Customer	
Part No.	**0430A006-N1T0591**
Date	**2021-05-03**
Version	**01**
Remarks	□Approval for Specification Only ■Approval for Specification and Sample

CUSTOMER			**HXWY**		
APPROVED	**CHECKED**	**PREPARED**	**APPROVED**	**CHECKED**	**PREPARED**

Revision Record

Rev. No.	Date	Description
V01	2021-05-03	Preliminary Specification Release.

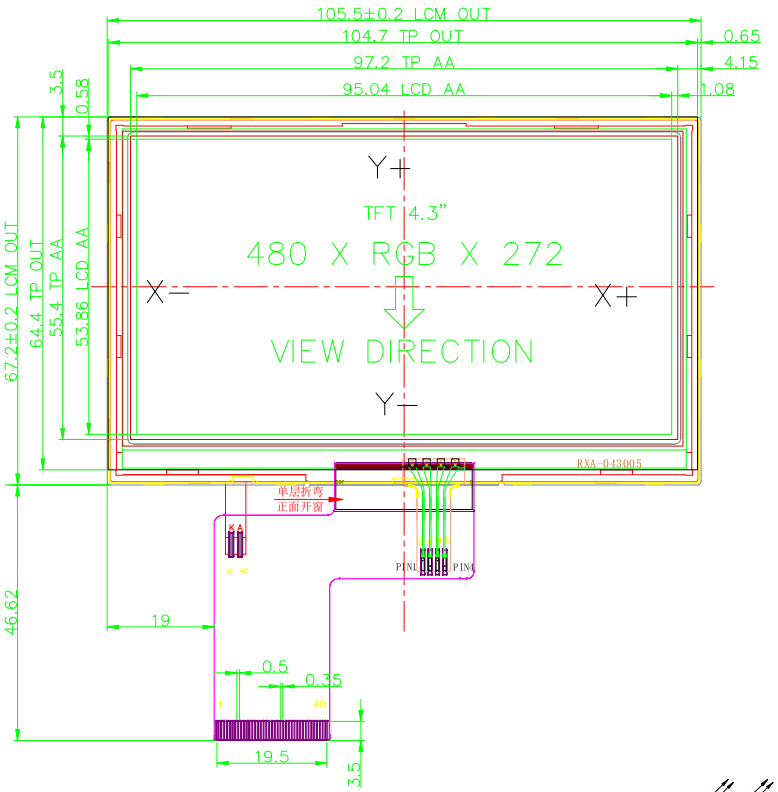
Contents

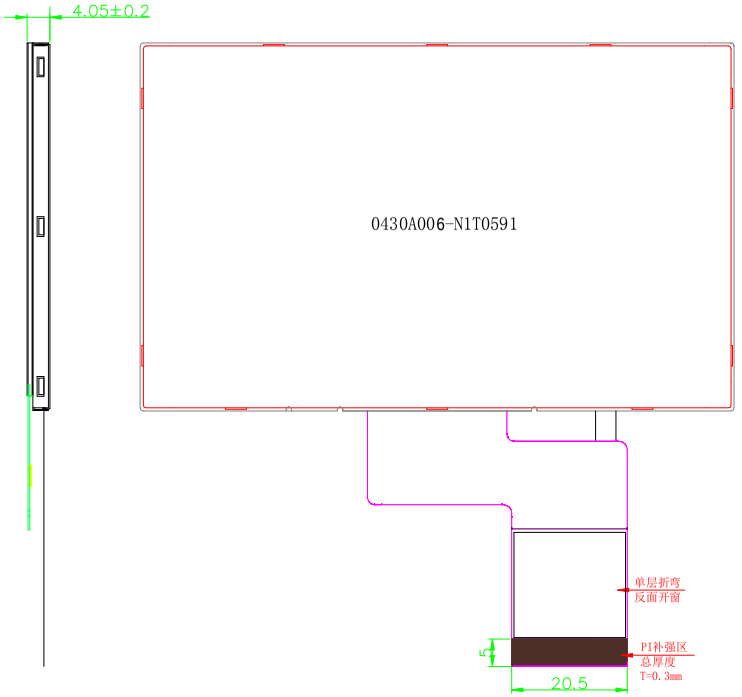
1. General Specifications

Item	Contents	Unit
Size	4.3’TFT	inch
LCM Dimension	105.50(W)*67.20(H)*4.05(D)	mm
LCD Active Area	95.04*53.86	mm
Number of Dots	480*RGB*272	pixel
LCD Type	a-Si TFT	
Viewing Direction	12 O'CLOCK	
Driver IC	NV3047	
Interface Type	RGB	
Operating Temperature	-20℃~70℃	
Storage Temperature	-30℃~80℃	
Backlight Type	7 LEDs	
Weight	TBD	g

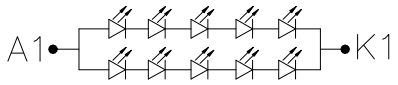
NO.	SIGNAL
1	LEDK
2	LEDA
3	GND
4	VCC
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	DISP
32	Hsync
33	Vsync
34	DEN
35	NC
36	GND
37	XR(NC)
38	YD(NC)
39	XL(NC)
40	YU(NC)

REV.	ECN No.	DESCRIPTION	DRAWN BY





1. LCD TYPE : CTC-4.3" TFT
2. DRIVER IC : NV3047
3. VIEING DIRECTION : 12 O'CLOCK
4. BACKLIGHT: WHITE LED 10 CHIPS Parallel
5. OPERATION TEMP : -20°C~70°C
6. STORAGE TEMP : -30°C~80°C
7. GENERAL TOLERANCE: ±0.2
8. Connector : FH19-40S-05SH(51)
9. * IS IMPORTANT DIMENSION



B/L CIRCUIT DIAGRAM

TP pin out	
1	Y+
2	X-
3	Y-
4	X+

TOLERANCE		SCALE	N.T.S				
.X	±	UNITS	mm				
.XX	±	MATERIAL		DRG DATE		MODEL:	
∠	± 1°			DRG BY		TITLE:	480(RGB)X272 DOTS
				CHK BY		DWG NO	P 1 OF 1
				APPROVED		P/N	VER. 01

HX DISPLAY

3. Pin Assignments

Pin No.	Symbol	Description
1	LEDK	LED BACKLIGHT(CATHODE)
2	LEDA	LED BACKLIGHT(ANODE)
3	GND	GROUND
4	VCC	POWER SUPPLY
5	R0	RED DATA
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
13	G0	GREEN DATA
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
21	B0	BLUE DATA
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
29	GND	GROUND
30	CLK	CLOCK SIGNAL
31	DISP	DISPLAY ON/OFF
32	HSYNC	HORIZONTAL SYNC INPUT IN RGB MODE
33	VSYNC	VERTICAL SYNC INPUT IN RGB MODE
34	DEN	DATA ENABLE
35	NC	NC
36	GND	GROUND
37	XR(NC)	TOUCH PLANE PIN/NC
38	YD(NC)	TOUCH PLANE PIN/NC
39	XL(NC)	TOUCH PLANE PIN/NC
40	YU(NC)	TOUCH PLANE PIN/NC

4. Electrical Specification

4.1. DC Characteristics

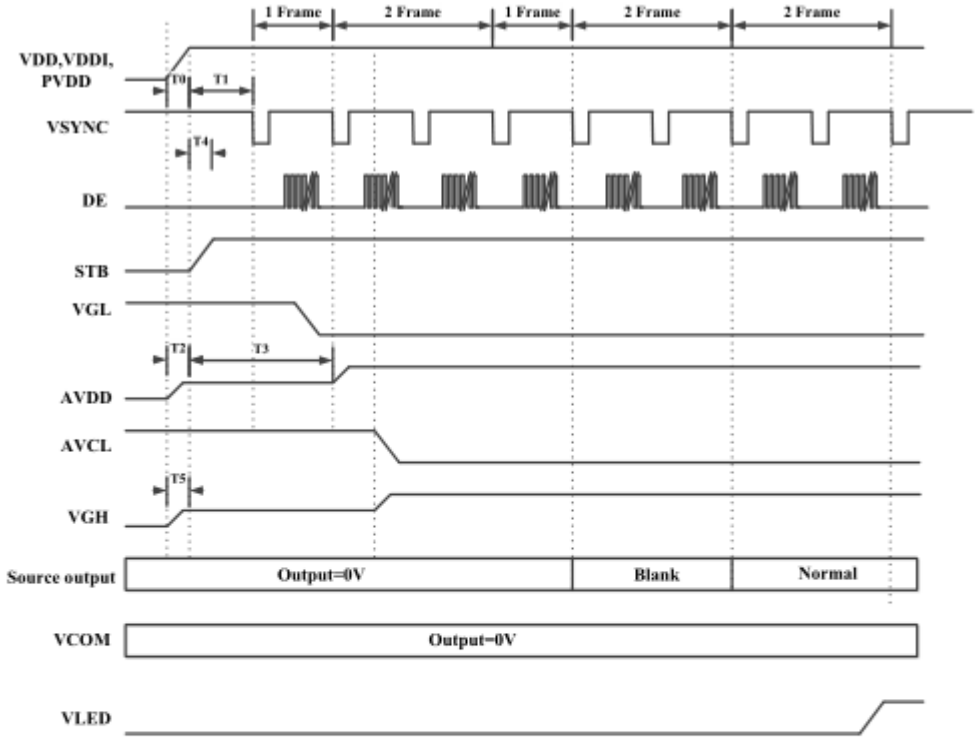
Item	Symbol	Min	Typ.	Max	Unit
TFT gate on voltage	VGH	--	15	--	V
TFT gate off voltage	VGL	--	-11.5	--	V
TFT common electrode Voltage	Vcom	--	--	--	V

4.2. Typical Operation Conditions

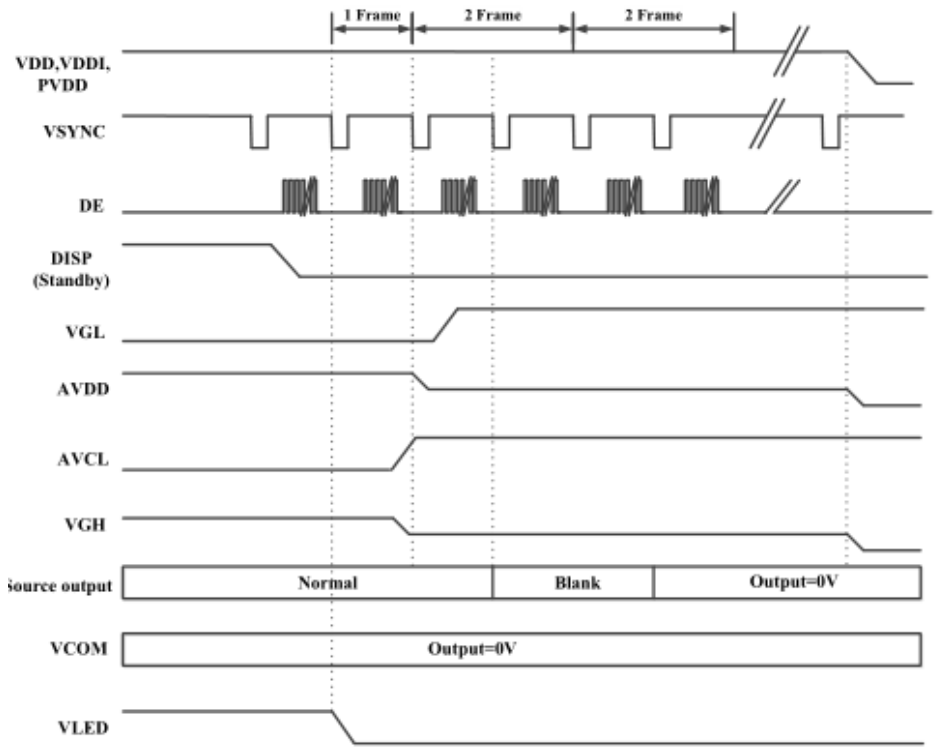
Item	Symbol	Min.	Typ.	Max.	Unit
Analog Supply Voltage	VCI	--	3.3	--	V
Digital Supply Voltage	VDD	--	3.3	--	V
I/O Supply Voltage	IOVCC	--	1.8	3.3	V
Input High Voltage	VIH	0.8*IOVCC	-	IOVCC	V
Input Low Voltage	VIL	0	-	0.2*IOVCC	V
Output High Voltage	VOH	0.8*IOVCC	-	-	V
Output Low Voltage	VOL	-	-	0.2*IOVCC	V

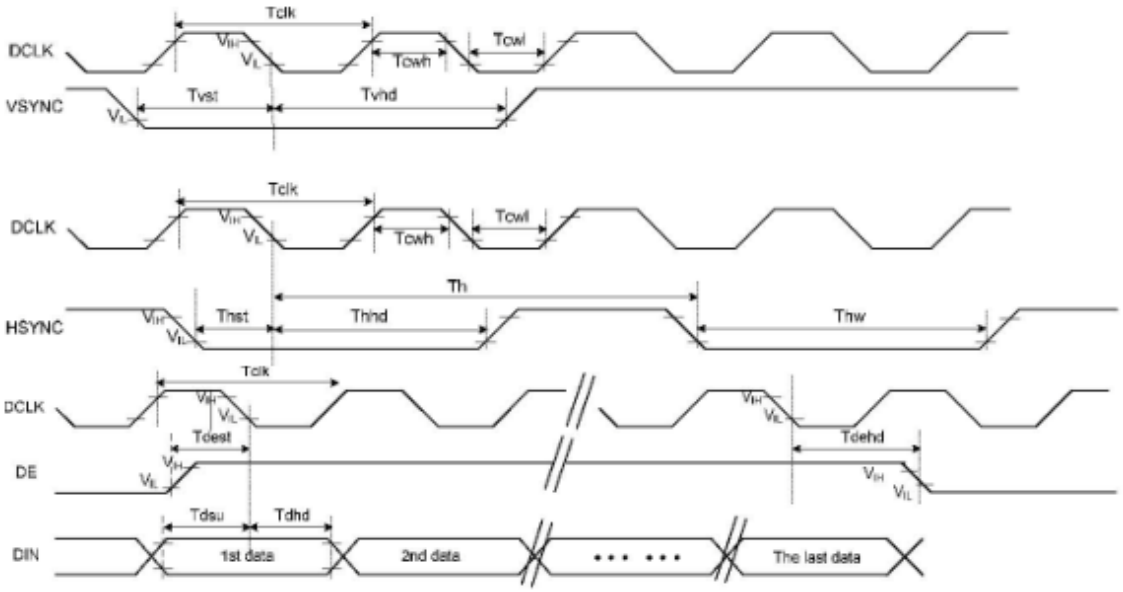
4.3. Backlight Circuit Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
LED Current	IB	--	40	--	mA
LED Voltage	Vf	14.0	15.0	16.0	V
Brightness of LCM	L		300		cd/m2



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0


1 Frame
2 Frame
2 Frame
VDD,VDDI,
PVDD
VSYNC
DE
DISP
(Standby)
VGL
AVDD
AVCL
VGH
Source output
Normal
Blank
Output=0V
VCOM
Output=0V
VLED


DCLK
VSYNC
Tclk
Tcwl
Tcwh
Tvst
Tvhd
DCLK
HSYNC
Tclk
Tcwl
Tcwh
Th
Thst
Thhd
Thw
DCLK
DE
DIN
Tclk
Tdest
Tdehd
Tdsu
Tdhd
1st data
2nd data
The last data

4.7. Parallel 24 bit RGB Input Timing Table

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		DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	30	43	64	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	64	DCLK	
	Pulse Width	Thw	2	4		DCLK	
VSYNC	Period Time	Tv	276	292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	64	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	64	H	
	Pulse Width	Tvw	2	4		H	

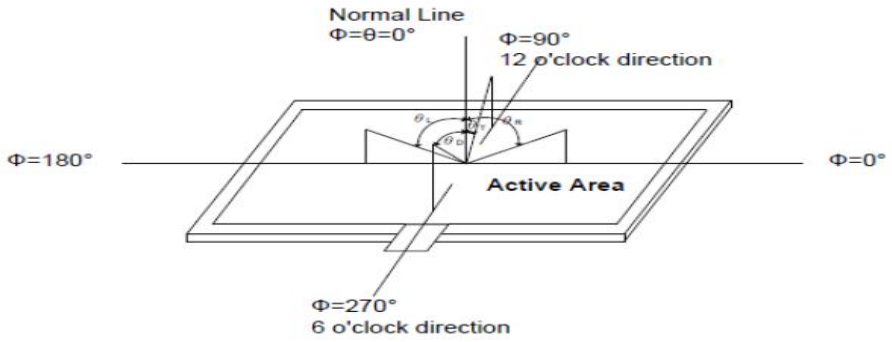
Note: It is necessary to keep Tvbp =12, Tvfp = 8, Tvw = 4 and Thbp = 43, Thfp = 8 Thw = 4 in sync mode.

4.8. Electro-Optical Characteristics

Item	Symbol	Condition	Specification			Unit	Remark
			Min.	Typ.	Max.		
Response Time	Tr + Tf	θ= 0°,Φ=0°	-	25	30	ms	Note 1,2,3
Contrast Ratio	CR	θ= 0°,Φ=0°	500	700	-		Note 1,2,4
Viewing Angle Direction (Gray Inversion)	-		-	6 O'clock	-		Note 1,2,5
Viewing Angle	Left (9 o'clock)	CR≧10	60	70	-	deg.	Note 1,2,5
	Right (3 o'clock)		60	70	-		
	Top (12 o'clock)		50	60	-		
	Bottom (6 o'clock)		55	65	-		
Color Chromaticity (CF only with C light, CIE 1931)	Wx	θ= 0°, Φ=0°	- 0.015	0.303	+ 0.015		Note 1,6 CF Glass
	Wy	θ= 0°, Φ=0°	- 0.015	0.340	+ 0.015		
Color Gamut (CF only with C light, CIE 1931)	NTSC	θ= 0°, Φ=0° CIE1931	45	50	-	%	Note 1,6 CF Glass
Transmittance (with Polarizer)	Tr	θ= 0°, Φ=0°	(6.2)	(6.6)	-	%	Note 1,7,8 EWV Pol

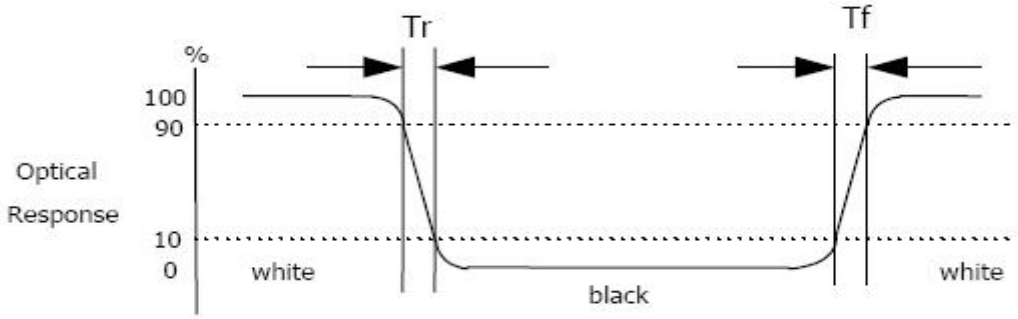
5. Measurement System

5.1. LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10.The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

5.2. Response Time



Response time is the time required for the display to transition from white to black (Rising time, T_r) and from black to white (Falling time, T_f) for additional information.

5.3. Contrast Ratio (CR)

Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

6. Reliability Test Items

Test Item	Test Condition	Test result determinant gist
High temperature storage	80±3℃,48H；	1. Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: a). Air bubble in the LCD; b). Non-display; c). Glass crack; 2. The electrical characteristics requirements shall be satisfied.
Low temperature storage	-30±3℃,48H；	
High temperature operation	70±3℃,48H；	
Low temperature operation	-20±3℃,48H；	
High temperature / humidity	60℃±3℃,90%±3%RH,48H；	
Thermal Shock	-20℃/0.5h~+70℃/0.5h for a total 24 cycles；	
Vibration Test	Frequency:10Hz~55Hz~10Hz; Amplitude:1.5mm, X, Y, Z direction for total 1H; (Packing condition)	
ESD test	±4KV, Human Body Mode,150pF/330Ω； ±8KV, Air Mode, 150pF/330Ω；	

Remark：

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 2pcs.

3.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

7. Suggestions for Using LCD Modules

1) The display panel is made of glass and polarizer. As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

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. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in to contact with room temperature air.

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 cloth with one of the following solvents

- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil and fats.

7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

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) Electro-Static Discharge Control, since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.

- Tools required for assembling, such as soldering irons, must be properly grounded. Make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dry. A relative humidity of 50%-60% is recommended. As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

- 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.

13) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.

- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

- Do not damage or modify the pattern writing on the printed circuit board.

- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.

- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.

- Do not drop, bend or twist the LCM.

8. Storage Method

1) Store in an ambient temperature of 23°C±5°C, and in a relative humidity of 55%±15%. Don't exceed 12 months and expose to sunlight or fluorescent light.

2) Store in a clean environment, free from dust, active gas, and solvent.

3) LCM module is stored in warehouse, Store in antistatic container, there may be air bubbles between the protective film on the surface of polarizer and polarizer. It can only be found under LED light, before production, IQC should be inspected directly by LED light, if residual traces are found, alcohol should be used to wipe them.