

# NHD-7.0-800480EF-ATXL#

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

NHD-	Newhaven Display
7.0-	7.0" Diagonal
800480-	800xRGBx480 pixels
EF-	Model
A-	Built-in driver / No Controller
T-	White LED backlight
X-	TFT
L-	12:00 Optimal View, Wide Temp
#-	<b>RoHS Compliant</b>

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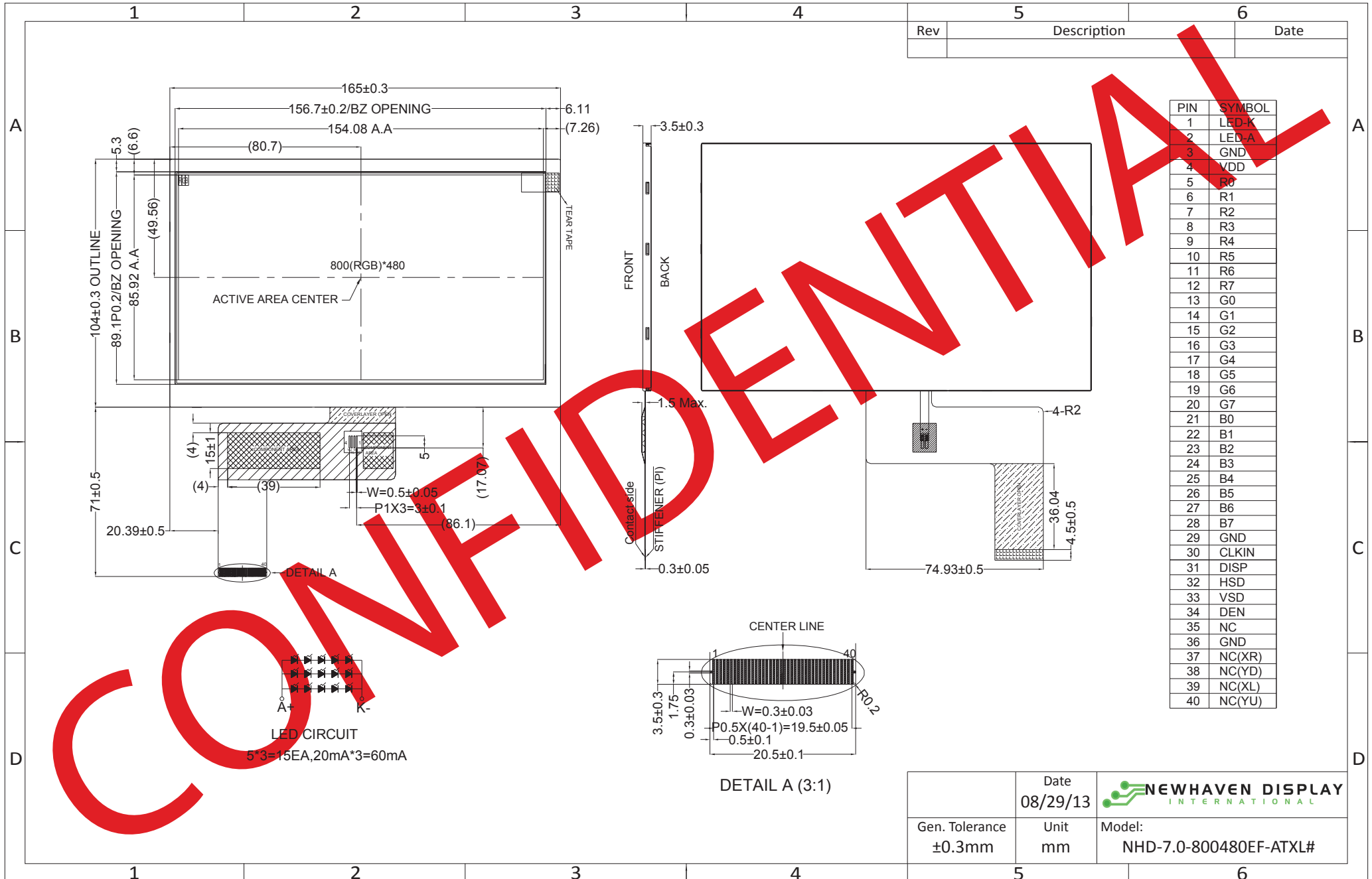
## Document Revision History

Revision	Date	Description	Changed by
0	8/29/2013	Initial Release	ML

## Functions and Features

- 800xRGBx480 resolution
- LED backlight
- 24-bit digital RGB interface
- 16.7M colors

# Mechanical Drawing



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## Pin Description

Pin No.	Symbol	Connection	Function Description
1	LED-K	Power Supply	Ground for Backlight
2	LED-A	Power Supply	Backlight Power Supply (60mA @ 16V)
3	GND	Power Supply	Ground
4	VDD	Power Supply	Power Supply (+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	CLKIN	MPU	Clock for input data
31	DISP	MPU	Display on/off DISP=1:Display on
32	HSD	MPU	Line synchronization signal
33	VSD	MPU	Frame synchronization signal
34	DEN	MPU	Data Enable signal
35	NC	-	No Connect
36	GND	Power Supply	Ground
37	NC(XR)	-	No Connect
38	NC(YD)	-	No Connect
39	NC(XL)	-	No Connect
40	NC(YU)	-	No Connect

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

**Backlight connector:** on LCD connector      **Mates with:** ---

## Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	Top	Absolute Max	-20	-	+70	°C
Storage Temperature Range	Tst	Absolute Max	-30	-	+80	°C
Supply Voltage	VDD		3.0	3.3	3.6	V
Supply Current	IDD	VDD=3.3V 25°C	60	85	120	mA
"H" Level Input	VIH		0.7*VDD	-	VDD	V
"L" Level Input	VIL		GND	-	0.3*VDD	V
"H" Level Output	VOH		VDD-0.4	-	-	V
"L" Level Output	VOL		-	-	GND+0.4	V
Backlight Supply Voltage	VLED		15	16	17	V
Backlight Supply Current	ILED	VLED=16V	45	60	75	mA

## Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle – Top		Cr ≥10	-	55	-	°
Viewing Angle – Bottom			-	65	-	°
Viewing Angle – Left			-	70	-	°
Viewing Angle – Right			-	70	-	°
Contrast Ratio	Cr	-	-	400	-	
Luminance	L	-	220	280	-	cd/m <sup>2</sup>
Response Time	Tr+Tf	-	-	25	35	ms

Viewing angles based on 6:00 gray scale inversion

## Driver Information

Built-in HX8264-D02 Source Driver: [http://www.newhavendisplay.com/app\\_notes/HX8264-D02.pdf](http://www.newhavendisplay.com/app_notes/HX8264-D02.pdf)

Built-in HX8664-B Gate Driver: [http://www.newhavendisplay.com/app\\_notes/HX8664-B.pdf](http://www.newhavendisplay.com/app_notes/HX8664-B.pdf)

## Timing Characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	$T_{hst}$	8	-	-	ns
HS hold time	$T_{hhd}$	8	-	-	ns
VS setup time	$T_{vst}$	8	-	-	ns
VS hold time	$T_{vhd}$	8	-	-	ns
Data setup time	$T_{dsu}$	8	-	-	ns
Data hold time	$T_{dhd}$	8	-	-	ns
DE setup time	$T_{esu}$	8	-	-	ns
DE hold time	$T_{ehd}$	8	-	-	ns
VDD Power On Slew rate	$T_{POR}$	-	-	20	ms
RSTB pulse width	$T_{Rst}$	10	-	-	us
CLKIN cycle time	$T_{cph}$	20	-	-	ns
CLKIN pulse duty	$T_{cwh}$	40	50	60	%
Output stable time	$T_{sst}$	-	-	6	us

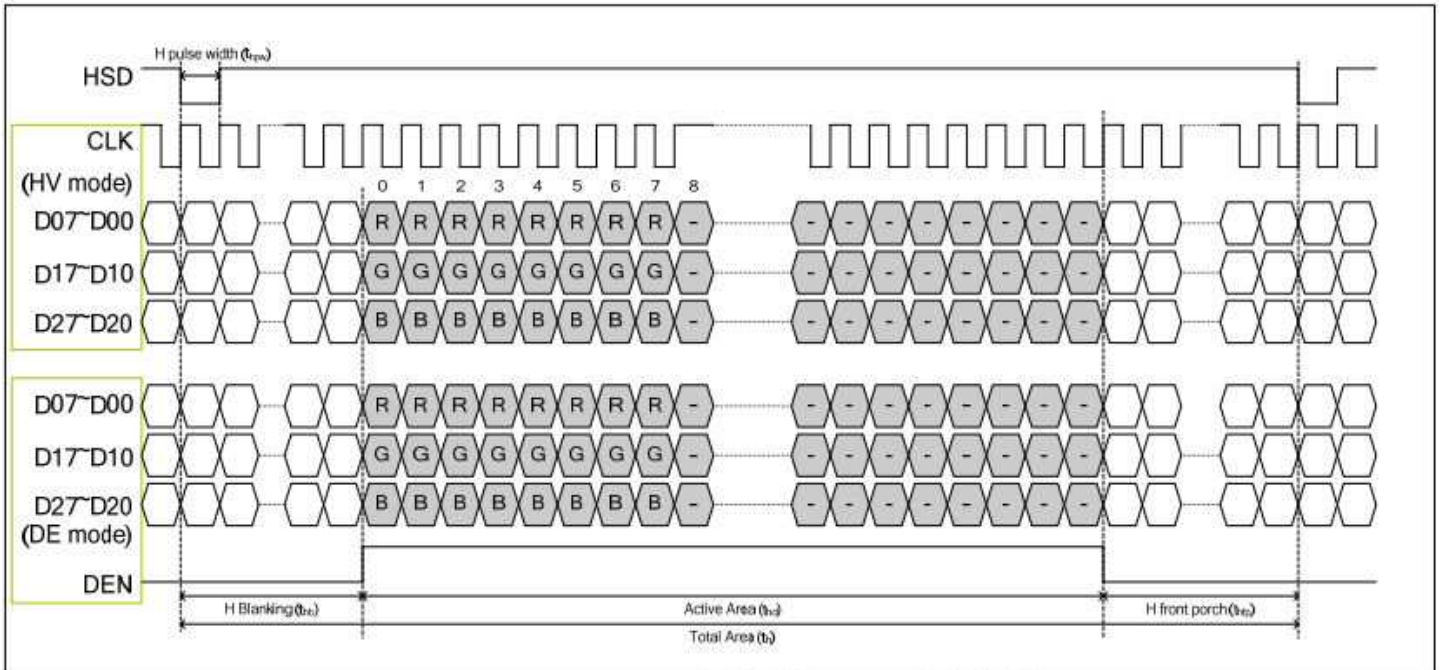
## Horizontal Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	889	928	1143	DCLK
HS pulse width	thpw	1	48	255	DCLK
HS Back Porch (Blanking)	thb		88		DCLK
HS Front Porch	thfp	1	40	255	DCLK
DE mode Blanking	th-thd	85	128	512	DCLK

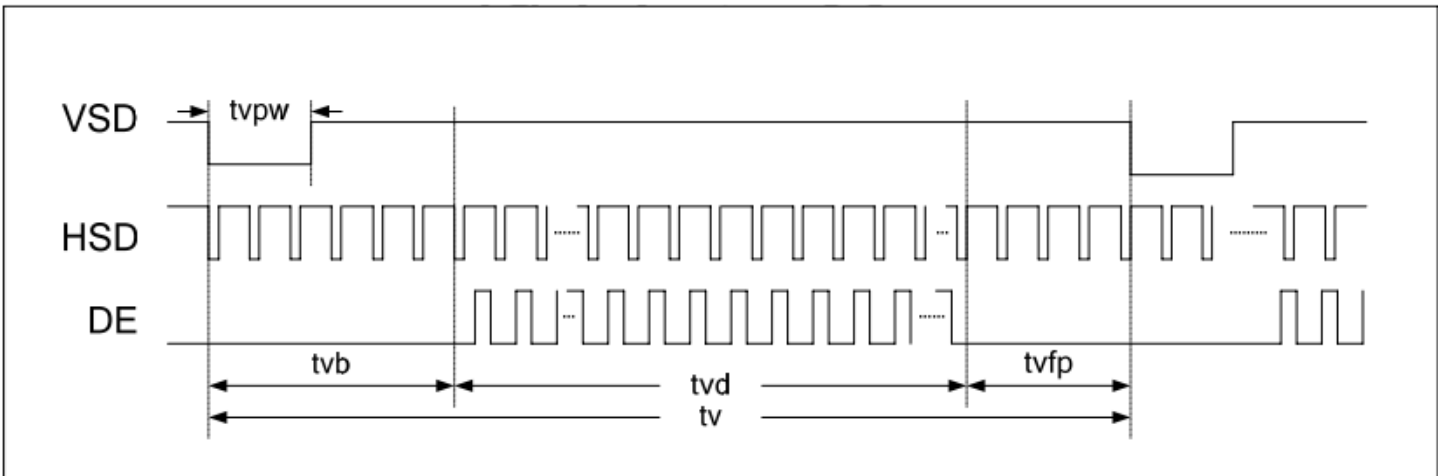
## Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		480		$T_H$
VS period time	tv	513	525	767	$T_H$
VS pulse width	tvpw	3	3	255	$T_H$
VS Back Porch (Blanking)	tvb		32		$T_H$
VS Front Porch	tvfp	1	13	255	$T_H$
DE mode Blanking	tv-tvd	4	45	255	$T_H$

## Horizontal Timing



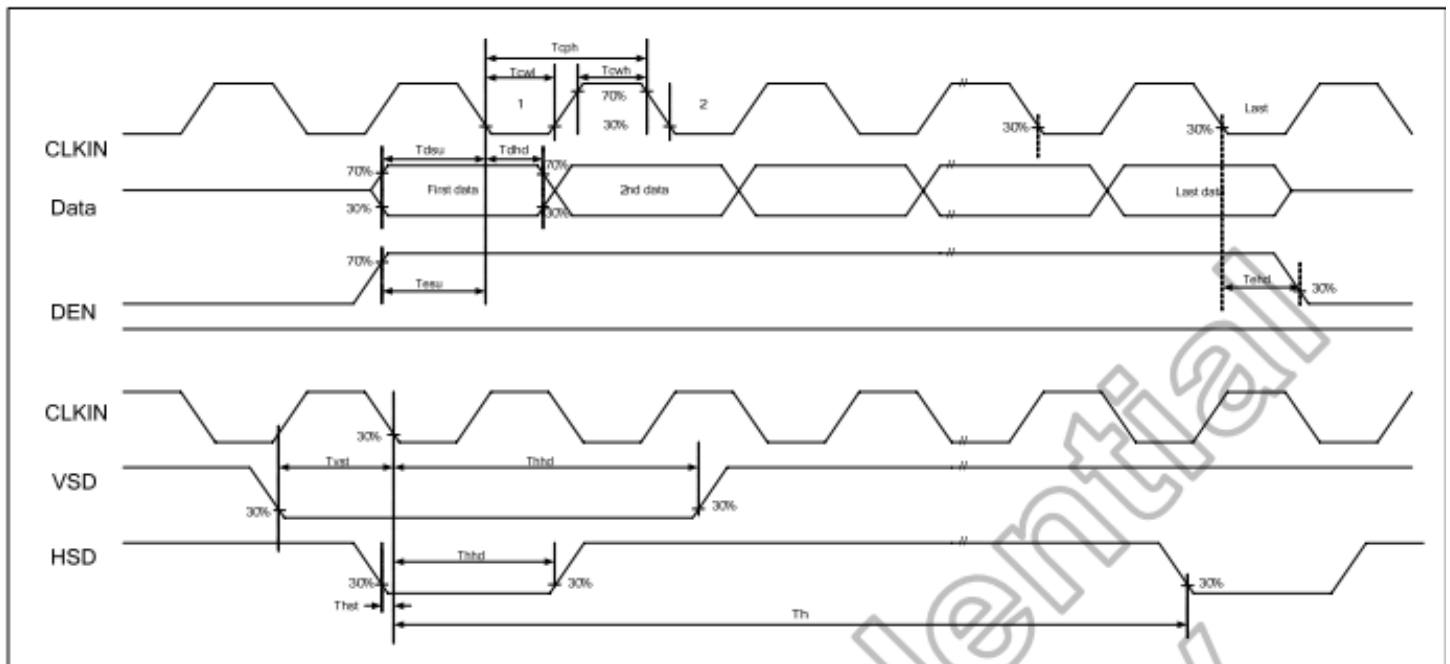
## Vertical Timing



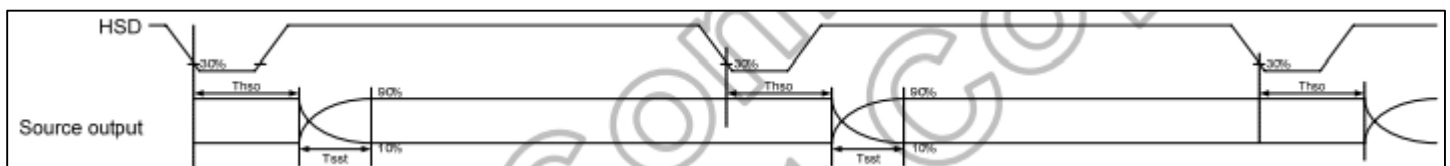
## Parallel 24-bit RGB mode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	40	50	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso		64		CLKIN	-
Time from HSD to LD	Thld		64		CLKIN	-
Time from HSD to STV	Thstv		2		CLKIN	-
Time from HSD to CKV	Thckv		20		CLKIN	-
Time from HSD to OEV	Thoev		4		CLKIN	-
LD Pulse Width	Twld		10		CLKIN	-
CKV Pulse Width	Twckv		66		CLKIN	-
OEV Pulse Width	Twoev		74		CLKIN	-

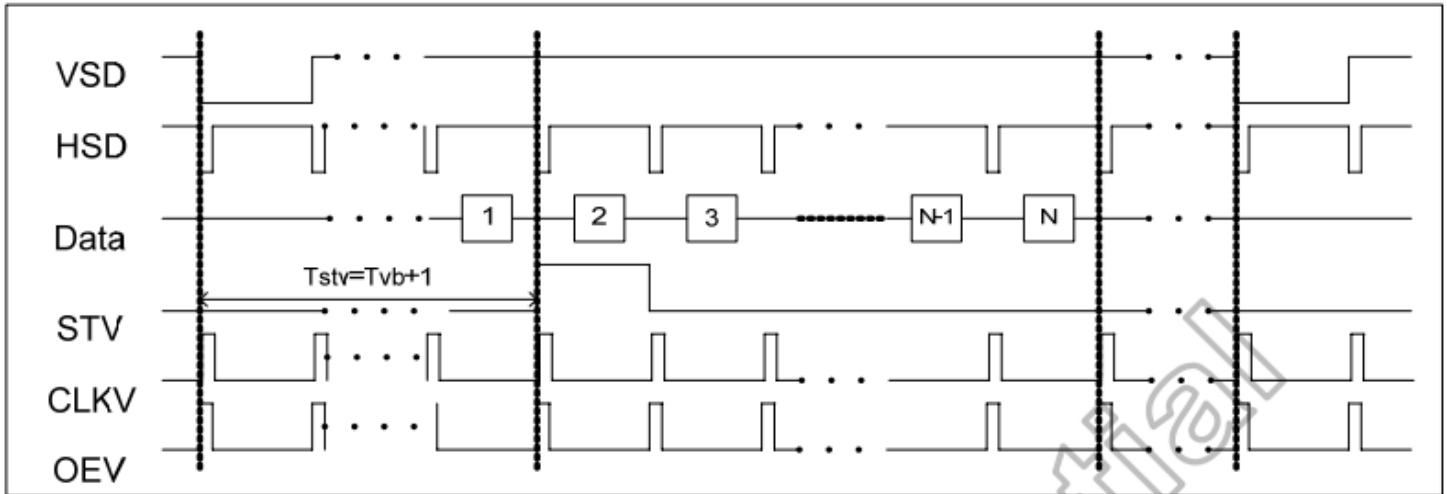
## Input Clock and Data Timing



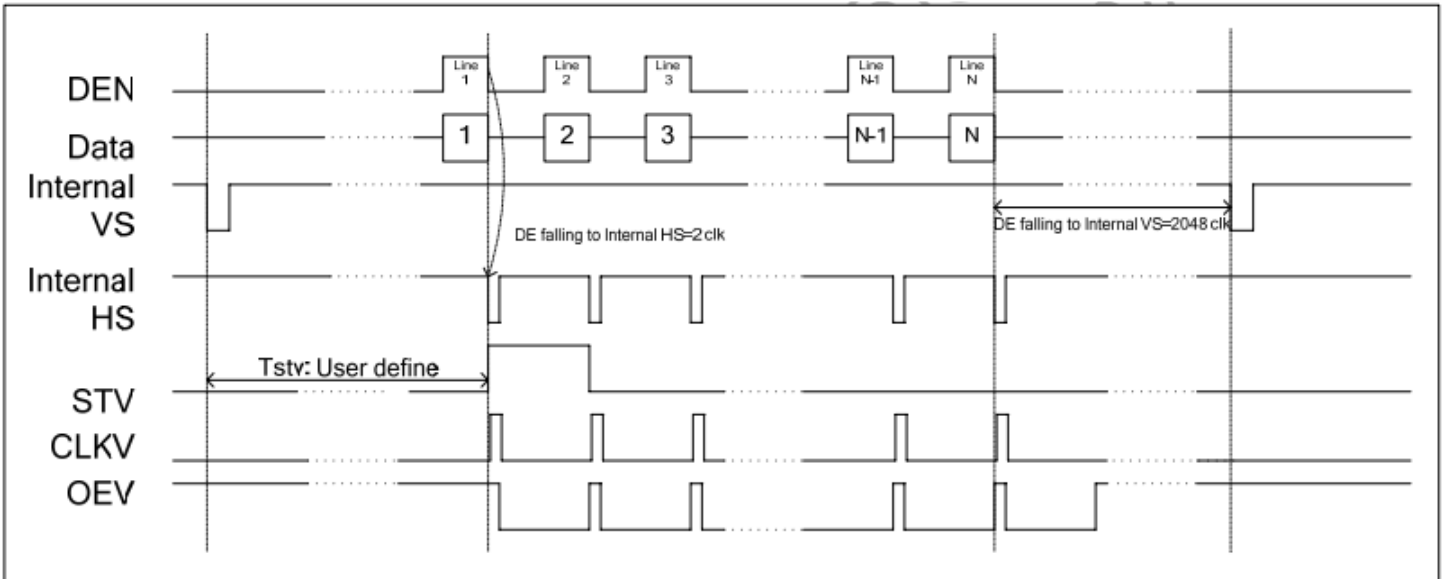
## Source Output Timing



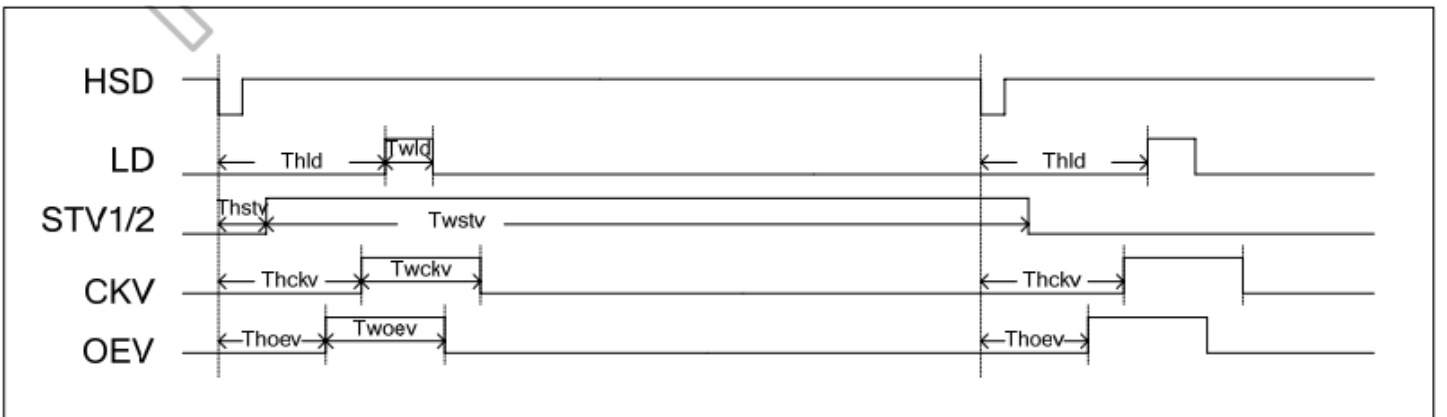
### Vertical Timing HV (Cascade)



### Vertical Timing DE (Cascade)

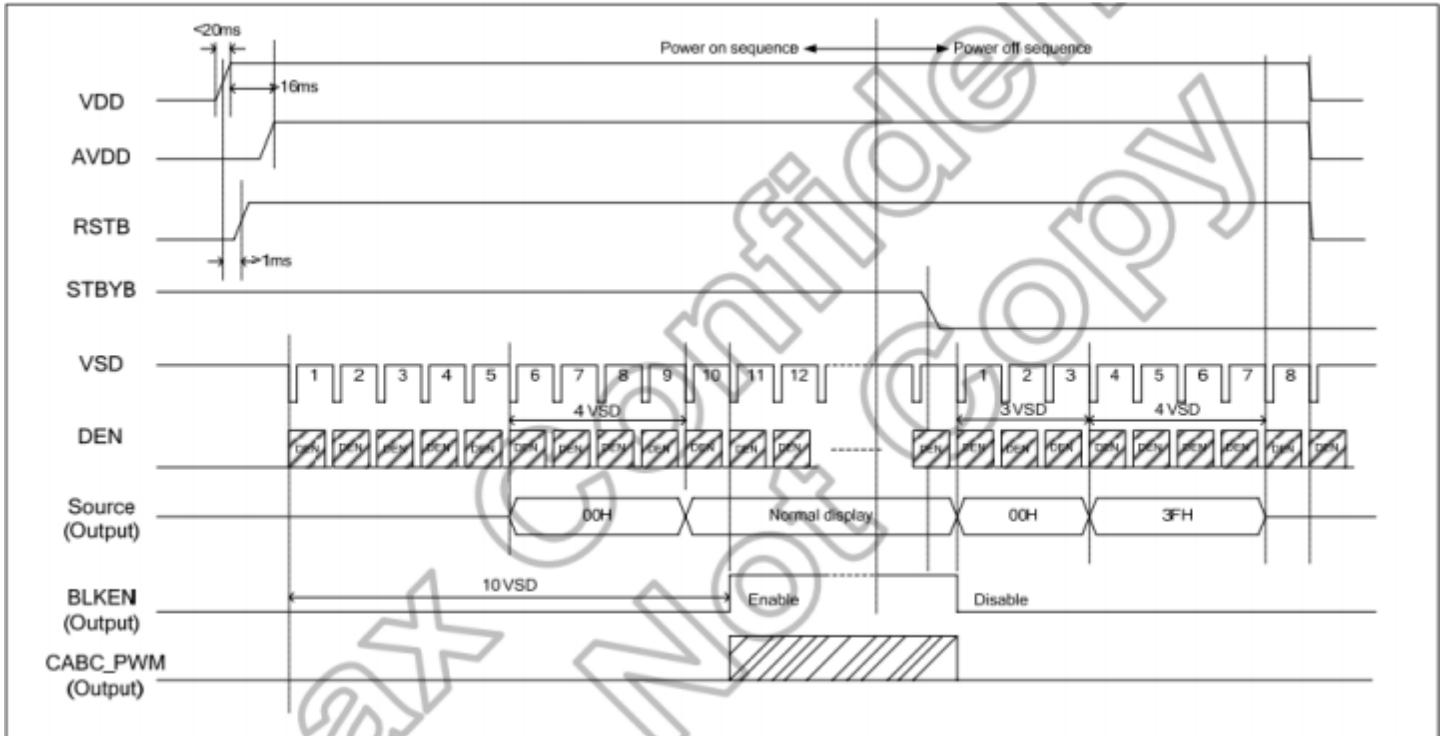


### Gate Output Timing (Cascade)

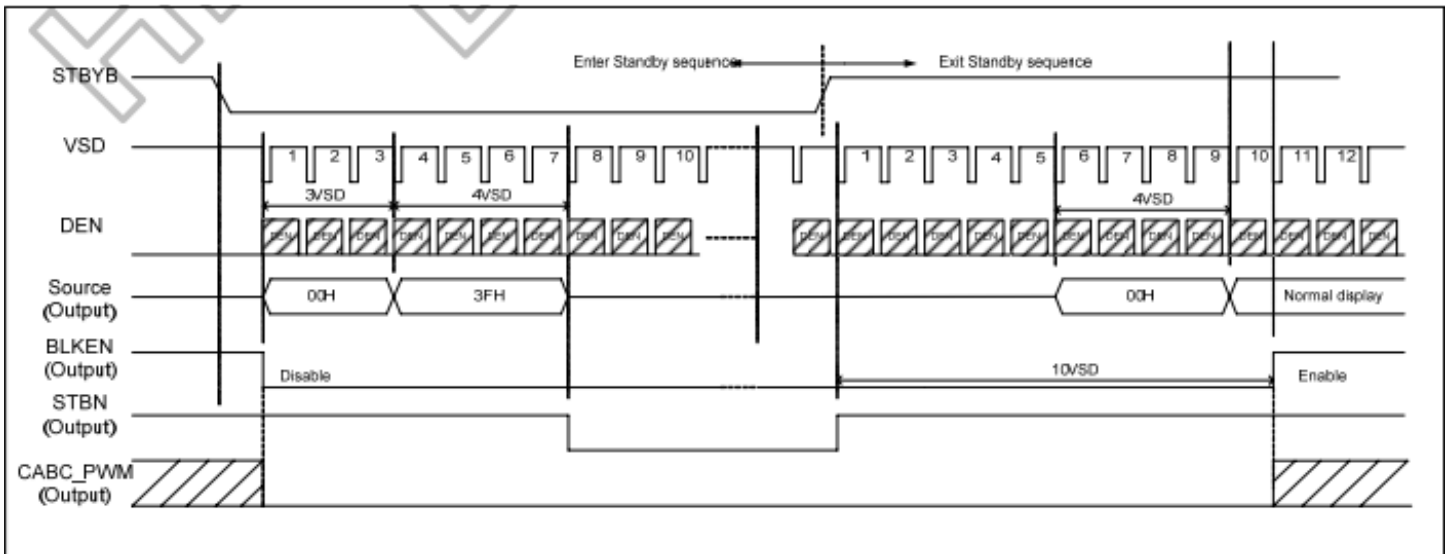




## Power ON/OFF Sequence



## 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 , 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C , 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C, 96hrs	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C , 96hrs	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 , 96hrs	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-30°C, 30min -> 80°C, 30min, Change time: 5min, 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.	VS=800V, RS=1.5kΩ, CS=100pF One time	

**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 and Terms & Conditions

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