

Display Elektronik GmbH

**DATA
SHEET**

TFT MODULE

DEM 480272N1 TMH-PW-N

(A-TOUCH)

4,3“ TFT + Touch

Product Specification

Ver.: 10

30.01.2018

Revision History

VERSION	DATE	Note
0	11.04.2013	First Issue
1	08.07.2013	Modify the Packing Diagram
2	09.04.2014	Update Revision
3	26.08.2014	Correct DC Characteristics
4	18.06.2015	Add Size, Surface & Resistance Touch Panel General Specifications. Modify Block Diagram Modify Reliability.
5	21.01.2016	Modify Static Electricity Test
6	05.08.2016	Remove Package Specification
7	11.08.2016	Modify Vibration Test
8	08.10.2016	Modify Summary
9	06.04.2017	Add Aspect Ratio
10	30.01.2018	Modify FPC

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1. Summary

This 4.3" TFT is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT LCD module, it is usually designed for industrial application and this module follows RoHS

2. General Specifications

- Size: 4.3 Inch
- Dot Matrix: 480 x RGB x 272 Dots
- Module Dimension: 105.50 x 67.20 x 4.05 mm
- Active Area: 95.04 x 53.86 mm
- Dot Pitch: 0.066 x 0.198 mm
- LCD Type: TN, TFT, Normally White, Transmissive
- View Direction: 12 o'Clock
- Gray Scale Inversion Direction: 6 o'Clock
- Aspect Ratio: 16:9
- Backlight Type: LED, Normally White, 50.000h
- With / without TP: with 4-Wire-Resistive Touch
- Surface: Anti-Glare

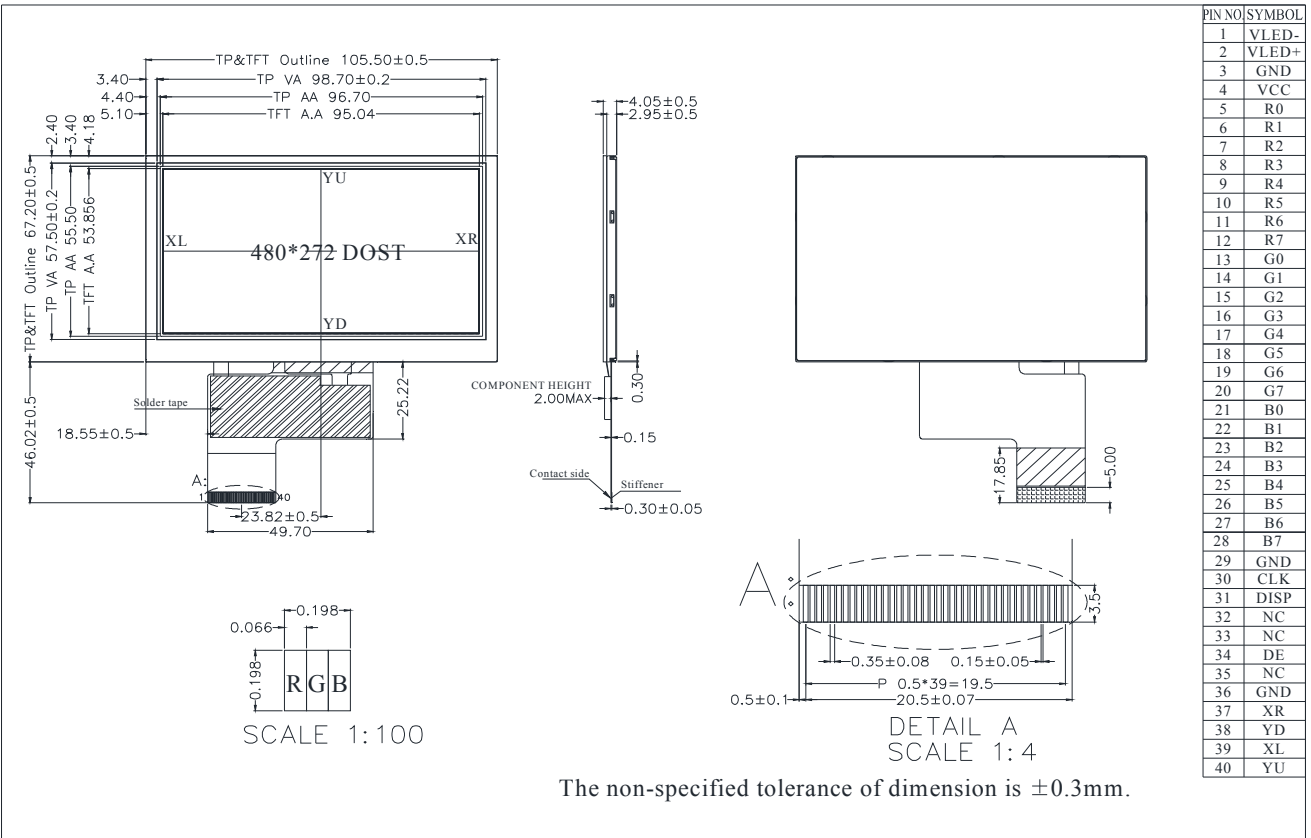
*Color tone slight changed by temperature and driving voltage.

3. Interface

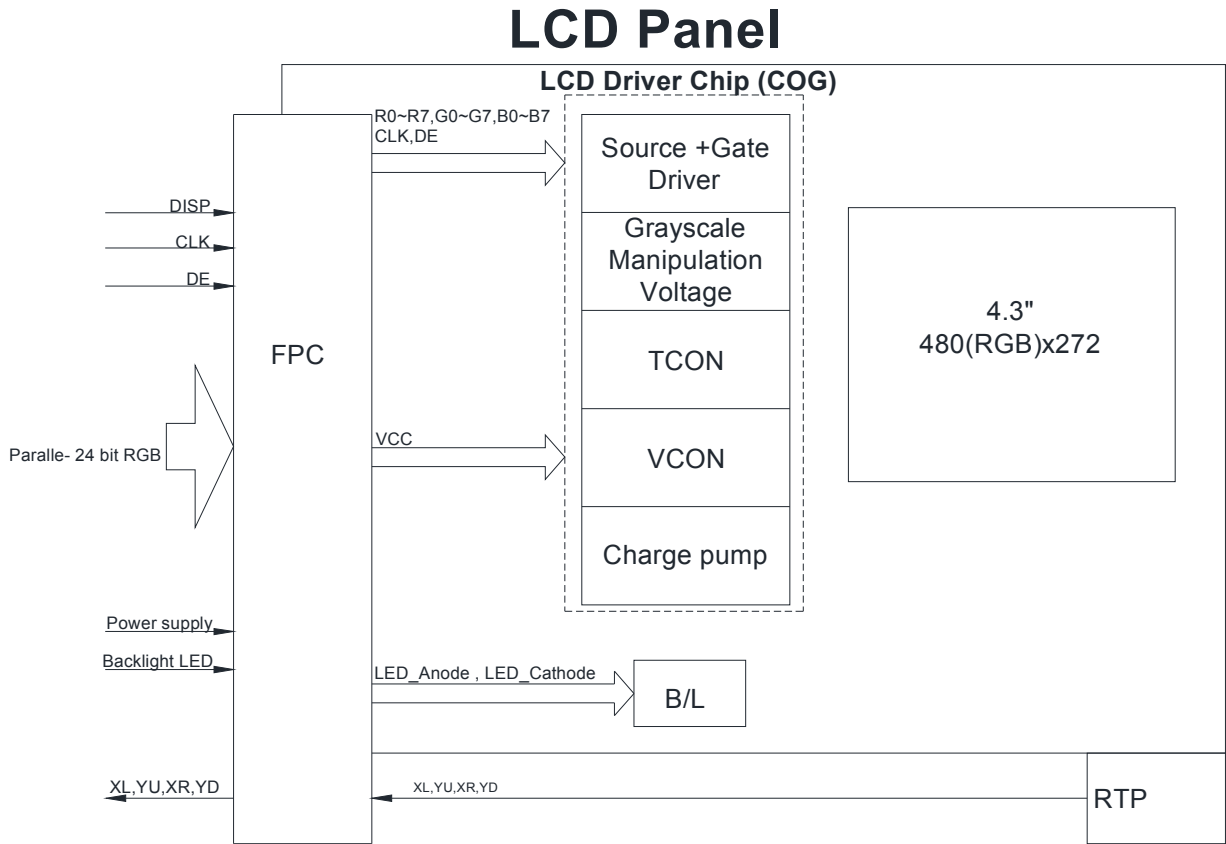
3.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	VLED-	Power for LED backlight cathode	
1	VLED+	Power for LED backlight anode	
3	GND	Power ground	
4	VCC	Power voltage	
5	R0	Red data (LSB)	
6	R1	Red data	
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data (MSB)	
13	G0	Green data (LSB)	
14	G1	Green data	
15	G2	Green data	
16	G3	Green data	
17	G4	Green data	
18	G5	Green data	
19	G6	Green data	
20	G7	Green data (MSB)	
21	B0	Blue data (LSB)	
22	B1	Blue data	
23	B2	Blue data	
24	B3	Blue data	
25	B4	Blue data	
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data (MSB)	
29	GND	Power ground	
30	CLK	Pixel clock	
31	DISP	Display on/off	
32	NC	No connection	
33	NC	No connection	
34	DE	Data Enable	
35	NC	No connection	
36	GND	Power ground	
37	XR	Right electrode	
38	YD	Down electrode	
39	XL	Left electrode	
40	YU	Top electrode	

4. Counter Drawing



5. Block Diagram



6. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

- Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$,
Absolute humidity shall be less than 90% RH at 60°C

7. Electrical Characteristics

7.1. Operating Conditions:

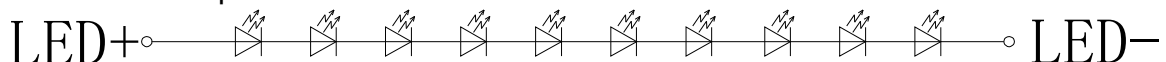
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	—	3.0	3.3	3.5	V	
Supply Current For LCM	IDD	—	—	200	300	mA	Note1

Note1: This value is test for VDD=3.3V , Ta=25 ° only

7.2. LED Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Current	-	-	20	-	mA	-
Power Consumption	-	600	640	680	mW	-
LED Voltage	VBL+	30	32	34	V	Note 1
LED Lifetime	-	-	50.000	-	Hr	Note 2,3,4

Note 1: There are 1 Groups LED



Note 2: Ta = +25°C

Note 3: Brightness to be decreased to 50% of the initial value

Note 4: The single LED lamp case

8. DC CHARATERISTICS

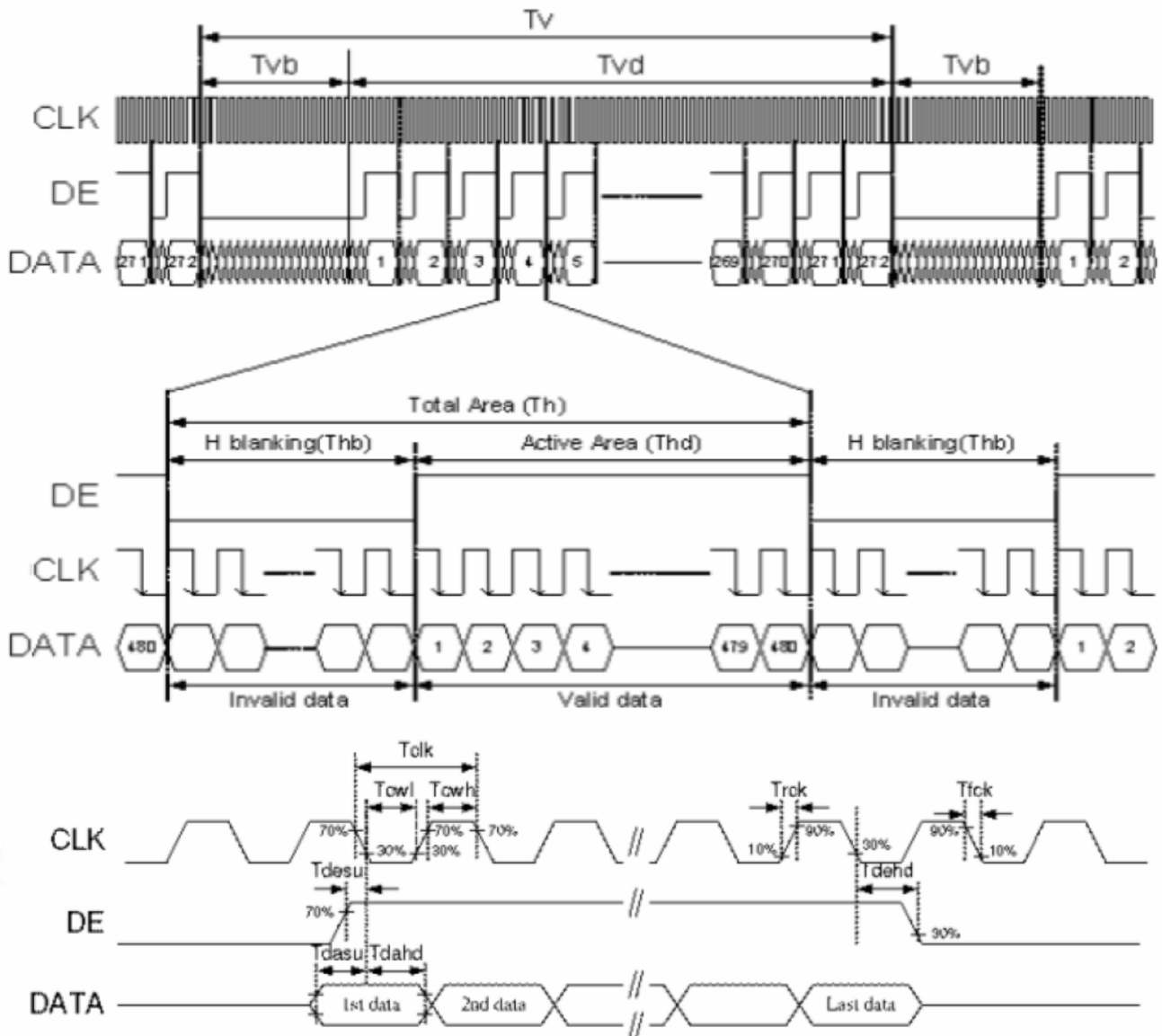
Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low Level Input Voltage	V_{IL}	0	-	0.2VCC	V	
High Level Input Voltage	V_{IH}	0.8VCC	-	VCC	V	

9. AC CHARATERISTICS

Parallel DE mode RGB input timing table

Signal	Symbol	Min	Typ	Max	Unit
CLK frequency	Tcl	7	9	12	MHz
DEV period time	Tv	277	288	400	H
DEV display area	Tvd	272			H
DEV blanking	Tvb	5	16	128	H
DEH period time	Th	520	525	800	CLK
DEH display area	Thd	480			CLK
DEH blanking	Thb	40	45	320	CLK
CLK cycle time	Tclk	83	110	143	ns
Clock width of high level	Tcwh	40	50	60	%
Clock width of low level	Tcwl	40	50	60	%
Clock rising time	trck		-	9	ns
Clock falling time	tfck		-	9	ns
Data Setup Time	tdesu	10	-	-	ns
Data Hold Time	tdahd	10	-	-	ns
DE Setup Time	tdesu	10	-	-	ns
DE Hold Time	tdehd	10	-	-	ns

9.1. Timing Diagram



10. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response Time	Tr	$\theta=0^\circ, \phi=0^\circ$	-	10	20	ms	Note 3	
	Tf		-	15	30	ms		
Contrast Ratio	CR	At optimized viewing angle	400	500	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ, \phi=0$	0.26	0.31	0.36	-	Note 2,5
		Wy		0.28	0.33	0.38	-	
Viewing Angle (Gray Scale Inversion Direction)	Hor.	θ_R	$CR \geq 10$	60	70	-	Deg.	Note 1
		θ_L		60	70	-		
	Ver.	ϕ_T		40	50	-		
		ϕ_B		60	70	-		
Brightness	-	-	280	350	-	cd/m ²	Center of display	

Ta=25°C±2°C, IL=20mA

Note 1: Definition of viewing angle range

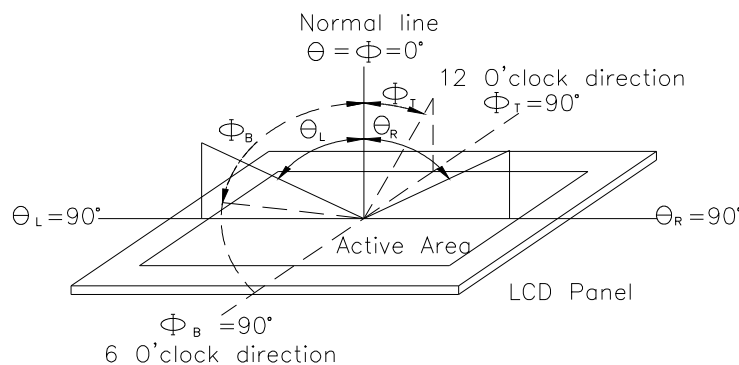


Fig. 11.1. Definition of viewing angle

Note 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-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

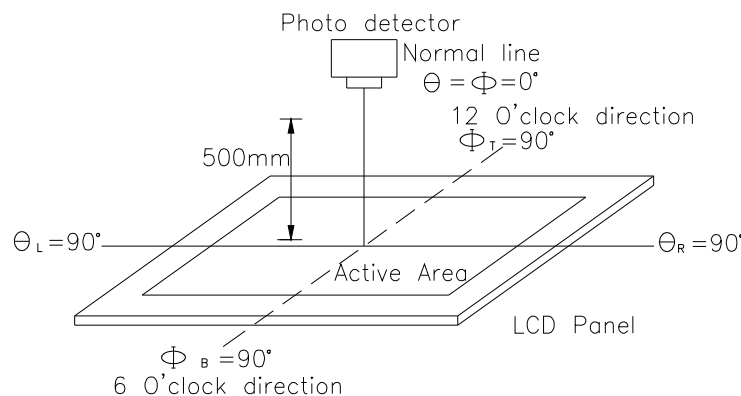
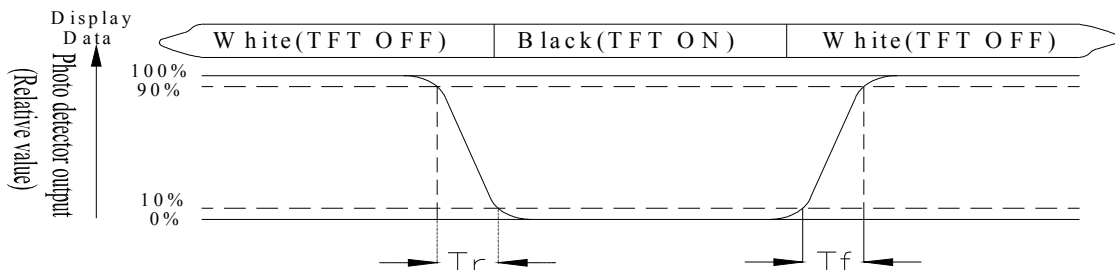


Fig. 11.2. Optical measurement system setup

Note 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, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: White $V_i = V_{i50} \pm 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

11. Reliability

Content of Reliability Test (Wide temperature, -20°C~+70°C)

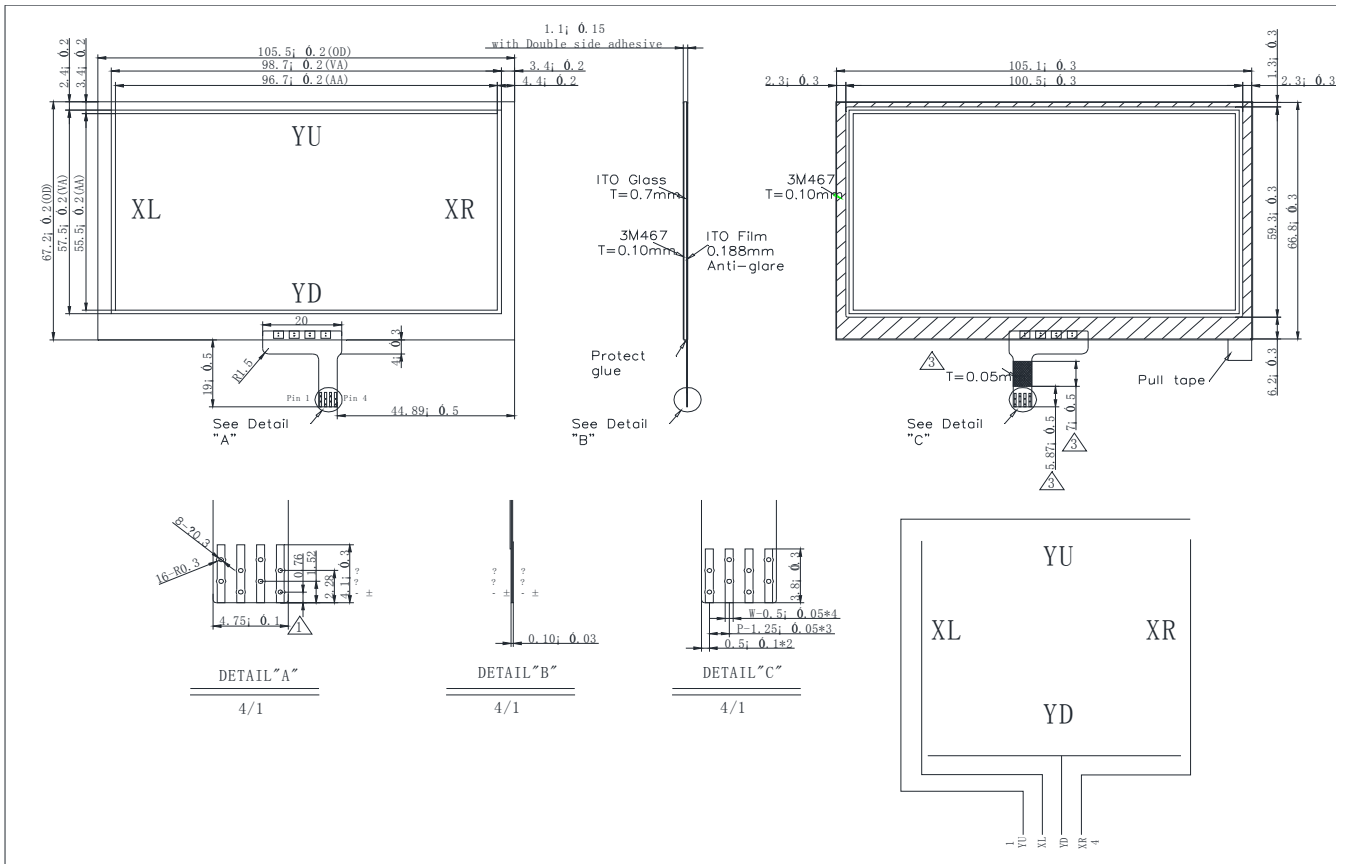
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	+70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60%, 90%RH max	+60°C, 90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="margin: 0;">-20°C +25°C +70°C</p> <p style="margin: 0;">30min 5min 30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C / +70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(Contact), ±800V(Air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

12. Touch Panel Information



12.1. Resistance Touch Panel General Specifications

Item	Description
Driving Condition	DC5V
Operating Force	60g~150g
Linearity max	≤±1.5%
Insulating Resistance	> 20MΩ , 25V(DC)
Light Transparence	70%
Structure Type	ITO Film/ITO Glass(F/G)
Surface Hardness	3H typ.
Pen Hitting Durability (with the silicon rubber)	> 1.000.000 times
X Resistance	200Ω ~ 1200 Ω
Y Resistance	200Ω ~ 900Ω