



# Specification

**CLAA070NA01CT**

**7.0" / 1024x600 / LVDS / LED / TOUCH**

**Version September 2007**

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## 1. OVERVIEW

CLAA070NA01CT is 7" color TFT-LCD(Thin Film Transistor Liquid Crystal Display)module which integrates Touch-Screen.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 :

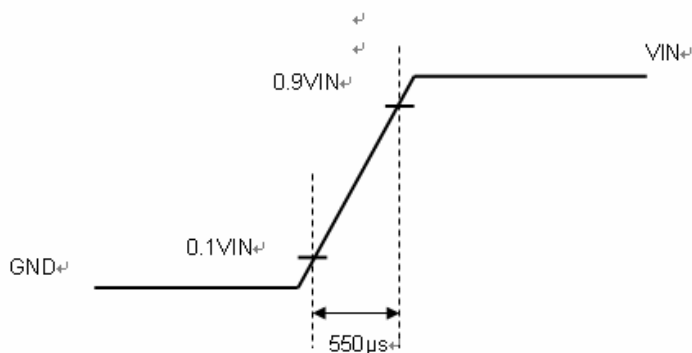
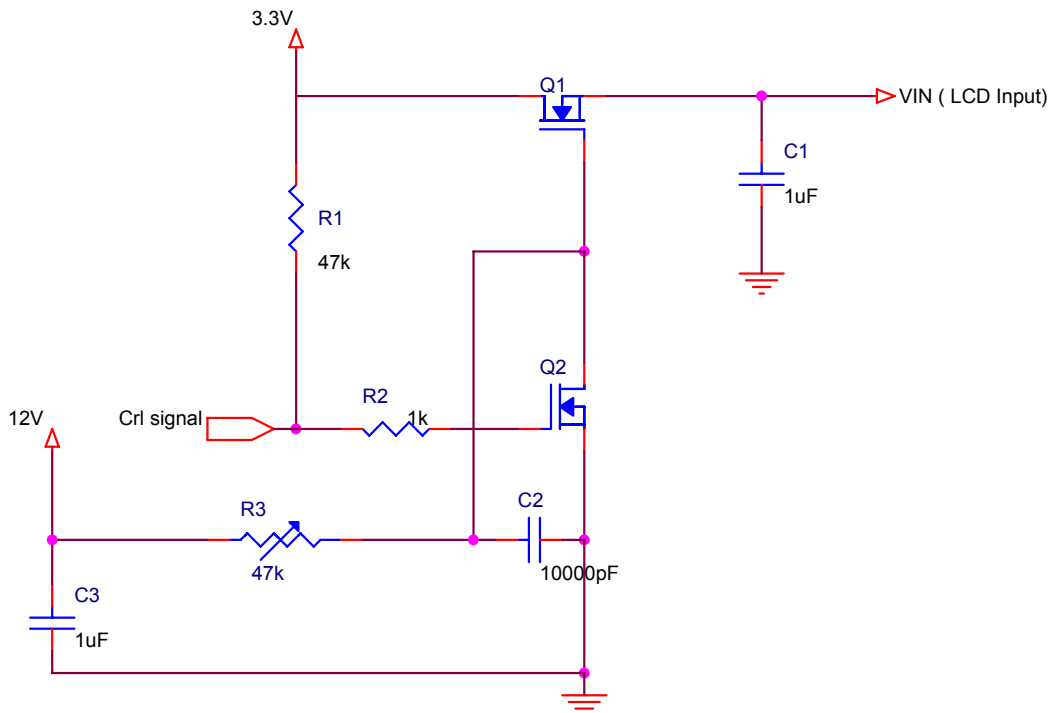
ITEM	SPECIFICATION
Display Area (mm)	153.6(H)×90(V)
Number of Pixels	1024(H)×3(RGB)×600(V)
Pixel Pitch (mm)	0.15(H)×0.15(V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of colors	262,144
Viewing Direction	6 o'clock
Response Time (Tr+Tf)	20ms
Brightness(cd/m <sup>2</sup> )	200 nit(min)/250nit(typ)
Viewing Angle(BL on,CR≥10)	140 degree(H) · 110degree(V)
Electrical Interface(data)	LVDS
Power consumption	2.825W (TYP)
Outline Dimension(in mm)	165(W)×102(H)×6(D)
Weight(g)	138
BL unit	LED
Surface Treatment	Anti-Glare · Hardness:3H
Touch Panel Type	4 wire resistive

## 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		*2)
	VESDm	-15K	+15K	V	
ICC Rush Current	IRUSH	--	1	A	*3)
Operation Temperature	T <sub>op</sub>	-30	85	°C	*1)
Storage Temperature	T <sub>stg</sub>	-40	95	°C	*1)

Remarks :

- \*1) If users use the product out off the environmment 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) 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

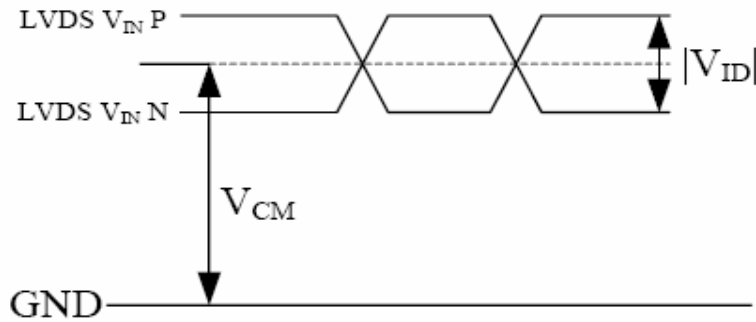
### 3.1 TFT LCD

Ta=25°C

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	*1)
	VID	250	350	450	mV	*1)
	VTH	--	--	100	mV	*1)
	VTL	-100	--	--	mV	*1) When VCM=+1.2V
ADJ Input Voltage	VIH	3.0		3.3	V	
	VIL	GND		0.3	V	

Remarks :

\*1) LVDS signal



$$|VID| = |VTH - VTL|,$$

$$VCM = (VTH + VTL)/2$$

### 3.2 TFT-LCD Current Consumption

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
LCD Power Current	ICC	--	250	300	mA	*1)
LED Power Current	IDD		400	450	mA	*2)

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



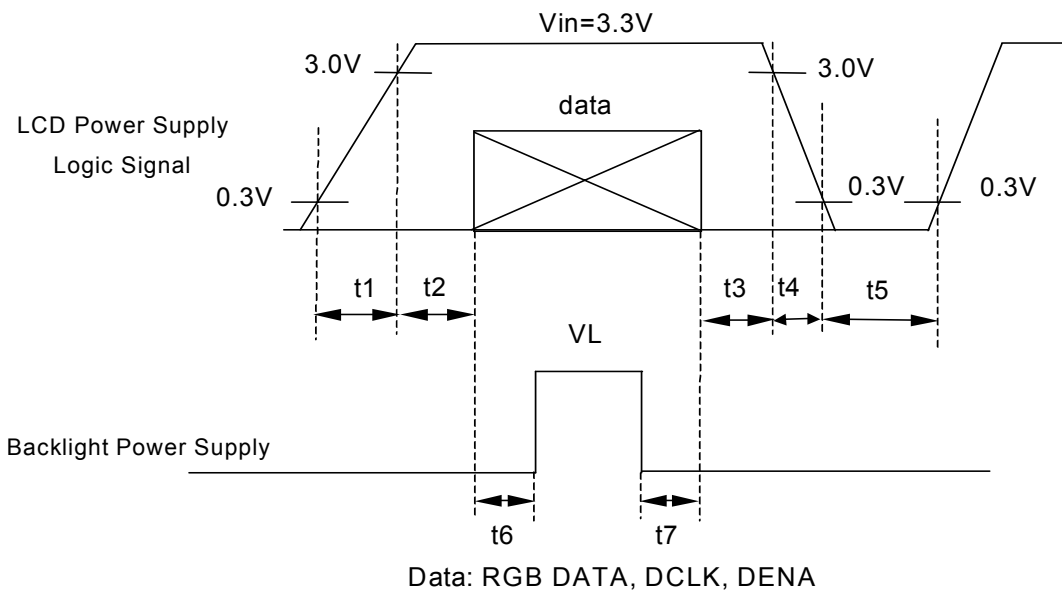
(a)64 Gray Pattern



(b)Black Pattern

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

### 3.3 Power 、 signal sequence



- $t_1 \leq 10\text{ms}$
- $0 < t_2 \leq 50\text{ms}$
- $0 < t_3 \leq 50\text{ms}$
- $0 < t_4 \leq 10\text{ms}$
- $1 \text{ sec} \leq t_5$
- $200\text{ms} \leq t_6$
- $200\text{ms} \leq t_7$

#### 4. INTERFACE CONNECTION

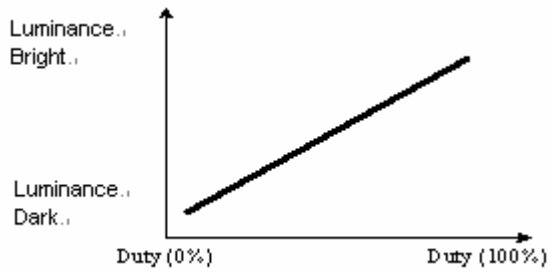
Pin NO.	SYMBOL	DESCRIPTION
1	AVSS	Power Ground
2	VCC	Power Supply for Digital circuit
3	VCC	Power Supply for Digital circuit
4	NC	NC
5	ADJ	Adjust for LED brightness
6	NC	NC
7	AVSS	Power Ground
8	RXIN0-	Negative LVDS differential data inputs
9	RXIN0+	Positive LVDS differential data inputs
10	AVSS	Power 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	NC	NC
23	NC	NC
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	YD	Touch Panel control pin
28	XL	Touch Panel control pin
29	YU	Touch Panel control pin
30	XR	Touch Panel control pin

Remarks :

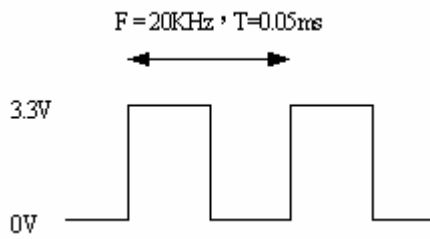
- 1) NC Pin must be retain, this pin can't contact GND or other signal.
- 2) GND Pin must ground contact , can not be floating.
- 3) Touch Panel Control

Pin No.	Symbol	function
1	YU	Y axis resistance
2	XR	X axis resistance
3	YD	Y axis resistance
4	XL	X axis resistance

4) ADJ adjust brightness to control Pin · Pulse duty the more big the more bright



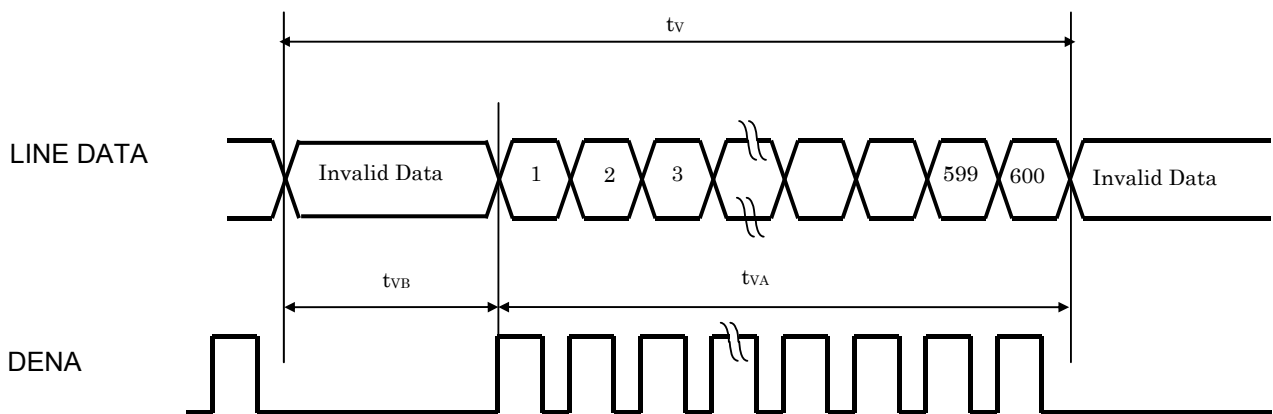
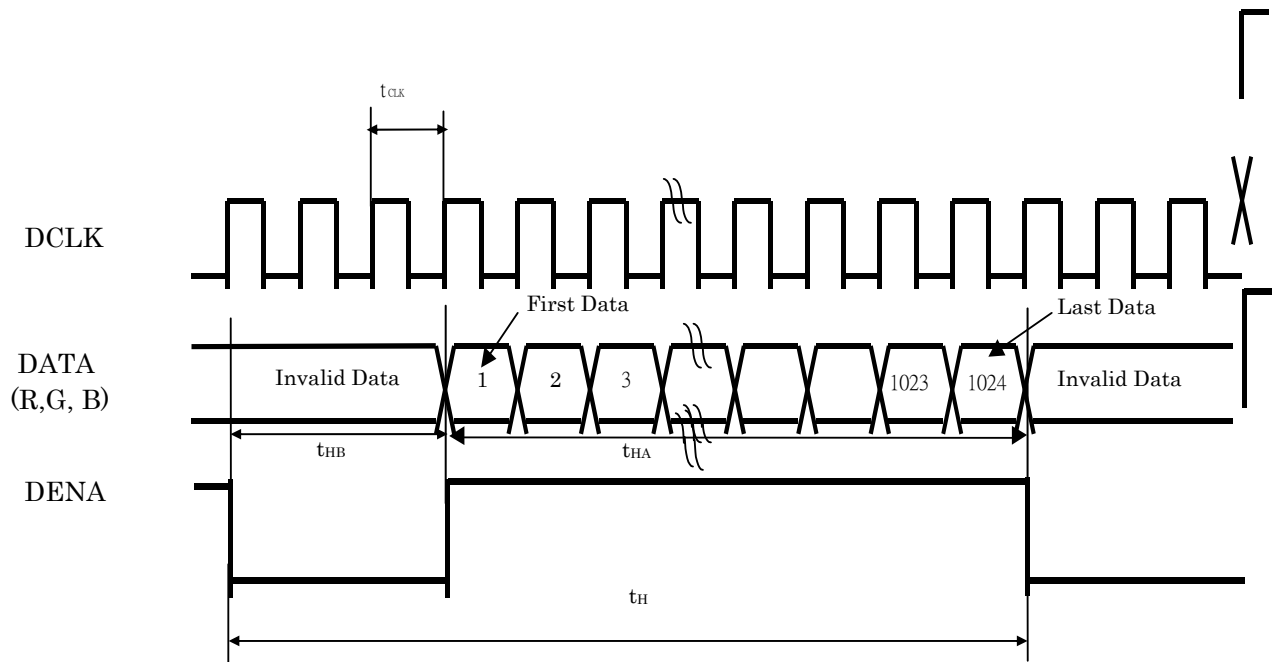
5) ADJ signal=0~3.3V · operation frequency :  $20 \pm 5\text{KHz}$



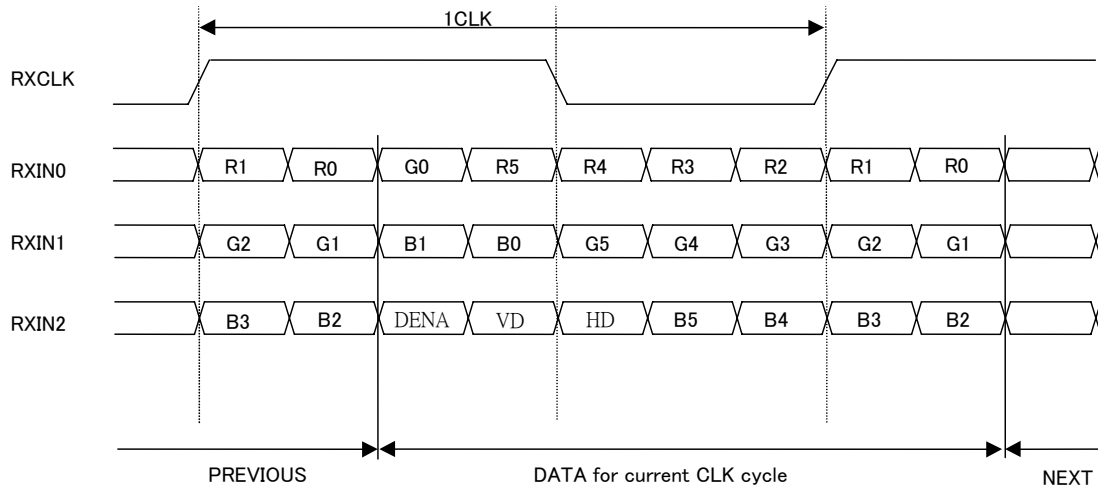
## 5. INPUT SIGNAL(DE ONLY MODE)

### 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 )	Horizontal	Horizontal total Time	t <sub>H</sub>	1150	1200	1250	tCLK
		Horizontal effective Time	t <sub>HA</sub>	1024			tCLK
		Horizontal Blank Time	t <sub>HB</sub>	126	176	226	tCLK
	Vertical	Frame	fV	55	60	65	Hz
		Vertical total Time	t <sub>V</sub>	610	625	640	t <sub>H</sub>
		Vertical effectiveTime	t <sub>VA</sub>	600			t <sub>H</sub>
		Vertical Blank Time	t <sub>VB</sub>	10	25	50	t <sub>H</sub>



## 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

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

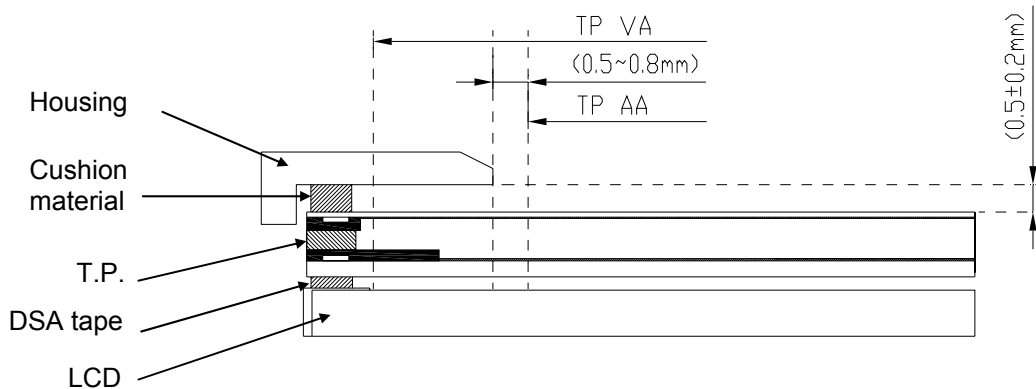
## 6. CHARACTERISTIC OF TOUCH PANEL

### 6.1 Basis characteristic

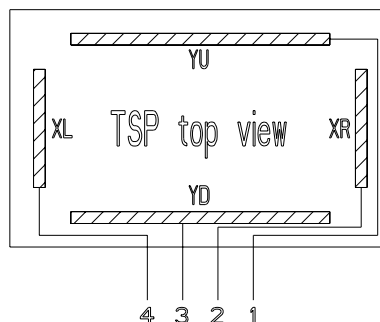
Item	Standard	Note
Operating Voltage	5V(Typ)/7V(Max)	DC
Surface Treatment	Anti-Glare · Hardness : 3H	
Activation Force	Max. 100gf	with stylus pen (R 0.8mm) or finger (R 8.0mm)
Interface Type	4 Wire Resistive	
Resistance Between Terminals	X(Film side) : 200~900Ω Y(Glass side) : 200~900Ω	At the connector
Linearity	X(Film side) : ≤ 1.5% Y(Glass side) : ≤ 1.5%	Testing interval is 2mm with load 80g
Insulation Resistance	Min. 20MΩ	At DC 25V

### 6.2 Design guideline for Touch-Panel

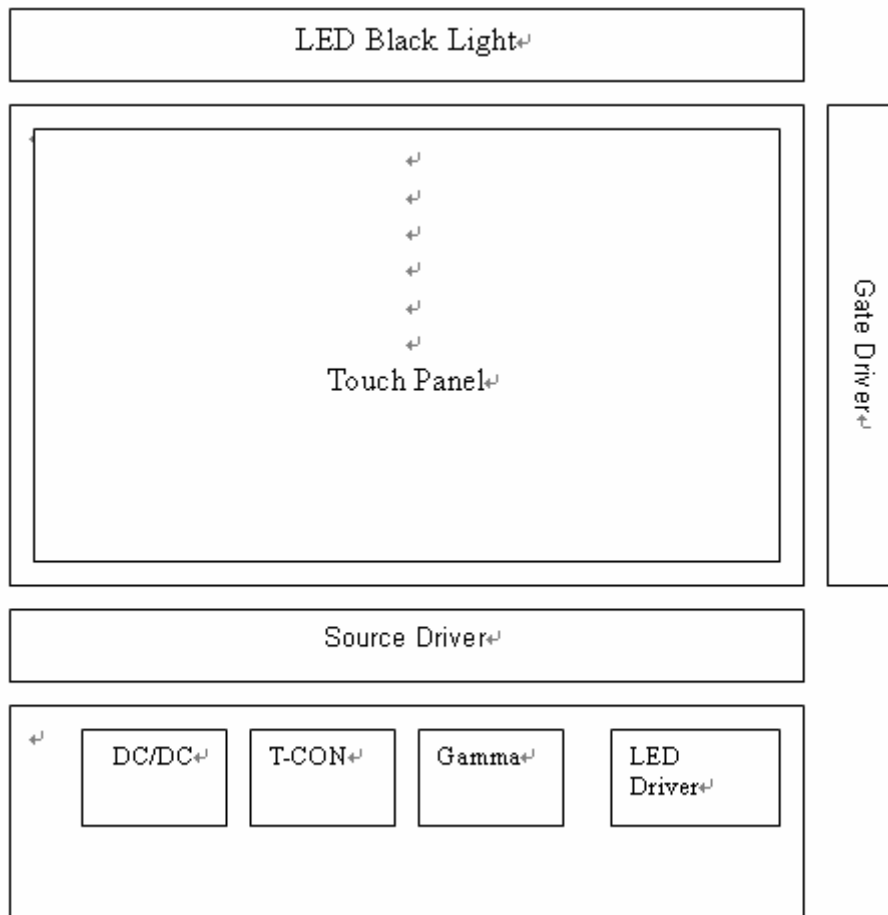
- (a) The Housing Cushion on touch-panel must be set at outside of T.P's view-area .
- (b) The Cushion material must be elastic material.
- (c) The housing must avoid to touch the T.P
- (d) To combine, the housing should not be stuck on T.P.
- (e) Example of housing design :



### 6.3 Circuit Diagram



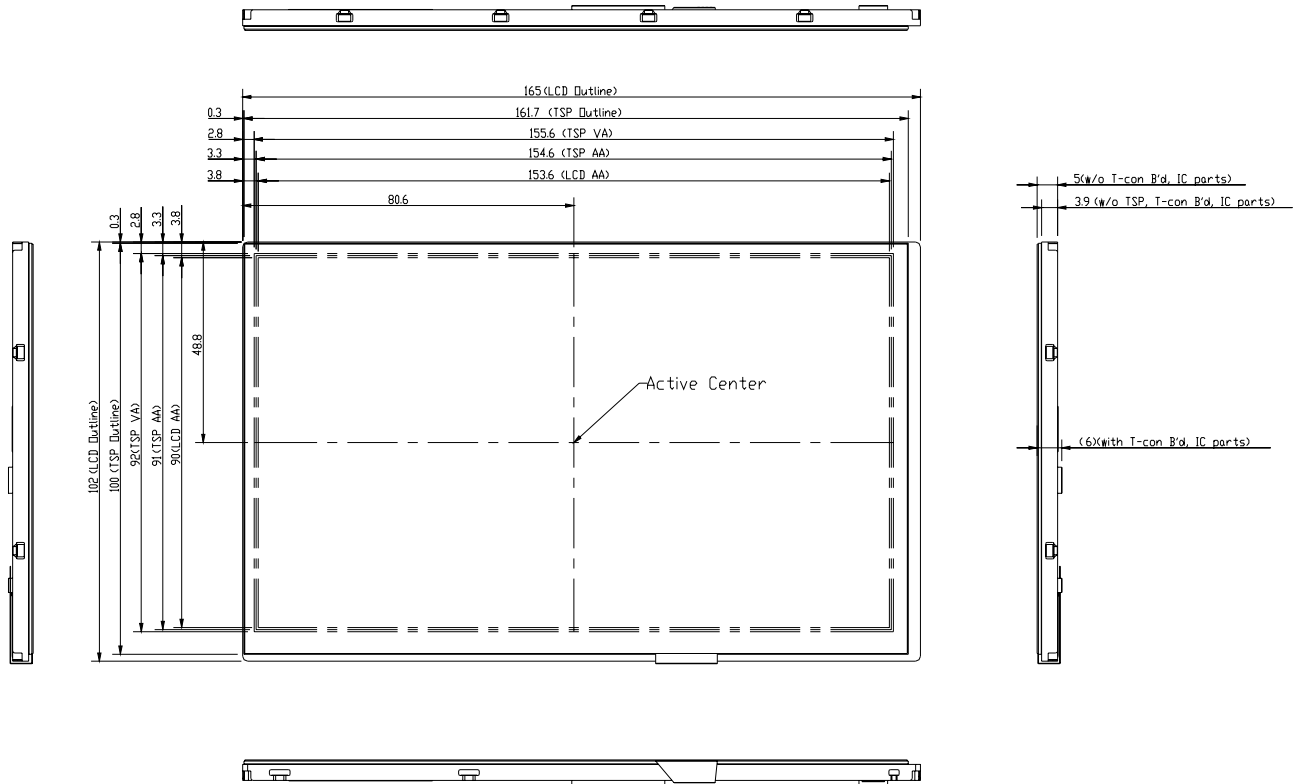
## 7. BLOCK DIAGRAM



## 8. MECHANICAL DIMENSION

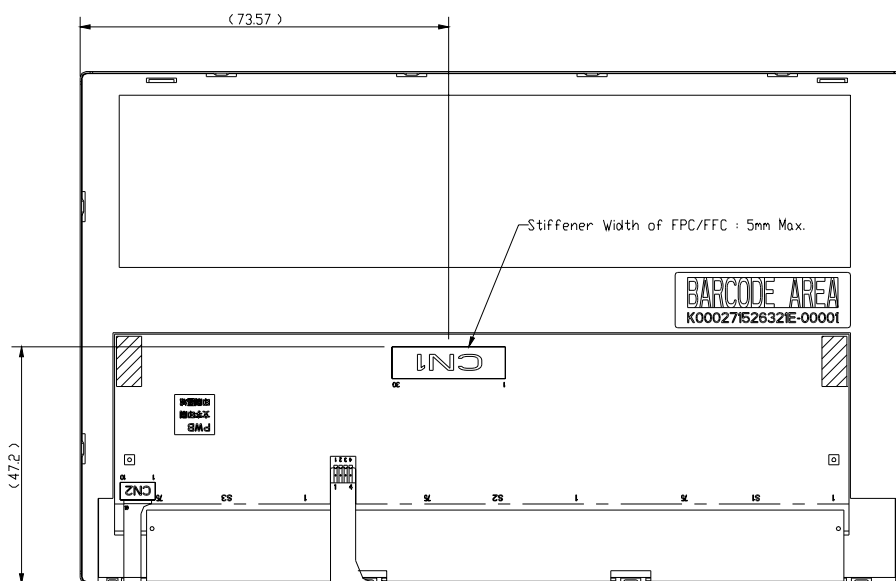
### 8.1 Front Side

[Unit : mm]



### 8.2 Rear Side

[Unit : mm]



Note :

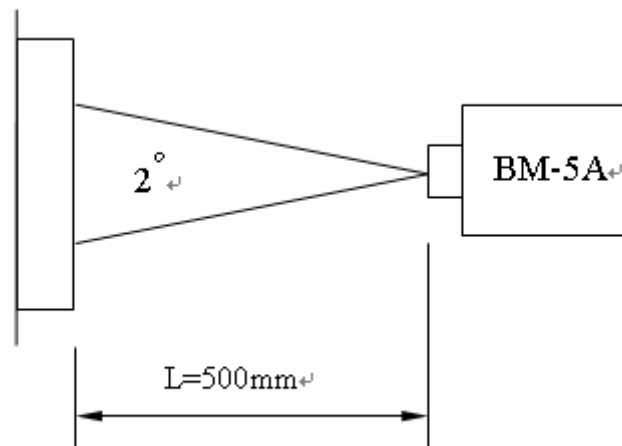
1. General tolerance :  $\pm 0.3\text{mm}$
2. LCD connector CN1(30pin) : STARCONN , P/N : 089N30-000R00-G2

## 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	200	250	--	cd/m <sup>2</sup>	*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	CR ≥ 10 Point-5	120	140	--	°	*1)*2)*4)
	Vertical		90	110	--	°	*1)*2)*4)
Color Coordinate	White	Wx Wy	0.273 0.289	0.313 0.329	0.353 0.369	*1)*3)	*1)*3)
	Red	Rx Ry	0.544 0.299	0.584 0.339	0.624 0.379		
	Green	Gx Gy	0.275 0.528	0.315 0.568	0.355 0.608		
	Blue	Bx By	0.108 0.118	0.148 0.158	0.188 0.198		

Remarks :

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



\*2) Definition of contrast ratio :

$$\text{Contrast Ratio (CR)} = (\text{White}) \text{ Luminance of ON} \div (\text{Black}) \text{ Luminance of OFF}$$

\*3) Definition of luminance :

Measure white luminance on the point 5 as figure9-1

Definition of Luminance Uniformity:

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

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

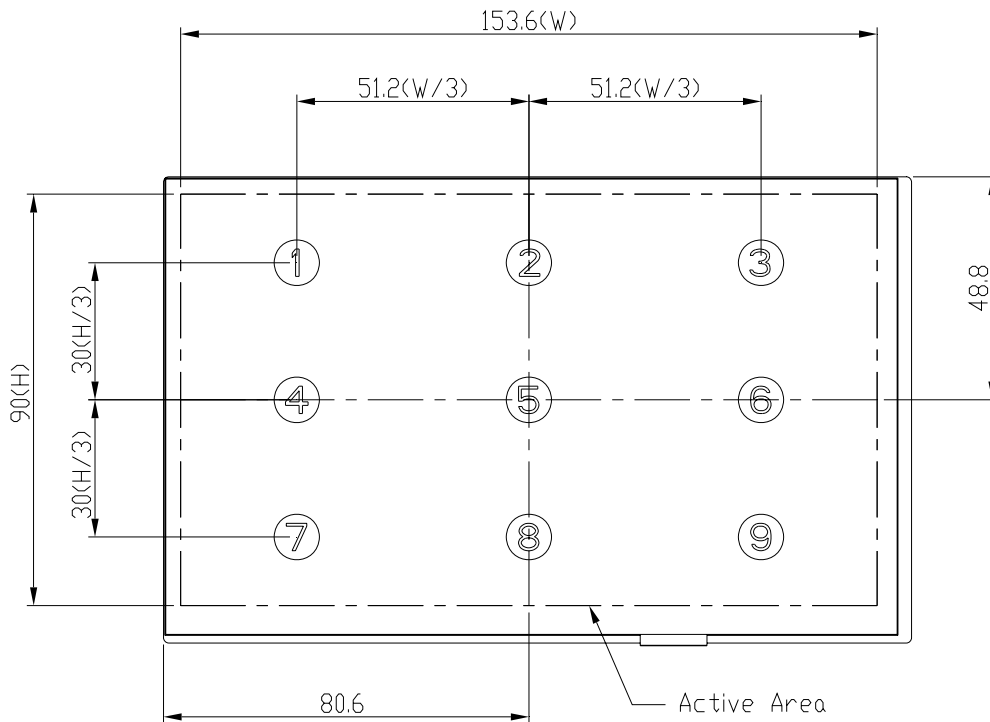


Fig9-1 Measuring point

\*4) Definition of Viewing Angle( $\theta, \psi$ ), refer to Fig9-2 as below :

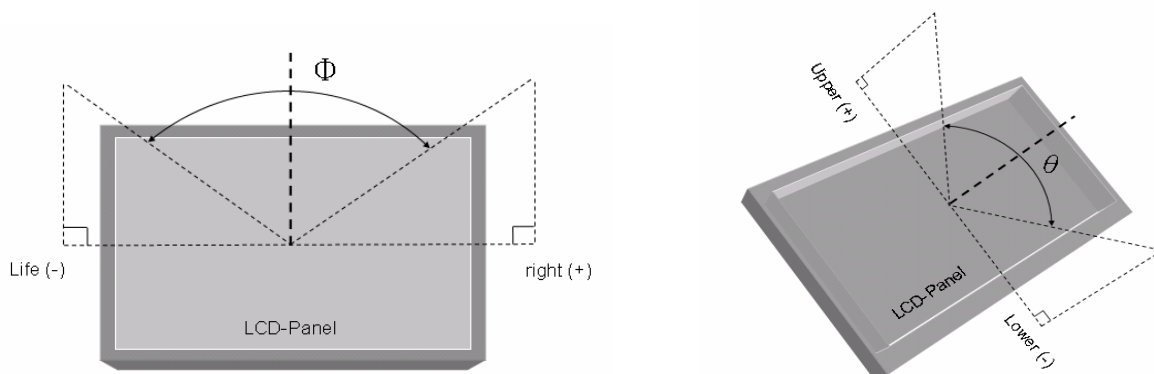


Fig9-2 Definition of Viewing Angle

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

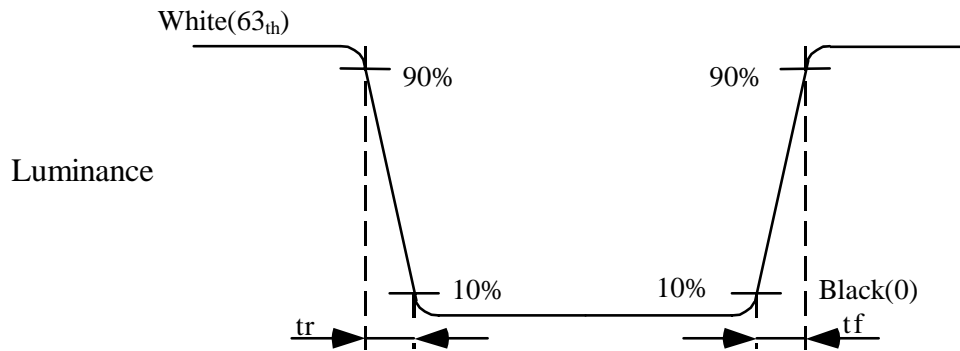


Fig9-3 Definition of Response Time(White-Black)

## 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"> <li>● Shock level:980m/s<sup>2</sup>(equal to 100G)</li> <li>● Waveform:half sinusoidal wave,6ms.</li> <li>● Number of shocks:one shock input in each direction of three mutually perpendicular axes for a total of three shock inputs.</li> </ul>
Vibration (Non-operation)	<ul style="list-style-type: none"> <li>● Frequency range:8~33.3Hz</li> <li>● Stoke:1.3mm</li> <li>● Vibration: sinusoidal wave, perpendicular axis(both x, z axis:2Hrs,y axis:4Hrs).</li> <li>● Sweep:2.9G,33.3Hz-400Hz</li> <li>● Cycle:15min</li> </ul>

### 10.3 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.



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