



Chunghwa Picture Tubes, Ltd.

Product Specification

To :

Date : 100721

TFT LCD

CLAA057VC01CT

ACCEPTED BY : (V0.1)

Tentative

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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)		2010/5/3
0.1	Revised the Input Signal	P12 P13 P14 P15	2010/5/14

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CONTENTS

1. OVERVIEW	4
2. ABSOLUTE MAXIMUM RATINGS	5
3. ELECTRICAL CHARACTERISTICS	6
3.1 TFT-LCD Power Supply Voltage.....	6
3.2 TFT-LCD Power Supply Current.....	6
3.3 Power 、Signal sequence.....	7
3.4 Backlight.....	9
4. INTERFACE CONNECTION	10
5. INPUT SIGNAL (DE ONLY MODE)	12
5.1 Timing specification.....	12
5.2 Timing Chart.....	13
6.TOUCH PANEL	16
6.1 Specification.....	16
6.2 Design guideline for Housing and cushion material.....	16
7. MECHANICAL DIMENSION	17
7.1 Front View.....	17
7.2 Rear View.....	18
8. OPTICAL CHARACT CS	19
9. RELIABILI EST	21
9.1 Temperature and Humidity.....	21
9.2 Shock and Vibration.....	21
9.3 ESD.....	22
9.4 Judgment Standard.....	22

1. OVERVIEW

CLAA057VC01CT is 5.7" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver IC, and LED backlight.

General specifications are summarized in the following table:

Item		Specification
Display Area (mm)		116.16(H) × 87.12(V)
Resolution		640(H) × 3(RGB) × 480(V)
Pixel Pitch (mm)		0.1815(H) × 0.1815(V)
Pixel Arrangement		R,G,B vertical stripe
Display Mode		Normally White
Number of Color		262K
Viewing Direction		6 o'clock
Response Time (Tr+Tf)		30ms(typ)
Contrast Ratio		300 : 1
Luminance (cd/m ²)		180nit(typ)
NTSC		50%(typ)
Viewing Angle	CR > 10	140 degree (Horizontal) , 100 degree (Vertical)
Electrical Interface		TTL
Power Consumption (W)		1.4W(typ)
Outline Dimension(mm)		127(W) × 100(H) × 7.85(D)
Module Weight(g)		135g(typ)
Backlight		LED
Surface Treatment		Anti-Glare , Surface hardness: 3H

2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit	Remarks
Power Supply Voltage for LCD	Vcc	-0.3	5	V	
Power Supply Voltage for LED	VLED	GND	30	V	
ICC Rush Current	IRUSH	-	1	A	*2)
Gate Off Voltage	VEEG	-20	0.3	V	
Operating temperature	Topa	-30	85	°C	*1)
Storage temperature	Tstg	-40	90	°C	*1)

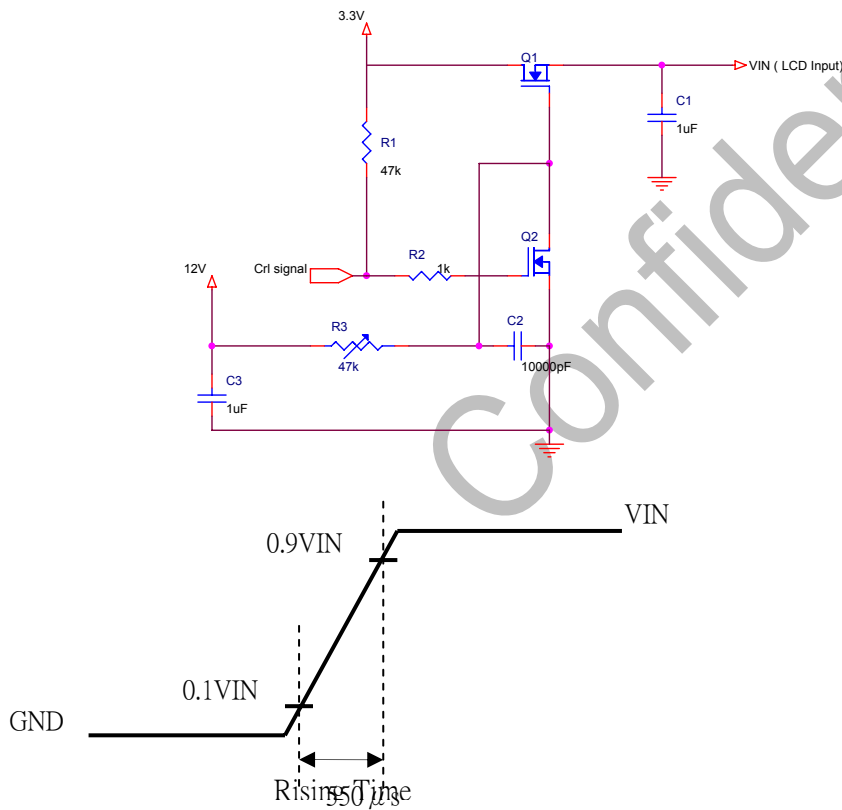
Remarks :

*1) If the product were used out of the operation and storage range, it will have quality issue.

*2) The input pulse-current measurement system is as below:

Control signal: High (+3.3V)→Low (GND)

Supply Voltage of rising time should be from R3 and C2 tune to 550 μs.



3. ELECTRICAL CHARACTERISTICS

3.1 TFT-LCD Power Supply Voltage

Ta=25°C

Item	Symbol	Min	Typ	Max	Unit	Remarks
Power Supply Voltage For LCD	V _{CC}	3.0	3.3	3.6	V	
Power Supply Voltage For LED	V _{LED}	4.5	5	5.5	V	
Logic Input Voltage	V _{IH}	V _{CC} *0.7	--	V _{CC}	V	
	V _{IL}	GND	--	V _{CC} *0.3	V	
ADJ Input Voltage	V _{IH}	3.0	--	3.3	V	
	V _{IL}	GND	--	0.3	V	

3.2 TFT-LCD Power Supply Current

Ta=25°C

Item	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
LCD Power Current	I _{CC}	--	95	115	mA	*1)	
LED Power Current	I _{LED}	--	210	240	mA	*2)	

Remarks :

*1)Typical : 64 gray pattern ◦ Maximum : Black pattern ◦



64 Gray Pattern

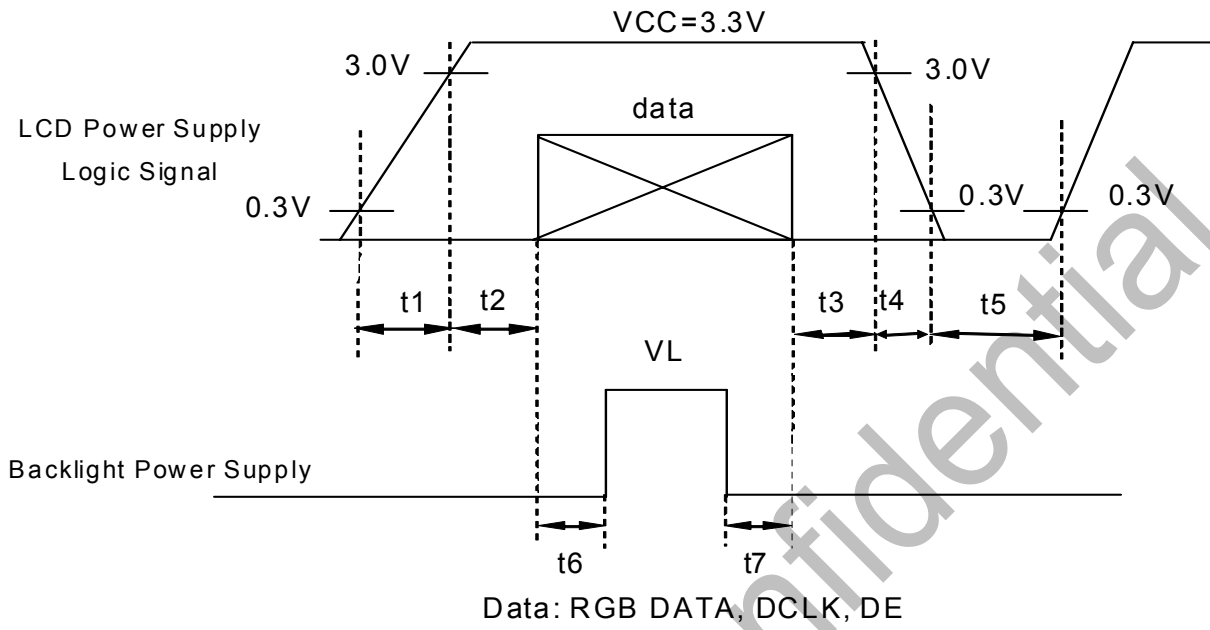


Black Pattern

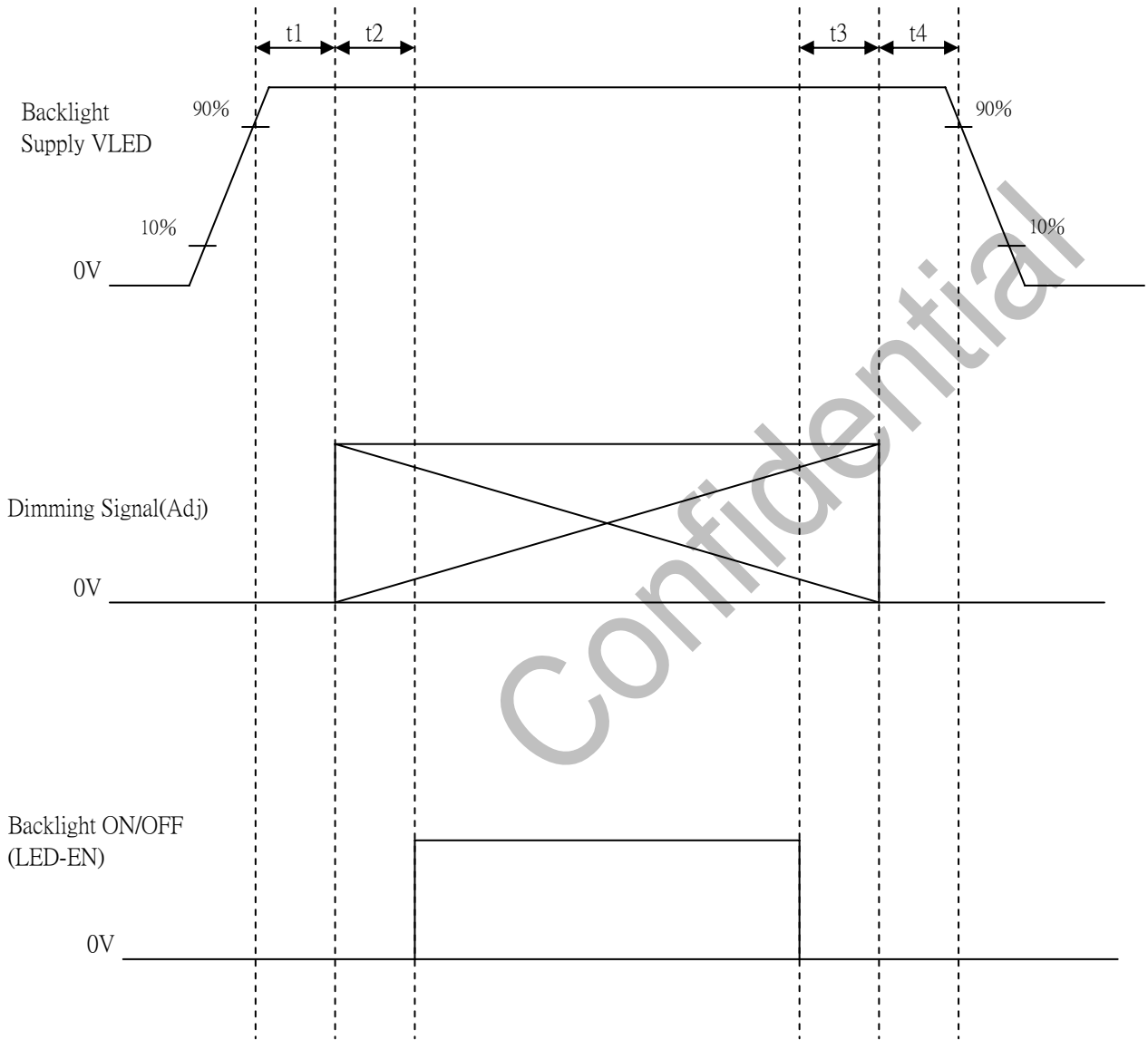
*2) Typical: VDD = 5V
Maximum: VDD = 4.5V

3.3 Power 、 Signal sequence

- 0.5 $t_1 \le 10\text{ms}$ 200ms $\le t_5$
- 0 $t_2 \le 50\text{ms}$ 200ms $\le t_6$
- 0 $t_3 \le 50\text{ms}$ 200ms $\le t_7$
- 0 $t_4 \le 10\text{ms}$



- 10ms \leq t1
- 10ms \leq t2
- 0ms \leq t3
- 10ms \leq t4



3.4 Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remarks
LED Lifetime	-	Ta=25°C Each serial=20mA	30000			Hr	
		Ta=60°C Each serial=20mA	15000			Hr	

Remarks :

*1) Definition LED lifetime : Luminance will decay less than 50%.

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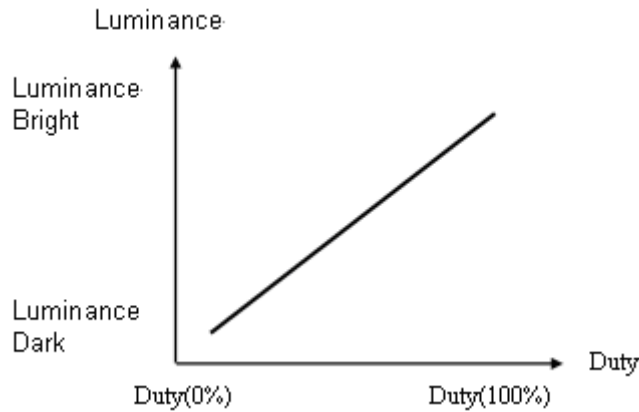
4. INTERFACE CONNECTION

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

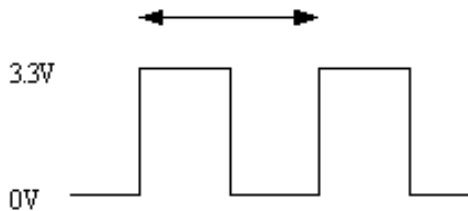
Remarks :

- *1) VSS pin must be connected with GND. Don't let it be an empty pin.
- *2) Adjust control pin (ADJ) controls brightness. The bigger pulse duty, the brighter luminance. ◦



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

$$F=25\text{KHz} \pm 5\text{KHz} \cdot T=0.04\text{ms}$$



The ADJ should pull-high if not adjust brightness, this pin can't floating. ◦

*4) U/D & L/R Control Function

L/R	U/D	Function
1	0	Normal Display
0	0	Left / Right Contrary
1	1	Up / Down Reverse
0	1	Left / Right Contrary , Up / Down Reverse

*5) DMS (Selection DE / SYNC mode)

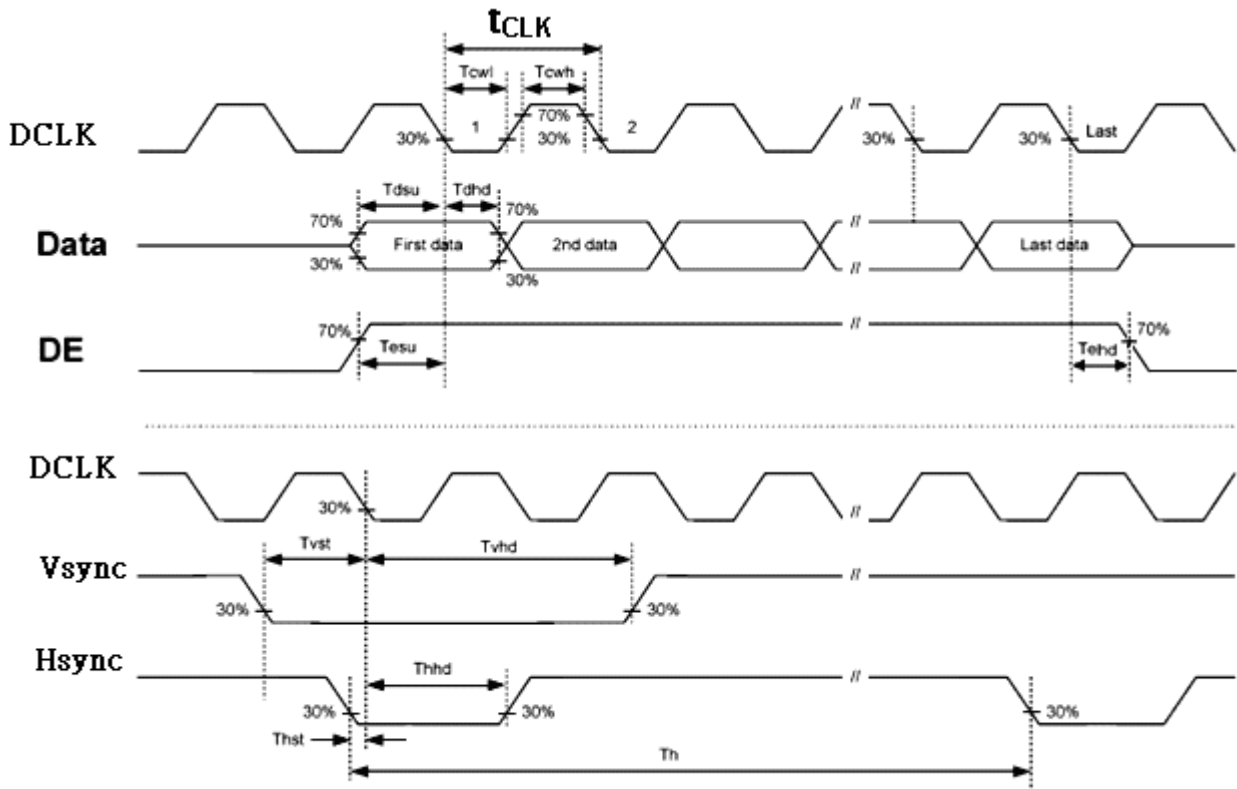
DMS	Function
1	DE Mode
0	SYNC Mode

5. INPUT SIGNAL (DE ONLY MODE)

5.1 Timing specification

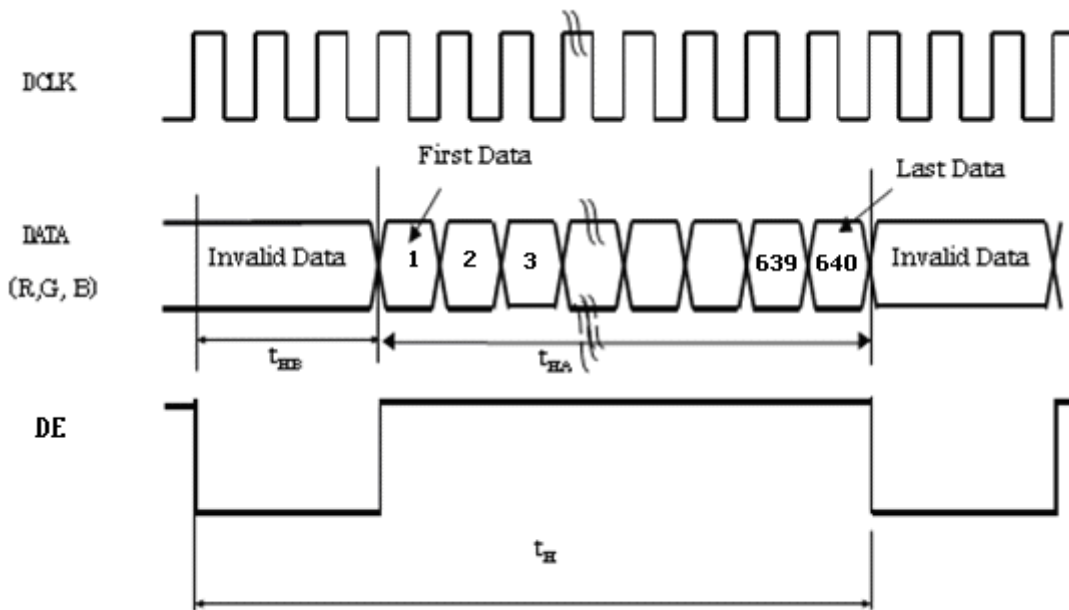
	Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
DCLK	Dot Clock	$1/t_{CLK}$	23	25	30	MHz	
	DCLK pulse duty	Tcwh	40	50	60	%	
DE	Setup Time	Tesu	8	-	-	ns	
	Hold time	Tehd	8	-	-	ns	
	Horizontal Period	t_H	750	800	900	t_{CLK}	
	Horizontal Valid	t_{HA}	640			t_{CLK}	
	Horizontal Blank	t_{HB}	110	160	260	t_{CLK}	
	Vertical Period	t_V	515	525	560	t_H	
	Vertical Valid	t_{VA}	480			t_H	
	Vertical Blank	t_{VB}	35	45	80	t_H	
SYNC	HSYNC Setup Time	Thst	8	-	-	ns	
	HSYNC Hold Time	Thhd	8	-	-	ns	
	VSYNC Setup Time	Tvst	8	-	-	ns	
	VSYNC Hold Time	Tvhd	8	-	-	ns	
	Horizontal Period	th	750	800	900	t_{CLK}	
	Horizontal Pulse Width	thpw	1	48	-	t_{CLK}	thb + thpw=88DCLK is fixed
	Horizontal Back Porch	thb	-	40	-	t_{CLK}	
	Horizontal Front Porch	thfp	22	72	172	t_{CLK}	
	Horizontal Valid	thd	640			t_{CLK}	
	Vertical Period	tv	515	525	560	th	
	Vertical Pulse Width	tvpw	1	3	-	th	tvpw + tvb = 32th is fixed
	Vertical Back Porch	tvb	-	29	-	th	
	Vertical Front Porch	tvfp	3	13	48	th	
	Vertical Valid	tvd	480			th	
DATA	Setup Time	Tdsu	8	-	-	ns	
	Hold Time	Tdhd	8	-	-	ns	

5.2 Timing Chart

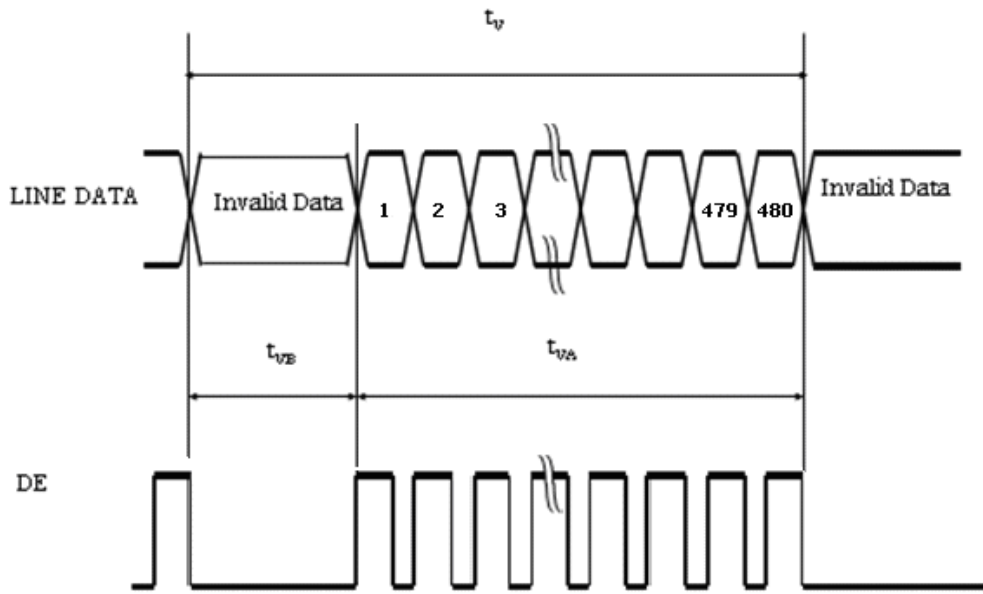


DE mode :

Horizontal Input Timing :



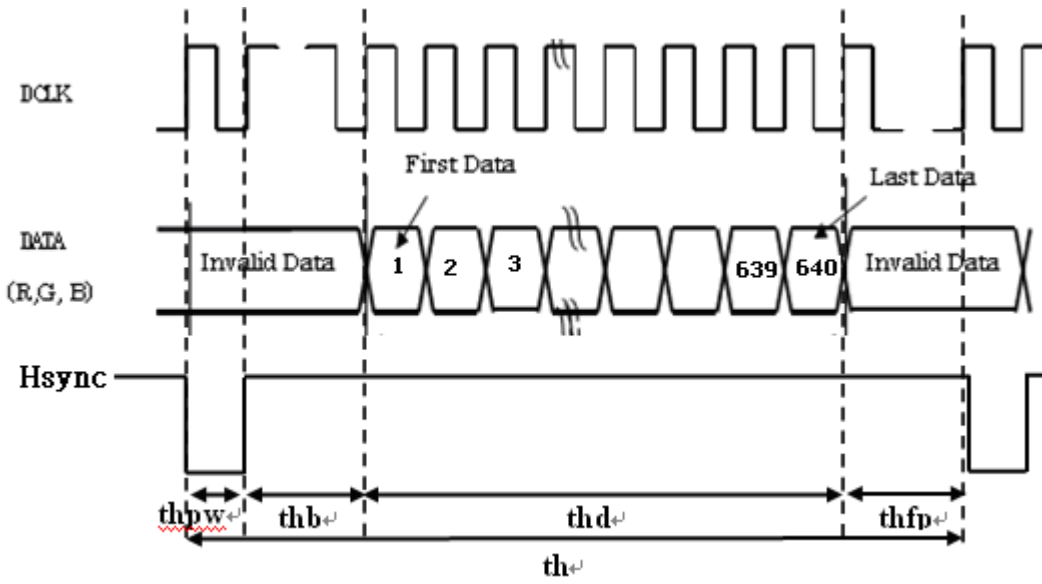
Vertical Input Timing :



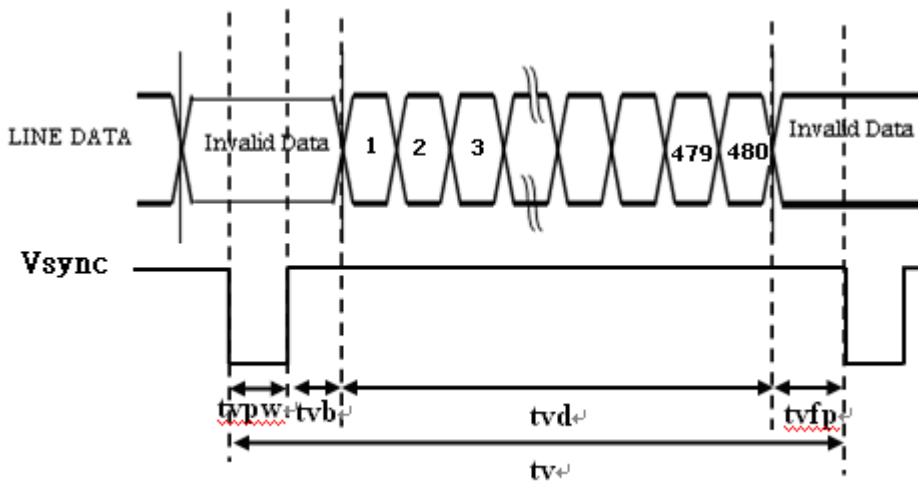
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SYNC mode

Horizontal Input Timing :



Vertical Input Timing :



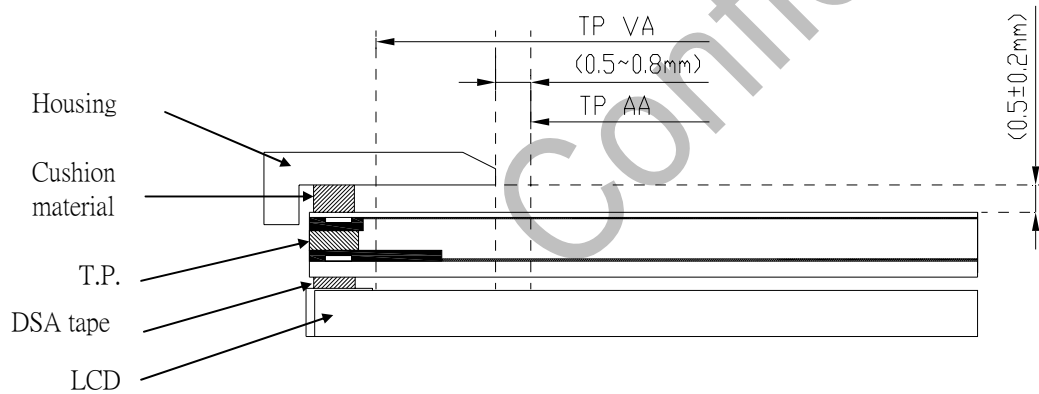
6. TOUCH PANEL

6.1 Specification

Item	Min	Typ	Max	Unit	Remarks
Operating Voltage	--	5	--	V	DC
Activation Force	--	--	80	gf	Stylus pen (R 0.8mm) or finger (R 8.0mm)
Linearity Tolerance	-1.5	--	1.5	%	load 250g
Terminal Resistance	X	150	--	700	At the connector
	Y	450	--	1200	
Insulation Resistance	20	--		M Ω	DC 25V
Surface Treatment	Anti-Glare · 3H			--	

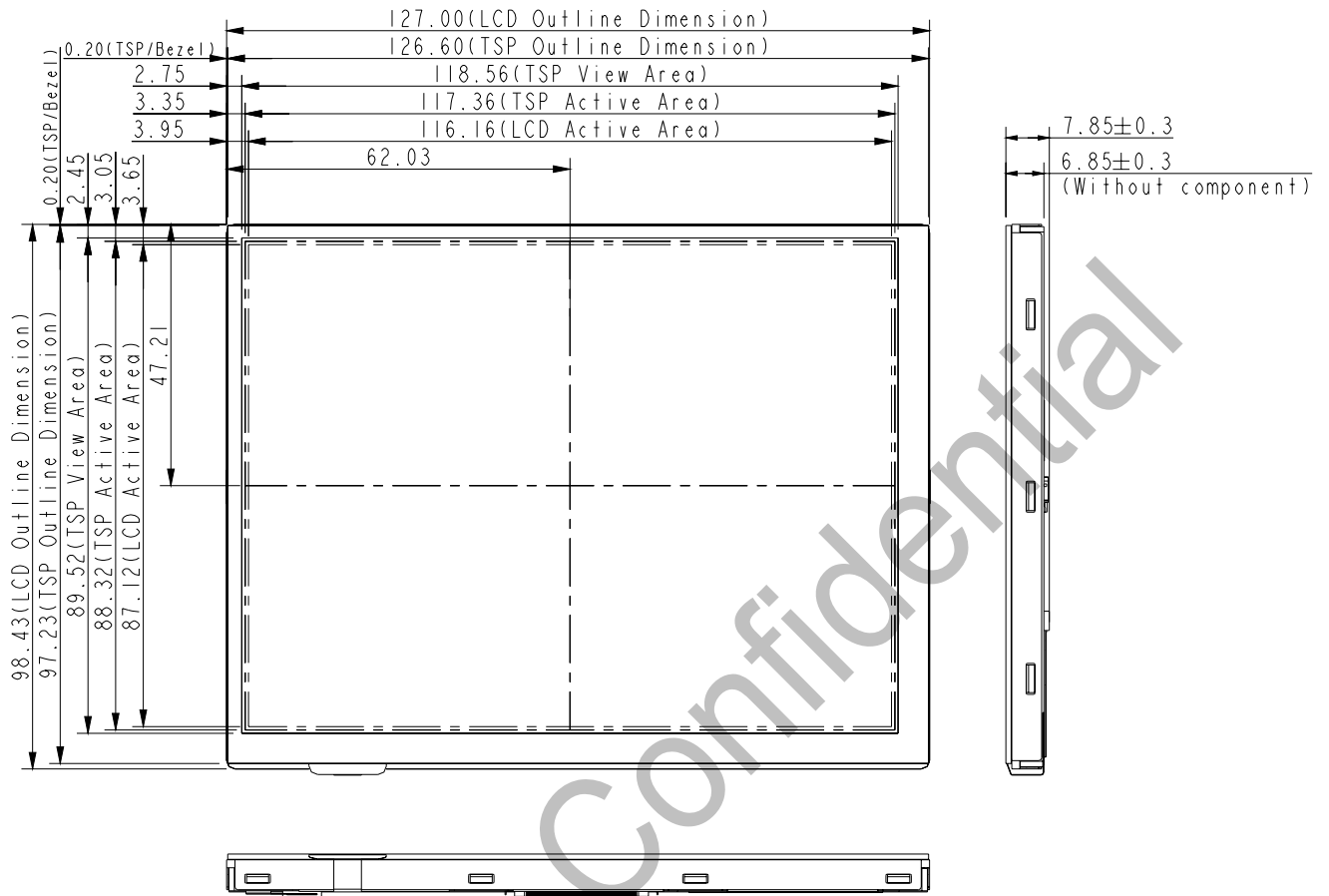
6.2 Design guideline for Housing and cushion material

- (1). The Cushion material must be elastic material.
- (2). The Cushion material on touch-panel must be outside of Touch Panel VA.
- (3). The housing must be outside of Touch Panel AA.
- (4). The housing is forbidden to contact the touch panel for abnormal function.
- (5). Example of housing design :



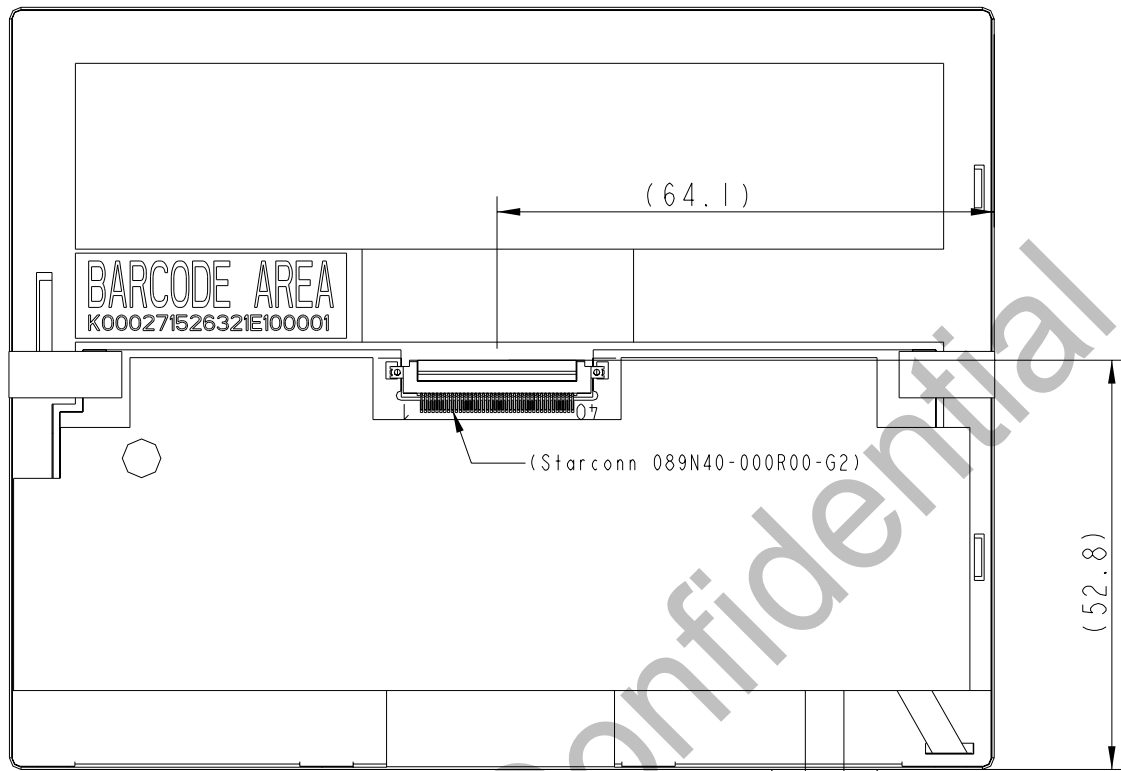
7. MECHANICAL DIMENSION

7.1 Front View



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7.2 Rear View



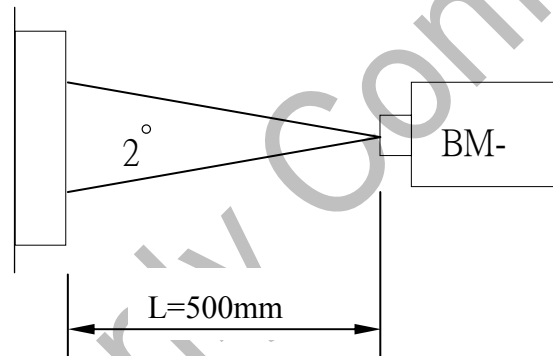
General tolerance ± 0.3 mm

8. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Contrast	CR	Point-5	200	300	--	--	*1)*2)*3)
Luminance	Center point	Lw	145	180	--	cd/m ²	*2)*3)
	Uniformity	ΔL	70	80	--	%	*2)*3)
Response Time (White - Black)	Tr+ Tf		--	20	--	ms	*1)*3)*5)
NTSC	-	Point-5	40	50		%	*1)*3)
View angle	Horizontal	∅	120	140	--	°	*1)*2)*4)
	Vertical	θ	80	100	--	°	*1)*2)*4)
Color Coordination	White	Wx Wy	0.273 0.289	0.313 0.329	0.353 0.369		*1)*3)
	Red	Rx Ry	TBD TBD	TBD TBD	TBD TBD		
	Green	Gx Gy	TBD TBD	TBD TBD	TBD TBD		
	Blue	Bx By	TBD TBD	TBD TBD	TBD TBD		

Remarks :

*1) Measuring conditions : 25°C±2°C , 60±10%RH , under 10 Lux in dark room ◦ BM-5A (TOPCON) , view cone=2° , VCC=3.3V , Vadj=3.3V Duty 100% , after 10 minutes operation ◦

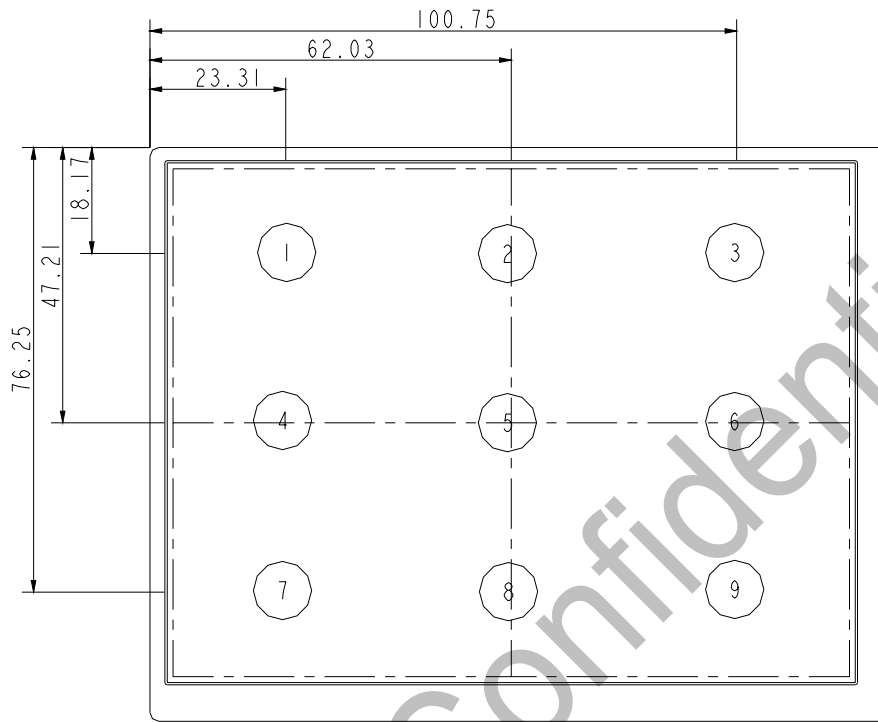


*2) Contrast : CR= On (White Luminance) / Off (Black Luminance)

*3) Luminance and Uniformity :

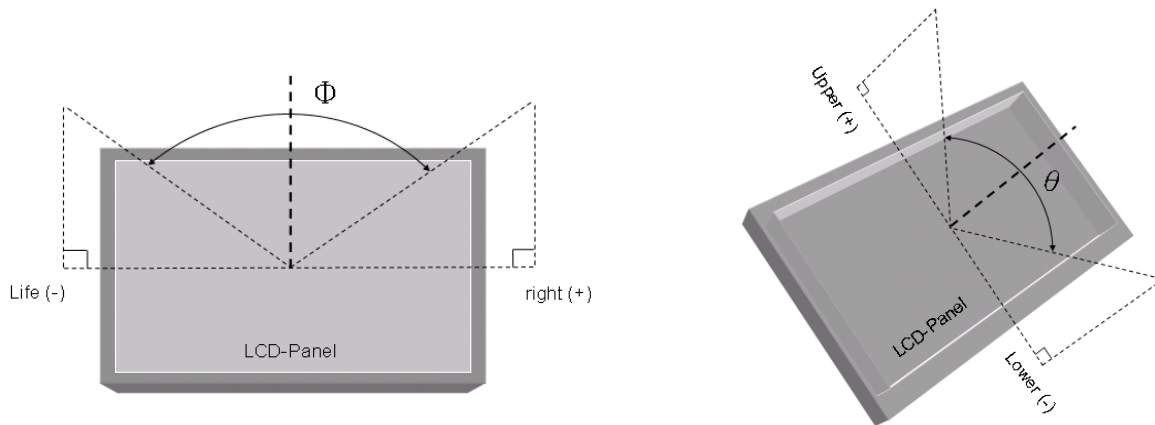
The center point of the Luminance : No 5 point.

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



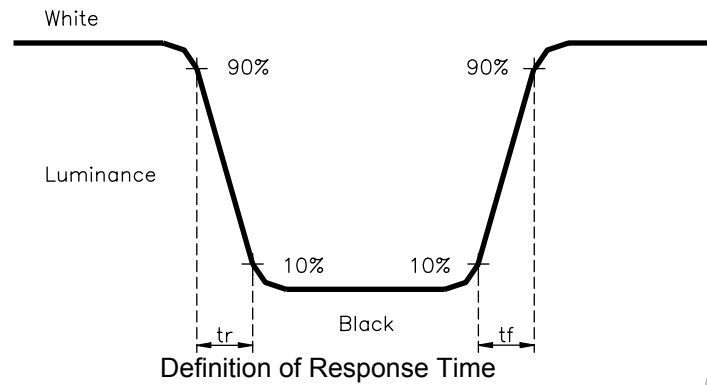
Measuring point

*4) Viewing Angle (θ , ψ) : (Measuring Device EZ-CONTRAST)



Definition of View Angle

*4) Response Time (White - Black)

**9. RELIABILITY TEST**

9.1 Temperature and Humidity

Item	Condition
High Temperature Operation	85° C , 240hrs
High Temperature Storage	95° C , 240hrs
High Temperature and 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 (0.5 hr)~85° C (0.5 hr), 200 CYCLE

9.2 Shock and Vibration

Item	Condition
Shock (Non-Operation)	100G 6msec 1/2 Sine wave, ±X , ±Y , ±Z , each axis 3times.
Vibration (Non-Operation)	Frequency range : 8~33.3Hz Stroke : 1.3mm Sweep : 2.9G , 33.3~40Hz Vibration : X , Z 2hrs each axis ◦ Y 4hrs each axis ◦ Sin wave ◦ Cycle time : 15min

9.3 ESD

Item	Condition	Remarks
E S D	150pF , 330Ω , ±8KV&±15KV air & contact test	*1)
	200pF , 0Ω , ±200V contact test	*2)

Remarks :

*1) LCD glass and metal bezel ◦

*2) 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 defects.

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