SPECIFICATION

Customer:

Model Name: VI104TN25

SPEC NO.:

Date: 2024.03.22

Version: V04

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
	张利江	

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Version	Revise Date	Page	Content
V02	2022.05.24	ALL	FOG IC IS changeed
V03	2022.10.18	4 11	Update Storage and operation temperature of ABSOLUTE MAXIMUM RATING. Update QUALITY ASSURANCE.&LUMINANCE
V04	2024.03.22	11	Update LUMINANCE

1. PURPOSE

VI104TN25 is a transmissive type color active matrix liquid crystal display Module (LCM), which uses amorphous thin film transistor (TFT) as switching devices. This panel has a 10.4 inches diagonally measured active display area with SVGA (800 RGB x 600) resolution. The following describes the features of this product.

2. FEATURES

- 10.4" (diagonal) inch configuration
- SVGA (800×600 pixels) resolution

3. GENERAL RULES OF SINGLE PANEL

No.	Item	Specification	Unit
1	Screen Size	10.4 (Diagonal)	inch
2	Display Resolution	800 RGB x 600	pixel
3	Dot Pitch	0.088 (H) x 0.264 (V)	mm
4	Pixel Pitch	0.264 (H) x0.264 (V)	mm
5	Active Area	211.2(H) x 158.4(V)	mm
6	Outline Dimension	228.4(W)x175.4(H)x5.9(D)	mm
7	Pixel Configuration	RGB-Stripe	--
8	Color Depth	16.2M	colors
9	LCD Type	TM TN	--
10	Interface Type	Digital 24bit RGB	--
11	Surface Treatment	3H	--
12	View direction (Gray inversion)	6 o'clock	--
13	Weight	376	g
14	Driver IC	HX8264-E/HX8677-C	

4.1 ABSOLUTE MAXIMUM RATING

$(Ta = 25 \pm 2℃)$

Item	Symbol	Values		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-20	70	℃	
Operation Temperature	T_{OP}	-20	70	℃	
Digital Supply Voltage	VCC	-0.3	5	V	(1)
Analog Power Supply Voltage	AVDD	-0.5	15	V	(1)
TFT Device on voltage	V_{GH}	-0.3	42	V	(1)
TFT Device off voltage	V_{GL}	V_{GH} - 42	0.3	V	(1)

Note:

(1) Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

4.2. Backlight Driving Conditions

$(Ta=25 \pm 2℃)$

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Power Consumption	P_{BL}	-	2.304	-	W	-
LED Current	I_F	-	240	-	mA	-
Backlight Voltage	V_{BL}	8.1	9.6	10.8	V	-
Life Time	-	20000	-	-	hrs	Note 1

Note 1:Brightness to be decresed to 50% of the initial value.

5. ELECTRICAL CHARICTERISTICS

5-1. Operating Conditions:

(Ta = 25 ± 2℃)

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Digital Power Supply Voltage	VCC	3.0	3.3	3.6	V	
Digital Supply Current	I_{CC}	-	6	12	mA	Black Pattern
Analog Power Supply Voltage	AVDD	10.3	10.5	10.7	V	
Analog Supply Current	I_{AVDD}		40	60	mA	Black Pattern
TFT Device on voltage	V_{GH}	16	18	20	V	
TFT Device off voltage	V_{GL}	-8	-7	-6	V	
Common Electrode Driving Voltage	VCOM	4.15	4.45	4.75	V	

5-2. Vcom circuit

Typ. VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR;
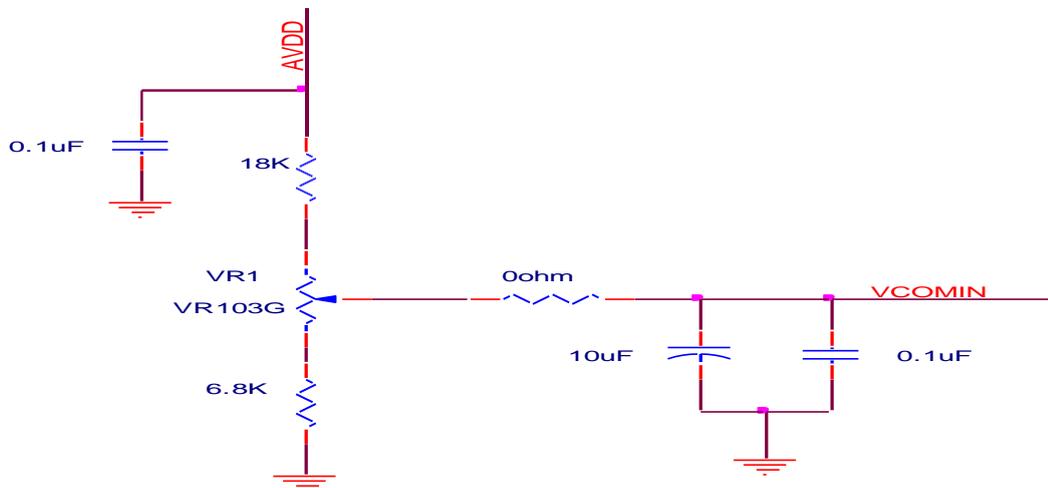
5-3. Advice circuit
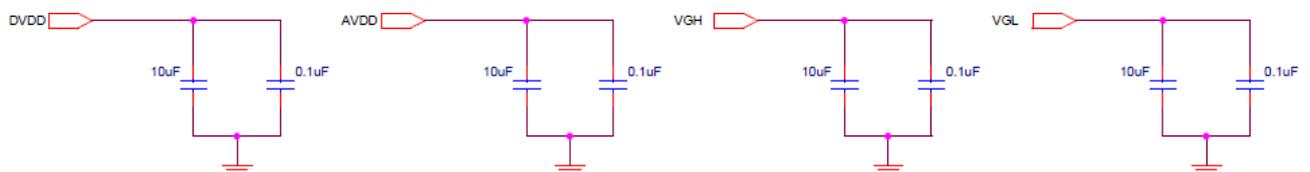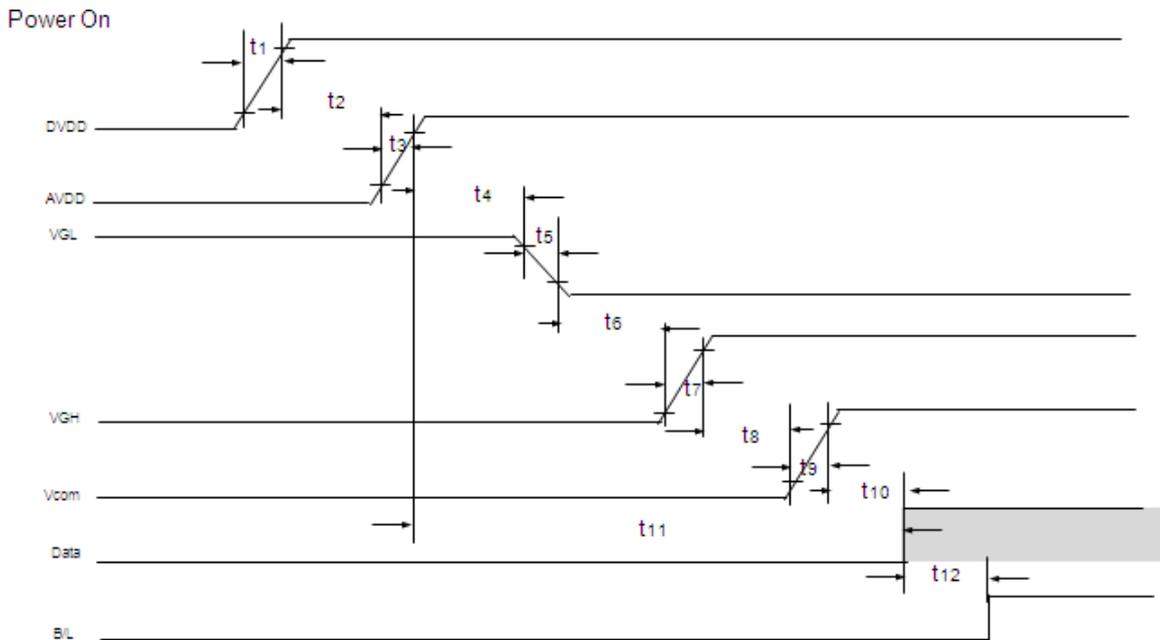
6. DC CHARCTERISTICS

6.1 Parameter

(Ta = 25 ± 2℃)

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Low Level Input Voltage	V_{IL}	0	-	0.3VCC	V	(1)
High Level Input Voltage	V_{IH}	0.7 VCC	-	VCC	V	(1)

Note:

(1) For Digital Circuit

6.2 Power Sequence

The LCD panel power ON/OFF sequence is as below

Symbol	Value			Unit	Note
	Min.	Typ.	Max.		
t1	0.1	-	20	ms	
t2	16	-	-	ms	
t3	0.1	-	10	ms	
t4	5	-	-	ms	
t5	0.1	-	10	ms	
t6	5	-	-	ms	
t7	0.1	-	10	ms	
t8	5	-	-	ms	
t9	0.1	-	10	ms	
t10	20			ms	
t11	38		80	ms	
t12	200			ms	

Power Off
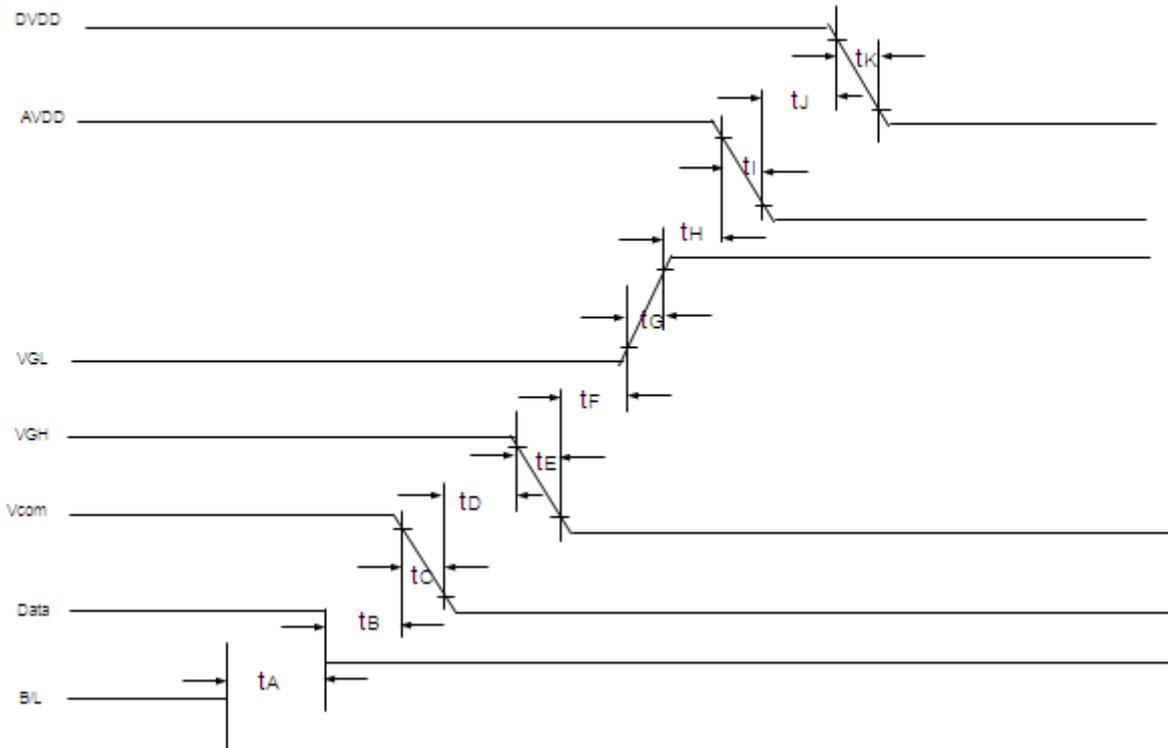
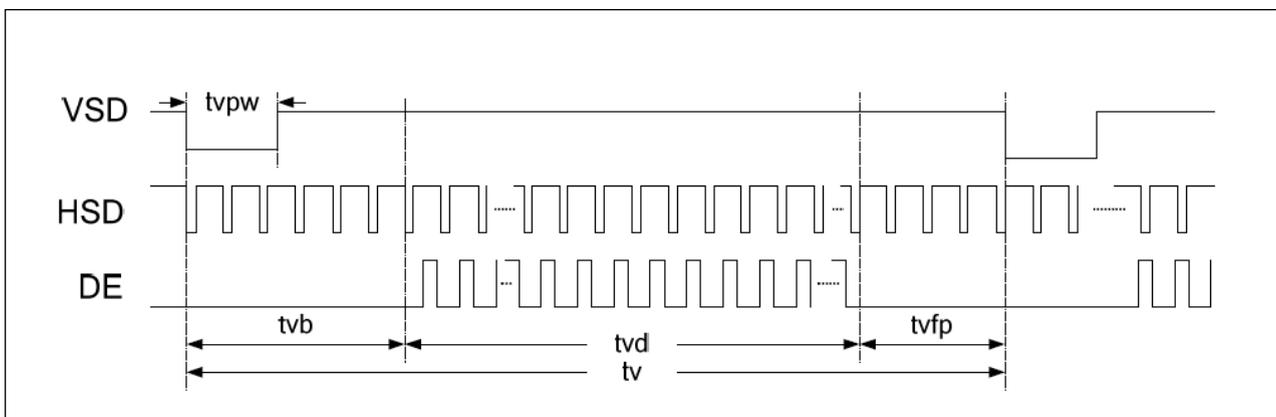| Symbol	Value			Unit	Note
	Min.	Typ.	Max.		
tA	10	-	20	ms	
tB	10	-	-	ms	
tC	0.1	-	10	ms	
tD	5	-	-	ms	
tE	0.1	-	10	ms	
tF	5	-	-	ms	
tG	0.1	-	10	ms	
tH	5	-	-	ms	
tI	0.1		10	ms	
tJ	10			ms	
tK	0.1		20	ms	

7. AC CHARCTERISTICS

7.1. Data Timing (Under frame rate is equal to 60Hz)

Horizontal Timing
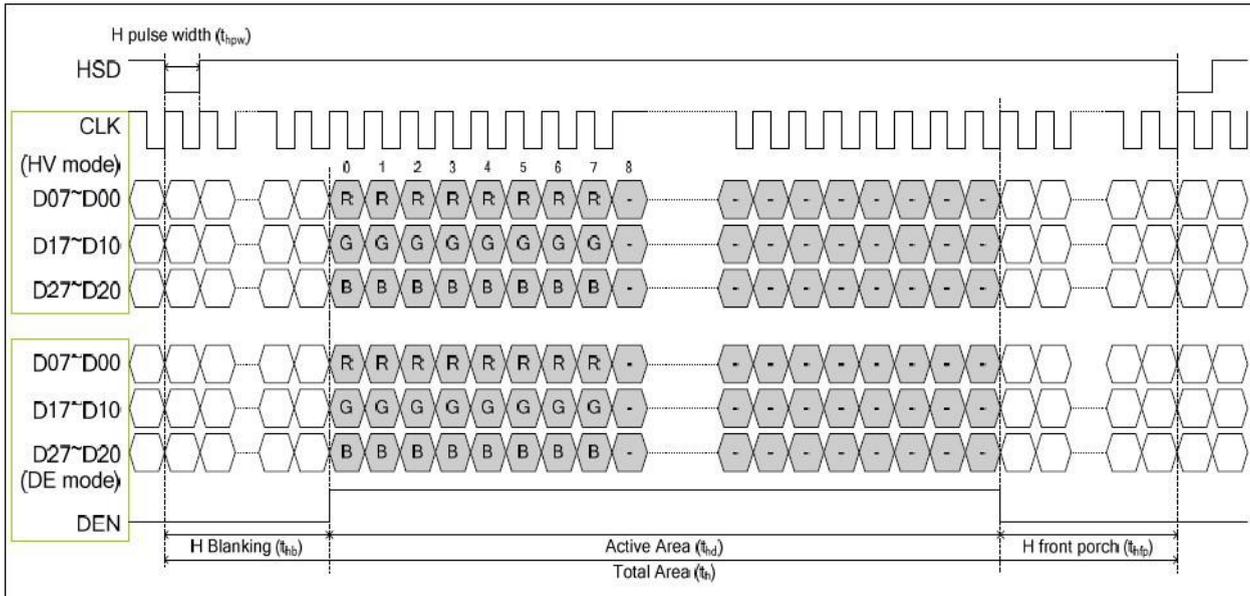
Vertical Timing

7.2. TIMING Characteristic

Horizontal Timing

Parameter	Symbol	Spec			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd		800		CLK
CLK Frequency	fclk	33	40	50	MHz
One Horizontal Line	th	862	1056	1200	CLK
HS Pulse Width	thpw	1	-	40	CLK
HS Back Porch	thb		46		CLK
HS Front Porch	thfp	16	210	354	CLK

Vertical Timing

Parameter	Symbol	Spec			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		th
VS Period Time	tv	624	635	700	th
VS Pulse Width	tvpw	1	-	20	th
VS Back Porch	tvb	23	23	23	th
VS Front Porch	tvfp	1	12	77	th

7.3. AC Electrical characteristic

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	8	-	-	ns
HS hold time	T_{hhd}	8	-	-	ns
VS setup time	T_{vst}	8	-	-	ns
VS hold time	T_{vhd}	8	-	-	ns
Data setup time	T_{dsu}	8	-	-	ns
Data hold time	T_{dhd}	8	-	-	ns
DE setup time	T_{esu}	8	-	-	ns
DE hold time	T_{ehd}	8	-	-	ns
VDD Power On Slew Rate	T_{POR}	-	-	20	ms
RSTB pulse width	T_{Rst}	10	-	-	us
CLKIN cycle time	T_{cph}	20	-	-	ns
CLKIN pulse duty	T_{cwh}	40	50	60	%
Output stable time	T_{sst}	-	-	6	us
Repair OPA Output Stable time	T_{Rsst}	-	-	6	ns

7.4. Input Clock and Data Timing Waveform
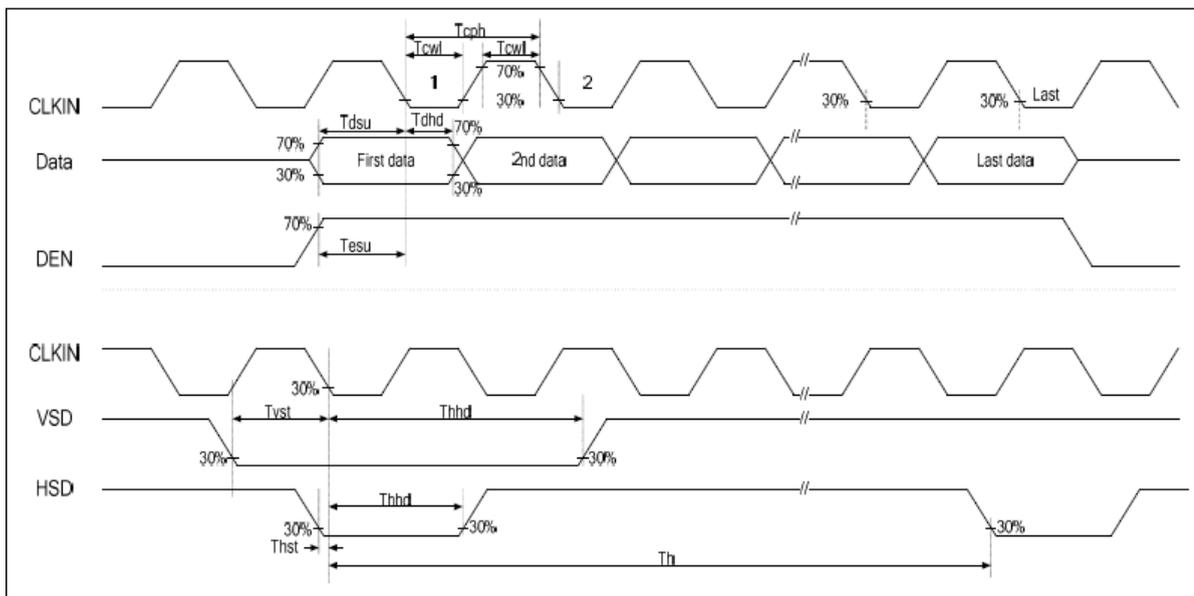
8. OPTICAL CHARCTERISTICS

Ta = 25 ± 2℃

Item		Symbol	Condition	Specification			Unit	Note
				Min.	Typ.	Max.		
Contrast		CR	$\Theta=0°$ B/L On Normal viewing angle	300	500	—	—	(2)(4)(6)
Response time		Tr		—	10	20	msec	(3)
		Tf		—	15	30		
Brightness		B		400	500	—	cd/m^2	(6)
Color chromaticity (CIE1931)	Red	R_x		0.523	0.573	0.623	—	(2)(5)(6)
		R_Y		0.30	0.350	0.40	—	
	Green	G_x		0.286	0.336	0.386	—	
		G_Y		0.547	0.597	0.647	—	
	Blue	B_x		0.102	0.152	0.202	—	
		B_Y		0.062	0.112	0.162	—	
	White	W		0.26	0.31	0.36	—	
		W		0.28	0.33	0.39	—	
Viewing angle	Hor.	Θ_L	CR>10 B/L On	60	70	—	deg.	(1)
		Θ_R		60	70	—		
	Ver.	Θ_t		40	50	—		
		Θ_b		50	60	—		
NTSC		—	—	—	50	—	%	
Uniformity		—	—	70	75	—	%	(7)

Note:
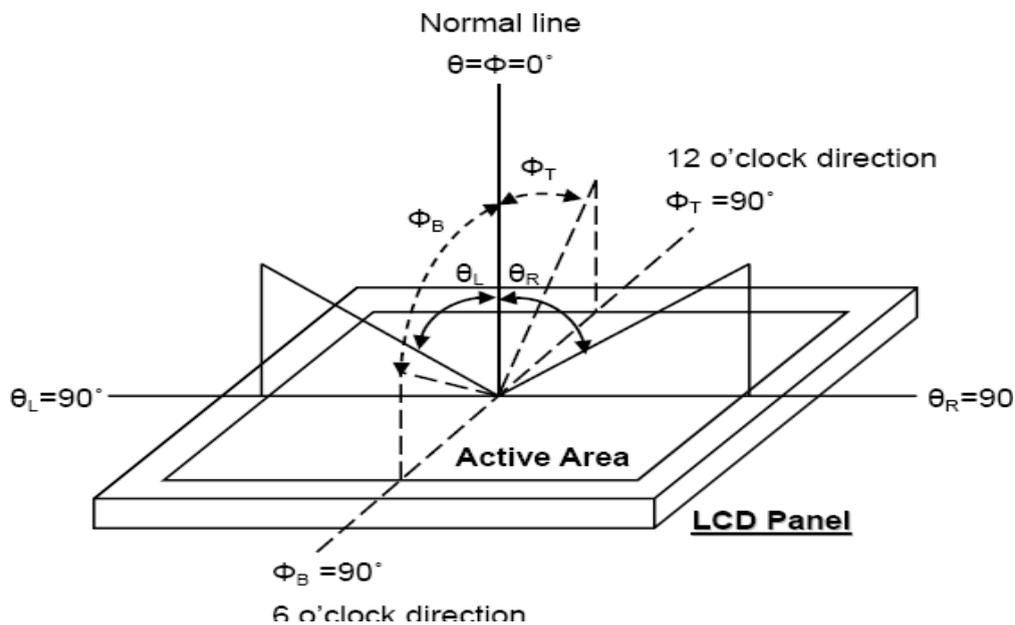(1) Definition of viewing angle range

Fig. 8-1 Definition of viewing angle

(2) Test equipment setup:
After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.
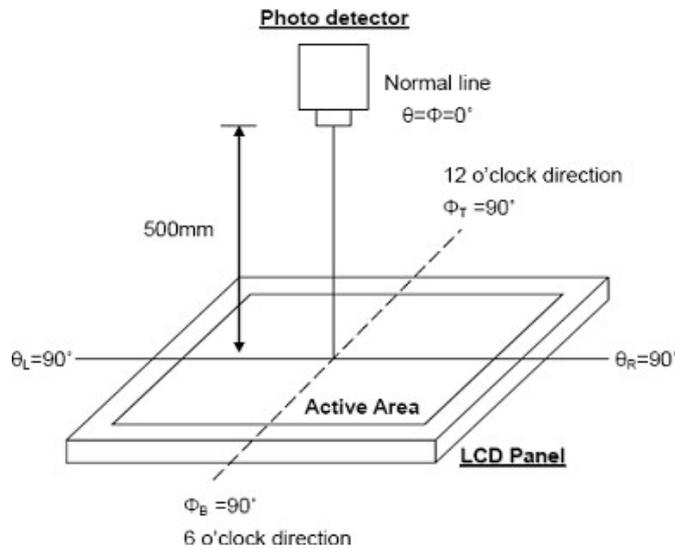
Fig. 8-2 Optical measurement system setup

(3) Definition of Response time:
The response time is defined as the LCD optical switching time interval between "White" state And "Black" state. Rise time, Tr, is the time between photo detector output intensity changed from 90% to 10%. And fall time, Tf, is the time between photo detector output intensity changed from10% to 90%.
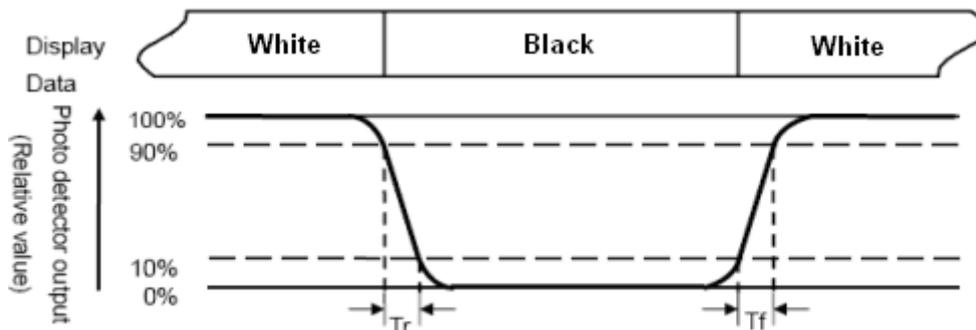

Fig. 8-3 Definition of response time

(4) Definition of contrast ratio:
The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

(5) Definition of color chromaticity (CIE 1931) Color coordinates measured at the center point of LCD, based on backlight.

(6) Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 7:Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}\,(Yu) = \frac{Bmin}{Bmax}$$
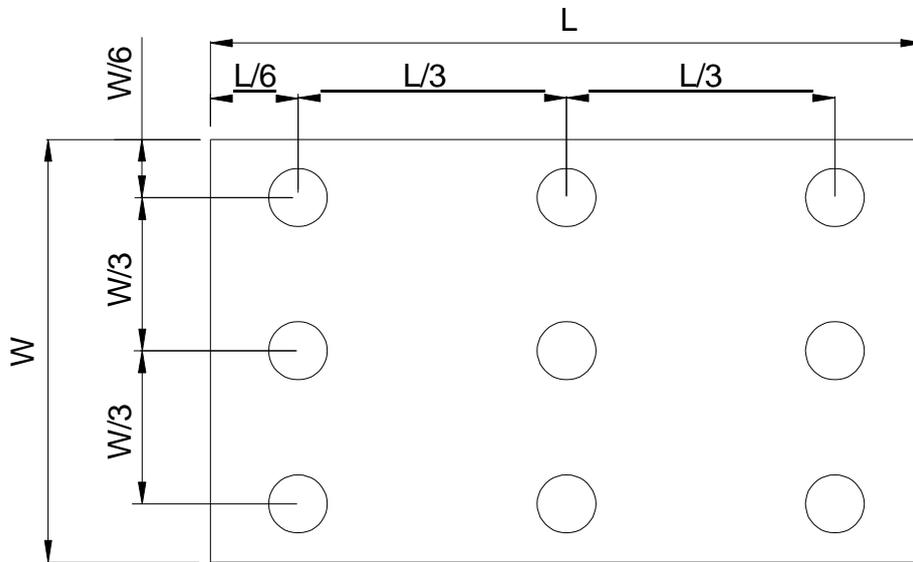
L-------Active area length   W ----- Active area width

Fig. 4-4 Definition of measuring points

Bmax： The measured maximum luminance of all measurement poition.
Bmin： The measured minimum luminance of all measurement poition.
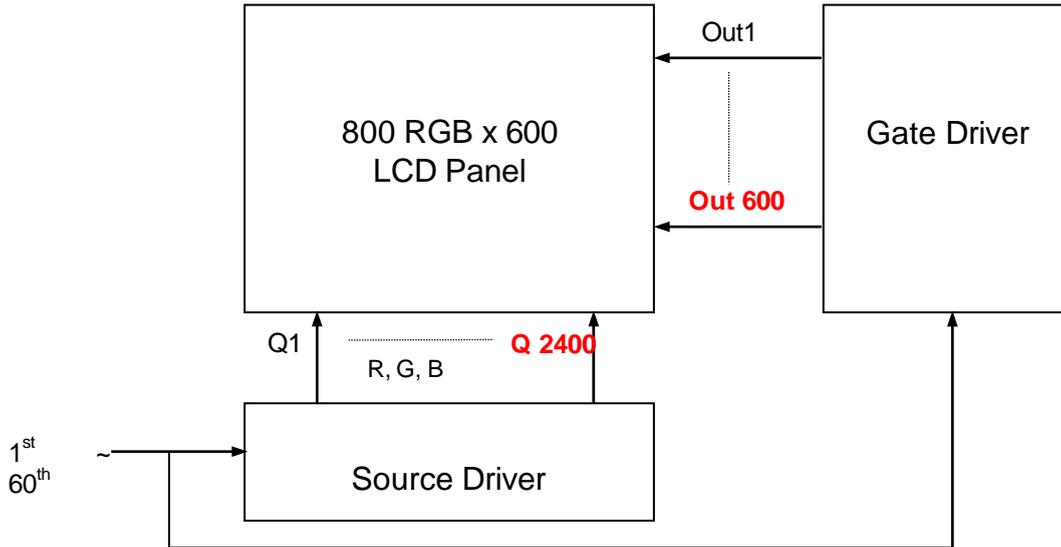
9. INTERFACE PIN CONNECTION

Pin	Symbol	I/O	Function	Remark
1	GND	G	Power Ground	
2	AVDD	P	Analog input voltage	
3	VCC	P	Digital input voltage	
4	R0	I	Red data input (LSB)	
5	R1	I	Red data input	
6	R2	I	Red data input	
7	R3	I	Red data input	
8	R4	I	Red data input	
9	R5	I	Red data input	
10	R6	I	Red data input	
11	R7	I	Red data input (MSB)	
12	G0	I	Green data input (LSB)	
13	G1	I	Green data input	
14	G2	I	Green data input	
15	G3	I	Green data input	
16	G4	I	Green data input	
17	G5	I	Green data input	
18	G6	I	Green data input	
19	G7	I	Green data input (MSB)	
20	B0	I	Blue data input (LSB)	
21	B1	I	Blue data input	
22	B2	I	Blue data input	
23	B3	I	Blue data input	
24	B4	I	Blue data input	
25	B5	I	Blue data input	
26	B6	I	Blue data input	
27	B7	I	Blue data input (MSB)	
28	CLKIN	I	Dot clock input	
29	DEN	I	Data enable signal	
30	HSD	I	HSYNC signal	
31	VSD	I	VSYNC signal	

32	MODE	I	H: DE mode (Default) L: SYNC mode	
33	NC	I	No connect (please leave it open)	
34	NC	I	No connect (please leave it open)	
35	NC	-	No connect (please leave it open)	
36	VCC	P	Digital input voltage	
37	NC	-	No connect (please leave it open)	
38	GND	G	Power Ground	
39	GND	G	Power Ground	
40	AVDD	P	Analog input voltage	
41	VCOM	P	VCOM DC input	
42	DITH	I	Dithering function setting H: Disable dithering function L: Enable dithering function	
43	NC	-	No connect (please leave it open)	
44	VCOM out	O	connect a capacitor	
45	NC		No connect (please leave it open)	
46	NC		No connect (please leave it open)	
47	NC		No connect (please leave it open)	
48	NC		No connect (please leave it open)	
49	NC		No connect (please leave it open)	
50	NC		No connect (please leave it open)	
51	NC		No connect (please leave it open)	
52	NC		No connect (please leave it open)	
53	NC		No connect (please leave it open)	
54	NC		No connect (please leave it open)	
55	NC	-	No connect (please leave it open)	
56	VGH	P	TFT turn on voltage	
57	VCC	P	Digital input voltage	
58	VGL	P	TFT turn off voltage	
59	GND	G	Power Ground	
60	NC	-	No connect (please leave it open)	

Note:
(1) Suggested connector: MT-FP160N-2FR (UJU)or any equivalent

10. BLOCK DIAGRAM

```
┌─────────────────────┐    Out1    ┌─────────────────────┐
│                     │ ◄────────  │                     │
│   800 RGB x 600     │            │    Gate Driver      │
│   LCD Panel         │   Out 600  │                     │
│                     │ ◄────────  │                     │
│                     │            │                     │
└─────────────────────┘            └─────────────────────┘
      ▲        ▲                              ▲
      Q1      Q 2400
      R, G, B
    ┌──────────────────────┐
1st ~│   Source Driver      │
60th │                      │
    └──────────────────────┘
```

11. QUALITY ASSURANCE

Item	Test Conditions	Remark
High Temperature Storage	Ta = 70℃ 240 hrs	Note1 & Note2
Low Temperature Storage	Ta = -20℃ 240hrs	Note1 & Note2
High Temperature Operation	Ts = 70℃ 240hrs	Note1 & Note2
Low Temperature Operation	Ts = -20℃ 240hrs	Note1 & Note2
High Temperature and High Humidity Operation Test	Ts=50℃, 80% RH 240 hrs	Note1 & Note2
Thermal Shock	-20℃(0.5Hr) ~ +70℃(0.5Hr) for 50 cycles	Note1 & Note2
Surface discharge ESD Test	C=150pF, R=330_ Discharge: Air: >±2kV; Contact: >±2kV	Note1 & Note2

T_a= Ambient Temperature , Ts = Surface Temperature

Note:

1. The test samples have recovery time for 2 hours at room temperature before the function check. In the standard conditions, there is no display function NG issue occurred.

2. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
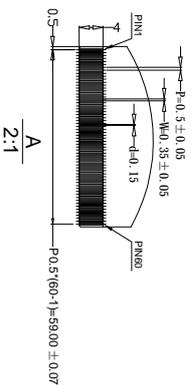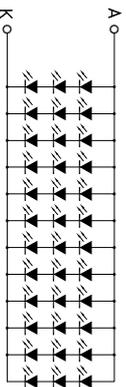
MECHANICAL OUTLINE, UNIT:mm
(Unspecified Tolerances is: ±0.3 mm)
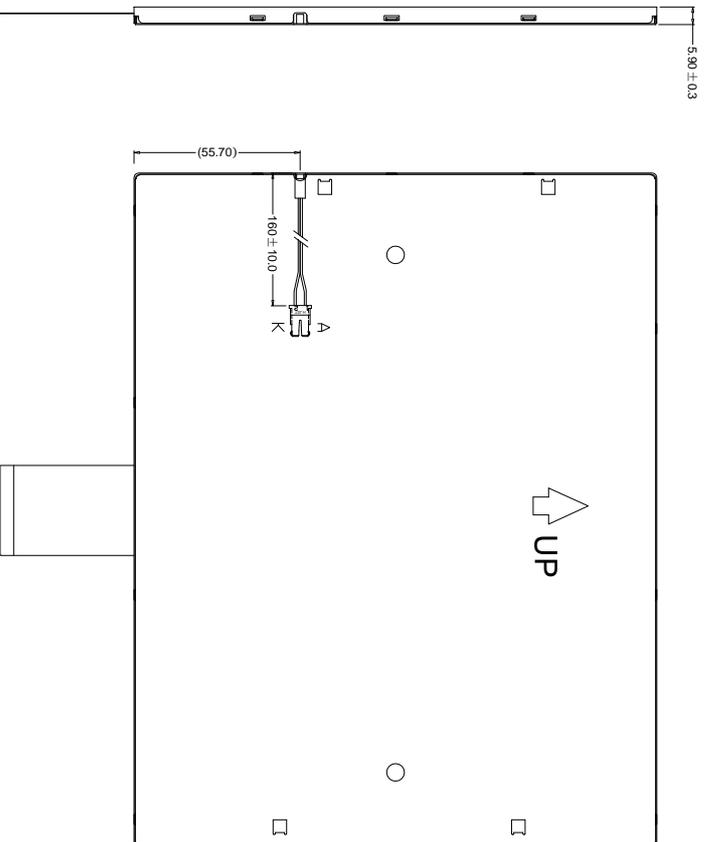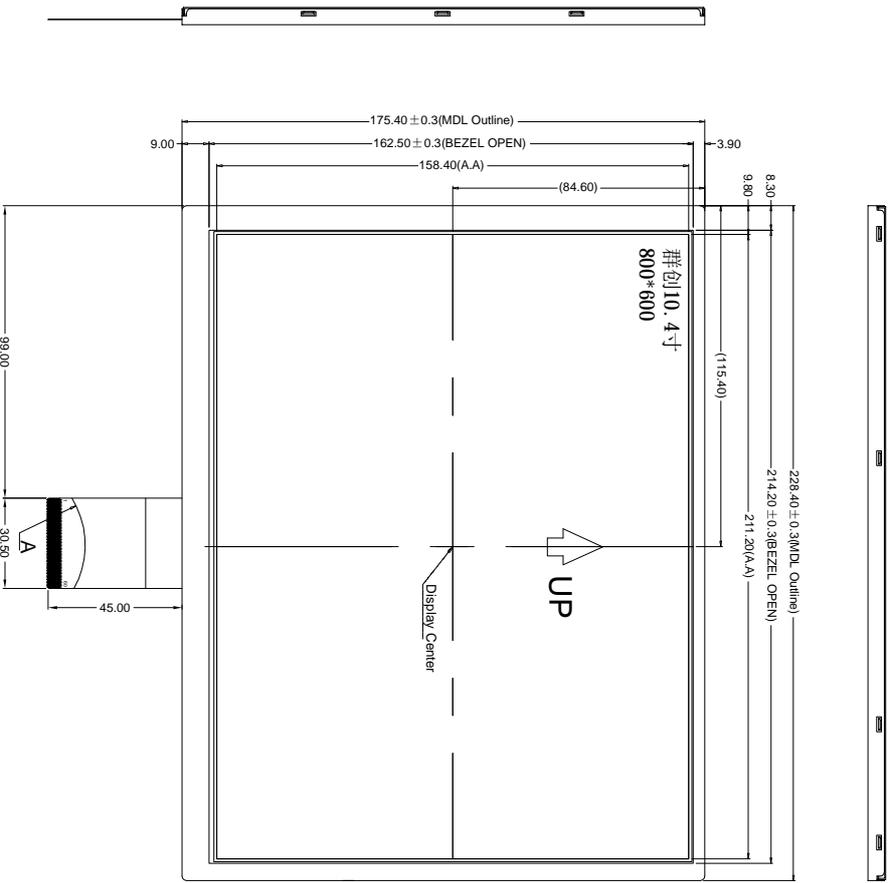
ELECTRICAL-OPTICAL CHARACTERISTICS
(Ta=25℃. The Ambient temperature Ta=25℃)

Item	Symbol	Condition		min.	typ.	max.	Unit
Forward Current	U	If=	240 mA	8.1	9.6	10.8	V
Reverse Current	Ir	Vr=	5 V			10	μA
Power dissipation	Pd	If=	480 mA		5.19		W
Colour Coordinates	X	If=	240 mA	0.26		0.36	
	Y	If=	240 mA	0.27		0.27	
Luminous Uniformity		If=	240 mA	70	75		%
LCM Luminance (reference参考值)	Lv	If=	240 mA	200	250		cd/m²
Operating Temperature Range	Topr	normal use		-20		+70	℃
Storage Temperature Range	Tstg	normal use		-20		+70	℃

CIRCUIT DIAGRAM (LED 3串X12并=36 dies)

K○

A○

175.40±0.3(MDL Outline)
162.50±0.3(BEZEL OPEN)
158.40(A.A)
9.00
3.90
8.30
9.80
(84.60)

群创10.4寸
800*600

(115.40)
(211.20(A.A))
214.20±0.3(BEZEL OPEN)
228.40±0.3(MDL Outline)

Display Center
UP

99.00
30.50
45.00

A
2:1

5.90±0.3

(55.70)
160±10.0

UP

PIN1
4
0.5
P=0.5±0.05
W0.35±0.05
d=0.15
P0.5(60-1)=59.00±0.07
PIN60

PRODUCT NAME:
产品名称
群创10.4寸晶精
VI104TN25

CUST NUMBER:
型号

PROJECTION
三角法

SHEET: 1 of 1
SCALE: 比例 FIT

厦门炬垄森科技有限公司

REV
V0
新发行

DESCRIPTION:

DATE
2022.01.19

DESIGN: 设计
APPROVALS 签字
CHECK: 核对
APPROVE: 批准

2023/2/8 14:02

13. PACKAGE INFORMATION

TBD