

# NHD-7.0-800480EF-ASXN#

## 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
S-	Sunlight Readable
X-	TFT
N-	TN, Wide Temperature
#-	<b>RoHS Compliant</b>

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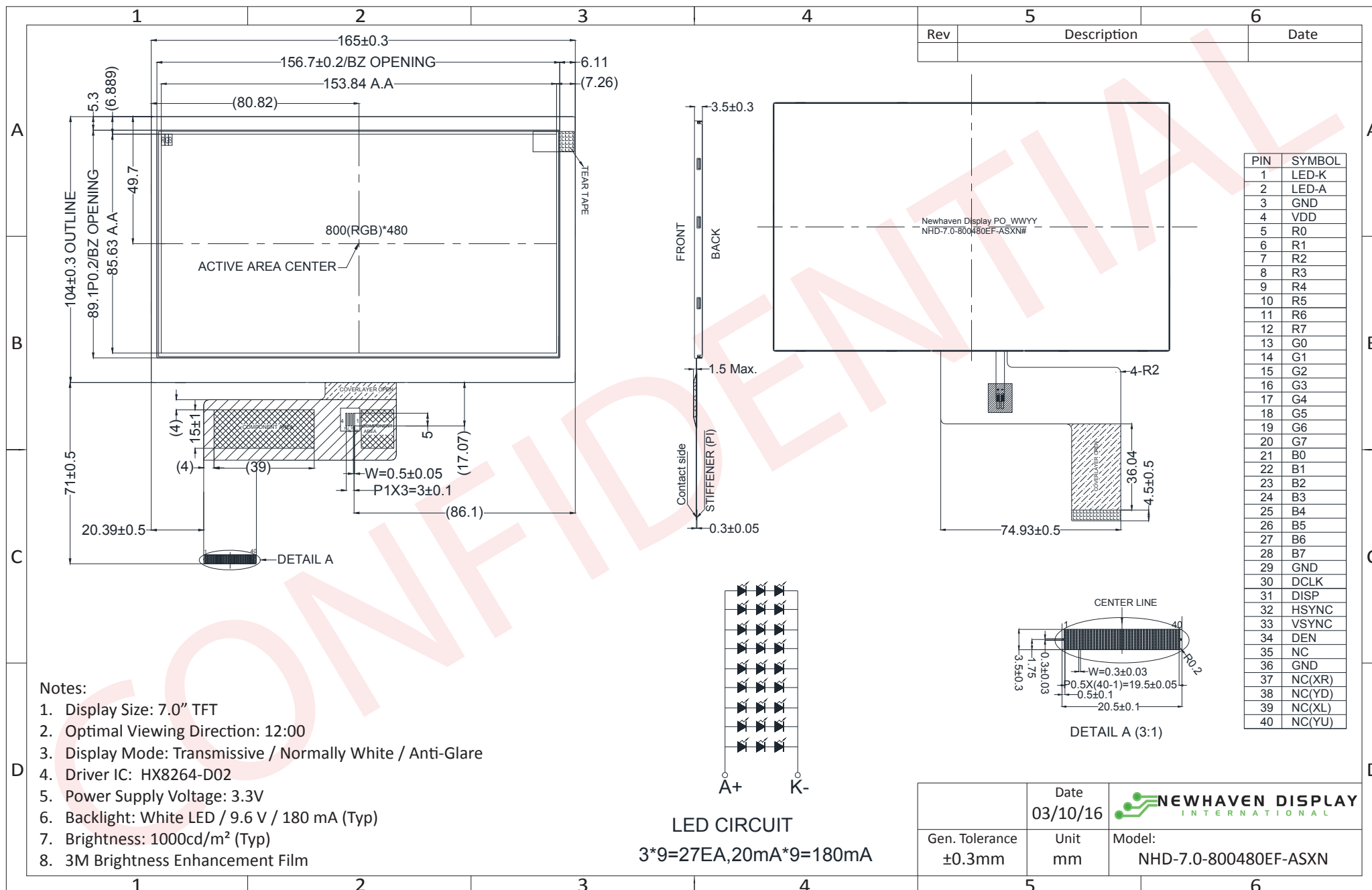
## Document Revision History

Revision	Date	Description	Changed by
0	3/10/16	Initial Release	SB

## Functions and Features

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

# Mechanical Drawing



**Notes:**

1. Display Size: 7.0" TFT
2. Optimal Viewing Direction: 12:00
3. Display Mode: Transmissive / Normally White / Anti-Glare
4. Driver IC: HX8264-D02
5. Power Supply Voltage: 3.3V
6. Backlight: White LED / 9.6 V / 180 mA (Typ)
7. Brightness: 1000cd/m<sup>2</sup> (Typ)
8. 3M Brightness Enhancement Film

PIN	SYMBOL
1	LED-K
2	LED-A
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYNC
33	VSYNC
34	DEN
35	NC
36	GND
37	NC(XR)
38	NC(YD)
39	NC(XL)
40	NC(YU)

	Date	
	03/10/16	
Gen. Tolerance	Unit	Model:
±0.3mm	mm	NHD-7.0-800480EF-ASXN

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## Pin Description

Pin No.	Symbol	Connection	Function Description
1	LED-K	Power Supply	Backlight Cathode (Ground)
2	LED-A	Power Supply	Backlight Anode (180mA @ 9.6V)
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	DCLK	MPU	Dot data Clock
31	DISP	MPU	Display ON/OFF signal. DISP=1 : Display ON
32	HSYNC	MPU	Line synchronization signal
33	VSYNC	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

**Recommended LCD connector:** 40pin 0.5mm pitch FFC. Molex P/N: 54104-4031 (top contact)

## 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	-	8.7	9.6	9.9	V
Backlight Supply Current	ILED	VLED=9.6V	-	180	-	mA
Backlight Lifetime	-	ILED = 180 mA Top = 25° C	20,000	50,000	-	Hrs.

\*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	-	60	-	°
	Bottom		-	50	-	°
	Left		-	60	-	°
	Right		-	60	-	°
Contrast Ratio	Cr	-	-	400	-	-
Luminance	Lv	ILED = 180 mA	800	1000	-	cd/m <sup>2</sup>
Response Time	Tr+Tf	-	-	25	35	ms

## 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

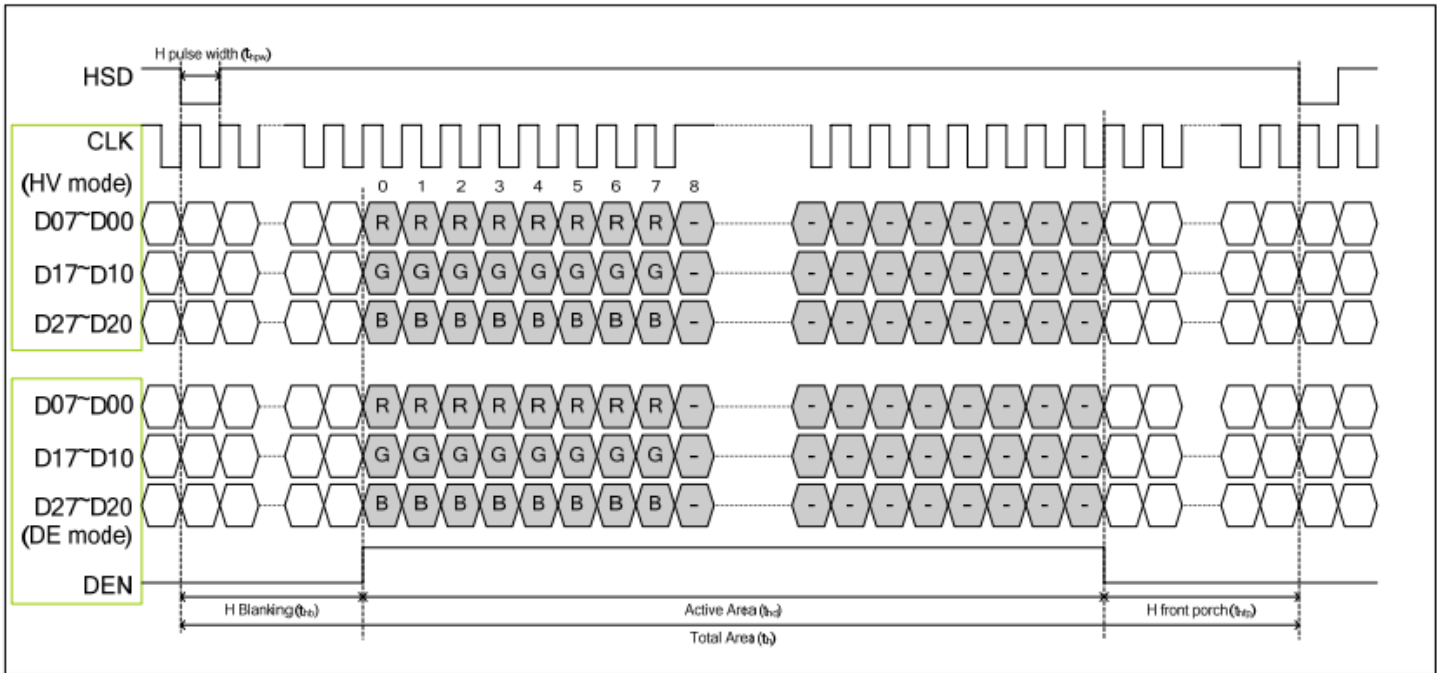
#### Horizontal Timing

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

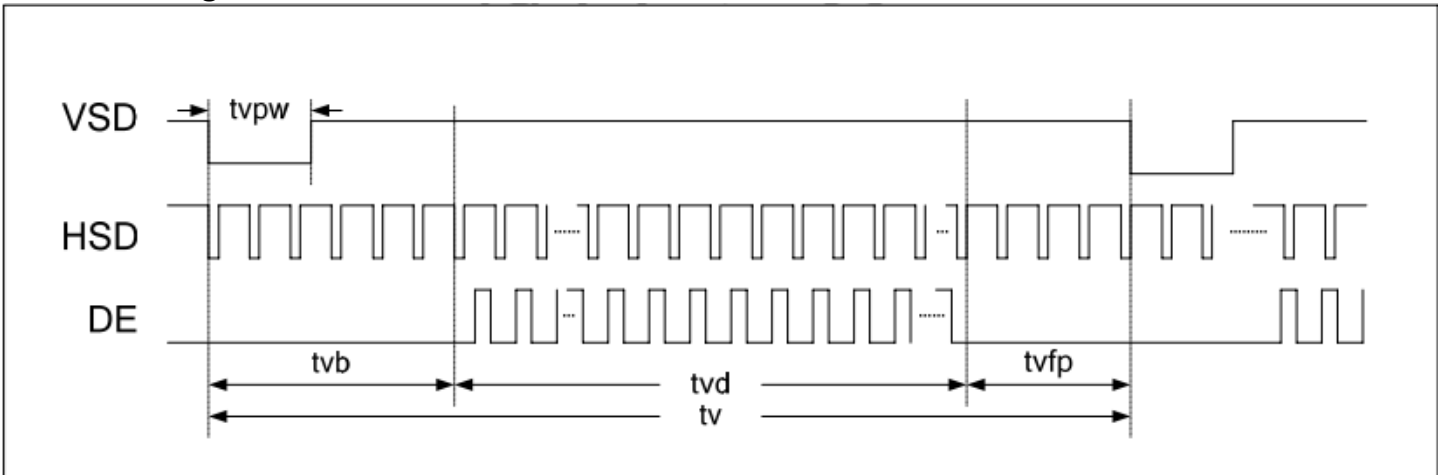
#### Vertical Timing

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



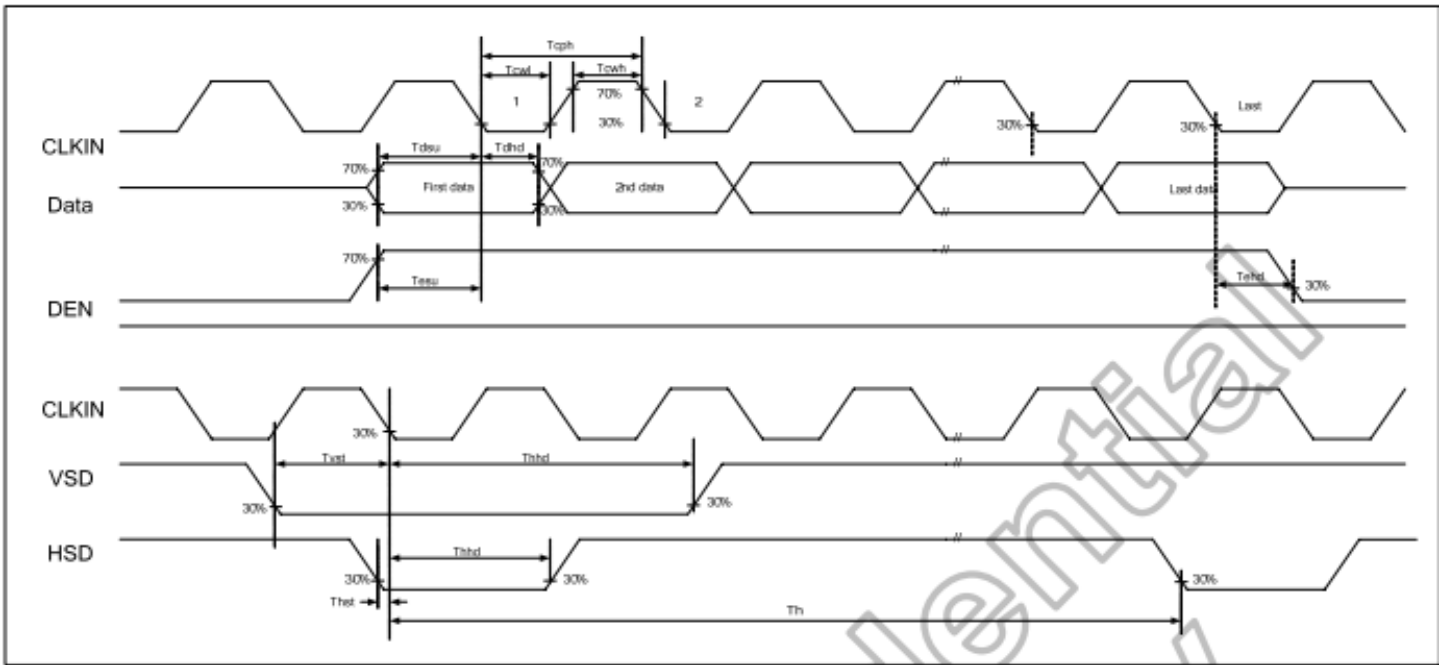
### Vertical Timing



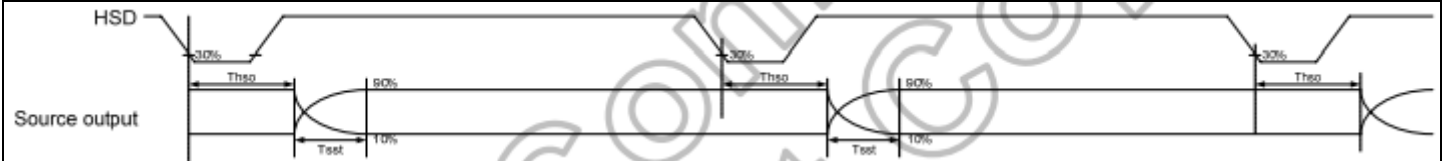
### Parallel 24-bit RGB mode

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**

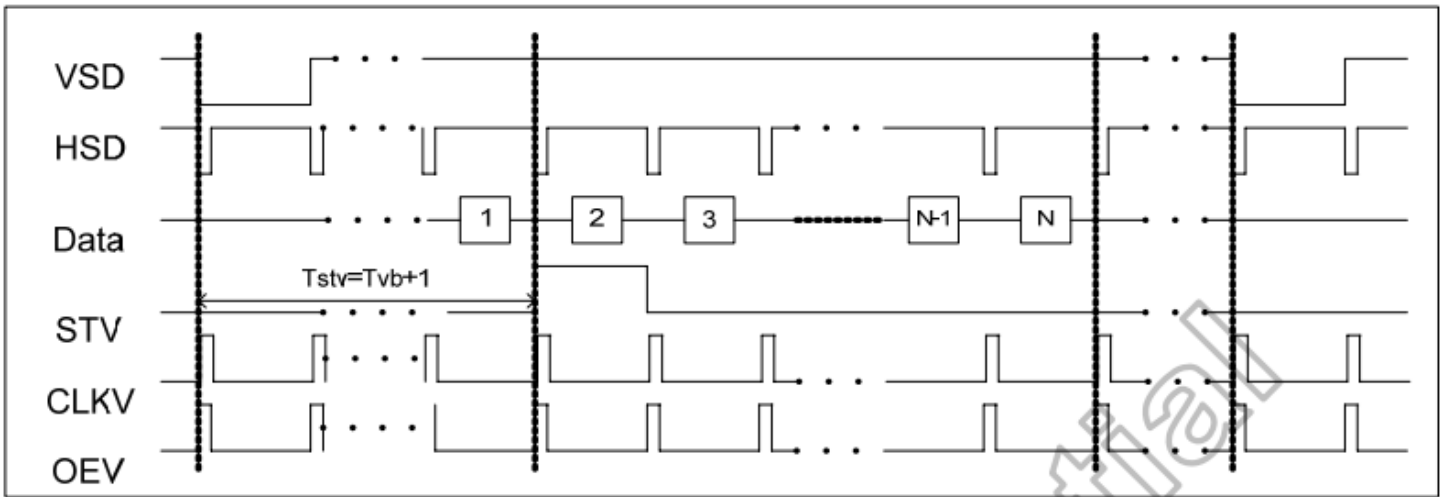


**Source Output Timing**

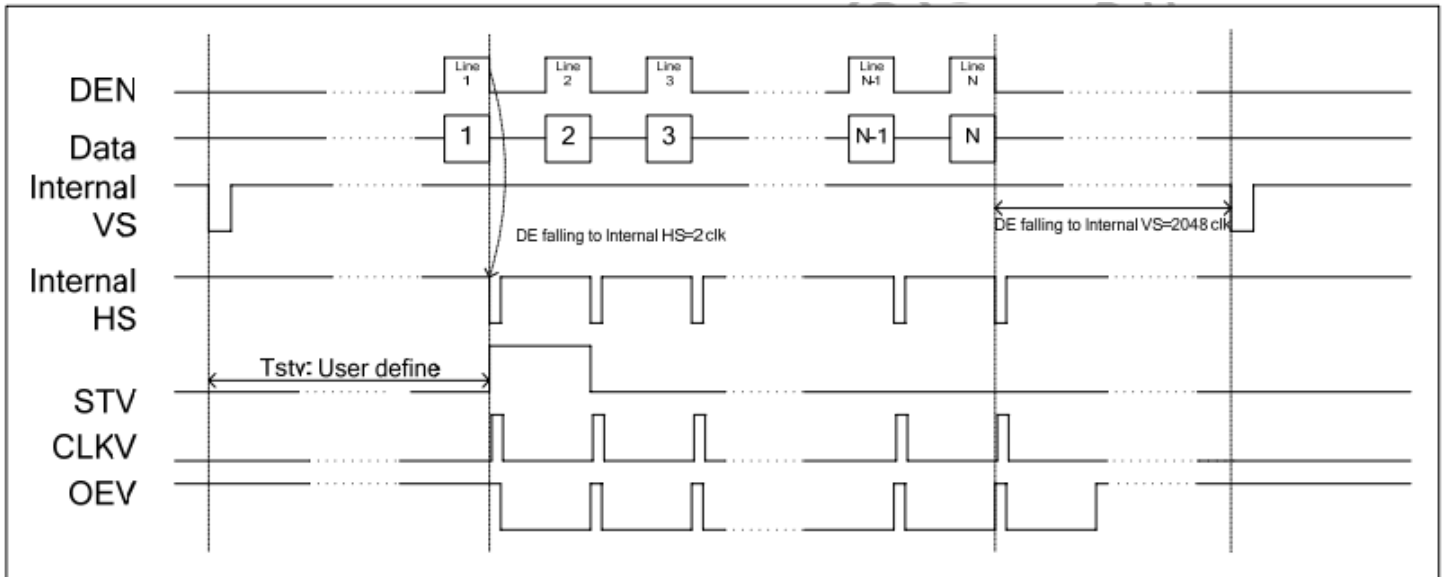


**Vertical Timing HV (Cascade)**

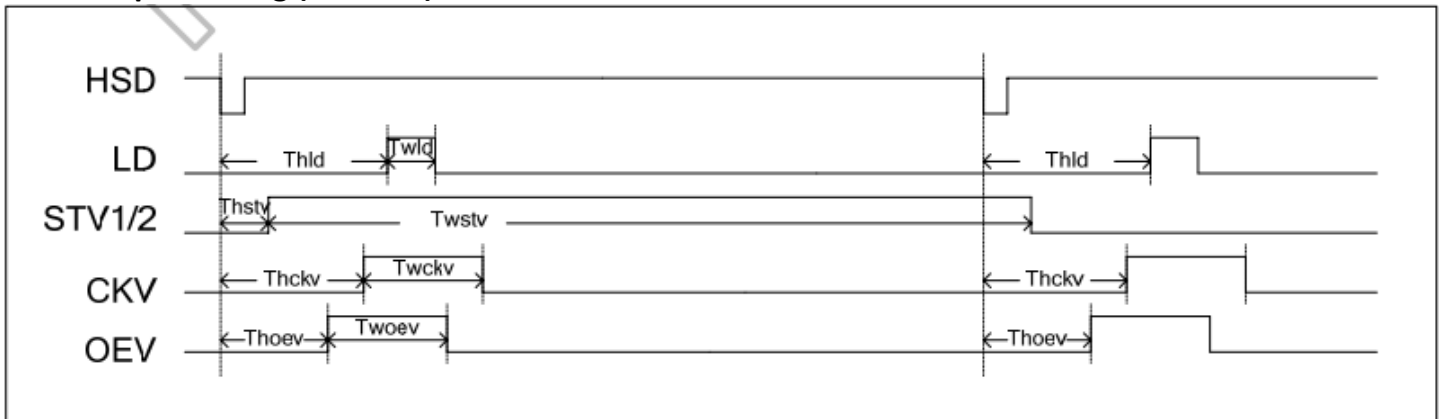




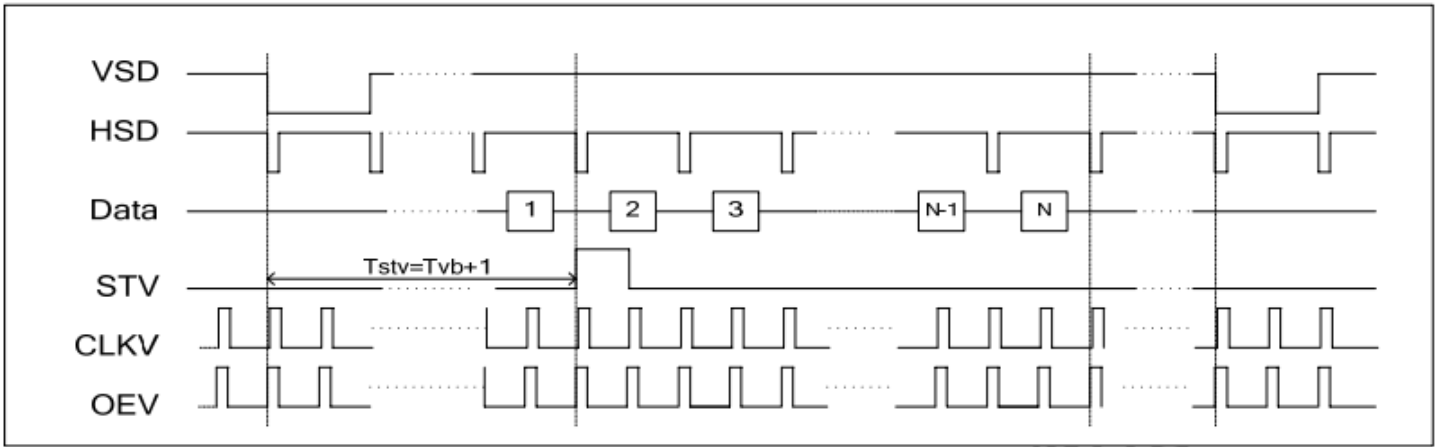
### Vertical Timing DE (Cascade)



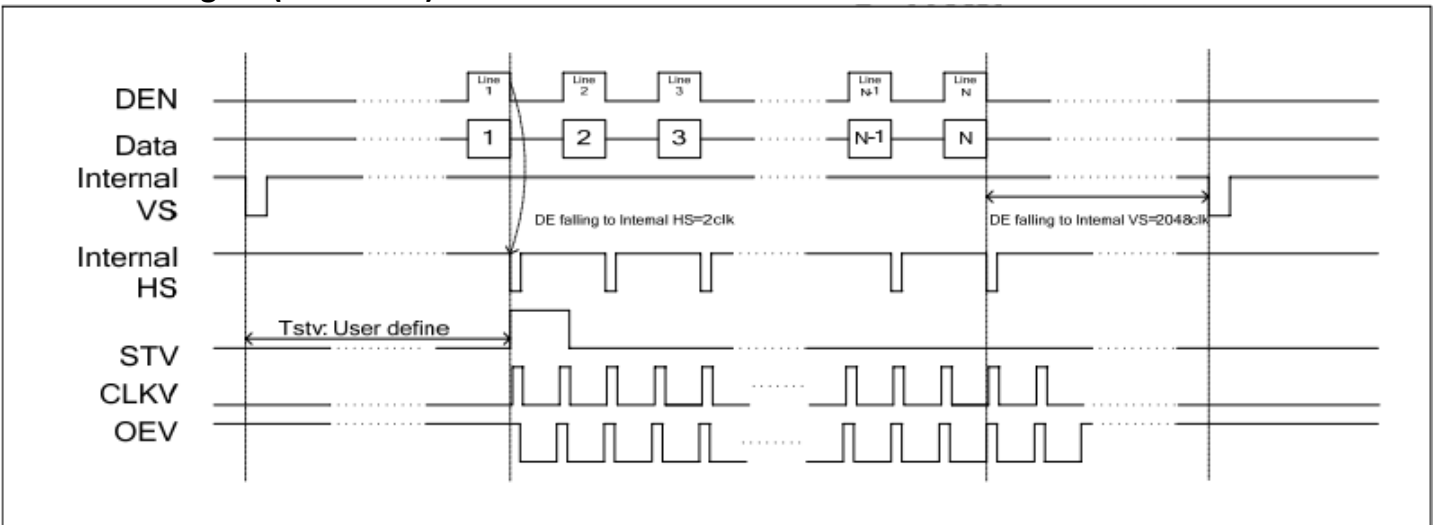
### Gate Output Timing (Cascade)



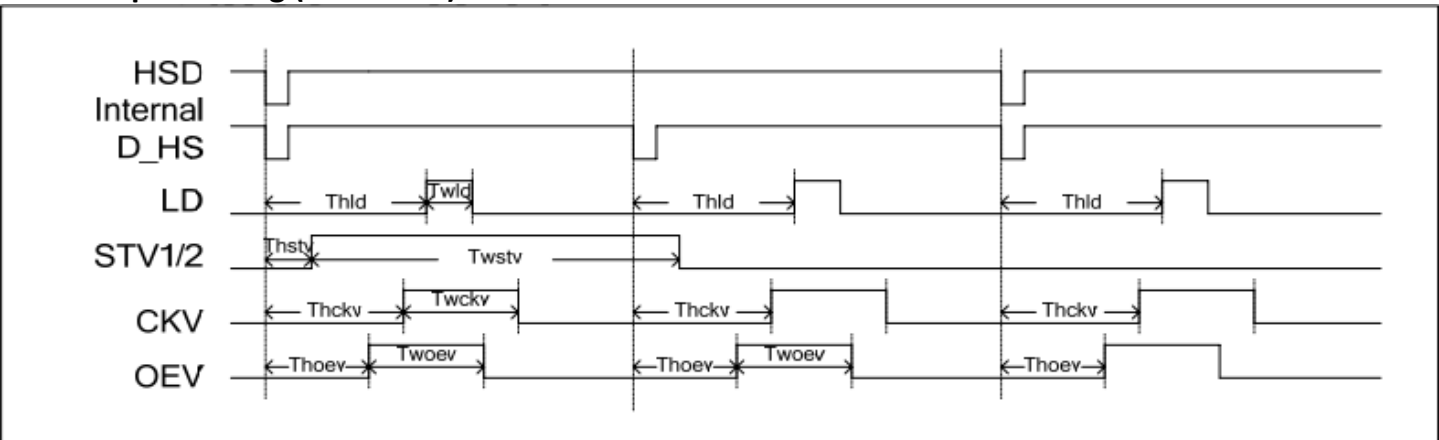
### Vertical Timing HV (Dual Gate)



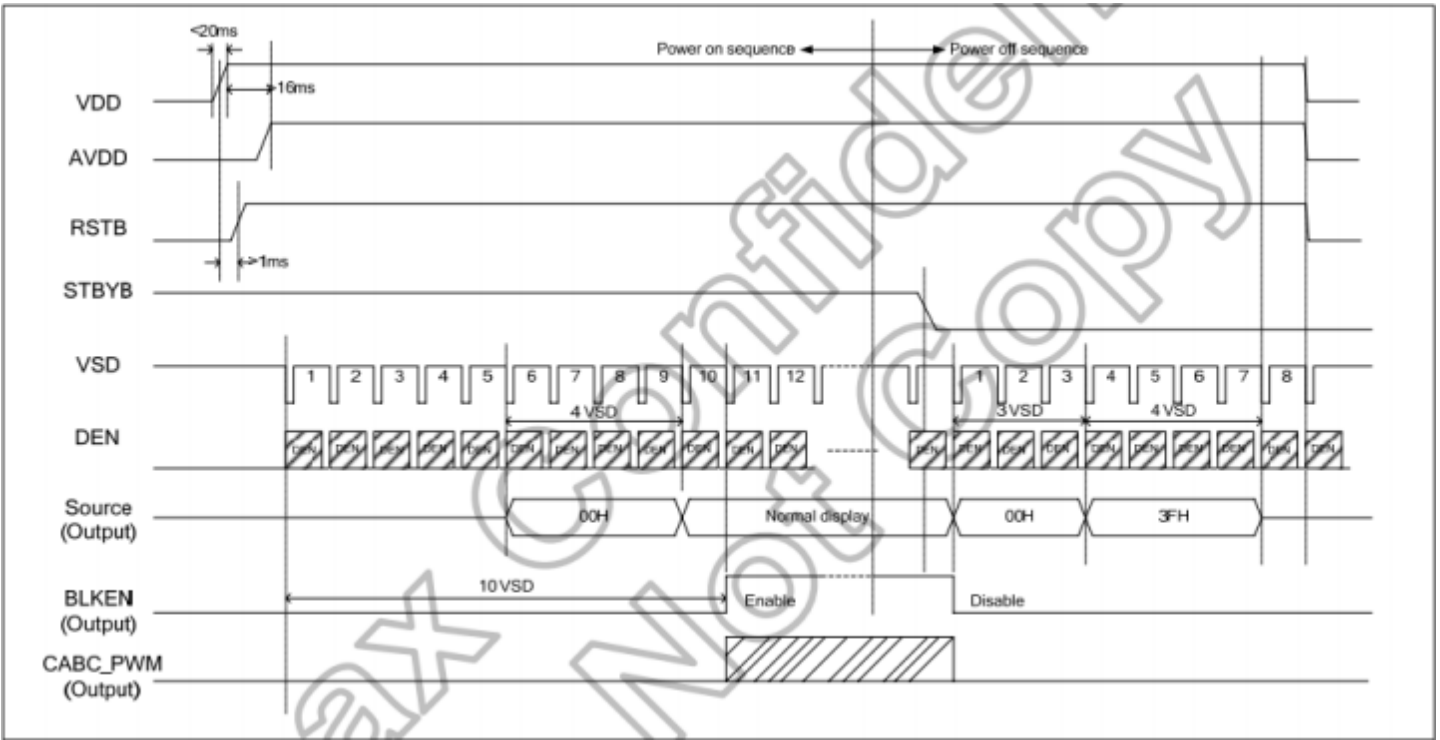
### Vertical Timing DE (Dual Gate)



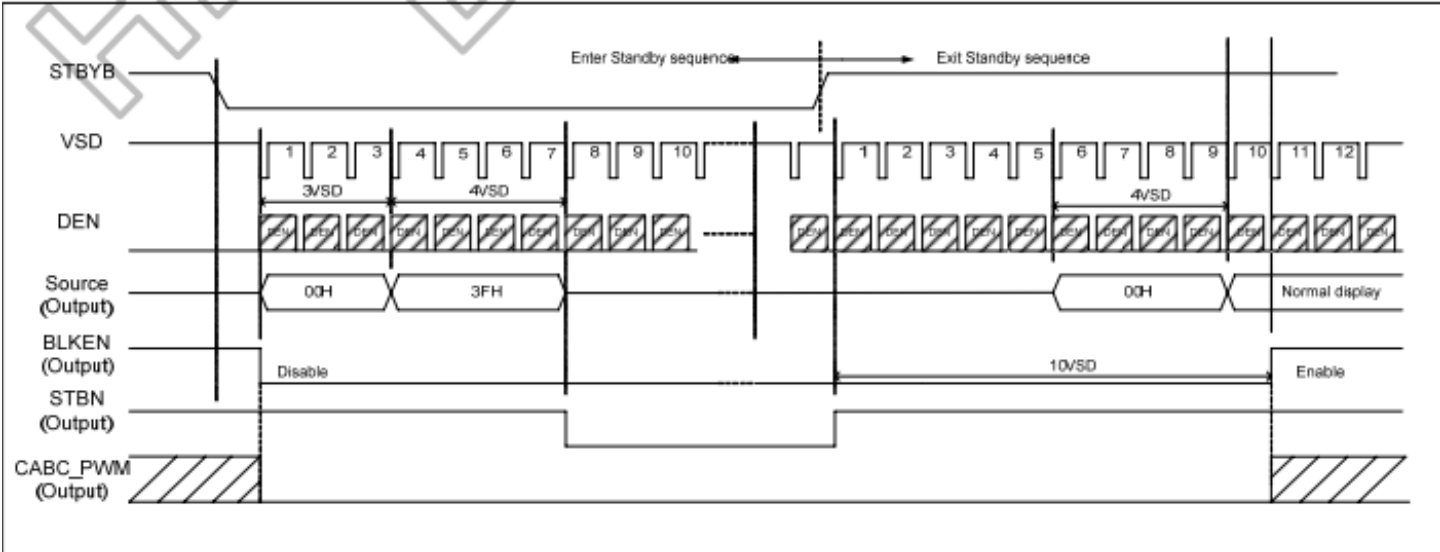
### Gate Output Timing (Dual Gate)



### 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

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