Chunghwa Picture Tubes, Ltd.
Product Specification

To : **AGI**
Date : 130628

TFT LCD
CLAA070NC0DCW

ACCEPTED BY : (V1.1)

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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision	--	2009.03.10
0.1	Revise EDID CODE	20	2009/3/23
0.2	Revise EDID CODE	20	2009/5/21
0.3	Revise EDID CODE	20	2009/9/3
0.4	Revise Power consumption 2.83W->2.38W	4	2009/10/22
	Revise LED Power Current	7	
	Revise the MECHANICAL DIMENSION	14-15	
	Revise the Color Coordinate	16	
0.5	Revise the Weight	4	2009/10/26
	Revise Vertical Blank Time(Max):50-> 40	10	
1.0	Response time: 30ms (max)	16	2011/4/16
1.1	Add MTBF	18	2011/6/23

CONTENTS

1. OVERVIEW

CLAA070NC0DCW 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 1024×600 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)	153.6(H)×90(V)
Number of Pixels	1024(H)×3(RGB)×600(V)
Pixel Pitch (mm)	0.15(H)×0.15(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(typ.)
Brightness(cd/m^2)	375nit(typ)
Viewing Angle(BL on,CR≧10)	140 degree(H)，120degree(V)
Electrical Interface(data)	LVDS
Power consumption	2.38W（TYP）
Outline Dimension(in mm)	165(W)x102(H)x4.9(D)
Weight(g)	105(TYP)
BL unit	LED
Surface Treatment	Anti-Glare，Hardness:3H

2. ABSOLUTE MAXIMUM RATINGS

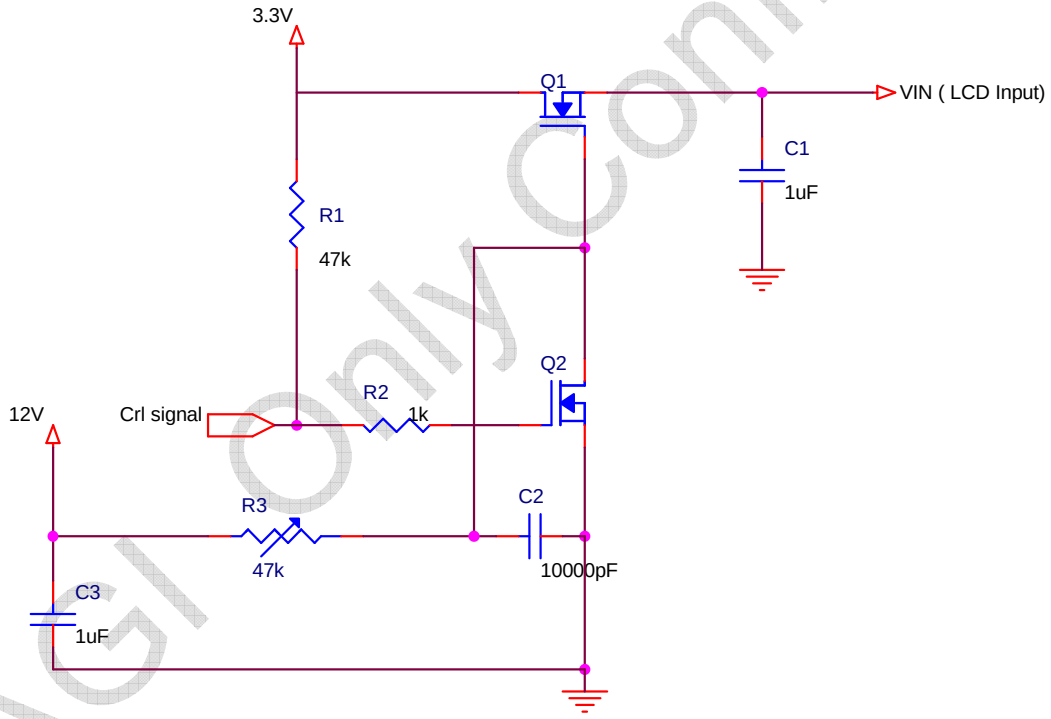
ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
LCD input Voltage	Vcc	-0.3	4.0	V	
LED input Voltage	VLED	-0.3	6	V	
Signal Input Voltage	RxIN0+ ~ RxIN2+ RxIN0- ~ RxIN2- Rx CLK IN +/-	-0.3	Vcc+0.3	V	
Static Electricity	VESDc	-200	+200		【Note2】
	VESDm	-15K	+15K	V	
ICC Rush Current	IRUSH	--	1	A	【Note3】
Operation Temperature	T_{op}	-20	70	℃	【Note1】
Storage Temperature	T_{stg}	-30	80	℃	【Note1】

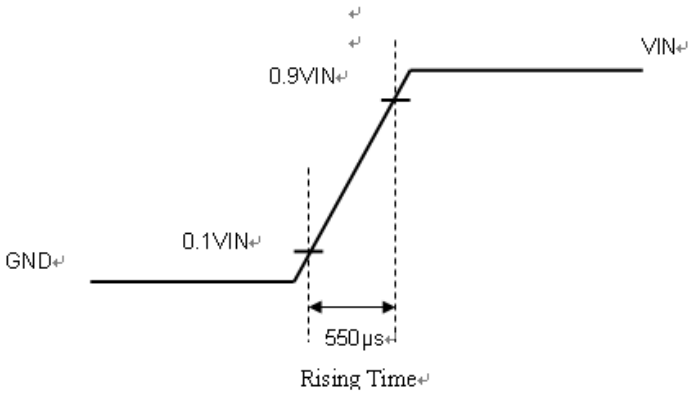
NOTE：

【Note1】 If users use the product out off the environmemt operation range （temperature and humidity）,it will concern for visual quality.

【Note2】 Test Condition: IEC 61000-4-2 ,
VESDc ：Contact discharge to input connector
VESDm：Contact discharge to module

【Note3】 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

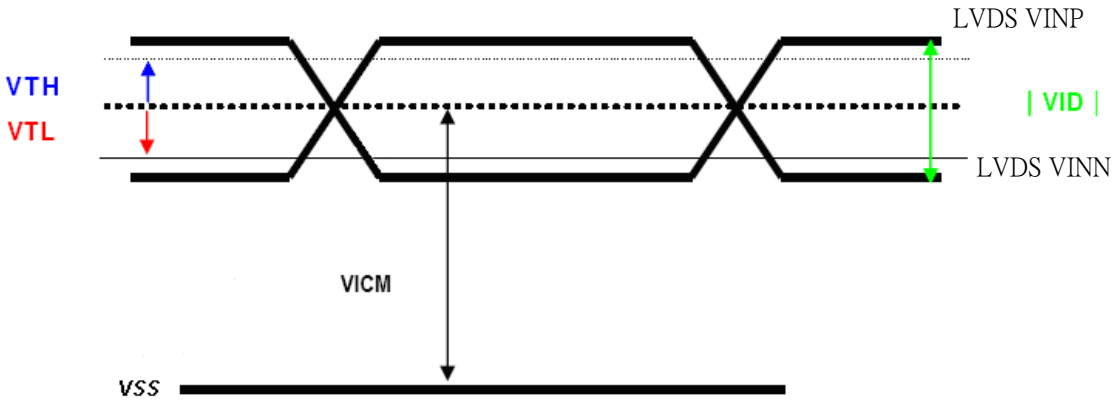
3.1 TFT LCD

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	
Power Supply Voltage For LED	VLED	4.5	5.0	5.5		
Logic Input Voltage (LVDS:IN+,IN-)	VCM	1.08	1.2	1.32	V	[Note1]
	| VID |	250	350	450	mV	[Note1]
	VTH	--	--	100	mV	[Note1]
	VTL	-100	--	--	mV	[Note1] When VCM=+1.2V
ADJ Input Voltage	VIH	3.0		3.3	V	
	VIL	GND		0.3	V	

NOTE：

[Note1] LVDS signal



3.2 TFT-LCD Current Consumption

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
LCD Power Current	ICC	--	250	300	mA	【Note1】
LED Power Current	IDD		310	370	mA	【Note2】

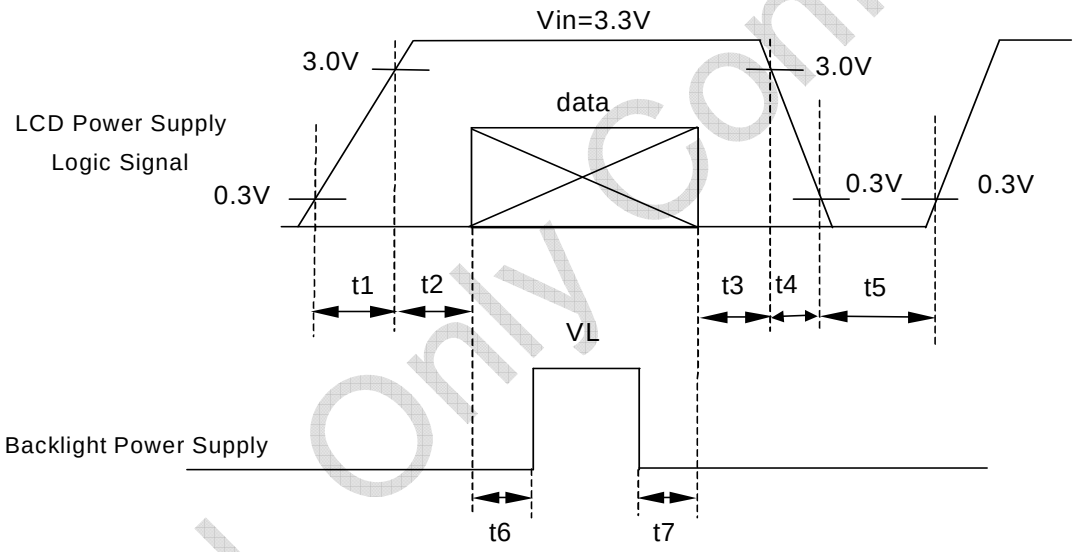
【Note1】 Typical: Under 64 gray pattern
Maximum: Under black pattern

(a)64 Gray Pattern

(b)Black Pattern

【Note2】 Typical: When VDD is 5V
Maximum: When VDD is 4.5V

3.3 Power、signal sequence



Data: RGB DATA, DCLK, DENA

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

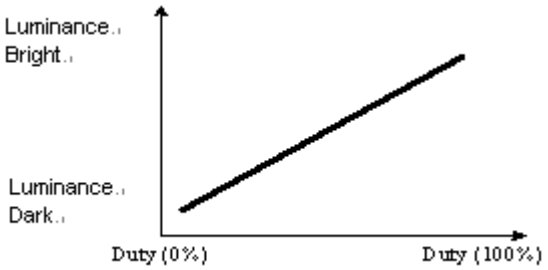
4. INTERFACE CONNECTION

CN1：STARCONN P/N (089N30-00R00-G2)

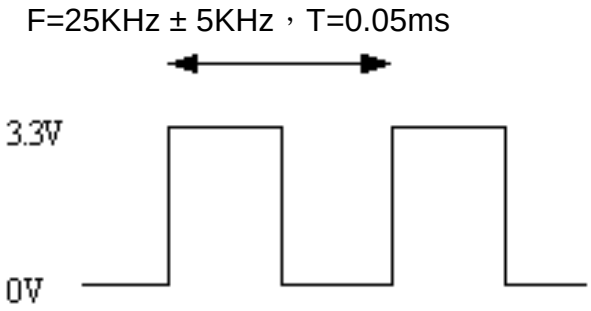
Pin NO.	SYMBOL	DESCRIPTION
1	AVSS	Power Ground
2	VCC	Power Supply for Digital circuit
3	VCC	Power Supply for Digital circuit
4	V_EDID	Power Supply for EDID circuit
5	ADJ	Adjust for LED brightness
6	CLK_EDID	EDID clock inputs
7	DATA_EDID	EDID data inputs
8	RXIN0-	Negative LVDS differential data inputs
9	RXIN0+	Positive LVDS differential data inputs
10	AVSS	Power Ground
11	RXIN1-	Negative LVDS differential data inputs
12	RXIN1+	Positive LVDS differential data inputs
13	AVSS	Power Ground
14	RXIN2-	Negative LVDS differential data inputs
15	RXIN2+	Positive LVDS differential data inputs
16	AVSS	Power Ground
17	RXCLK-	Negative LVDS differential clock inputs
18	RXCLK+	Positive LVDS differential clock inputs
19	AVSS	Power Ground
20	NC	NC
21	NC	NC
22	LR	Left / Right Display Control
23	UD	Up / Down Display Control
24	VLED	Power Supply for LED(Vled=5.0±0.5)
25	VLED	Power Supply for LED(Vled=5.0±0.5)
26	VLED	Power Supply for LED(Vled=5.0±0.5)
27	NC	NC
28	NC	NC
29	NC	NC
30	NC	NC

NOTE：

1) NC Pin must be retain, this pin can't contact GND or other signal.
2) GND Pin must ground contact，can not be floating.
3) ADJ adjust brightness to control Pin，Pulse duty the more big the more bright



4) ADJ signal=0~3.3V，operation frequency：25±5KHz



5) 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

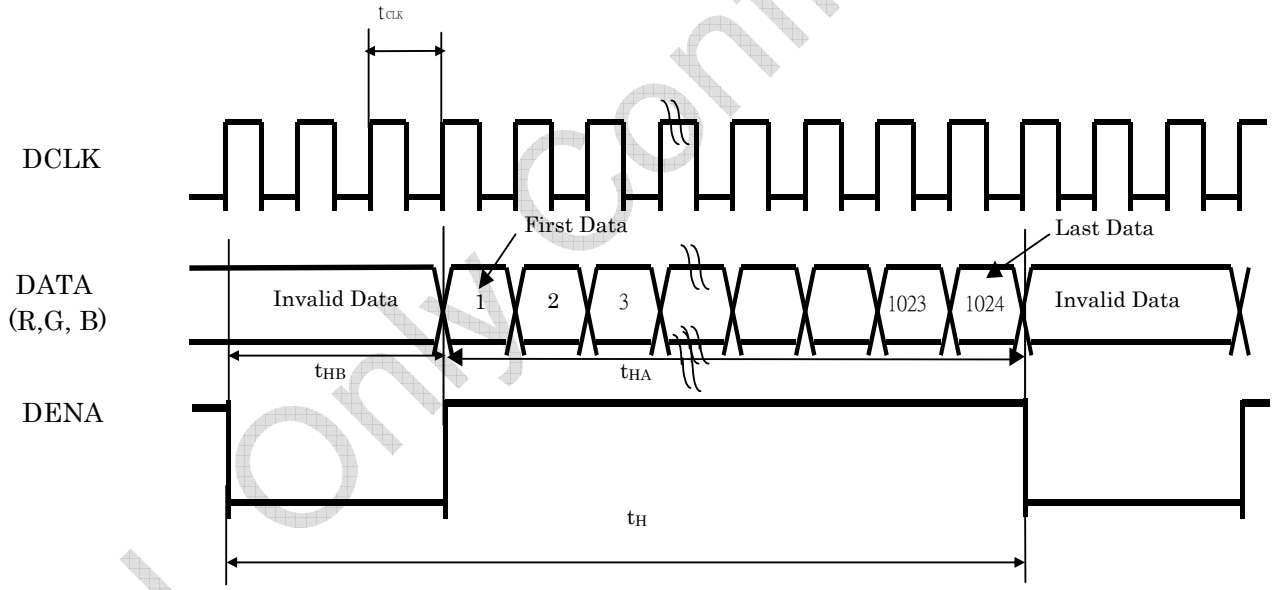
5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

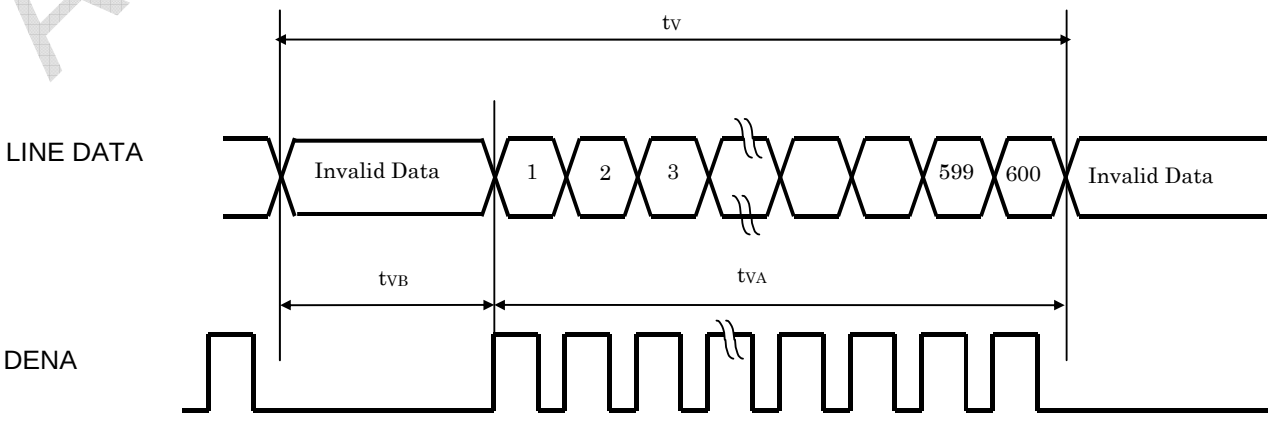
ITEM				SYMBOL	MIN.	TYP.	MAX.	UNIT
LVDS input signal sequence	CLK Frequency			fCLKin	39	45	52	MHz
LCD input signal sequence （Input LVDS Transmitter）	DENA	Horizontal	Horizontal total Time	t_H	1150	1200	1250	tCLK
			Horizontal effective Time	t_{HA}	1024			tCLK
			Horizontal Blank Time	t_{HB}	126	176	226	tCLK
		Vertical	Frame	fV	55	60	65	Hz
			Vertical total Time	t_V	610	625	640	t_H
			Vertical effectiveTime	t_{VA}	600			t_H
			Vertical Blank Time	t_{VB}	10	25	40	t_H

5.2 Timing sequence(Timing chart)

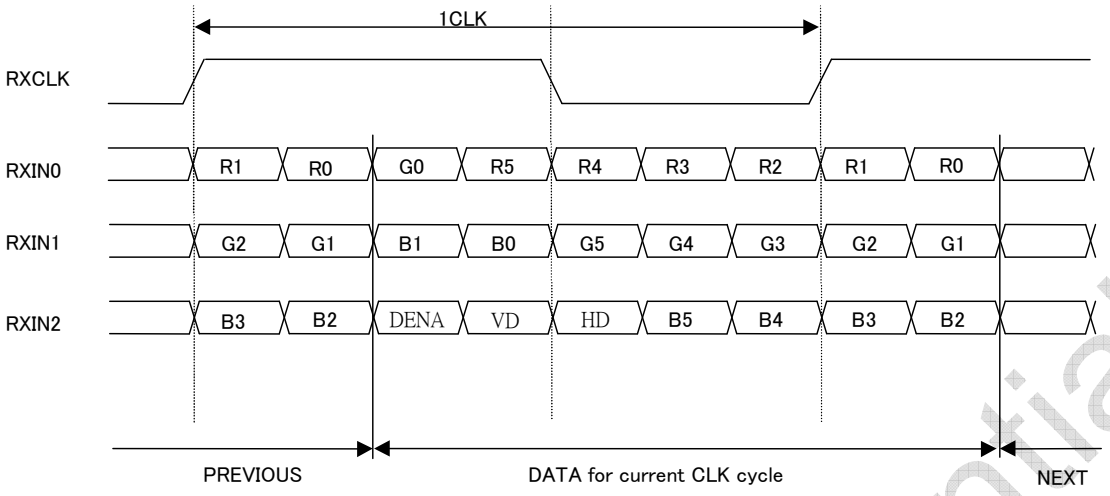
5.2.1 Horizontal Timing Sequence



5.2.2 Vertical Timing Sequence



5.3 LVDS Input Data mapping



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：

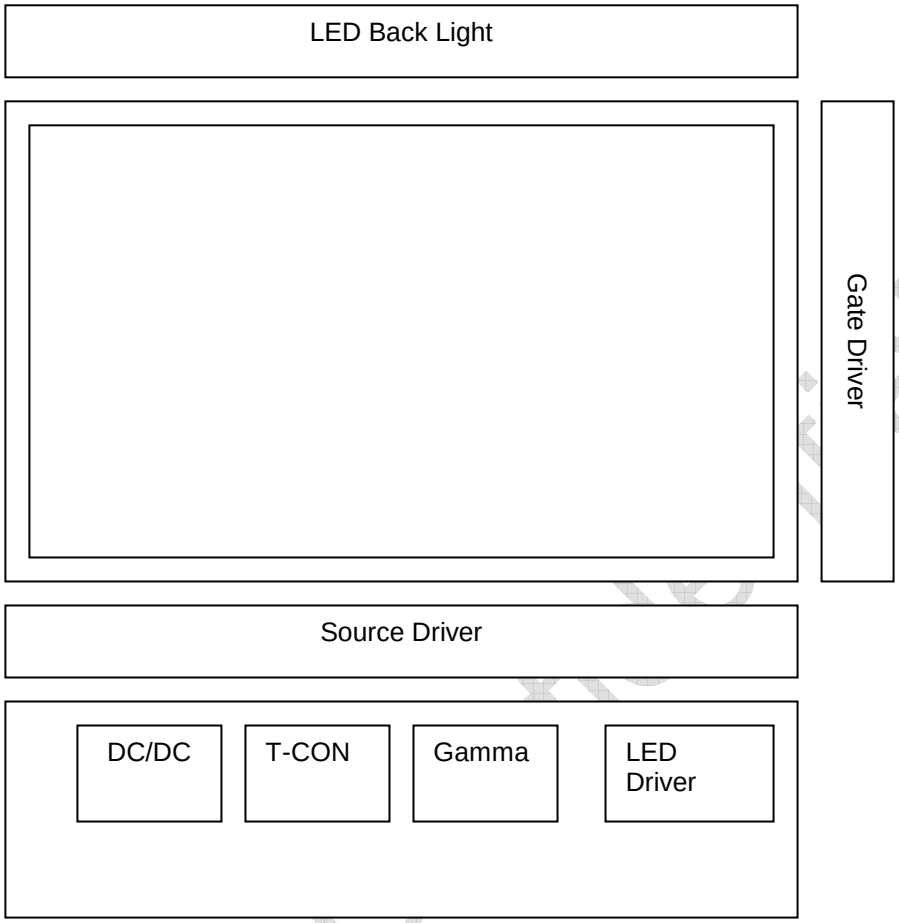
(1) Definition of Gray Scale

color(n)：n is series of Gray Scale

The more n value is, the bright Gray Scale.

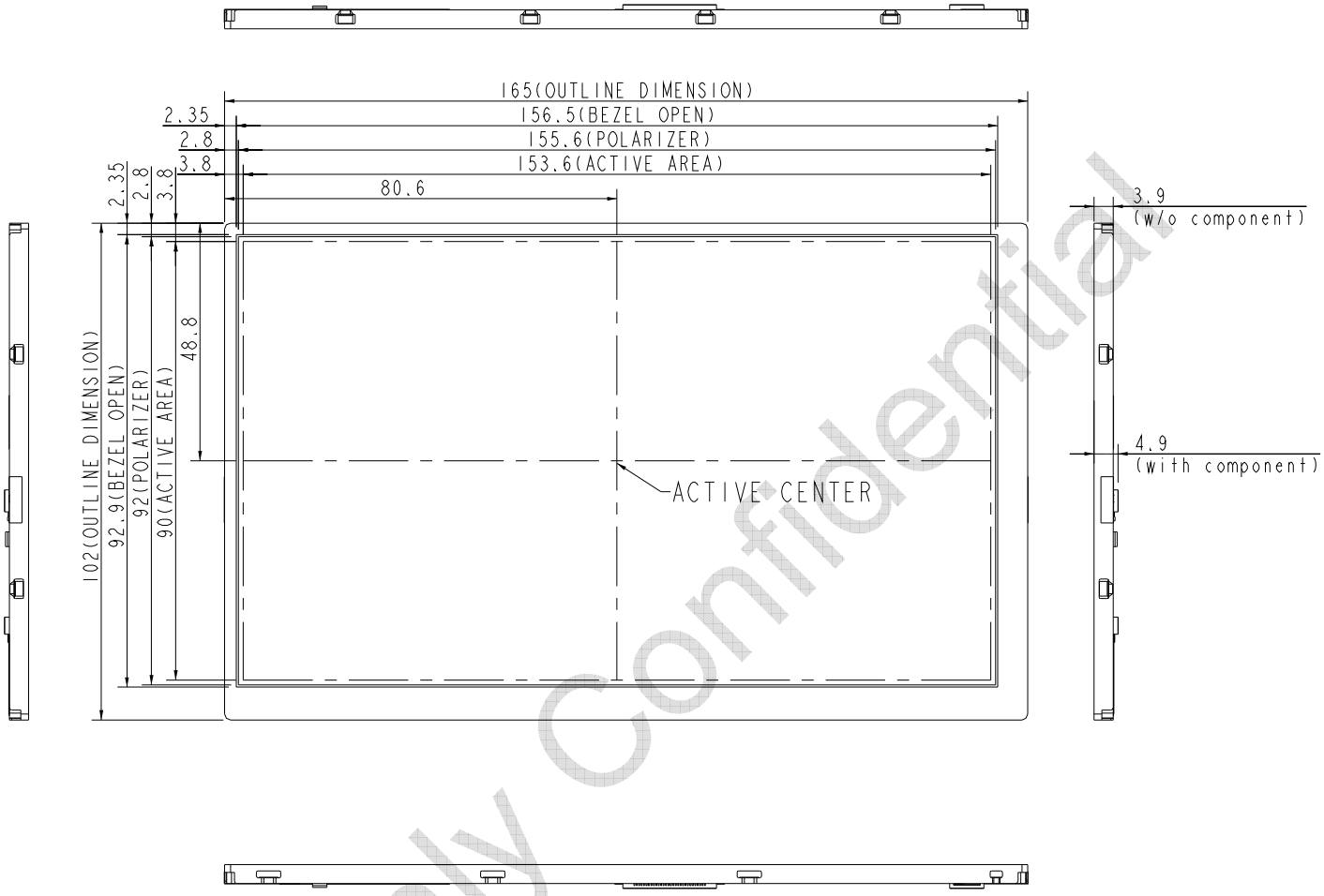
(2)Data:1-High,0-Low

6. BLOCK DIAGRAM



7. MECHANICAL DIMENSION

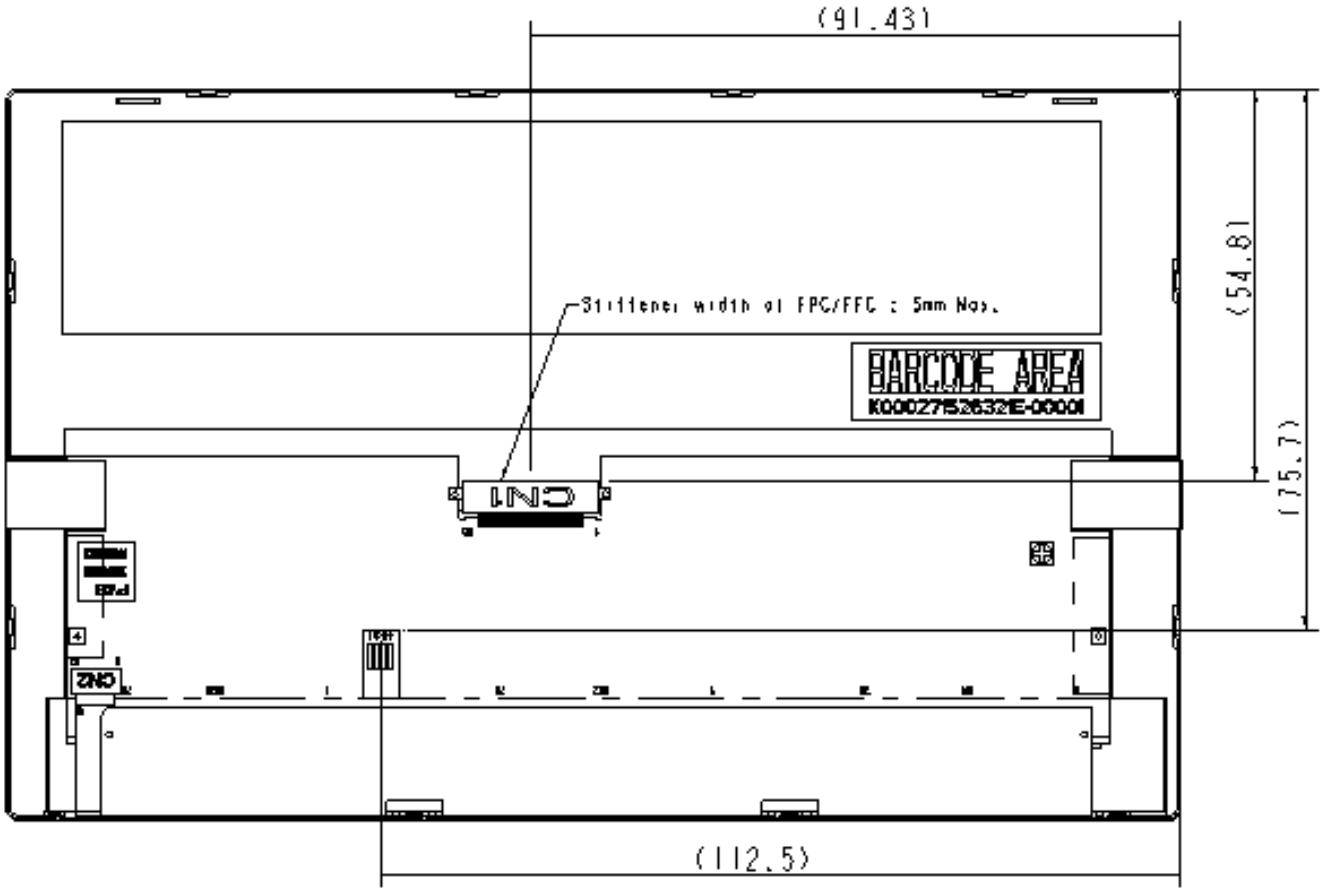
7.1 Front Side [Unit：mm]



NOTE:General tolerance：±0.3mm

7.2 Rear Side

[Unit：mm]



NOTE：

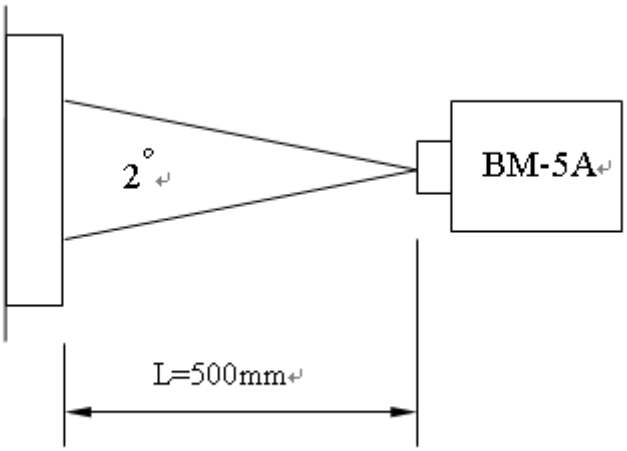
1. General tolerance：±0.3mm
2. LCD connector CN1(30pin)：STARCONN，P/N：089N30-000R00-G2

8. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Constrast Ratio		CR	Point-5	---	400	--	--	*1)*2)*3)
Luminance*)		Lw	Point-5	300	375	--	cd/m^2	*1)*3)
Luminance Uniformity		ΔL		70	80	--	%	*1)*3)
Response Time (White - Black)		Tr+ Tf	Point-5	--	20	30	ms	*1)*3)*5)
Viewing Angle	Horizontal	ϕ	CR≧10 Point-5	120	140	--	°	*1)*2)*4)
	Vertical	θ		100	120	--	°	*1)*2)*4)
Color Coordinate	White	Wx Wy	. Point-5	0.273 0.289	0.313 0.329	0.353 0.369	*1)*3)	*1)*3)
	Red	Rx Ry		0.548 0.301	0.578 0.331	0.608 0.361		
	Green	Gx Gy		0.320 0.545	0.350 0.575	0.380 0.605		
	Blue	Bx By		0.126 0.087	0.156 0.117	0.186 0.147		

NOTE：

*1)Measure condition：25℃±2℃，60±10%RH，under10 Lux in the dark room.BM-5A (TOPCON)，viewing angle2°，VCC=3.3V，VLED=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 point1～9as figure8-1

△L = [L(MIN)/L(MAX)]×100

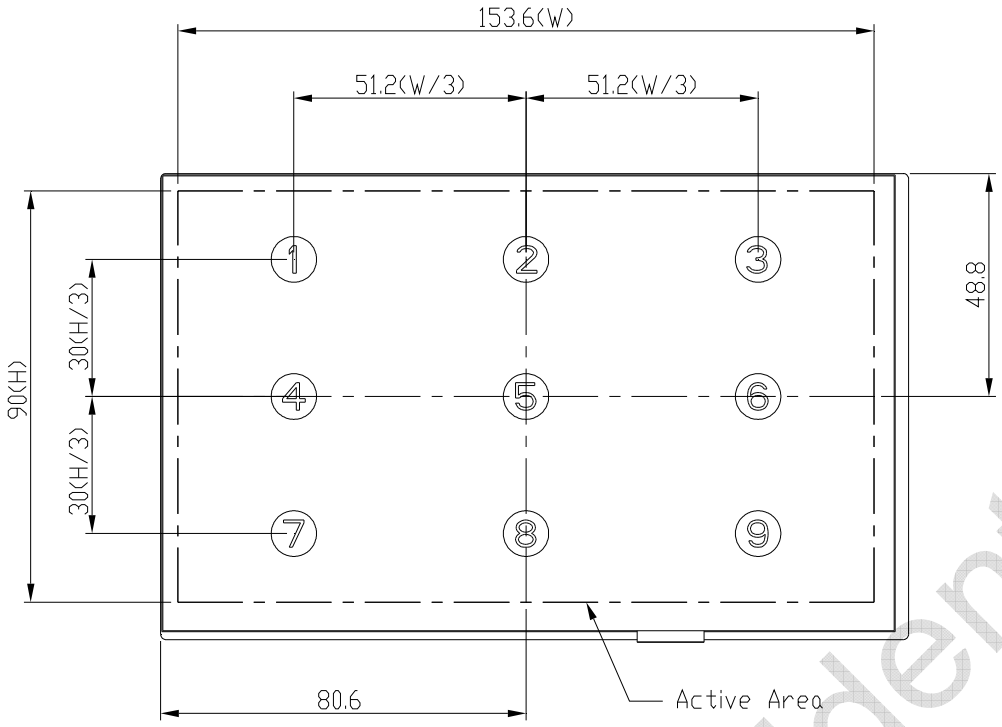


Fig8-1 Measuring point

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

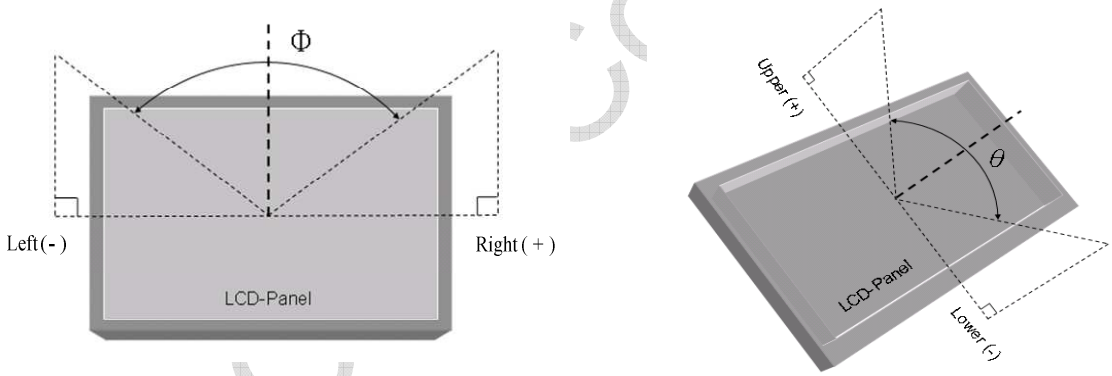


Fig8-2 Definition of Viewing Angle

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

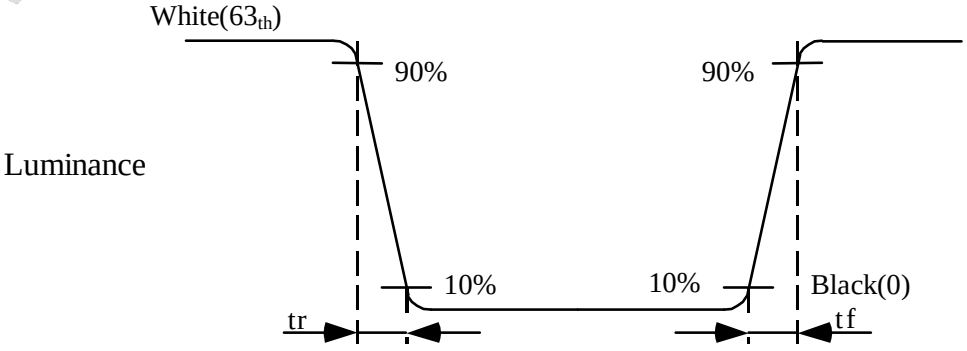


Fig8-3 Definition of Response Time(White-Black)

9. RELIABILITY TEST

9.1. Temperature and humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70℃，240Hrs	
High Temperature Storage	80℃，240Hrs	
High Temperature High Humidity Operation	60℃，90%RH，240Hrs	No condensation
Low Temperature Operation	-20℃，240Hrs	
Low Temperature Storage	-30℃，240Hrs	
Thermal Shock	-30℃（0.5Hr）~ 80℃(0.5Hr) 200 cycles	
MTFB	20000Hrs	

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 ● Stroke:1.3mm ● Vibration: sinusoidal wave, perpendicular axis(both x, z axis:2Hrs,y axis:4Hrs). ● Sweep:2.9G,33.3Hz-400Hz ● Cycle:15min

9.3 ESD

ITEM	CONDITION	NOTE
ESD	150pF，330Ω，±8KV&±15KV air test	【Note1】
	200pF，0Ω，±200V contact test	【Note2】

【Note1】 LCD glass and metal bezel
【Note2】 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 transformation of the module parts should be ignored.
Fail:No display image,obvious non-uniformity,or line defect.

10. WARRANTY

10.1 The period is within 12 months since the date of shipping out under normal using and storage conditions.

10.2 The warranty will be avoided in case of defect induced by customer