Next Vision Display
Brighten The Future

NEXT VISION DISPLAY

SPECIFICATION

CUSTOMER : _____

MODULE NO.: NT021RN002ML

Version	01
Engineer	
Date	2021/03/5

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Customer:
Approved by

NEXT VISION DISPLAY CO., LTD.

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Documents Revision History:

Rivision	Date	Description	Changed By
01	2021/03/5	New released	

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General Specifications

NT021RN002ML is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC, a back light unit. The 2.1'' display area contains 480X(RGB)x480 pixels and can display up to 262K colors. This product accords with ROHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	262K	Color	1
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	56.18X59.71X2.24	mm	2
Active Area(W×H)	53.28X53.28	mm	
Number of Dots	480×480	dots	
Controller	ST7701S	-	
Power Supply Voltage	2.8	V	
Backlight	4P-LEDs (white)	pcs	
Weight	---	g	
Interface	RGB18bit+SPI	-	

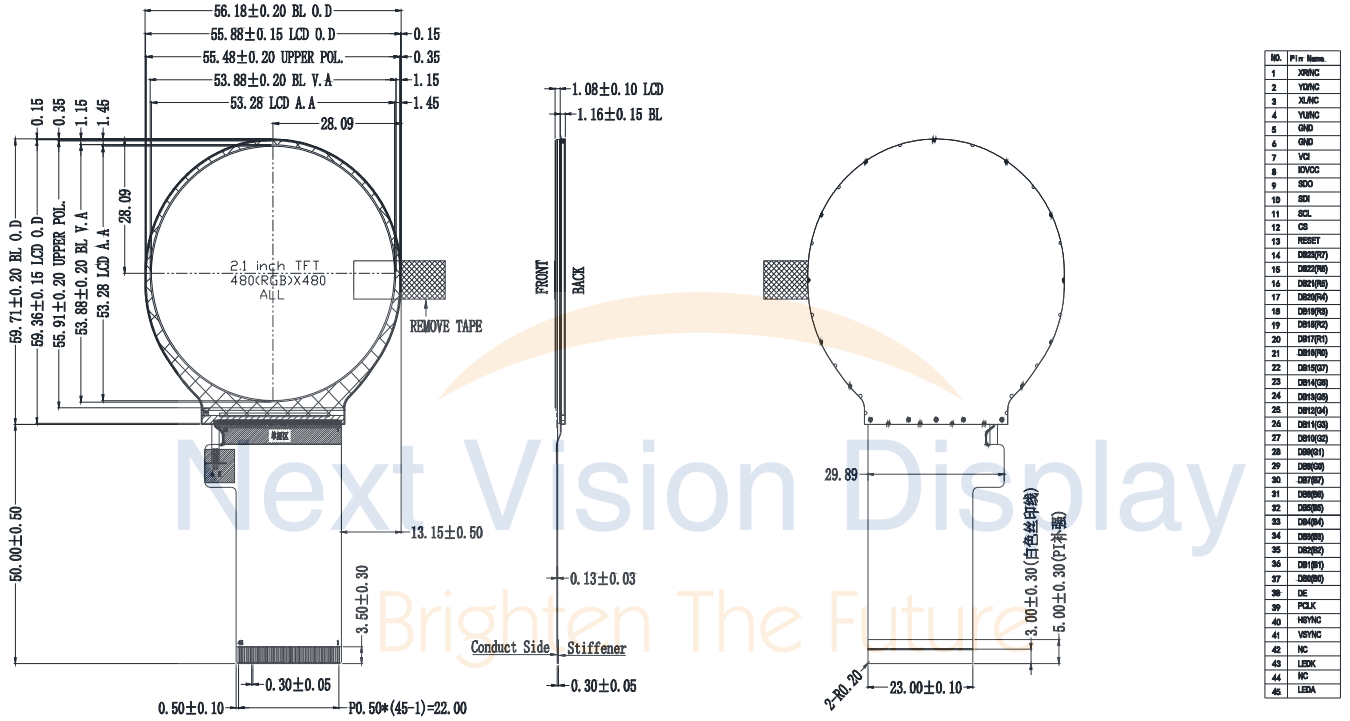
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Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.

Outline Drawing

ALL PAGES OF THIS VERSION APPROVED			
SIGNATURE:		DATE:	



NO.	Pin Name
1	XRINC
2	YDINC
3	XLINC
4	YUINC
5	GND
6	GND
7	VCI
8	IOVCC
9	SDO
10	SDI
11	SCL
12	CS
13	RESET
14	DB23(R7)
15	DB22(R6)
16	DB21(R5)
17	DB20(R4)
18	DB19(R3)
19	DB18(R2)
20	DB17(R1)
21	DB16(R0)
22	DB15(G7)
23	DB14(G6)
24	DB13(G5)
25	DB12(G4)
26	DB11(G3)
27	DB10(G2)
28	DB9(G1)
29	DB8(G0)
30	DB7(B7)
31	DB6(B6)
32	DB5(B5)
33	DB4(B4)
34	DB3(B3)
35	DB2(B2)
36	DB1(B1)
37	DB0(B0)
38	DE
39	PCLK
40	HSYNC
41	VSYNC
42	NC
43	LEDK
44	NC
45	LEDA

NOTES:

1. DISPLAY TYPE: 2.1"TFTNormally Black
2. VIEWING DIRECTION : U/L/D/R 80/80/80/80
3. Driver IC : ST7701S
4. Top : −20°C ~ 70°C, Tst : −30°C ~ 80°C
5. GENERAL TOLERANCE: ±0.2
6. LCM Luminance: LED/500cd/m² (Typical)

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GENERAL TOL 0.30	ALL UNITS: MM	DATE	MODEL NUMBER : NT021RN002ML		SHEET: 1 OF 1
DWN:					DATE:
CHK:					
APP:			DO NOT SCALE THIS DRAWING.	PROJECTION	

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Absolute Maximum Ratings(Ta=25℃)

Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VCI	-0.3	3.6	V	1,2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.

2. $V_{CI} > V_{SS}$ must be maintained.

3. Please be sure users are grounded when handing LCD Module.

Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-30℃	80℃	-20℃	70℃	1,2
Humidity	-	-	-	-	3

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Notes:

1. The response time will become lower when operated at low temperature.

2. Background color changes slightly depending on ambient temperature.
   The phenomenon is reversible.

3. Ta<=40℃:85%RH MAX.

   Ta>=40℃:Absolute humidity must be lower than the humidity of 85%RH at 40℃.

Electrical Specifications

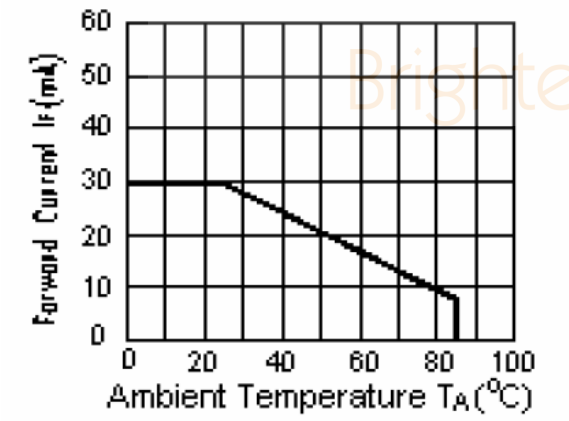
Electrical characteristics(Vss=0V ,Ta=25˚C)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power voltage		VCI	Ta=25℃	2.5	2.8	3.6	V	
Input voltage	'H'	V_{IH}	Ta=25℃	0.7*VCI	-	VCI	V	
	'L'	V_{IL}	Ta=25℃	0	-	0.3*VCI	V	

LED backlight specification(VSS=0V ,Ta=25˚C)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	V_f	If=20mA	11.2	12.8	13.5	V	
Uniformity	ΔBp	If=20mA	75	80	-	%	
Life Time	time	If=20mA	-	20K	-	hours	1

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Note 1: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

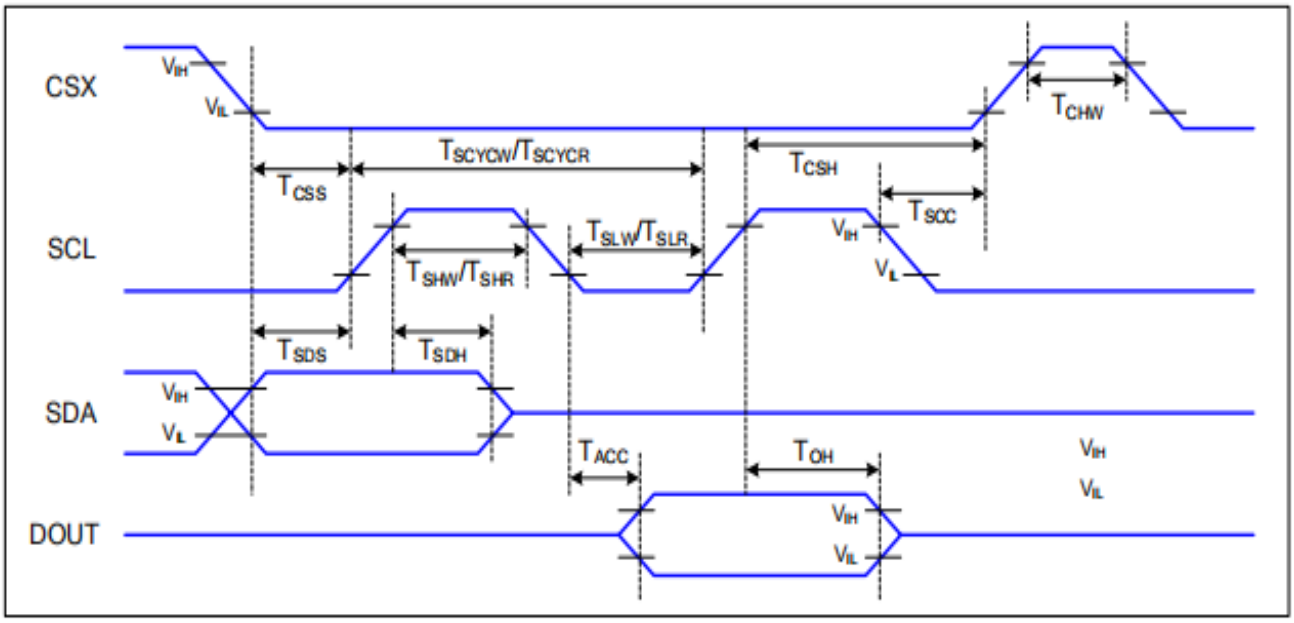
Interface signals

Pin No.	Symbol	Function
1	XR(NC)	No connection
2	YD(NC)	No connection
3	XL(NC)	No connection
4	YU(NC)	No connection
5	GND	Ground.
6	GND	Ground.
7	VCI	Power supply
8	IOVCC	I/O power supply
9	SDO	SPI interface output
10	SDI	Serial Input data bus
11	SCL	Serial clock as serial interface.
12	CS	Chip select signal
13	RESET	Reset pin,active “L”
14~37	DB23~DB0	RGB data bus
38	DE	Data enable pin
39	PCLK	Data clock
40	HSYNC	Horizontal sync input in RGB mode
41	VSYNC	Vertical sync input in RGB mode
42	NC	No connection
43	LEDK	LED back light(Cathode)
44	NC	No connection
45	LEDA	LED back light(Anode)

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AC Characteristics

Serial Interface Characteristics (3-line serial):



Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	60		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	66		ns	
	T_{SHW}	SCL "H" pulse width (Write)	15		ns	
	T_{SLW}	SCL "L" pulse width (Write)	15		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	10		ns	
	T_{SDH}	Data hold time	10		ns	

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Optical Characteristics

Item	Symbol		Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp		θ=0° Φ=0°	450	500	-	Cd/m^2	1
Uniformity	⊿Bp			75	80	-	%	1,2
Viewing Angle	3:00		Cr≥10	-	80	-	Deg	3
	6:00			-	80	-		
	9:00			-	80	-		
	12:00			-	80	-		
Contrast Ratio	Cr		θ=0° Φ=0°	800	1000	-	-	4
Response Time	$T_{r+}T_f$			-	30	35	ms	5
Color of CIE Coordinate	W	x	θ=0° Φ=0°	Typ. -0.05	TBD	Typ. +0.05	-	1,6
		y			TBD		-	
	R	x			TBD		-	
		y			TBD		-	
	G	x			TBD		-	
		y			TBD		-	
	B	x			TBD		-	
		y			TBD		-	
NTSC Ratio	S			60	69	-	%	

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