



# Chunghwa Picture Tubes, Ltd.

## Product Specification

To : NLK  
Date : 071114

**TFT LCD**  
**CLAA080MB0ACW**

ACCEPTED BY : (V0.5)  
Tentative

APPROVED BY	CHECKED BY	PREPARED BY
張聖暉	李家銘	羅世奎

Prepared by :  
Product Planning Management Division  
Small & Medium TFT Product Business Unit  
**CHUNGHWA PICTURE TUBES, LTD.**

1127 Hopin Rd., Padeh, Taoyuan, Taiwan 334, R.O.C.  
TEL: +886-3-3675151 FAX: +886-3-377-3858

Doc.No:	SPEC_CLAA080MB0ACW_V0.5_NLK_071114	Issue Date:	2007/11/05
---------	------------------------------------	-------------	------------



## CONTENTS

<b>1. OVERVIEW</b> .....	<b>4</b>
<b>2. ABSOLUTE MAXIMUM RATINGS</b> .....	<b>5</b>
<b>3.ELECTRICAL CHARACTERISTICS</b> .....	<b>6</b>
3.1TFT LCD Power Voltage.....	6
3.2 TFT-LCD current consumption .....	6
3.3 Power、Signal sequence.....	7
<b>4. INTERFACE CONNECTION</b> .....	<b>8</b>
<b>5. INPUT SIGNAL(DE ONLY MODE)</b> .....	<b>10</b>
5.1 Timing Specification.....	10
5.2 Timing Chart : .....	10
5.3 Color Data Assignment.....	11
<b>6. BLOCK DIAGRAM</b> .....	<b>12</b>
<b>7. MECHANICAL DIMENSION</b> .....	<b>13</b>
7.1 Front Side .....	13
7.2 Rear Side.....	14
<b>8. OPTICAL CHARACTERISTICS</b> .....	<b>15</b>
<b>9. RELIABILITY TEST</b> .....	<b>17</b>
9.1. Temperature and humidity .....	17
9.2. Shock and Vibration.....	17
9.3.ESD experiments.....	17
9.4. Judgment standard.....	17

## 1. OVERVIEW

CLAA080MB0ACW is 20.32 cm(8") color TFT-LCD(Thin Film Transistor Liquid Crystal Display)module composed of LCD panel,driver ICs,control circuit,and backlight.

The 8.0" screen produces a high resolution image that is composed of 800×600 pixel elements in a stripe arrangement.Display 262K colors by 6 Bit R.G.B signal input.Use 3.3 voltage (Vcc) to drive the power of LCD system, and 5 Voltage to drive the LED back light.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Panel Size	8 inch(panel diagonal)
Display Area (mm)	162(H)×121.5(W)
Number of Pixels	800(H) x 3(RGB) x 600(V)
Pixel Pitch (mm)	0.2025(H)×0.2025(V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of colors	262,144
Brightness(cd/m <sup>2</sup> )	250
NTSC ratio	50 %
Response Time (Tr+Tf)	25 ms
Outline Dimension(in mm)	183(W) x 141(H) x 6.3(D) (TYP)
Viewing Angle(BL on,CR≥10)	140 degree(H) · 120 degree(V)
Power consumption (with BLU)	4 W (typ.)
BL unit	LED
Electrical Interface(data)	TTL
Viewing Direction	6 o'clock
Weight(g)	208 (typ.)
Surface Treatment	Anti-Glare · Hardness:3H

## 2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	Vcc	-0.3	4.0	V	
Signal Input Voltage	R0~ R5 / G0~G5 B0~B5 / CLK	-0.3	Vcc + 0.3	V	
Static Electricity	VESDc	-200	200	V	【Note2】
	VESDm	-15K	15K	V	
ICC Rush Current	IRUSH	-	1	A	【Note3】
Operation temperature	T <sub>op</sub>	-30	70	°C	【Note1】
Storage temperature	T <sub>stg</sub>	-40	80	°C	【Note1】

[Note]

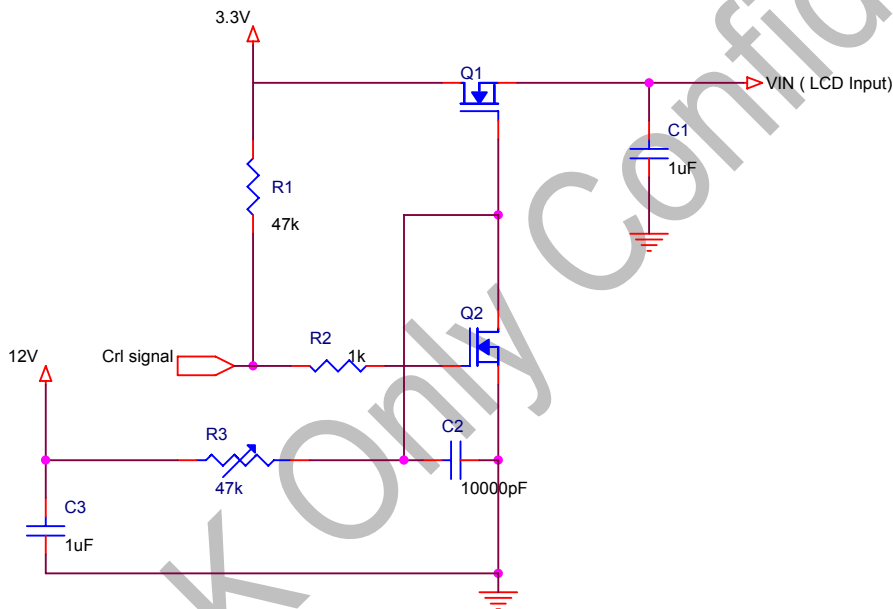
\*1) If users use the product out of the environment operation range (temperature and humidity), it will concern for visual quality.

\*2) Test Condition: IEC 61000-4-2 ,

VESDc : Contact discharge to input connector

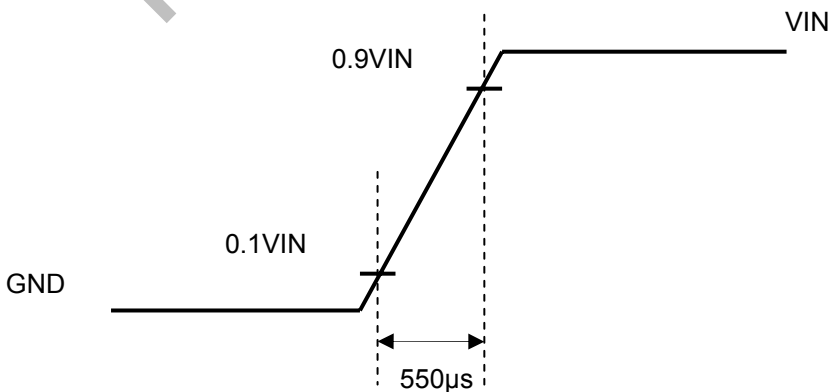
VESDm : Contact discharge to module

\*3) The Input pulse-current measurement system as below :



Control signal: High(+3.3V)→Low(GND)

Supply Voltage of rising time should be from R3 and C2 tune to 550 us.



### 3.ELECTRICAL CHARACTERISTICS

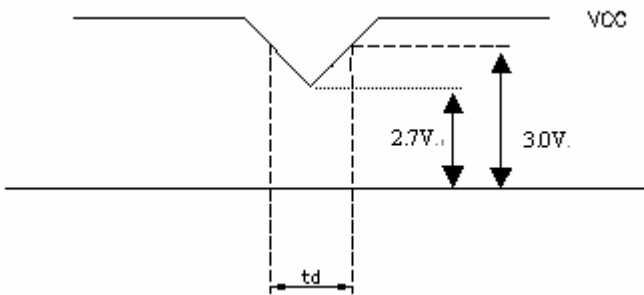
#### 3.1TFT LCD Power Voltage

Ta=25°C

Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	[Note1]
Power Supply Voltage For LED	VDD	4.5	5	5.5	V	
Logic Input Voltage	VIH	0.7VCC		VCC	V	
	VIL	0		0.3VCC	V	
ADJ Input Voltage	Input Voltage(high)	VIH	3.0	3.3	V	
	Input Voltage(low)	VIL	GND	0.3	V	

[Note1]VCC –dip codition:

- 1) When  $2.7\text{ V} \leq VCC < 3.0\text{V}$  ,  $td \leq 10\text{ms}$ .
- 2)  $VCC > 3.0\text{V}$  , VCC-dip condition should be same as VCC-turn-on condition.



#### 3.2 TFT-LCD current consumption

Item	Symbol	Min.	Typ	Max.	Unit	Note
LCD Power Current	ICC	--	150	200	mA	【Note1】
LED Power Current	IDD	--	450	550	mA	【Note2】

[Note1]

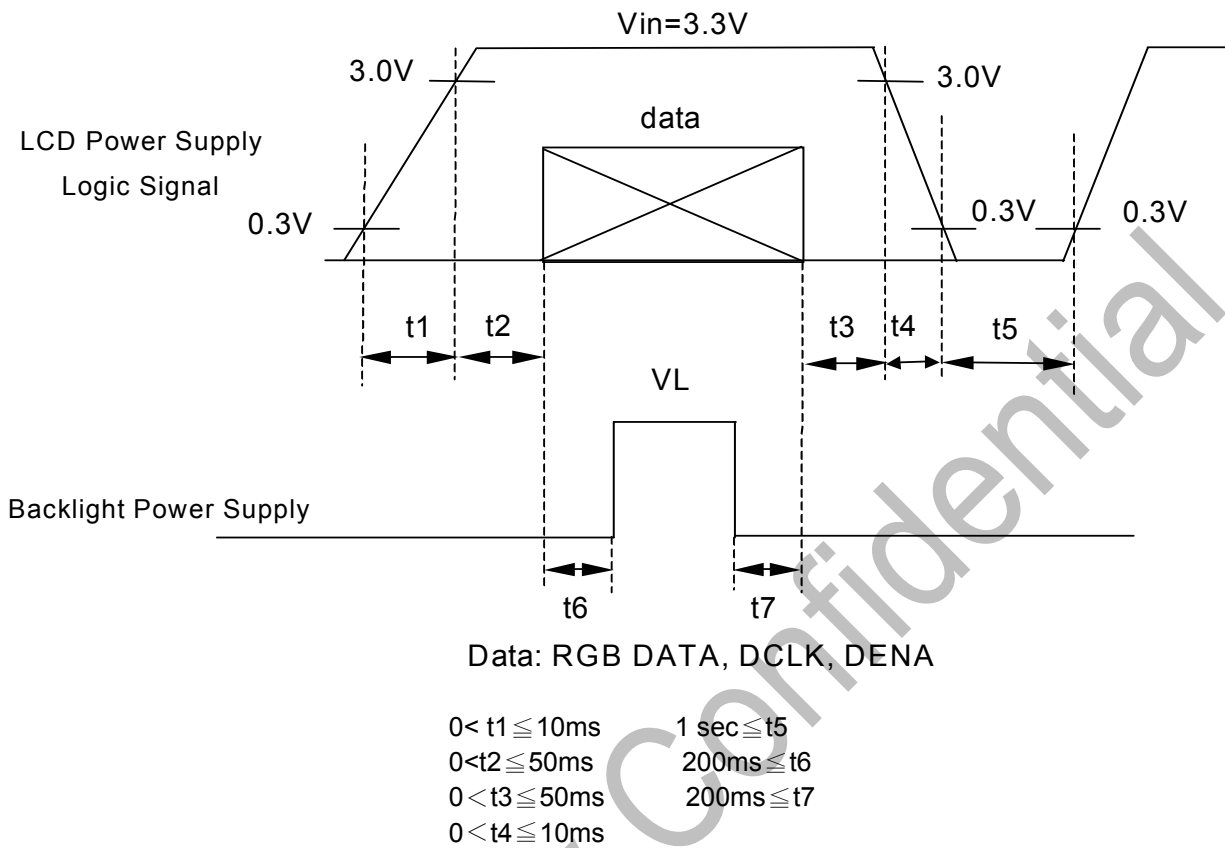
Typical: Under 64 gray pattern  
 Maximum: Under black pattern



.. (a)64-Gray-Pattern .. (b)Black-Pattern ..

[Note2] Typical: When VDD is 5V  
 Maximum: When VDD is 4.5V

3.3 Power 、 Signal sequence



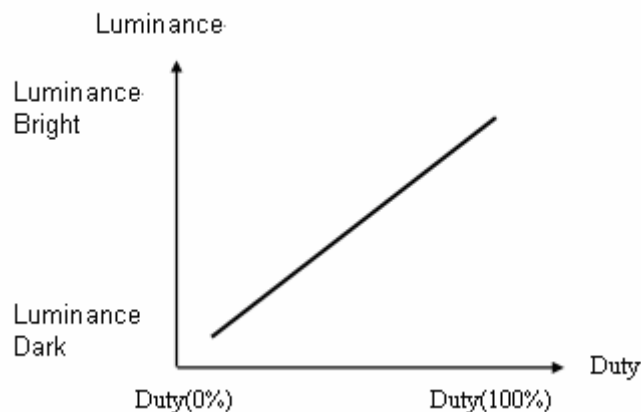
## 4. INTERFACE CONNECTION

CN1 : Connector type : FR03-S40D-2-E3000

Pin NO.	SYMBOL	DESCRIPTION
1	V <sub>SS</sub>	Power Ground
2	V <sub>SS</sub>	Power Ground
3	ADJ	LED adjust
4	V <sub>LED</sub>	Power Supply for LED (V <sub>LED</sub> =5.0±0.5)
5	V <sub>LED</sub>	Power Supply for LED (V <sub>LED</sub> =5.0±0.5)
6	V <sub>LED</sub>	Power Supply for LED (V <sub>LED</sub> =5.0±0.5)
7	V <sub>CC</sub>	Power Supply for LCD
8	V <sub>CC</sub>	Power Supply for LCD
9	DE	Data Enable
10	V <sub>SS</sub>	Power Ground
11	V <sub>SS</sub>	Power Ground
12	V <sub>SS</sub>	Power Ground
13	B5	Blure Data (MSB)
14	B4	Blure Data
15	B3	Blure Data
16	V <sub>SS</sub>	Power Ground
17	B2	Blue Data
18	B1	Blue Data
19	B0	Blue Data (LSB)
20	V <sub>SS</sub>	Power Ground
21	G5	Green Data (MSB)
22	G4	Green Data
23	G3	Green Data
24	V <sub>SS</sub>	Power Ground
25	G2	Green Data
26	G1	Green Data
27	G0	Green Data (LSB)
28	V <sub>SS</sub>	Power Ground
29	R5	Red Data (MSB)
30	R4	Red Data
31	R3	Red Data
32	V <sub>SS</sub>	Power Ground
33	R2	Red Data
34	R1	Red Data
35	R0	Red Data (LSB)
36	V <sub>SS</sub>	Power Ground
37	NC	None connect
38	DCLK	Clock
39	NC	None connect
40	NC	None connect

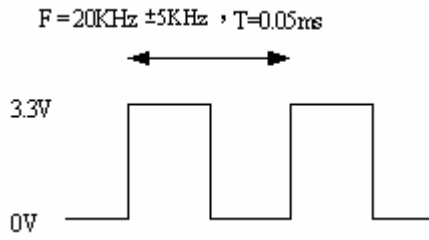
Remarks:

1) ADJ adjust brightness to control Pin , Pulse duty the bigger the brighter.





2) ADJ signal = 0~3.3V , operation frequency : 20KHZ±5KHZ



3)  $V_{SS}$  Pin must ground contact , can not be floating.

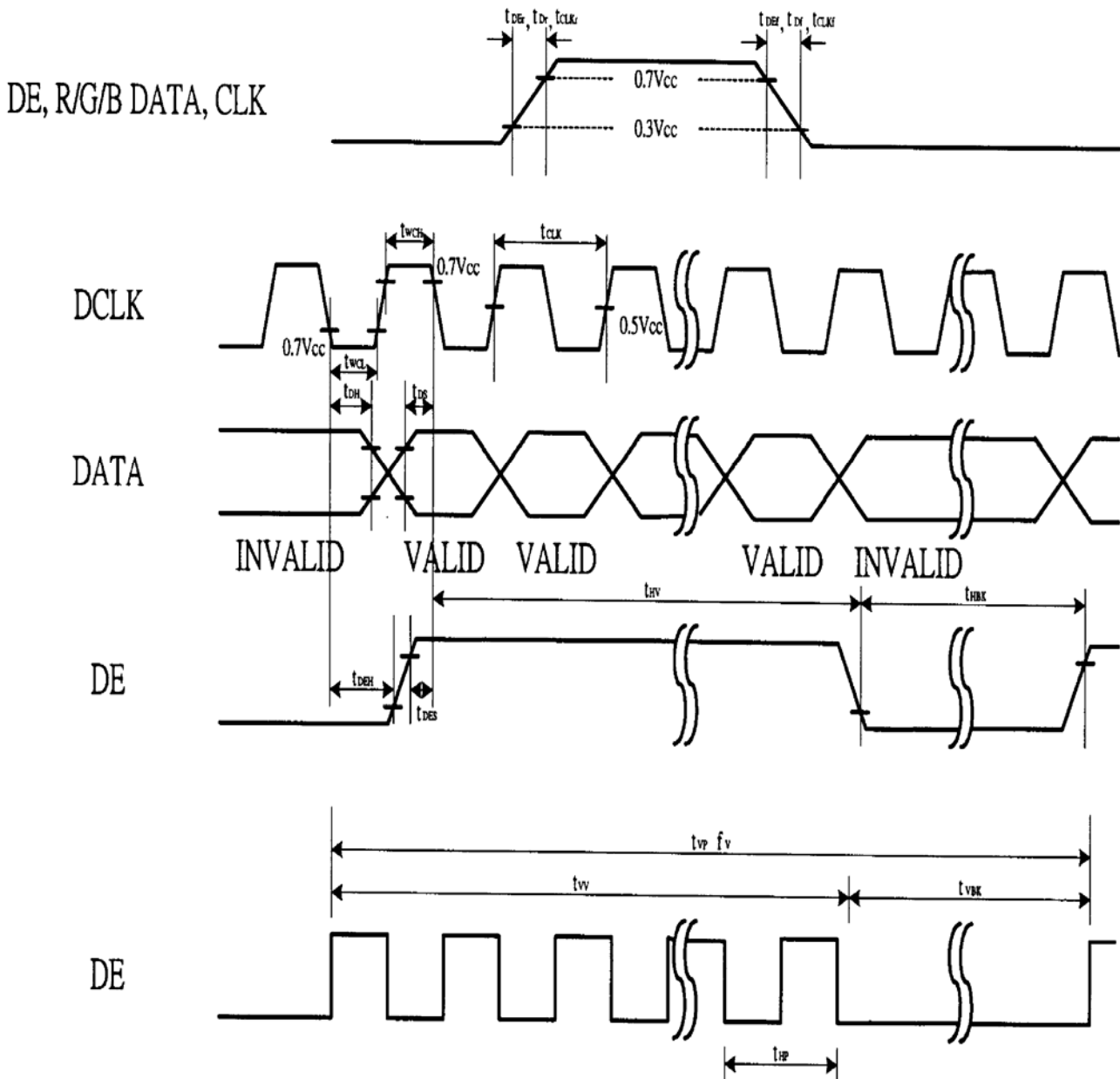
NLK Only Confidential

### 5. INPUT SIGNAL(DE ONLY MODE)

#### 5.1 Timing Specification

Item		SYMBOL	MIN.	TYP.	MAX.	UNIT		
LCD Input timing	DCLK	Dot clock	$f_{CLK}$	32	38.28	43	MHz	
		High level width	$t_{WCH}$	--	13	--	ns	
		Low level width	$t_{WCL}$	--	13	--	ns	
	DENA	Horizontal	Horizontal Period	$t_{HP}$	976	1016	1056	tCLK
			Horizontal Valid	$t_{HV}$	800	800	800	tCLK
			Horizontal Blank	$t_{HBK}$	176	216	256	tCLK
		Vertical	Frame	$f_V$	55	60	65	Hz
			Vertical Period	$t_{VP}$	625	628	631	$t_H$
			Vertical Valid	$t_{VV}$	600	600	600	$t_H$
	Data	Setup Time	$t_{DS}$	6	--	--	ns	
		Hold Time	$t_{DH}$	12	--	--	ns	
	DE	Setup Time	$t_{DES}$	6	--	--	ns	
		Hold Time	$t_{DEH}$	12	--	--	ns	

#### 5.2 Timing Chart :



## 5.3 Color Data Assignment

COLOR	INPUT	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
	DATA	MSB					LSB	MSB					LSB	MSB					LSB
	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
BASIC	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
COLOR	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
RED																			
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
GREEN																			
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BLUE																			
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

[Note]

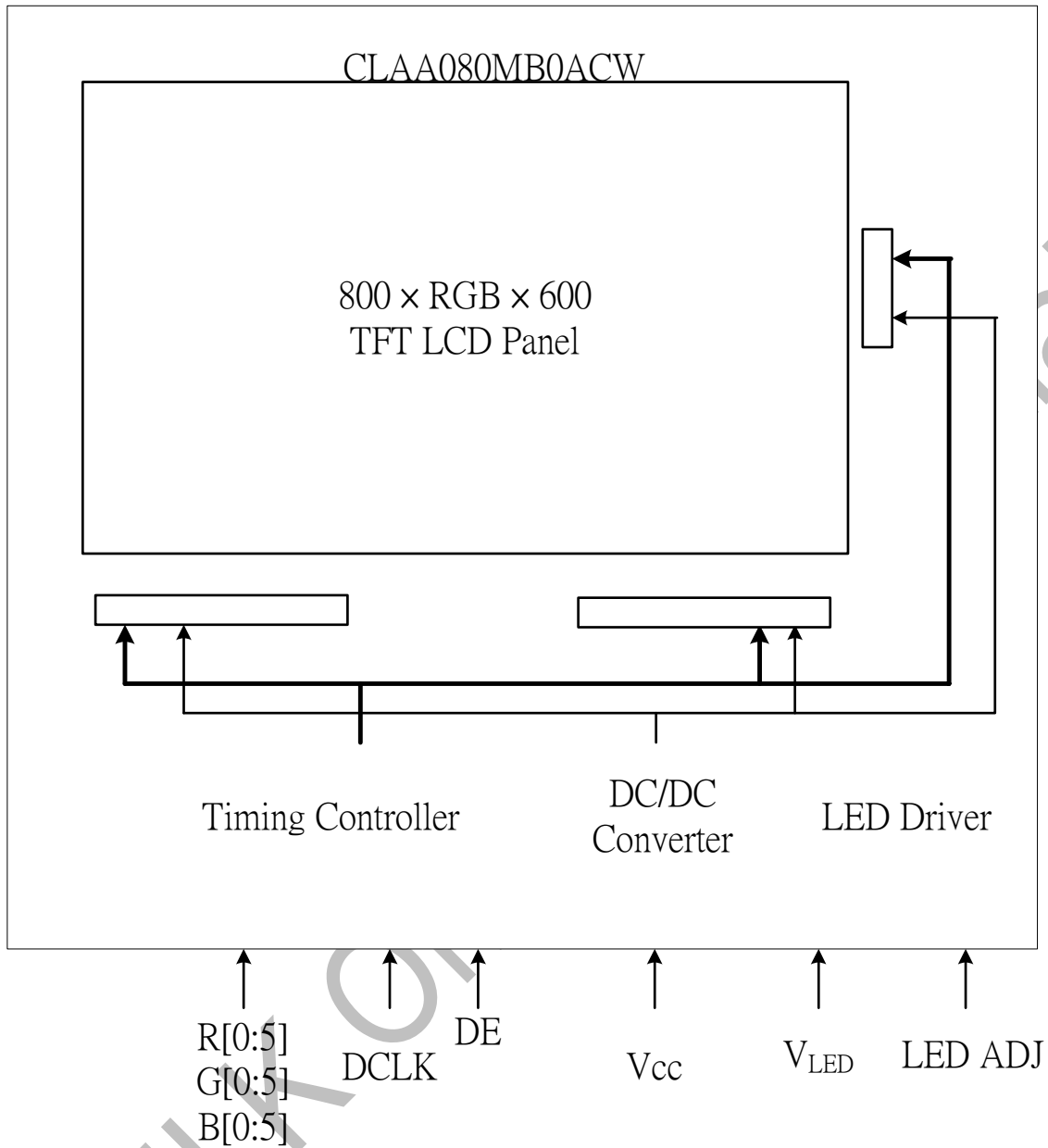
(1) Definition of Gray Scale

color(n) : n is series of Gray Scale

The more n value is, the bright Gray Scale.

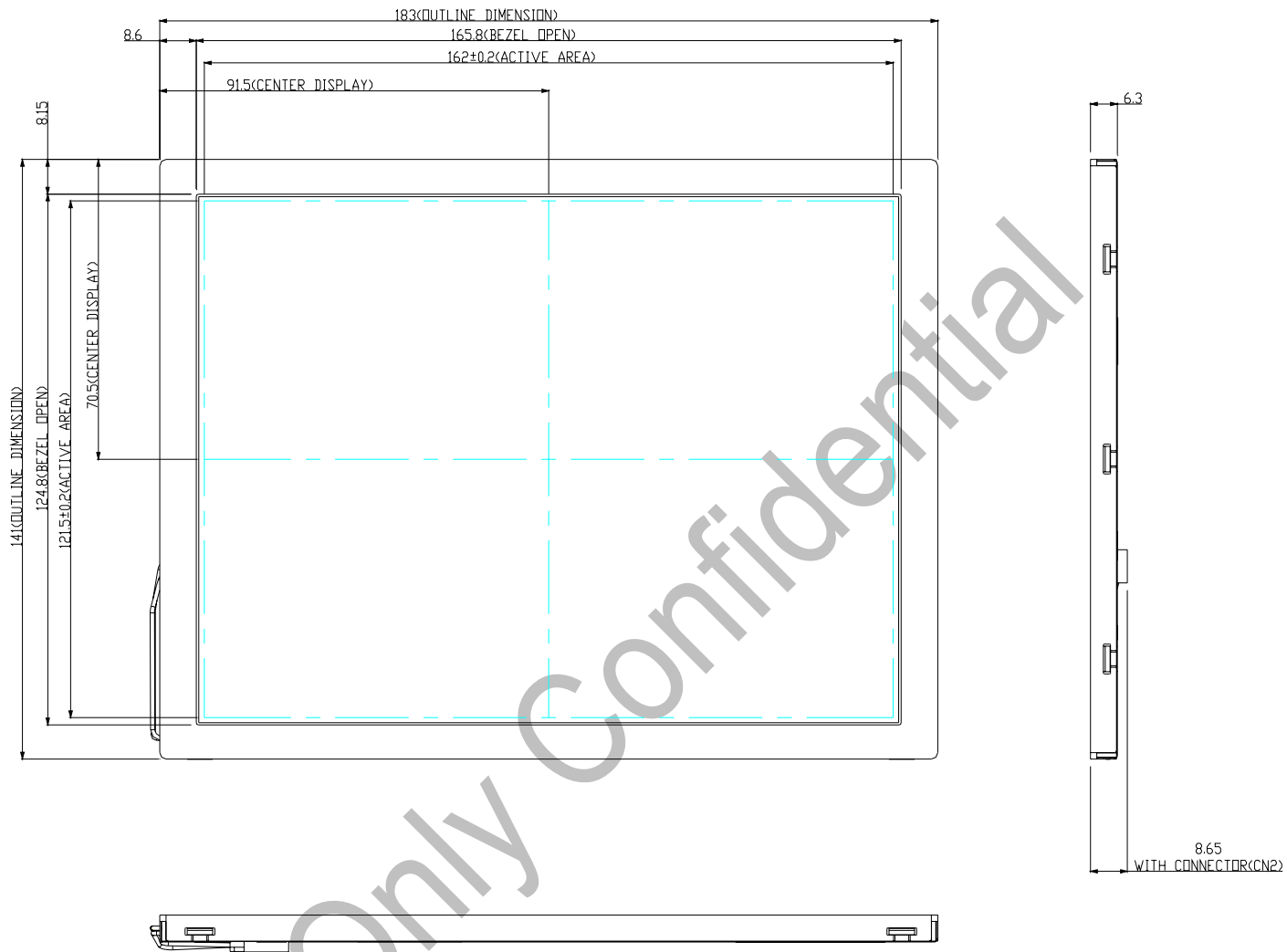
(2)Data:1-High,0-Low

### 6. BLOCK DIAGRAM

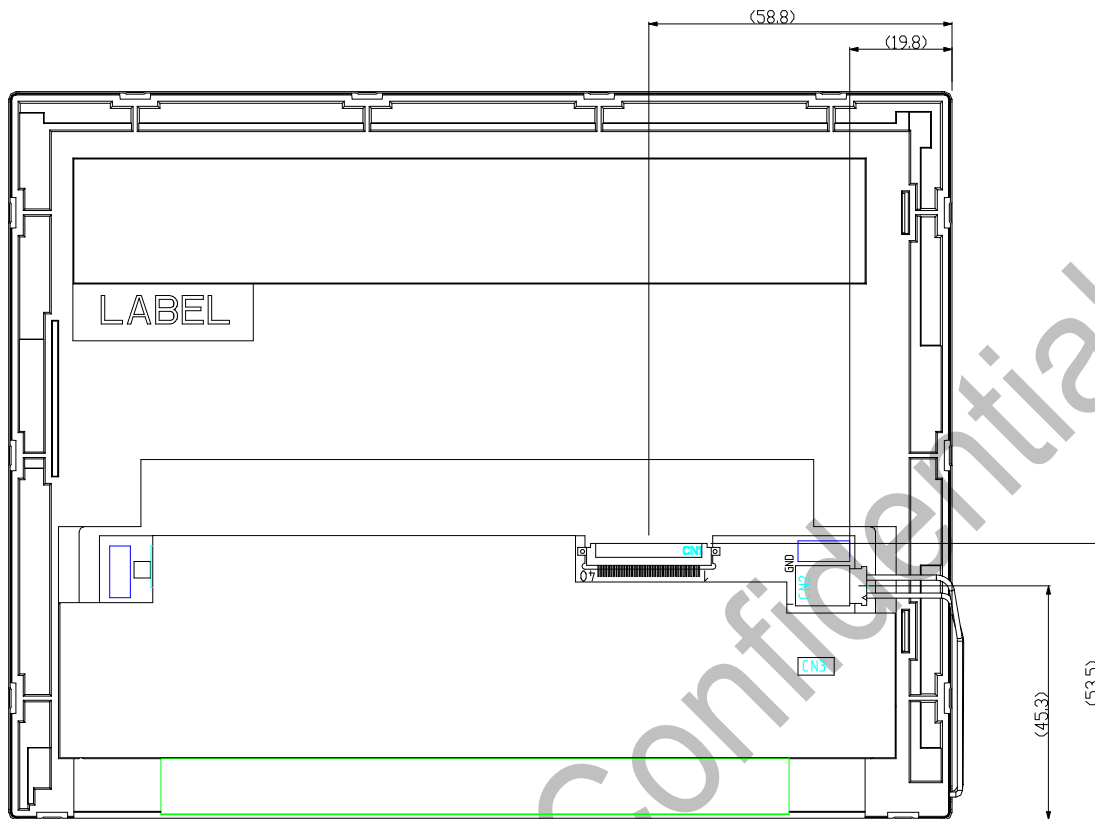


### 7. MECHANICAL DIMENSION

#### 7.1 Front Side



## 7.2 Rear Side



## NOTE:

1. GENERAL TOLERANCE:  $\pm 0.3\text{mm}$
2. 6 O'CLOCK DIRECTION IS THE OPTIMUM VIEWING ANGLE.
3. CONNECTOR TYPE: STARCONN 089N40-000R00-G2 or CONN-TEK FR03-S40D-2-E3000
4. STIFFENER LENGTH OF FPC MUST BE 6.0mm MAX.

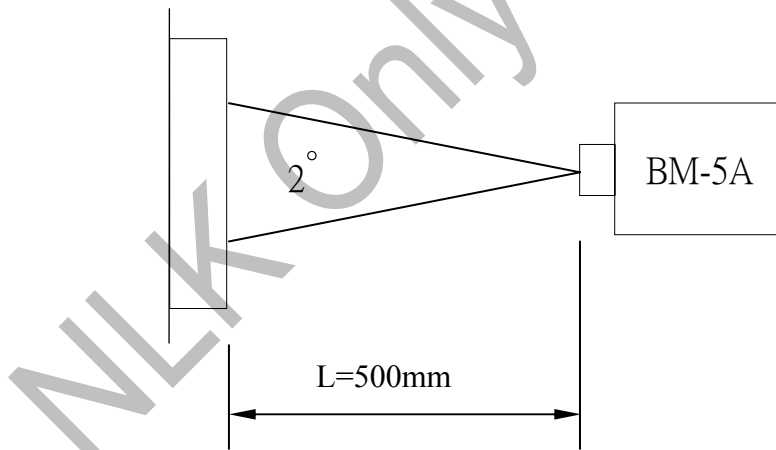
## 8. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Contrast	CR	$\theta = \phi = 0^\circ$ Point-5	450	500	--	--	*1)
Luminance	Luminance (CEN)	$\theta = \phi = 0^\circ$	200	250	--	cd/m <sup>2</sup>	*2)
	Luminance Uniformity	$\theta = \phi = 0^\circ$	70	80	--	%	*2)
Color saturation			--	50		%	
Response Time	tr+tf	$\theta = \phi = 0^\circ$	--	25	30	ms	*3) *5)
View angle	Horizontal	CR $\geq$ 10 Point-5	130	140	--	°	*4)
	Vertical		110	120	--	°	*4)
Color Coordinate	White	$\theta = \phi = 0^\circ$ Point-5	0.273	0.313	0.353	--	*1)*2)*3)
			0.289	0.329	0.369		
	Red		0.577	0.607	0.637	--	
			0.301	0.331	0.361		
Green	0.295	0.325	0.355	--			
	0.565	0.595	0.625				
Blue	0.114	0.147	0.177	--			
	0.065	0.095	0.125				

Remarks :

\*1)Measure condition : 25°C $\pm$ 2°C , 60 $\pm$ 10%RH , under10 Lux in the dark room.BM-5A (TOPCON) , viewing angle2° , VCC=3.3V , VDD=5V.



\*2) Definition of contrast ratio :

Contrast Ratio (CR)= (White) Luminance of ON  $\div$  (Black) Luminance of OFF

\*3) Definition of luminance :

Measure white luminance on the point 5 as figure8-1

Definition of Luminance Uniformity:

Measure white luminance on the point1~9 as figure8-1

$$\Delta L = [L(\text{Min})/L(\text{Max})] \times 100\%$$

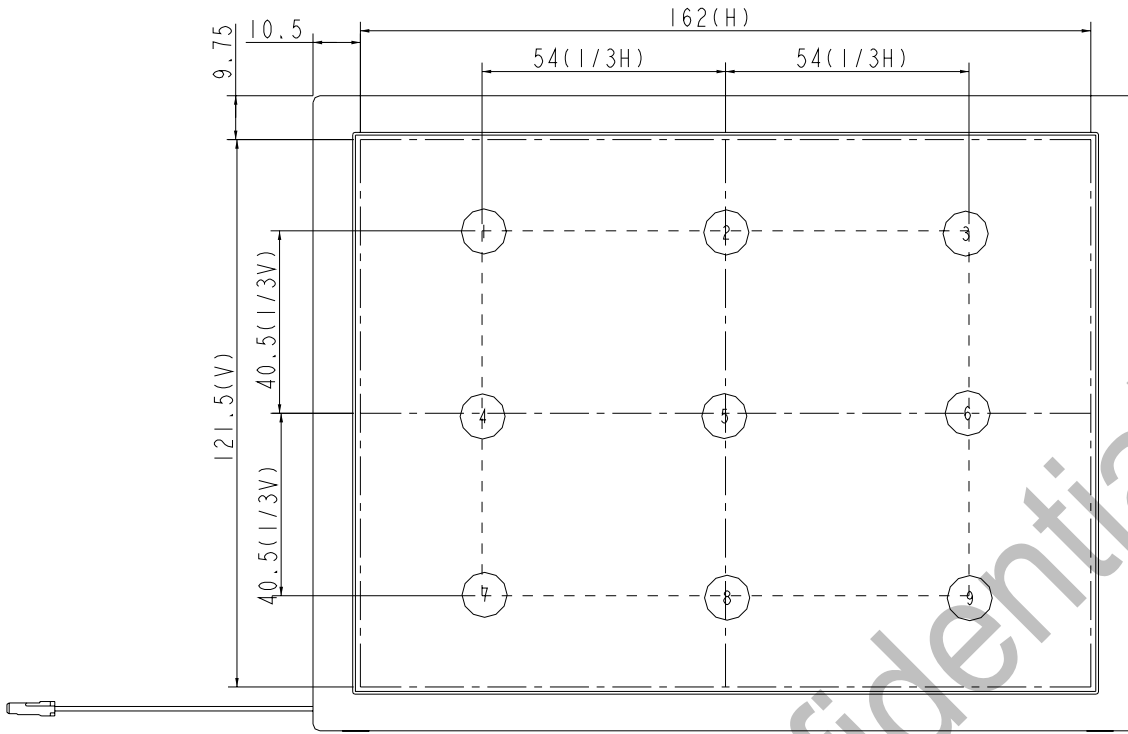


Fig8-1 Measuring point

\*4) Definition of Viewing Angle( $\theta, \psi$ ), refer to Fig8-2 as below :

These items are measured by EZ-CONTRAST(ELDIM) in the dark room. (no ambient light).

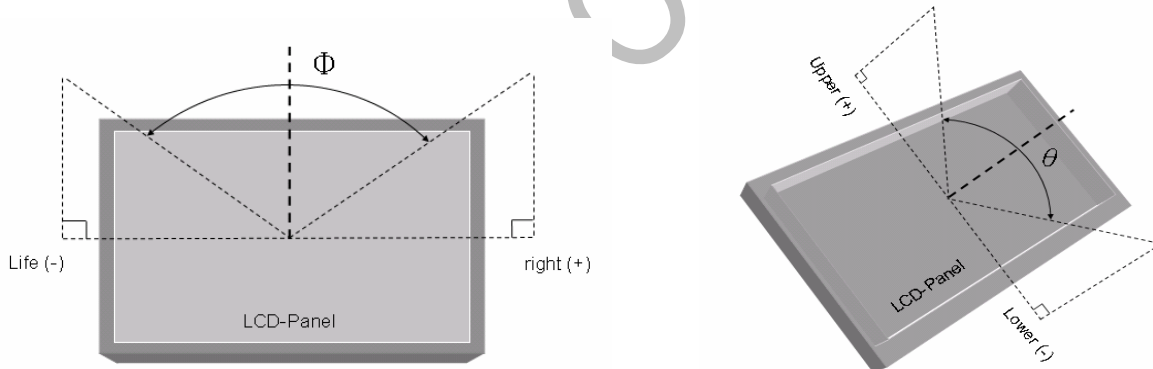


Fig8-2 Definition of Viewing Angle

\*5) Definition of Response Time.(White-Black)

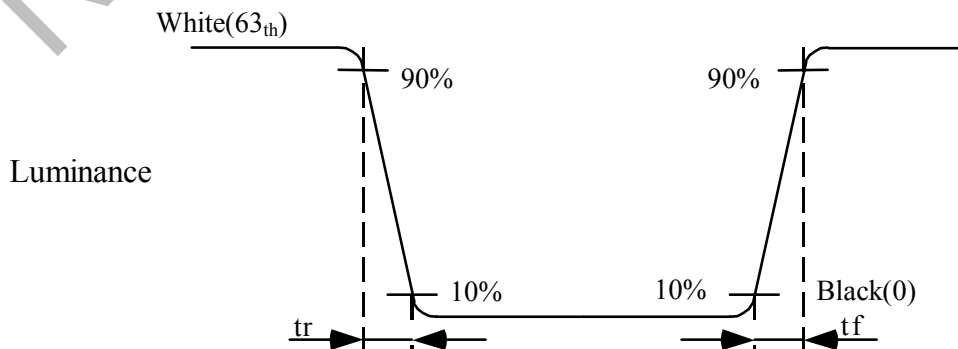


Fig8-3 Definition of Response Time(White-Black)



## 9. RELIABILITY TEST

### 9.1. Temperature and humidity

TEST ITEMS	CONDITIONS	REMARK
High Temperature Operation	70°C , 240Hrs	
High Temperature Storage	80°C , 240Hrs	
High Temperature High Humidity Operation	60°C , 90%RH , 240Hrs	No condensation
Low Temperature Operation	-30°C , 240Hrs	
Low Temperature Storage	-40°C , 240Hrs	
Thermal Shock	-30°C ( 0.5Hr ) ~ 80°C(0.5Hr) 200 cycles	

### 9.2. Shock and Vibration

TEST ITEMS	CONDITIONS
Shock (Non-operation)	<ul style="list-style-type: none"> <li>● Shock level:980m/s<sup>2</sup>(equal to 100G)</li> <li>● Waveform:half sinusoidal wave,6ms.</li> <li>● Number of shocks:one shock input in each direction of three mutually perpendicular axes for a total of three shock inputs.</li> </ul>
Vibration (Non-operation)	<ul style="list-style-type: none"> <li>● Frequency range:8~33.3Hz</li> <li>● Stoke:1.3mm</li> <li>● Vibration:sinusoidal wave,perpendicularaxis(both x,z axis:2Hrs,y axis:4Hrs).</li> <li>● Sweep:2.9G,33.3Hz-400Hz</li> <li>● Cycle:15min</li> </ul>

### 9.3.ESD experiments

ITEM	TESTING CONDITIONS	REMARK
E S D	150pF , 330Ω , ±8KV&±15KV air & contact test	*1)
	200pF , 0Ω , ±250V contact test	*2)

Remarks :

\*1)LCD glass and metal bezel °

\*2)IF connector pins °

### 9.4. Judgment standard

The Judgment of the above test should be made as follow:

Pass:Normal display image with no obvious non-uniformity and no line defect.Partial trasformation of the module parts should be ignored.

Fail:No display image,obvious non-uniformity,or line defect.