



Chunghwa Picture Tubes, Ltd.

Product Specification

To : NLK
Date : 071114

TFT LCD
CLAA080MB0ACW

ACCEPTED BY : (V0.5)
Tentative

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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 ²)	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 _{op}	-30	70	°C	【Note1】
Storage temperature	T _{stg}	-40	80	°C	【Note1】

[Note]

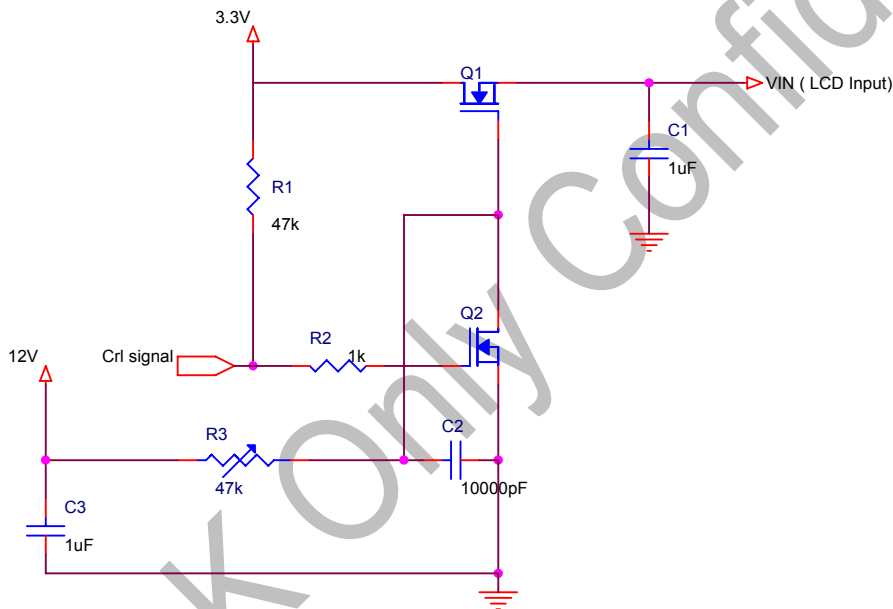
*1) If users use the product out of the environment operation range (temperature and humidity), it will concern for visual quality.

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

VESDc : Contact discharge to input connector

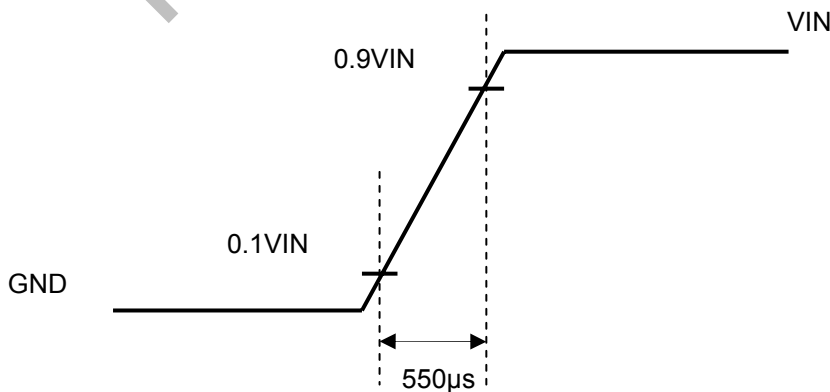
VESDm : Contact discharge to module

*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

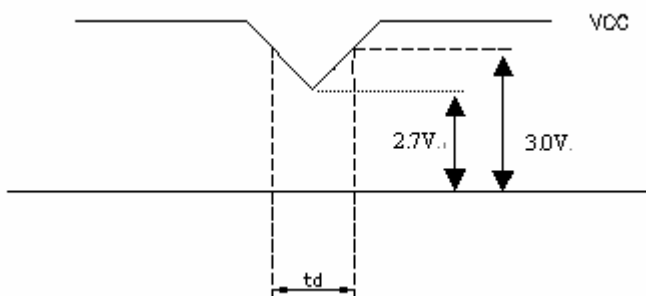
3.1TFT LCD Power Voltage

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 condition:

- 1) When $2.7\text{ V} \leq \text{VCC} < 3.0\text{ V}$, $t_d \leq 10\text{ ms}$.
- 2) $\text{VCC} > 3.0\text{ V}$, 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

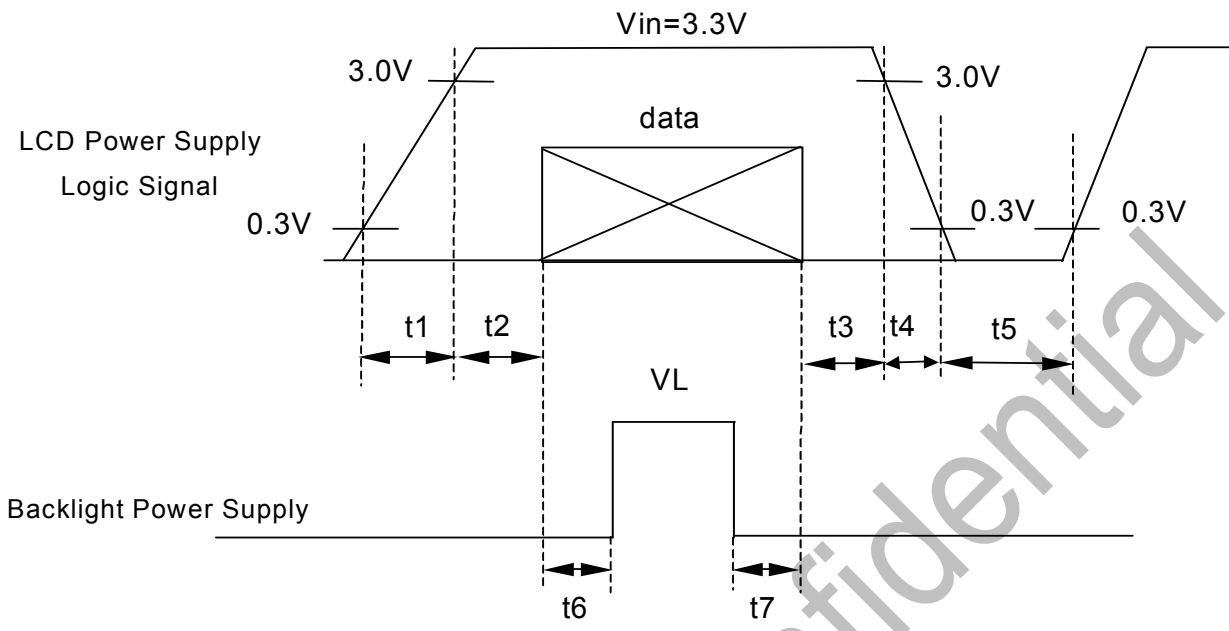


·· (a)64-Gray-Pattern······ (b)Black-Pattern····

[Note2] Typical: When VDD is 5V

Maximum: When VDD is 4.5V

3.3 Power 、 Signal sequence



Data: RGB DATA, DCLK, DENA

- $0 < t1 \leq 10\text{ms}$
- $0 < t2 \leq 50\text{ms}$
- $0 < t3 \leq 50\text{ms}$
- $0 < t4 \leq 10\text{ms}$
- $1 \text{ sec} \leq t5$
- $200\text{ms} \leq t6$
- $200\text{ms} \leq t7$

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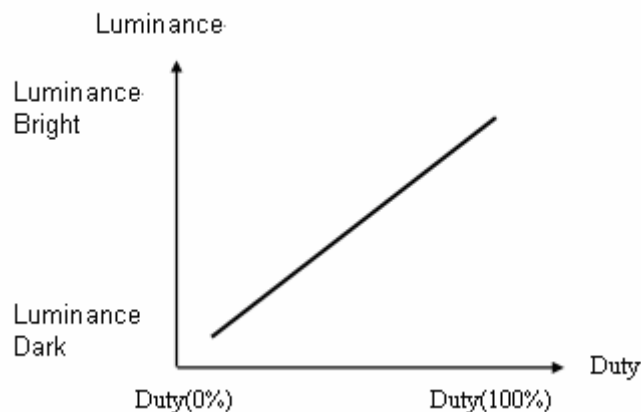
4. INTERFACE CONNECTION

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

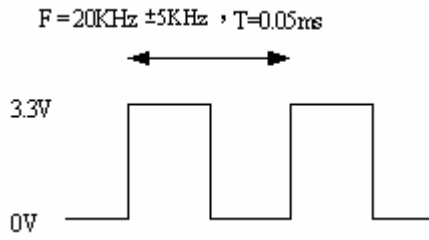
Pin NO.	SYMBOL	DESCRIPTION
1	V _{SS}	Power Ground
2	V _{SS}	Power Ground
3	ADJ	LED adjust
4	V _{LED}	Power Supply for LED (V _{LED} =5.0±0.5)
5	V _{LED}	Power Supply for LED (V _{LED} =5.0±0.5)
6	V _{LED}	Power Supply for LED (V _{LED} =5.0±0.5)
7	V _{CC}	Power Supply for LCD
8	V _{CC}	Power Supply for LCD
9	DE	Data Enable
10	V _{SS}	Power Ground
11	V _{SS}	Power Ground
12	V _{SS}	Power Ground
13	B5	Blure Data (MSB)
14	B4	Blure Data
15	B3	Blure Data
16	V _{SS}	Power Ground
17	B2	Blue Data
18	B1	Blue Data
19	B0	Blue Data (LSB)
20	V _{SS}	Power Ground
21	G5	Green Data (MSB)
22	G4	Green Data
23	G3	Green Data
24	V _{SS}	Power Ground
25	G2	Green Data
26	G1	Green Data
27	G0	Green Data (LSB)
28	V _{SS}	Power Ground
29	R5	Red Data (MSB)
30	R4	Red Data
31	R3	Red Data
32	V _{SS}	Power Ground
33	R2	Red Data
34	R1	Red Data
35	R0	Red Data (LSB)
36	V _{SS}	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.

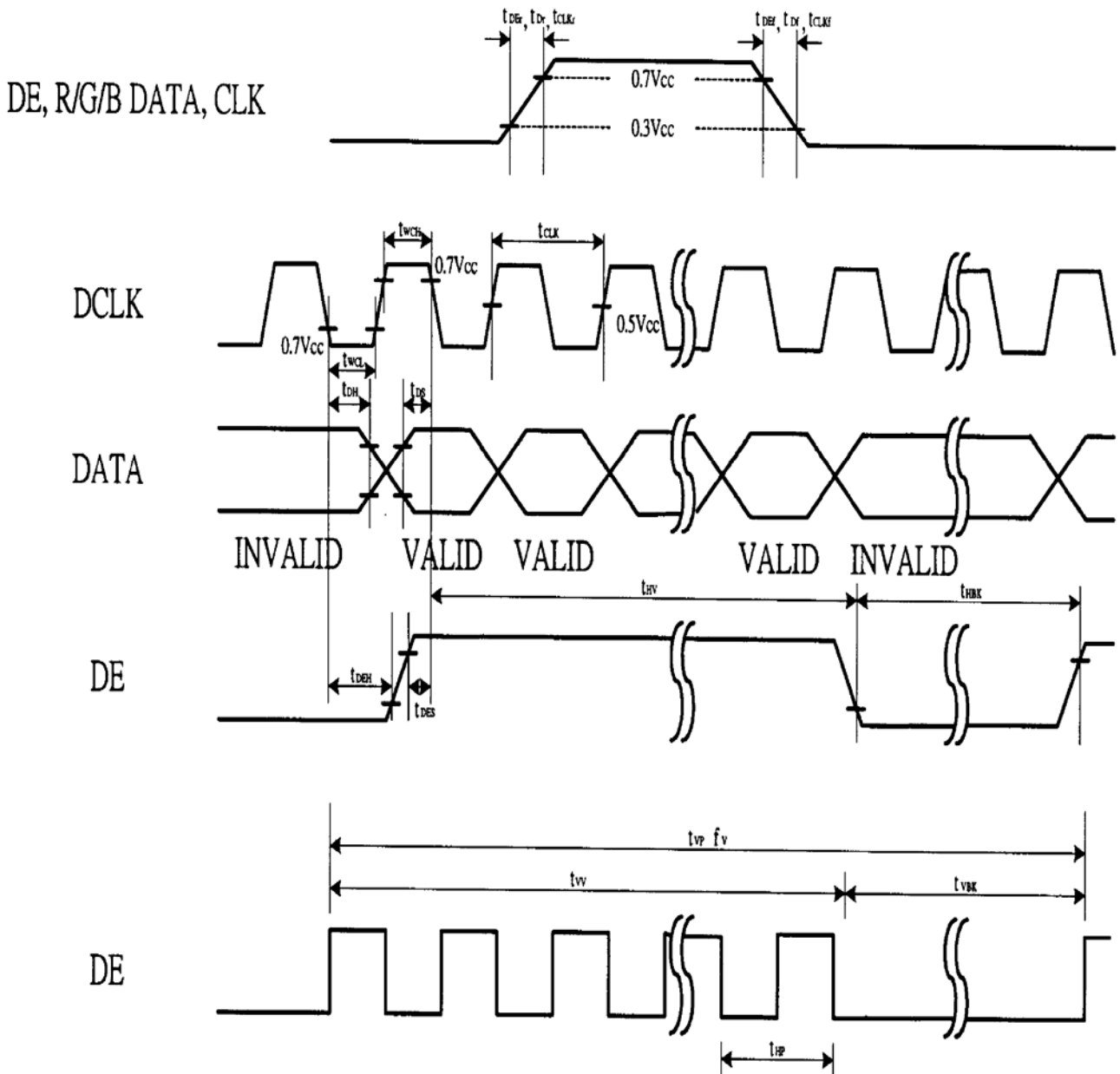
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5. INPUT SIGNAL(DE ONLY MODE)

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	
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	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	
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	
	BLUE(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	1	
	BLUE(2)	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	1	1	1	1	1	0	
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	

[Note]

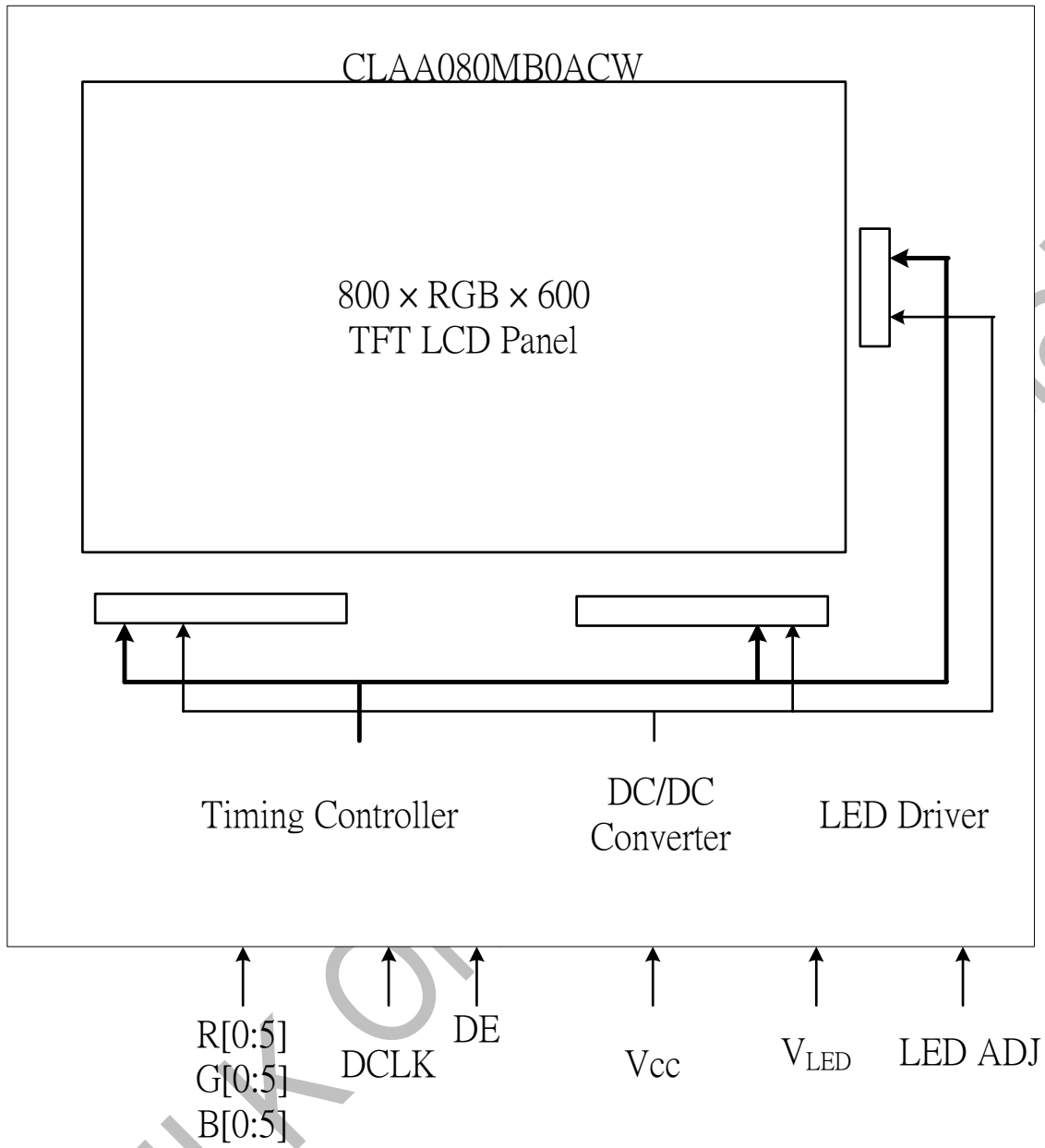
(1) Definition of Gray Scale

color(n) : n is series of Gray Scale

The more n value is, the bright Gray Scale.

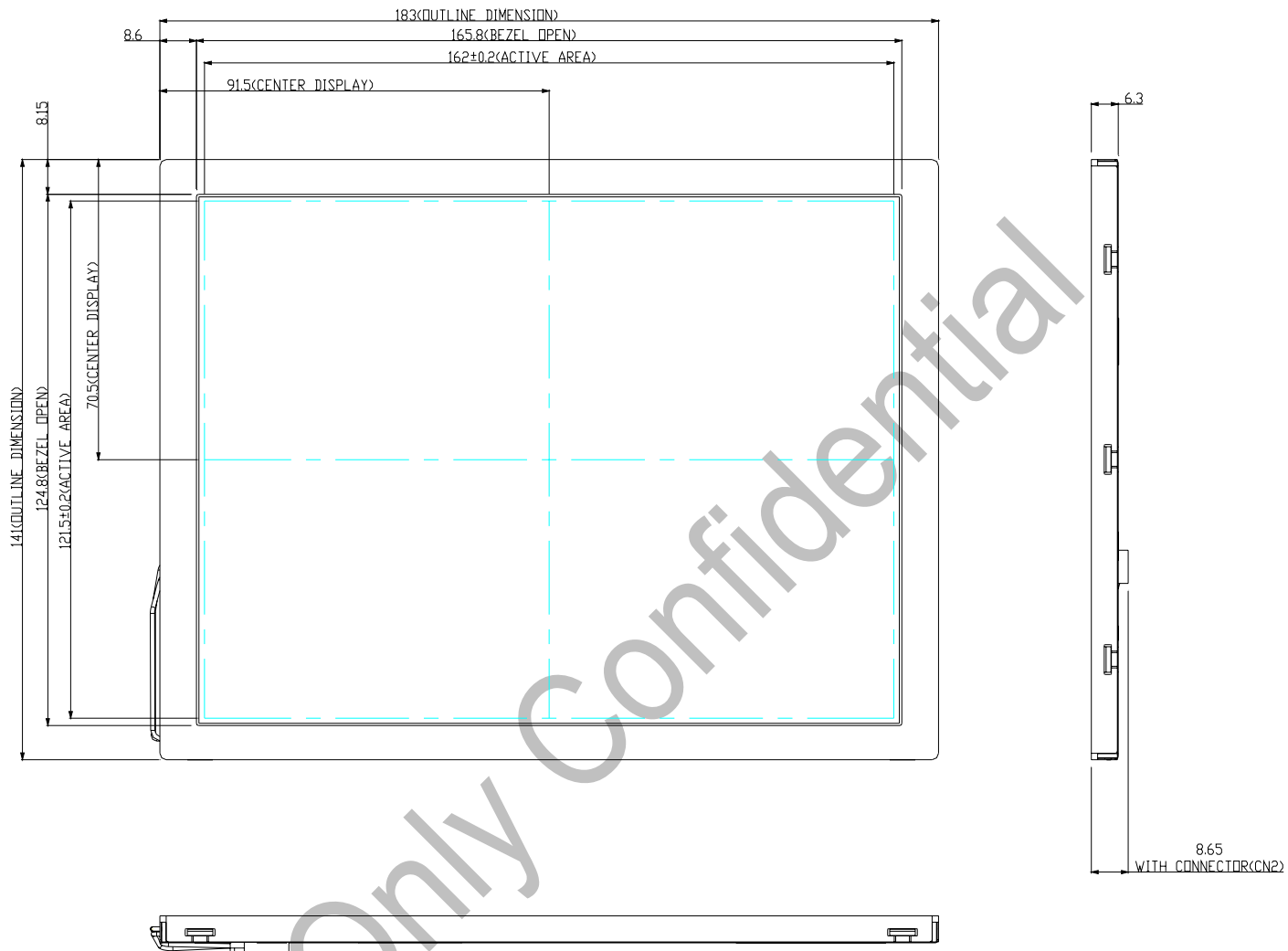
(2)Data:1-High,0-Low

6. BLOCK DIAGRAM

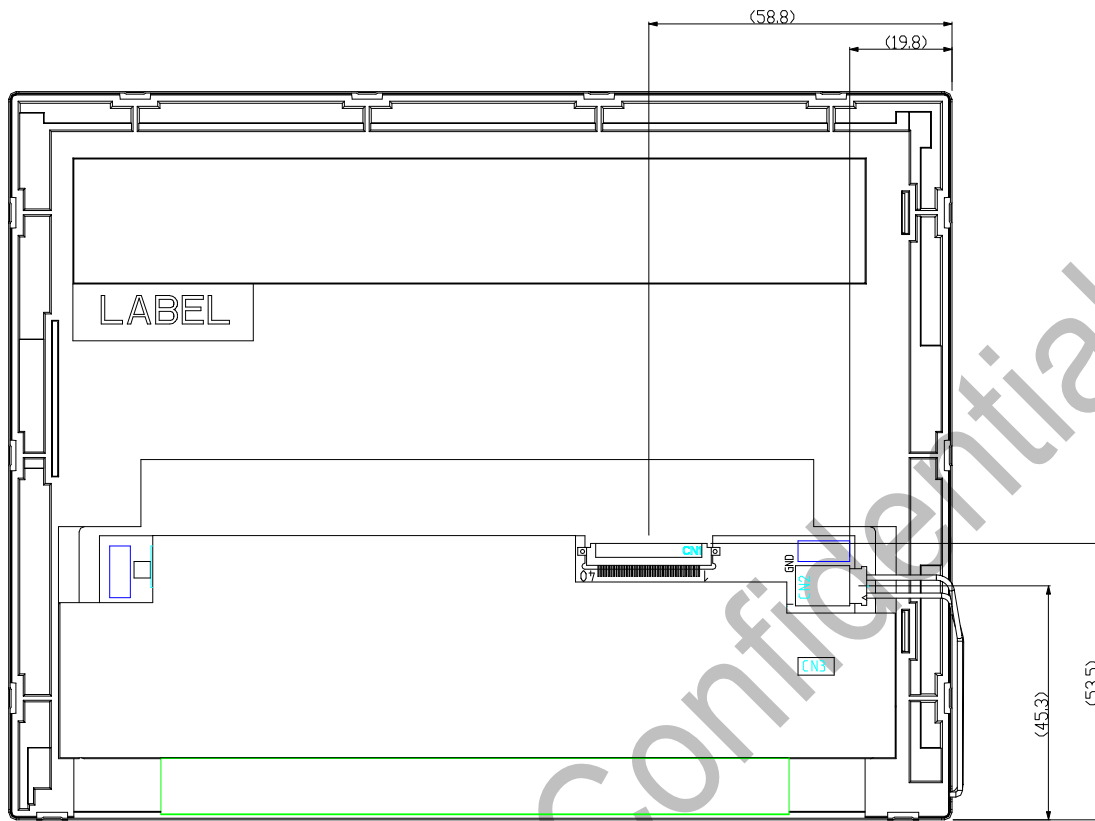


7. MECHANICAL DIMENSION

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.

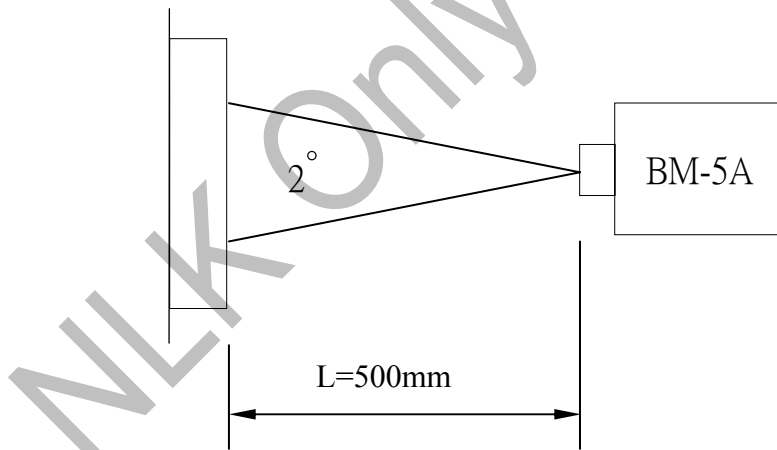
8. OPTICAL CHARACTERISTICS

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 ²	*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	Wx Wy	0.273 0.289	0.313 0.329	0.353 0.369	--	*1)*2)*3)
	Red	Rx Ry	0.577 0.301	0.607 0.331	0.637 0.361	--	
	Green	Gx Gy	0.295 0.565	0.325 0.595	0.355 0.625	--	
	Blue	Bx By	0.114 0.065	0.147 0.095	0.177 0.125	--	

Remarks :

*1) Measure condition : 25°C \pm 2°C , 60 \pm 10%RH , under 10 Lux in the dark room. BM-5A (TOPCON) , viewing angle 2° , 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 point 1~9 as figure8-1

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

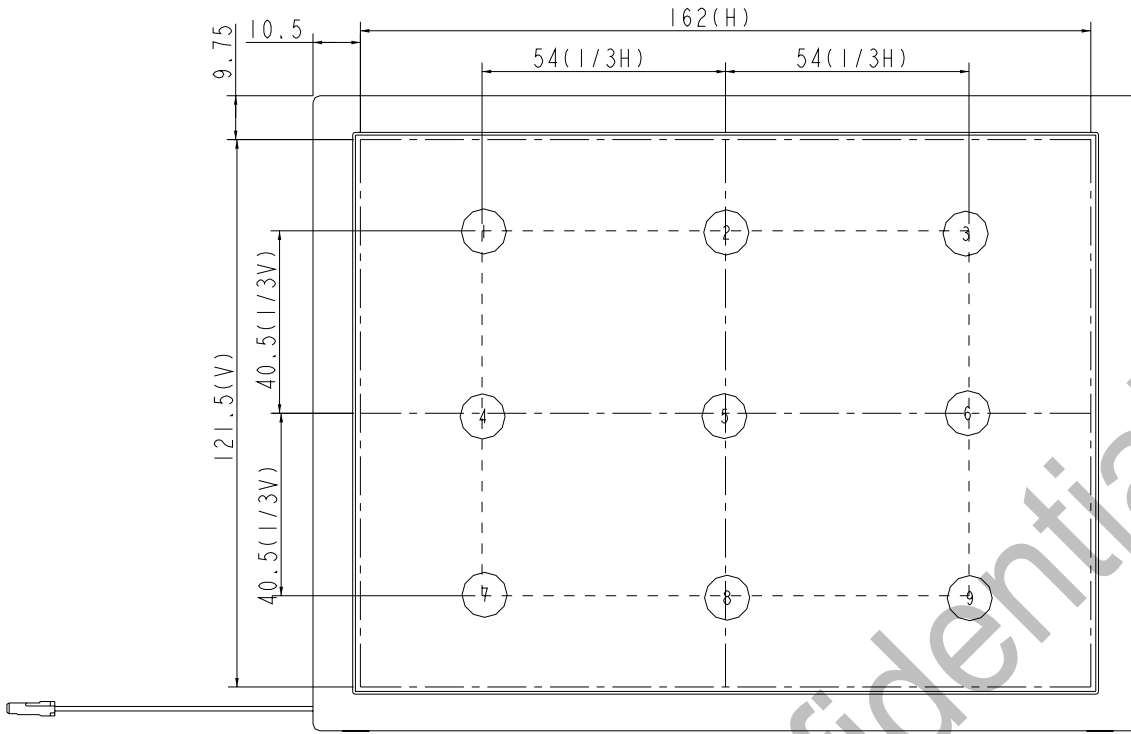


Fig8-1 Measuring point

*4) Definition of Viewing Angle(θ, ψ), refer to Fig8-2 as below :

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

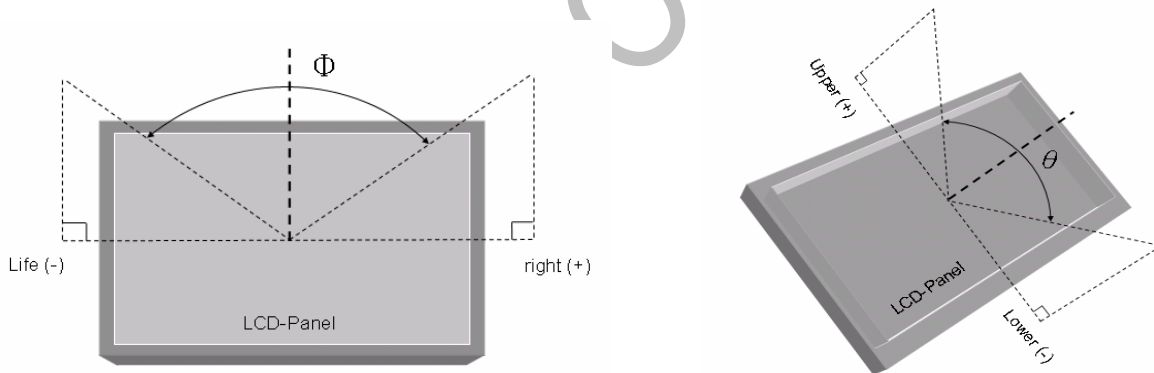


Fig8-2 Definition of Viewing Angle

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

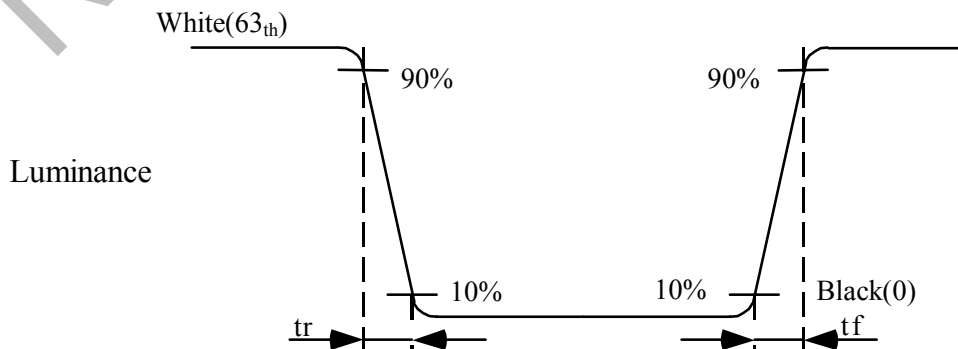


Fig8-3 Definition of Response Time(White-Black)

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"> ● Shock level:980m/s²(equal to 100G) ● Waveform:half sinusoidal wave,6ms. ● Number of shocks:one shock input in each direction of three mutually perpendicular axes for a total of three shock inputs.
Vibration (Non-operation)	<ul style="list-style-type: none"> ● Frequency range:8~33.3Hz ● Stoke:1.3mm ● Vibration:sinusodial wave,perpendicularaxis(both x,z axis:2Hrs,y axis:4Hrs). ● Sweep:2.9G,33.3Hz-400Hz ● Cycle:15min

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.