



# Chunghwa Picture Tubes, Ltd.

## Product Specification

To : CERAMATE\_光碁

Date : 080304

**TFT LCD**  
**CLAA080MB0DCW**

ACCEPTED BY : (V0.7)

Tentative

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### REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)		2007.10.26
0.1	Revise CLKH Frequency & CLKH Pulse Width Revise Rear Side of block diagram	p.11 p.17	2007.11.09
0.2	Revise Rear Side	p.17	2007/11/15
0.3	Revise Vertical Timing spec	p.11	2007/11/26
0.4	Revise Power consumption	p.4	2007/11/27
0.5	Add the weight	p.4	2007/12/4
	<b>Revise the mechanical dimension</b>	p.16-p.17	
0.6	Revise Gamma Voltage	p.7	2007/12/18
0.7	Revise MECHANICAL DIMENSION(Front Side)	p.16	2008/1/30

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## 1. OVERVIEW

CLAA080MB0DCW is 20.32 cm(8") color TFT-LCD(Thin Film Transistor Liquid Crystal Display)module composed of LCD panel,driver ICs,FPC 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.Inverter for backlight and drive board for panel are not included in this module.Use 3.3 voltage to drive the power of LCD system.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Panel Size	8 inch(panel diagonal)
Display Area (mm)	162.0(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 (typ.)
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 (W)	2.336
BL unit	LED
Electrical Interface(data)	TTL
Viewing Direction	6 o'clock
Weight (g)	200g (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	
Analog Power Voltage	AVDD	-0.3	13.5	V	
Gate On Voltage	VGH	-0.3	40	V	
Gate Off Voltage	VGL	-20	0.3	V	
Input Gamma Voltage	Vr1 ~ Vr7	0.4 AVDD	AVDD + 0.3	V	【Note2】
	Vr8 ~ Vr14	- 0.3	0.6 AVDD	V	
Static Electricity	VESDc	-200	200	V	【Note3】
	VESDm	-15K	15K	V	
ICC Rush Current	IRUSH	--	1	A	【Note4】
Operation temperature	T <sub>op</sub>	-30	70	°C	【Note1】
Storage temperature	T <sub>stg</sub>	-40	80	°C	【Note1】
Forward Current ( per LED )	I <sub>f</sub>	--	30	mA	
Reverse Voltage ( per LED )	VR	--	5	V	
Pulse forward current ( per LED )	I <sub>fp</sub>	--	100	mA	【Note5】

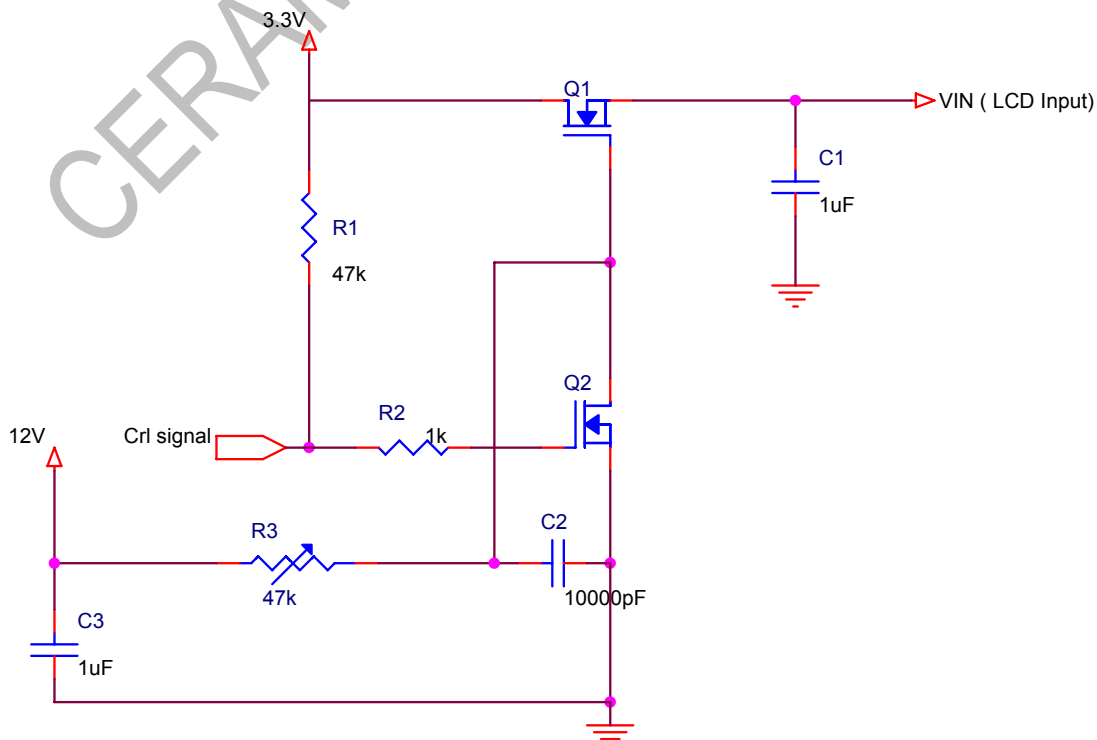
### [Note]

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

\*2) AVDD-0.1 > Vr1 > Vr2 > Vr3 > Vr4 > Vr5 > Vr6 > Vr7 > Vr8 > Vr9 > Vr10 > Vr11 > Vr12 > Vr13 > Vr14 > GND+0.1.

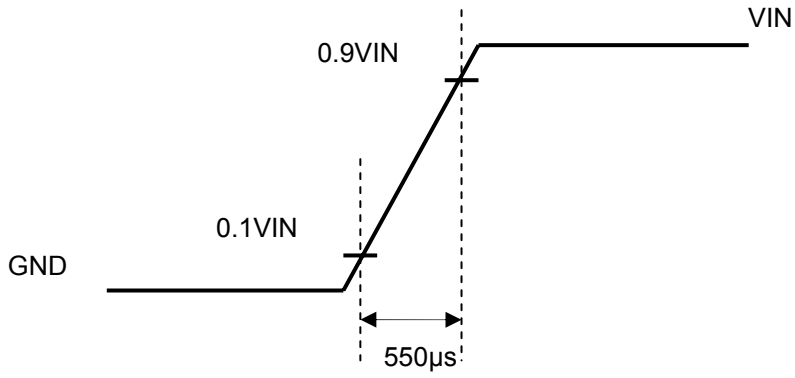
\*3) Test Condition: IEC 61000-4-2 ,  
VESDc : Contact discharge to input connector  
VESDm : Contact discharge to module

\*4) 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.



\*5) Ifp Conditions : Pulse Width  $\leq$  10msec and Duty  $\leq$  1/10 ◦

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### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT LCD Power Voltage

Ta=25°C

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Voltage	V <sub>CC</sub>	3	3.3	3.6	V	
Analog Power Voltage	AVDD	9.3	9.6	9.9	V	
Gate On Power Voltage	VGH	17	18	19	V	
Gate Off Power Voltage	VGL	-6.6	-6	-5.4	V	
Common Power Voltage	VCDC	3.5	4.0	4.5	V	【Note1】
Gamma Voltage	V1	-	8.858	-	V	
	V2	-	8.524	-	V	
	V3	-	7.456	-	V	
	V4	-	6.999	-	V	
	V5	-	6.679	-	V	
	V6	-	6.251	-	V	
	V7	-	5.932	-	V	
	V8	-	4.918	-	V	
	V9	-	3.910	-	V	
	V10	-	3.239	-	V	
	V11	-	2.817	-	V	
	V12	-	2.244	-	V	
	V13	-	1.136	-	V	
	V14	-	0.863	-	V	
Input signal Voltage	V <sub>IH</sub>	0.7 V <sub>CC</sub>	-	V <sub>CC</sub>	V	
	V <sub>IL</sub>	0	-	0.3 V <sub>CC</sub>	V	

【Note1】 Please adjust VCDC to make the flicker level be minimum.

#### 3.2 TFT-LCD current consumption

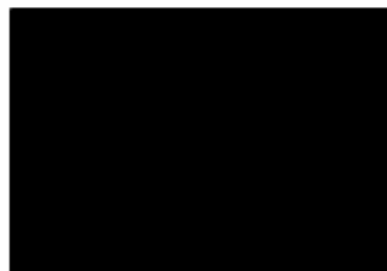
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	NOTE
Gate on power current	IVGH	VGH = 18V	-	0.5	1	mA	【Note1】
Gate off power current	IVGL	VGL = -6V	-	0.5	1	mA	【Note1】
Digital power current	IVCC	VCC = 3.3V	-	150	250	mA	【Note1】
Analog power current	IAVDD	AVDD = 9.6V	-	30	50	mA	【Note1】

[Note1]

V<sub>CC</sub> = 3.3V 、 Frequency = 60Hz

Typical: Under 64 gray pattern

Maximum: Under black pattern

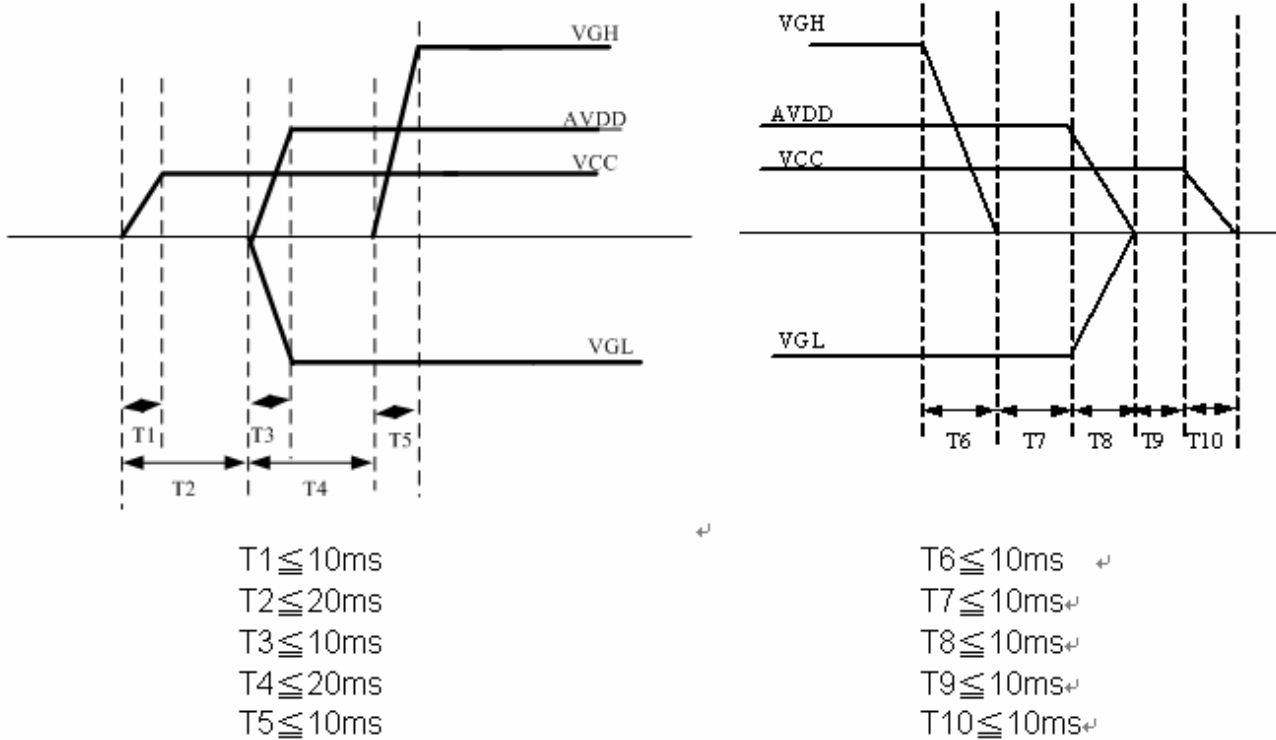


··· (a)64 Gray Pattern ······ (b)Black Pattern ···↵

### 3.3 Power & Signal sequence

Power On :  $V_{CC} \rightarrow AVDD/VGL \rightarrow VGH \rightarrow Data$

Power Off :  $Data \rightarrow VGH \rightarrow AVDD/VGL \rightarrow V_{CC}$

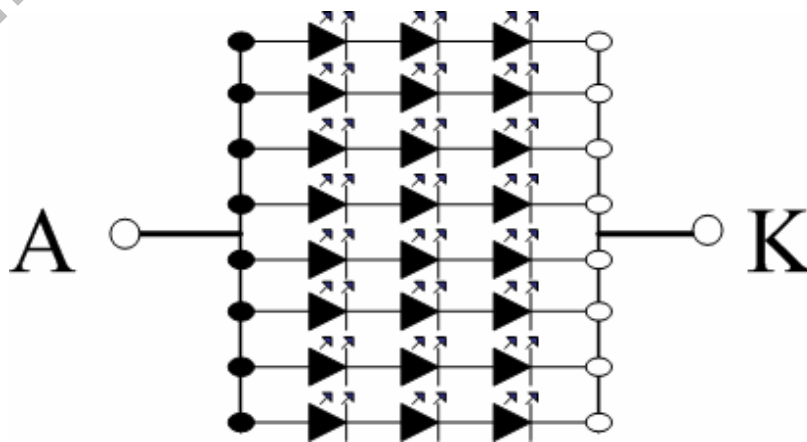


### 3.4 Backlight unit

( $T_a=25^\circ C$ )

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
LED current	IL	--	160	--	mA	Note 1
LED voltage	VL	9.0	9.6	10.65	V	Note 1
Power consumption	WL	--	1.536	--	W	Note 1

Note 1 : The LED driving condition is defined for each LED module.



A : ANOD (+)    K : CATHOD (-)

Note 2 : We suggest using the constant current control,  $I_L=160mA$ , to avoid the leakage light and brightness quality issue.



## 4. INTERFACE CONNECTION

Pin No.	Symbol	Function
1	POL	Polarity selection
2	STVD	Vertical start pulse input when U/D= H
3	OEV	Output enable
4	CLKV	Vertical clock
5	STVU	Vertical start pulse input when U/D= L
6	GND	Power ground
7	EDGSL	Select rising edge or falling edge
8	V <sub>CC</sub>	Power supply for digital circuit
9	Vr9	Gamma voltage level 9
10	VGL	Gate OFF voltage
11	Vr2	Gamma voltage level 2
12	VGH	Gate ON voltage
13	Vr6	Gamma voltage level 6
14	U/D	Up/down selection
15	VCOM	Common voltage
16	GND	Power ground
17	AVDD	Power supply for analog circuit
18	Vr14	Gamma voltage level 14
19	Vr11	Gamma voltage level 11
20	Vr8	Gamma voltage level 8
21	Vr5	Gamma voltage level 5
22	Vr3	Gamma voltage level 3
23	GND	Power ground
24	R5	Red data (MSB)
25	R4	Red data
26	R3	Red data
27	R2	Red data
28	R1	Red data
29	R0	Red data (LSB)
30	GND	Power ground
31	GND	Power ground
32	G5	Green data (MSB)
33	G4	Green data
34	G3	Green data
35	G2	Green data
36	G1	Green data
37	G0	Green data (LSB)
38	STHL	Horizontal start pulse input when R/L = H
39	REV	Data inversion input
40	GND	Power ground
41	CLK	Sample clock

42	V <sub>CC</sub>	Power supply for digital circuit
43	STHR	Horizontal start pulse input when R/L = L
44	LD	Latches the polarity of outputs switches the new data to outputs
<b>Pin No.</b>	<b>Symbol</b>	<b>Function</b>
45	B5	Blue data (MSB)
46	B4	Blue data
47	B3	Blue data
48	B2	Blue data
49	B1	Blue data
50	B0	Blue data (LSB)
51	R/L	Right/ left selection
52	Vr1	Gamma voltage level 1
53	Vr4	Gamma voltage level 4
54	Vr7	Gamma voltage level 7
55	Vr10	Gamma voltage level 10
56	Vr12	Gamma voltage level 12
57	Vr13	Gamma voltage level 13
58	AVDD	Power supply for analog circuit
59	GND	Power ground
60	VCOM	Common voltage

Remarks :

- 1) GND Pin had been connected to “ground”, should not be “ Non-Connect ”.
- 2) SHL : Select left or right

SHL	DIO1	DIO2	SHIFT
1	Input	Output	Right
0	Output	Input	Left

- 3) U/D : Shift up or down control

U/D	STVD	STVU	SHIFT
1	Input	Output	UP
0	Output	Input	Down

### 5. INPUT SIGNAL((TTL )

#### 5.1 Timing Specification

✚ Horizontal Timing spec :

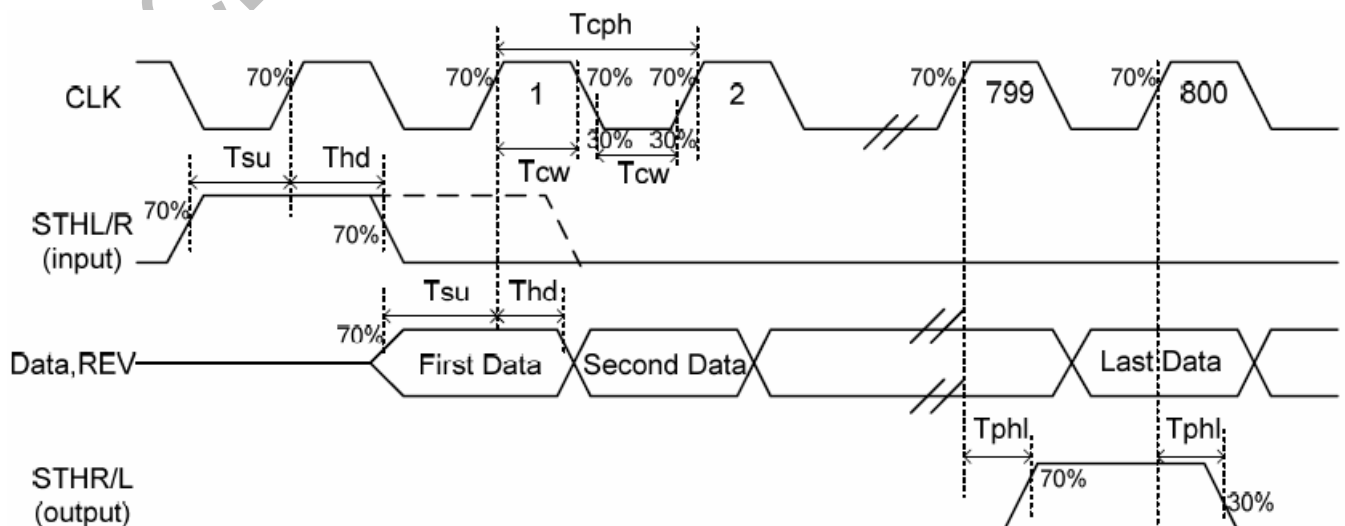
ITEM	SYMBOL	SPECIFICATION			UNIT
		Min	Typ	Max	
CLKH Frequency	1/Tcph	32	38.28	43	MHz
CLKH Pulse Width	Tcw	--	26	--	ns
Data Set-up Time	Tsu	4	--	--	ns
Data Hold Time	Thd	2	--	--	ns
Propagation Delay of DIO2/1	Tphl	6	10	15	ns
Time That The Last Data to LD	Tld	1	--	--	Tcph
Pulse Width of LD	Twld	2	--	--	Tcph
Time That LD to DIO1/2	Tlds	5	--	--	Tcph
POL Set-up Time	Tpsu	6	--	--	ns
POL Hold Time	Tphd	6	--	--	ns

✚ Vertical Timing spec :

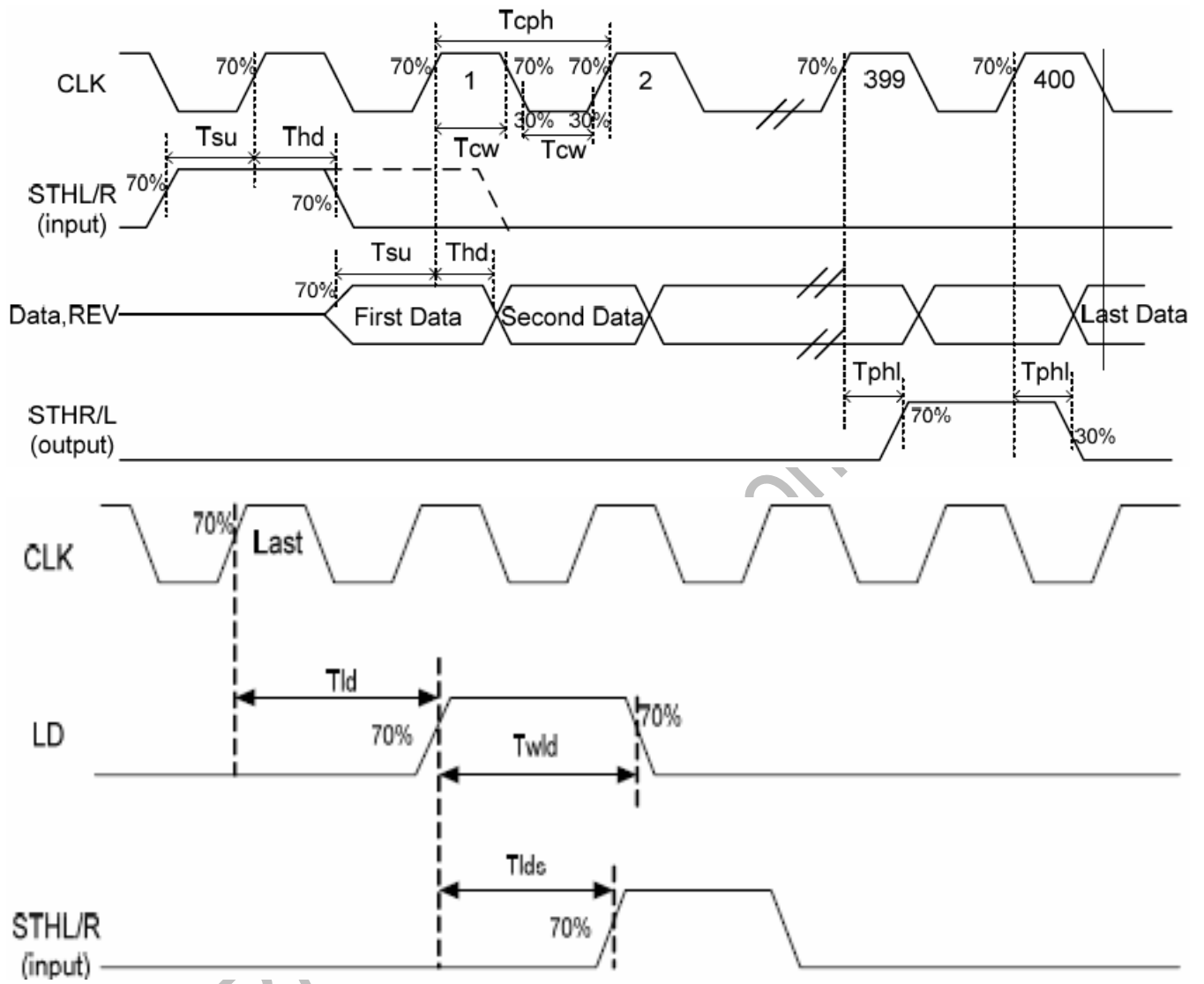
ITEM	SYMBOL	SPECIFICATION			UNIT
		Min	Typ	Max	
CLKV Frequency	1/Tcpv	--	37.6	41.0	KHz
CLKV Pulse Width	Tcpvh	24.4	26.5	--	μs
STVD/STVU Set-up Time	Tsu	700	--	--	ns
STVD/STVU Hold Time	Thd	700	--	--	ns

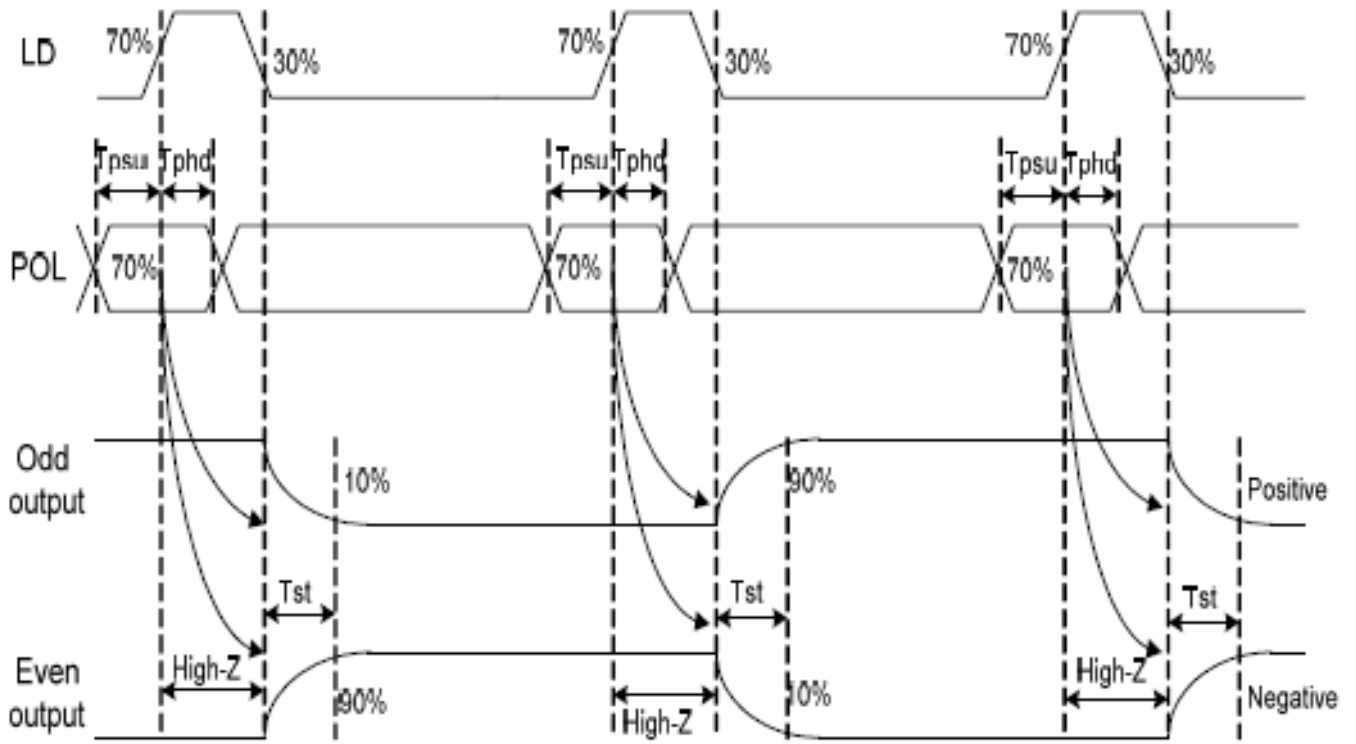
#### 5.2 Horizontal Timing Chart

\* EDGSL = L or OPEN

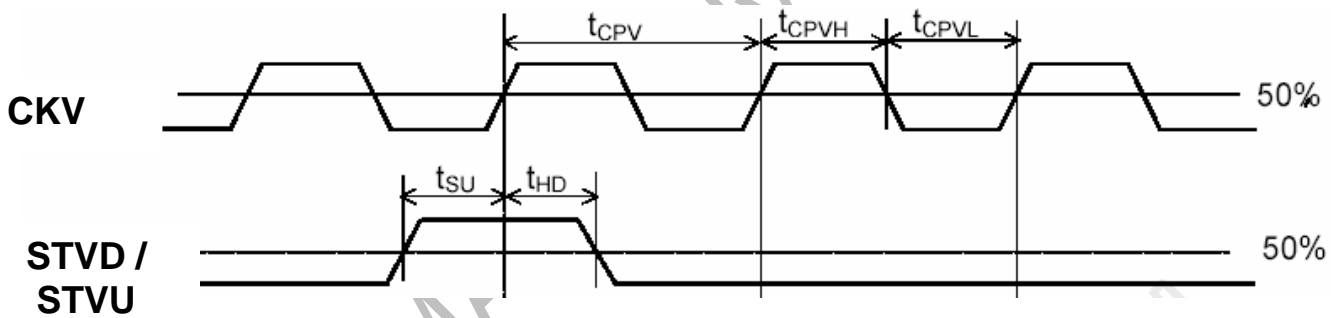


\* EDGSL = H





5.3 Vertical Timing Chart



5.4 Color Data Assignment

COLOR	INPUT DATA	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB			LSB			MSB			LSB			MSB			LSB		
BASIC COLOR	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
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	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	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(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	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	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	0
	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	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(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

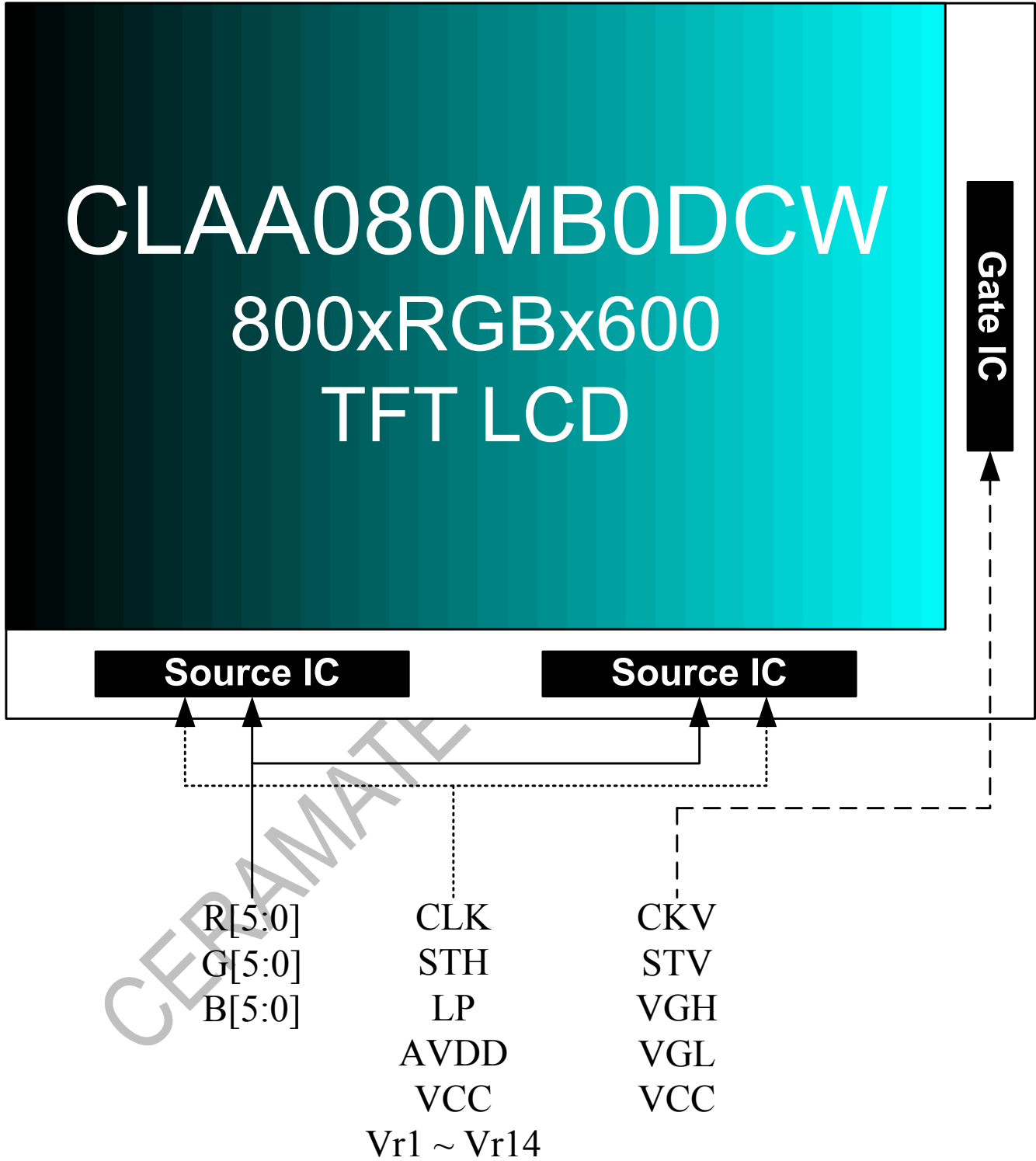
[Note]

(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

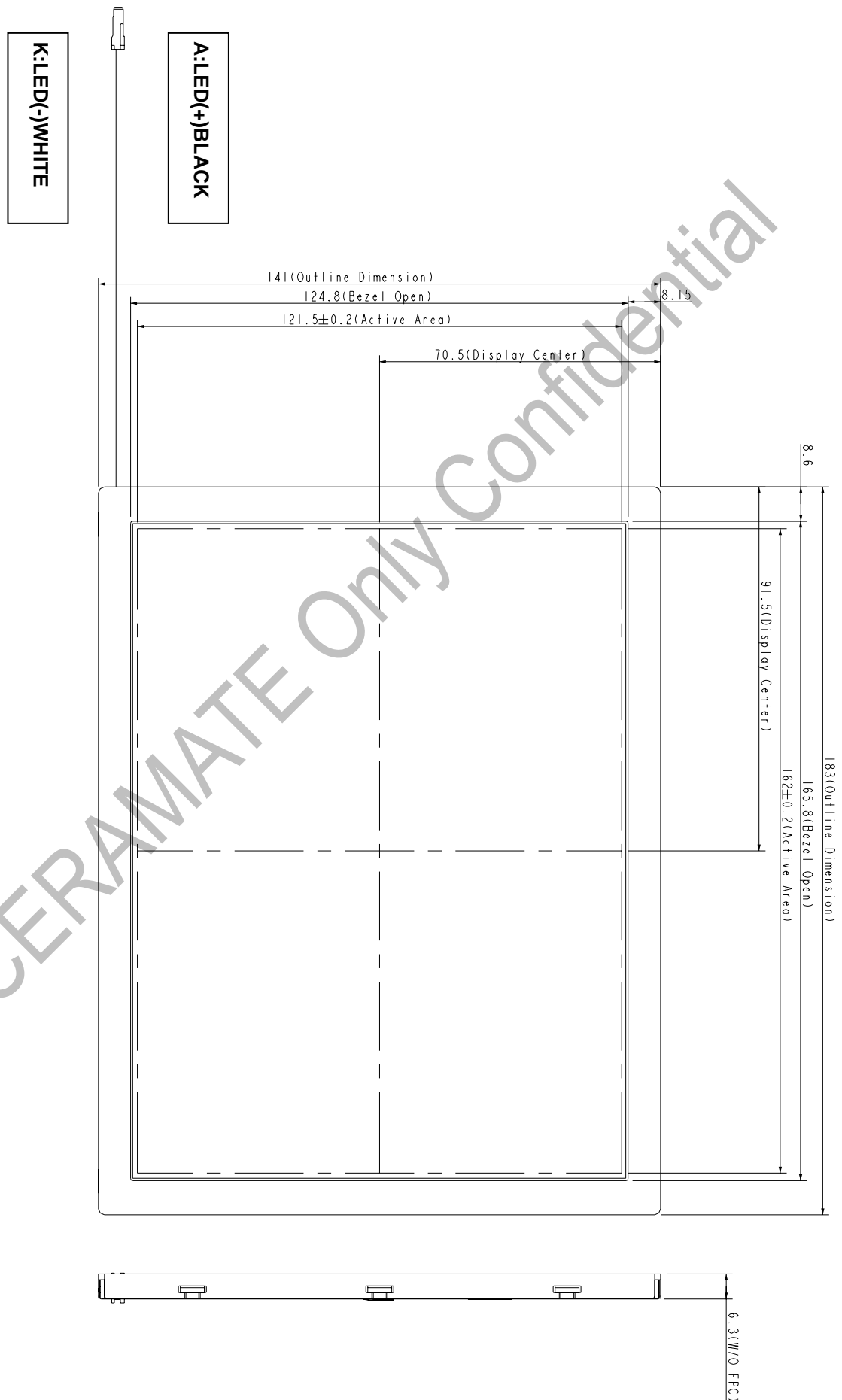
6. BLOCK DIAGRAM



### 7. MECHANICAL DIMENSION

#### 7.1 Front Side

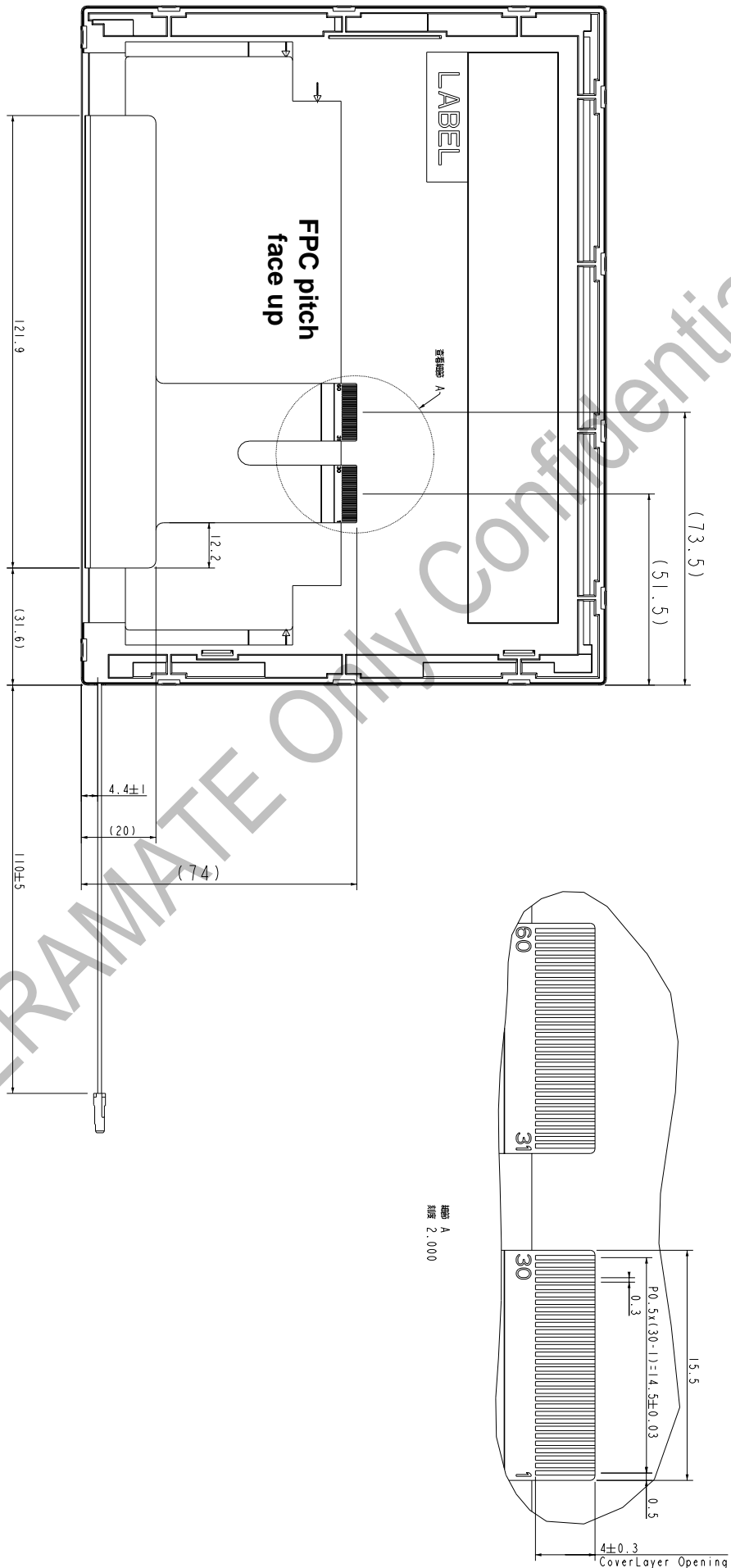
[Unit : mm]





7.2 Rear Side

[Unit : mm]



NOTE:  
 2. GENERAL TOLERANCE: ± 0.3mm  
 NOTE:  
 1. GENERAL TOLERANCE: ± 0.3mm

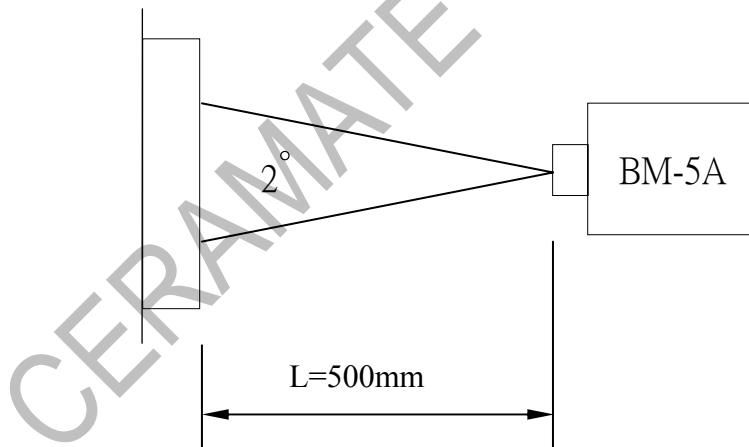
## 8. OPTICAL CHARACTERISTICS

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	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 , under10 Lux in the dark room.BM-5A (TOPCON) , viewing angle2° , I<sub>L</sub>=160mA , V<sub>CC</sub>=3.3V.



\*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

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

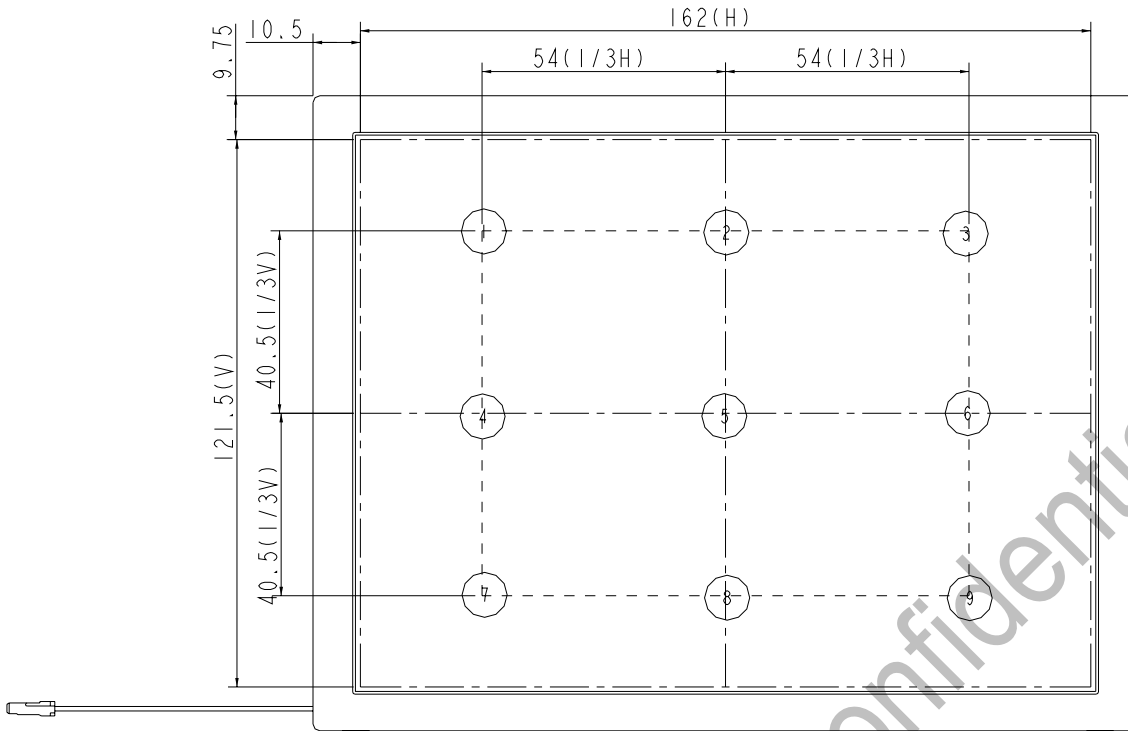


Fig8-1 Measuring point

\*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).

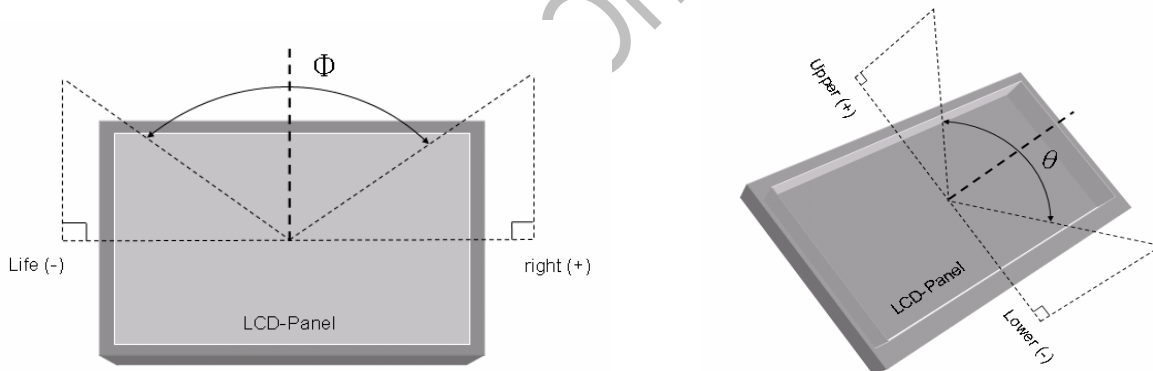


Fig8-2 Definition of Viewing Angle

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

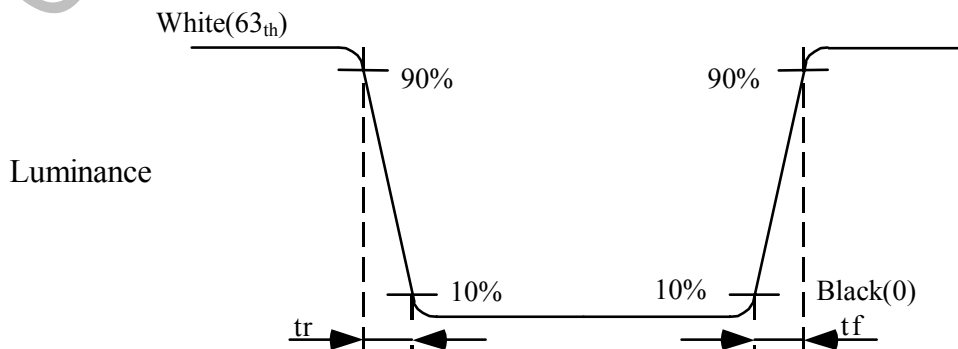


Fig8-3 Definition of Response Time(White-Black)

## 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>● Stroke: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. 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 transformation of the module parts should be ignored.

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