Chunghwa Picture Tubes, Ltd.
Product Specification

To :
Date : 080321

TFT LCD
CLAA080JA11CW

ACCEPTED BY : Ver0.1

APPROVED BY	CHECKED BY	PREPARED BY
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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)	--	2007.05.23
0.1	Revised STVR/STVL to STVD/STVU. Revised Fig.5 Vertical Timing sequence	7 9	2007/8/14

CONTENTS

1. OVERVIEW

CLAB080JA11CW is 8” color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel and driver ICs, control circuit and backlight. The 8.0" screen produces 480(*3) x 220 WQVGA resolution image. By applying R.G.B. input signal, full color images are displayed.

General specification are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	180.72(H) × 94.27(V)
Number of Pixels	480 (H)x3(RGB) × 220(V)
Pixel Pitch (mm)	0.3765(H) ×0.4285(V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white, TN
Number of Colors	Full color
Optimum Viewing Angle	6 o’clock
Brightness (cd/m^2)	200nit(min)/250nit(typ)
Contrast Ratio	400:1(typ)
Response Time (ms)	30ms(typ)
Viewing Angle	120 degree(Horizontal) ; 110 degree(Vertical)
NTSC ratio	45%
Power Consumption	1.742 W (typ)
Module Size (mm)	193 (W) x 108.3(H) x 6.5(D)
Module Weight (g)	225(TYP)
Backlight Unit	LED
Surface Treatment	Anti-Glare

2. ABSOLUTE MAXIMUM RATINGS

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

ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
Power Supply Voltage For LCD	VCC	-0.3	7.0	V	GND=0
	AVDD	-0.3	7	V	AVSS=0
	VGH	-0.3	25	V	GND=0
	VGL	-15	0.3	V	GND=0
Input Voltage	Vi	-0.2	AVDD+0.2	V	Note1
	VI	-0.3	VCC+0.3	V	Note2
Forward Current（per LED）	If		30	mA	
Reverse Voltage（per LED）	VR		5	V	
Pulse forward current（per LED）	Ifp		100	mA	Note3

[Note]

Note1：Analog input voltage VR, VG, VB

Note2：Logical signal STHL, STHR, OEH, L/R, CPH1~CPH3, STVR, STVL, OEV, CKV, U/D.

Note 3：Ifp Conditions ： Duty 1/10@1KHz

3. ELECTRICAL CHARACTERISTICS

(a) 3.1 Typical operation conditions (GND = Avss = 0V)

Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Power Supply Voltage	VCC	3	5	5.5	V	
	AVDD	4.5	5	5.5	V	
	VGH	17	18	19	V	
	VGL	-7	-6	-5	V	
Signal Amplitude (VR, VG, VB)	ViA	0.4	-	AVDD-0.4	V	Note1
	ViAC	-	4	-	V	Note1
	ViDC	-	AVDD/2	-	V	Note1
VCOM	VCAC	4	5.6	6.5	Vp-p	Note1,2
	VCDC	1.8	1.9	2.1	V	Note1,3
Input Signal Voltage	VIH	0.7VCC	-	VCC	V	Note4
	VIL	0	-	0.3VCC	V	

[Note]

Note1：Please refer to Fig.6

Note2：Brightness level is adjusted by varying this amplitude V_{CAC}

Note3：Please adjust V_{CDC} to make the flicker level be minimum.

Note4：logical signal STHL,STHR,OEH,L/R,CPH1~CPH3,STVR,STVL,OEV,CKV,U/D.

(b)Current consumption (GND = Avss = 0V)

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	NOTE
Drive Current	I_{GH}	VGH =18V	-	0.12	1	mA	
	I_{GL}	VGL = -6V	-	0.45	1	mA	
	I_{CC}	VCC = 5V	-	2.5	4.5	mA	
	I_{DD}	AVDD = 5V	-	9	24	mA	

(c) Timing characteristics of input signals:

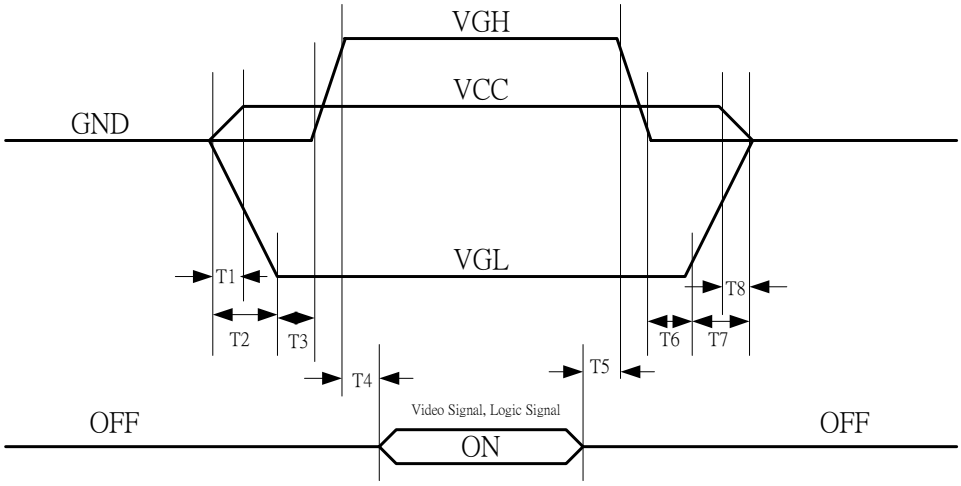
CHARACTERISTICS	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
1 Field scanning period	T_{IV}	-	262.5	-	H	
1 Line scanning period	T_{IH}	-	63.5	-	μs	
Source driver operating frequency	F_{OP}	-	9.6	-	MHz	
CLK pulse width	T_{CW}	75	104	2000	ns	
CLK pulse high period	T_{CWH}	40	50	60	% Tcw	
CLK pulse low period	T_{CWL}	40	50	60	% Tcw	
CLK pulse delay	TC12 TC23 TC31	12	35	1000	ns	CPH1~CPH3
STH start pulse width	T_{STH}	32	107	-	ns	STHR,STHL
STH start pulse setup time	T_{SUH}	16	35	-	ns	STHR,STHL
STH start pulse hold time	T_{HDH}	16	72	-	ns	STHR,STHL
OEH output enable pulse width	T_{OEH}	1			Tcw	OEH
Sample and hold disable time OEH& STH	$T_{OEH-STH}$	-	8.2	-	μs	OEH-STH
CLKV pulse width	T_{CKVW}	5	64	-	μs	CKV
CLKV pulse high period	T_{CKVH}	2.5	16.5	-	μs	CKV
CLKV pulse low period	T_{CKVL}	1	47	-	μs	CKV
STV start pulse width	T_{STV}	0.5	64	-	μs	STVR, STVL
STV start pulse setup time	T_{SUV}	0.2	50	-	μs	STVR, STVL
STV start pulse hold time	T_{HDV}	0.3	15	-	μs	STVR,STVL

＜Note1＞ 1. High level of source driver and gate driver logic signal are 70%

2. Low level of source driver and gate driver logic signal are 30%

＜Note2＞ Please refer to Fig. 4 and Fig. 5

(d) Sequence for power on/off and signal on/off



0<T1 <T2≦ 20ms

T3 ≦10ms

T4≦ 10ms

T5≦ 10ms

T6≦ 10ms

T8<T7≦ 10ms

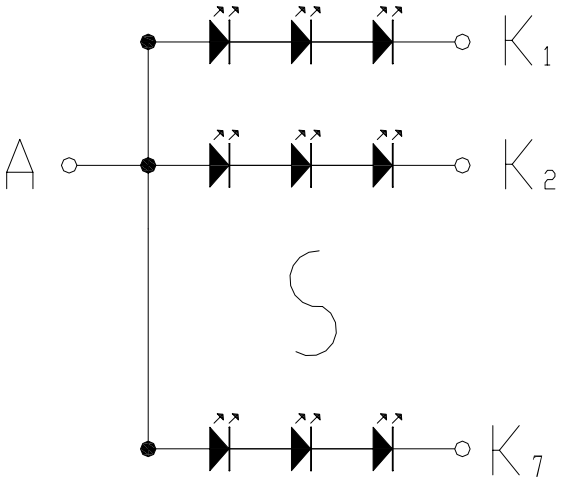
(e) Backlight

a. Electrical Characteristics

Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LED current	IL	--	140		mA	Note 1
LED voltage	VL	--	12	--	V	Note 1
Power consumption	WL	--	1.68	--	W	Note 1

＜Note1＞LED B/L circuit如下圖,A：Anode,K：Cathode。



4. INTERFACE CONNECTION

(a.) CN1

Pin No.	SYMBOL	I/O	FUNCTION	NOTE
1	GND	-	Digital ground pin for Gate driver	
2	VCC	I	Supply power for gate digital circuit	
3	VGL	I	Gate driver negative voltage	
4	VGH	I	Gate driver positive voltage	
5	STVD	I/O	Gate scanning start signal	Note 1
6	STVU	I/O	Gate scanning start signal	Note 1
7	CKV	I	Gate driver scanning clock pulse	
8	U/D	I	Up/Down scanning change	Note 1
9	OEV	I	Gate driver output enable	
10	VCOM	I	Voltage applied to color filter substrate	
11	VCOM	I	Voltage applied to color filter substrate	
12	L/R	I	Left / Right scanning change	Note 2
13	MOD	I	Sampling mode change (H: Simultaneous, L: Sequential)	Note 3
14	OEH	I	Source driver output enable	
15	STHL	I/O	Source scanning start signal	Note 2
16	STHR	I/O	Source scanning start signal	Note 2
17	CPH3	I	Source driver clock input 3	
18	CPH2	I	Source driver clock input 2	
19	CHP1	I	Source driver clock input 1	
20	VCC	I	Supply power for source digital circuit	
21	GND	-	Digital ground pin for source driver	
22	VR	I	Red video signal	
23	VG	I	Green video signal	
24	VB	I	Blue video signal	
25	AVDD	I	Supply power for analog circuit	
26	AVSS	-	Analog ground pin	

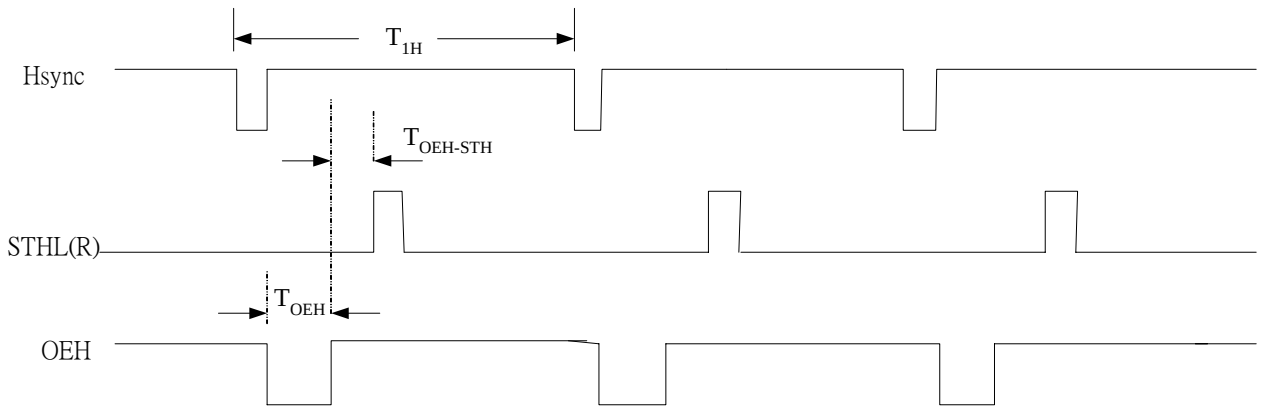
Note1：The function of STVD and STVU is changed as follows by the U/D terminal (up/down scanning)

U/D	STVD	STVU
H(VCC)	Signal Input	Signal Output
L(GND)	Signal Output	Signal Input

Note2：The function of STHR and STHL is changed as follows by the L/R terminal(right/left scanning)

L/R	STHL	STHR
H(VCC)	Signal Input	Signal Output
L(GND)	Signal Output	Signal Input

Note3：MOD=H:Simultaneous sampling (Set CPH2 and CPH3 to GND)
MOD=L:Sequential sampling



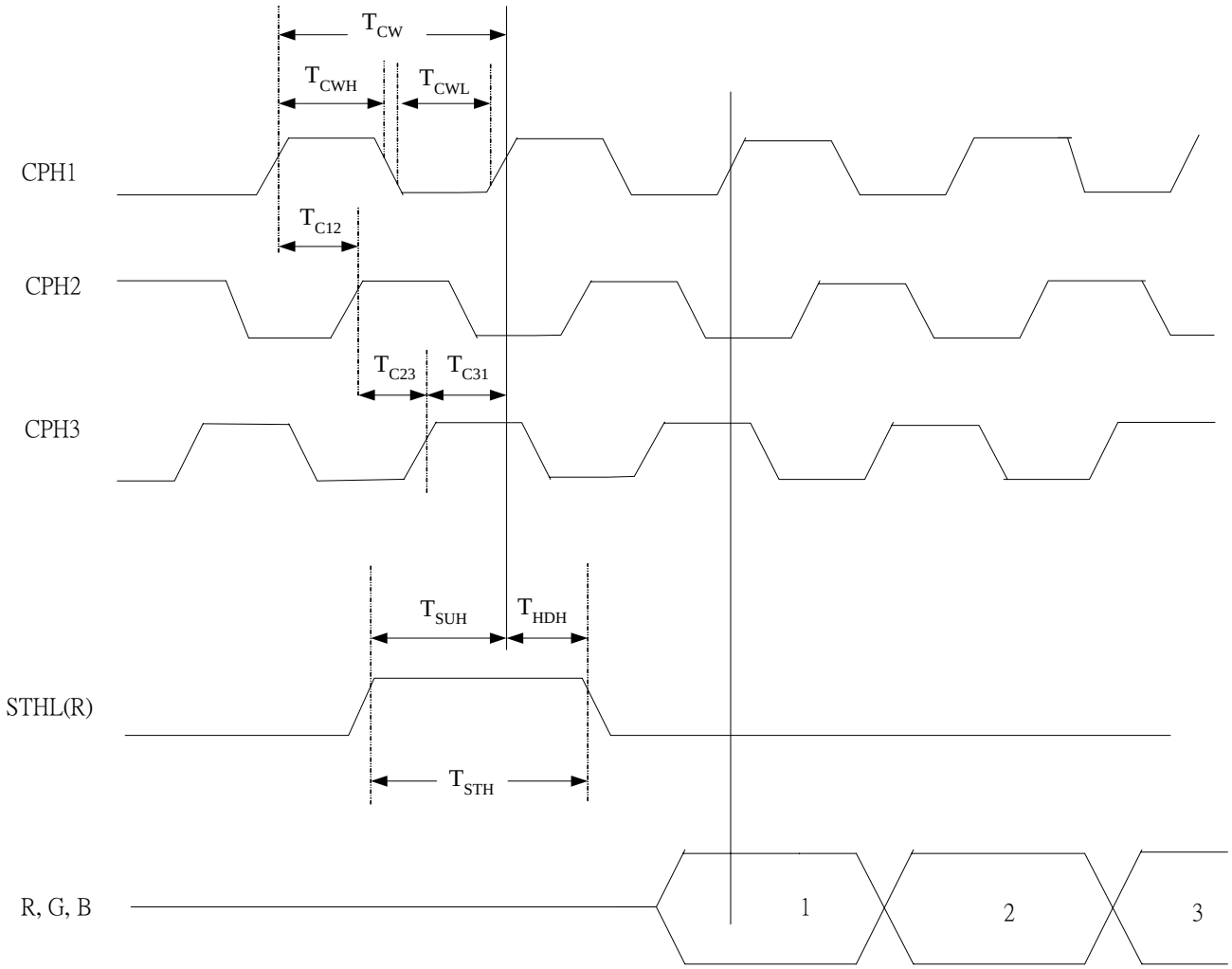


Fig.4 Horizontal Timing sequence

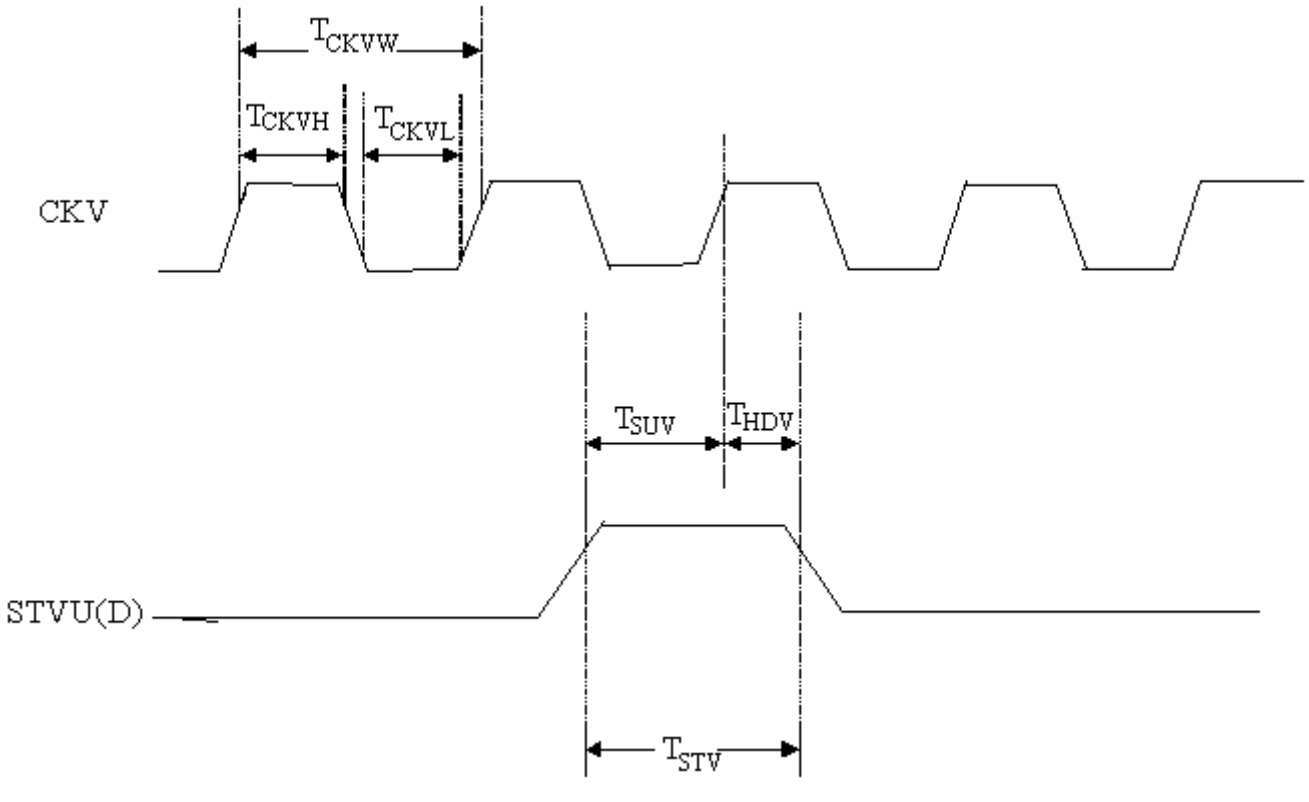


Fig.5 Vertical Timing sequence

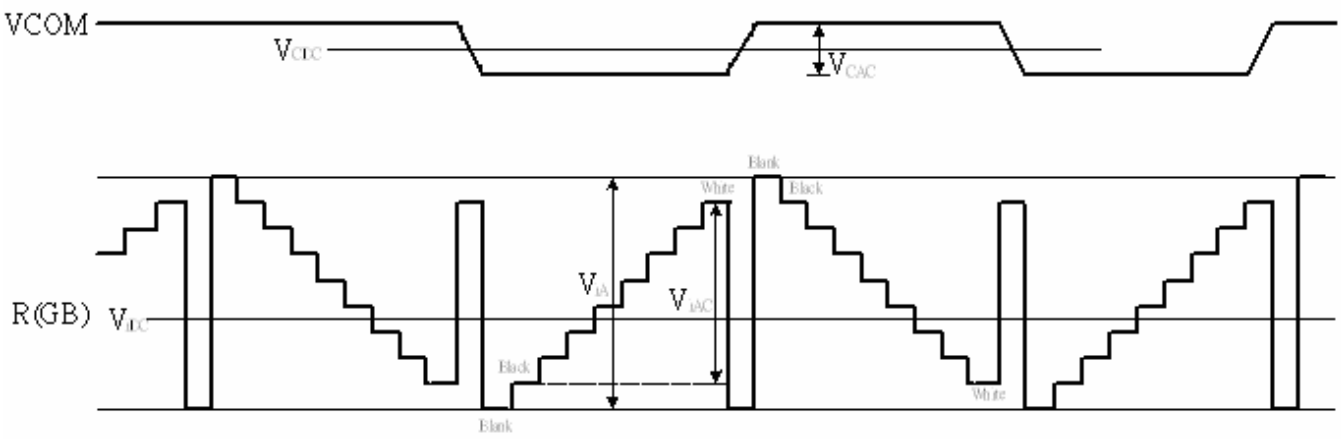
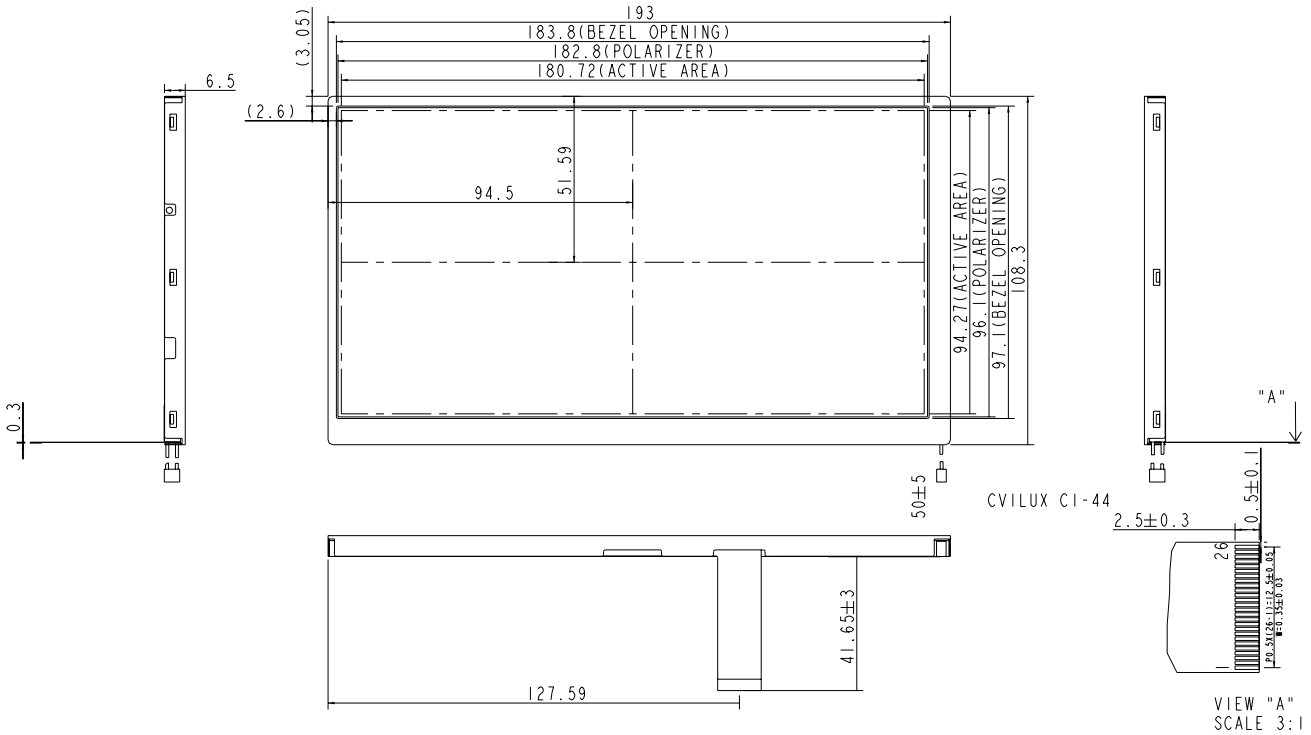


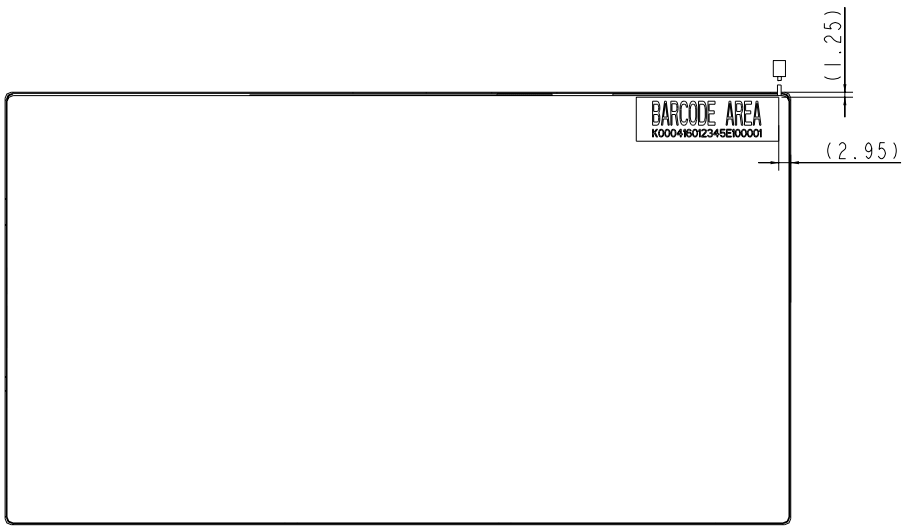
Fig.6 VCM-RGB

5. MECHANICAL DIMENSION

5.1 Front Side [Unit：mm]



5.2 Rear Side



NOTE：
UNDEFINED TOLERANCE TO BE ±0.3mm

6. OPTICAL CHARACTERISTICS

Ta = 25°C, VCC=3.3V

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast		CR	320	400	--	--	*1)
Luminance (CEN)		L	200	250	--	cd/m^2	I_L = 20 mA
Luminance Uniformity		ΔL	70	80	--	%	*2)
Color saturation			40	45		%	
Response Time		T	--	30	45	ms	*4)
View angle	Horizontal	ψ	100	120		°	*3)
	Vertical	θ	90	110		°	*3)
Color Coordinate	White	x y	0.273 0.289	0.313 0.329	0.353 0.369		θ = ϕ = 0°
	Red	x y	TBD	TBD	TBD		θ = ϕ = 0°
	Green	x y	TBD	TBD	TBD		θ = ϕ = 0°
	Blue	x y	TBD	TBD	TBD		θ = ϕ = 0°

[Note]

- These items are measured by BM-5A (TOPCON) in the dark room. (no ambient light).

*1) Definition of contrast ratio：

Measure contrast ratio on the #5 point (refer to figure 1).
Contrast ratio is calculated with the following formula
Contrast Ratio (CR)= (White) Luminance of ON ÷ (Black) Luminance of OFF

*2) Definition of Luminance Uniformity

Measure maximum luminance(L(MAX))and minimum luminance (L(MIN))on the 9 points as figure 1(#1~#9 poin).Luminance Uniformity is calculated with the following formula ：

△L = (L(MIN)÷L (MAX))x100

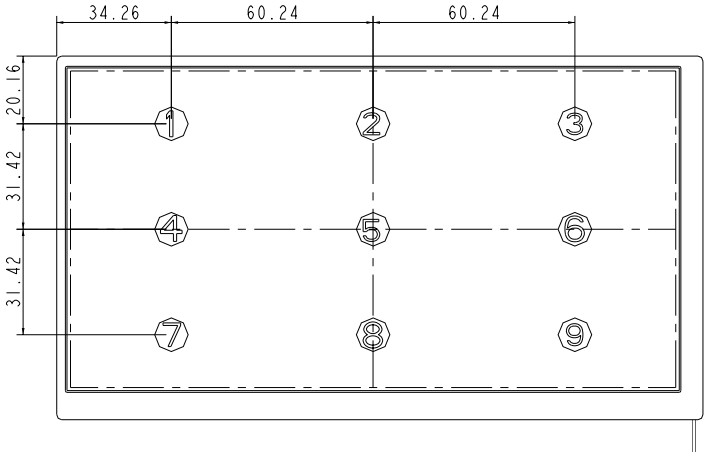


Fig.1 Measuring point

*3) Definition of Viewing Angle(θ,ψ),refer to Fig.2 as below：

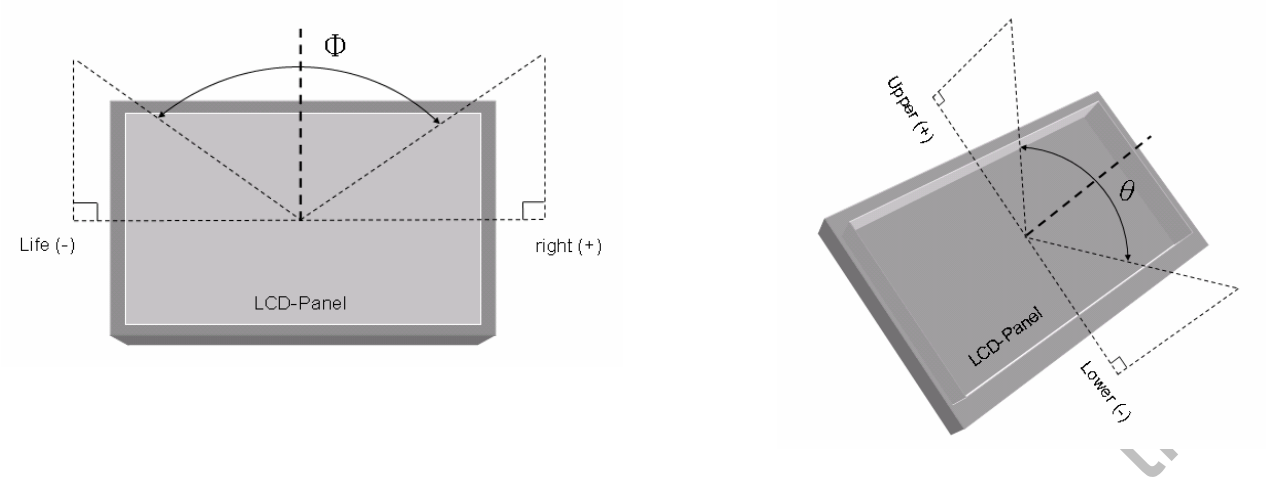


Fig.2 Definition of Viewing Angle

*4) Definition of Response Time.

The response time is defined as the time interval between the 10% and 90% amplitudes.Refer to figure 3 as below.

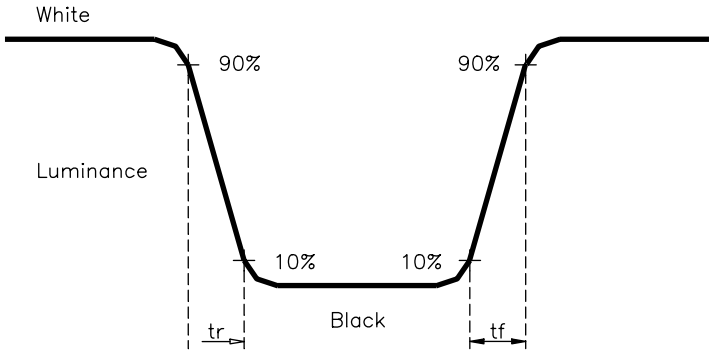


Fig.3 Definition of Response Time

7. RELIABILITY TEST

7.1. Temperature and humidity

TEST ITEMS	CONDITIONS
High Temperature Operation	85℃; 240hrs
High Temperature High Humidity Operation	60℃; 90%RH; 240hrs (No condensation)
High Temperature Storage	95℃; 240hrs
Low Temperature Operation	-30℃; 240hrs (Backlight unit always turn on)
Low Temperature Storage	-40℃; 240hrs
Thermal Shock (No operation)	Between –30℃(0.5hr) and 85℃(0.5hr); 200 Cycles

7.2. Shock and Vibration

ITEMS	CONDITIONS
Shock (Non-Operation)	980m/S^2(equal to 100G), 6ms, (1/2 Sine wave), Each axis X,Y,Z.
Vibration (Non-Operation)	Frequency range:8~33.3Hz Stroke：1.3 mm Vibration: sinusoidal wave, perpendicular axis(both x,z axis: 2Hrs , y axis: 4Hrs). Sweep: 2.9G, 33.3~400Hz Cycle: 15 min

7.3. Electrostatic Discharge

TEST ITEM	CONDITIONS	Note
ESD	150pF，330Ω，±8kV&±15kV air & contact test	(1)
	200pF，0Ω，±200V contact test	(2)

[NOTE]Measure point :(1)LCD glass and metal bezel
(2)IF connector pins

(3) 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.