



Chunghwa Picture Tubes, Ltd.

Product Specification

To : DATA MODUL

Date : 081218

TFT LCD

CLAA070LC0ACW

ACCEPTED BY : (V1.2)

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1. OVERVIEW

CLAA070LC0ACW 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	2.0W(Typ)
Outline Dimension(in mm)	165(W)×104(H)×5(D)
Weight(g)	115
BL unit	LED
Surface Treatment	Anti-Glare , Hardness:3H

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Input 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	【Note1】
	VESDm	-15K	15K	V	
ICC Rush Current	IRUSH	-	1	A	【Note2】

【Note1】

Test Condition: IEC 61000-4-2 ,

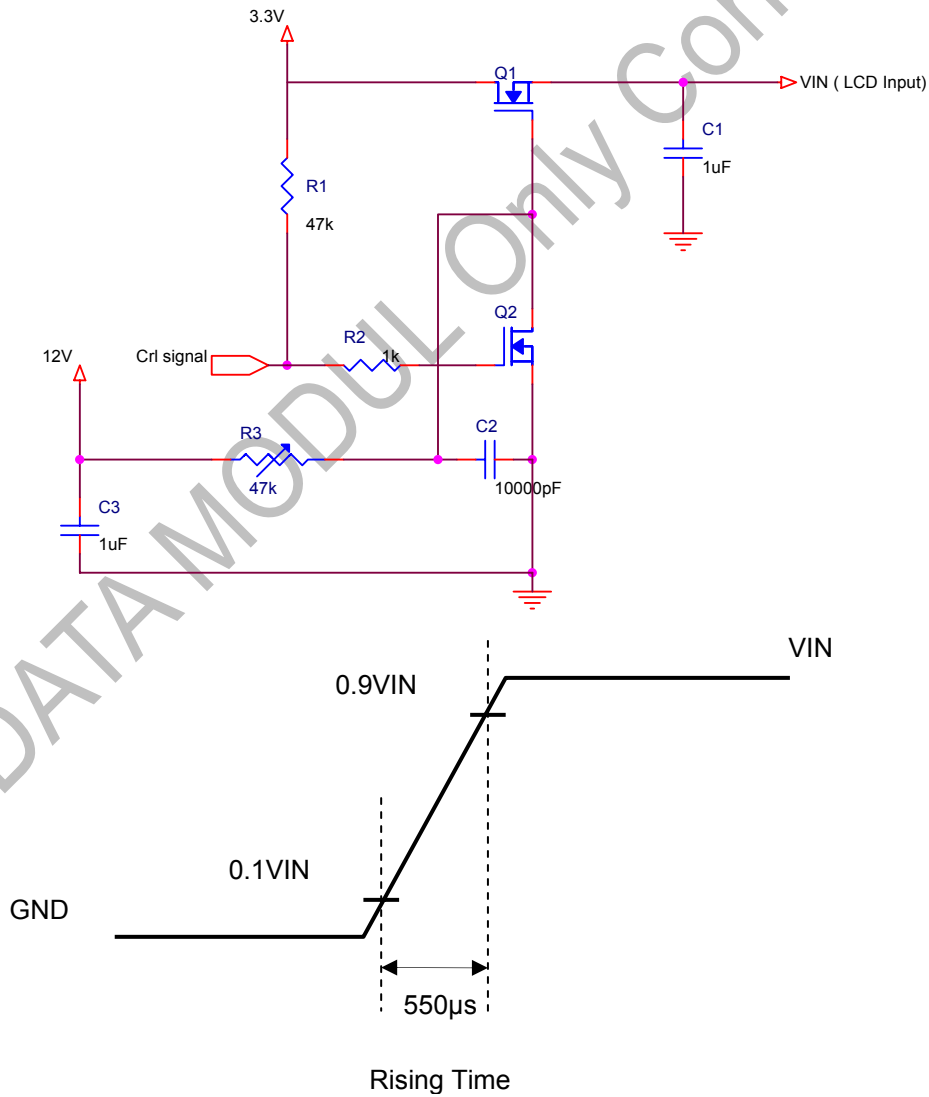
VESDc : Contact discharge to input connector

VESDm : Discontact discharge to module

【Note2】

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

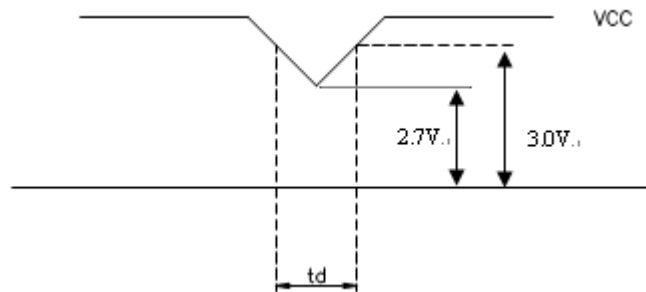
Item	Symbol	Min.	Typ	Max.	Unit	Note
Power Supply Voltage For LCD	VCC	3.0	3.3	3.6	V	【Note1】
Power Supply Voltage For LED	VLED	4.5	5	5.5	V	
Logic Input Voltage	VIH	VCC*0.7	--	VCC	V	
	VIL	GND	--	VCC*0.3	V	
ADJ Input Voltage	Threshold Voltage(high)	VADJ_H	3.0	--	3.3	V
	Threshold Voltage(low)	VADJ_L	GND	--	0.3	V

Remarks :

【Note1】

VCC –dip condition:

- 1) When 2.7 V $VCC < 3.0V$, $t_d \leq 10ms$.
- 2) When $VCC < 3.0V$, it works abnormal that must reset power.
VCC dip conditions should follow VCC turn on conditions



3.2 TFT-LCD Current Consumption

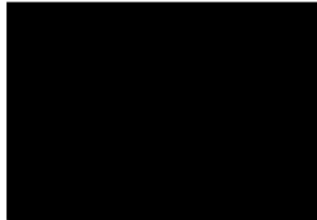
Item	Symbol	Min	Type	Max	Unit	Notes
LCD power current	ICC	--	150	200	mA	【Note1】
LED power current	ILED		300	350	mA	【Note2】

【Note1】

Typical: Under 64 gray pattern
 Maximum: Under black pattern



(a) 64 Gray Pattern



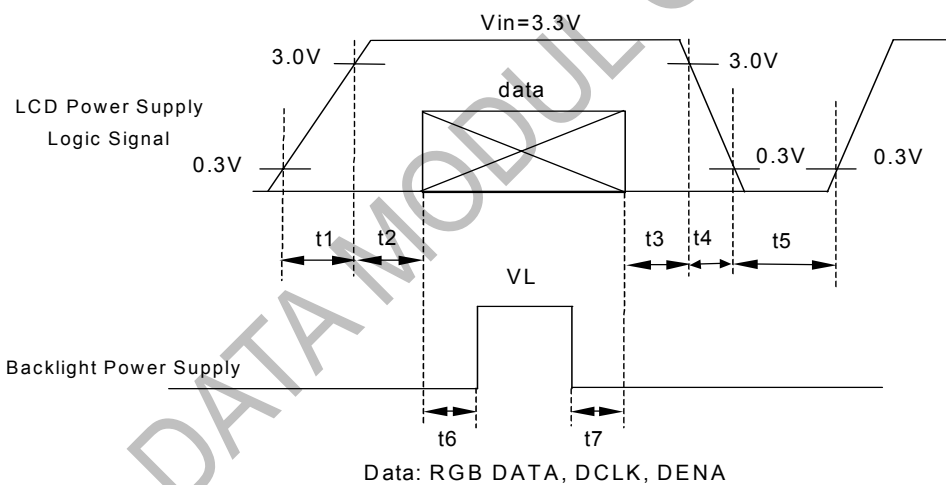
(b) Black Pattern

【Note2】

Typical: When VLED is 5V
 Maximum: When VLED is 4.5V

3.3 Power 、 Signal sequence

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



3.4 Backlight

Ta=25

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
LED Lift Time	N/A	12,000			Hour	【Note1】

【Note1】 Definition of life time : Luminance < 50% initial value

4. INTERFACE CONNECTION

4.1 CN1 : (Connector type : 40pin / 0.5mm pitch / Bottom contact) : 089N40-000R00-G2

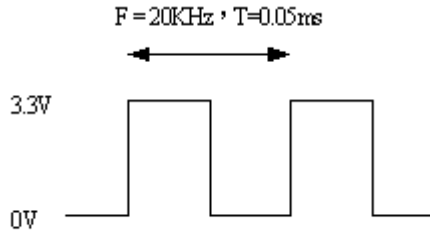
Pin NO.	SYMBOL	DESCRIPTION
1	AV _{SS}	Ground
2	AV _{SS}	Ground
3	ADJ	Brightness control for LED B/L
4	VLED	Power Supply for LED Driver circuit
5	VLED	Power Supply for LED Driver circuit
6	VLED	Power Supply for LED Driver circuit
7	VCC	Power Supply
8	VCC	Power Supply
9	DE	Data Enable Signal
10	AV _{SS}	Ground
11	AV _{SS}	Ground
12	AV _{SS}	Ground
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	V _{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
36	AV _{SS}	Ground
37	AV _{SS}	Ground
38	DCLK	Clock Signal
39	AV _{SS}	Ground
40	AV _{SS}	Ground

Remarks:

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



2) The ADJ adjust signal level is 0~3.3V , operation frequency:20±5KHz



3) AVSS Pin must connection to ground.

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5. INPUT SIGNAL(DE ONLY MODE)

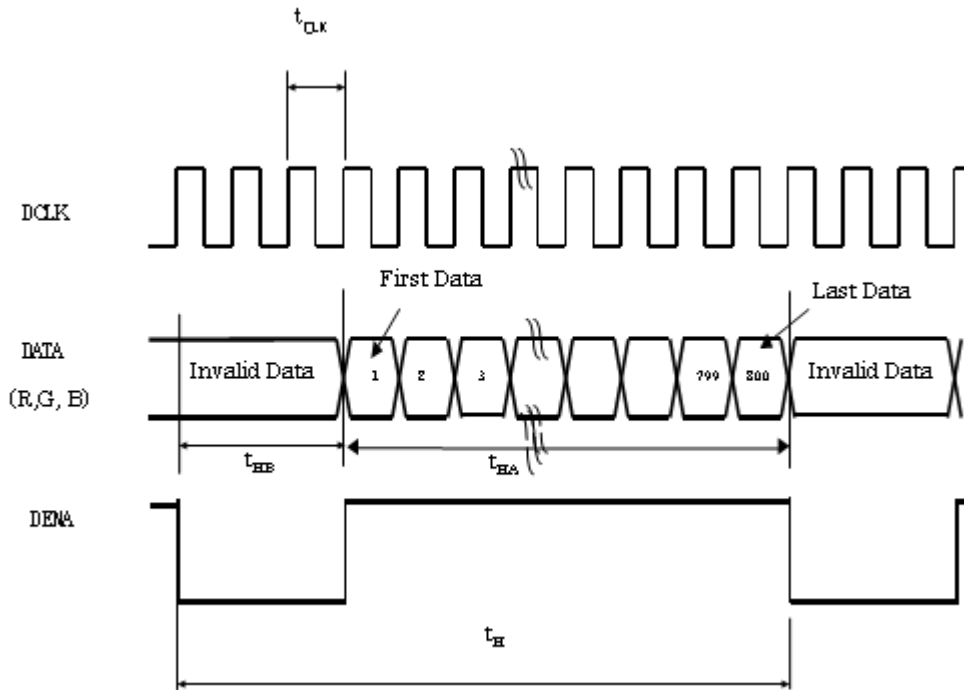
5.1 Timing Specification

	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT		
DCLK	Dot Clock	$1/t_{CLK}$	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_H	850	900	950	t_{CLK}		
	Horizontal Valid	t_{HA}		800				
	Horizontal Blank	t_{HB}	50	100	150			
		Vertical Period	t_V	490	500	520	t_{HP}	
		Vertical Valid	t_{VA}		480			
		Vertical Blank	t_{VB}	10	20	40		
		Vertical Frequency	f_V	55	60	65		Hz
		Setup Time	t_{DS}	5	-	-		ns
Hold Time	t_{DH}	10	-	-				

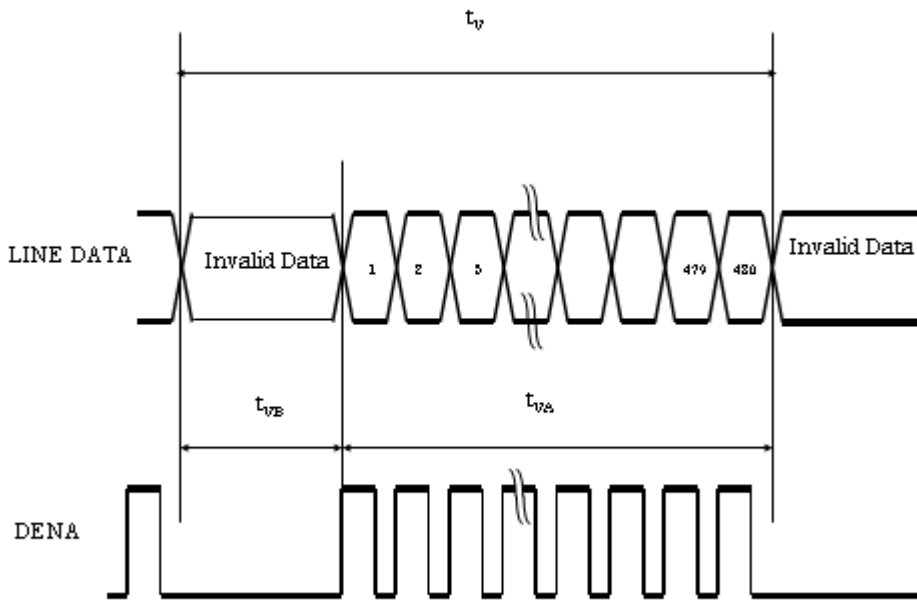
【Note1】 This module is operated by DE only mode.

5.2 Timing sequence(Timing chart)

5.2.1 Horizontal Timing Sequence



5.2.2 Vertical Timing Sequence



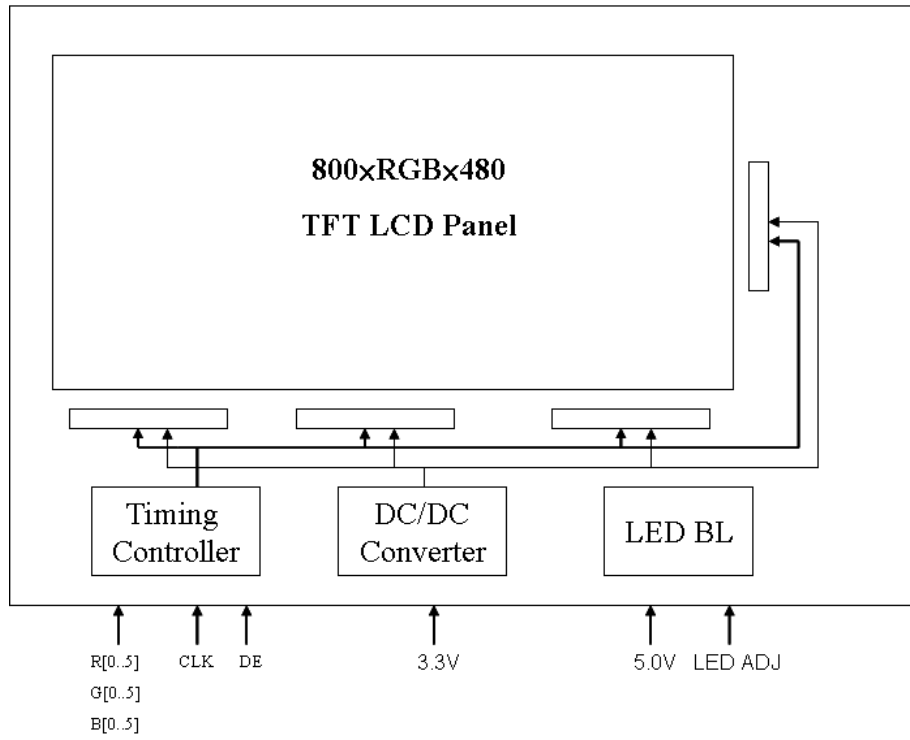
5.3 Color Data Assignment

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	1	0	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

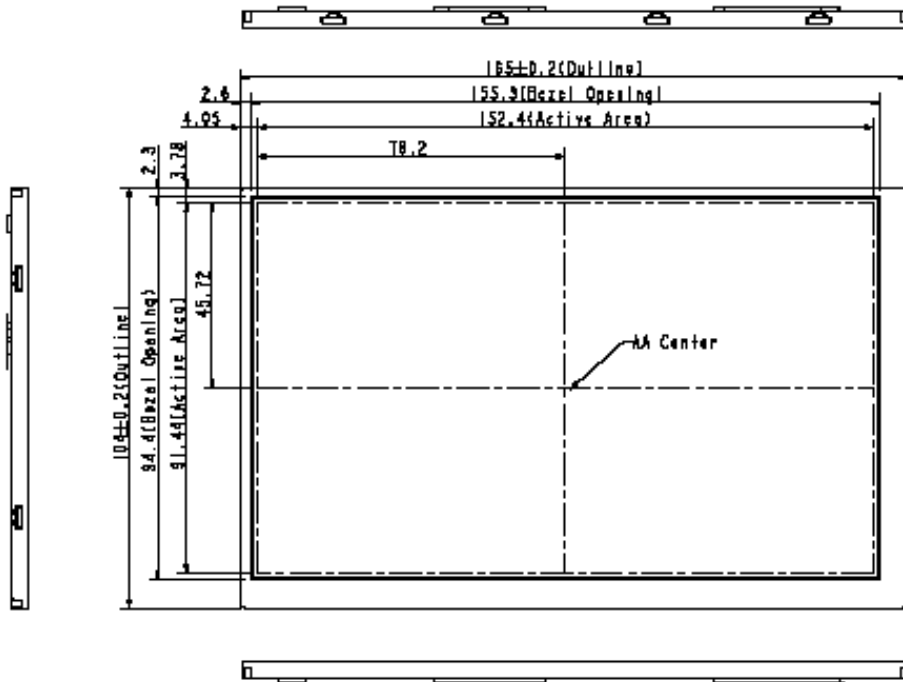
7. BLOCK DIAGRAM



8. MECHANICAL DIMENSION

8.1 Front Side

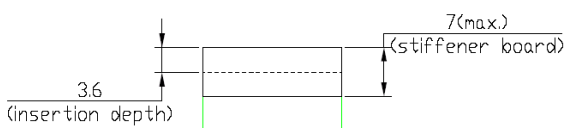
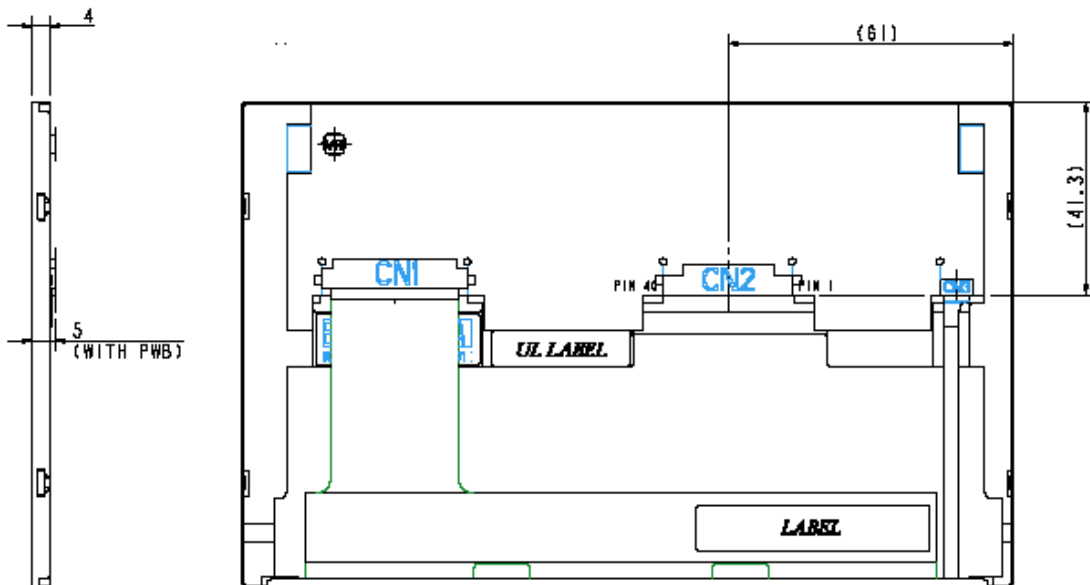
[Unit : mm]



Remark : Un-indication tolerance is ±0.3mm

8.2 Rear Side

[Unit : mm]



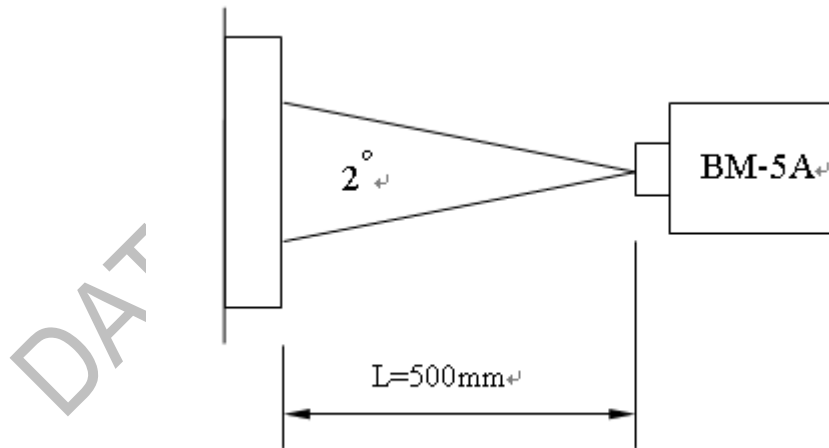
Remark : Un-indication tolerance is ±0.3mm

9. OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Constrast Ratio		CR	Point-5	300	400	--	--	*1)*2)*3)
Luminance*)		Lw	Point-5	176	220	--	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		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		0.535 0.292	0.575 0.332	0.615 0.372		
	Green	Gx Gy		0.290 0.525	0.330 0.565	0.370 0.605		
	Blue	Bx By		0.110 0.080	0.150 0.120	0.190 0.160		

Remarks :

*1)Measure condition : 25 ±2 , 60±10%RH , under10 Lux in the dark room.BM-5A (TOPCON) , viewing angle2° , VCC=3.3V , Vadj=3.3V. (Duty=100%) , test the panel after turning on10 minute ago.



*2) Definition of contrast ratio : (in the dark room.BM-5A (TOPCON))

Contrast Ratio (CR)= (White) Luminance of ON ÷ (Black) Luminance of OFF

*3) Definition of luminance : (in the dark room.BM-5A (TOPCON))

Measure white luminance on the point 5 as figure9-1

Definition of Luminance Uniformity:

Measure white luminance on the point1~9 as figure9-1

$$L = [L(\text{MIN})/L(\text{MAX})] \times 100$$

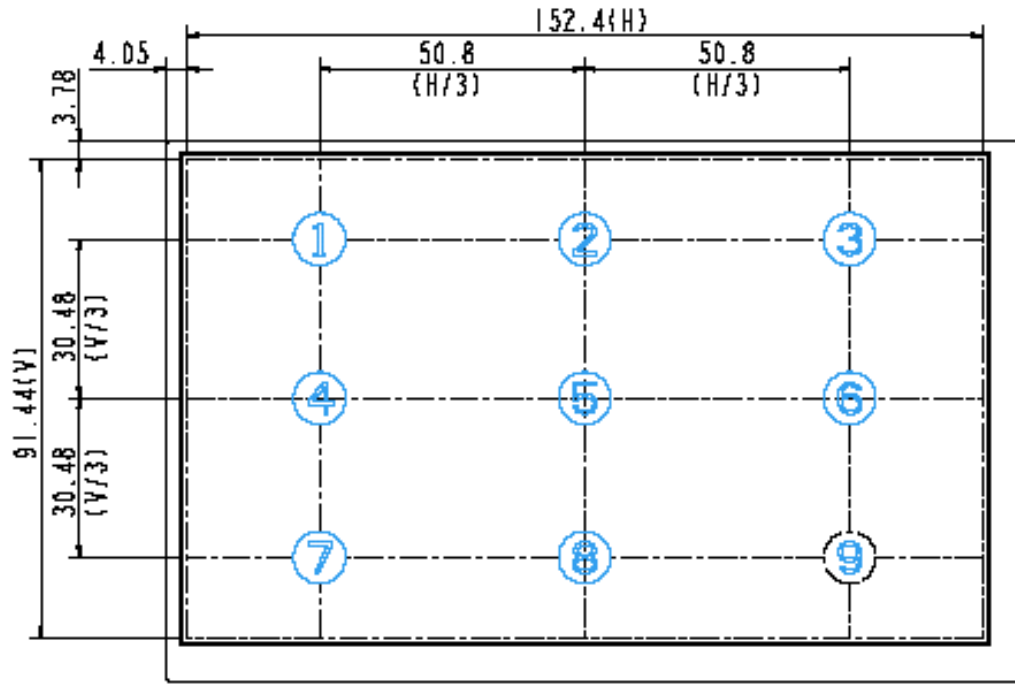


Fig9-1 Measuring point

*4) Definition of Viewing Angle(θ, ψ), refer to Fig9-2 as below : (in the dark room.EZ-CONTRAST (ELDIM))

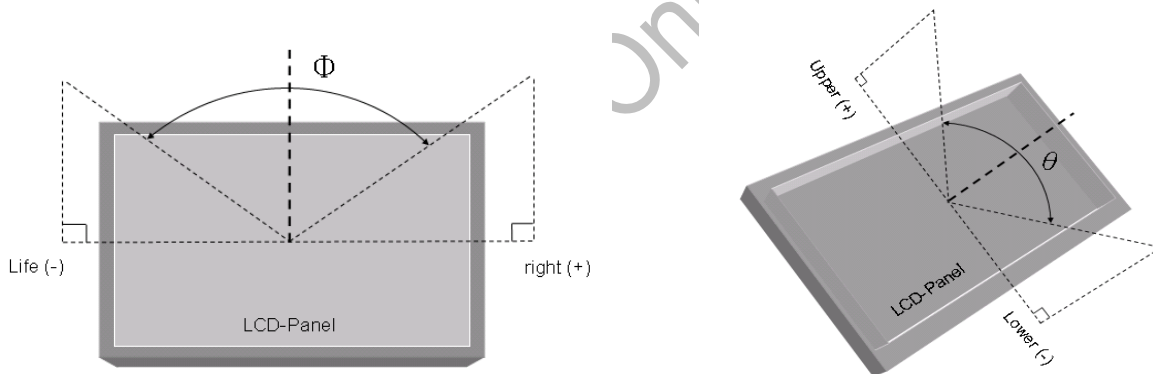


Fig9-2 Definition of Viewing Angle

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

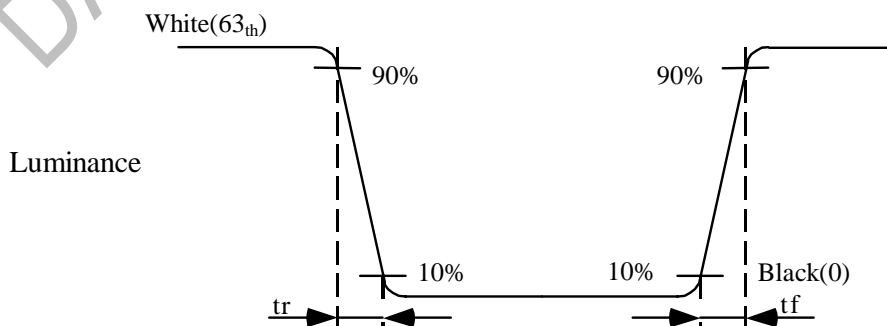


Fig9-3 Definition of Response Time(White-Black)

10. RELIABILITY TEST

10.1. Temperature and humidity

TEST ITEMS	CONDITIONS	REMARK
High Temperature Operation	85°C , 240Hrs	
High Temperature Storage	95°C , 240Hrs	
High Temperature High Humidity Operation	60°C , 90%RH , 240Hrs	No condensation
Low Temperature Operation	-30°C , 240Hrs	
Low Temperature Storage	-40°C , 240Hrs	
Thermal Shock	-30°C (0.5Hr) ~ 85°C(0.5Hr) 200 cycles	

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

10.3 Electrostatic Discharge

TEST ITEMS	CONDITIONS	Note
ESD	150pF , 330Ω , ±15kV air test	(1)
	200pF , 0Ω , 200V contact test	(2)

[Note]

Measure point : (1) LCD glass and metal bezel..
(2) IF connector pins

10.4 MTBF : with LED B/L:20000Hrs lifetimes

10.5 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.