AIO TDA07A
Touch Display Specification

Preliminary

Version: 1.0
Released date: 2024/4
All information in this technical Specification subject to change without notice.

Revision Record

Revision	Description	Date
0.0	Initial Release	2024/8/1
1.0	General updates	2024/8/15

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1. General Descriptions

TDA07A is a 7-inch color active matrix TFT-LCD monitor featuring a 16:9 aspect ratio. It delivers exceptional display performance through a digital LVDS interface and has a compact LED backlight unit. The LCD supports a pixel format of 1024(H) x RGB x 600(V) in stripe color, with 16.7M colors, resulting in a vivid and vibrant color image.

Notably, this monitor boasts outstanding features, including a wide operating temperature range of -30 to +85℃, high brightness LCD of 1000nits (Typ.), a wide viewing angle, and a high contrast ratio of 1000:1. These attributes make the monitor exceptionally well-suited for applications in challenging environments or outdoor use.

1.1. General Applications

This display terminal is versatile and well-suited for various applications, including but not limited to Car Navigation, Industrial usage, Medical devices, Gaming, Human-Machine Interface (HMI), Amusement, Advertising, and more.

1.2 Features

- IPS mode
- High brightness LED backlight with a lifetime of 70,000 hours
- Wide operational temperature range
- Chemical strengthen with Anti-UV layer
- Integrated LVDS, LED driver, and Touch interface into one connector
- Built-in LED driver
- Air bonding
- Pre-qualification for CE and UL Certifications
- RoHS Compliant

1.3 General Information

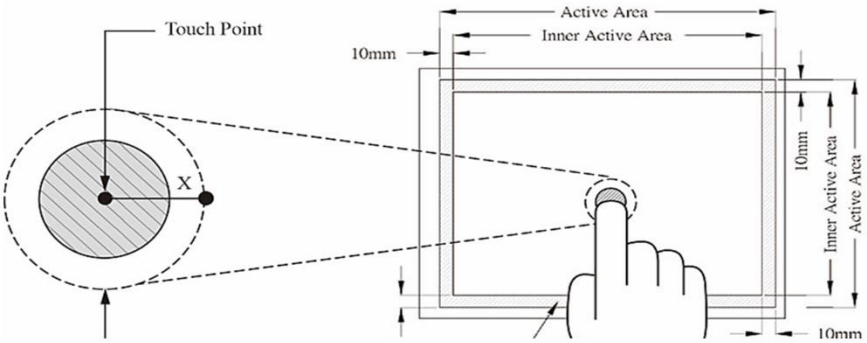
1.3.1 TD Characteristics

Item	Specification	Unit
Screen Size	7 inches	Diagonal
Display Resolution	1024(H) x 600(V)	Pixel
Active Area	154.2144(H) x 85.92(V)	mm
Cover glass	1.1t Chemical strengthen, black printed frame	-
Surface treatment	Clear surface, Anti-UV	-
Display Mode	Normally Black	-
Touch Display Luminance	800 (Typ.)	nits
Contrast Ratio	1000:1 (Typ.)	-
Pixel Arrangement	R,G,B Stripe	-
Pixel Size	0.1506(H) x 0.1432(V)	mm
Display Color	16.7M	-
Viewing Direction	Full View	-
Input Interface	LVDS	-
Total Power Consumption	3.5 (Typ.)	W
Operating temperature	-30~85	℃
Storage temperature	-30~85	℃

1.3.2 Touch Characteristics

Item	Specification	Unit
TouchTechnology	Projected Capacitive Touch (G/F/F)	-
Touch Point	5 fingers	-
Touch Controller	COF PM2503A	-
Touch Interface	USB / I2C	-
S/W protocol	Follow HID standard	-
Accuracy	Inner Active Area <1, Active Area <2	mm

Note: The definition of the accuracy area:



1.3.3 Touch Display Mechanical Dimensions

Item		Min.	Typ.	Max.	Unit
Module Size	Width (W)	188.5	188.8	189.1	mm
	Height (H)	120.22	120.52	120.82	
	Depth (D)	-	5.5	-	
Weight		-	205	-	g

Note: Not include components. Refer to the outline dimension drawing as attached.

2 Absolute Maximum Ratings

2.1 Electrical Absolute Maximum Ratings

2.1.1 DC Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power supply for LCM	V_{CC}	3.0	3.3	3.6	V	
Power supply current for LCM	I_{DD}	-	145	-	mA	(a)

Note (a) fv=60Hz , Ta=25 °C , Display pattern : White pattern.

2.1.2 Backlight

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power supply voltage for LED driver		V_{LED}	-	12	-	V	
Power supply current for LED driver		I_{LED}	-	220	-	mA	
EN Signal Voltage	High	PWM/EN	2.1	-	-	V	
	Low		-	-	0.9	V	
PWM Frequency		PWM	100		1000	Hz	

2.1.3 USB Interface

Item	Symbol	Min.	Typ.	Max.	Unit	Note
USB Positive power supply	USB_5V	4.75	5	5.25	V	
D- pin of internal USB transceiver	USB_D-	-	3.3	-	V	
D+ pin of internal USB transceiver	USB_D+	-	3.3	-	V	
USB Ground	USB_GND		0		V	

2.1.4 I2C Interface

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Serial data line for I²C	I2C_SDA	-	3.3	-	V	Open drain requires external pull-up to 3.3V
Serial clock line for I²C	I2C_SCL	-	3.3	-	V	Open drain requires external pull-up to 3.3V
Processor Interrupt	TOUCH_INT				V	Open drain requires external pull-up to 3.3V This pin is active low
Chip reset signal	TOUCH_RESET	-	3.3	-	V	Normal: High, Active Reset: Low
I2C Positive power supply	TOUCH_VCC	2.97	3.3	3.4	V	
I2C Ground	TOUCH_GND	-	0	-	V	

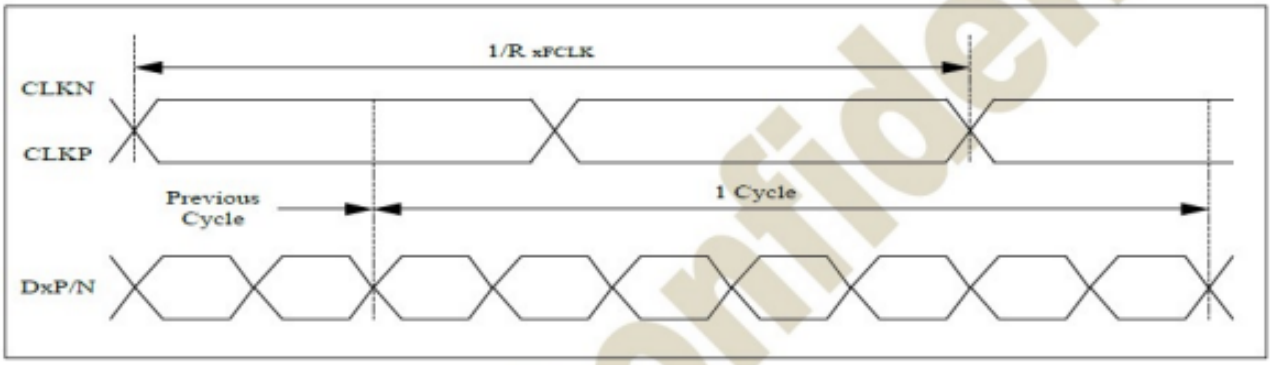
2.2 Timing Characteristics

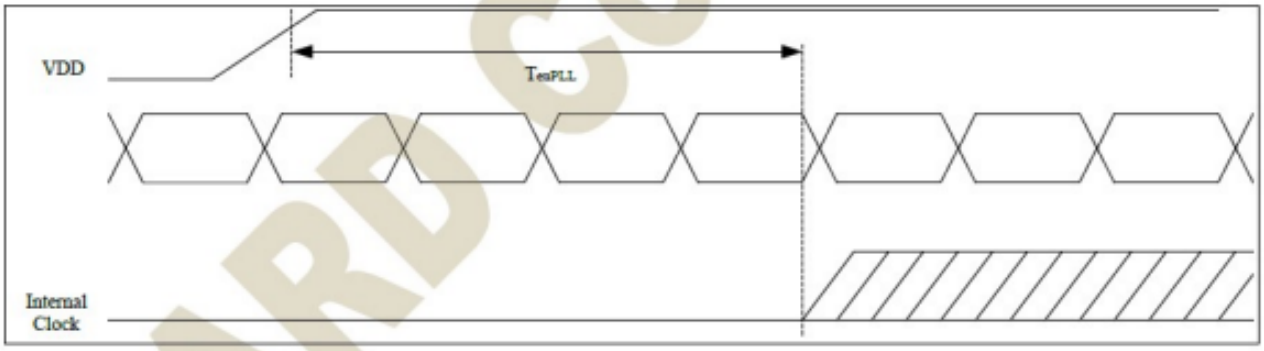
2.2.1 Timing Condition

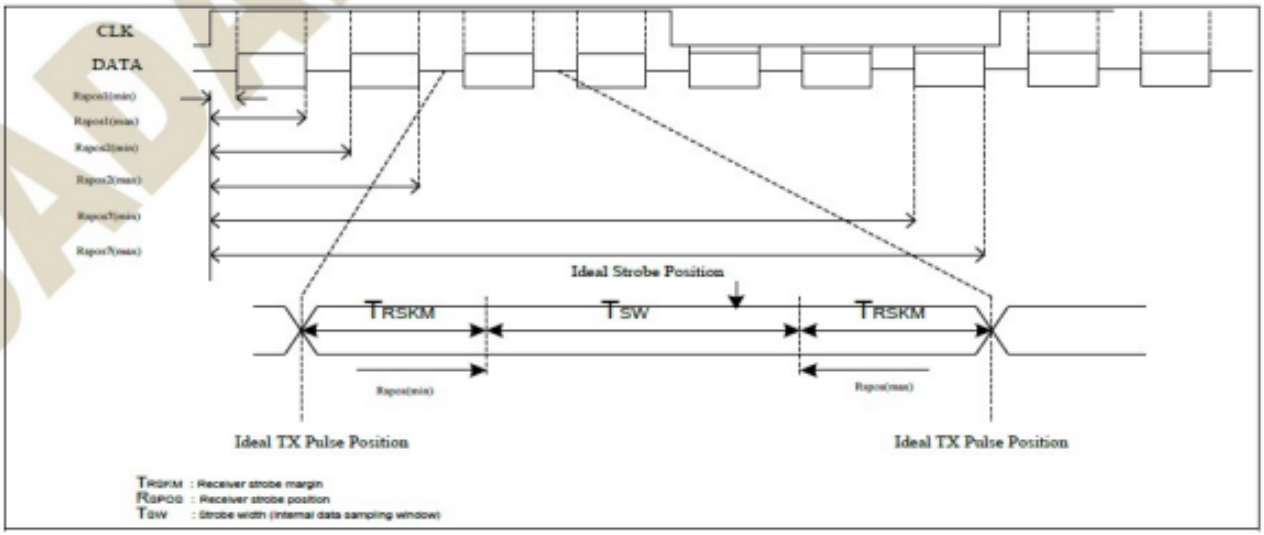
Parameter		Symbol	Min.	Typ.	Max.	Unit
DCLK frequency @frame Rate=60Hz (LVDS)		F_{DCLK}	41.4	51.2	67.2	MHz
HSYNC period time		T_H	1114	1344	1400	DCLK
Horizontal display area		T_{HD}		1024		DCLK
HSYNC pulse width	Min.	T_{HPW}		1		
	Typ.			24		
	Max.			HBP-1		
HSYNC back porch (with pulse width)		T_{HBP}	60	160	160	DCLK
HSYNC front porch		T_{HFP}	30	160	216	DCLK
VSYNC period time		T_V	620	635	800	H
Vertical display area		T_{VD}		600		H
VSYNC pulse width	Min.	T_{VPW}		1		
	Typ.			2		
	Max.			VBP-1		
VSYNC back porch (with pulse width)		T_{VBP}	8	23	100	H
VSYNC front porch		T_{VFP}	12	12	100	H

2.2.2 Timing Condition

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	20	-	71	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	-0.2	-	0.2	UI	|VID| = 200mV RxVCM = 1.2V 1UI=1/(RxFCLKx7)
Clock high time	T_{LVCH}	-	3.5/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3.5/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	







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3. Optical Characteristics of LCD

The listed parameters are measured under stable conditions. Optical characteristics should be assessed in a dark room or an equivalent state using the prescribed methods.

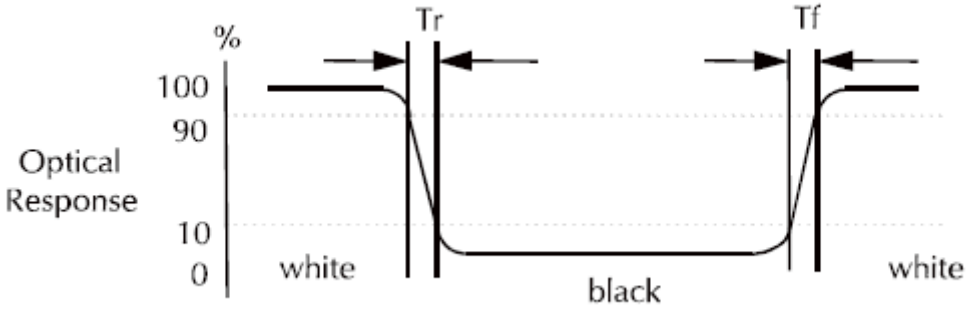
Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Brightness		B		-	1000	-	cd/m²	
Response time		Tr+Tf	θ=0°	-	30	40	ms	
Contrast ration (Center)		CR	At optimized viewing angle	800	1000	-	-	
Viewing Angle	Hor.	θ_R	CR≥10	-	80	-	Deg	
		θ_L		-	80	-		
	Ver.	θ_U		-	80	-		
		θ_D		-	80	-		
LED Life Time		-		70000	-	-	hr	

(a) Test equipment setup

Once the panel has stabilized and been allowed to warm up for optimal Liquid Crystal Module (LCM) operation, measurements should be conducted. The assessment is carried out in a stable, windless, and dark room environment. Optical specifications are measured using the Topcon BM-7A(fast) instrument with a 2° viewing angle at a distance of 50cm in the normal direction.

(b) Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

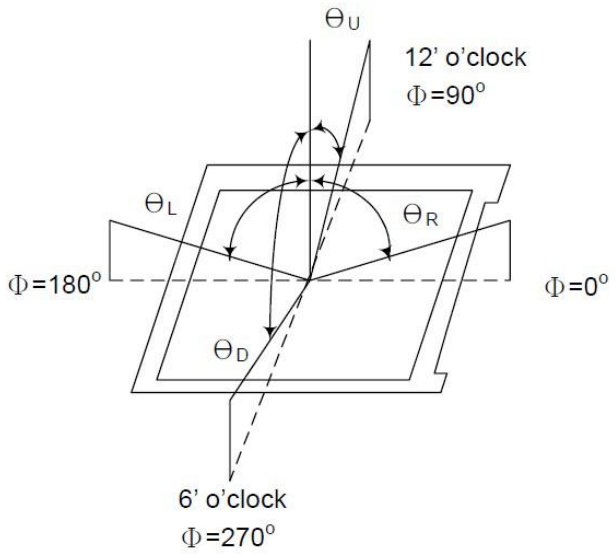


(c) Definition of contrast ratio:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at “white state”}}{\text{Brightness measured when LCD is at “black state”}}$$

(d) Measurements are taken at the central region of the panel when all the input terminals of the LCD panel are electrically open.

(e) View Angle



(f) Definition of Luminance of White: Luminance of white at the center points

- Light Source of Back-Light Unit : LED Type

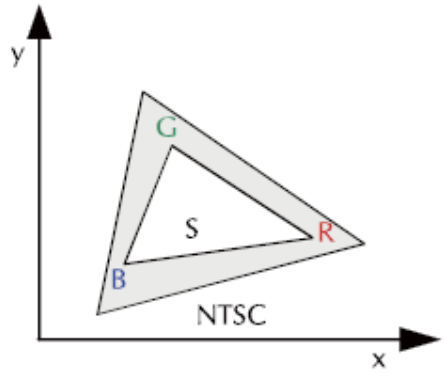
(g) Definition of White Uniformity

$$\text{White Uniformity} = \frac{\text{Min. luminance of white among 9-points}}{\text{Max. luminance of white among 9-points}} \times 100\%$$

(h) The definition of Color Gamut -Color Chromaticity CIE 1931

Color coordinate of white & red, green, blue at center point.

Color Gamut : NTSC(%) = (RGB Triangle Area / NTSC Triangle Area) x 100



4. Input Terminal Pin Assignment

CN1 : JAE FI-RE51S-HF-G1-R1500

Cable : JAE KB904-51HLF1A(FIR)

PIN#	Symbol	I/O	Function	Note
1	GND	P	Ground	
2	ENABLE_DISPLAY	-	No Connect	
3	VCC_DISPLAY	P	Power Supply Logic voltage (+3.3V)	
4	VCC_DISPLAY	P	Power Supply Logic voltage (+3.3V)	
5	GND	P	Ground	
6	RXIN 0-	I	Negative LVDS differential data 0 input	
7	RXIN 0+	I	Positive LVDS differential data 0 input	
8	RXIN 1-	I	Negative LVDS differential data 1 input	
9	RXIN 1+	I	Positive LVDS differential data 1 input	
10	GND	P	Ground	
11	RXIN 2-	I	Negative LVDS differential data 2 input	
12	RXIN 2+	I	Positive LVDS differential data 2 input	
13	RXCLKIN -	I	Negative LVDS differential CLK input	
14	RXCLKIN +	I	Positive LVDS differential CLK input	
15	GND	P	Ground	
16	RXIN 3-	I	Negative LVDS differential data 3 input	
17	RXIN 3+	I	Positive LVDS differential data 3 input	
18	NC	-	No Connect	
19	NC	-	No Connect	
20	GND	P	Ground	
21	NC	-	No Connect	
22	NC	-	No Connect	
23	NC	-	No Connect	
24	NC	-	No Connect	
25	GND	P	Ground	
26	NC	-	No Connect	
27	NC	-	No Connect	
28	NC	-	No Connect	
29	NC	-	No Connect	
30	GND	P	Ground	
31	V_BL	P	Power Supply LED voltage (+12.0V)	
32	V_BL	P	Power Supply LED voltage (+12.0V)	
33	V_BL	P	Power Supply LED voltage (+12.0V)	
34	ENABLE_BL	I	LED enable pin (+3.3V)	

35	PWM_BL	I	Power input signal for LED driver (+3.3V)	
36	GND_BL	P	Ground for BL Circuit	
37	GND_BL	P	Ground for BL Circuit	
38	GND_BL	P	Ground for BL Circuit	
39	NC	-	No Connect	
40	NC	-	No Connect	
41	NC	-	No Connect	
42	I2C_SDA	I	Touch I2C Data Signal. (Open drain requires external pull-up to +3.3V)	
43	I2C_SCL	I	Touch I2C Data Clock Signal (Open drain requires external pull-up to +3.3V)	
44	TOUCH_INT	I	Touch INT Signal	
45	TOUCH_RESET	I	Touch Reset Signal	
46	TOUCH_VCC	P	Touch VCC Input (+3.3V)	
47	TOUCH_GND	P	Ground	
48	USB_5V	P	Touch USB VDD Input (+5V)	
49	USB_D-	I	Touch USB D- Signal	
50	USB_D+	I	Touch USB D+ Signal	
51	USB_GND	P	Touch GND Input	

Notes: (a) NC Pin must be retained; this pin can't contact GND or other signal.

(b) GND Pin must ground contact, can not be floating.

5. Display Color and Input Data

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0 : Low level voltage,

1 :High level voltage

Each primary color can be represented with 256 gray scales using 8-bit data signals. By combining a total of 24-bit data signals, a display with 16,777,216 colors can be achieved on the screen.

6. Reliability Condition

The display and operation remain unchanged under the specified test conditions.

Condition: Unless otherwise specified, tests will be conducted under the following condition.

Temperature: 20±5℃

Humidity: 65±5% RH.

Tests will be not conducted under functioning state.

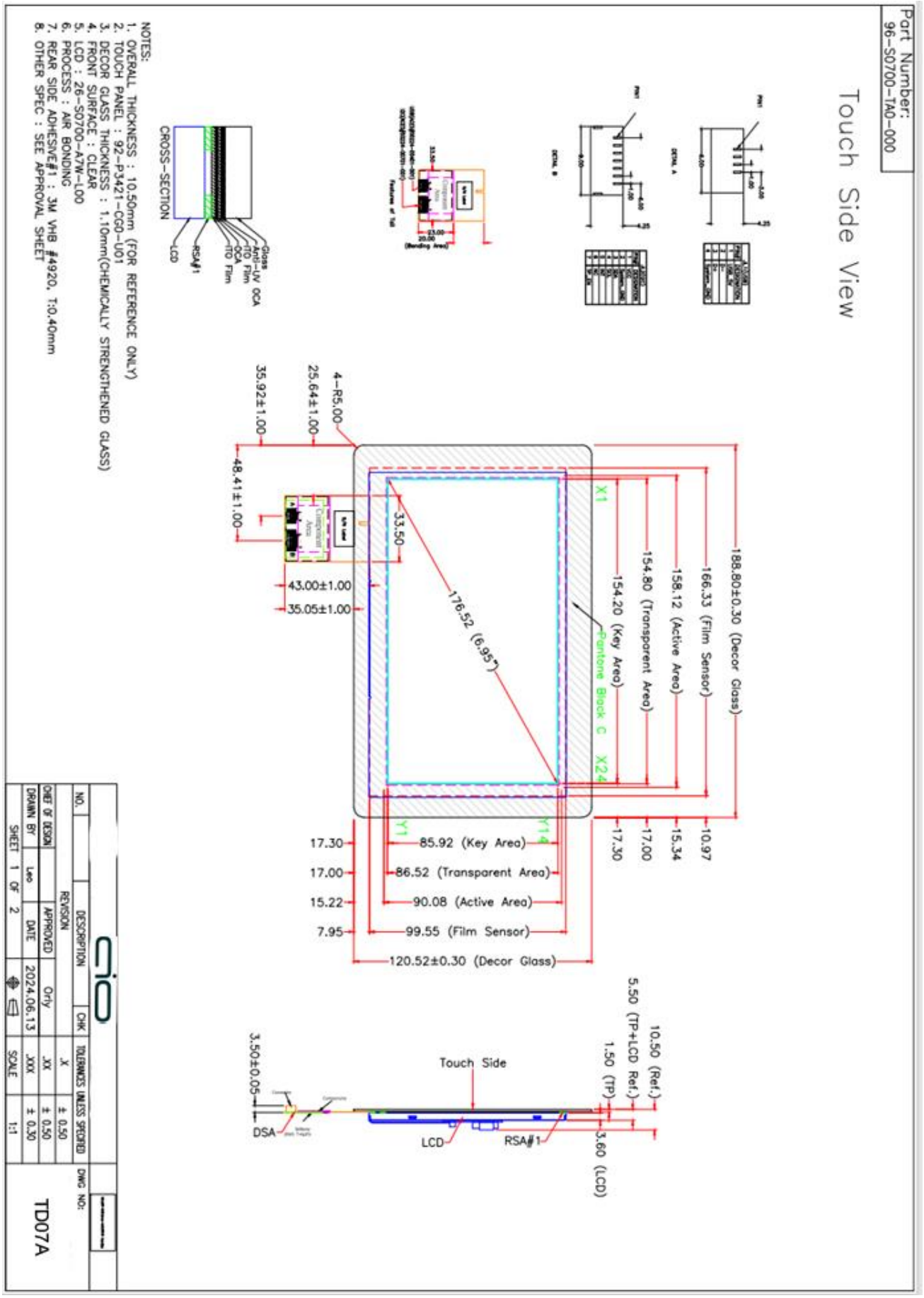
No.	Test Items	Conditions	Note
1	High Temperature Operating	85±2℃, 240hrs (Operation state)	(b)
2	Low Temperature Operating	-30±2℃, 240hrs (Operation state)	(a,b)
3	High Temperature Storage	85±2℃, 240hrs.	(b)
4	Low Temperature Storage	-30±2℃, 240hrs.	(a,b)
5	High Temperature and High Humidity Test	40±2℃, 90%, 240hrs.	(a,b)
6	Electrostatic discharge	Contact Discharge ±8kV, 10 times at 1sec interval Air Discharge ±15kV, 10 times at 1sec interval	

Notes:

(a) No dew condensation should be observed.

(b) The functional test should be conducted after the product has been stored for 4 hours at normal temperature and humidity following its removal from the test chamber.

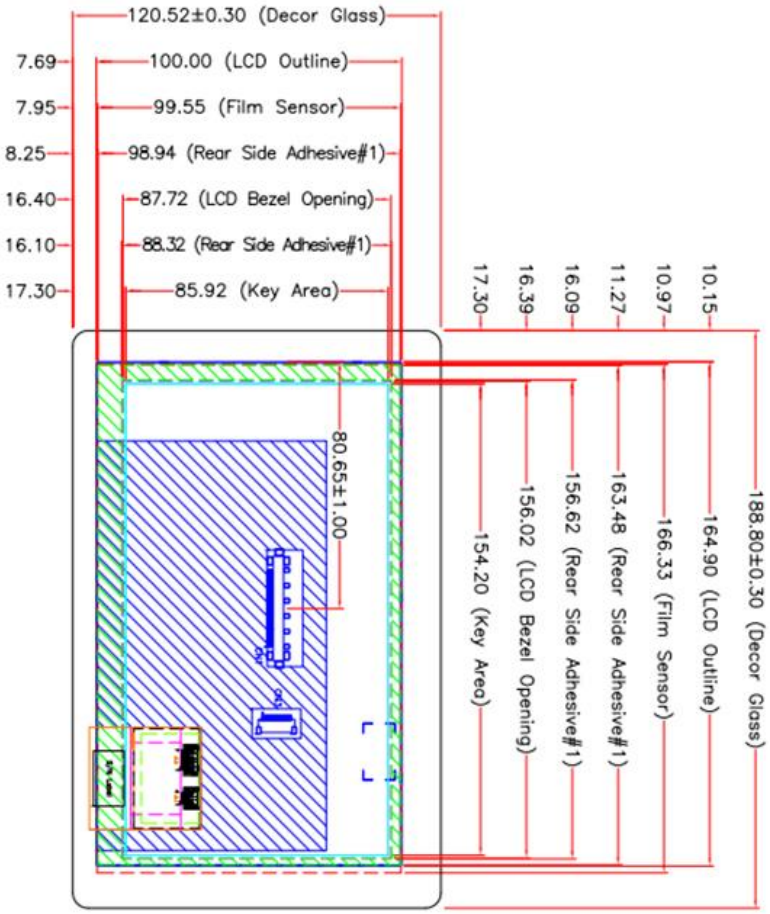
Attachment: AD Board Drawing



Part Number:
96-S0700-TA0-000

Rear Side View

Pin	Name	Function
1	GND	Ground
2	ENABLE_DISPLAY	NO Connect
3	VCC_DISPLAY	Power Supply Logic voltage (+3.3V)
4	VCC_DISPLAY	Power Supply Logic voltage (+3.3V)
5	GND	Ground
6	RXIN 0−	Negative LVDS differential data 0 input
7	RXIN 0+	Positive LVDS differential data 0 input
8	RXIN 1−	Negative LVDS differential data 1 input
9	RXIN 1+	Positive LVDS differential data 1 input
10	GND	Ground
11	RXIN 2−	Negative LVDS differential data 2 input
12	RXIN 2+	Positive LVDS differential data 2 input
13	RXCLKIN −	Negative LVDS differential CLK input
14	RXCLKIN +	Positive LVDS differential CLK input
15	GND	Ground
16	RXIN 3−	Negative LVDS differential data 3 input
17	RXIN 3+	Positive LVDS differential data 3 input
18	NC	NO Connect
19	NC	NO Connect
20	GND	Ground
21	NC	NO Connect
22	NC	NO Connect
23	NC	NO Connect
24	NC	NO Connect
25	GND	Ground
26	NC	NO Connect
27	NC	NO Connect
28	NC	NO Connect
29	NC	NO Connect
30	GND	Ground
31	V_BL	Power Supply LED voltage (+12.0V)
32	V_BL	Power Supply LED voltage (+12.0V)
33	V_BL	Power Supply LED voltage (+12.0V)
34	ENABLE_BL	LED enable pin
35	PWM_BL	Power input signal for LED driver
36	GND_BL	Ground for BL Circuit
37	GND_BL	Ground for BL Circuit
38	GND_BL	Ground for BL Circuit
39	NC	NO Connect
40	NC	NO Connect
41	NC	NO Connect
42	I2C_SDA	Touch I2C Data Signal
43	I2C_SCL	Touch I2C Data Clock Signal
44	TOUCH_INT	Touch INT Signal
45	TOUCH_RESET	Touch Reset Signal
46	TOUCH_VDD	Touch VDD Input
47	GND	Ground
48	USB_5V	Touch USB VDD Input
49	USB_D−	Touch USB D− Signal
50	USB_D+	Touch USB D+ Signal
51	USB_GND	Touch GND Input



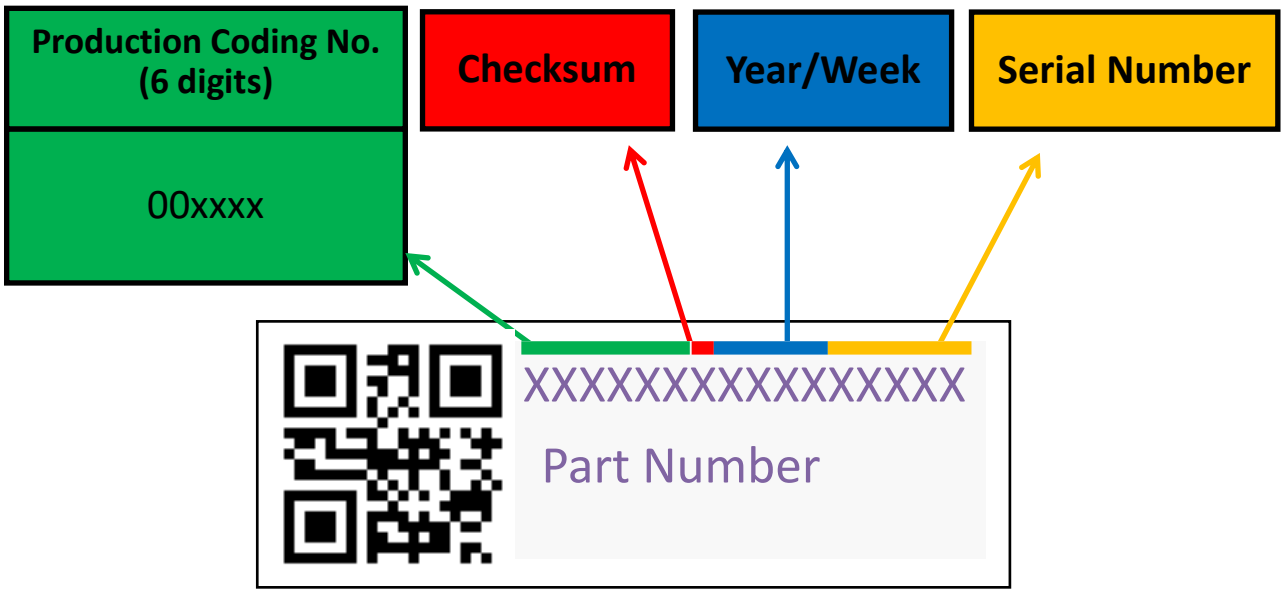
NO.	DESCRIPTION	CHK	TOLERANCES UNLESS SPECIFIED
	REVISION		.X ± 0.50
CHIEF OF DESIGN	APPROVED	Orly	.XX ± 0.50
DRAWN BY Leo	DATE	2024.06.13	.XXX ± 0.30
SHEET 2 OF 2			SCALE 1:1

aio

RoHS

DWG NO: TD07A

Attachment: Label Information



Attachment: Packing Information

Part Number	TDA07A Size:7.0”	Doc Rev： 1.0
Title	WI-E32004 Packing Method	Released Date：2024/08/23
		Page.18 of 18

1x Plastic tray

One plastic tray contains 4pcs of TD.
A pack has 8 plastic trays, 28pcs of TD in total.

*Note: Top tray is for protection only

1x BOX

One box contains two packs, 56pcs of TD in total.

*Note: If accessories are included, they will be provided separately.