

NHD-4.3-480272EF-ATXL#

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
T-	White LED Backlight
X-	TFT
L-	6:00 Optimal View, Wide Temperature
#-	RoHS Compliant

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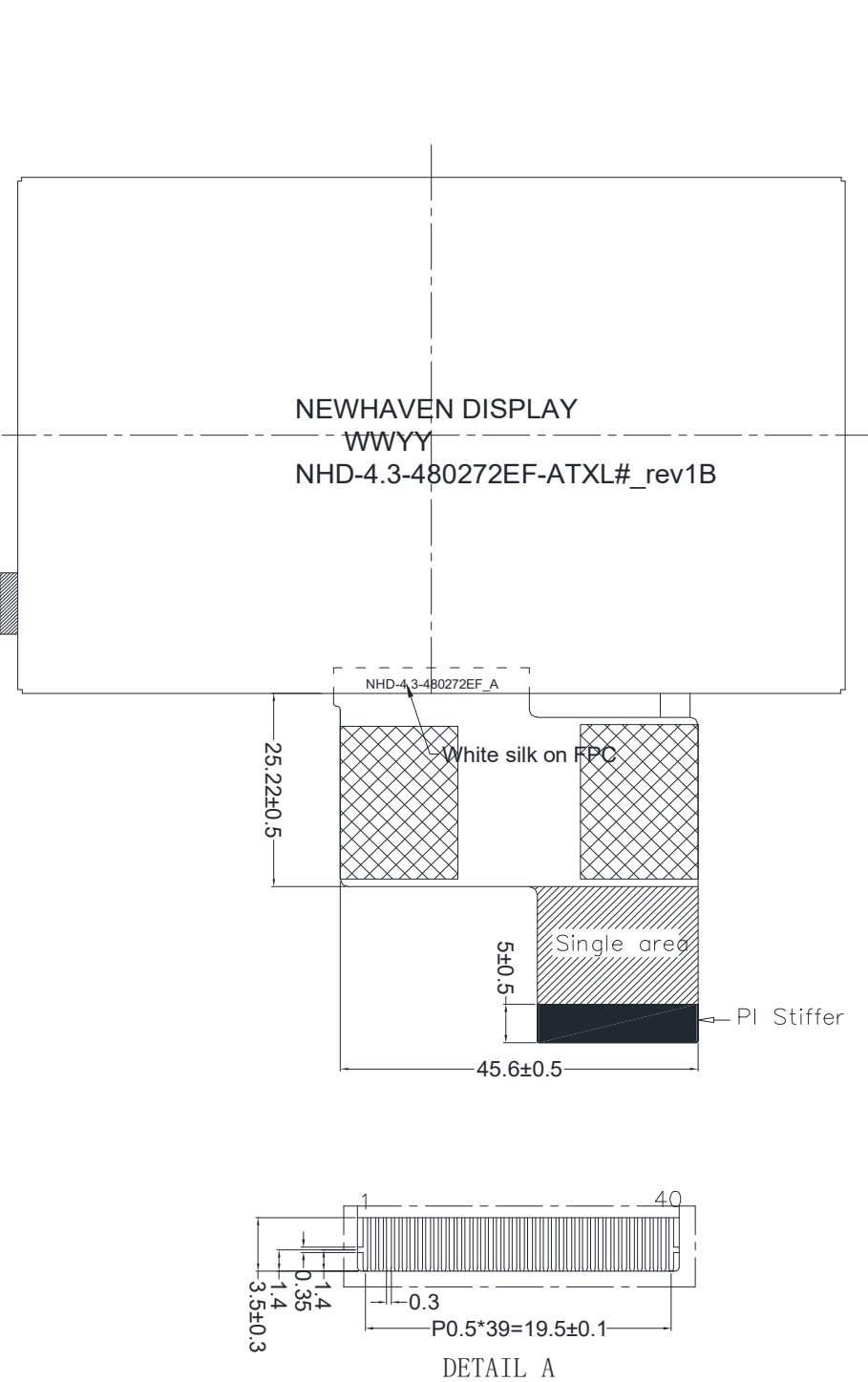
Document Revision History

Revision	Date	Description	Changed by
0	8/29/12	Initial Release	AK
1	7/11/13	Mechanical and Optical characteristic updated	KA
2	2/14/14	Mechanical drawing updated	KA
3	6/24/14	Timing characteristics updated	ML
4	12/8/15	Datasheet Reformat, Backlight lifetime added	SB
5	11/10/16	Mechanical Drawing & Electrical Characteristics Updated	SB
6	3/31/17	Driver IC Updated	SB
7	2/12/18	Brightness and Mechanical Drawing Updated	SB
8	3/2/21	Updated Silkscreen on FPC	AS
9	3/30/21	Updated 2D Mechanical Drawing for Tape Size	JT

Functions and Features

- 480xRGBx272 resolution, up to 16.7M colors
- 12-LED backlight
- 24-Bit RGB interface
- Resistive and Capacitive touch panel available

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1. Display Size:	4.3" TFT
2. Optimal View:	6:00
3. Display Mode:	Transmissive / Normally White / Anti-Glare
4. Driver IC:	ST7282T2
5. Supply Voltage:	3.3 V
6. Backlight:	White LED / 40mA / 19.2V (Typ)
7. Brightness:	500 cd/m ² (Typ)

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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 (40mA @ 19.2V)
3	GND	Power Supply	Ground
4	V _{DD}	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 (High: ON (Default), Low: Standby)
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	-	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: 54132-4062

Backlight connector: on LCD connector

Mates with: ---

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T _{OP}	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T _{ST}	Absolute Max	-30	-	+80	°C
Supply Voltage	V _{DD}	-	3.0	3.3	3.6	V
Supply Current	I _{DD}	V _{DD} = 3.3V	12	25	50	mA
"H" level input	V _{IH}	-	0.7 * V _{DD}	-	V _{DD}	V
"L" level input	V _{IL}	-	V _{SS}	-	0.3 * V _{DD}	V
Backlight Supply Current	I _{LED}	-	-	40	50	mA
Backlight Supply Voltage	I _{LED}	I _{LED} = 40mA	16.8	19.2	20.4	V
Backlight Lifetime*	-	T _{OP} = 25°C	20,000	50,000	-	Hrs.

*Backlight is current driven; do not supply more than 50 mA. 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	-	50	-	°
	Bottom	φY-		-	70	-	°
	Left	θX-		-	70	-	°
	Right	θX+		-	70	-	°
Contrast Ratio		CR	-	400	500	-	-
Luminance		L _V	I _{LED} = 40 mA	400	500	-	cd/m ²
Response Time	Rise + Fall	T _R +T _F	T _{OP} = 25°C	-	25	30	ms
Chromaticity	Red	X _R	-	0.525	0.575	0.625	-
		Y _R	-	0.292	0.342	0.392	-
	Green	X _G	-	0.261	0.311	0.361	-
		Y _G	-	0.564	0.614	0.664	-
	Blue	X _B	-	0.093	0.143	0.193	-
		Y _B	-	0.040	0.090	0.140	-
	White	X _W	-	0.221	0.271	0.321	-
		Y _W	-	0.265	0.315	0.365	-

* Luminance is directly related to Backlight Supply Current.

Driver Information

Built-in Sitronix ST7282T2 Driver.

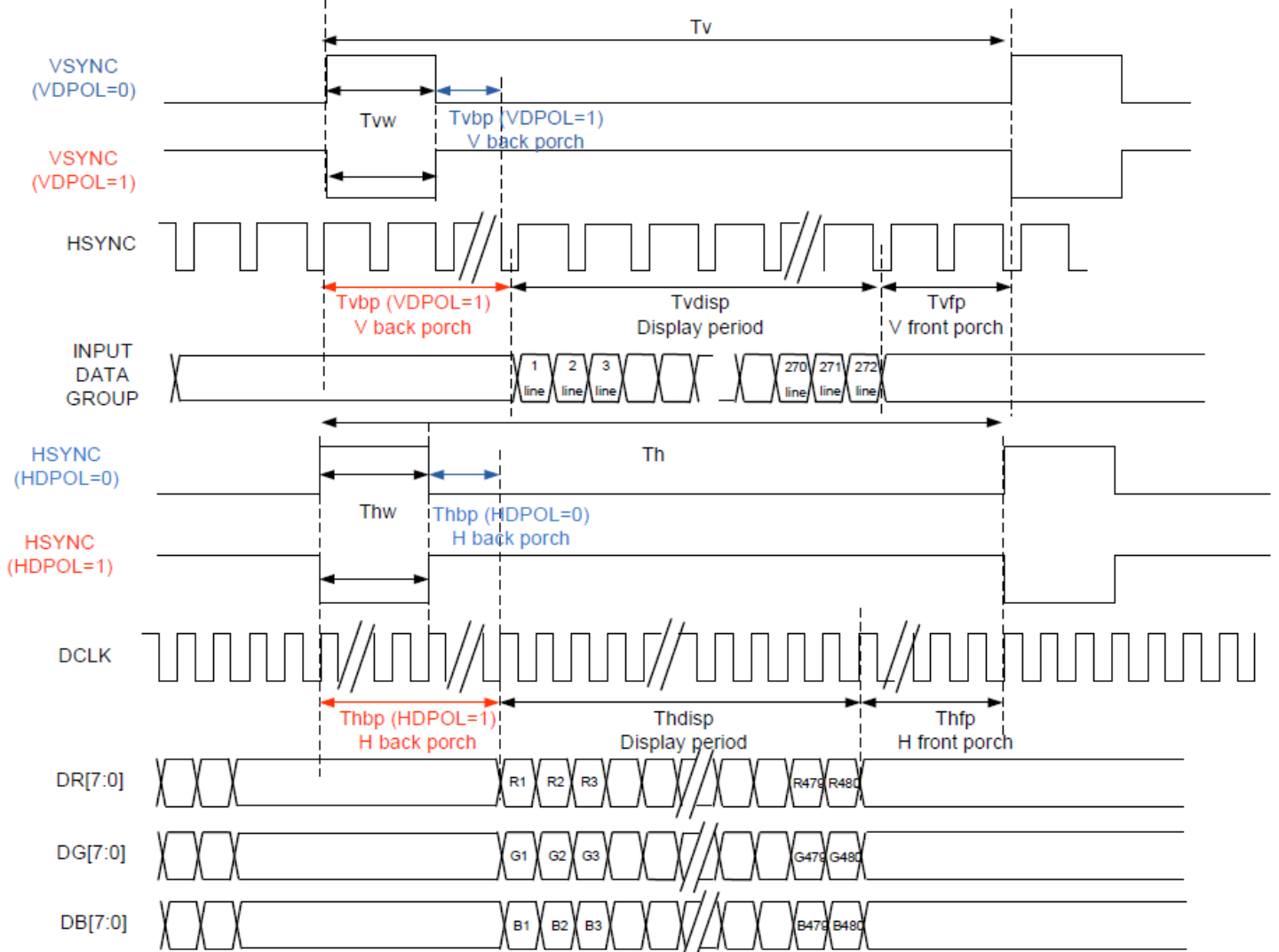
Please download specification at <http://www.newhavendisplay.com/appnotes/datasheets/LCDs/ST7282T2.pdf>

Timing Characteristics

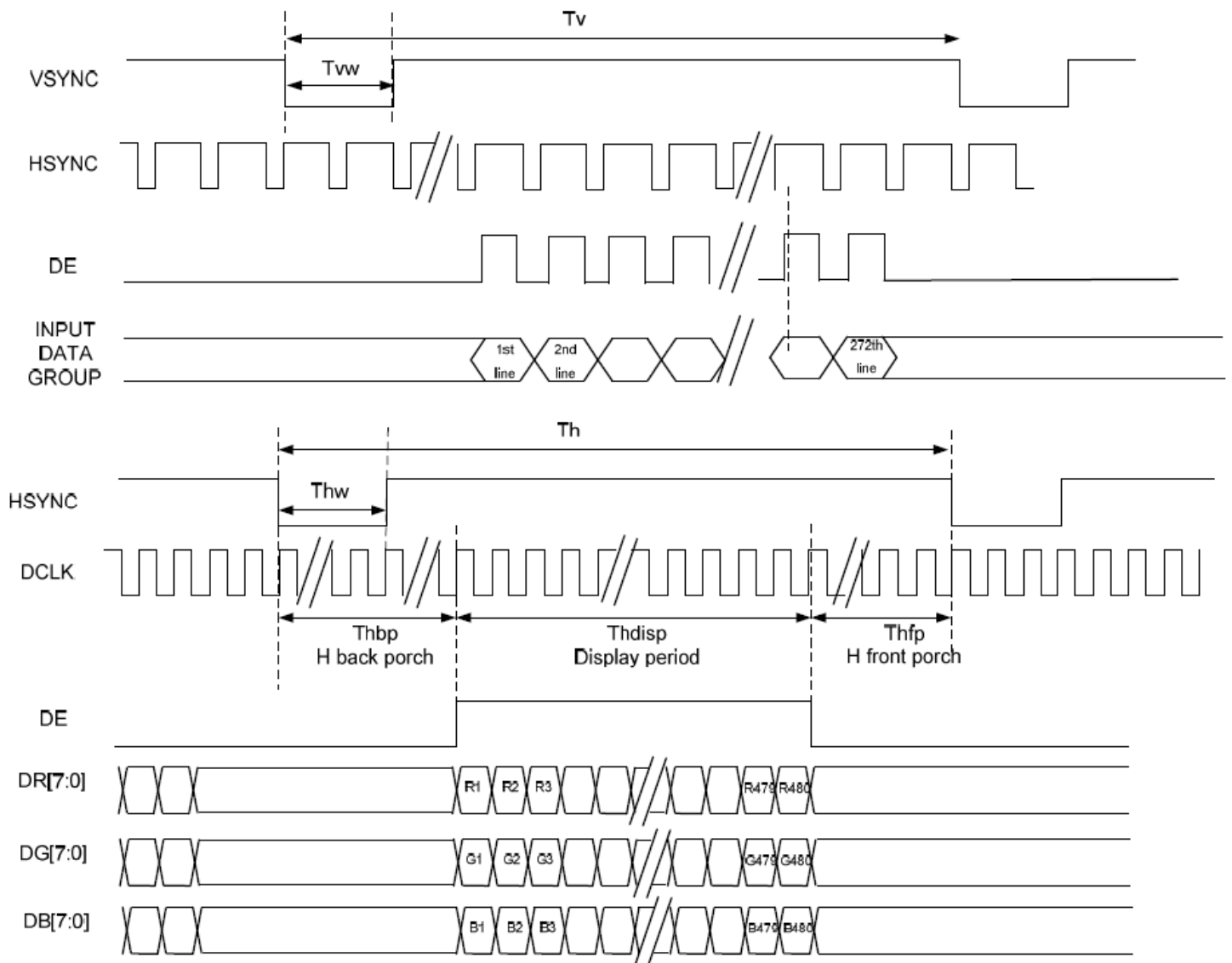
Parallel RGB input timing requirement

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		FCLK	9	12	15	MHz	
DCLK Period		TCLK	10	50	-	μS	R=10KΩ, 1μF
HSYNC	Period Time	Th	485	525	532	DCLK	
	Display Period	Thdisp	-	480	-	DCLK	
	Back Porch	Thbp	3	43	50	DCLK	By H_Blanking Setting
	Front Porch	Thfp	2	2	2	DCLK	
	Pulse Width	Thw	1	1	1	DCLK	
VSYNC	Period Time	Tv	275	285	303	H	
	Display Period	Tvdisp	-	272	-	H	
	Back Porch	Tvbp	2	12	30	H	By V_Blanking Setting
	Front Porch	Tvfp	1	1	1	H	
	Pulse Width	Tvw	1	1	1	H	

- SYNC Mode Timing



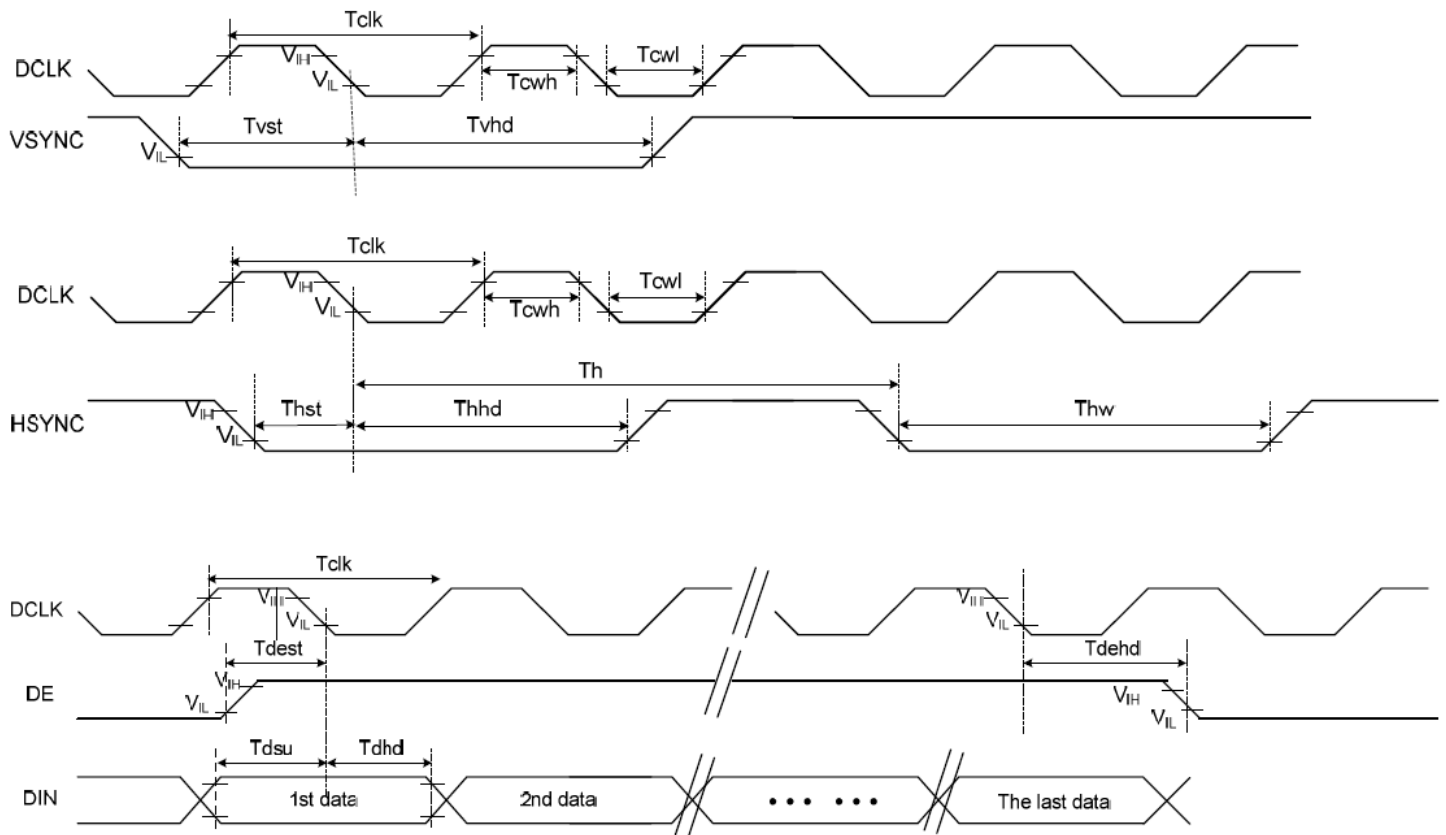
- SYNC-DE Mode Timing



Input setup timing requirement

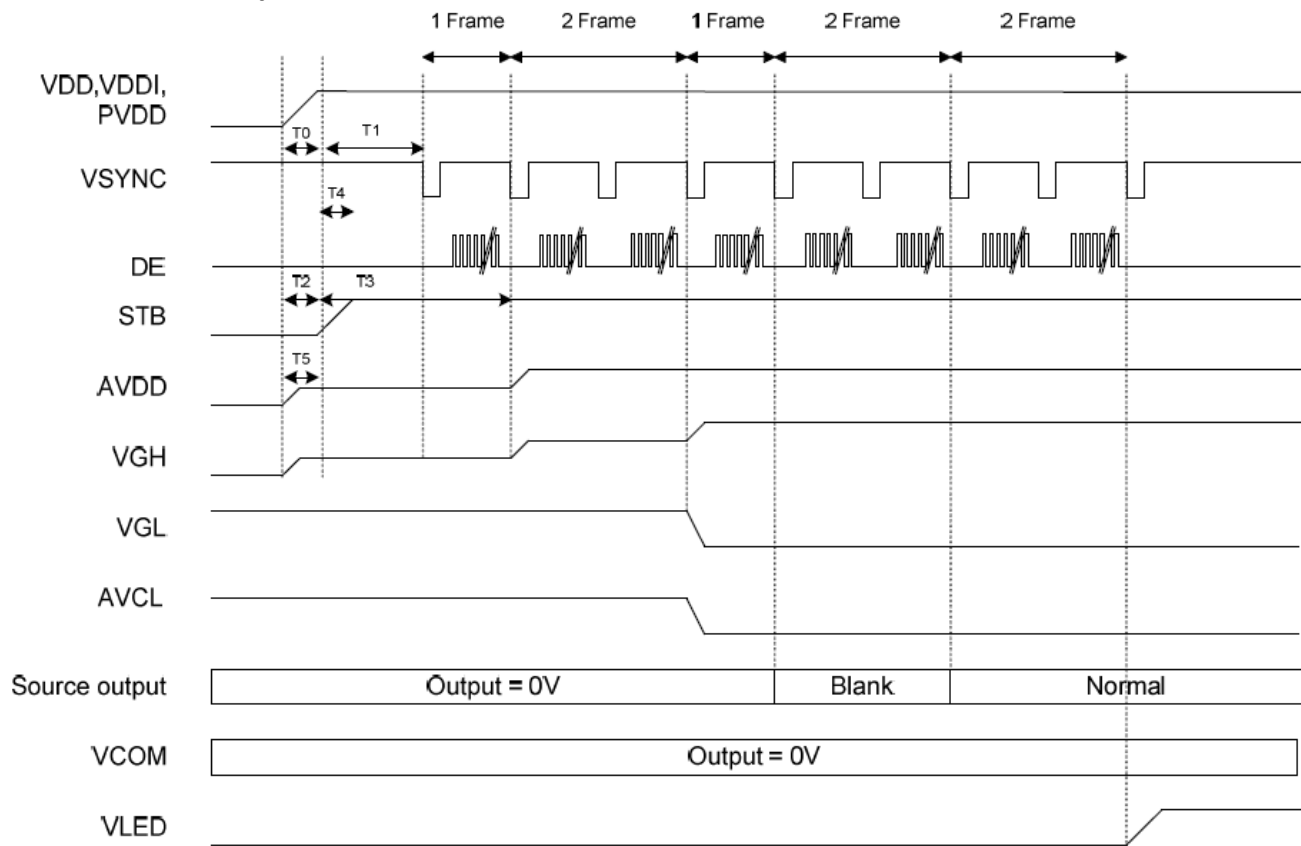
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System Operation Timing						
V _{DD} Power Source Slew Time	TPOR	-	-	20	ms	From 0V to 99% V _{DD}
GRB Pulse Width	tRSTW	10	50	-	μS	R=10KΩ, 1μF
Input / Output Timing						
CLK pulse Duty	TCW	40	50	60	%	
Hsync Width	Thw	1	-	-	DCLK	
Hsync Period	Th	50	60	65	μS	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data setup time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
SD output stable time	Tst	-	-	12	μS	Output settled within +20mV Loading = 6.8k+28.2pF
GD output rise and fall time	Tgst	-	-	6	μS	Output settled (5%~95%) Loading = 4.7k+29.8pF

- Clock And Data Input Timing Diagram



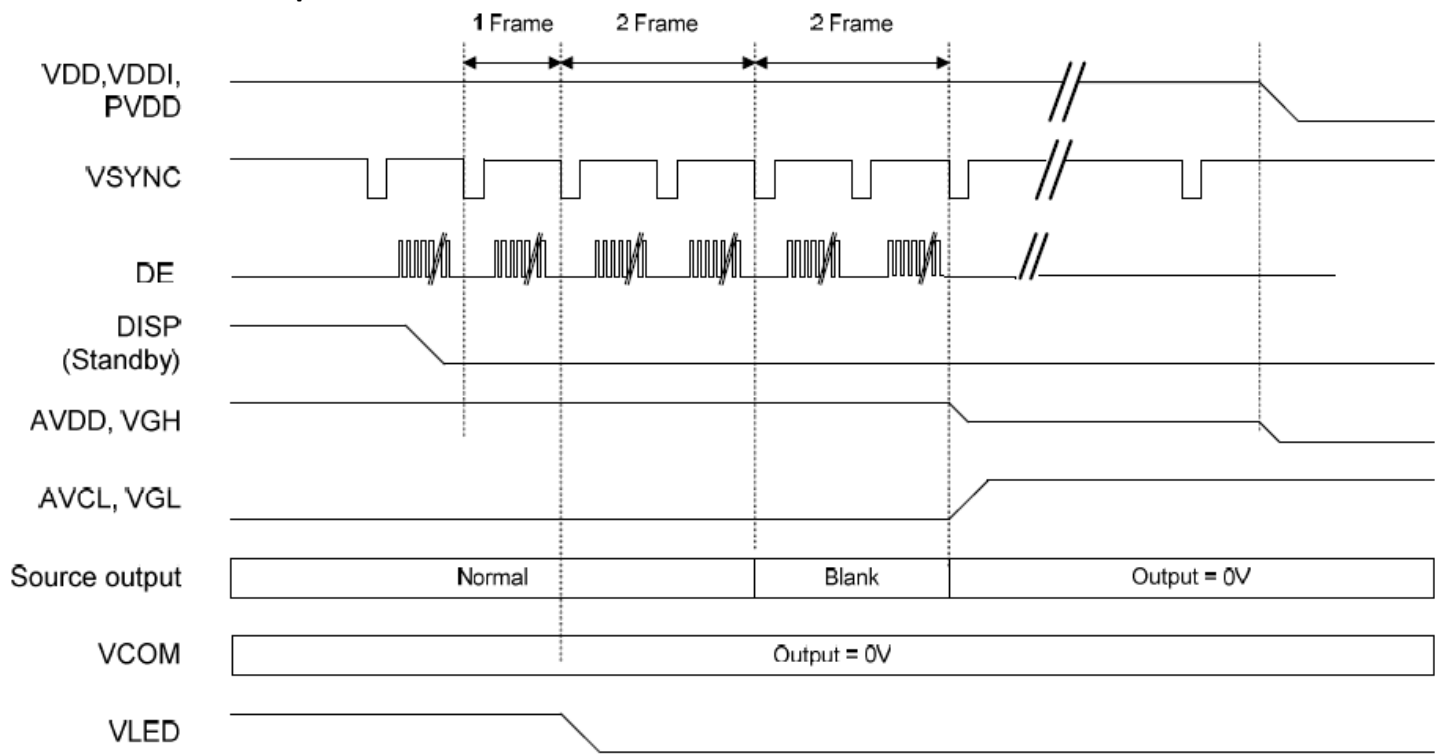
Power On/Off Sequence

- Power On Sequence



	Description	Min. Time
T0	Determined by the external power	
T1	Time from stable VDD, VDDI, PVDD set-up to the first VSYNC	T1=0
T2	Time from AVDD=0V to AVDD=3.3V	T2=T0
T3	Time from AVDD=3.3V to AVDD=6.0V	T3=T1+ (1*Frame)
T4	Time from stable VDD, VDDI, PVDD set-up to DISP asserted	T4=0
T5	Time from VGH=0V to VGH=3.3V	T5=T0

- Power Off 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.	+50°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,60min -> 25°C,5min -> 70°C,60min = 1 cycle 20 cycles	-
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-50Hz , 15mm amplitude. 30 Min. Each Direction X,Y,Z	3
Static electricity test	Endurance test applying electric static discharge.	Air: V _s =±8KV, Contact: V _s =±4KV R _s =330Ω C _s =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

Warranty Information

See Terms & Conditions at http://www.newhavendisplay.com/index.php?main_page=terms

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