



# SOLUTIONS

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## TFT-Display Datasheet

# FG080430DSSWDG01 | DataImage

### Features

■ Active Screen Area	170.4x127.8 [mm]
■ Size   Format	8,4"   4:3
■ Resolution	800x600
■ Backlight	LED
■ Brightness	380 cd/m <sup>2</sup>
■ LED Life Time	20K (h)
■ Interface	RGB
■ Viewing Angle	L/R 75/75 - U/D 70/60
■ Touchscreen	no
■ Power Supply	3.3V [Typ.]
■ Module Outline	189.75x149.4x5.0 [mm]
■ Operation Temperature	-20... + 70°C
■ Storage Temperature	-30... + 80°C

### Contact

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# DATA IMAGE CORPORATION

## TFT Module Specification

Preliminary

ITEM NO.: FG080430DSSWDG01

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Customer Companies	QA Approval	DQA Check	R&D Approval	R&D Check
	<i>pretty</i>	<i>Andy</i>	<i>Bing</i>	<i>Shone</i>
Customer Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
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### 3. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	8.4 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 600(V)	dots
Active Area	170.4(H) x 127.8 (V)	mm
Pixel Pitch	0.213 (H) x 0.213 (V)	mm
Pixel Configuration	R.G.B.-Stripe	
Outline Dimension	189.75(W) x 149.4(H) x 5(D)	mm
Surface treatment	Anti-glare	
Back-light	LED Side-light type.	
Display mode	Normally white	
Weight	TBD	g
View Angle direction	12 o'clock	
Our components and processes are compliant to RoHS and REACH standard		

### 4. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V <sub>CC</sub>	-0.3	5.0	V	GND=0
	AV <sub>DD</sub>	-0.5	15	V	AGND=0
	V <sub>COM</sub>	0	6	V	
Logic Signal Input Level	V <sub>I</sub>	-0.3	V <sub>CC</sub> +0.3	V	
Operating Temperature	T <sub>opa</sub>	-20	70	°C	
Storage Temperature	T <sub>stg</sub>	-30	80	°C	

### 5. ELECTRICAL CHARACTERISTICS

#### 5.1 AC Characteristics

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V <sub>CC</sub>	+3.0	+3.3	+3.6	V	
	V <sub>GH</sub>	14	15	16	V	
	V <sub>GL</sub>	-8	-7	-6	V	
	AV <sub>DD</sub>	9.85	10	10.15	V	
Power Supply Current	ICC	-	7.4	-	mA	V <sub>CC</sub> =3.3V
	I <sub>ADD</sub>	-	32.8	-	mA	AV <sub>DD</sub> =10V
	I <sub>GH</sub>	-	0.281	-	mA	V <sub>GH</sub> =15V
	I <sub>GL</sub>	-	0.569	-	mA	V <sub>GL</sub> =-7V
V <sub>COM</sub>	V <sub>COM</sub>	3.96	4.16	4.36	V	
Input signal voltage	V <sub>iH</sub>	0.7V <sub>CC</sub>	-	V <sub>CC</sub>	V	Note 1
	V <sub>iL</sub>	0	-	0.3V <sub>CC</sub>	V	
Input level of V1~V5	V <sub>x</sub>	AV <sub>DD</sub> /2	--	AV <sub>DD</sub> -0.1		
Input level of V6~V10	V <sub>x</sub>	0.1	--	AV <sub>DD</sub> /2		

Note (1): HSYNC, VSYNC, DE, Digital Data

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

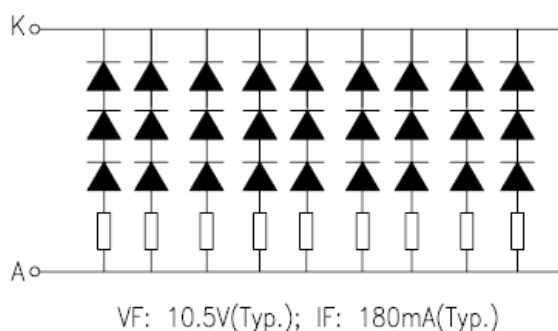
Note (3): DGND=AGND=0V

## 5.2 Backlight unit

Item	Symbol	MIN.	TYP.	MAX.	Unit	Note
LED current	IL	-	180	-	mA	Note 1
LED voltage	VL	-	10.5	-	V	
Operating LED life time	Hr	20000	-	-	Hour	Note 1,2

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:  $T_a=25\pm 3\text{ }^\circ\text{C}$ , typical IL value indicated in the above table until the brightness becomes less than 50%.

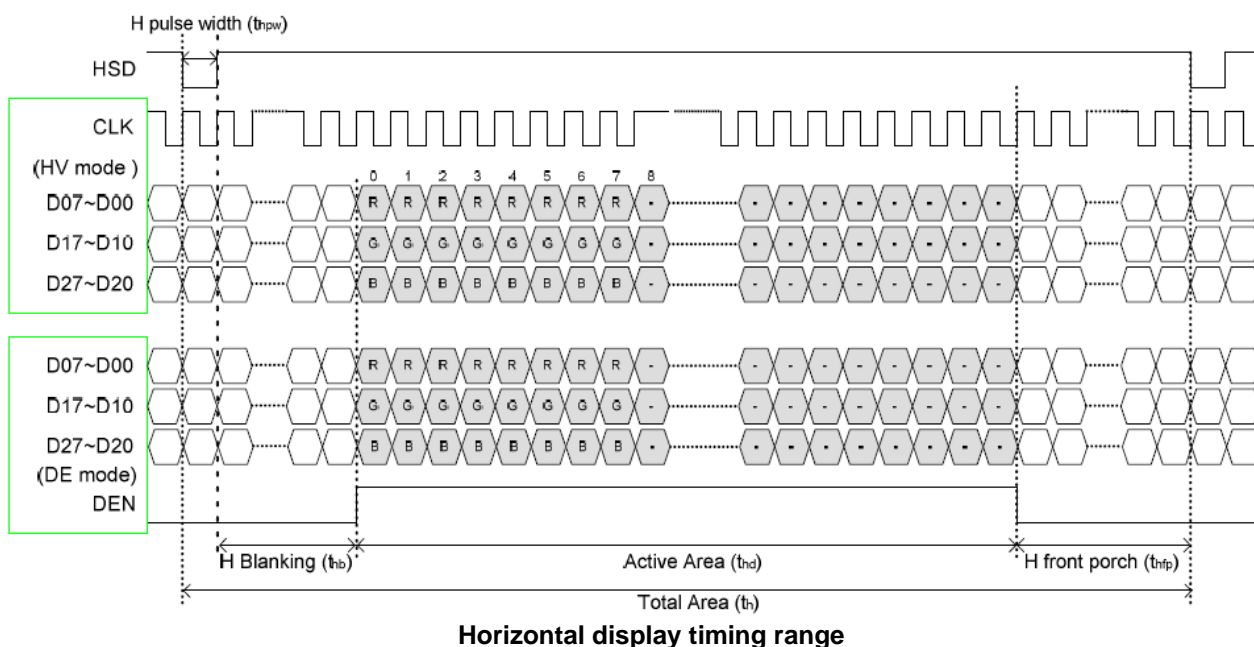
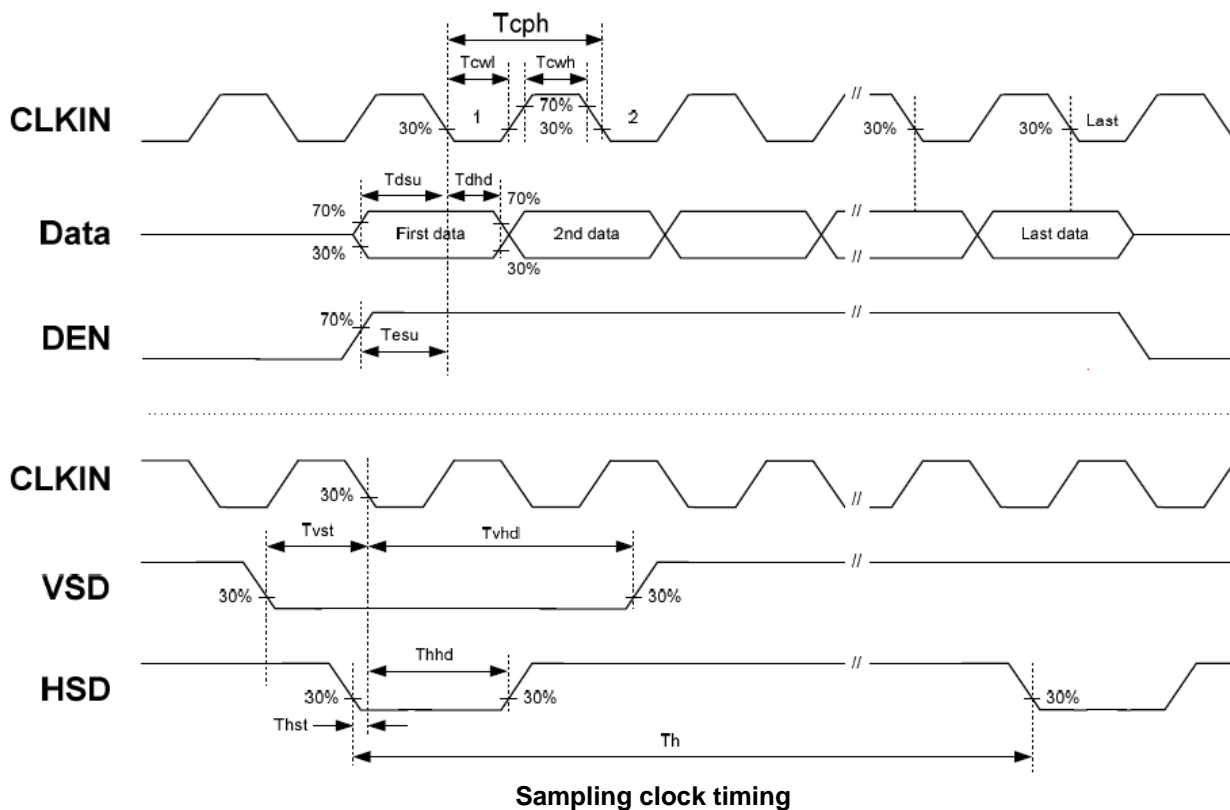
Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $T_a=25\text{ }^\circ\text{C}$  and  $I_L=180\text{mA}$ . The LED lifetime could be decreased if operating  $I_L$  is larger than 180mA. The constant current driving method is suggested.

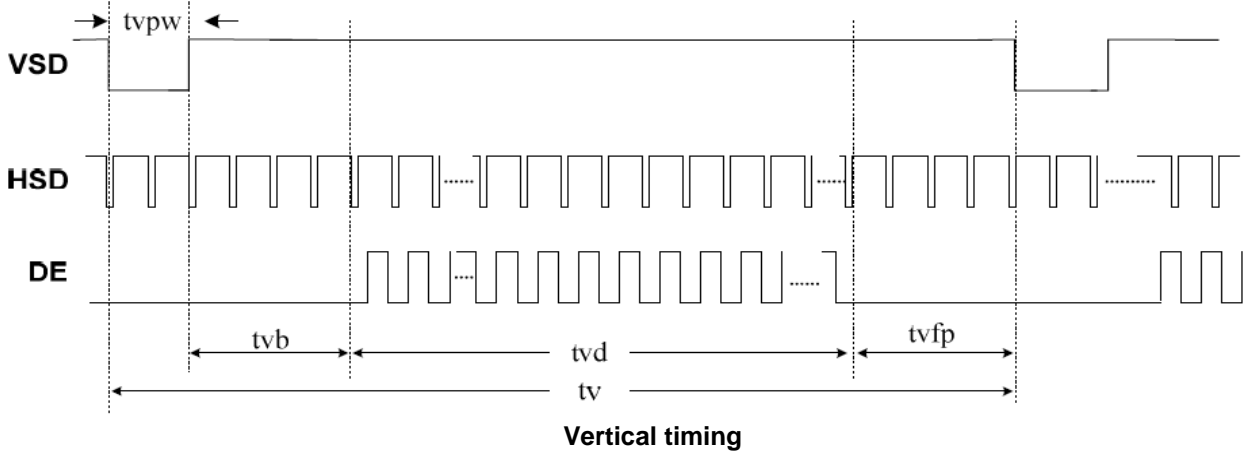


## 6. TIMING CHARACTERISTICS

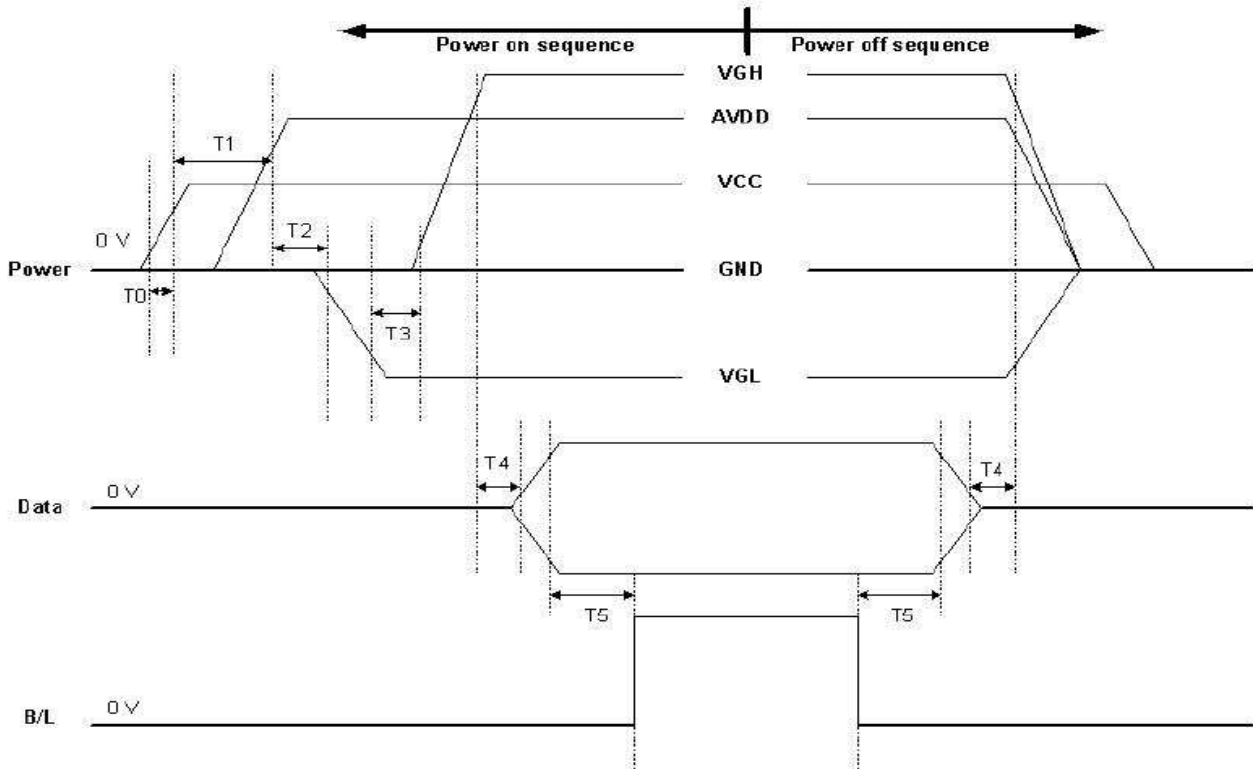
### 6.1 AC Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20			ns	
DCLK frequency	fclk		40	50	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		1000		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		40		Tcph	
HSD front porch	thfp		112		Tcph	
Vertical display area	tvd		600		th	
VSD period time	tv		660		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		39		th	
VSD front porch	tvfp		18		th	

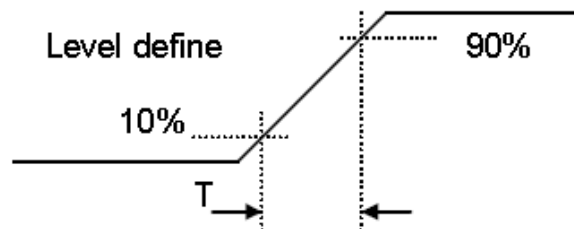
**6.2 Timing Controller Timing Chart**




### 6.3 Power Sequence



Item	Min.	Typ.	Max.	Unit
T0	0.5	--	20	msec
T1	16			msec
T2	0			msec
T3	20			μsec
T4	10		50	msec
T5	50			msec



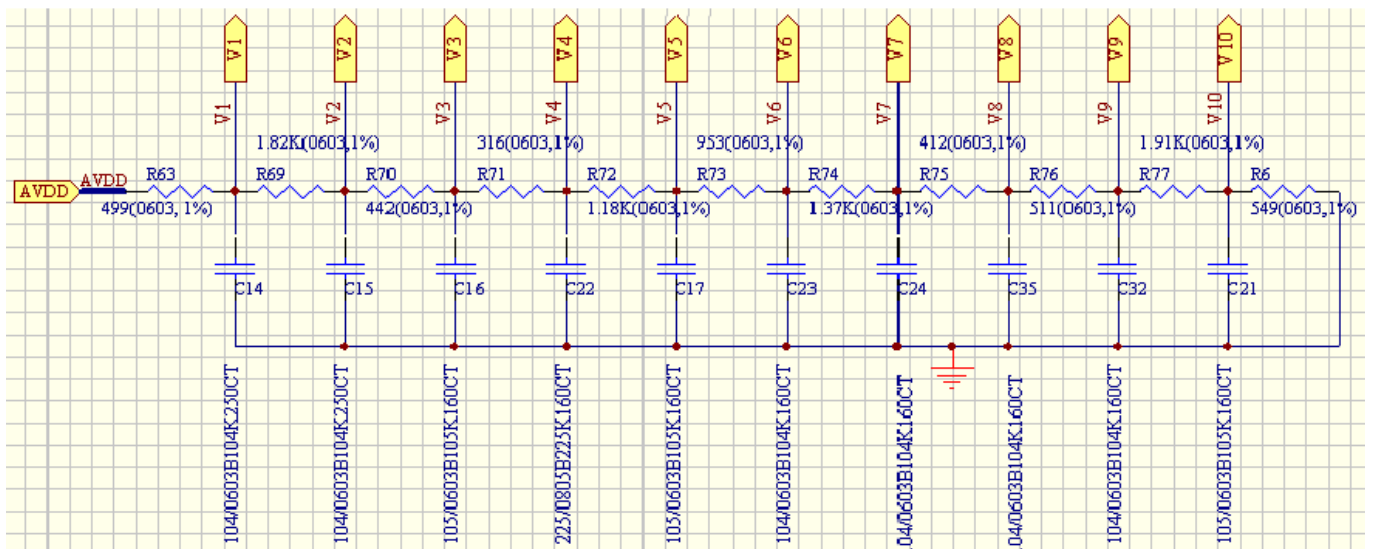
Power On Sequence: VCC-> AVDD -> VGL -> VGH -> Data -> B/L

Power Off Sequence: B/L-> Data -> VGH -> VGL -> AVDD -> VCC

Notes: Data include R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, SHLR, UPDN, DE MODE, RSTB, STBYB, SHLR, UPDN, DITH

#### 6.4 Gamma Circuit

9.499V 7.672V 7.228V 6.911V 5.727V 4.77V 3.395V 2.981V 2.468V 0.551V





### 7. OPTICAL CHARACTERISTIC

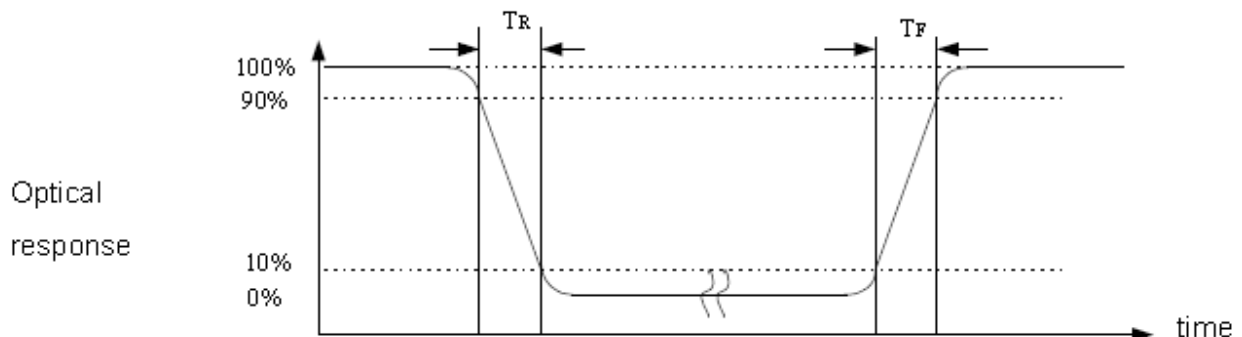
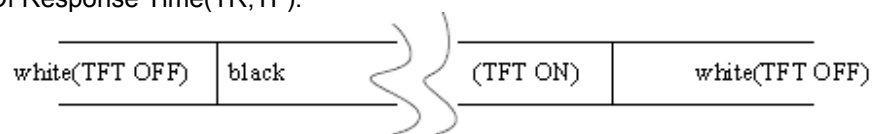
Ta=25°C

Parameter	Symbol	Conditions	Specifications				Remark	
			Min.	Typ.	Max.	Unit		
Response Time	TF	T=0	-	2	4	ms	Note 2	
	TR		-	6	12	ms		
Contrast Ratio	CR		480	600	-	ms	Note 1	
Chromaticity	White	Viewing Normal Angle $\theta_x=\theta_y=0^\circ$	XW	0.240	0.290	0.340	-	Note 4
			YW	0.250	0.300	0.350	-	
Viewing Angle	Hor.	Viewing Normal Angle $\theta_x=\theta_y=0^\circ$ CR $\geq$ 10	$\theta_L$	65	75	-	Deg.	Note 3
			$\theta_R$	65	75	-		
	Ver.		$\theta_U$	60	70	-		
			$\theta_D$	50	60	-		
Luminance	L	PWM=100%	300	380	-	cd/m2		
Luminance uniformity	YU		70	80	-	%	Note 5	

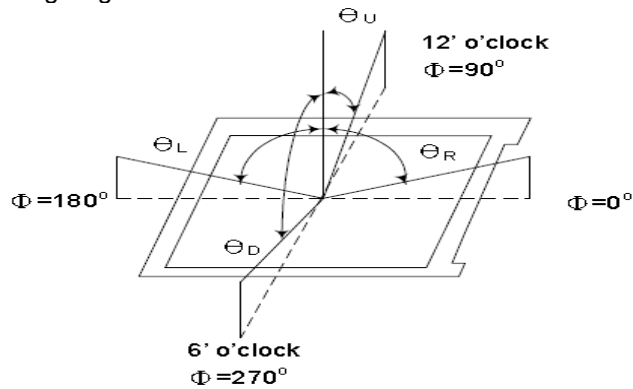
Note 1: Definition of Contrast Ratio(CR) :  
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

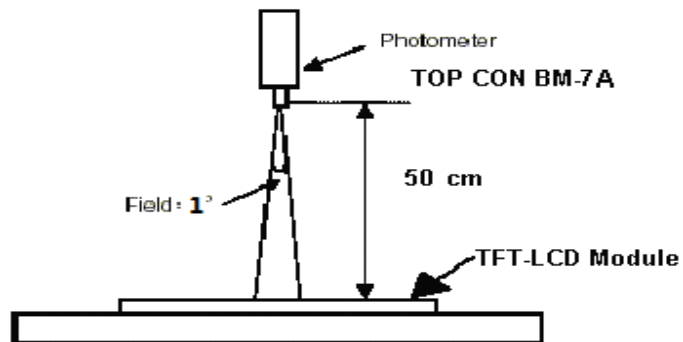
Note 2: Definition Of Response Time(TR,TF):



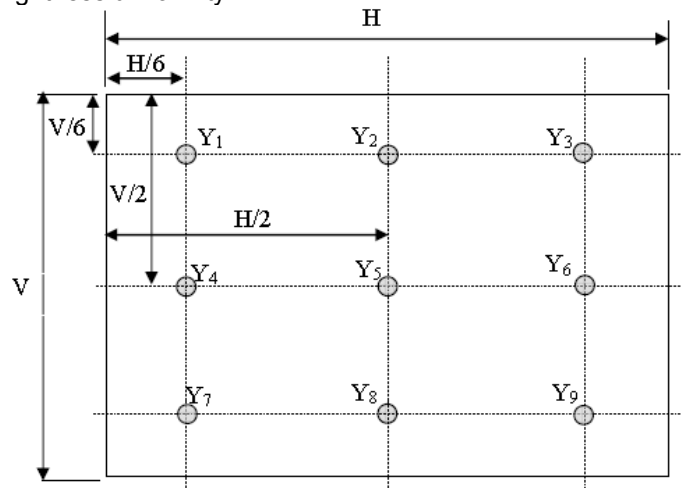
Note 3: Definition Of Viewing Angle



Note 4: Definition of optical measurement setup



Note 5: Definition of brightness uniformity



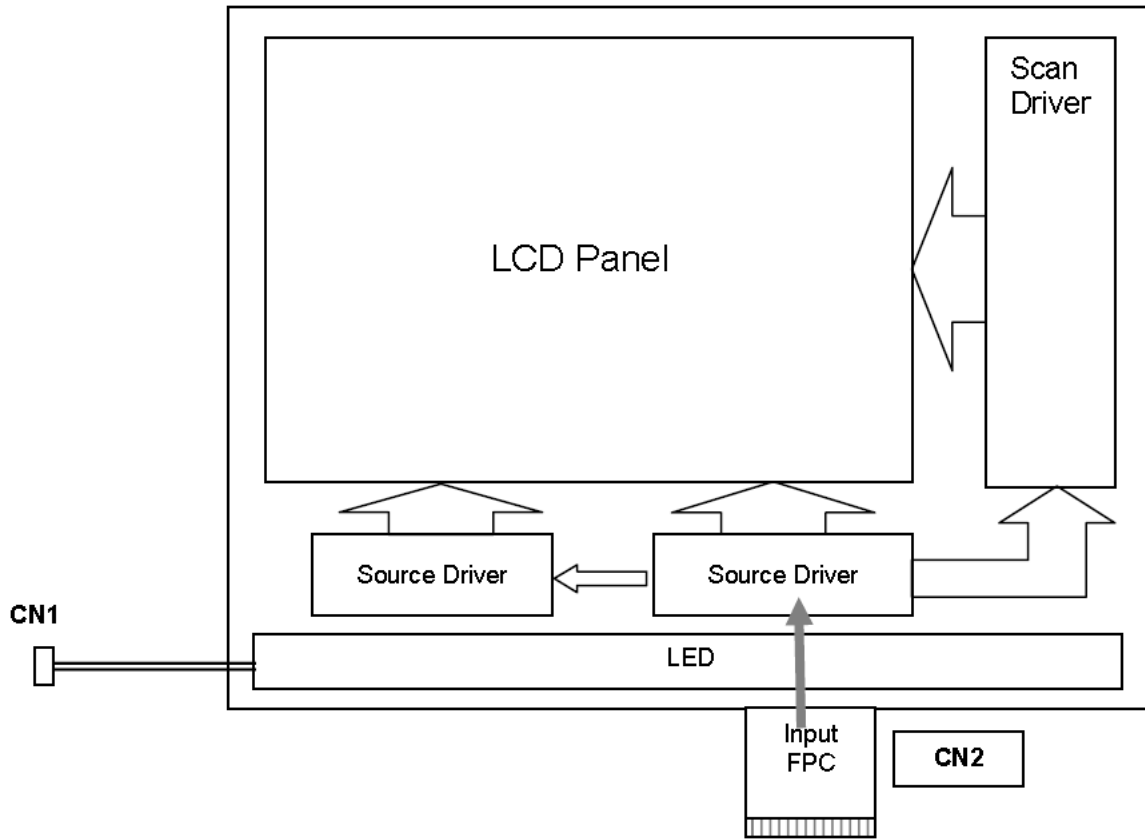
$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

## 8. PIN CONNECTIONS

### 8.1 TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Function
1	AGND	P	Analog Ground
2	AVDD	P	Analog Power
3	VCC	P	Digital Power
4	R0	I	Data Input(LSB)
5	R1	I	Data Input
6	R2	I	Data Input
7	R3	I	Data Input
8	R4	I	Data Input
9	R5	I	Data Input
10	R6	I	Data Input
11	R7	I	Data Input(MSB)
12	G0	I	Data Input(LSB)
13	G1	I	Data Input
14	G2	I	Data Input
15	G3	I	Data Input
16	G4	I	Data Input
17	G5	I	Data Input
18	G6	I	Data Input
19	G7	I	Data Input(MSB)
20	B0	I	Data Input(LSB)
21	B1	I	Data Input
22	B2	I	Data Input
23	B3	I	Data Input
24	B4	I	Data Input
25	B5	I	Data Input
26	B6	I	Data Input
27	B7	I	Data Input(MSB)
28	DCLK	I	Clock input
29	DE	I	Data Enable signal
30	HSD	I	Horizontal sync input. Negative polarity
31	VSD	I	Vertical sync input. Negative polarity
32	MODE3	I	DE/SYNC mode select .normally pull high H:DE mode .L:HSD/VSD mode
33	RSTB	I	Global reset pin. Active low to enter reset state. suggest to connecting with an RC reset circuit for stability .normally pull high.
34	STBYB	I	Standby mode, normally pull high STBYB="1",normal operation STBYB="0",timming control , source driver will turn off, all
35	SHLR	I	Source right or left sequence control .SHLR="L", shift left: last data=S1<-S2...S1200=first data ; SHLR="H", shift right :first data=S1->S2...S1200=last data
36	VCC	P	Digital Power
37	UPDN	I	gate up or down scan control. UPDN="L" , DOWN shift : G1->G2...->G600 ; UPDN="H". up shift: G1<-G2...<-G600
38	GND	P	Digital Ground
39	AGND	P	Analog Ground
40	AVDD	P	Analog Power
41	VCOM	I	For external VCOM DC input (Adjustable)

42	DITH	I	Dithering setting DITH="H" 6bit resolution (last 2 bits of input data truncated) (default setting) DITH="L" 8bit resolution
43	NC	-	Not connect
44	NC	-	Not connect
45	V10	P	Gamma correction voltage reference
46	V9	P	Gamma correction voltage reference
47	V8	P	Gamma correction voltage reference
48	V7	P	Gamma correction voltage reference
49	V6	P	Gamma correction voltage reference
50	V5	P	Gamma correction voltage reference
51	V4	P	Gamma correction voltage reference
52	V3	P	Gamma correction voltage reference
53	V2	P	Gamma correction voltage reference
54	V1	P	Gamma correction voltage reference
55	NC	-	Not connect
56	VGH	P	Positive Power for TFT
57	VCC	P	Digital Power
58	VGL	P	Negative Power for TFT
59	GND	P	Digital Ground
60	NC	-	Not connect

**9. BLOCK DIAGRAM**

## 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=80°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=70°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-20°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,240hrs	IEC68-2-3
6	Thermal Cycling Test (No operation)	-30°C → +25°C → +80°C, 100Cycles 30 min 5min 30 min	IEC68-2-14
7.	Vibration Test	Frequency:10~55HZ Amplitude:1.5mm Sweep time:11min Test period:6Cycles for each direction of X,Y,Z	IEC68-2-6
8	Shock Test	100G, 6ms Direction : ± X,± Y,± Z Cycle : 3 times	IEC68-2-27
9	Drop Test	Height:60cm 1 conner,3edges,6surfaces	IEC68-2-32
10.	ESD test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC61000-4-2

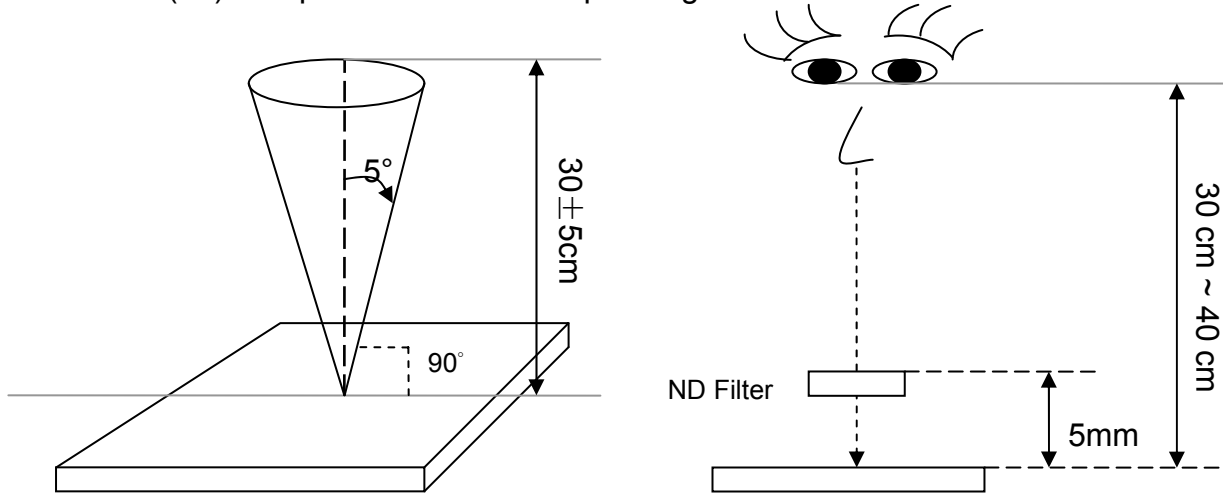
## 10.2 Inspection condition

### 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 $\leq 8$ 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>4</td> <td rowspan="2">8</td> <td rowspan="4">Minor</td> <td rowspan="4">1.5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> <tr> <td>Adjacent Bright</td> <td>1</td> <td>1</td> </tr> <tr> <td>Adjacent Dark</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Class Of Defects	AQL Level	Bright	4	8	Minor	1.5	Dark	4	Adjacent Bright	1	1	Adjacent Dark	1	1
		Item	Acceptable number	Total	Class Of Defects	AQL Level														
		Bright	4	8	Minor	1.5														
		Dark	4																	
		Adjacent Bright	1	1																
		Adjacent Dark	1	1																
		Non-uniformity: Visible through 2%ND filter white, R, G, B and gray 50%pattern. (Minor)																		
Foreign material in Black or White spots shape ( $W > 1/4L$ ) (Note: 5)																				
<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.3</math></td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>0.3 &lt; D \leq 0.5</math></td> <td>4</td> </tr> <tr> <td><math>D &gt; 0.5</math></td> <td>0</td> </tr> </tbody> </table>	Dimension	Acceptable number	Class Of Defects	AQL Level	$D \leq 0.3$	*	Minor	1.5	$0.3 < D \leq 0.5$	4	$D > 0.5$	0								
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$D \leq 0.3$	*	Minor	1.5																	
$0.3 < D \leq 0.5$	4																			
$D > 0.5$	0																			
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																				
Foreign Material in Line or spiral shape ( $W \leq 1/4L$ ) (Note: 4)																				
<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.5\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.1\text{mm} &lt; W \leq 0.5\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W \leq 0.1\text{mm}</math></td> <td>*</td> </tr> </tbody> </table>	Dimension	Acceptable number	Class Of Defects	AQL Level	$W > 0.5\text{mm}, L > 5\text{mm}$	0	Minor	1.5	$L \leq 5\text{mm}, 0.1\text{mm} < W \leq 0.5\text{mm}$	4	$L \leq 5\text{mm}, W \leq 0.1\text{mm}$	*								
Dimension	Acceptable number	Class Of Defects	AQL Level																	
$W > 0.5\text{mm}, L > 5\text{mm}$	0	Minor	1.5																	
$L \leq 5\text{mm}, 0.1\text{mm} < W \leq 0.5\text{mm}$	4																			
$L \leq 5\text{mm}, W \leq 0.1\text{mm}$	*																			
L : Length W : Width * : Disregard																				
2	External Inspection (non-operating)	Dimension: Outline (Major)																		
		Bezel appearance: uneven (Minor)																		
		Scratch on the Polarize & Touch Panel : (Note:2)																		
		<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.2\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.07\text{mm} &lt; W \leq 0.2\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W \leq 0.07\text{mm}</math></td> <td>*</td> </tr> <tr> <td colspan="2">BM: No count</td> <td></td> <td></td> </tr> </tbody> </table>	Dimension	Acceptable number	Class Of Defects	AQL Level	$W > 0.2\text{mm}, L > 5\text{mm}$	0	Minor	1.5	$L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.2\text{mm}$	4	$L \leq 5\text{mm}, W \leq 0.07\text{mm}$	*	BM: No count					
		Dimension	Acceptable number	Class Of Defects	AQL Level															
		$W > 0.2\text{mm}, L > 5\text{mm}$	0	Minor	1.5															
$L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.2\text{mm}$	4																			
$L \leq 5\text{mm}, W \leq 0.07\text{mm}$	*																			
BM: No count																				
L : Length W : Width * : Disregard																				



Dent and spots shape on the polarize (Note:2): (Note: 5)			
Dimension	Acceptable number	Class Of Defects	AQL Level
$D \leq 0.3$	*	Minor	1.5
$0.3 < D \leq 0.5$	4		
$D > 0.5$	0		
BM: No count			
D = (Long + Short) / 2    * : Disregard			

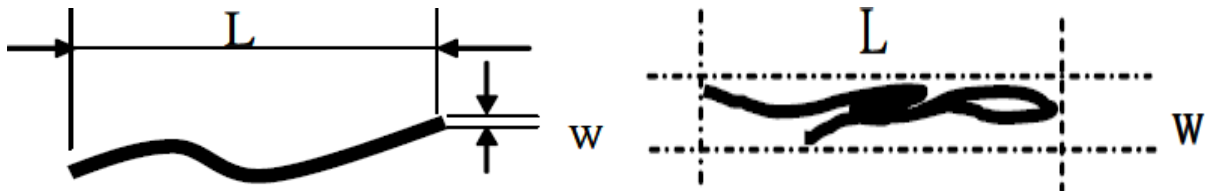
		Dimension	Acceptable number	Class Of Defects	AQL Level
3	TP Newton Rings if LCM with TP	The area of the Newton ring is more than 1/6 view area of the touch panel.	0	Minor	1.5
		The area of the Newton ring is less than 1/6 view area of the touch panel; and no character affected and line distorted after touch panel lightening.	Ignore		
Class of defects	<b>Major</b>	AQL 0.65	<b>Definition</b>		
	<b>Minor</b>	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.		
		It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.			

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

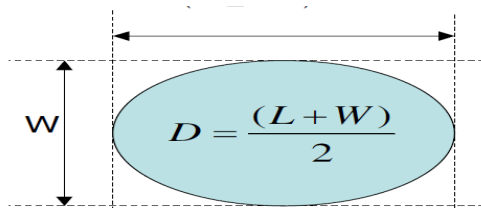
Note:2 The external inspection should be conducted at the distance  $30 \pm 5$ cm between the eyes of inspector and the panel .

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 ( $W \geq L/4$ )



### 5.3 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.

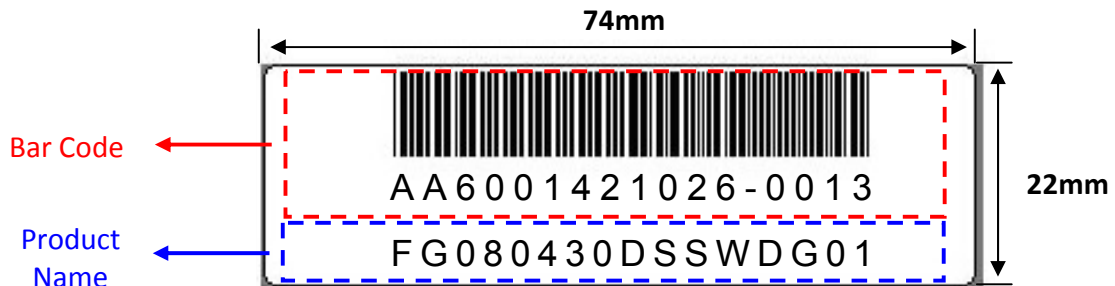
Sampling type: normal inspection, single sampling

Sampling table: ISO 2859

Inspection level: Level II

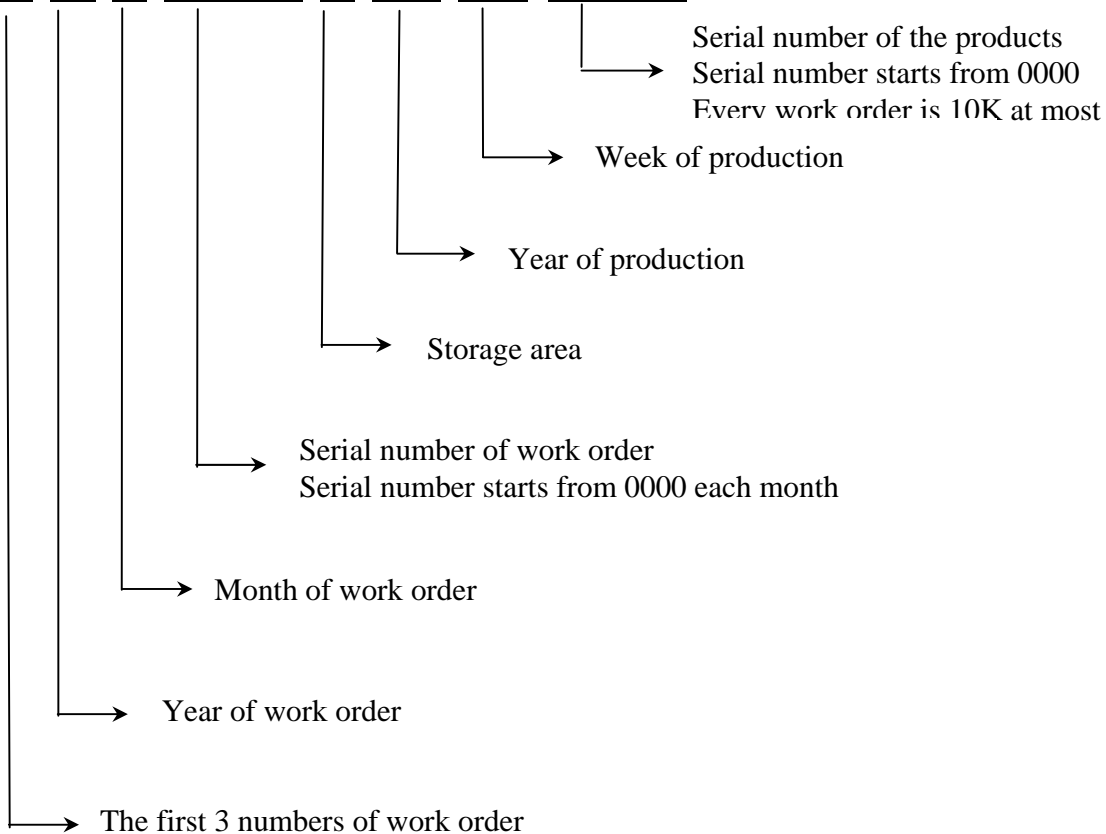
## 11. LCM PRODUCT LABEL DEFINE

### Product Label style:

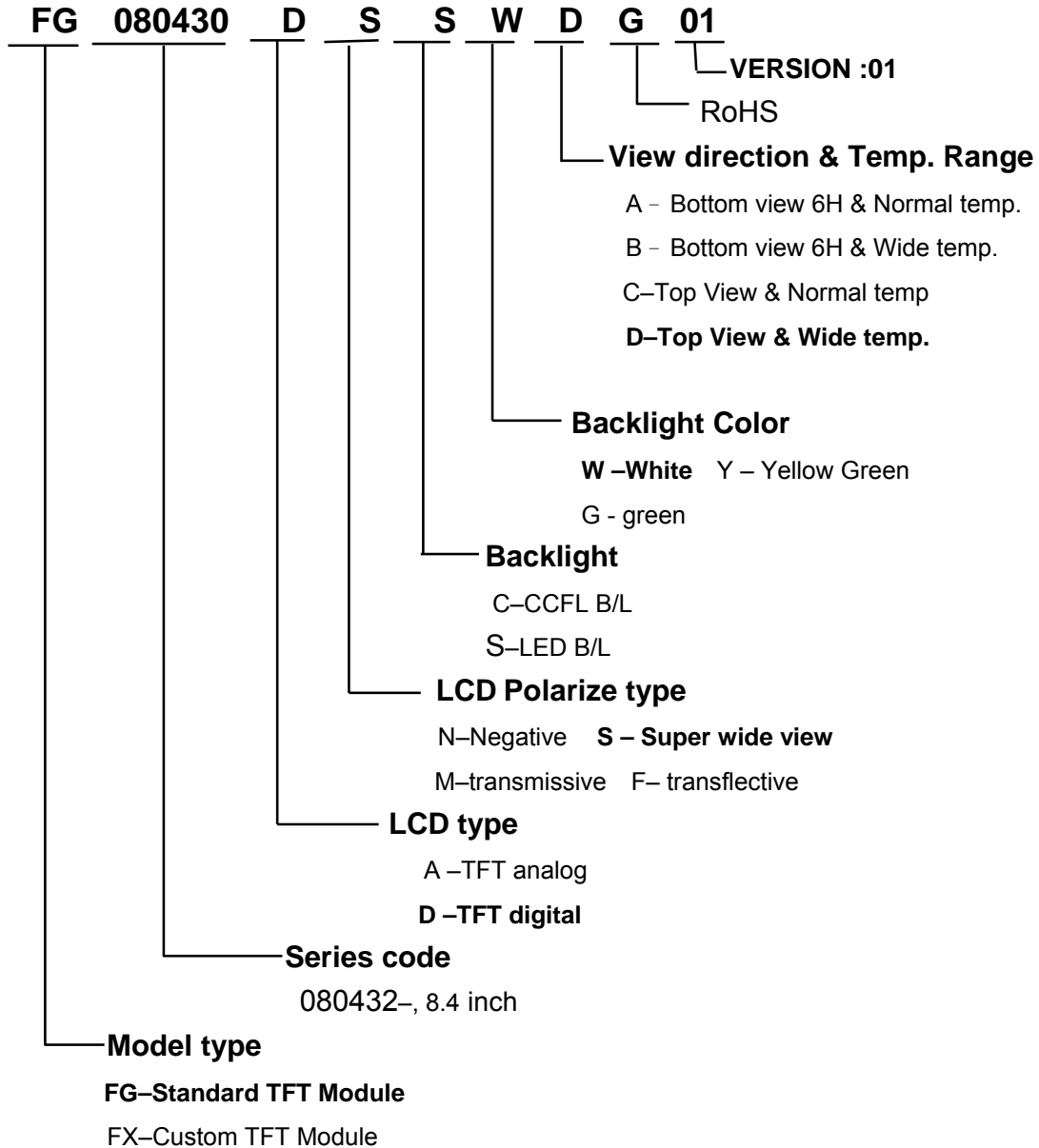


### BarCode Define:

**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.

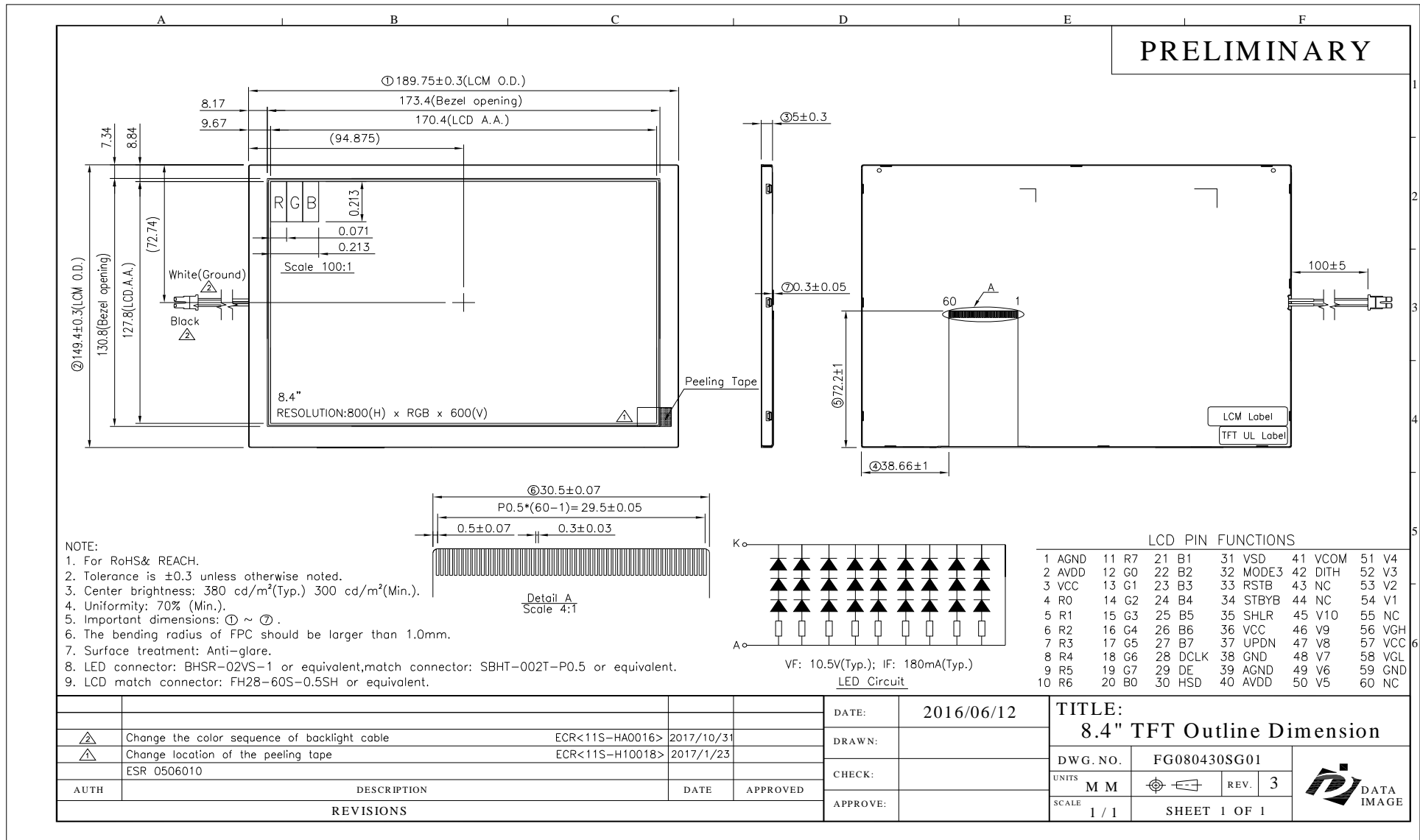
### 5. OTHERS

- (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.)
- (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.

Confidential Document  
**13. OUTLINE DRAWING**



## 14. PACKAGE INFORMATION

TBD



# DATA IMAGE CORPORATION

## TFT Module Specification

Preliminary

ITEM NO.: FG080430DSSWDG01

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Customer Companies	QA Approval	DQA Check	R&D Approval	R&D Check
	<i>pretty</i>	<i>Andy</i>	<i>Bing</i>	<i>Shone</i>
Customer Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	4	07/NOV/17'		21





### 3. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	8.4 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 600(V)	dots
Active Area	170.4(H) x 127.8 (V)	mm
Pixel Pitch	0.213 (H) x 0.213 (V)	mm
Pixel Configuration	R.G.B.-Stripe	
Outline Dimension	189.75(W) x 149.4(H) x 5(D)	mm
Surface treatment	Anti-glare	
Back-light	LED Side-light type.	
Display mode	Normally white	
Weight	TBD	g
View Angle direction	12 o'clock	
Our components and processes are compliant to RoHS and REACH standard		

### 4. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	VCC	-0.3	5.0	V	GND=0
	AV <sub>DD</sub>	-0.5	15	V	AGND=0
	V <sub>COM</sub>	0	6	V	
Logic Signal Input Level	V <sub>I</sub>	-0.3	VCC +0.3	V	
Operating Temperature	T <sub>opa</sub>	-20	70	°C	
Storage Temperature	T <sub>stg</sub>	-30	80	°C	

### 5. ELECTRICAL CHARACTERISTICS

#### 5.1 AC Characteristics

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	VCC	+3.0	+3.3	+3.6	V	
	VGH	14	15	16	V	
	VGL	-8	-7	-6	V	
	AVDD	9.85	10	10.15	V	
Power Supply Current	ICC	-	7.4	-	mA	VCC =3.3V
	IADD	-	32.8	-	mA	AVDD=10V
	IGH	-	0.281	-	mA	VGH=15V
	IGL	-	0.569	-	mA	VGL=-7V
VCOM	VCOM	3.96	4.16	4.36	V	
Input signal voltage	V <sub>IH</sub>	0.7V <sub>CC</sub>	-	V <sub>CC</sub>	V	Note 1
	V <sub>IL</sub>	0	-	0.3V <sub>CC</sub>	V	
Input level of V1~V5	V <sub>x</sub>	AVDD/2	--	AVDD-0.1		
Input level of V6~V10	V <sub>x</sub>	0.1	--	AVDD/2		

Note (1): HSYNC, VSYNC, DE, Digital Data

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

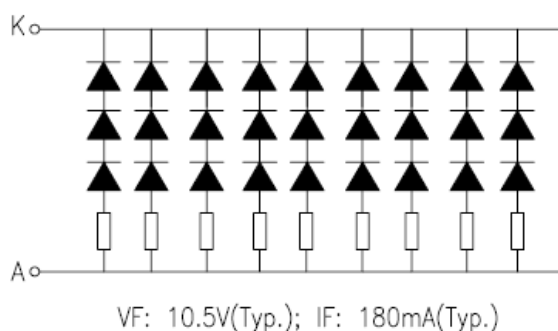
Note (3): DGND=AGND=0V

## 5.2 Backlight unit

Item	Symbol	MIN.	TYP.	MAX.	Unit	Note
LED current	IL	-	180	-	mA	Note 1
LED voltage	VL	-	10.5	-	V	
Operating LED life time	Hr	20000	-	-	Hour	Note 1,2

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:  $T_a=25\pm 3\text{ }^\circ\text{C}$ , typical IL value indicated in the above table until the brightness becomes less than 50%.

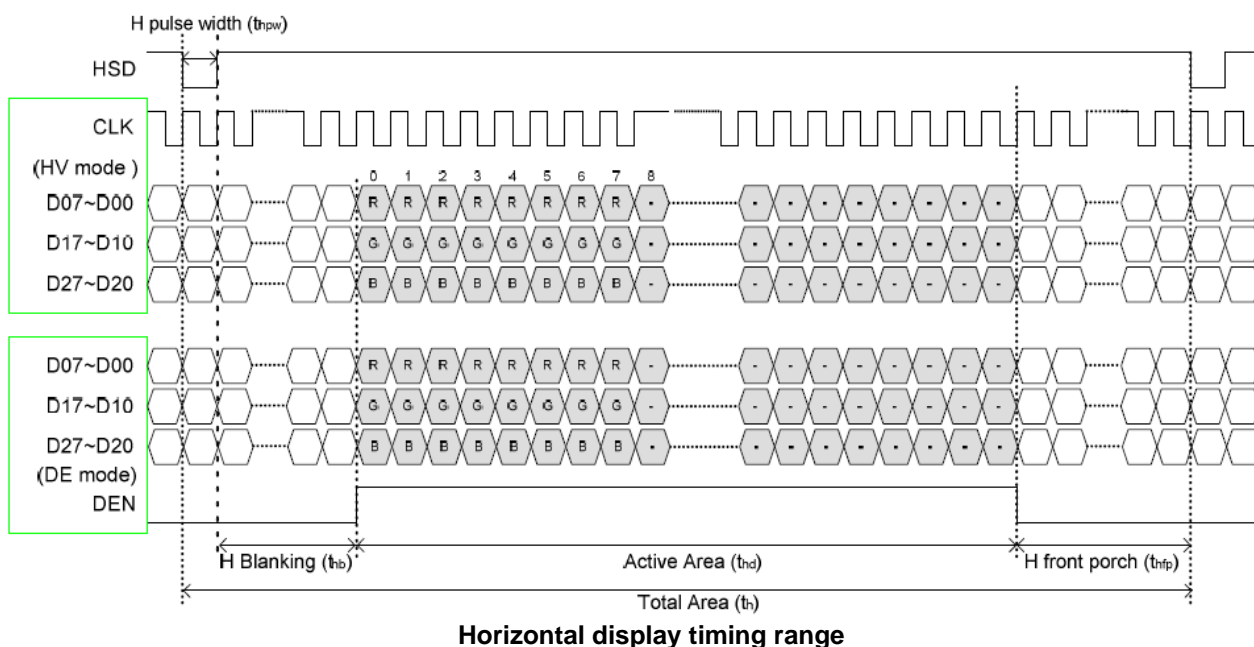
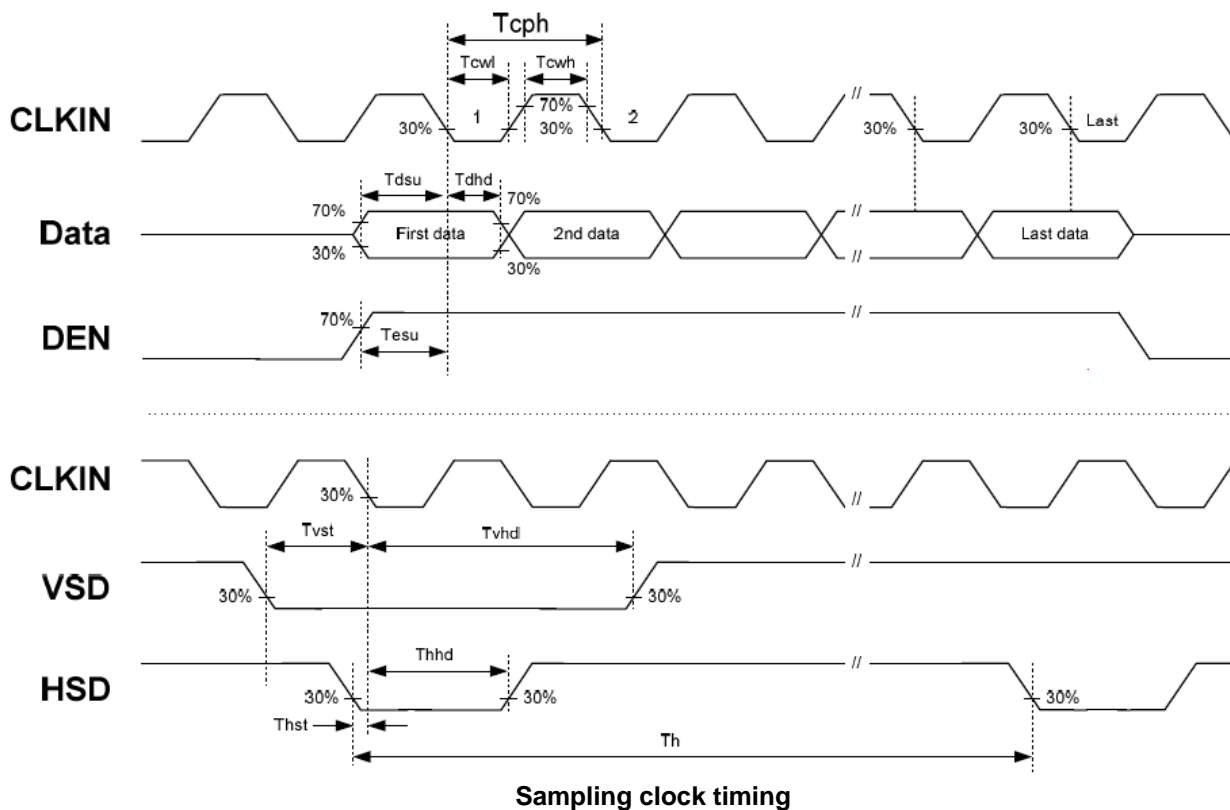
Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $T_a=25\text{ }^\circ\text{C}$  and  $I_L=180\text{mA}$ . The LED lifetime could be decreased if operating  $I_L$  is larger than 180mA. The constant current driving method is suggested.

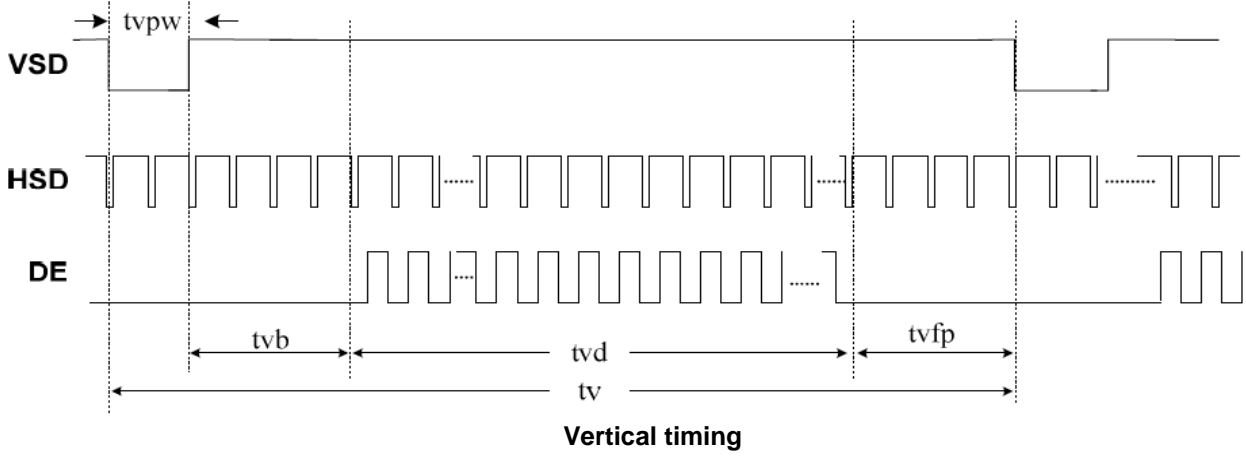


## 6. TIMING CHARACTERISTICS

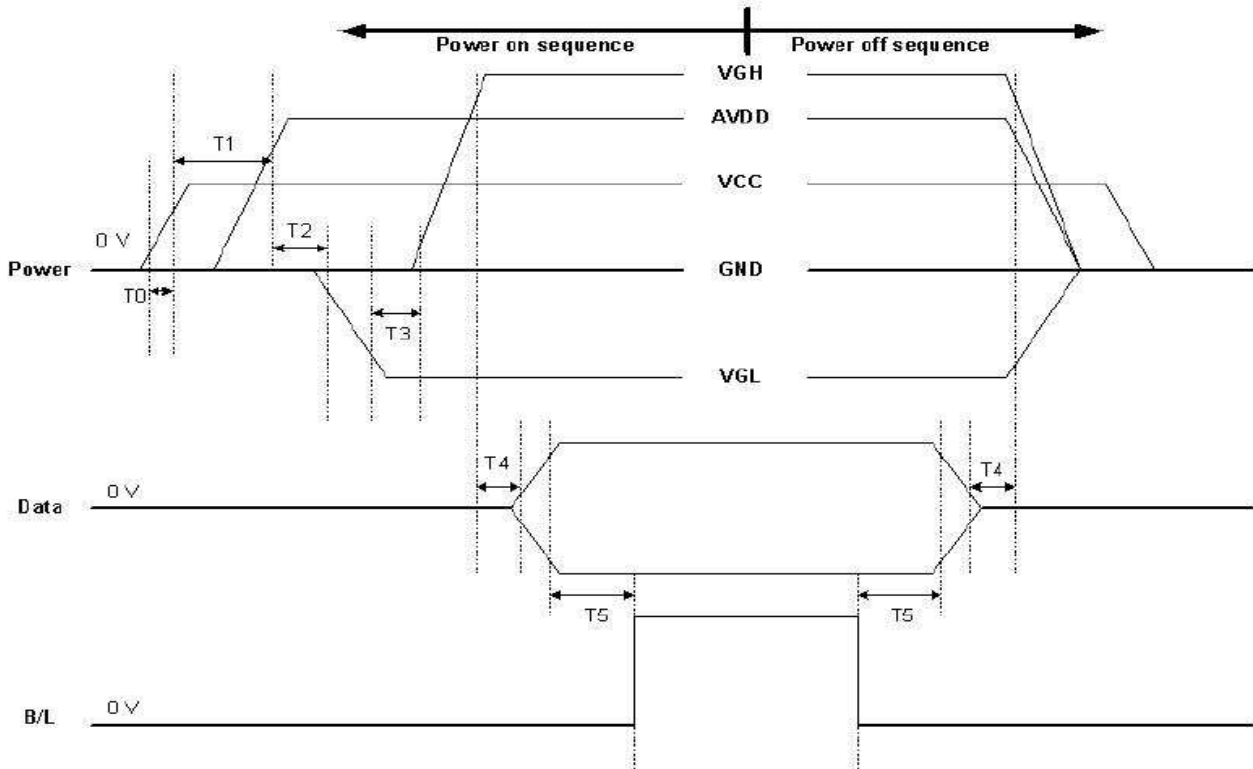
### 6.1 AC Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	20			ns	
DCLK frequency	fclk		40	50	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		1000		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		40		Tcph	
HSD front porch	thfp		112		Tcph	
Vertical display area	tvd		600		th	
VSD period time	tv		660		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		39		th	
VSD front porch	tvfp		18		th	

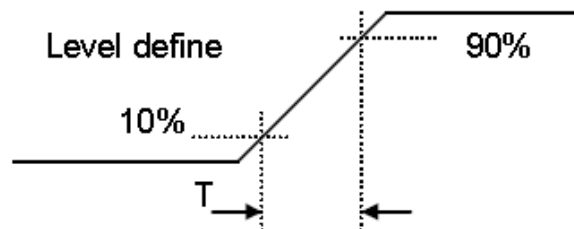
**6.2 Timing Controller Timing Chart**




### 6.3 Power Sequence



Item	Min.	Typ.	Max.	Unit
T0	0.5	--	20	msec
T1	16			msec
T2	0			msec
T3	20			μsec
T4	10		50	msec
T5	50			msec



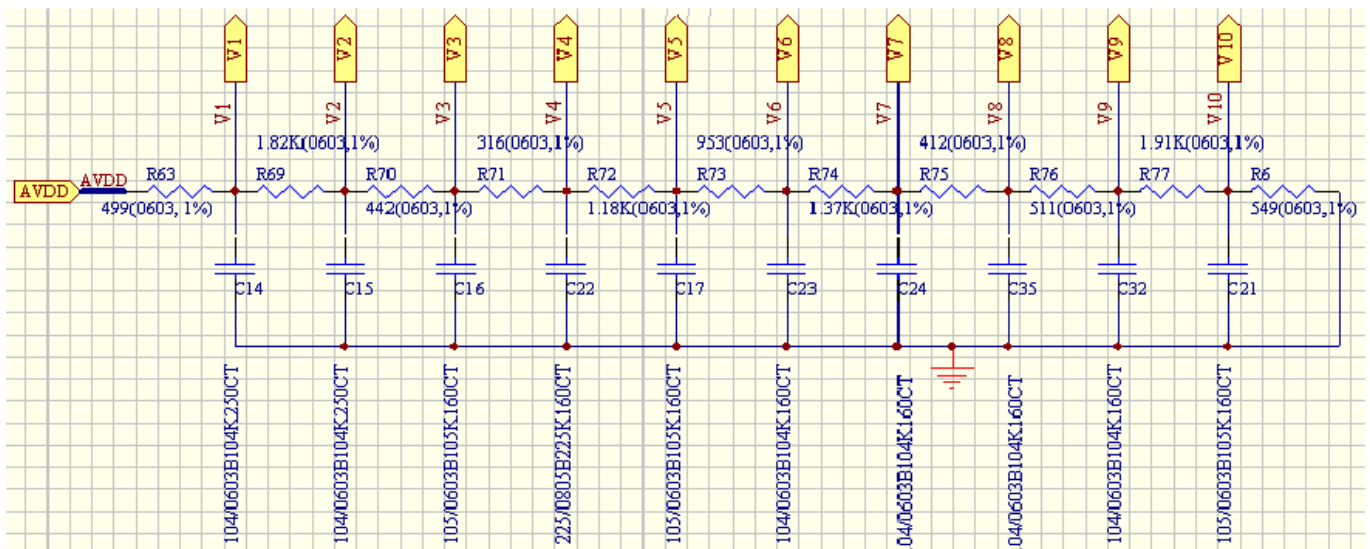
Power On Sequence: VCC-> AVDD -> VGL -> VGH -> Data -> B/L

Power Off Sequence: B/L-> Data -> VGH -> VGL -> AVDD -> VCC

Notes: Data include R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, SHLR, UPDN, DE MODE, RSTB, STBYB, SHLR, UPDN, DITH

#### 6.4 Gamma Circuit

9.499V 7.672V 7.228V 6.911V 5.727V 4.77V 3.395V 2.981V 2.468V 0.551V



### 7. OPTICAL CHARACTERISTIC

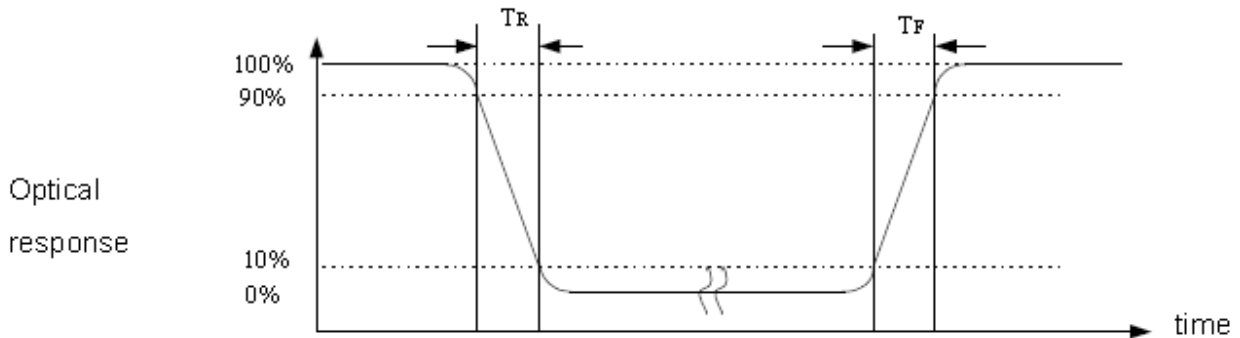
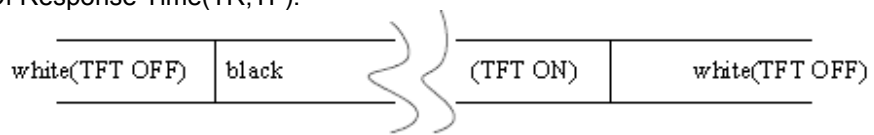
Ta=25°C

Parameter	Symbol	Conditions	Specifications				Remark	
			Min.	Typ.	Max.	Unit		
Response Time	TF	T=0	-	2	4	ms	Note 2	
	TR		-	6	12	ms		
Contrast Ratio	CR		480	600	-	ms	Note 1	
Chromaticity	White	Viewing Normal Angle $\theta_x=\theta_y=0^\circ$	XW	0.240	0.290	0.340	-	Note 4
			YW	0.250	0.300	0.350	-	
Viewing Angle	Hor.	Viewing Normal Angle $\theta_x=\theta_y=0^\circ$ CR $\geq$ 10	$\theta_L$	65	75	-	Deg.	Note 3
			$\theta_R$	65	75	-		
	Ver.		$\theta_U$	60	70	-		
			$\theta_D$	50	60	-		
Luminance	L	PWM=100%	300	380	-	cd/m2		
Luminance uniformity	YU		70	80	-	%	Note 5	

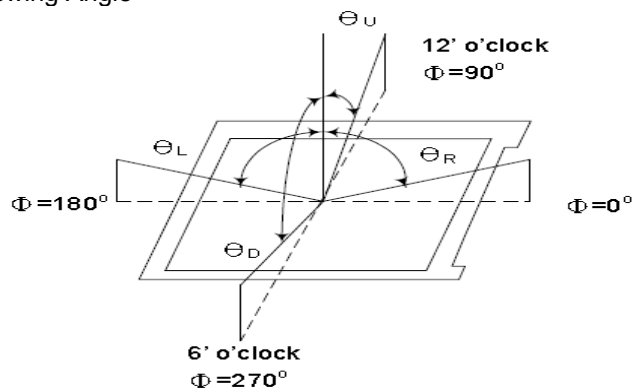
Note 1: Definition of Contrast Ratio(CR) :  
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

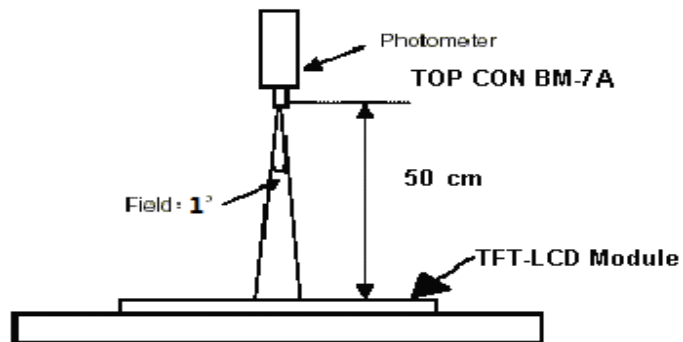
Note 2: Definition Of Response Time(TR,TF):



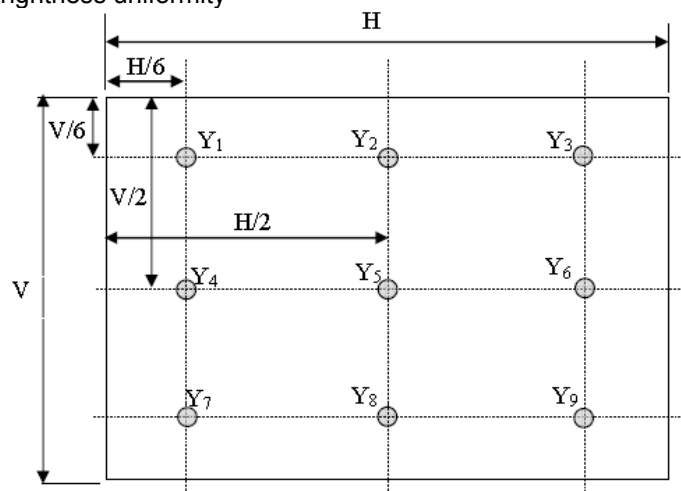
Note 3: Definition Of Viewing Angle



Note 4: Definition of optical measurement setup



Note 5: Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

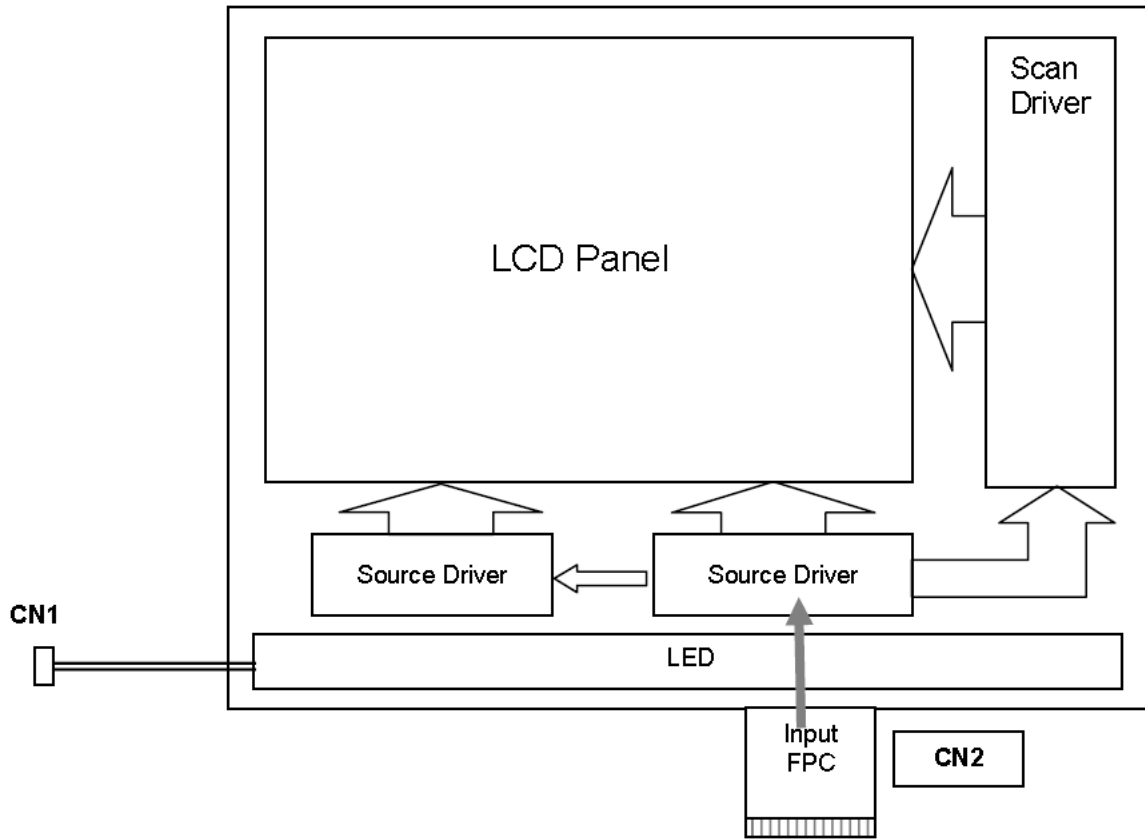


## 8. PIN CONNECTIONS

### 8.1 TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Function
1	AGND	P	Analog Ground
2	AVDD	P	Analog Power
3	VCC	P	Digital Power
4	R0	I	Data Input(LSB)
5	R1	I	Data Input
6	R2	I	Data Input
7	R3	I	Data Input
8	R4	I	Data Input
9	R5	I	Data Input
10	R6	I	Data Input
11	R7	I	Data Input(MSB)
12	G0	I	Data Input(LSB)
13	G1	I	Data Input
14	G2	I	Data Input
15	G3	I	Data Input
16	G4	I	Data Input
17	G5	I	Data Input
18	G6	I	Data Input
19	G7	I	Data Input(MSB)
20	B0	I	Data Input(LSB)
21	B1	I	Data Input
22	B2	I	Data Input
23	B3	I	Data Input
24	B4	I	Data Input
25	B5	I	Data Input
26	B6	I	Data Input
27	B7	I	Data Input(MSB)
28	DCLK	I	Clock input
29	DE	I	Data Enable signal
30	HSD	I	Horizontal sync input. Negative polarity
31	VSD	I	Vertical sync input. Negative polarity
32	MODE3	I	DE/SYNC mode select .normally pull high H:DE mode .L:HSD/VSD mode
33	RSTB	I	Global reset pin. Active low to enter reset state. suggest to connecting with an RC reset circuit for stability .normally pull high.
34	STBYB	I	Standby mode, normally pull high STBYB="1",normal operation STBYB="0",timming control , source driver will turn off, all
35	SHLR	I	Source right or left sequence control .SHLR="L", shift left: last data=S1<-S2...S1200=first data ; SHLR="H", shift right :first data=S1->S2...S1200=last data
36	VCC	P	Digital Power
37	UPDN	I	gate up or down scan control. UPDN="L" , DOWN shift : G1->G2...->G600 ; UPDN="H". up shift: G1<-G2...<-G600
38	GND	P	Digital Ground
39	AGND	P	Analog Ground
40	AVDD	P	Analog Power
41	VCOM	I	For external VCOM DC input (Adjustable)

42	DITH	I	Dithering setting DITH="H" 6bit resolution (last 2 bits of input data truncated) (default setting) DITH="L" 8bit resolution
43	NC	-	Not connect
44	NC	-	Not connect
45	V10	P	Gamma correction voltage reference
46	V9	P	Gamma correction voltage reference
47	V8	P	Gamma correction voltage reference
48	V7	P	Gamma correction voltage reference
49	V6	P	Gamma correction voltage reference
50	V5	P	Gamma correction voltage reference
51	V4	P	Gamma correction voltage reference
52	V3	P	Gamma correction voltage reference
53	V2	P	Gamma correction voltage reference
54	V1	P	Gamma correction voltage reference
55	NC	-	Not connect
56	VGH	P	Positive Power for TFT
57	VCC	P	Digital Power
58	VGL	P	Negative Power for TFT
59	GND	P	Digital Ground
60	NC	-	Not connect

**9. BLOCK DIAGRAM**

## 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=80°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=70°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-20°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,240hrs	IEC68-2-3
6	Thermal Cycling Test (No operation)	-30°C → +25°C → +80°C, 100Cycles 30 min 5min 30 min	IEC68-2-14
7.	Vibration Test	Frequency:10~55HZ Amplitude:1.5mm Sweep time:11min Test period:6Cycles for each direction of X,Y,Z	IEC68-2-6
8	Shock Test	100G, 6ms Direction : ± X,± Y,± Z Cycle : 3 times	IEC68-2-27
9	Drop Test	Height:60cm 1 conner,3edges,6surfaces	IEC68-2-32
10.	ESD test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC61000-4-2

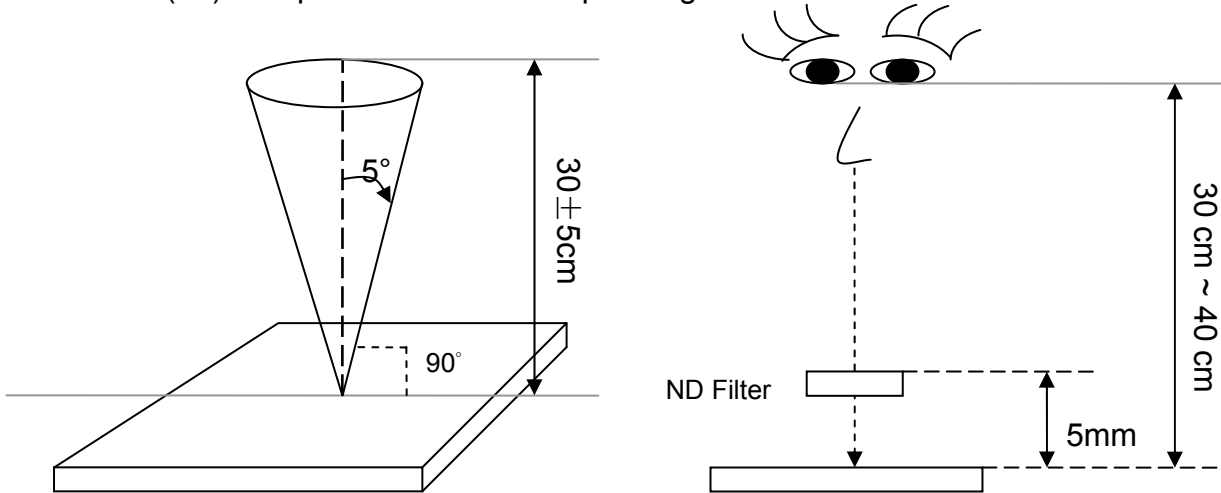
## 10.2 Inspection condition

### 10.2.1 Inspection conditions

10.2.1.1 Inspection Distance:  $35 \pm 5$  cm

10.2.1.2 View Angle:

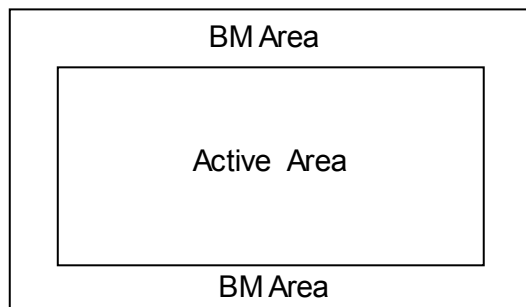
- (1) Inspection under operating condition :  $\pm 5^\circ$
- (2) Inspection under non-operating condition :  $\pm 45^\circ$



10.2.1.3 Environment conditions:

Ambient Temperature :		25±5°C
Ambient Humidity :		65±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 $\leq 8$ 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>4</td> <td rowspan="2">8</td> <td rowspan="4">Minor</td> <td rowspan="4">1.5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> <tr> <td>Adjacent Bright</td> <td>1</td> <td>1</td> </tr> <tr> <td>Adjacent Dark</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Class Of Defects	AQL Level	Bright	4	8	Minor	1.5	Dark	4	Adjacent Bright	1	1	Adjacent Dark	1	1
		Item	Acceptable number	Total	Class Of Defects	AQL Level														
		Bright	4	8	Minor	1.5														
		Dark	4																	
		Adjacent Bright	1	1																
		Adjacent Dark	1	1																
Non-uniformity: Visible through 2%ND filter white, R, G, B and gray 50%pattern. (Minor)																				
Foreign material in Black or White spots shape ( $W > 1/4L$ ) (Note: 5)																				
<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>D \leq 0.3</math></td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>0.3 &lt; D \leq 0.5</math></td> <td>4</td> </tr> <tr> <td><math>D &gt; 0.5</math></td> <td>0</td> </tr> </tbody> </table> $D = (\text{Long} + \text{Short}) / 2$ * : Disregard	Dimension	Acceptable number	Class Of Defects	AQL Level	$D \leq 0.3$	*	Minor	1.5	$0.3 < D \leq 0.5$	4	$D > 0.5$	0								
Dimension	Acceptable number	Class Of Defects	AQL Level																	
$D \leq 0.3$	*	Minor	1.5																	
$0.3 < D \leq 0.5$	4																			
$D > 0.5$	0																			
Foreign Material in Line or spiral shape ( $W \leq 1/4L$ ) (Note: 4)																				
<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.5\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.1\text{mm} &lt; W \leq 0.5\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W \leq 0.1\text{mm}</math></td> <td>*</td> </tr> </tbody> </table> L : Length W : Width * : Disregard	Dimension	Acceptable number	Class Of Defects	AQL Level	$W > 0.5\text{mm}, L > 5\text{mm}$	0	Minor	1.5	$L \leq 5\text{mm}, 0.1\text{mm} < W \leq 0.5\text{mm}$	4	$L \leq 5\text{mm}, W \leq 0.1\text{mm}$	*								
Dimension	Acceptable number	Class Of Defects	AQL Level																	
$W > 0.5\text{mm}, L > 5\text{mm}$	0	Minor	1.5																	
$L \leq 5\text{mm}, 0.1\text{mm} < W \leq 0.5\text{mm}$	4																			
$L \leq 5\text{mm}, W \leq 0.1\text{mm}$	*																			
2	External Inspection (non-operating)	Dimension: Outline (Major)																		
		Bezel appearance: uneven (Minor)																		
		Scratch on the Polarize & Touch Panel : (Note:2)																		
		<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td><math>W &gt; 0.2\text{mm}, L &gt; 5\text{mm}</math></td> <td>0</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td><math>L \leq 5\text{mm}, 0.07\text{mm} &lt; W \leq 0.2\text{mm}</math></td> <td>4</td> </tr> <tr> <td><math>L \leq 5\text{mm}, W \leq 0.07\text{mm}</math></td> <td>*</td> </tr> <tr> <td colspan="2">BM: No count</td> <td></td> <td></td> </tr> </tbody> </table> L : Length W : Width * : Disregard	Dimension	Acceptable number	Class Of Defects	AQL Level	$W > 0.2\text{mm}, L > 5\text{mm}$	0	Minor	1.5	$L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.2\text{mm}$	4	$L \leq 5\text{mm}, W \leq 0.07\text{mm}$	*	BM: No count					
		Dimension	Acceptable number	Class Of Defects	AQL Level															
$W > 0.2\text{mm}, L > 5\text{mm}$	0	Minor	1.5																	
$L \leq 5\text{mm}, 0.07\text{mm} < W \leq 0.2\text{mm}$	4																			
$L \leq 5\text{mm}, W \leq 0.07\text{mm}$	*																			
BM: No count																				
L : Length W : Width * : Disregard																				

Dent and spots shape on the polarize (Note:2): (Note: 5)			
Dimension	Acceptable number	Class Of Defects	AQL Level
$D \leq 0.3$	*	Minor	1.5
$0.3 < D \leq 0.5$	4		
$D > 0.5$	0		
BM: No count			
D = (Long + Short) / 2    * : Disregard			

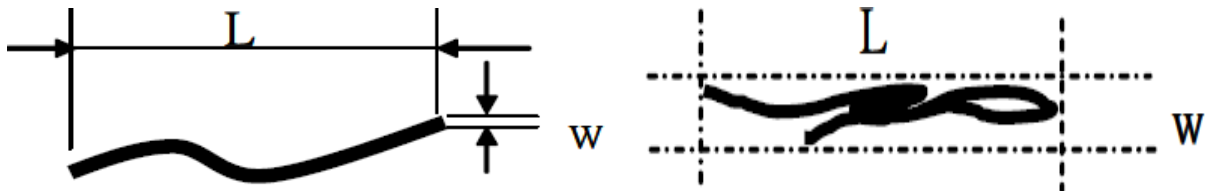
		Dimension	Acceptable number	Class Of Defects	AQL Level
3	TP Newton Rings if LCM with TP	The area of the Newton ring is more than 1/6 view area of the touch panel.	0	Minor	1.5
		The area of the Newton ring is less than 1/6 view area of the touch panel; and no character affected and line distorted after touch panel lightening.	Ignore		
Class of defects	<b>Major</b>	AQL 0.65	<b>Definition</b> It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.		
	<b>Minor</b>	AQL 1.5			

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

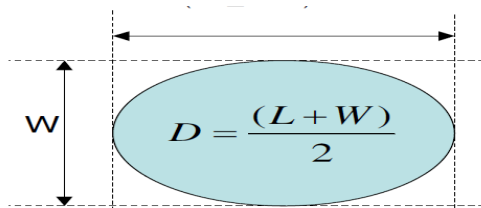
Note:2 The external inspection should be conducted at the distance  $30 \pm 5$ cm between the eyes of inspector and the panel .

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 ( $W \geq L/4$ )



### 5.3 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

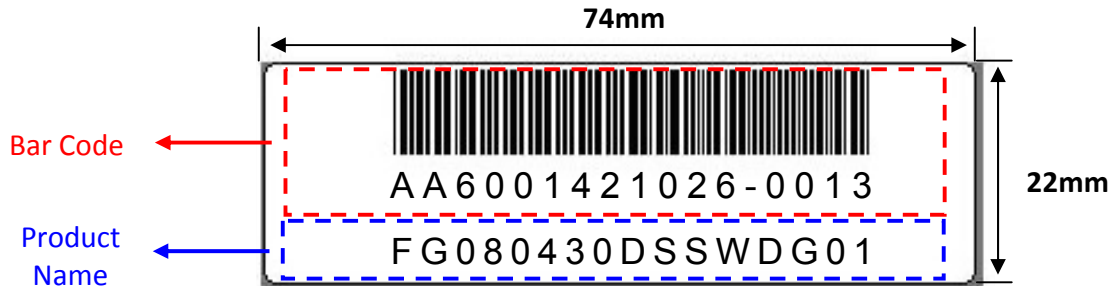
Sampling table: ISO 2859

Inspection level: Level II



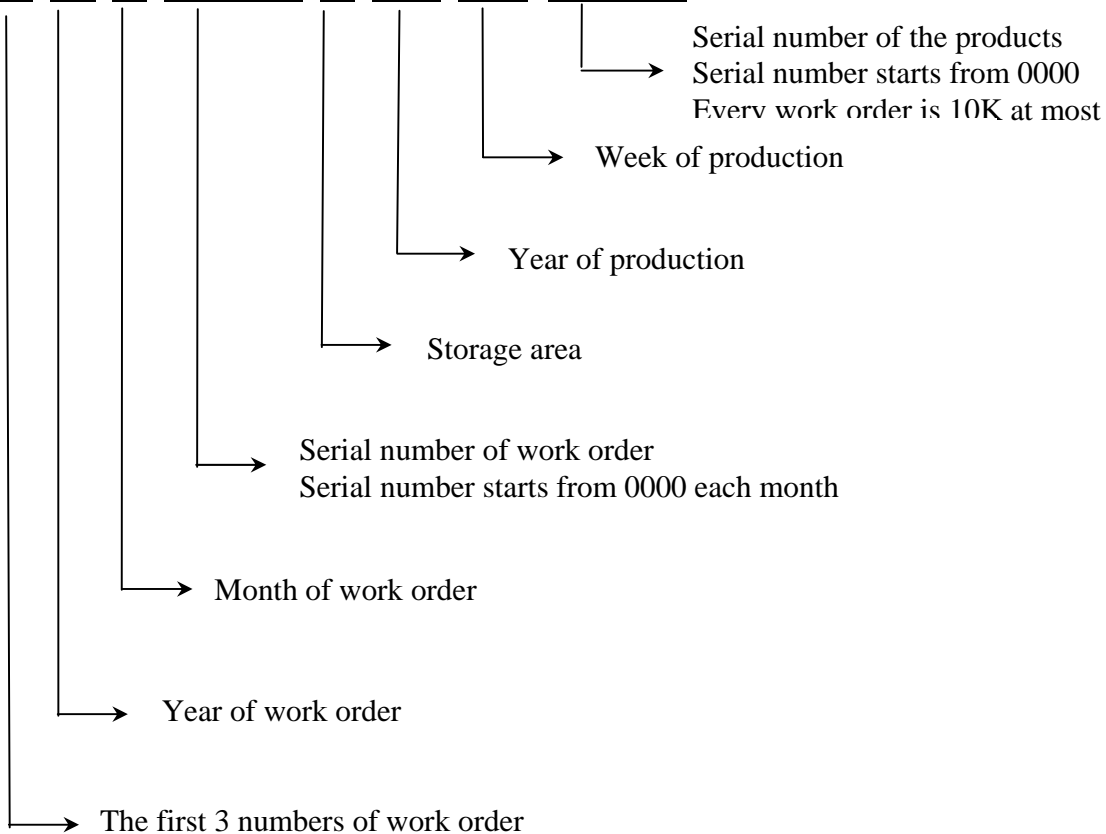
## 11. LCM PRODUCT LABEL DEFINE

### Product Label style:

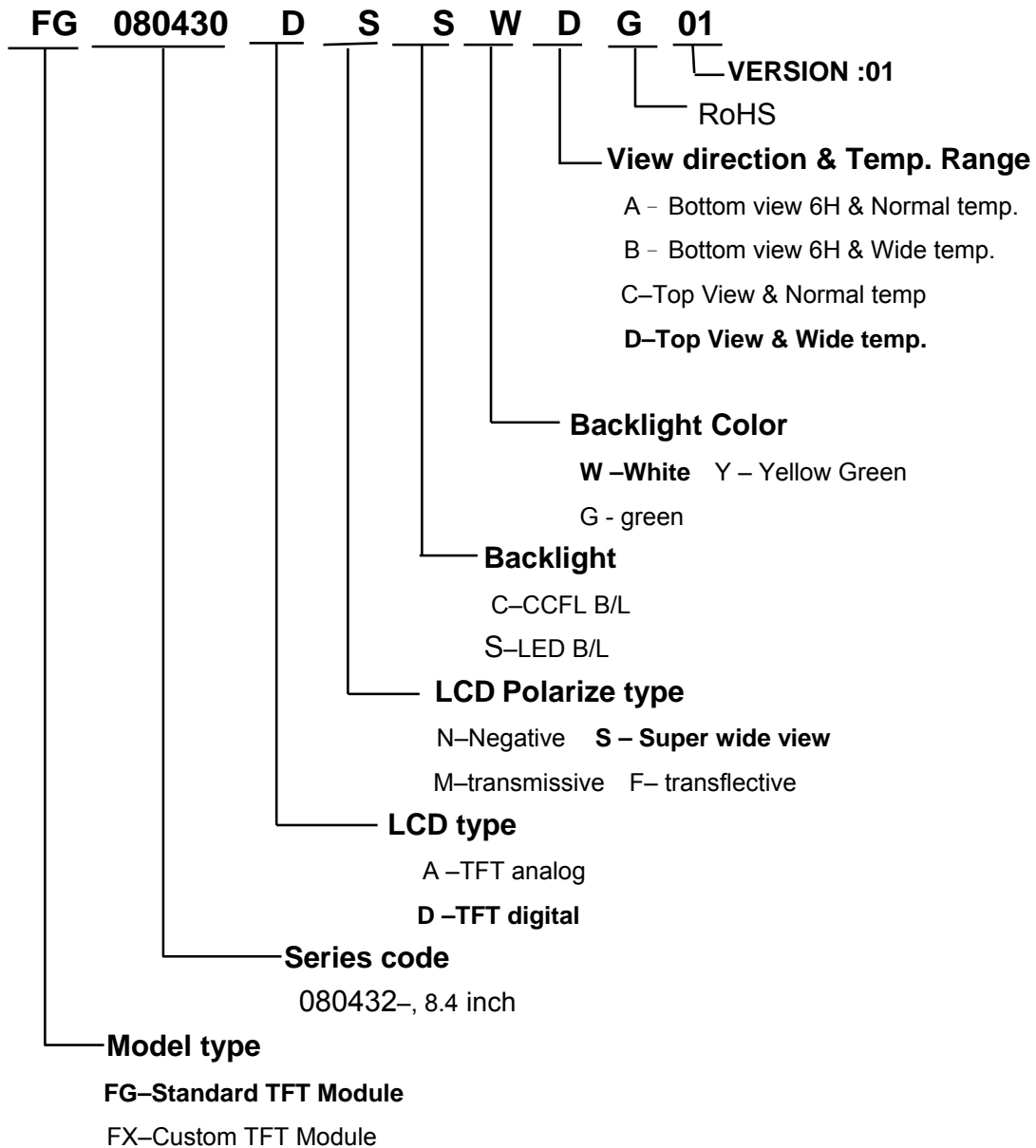


### BarCode Define:

**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.

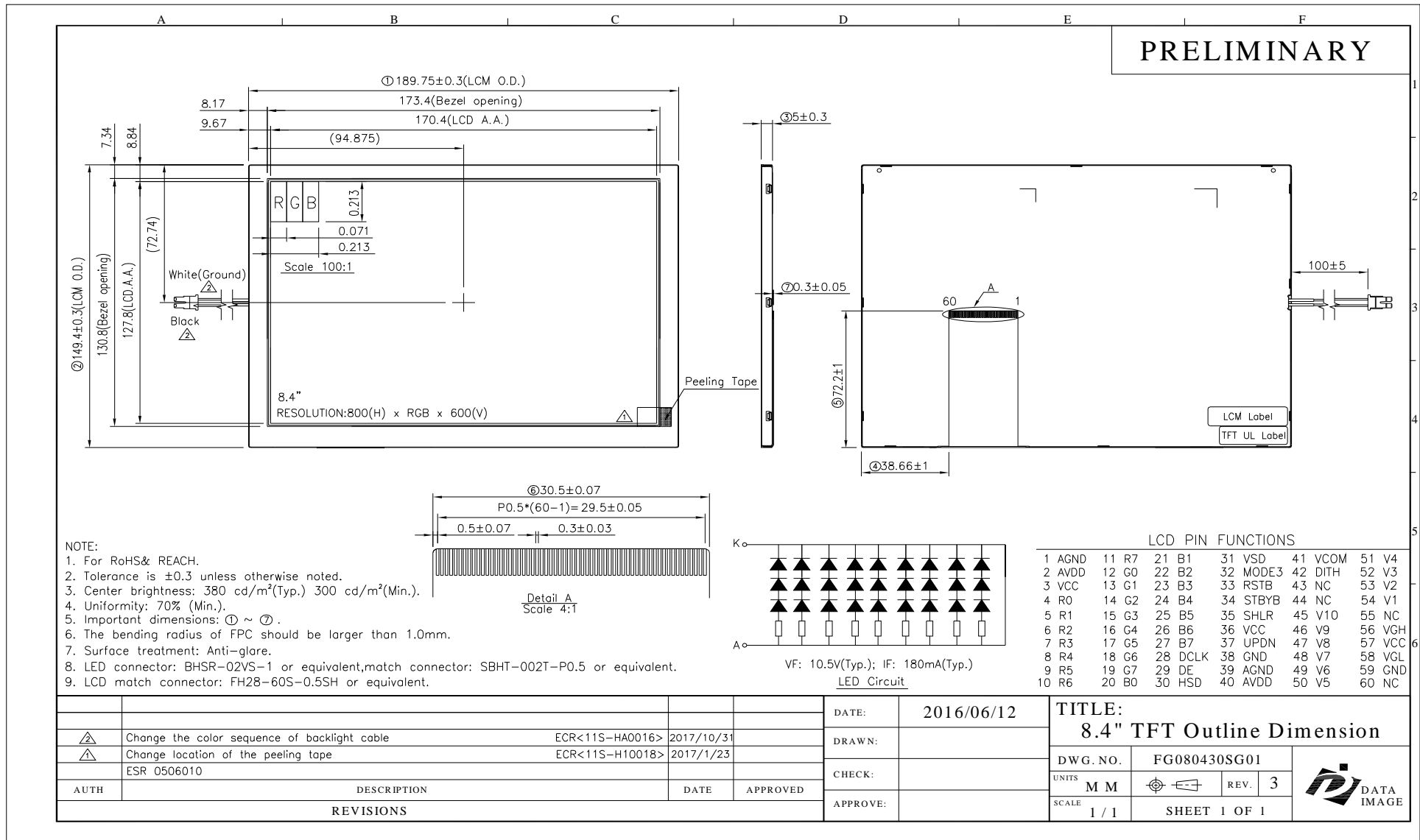
### 5. OTHERS

- (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.)
- (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.

Confidential Document  
**13. OUTLINE DRAWING**



## 14. PACKAGE INFORMATION

TBD