Next Vision Display
Brighten The Future

NEXT VISION DISPLAY

SPECIFICATION

CUSTOMER : _____

MODULE NO.: NL015FN002ML

Version	1.0
Engineer	
Date	Aug-15-2008

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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

Basic Specifications

Display Specifications

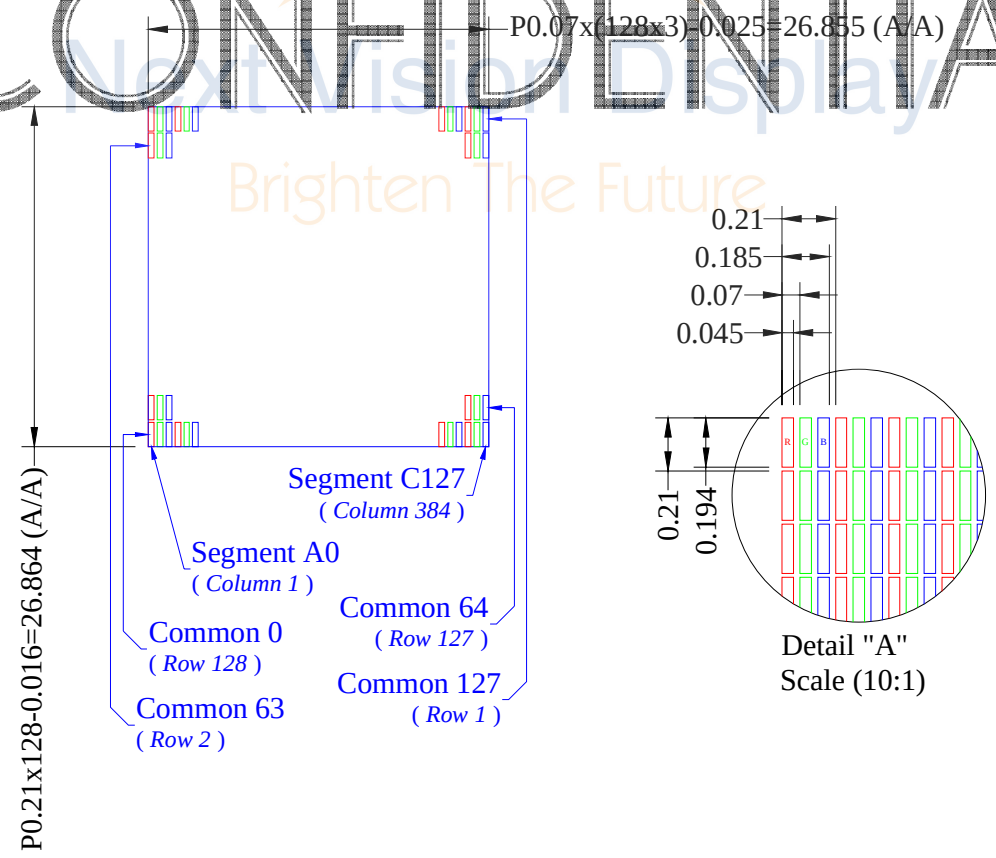
1) Display Mode: Passive Matrix
2) Display Color: 262,144 Colors (Maximum)
3) Drive Duty: 1/128 Duty

Mechanical Specifications

1) Outline Drawing: According to the annexed outline drawing
2) Number of Pixels: 128 (RGB) × 128
3) Panel Size: 33.80 × 34.00 × 1.60 (mm)
4) Active Area: 26.855 × 26.864 (mm)
5) Pixel Pitch: 0.07 × 0.21 (mm)
6) Pixel Size: 0.045 × 0.194 (mm)
7) Weight: 3.75 (g)

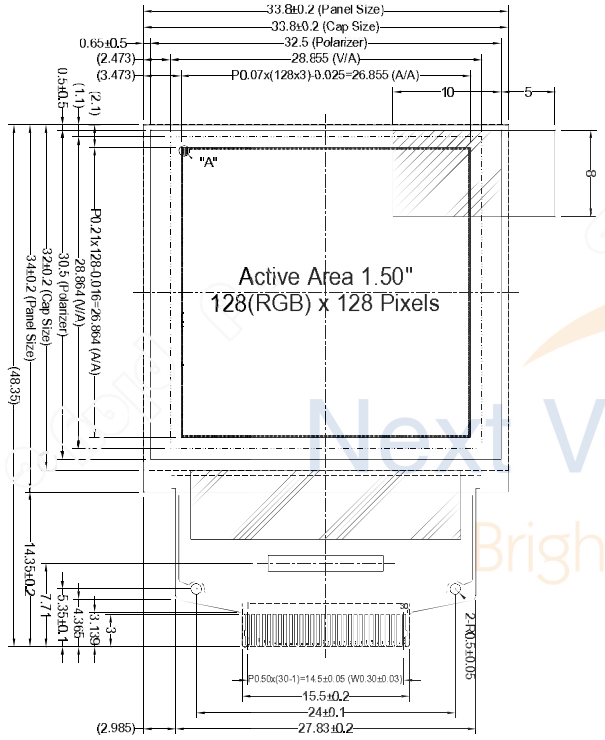
Active Area & Pixel Construction

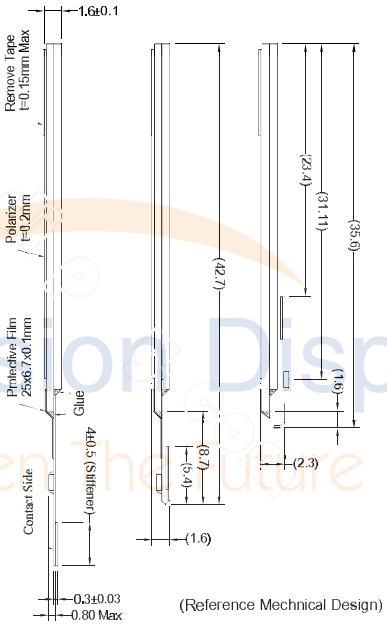
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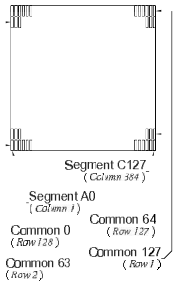
Mechanical Drawing

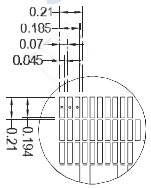
Item	Date	Remark
A	Aug-15-2008	Original Drawing





(Reference Mechnical Design)





Detail "A"
Scale (10:1)

Pin	Symbol
1	N.C. (GND)
2	VCC
3	VCOMH
4	VDDIO
5	VSL
6	N.C.
7	D7
8	D6
9	D5
10	D4
11	D3
12	D2
13	D1
14	D0
15	E/RD#
16	R/W#
17	BS0
18	BS1
19	CS#
20	D/C#
21	RES#
22	IREF
23	GPIO1
24	GPIO0
25	N.C.
26	VDD
27	VCI
28	VSS
29	N.C.
30	N.C. (GND)

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Customer Approval Signature							Drawing Number	Rev.
							DFE2828CNCF36	A
	Unless Otherwise Specified		Title	NL015FN002ML			Material	
	Unit	mm					Soda Lime / Polyimide	
	General Roughness							
	Tolerance			Drawn	E.E.	Panel / E.	P.M.	Scale	Sheet	Size
	Dimension	±0.3	By	Humphrey Lin	Sean Lai	Ivy Lo	Cherry Lin	1:1	1 of 1	A3
	Angle	±1	Date	20080815	20080815	20080815	20080815			

Pin Definition

Pin Number	Symbol	Type	Function
Power Supply			
27	VCI	P	*Power Supply for Operation* This is a voltage supply pin. It must be connected to external source & always be equal to or higher than VDD & VDDIO.
26	VDD	P	*Power Supply for Core Logic Circuit* This is a voltage supply pin which is regulated internally from VCI. A capacitor should be connected between this pin & VSS under all circumstances.
4	VDDIO	P	*Power Supply for I/O Pin* This pin is a power supply pin of I/O buffer. It should be connected to VCI or external source. All I/O signal should have VIH reference to VDDIO. When I/O signal pins (BS0~BS1, D0~D7, control signals…) pull high, they should be connected to VDDIO.
28	VSS	P	*Ground of OEL System* This is a ground pin. It also acts as a reference for the logic pins, the OEL driving voltages, and the analog circuits. It must be connected to external ground.
2	VCC	P	*Power Supply for OEL Panel* This is the most positive voltage supply pin of the chip. It must be connected to external source.
Driver			
22	IREF	I	*Current Reference for Brightness Adjustment* This pin is segment current reference pin. A resistor should be connected between this pin and VSS. Set the current lower than 12.5uA.
3	VCOMH	P	*Voltage Output High Level for COM Signal* This pin is the input pin for the voltage output high level for COM signals. A tantalum capacitor should be connected between this pin and VSS.
5	VSL	P	*Voltage Output Low Level for SEG Signal* This is segment voltage reference pin. When external VSL is not used, this pin should be left open. When external VSL is used, this pin should connect with resistor and diode to ground.
External IC Control			
24 23	GPIO0 GPIO1	I/O	*General Purpose Input/Output* These pins could be left open individually or have signal inputted/outputted. They are able to use as the external DC/DC converter circuit enabled/disabled control or other applications.

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Pin Definition (Continued)

<table>
<tr><th>Pin Number</th><th>Symbol</th><th>I/O</th><th>Function</th></tr>
<tr><td colspan="4">Interface</td></tr>
<tr><td>17
18</td><td>BS0
BS1</td><td>I</td><td>Communicating Protocol Select
These pins are MCU interface selection input. See the following table:
<table>
<tr><td></td><td>BS0</td><td>BS1</td></tr>
<tr><td>3-wire SPI</td><td>1</td><td>0</td></tr>
<tr><td>4-wire SPI</td><td>0</td><td>0</td></tr>
<tr><td>68XX-parallel (8-bit)</td><td>1</td><td>1</td></tr>
<tr><td>80XX-parallel (8-bit)</td><td>0</td><td>1</td></tr>
</table></td></tr>
<tr><td>21</td><td>RES#</td><td>I</td><td>Power Reset for Controller and Driver
This pin is reset signal input. When the pin is low, initialization of the chip is executed.</td></tr>
<tr><td>19</td><td>CS#</td><td>I</td><td>Chip Select
This pin is the chip select input. The chip is enabled for MCU communication only when CS# is pulled low.</td></tr>
<tr><td>20</td><td>D/C#</td><td>I</td><td>Data/Command Control
This pin is Data/Command control pin. When the pin is pulled high, the input at D7~D0 is treated as display data. When the pin is pulled low, the input at D7~D0 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the Timing Characteristics Diagrams.
When 3-wire serial mode is selected, this pin must be connected to VSS.</td></tr>
<tr><td>15</td><td>E/RD#</td><td>I</td><td>Read/Write Enable or Read
This pin is MCU interface input. When interfacing to a 68XX-series microprocessor, this pin will be used as the Enable (E) signal. Read/write operation is initiated when this pin is pulled high and the CS# is pulled low.
When connecting to an 80XX-microprocessor, this pin receives the Read (RD#) signal. Data read operation is initiated when this pin is pulled low and CS# is pulled low.
When serial mode is selected, this pin must be connected to VSS.</td></tr>
<tr><td>16</td><td>R/W#</td><td>I</td><td>Read/Write Select or Write
This pin is MCU interface input. When interfacing to a 68XX-series microprocessor, this pin will be used as Read/Write (R/W#) selection input. Pull this pin to “High” for read mode and pull it to “Low” for write mode.
When 80XX interface mode is selected, this pin will be the Write (WR#) input. Data write operation is initiated when this pin is pulled low and the CS# is pulled low.
When serial mode is selected, this pin must be connected to VSS.</td></tr>
<tr><td>7~14</td><td>D7~D0</td><td>I/O</td><td>Host Data Input/Output Bus
These pins are 8-bit bi-directional data bus to be connected to the microprocessor’s data bus. When serial mode is selected, D1 will be the serial data input SDIN and D0 will be the serial clock input SCLK.
Unused pins must be connected to VSS except for D2.</td></tr>
</table>

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Pin Definition (Continued)

Pin Number	Symbol	I/O	Function
Reserve			
6, 25, 29	N.C.	-	*Reserved Pin* The N.C. pins between function pins are reserved for compatible and flexible design.
1, 30	N.C. (GND)	-	*Reserved Pin (Supporting Pin)* The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.

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Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage for Operation	V_{CI}	-0.3	4	V	1, 2
Supply Voltage for Logic	V_{DD}	-0.5	2.75	V	1, 2
Supply Voltage for I/O Pins	V_{DDIO}	-0.5	V_{CI}	V	1, 2
Supply Voltage for Display	V_{CC}	-0.5	16	V	1, 2
Operating Temperature	T_{OP}	-30	70	°C	-
Storage Temperature	T_{STG}	-40	80	°C	-

Note 1: All the above voltages are on the basis of “VSS = 0V”.

Note 2: When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to Section 3. “Optics & Electrical Characteristics”. If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

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Optics & Electrical Characteristics

Optics Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Brightness (White)	L_{br}	With Polarizer (Note 3)	70	90	-	cd/m^2
C.I.E. (White)	(x) (y)	With Polarizer	0.26 0.29	0.30 0.33	0.34 0.37	
C.I.E. (Red)	(x) (y)	With Polarizer	0.60 0.30	0.64 0.34	0.68 0.38	
C.I.E. (Green)	(x) (y)	With Polarizer	0.27 0.58	0.31 0.62	0.35 0.66	
C.I.E. (Blue)	(x) (y)	With Polarizer	0.10 0.12	0.14 0.16	0.18 0.20	
Dark Room Contrast	CR		-	>2000:1	-	
View Angle			>160	-	-	degree

* Optical measurement taken at V_{CI} = 2.8V, V_{CC} = 13V.
Software configuration follows Section 4.4 Initialization.

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DC Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage for Operation	V_{CI}		2.4	2.8	3.5	V
Supply Voltage for Logic	V_{DD}		2.4	2.5	2.6	V
Supply Voltage for I/O Pins	V_{DDIO}		1.65	1.8	V_{CI}	V
Supply Voltage for Display	V_{CC}	Note 3	12.5	13	13.5	V
High Level Input	V_{IH}		$0.8\times V_{DDIO}$	-	V_{DDIO}	V
Low Level Input	V_{IL}		0	-	$0.2\times V_{DDIO}$	V
High Level Output	V_{OH}	I_{out} = 100μA, 3.3MHz	$0.9\times V_{DDIO}$	-	V_{DDIO}	V
Low Level Output	V_{OL}	I_{out} = 100μA, 3.3MHz	0	-	$0.1\times V_{DDIO}$	V
Operating Current for V_{CI}	I_{CI}		-	240	300	μA
Operating Current for V_{CC}	I_{CC}	Note 4	-	23.2	29.0	mA
		Note 5	-	33.4	41.8	mA
Sleep Mode Current for V_{CI}	$I_{CI, SLEEP}$		-	1	5	μA
Sleep Mode Current for V_{CC}	$I_{CC, SLEEP}$		-	1	5	μA

Note 3: Brightness (L_{br}) and Supply Voltage for Display (V_{CC}) are subject to the change of the panel characteristics and the customer's request.
Note 4: V_{CI} = 2.8V, V_{CC} = 13V, 50% Display Area Turn on.
Note 5: V_{CI} = 2.8V, V_{CC} = 13V, 100% Display Area Turn on.

* Software configuration follows Section 4.4 Initialization.