To :

Date : 120328

TFT LCD

TF101201

ACCEPTED BY :

APPROVED BY	CHECKED BY	PREPARED BY

Doc.No:		Issue Date:	2012/03/12

REVISION STATUS

Revision Notice	Description	Page	Rev. Date
0.0	First revision (Tentative)	--	2012/02/22
0.1	Modify the condition of Image Sticking	P.16	2012/03/12

CONTENTS

1. OVERVIEW

TF101201 is 10.1" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) OLB module (finish outer lead bonding) composed of LCD panel and driver ICs (the backlight is not included in this OLB module).

The 10.1" screen produces 1024(*3)X600 resolution image. By applying R.G.B. input signal, full color images are displayed.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	222.72(W) x 125.28(H)
Number of Pixels	1024(H) × 3 (RGB) × 600(V)
Pixel Pitch (mm)	0.2175(W) x 0.2088(H)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of color	16.2M
Response Time (Tr+Tf)	25ms(typ.)
Panel Transmittance (%)	5.9(typ)
Power Consumption(W)	480mW(typ.)
Interface	TTL
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
Digital Supply Voltage	DVDD	-0.3	3.96	V	
Analog Supply Voltage	AVDD	-0.5	14.85	V	
Gate On Voltage	VGH	-0.3	40	V	
Gate Off Voltage	VGL	-20	0.3	V	
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	
Operating temperature	Topa	-20	70	℃	Note1
Storage temperature	Tstg	-30	80	℃	Note1

Note1：If users use the product out off the environmemtal operation range（temperature and humidity）, it will have visual quality concerns.

3. ELECTRICAL CHARACTERISTICS

3.1 Typical operation conditions

Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit.	Note
Digital Power Supply Voltage For LCD	DVDD	3	3.3	3.6	V	-
Analog Power Supply Voltage	AVDD	9.4	9.6	9.8	V	-
Gate On Power Supply Voltage	VGH	17	18	19	V	-
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	-
Common Power Supply Voltage	VCOM	TBD	TBD	TBD	V	Note1
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	-
	VIL	GND	-	0.3*DVDD	V	

【Note1】Please adjust VCOM to make the flicker level be minimum.

3.2 TFT-LCD Current consumption

ITEM	SYMBOL	Condition	MIN	TYPE	MAX	UNIT	NOTE
Gate on power current	IVGH	VGH =18V	-	0.5	1	mA	Note1
Gate off power current	IVGL	VGL= -6V	-	0.5	1	mA	Note1
Digital power current	IVDD	VDD = 3.3V	-	40	50	mA	Note1
Analog power current	IAVDD	AVDD = 9.6V	-	35	45	mA	Note1
Total Power Consumption	PC		-	480	621	mW	Note1

Note1: Typical: Under 256 gray pattern
Maximum: Under black pattern

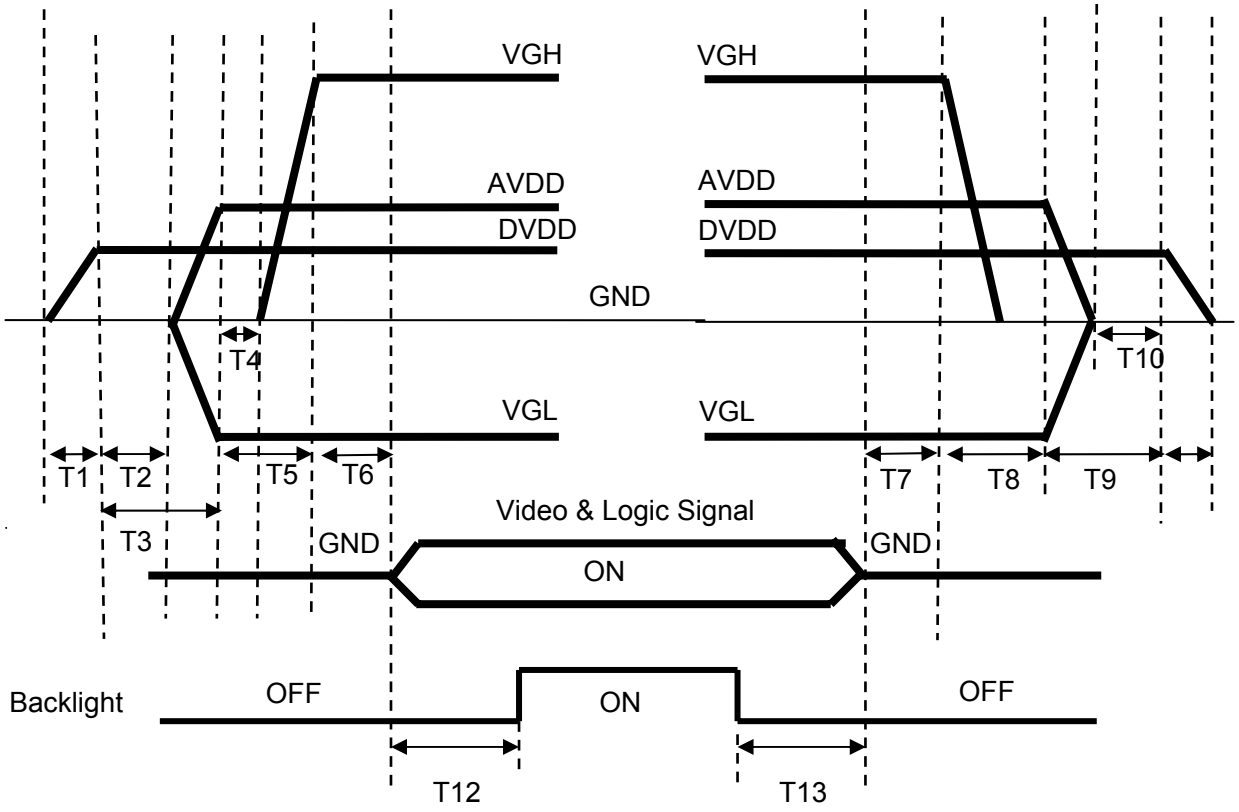
256 gray pattern

Black Pattern

3.3 Power、Signal sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight

Power Off：Backlight→Video &Logic Signal→ VGH→AVDD/VGL→DVDD

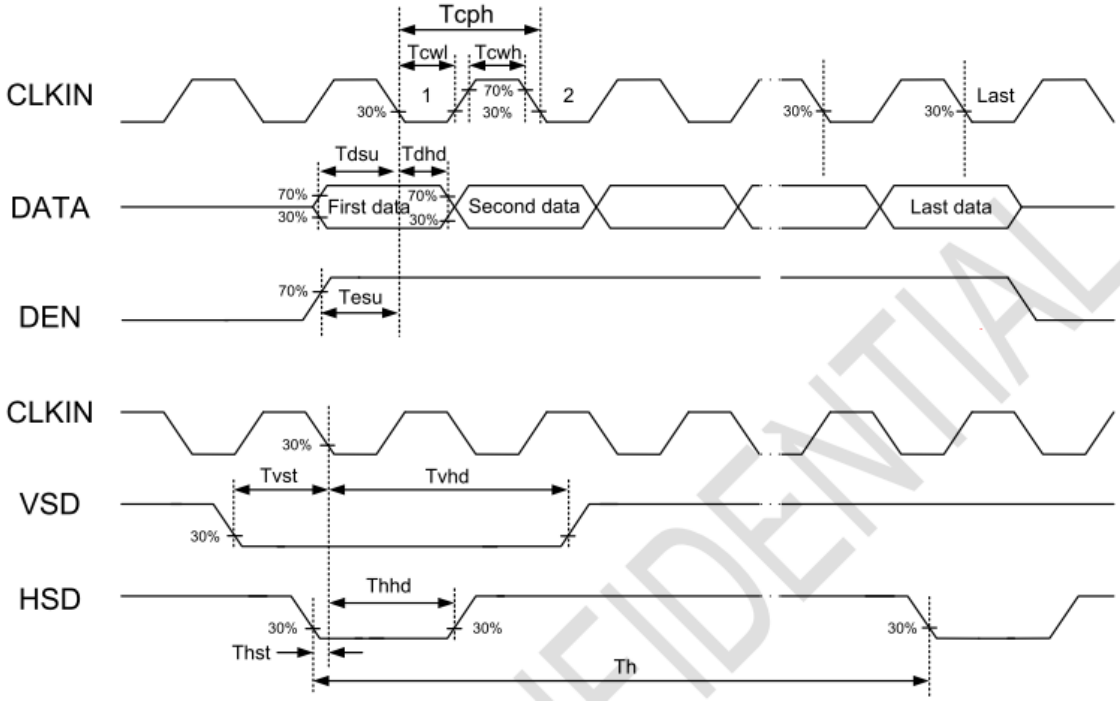


0<T1≦10ms
T2>0ms
T3>20ms
T4>0ms
T5>10ms
0<T6≦10ms
T12≧200ms

T7>0ms
T8>0ms
T9>0ms
T10>0ms
0<T11≦10ms
T13≧200ms

3.4 Timing characteristics of input signals

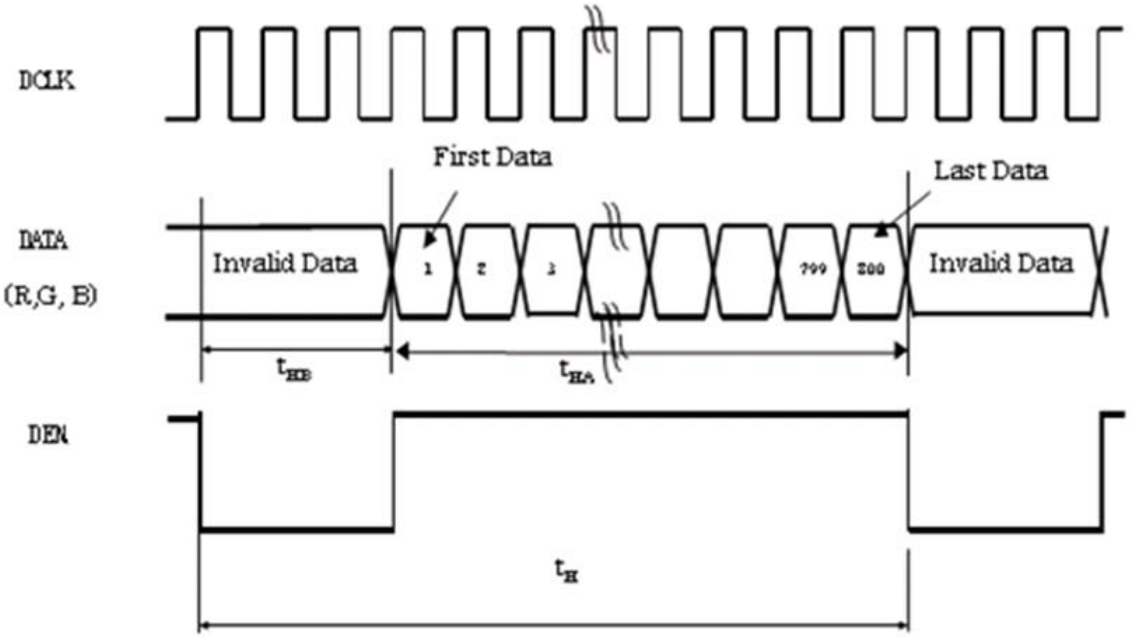
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DCLK	Dot Clock	$1/t_{CLK}$	45	51.2	57	MHz	
	DCLK pulse duty	Tcwh	40	50	60	%	
DE	Setup Time	Tesu	5	-	-	ns	
	Hold time	Tehd	5	-	-	ns	
	Horizontal total Time	t_H	1324	1344	1364	t_{CLK}	
	Horizontal Valid	t_{HA}		1024		t_{CLK}	
	Horizontal Blank	t_{HB}	300	320	340	t_{CLK}	
	Vertical total Time	t_V	625	635	645	t_H	
	Vertical Valid	t_{VA}		600		t_H	
	Vertical Blank	t_{VB}	25	35	45	t_H	
SYNC	HSYNC Setup Time	Thst	5	-	-	ns	
	HSYNC Hold Time	Thhd	5	-	-	ns	
	VSYNC Setup Time	Tvst	5	-	-	ns	
	VSYNC Hold Time	Tvhd	5	-	-	ns	
	Horizontal total Time	th	1324	1344	1364	t_{CLK}	
	Horizontal Pulse Width	thpw		20	-	t_{CLK}	thb + thpw=160DCLK is fixed
	Horizontal Back Porch	thb		140	-	t_{CLK}	
	Horizontal Front Porch	thfp	140	160	180	t_{CLK}	
	Horizontal Valid	thd		1024		t_{CLK}	
	Vertical total Time	tv	625	635	645	th	
	Vertical Pulse Width	tvpw		3	-	th	tvpw + tvb = 23th is fixed
	Vertical Back Porch	tvb	-	20	-	th	
	Vertical Front Porch	tvfp	2	12	22	th	
	Vertical Valid	tvd		600		th	
DATA	Setup Time	Tdsu	5	-	-	ns	
	Hold Time	Tdhd	5	-	-	ns	



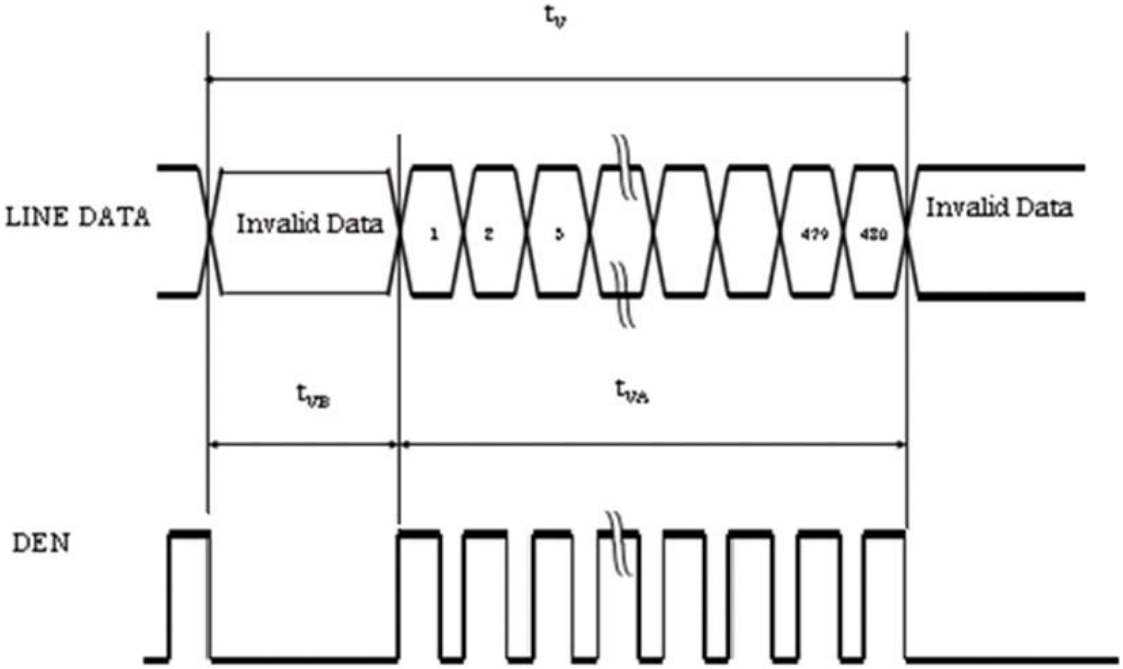
3.5 Timing Sequence(Timing Chart)

DE mode

Horizontal timing：

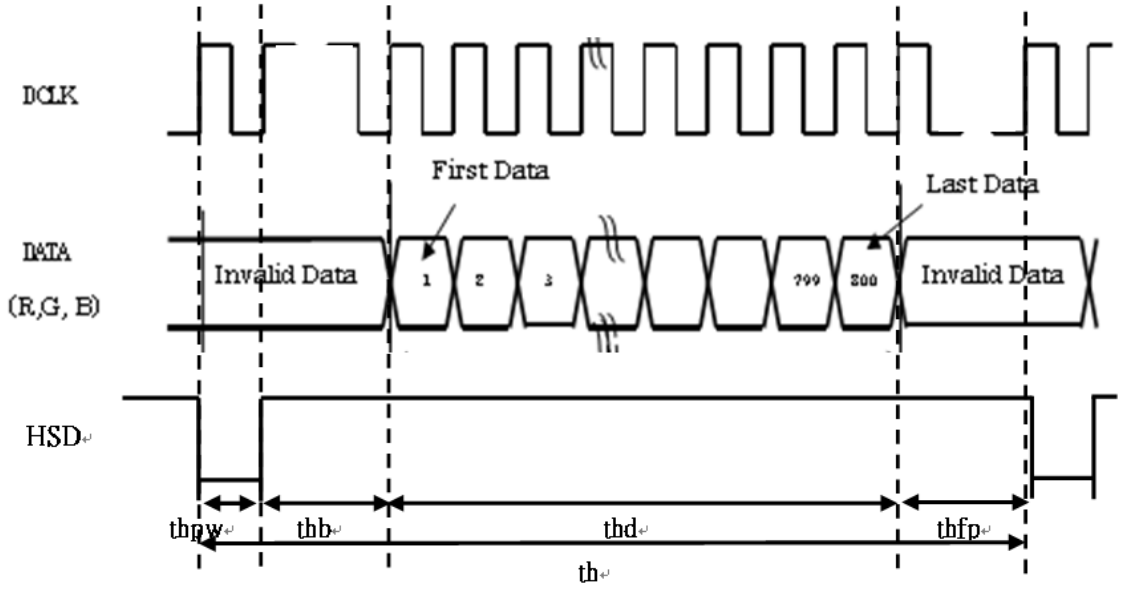


Vertical timing：

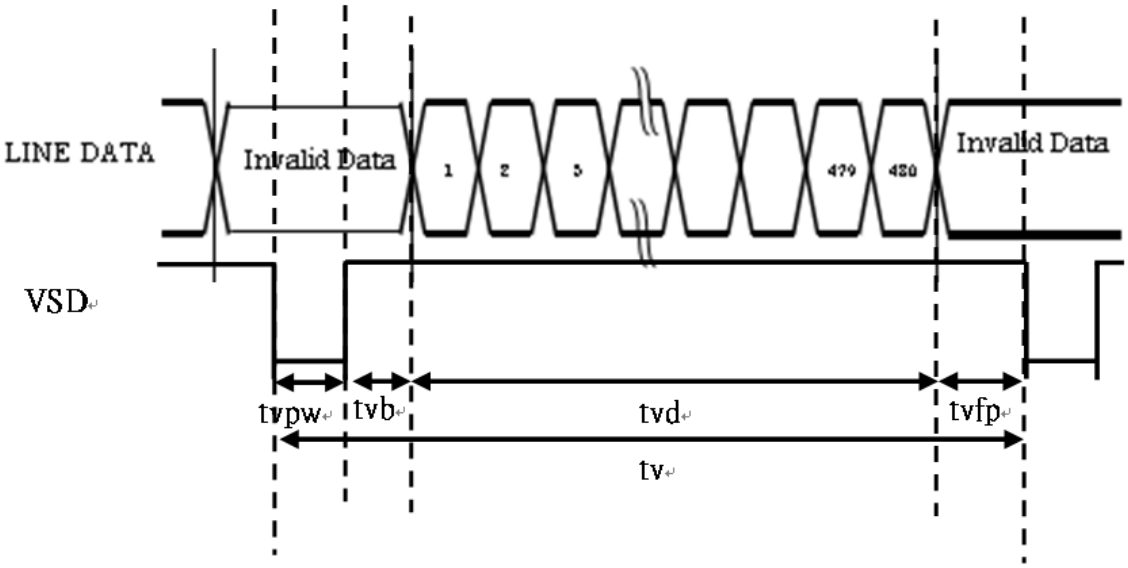


SYNC mode

Horizontal timing：



Vertical timing：



4. INTERFACE CONNECTION:

4.1 CN1(Signal of interface)

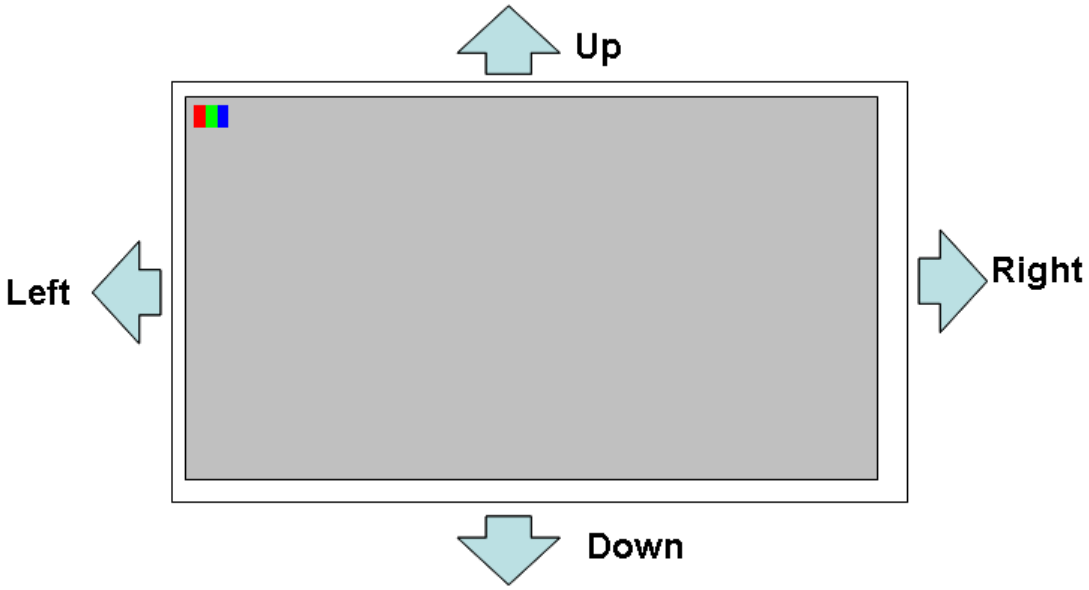
Pin NO.	Symbol	Description	Note
1	LED+	LED Anode	
2	LED+	LED Anode	
3	LED-	LED Cathode	
4	LED-	LED Cathode	
5	GND	Ground	
6	VCOM	Common Voltage	
7	DVDD	Digital Power	
8	MODE	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode	
9	DEN	Data Enable signal	
10	VSD	Vertical sync input. Negative polarity	
11	HSD	Horizontal sync input. Negative polarity	
12	B7	Blue Data Input(MSB)	
13	B6	Blue Data Input	
14	B5	Blue Data Input	
15	B4	Blue Data Input	
16	B3	Blue Data Input	
17	B2	Blue Data Input	
18	B1	Blue Data Input	
19	B0	Blue Data Input(LSB)	
20	G7	Green Data Input(MSB)	
21	G6	Green Data Input	
22	G5	Green Data Input	
23	G4	Green Data Input	
24	G3	Green Data Input	
25	G2	Green Data Input	
26	G1	Green Data Input	
27	G0	Green Data Input(LSB)	
28	R7	Red Data Input(MSB)	
29	R6	Red Data Input	
30	R5	Red Data Input	
31	R4	Red Data Input	
32	R3	Red Data Input	
33	R2	Red Data Input	
34	R1	Red Data Input	
35	R0	Red Data Input(LSB)	
36	GND	Power ground	
37	DCLK	Clock input	
38	GND	Power ground	
39	SHLR	Left or Right Display Control	Note 1
40	UPDN	Up / Down Display Control	Note 1
41	VGH	Positive Power for TFT	
42	VGL	Negative Power for TFT	
43	AVDD	Analog Power	
44	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=1μF)	
45	NC	Not connect	
46	VCOM	Common Voltage	
47	DITH	Dithering setting DITH="H" 6bit resolution(last 2 bit of input data truncated) DITH="L" 8bit resolution(default setting)	
48	GND	Power ground	
49	NC	Not connect	
50	NC	Not connect	

Remarks：

1) Mating connector：089H50-000100-G2-R (STARCONN)

Note 1：UPDN and SHLR control function

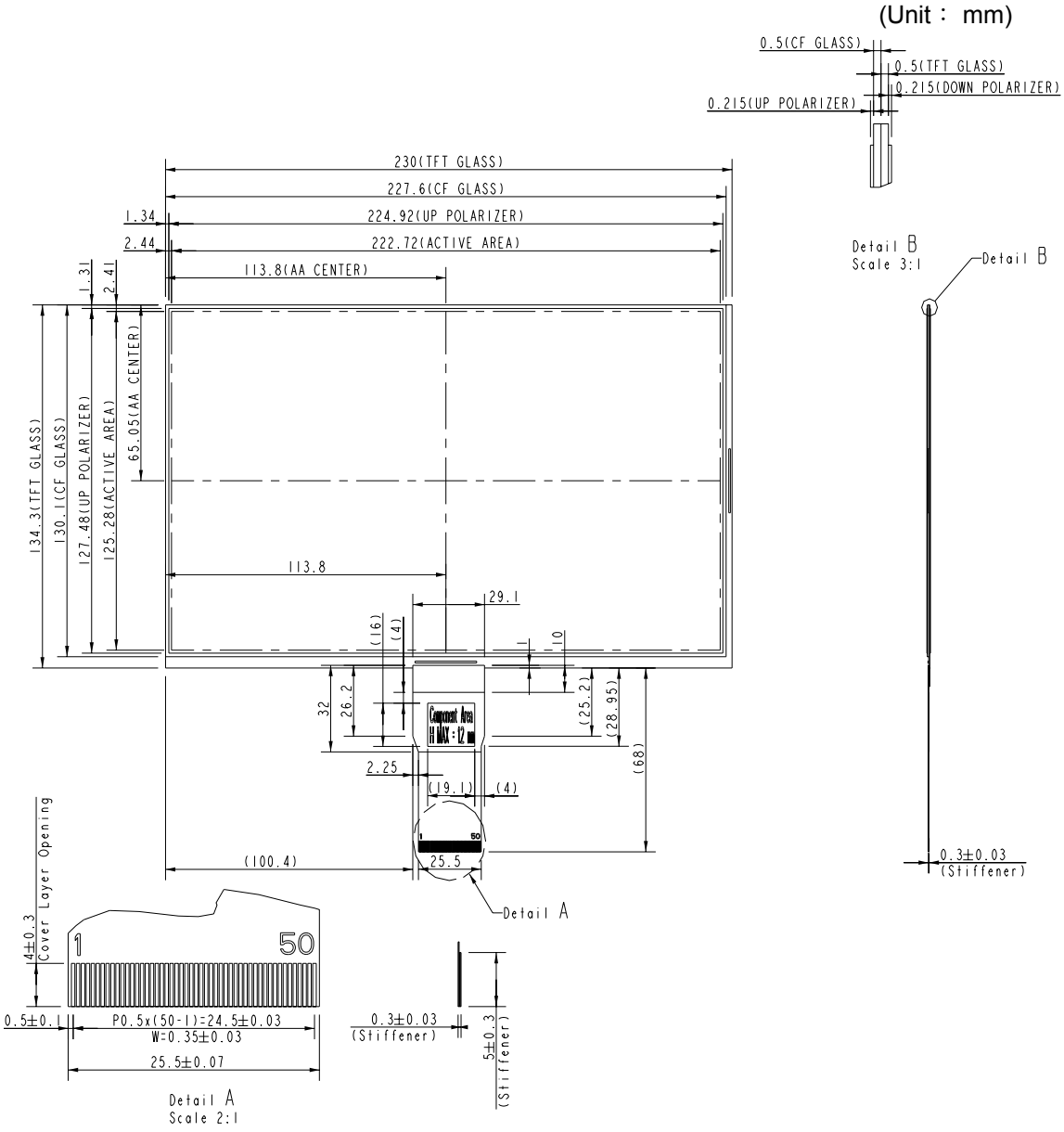
UPDN	SHLR	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down



5. MECHANICAL DIMENSION

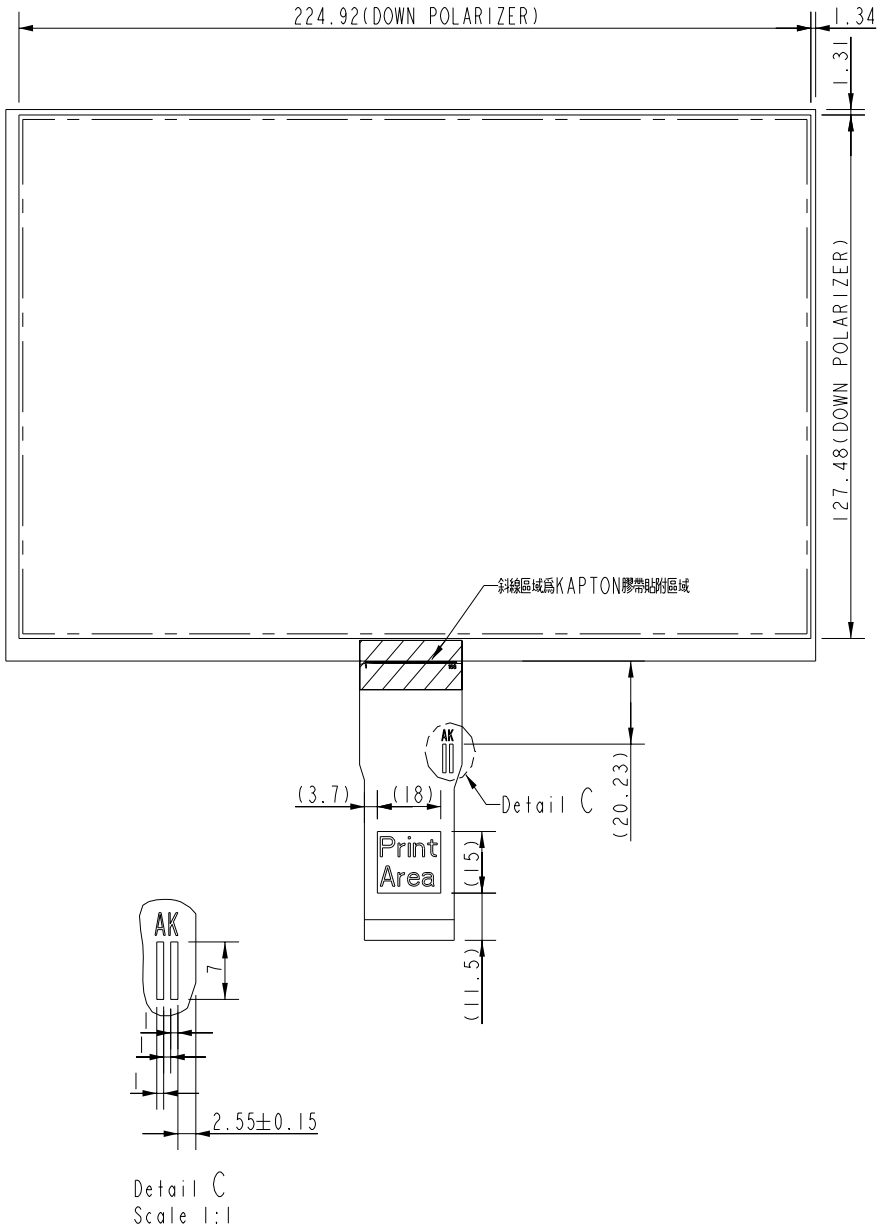
5.1 Front Side

(Unit： mm)



5.2 Rear Side

(Unit： mm)



Remark：1.General tolerance ±0.3mm

2. Module Warping≦0.8mm

6. OPTICAL CHARACTERISTICS

(Use CPT LED backlight) Ta=25℃

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Panel Transmittance		T	~	5.5	5.9	--	%	
Response Time		Tr +Tf	Point-5	--	25	40	ms	. 1
Viewing Angle	Vertical	Upper(θ)	CR≧10 Point-5	60	70	--	°	2
		Down(θ)		40	50			2
	Horizontal	Left(ϕ)		60	70			2
		Right(ϕ)		60	70	--	°	2
Color Filter Chromacicity	White	x	$\theta=\phi=0°$	0.273	0.313	0.353		3
		y		0.289	0.329	0.369		3
	Red	x	$\theta=\phi=0°$	0.550	0.590	0.630		3
		y		0.293	0.333	0.373		3
	Green	x	$\theta=\phi=0°$	0.301	0.341	0.381		3
		y		0.549	0.589	0.629		3
	Blue	x	$\theta=\phi=0°$	0.122	0.162	0.202		3
		y		0.059	0.099	0.139		3

Note 1: Definition of Response Time.(White-Black)
The response time is defined as the time interval between the 10% and 90% amplitudes.

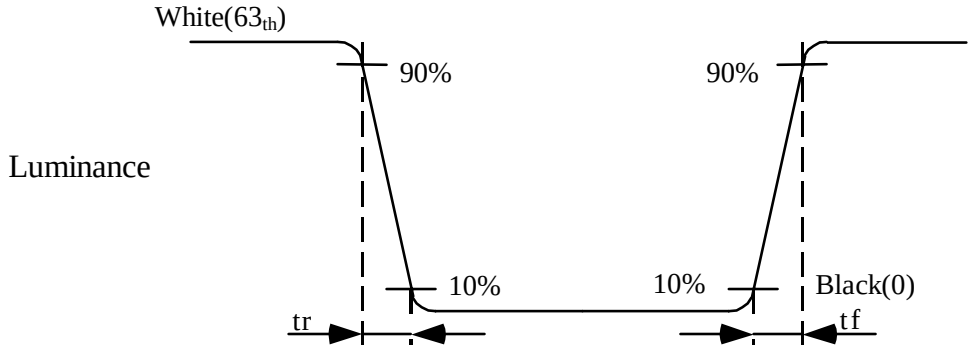


Fig. 6-1 Measuring point

Note 2: Definition of Viewing Angle(θ,ψ)

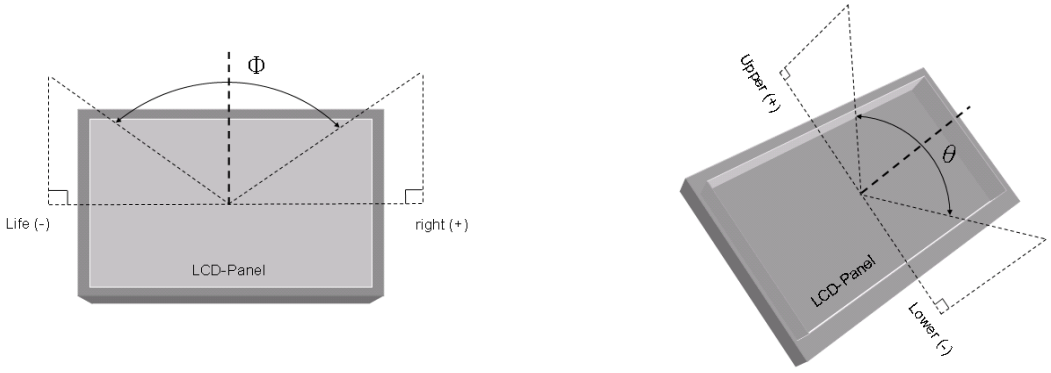


Fig.6-2 Definition of Viewing Angle

Note 3: Under C light

7. RELIABILITY TEST

(These tests are conducted with CPT backlight.)

7.1 Temperature and Humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70℃ ;240hrs	
High Temperature Storage	80℃ ; 240hrs	
High Temperature High Humidity Operation	60℃ ; 90%RH ;240hrs	No condensation
Low Temperature Operation	-20℃ ; 240hrs	Backlight unit always turn on
Low Temperature Storage	-30℃ ; 240hrs	
Thermal Shock	–30℃(0.5hr) ~ 80℃(0.5hr) ; 200 Cycles	
Image Sticking	25 ℃± 2 ℃ ; 4hrs	Note 1.

Note 1.：

Condition of Image Sticking test：25 ℃± 2 ℃

Operation with test pattern sustained for 4 hrs, then change to gray pattern immediately.

After 5 mins, the mura must be disappeared completely .

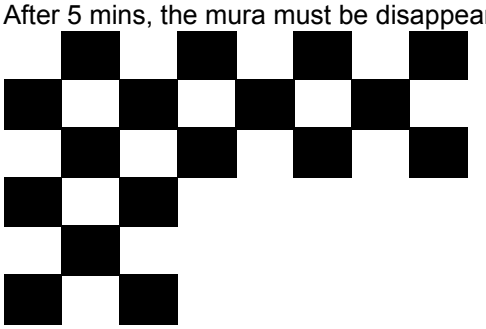


Image Sticking –pattern

Mid-Gray pattern

7.2 Electrostatic Discharge(with BL)

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

7.3 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 defects.

8. WARRANTY

8.1 The period is within 12 months since the date of shipping out under normal using and storage conditions.

8.2 The warranty will be avoided in case of defect induced by customer