

# NHD-4.3-480272EF-ASXN#-T

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

NHD-	Newhaven Display
4.3-	4.3" Diagonal
480272-	480xRGBx272 Pixels
EF-	Model
A-	Built-in Driver / No Controller
S-	Sunlight Readable
X-	TFT
N-	TN, Wide Temperature
#-	<b>RoHS Compliant</b>
T-	4-wire Resistive Touch Panel

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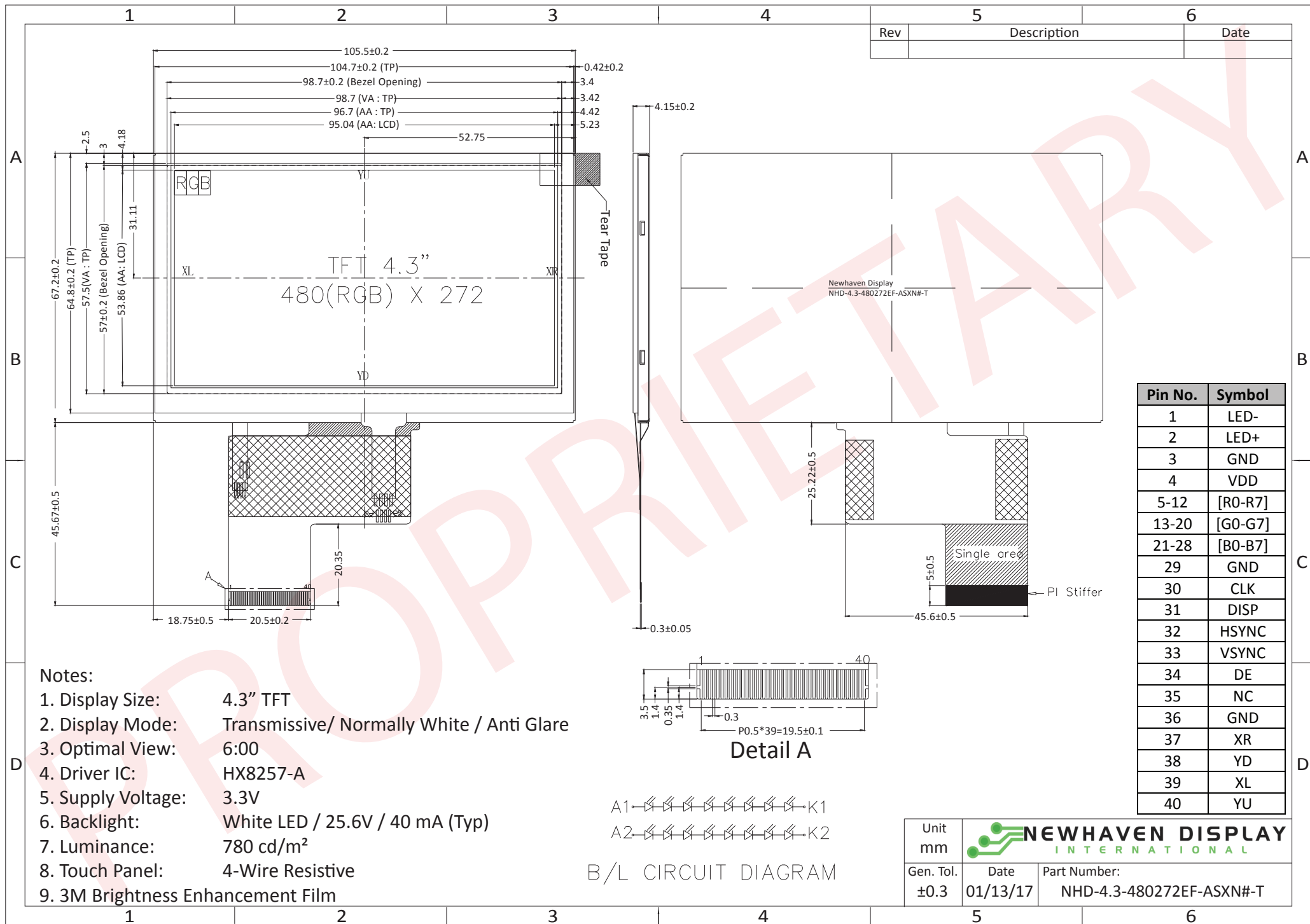
## Document Revision History

Revision	Date	Description	Changed by
0	9/22/15	Initial Release	SB
1	1/13/17	Mechanical Drawing, Electrical & Optical Char. Updated	SB

## Functions and Features

- 480xRGBx272 resolution, up to 16.7M colors
- 16-LED backlight
- 24 bit RGB interface
- Sunlight readable
- 4-wire Resistive touch panel

# Mechanical Drawing



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## Pin Description

Pin No.	Symbol	External Connection	Function Description
1	LED-	Power Supply	Backlight Cathode
2	LED+	Power Supply	Backlight Anode (40mA @ 25.6V)
3	GND	Power Supply	Ground
4	V <sub>DD</sub>	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	Data sample Clock signal
31	DISP	MPU	Display ON/OFF signal
32	HSYNC	MPU	Line synchronization signal
33	VSYNC	MPU	Frame synchronization signal
34	DE	MPU	Data Enable signal
35	NC	-	No Connect
36	GND	Power Supply	Ground
37	XR	Touch Controller	Touch Panel Right
38	YD	Touch Controller	Touch Panel Down
39	XL	Touch Controller	Touch Pane Left
40	YU	Touch Controller	Touch Panel Up

**Recommended LCD connector:** 0.5mm pitch 40-Conductor FFC. Molex p/n: 54104-4033

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

## 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>	-	3.0	3.3	3.6	V
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = 3.3V	14	28	56	mA
“H” level input	V <sub>IH</sub>	-	0.8 * V <sub>DD</sub>	-	V <sub>DD</sub>	V
“L” level input	V <sub>IL</sub>	-	GND	-	0.3 * V <sub>DD</sub>	V
	V <sub>OH</sub>	-	0.9 * V <sub>DD</sub>	-	V <sub>DD</sub>	V
	V <sub>OL</sub>	-	GND	-	0.1 * V <sub>DD</sub>	V
Backlight Supply Voltage	V <sub>LED</sub>	-	23.2	25.6	26.4	V
Backlight Supply Current	I <sub>LED</sub>	V <sub>LED</sub> = 25.6V	30	40	50	mA
Backlight Lifetime*	-	I <sub>LED</sub> = 40mA T <sub>OP</sub> = 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	-	50	-	°
	Bottom		-	60	-	°
	Left		-	60	-	°
	Right		-	60	-	°
Contrast Ratio	CR	-	400	500	-	-
Luminance	L <sub>V</sub>	I <sub>LED</sub> = 40mA	620	780	-	cd/m <sup>2</sup>
Response Time	Rise + Fall	T <sub>R</sub> + T <sub>F</sub>	-	25	30	ms

## Touch Panel Characteristics

Item	Min.	Typ.	Max.	Unit
Linearity	-1.5	-	1.5	%
Circuit Resistance – X-Axis	350	-	1050	Ω
Circuit Resistance – Y-Axis	100	-	450	Ω
Insulation Resistance	20	-	-	MΩ
Operating Voltage	-	-	10	V
Chattering	-	-	10	ms
Transmittance	80	-	-	%
Activation Force	30	-	120	g
Pen Writing Durability	20,000	-	-	Characters
Pitting Durability	1,000,000	-	-	Touches
Surface Hardness	3	-	-	H
Haze	4	7	10	%

## Driver Information

Built-in Himax HX8257-A driver.

Please download specification at [http://www.newhavendisplay.com/app\\_notes/HX8257.pdf](http://www.newhavendisplay.com/app_notes/HX8257.pdf)

## Timing Characteristics

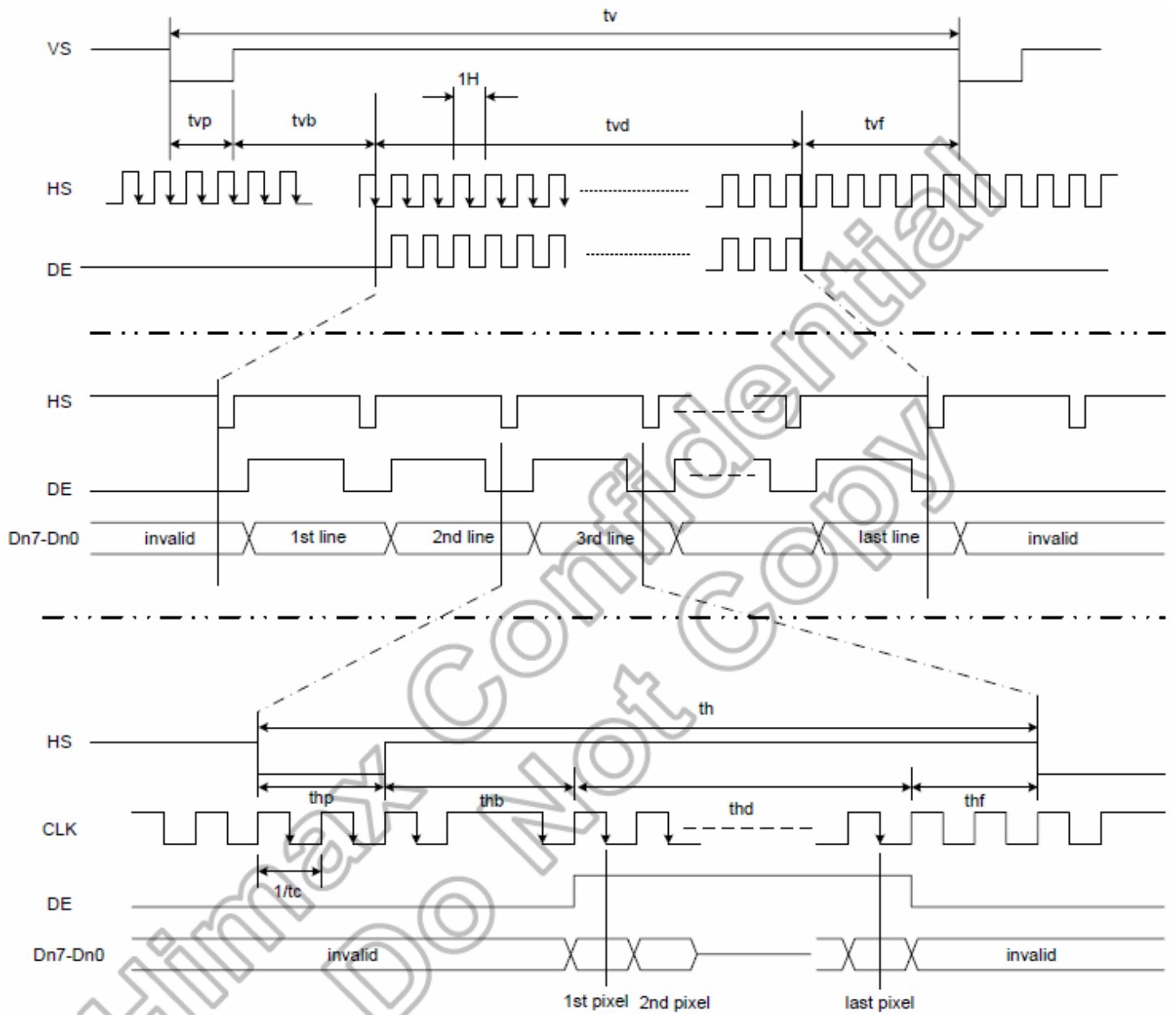
### Parallel RGB input timing requirement

(480RGBx272,  $T_A=25^\circ\text{C}$ ,  $V_{DDIO}=1.8\text{V to }3.6\text{V}$ ,  $DVSS=0\text{V}$ )

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	$f_{\text{CLK}}^{(1)}$	-	9	15	MHz
Hsync cycle	$1/\text{th}$	-	17.14	-	KHz
Vsync cycle	$1/\text{tv}$	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	$\text{thp}^{(2)}$	2	41	41	CLK
Horizontal back porch	$\text{thb}^{(2)}$	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	399	$\text{H}^{(1)}$
Vertical display period	tvd	272	272	272	$\text{H}^{(1)}$
Vertical front porch	tvf	1	2	227	$\text{H}^{(1)}$
Vertical pulse width	$\text{tvp}^{(2)}$	1	10	11	$\text{H}^{(1)}$
Vertical back porch	$\text{tvb}^{(2)}$	1	2	11	$\text{H}^{(1)}$

**Note:** (1) Unit:  $\text{CLK}=1/f_{\text{CLK}}$ ,  $\text{H}=\text{th}$ ,

(2) It is necessary to keep  $\text{tvp}+\text{tvb}=12$  and  $\text{thp}+\text{thb}=43$  in sync mode. DE mode is unnecessary to keep it.



## Input setup timing requirement

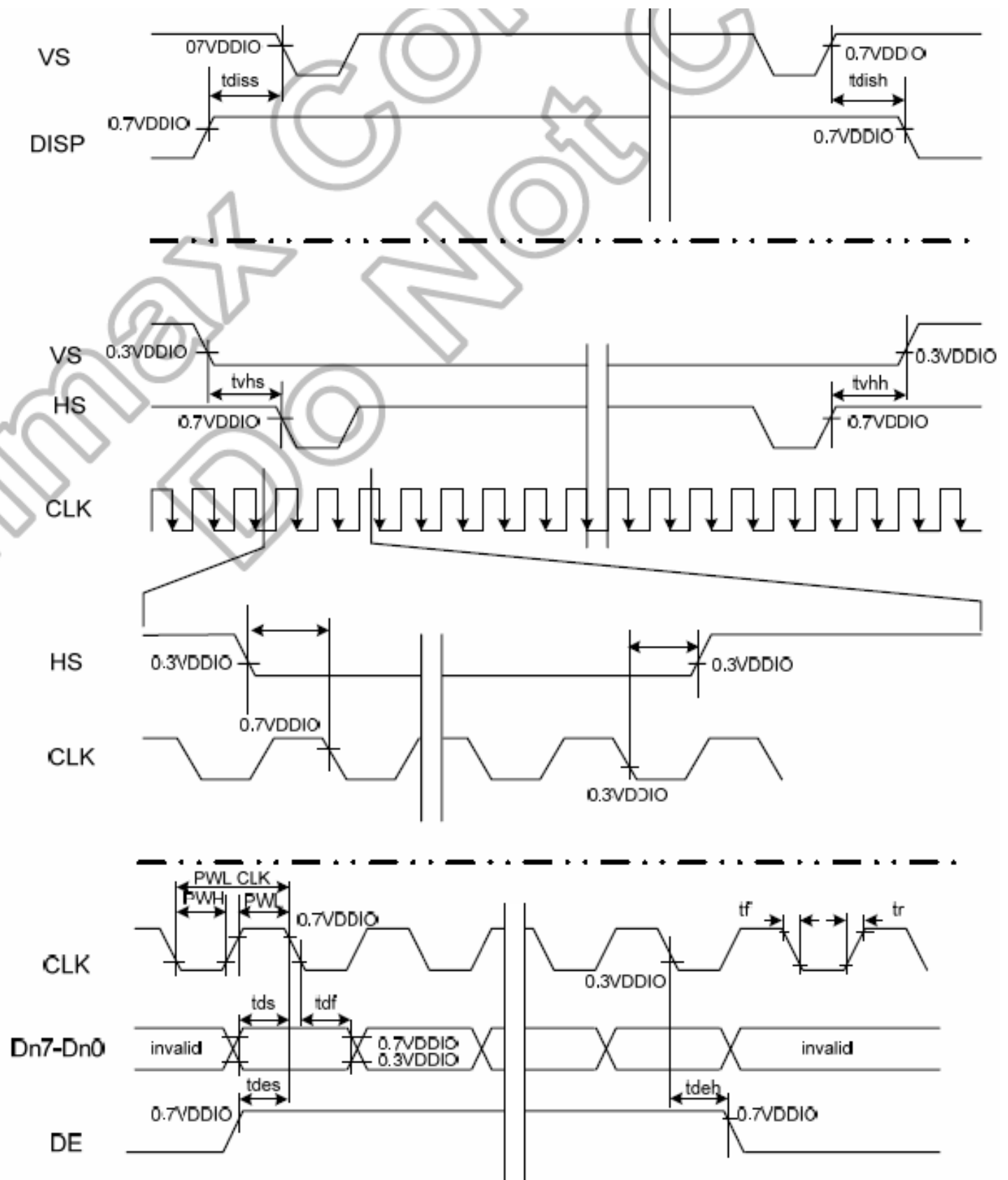
( $T_A=25^\circ\text{C}$ ,  $V_{DDIO}=1.8\text{V}$  to  $3.6\text{V}$ ,  $DV_{SS}=0\text{V}$ ,  $t_r^{(1)}=t_f^{(1)}=2\text{ns}$ )

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DISP setup time	$t_{diss}$	10	-	-	ns
DISP hold time	$t_{dish}$	10	-	-	ns
Clock period	$PW_{CLK}^{(2)}$	66.7	-	-	ns
Clock pulse high period	$PWH^{(2)}$	26.7	-	-	ns
Clock pulse low period	$PWL^{(2)}$	26.7	-	-	ns
Hsync setup time	$t_{hs}$	10	-	-	ns
Hsync hold time	$t_{hh}$	10	-	-	ns
Data setup time	$t_{ds}$	10	-	-	ns
Data hold time	$t_{dh}$	10	-	-	ns
DE setup time	$t_{des}$	10	-	-	ns
DE hold time	$t_{deh}$	10	-	-	ns
Vsync setup time	$t_{vhs}$	10	-	-	ns
Vsync hold time	$t_{vhh}$	10	-	-	ns

**Note:** (1)  $t_r$ ,  $t_f$  is defined 10% to 90% of signal amplitude.

(2) For parallel interface, maximum clock frequency is 15MHz.





## 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.	+60°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.	-20°C,30min -> 25°C,5min ->70°C,30min = 1 cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	V <sub>s</sub> =8KV, 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)