NHD-10.1-1024600AF-ASXV#

TFT (Thin-Film-Transistor) Color Liquid Crystal Display Module

NHD-	Newhaven Display
10.1-	10.1” Diagonal
1024600-	1024xRGBx600 Pixels
AF-	Model
A-	RGB Interface
S-	High Brightness, White LED Backlight
X-	TFT
V-	MVA, Transmissive, Standard Temperature
#-	**RoHS Compliant**

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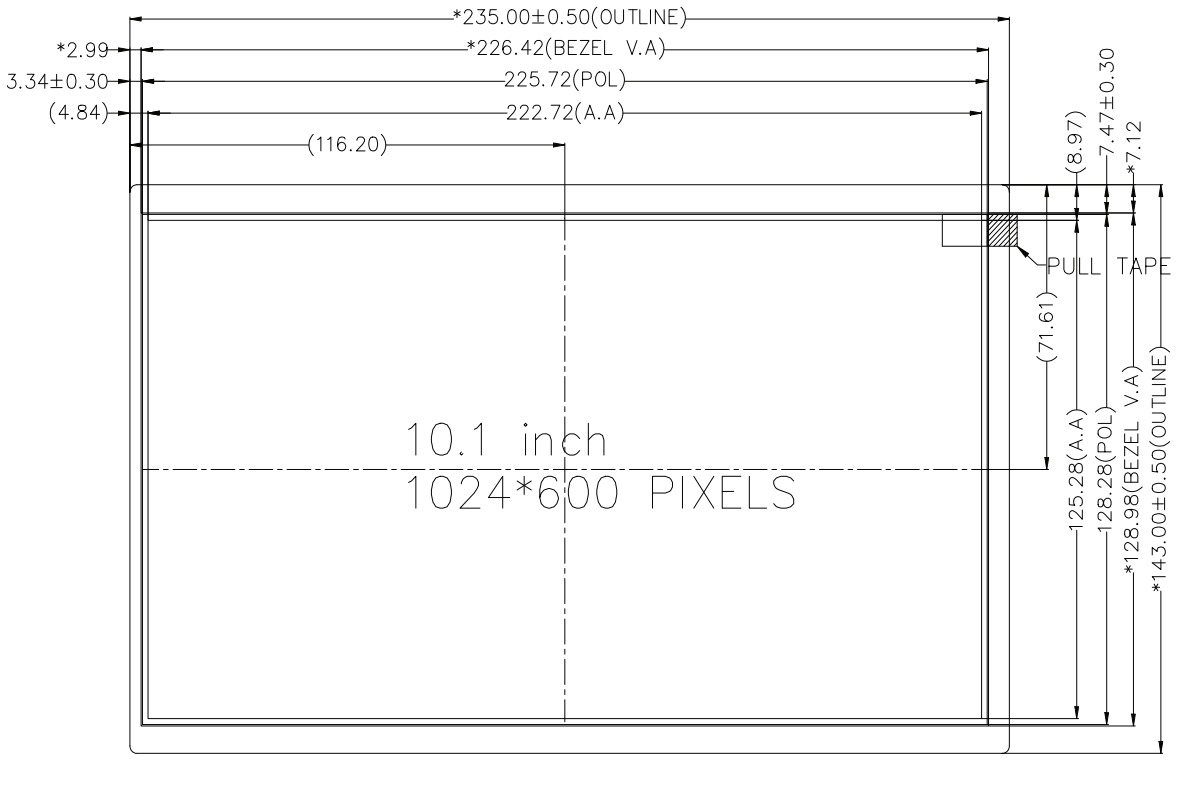
Document Revision History

Revision	Date	Description	Changed by
-	08/01/18	Initial Release	NP
1	7/10/19	Backlight Voltage Updated	SB
2	3/11/20	Optical Characteristics Updated	SB
3	9/3/20	Updated 2D Drawing; Kapton Tape over Molex Connector	AS

Functions and Features

- **1024xRGBx600 Resolution**
- **LED Backlight**
  - **Built In-LED Driver**
  - **PWM Brightness Control**
- **RGB Interface**
- **262K Colors**
- **Wide Viewing Angles**

Mechanical Drawing



Notes:

1.	Display Size:	10.1” TFT
2.	Display Resolution:	1024 x 600 Pixels
3.	Display Mode:	Transmissive / Normally White / Anti-Glare
4.	Optimal View:	Full View
5.	Driver IC:	HX8282 - RGB Interface
6.	Power Supply Voltage:	3.3V
7.	Backlight:	White LED
8.	Luminance:	800 cd/m² (Typ)

Pin Description

Pin No.	Symbol	Connection	Function Description
1	LED_GND	Power Supply	Ground for Backlight Driver
2-4	LED_V_{DD}	Power Supply	Supply Voltage for Backlight Driver
5	LED_PWM	MPU	Backlight PWM Signal Input (See Table Below)
6	LED_EN	MPU	Backlight Enable H: Backlight On; L: Backlight Off
7	GND	Power Supply	Ground
8	V_{DD}	Power Supply	Supply voltage for LCD (+3.3V)
9-16	[R0-R7]	MPU	Red Data Signals
17-24	[G0-G7]	MPU	Green Data Signals
25-32	[B0-B7]	MPU	Blue Data Signals
33	GND	Power Supply	Ground
34	DCLK	MPU	Dot data Clock
35	HSYNC	MPU	Horizontal sync input
36	VSYNC	MPU	Vertical sync input
37	DEN	MPU	Data Enable signal
38	MODE	MPU	DE/SYNC mode select MODE= H: DE mode MODE= L: SYNC mode
39	RESET	MPU	Active Low Reset Signal
40	STBYB	MPU	Active Low Standby Signal

LCD connector: 0.5mm pitch 40-Conductor FFC.
Recommended cable: 40 POS FFC **Molex P/N:** 15020-0435

LED_PWM Signal Operating Frequency:

PWM Frequency (F)	Duty Cycle (Min.)	Duty Cycle (Max.)
100Hz < F < 500Hz	5%	100%
500Hz < F < 20KHz	10%	100%

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T_{OP}	Absolute Max	0	-	+50	°C
Storage Temperature Range	T_{ST}	Absolute Max	-20	-	+60	°C
Supply Voltage for LCD	V_{DD}	-	3.0	3.3	3.6	V
Supply Current for LCD	I_{DD}	V_{DD} = 3.3V	50	120	180	mA
"H" Level Input	V_{IH}	-	0.7 * V_{DD}	-	V_{DD}	V
"L" Level Input	V_{IL}	-	GND	-	0.3 * V_{DD}	V
"H" Level Output	V_{OH}	-	V_{DD} - 0.4	-	V_{DD}	V
"L" Level Output	V_{OL}	-	GND	-	GND + 0.4	V
Supply Voltage for Backlight Driver	LED_V_{DD}	-	5.0	12.0	22.4	V
Supply Current for Backlight Driver[1]	LED_I_{DD}	-	160	360	1200	mA
Backlight Enable Voltage	LED_EN	-	1.5	3.3	5.5	V
Backlight PWM Voltage	LED_PWM	I_{PWM} ≤ 5 mA	1.5	3.3	5.5	V
Backlight Lifetime[2]	-	T_{OP} = 25° C	20,000	50,000	-	Hrs.

[1]Minimum supply current occurs when supply voltage is at max; maximum supply current when supply voltage is at minimum.
[2]Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions.

Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top	φY+	Cr ≥10	-	80	-	o
	Bottom	φY-		-	80	-	o
	Left	θX-		-	80	-	o
	Right	θX+		-	80	-	o
Contrast Ratio		CR	-	300	450	750	-
Luminance		L_V	-	600	800	1000	cd/m^2
Response Time	Rise + Fall	T_R + T_F	T_{OP} = 25°C	-	8	-	ms
Chromaticity	Red	X_R	-	0.565	0.605	0.635	-
		Y_R	-	0.309	0.349	0.379	-
	Green	X_G	-	0.286	0.326	0.356	-
		Y_G	-	0.565	0.605	0.635	-
	Blue	X_B	-	0.112	0.152	0.182	-
		Y_B	-	0.075	0.115	0.145	-
	White	X_W	-	0.257	0.297	0.327	-
		Y_W	-	0.283	0.323	0.353	-

Driver Information

Built-in HX8282 Source Driver: http://www.newhavendisplay.com/appnotes/datasheets/LCDs/HX8282-A01.pdf
Built-in HX8696 Gate Driver: http://www.newhavendisplay.com/appnotes/datasheets/LCDs/HX8696-A.pdf

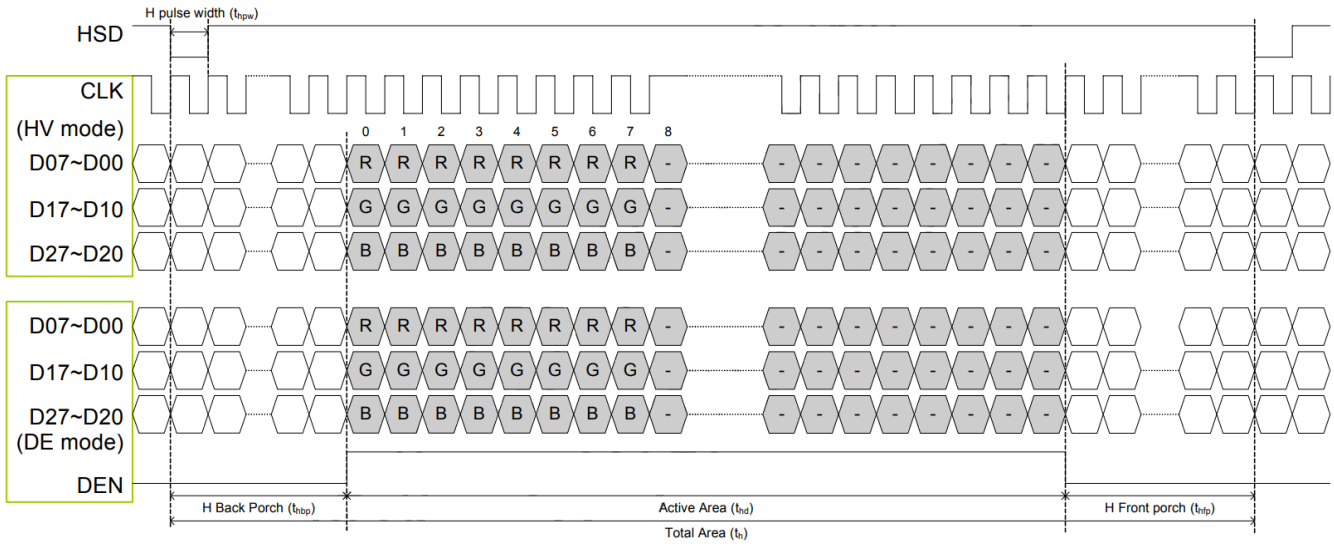
Timing Characteristics

DE Mode

Parameter	Symbol	Spec			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1600	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		TH
VSD Period	tv	610	635	800	TH
VSD Blanking	tvbp+ tvfp	10	35	200	TH

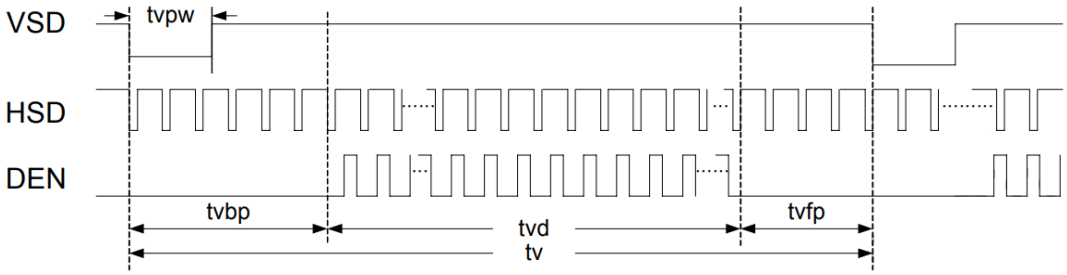
Horizontal Timing

Parameter	Symbol	Spec			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp		160		DCLK
HSD Front Porch	thfp	16	160	216	DCLK



Vertical Timing

Parameter	Symbol	Spec			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		TH
VSD Period	tv	624	635	750	TH
VSD Pulse Width	tvpw	1	-	20	TH
VSD Back Porch	tvbp		23		TH
VSD Front Porch	tvfp	1	12	127	TH



Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+60°C, 240 hrs.	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-20°C, 240 hrs.	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+50°C, 120 hrs.	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	0°C, 120 hrs.	1,2
High Temperature / Humidity Operation	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+50°C, 90% RH, 120 hrs.	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	0°C, 30min->25°C, 5min -> 50°C, 30min 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz, 1.5mm amplitude. 60 sec in each of 3 directions X, Y, Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	Air: V_S=8KV, Contact: V_S=4KV 10 Times	

Note 1: No condensation to be observed.
Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.
Note 3: Test performed on product itself, not inside a container.

Precautions for using LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms

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