



深圳市一众显示科技有限公司

SHEN ZHEN TEAM SOURCE DISPLAYTECH. CO, TD.

TFT-LCD Module Specification

Module NO.: TST043WQOS-G07

Version: V1.0

☐ APPROVAL FOR SPECIFICATION

☐ APPROVAL FOR SAMPLE

For Customer' s Acceptance:	
Approved by	Comment

Team Source Display:		
Presented by	Reviewed by	Organized by

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1. GENERAL DESCRIPTION

1.1 Product Introduction

TST043WQOS-G07 is a color active matrix thin film transistor(TFT) liquid crystal display(LCD) single chip and Sub Chips that uses amorphous silicon TFT as a switching device. This TFT LCD panel has a 4.3 inch diagona measured active display area with WQVGA resolution (480 horizontal by 272 vertical pixels) and can display up to 16.7M colors.

1.2 Product Features

- 4.3" TFT-LCD Panel
- Supported WQVGA Resolution
- Compatible with ROHS Standard

1.3 General Information

Item	Specification	Unit	Note
Active Area	95.04(H)*53.856 (V)	mm	Single chip
Cell Size	100.16(H)*61.856(V)	mm	Single chip
Number of Pixels	480 *RGB* 272	pixel	Single chip
Pixel Pitch (Sub Pixel)	0.198×0.198	mm	Single chip
Pixel Arrangement	RGB Vertical stripe	-	
Display Colors	16.7M	Colors	
Display Mode	Normally White	-	
Glass Thickness (Array/CF)	0.5/0.5	mm	
Response Time	20(Typ.)	ms	
Module Dimension	105.42×67.10	mm	
White Luminance	350 (Typ.)	cd/m ²	
Contrast Ratio	700:1(Typ.)	-	
NTSC	50(Typ.)	%	
Driver IC	ST7285B-G4-CT	-	Reference
Interface	RGB	-	

2. ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceeded, may cause damage to the unit.

Item	Symbol	Value			Unit
		Min.	Typ.	Max.	
Power Supply Voltage	VDD	3.0	3.3	3.6	V
I/O Supply Voltage	VDDI	3.0	3.3	3.6	V
Logic Input Supply Voltage	V _{IN}	3.0	3.3	3.6	V
Logic Output Supply Voltage	V _{OUT}	3.0	--	VDDI+0.3	V
TFT Gate ON Voltage	VGH	--	16	--	V
TFT Gate OFF Voltage	VGL	--	-10	--	V
TFT Common Voltage	Vcom	--	-1.113	--	V
Operating Temperature	Top	-20	--	70	°C
Storage Temperature	Tst	-30	--	80	°C

Note :

1. That the stress exceeds the Limiting Value listed above it may cause the driver IC permanent damage. These values are for stress only. IC should be operated under the DC/AC Characteristic conditions for normal operation. If these conditions are not met, IC operation may be error and the reliability may be deteriorated.
2. Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to VSS unless otherwise noted.
3. Insure the voltage levels of VDDI, VDD, PVDD always matches the correct relation: $3.0V \leq VDDI \leq VDD = PVDD \leq 3.6V$
4. VIN should be less than or equal to 3.6V. ($V_{IN} \leq 3.6V$)

3. BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	Vf	8.4	12.4	13.2	V	If=20mA
Luminance	Lv	5100	5700		cd/m ²	If=20mA
Number of LED	--	8			Piece	--
Connection mode	P	4 serial 2 parallel			--	--
Uniformity	--	80	85	--	%	--

4. ELECTRICAL SPECIFICATIONS

4.1 Interface Connector

Pin No.	Symbol	Description	Remark
1	LEDK	Power for LED backlight(Cathode)	
2	LEDA	Power for LED backlight (Anode)	
3	GND	Power ground	
4	VCC	Common Voltage(3.3v)	
5	R0	7 Bit RED Data Bus	
6	R1	7 Bit RED Data Bus	
7	R2	7 Bit RED Data Bus	
8	R3	7 Bit RED Data Bus	
9	R4	7 Bit RED Data Bus	
10	R5	7 Bit RED Data Bus	
11	R6	7 Bit RED Data Bus	
12	R7	7 Bit RED Data Bus	
13	G0	7 Bit GREEN Data Bus	
14	G1	7 Bit GREEN Data Bus	
15	G2	7 Bit GREEN Data Bus	
16	G3	7 Bit GREEN Data Bus	
17	G4	7 Bit GREEN Data Bus	
18	G5	7 Bit GREEN Data Bus	
19	G6	7 Bit GREEN Data Bus	
20	G7	7 Bit GREEN Data Bus	
21	B0	7 Bit BLUE Data Bus	
22	B1	7 Bit BLUE Data Bus	
23	B2	7 Bit BLUE Data Bus	
24	B3	7 Bit BLUE Data Bus	
25	B4	7 Bit BLUE Data Bus	
26	B5	7 Bit BLUE Data Bus	
27	B6	7 Bit BLUE Data Bus	
28	B7	7 Bit BLUE Data Bus	
29	GND	Power ground	
30	PCLK	Clock signal	

31	DISP	DISP 1=Display on 0=Display off	
32	HSYNC	Horizontal sync input in RGB mode	
33	VSYNC	Vertical sync input in RGB mode	
34	DE	Data enable	
35	NC	No Connection	
36	GND	Power ground	
37	XR	Touch panel X-right(no connect)	
38	YD	YD Touch panel Y-bottom(no connect)	
39	XL	XL Touch panel X-left(no connect)	
40	YU	YU Touch panel Y-up(no connect)	

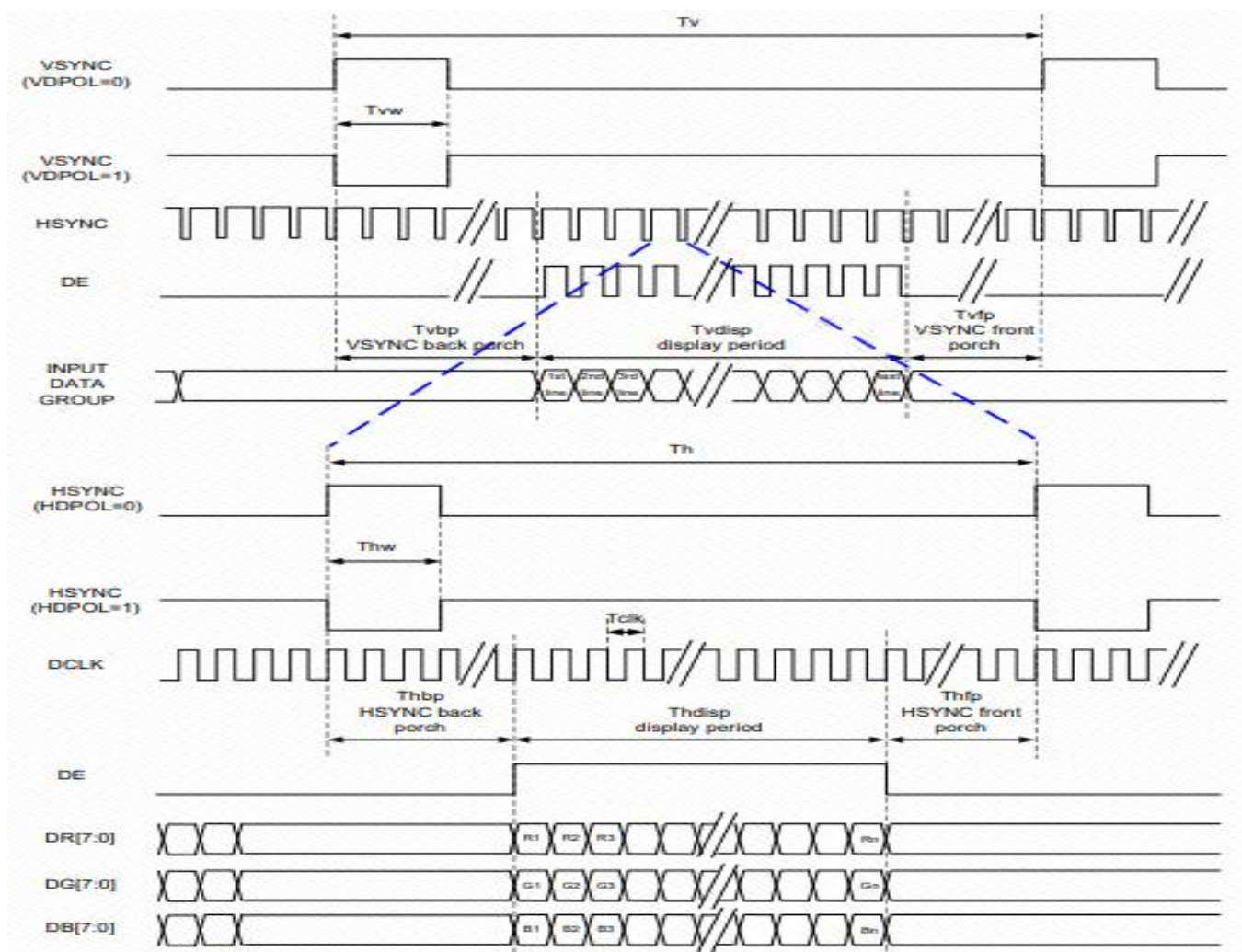
4.2 Parallel 24-bit RGB Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI=3.3V,AGND=0V,TA=25°C)

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	ns	
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	12+A1:H14+B6	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	12	H	

Note: It is necessary to keep Tvbp=12 and Thbp=43 in sync mode.DE mode is unnecessary to keep it.

4.3 SYNC-De Mode Timing



4.4 DC&AC Characteristics

4.4.1 DC Characteristics

DE Electricl Characteristics ((PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25 C, Bare Chip)

4.4.1.1 Recommended Operating Range

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3.0	3.3	3.6	V	
IO Supply Voltage	VDDI	3.0	-	3.6	V	
Charge Pump Supply Voltage	PVDD	3.0		3.6	V	
OTP Supply Voltage	VPP	7.4	7.5	7.6	V	

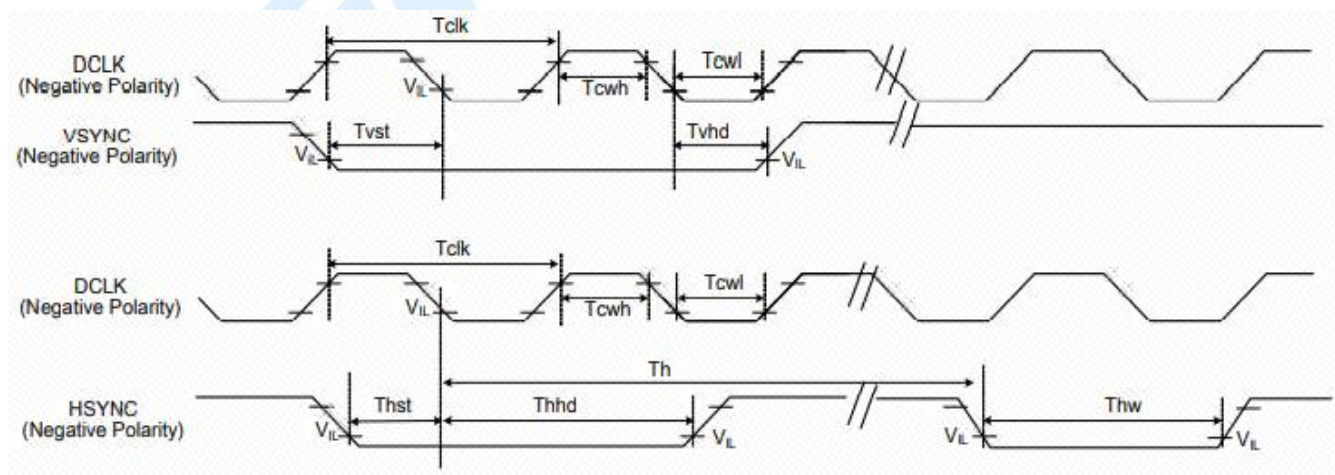
4.4.1.2 Digital Circuit

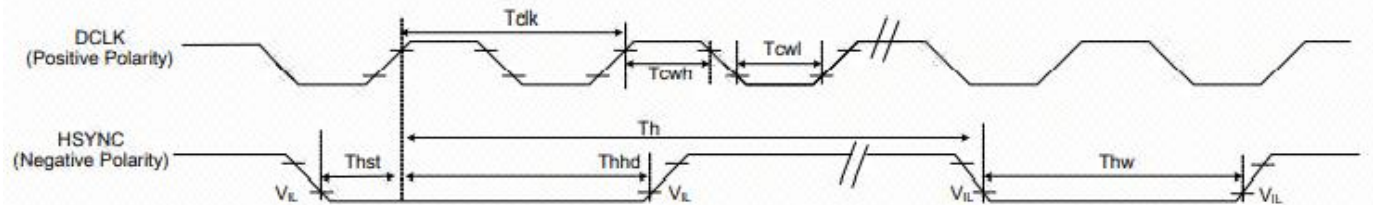
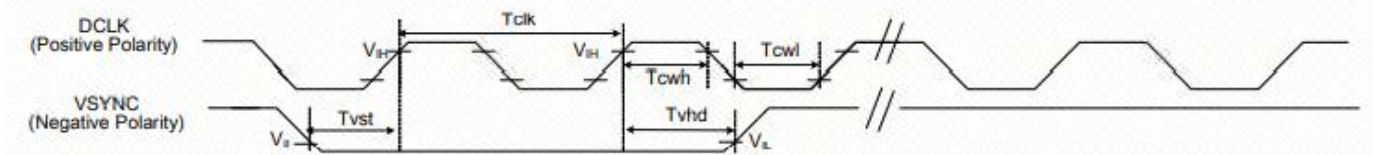
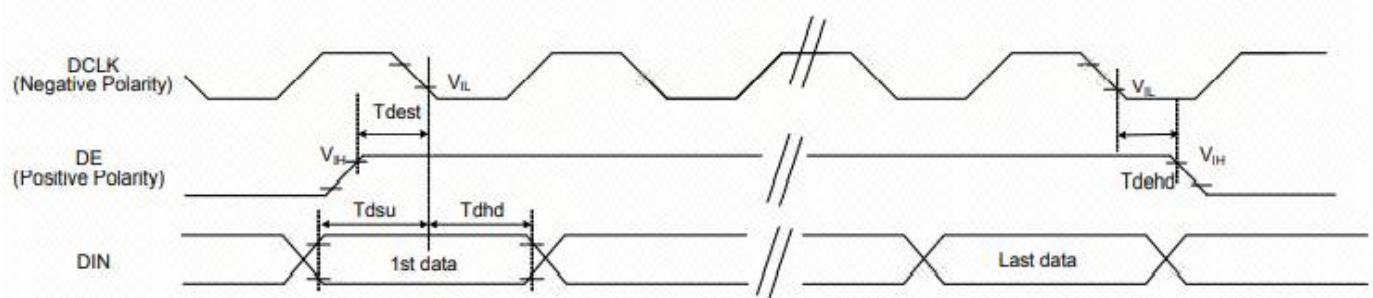
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic-High Input Voltage	V _{ih}	0.7V _{DDI}	–	V _{DDI}	V	
Logic-Low Input Voltage	V _{il}	DGND	–	0.3V _{DDI}	V	
Logic-High Output Voltage	V _{oh}	V _{DDI} -0.4	–	V _{DDI}	V	
Logic-Low Output Voltage	V _{ol}	DGND	–	DGND+0.4	V	

4.4.1.3 Analog Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive High-Voltage Power	V _{GH}	13	15	16.5	V	No Load@ FR=60Hz
Negative High-Voltage Power	V _{GL}	-7	-10	-11	V	
Output Voltage Deviation	V _{od}		±35	±45	mV	
Standby Current	I _{sc}			50	uA	
Operation Current	I _{oc}		30		mA	

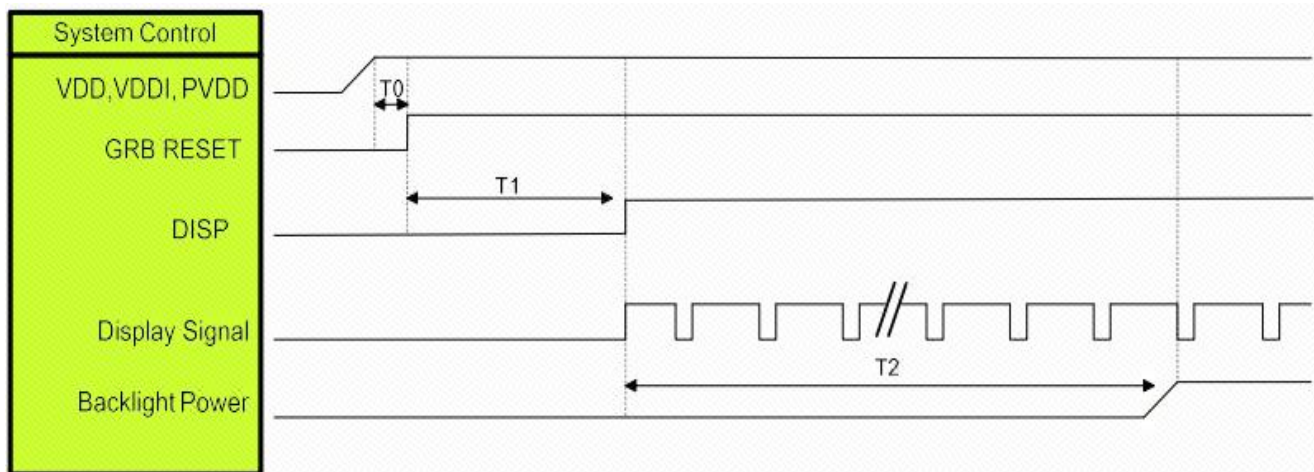
4.4.2 System Bus Timing for RGB Interface





4.5 Power on/off Sequence

4.5.1 Power on Sequence

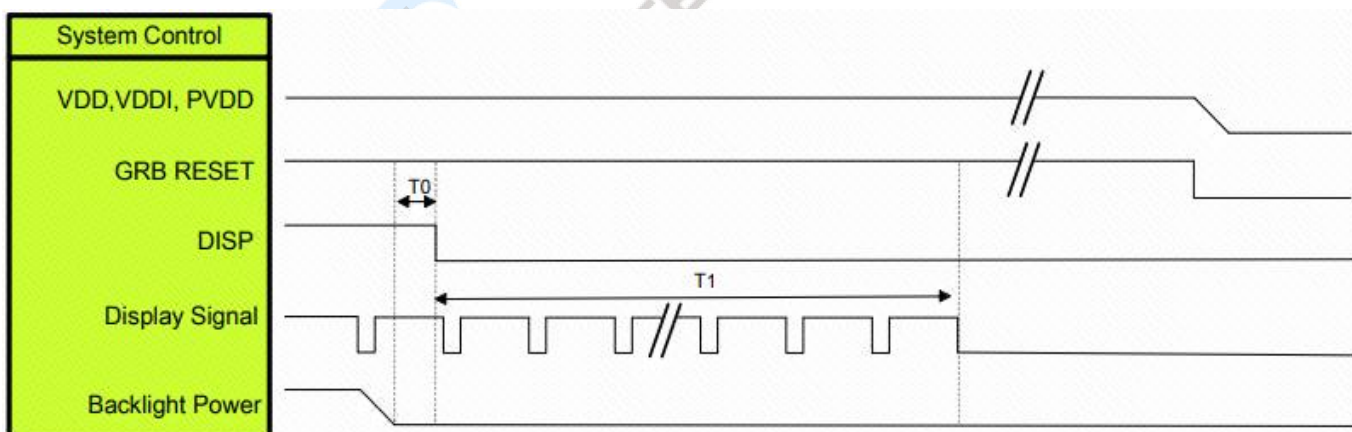


	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP=" High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note:

1. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR [7:0]; DG [7:0]; DB [7:0]
2. LVDS interface Display signal: DCLK P/N; RX [3:0] P/N

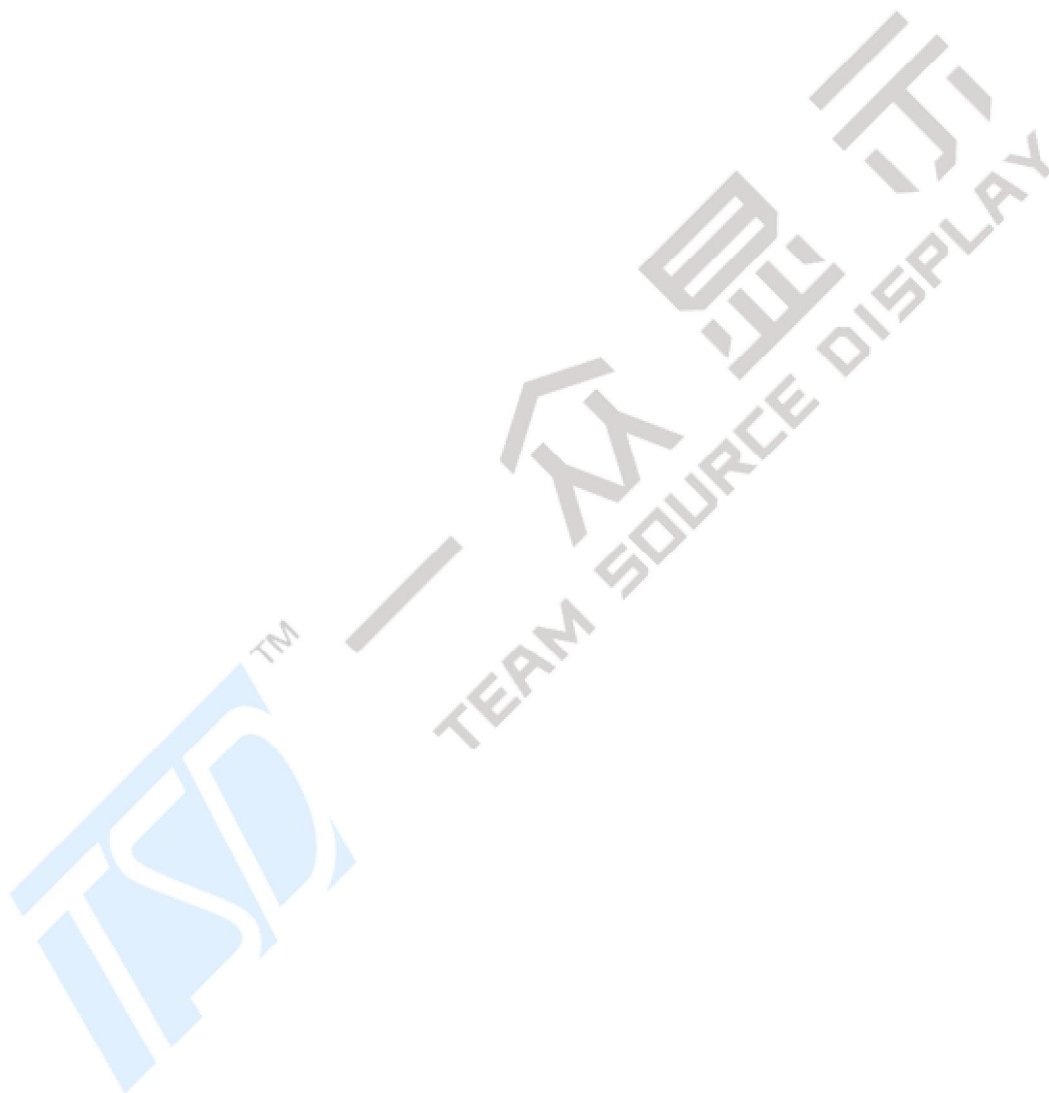
4.5.2 Power off Sequence



	Description	Min. Time	Unit
T0	Backlight Power off to DISP=" Low"	5	ms
T1	DISP=" Low" to IC internal voltage discharge complete	80	ms

Note:

1. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR [7:0]; DG [7:0]; DB [7:0]
2. LVDS interface Display signal: DCLK P/N; RX [3:0] P/N



5. OPTICAL CHARACTERISTICS

5.1 Optical Specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance		TR	Θ=0 Normal viewing angle	6.4	6.85	-	%	Measuring with Polarizer
Contrast		CR		-	700	-	-	(1)(2)
Response time		T _R + T _F		-	20	-	ms	(1)(3)
Color gamut	(%)	NTSC		-	50	-	%	(1)(2)
Color chromaticity (CIE1931)	White	W _x		-0.03	0.271	+0.03	-	(1)(4)
		W _y			0.306			
	Red	R _x			0.536			
		R _y			0.319			
	Green	G _x	0.325					
		G _y	0.620					
	Blue	B _x	0.162					
		B _y	0.112					
Color Temperature	-		-	-	10141	-	K	-
White Luminance	-		Center	-	350	-	cd/m²	-
Luminance Uniformity	-		9 Points	75	80		%	-

Note:

(1).Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight 30 minutes in the windless room.

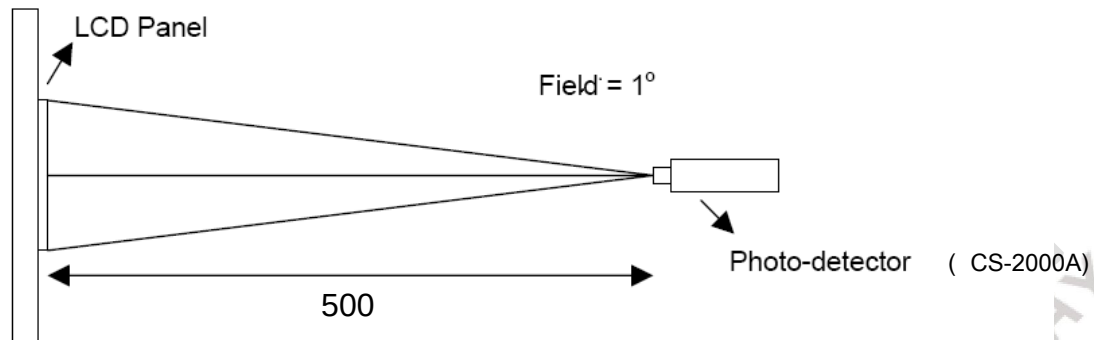


Figure 6 Measurement Setup

(2). Definition of Viewing Angle:

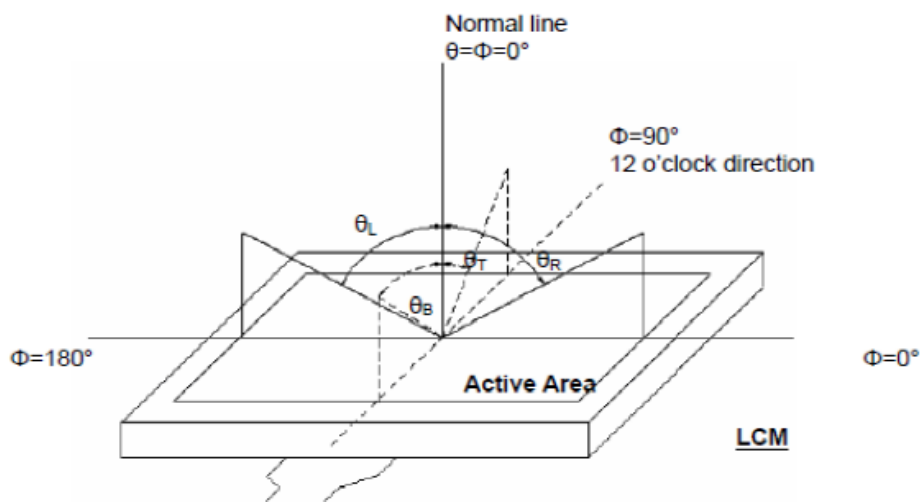


Figure 7 Definition of Viewing Angle

(3). Definition of Contrast Ratio (CR): measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

(4). Definition of Response Time: Sum of T_R and T_F

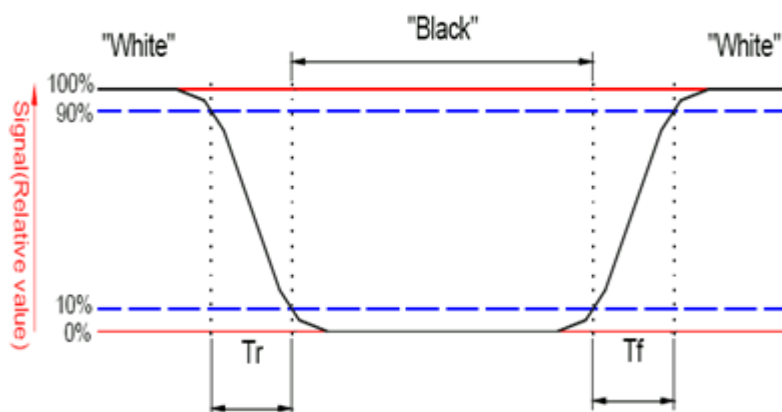


Figure 8 Definition of Response Time

(5). Definition of Luminance of White

Measure the luminance of White pattern (Ref.: Active Area)

Display Luminance=L1 (center point)

H—Active Area Width, V—Active Area Height, L—Luminance

(6). Definition of Luminance Uniformity (Ref.: Active Area)

Measure the luminance of White pattern at 9 points.

Luminance Uniformity= Min. (L1, L2, ... L9) / Max.(L1, L2, ... L9)

H—Active Area Width, V—Active Area Height, L—Luminance

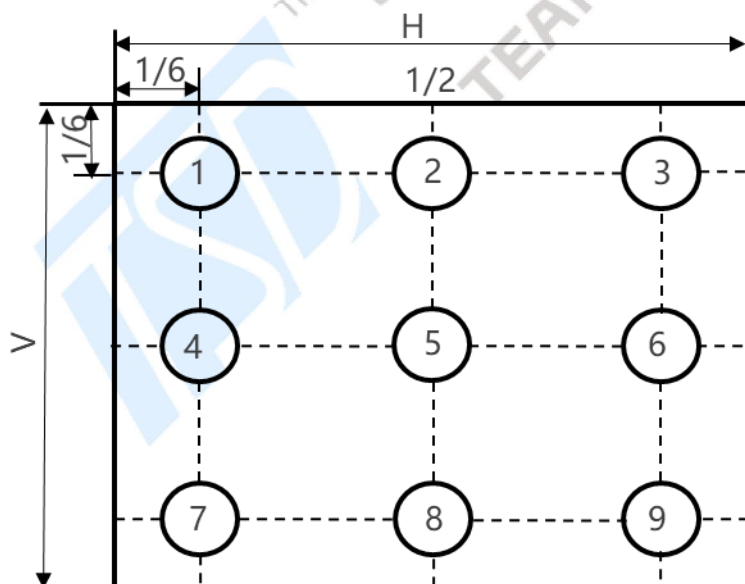
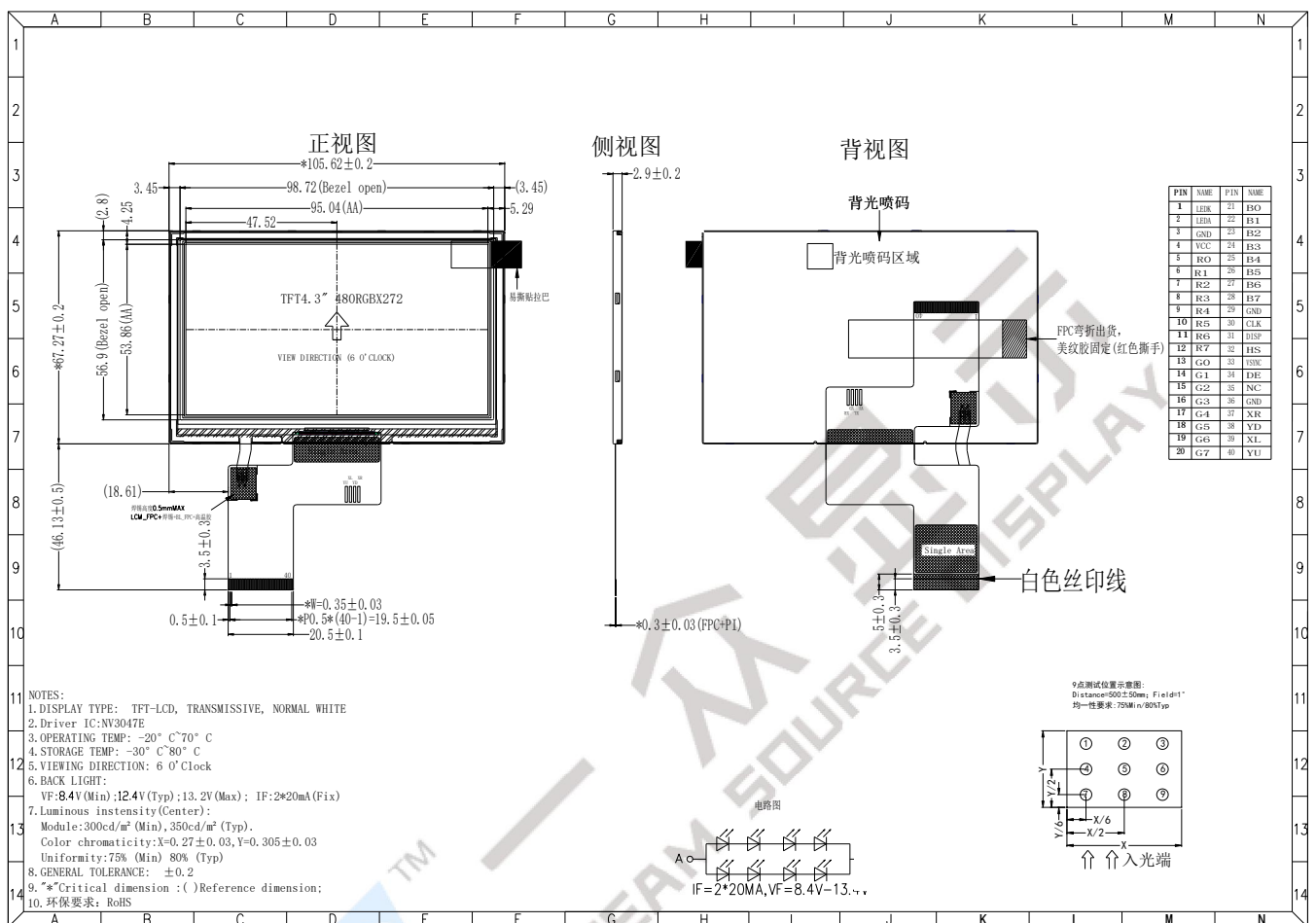


Figure 9 Measurement Locations of 9 Points

6. OUTLINE DIMENSION



7. RELIABILITY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	+80 °C, 96h	-
2	Low Temperature Storage	-30 °C, 96h	-
3	High Temperature Operation	+70 °C, 48h	-
4	Low Temperature Operation	-20 °C, 48h	-
5	Temperature & Humidity Storage	+40 °C, 90%RH, 48h	-
6	Thermal shock	Ta= -20°C↔70°C(0.5hr), 10cycle	-
7	Electric-static discharge (non-operation)	Contact : 150pF, 330ohm, ±4KV Air : 150pF, 330ohm, ±8KV	-

Note: (1) All tests above are practiced at module type.

(2) There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

(3) Before judgement, please release 2 hours in normal condition when the test is finished.

8. PACKAGE SPECIFICATION

TBD

