Chunghwa Picture Tubes, Ltd.
Product Specification

To :
Date :

TFT LCD

CLAA057VA01CW

ACCEPTED BY : (V0.6)

Tentative

APPROVED BY	CHECKED BY	PREPARED BY

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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)		2006/9/6

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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 LED back light.

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)	2W
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	95	℃	*1)

Remarks：

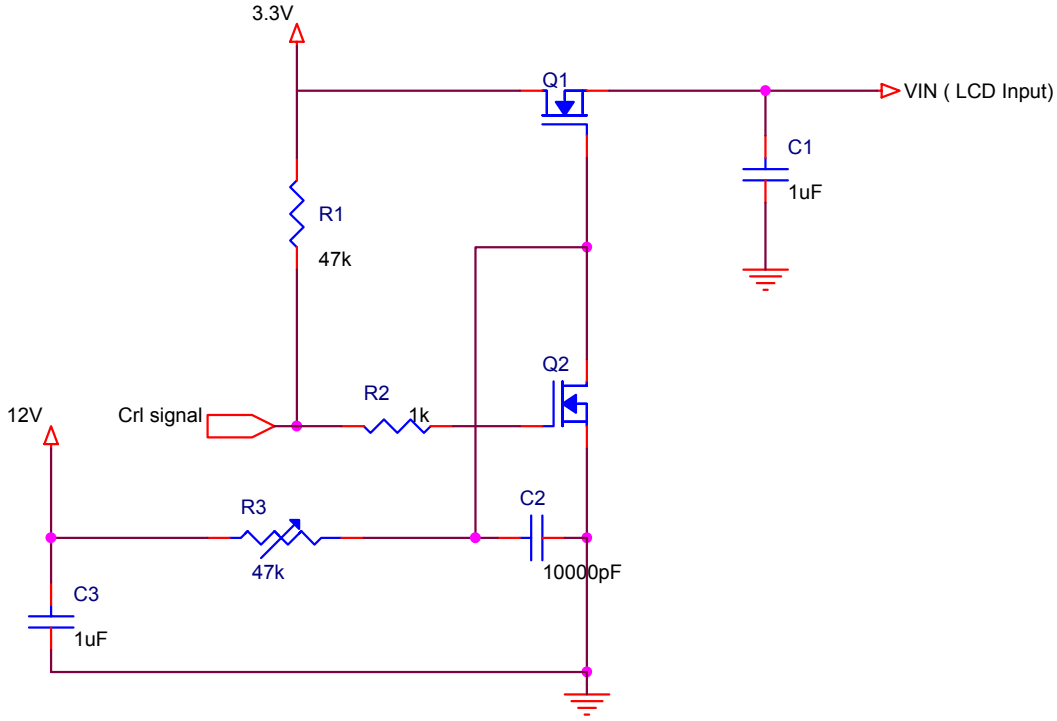
*1) If users use the product out off the environmemt operation range（temperature and humidity）,it will concern for visual quality.

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

VESDc ：Contact discharge to input connector

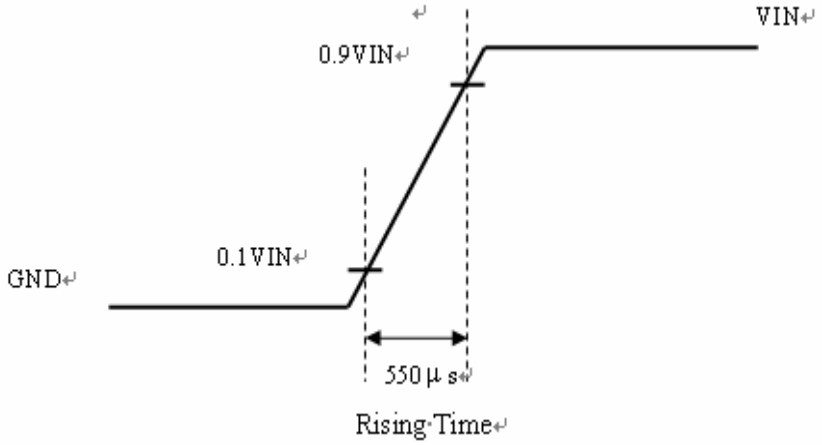
VESDm：Contact discharge to module

*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℃

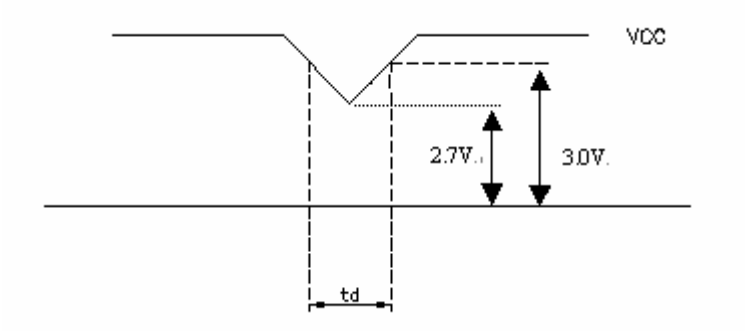
Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	V_{CC}	3.0	3.3	3.6	V	*1)
Power Supply Voltage For LED	V_{LED}	4.5	5	5.5	V	
Logic Input Voltage	V_{IH}	VCC*0.7	--	VCC	V	
	V_{IL}	0	--	VCC*0.3	V	
ADJ Input Voltage	VIH	3.0	--	3.3	V	
	VIL	GND	--	0.3	V	

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.

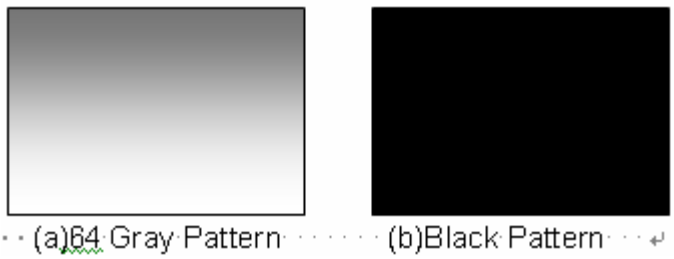


3.2TFT-LCD current comsumption

Item	Symbol	Min.	Typ	Max.	Unit	Note
LCD power current	I_{CC}	--	140	190	mA	*1)
LED power current	I_{LED}		300	350	mA	*2)

*1) Typical: Under 64 gray pattern

Maximum: Under black pattern

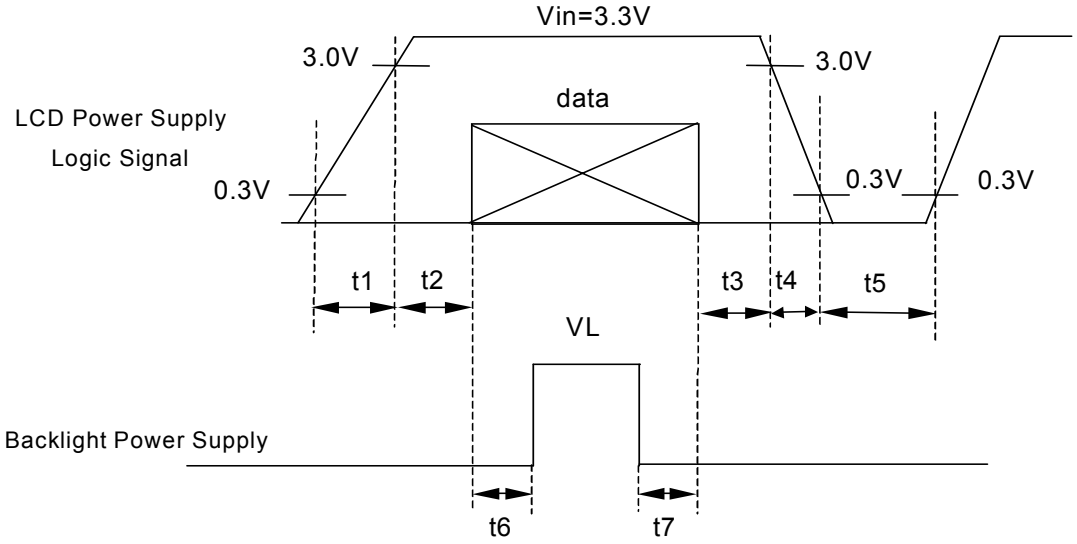


*2) Typical: When V_{LED} is 5.0V

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

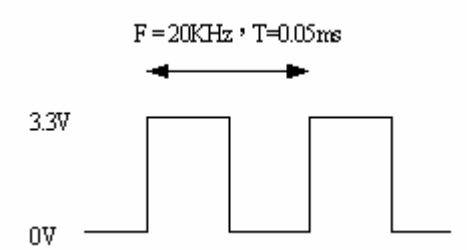
(a) CN1：Starconn 089N40-000R00-G2

Pin NO.	SYMBOL	DESCRIPTION
1	U/D	Up / Down Display Control
2	DMS	DE / SYNC Mode Selection
3	Hsync	Horizontal SYNC.
4	V_{LED}	Power Supply for LED
5	V_{LED}	Power Supply for LED
6	V_{LED}	Power Supply for LED
7	Vcc	Power Supply for LCD
8	Vsync	Vertical SYNC.
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 / 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:20±10KHZ



3) VSS 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) DMS (Selection DE / SYNC mode)

DMS	Function
1	DE Mode
0	SYNC Mode

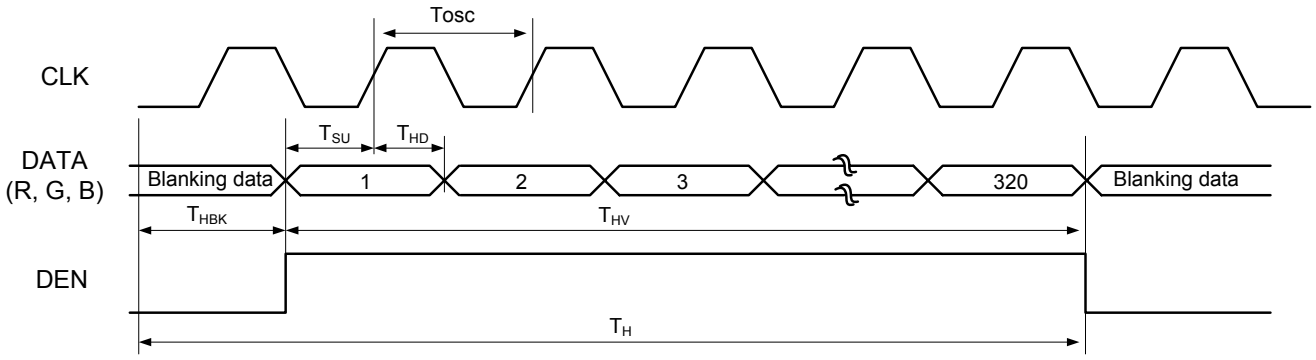
5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

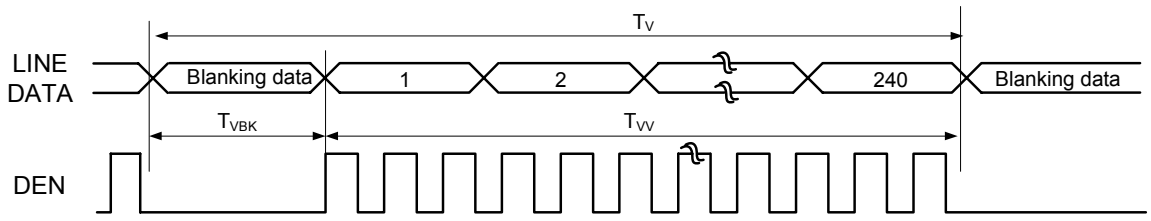
characteristics		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
DE MODE	Dot Clock	F_{OSC}	23	25	30	MHz	
	Horizontal Period	T_H	750	800	900	T_{OSC}	
	Horizontal Valid	T_{HV}	640				
	Horizontal Blank	T_{HBK}	110	160	260		
	Vertical Period	T_{VP}	515	525	560	T_H	
	Vertical Valid	T_{VV}	480				
	Vertical Blank	T_{VBK}	35	45	80		
	Vertical Frequency	F_V	55	60	65	Hz	
SYNC MODE	Horizontal Period	T_H	750	800	900	T_{OSC}	
	Horizontal Pulse Width	T_{HS}	1	1	1		
	Horizontal Pulse Width + Back Proch	T_{HPWB}	46	46	46		
	Horizontal Front Proch	T_{HF}	64	114	214		
	Horizontal Valid	T_{HV}	640				
	Vertical Period	T_{VP}	515	525	560	T_H	
	Vertical Pulse Width	T_{VS}	1	1	1		
	Vertical Pulse Width + Back Proch	T_{VPWB}	34	34	34		
	Vertical Front Proch	T_{VF}	1	11	46		
	Vertical Valid	T_{VV}	480				
	Vertical Frequency	F_V	55	60	65	Hz	

5.2 Timing sequence(Timing chart)

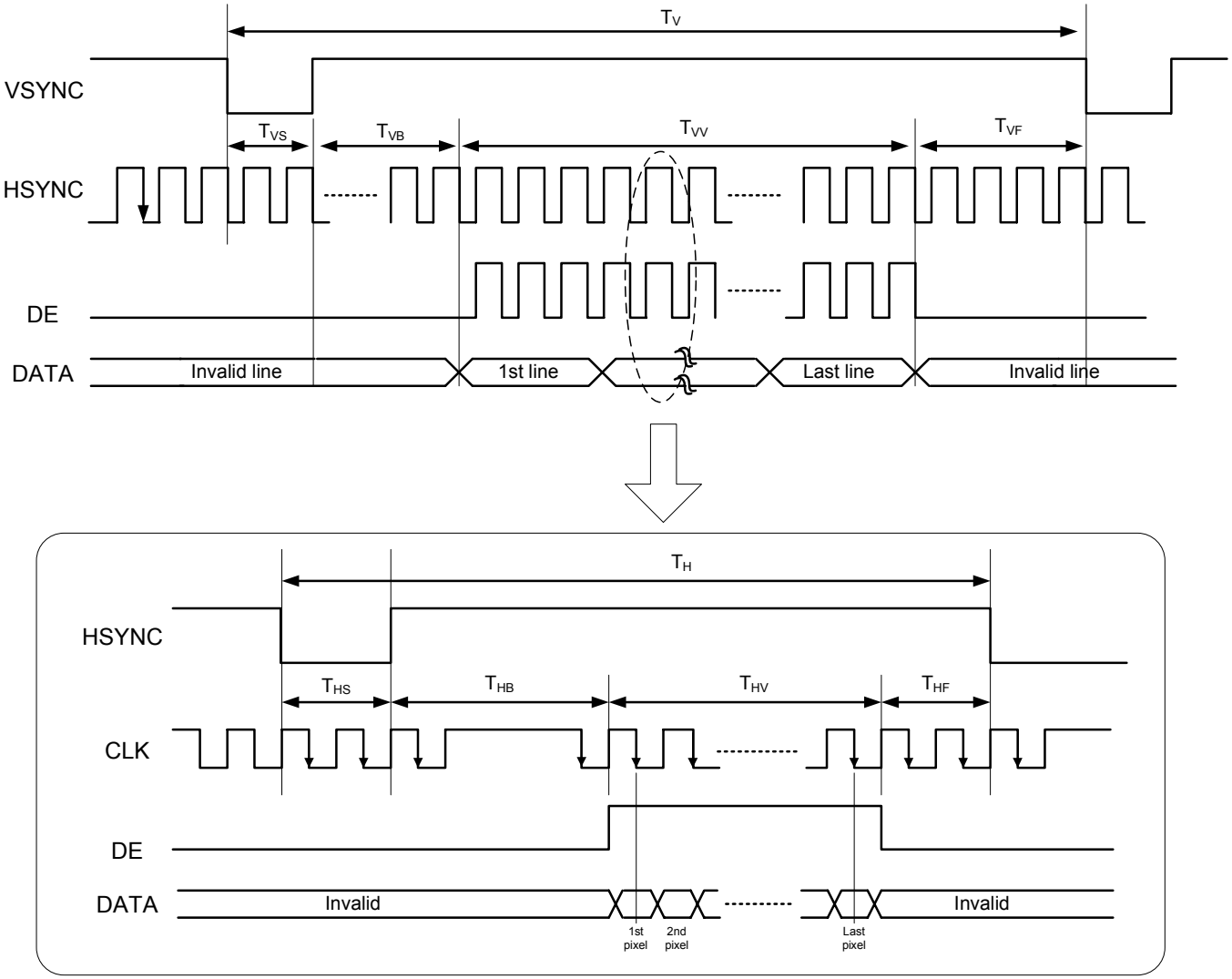
Horizontal Timing Sequence



Vertical Timing Sequence



DE mode Timing



Sync mode Timing

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：

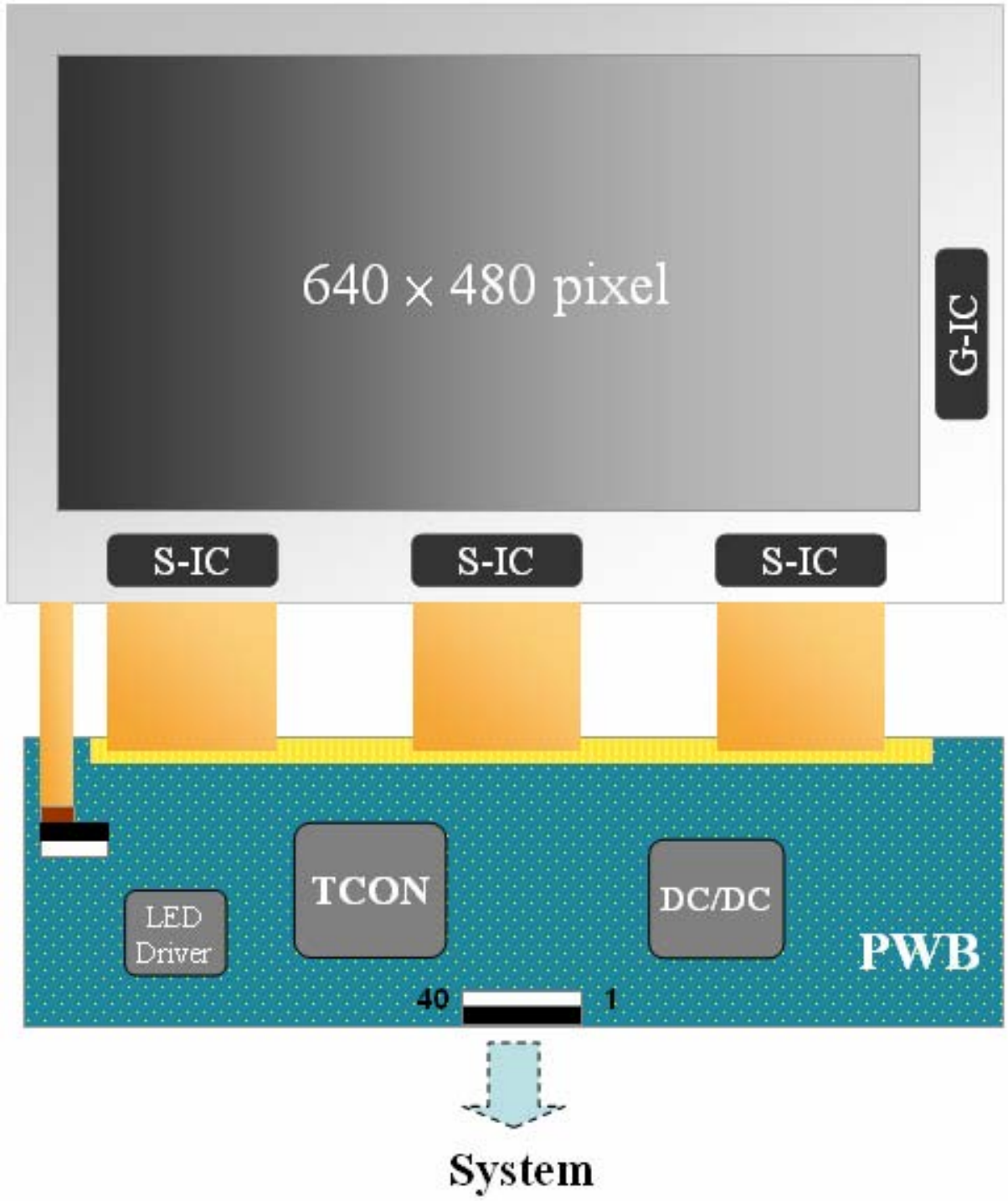
(1) Definition of Gray Scale

color(n)：n is series of Gray Scale

The more n value is, the bright Gray Scale.

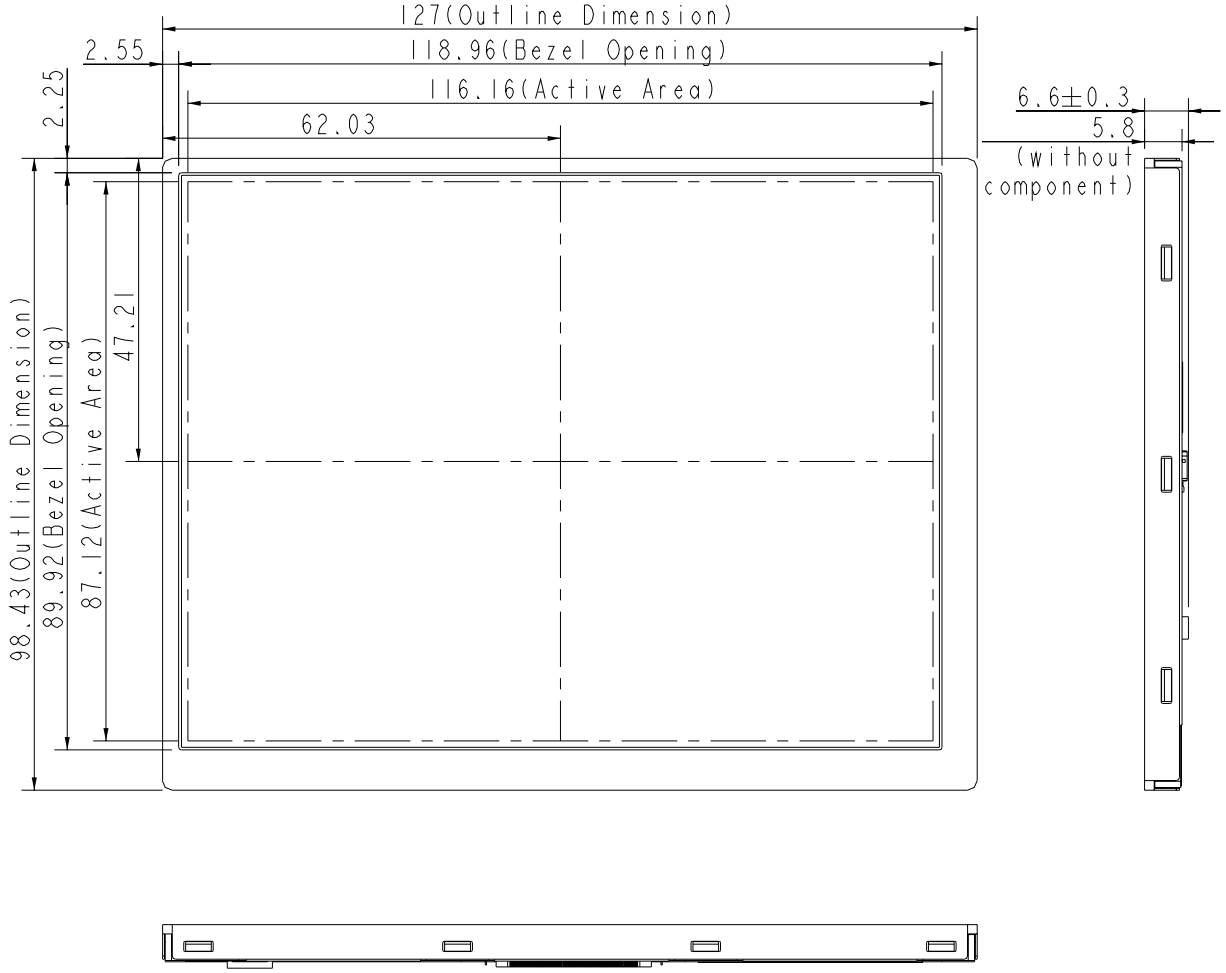
(2)Data:1-High,0-Low

6. BLOCK DIAGRAM



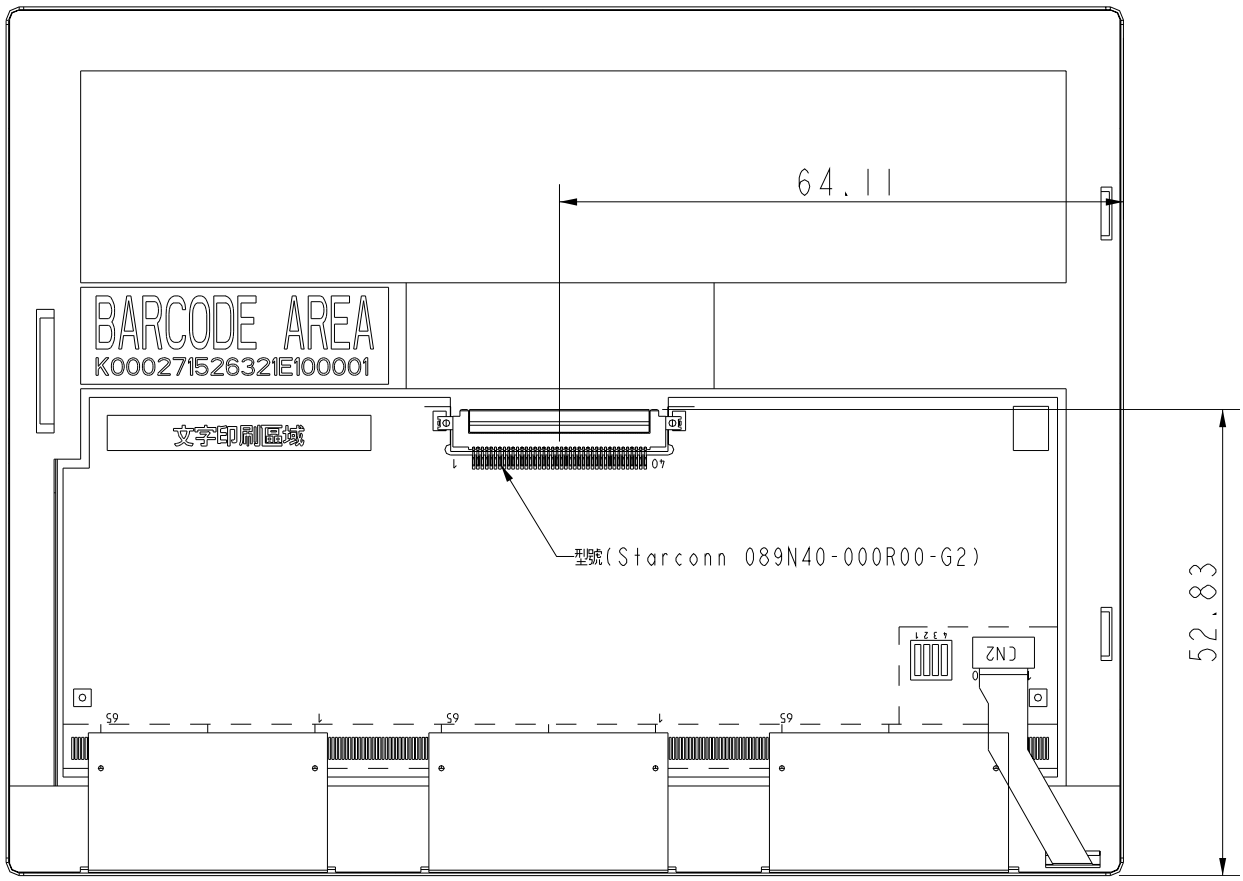
7. MECHANICAL DIMENSION

7.1 Front Side [Unit：mm]



7.2 Rear Side

[Unit：mm]



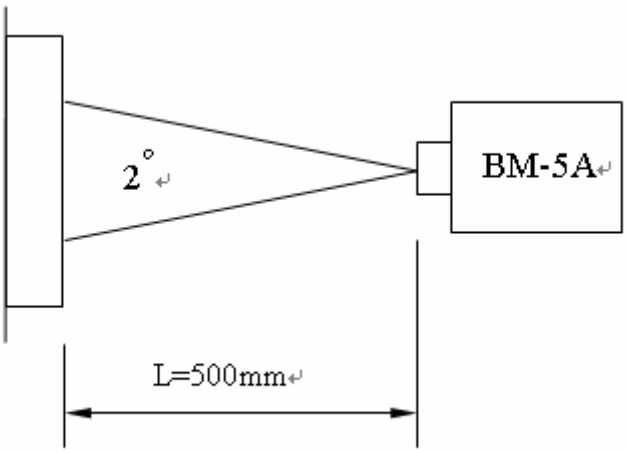
Remark：Un-indication tolerance is ±0.3mm

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	0.283 0.299	0.313 0.329	0.343 0.359	--	*1)*3)
	Red	Rx Ry		0.580 0.306	0.610 0.336	0.640 0.366		
	Green	Gx Gy		0.300 0.544	0.330 0.574	0.360 0.604		
	Blue	Bx By		0.116 0.080	0.146 0.110	0.176 0.140		

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：

Definition of Luminance Uniformity:

Measure white luminance on the point 5 as figure8-1

Measure white luminance on the point1~9 as figure8-1

△L = [L(MIN)/L(MAX)]×100%

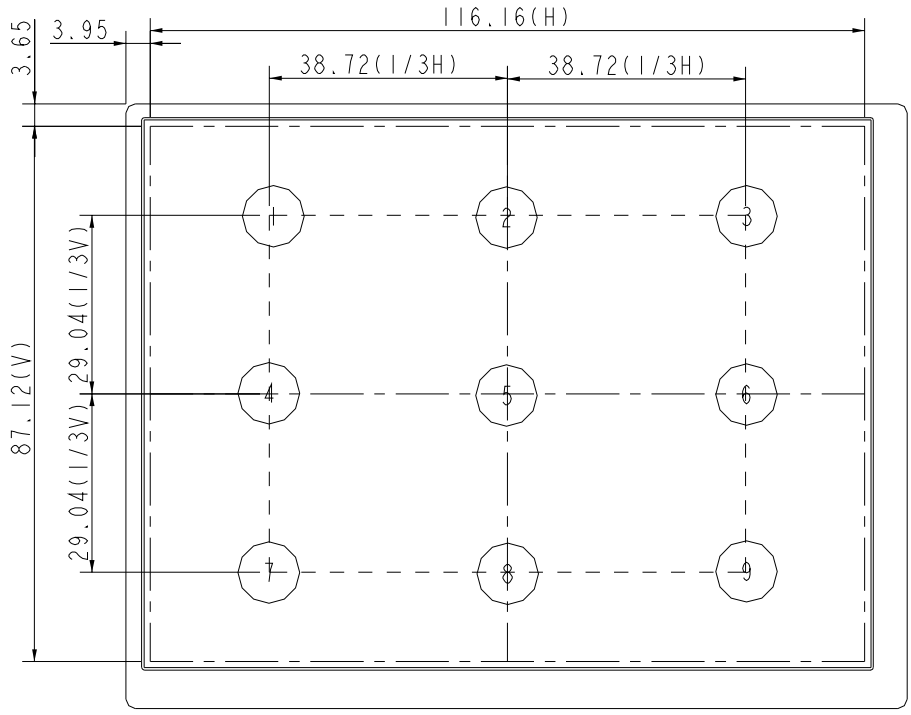


Fig8-1 Measuring point

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

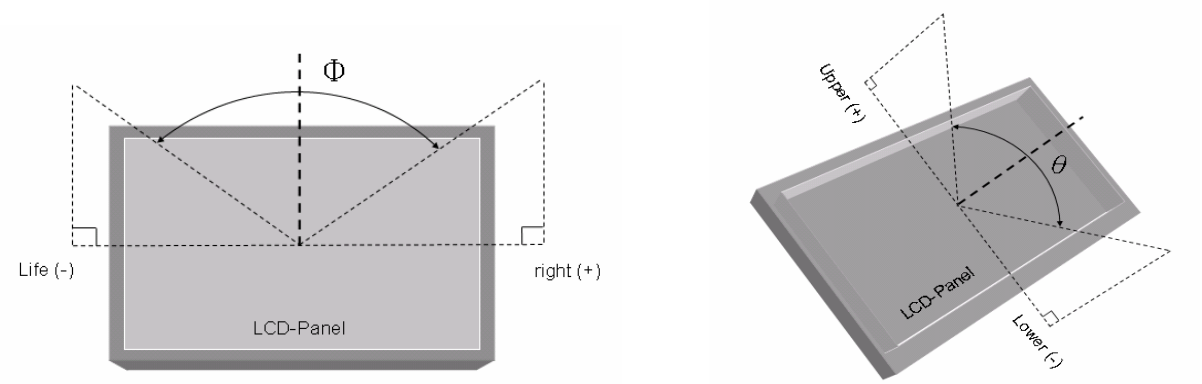


Fig8-2 Definition of Viewing Angle

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

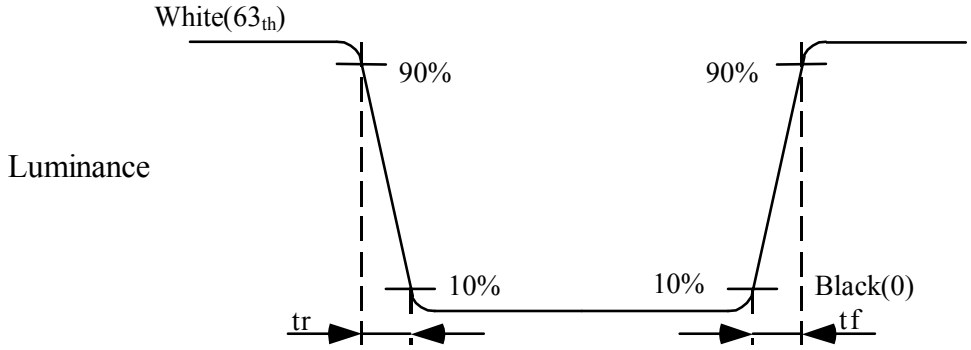


Fig8-3 Definition of Response Time(White-Black)

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(No condensation)
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.