



Chunghwa Picture Tubes, Ltd.

Product Specification

To :
Date : 070831

TFT LCD

CLAA070LC0HCW

ACCEPTED BY : (V0.2)

Tentative

APPROVED BY	CHECKED BY	PREPARED BY
張聖暉	李家銘	羅宇城

Doc.No:	SPEC_CLAA070LC0HCW_V0.2_Ceramate_070831	Issue Date:	2007/08/09
---------	---	-------------	------------

CONTENTS

1. OVERVIEW	4
2. ABSOLUTE MAXIMUM RATINGS	5
3. ELECTRICAL CHARACTERISTICS	6
3.1TFT LCD	6
3.2TFT-LCD current consumption.....	7
3.3 Power 、Signal sequence.....	7
4. INTERFACE CONNECTION	8
5. INPUT SIGNAL(DE ONLY MODE)	10
5.1 Timing Specification	10
5.2 Timing sequence(Timing chart).....	10
5.3 Color Data Assignment.....	12
6. BLOCK DIAGRAM	13
7. MECHANICAL DIMENSION	14
7.1 Front Side	14
7.2 Rear Side.....	15
8. OPTICAL CHARACTERISTICS	16
9. RELIABILITY TEST	18
9.1. Temperature and humidity	18
9.2. Shock and Vibration.....	18
9.3 Judgment standard.....	18

1. OVERVIEW

CLAA070LC0HCW is 7" color TFT-LCD(Thin Film Transistor Liquid Crystal Display)module composed of LCD panel,driver ICs,control circuit,and LED backlight.

The 7.0"screen produces a high resolution image that is composed of 800×480 pixel elements in a stripe arrangement.Display 262K colors by 6 Bit R.G.B signal input.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	152.4(W)×91.44(H)
Number of Pixels	800(H)×3(RGB)×480(V)
Pixel Pitch (mm)	0.1905(H)×0.1905(V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of colors	262,144
Viewing Direction	6 o'clock
Response Time (Tr+Tf)	20ms
Brightness(cd/m ²)	220nit(typ)
Viewing Angle(BL on,CR≥10)	140 degree(H) · 110degree(V)
Electrical Interface(data)	TTL
Power consumption(W)	2.0W(Typ)
Outline Dimension(in mm)	165(W)×104(H)×5(D)
Weight(g)	114.5g(Typ)
BL unit	LED
Surface Treatment	Anti-Glare · Hardness:3H

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	Vcc	-0.5	5.0	V	
Signal Input Voltage	DCLK,DE,R0,G0,B0~R5,G5,B5	-0.5	Vcc + 0.5	V	
Static Electricity	VESDc	-200	+200	V	*1)
	VESDm	-15K	+15K	V	
ICC Rush Current	IRUSH	-	1	A	*2)

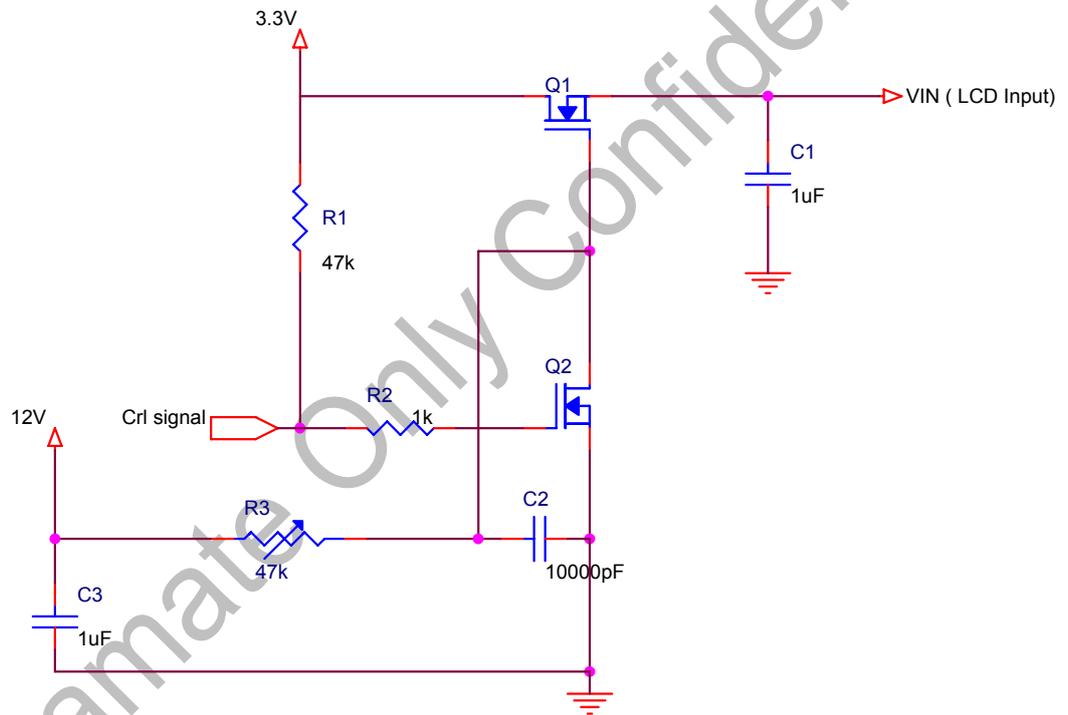
Remarks :

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

VESDc : Contact discharge to input connector

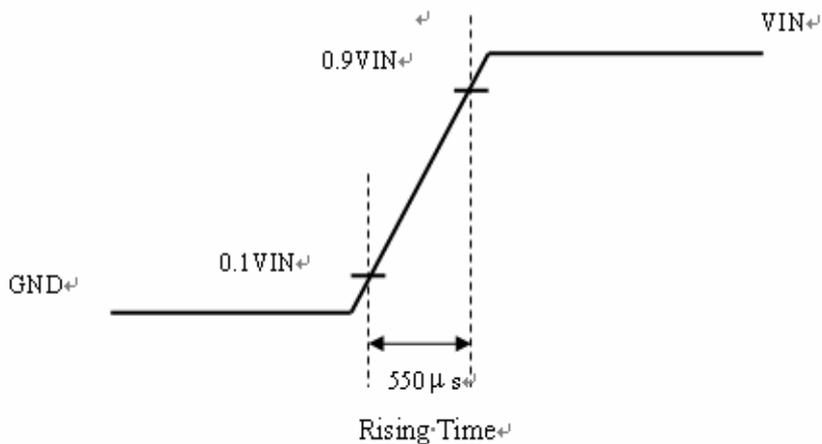
VESDm : Contact discharge to module

*2) 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

3.1 TFT LCD

Ta=25°C

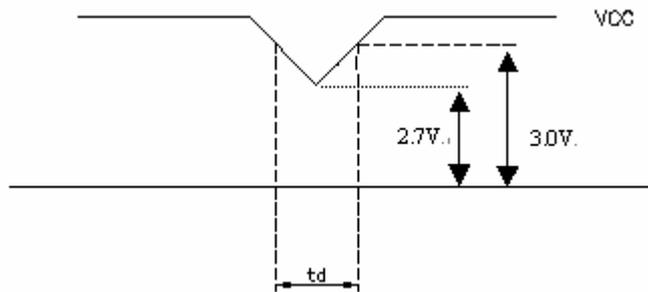
Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	*1)
Power Supply Voltage For LED	VDD	4.5	5	5.5	V	
Logic Input Voltage	VIH	VCC*0.7	--	VCC	V	
	VIL	GND	--	VCC*0.3	V	
ADJ Input Voltage	VADJ_H	3.0	--	3.3	V	
	VADJ_L	GND	--	0.3	V	

Remarks :

*1) VCC -dip condition:

When $2.7\text{ V} \leq \text{VCC} < 3.0\text{ V}$, $t_d \leq 10\text{ ms}$.*2) When $\text{VCC} < 3.0\text{ V}$, it works abnormal that must reset power.

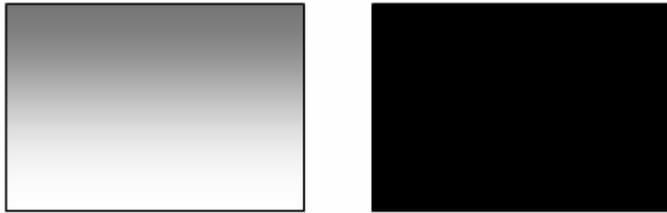
VCC dip conditions should follow VCC turn on conditions.



3.2TFT-LCD current consumption

Item	Symbol	Min.	Typ	Max.	Unit	Note
LCD power current	ICC	--	150	200	mA	*1)
LED power current	ILED		300	350	mA	*2)

*1) Typical: Under 64 gray pattern
 Maximum: Under black pattern

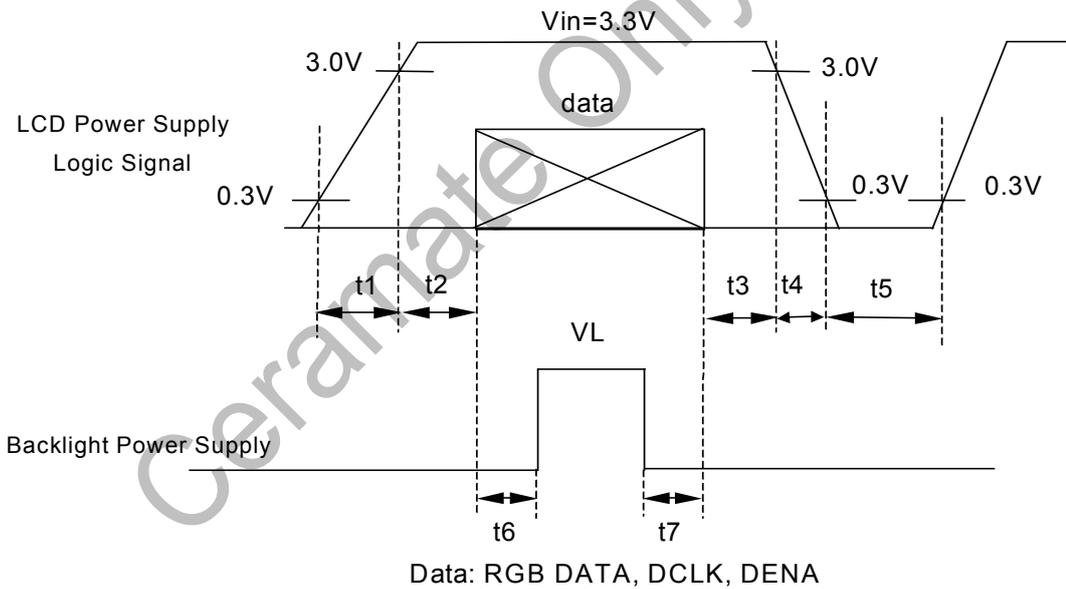


(a) 64 Gray Pattern (b) Black Pattern

*2) Typical: When VDD is 5V
 Maximum: When VDD is 4.5V

3.3 Power 、 Signal sequence

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



4. INTERFACE CONNECTION

(Connector type:40pin/0.5mm pitch/Bottom contact)-089N40-000R00-G2

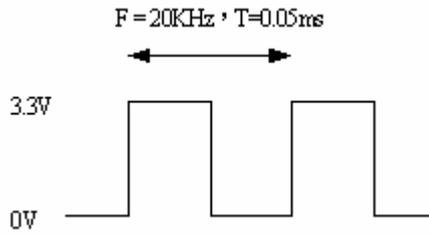
Pin NO.	SYMBOL	DESCRIPTION
1	VLED	Power Supply for LED Driver circuit
2	VLED	Power Supply for LED Driver circuit
3	ADJ	Brightness control for LED B/L
4	AV _{SS}	Ground
5	AV _{SS}	Ground
6	VCC	Power Supply
7	VCC	Power Supply
8	NC	NC
9	DE	Data Enable Signal
10	NC	NC
11	NC	NC
12	AV _{SS}	Ground
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	AV _{SS}	Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	AV _{SS}	Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	AV _{SS}	Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	AV _{SS}	Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	AV _{SS}	Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)
36	AV _{SS}	Ground
37	DCLK	Clock Signal
38	AV _{SS}	Ground
39	L/R	Left/Right select
40	U/D	Up/Down select

Remarks :

- 1). The ADJ can adjust LED BL brightness , where Duty and Luminance are in direct ratio.



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



3) AVSS Pin must connection to ground.

4) U/D and L/R controled Function

L/R	U/D	Function
1	0	Normally display
0	0	Left and Right opposite
1	1	Up and Down opposite
0	1	Left and Right opposite , Up and Down opposite

Ceramate Only Confidential

5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

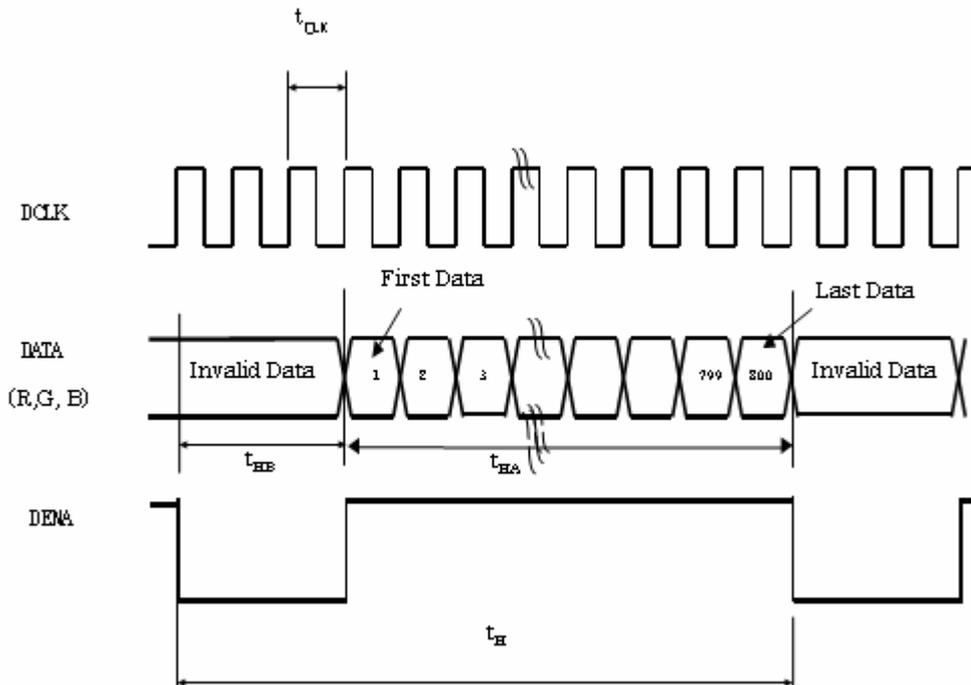
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	Dot Clock	f_{CLK}	25	27	32	MHz
	Low Level Width	t_{WCL}	6	-	-	ns
	High Level Width	t_{WCH}	6	-	-	
DE	Setup Time	t_{DES}	5	-	-	ns
	Hold time	t_{DEH}	10	-	-	
	Horizontal Period	t_{HP}	850	900	950	t_{CLK}
	Horizontal Valid	t_{HV}	800			
	Horizontal Blank	t_{HBK}	50	100	150	
	Vertical Period	t_{VP}	490	500	520	t_{HP}
	Vertical Valid	t_{VV}	480			
	Vertical Blank	t_{VBK}	10	20	40	
	Vertical Frequency	f_V	55	60	65	
DATA	Setup Time	t_{DS}	5	-	-	ns
	Hold Time	t_{DH}	10	-	-	

Remarks :

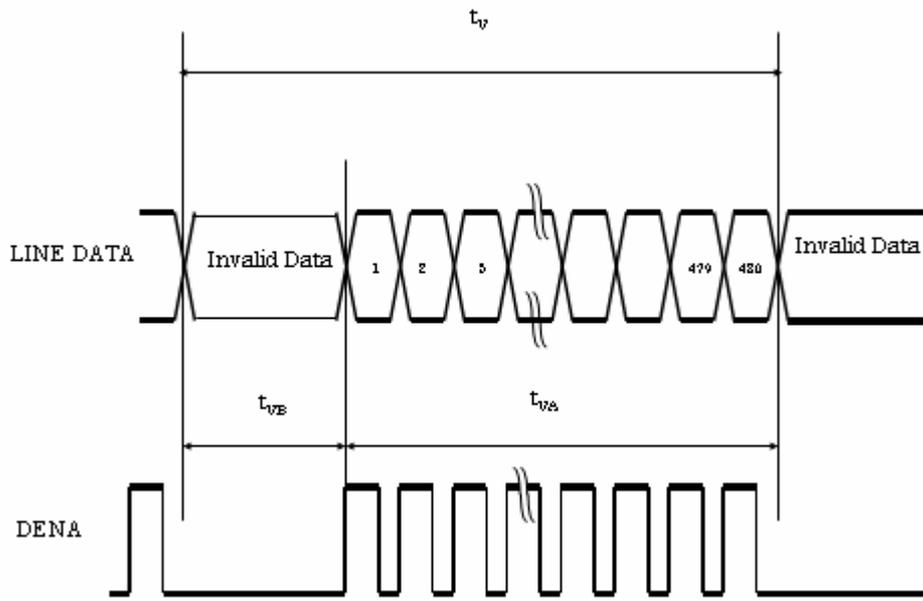
*1) This module is operated by DE only mode

5.2 Timing sequence(Timing chart)

Horizontal sequence



Vertical sequence



5.3 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

Remarks :

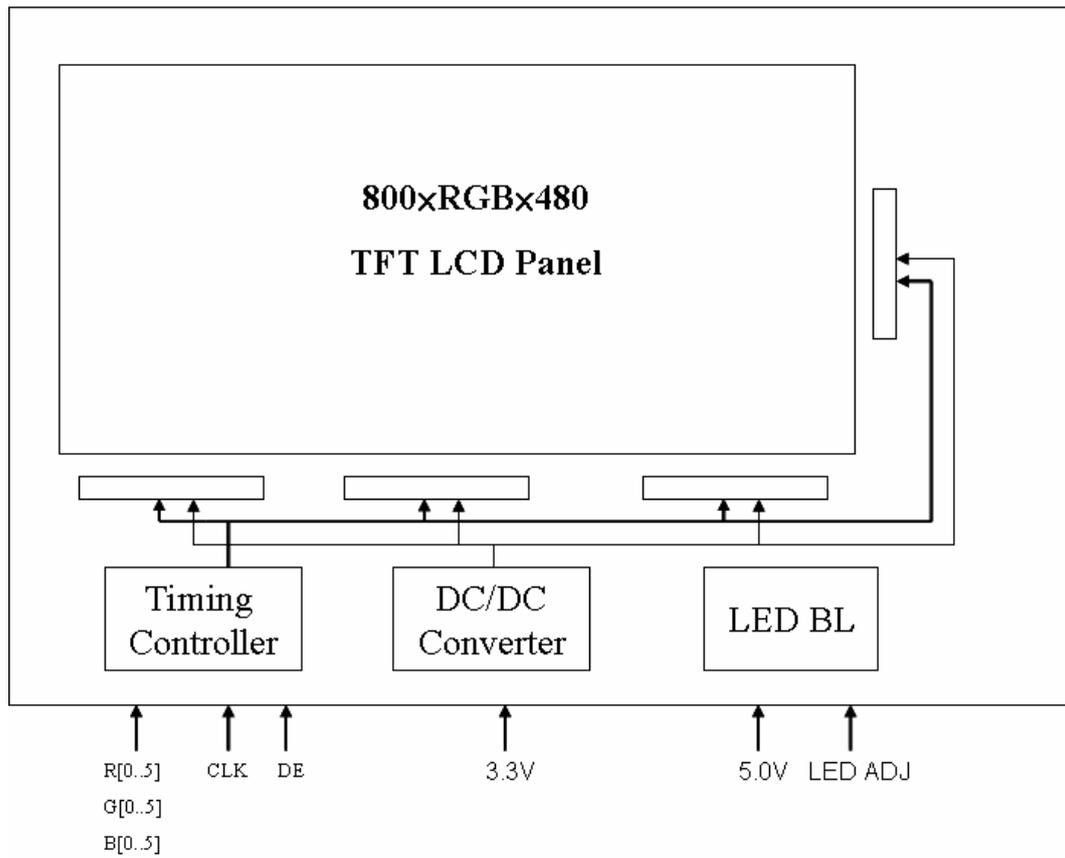
(1) Definition of Gray Scale

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

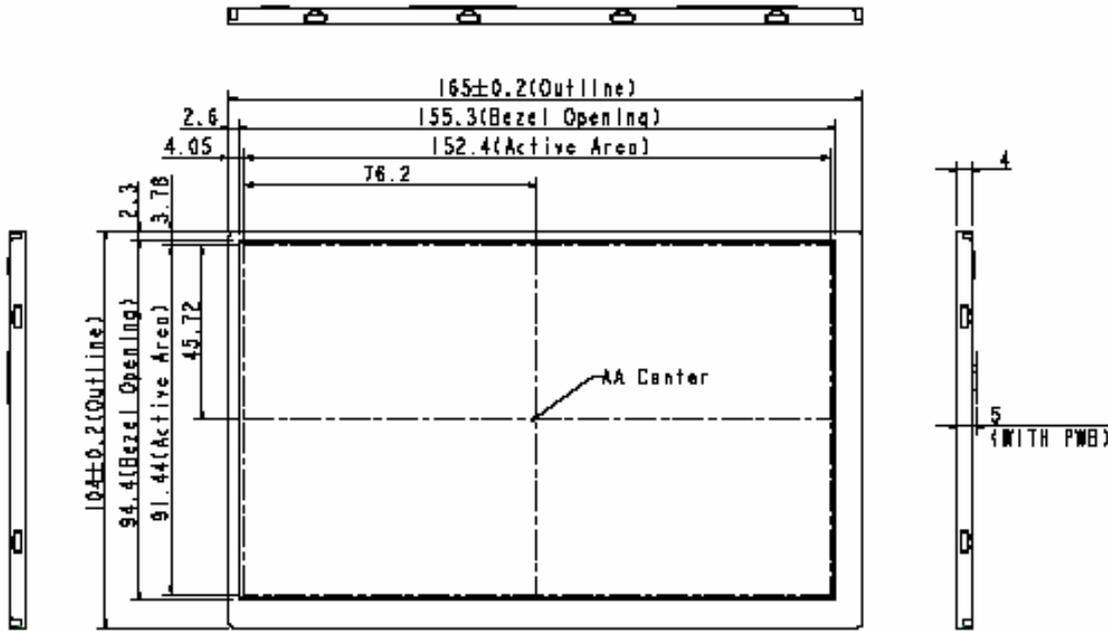


Ceramate

7. MECHANICAL DIMENSION

7.1 Front Side

[Unit : mm]

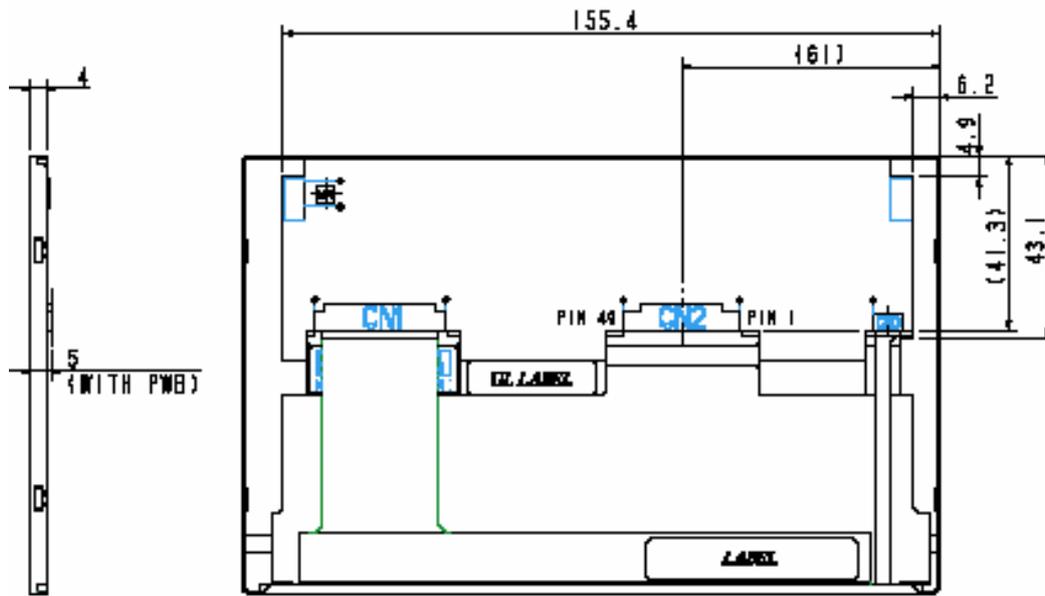


Remark : Un-indication tolerance is ± 0.3 mm

Ceramate Only

7.2 Rear Side

[Unit : mm]



Remark : Un-indication tolerance is $\pm 0.3\text{mm}$

8. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Constrast Ratio	CR	Point-5	300	400	--	--	*1)*2)*3)
Luminance	Lw	Point-5	200	250	--	cd/m ²	*2)
Luminance Uniformity	ΔL		70	80	--	%	*2)
Response Time (White - Black)	Tr+ Tf	Point-5	--	20	30	ms	*2)*4)
Viewing Angle	Horizontal	CR ≥ 10 Point-5	120	140	--	°	*2)*3)
	Vertical		90	110	--	°	*2)*3)
Color Coordinate	White	Wx Wy	0.283 0.299	0.313 0.329	0.343 0.359	--	*2)*3)
	Red	Rx Ry	0.56 0.305	0.59 0.335	0.62 0.365		
	Green	Gx Gy	0.295 0.528	0.325 0.558	0.355 0.588		
	Blue	Bx By	0.117 0.080	0.147 0.110	0.177 0.140		

Remarks :

- *1) Definition of contrast ratio : (in the dark room.BM-5A (TOPCON))
 Contrast Ratio (CR)= (White) Luminance of ON ÷ (Black) Luminance of OFF
- *2) Definition of luminance : (in the dark room.BM-5A (TOPCON))
 Measure white luminance on the point 5 as figure8-1
 Definition of Luminance Uniformity:
 Measure white luminance on the point1~9 as figure8-1

$$\Delta L = [L(MIN)/L(MAX)] \times 100$$

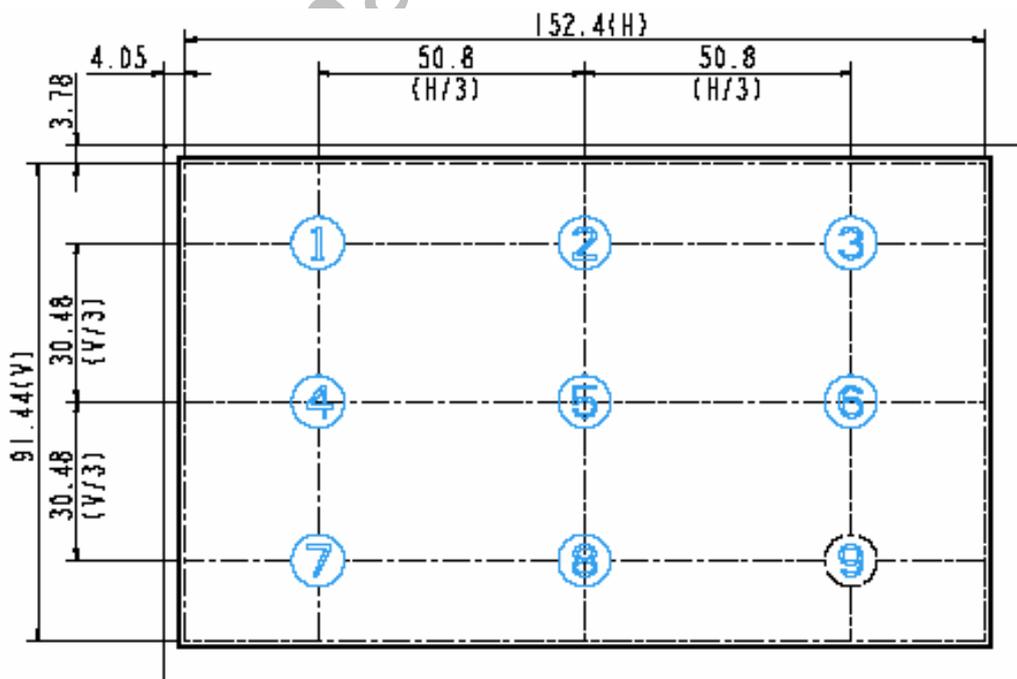


Fig8-1 Measuring point

*3) Definition of Viewing Angle(θ, ψ), refer to Fig8-2 as below : (in the dark room.EZ-CONTRAST (ELDIM))

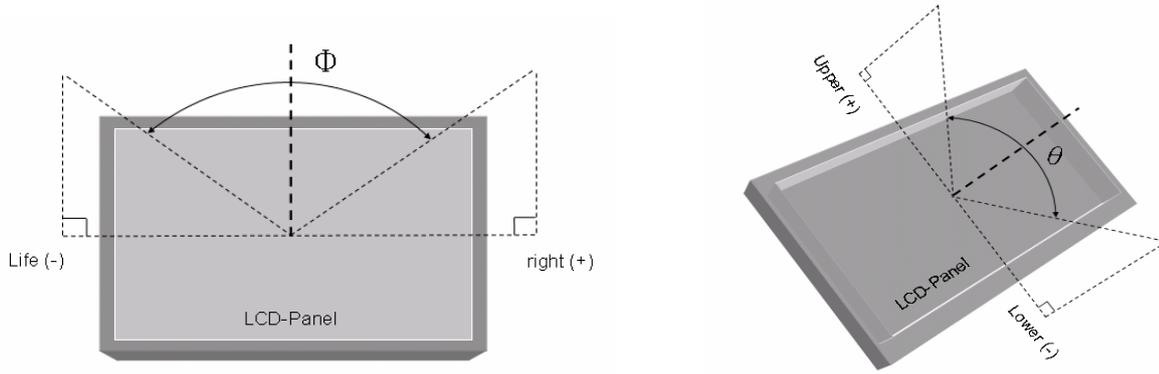


Fig8-2 Definition of Viewing Angle

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

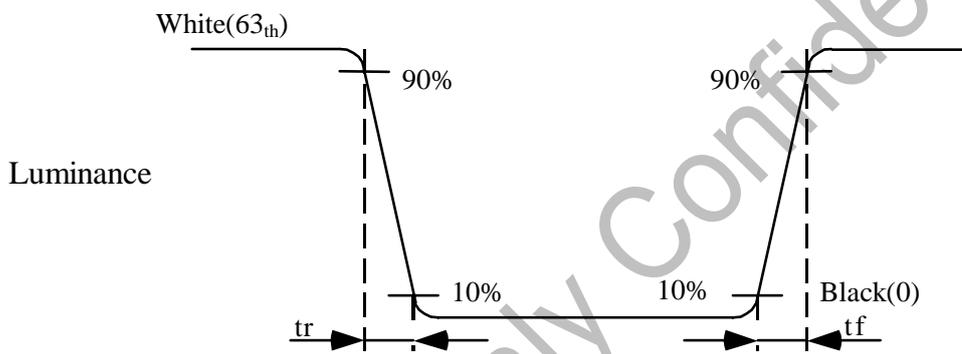


Fig8-3 Definition of Response Time(White-Black)

9. RELIABILITY TEST

9.1. Temperature and humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	85°C , 240Hrs
High Temperature Storage	95°C , 240Hrs
High Temperature High Humidity Operation	60°C , 90%RH , 240Hrs
Low Temperature Operation	-30°C , 240Hrs
Low Temperature Storage	-40°C , 240Hrs
Thermal Shock	-30°C (0.5Hr) ~ 85°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 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.