Chunghwa Picture Tubes, Ltd.
Product Specification

To :

Date : 20061026

TFT LCD

CLAA070VC01

ACCEPTED BY :

APPROVED BY	CHECKED BY	PREPARED BY

Prepared by :

Small &Medium Product Planning Management Department

Small &Medium Product General Division

CHUNGHWA PICTURE TUBES, LTD.

Doc.No:	CLAA070VC01 -- Ver.0.2	Issue Date:	2006/07/17

REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision	--	2006.05.22
0.1	Change Power consumption	4	
	Delete Signal Input Voltage	6	
	Change Power Supply Current For LED		
	Change Logic Input Voltage		
	Change Power Supply Current For LCD		
	Change Remark*2)	7	
	Modify mechanical dimension：Front side	13	
	Change response time	15	
	Change viewing angle	15	
	Change Rmark*1)	15	
0.2	Change power consumption	4	2006.07.17
	Add to signal input voltage	5	
	Delete note*3) of static eletricity	5	
	Delete remark*2 of ICC rush current	5	
	Change electrical characteristics	7	
	Change definition of PIN 35	9	
	Change remarks *1)	9	
	Add to figure of remarks *2)	10	
	Change remarks *3)	10	
	Add to remarks *1)	11	
	Change block diagram	14	
	Change color coordinate	17	
	Change remarks *1)	17	
	Change condition of high temperature high humidity storage	20	
	Change condition of vibration	20	
	Add to ESD specification	20	

CONTENTS

1. OVERVIEW

CLAA070VC01 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)
NTSC ratio	50%
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)	110g(Typ)
BL unit	LED
Surface Treament	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	*2)
	VESDm	-15K	+15K	V	
ICC Rush Current	IRUSH	-	1	A	*3)
Operation Temperature	T_{op}	-30	85	℃	*1)
Storage Temperature	T_{stg}	-40	95	℃	*1)

Remarks：

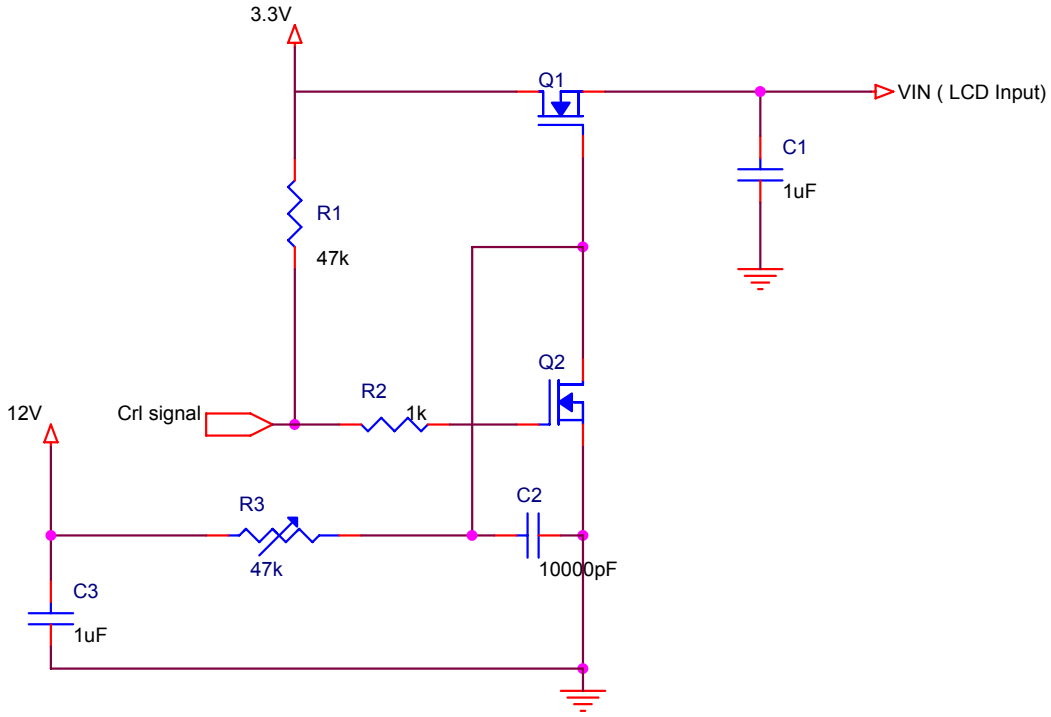
*1) If users use the product out off the environmemt operation range（temperature and humidity）,it will concern for visual quality.

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

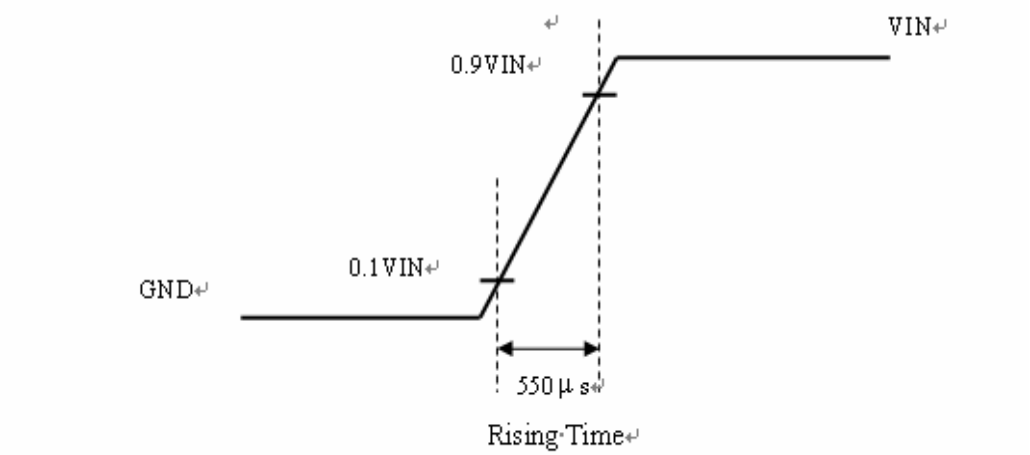
VESDc ：Contact discharge to input connector

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

Ta=25℃

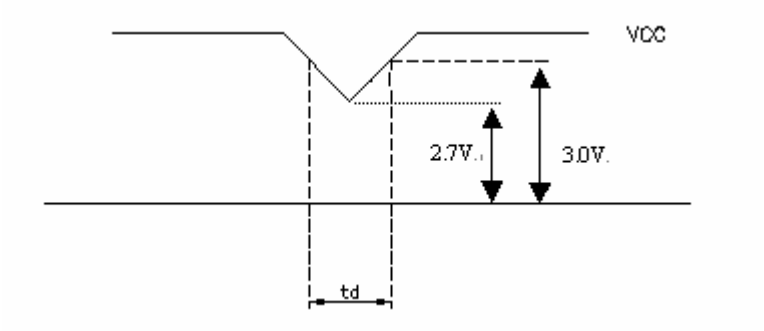
Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	*1)
Power Supply Voltage For LED	VDD	4.5	5	5.5	V	
Logic Input Voltage	VIH	VCC*0.7	--	VCC	V	
	VIL	0	--	VCC*0.3	V	
ADJ Input Voltage	VIH	3.0		3.3	V	
	VIL	GND		0.3	V	

Remarks：

*1)VCC –dip codition:

When 2.7 V≦VCC＜3.0V，td≦10ms.

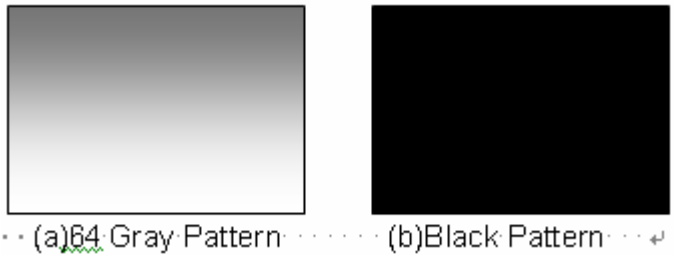
VCC＞3.0V，VCC-dip condition should be same as VCC-turn-on condition.



3.2TFT-LCD current consumption

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

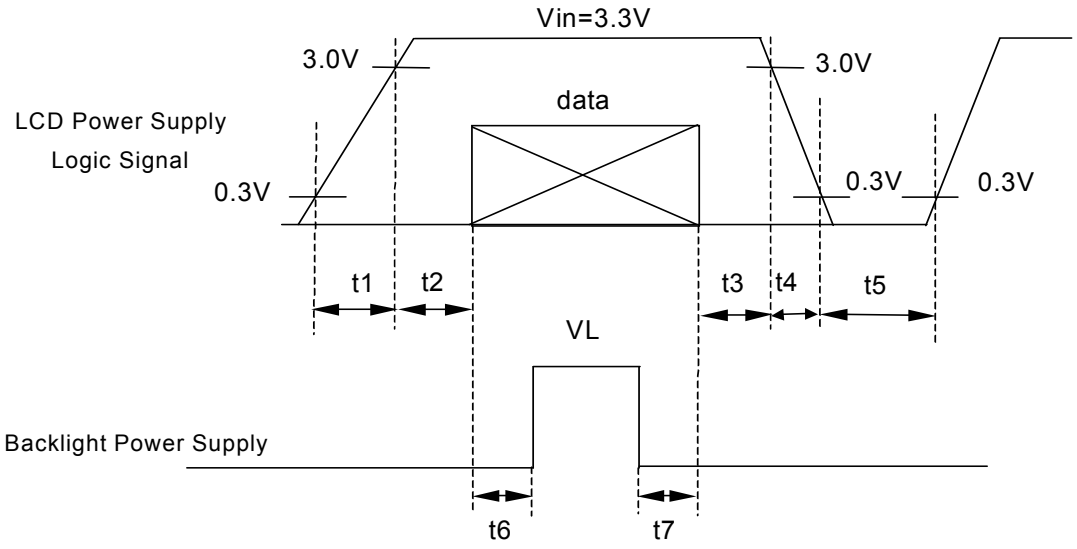
*1) Typical: Under 64 gray pattern
Maximum: Under black pattern



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

3.3 Power、Signal sequence

t1≦10ms 1 sec≦t5
50ms≦t2 200ms≦t6
0＜t3≦50ms 200ms≦t7
0＜t4≦10ms



Data: RGB DATA, DCLK, DENA

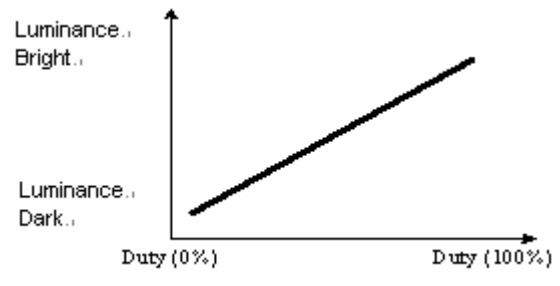
4. INTERFACE CONNECTION

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

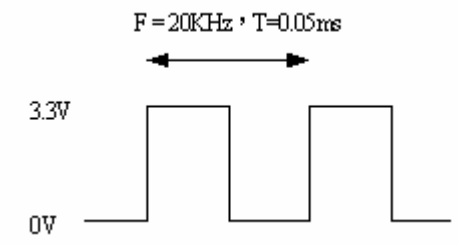
Pin NO.	SYMBOL	DESCRIPTION
1	V_{SS}	Power Ground
2	V_{SS}	Power Ground
3	ADJ	Brightness control for LED B/L
4	VDD	Power Supply for LED Driver circuit
5	VDD	Power Supply for LED Driver circuit
6	VDD	Power Supply for LED Driver circuit
7	V_{CC}	Power Supply for Digital Circuit
8	V_{CC}	Power Supply for Digital Circuit
9	DE	Data Enable
10	V_{SS}	Power Ground
11	V_{SS}	Power Ground
12	V_{SS}	Power Ground
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	V_{SS}	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	V_{SS}	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	V_{SS}	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	V_{SS}	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	V_{SS}	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)
36	V_{SS}	Power Ground
37	V_{SS}	Power Ground
38	DCLK	Clock Signals ; Latch Data at the Falling Edge
39	V_{SS}	Power Ground
40	V_{SS}	Power Ground

Remarks：

1).ADJ adjust brightness to control Pin，Pulse duty the more big the more bright



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



3) AVSS Pin must ground contact，can not be floating.

5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

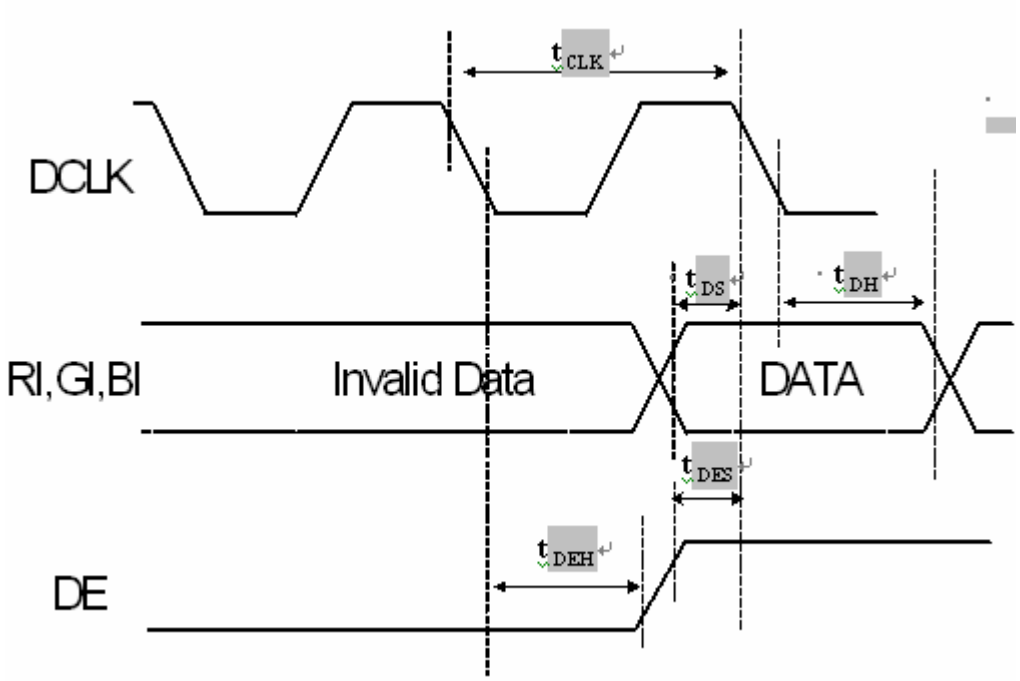
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	Period	t_{CLK}	31	37.0	40.0	ns
	Dot Clock	f_{CLK}	25	27	32.11	MHz
	Low Level Width	t_{WCL}	6	-	-	ns
	High Level Width	t_{WCH}	6	-	-	
DE	Setup Time	t_{DES}	5	-	-	ns
	Hold time	t_{DEH}	10	-	-	
	Horizontal Period	t_{HP}	850	900	950	t_{CLK}
	Horizontal Valid	t_{HV}		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	Hz
DATA	Setup Time	t_{DS}	5	-	-	ns
	Hold Time	t_{DH}	10	-	-	

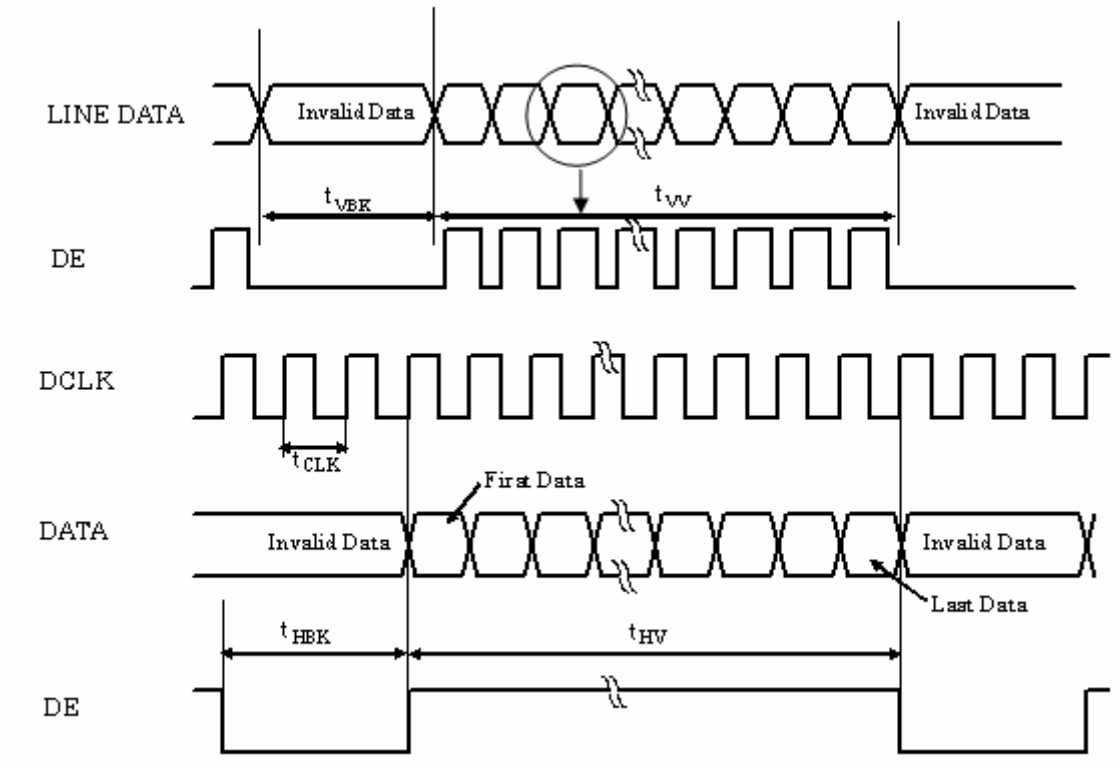
Remarks：

*1) High level of logic signal is 70%。Low level of logic signal is 20%。

*2) This module is operated by DE only mode

5.2 Timing sequence(Timing chart)





5.3 Color Data Assignment

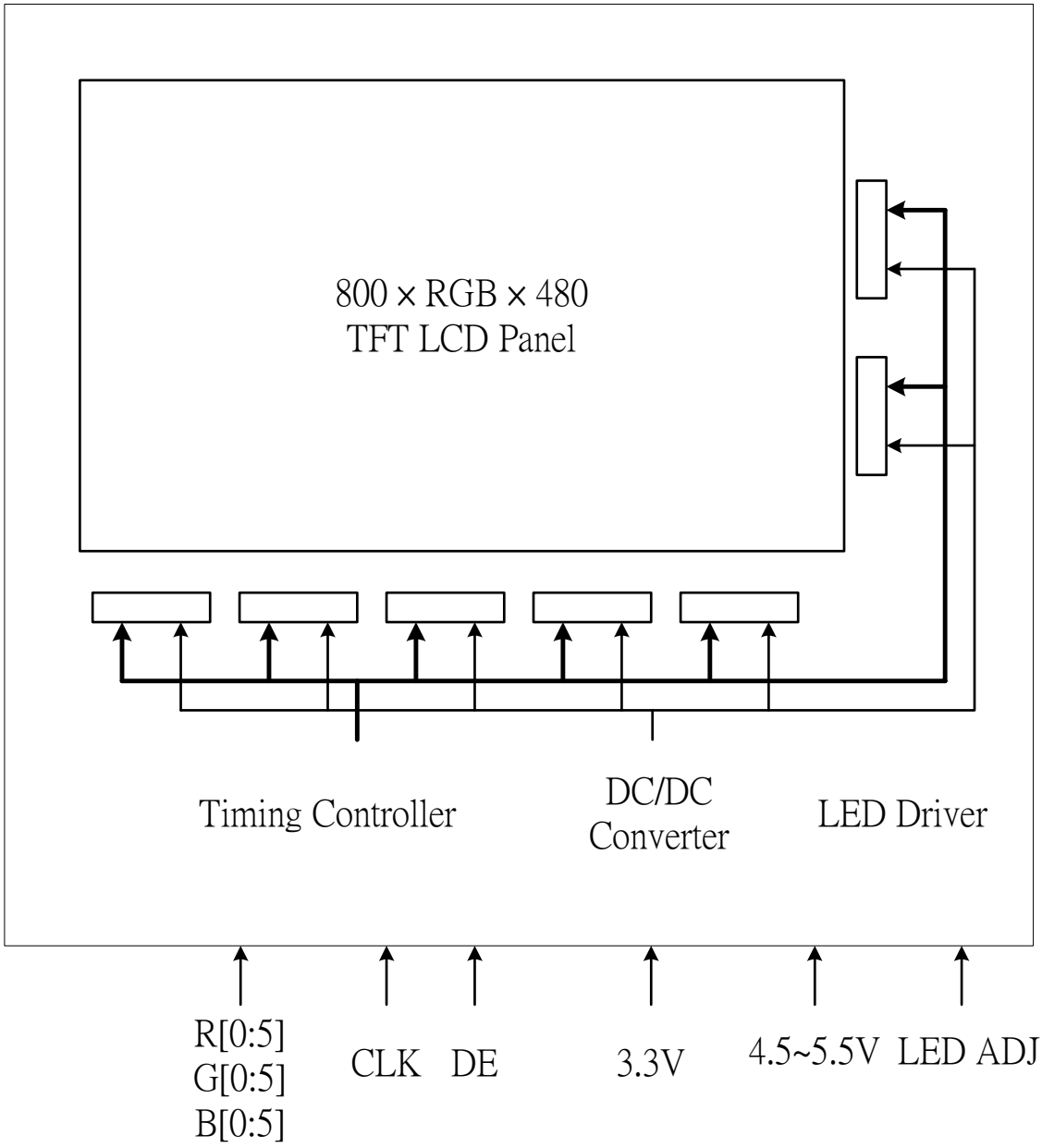
COLOR	INPUT DATA	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB					LSB	MSB					LSB	MSB					LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)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

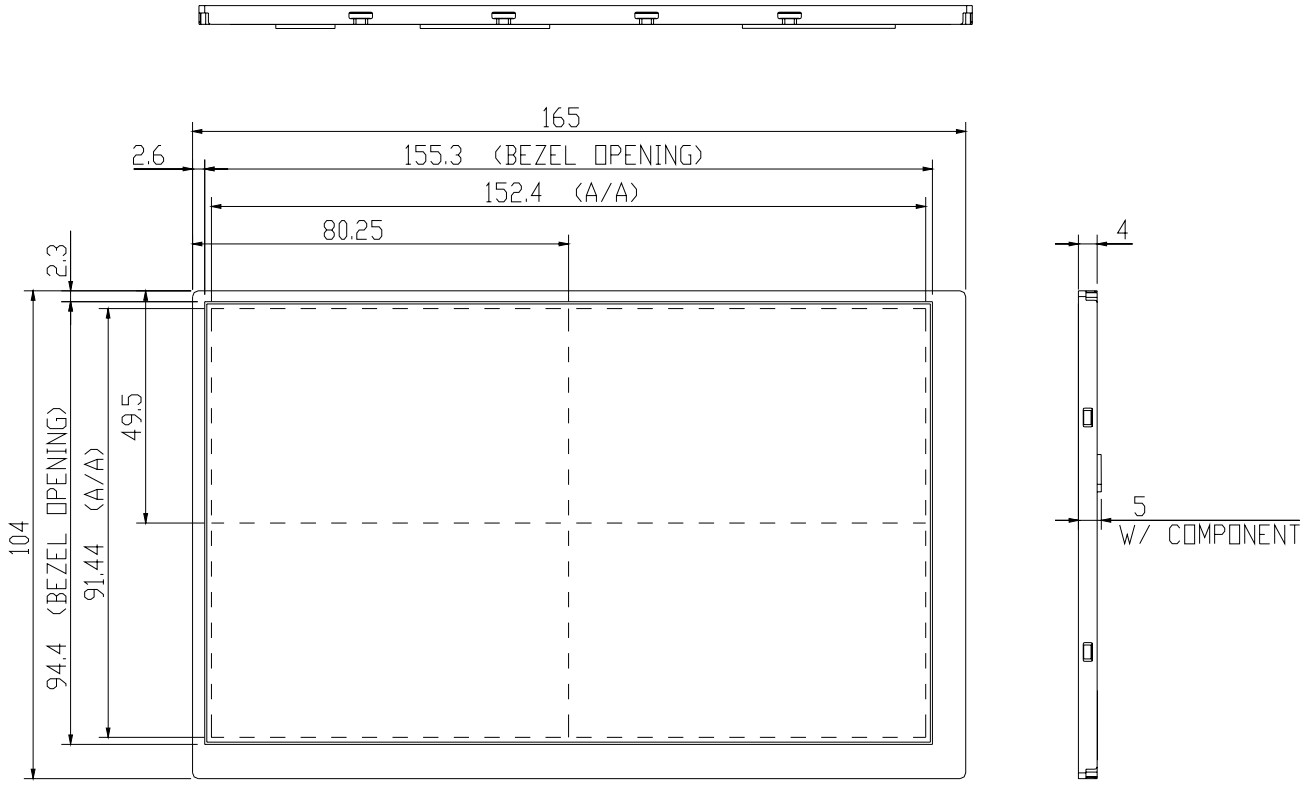
(2)Data:1-High,0-Low

6. BLOCK DIAGRAM



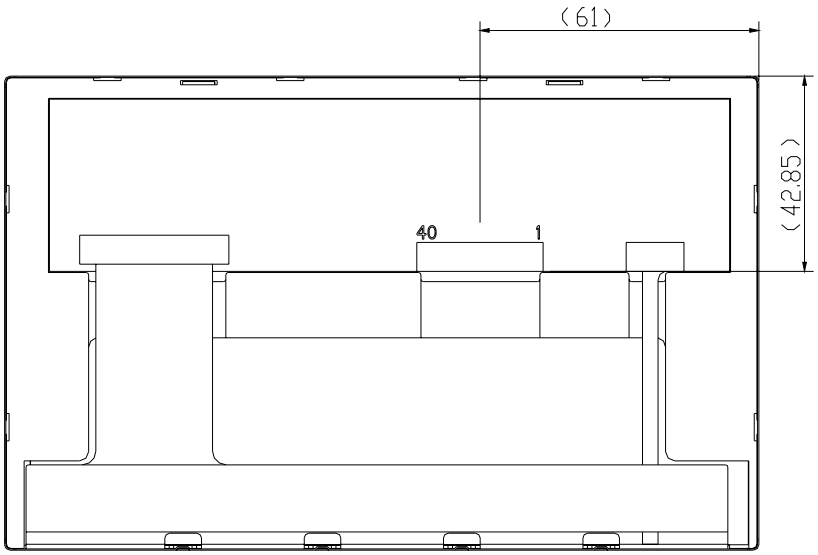
7. MECHANICAL DIMENSION

7.1 Front Side [Unit：mm]



7.2 Rear Side

[Unit：mm]



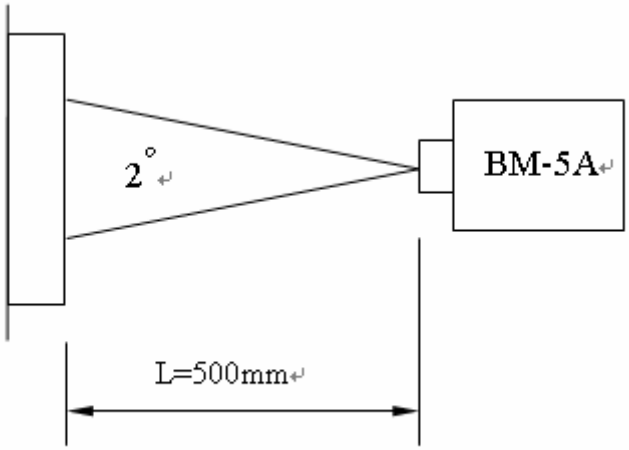
Remark：Un-indication tolerance is ±0.3mm

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	180	220	--	cd/m^2	*1)*3)
Luminance Uniformity		ΔL		70	80	--	%	*1)*3)
Response Time (White - Black)		Tr+ Tf	Point-5	--	--	20	ms	*1)*3)*5)
Viewing Angle	Horizontal	ϕ	CR≧10 Point-5	120	140	--	°	*1)*2)*4)
	Vertical	θ		90	110	--	°	*1)*2)*4)
Color Coordinate	White	Wx Wy	Point-5	0.273 0.289	0.313 0.329	0.353 0.369	--	*1)*3)
	Red	Rx Ry		0.544 0.291	0.584 0.331	0.624 0.371		
	Green	Gx Gy		0.291 0.524	0.331 0.564	0.371 0.604		
	Blue	Bx By		0.108 0.084	0.148 0.124	0.188 0.164		

Remarks :

*1)Measure condition : 25℃±2℃ , 60±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 ÷ (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

△L = [L(MIN)/L(MAX)]×100

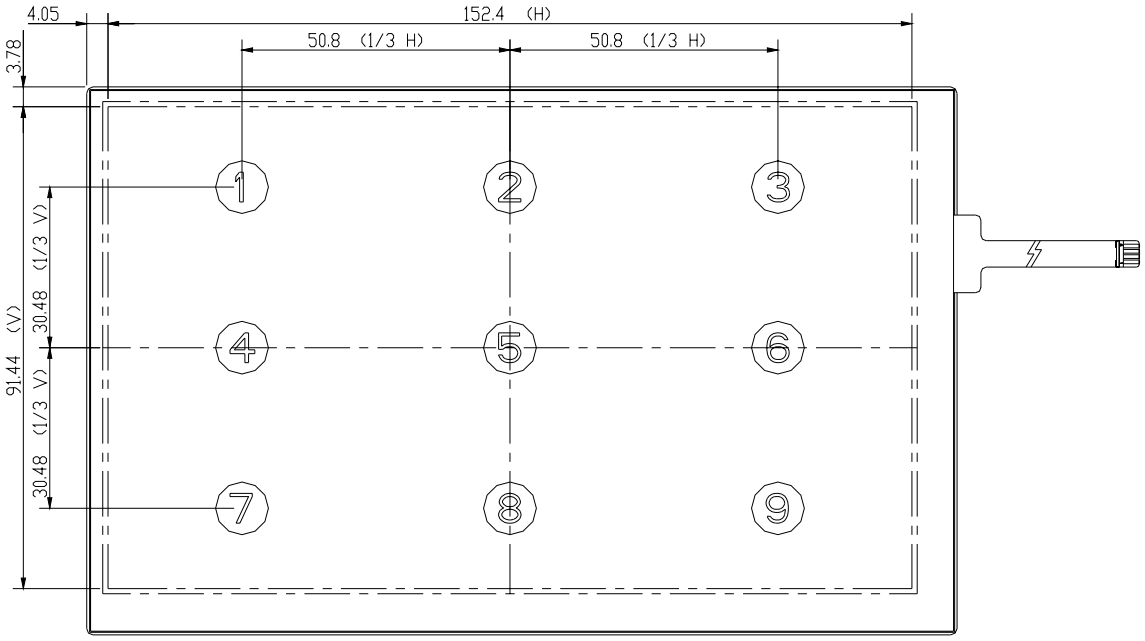


Fig8-1 Measuring point

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

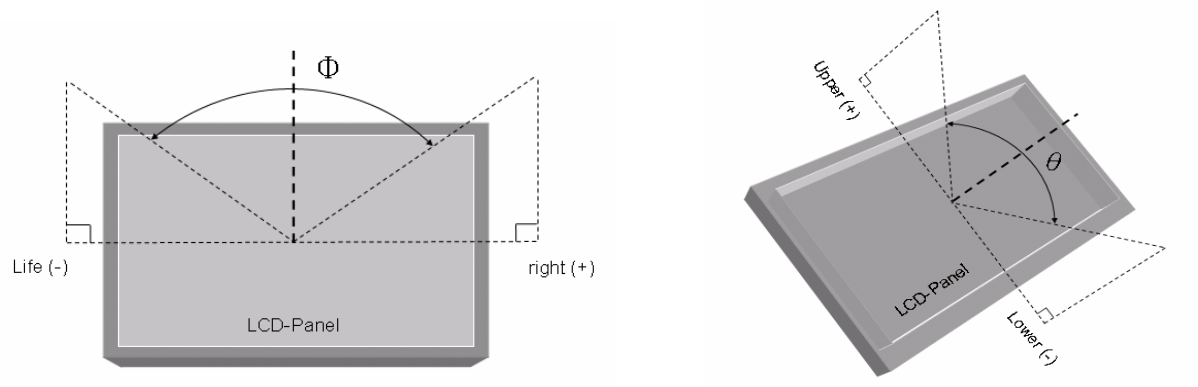


Fig8-2 Definition of Viewing Angle

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

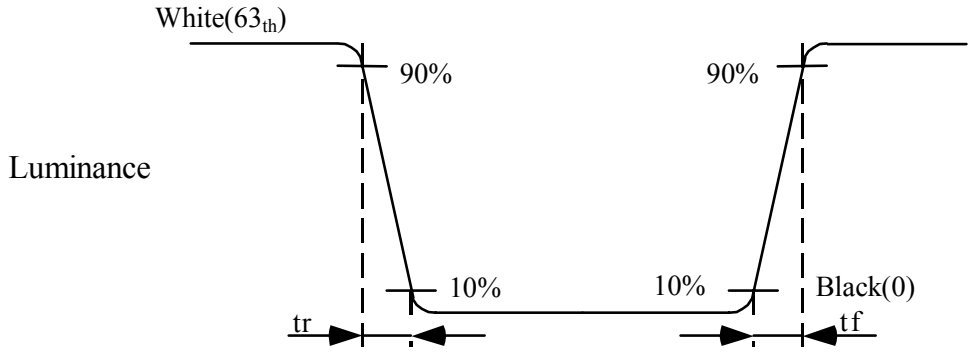


Fig8-3 Definition of Response Time(White-Black)

9. RELIABILITY TEST

9.1. Temperature and humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	85℃，240Hrs
High Temperature Storage	95℃，240Hrs
High Temperature High Humidity Operation	60℃，90%RH，240Hrs
Low Temperature Operation	-30℃，240Hrs
Low Temperature Storage	-40℃，240Hrs
Thermal Shock	-30℃（0.5Hr）~ 85℃(0.5Hr) 200 cycles

9.2. Shock and Vibration

TEST ITEMS	CONDITIONS
Shock (Non-operation)	● Shock level:980m/s^2(equel 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)	● 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 Test

ITEM	CONDITION	REMARKS
ESD	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.