






# SPECIFICATIONS

**CUSTOMER** : \_\_\_\_\_  
**MODEL NO.** : **GFTO080KA800600**  
**VERSION** : **A**  
**DATE** : **2017.12.27**  
**CERTIFICATION** : **ROHS**  
**CUSTOMER SIGN** : \_\_\_\_\_

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## 1. General Specifications

Item	Specification	Remark
LCD size	8.0 inch(Diagonal)	
Driver element	a-Si TFT active matrix	
Resolution	800 × 3(RGB) × 480	
Display mode	Normally White, Transmissive	
Dot pitch	0.0675(W) X 0.2025(H) mm	
Active area	162.0(W) X 121.5(H) mm	
Module size	183.0(W) X 141.0(H) X 5.6(D) mm	Note 1
Surface treatment	Anti-Glare	
Color arrangement	RGB-stripe	
Interface	Digital	
Backlight power onsumption	1.674 W (Typ.)	
Panel power consumption	0.356W (Typ.)	
Weight	241g (Typ.)	

Note 1: Refer to Mechanical Drawing.



## 2. Pin Assignment

### 2.1. TFT LCD Panel Driving Section

FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	LED +	P	LED Anode	
2	LED +	P	LED Anode	
3	LED -	P	LED Cathode	
4	LED -	P	LED Cathode	
5	GND	P	Power ground	
6	V <sub>COM</sub>	I	Common voltage	
7	V <sub>CC</sub>	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	Note 3
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	
19	B0	I	Blue data(LSB)	
20	G7	I	Green data(MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	
26	G1	I	Green data	



27	G0	I	Green data(LSB)	
28	R7	I	Red data(MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	
35	R0	I	Red data(LSB)	
36	GND	P	Power Ground	
37	DCLK	I	Sample clock	
38	GND	P	Power Ground	
39	L/R	I	Right/ left selection	Note2,5
40	U/D	I	Up/down selection	Note2,5
41	V <sub>GH</sub>	P	Gate ON Voltage	
42	V <sub>GL</sub>	P	Gate OFF Voltage	
43	AV <sub>DD</sub>	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	Note1
45	NC	-	No connection	
46	V <sub>COM</sub>	I	Common Voltage	
47	DITHB	I	Dithering function	Note4
48	GND	P	Power Ground	
49	NC	-	No connection	
50	NC	-	No connection	

I: input, O: output, P: Power

Note 1: Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.

Note 2: Selection of scanning mode

Setting of scan control input		LScanning direction
U/D	R/L	
GND	V <sub>CC</sub>	Up to down, left to right
V <sub>CC</sub>	GND	Down to up, right to left
GND	GND	Up to down, right to left
V <sub>CC</sub>	V <sub>CC</sub>	Down to up, left to right

Note 3: DE/SYNC mode select. Normally pull high.

H: DE mode.

L: HS/VS mode.



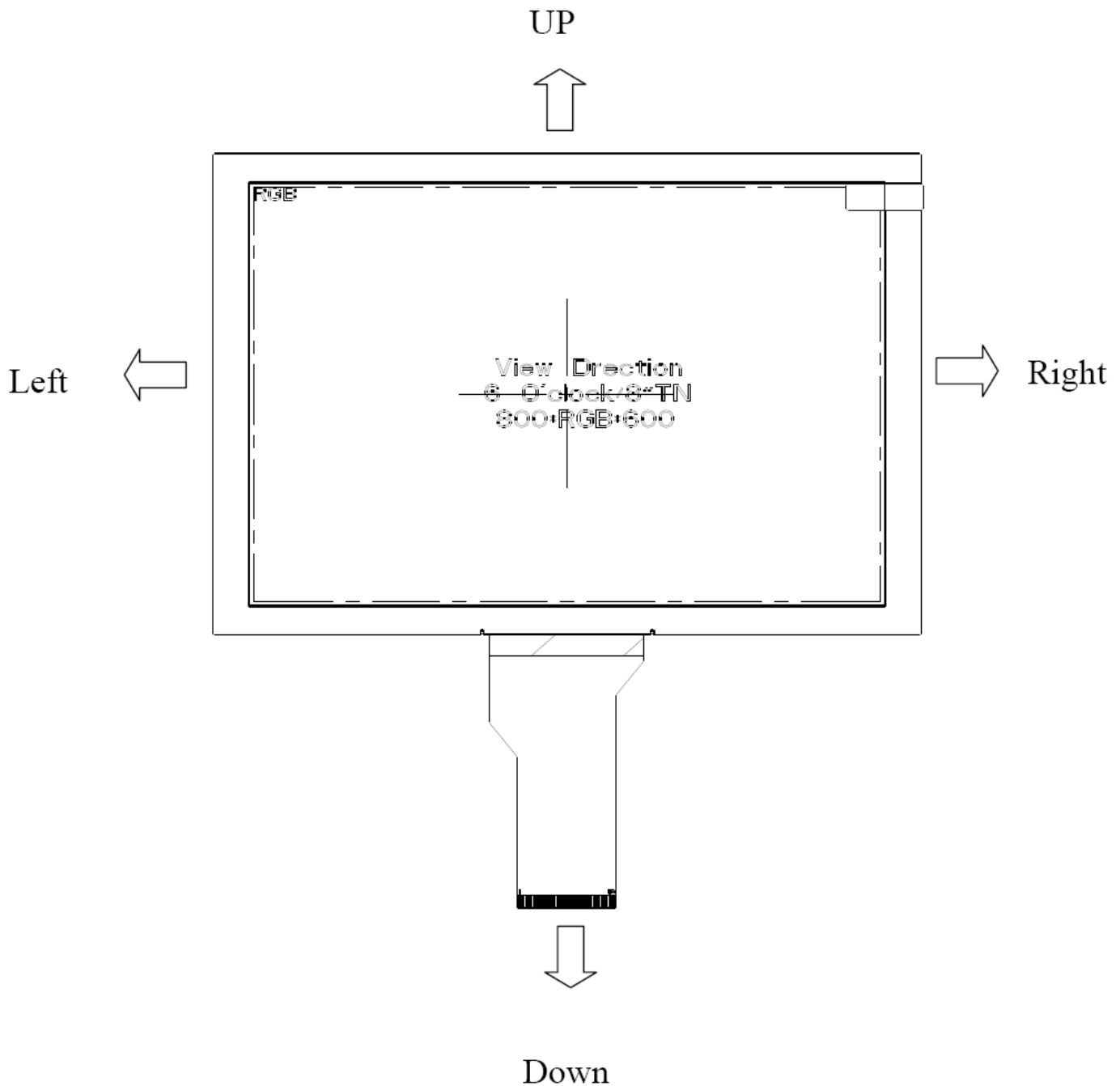
Note4: Dithering function enable control. Normally pull high.

DITHB="1", Disable internal dithering function. For 18bit RGB interface, connect two LSB bits of all the R/G/B data buses to GND.

DITHB="0", Enable internal dithering function, For TTL 24bit parallel RGB image data input.

Note 5: Definition of scanning direction.

Refer to the figure as below:





### 3. Operation Specifications

#### 3.1. Absolute Maximum Ratings

(GND=AV<sub>SS</sub>=0V, Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V <sub>CC</sub>	-0.3	5.0	V	
	AV <sub>DD</sub>	6.5	13.5	V	
	V <sub>GH</sub>	-0.3	42	V	
	V <sub>GL</sub>	-20	0.3	V	
	V <sub>GH</sub> -V <sub>GL</sub>	-0.3	40	V	
Operation Temperature	T <sub>OP</sub>	-20	70	°C	
Storage Temperature	T <sub>ST</sub>	-30	80	°C	
LED Reverse Voltage	V <sub>R</sub>	-	1.2	V	Each LED Note2
LED Forward Current	I <sub>F</sub>	-	25	mA	Each LED

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

Note 2: V<sub>R</sub> Conditions: Zener Diode 20mA





### 3.1.1. Typical Operation Conditions

(GND=AV<sub>SS</sub>=0V, Note 1)

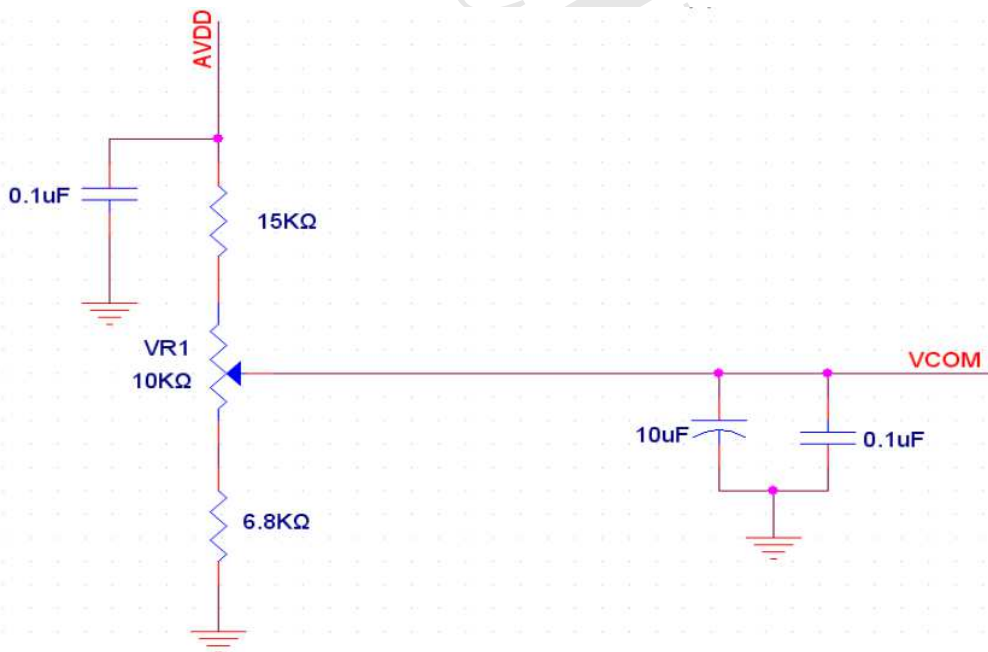
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV <sub>DD</sub>	3.0	3.3	3.6	V	Note2
	AV <sub>DD</sub>	10.2	10.4	10.6	V	
	V <sub>GH</sub>	15.3	16.0	16.7	V	
	V <sub>GL</sub>	-7.7	-7.0	-6.3	V	
Input signal voltage	V <sub>COM</sub>	2.8	3.8	4.8	V	Note4
Input logic high voltage	V <sub>IH</sub>	0.7 V <sub>CC</sub>	0.9 V <sub>CC</sub>	V <sub>CC</sub>	V	Note3
Input logic low voltage	V <sub>IL</sub>	0	0.1 V <sub>CC</sub>	0.3 V <sub>CC</sub>	V	

Note 1: Be sure to apply V<sub>CC</sub> and V<sub>GL</sub> to the LCD first, and then apply V<sub>GH</sub>.

Note 2: V<sub>CC</sub> setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK, HS, VS, RSTB, UPDN, STLR, MODE, DITHB.

Note 4: Typical V<sub>COM</sub> is only a reference value. It must be optimized according to each LCM. Be sure to use VR;





### 3.1.2. Current Consumption

(GND=AVSS=0V)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I <sub>GH</sub>	0.05	0.2	0.5	mA	V <sub>GH</sub> =16.0V
	I <sub>GL</sub>	0.05	0.2	1.0	mA	V <sub>GL</sub> = -7.0V
	IDV <sub>DD</sub>	1	5.5	10.0	mA	V <sub>CC</sub> =3.3V
	I <sub>AVDD</sub>	5	32.0	50.0	mA	AV <sub>DD</sub> =10.4V

### 3.1.3. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V <sub>L</sub>	8.4	9.3	10.5	V	Note1
Current for LED backlight	I <sub>L</sub>	162	180	198	mA	
LED life time	-	20,000	-	-	Hr	Note2

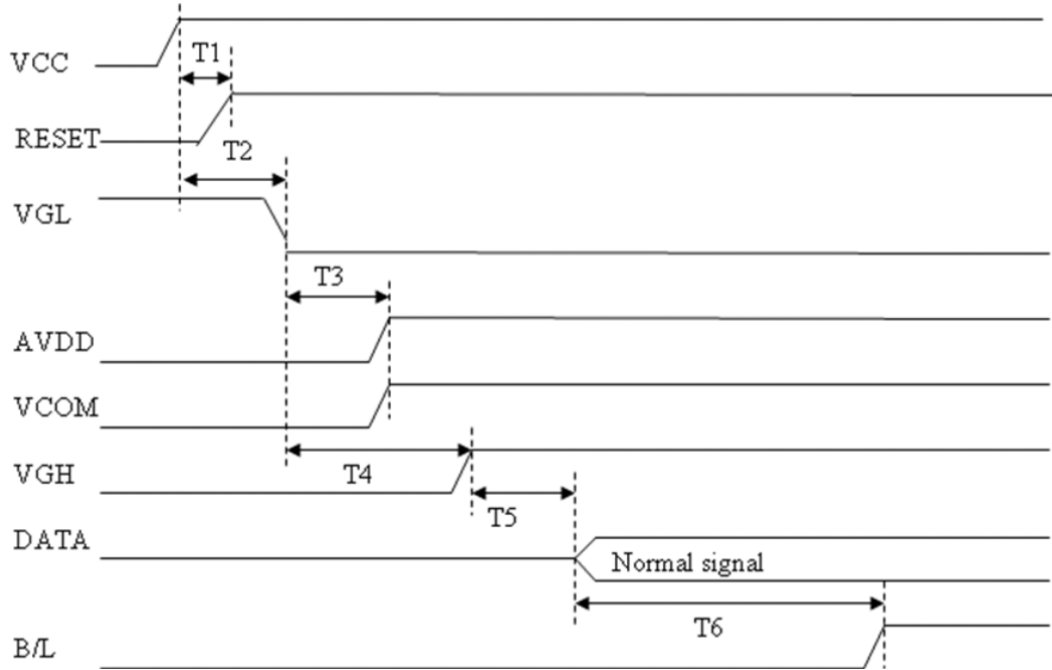
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I<sub>L</sub> =180mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I<sub>L</sub> =180mA. The LED lifetime could be decreased if operating I<sub>L</sub> is larger than 180mA.



### 3.2. Power Sequence

#### 3.2.1. Power on:



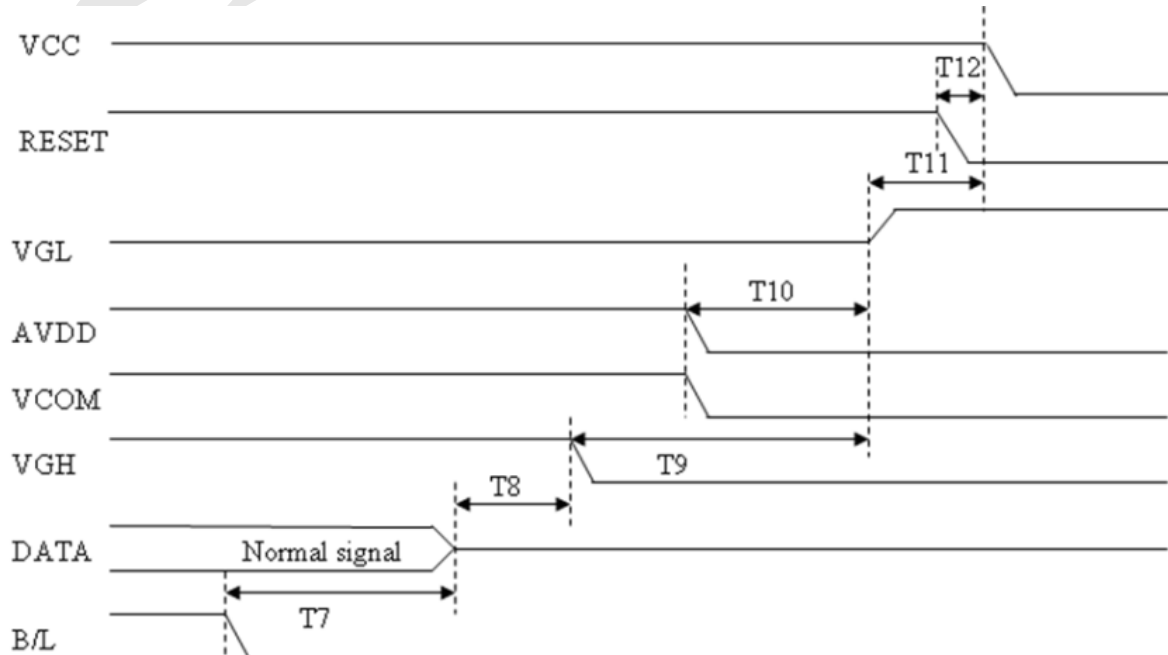
VCC→RESET→DATA→AVDD Gamma →VGL→VGH→B/L

Symbol	SPEC			Unit
	Min.	Typ.	Max.	
T1	1	1	1.5	ms
T2	20	30	50	ms
T3	5	20	50	ms
T4	10	20	50	ms
T5	10	20	50	ms
T6	200	300	400	ms

Note: Data include R0~R7, B0~B7, GO~G7, UD, LR, DCLK, HS, VS, DE.



### 3.2.2. Power off:



Note: Data include R0~R7, B0~B7, GO~G7, STLR,UPDN, DCLK, HS,VS,DE.

Symbol	SPEC			Unit
	Min.	Typ.	Max.	
T7	0	30	50	ms
T8	10	20	50	ms
T9	10	20	50	ms
T10	5	20	50	ms
T11	20	30	50	ms
T12	1	1.5	3	ms



### 3.3. Timing Characteristics

#### 3.3.1. AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T <sub>hst</sub>	8	10	12	ns	
HS hold time	T <sub>hhd</sub>	8	10	12	ns	
VS setup time	T <sub>vst</sub>	8	10	12	ns	
VS hold time	T <sub>vhd</sub>	8	10	12	ns	
Data setup time	T <sub>dsu</sub>	8	10	12	ns	
Data hole time	T <sub>dhd</sub>	8	10	12	ns	
DE setup time	T <sub>esu</sub>	8	10	12	ns	
DE hole time	T <sub>ehd</sub>	8	10	12	ns	
DV <sub>DD</sub> Power On Slew rate	T <sub>POR</sub>	1	2	20	ms	
RESET pulse width	TR <sub>st</sub>	10	20	50	ms	
DCLK cycle time	T <sub>coh</sub>	20	25	30	ns	
DCLK pulse duty	T <sub>cwh</sub>	40	50	60	%	

#### 3.3.2. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	800	800	800	DCLK	
DCLK Frequency	fclk	33	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	6	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	600	600	600	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	3	20	TH	
VS pulse width	tvb	23	23	23	TH	
VS pulse width	tvfp	1	12	77	TH	



### 3.3.3. Data Input Format

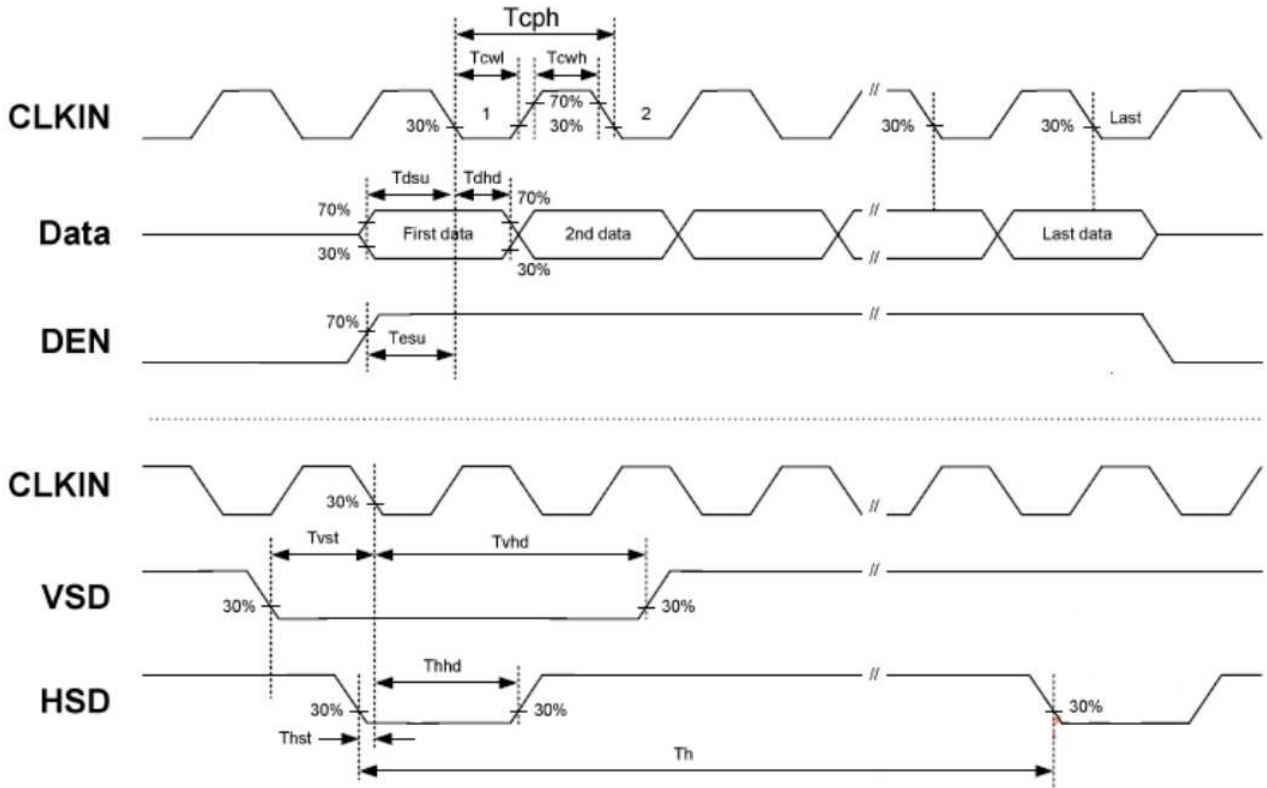


Figure 3.1 Input Clock and Data Timing Diagram

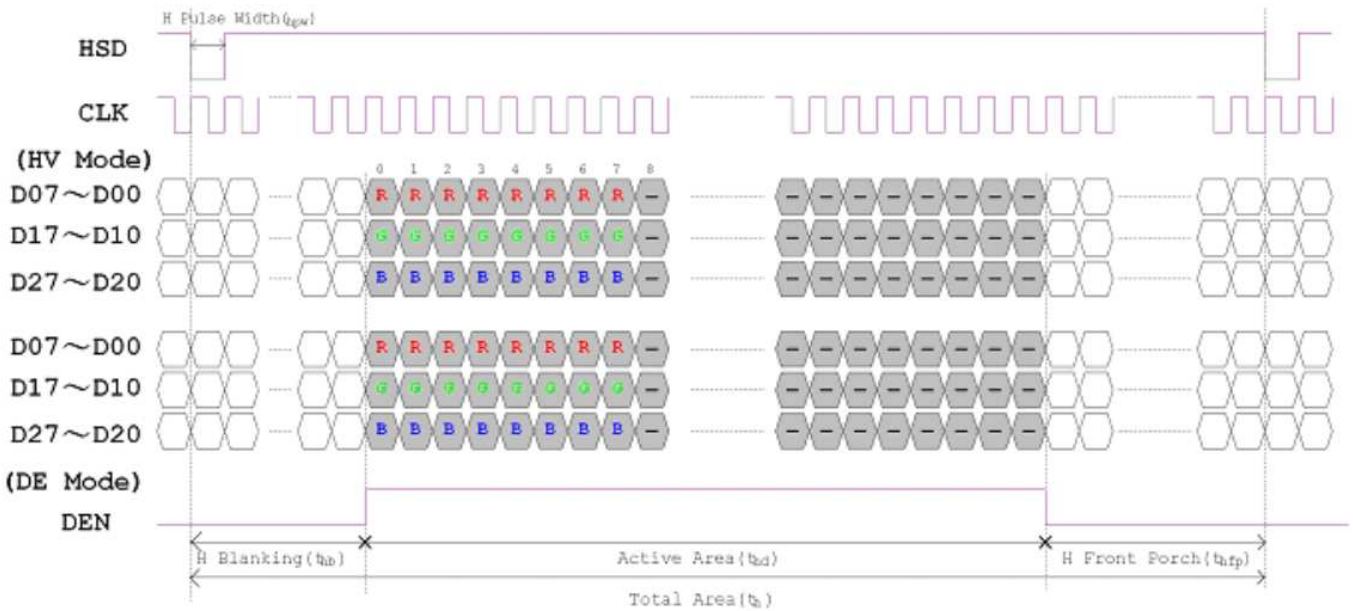


Figure 3.2 Horizontal input timing diagram.



## 4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	$\theta_L$	$\Phi=180^\circ$ (9 o'clock)	60	70	-	degree	Note1
	$\theta_R$	$\Phi=0^\circ$ (3 o'clock)	60	70	-		
	$\theta_T$	$\Phi=90^\circ$ (12 o'clock)	40	50	-		
	$\theta_B$	$\Phi=270^\circ$ (6 o'clock)	60	70	-		
Response time	$T_{ON+}$	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note3
	$T_{OFF}$		-	15	30	msec	Note3
Contrast ratio	CR		400	500	-	-	Note4
Color chromaticity	$W_X$		0.26	0.31	0.36	-	Note2
	$W_Y$		0.28	0.33	0.38	-	Note5
Luminance	L		200	250	-	cd/m <sup>2</sup>	Note6
Luminance uniformity	$Y_U$		70	75	-	%	Note7

Test Conditions:

- $V_{CC}=3.3V$ ,  $I_L=180mA$  (Backlight current), the ambient temperature is  $25^\circ C$ .
- The test systems refer to Note 2.



Note 1: Definition of viewing angle range

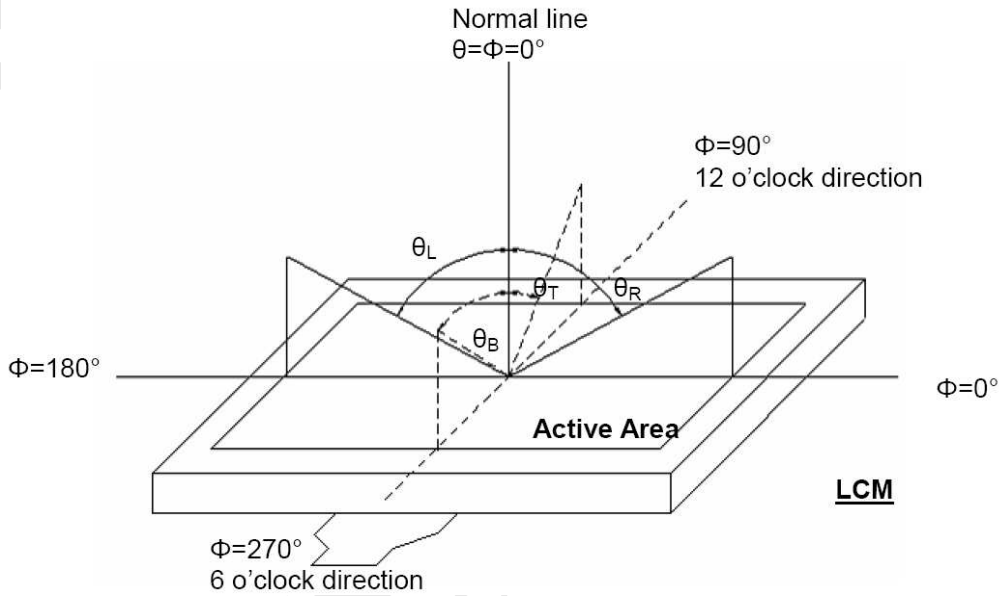


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

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

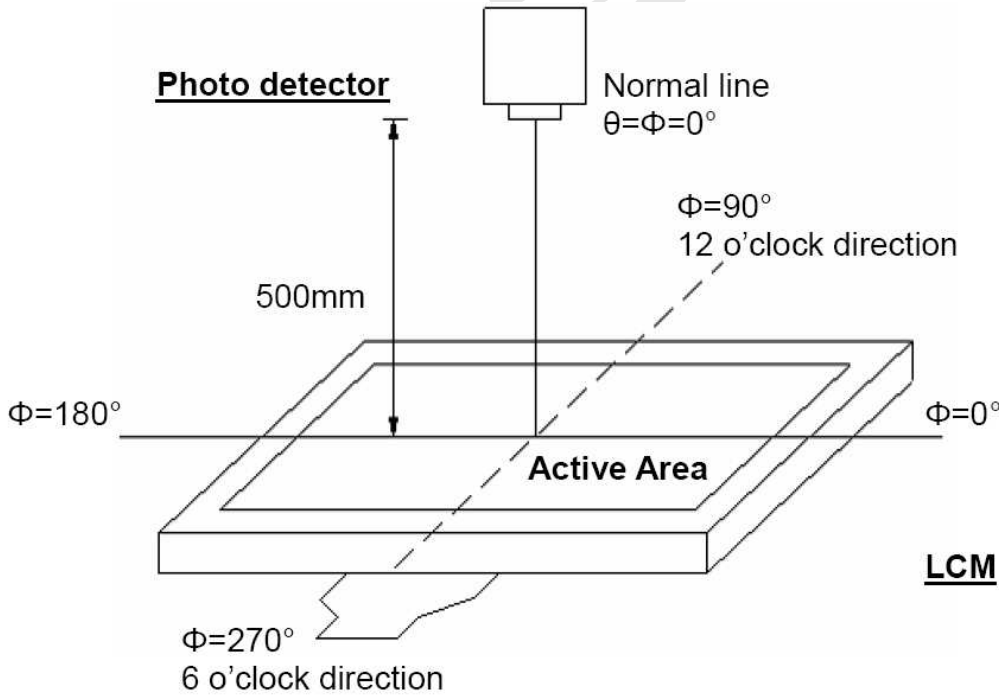


Fig. 4-2 Optical measurement system setup





Note 3: Definition of Response time

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

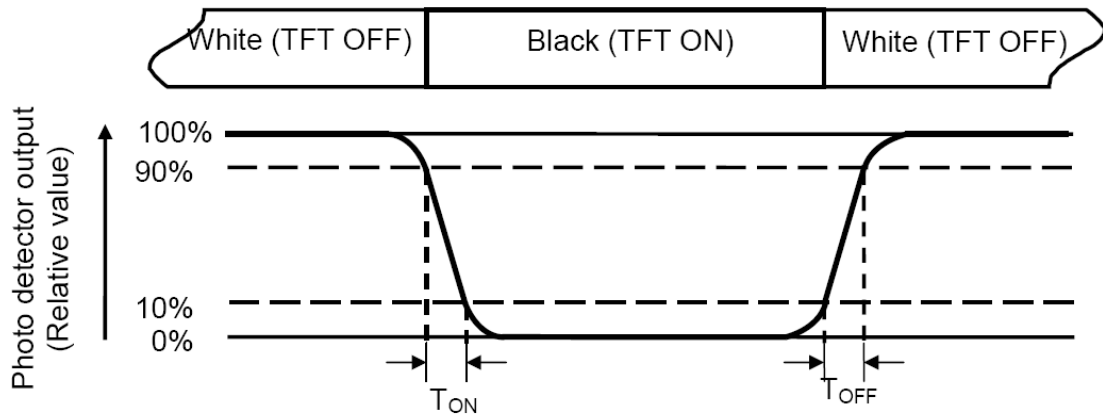


Fig. 4-3 Definition of response time

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: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is  $I_L=180\text{mA}$  .



Note 7: Definition of Luminance Uniformity

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

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

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

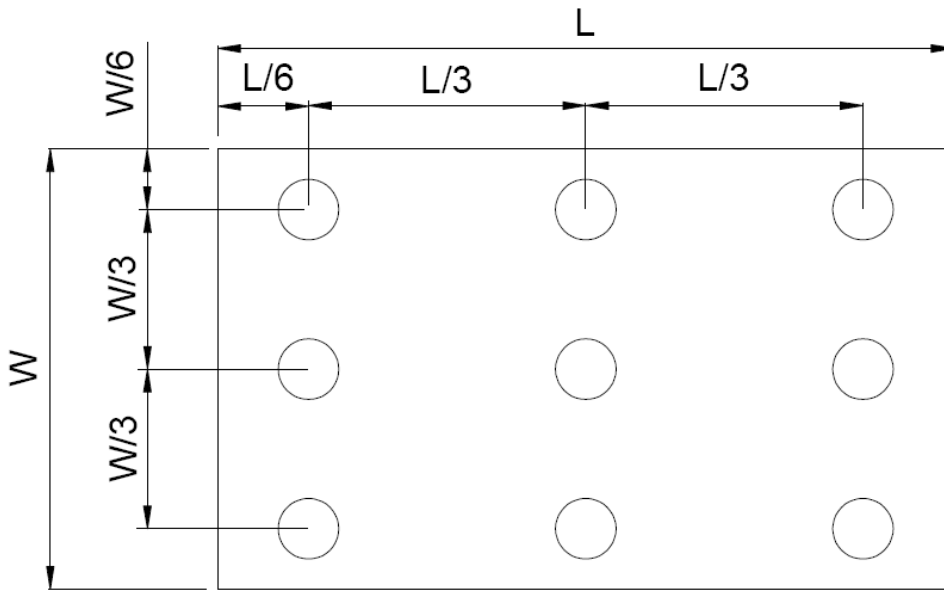


Fig. 4-4 Definition of measuring points

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

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



## 5. Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80°C                      240hrs	Note 1 , Note 4
Low Temperature Storage	Ta = -30°C                      240hrs	Note 1 , Note 4
High Temperature Operation	Ts = 70°C                      240hrs	Note 2 , Note 4
Low Temperature Operation	Ta = -20°C                      240hrs	Note 1 , Note 4
Operate at High Temperature and Humidity	+40°C , 90%RH                      240hrs	Note 4
Thermal Shock	-30°C 30min)→80°C 30 min for a total 100 cycles, Start with cold temperature and end with high temperature	Note 4
Vibration Test	1.5G / 10-500Hz, 30min/cycle, 1cycle for each X, Y, Z	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	1.47Grms X, Y, Z three axes (30min /axis) [spectrum : 5Hz(0.015G <sup>2</sup> /Hz) , 100Hz(0.015G <sup>2</sup> /Hz) , 200Hz(0.0037G <sup>2</sup> /Hz)]	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
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.



## 6. General Precautions

### 6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

### 6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

### 6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

### 6.4. Storage

1. Store the module in a dark room where must keep at  $25\pm 10^{\circ}\text{C}$  and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

### 6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

### 6.6. Quality warranty period

Within one year after shipment date. ( excluding abnormal usage way and abnormal environments. )





## 8. Package Drawing

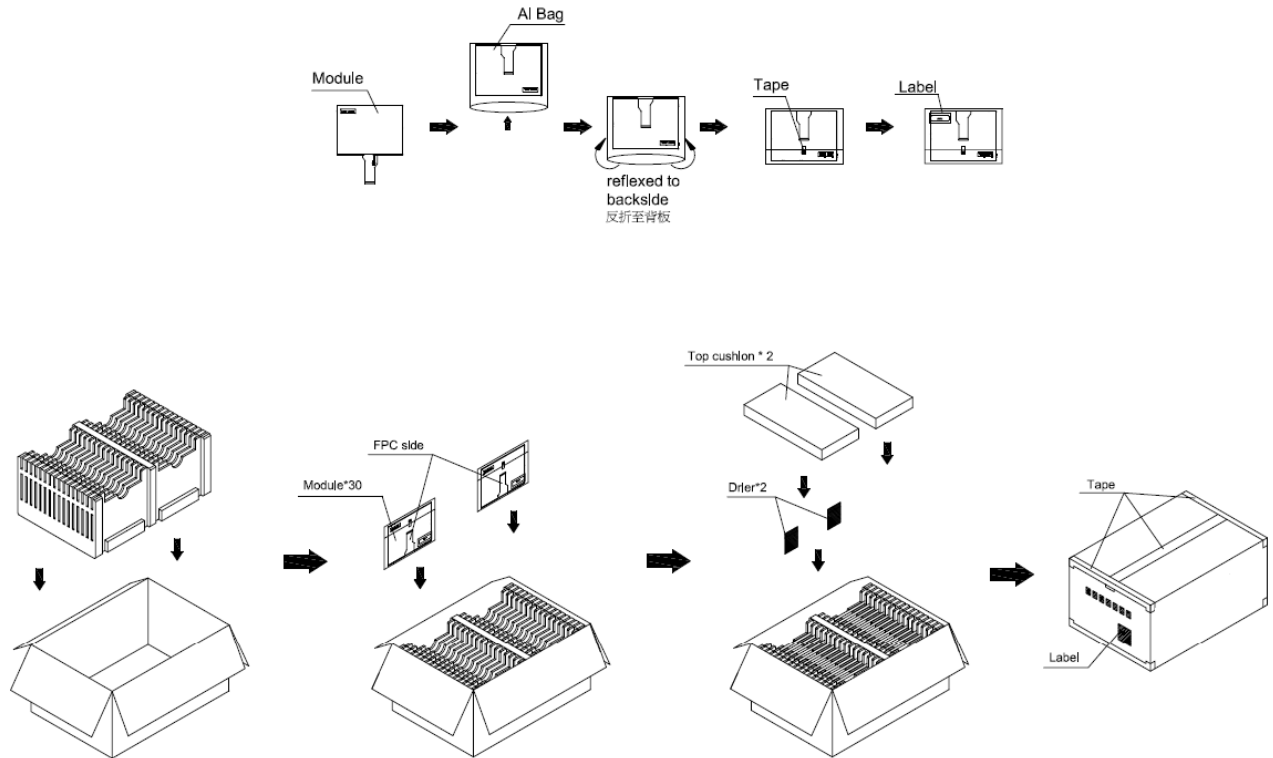
### 8.1 Package Material Table

No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity	Remark
1	LCM Module	GFTO080KA800600	183X141.0X5.6	0.241	30pcs	
2	Cushion	Paper & EPE	515X349X227	1.45	1 pcs	
3	Bag	Aluminum foil	216X200X0.07	0.0088	30pcs	
4	Exsiccator	Montmorillonite	105X80	0.035	2 pcs	
5	Tape	Cre pe - Paper	300X10X0.13	0.0001	30 pcs	
6	Carton	Corrugated paper	530X367X260	0.95	1 pcs	
7	Total weight	9.967 Kg ± 5%				

### 8.2 Packaging Quantity

Total LCM quantity in Carton: no. of Partition 2 Rows x quantity per Row 15 = 30 pcs

### 8.3 Packaging Drawing



- (1) Box Dimensions : 530(L)\*367(W)\*260(H)
- (2) 30 Modules/Carton