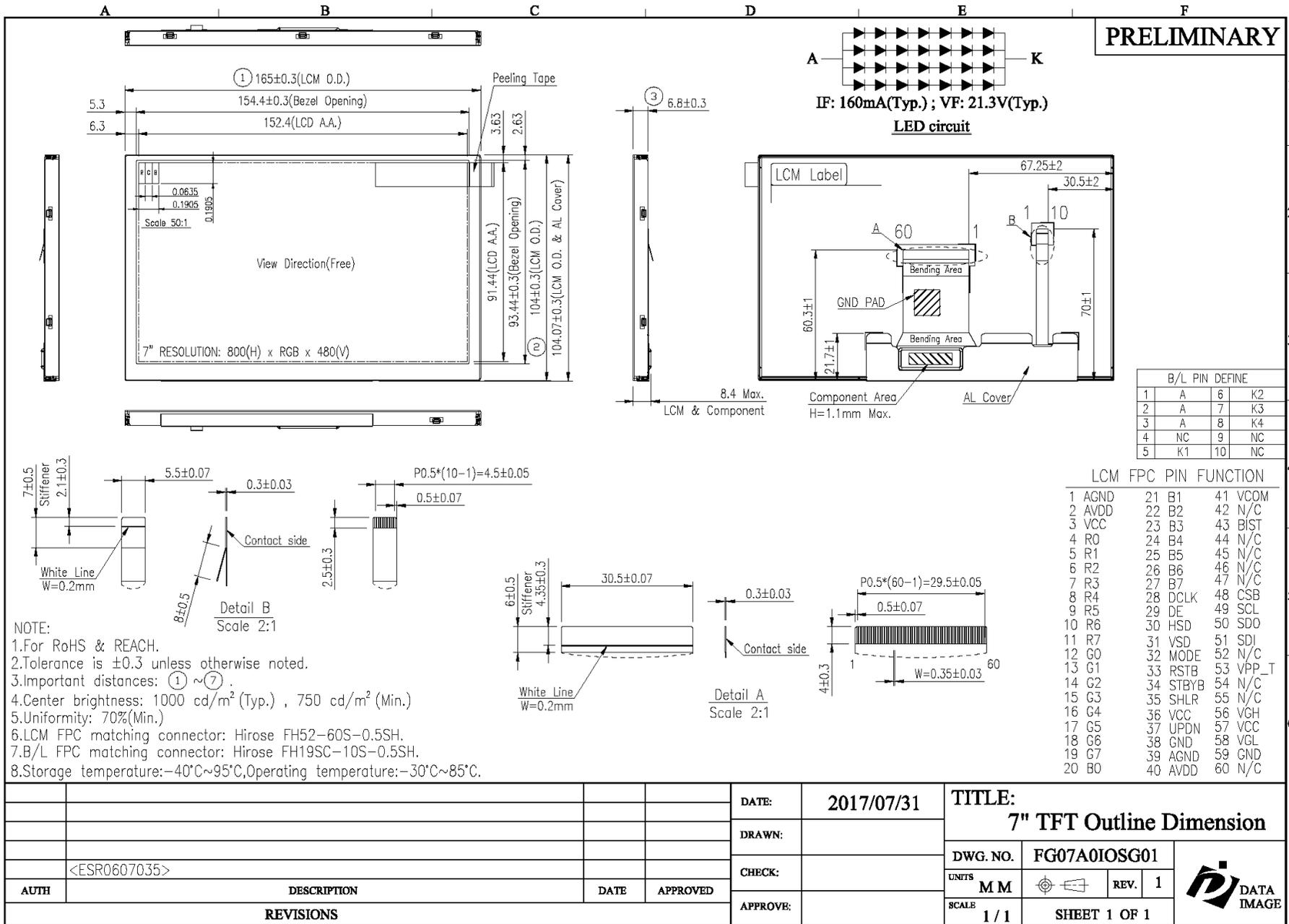
### 5. OTHERS

- (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.)
- (4) Waste  
Liquid crystal module products shall not be arbitrarily discarded; the water and soil have a negative impact on the environment, the need to be handled by a qualified unit.

### 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.

### 13. OUTLINE DRAWING



## 14. PACKAGE INFORMATION

TBD