NEWHAVEN DISPLAY INTERNATIONAL

Product Specification

NHD-7.0-800480EF-ASXV#

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-	High Brightness, White LED Backlight
X-	TFT
V-	MVA, Wide Temperature
#-	RoHS Compliant

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REACH Compliant

RoHS Compliant

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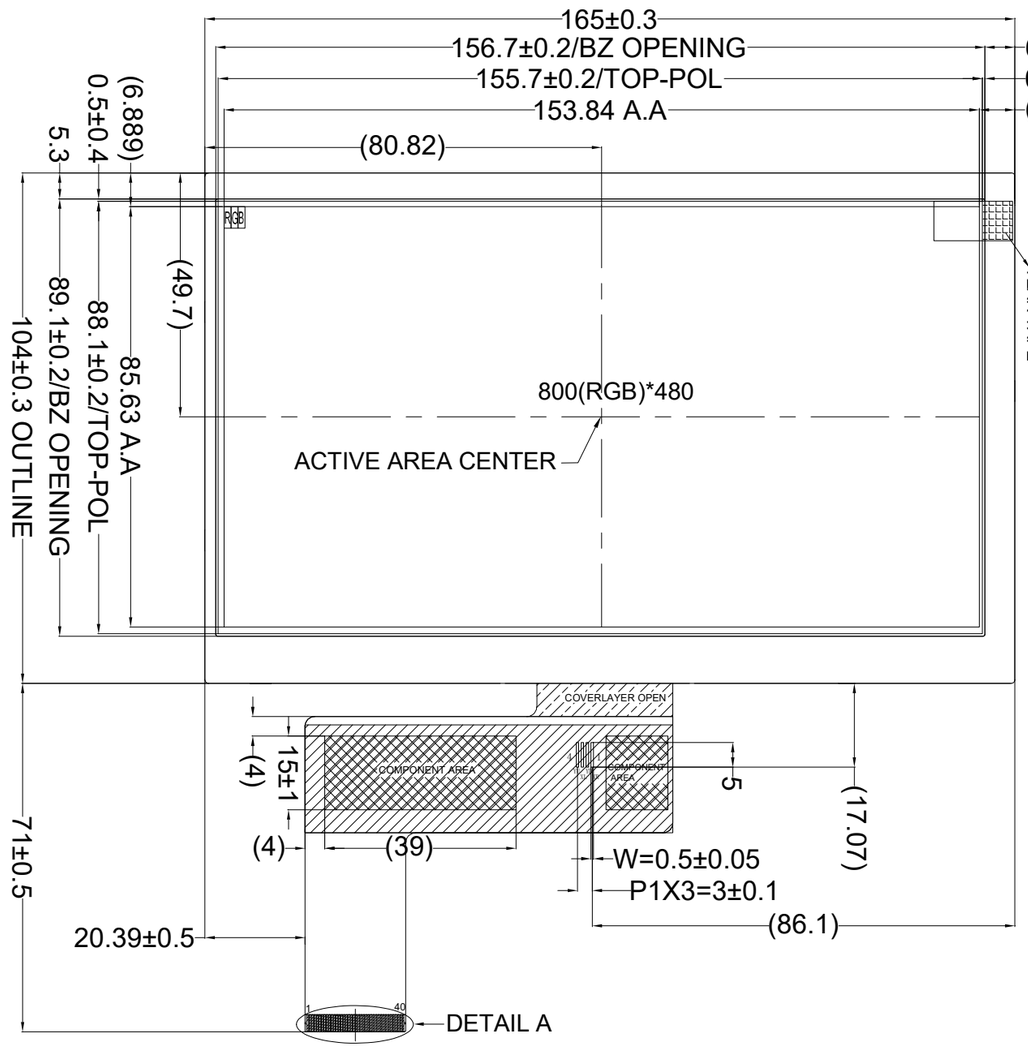
Additional Resources

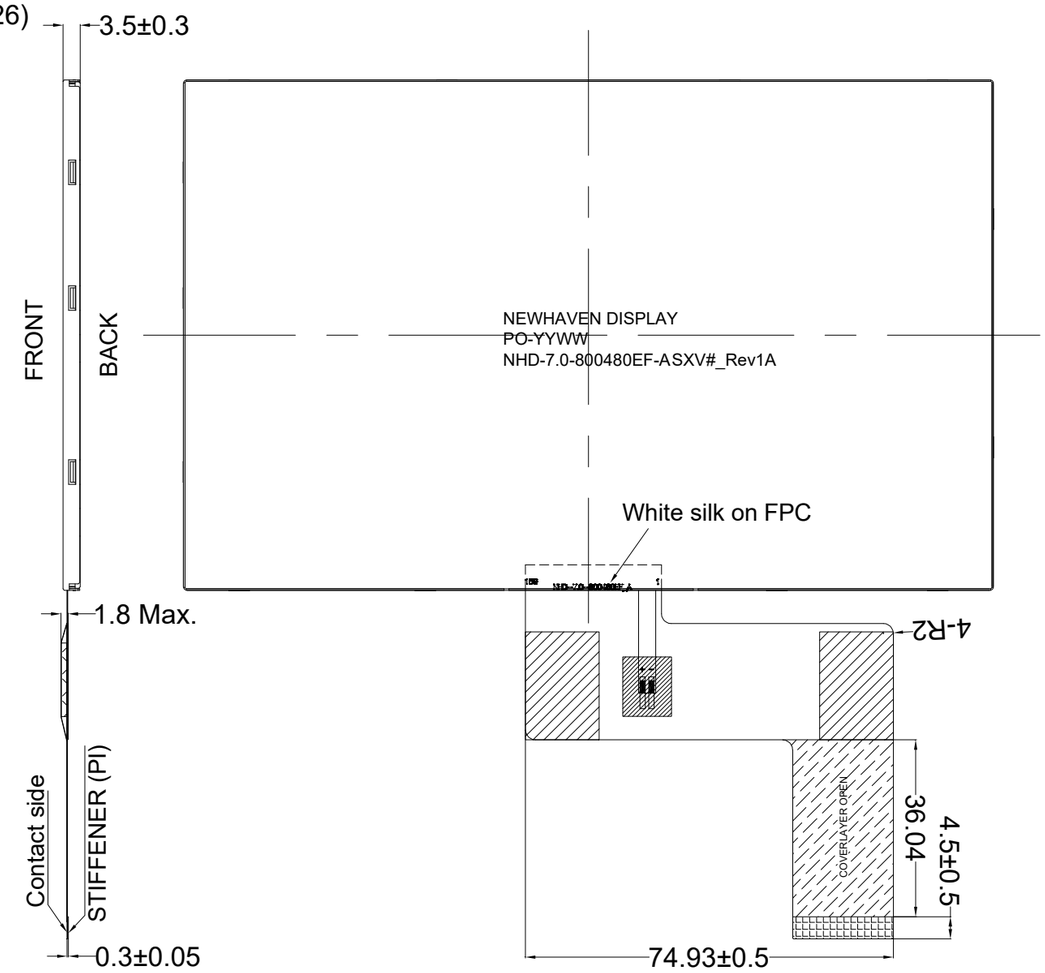
- **Support Forum:** https://support.newhavendisplay.com/hc/en-us/community/topics
- **GitHub:** https://github.com/newhavendisplay
- **Example Code:** https://support.newhavendisplay.com/hc/en-us/categories/4409527834135-Example-Code/
- **Knowledge Center:** https://www.newhavendisplay.com/knowledge_center.html
- **Quality Center:** https://www.newhavendisplay.com/quality_center.html
- **Precautions for using LCDs/LCMs:** https://www.newhavendisplay.com/specs/precautions.pdf
- **Warranty / Terms & Conditions:** https://www.newhavendisplay.com/terms.html

Document Revision History

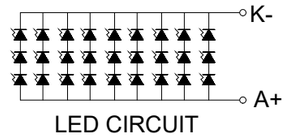
Revision	Date	Description	Changed By
0	03/10/2016	Initial Release	SB
1	07/05/2016	Chromaticity Added	SB
2	06/20/2019	Backlight Characteristics Updated	SB
3	03/09/2020	LCD Driver Changed to EK9716	SB
4	06/04/2020	Updated 2D Mechanical Drawing, Contrast Ratio, Quality Information	AS
5	03/02/2021	Updated Silkscreen on FPC	AS
6	05/20/2021	Updated Mechanical Drawing	JT
7	06/19/2023	Date Code Format Updated on Mechanical Drawing	KL

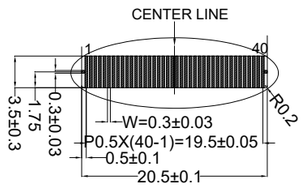
Mechanical Drawing





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)





Product Description: 7.0” 800x480 Premium TFT

1. Driver IC: EK9716B
2. Interface: 24-bit Parallel RGB TFT
3. Power Requirement: 3.3V TFT, 9.3V/180mA Backlight
4. Optical Features: Normally White, Transmissive, Anti-Glare, 800cd/m²
5. Recommended FFC Connector: 40pin 0.5mm pitch; Ex. Molex 54104-4031

Standard Tolerance:
(Unless otherwise specified)
Linear: ±0.3mm

Unless otherwise specified:
• Dimensions are in Millimeters
• Third Angle Projection

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Drawing/Part Number:	Revision:
NHD-7.0-800480EF-ASXV#	1A
Drawn By: K. Lewis	Approved By: K. Lewis
Drawn Date: 06/19/2023	Approved Date: 06/19/2023

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Pin Description

Pin No.	Symbol	Electrical Connection	Function Description
1	LED-K	Power Supply	Backlight Cathode (Ground)
2	LED-A	Power Supply	Backlight Anode (180mA @ 9.3V)
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	DCLK	MPU	Dot data Clock (Falling Edge Triggered)
31	DISP	MPU	Display ON/OFF signal. DISP=1: Display ON
32	HSYNC	MPU	Line synchronization signal
33	VSSYNC	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	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, 25°C	45	90	135	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
"H" Level Output	V_{OH}	-	V_{DD} - 0.4	-	V_{DD}	V
"L" Level Input	V_{OL}	-	V_{SS}	-	V_{SS} + 0.4	V
Backlight Supply Current	I_{LED}	-	90	180	225	mA
Backlight Supply Voltage	V_{LED}	I_{LED} = 180 mA	8.4	9.3	10.2	V
Backlight Lifetime*	-	T_{OP} = 25° C	20,000	30,000	-	Hrs.

*Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions. The LED of the backlight is driven by current drain; drive voltage is for reference only. Drive voltage must be selected to ensure backlight current drain is below MAX level stated.

Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top	φY+	Cr ≥10	60	70	-	°
	Bottom	φY-		60	70	-	°
	Left	θX-		60	70	-	°
	Right	θX+		60	70	-	°
Contrast Ratio		CR	-	-	500	-	-
Luminance		L_V	I_{LED} = 180 mA	640	800	-	cd/m²
Response Time		T_R+T_F	T_{OP} = 25°C	-	25	-	ms
Chromaticity	Red	X_R	-	0.532	0.582	0.632	-
		Y_R	-	0.292	0.342	0.392	-
	Green	X_G	-	0.285	0.335	0.385	-
		Y_G	-	0.574	0.624	0.674	-
	Blue	X_B	-	0.104	0.154	0.204	-
		Y_B	-	0.092	0.142	0.192	-
	White	X_W	-	0.257	0.307	0.357	-
		Y_W	-	0.334	0.384	0.434	-

Driver Information

Built-in EK9716B Source Driver: https://support.newhavendisplay.com/hc/en-us/articles/4414491960599-EK9716B

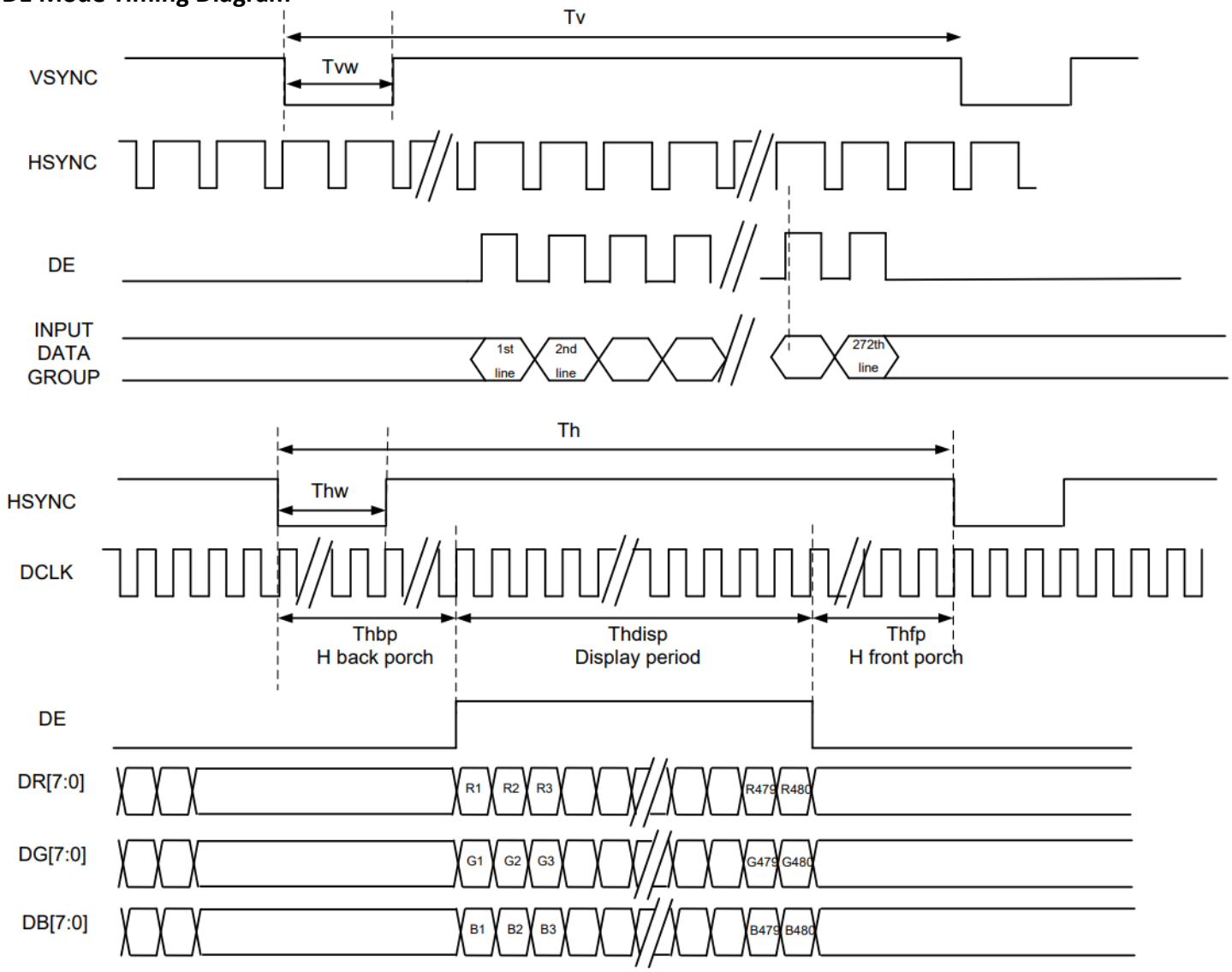
Built-in EK73002AB2 Gate Driver: https://support.newhavendisplay.com/hc/en-us/articles/4414491516183-EK73002AB2

Timing Characteristics

Parallel RGB Input Timing Requirements

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		F_{clk}	28.2	29.2	40	MHz	-
DLCK Period		T_{clk}	25	34	-	ns	-
HSYNC	Period Time	T_h	908	928	1088	DCLK	Thw + Thbp = 88 DLCK is fixed
	Display Period	T_{hdisp}		800		DCLK	
	Pulse Width	T_{hw}	1	48	87	DCLK	
	Back Porch	T_{hbp}	87	40	1	DCLK	
	Front Porch	T_{hfp}	20	40	200	DCLK	-
VSYNC	Display Period	T_{vdisp}		480		H	Tvw + Tvbp = 32 H is fixed
	Period Time	T_v	517	525	613	H	
	Pulse Width	T_{vw}	1	1	3	H	
	Back Porch	T_{vbp}	31	31	29	H	
	Front Porch	T_{vfp}	5	13	101	H	-

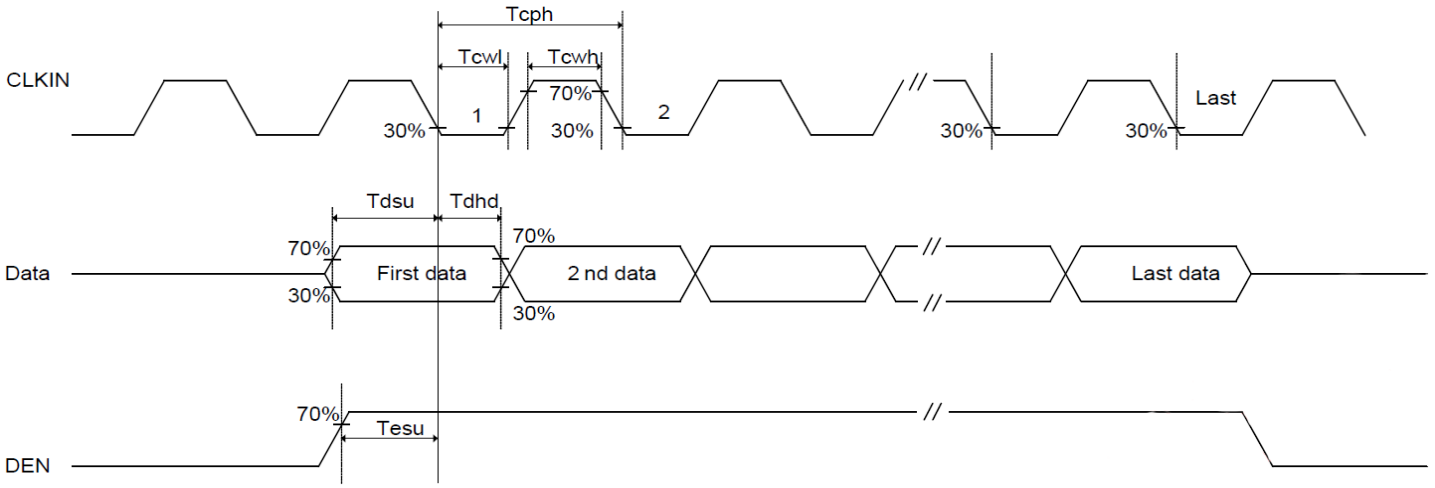
DE Mode Timing Diagram



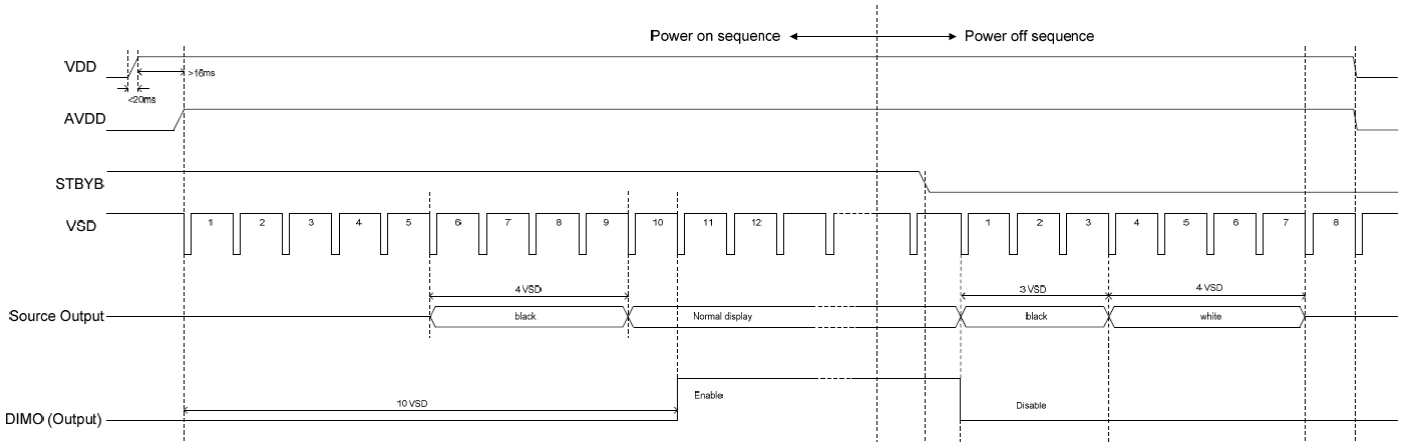
Input Setup Timing Requirements

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

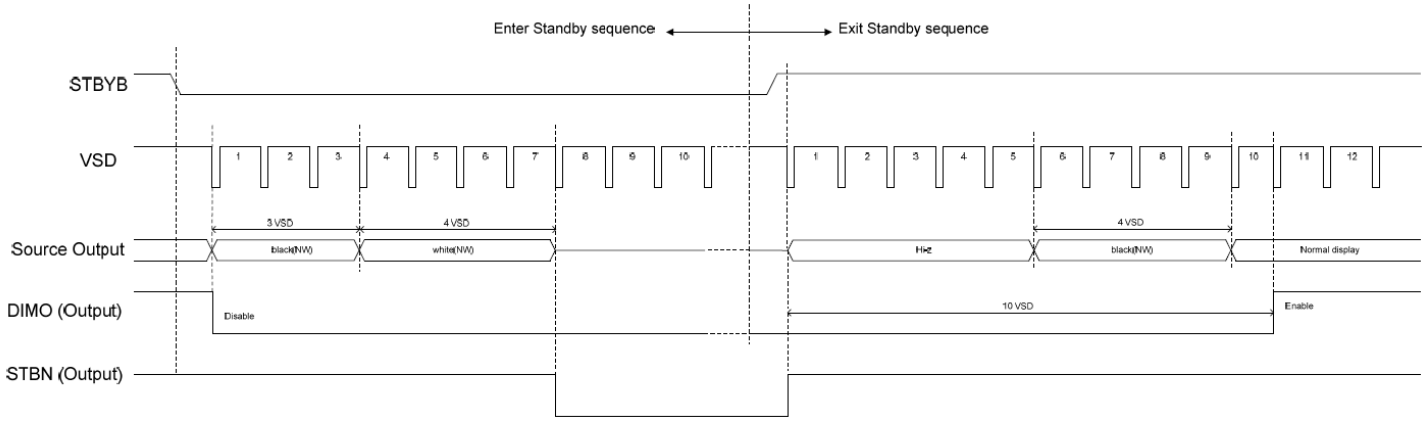
Input Setup Timing Diagram



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, 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.	-20°C, 60min -> 70°C, 60min = 1 cycle For 20 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-50Hz, 5G amplitude. 30 min in each of 3 directions: X, Y, Z	3
Static electricity test	Endurance test applying electric static discharge.	Air: ±8KV 150pf/330Ω 5 Times Contact: ±4KV 150pf/330Ω 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.