Next Vision Display
Brighten The Future

NEXT VISION DISPLAY

SPECIFICATION

CUSTOMER : _____

MODULE NO.: NT021RN001ML

Version	01
Engineer	
Date	2021/01/14

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Customer:
Approved by

NEXT VISION DISPLAY CO., LTD.

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General Specifications

NT021RN001ML 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	56.18X59.71X2.20	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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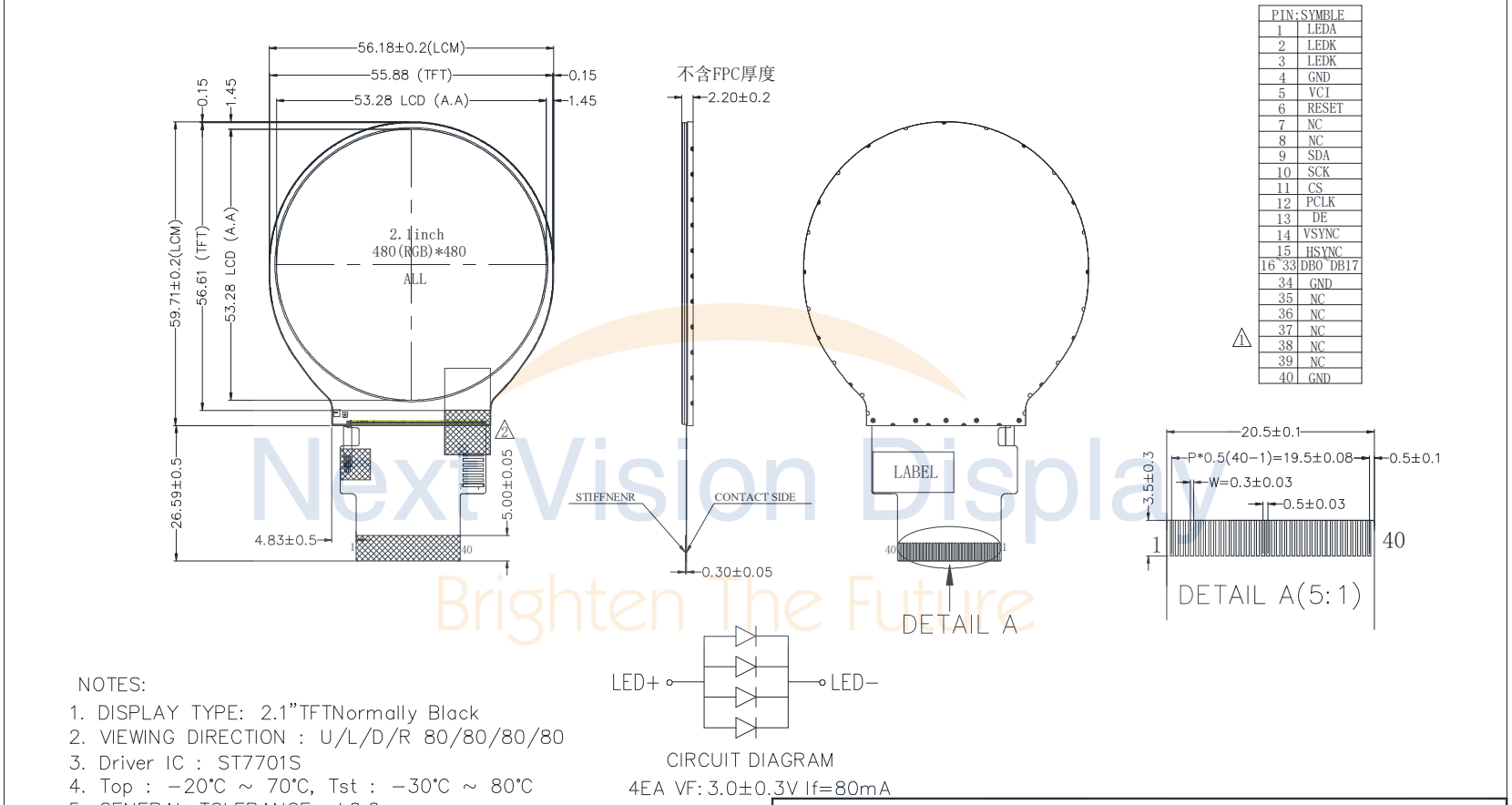
Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: Without FPC and Solder.

Outline Drawing

ALL PAGES OF THIS VERSION APPROVED			
SIGNATURE:		DATE:	

REV.	Description	Date
01	New released	



PIN	SYMBLE
1	LEDA
2	LEDK
3	LEDK
4	GND
5	VCI
6	RESET
7	NC
8	NC
9	SDA
10	SCK
11	CS
12	PCLK
13	DE
14	VSYNC
15	HSYNC
16~33	DB0~DB17
34	GND
35	NC
36	NC
37	NC
38	NC
39	NC
40	GND

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/250cd/m² (Typical)

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GENERAL TOL 0.30	ALL UNITS: MM	DATE	MODEL NUMBER : NT021RN001ML		SHEET: 1 OF 1
DWN:					
CHK:					DATE:
APP:			DO NOT SCALE THIS DRAWING.	PROJECTION	

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℃.

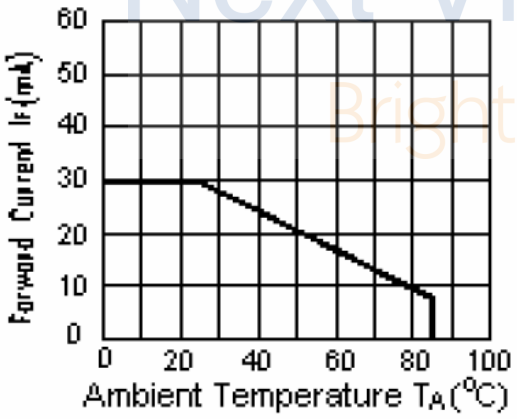
Electrical Specifications

Electrical characteristics(Vss=0V ,Ta=25℃)

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℃)

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply voltage	V_f	If=80mA	2.7	3.0	3.3	V	
Uniformity	ΔBp	If=80mA	75	80	-	%	
Life Time	time	If=80mA	-	20K	-	hours	1



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

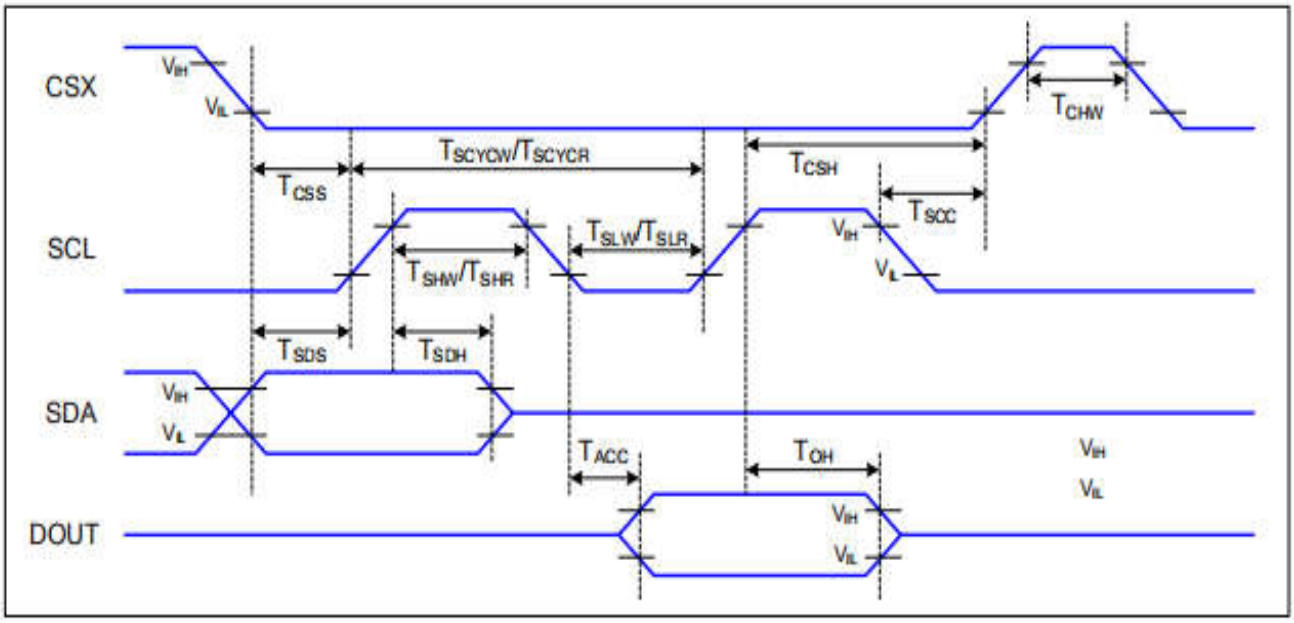
Interface signals

Pin No.	Symbol	I/O	Function
1	LEDA	P	LED back light(Anode)
2-3	LEDK	P	LED back light(Cathode)
4	GND	P	Ground.
5	VCI	P	Power supply
6	RESET	I	Reset pin,active “L”
7-8	NC	-	No connection.
9	SDA	I	Serial Input data bus
10	SCK	I	Serial clock as serial interface.
11	CS	I	Chip select signal
12	PCLK	I	Data clock
13	DE	I	Data enable pin
14	VSYNC	I	Vertical sync input in RGB mode
15	HSYNC	I	Horizontal sync input in RGB mode
16-33	DB0-DB17	I	RGB data bus
34	GND	P	Ground.
35	TP-INT	I	CTP control pin,no use please NC
36	TP-SDA	I	
37	TP-SCL	I	
38	TP-RESET	I	
39	TP-VCI	I	
40	GND	P	Ground.

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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°	-	250	-	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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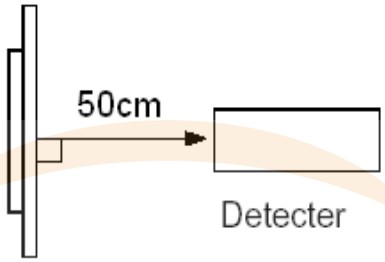
Note：The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 (Φ5mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25℃.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.



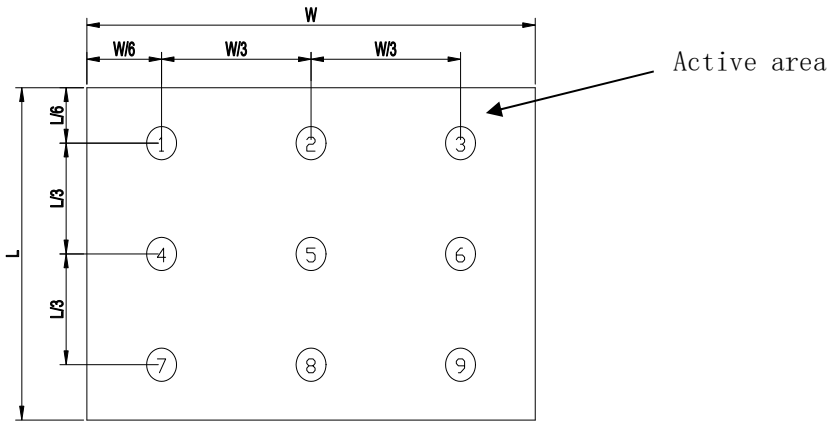
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Note 2: The luminance uniformity is calculated by using following formula.

⊿Bp = Bp (Min.) / Bp (Max.)×100 (%)

Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.



Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and Φ