NHD-10.1-1024600AF-LSXV#

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

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

Document Revision History

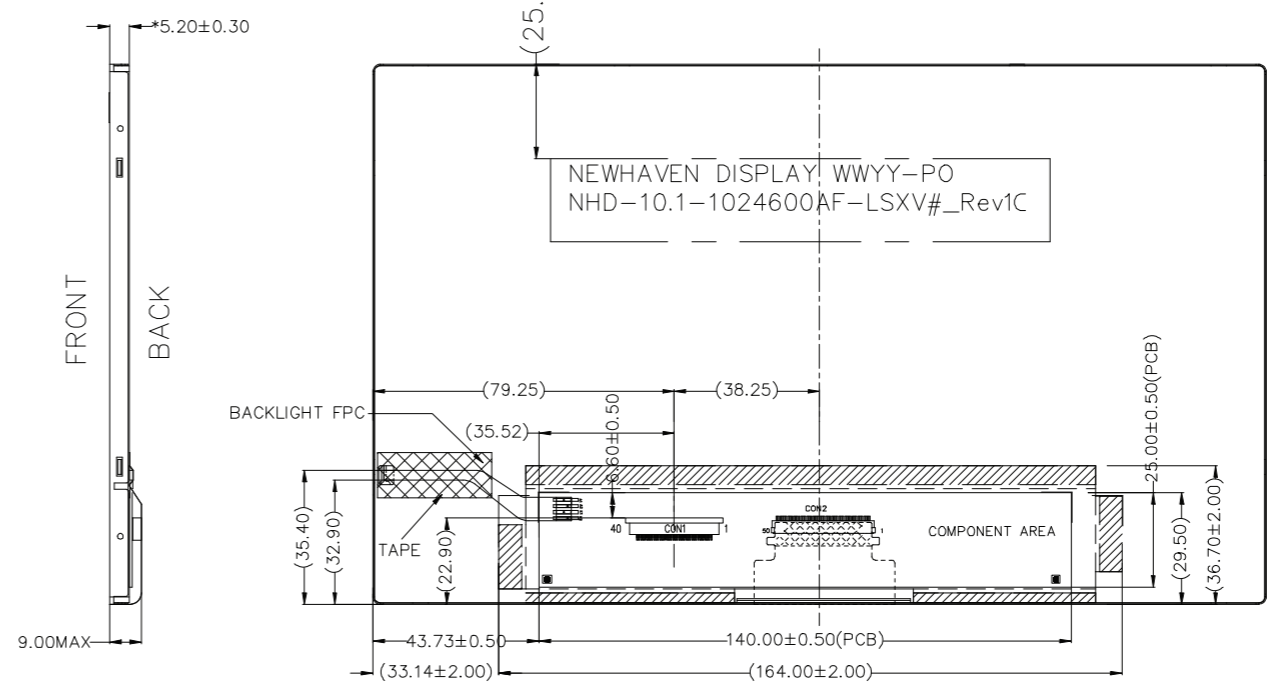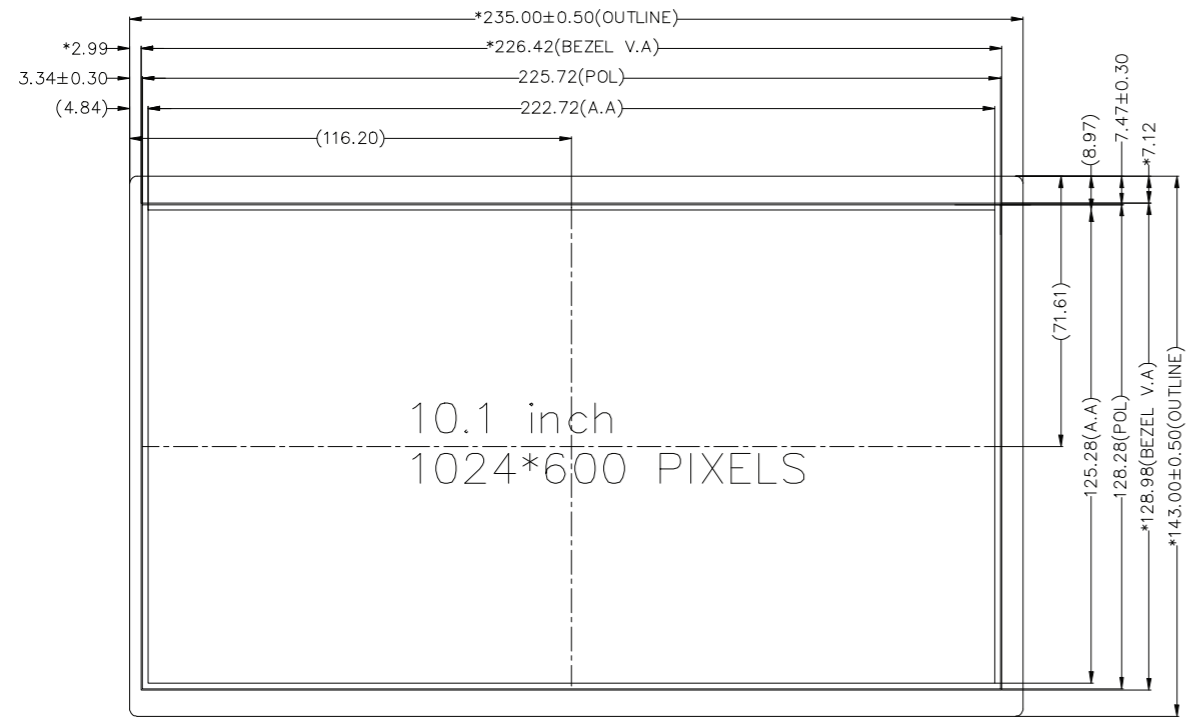| Revision	Date	Description	Changed by
0	5/17/17	Initial Release	SB
1	8/14/17	Backlight Characteristics Added, Pin Descriptions Updated	SB
2	3/6/18	Electrical & Optical Characteristics Updated	SB
3	7/1/18	Backlight Redesign	SB
4	7/10/19	Electrical Characteristics Updated	SB

Functions and Features

- **1024xRGBx600 Resolution**
- **LED Backlight**
    - o **Built In-LED Driver**
    - o **PWM Brightness Control**
- **LVDS Interface**
    - o **4 LVDS Channels**
- **262K Colors**
- **Wide Viewing Angles**

Pin Assignment

PIN No.	SYMBOL
1	GND
2	VDD
3	VDD
4	V_EDID
5	GND
6	SCL
7	SDA
8	Rin0−
9	Rin0+
10	GND
11	Rin1−
12	Rin1+
13	GND
14	Rin2−
15	Rin2+
16	GND
17	CLKIN−
18	CLKIN+
19	GND
20	Rin3−
21	Rin3+
22	GND
23	INSEL
24	GND
25	GND
26	UPDN
27	SHLR
28	GND
29	RESET
30	STBYB
31	LED−GND
32	LED−GND
33	LED−GND
34	GND
35	LED_PWM
36	LED_EN
37	BIST
38	LED_VDD
39	LED_VDD
40	LED_VDD

*235.00±0.50(OUTLINE)
*226.42(BEZEL V.A)
225.72(POL)
222.72(A.A)
(116.20)

*2.99
3.34±0.30
(4.84)

(8.97)
7.47±0.30
*7.12

*5.20±0.30

(25.00)

NEWHAVEN DISPLAY WWYY−PO
NHD−10.1−1024600AF−LSXV#_Rev1C

10.1 inch
1024*600 PIXELS

FRONT
BACK

(71.61)
125.28(A.A)
128.28(POL)
*128.98(BEZEL V.A)
*143.00±0.50(OUTLINE)

BACKLIGHT FPC
(35.52)
(35.40)
(32.90)
TAPE
(22.90)
9.00MAX

40 CON1 1
CON2
COMPONENT AREA

(79.25)
(38.25)
(60±0.50)

25.00±0.50(PCB)
(29.50)
36.70±2.00

43.73±0.50
(33.14±2.00)
140.00±0.50(PCB)
(164.00±2.00)

Backlight Circuit

A1/A2

K1/K2

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 - LVDS Interface
6. Power Supply Voltage: 3.3V
7. Backlight: White LED
8. Luminance: 800cd/m² (Typ)

STANDARD TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
LINEAR:
XX.   ±0.3 mm
XX.X   ±0.3 mm
XX.XX   ±0.3 mm

UNLESS OTHERWISE SPECIFIED
- DIMENSIONS ARE IN MILLIMETERS
- THIRD ANGLE PROJECTION

NEWHAVEN DISPLAY
INTERNATIONAL

DRAWING/PART NUMBER:			REVISION:
NHD-10.1-1024600AF-LSXV#			1C
			SIZE:
DRAWN BY:	CHECKED BY:	APPROVED BY:	A3
S. Baxi	S. Baxi	S. Baxi	
DRAWN DATE:	CHECKED DATE:	APPROVED DATE:	SCALE:
12/19/17	12/19/17	12/19/17	NS
DO NOT SCALE DRAWING			SHEET 1 OF 1

Pin Description

Pin No.	Symbol	Connection	Function Description
1	GND	Power Supply	Ground
2-3	V$_{DD}$	Power Supply	Supply voltage for LCD (+3.3V)
4	V$_{\_EDID}$	Power Supply	Supply voltage for EDID (+3.3V)
5	GND	Power Supply	Ground
6	SCL	MPU	Serial Clock
7	SDA	MPU	Serial Data
8	Rin0-	MPU	-LVDS differential data input CH0
9	Rin0+	MPU	+LVDS differential data input CH0
10	GND	Power Supply	Ground
11	Rin1-	MPU	-LVDS differential data input CH1
12	Rin1+	MPU	+LVDS differential data input CH1
13	GND	Power Supply	Ground
14	Rin2-	MPU	-LVDS differential data input CH2
15	Rin2+	MPU	+LVDS differential data input CH2
16	GND	Power Supply	Ground
17	CLKIN-	MPU	-LVDS differential Clock
18	CLKIN+	MPU	+LVDS differential Clock
19	GND	Power Supply	Ground
20	Rin3-	MPU	-LVDS differential data input CH3
21	Rin3+	MPU	+LVDS differential data input CH3
22	GND	Power Supply	Ground
23	INSEL (HSD)	MPU	Data Input Format: INSEL = L 8-Bit LVDS Input (Default) INSEL = H 6-Bit LVDS Input
24-25	GND	Power Supply	Ground
26	UPDN	MPU	Gate Driver Up/Down Scan Setting: UPDN = H: Reverse Scan UPDN = L: Normal Scan (Default)
27	SHLR	MPU	Gate Driver Left/Right Scan Setting: SHLR = H: Normal Scan (Default) SHLR = L: Reverse Scan
28	GND	Power Supply	Ground
29	RESET	MPU	Active Low Reset Signal
30	STBYB	MPU	Active Low Standby Signal
31-33	LED_GND	Power Supply	Ground for Backlight Driver
34	GND	Power Supply	Ground
35	LED_PWM	MPU	Backlight PWM Signal Input (See Table Below)
36	LED_EN	MPU	Backlight Enable H: Backlight On; L: Backlight Off
37	BIST	MPU	Built in Self-Test BIST = H: Self-Test Enabled BIST = L: Normal Operation (Default)
38-40	LED_V$_{DD}$	Power Supply	Supply Voltage for Backlight Driver

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 (T_{OP} = 25°C)

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 Voltage for EDID	$V_{\_EDID}$	-	3.0	3.3	3.6	V
Supply Current for LCD	I_{DD}	V_{DD} = 3.3V	50	120	180	mA
LVDS Differential input HIGH Voltage	RxVTH	-	-	-	+100	mV
LVDS Differential input LOW Voltage	RxVTL	-	-100	-	-	mV
LVDS Differential input Common Voltage	RxVCM	-	0.7	-	1.6	V
LVDS Differential Voltage	|VID|	-	200	-	600	mV
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	-	2.5	3.3	5.5	V
Backlight PWM Voltage	LED_PWM	$I_{PWM} \leq 5$ mA	2.5	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	-	°
	Bottom	φY-		-	80	-	°
	Left	θX-		-	80	-	°
	Right	θX+		-	80	-	°
Contrast Ratio		CR	-	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

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$\| VID \| = 400mV$ $R_{XVCM} = 1.2V$ $R_{XFCLK} = 71MHz$
Clock high time	T_{LVCH}	-	4/(7 * RXFCLK)	-	nS	-
Clock low time	T_{LVCL}	-	3/(7 * RXFCLK)	-	nS	-
PLL wake-up time	T_{emPLL}	-	-	150	µS	-

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	23	-	93	KHz	-
Modulation Rate	SSC_{MR}	-	-	±3	%	LVDS Clock = 71 MHz

T_{RSKM} : Receiver strobe margin
R_{SPOS} : Receiver strobe position
T_{SW} : Strobe width (Internal data sampling window)

[6]

6-bit LVDS data input format:

PINC								
NINC								
IND0	R0	G0	R5	R4	R3	R2	R1	R0	G0
IND1	G1	B1	B0	G5	G4	G3	G2	G1	B1
IND2	B2	DE	VS	HS	B5	B4	B3	B2	DE

8-Bit LVDS Data Input Format:

PINC								
NINC								
IND0	R0	G0	R5	R4	R3	R2	R1	R0	G0
IND1	G1	B1	B0	G5	G4	G3	G2	G1	B1
IND2	B2	DE	VS	HS	B5	B4	B3	B2	DE
IND3	R6	-	B7	B6	G7	G6	R7	R6	-
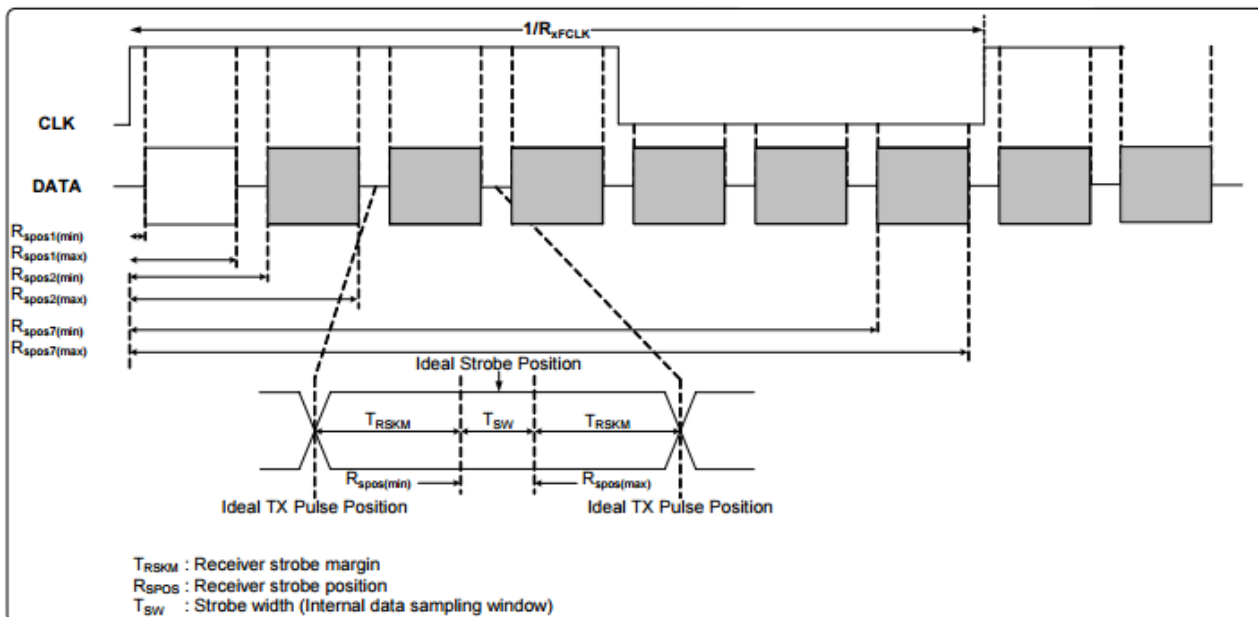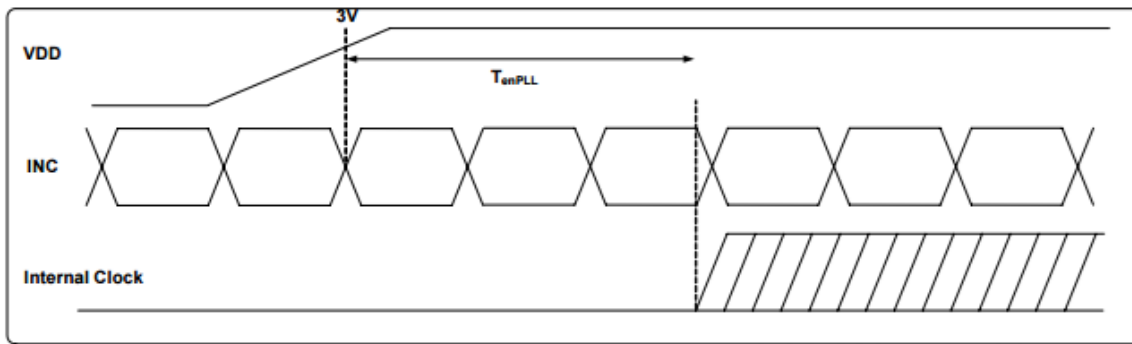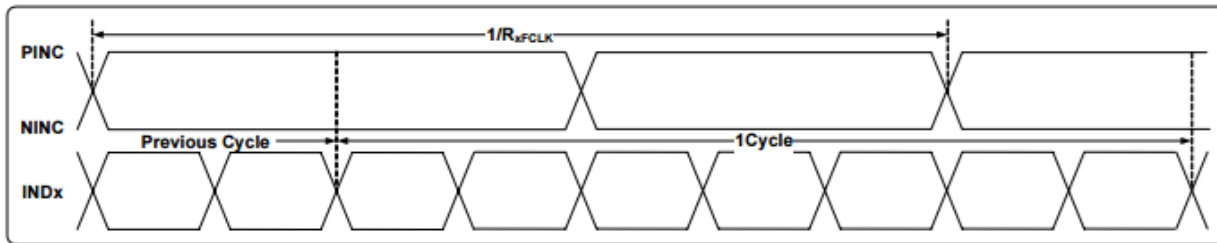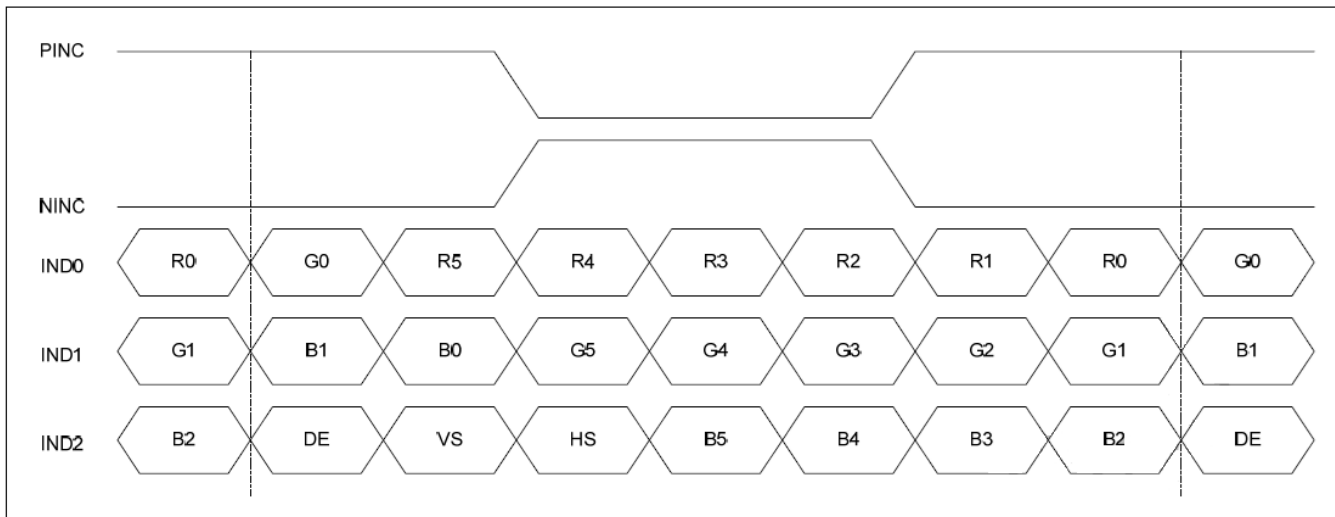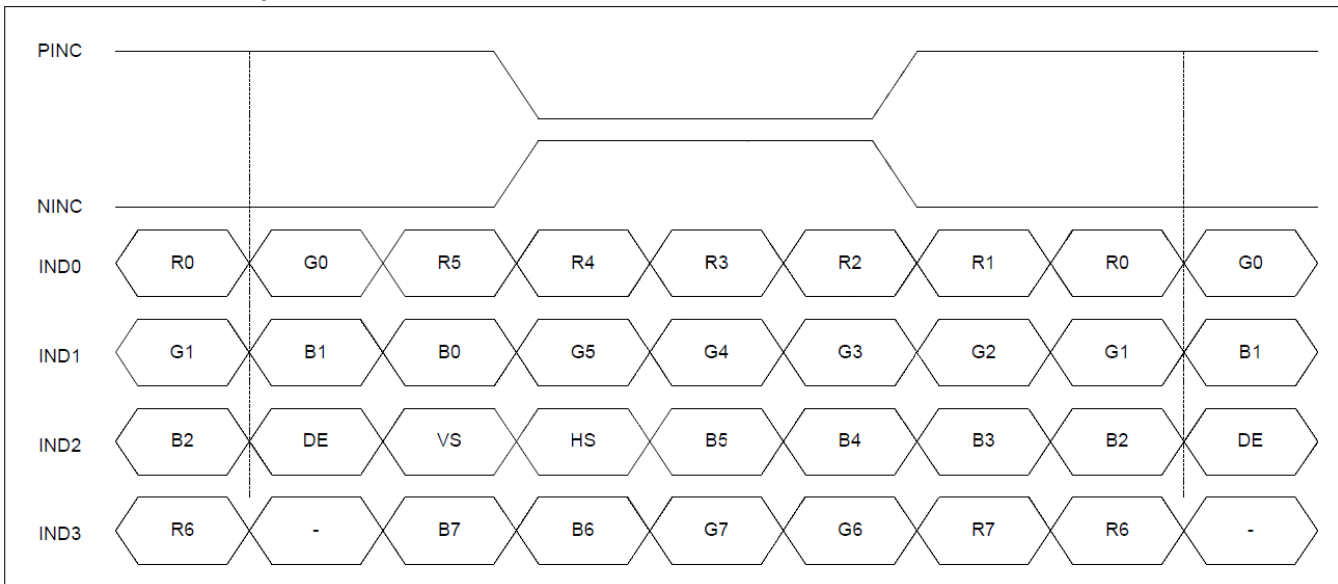
Backlight Power ON Timing Sequence

VIN

>10mS

VOUT

EN

PWM

[7]
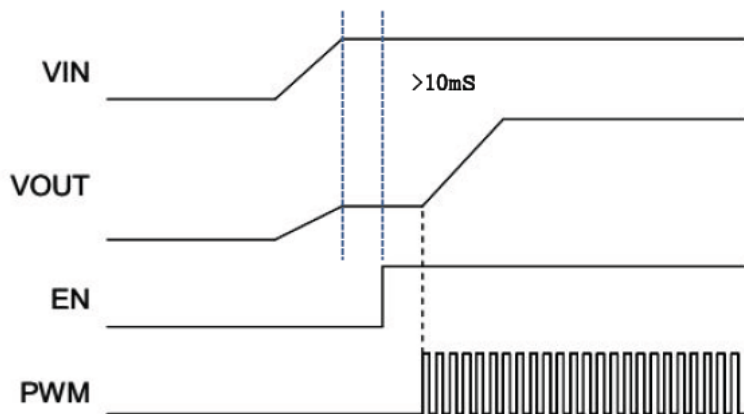
Quality Information

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