Chunghwa Picture Tubes, Ltd.
Product Specification

To :
Date : 20060915

TFT LCD
CLAA057VA01CW

ACCEPTED BY :

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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)	18	2006/9/6
1.0	Product name change to CLAA057VA01CW	18	2006/9/13
	Revise the contact of 1.OVERVIEW (P.3)		
	The thickness of MDL appearance is revised for 6.6mm (P.3)		
	MDL weight is revised for 110g (P.3)		
	Delete three items Forward Current, Reverse Voltage, Pulse forward current in 2.ABSOLUTE MAXIMUM RATINGS(P4)		
	Voltage of LED power in the 3.ELECTRICAL CHARACTERISTICS (V_{LED}) as Minimum= 4.5V Stand= 5V & Maximum= 5.5V.		
	Revision LED power electric current mark is I_{LED} in the 3.ELECTRICAL CHARACTERISTICS		
	Revise standard specification value:V_{LED} is input for 5.0 V. Maximum specification value:$V_{LED}$is input for 4.5 V.		
	Revise 4.INTERFACE CONNECTION SYMBOL & DESCRIPTION of 2nd, 3rd & 8th pin.		
	Alter ADJ: Luminance control pin, the bigger the brighter its pulse duty is.		
	Revise 5. Input signal (DE only mode): Dot Clock (f_{CLK}) TYP value is 25.		
	Modification of figures of front view and back view in the 7. MECHANICAL DIMENSION.		
	Modification of the high temperature keeping testing is 95℃ for 240 hours. Thermal shock testing is -30℃(0.5hours) to 85 (0.5hours) for 200 cycles in 9.RELIABILITY TEST. Supplementary: Low-temperature turn on testing condition : Backlight unit always turn on.		

CONTENTS

1. OVERVIEW

CLAA057VAO1CW is 5.7" color TFT-LCD(Thin Film Transistor Liquid Crystal Display)module composed of LCD panel,driver ICs,control circuit,and LED backlight.

The 14.52cm(5.7") screen produces a high resolution image that is composed of 640×480 pixel elements in a stripe arrangement.Display 262K colors by 6 Bit R.G.B signal input.Use 3.3 Voltage to drive the power of LCD system,and 5 Voltage to drive the black light LED.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Panel Size	5.7 inch(panel diagonal)
Display Area (mm)	116.16(W)×87.12(H)
Number of Pixels	640×3(H)×480(V)
Pixel Pitch (mm)	0.1815(H)×0.1815(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)	30ms
Brightness(cd/m^2)	220nit(typ)
NTSC ratio	50%
Viewing Angle(BL on,CR≧10)	140 degree(H)，100degree(V)
Electrical Interface(data)	TTL
Power consumption(W)	TBD
Outline Dimension(in mm)	127(W)×100(H)×6.6(D)
Weight(g)	110g
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	90	℃	*1)

Remarks：

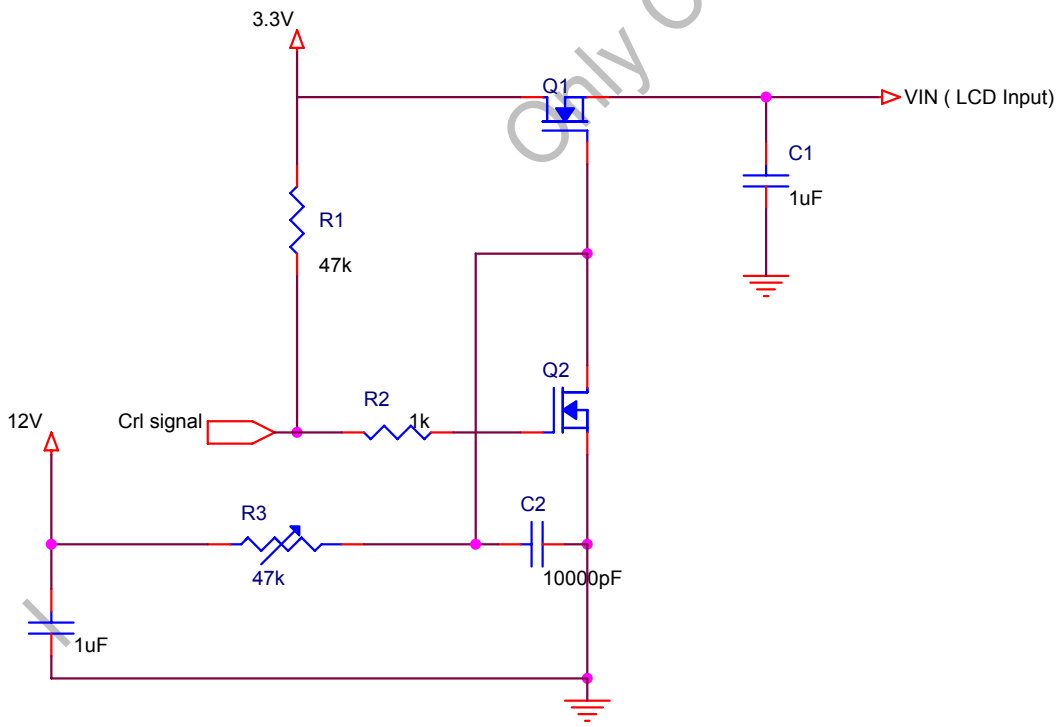
*1) If users use the product out off the environmemt operation range（temperature and humidity）,it will concern for visual quality.

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

VESDc ：Contact discharge to input connector

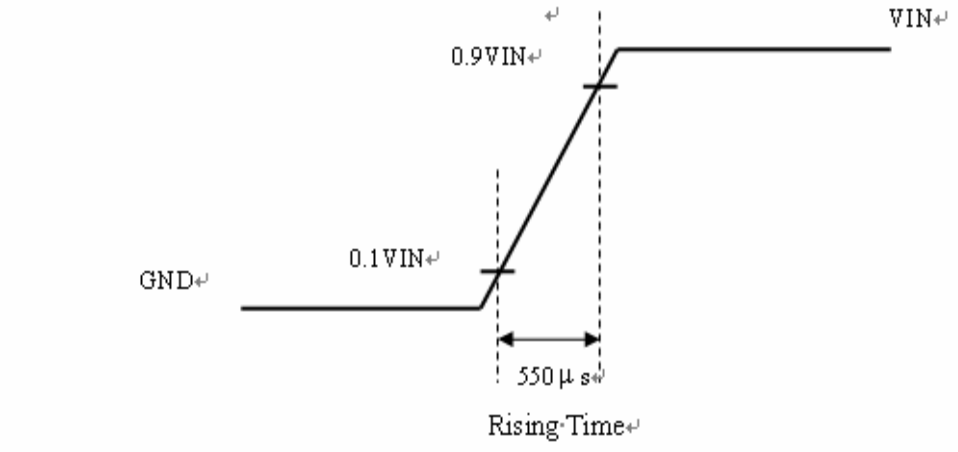
VESDm：Contact discharge to module

*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.



*4) Ifp Conditions ： Pulse Width=10msec and Duty=1/10。

3. ELECTRICAL CHARACTERISTICS

3.1TFT LCD

Ta=25℃

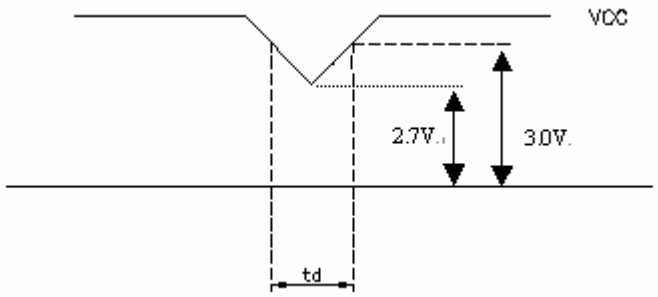
Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	V_{CC}	3.0	3.3	3.6	V	*1)
Power Supply Voltage For LED	V_{LED}	4.5	5	5.5	V	
Logic Input Voltage	V_{IH}	VCC*0.7	--	VCC	V	
	V_{IL}	0	--	VCC*0.3	V	

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.

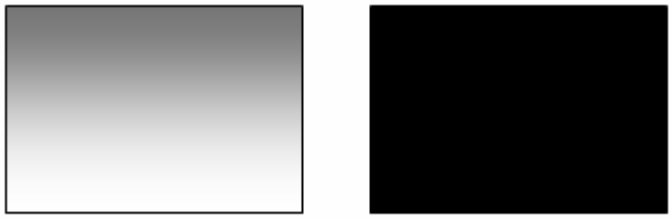


3.2TFT-LCD current comsumption

Item	Symbol	Min.	Typ	Max.	Unit	Note
LCD power current	I_{CC}	--	TBD	TBD	mA	*1)
LED power current	I_{LED}		TBD	TBD	mA	*2)

*1) Typical: Under 64 gray pattern

Maximum: Under black pattern

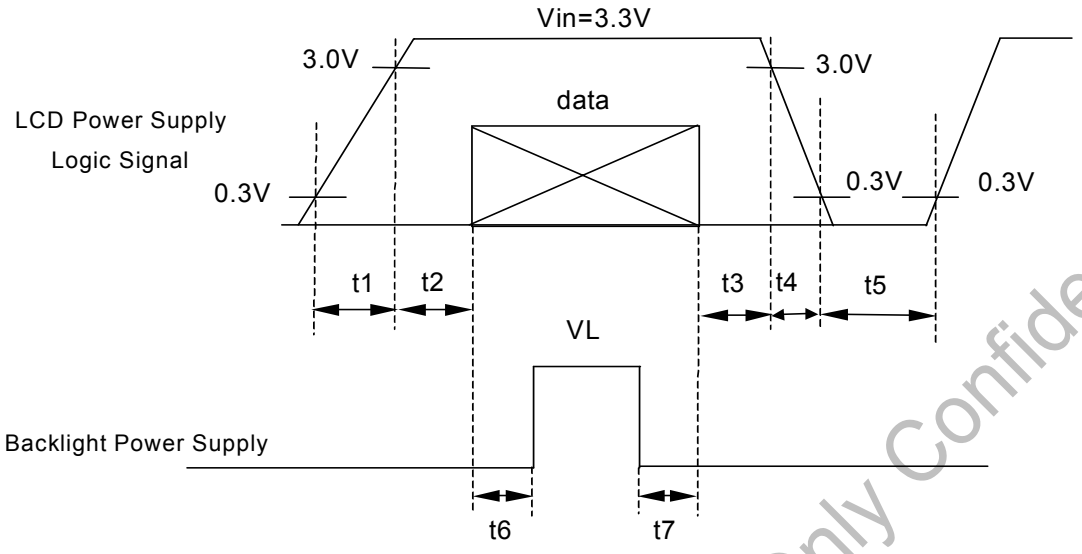


*2) Typical: When V_{LED} is 5.0V

Maximum: When V_{LED} 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

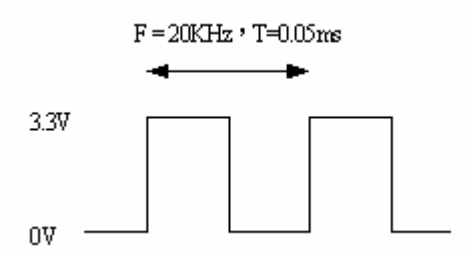
(Connector type:40pin/0.5mm pitch/Bottom contact)-089N40-000R00-G2

Pin NO.	SYMBOL	DESCRIPTION
1	U/D	Up or Down Display Control
2	NC	NC
3	NC	NC
4	Vcc	Power Supply for Digital Circuit
5	Vcc	Power Supply for Digital Circuit
6	Vcc	Power Supply for Digital Circuit
7	Vcc	Power Supply for Digital Circuit
8	NC	NC
9	DE	Data Enable
10	V_{SS}	Power Ground
11	V_{SS}	Power Ground
12	ADJ	Adjust for LED brightness
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
39	V_{SS}	Power Ground
40	L/R	Left or Right Display Control

Remarks：

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

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



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

4) U/D and L/R are 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

5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

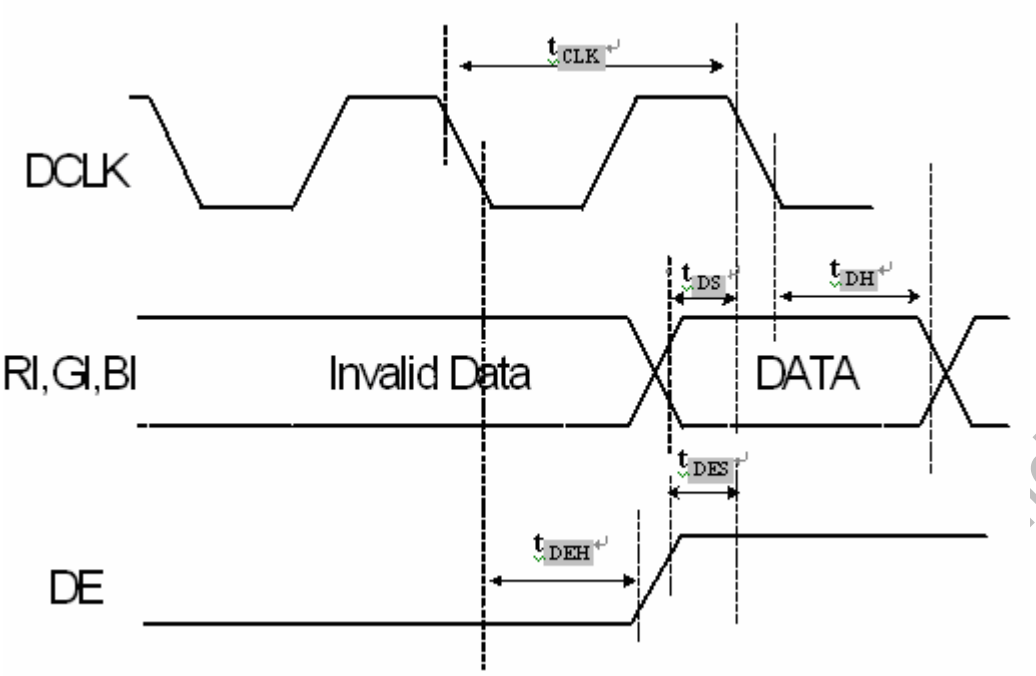
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	Period	t_{CLK}	16.67			ns
	Dot Clock	f_{CLK}	5	25	40	MHz
	Low Level Width	t_{WCL}	0.3	-	-	ns
	High Level Width	t_{WCH}	0.3	-	-	
DE	Setup Time	t_{DES}	5	-	-	ns
	Hold time	t_{DEH}	10	-	-	
	Horizontal Period	t_{HP}	750	800	900	t_{CLK}
	Horizontal Valid	t_{HV}		640		
	Horizontal Blank	t_{HBK}	110	160	260	
	Vertical Period	t_{VP}	515	525	560	t_{HP}
	Vertical Valid	t_{VV}		480		
	Vertical Blank	t_{VBK}	35	45	80	
	Vertical Frequency	f_V	55	60	65	Hz
DATA	Setup Time	t_{DS}	4	-	-	ns
	Hold Time	t_{DH}	8	-	-	

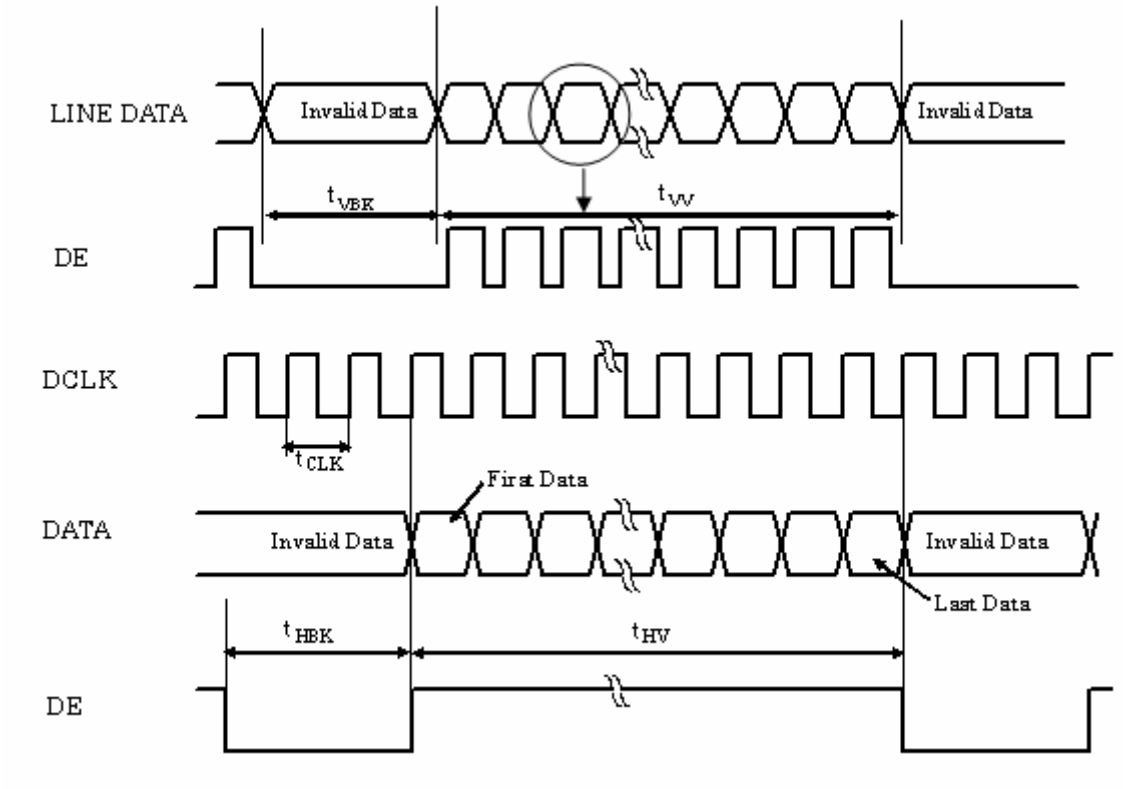
Remarks：

*1) High level of logic signal is 80%。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	R DATA						G DATA						B DATA					
	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
	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	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																			
	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

Remarks：

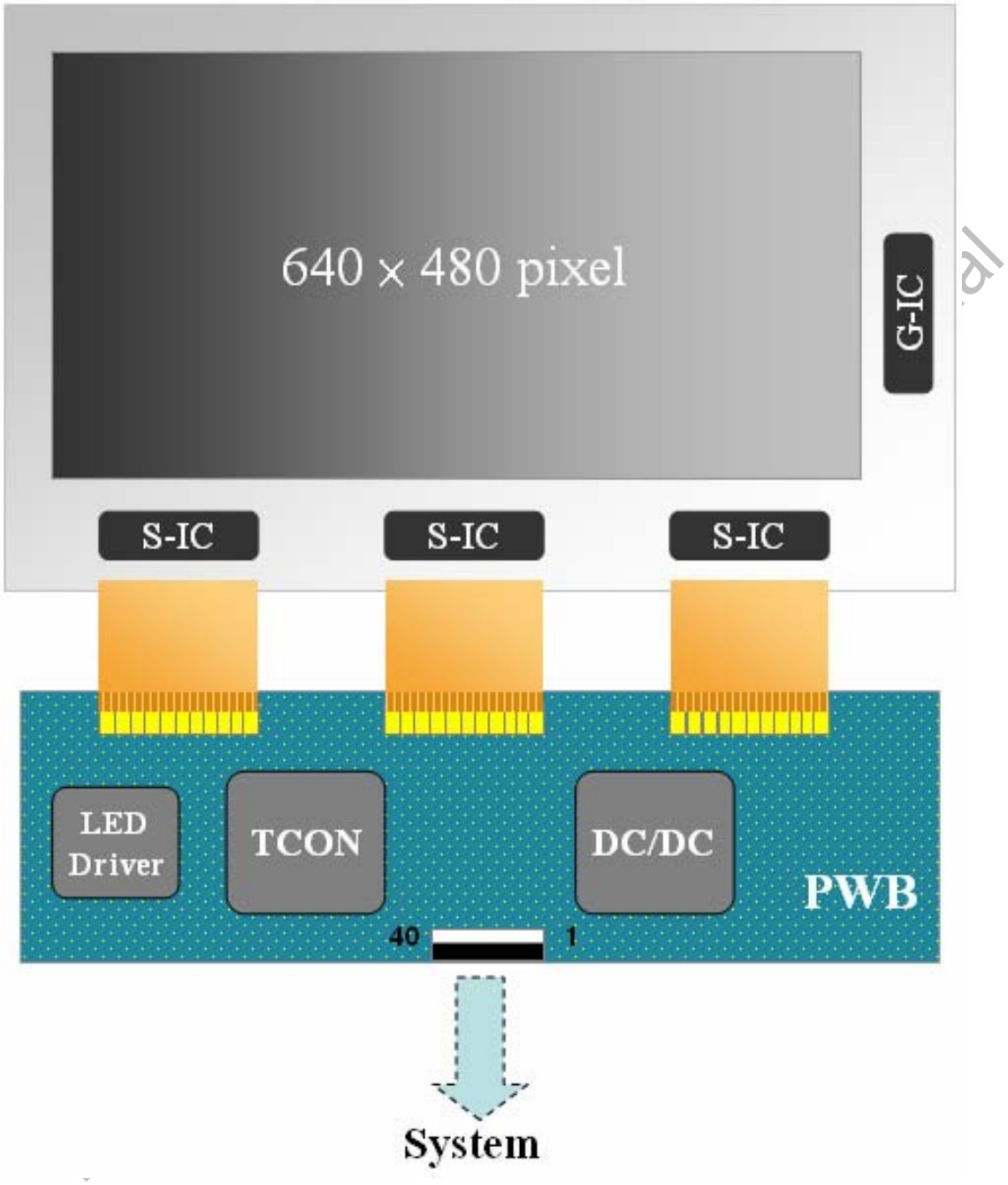
(1) Definition of Gray Scale

color(n)：n is series of Gray Scale

The more n value is, the bright Gray Scale.

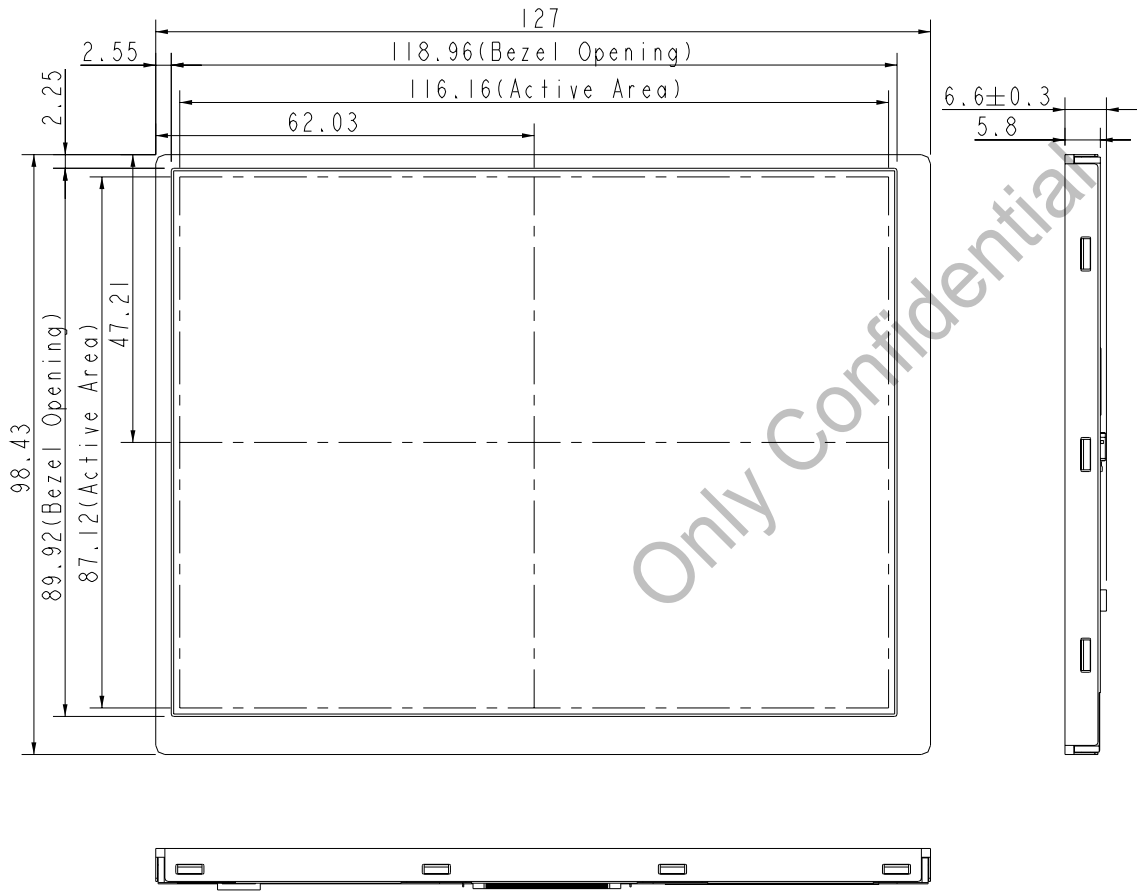
(2)Data:1-High,0-Low

6. BLOCK DIAGRAM



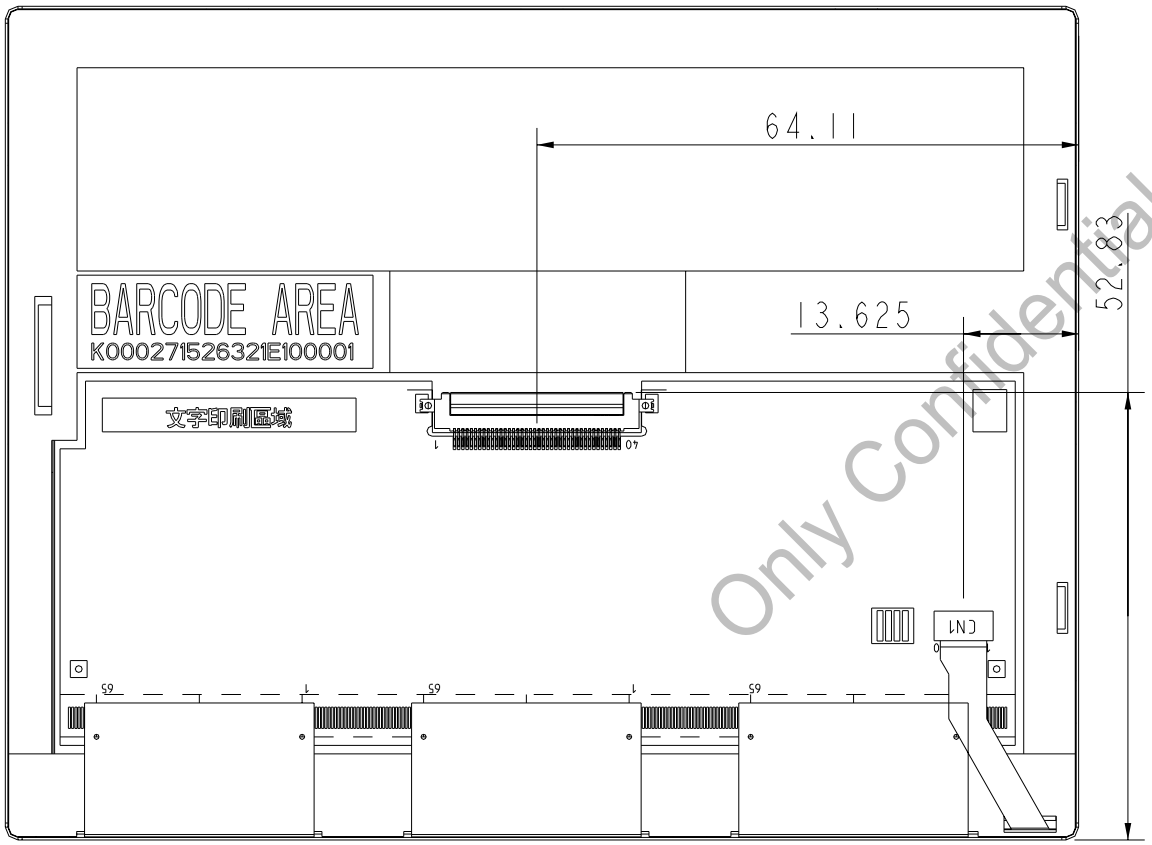
7. MECHANICAL DIMENSION

7.1 Front Side [Unit：mm]



7.2 Rear Side

[Unit：mm]



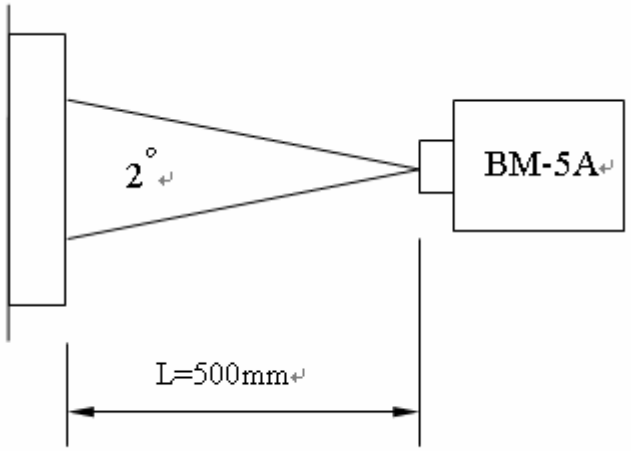
Remark：Un-indication tolerance is ±0.3mm

8. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Constrast Ratio		CR	Point-5	200	300	--	--	*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	--	30	50	ms	*1)*3)*5)
Viewing Angle	Horizontal	ϕ	CR≧10 Point-5	120	140	--	°	*1)*2)*4)
	Vertical	θ		80	100	--	°	*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		TBD	TBD	TBD		
	Green	Gx Gy		TBD	TBD	TBD		
	Blue	Bx By		TBD	TBD	TBD		

Remarks：

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



*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

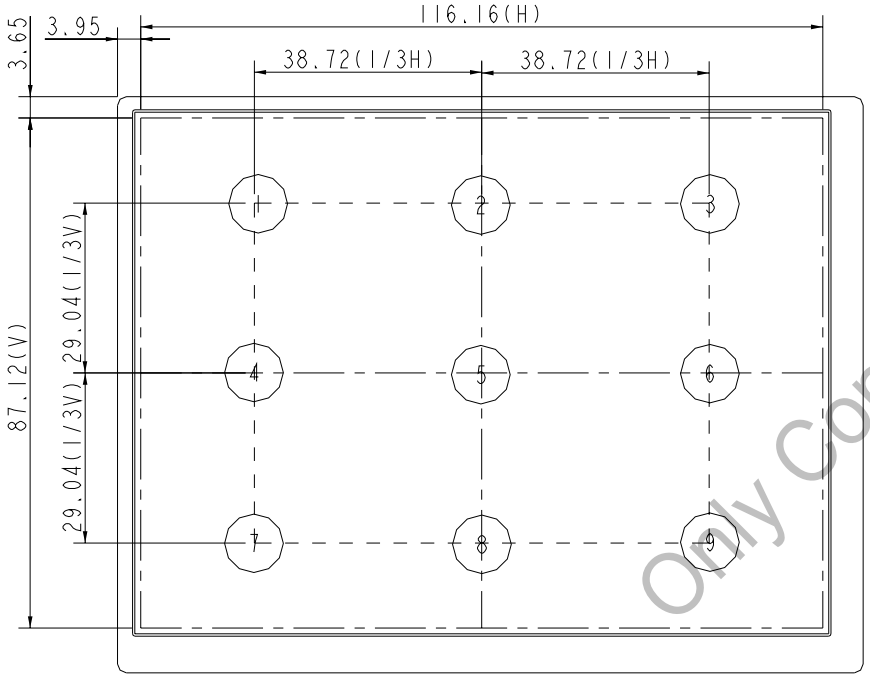


Fig8-1 Measuring point

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

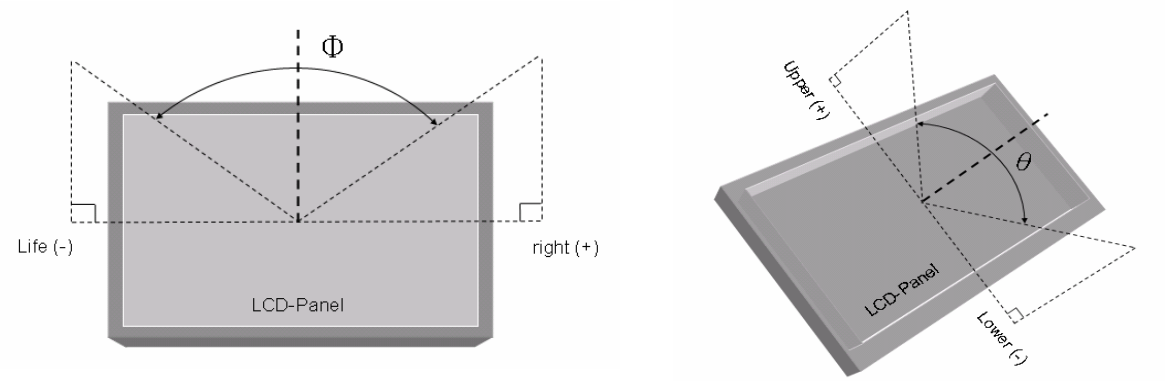


Fig8-2 Definition of Viewing Angle

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

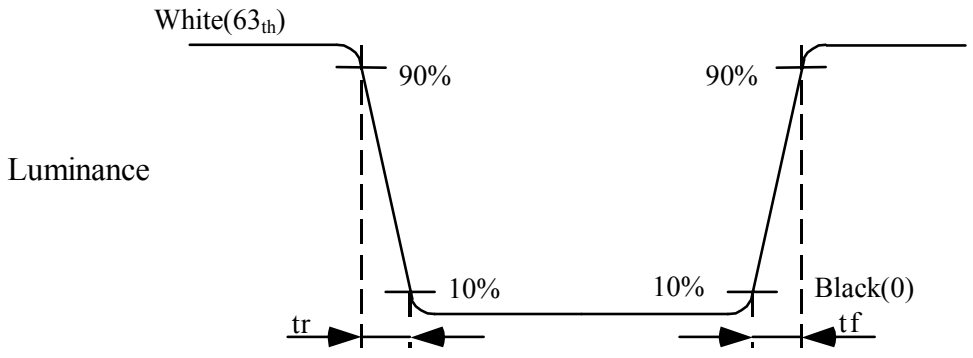


Fig8-3 Definition of Response Time(White-Black)

9. RELIABILITY TEST

9-1. Temperature and humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	85℃，240H
High Temperature Storage	95℃，240H
High Temperature High Humidity Operation	60℃，90%RH，240H
Low Temperature Operation	-30℃，240H, Backlight unit always turn on
Low Temperature Storage	-40℃，240H
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,y,z axis:2Hrs). 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.