

Product Specification

NHD-7.0-800480AF-LSXP-CTP

IPS TFT Liquid Crystal Display

| | |
|----------------|--------------------------------------|
| NHD- | Newhaven Display |
| 7.0- | 7.0" Diagonal |
| 800480- | 800x480 pixels |
| AF- | Model |
| L- | LVDS Interface |
| S- | High Brightness, White LED Backlight |
| X- | TFT |
| P- | IPS, Wide Temperature |
| CTP- | Capacitive Touch Panel |

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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

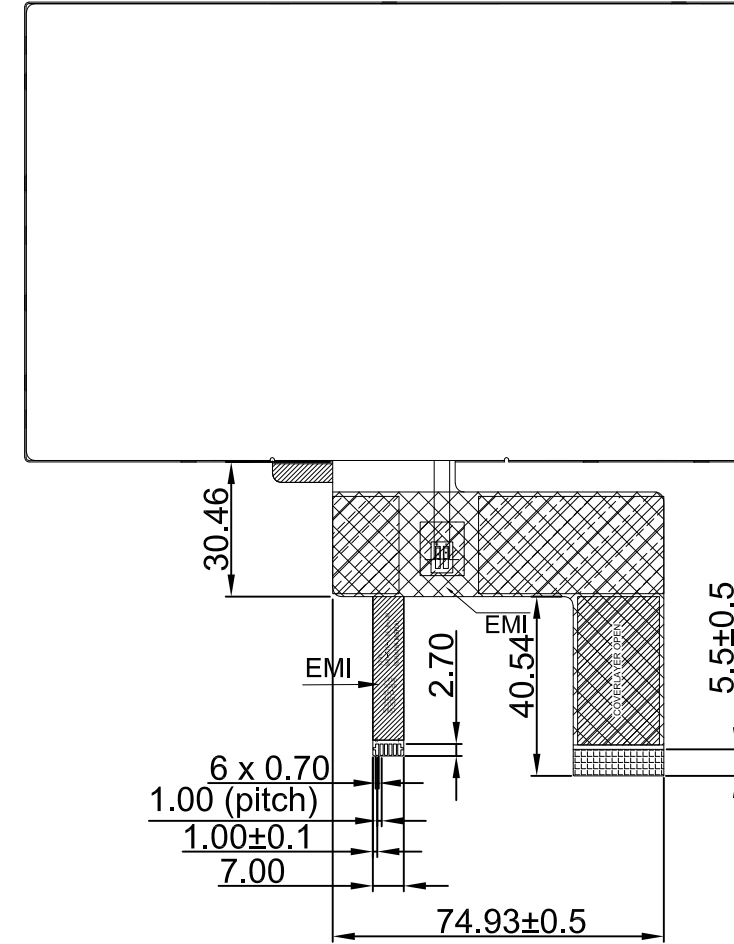
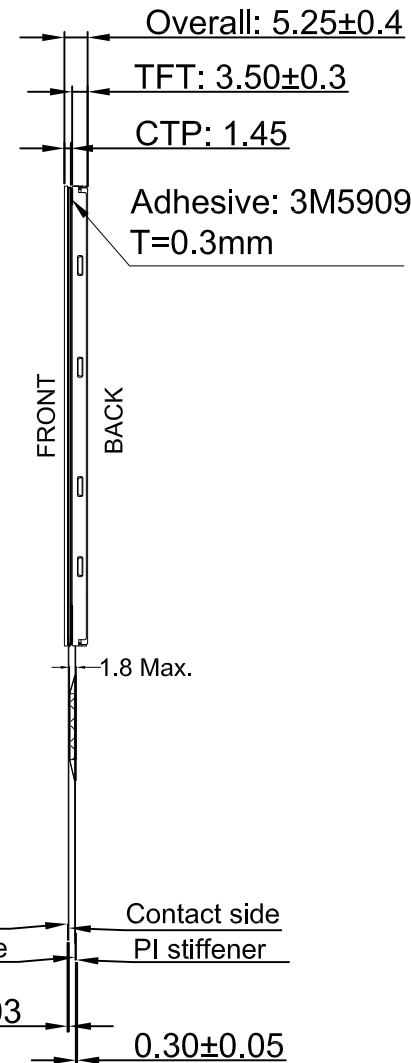
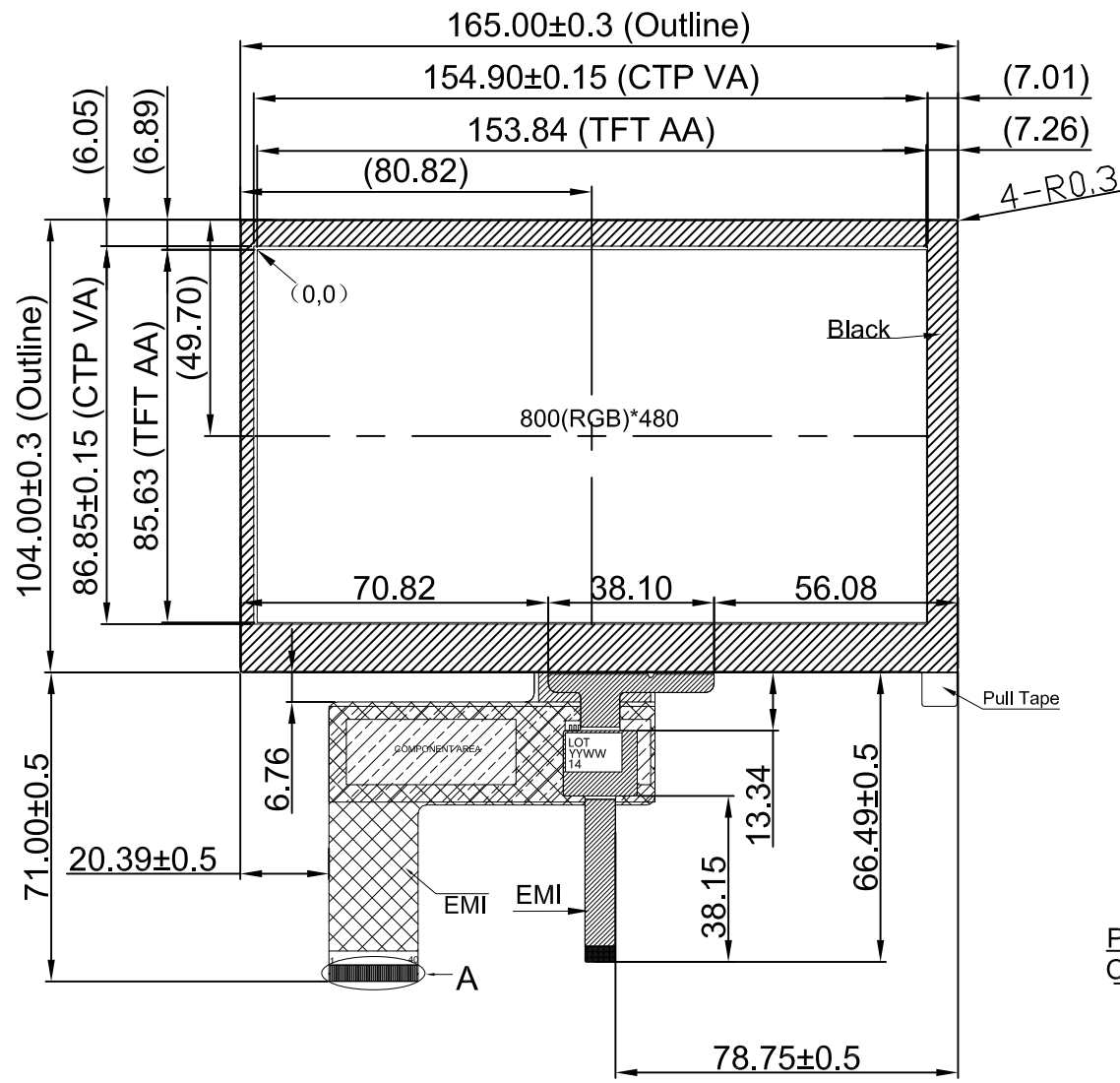
| Revision | Date | Description | Changed By |
|----------|------------|-----------------|------------|
| - | 10/09/2024 | Initial Release | KL |

Mechanical Drawing

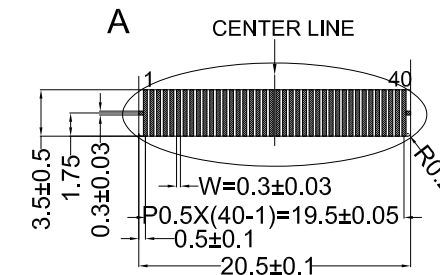
Newhaven Display

NHD-7.0-800480AF-LSXP-CTP
Date Code

Part Label (type/format may vary)



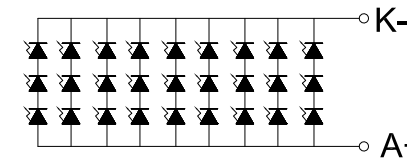
| PIN | SYMBOL |
|-----|----------|
| 1 | NC |
| 2 | VDD |
| 3 | VDD |
| 4 | NC |
| 5 | GRB |
| 6 | DISP |
| 7 | GND |
| 8 | RX0N |
| 9 | RX0P |
| 10 | GND |
| 11 | RX1N |
| 12 | RX1P |
| 13 | GND |
| 14 | RX2N |
| 15 | RX2P |
| 16 | GND |
| 17 | DCLKN |
| 18 | DCLKP |
| 19 | GND |
| 20 | RX3N |
| 21 | RX3P |
| 22 | GND |
| 23 | NC |
| 24 | NC |
| 25 | GND |
| 26 | NC |
| 27 | BIST_EN |
| 28 | LVDS_SEL |
| 29 | NC |
| 30 | GND |
| 31 | NC |
| 32 | NC |
| 33 | HDIR |
| 34 | VDIR |
| 35 | NC |
| 36 | LED-K |
| 37 | LED-K |
| 38 | NC |
| 39 | LED-A |
| 40 | LED-A |



| PIN | DEFINE |
|-----|------------|
| 1 | VDD 3.3V |
| 2 | GND |
| 3 | SCL 3.3V |
| 4 | SDA 3.3V |
| 5 | INT 3.3V |
| 6 | RESET 3.3V |

Product Description: 7.0" 800x480 IPS TFT w/ Capacitive Touch Panel

1. Driver IC: ST7277 TFT, FT5426G CTP
2. Interface: LVDS
3. Power Requirement: 3.3V TFT, 9.3V/180mA Backlight
4. Optical Features: Normally Black, Transmissive, 850cd/m²
5. Recommended FFC Connector:
TFT: 40pin 0.5mm pitch; Ex. Molex 54104-4031
CTP: 6pin 1.0mm pitch; Ex. Molex 52271-0679
6. Key Features: EMI Shielded FPC, 10-Point Multitouch



| | | |
|---|--|---------------------------|
| Standard Tolerance: (Unless otherwise specified) Linear: ±0.3mm | | |
| | Drawing/Part Number: NHD-7.0-800480AF-LSXP-CTP | Revision: - |
| Unless otherwise specified: • Dimensions are in Millimeters • Third Angle Projection | Drawn By: K. Lewis | Approved By: K. Lewis |
| | Drawn Date: 10/09/2024 | Approved Date: 10/09/2024 |
| This drawing is solely the property of Newhaven Display International, Inc. The information it contains is not to be disclosed, reproduced or copied in whole or part without written approval from Newhaven Display. | | |

Pin Description

TFT:

| Pin No. | Symbol | Connection | Function Description |
|---------|----------|--------------|--|
| 1 | NC | - | No connection |
| 2-3 | VDD | Power Supply | Supply voltage for LCD (+3.3V) |
| 4 | NC | - | No connection |
| 5 | GRB | MPU | Active LOW Reset signal (normally pull high) |
| 6 | DISP | MPU | Active LOW Standby signal (normally pull high) |
| 7 | GND | Power Supply | Power Ground |
| 8 | RX1N | MPU | -LVDS differential data input CH0 |
| 9 | RX0P | MPU | +LVDS differential data input CH0 |
| 10 | GND | Power Supply | Ground |
| 11 | RX1N | MPU | -LVDS differential data input CH1 |
| 12 | RX1P | MPU | +LVDS differential data input CH1 |
| 13 | GND | Power Supply | Ground |
| 14 | RX2N | MPU | -LVDS differential data input CH2 |
| 15 | RX2P | MPU | +LVDS differential data input CH2 |
| 16 | GND | Power Supply | Ground |
| 17 | DCLKN | MPU | -LVDS differential Clock |
| 18 | DCLKP | MPU | +LVDS differential Clock |
| 19 | GND | Power Supply | Ground |
| 20 | RX3N | MPU | -LVDS differential data input CH3 |
| 21 | RX3P | MPU | +LVDS differential data input CH3 |
| 22 | GND | Power Supply | Ground |
| 23 - 24 | NC | - | No connection |
| 25 | GND | Power Supply | Ground |
| 26 | NC | - | No connection |
| 27 | BIST_EN | MPU | Built in Self-Test BIST = H: Self-Test Enabled. BIST = L: Normal Operation (Default) |
| 28 | LVDS_SEL | MPU | Data Input Format: LVDS = L: 3 Lane (6-bit) Input. LVDS = H: 4 Lane (8-bit) Input (Default) |
| 29 | NC | - | No connection |
| 30 | GND | Power Supply | Ground |
| 31-32 | NC | - | No connection |
| 33 | HDIR | MPU | Horizontal Scan Direction: HDIR = H: Normal Scan (Default). HDIR = L: Reverse Scan |
| 34 | VDIR | MPU | Vertical Scan Direction: VDIR = H: Normal Scan (Default). VDIR = L: Reverse Scan |
| 35 | NC | - | No connection |
| 36-37 | LED-K | Power Supply | Backlight Cathode (Ground) |
| 38 | NC | - | No connection |
| 39-40 | LED-A | Power Supply | Backlight Anode (180mA @ 9.3V) |

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

Capacitive Touch Panel:

| Pin No. | Symbol | External Connection | Function Description |
|---------|-----------------|---------------------|--|
| 1 | V _{DD} | Power Supply | Supply voltage for Logic (3.3V) |
| 2 | V _{SS} | Power Supply | Ground |
| 3 | SCL | MPU | Serial I2C Clock (Requires 4.7kΩ pull-up resistor) |
| 4 | SDA | MPU | Serial I2C Data (Requires 4.7kΩ pull-up resistor) |
| 5 | /INT | MPU | Interrupt signal from touch panel module to host |
| 6 | /RESET | MPU | Active LOW Reset signal |

Recommended CTP connector: Recommended connector: 6pin 1.0mm pitch FFC. Molex P/N 52271-0679



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 for LCD | V _{DD} | - | 3.1 | 3.3 | 3.6 | V |
| Supply Current for LCD | I _{DD} | V _{DD} = 3.3V | 45 | 90 | 135 | mA |
| LVDS Differential input high Threshold voltage | R _X VTH | R _X VCM = 1.2V | - | - | 100 | mV |
| LVDS Differential input low Threshold voltage | R _X VTL | | -100 | - | - | mV |
| LVDS Differential input common mode voltage | R _X VCM | - | VID /2 | - | 2.4- VID /2 | V |
| LVDS Differential voltage | VID | - | 200 | - | 600 | mV |
| Backlight Supply Current | I _{LED} | - | - | 180 | - | mA |
| Backlight Supply Voltage | V _{LED} | I _{LED} = 180 mA T _{OP} = 25° C | 8.3 | 9.3 | 10.2 | V |
| Backlight Lifetime* | - | | 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} | - | 2.7 | 3.3 | 3.6 | V |
| Supply Current – Operating | I _{DD} | - | 10 | 20.5 | 36 | 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} | - | 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 | $\phi Y+$ | - | - | 85 | - | ° |
| | Bottom | $\phi Y-$ | | - | 85 | - | ° |
| | Left | $\theta X-$ | | - | 85 | - | ° |
| | Right | $\theta X+$ | | - | 85 | - | ° |
| Contrast Ratio | | CR | - | 800 | 1000 | - | - |
| Luminance | | L_V | $I_{LED} = 180 \text{ mA}$ | 680 | 850 | - | cd/m^2 |
| Response Time (Rise + Fall) | | $T_R + T_F$ | $T_{OP} = 25^\circ\text{C}$ | - | 25 | - | ms |
| Chromaticity | Red | X_R | - | 0.556 | 0.606 | 0.656 | - |
| | | Y_R | - | 0.297 | 0.347 | 0.397 | - |
| | Green | X_G | - | 0.274 | 0.324 | 0.374 | - |
| | | Y_G | - | 0.547 | 0.597 | 0.647 | - |
| | Blue | X_B | - | 0.076 | 0.126 | 0.176 | - |
| | | Y_B | - | 0.084 | 0.134 | 0.184 | - |
| | White | X_W | - | 0.241 | 0.291 | 0.341 | - |
| | | Y_W | - | 0.295 | 0.345 | 0.36 | - |

Driver/Controller Information

TFT Display:

Built-in ST7277 Source Driver: <https://support.newhavendisplay.com/hc/en-us/articles/22014397027991-ST7277>

Capacitive Touch Panel:

Built-in FT5426G Controller: <https://support.newhavendisplay.com/hc/en-us/articles/17688730921367-FT5426G>



Capacitive Touch Panel Registers

| Register No. | Access | Register Name | Bits | Value | Description |
|--------------|--------|-------------------|-------|----------|---|
| 01h | RO | Gesture ID | [7:0] | 1C | Swipe Up |
| | | | | 14 | Swipe Down |
| | | | | 10 | Swipe Left |
| | | | | 18 | Swipe Right |
| | | | | 48 | Zoom In |
| | | | | 49 | Zoom Out |
| | | | | 00 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 | Put Down |
| | | | | 1 | Put Up |
| | | | | 2 | Contact |
| | | | | 3 | 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 |

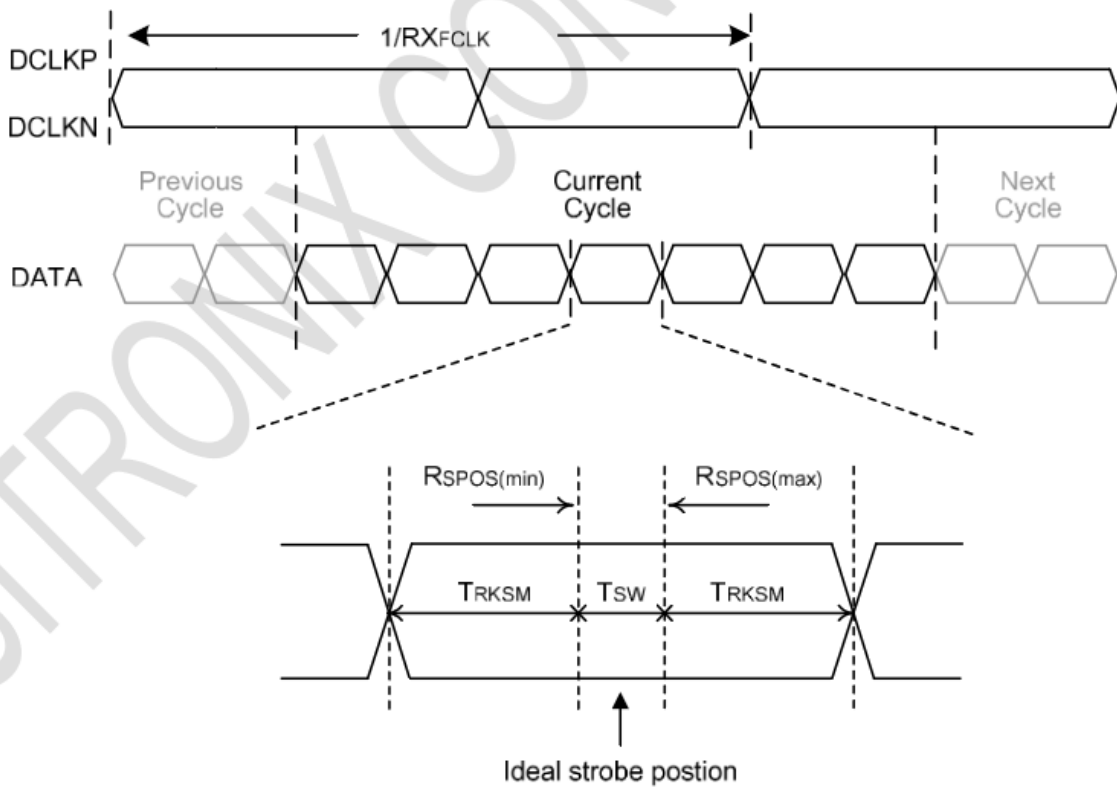
| | | | | | |
|-----|----|--------------------|-------|--------|---|
| 3Dh | RO | TOUCH10_Weight | [7:0] | 00-FFh | Touch Weight |
| 3Eh | RO | TOUCH10_Misc | [3:0] | 00-0Fh | Touch Area |
| A1h | RO | ID_G_LIB_VERSION_H | [7:0] | 00-FFh | App library version high-byte Default: 0 |
| A2h | RO | ID_G_LIB_VERSION_L | [7:0] | 00-FFh | App library version low-byte Default: 1h |
| A3h | RO | ID_G_CHIPER_HIGH | [7:0] | 00-FFh | Chip Vendor ID Default: 54 |
| A6h | RO | ID_G_FIRMID | [7:0] | 00-FFh | Firmware ID Number Default: 14 |
| A8h | RO | ID_G_VENODRID | [7:0] | 00-FFh | CTPM Vendor's Chip ID Default: 79 |

Timing Characteristics

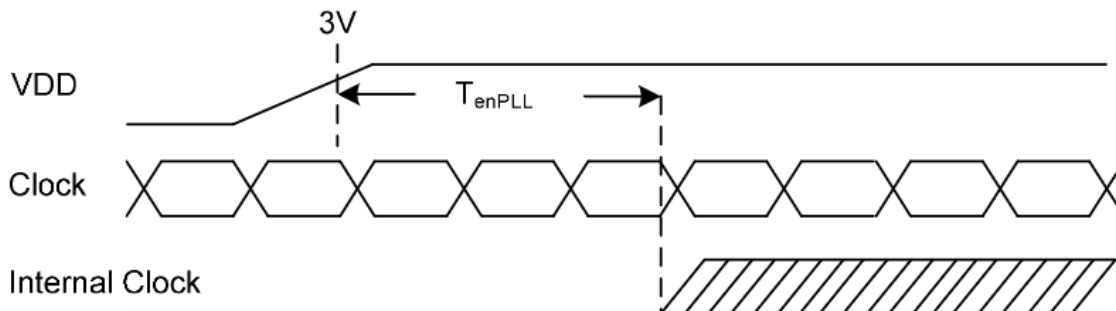
| Parameter | Symbol | Spec | | | Unit | Condition |
|------------------------|--------------------|------|-----------------------------|------|------|-----------|
| | | Min. | Typ. | Max. | | |
| Clock frequency | R _{XFCLK} | 23 | 25 | 27 | MHz | - |
| Input data skew margin | T _{RSKM} | 400 | - | - | pS | - |
| Clock high time | T _{LVCH} | - | 4/(7 * R _{XFCLK}) | - | nS | - |
| Clock low time | T _{LVCL} | - | 3/(7 * R _{XFCLK}) | - | nS | - |
| PLL wake-up time | T _{emPLL} | - | - | 150 | μS | - |

| Parameter | Symbol | Spec | | | Unit | Condition |
|----------------------|--------|------|------|------|------|-----------|
| | | Min. | Typ. | Max. | | |
| Modulation Frequency | SSCMF | - | - | 100 | KHz | - |
| Modulation Rate | SSCMR | - | - | ±3 | % | - |

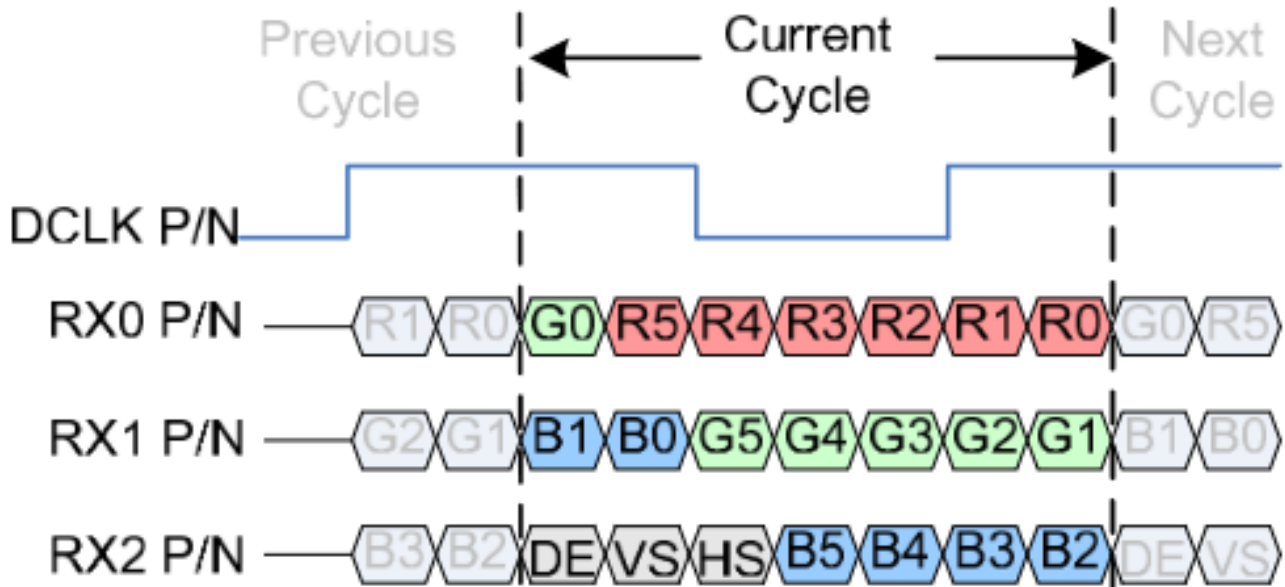
LVDS input Timing



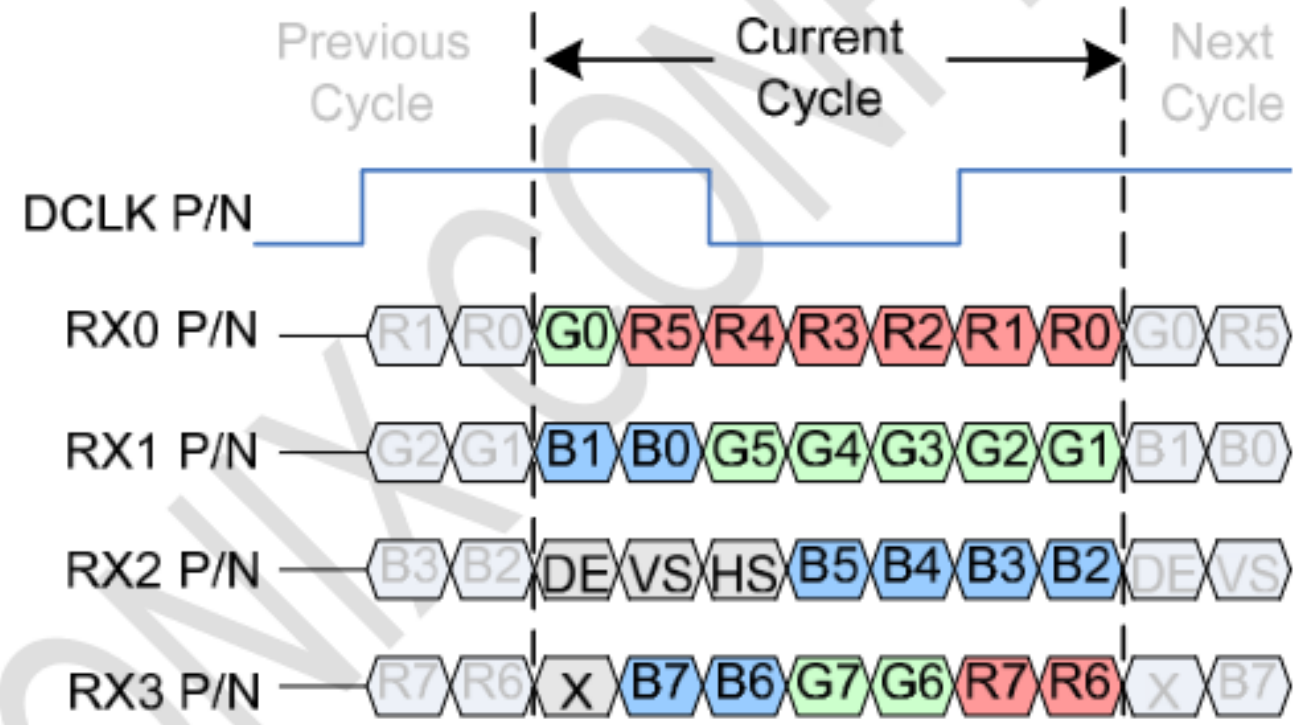
RRKSM : Receiver strobe margin
 RSPOS : Receiver strobe position
 T_{sw} : Strobe width (internal DATA sampling window)



3 Lane VESA Mode Color Bit Map

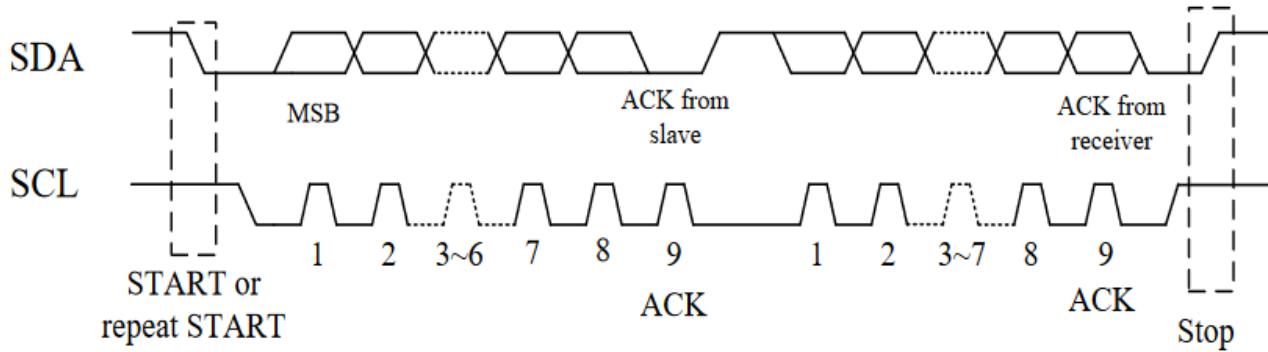


4 Lane VESA Data Format Color Bit Map



Timing Characteristics- Capacitive Touch Panel

Data Transfer Format



| Parameter | Min | Max | Unit |
|--|-----|-----|------|
| SCL frequency | 0 | 400 | KHz |
| Bus free time between a STOP and START condition | 1.3 | | us |
| Hold time (repeated) START condition | 0.6 | | us |
| Data setup time | 100 | | ns |
| Setup time for a repeated START condition | 0.6 | | us |
| Setup Time for STOP condition | 0.6 | | us |

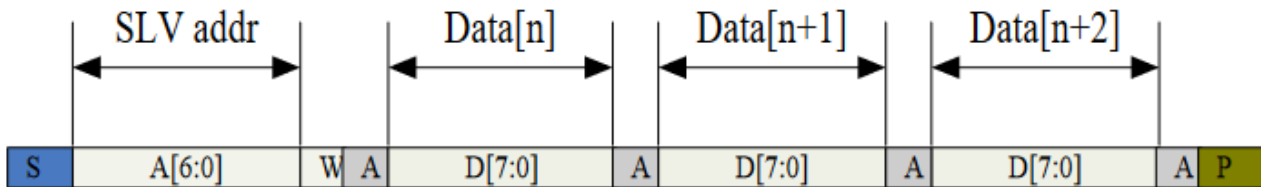


Figure 2-5 I2C master write, slave read

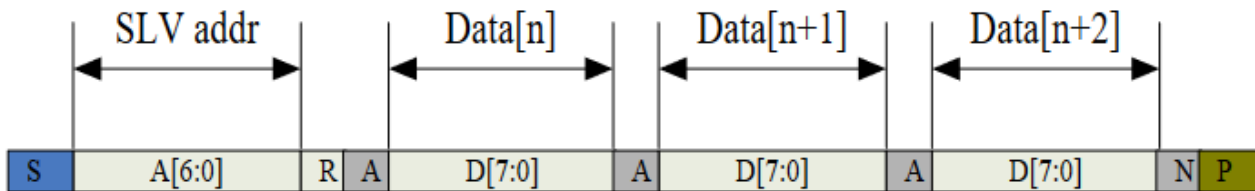


Figure 2-6 I2C master read, slave write

Power ON/Reset Sequence

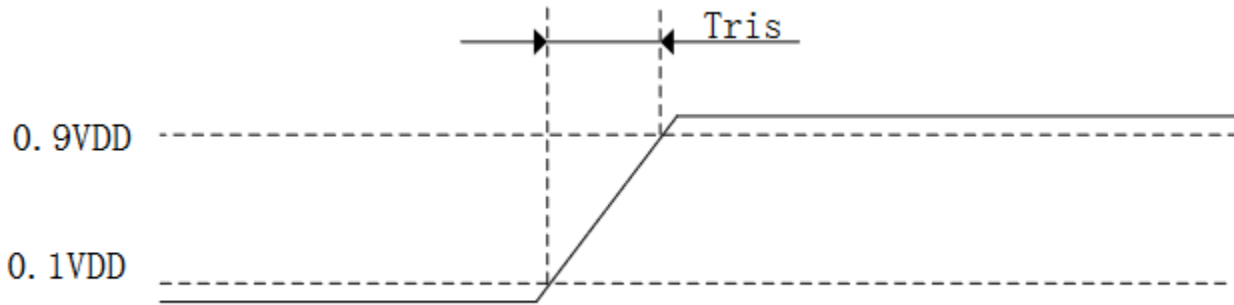
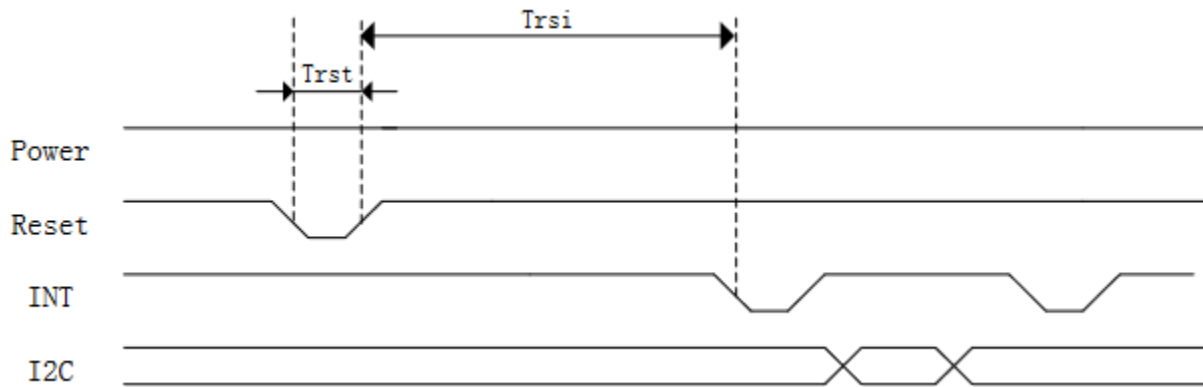
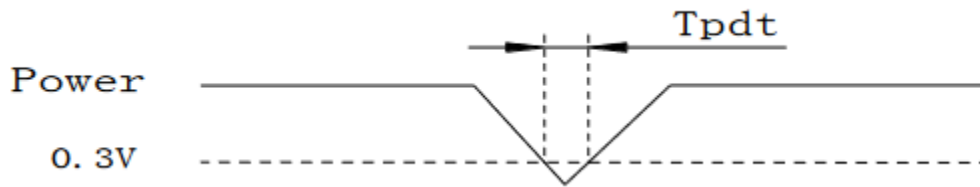


Figure 3-3 Power on time



| Parameter | Description | Min | Max | Units |
|-----------|--|-----|-----|---------|
| T_{ris} | Rise time from 0.1VDD to 0.9VDD | -- | 5 | ms |
| T_{pdT} | Time of the voltage of supply being below 0.3V | 5 | -- | ms |
| T_{rtp} | Time of resetting to be low before powering on | 100 | -- | μ s |
| T_{ivd} | Delay time of VDD powering on after IOVCC | 10 | -- | μ s |
| T_{vdr} | Reset time after VDD powering on | 1 | -- | ms |
| T_{rsi} | Time of starting to report point after resetting | 200 | -- | ms |
| T_{rst} | Reset time | 1 | -- | ms |

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 , 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 Storage | 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,60 min =20 cycles | |
| Vibration test | Endurance test applying vibration to simulate transportation and use. | Frequency range:10Hz~50Hz Acceleration of gravity:5G X, Y, Z 30 min for each direction | 3 |
| Static electricity test | Endurance test applying electric static discharge. | Air: ±8kV ; Contact: ±4kV For 5 times each. | |

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.