

# NHD-4.3-800480CF-ASXP

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

NHD-	Newhaven Display
4.3-	4.3" Diagonal
800480-	800xRGBx480 Pixels
CF-	Model
A-	Built-in Driver / No Controller
S-	High Brightness, White LED Backlight
X-	TFT
P-	IPS, Wide Temperature

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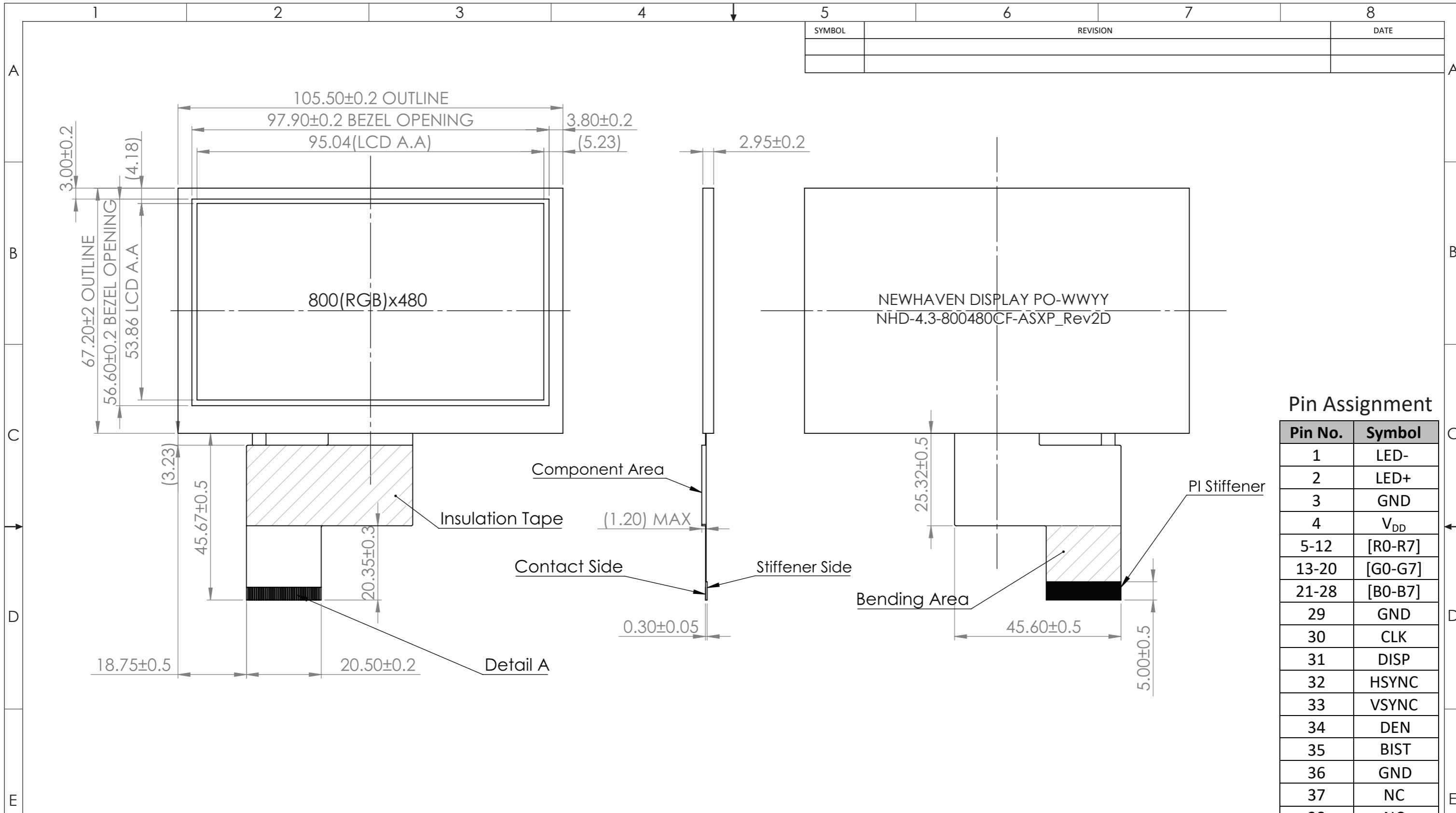
## Document Revision History

Revision	Date	Description	Changed by
-	10/20/19	Initial Release	PK

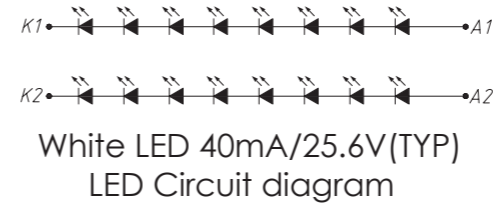
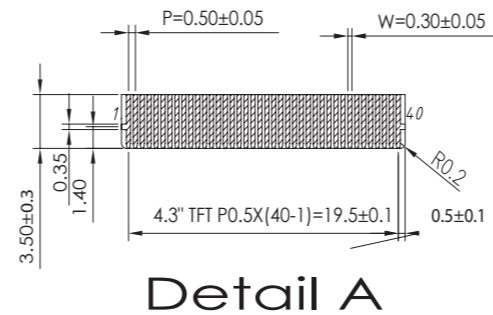
## Functions and Features

- 800xRGBx480 resolution, up to 16.7M colors
- High-brightness LED backlight
- IPS Type, Full Viewing Angles
- 24-Bit RGB interface
- Capacitive touch panel available

SYMBOL	REVISION	DATE



- Notes:
- Display Size: 4.3" TFT
  - Optimal View: Full View IPS
  - Display Mode: Transmissive / Normally Black / Anti-Glare
  - Driver IC: EK9716BE3+EK73002AB2
  - Supply Voltage: 3.3V
  - Backlight: White LED / 25.6V / 40mA (Typ)
  - Luminance: 850 cd/m<sup>2</sup> (Typ)
  - 3M Brightness Enhancement Film



STANDARD TOLERANCE: (UNLESS OTHERWISE SPECIFIED)  
LINEAR: ±0.3mm

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

**NEWHAVEN DISPLAY INTERNATIONAL**

DRAWING/PART NUMBER: NHD-4.3-800480CF-ASXP

REVISION: -

SIZE: A3

SCALE: 1:1

DO NOT SCALE DRAWING SHEET 1 OF 1

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## Pin Description

Pin No.	Symbol	External Connection	Function Description
1	LED-	Power Supply	Backlight Cathode (Ground)
2	LED+	Power Supply	Backlight Anode (25.6V @ 40 mA)
3	GND	Power Supply	Ground
4	VDD	Power Supply	Supply Voltage for LCD and logic (3.3V)
5-12	[R0-R7]	MPU	Red Data signals
13-20	[G0-G7]	MPU	Green Data signals
21-28	[B0-B7]	MPU	Blue Data signals
29	GND	Power Supply	Ground
30	CLK	MPU	Pixel Clock signal
31	DISP	MPU	Display ON/OFF Signal
32	HSYNC	MPU	Line synchronization signal
33	VSYNC	MPU	Frame synchronization signal
34	DEN	MPU	Data Enable signal
35	BIST	MPU	Built in Self-Test. BIST = H: Self-Test Enabled. BIST = L: Normal Operation (Default)
36	GND	Power Supply	Ground
37	NC	-	No Connect
38	NC	-	No Connect
39	NC	-	No Connect
40	NC	-	No Connect

**Recommended LCD connector:** 0.5mm pitch 40-Conductor FFC. **Molex p/n:** 54104-4031 (top contact)

## Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T <sub>OP</sub>	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T <sub>ST</sub>	Absolute Max	-30	-	+80	°C
Supply Voltage	V <sub>DD</sub>	-	2.4	3.3	3.5	V
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = 3.3V	80	160	240	mA
"H" Level input	V <sub>IH</sub>	-	0.7 * V <sub>DD</sub>	-	V <sub>DD</sub>	V
"L" Level input	V <sub>IL</sub>	-	GND	-	0.3 * V <sub>DD</sub>	V
Backlight Supply Current	I <sub>LED</sub>	-	30	40	50	mA
Backlight Supply Voltage	V <sub>LED</sub>	I <sub>LED</sub> = 40mA T <sub>OP</sub> = 25°C	22.4	25.6	27.2	V
Backlight Lifetime*	-		30,000	50,000	-	Hrs.

\*Backlight is current driven; do not supply more than 50mA. 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	CR ≥ 10	-	80	-	°		
	Bottom		-	80	-	°		
	Left		-	80	-	°		
	Right		-	80	-	°		
Contrast Ratio	CR	-	640	800	-	-		
Luminance	L <sub>V</sub>	I <sub>LED</sub> = 40 mA	680	850	-	cd/m <sup>2</sup>		
Response Time	Rise + Fall	T <sub>R</sub> +T <sub>F</sub>	T <sub>OP</sub> = 25°C		-	30	40	ms
Chromaticity	Red	X <sub>R</sub>	-	0.558	0.598	0.638	-	
		Y <sub>R</sub>	-	0.305	0.345	0.385	-	
	Green	X <sub>G</sub>	-	0.335	0.375	0.415	-	
		Y <sub>G</sub>	-	0.521	0.561	0.601	-	
	Blue	X <sub>B</sub>	-	0.103	0.143	0.183	-	
		Y <sub>B</sub>	-	0.062	0.102	0.142	-	
White	X <sub>W</sub>	-	0.269	0.309	0.349	-		
	Y <sub>W</sub>	-	0.279	0.319	0.355	-		

\* Luminance is directly related to Backlight Supply Current.

## Driver Information

Built-in EK9716B Source Driver: [https://www.newhavendisplay.com/appnotes/datasheets/LCDs/EK9716B\\_v1-1.pdf](https://www.newhavendisplay.com/appnotes/datasheets/LCDs/EK9716B_v1-1.pdf)

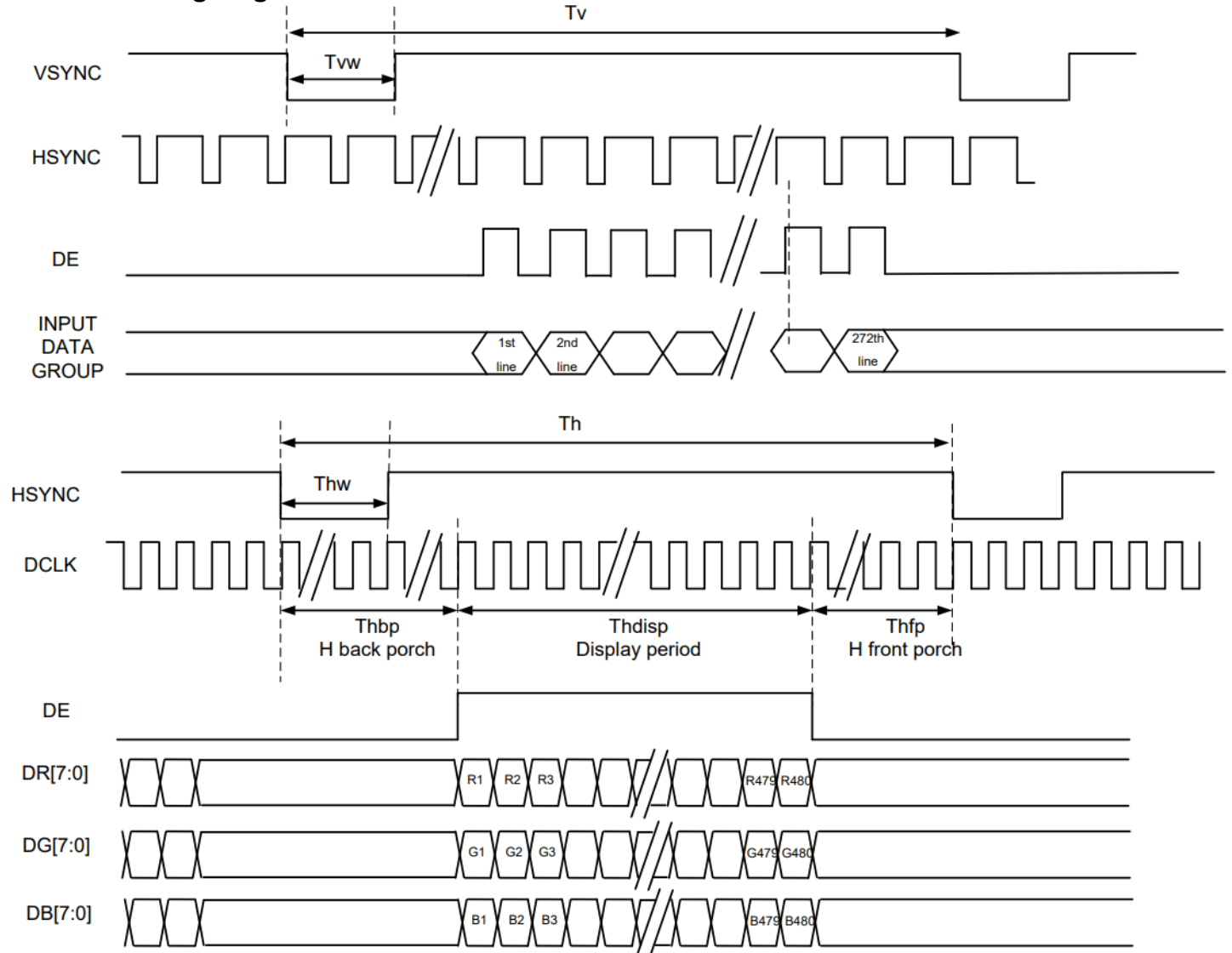
Built-in EK73002AB2 Gate Driver: <https://www.newhavendisplay.com/appnotes/datasheets/LCDs/EK73002AB2.pdf>

# Timing Characteristics

## Parallel RGB Input Timing Requirements

Item	Symbol	Min.	Typ.	Max.	Unit	Remark	
DCLK Frequency	Fclk	28.2	29.2	40	MHz	-	
DLCK Period	Tclk	25	34	-	ns	-	
HSYNC	Period Time	Th	908	928	1088	DCLK	Thw + Thbp = 88 DLCK is fixed
	Display Period	Thdisp	800			DCLK	
	Pulse Width	Thw	1	48	87	DCLK	
	Back Porch	Thbp	87	40	1	DCLK	
	Front Porch	Thfp	20	40	200	DCLK	-
VSYNC	Period Time	Tv	517	525	613	H	Tvw + Tvbp = 32 H is fixed
	Display Period	Tvdisp	480			H	
	Pulse Width	Tvw	1	1	3	H	
	Back Porch	Tvbp	31	31	29	H	
	Front Porch	Tvfp	5	13	101	H	-

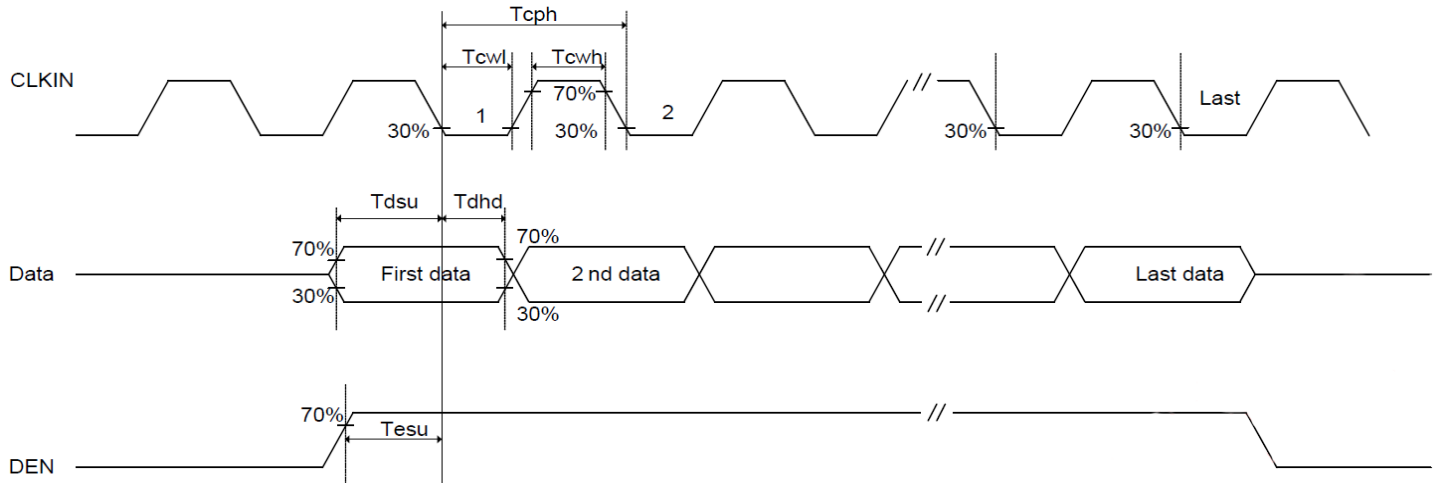
## DE Mode Timing Diagram



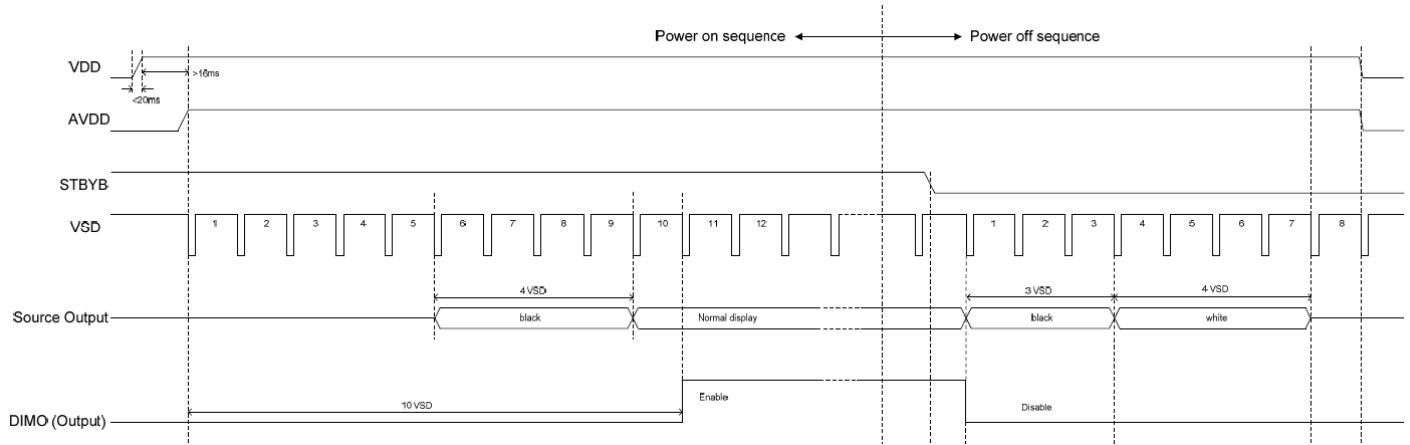
## Input Setup Timing Requirements

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
V <sub>DD</sub> Power Source Slew Time	T <sub>por</sub>	-	-	20	ms	From 0V to 90% V <sub>DD</sub>
CLK cycle time	T <sub>cph</sub>	25	-	-	ns	-
CLK pulse duty	T <sub>cwh</sub>	40	50	60	%	-
Data setup time	T <sub>dsu</sub>	8	-	-	ns	-
Data hold time	T <sub>dhd</sub>	8	-	-	ns	-
DEN setup time	T <sub>esu</sub>	8	-	-	ns	-
DEN hold time	T <sub>ehd</sub>	8	-	-	ns	-

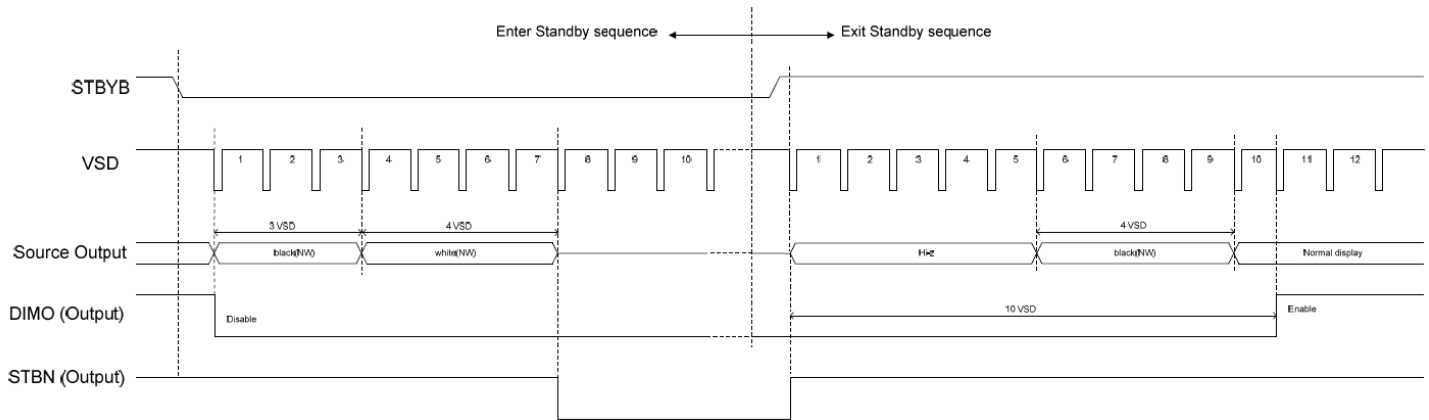
## Input Setup Timing Diagram



## Power ON/OFF Sequence



## Enter/Exit Standby Mode Sequence



## Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C, 96 Hrs.	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C, 96 Hrs.	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C, 96 Hrs.	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C, 96 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.	+60°C, 90% RH , 96 Hrs.	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-20°C,30min -> 25°C,5min ->70°C,30min -> 25°C,5min = 1 cycle, 10 cycles	-
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz, 1.5mm amplitude. 2 hours. Each Direction X, Y, Z	3
Static electricity test	Endurance test applying electric static discharge.	Air: V <sub>s</sub> =±6KV, Contact: V <sub>s</sub> =±4KV R <sub>s</sub> =330Ω C <sub>s</sub> =150pF 5 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](http://www.newhavendisplay.com/specs/precautions.pdf)

## Warranty Information

See Terms & Conditions at [http://www.newhavendisplay.com/index.php?main\\_page=terms](http://www.newhavendisplay.com/index.php?main_page=terms)