4D LCD

4DLCD-43-800-480 Series

- **4.3" TFT-LCD**
- **Colour active matrix TFT-LCD module**

Available in:
4DLCD-43-800-480-NT-NM-500R – 4.3″ IPS TFT LCD, Non Touch
4DLCD-43-800-480-NT-CLB-450-R – 4.3″ IPS TFT LCD, Non Touch with Cover Lens Bezel
4DLCD-43-800-480-CT-CLB-450-R – 4.3″ IPS TFT LCD, Capacitive Touch with Cover Lens Bezel

Datasheet

Revision History

REVISION	DATE	COMMENT	REMARKS
1.0	04/12/2022	Initial Draft	Initial Draft Version

Table of Contents

1. General Specification

4DLCD-43-800-480 Series is a colour active-matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a colour TFT-LCD panel, driver IC, FPC and a back light unit and with/without a Resistive Touch or a Capacitive Touch Panel (CTP), with or without a cover lens bezel. The module display area contains 800 x 480 pixels. This product accords with RoHS environmental criterion.

ITEM	CONTENTS	UNIT
LCD Type	TFT / Transmissive / Normally Black	
Size	4.3	Inch
Viewing Direction	ALL	O'Clock
Display Mode	Normally Black	
LCD (W × H)	105.5 × 67.2	mm^2
Active Area (W × H)	95.04 × 53.856	mm^2
Dot Pitch (W × H)	0.1188 × 0.1122	mm^2
Number of Dots (Pixels)	800 (RGB) × 480	
Driver IC	ST7262	
Backlight Type	10 LEDs	
Surface Luminance 4DLCD-43-800-480-NT	500(typical)	cd/m^2
Interface Type	RGB	
Color Depth	16.7M	
Pixel Arrangement	RGB Vertical Stripe	
Surface Treatment	AG	
With/Without TP	Touch Pan el Optional	

Note 1: RoHS compliant
Note 2: LCD weight tolerance: ± 5%

Part Number Details:
NT - Non Touch
RP - Resistive Touch
CT - Capacitive Touch
EAR - Metal or Plastic EARs
CLB - Glass Cover Lenz Bezel NM
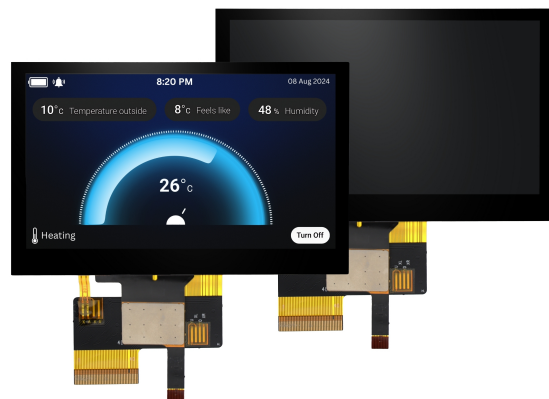- No Mounting
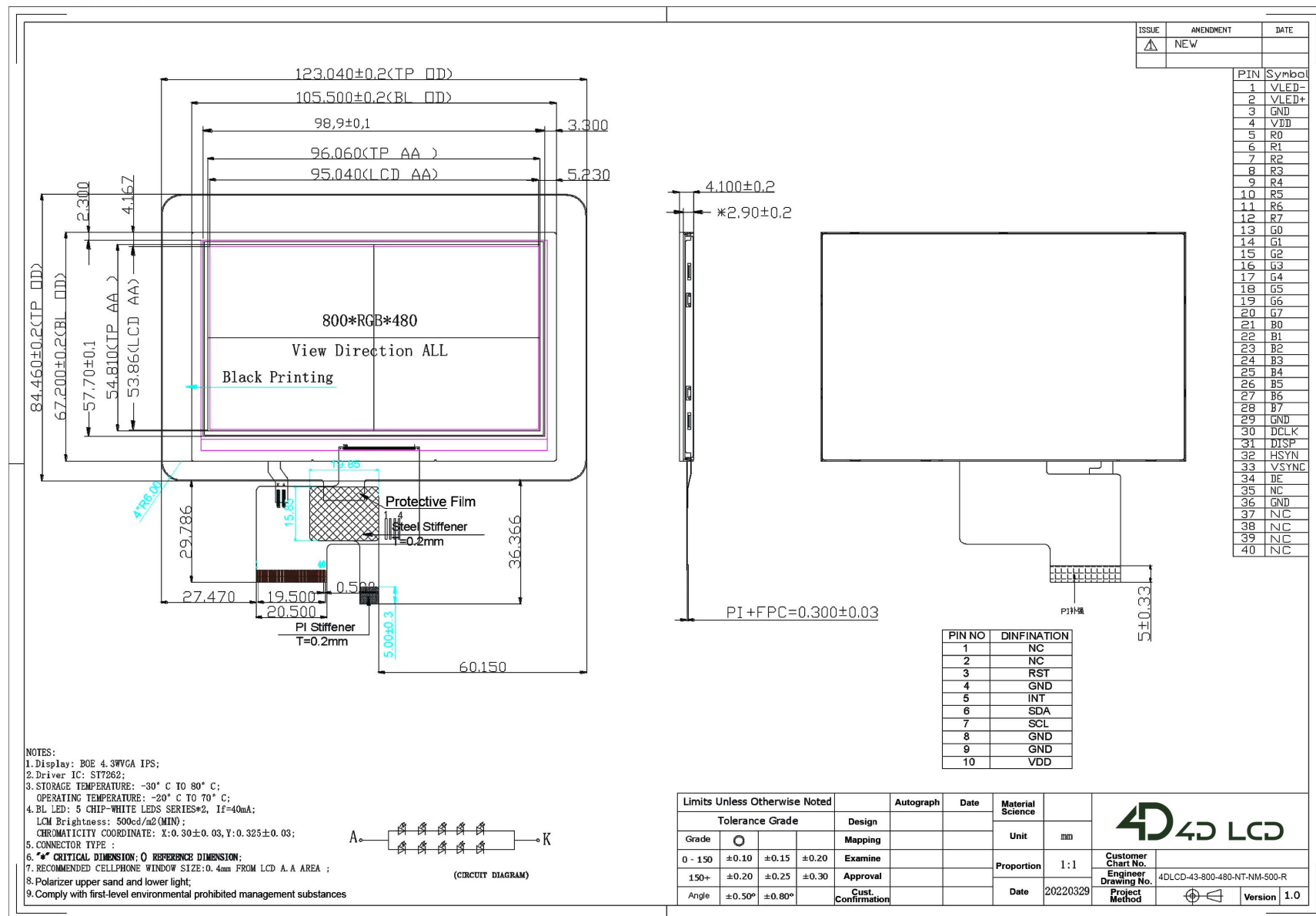L - LVDS
D - MIPI/DSI
R - RGB
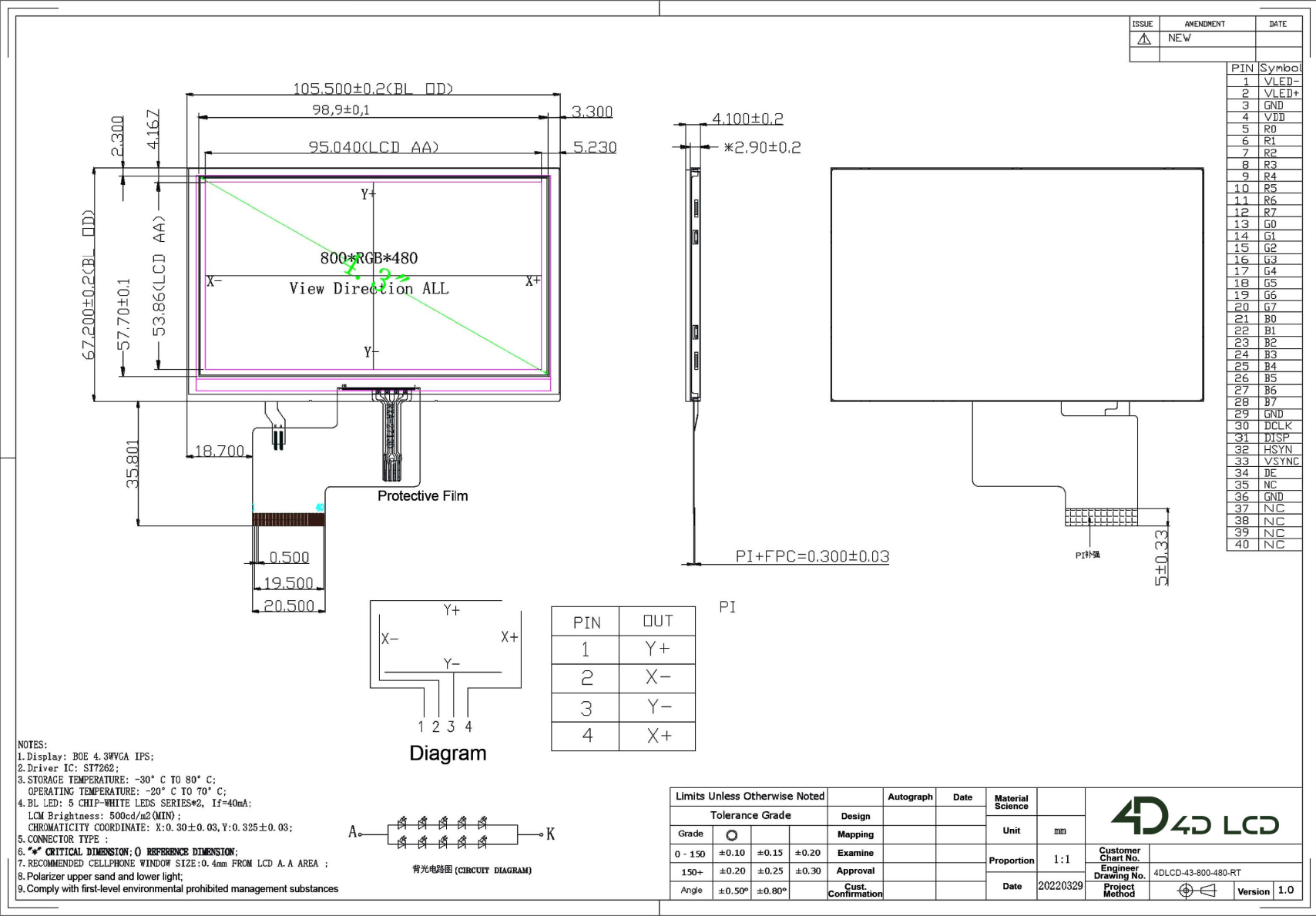S - SPI
M8 - MCU 8bit
M16 - MCU 16bit

2. TFT LCD Display Drawing (Non Touch with Cover Lens Version)

4DLCD-43-800-480-NT-NM-500-R
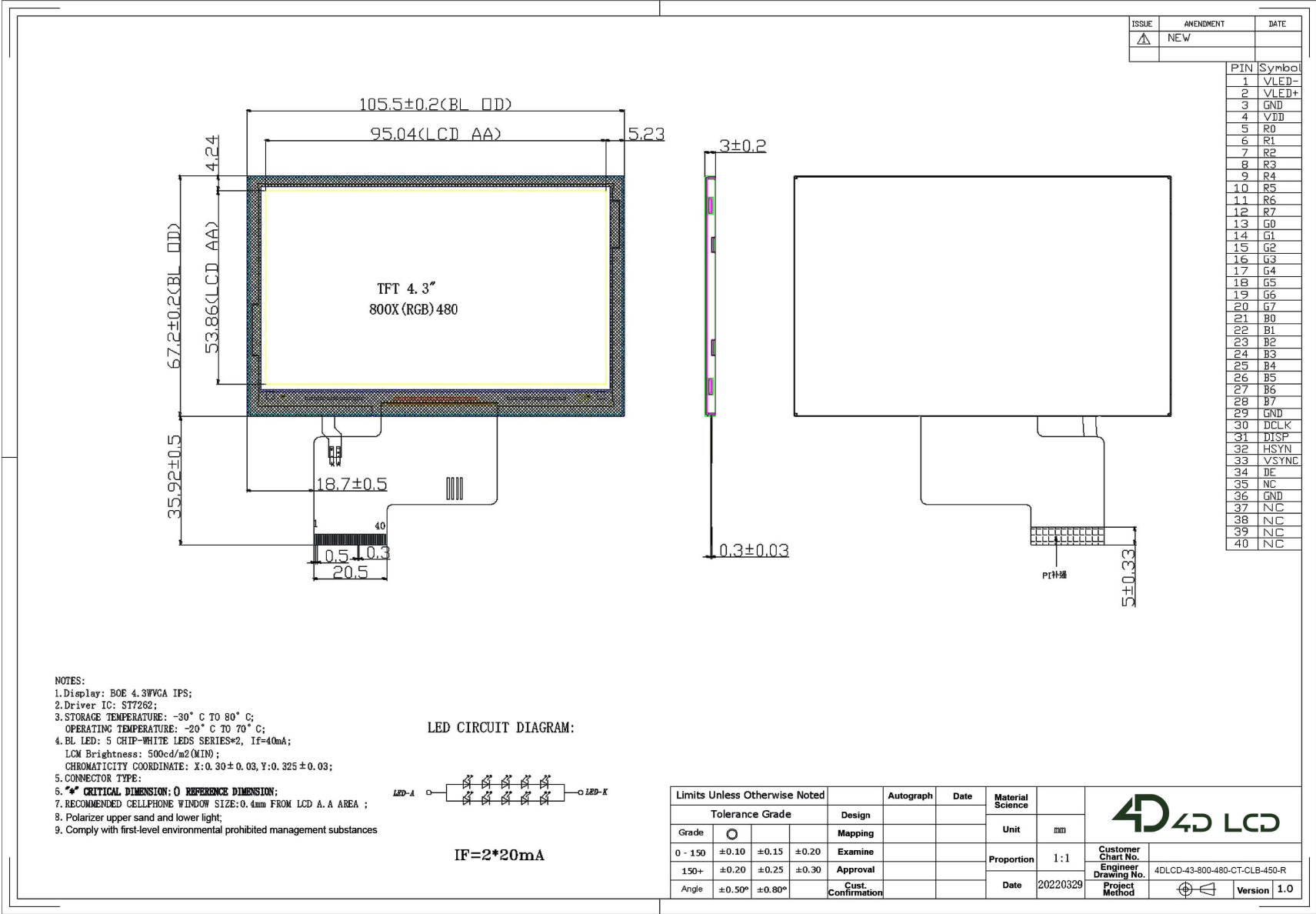

Dimensions (left drawing):
- 123.040±0.2(TP OD)
- 105.500±0.2(BL OD)
- 98.9±0.1
- 96.060(TP AA)
- 95.040(LCD AA)
- 3.300
- 5.230
- 2.300
- 4.167
- 84.460±0.2(TP OD)
- 67.200±0.2(BL OD)
- 57.70±0.1
- 54.810(TP AA)
- 53.86(LCD AA)

800*RGB*480
View Direction ALL
Black Printing

- 4.100±0.2
- *2.90±0.2
- 4*R6.0*
- 29.786
- 15.85
- 10.85
- 36.366
- 27.470
- 19.500
- 20.500
- 0.500
- 5.00±0.3
- 60.150
- PI+FPC=0.300±0.03
- 5±0.33

Protective Film
Steel Stiffener T=0.2mm
PI Stiffener T=0.2mm

Amendment table:

ISSUE	AMENDMENT	DATE
⚠	NEW	

Pin table:

PIN	Symbol
1	VLED-
2	VLED+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYN
33	VSYNC
34	DE
35	NC
36	GND
37	NC
38	NC
39	NC
40	NC

Touch connector pin table:

PIN NO	DINFINATION
1	NC
2	NC
3	RST
4	GND
5	INT
6	SDA
7	SCL
8	GND
9	GND
10	VDD

P1补强

NOTES:
1. Display: BOE 4.3WVGA IPS;
2. Driver IC: ST7262;
3. STORAGE TEMPERATURE: -30° C TO 80° C;
   OPERATING TEMPERATURE: -20° C TO 70° C;
4. BL LED: 5 CHIP-WHITE LEDS SERIES*2, If=40mA;
   LCM Brightness: 500cd/m2(MIN);
   CHROMATICITY COORDINATE: X:0.30±0.03,Y:0.325±0.03;
5. CONNECTOR TYPE :
6. "*" CRITICAL DIMENSION; () REFERENCE DIMENSION;
7. RECOMMENDED CELLPHONE WINDOW SIZE:0.4mm FROM LCD A.A AREA ;
8. Polarizer upper sand and lower light;
9. Comply with first-level environmental prohibited management substances

A ⊸ K
(CIRCUIT DIAGRAM)

Title block:

Limits Unless Otherwise Noted				Autograph	Date	Material Science	
Tolerance Grade			Design				
Grade	○		Mapping			Unit	mm
0 - 150	±0.10	±0.15 ±0.20	Examine				
150+	±0.20	±0.25 ±0.30	Approval			Proportion	1:1
Angle	±0.50°	±0.80°	Cust. Confirmation			Date	20220329

4D LCD

Customer Chart No.
Engineer Drawing No. 4DLCD-43-800-480-NT-NM-500-R
Project Method
Version 1.0

3. TFT LCD Display Drawing (With Resistive Touch Version)
4DLCD-43-800-480-RT

NOTES:
1. Display: BOE 4.3WVGA IPS;
2. Driver IC: ST7262;
3. STORAGE TEMPERATURE: -30°C TO 80°C;
   OPERATING TEMPERATURE: -20°C TO 70°C;
4. BL LED: 5 CHIP-WHITE LEDS SERIES*2, If=40mA;
   LCM Brightness: 500cd/m2(MIN);
   CHROMATICITY COORDINATE: X:0.30±0.03,Y:0.325±0.03;
5. CONNECTOR TYPE :
6. "✳" CRITICAL DIMENSION;() REFERENCE DIMENSION;
7. RECOMMENDED CELLPHONE WINDOW SIZE:0.4mm FROM LCD A.A AREA ;
8. Polarizer upper sand and lower light;
9. Comply with first-level environmental prohibited management substances

4. TFT LCD Display Drawing (With Capacitive Touch Version)
4DLCD-43-800-480-CT-450-R

ISSUE	AMENDMENT	DATE
⚠	NEW	

PIN	Symbol
1	VLED-
2	VLED+
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYN
33	VSYNC
34	DE
35	NC
36	GND
37	NC
38	NC
39	NC
40	NC

TFT 4.3"
800X(RGB)480

NOTES:
1. Display: BOE 4.3WVGA IPS;
2. Driver IC: ST7262;
3. STORAGE TEMPERATURE: -30° C TO 80° C;
   OPERATING TEMPERATURE: -20° C TO 70° C;
4. BL LED: 5 CHIP-WHITE LEDS SERIES*2, If=40mA;
   LCM Brightness: 500cd/m2(MIN);
   CHROMATICITY COORDINATE: X:0.30±0.03, Y:0.325±0.03;
5. CONNECTOR TYPE:
6. "*" CRITICAL DIMENSION; () REFERENCE DIMENSION;
7. RECOMMENDED CELLPHONE WINDOW SIZE:0.4mm FROM LCD A.A AREA ;
8. Polarizer upper sand and lower light;
9. Comply with first-level environmental prohibited management substances

LED CIRCUIT DIAGRAM:

IF=2*20mA

Limits Unless Otherwise Noted					Autograph	Date	Material Science		
Tolerance Grade			Design						
Grade	◯		Mapping				Unit	mm	
0 - 150	±0.10	±0.15 ±0.20	Examine				Proportion	1:1	Customer Chart No.
150+	±0.20	±0.25 ±0.30	Approval						Engineer Drawing No. 4DLCD-43-800-480-CT-CLB-450-R
Angle	±0.50°	±0.80°	Cust. Confirmation				Date	20220329	Project Method / Version 1.0

4D LCD

5. Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Power Supply	VDD	-0.3	-	4.0	V
	VDDI	-0.3	-	4.0	V
	PVDD	-0.3	-	4.0	V
	PVDD1	-0.3	-	4.0	V
Operating Temperature	T_{OP}	-20		70	℃
Storage Temperature	T_{ST}	-30		80	℃

6. Electrical Characteristics and Timing Characteristics

6.1. DC Electrical Characteristics (VSS=0V, Ta=25℃)

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Power Supply		VDD	3.1	3.3	3.6	V
Input Voltage	'H'	V_{IH}	0.7VDD	-	VDD	V
	'L'	V_{IL}	0	-	0.3VDD	

6.2. LED Backlight Specification (VSS=0V, Ta=25℃)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Forward Voltage	V_F	-	18	16.5	V
Forward Current	I_F	-	20	-	mA
LED Life Time	-	-	30000	-	Hrs

7. Electro-Optical Characteristics

ITEM	SYM	CONDITION	MIN	TYP	MAX	UNIT	Note
Response Time	Tr+Tf	θ=0	-	30	40	ms	Note 6
Contrast Ratio	Cr	°	-	1200	-	-	Note 2
Color Gamut	NTSC	∅=0	-	50	-	%	Note 5
Surface Luminance	Lv	4DLCD-43800480-IPS	-	500	-	cd/m2	
		4DLCD-43800480-CTP-CLB-I	-	450	-		
Viewing Angle Range	θ	∅ = 90°	-	80	-	deg	Note 1
		∅ = 270°	-	80	-	deg	
		∅ = 0°	-	80	-	deg	
		∅ = 180°	-	80	-	deg	
CIE (x,y) Chromacity	Red	x	-	0.311	-		Note 5
		y		0.338			

Note:

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.

2. Contrast measurements shall be made at viewing angle of $=\theta 0°$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4 for a total of the measurements per display.

4. The White luminance uniformity on LCD surface is then expressed as: ΔY = Minimum Luminance of 9 Points or 5 points / Maximum Luminance of 9 Points or 5 points (See FIGURE 2).

5. The color chromaticity coordinates specified in Table 5. shall be calculated from the spectral data measured with C light. Measurements shall be made at the center of the panel.

6. The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Td, and 90% to 10% is Tr.
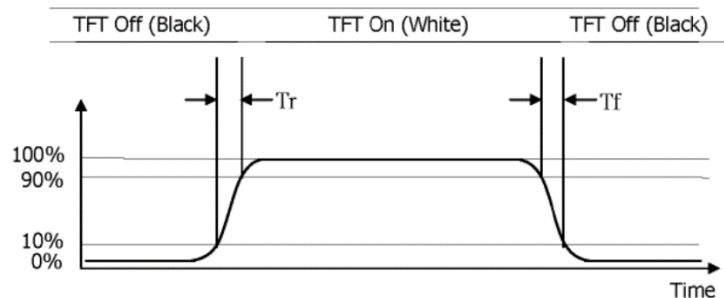
8. Interface Descriptions

8.1. LCD Interface

PIN NO.	SYMBOL	DESCRIPTION	REMARK
1	LED_K	LED Backlight Ground	
2	LED_A	LED Backlight Power	
3	GND	Ground	
4	VDD	Power Supply	
5~12	R0~R7	Red Data Input	
13~20	G0~G7	Green Data Input	
21~28	B0~B7	Blue Data Input	
29	GND	Ground	
30	PCLK	Data Clock	
31	DISP	Standby mode control Select Pin	
32	HS	Horizontal SYNC Input	
33	VS	Vertical SYNC Input	
34	DE	Data enable control	
35	NC	Not Connect	
36	GND	Ground	
37	X1	The touch panel control pin	
38	Y1	The touch panel control pin	
39	X2	The touch panel control pin	
40	Y2	The touch panel control pin	

8.2. CTP Interface

The Capacitive Touch is driven by a **Focaltech FT5446** capacitive touch driver IC, which utilizes an I2C interface, and is capable of 5-point touch.

PIN NO.	SYMBOL	DESCRIPTION	REMARK
1	NC	Not Connect	
2	NC	Not Connect	
3	RST	Reset Pin	
4	GND	Ground	
5	INT	Interrupt Signal from CTP	Only connected to the CTP Panel, not connected to the LCD itself
6	SDA	I2C SCA	
7	SCL	I2C SCL	
8	GND	Ground	
9	GND	Ground	
10	VDD	Power Supply (3.3V)	

9. LCD Timing Details

9.1. SYNC Mode
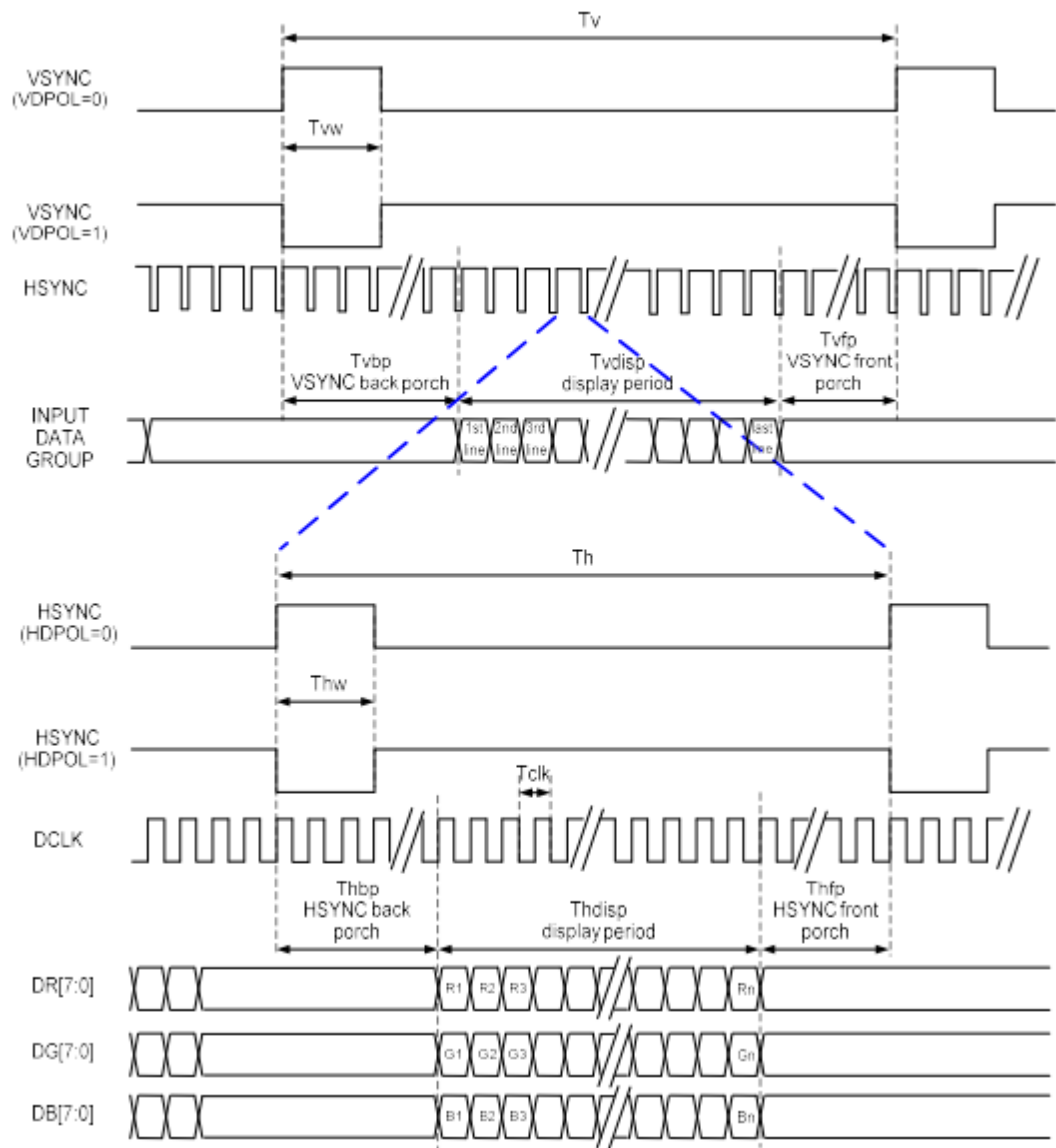
9.2. SYNC-DE Mode
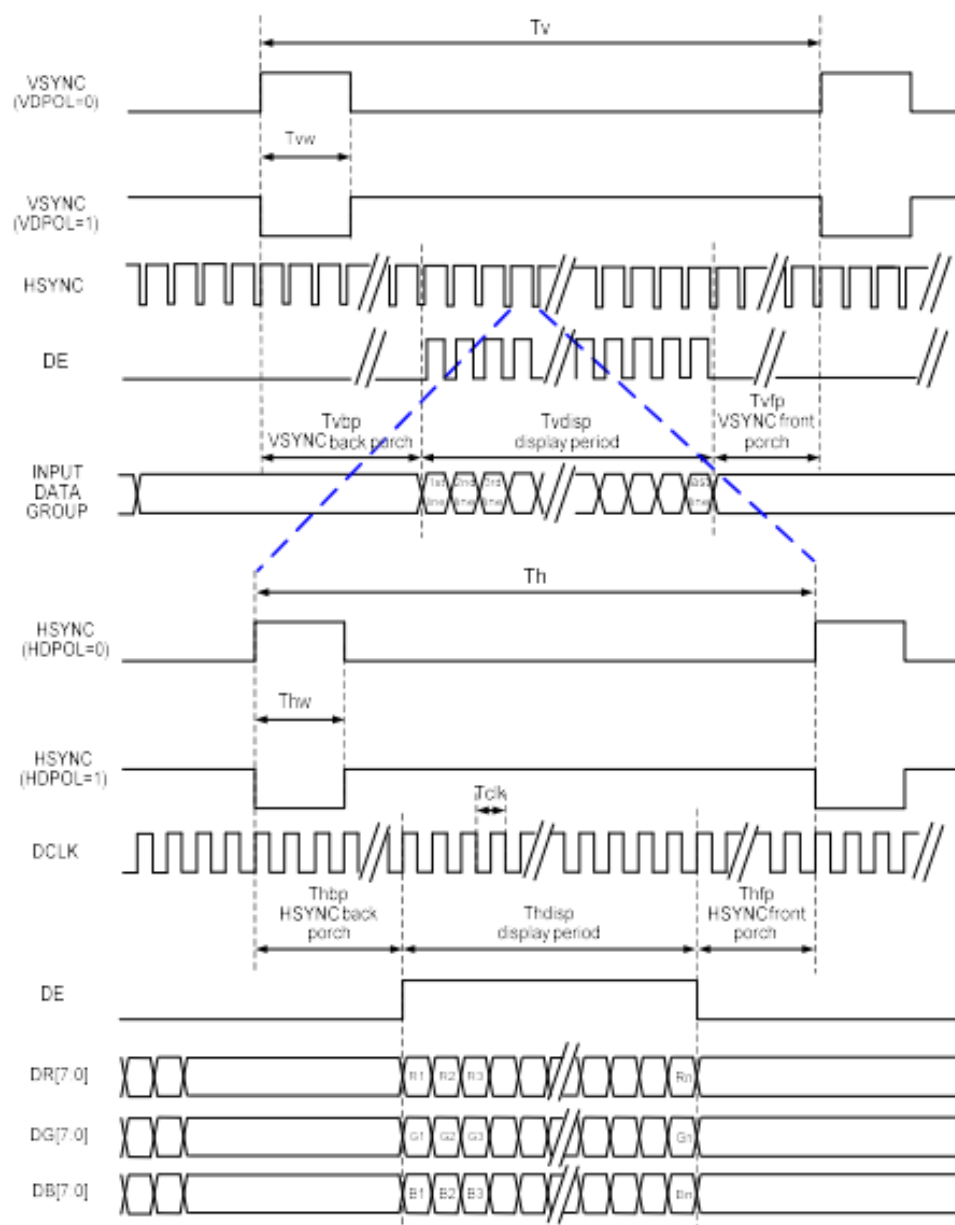
9.3. DE Mode
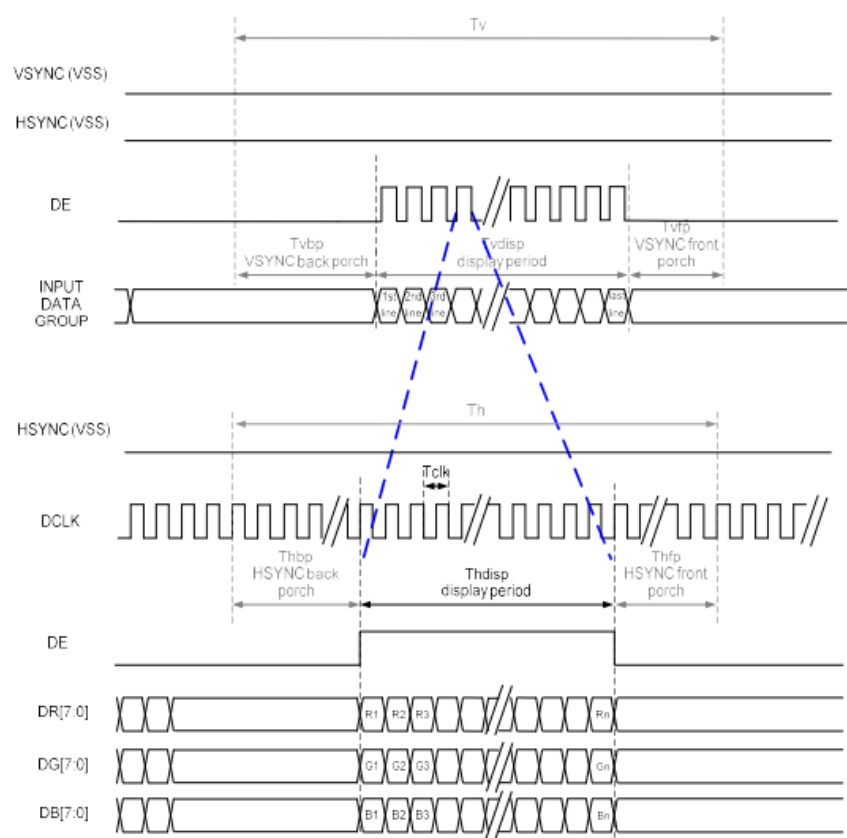
9.4. Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND=

PARALLEL 24-BIT RGB INTERFACE TIMING TABLE							
ITEM		SYMBOL	MIN	TYP	MAX	UNIT	REMARK
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp	800			DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Porch	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	492	496	504	HSYNC	
	Display Period	Tvdisp	480			HSYNC	
	Back Porch	Tvbp	6	8	12	HSYNC	
	Front Porch	Tvfp	6	8	12	HSYNC	
	Pulse Porch	Tvw	2	4	8	HSYNC	

Note: 1. The minimum blanking time depends on the GIP timing of the panel specification.

2. To ensure the compatibility of different panels, it is recommended to use the typical setting.

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

10. Reliability Test

No.	SYMBOL	TEST CONDITION	REMARK
1	High Temperature Storage	80℃±2℃ 96H Restore 2H at 25℃ Power off	After test cosmetic and electrical defects should not happen.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 2H at 25℃ Power off	
3	High Temperature Operation	70℃±2℃ 96H Power on	
4	Low Temperature Operation	-20℃±2℃ 96H Power	
5	High Temperature & Humidity Operation	60℃±2℃ 90%RH 96H Power on	
6	Temperature Cycle	-20℃←→25℃←→70℃ 30min　5min　30min After 10 cycles, restore 2H at 25℃ Power off	
7	Vibration Test	10Hz~150Hz, 100m/s^2, 120min	
8	Shock Test	Half-sinewave, 300m/s^2, 11ms	

11.   Precautions for Using LCD Module

11.1. Handing Precautions

(1) The display panel is made of glass. Do not subject it to a mechanical shock or impact by dropping it.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten a cloth with one of the following solvents:

   - Isopropyl alcohol

   - Ethyl alcohol

(6) Solvents other than those above mentioned may damage the polarizer.

Especially, do not use the following:

   - Water

   - Ketone

   - Aromatic solvents

(7) Extra care to minimize corrosion of the electrode. Water droplets, moisture condensation or a current flow in a high-humidity environment accelerates corrosion of the electrode.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD Module, make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD Module.

(10)   NC terminal should be open. Do not connect anything.

(11)   If the logic circuit power is off, do not apply the input signals.

(12)   To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

   - Be sure to ground the body when handling he LCD Module.

   - Tools required for assembling, such as soldering irons, must be properly grounded.

   - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.

   - The LCD Module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

11.2. Storage Precautions

When storing the LCD Module, avoid exposure to direct sunlight of fluorescent lamps. Keep the modules in bags (avoid high temperature / high humidity and low temperatures below 0℃. Whenever possible, the LCD Module should be stored in the same conditions in which they were shipped from our company.

11.3. Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD Module have been operating for a long time showing the same display patterns the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be recovered by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD Module resulting from destruction caused by static electricity etc. Exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.

12.   Legal Information

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