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NEXT VISION DISPLAY

SPECIFICATION

CUSTOMER : _____

MODULE NO.: NT040-N001ET

Version	2
Engineer	
Date	08/02/2023

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Customer:
Approved by

NEXT VISION DISPLAY CO., LTD.

地址: 中國上海小木橋路600號
ADD: 600 XIAO MU QIAO ROAD, SHANGHAI, CHINA

WEB: www.nextvisiondisplay.com

TECHNICAL: technical@nextvisiondisplay.com
MARKETING: marketing@nextvisiondisplay.com
SALES: sales@nextvisiondisplay.com

Represented by:

first FC components
FIRST Components s.r.l.
www.first-components.com
sales@first-components.com
+39 0332 1888005

Record of Revision

Version	Revise Date	Content	Editor
1.0	2021/11/08	First Release.	

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General Specifications

Feature		Spec
Characteristics	Size	3.99 inch
	Resolution	400(horizontal)*960(Vertical)
	Interface	3SPI+18BIT RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (um)	32.65x97.95
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	ST7701S
	Viewing Direction	ALL
	Gray Scale Inversion Direction	ALL
Mechanical	LCM (W x H x D) (mm)	42.9*102.08*2.25
	Active Area(mm)	39.18 x 94.032
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	8 LED

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Note 1: Viewing direction is following the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

Input/Output Terminals

Pin.No	Symbol	Function
1	LEDA	Power for LED backlight (Anode)
2	LEDK1	Power for LED backlight (Cathode)
3	LEDK2	Power for LED backlight (Cathode)
4	GND	Ground
5	VCC	Digital Power +3.3V
6	RSTB	Global reset pin
7-8	NC	Not connect
9	SDA	SPI Data signal
10	SCL	SPI Clock signal
11	CS	SPI Chip select signal
12	DCLK	RGB dot clock signal
13	DE	RGB data enable signal
14	VS	RGB frame synchronizing signal
15	HS	RGB line synchronizing signal
16-33	DB0~DB17	RGB data signal
34	GND	Ground
35	TP_INT/NC	Touch Interrupt/NC
36	TP_SDA/NC	Touch IIC Data signal/NC
37	TP_SCL/NC	Touch IIC Clock signal/NC
38	TP_RESET/NC	Touch Reset Signal/NC
39	TP_VCI/NC	Touch Power supply/NC
40	GND	Ground

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Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.3	3.6	V	
Input Signal Voltage	V_{in}	-0.3	VDD+0.3	V	
Logic Output Voltage	V_{OUT}	-0.3	VDD+0.3	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

Electrical Characteristics

Operating conditions:

Parameter	Symbol	MIN	TYP	MAX	Unit	Test condition
Power Voltage	V_{DD}	2.8	3.3	3.6	V	
Supply Current	I_{DD}			50	mA	V_{DD}=2.8V,Ta=25 ☐ C
Input voltage	V_{IH}	0.8VDD	-	VDD	V	-
	V_{IL}	0	-	0.2VDD	V	-
Input leakage current	I_{IL}	-1.0	-	1.0	uA	V_{IN}=V_{DD} or V_{SS}

Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	-	20	-	mA	
Power Consumption			-	-	mW	
LED Voltage	V_F	23.2	24	24.8	V	Note 1
LED Life Time	W_{BL}	25000		-	Hr	Note 2,3

Note 1 : There are 8 Groups LED

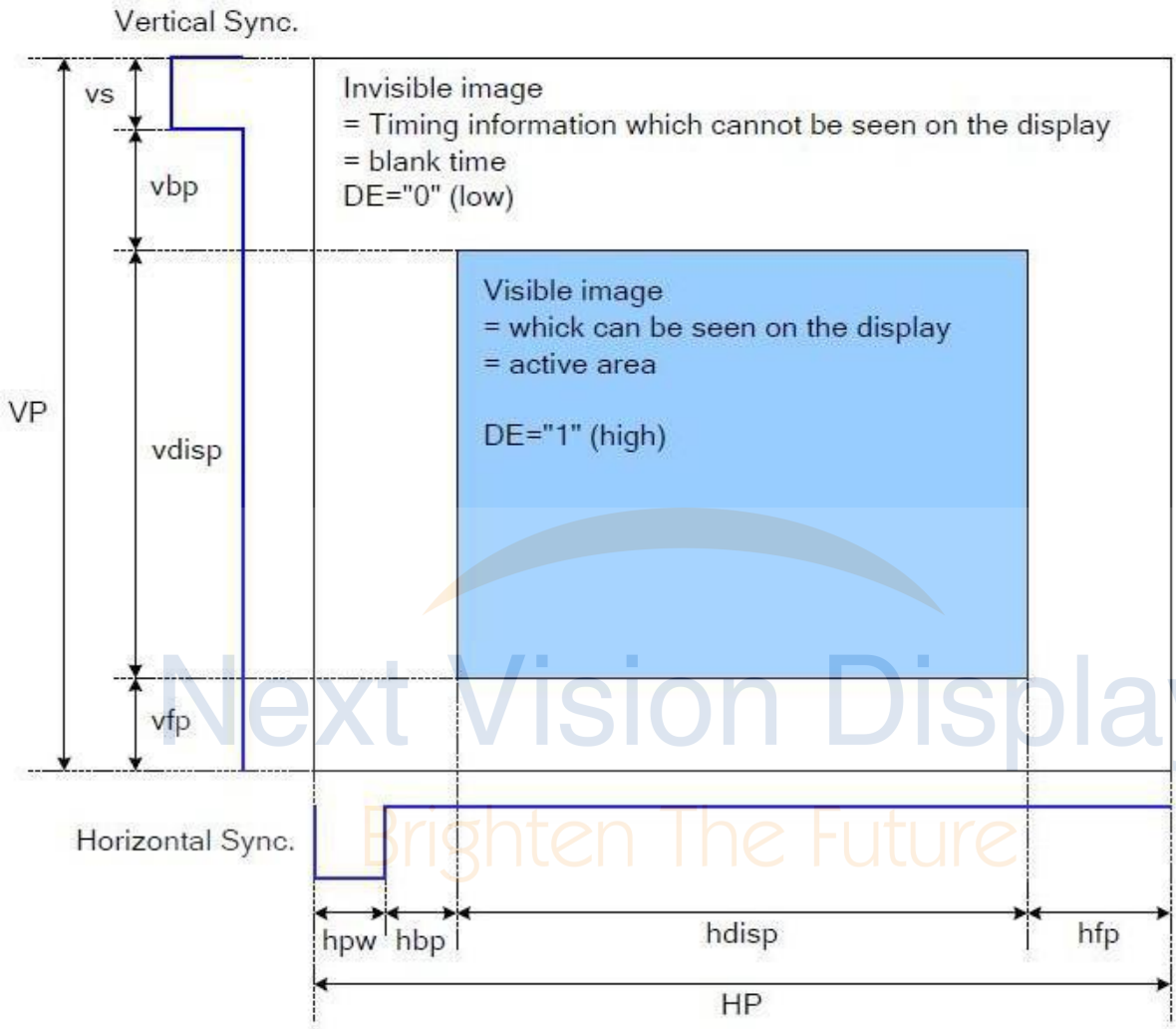
Note 2 : Ta = 25℃

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

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INTERFACE TIMING

System Bus Read/Write Characteristics.



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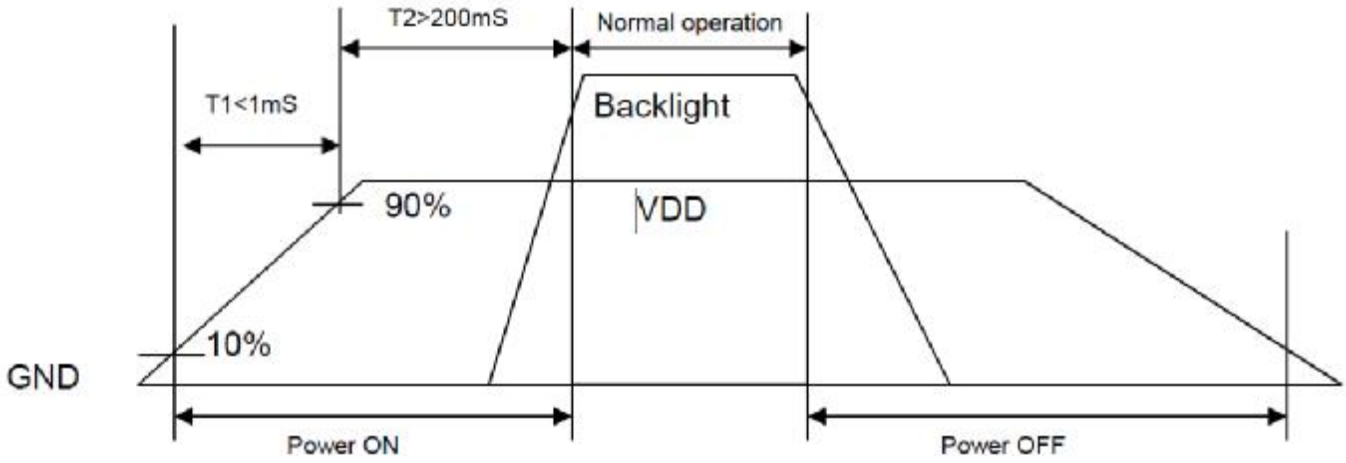
Please refer to the following table for the setting limitation of RGB interface signals.

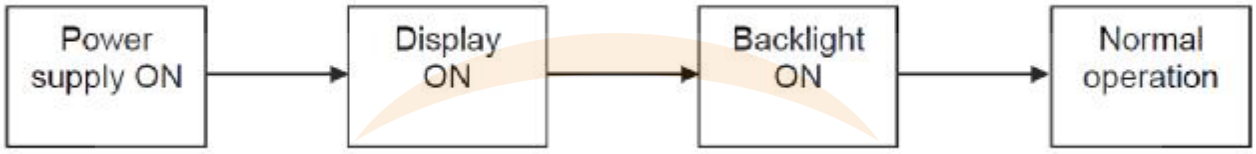
Parameter	Symbol	Min.	Typ.	Max.	Unit
Horizontal Sync. Width	hpw	1	-	255	Clock
Horizontal Sync. Back Porch	hbp	1	--	255	Clock
Horizontal Sync. Front Porch	hfp	1	--	-	Clock
Vertical Sync. Width	vs	1	--	254	Line
Vertical Sync. Back Porch	vbp	1	--	254	Line
Vertical Sync. Front Porch	vfp	2	--	--	Line

Note:

1. *Typical value are related to the setting frame rate is 60Hz..*

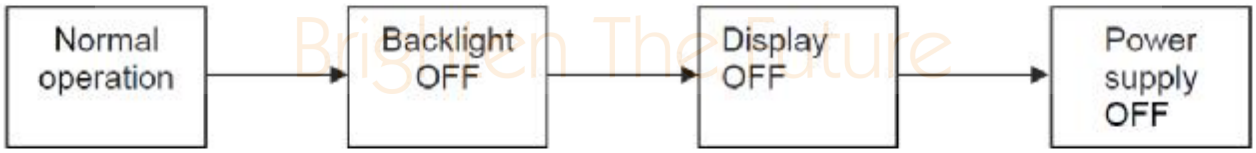
Power ON/OFF Timing





Power ON sequence

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Power OFF sequence

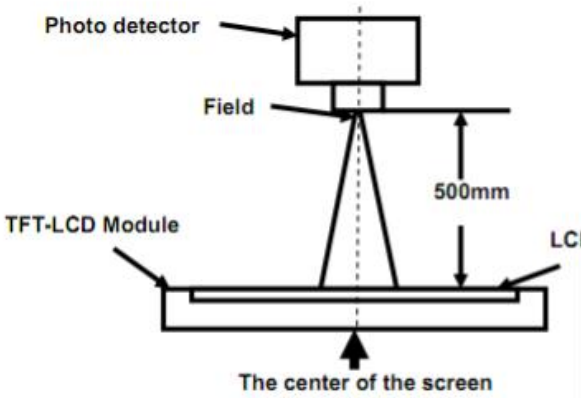
Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	-	85	-	Degree.	Note2
		θ_B		-	85	-		
		θ_L		-	85	-		
		θ_R		-	85	-		
Contrast Ratio		CR	Θ =0	1000	1500	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	30	40	ms	Note1, Note4
		T_{OFF}		-	-	-		
Chromaticity	White	X_W	Backlight is on	0.275	0.291	0.315	-	Note1, Note5
		Y_W		0.311	0.311	0.351	-	
	Red	X_R		0.629	0.649	0.669	-	
		Y_R		0.294	0.314	0.334	-	
	Green	X_G		0.243	0.263	0.283	-	
		Y_G		0.542	0.562	0.582	-	
	Blue	X_B		0.117	0.137	0.157	-	
		Y_B		0.091	0.111	0.131	-	
Uniformity		U		80	-	-	%	Note1, Note6
NTSC					65		%	Note5
Luminance		L		300	350			Note1, Note7

Next Vision Display
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Test Conditions:

1. IF= 20mA (one channel),the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.



Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°

Note 2: Definition of viewing angle range and measurement system.
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

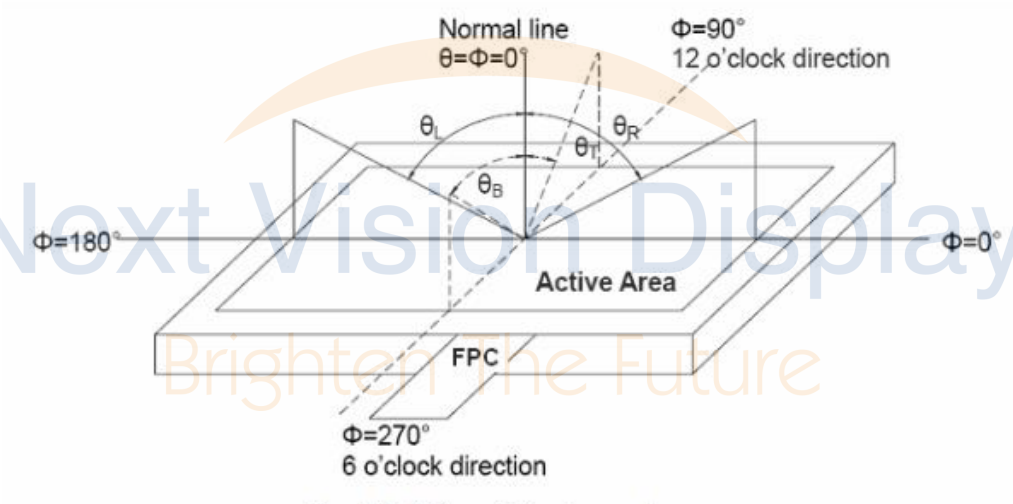


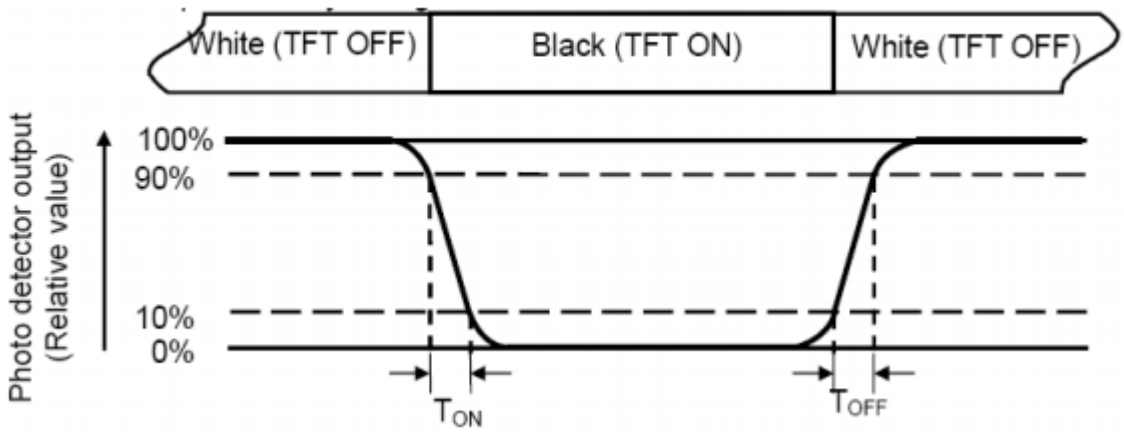
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

Note 4: Definition of Response time
The response time is defined as the LCD optical switching time interval between “White” state and “Black” state Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

Next Vision Display
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Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.
Note 6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the Center of each measuring area
Luminance Uniformity (U) = Lmin/ Lmax100%
L-------Active area length W----- Active area width

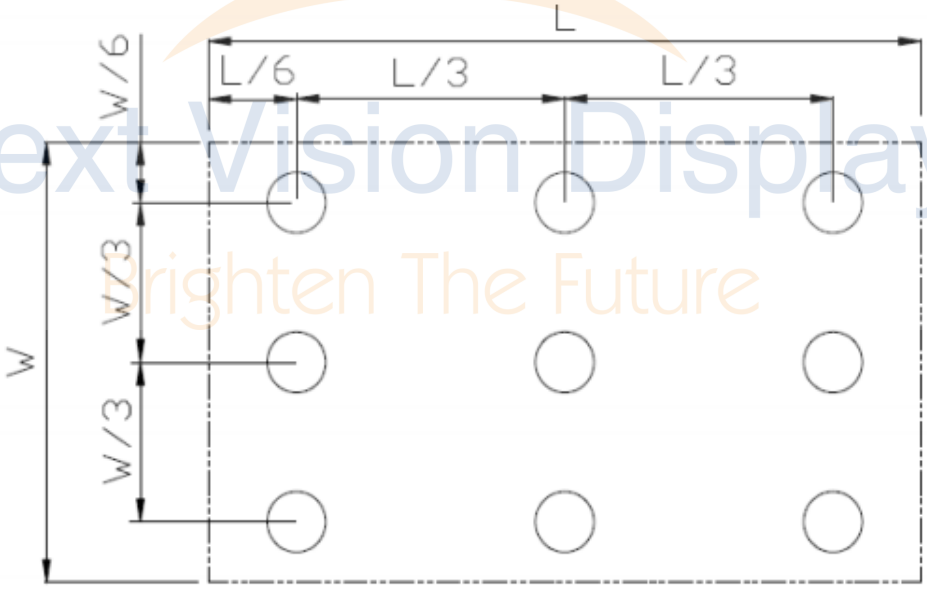


Fig. 2 Definition of uniformity
Lmax: The measured maximum luminance of all measurement position.
Lmin: The measured minimum luminance of all measurement position.
Note 7: Definition of Luminance:
Measure the luminance of white state at center point.

Next Vision Display
Brighten The Future

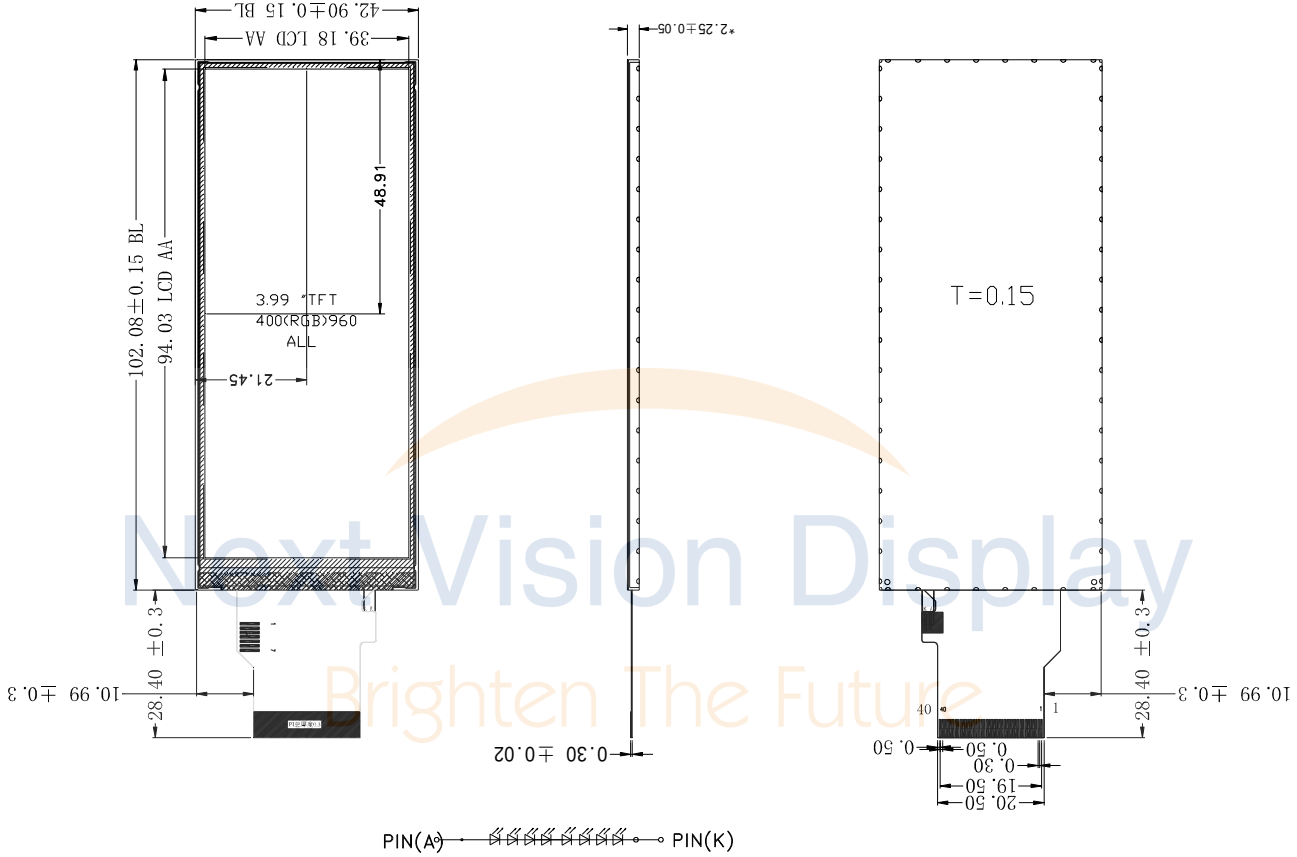
Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

Next Vision Display
Brighten the Future

Mechanical Drawing



1	LEDA
2	LEDK1
3	LEDK2
4	GND
5	VCC
6	RESET
7	NC
8	NC
9	SDA
10	SCL
11	CS
12	DCLK
13	DE
14	VS
15	HS
16	DB0
17	DB1
18	DB2
19	DB3
20	DB4
21	DB5
22	DB6
23	DB7
24	DB8
25	DB9
26	DB10
27	DB11
28	DB12
29	DB13
30	DB14
31	DB15
32	DB16
33	DB17
34	GND
35	TP_INT/NC
36	TP_SDA/NC
37	TP_SCL/NC
38	TP_RESET/NC
39	TP_VDD/NC
40	TP_GND/NC

Next Vision Display
Brighten The Future

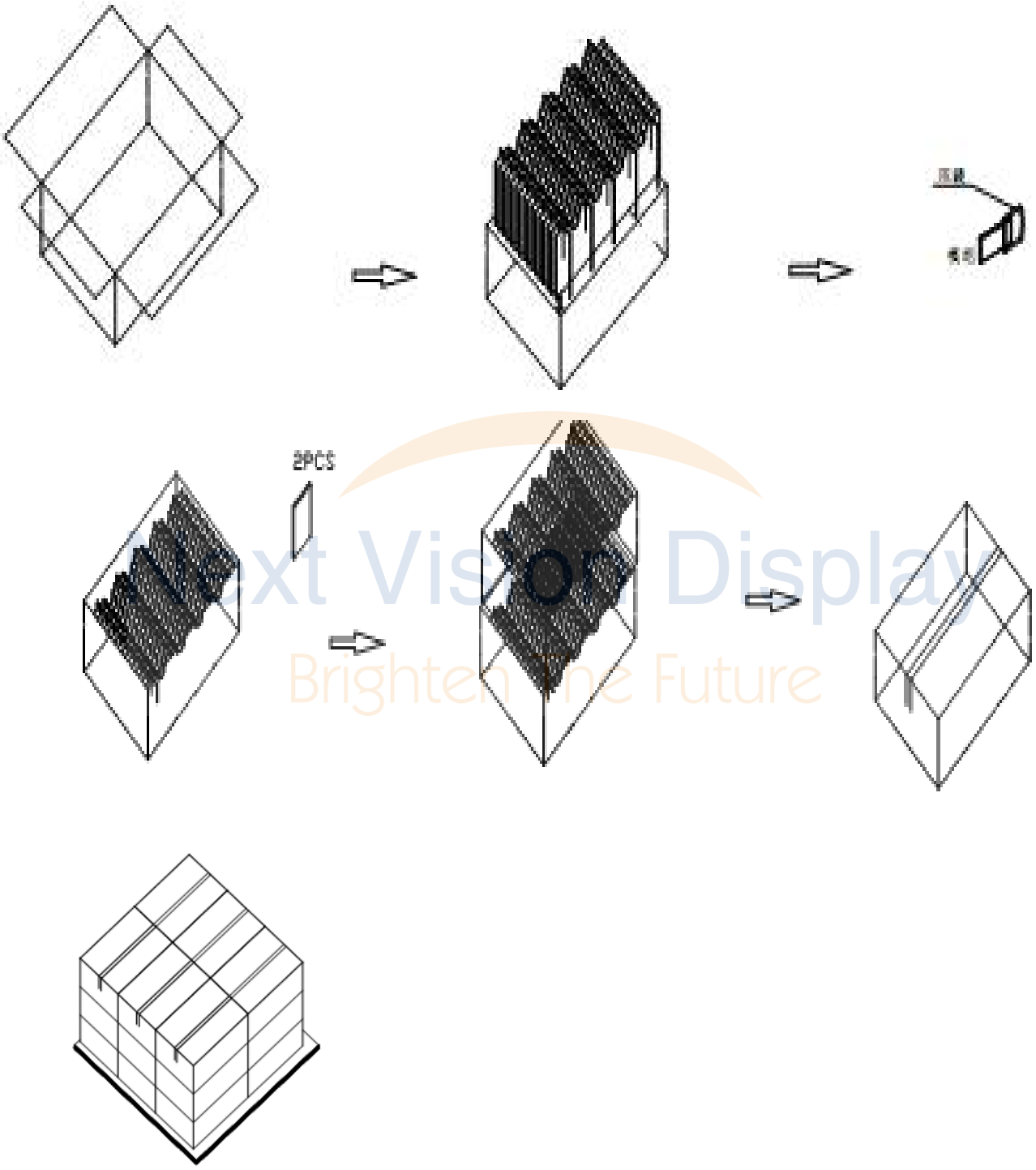
1. DISPLAY TYPE	TFT/NEGATIVE	Approve		Unmarked Tolerance	±0.2
2. VIEWING DIRECTION	ALL 0' CLOCK			Unit	mm
3. DRIVER IC		Checked		Version	A.0
4. LED VOLTAGE	24V(20mA)	Drawn		Date	
5. OPERATIVE TEMP.	-20° C TO 70° C			Page	4/9
6. STORAGE TEMP.	-30° C TO 80° C	Approved			1.0
7. CONNECTOR	FPC				

Next Vision Display
Brighten The Future

Dwg.No NT040-N001ET

Packing

Packing Method



Next Vision Display
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Precautions for Use of LCD modules

Handling Precautions

1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

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

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

1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

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

- Water
- Ketene
- Aromatic solvents

1.6. Do not attempt to disassemble the LCD Module.

1.7. If the logic circuit power is off, do not apply the input signals.

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

1.8.1. Be sure to ground the body when handling the LCD Modules.

1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

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

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

2 Storage Precautions

2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

Next Vision Display
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