



Specification

CLAA057VA01CT

5.7" / 640x480 / TTL / LED / Touch

Version October 2008

REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)		2006/9/15
0.1	1.Add CHARACTERISTIC OF TOUCH PANEL	p.13 & p.14	2006/11/7
	2. Revise INTERFACE CONNECTION	p.8	
0.2	1. Add ADJ Input Voltage in 3-1 TFT-LCD	p.6	2006/11/7
	2. Delete Remark(4) in ABSOLUTE MAXIMUM RATINGS	p.4	
	3. Revise TFT-LCD current consumption	p.6	
	4. Revise INTERFACE CONNECTION	p.8	
	5. Revise Timing Specification	p.10	
	6. Revise Timing sequence(Timing chart)	p.11	
	7. Revise BLOCK diagram	p.15	
0.3	1. operation frequency:20±5KHZ	p.9	2006/12/22
	2. 6.1 Basis characteristic: Hardness:3H	p.14	
0.4	Revise Overview	p.4	2007/4/19
	Revise ADJ Input Voltage	p.6	
	Revise TFT-LCD current consumption	p.6	
	Revise Interface Connection & remark 3	p.8	
	Delet Period in Timing specification	p.10	
	Revise Resistance Between Terminals & Linearity in Basis characteristic	p.14	
	Revise Circuit Diagram	p.15	
0.5	Add LED life time 20000hr	p.21	2008/04/15
0.6	Revise the Front Side	p.17	2008/06/26
0.7	Revise Timing Specification (Add DATA Setup Time & DATA Hold Time)	p.10	2008/10/24
	Revise Timing sequence	p.11	

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1. OVERVIEW

CLAA057VAO1CT 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)	180nit(typ)
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)×7.85(D)
Weight(g)	~132g
BL unit	LED
Surface Treatment	Anti-Glare · Hardness:3H
Type of touch screen	4 Wire resistance type

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{cc}	-0.5	5.0	V	
Signal Input Voltage	DCLK,DE,R0,G0 ,B0~R5,G5,B5	-0.5	V _{cc} + 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 :

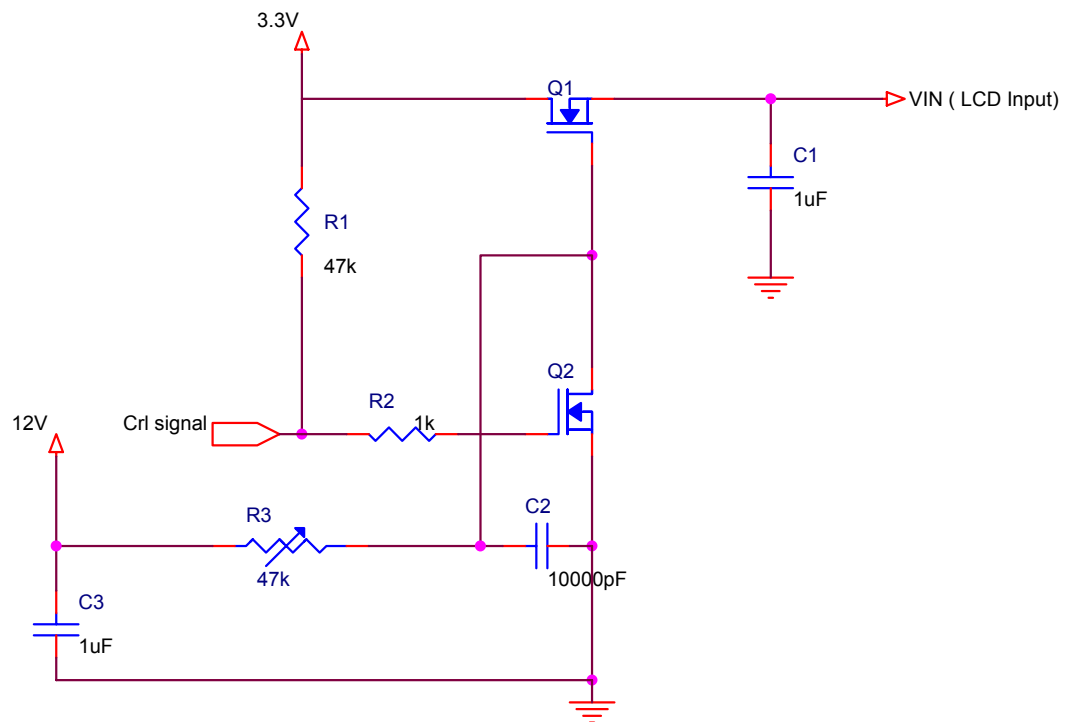
*1) If users use the product out off the environmment operation range (temperature and humidity) ,it will concern for visual quality.

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

VESDc : Contact discharge to input connector

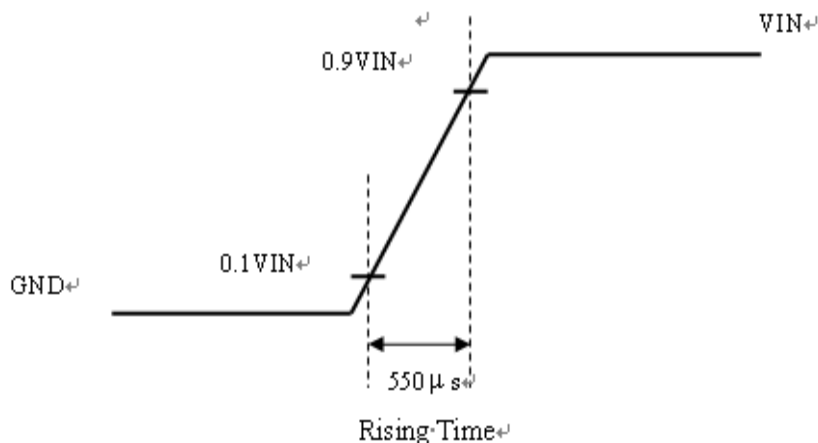
VESDm : Contact discharge to module

*3) 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

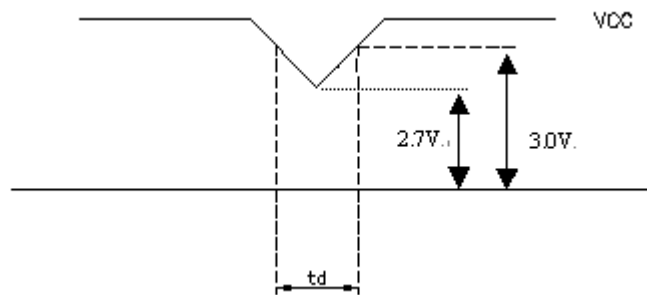
3.1TFT LCD

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}	$V_{CC} \cdot 0.7$	--	V_{CC}	V	
	V_{IL}	0	--	$V_{CC} \cdot 0.3$	V	
ADJ Input Voltage	Threshold Voltage(high)	V_{IH}	3.0	--	3.3	V
	Threshold Voltage(low)	V_{IL}	GND	--	0.3	V

Remarks :

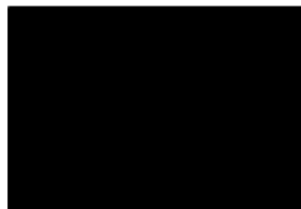
- *1) VCC -dip condition:
 When $2.7\text{ V} < V_{CC} < 3.0\text{V}$, $t_d = 10\text{ms}$.
 $V_{CC} > 3.0\text{V}$, VCC-dip condition should be same as VCC-turn-on condition.



3.2TFT-LCD current consumption

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

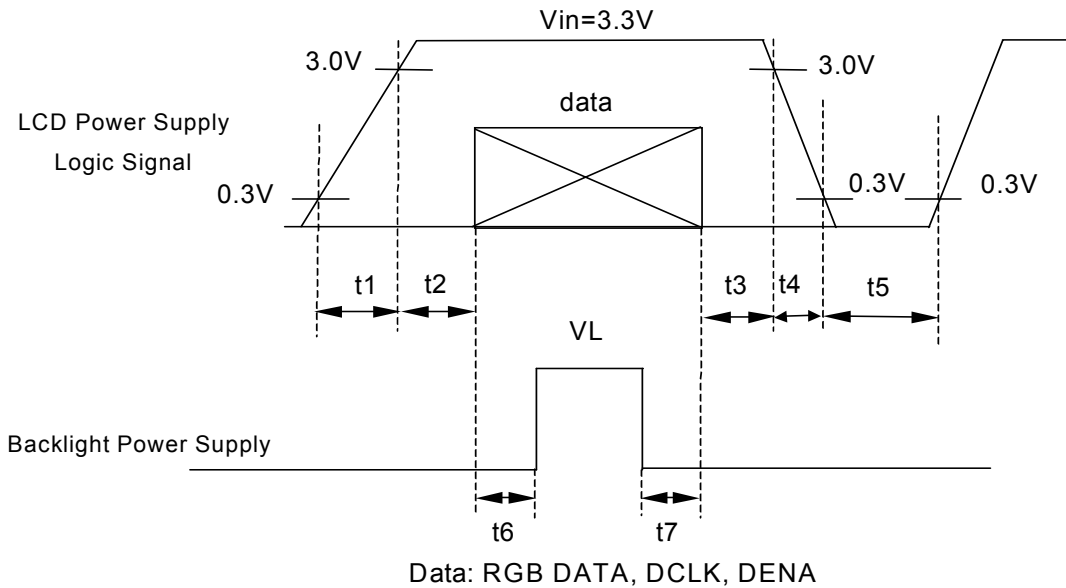


·· (a)64 Gray Pattern ······ (b)Black Pattern ····

- *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		



4. INTERFACE CONNECTION

CN1 : Starconn 089N40-000R00-G2

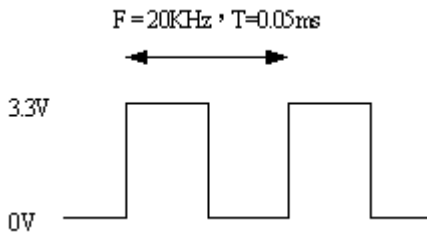
Pin NO.	SYMBOL	DESCRIPTION
1	U/D	Up / Down Display Control
2	DMS	DE / SYNC Mode Selection
3	Hsync	Horizontal SYNC.
4	V _{LED}	Power Supply for LED
5	V _{LED}	Power Supply for LED
6	V _{LED}	Power Supply for LED
7	V _{CC}	Power Supply for LCD
8	Vsync	Vertical SYNC.
9	DE	Data Enable
10	X2	TSP control (Left)
11	Y1	TSP control (Up)
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	X1	TSP control (Right)
37	Y2	TSP control (Down)
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)

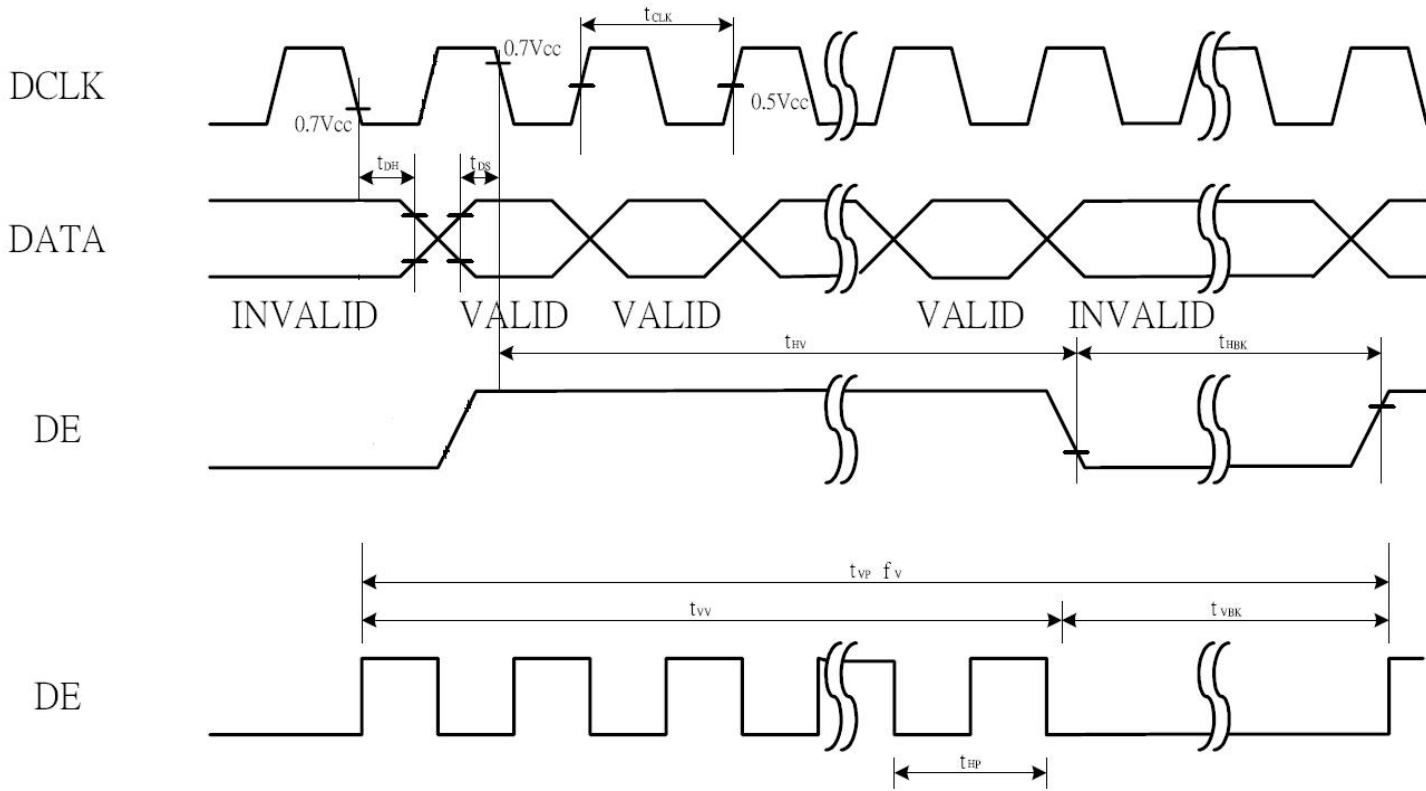
DMS	Function
1	DE Mode
0	SYNC Mode

5. INPUT SIGNAL(DE ONLY MODE)

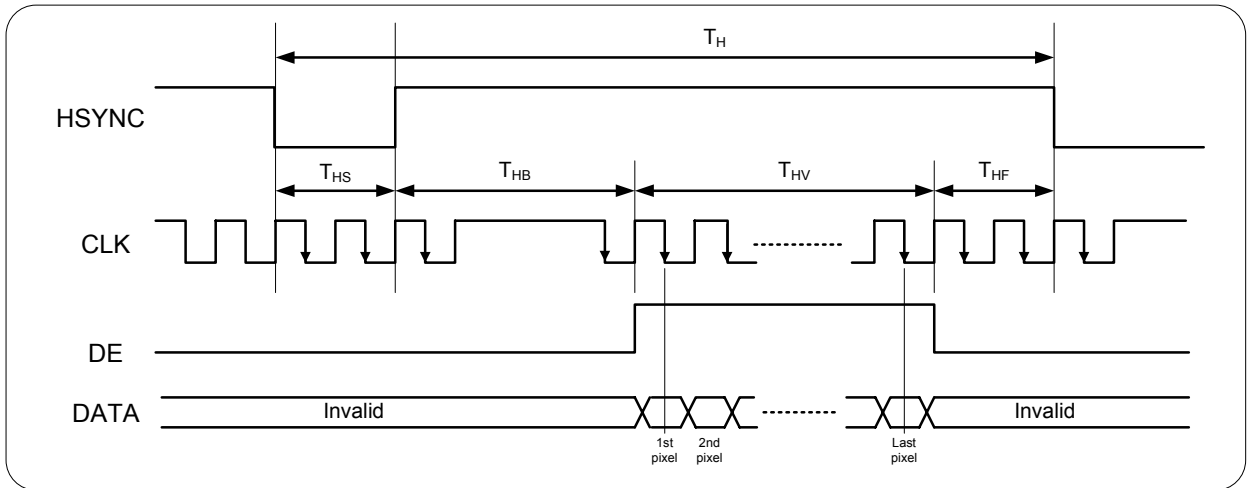
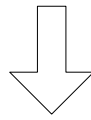
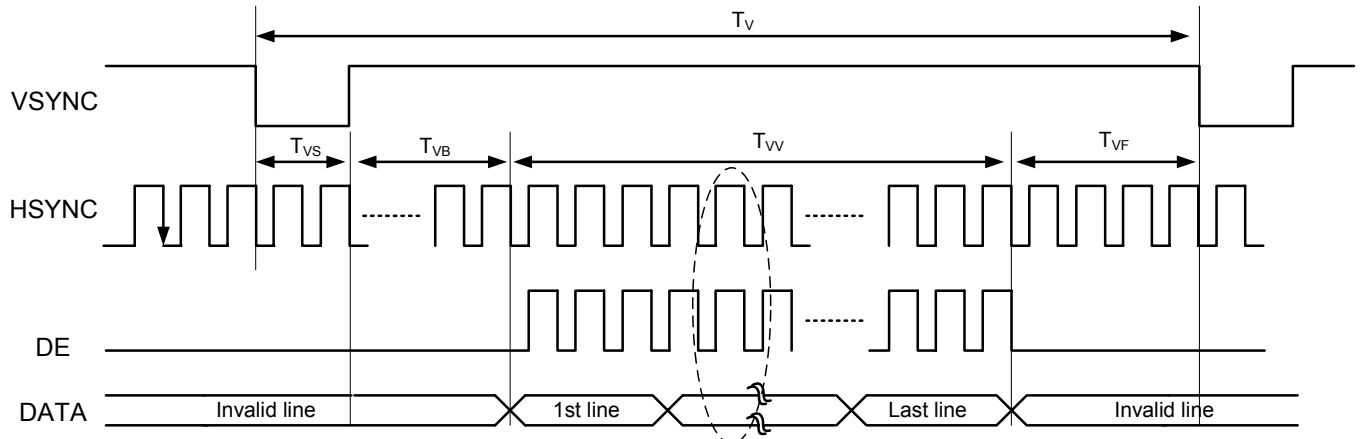
5.1 Timing Specification

characteristics		SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DE MODE	Dot Clock	f_{CLK}	23	25	30	MHz	
	Horizontal Period	t_{HP}	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	
	DATA Setup Time	t_{DS}	5	-	-	ns	
	DATA Hold Time	t_{DH}	10	-	-		
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)



DE mode Timing



Sync mode Timing

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
	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

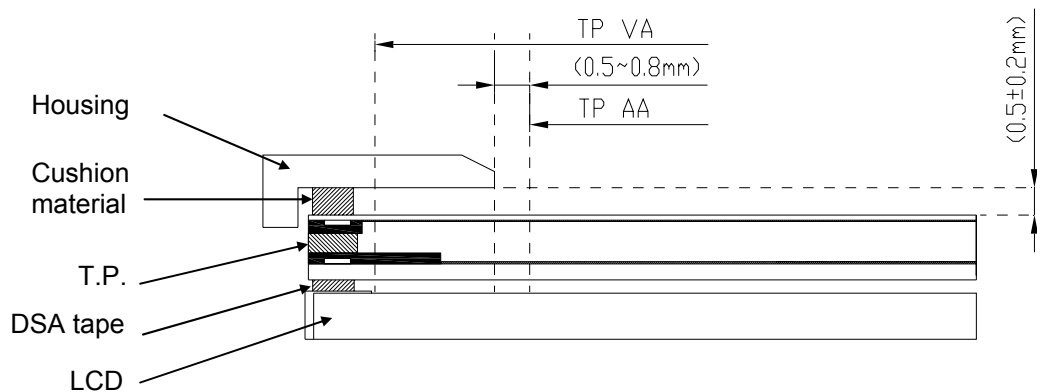
6. CHARACTERISTIC OF TOUCH PANEL

6.1 Basis characteristic

Item	Standard	Note
Operating Voltage	3V(Min)/5V(Typ)/7V(Max)	DC
Surface Treatment	Anti-Glare · Hardness : 3H	
Activation Force	< 80gf	Less than 80gf(Typical 25gf) individual with stylus pen (R 0.8mm) or finger (R 8.0mm)
Linearity Force	130 gf	2 Layer(Thickness :0.7mm)
Interface Type	4 Wire Resistive	
Resistance Between Terminals	X(Glass side) : 450~1200Ω Y(Film side) : 150~700Ω	At the connector
Linearity	X(Glass side) : 1.5% Y(Film side) : 1.5%	Testing interval is 2mm with load 120g
Insulation Resistance	Min. 20MΩ	At DC 25V

6.2 Design guideline for Touch-Panel

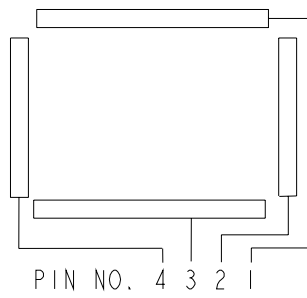
- (a) The Housing Cushion on touch-panel must be set at outside of T.P's view-area .
- (b) The Cushion material must be elastic material.
- (c) The housing must avoid to touch the T.P
- (d) To combine, the housing should not be stuck on T.P.
- (e) Example of housing design :



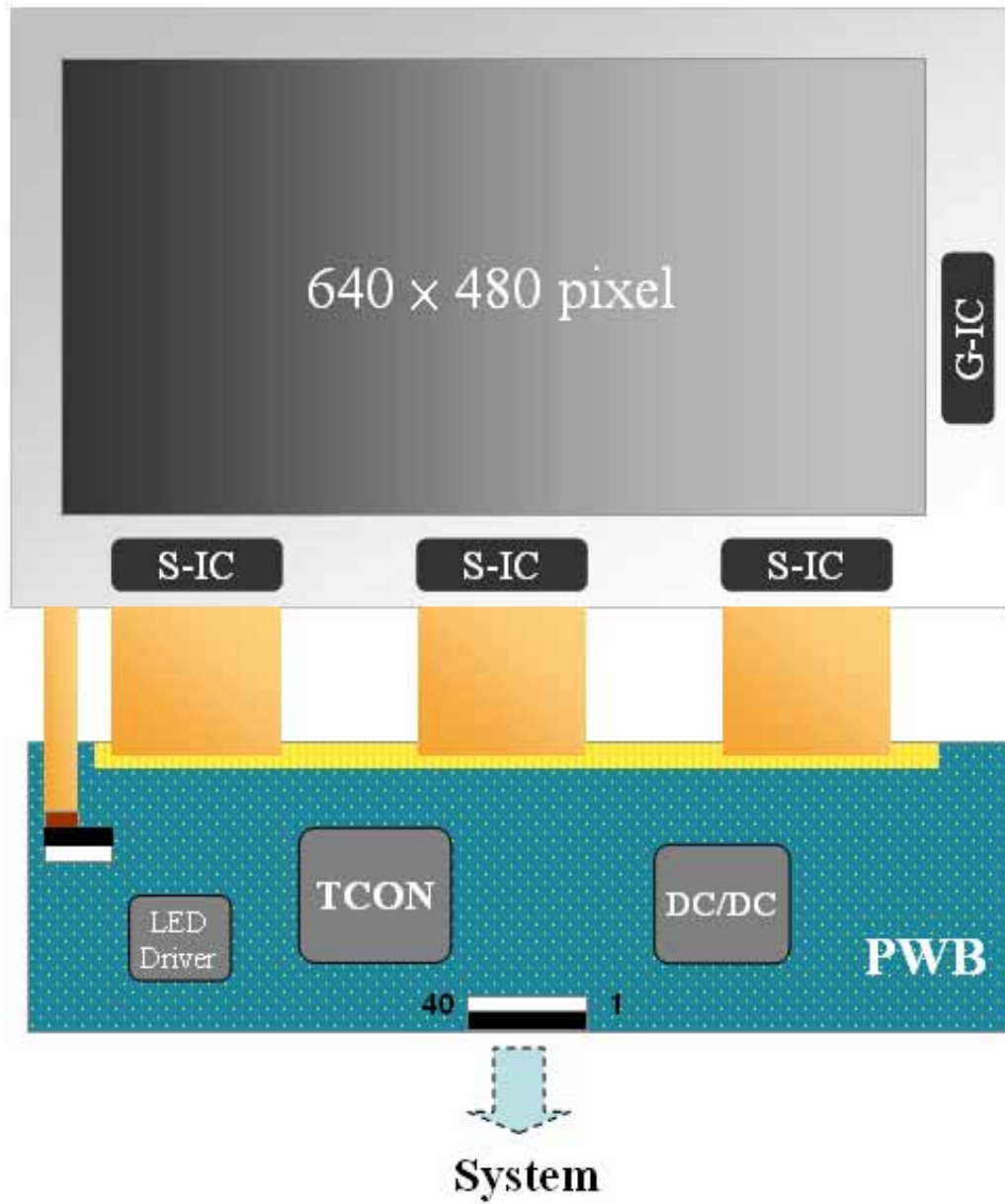
6.3 Circuit Diagram

PIN No.	Assignment
1	YU
2	XR
3	YD
4	XL

X:Glass electrode
Y:Film electrode



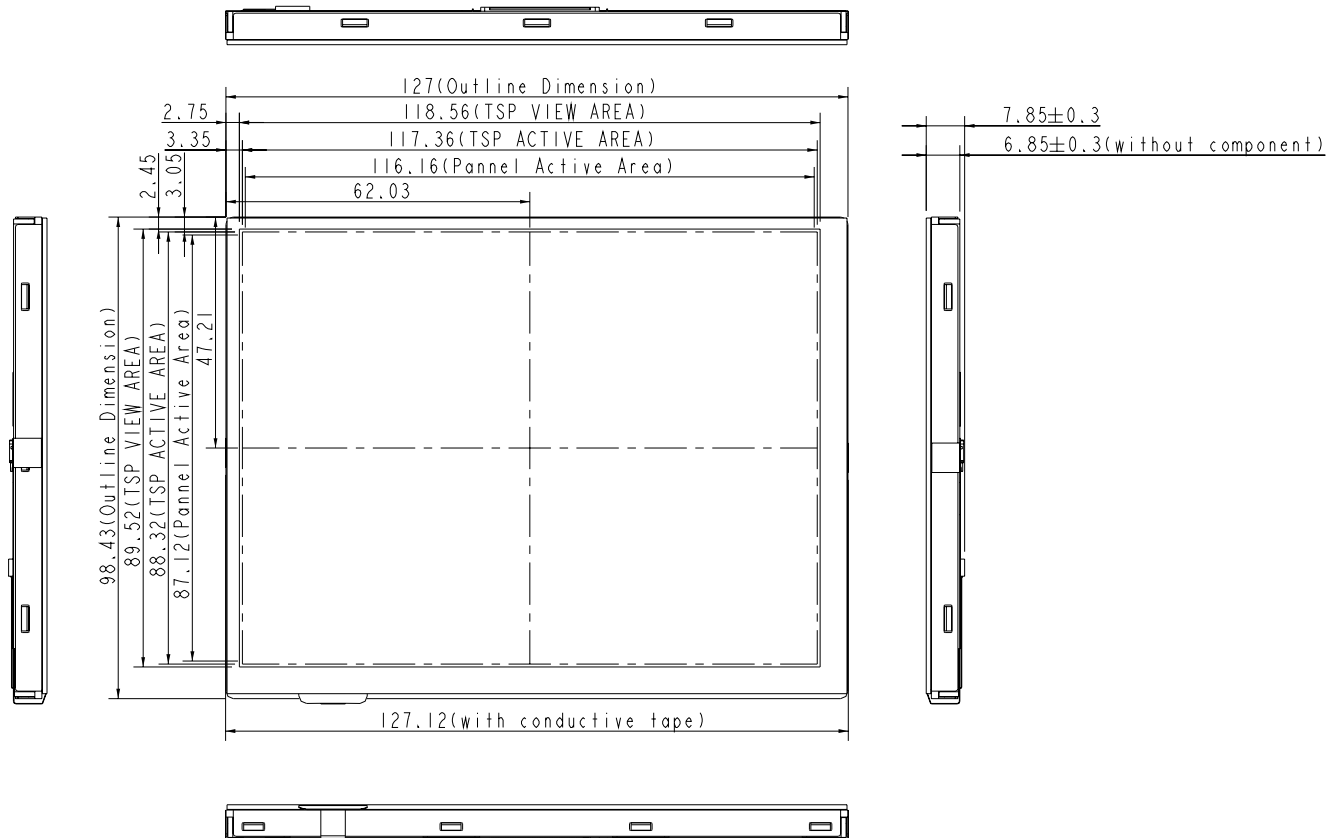
7. BLOCK DIAGRAM



8. MECHANICAL DIMENSION

8.1 Front Side

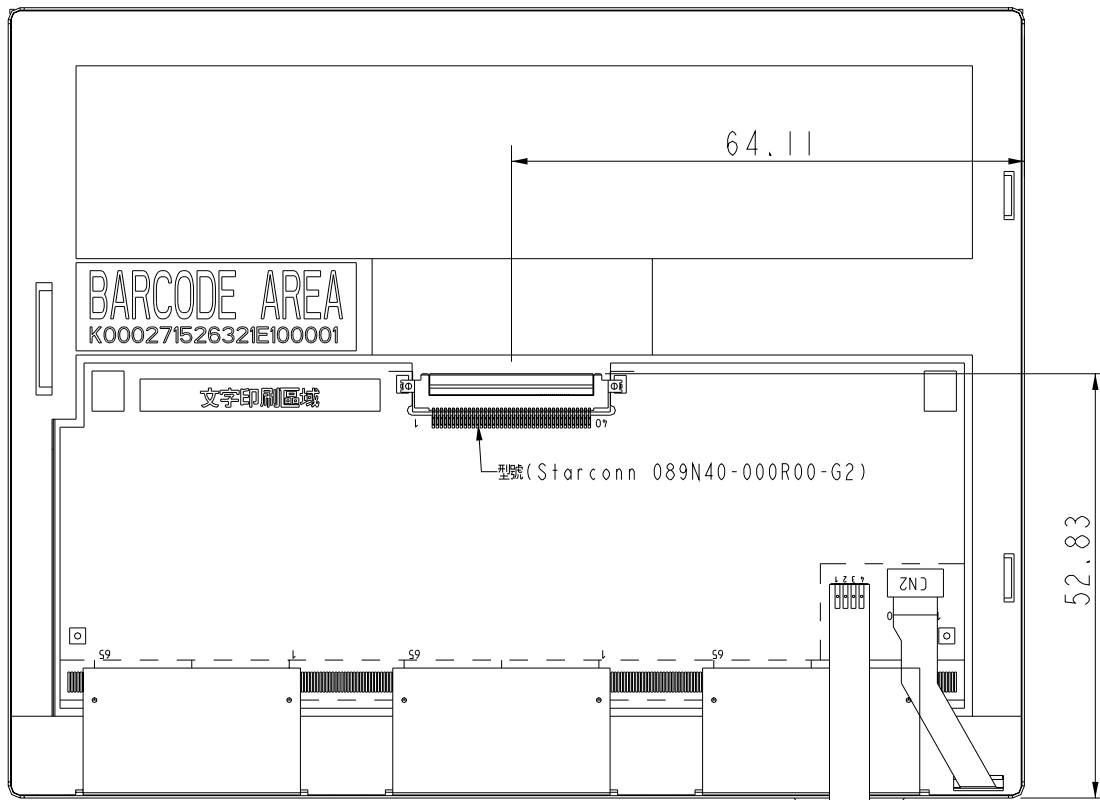
[Unit : mm]



NOTE:
 General tolerance : ±0.3

8.2 Rear Side

[Unit : mm]



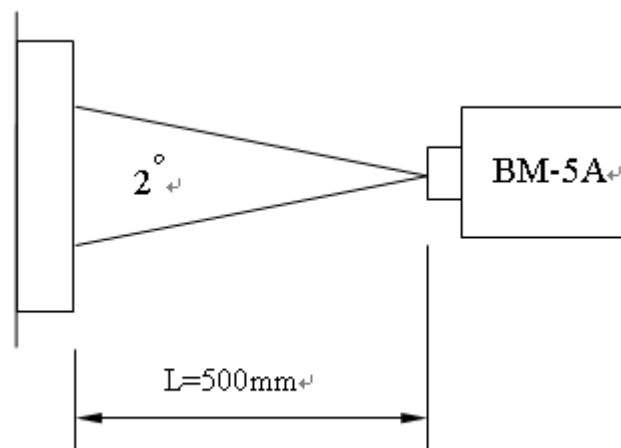
Remark : Un-indication tolerance is $\pm 0.3\text{mm}$

9. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Constrast Ratio	CR	Point-5	200	300	--	--	*1)*2)*3)
Luminance	Lw	Point-5	160	180	--	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	CR 10 Point-5	120	140	--	°	*1)*2)*4)
	Vertical		80	100	--	°	*1)*2)*4)
Color Coordinate	White	Wx Wy	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 , V_{LED}=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 point1~9 as figure8-1

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

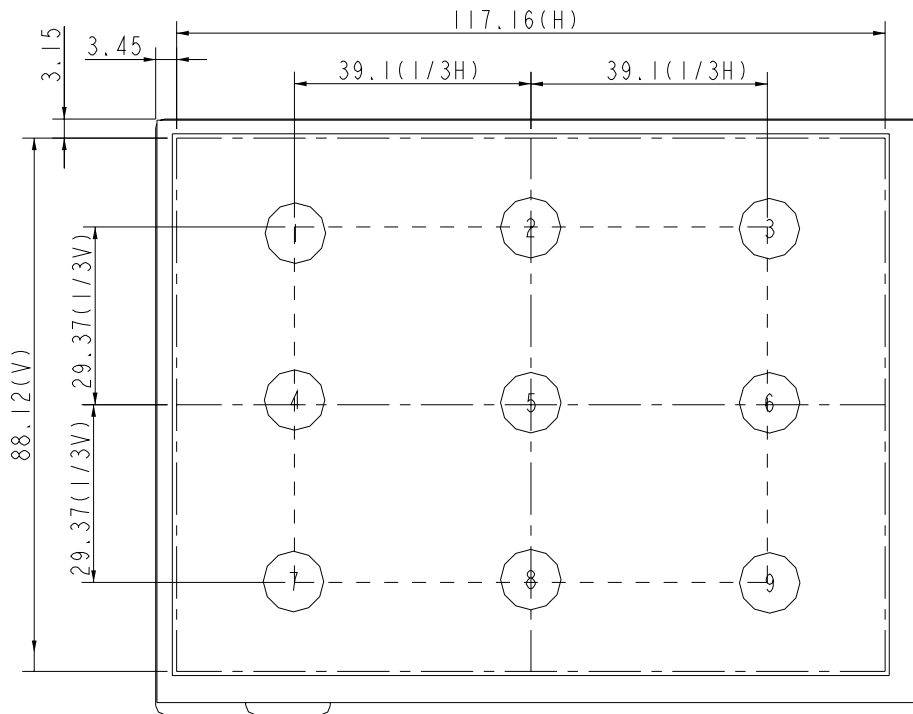


Fig8-1 Measuring point

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

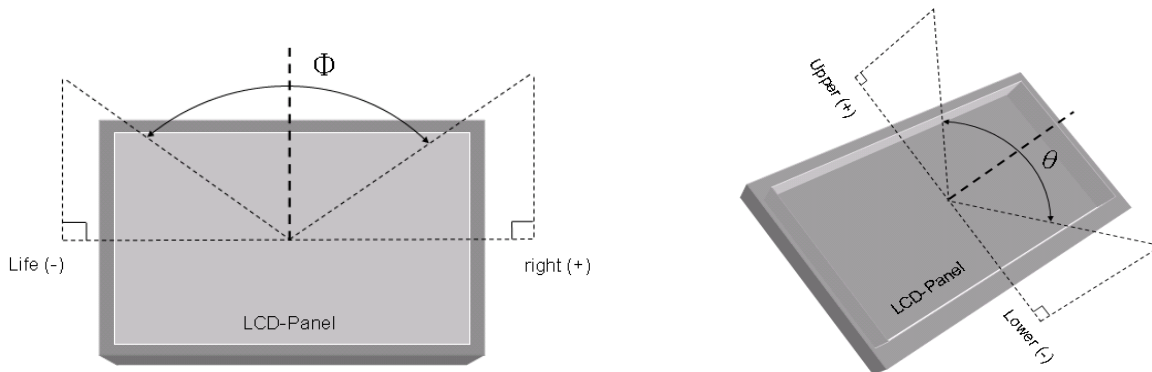


Fig8-2 Definition of Viewing Angle

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

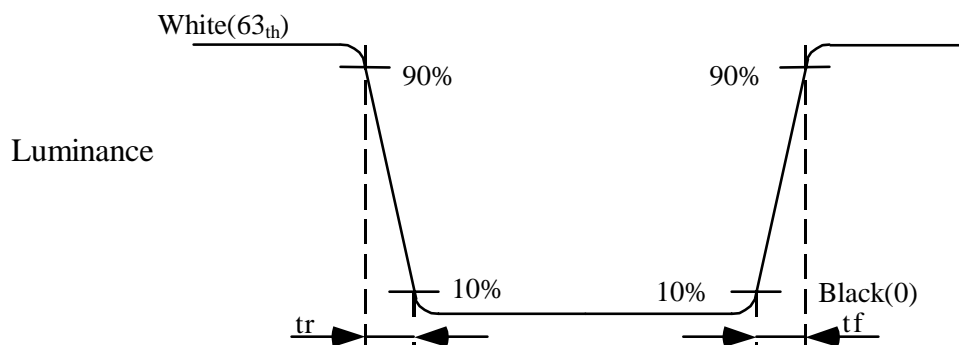


Fig8-3 Definition of Response Time(White-Black)

10. RELIABILITY TEST

10-1. Temperature and humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	85°C , 240H
High Temperature Storage	95°C , 240H
High Temperature High Humidity Operation	60°C , 90%RH , 240H
Low Temperature Operation	-30°C , 240H, Backlight unit always turn on
Low Temperature Storage	-40°C , 240H
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:sinusoidal wave,perpendicularaxis(both x,y,z axis:2Hrs). ● Sweep:2.9G,33.3Hz-400Hz ● Cycle:15min
LED life time	20000 Hr

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 transformation of the module parts should be ignored.

Fail:No display image,obvious non-uniformity,or line defect.



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