NHD-5.0-800480TF-ATXL#-CTP

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

NHD-	Newhaven Display
5.0-	5.0" Diagonal
800480-	800xRGBx480 Pixels
TF-	Model
A-	Built-in Driver / No Controller
T-	White LED Backlight
X-	TFT
L-	MVA, Enhanced Optical Characteristics, Wide Temperature
#	**RoHS Compliant**
CTP	Capacitive Touch Panel with Controller

Document Revision History

Revision	Date	Description	Changed by
0	3/20/13	Initial Release	AK
1	8/28/13	Electrical Characteristics updated	AK
2	9/16/14	Electrical Characteristics updated	ML
3	4/1/15	CTP mechanical dimensions updated	AK
4	9/2/15	Driver, Electrical, Optical characteristics updated	AK
5	10/27/15	Backlight lifetime rating added	AK
6	10/30/15	Datasheet Reformat	SB
7	1/18/16	CTP Controller Updated, Updated Brightness Rating	SB
6	2/23/16	Corrected Notes on Drawing, Updated CTP Supply Voltage	SB
7	4/5/16	Updated Brightness Rating	SB
8	7/7/16	Mechanical Drawing Updated	SB
9	7/22/16	Electrical Characteristics	TM
10	4/14/17	Supply Current Updated	SB
11	7/27/17	CTP Registers updated	SB
12	7/13/18	Drawing Updated to Show Accurate Thickness	SB
13	8/14/18	CTP Bonding Tape Thickness Increased to 0.3mm	SB
14	9/21/18	Updated CTP Driver & Panel	SB
15	10/10/18	TFT Driver IC Updated	SB
16	5/2/19	CTP Timing Note Added	SB
17	7/10/19	Timing Information Updated	SB
18	1/14/20	Driver Change to ILI6122, Optical Characteristics Updated	SB
19	4/22/20	Added Information for DE Mode Operation	TM
20	5/6/20	Corrected Mechanical Drawing Typo	AS

Functions and Features

- **800xRGBx480 resolution, up to 16.7M colors**
- **18-LED backlight**
- **24-bit RGB interface**
- **Enhanced Optical Characteristics**
- **Wide Viewing Angles**
- **Capacitive touch panel with controller**
  - **10-Point multi-touch input**
  - **Gesture input**
    - **Zoom In/Out**
    - **Swipe Up/Down/Left/Right**

120.7±0.3
109.00±0.15 (VA)
108(TFT A,A)
5.85
6.35
4-R0.30
(3.36)

Overall: 4.8±0.35
TFT: 3.1±0.2
CTP: 1.7±0.15
Adhesive: 0.3

Newhaven Display
NHD-5.0-800480TF-ATXL#-CTP
WWYY

5.0" TFT

800(RGB)*480

75.8±0.3
65.80±0.15 (VA)
64.8(TFT A,A)

FRONT   BACK

NEWHAVEN DISPLAY
WWYY
NHD-5.0-800480TF-ATXL#_Rev1C

43.85
41.25
14.55
55.80
58.40±0.5
6.50

7.13
46±0.3
61.00±0.5

1.2mm Max
IC
Contact side
STIFFENER (PI)

Date Code 6
14.00
14.50

30.15±0.2
42.88±0.5

IC

23±0.2
12.00
20±0.2
5±0.5
10±0.2

0.3±0.05

2.70
20.5±0.1
R0.3

W=0.3
1   40
0.5±0.1
P0.5*39=19.5±0.05
PI Stiffener: 0.2mm
3.5±0.3

1VDD
2GND
3SCL
4SDA
5 INT
6RST

70.06±0.3
7.00±0.1
3.60

6   1

0.3±0.05

Pitch: 1.00
6*0.7
1.00

NO.	PIN NAME
1	VLED−
2	VLED+
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	CLKIN
31	STBYB
32	HSD
33	VSD
34	DEN
35	NC
36	GND
37	XR
38	YD
39	XL
40	YU

PIN	DEFINE
1	VDD
2	GND
3	SCL
4	SDA
5	INT
6	RESET

Notes:

1. Display Size: 5.0" TFT
2. Display Mode: Transmissive / Normally White / Anti-Glare
3. Optimal View: Full View
4. Supply Voltage: 3.3V
5. Driver IC: ILI6122
6. Backlight: White LED / 19.2V / 60 mA (Typ)
7. Brightness: 500 cd/m² (Typ)
8. Touch Panel: PCAP
9. 3M Brightness Enhancement Film

A+   K-

Pin Description

TFT:

Pin No.	Symbol	External Connection	Function Description
1	LED-	LED Power Supply	Ground for Backlight
2	LED+	LED Power Supply	Backlight Power Supply (60mA @ ~19.2V)
3	GND	Power Supply	Ground
4	V_{DD}	Power Supply	Power supply 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	CLKIN	MPU	Clock for input data (Rising Edge)
31	STBYB	MPU	1: Normal Operation;0: Standby Mode
32	HSD	MPU	Line synchronization signal
33	VSD	MPU	Frame synchronization signal
34	DEN	MPU	Data Enable signal; Positive Polarity (Required in DE mode)
35	NC	-	No Connect
36	GND	Power Supply	Ground
37	XR	-	No Connect
38	YD	-	No Connect
39	XL	-	No Connect
40	YU	-	No Connect

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

The ILI6122 driver IC is configured for DE Mode by default which eliminates the need to depend on HSD and VSD timing signals. Using DE mode in place of Sync mode, the display will no longer be affected by changes to the sync timing or porch settings in the event of a driver IC change. This will maintain a consistent display performance for any driver IC changes that may occur in the future.

The ILI6122 driver will treat the data on the Dx[7:0] RGB data bus as active display data while DEN is at "H" level and ignore the data on the Dx[7:0] RGB data bus while DEN is at "L" level.

Sync Mode can still be provided as the default setting but will need to be ordered as a custom option.

Capacitive Touch Panel:

Pin No.	Symbol	External Connection	Function Description
1	V_{CC}	Power Supply	Power supply for logic (3.3V)
2	GND	Power Supply	Ground
3	SCL	MPU	Serial I2C Clock (Requires pull-up resistor)
4	SDA	MPU	Serial I2C Data (Requires pull-up resistor)
5	/INT	MPU	Interrupt signal from touch panel module to host
6	/RESET	MPU	Active LOW Reset signal (Do not tie to V_{CC})

Recommended connector: 1.0mm pitch 6-Conductor FFC. Molex p/n: 52271-0679

Driver/Controller Information

TFT:

Built-in ILI6122 Source Driver: http://www.newhavendisplay.com/appnotes/datasheets/LCDs/ILI6122.pdf
Built-in ILI5960D Gate Driver: http://www.newhavendisplay.com/appnotes/datasheets/LCDs/ILI5960D.pdf

Capacitive Touch Panel:

Built-in FocalTech FT5426 controller.
Please download specification at http://www.newhavendisplay.com/appnotes/datasheets/touchpanel/FT5x26.pdf

Electrical Characteristics

TFT:

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	39	78	117	mA
"H" Level input	V_{IH}	-	0.7 * V_{DD}	-	V_{DD}	V
"L" Level input	V_{IL}	-	GND	-	0.3 * V_{DD}	V
"H" Level output	V_{OH}	-	V_{DD} - 0.4	-	V_{DD}	V
"L" Level output	V_{OL}	-	GND	-	0.4	V
Backlight Supply Current	I_{LED}	-	-	60	75	mA
Backlight Supply Voltage	V_{LED}	I_{LED} = 60mA	16.8	19.2	20.4	V
Backlight Lifetime*	-	T_{OP} = 25°C	-	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.

Capacitive Touch Panel:

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}	-	2.8	3.3	3.6	V
Supply Current – Operating	I_{DD}	V_{DD} = 3.3V	-	12	20	mA
Supply Current – Hibernate	I_{DD}	T_{OP} = 25°C	-	1.0	-	uA
"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}	-	0.7 * V_{DD}	-	V_{DD}	V
"L" Level Output	V_{OL}	-	V_{SS}	-	0.3*V_{DD}	V

Optical Characteristics:

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top	$\varphi Y+$	CR ≥ 10	60	70	-	°
	Bottom	$\varphi Y-$		60	70	-	°
	Left	$\theta X-$		60	70	-	°
	Right	$\theta X+$		60	70	-	°
Contrast Ratio		CR	-	400	500	-	-
Luminance		L_V	I_{LED} = 60 mA	400	500	-	cd/m^2
Response Time		$T_R + T_F$	T_{OP} = 25°C	-	25	50	ms
Chromaticity	Red	X_R	-	0.513	0.563	0.613	-
		Y_R	-	0.286	0.336	0.386	-
	Green	X_G	-	0.283	0.333	0.383	-
		Y_G	-	0.557	0.607	0.657	-
	Blue	X_B	-	0.094	0.144	0.194	-
		Y_B	-	0.047	0.097	0.147	-
	White	X_W	-	0.257	0.307	0.357	-
		Y_W	-	0.300	0.350	0.400	-

Capacitive Touch Panel Registers

Register No.	Access	Register Name	Bits	Value	Description
01h	RO	Gesture ID	[7:0]	10 18h 1Ch 14h 48h 49h 00	Swipe Up Swipe Down Swipe Left Swipe Right Zoom Out Zoom In No gesture
02h	RO	Touch Points	[7:0]	0-Ah	0: No touch detected A: 10 touch points detected
03h	RO	TOUCH1_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
03h	RO	TOUCH1_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
04h	RO	TOUCH1_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
05h	RO	TOUCH1_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
06h	RO	TOUCH1_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
07h	RO	TOUCH1_Weight	[7:0]		Touch Weight
08h	RO	TOUCH1_Misc	[3:0]	00-0Fh	Touch Area
09h	RO	TOUCH2_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
09h	RO	TOUCH1_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
0Ah	RO	TOUCH2_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
0Bh	RO	TOUCH2_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
0Ch	RO	TOUCH2_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
0Dh	RO	TOUCH2_Weight	[7:0]		Touch Weight
0Eh	RO	TOUCH2_Misc	[3:0]	00-0Fh	Touch Area
0Fh	RO	TOUCH3_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
0Fh	RO	TOUCH3_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
10	RO	TOUCH3_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
11h	RO	TOUCH3_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
12h	RO	TOUCH3_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
13h	RO	TOUCH3_Weight	[7:0]		Touch Weight
14h	RO	TOUCH3_Misc	[3:0]	00-0Fh	Touch Area
15h	RO	TOUCH4_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
15h	RO	TOUCH4_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
16h	RO	TOUCH4_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
17h	RO	TOUCH4_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
18h	RO	TOUCH4_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
1Ah	RO	TOUCH4_Misc	[3:0]	00-0Fh	Touch Area
1Bh	RO	TOUCH5_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved

Register No.	Access	Register Name	Bits	Value	Description
1Bh	RO	TOUCH5_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
1Ch	RO	TOUCH5_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
1Dh	RO	TOUCH5_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
1Eh	RO	TOUCH5_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
1Fh	RO	TOUCH5_Weight	[7:0]		Touch Weight
20	RO	TOUCH5_Misc	[3:0]	00-0Fh	Touch Area
21h	RO	TOUCH6_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
21h	RO	TOUCH6_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
22h	RO	TOUCH6_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
23h	RO	TOUCH6_YH	[3:0]	0 -1	Upper 4 bits of Y touch coordinate
24h	RO	TOUCH6_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
25h	RO	TOUCH6_Weight	[7:0]		Touch Weight
26h	RO	TOUCH6_Misc	[3:0]	00-0Fh	Touch Area
27h	RO	TOUCH7_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
27h	RO	TOUCH7_XH	[3:0]	0 -1	Upper 4 bits of X touch coordinate
28h	RO	TOUCH7_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
29h	RO	TOUCH7_YH	[3:0]	0 − 1	Upper 4 bits of Y touch coordinate
2Ah	RO	TOUCH7_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
2Bh	RO	TOUCH7_Weight	[7:0]		Touch Weight
2Ch	RO	TOUCH7_Misc	[3:0]	00-0Fh	Touch Area
2Dh	RO	TOUCH8_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
2Dh	RO	TOUCH8_XH	[3:0]	0 − 1	Upper 4 bits of X touch coordinate
2Eh	RO	TOUCH8_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
2Fh	RO	TOUCH8_YH	[3:0]	0 − 1	Upper 4 bits of Y touch coordinate
30	RO	TOUCH8_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
31h	RO	TOUCH8_Weight	[7:0]		Touch Weight
32h	RO	TOUCH8_Misc	[3:0]	00-0Fh	Touch Area
33h	RO	TOUCH9_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
33h	RO	TOUCH9_XH	[3:0]	0 - 1	Upper 4 bits of X touch coordinate
34h	RO	TOUCH9_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
35h	RO	TOUCH9_YH	[3:0]	0 − 1	Upper 4 bits of Y touch coordinate
36h	RO	TOUCH9_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate
37h	RO	TOUCH9_Weight	[7:0]		Touch Weight
38h	RO	TOUCH9_Misc	[3:0]	00 - 0Fh	Touch Area
39h	RO	TOUCH10_Event_Flag	[7:6]	0 1 2 3	Put Down Put Up Contact Reserved
39h	RO	TOUCH10_XH	[3:0]	0 − 1	Upper 4 bits of X touch coordinate
3Ah	RO	TOUCH10_XL	[7:0]	00 - FFh	Lower 8 bits of X touch coordinate
3Bh	RO	TOUCH10_YH	[3:0]	0 − 1	Upper 4 bits of Y touch coordinate
3Ch	RO	TOUCH10_YL	[7:0]	00 - FFh	Lower 8 bits of Y touch coordinate

Register No.	Access	Register Name	Bits	Value	Description
3Dh	RO	TOUCH10_Weight	[7:0]	00-FFh	Touch Weight
3Eh	RO	TOUCH10_Misc	[3:0]	00-0Fh	Touch Area
80	RW	ID_G_MC_THGROUP	[7:0]	00-FFh	Mutual-Capacitive touch Threshold / 4 Default: 4Bh
81h	RW	ID_G_MC_THPEAK	[7:0]	00-FFh	Mutual-Capacitive Peak Threshold / 4 Default: 46h
85h	RW	ID_G_THDIFF	[7:0]	00-FFh	Points Filtering Range Threshold / 16 Default: A0
86h	RW	ID_G_CTRL	[1:0]	0-1	Allowed to switch to monitor mode or not (1: Allowed, 0: Not Allowed)
88h	RW	ID_G_PERIODACTIVE	[3:0]	3h-Eh	Period of Active Status
89h	RW	ID_G_PERIODMONITOR	[7:0]	1Eh-FFh	Timer to enter "idle" while in Monitor (ms)
A1h	RO	ID_G_LIB_VERSION_H	[7:0]	00-FFh	App library version high-byte Default: 0
A2h	RO	ID_G_LIB_VERSION_L	[7:0]	00-FFh	App library version low-byte Default: 2h
A3h	RO	ID_G_CHIPER_HIGH	[7:0]	00-FFh	Chip Vendor ID Default: 0x54
A4h	RW	ID_G_MODE	[0]	0 1	INT Trigger Mode INT Polling Mode
A5h	RW	ID_G_PMODE	[1:0]	0 1 3	Active Monitor Sleep
A6h	RO	ID_G_FIRMID	[7:0]	00-FFh	Firmware ID Number Default: 6
A8h	RO	ID_G_VENODRID	[7:0]	00-FFh	CTPM Vendor's Chip ID Default: 79h
C0h	RW	ID_G_GLOVE_MODE_EN	[0]	0 1	Glove Mode Switch Disable Glove Mode Switch Enable
C1h	RW	ID_G_COVER_MODE_EN	[0]	0 1	Cover Mode Switch Disable Cover Mode Switch Enable

Capacitive Touch Panel Material Characteristics:

Property	Requirement	Unit
IC	FT5426	-
ITO Glass thickness	0.55	mm
Surface Hardness	≥6	H
Light transmission	82%	-
Operating Humidity	20~90	RH
Storage Humidity	20~90	RH

Timing Characteristics – TFT display

AC Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
V_{DD} Power ON Slew Rate	T_{POR}	-	-	20	ms	From 0V to 90% V_{DD}
RSTB Pulse Width	T_{RST}	10	-	-	µs	CLKIN = 45MHz
CLKIN cycle time	T_{cph}	20	-	-	ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
VSD setup time	T_{vst}	8	-	-	ns	
VSD hold time	T_{vhd}	8	-	-	ns	
HSD setup time	T_{hst}	8	-	-	ns	
HSD hold time	T_{hhd}	8	-	-	ns	
Data set-up time	T_{dsu}	8	-	-	ns	D0R[7:0], D1G[7:0], D2B[7:0] to CLKIN
Data hold time	T_{dhd}	8	-	-	ns	D0R[7:0], D1G[7:0], D2B[7:0] to CLKIN
DE setup time	T_{esu}	8	-	-	ns	
DE hold time	T_{ehd}	8	-	-	ns	
Output stable time	T_{sst}	-	-	6	µs	10%-90% target voltage C_L = 120pf, R= 10kΩ

Parallel 24-Bit RGB Mode TIming

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
CLKIN Frequency	F_{clk}	-	40	50	MHz	V_{DD} = 2.7V ~ 3.6V
CLKIN time	T_{clk}	20	25	-	Ns	
CLKIN Pulse Duty	T_{cwh}	40	50	60	%	T_{clk}
Time from HSD to Source Output	T_{hso}	-	20	-	CLKIN	
Time from HSD to LD	T_{hld}	-	20	-	CLKIN	
Time from HSD to STV	T_{hstv}	-	2	-	CLKIN	
Time from HSD to CKV	T_{hckv}	-	20	-	CLKIN	
Time from HSD to OEV	T_{hoev}	-	4	-	CLKIN	
LD Pulse Width	T_{wld}	-	10	-	CLKIN	
CKV Pulse Width	T_{wckv}	-	66	-	CLKIN	
OEV Pulse Width	T_{woev}	-	74	-	CLKIN	

Vertical Input Timing
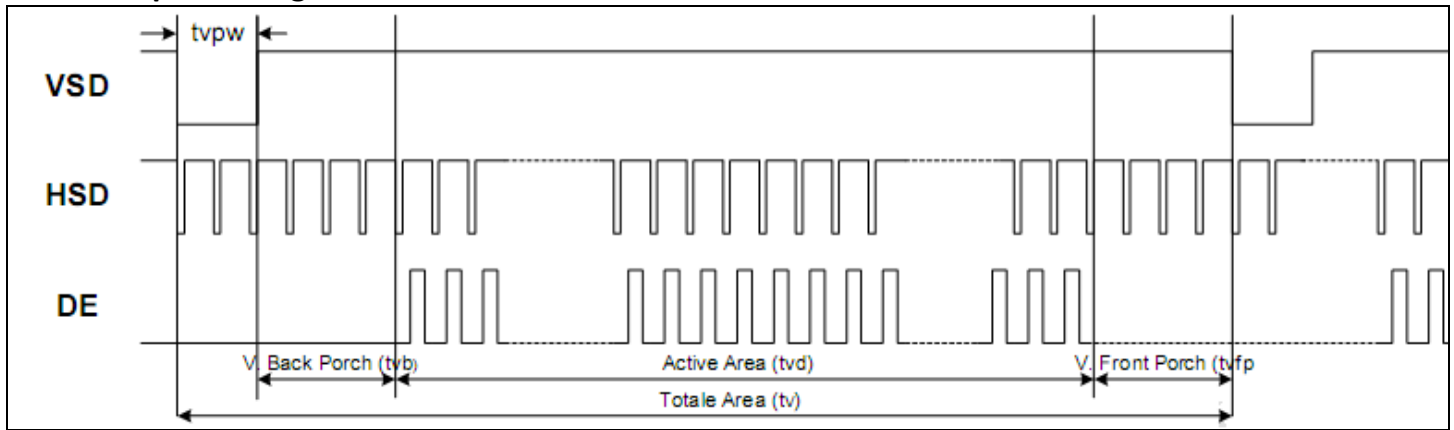
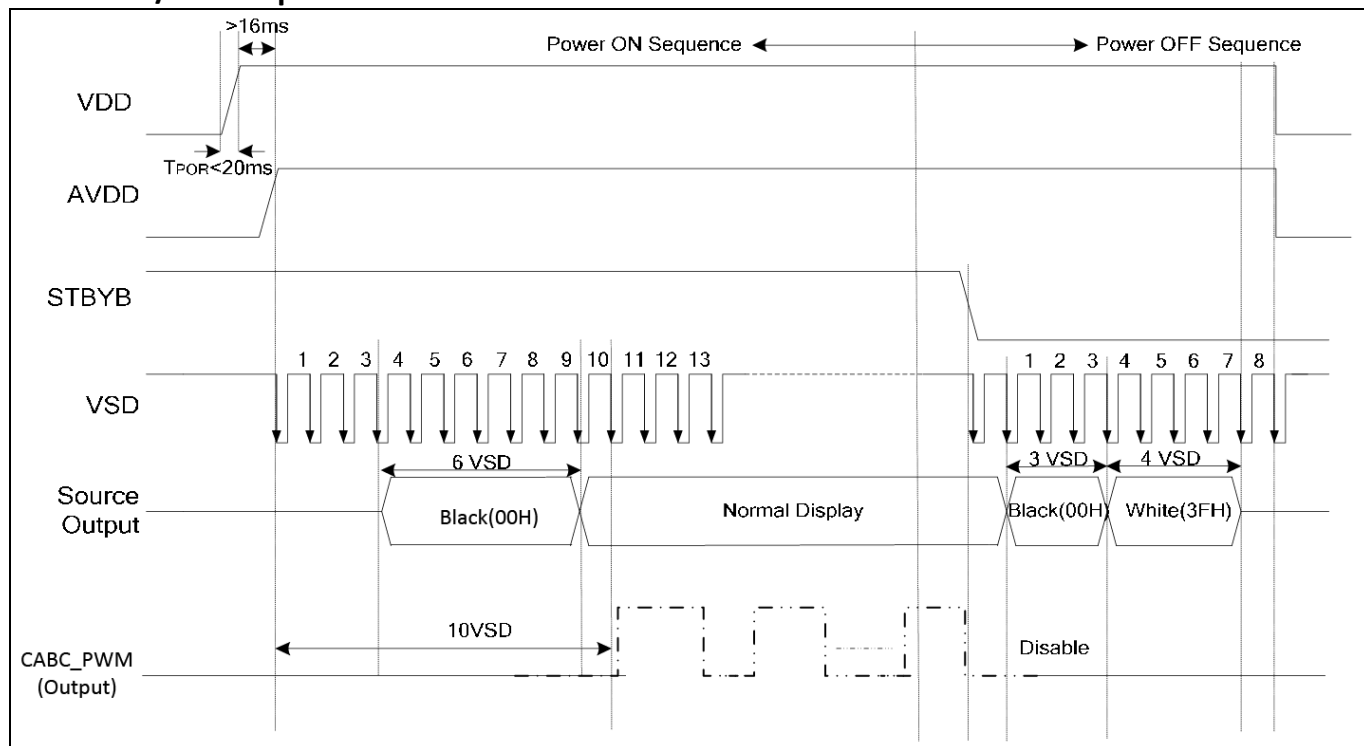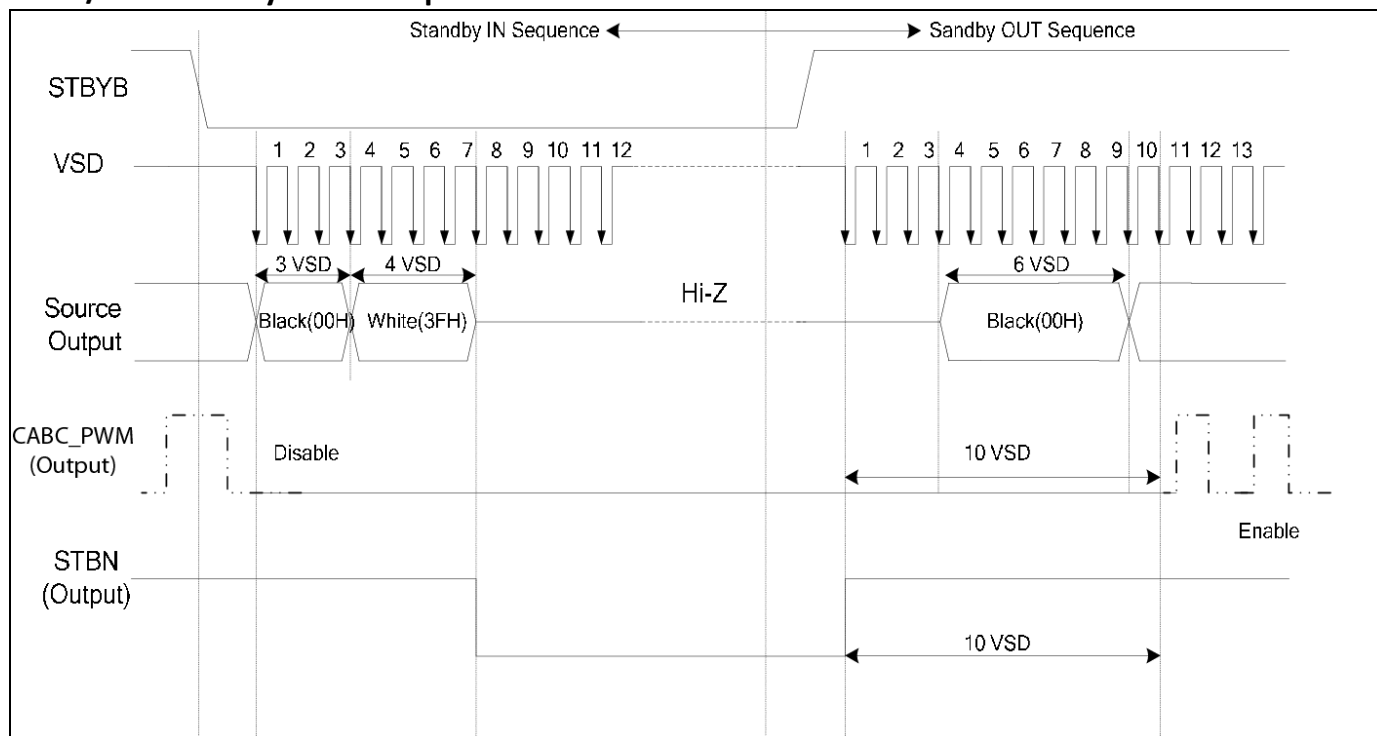## Horizontal Input Timing (DE Mode)
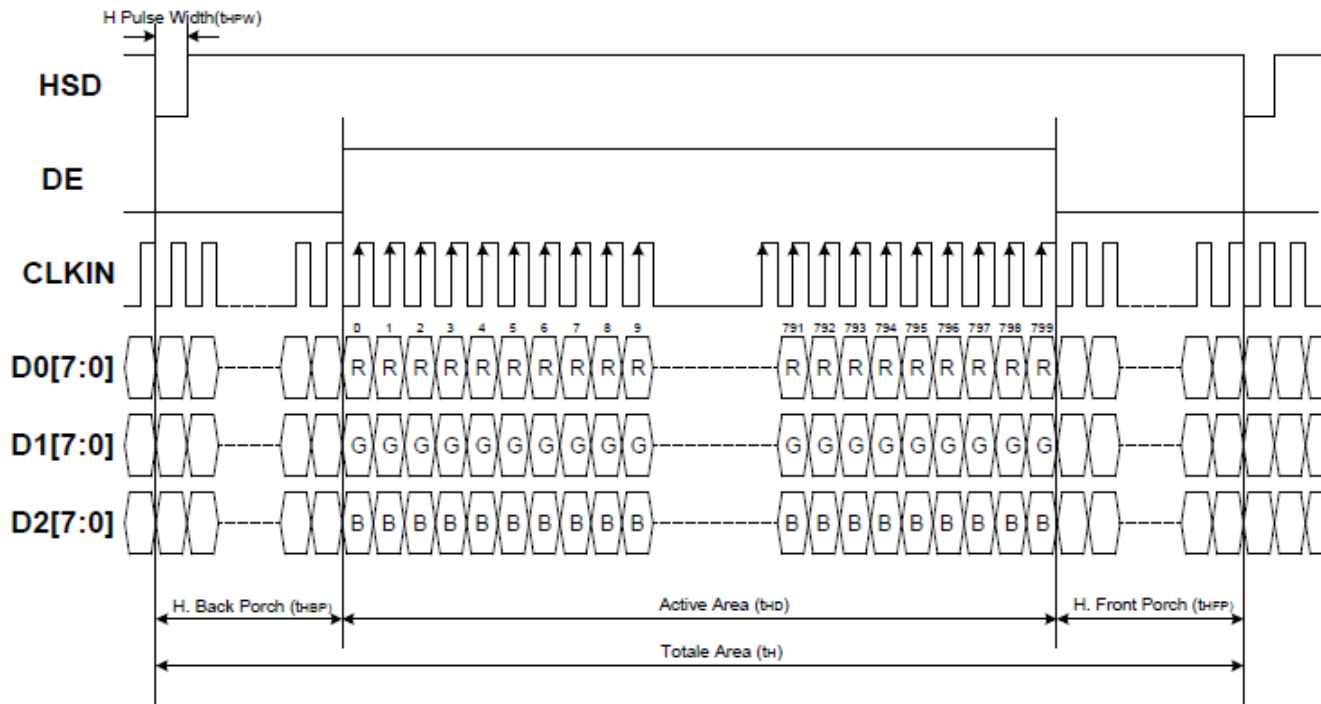
Input Clock and Data Timing
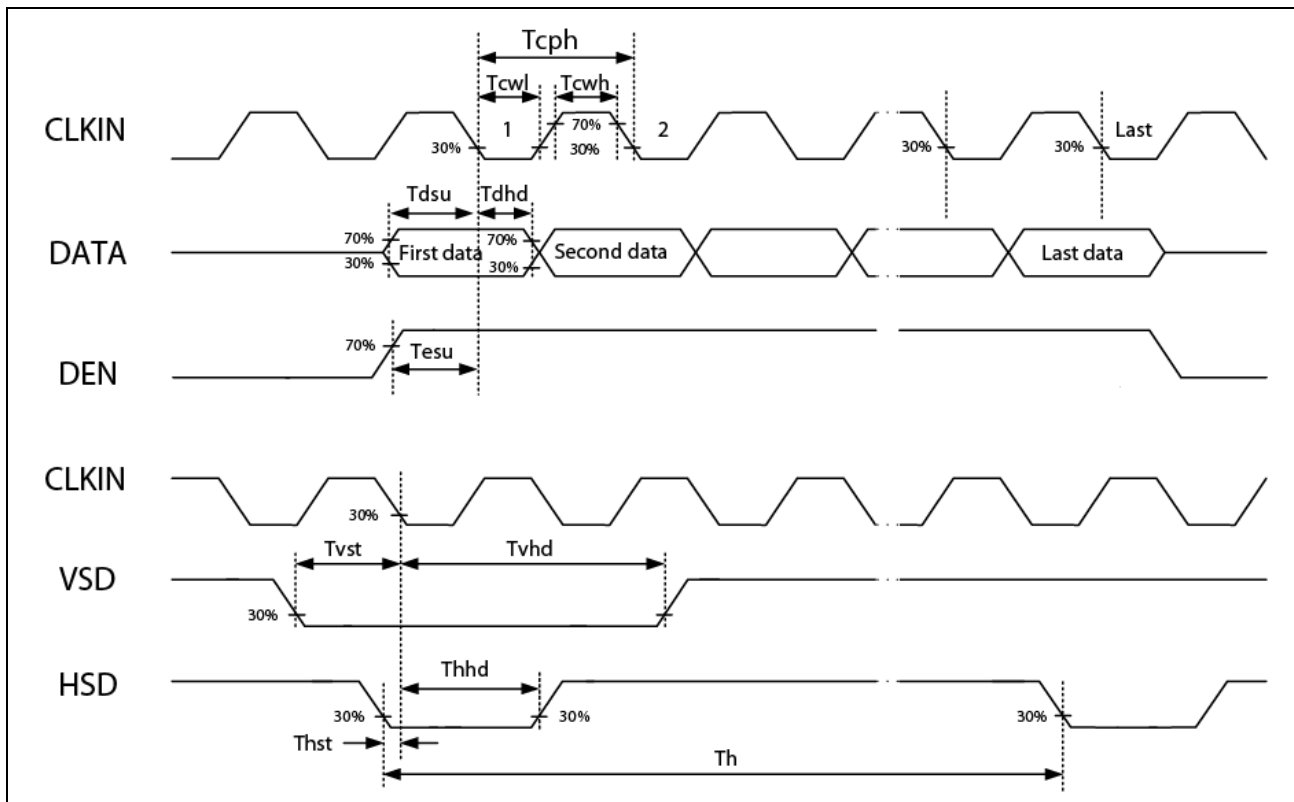
Source Output Timing
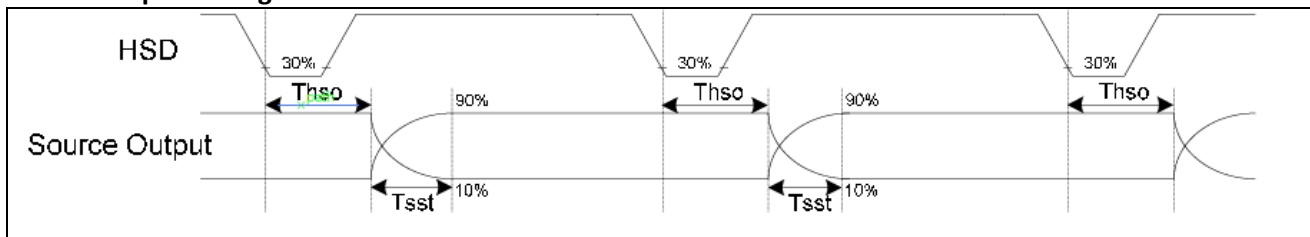
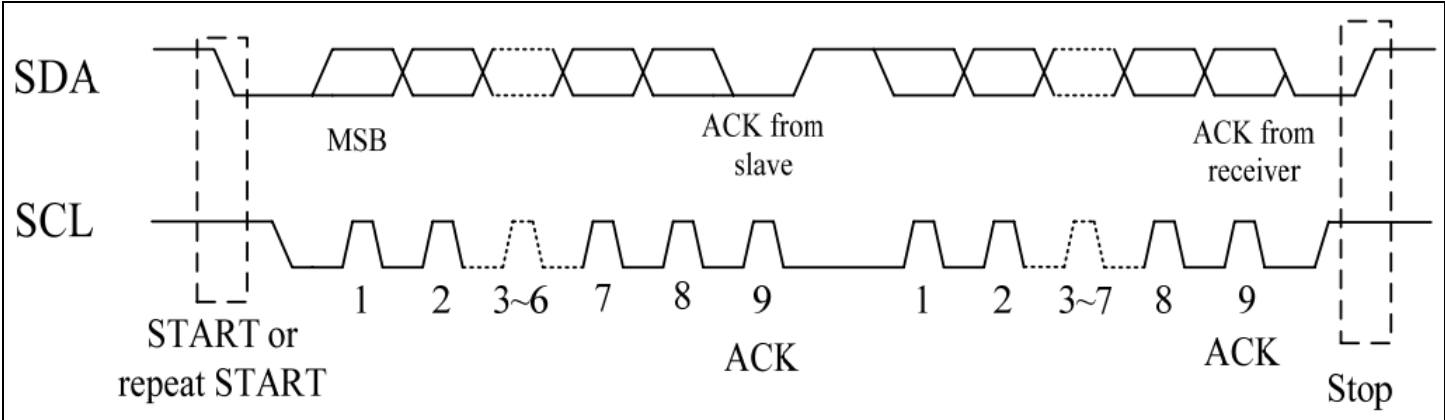## Power ON/OFF Sequence

## Enter/Exit Standby Mode Sequence

[13]

Timing Characteristics – Capacitive Touch Panel
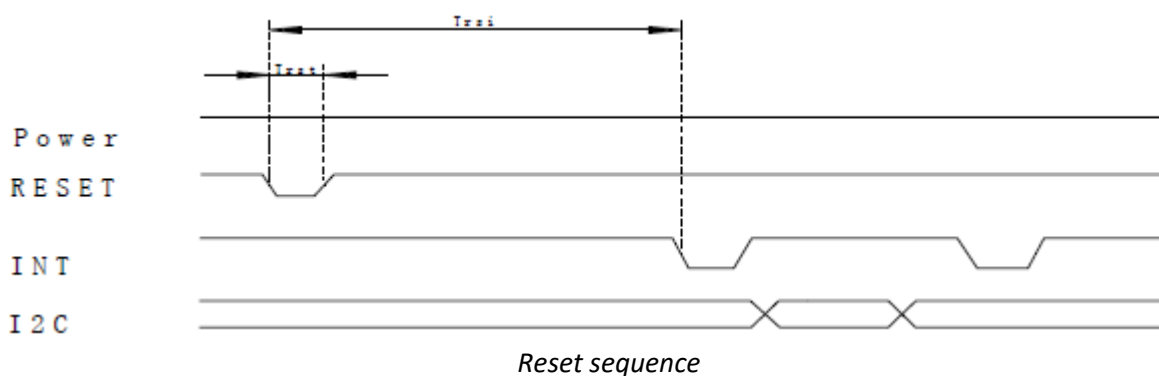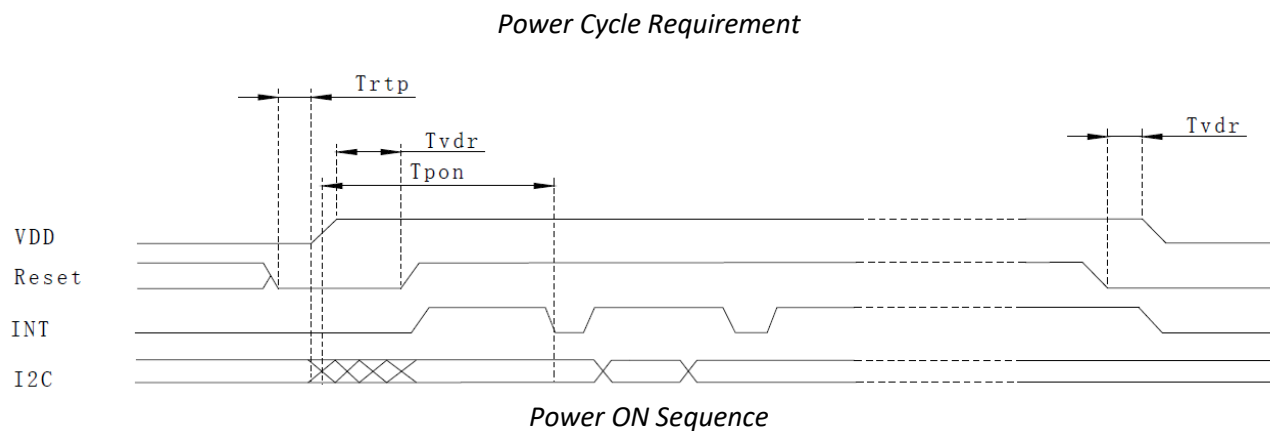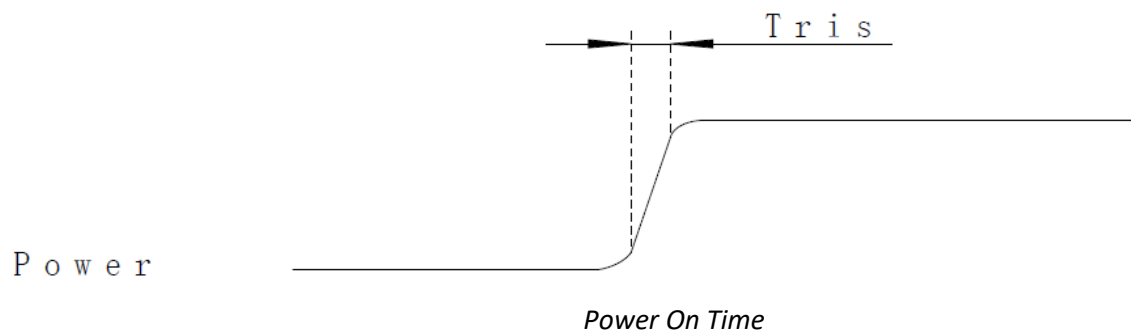
Data Transfer Format

Parameter	Min	Max	Unit
SCL Frequency	0	400	KHz
Bus free time between a STOP & START condition	1.3	-	µs
Hold time Repeated START condition	0.6	-	µs
Data Setup Time	100	-	ns
Setup time for a repeated START condition	0.6	-	µs
Setup time for a STOP condition	0.6	-	µs

I2C master write, slave read

I2C master read, slave write
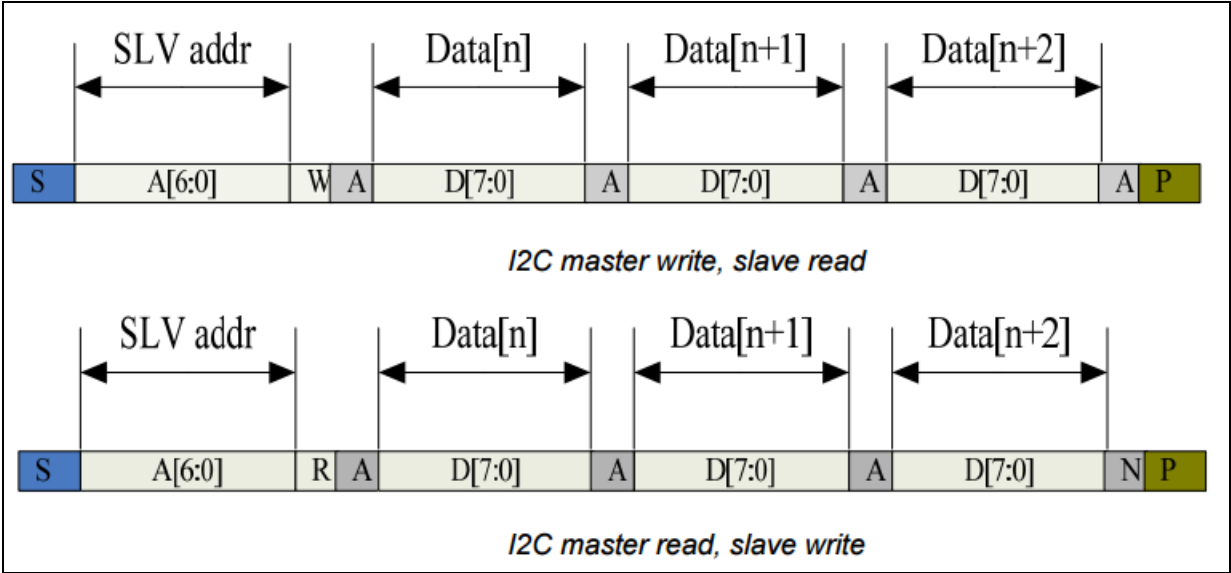
Power ON/Reset Sequence

Power On Time

Power Cycle Requirement

Power ON Sequence

Reset sequence

Parameter	Description	Min	Max	Unit
Tris	Rise time from $0.1V_{DD}$ to $0.9V_{DD}$	-	5	ms
Tpdt	Time of the voltage of supply being below 0.3V	5	-	ms
Trtp	Time of resetting to be low before powering on	100	-	µs
Tpon	Time to start reporting after power on	-	200	ms
Tvdr*	Reset time after applying V_{DD}	1	-	ms
Trsi	Time to start reporting after reset	-	200	ms
Trst*	Reset Time	1	-	ms

*If Reset is tied to V_{CC} data corruption can occur.

[15]

Interrupt trigger mode
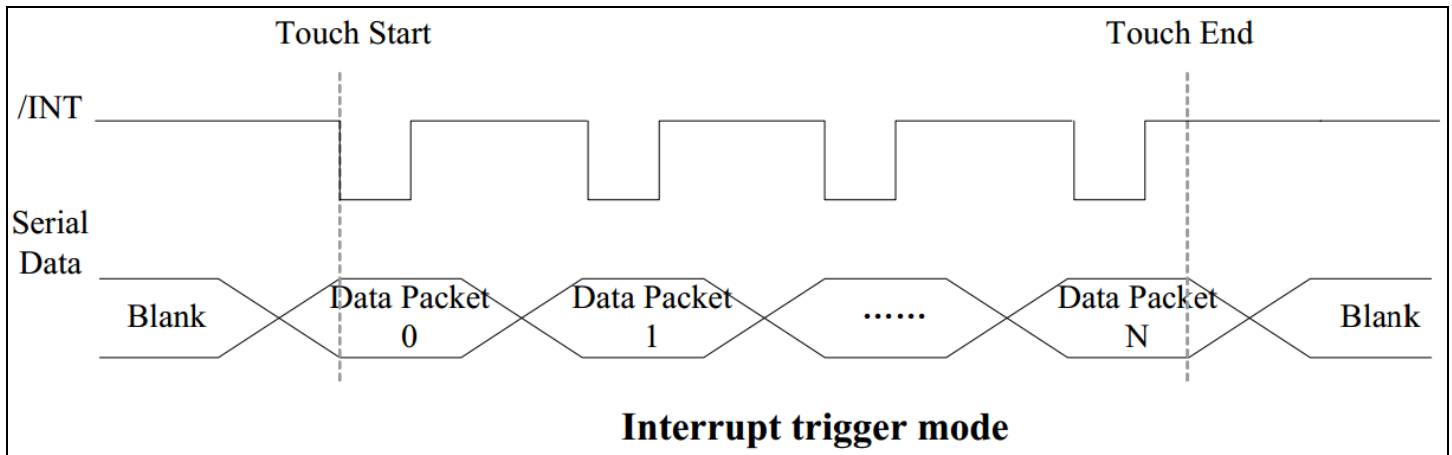
Sample code to read touch data:

```
i2c_start();
i2c_tx(0x70);          //Slave Address (Write)
i2c_tx(0x00);          //Start reading address
i2c_stop();

i2c_start();
i2c_tx(0x71);          //Slave Address (Read)
for(i=0x00;i<0x1F;i++)
{touchdata_buffer[i] = i2c_rx(1);}
i2c_stop();
```

Sample code to overwrite default register values:

```
i2c_start();
i2c_tx(0x70);          //Slave Address (Write)
i2c_tx(0xA4);          //ID_G_Mode
i2c_tx(0x01);          //Disable interrupt status to host
i2c_stop();
```

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 -> 70°C, 60min = 1 Cycle for 20 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-50Hz, 5G in each of 3 directions X, Y, Z For 30 minutes each direction	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.

Precautions for using LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms