Chunghwa Picture Tubes, Ltd.
Technical Specification

To :
Date :

TFT LCD
CLAA156WA01A

ACCEPTED BY :

APPROVED BY	CHECKED BY	PREPARED BY

Prepared by : TFT-LCD Product Planning Management Division

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RECORD OF REVISIONS

Revision No.	Date	Description
V1	2008/07/18	First Issued
V2	2008/08/18	Pg 4 : Revise Operation Temperature (Max)
V3	2008/09/05	Pg 17 : Color Temperature Coordinate : Add the value of min and max.

CONTENTS

1. OVERVIEW

CLAA156WA01A is 15.6" color (16：9) TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, LVDS driver ICs, control circuit and backlight. By applying 6 bit digital data, 1366×RGB (3) ×768, 262K-color images are displayed on the 15.6" diagonal screen. general specifications are summarized in the following table：

ITEM	SPECIFICATION
Display Area (mm)	344.232 (H)x193.536 (V) (15.6-inch diagonal)
Number of Pixels	1366 ×3(H)×768 (V)
Pixel Pitch (mm)	0.252 (H)×0.252(V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Colors	262,144(6bits)(LVDS)
Gamut	60%(typ)
Optimum Viewing Angle	6 o'clock
Response Time (ms)	8ms (Typ)
Surface Treatment	Glare
Viewing Angle	40°、40° /15°、30°(Min.)
Brightness (cd/m^2)	220 cd/m^2 (5point)/6 mA (Typ.) 200 cd/m^2 (5point)/6 mA (Min.)
Uniformity	5point：80% 13point：(65%)
Consumption of Power (W)	6.35W（Max）
Module Size (mm)	359.8(W)×210(H)×6.2(D)（Max）
Module Weight (g)	520 (max)

The LCD Products listed on this document are not suitable for use of aerospace equipment, submarine cable, and nuclear reactor control system and life support systems. If customers intend to use these LCD products for applications listed above or those not included in the "Standard" list as follows, please contact our sales in advance.

Standard：Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tool, Industrial robot, Audio and Visual equipment, Other consumer products.

2. ABSOLUTE MAXIMUM RATINGS

The following are maximum value, which if exceeded, may cause faulty operation or damage to the unit.

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage for LCD	VCC	0	4.0	V	
Lamp voltage	VL	700	920	Vrms	
Lamp current	IL	2	6.5	mArms	*1). 2)
Lamp frequency	FL	40	80	kHz	
Operation Temperature	Top	0	50	℃	*3). 4). 5). 6)
Storage Temperature	Tstg	-25	65	℃	*3). 4). 5)
Delayed Discharge Time	TD	--	1	sec	*7)

【Note】

*1) Product life-time relate to lamp current, please operate production follow statement at page 9 〝(b)back light〞.

*2) When lamp current over the definition of absolute max, product life-time will decay rapidly or operate unusual.

*3) The relative temperature and humidity range are as below sketch, 90%RH Max. (Ta≦40℃)

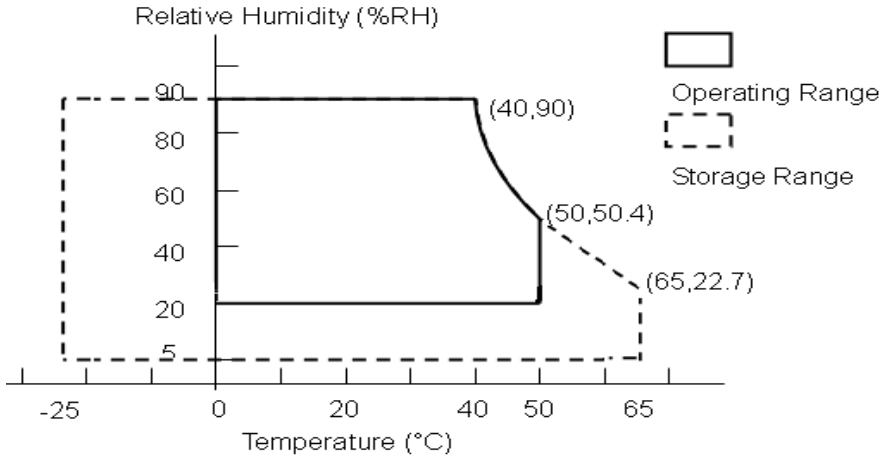
*4) The maximum wet bulb temperature ≦39℃(Ta＞40℃) and without dewing.

*5) If product in environment which over the definition of the relative temperature and humidity out of range too long, it will affect visual of LCD.

*6) If you operate LCD in normal temperature range, the center surface of panel should be under 60℃.

*7) Delay discharge time test condition ：Starting lamp voltage=1650Vrms. (please follow statement at page 9 〝 (b) back light〞

Before test TD, lamp should operate at least 1min, and lamp current should follow typical lamp current specification. To place panel at room temp. (25±2℃)below for 24hrs,nd then to measure TD with the same starting lamp voltage in dark room.



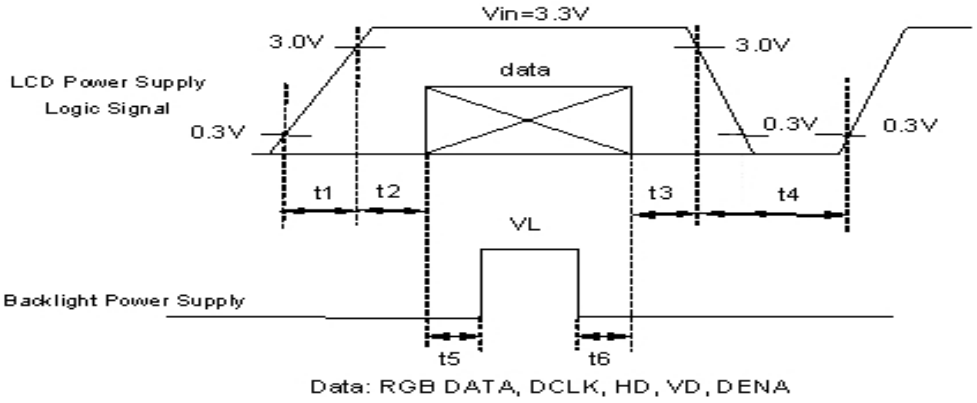
3. ELECTRICAL CHARACTERISTICS

(A) TFT LCD

TEM		SYMBOL	MIN	TYP	MAX	UNIT	REMARK
LCD POWER VOLTAGE		VCC	3.0	3.3	3.6	V	【Note 1】
LCD POWER CURRENT		ICC	-	400	500	mA	【Note 2】
Rush CRRENT		Irush	-	-	2	A	【Note 4】
LOGIC INPUT VOLTAGE (LVDS: IN+,IN-)	INPUT VOLTAGE	VIN	0	-	VCC	V	【Note 3】
	COMMON VOLTAGE	VCM	1.125	1.25	1.375	V	【Note 3】
	DIFFRENTIAL INPUT VOLTAGE	| VID |	250	350	450	mV	【Note 3】
	THRESHOLD VOLTAGE (HIGH)	VTH	-	-	100	mV	【Note 3】 When VCM = +1.2V
	THRESHOLD VOLTAGE (LOW)	VTL	-100	-	-	mV	
DIFFRENTIAL INPUT VOLTAGE TOLERANCE		△VID	-	-	35	mV	
COMMON VOLTAGE TOLERANCE		△VCM	-	-	35	mV	

【Note 1】Power Sequence：

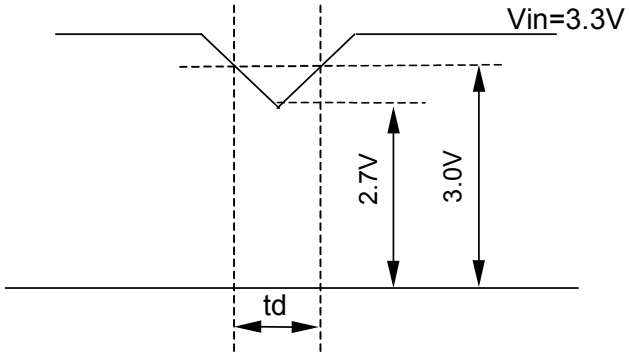
0.5 ms ≦t1≦10ms　　1 sec≦t4
0.01 ms＜t2≦50 ms　　200 ms≦t5
0.01 ms＜t3≦50 ms　　200 ms≦t6



VCC-dip state

(1)when 3.0＞VCC≧2.7V，td≦10 ms

(2)when VCC＜2.7V，VCC-dip condition should as the VCC-turn-off condition.



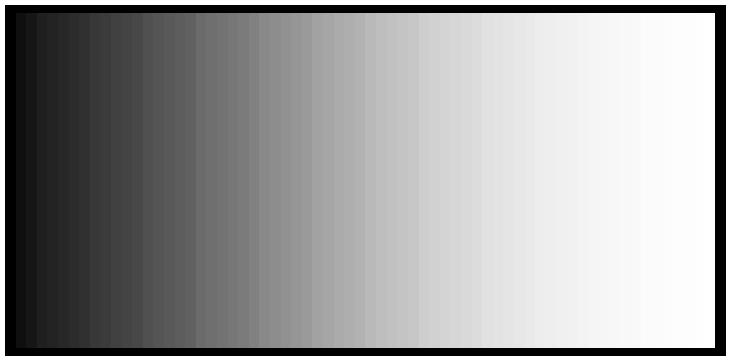
【Note 2】Typical value is 0～63 gray level.(Horizontal line Pattern)

768 line mode，VCC= +3.3V

Circuit condition (Typ.)：

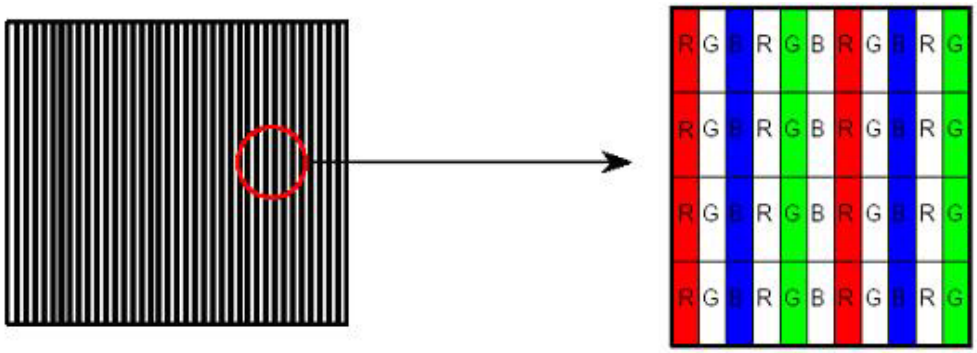
VCC=3.3 V，f_V=60 Hz f_H=48.36 kHz，f_{CLK}=75.44 MHz

64-Gray

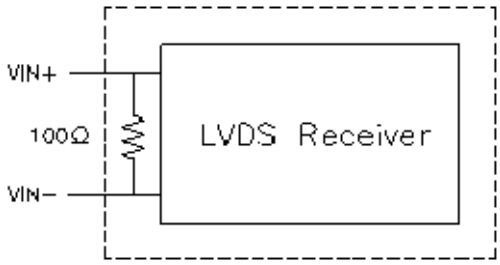


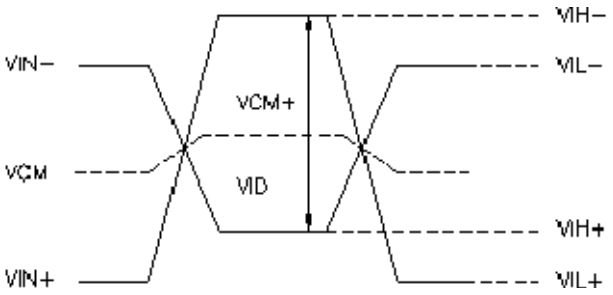
Circuit condition (Max.)：

VCC=3.3 V，f_V=60 Hz f_H=48.36 kHz，f_{CLK}=75.44 MHz



【Note 3】 LVDS Signal Definite：





VIN+ ：Positive differential DATA & CLK Input

VIN- ：Negative differential DATA & CLK Input

VID = VIN+ – VIN-,

△VCM = | VCM+–VCM- | ,

△VID = | VID+–VID- | ,

VID+ = | VIH+–VIH- | ,

VID- = | VIL+–VIL- | ,

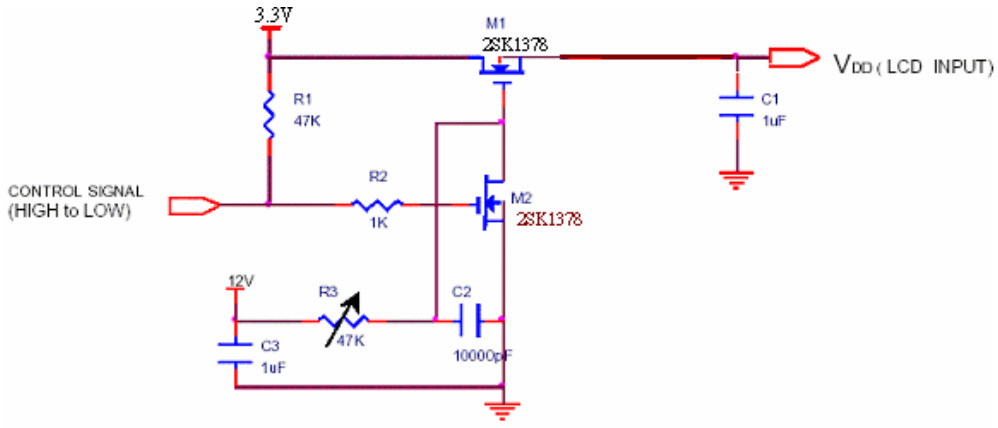
VCM =(VIN+ +VIN-)/2,

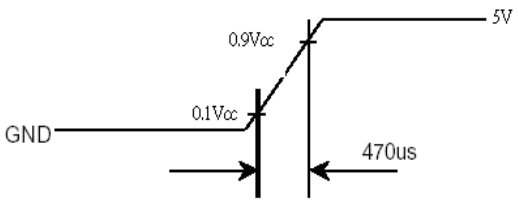
VCM+ =(VIH+ +VIH-)/2,

VCM- =(VIL+ +VIL-)/2,

Refer to Inverter rated voltage

[Note 4] Irush measure condition





(B) BACK LIGHT

(a.) ELECTRICAL CHARACTERISTICS

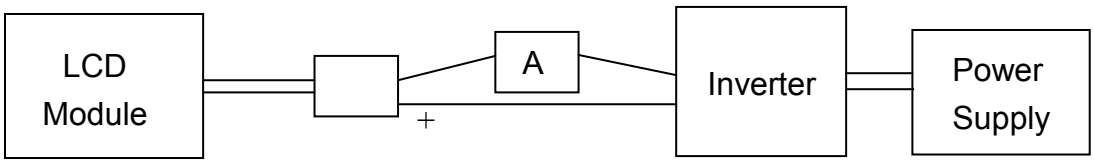
Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Lamp Voltage (IL=6.0mA)	VL	657	730	803	Vrms	IL=6.0mA
Lamp Current	IL	5.5	6.0	6.5	mArms	*1)
Inverter Frequency	FI	40	--	60	kHz	*2)
Lamp Initial Voltage	VS	1460			Vrms	Ta=25℃
		1600	--			Ta=0℃

(b) LAMP LIFE – TIME

ITEM	IL at 2.0 mA	IL at 6.0 mA	IL at 6.5 mA	UNIT	REMARK
LAMP LIFE-TIME (LT)	Min. 15,000	Min. 15,000	Min.15,000	hr	Continuous Operation*3)
Turn-on and turn-off Operation	--	Min.100,000	--	times	Continuous Operation *4)

*1)Measure method：Galvanometer connect to low voltage



*2) Frequency in this range can make the characteristics of electric and optics maintain in +/- 10% except hue.

Lamp frequency of inverter may produce interference with horizontal synchronous frequency,and this may cause horizontal beat on the display. Therefore, please adjust lamp frequency, and keep inverter as far from module as possible or use electronic shielding between inverter and module to avoid the interference.Under optimum operate frequency range (50~80 KHz), will not effect panel life-time and relability .

*3) The voltage above VS should be applied to the lamps for more than 1 second for start-up. (Inverter open voltage must be more than lamp starting voltage.)

*4) Definition of the lamp life time：

a. Luminance (L) under 50% of specification starting lamp voltage
b. Starting Lamp Voltage: over130% of the initial value. Ta=25℃

*5) For keeping good lighting situation, when design the inverter, it must be considered that the voltage large than starting lamp voltage.

*6) WL=IL x VL。(IL=6mA，Ta=25℃)

4. Connector Interface PIN & Function

(a) CN1 (Interface signal)

Outlet connector: FI-XB30SL-HF10 (JAE) ， GS23302-0011S-7F(Foxconn)

Link connector: FI-X30H (JAE, Link Type)

(Note) DDC: Display Data Requirements

(Note)Refer to page6、7、8、9之 Data Mapping

Pin No.	SYMBOL	FUNCTION
1	Vss	Ground
2	Vin	+3.3V Power
3	Vin	+3.3V Power
4	V_EDID	DDC 3.3V Power
5	NC	No connect
6	CLK_EDID	DDC Clock
7	DATA_EDID	DDC Data
8	R0N	minus signal of channel 0(LVDS)
9	R0P	plus signal of channel 0(LVDS)
10	Vss	Ground
11	R1N	minus signal of channel 1(LVDS)
12	R1P	plus signal of channel 1(LVDS)
13	Vss	Ground
14	R2N	minus signal of channel 2(LVDS)
15	R2P	plus signal of channel 2(LVDS)
16	Vss	Ground
17	RCLKN	minus signal of clock channel (LVDS)
18	RCLKP	plus signal of clock channel (LVDS)
19	Vss	Ground
20	NC	No connect
21	NC	No connect
22	VSS	Ground
23	NC	No connect
24	NC	No connect
25	VSS	Ground
26	NC	No connect
27	NC	No connect
28	VSS	Ground
29	NC	No connect
30	NC	No connect

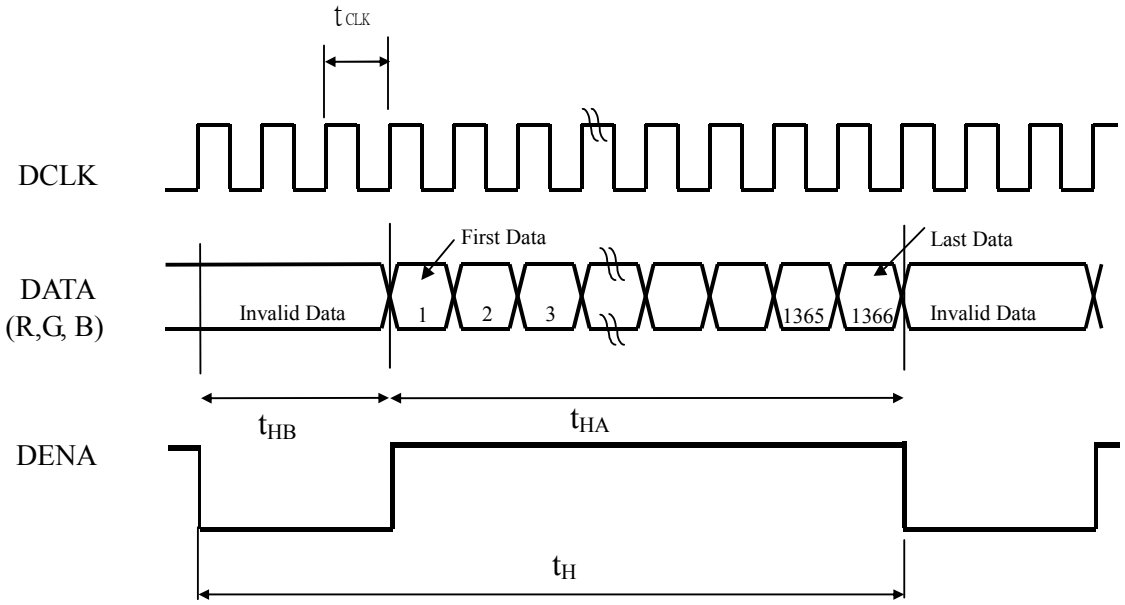
(b) CN2 (BACKLIGHT)

Backlight-side connector: BHSR-02VS-1 (JST)

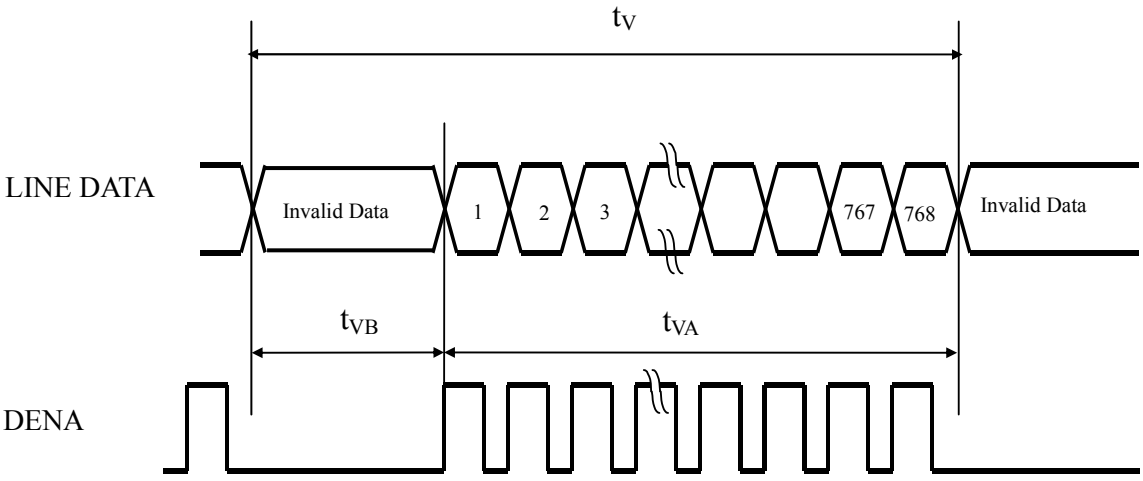
5. INTERFACE TIMING CHART

(1)LCD Input Signal Timing Chart

(a)Horizontal timing sequence



(b)Vertical timing sequence:



(2) Timing chart

ITEM				SYNBOL	MIN	TYP	MAX	UNIT
LCD Timing	DCLK		Frequency	f_{CLK}	65.83	75.44	88.74	MHz
			Period	t_{CLK}	15.19	13.25	11.11	ns
	DENA	Horizontal	Horizontal total time	t_H	1414	1560	1700	t_{CLK}
			Horizontal Active time	t_{HA}	1366	1366	1366	t_{CLK}
			Horizontal Blank time	t_{HB}	48	194	334	t_{CLK}
		Vertical	Vertical total time	t_V	776	806	870	t_H
			Vertical Active time	t_{VA}	768	768	768	t_H
			Vertical Blank time	t_{VB}	8	38	114	t_H

【Note】

*1) Data is latched during DCLK falling period.

*2) HD、VD is negative.

*3) DENA (DATA ENABLE) usually is positive.

*4) During the whole blank period, DCLK should keep input.
During the vertical blank period, HD should keep input.

(3) DATA mapping

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】

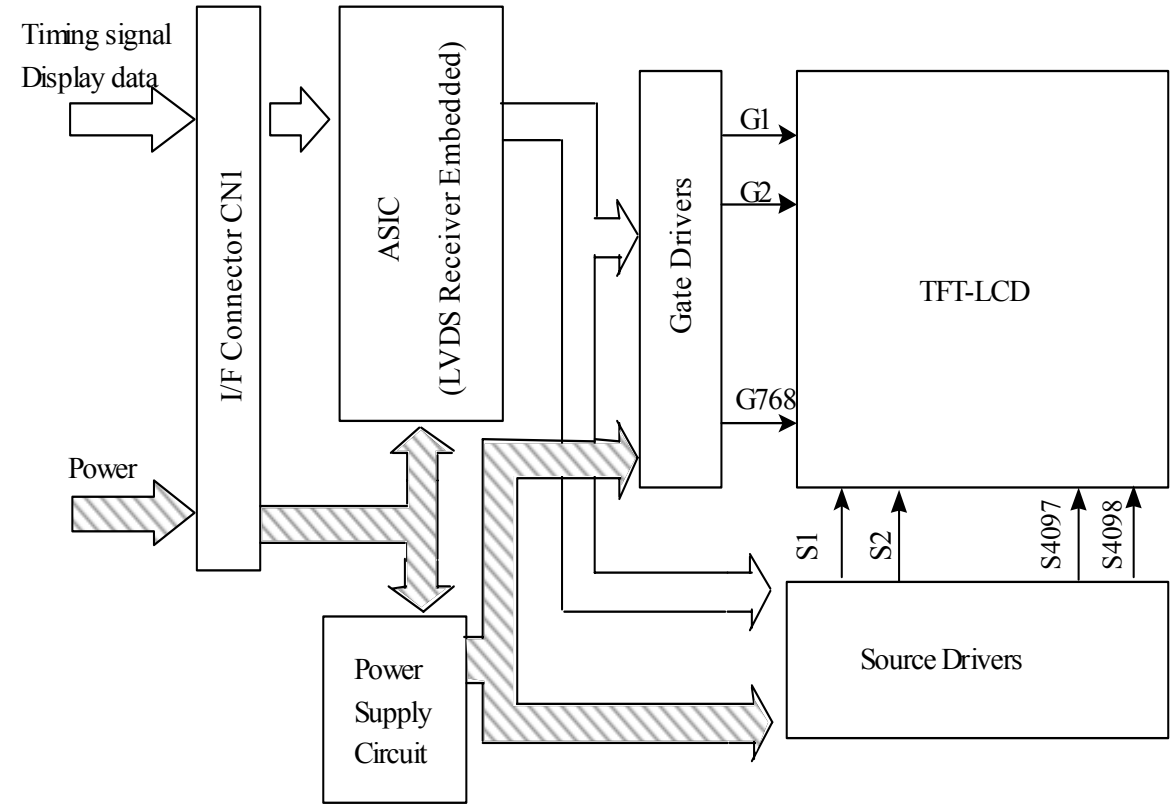
1) Gray level:

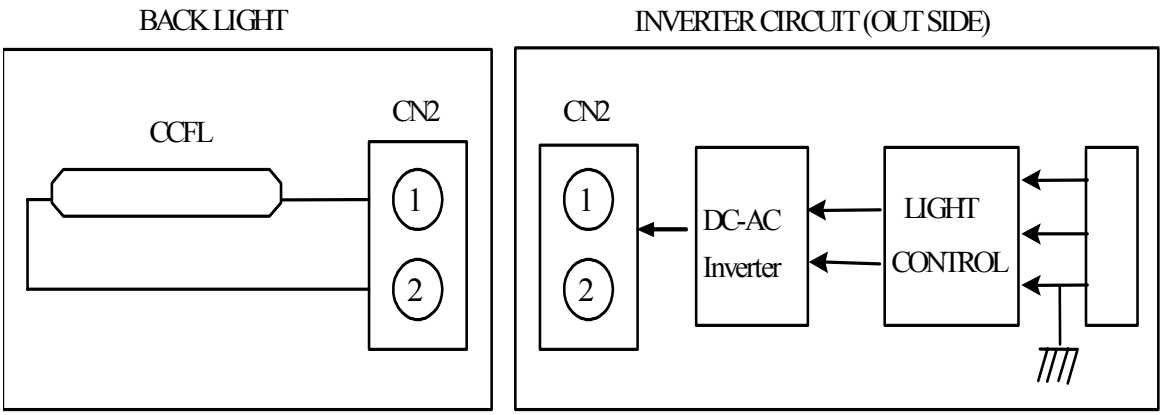
Color(n)：n is level order; higher n means brighter level.

2) DATA:

1: high，0: low

6. BLOCK DIAGRAM

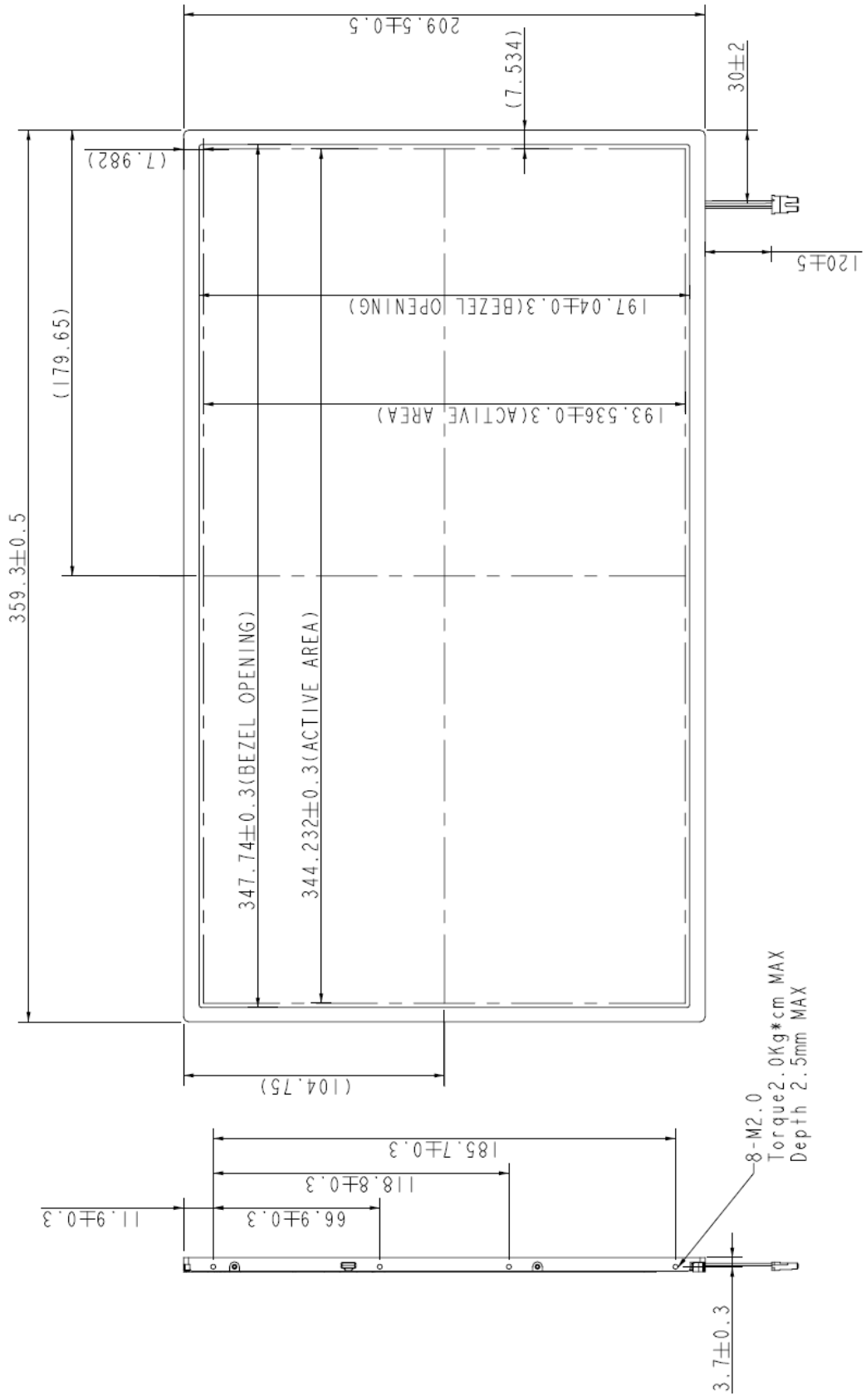




7. MECHANICAL SPECIFICATION

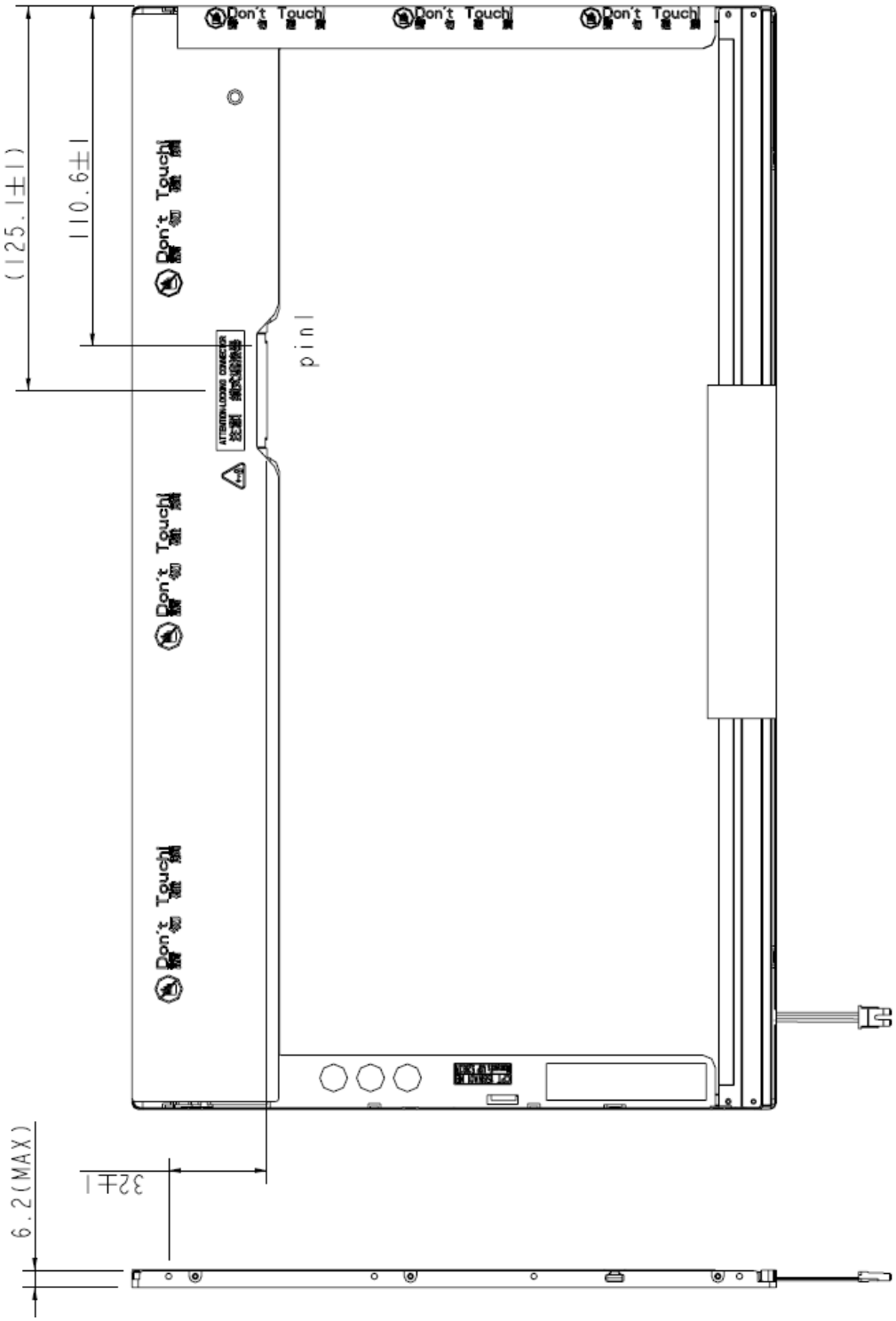
(1) Front side

The tolerance, not show in the figure, is ±0.5mm. **[Unit： mm]**



2) Rear side

The tolerance, not show in the figure, is ±0.5mm. **[Unit： mm]**



8. OPTICAL CHARACTERISTICS

Ta=25℃，VDD=3.3V

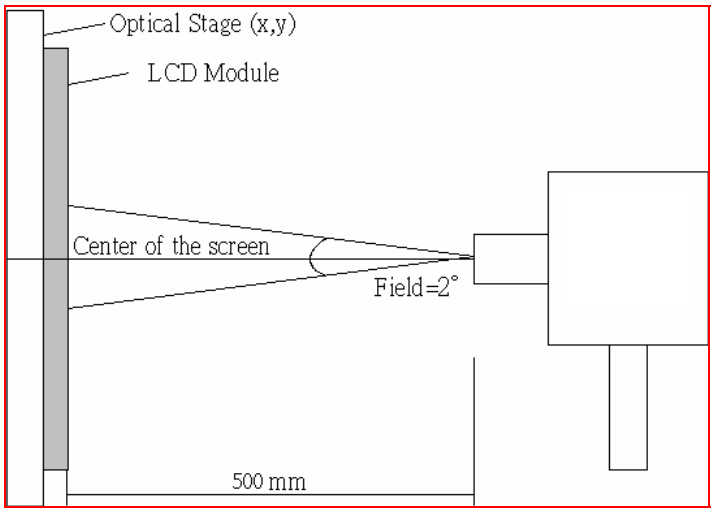
ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	θ＝ψ= 0°	500	600		--	*1) 2)
Luminance (5P)		L	θ＝ψ= 0°	200	220		cd/m^2	*1) 3)
Uniformity(5P)		ΔL	θ＝ψ= 0°	80			%	*1) 3)
Uniformity(13P)		ΔL	θ＝ψ= 0°	65			%	*1) 3)
Response Time		Tr	θ＝ψ= 0°		3	6	ms	*5)
		Tf	θ＝ψ= 0°		5	10	ms	*5)
Cross talk		CT	θ＝ϕ= 0°*3			1	%	*6)
View angle	Horizontal	Ψ	CR≧10	40/-40	45/-45		°	*4)
	Vertical	θ		15/-30	20/-35		°	*4)
Color Temperature Coordinate	W	X	θ＝ψ= 0°	0.283	0.313	0.343		*3)
		Y		0.299	0.329	0.359		
	R	X		0.599	0.629	0.659		
		Y		0.303	0.333	0.363		
	G	X		0.262	0.292	0.322		
		Y		0.550	0.580	0.610		
	B	X		0.130	0.160	0.190		
		Y		0.066	0.096	0.126		
Gamut			θ＝ψ= 0°	56%	60%			*7)
Gamma		γ	GL	2.0	2.2	2.4		

Color coordinate and color gamut are measured by CS-1000, response time are measured by TRD-100,and all the other items are measured by BM-5A (TOPCON). All these items are measured under the dark room condition (no ambient light).
Measurement Condition: IL=6.0mA
Inverter：SUMIDA / IV11145/T

Definition of these measurement items is as follows:

***1) Setup of Measurement Equipment**

The LCD module should be turn-on to a stable luminance level to be reached. The measurement should be executed after lighting Backlight for 20 minutes and in a dark room.



***2) Definition of Contrast Ratio**

CR=ON (White) Luminance/OFF (Black) Luminance

***3) Definition of Luminance and Luminance uniformity**

Central luminance: The white luminance is measured at the center position "55" on the screen, see Fig.1 below.

5P Luminance (AVG): The white luminance is measured at measuring points 33、37、55、73、77, see Fig.1 below.

5P Uniformity: Δ L = (Lmin / Lmax) ×100%

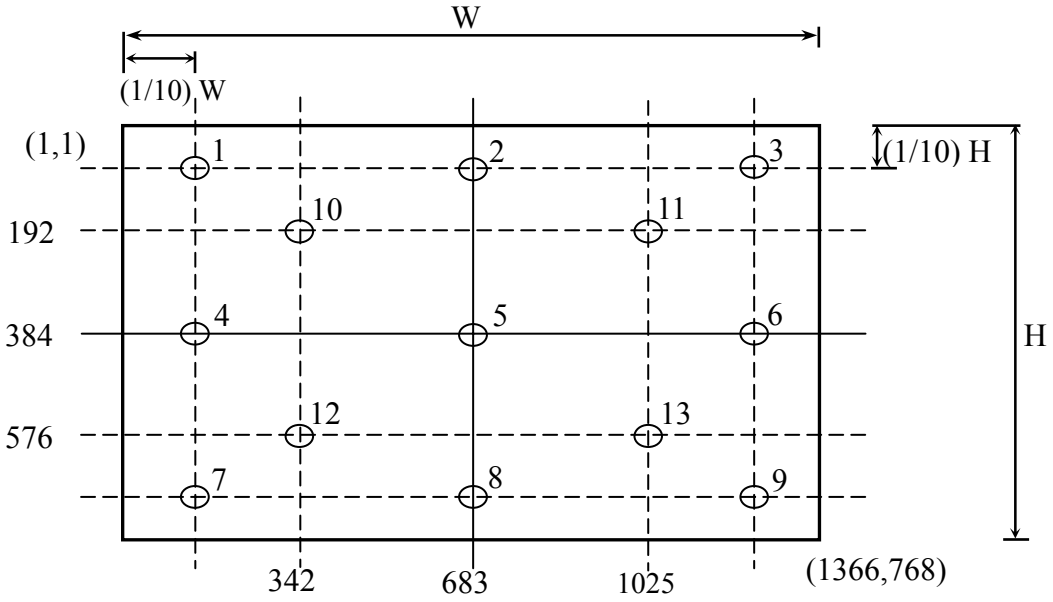
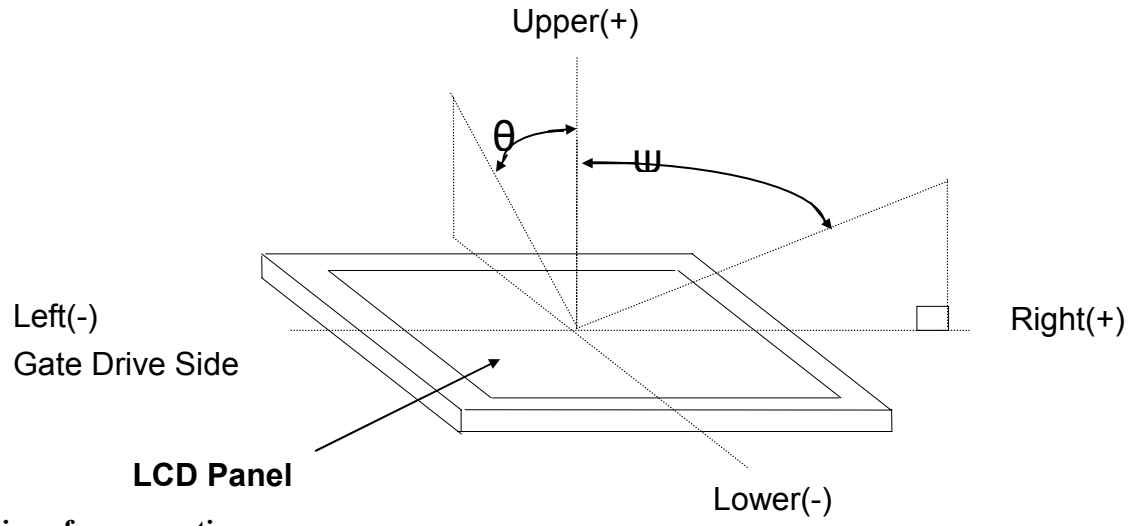
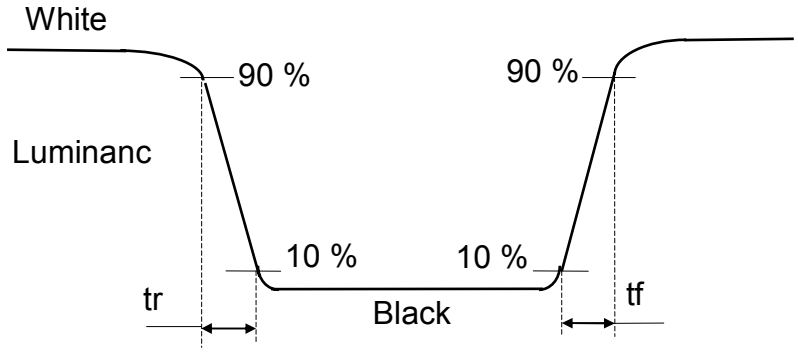


Fig.1 Measure point

***4) Definition of view angle(θ，ψ)**



***5) Definition of response time**



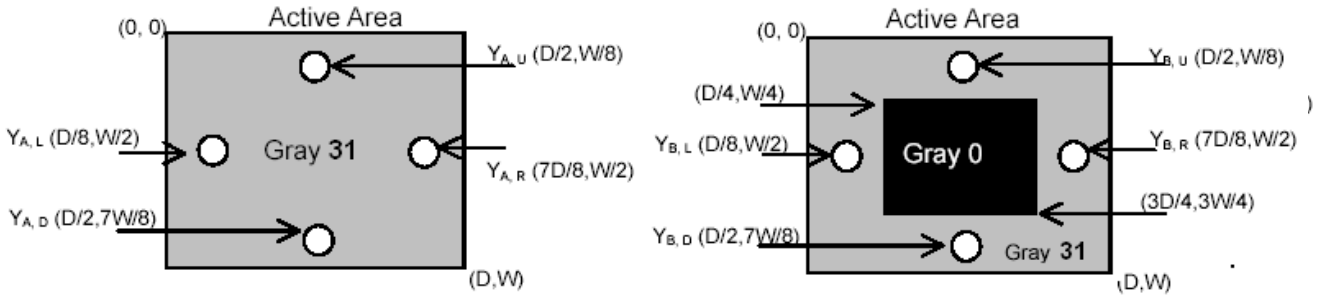
***6) Crosstalk Modulation Ratio:**

CT=｜Y_B-Y_A｜ / Y_A×× 100%

Y_A、Y_B measure position and definition

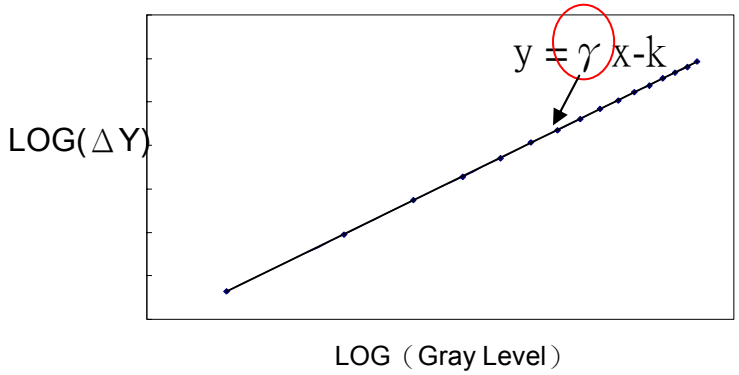
Y_A means luminance at gray level 32(exclude gray level 0 pattern)

Y_B means luminance at gray level 32(include gray level 0 pattern)



***7) Definition Gamma (VESA)**

Based on Customer Sample, take the average value as a standard center value and the variation range of gamma value caused by loop voltage error should be between +/- 0.2. the bellow figure shows how to obtain the gamma curve and γ (from gray level: 0、4、8-----60、63).



9.RELIABILITY TEST CONDITIONS

9.1 Temperature and Humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	50° C ；240Hrs
High Temperature Storage	60° C ；240Hrs
High Temperature High Humidity Operation	50° C ；90％ RH；240Hrs
High Temperature High Humidity Storage	60° C ；90％ RH；48 Hrs
Low Temperature Operation	0° C ；240 Hrs
Low Temperature Storage	-20° C ；240 Hrs
Thermal Shock	-20° C (0.5 hr)～60° C (0.5 hr)， Ramp<20℃，100 CYCLE

9.2 Shock & Vibration

TEST ITEMS	CONDITIONS
Shock (Non-Operation)	Shock level : 1960m/s^2 (200G), Waveform : half sinusoidal wave, 2ms, 6 axis (± X,± Y,± Z) per cycle
Vibration (Non-Operation)	Vibration level : 9.8m/s^2 (1.0G), sinusoidal wave (each x, y, z axis : 1hr, total 3hrs) Frequency range : 5～500 Hz Sweep speed : 0.5 Octave/min.

9.3 ESD

	Surface discharge(Panel display area、Frame、PWB、Panel back side)		Electrics capacity of Connector
	Contact	Air	Contact
Capacity	150 pF	150 pF	200 pF
Resistance	330 Ω	330 Ω	0 Ω
Voltage	±8kV	±8kV/±15kV	±250 V
Interval	1 sec	1 sec	1 sec
Times(single point)	25	25	1

Acceptance Criteria	Air Discharge	Air Discharge
	+/-8 kV	+/-15 kV
A	Permitted	Permitted
B	Permitted	Permitted
C	Not Permitted	Permitted
D	Not Permitted	Not Permitted

Acceptance Definitions	
A	Normal operation. No degradation. No failures.
B	Some performance degradation allowed. No data lost. Self-recoverable.
C	Temporary performance degradation. Recovery by operator is acceptable.
D	Degradation or loss of function,which is not recoverable due to damage of equipment (components)

9.4 MTBF without B/L: 200,000 Hrs (min) lifetimes.

9.5 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 defects.

10. HANDLING PRECAUTIONS FOR TFT-LCD MODULE

Please pay attention to the followings in handling- TFT-LCD products;

10.1 ASSEMBLY PRECAUTION

(1) Please use the mounting hole on the module side in installing and do not beading or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.

(2) Please design display housing in accordance with the following guidelines.

- Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.
- Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. Approximately 1.0 mm of the clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
- When some parts, such as, FPC cable and ferrite plate, are installed underneath the LCD module, still sufficient clearance is required, such as 0.5mm. This clearance is, especially, to be reconsidered when the additional parts are implemented for EMI countermeasure.
- Design the inverter location and connector position carefully so as not to give stress to lamp cable, or not to interface the LCD module by the lamp cable.
- Keep sufficient clearance between LCD module and the others parts, such as inverter and speaker so as not to interface the LCD module. Approximately 1.0mm of the clearance in the design is recommended.

(3) Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)

(4) Please do not press any parts on the rear side such as source TCP, gate TCP, control circuit board and FPCs during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.

(5) Please wipe out LCD panel surface with absorbent cotton or soft clothe in case of it being soiled.

(6) Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.

(7) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

(8) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.

(9) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

10.2 OPERATING PRECAUTIONS

(1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.

(2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification.

(3) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

(4) A condensation might happen on the surface and inside of LCD module in case of sudden change of ambient temperature.
(5) Please pay attention to displaying the same pattern for very long time. Image might stick on LCD. If then, time going on can make LCD work well.
(6) Please obey the same caution descriptions as ones that need to pay attention to ordinary electronic parts.

10.3 PRECAUTIONS WITH ELECTROSTATICS

(1) This LCD module use CMOS-IC on circuit board and TFT-LCD panel, and so it is easy to be affected by electrostatics. Please be careful with electrostatics by the way of your body connecting to the ground and so on.
(2) Please remove protection film very slowly on the surface of LCD module to prevent from electrostatics occurrence.

10.4 STORAGE PRECAUTIONS

(1) When you store LCDs for a long time, it is recommended to keep the temperature between 0℃ ~40℃ without the exposure of sunlight and to keep the humidity less than 90%RH.
(2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60℃ and 90%RH.
(3) Please do not leave the LCDs in the environment of low temperature(below -20℃.)

10.5 SAFETY PRECAUTIONS

(1) When you waste LCDs, it is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.
(2) If any liquid leaks out of a damaged-glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

10.6 OTHERS

(1) A strong incident light into LCD panel might cause display characteristic changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays.
(2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
(3) For the packaging box, please pay attention to the followings:
- Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.
- Please do not pile them up more than 3 boxes. (They are not designed so.) And please do not turn over.
- Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

- Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

11.APPENDIX - ISP Enhanced Extended Display Identification Data (EEDID) Requirements

SPWG V2.1 **LCD Model : CLAA156WA01A**

Byte# (dec)	Byte# (hex)	Field Name and Comments	Value (hex)	Value (binary)
0	0		0	0000 0000
1	1		FF	1111 1111
2	2		FF	1111 1111
3	3		FF	1111 1111
4	4		FF	1111 1111
5	5		FF	1111 1111
6	6		FF	1111 1111
7	7		0	0000 0000
8	8	EISA manufacturer code = CPT *(1st byte)*	0E	0000 1110
9	9	*(2nd byte)*	14	0001 0100
10	0A	Product code LSB =	B5	1011 0101
11	0B	Product code MSB = (CLAA156WA01A=5301(DEC)=14B5(HEX)	14	0001 0100
12	0C	ID (32-bit) serial number *(preferred, but optional, zero if not used)*	0	0000 0000
13	0D		0	0000 0000
14	0E		0	0000 0000
15	0F		0	0000 0000
16	10	Week of manufacture *(preferred, but optional, zero if not used)*	18	0001 1000
17	11	Year of manufacture *(preferred, but optional, zero if not used)*	12	0001 0010
18	12	EDID Structure version # = 1	1	0000 0001
19	13	EDID Revision # = 3	3	0000 0011
20	14	Video input definition *(Digital I/P, non TMDS CRGB)*	80	1000 0000
21	15	Max H image size (34.42) *(rounded to cm)*	22	0010 0010
22	16	Max V image size (19.35) *(rounded to cm)*	13	0001 0011
23	17	Display gamma =2.2 *(=(gamma*100)-100)*	78	0111 1000
24	18	Features *(no DPMS, Active off, RGB, timing BLK1)*	0A	0000 1010
25	19	Red/Green low Bits	1B	0001 1011
26	1A	Blue/White Low Bits	DD	1101 1101
27	1B	Red X Rx = 0.629	A1	1010 0001
28	1C	Red Y Ry = 0.333	55	0101 0101
29	1D	Green X Gx = 0.292	4A	0100 1010
30	1E	Green Y Gy = 0.580	94	1001 0100
31	1F	Blue X Bx = 0.160	28	0010 1000
32	20	Blue Y By = 0.096	18	0001 1000
33	21	White X Wx = 0.313	50	0101 0000
34	22	White Y Wy = 0.329	54	0101 0100
35	23	Established Timing I not used	0	0000 0000
36	24	Established Timing II not used	0	0000 0000
37	25	Manufacturer's Timings not used	0	0000 0000
38	26	Standard Timing Identification 1 not used	1	0000 0001
39	27	Standard Timing Identification 1 not used	1	0000 0001
40	28	Standard Timing Identification 2 not used	1	0000 0001
41	29	Standard Timing Identification 2 not used	1	0000 0001
42	2A	Standard Timing Identification 3 not used	1	0000 0001
43	2B	Standard Timing Identification 3 not used	1	0000 0001
44	2C	Standard Timing Identification 4 not used	1	0000 0001
45	2D	Standard Timing Identification 4 not used	1	0000 0001
46	2E	Standard Timing Identification 5 not used	1	0000 0001
47	2F	Standard Timing Identification 5 not used	1	0000 0001
48	30	Standard Timing Identification 6 not used	1	0000 0001
49	31	Standard Timing Identification 6 not used	1	0000 0001
50	32	Standard Timing Identification 7 not used	1	0000 0001
51	33	Standard Timing Identification 7 not used	1	0000 0001
52	34	Standard Timing Identification 8 not used	1	0000 0001
53	35	Standard Timing Identification 8 not used	1	0000 0001
54	36	Pixel Clock *(LSB)*	78	0111 1000
55	37	Pixel Clock =75.44MHz 1366 X 768@60Hz *(MSB)*	1D	0001 1101
56	38	Horizontal Active = 1366 pixels Notes2 (lower 8 bits)	56	0101 0110
57	39	Horizontal Blanking = 194 pixels (lower 8 bits	C2	1100 0010
58	3A	Horizontal Active : Horizontal Blanking (upper 4:4 bits)	50	0101 0000
59	3B	Vertical Avtive = 768 lines	0	0000 0000
60	3C	Vertical Blanking = 38 lines (DE Blanking min for DE-only panels) lines	26	0010 0110
61	3D	Vertical Active : Vertical Blanking (upper 4:4 bits)	30	0011 0000
62	3E	Horizontal Sync. Offset = 59 pixels	3B	0011 1011
63	3F	Horizontal Sync Pulse Width = 39 pixels(WHL)	27	0010 0111
64	40	Vertical Sync Offset = 5 lines,Sync Width(tWVL) = 10 lines	5A	0101 1010
65	41	Horizontal Vertical Sync Offset/Width upper 2bits	0	0000 0000
66	42	Horizontal Image Size = 344mm (lower 8bits)	58	0101 1000
67	43	Vertical Image Size =193mm (lower 8bits)	C1	1100 0001
68	44	Horizontal & Vertical Image Size (upper 4:4bits)	10	0001 0000
69	45	Horizontal Border = X (Zero for internal LCD)	0	0000 0000
70	46	Vertical Border = X (Zero for internal LCD)	0	0000 0000
71	47	Non-interlaced,Normal display,no stereo, Digital separate sync,H/V pol negatives	18	0001 1000
72	48	Flag	0	0000 0000
73	49	Flag	0	0000 0000
74	4A	Flag	0	0000 0000
75	4B	Data Type Tag: Descriptor Defined by Manufacture	0F	0000 1111
76	4C	Flag	0	0000 0000
77	4D	value=HSPWmin/2 (pixel clks)WHL	20	0010 0000
78	4E	value=HSPWmax/2 (pixel clks)WHL	20	0010 0000
79	4F	value=Thbpmin/2 (pixel clks) (for DE-only timing also, with Thfp=0)	20	0010 0000
80	50	value=Thbpmax/2 (pixel clks) (for DE-only timing also, with Thfp=0)	20	0010 0000
81	51	value=VSPWmin/2 (line pulses)WVL	20	0010 0000
82	52	value=VSPWmax/2 (line pulses)WVL	20	0010 0000

83	53	value=Tvbpmin/2	20	0010 0000
84	54	value=Tvbpmax/2	20	0010 0000
85	55	Thpmin=value*2+HApixelClks (pixel clks) Note2	18	0001 1000
86	56	Thpmax=value*2+HApixelClks (pixel clks) Note2	A7	1010 0111
87	57	Tvpmin=value*2+Valines (line pulses)	4	0000 0100
88	58	Tvpmax=value*2+Valines (line pulses)	33	0011 0011
89	59	Module revision	0	0000 0000
90	5A	Flag	0	0000 0000
91	5B	Flag	0	0000 0000
92	5C	Flag	0	0000 0000
93	5D	Data Type Tag: *(Monitor)* **ASCII String**	FE	1111 1110
94	5E	Flag	0	0000 0000
95	5F	**"C",67**	43	0100 0011
96	60	**"P",80**	50	0101 0000
97	61	**"T",84**	54	0101 0100
98	62		0A	0000 1010
99	63		20	0010 0000
100	64		20	0010 0000
101	65		20	0010 0000
102	66		20	0010 0000
103	67		20	0010 0000
104	68		20	0010 0000
105	69		20	0010 0000
106	6A		20	0010 0000
107	6B	*(if <13 char, then terminate with ASCII code 0Ah, and set remaining char = 20h)*	20	0010 0000
108	6C	Flag	0	0000 0000
109	6D	Flag	0	0000 0000
110	6E	Flag	0	0000 0000
111	6F	Data Type Tag: *(Monitor)* **ASCII String**	FE	1111 1110
112	70	Flag	0	0000 0000
113	71	**"C",67**	43	0100 0011
114	72	**"L",76**	4C	0100 1100
115	73	**"A",65**	41	0100 0001
116	74	**"A",65**	41	0100 0001
117	75	**"1",49**	31	0011 0001
118	76	**"5",53**	35	0011 0101
119	77	**"6",54**	36	0011 0110
120	78	**"W",87**	57	0101 0111
121	79	**"A",65**	41	0100 0001
122	7A	**"0",48**	30	0011 0000
123	7B	**"1",49**	31	0011 0011
124	7C	**"A",65**	41	0100 0001
125	7D	*(if <13 char, then terminate with ASCII code 0Ah, and set remaining char = 20h)*	20	0010 0000
126	7E	Extension Flag *(# of optional 128-byte EDID extension blocks to follow, typ=0)*	0	0000 0000
127	7F	Checksum *(the 1-byte sum of all 128 bytes in this EDID block shall equal zero)*	8D	1000110 1

PS : The value for the orange color column will be changed by the date of product cycle