

DISPLAY Elektronik GmbH

DATA SHEET

EPD MODULE

DEE 7581024A-W

6,0"

E-Paper Display

Product Specification

Ver.: 3

28.11.2017

| Version | Content | Date | Producer |
|----------------|--|-------------|-----------------|
| 0 | New release | 26.06.2013 | YQ |
| 1 | Change "Mark and Bar Code definition" | 18.05.2016 | YQ |
| 2 | Change "Mark and Bar Code Definition" or other | 31.05.2016 | LL |
| 3 | Update dimension of EPL and PS | 28.11.2017 | JQ |
| | | | |
| | | | |

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1 General Description

DEE 7581024A-W is an Active Matrix Electrophoretic Display (AM EPD), High-Resolution AM TFT Black/White display module which can be used in portable electronic devices, such as E-book Reader.

The module is a TFT-array driving electrophoretic display, with integrated circuits including source and gate drivers.

The resolution of the module is 1024×758 (XGA) , and the active area is 6 inch diagonal.

2 Features

- ◆ 1024×758 display
- ◆ White Reflectance above 35% (0 minute)
- ◆ Contrast Ratio above 8:1 (0 minute)
- ◆ 3:4 aspect ratio
- ◆ Wide viewing angle
- ◆ Ultra low power consumption
- ◆ Reflective mode
- ◆ Bi -stable display
- ◆ Commercial temperature range
- ◆ Landscape, portrait modes
- ◆ Hard-coat antiglare display surface

3 Application

E-book reader.

4 Input/output pin assignment

| No. | Pin Name | Description |
|-----|----------|-------------------------------------|
| 1 | VNEG | Negative power supply source driver |
| 2 | VGL | Negative power supply gate driver |
| 3 | VSS | Ground |
| 4 | NC | NO Connection |
| 5 | NC | NO Connection |
| 6 | VDD | Digital power supply drivers |
| 7 | VSS | Ground |
| 8 | CLK | Clock source driver |
| 9 | VSS | Ground |
| 10 | LE | Latch enable source driver |
| 11 | OE | Output enable source driver |
| 12 | SPH | Start pulse source driver |
| 13 | D0 | Data signal source driver |
| 14 | D1 | Data signal source driver |
| 15 | D2 | Data signal source driver |
| 16 | D3 | Data signal source driver |
| 17 | D4 | Data signal source driver |
| 18 | D5 | Data signal source driver |
| 19 | D6 | Data signal source driver |
| 20 | D7 | Data signal source driver |
| 21 | VCOM | Common connection |
| 22 | NC | NO Connection |
| 23 | NC | NO Connection |
| 24 | NC | NO Connection |
| 25 | NC | NO Connection |
| 26 | VSS | Ground |
| 27 | GMODE1 | Output mode selection gate driver |
| 28 | CPV | Shift clock input |
| 29 | STV | Start pulse gate driver |
| 30 | NC | NO Connection |
| 31 | VBORDER | Border connection |
| 32 | VSS | Ground |
| 33 | VPOS | Positive power supply source driver |
| 34 | VGH | Positive power supply gate driver |

5 Electrical Characteristics

5.1 Module interface description

This module can be driven by ASIC AVT6201A Timing Controller(T-Con).

5.2 Module DC characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------------------|--------|------------|-------|----------|-------|------|
| Signal Ground | VSS | | - | 0 | - | V |
| Logic Voltage Supply | VDD | | 3.0 | 3.3 | 3.6 | V |
| | IVDD | VDD=3.3V | - | 2.0 | - | mA |
| Gate Positive Supply | VGH | | 21 | 22 | 23 | V |
| | IVGH | VGH=22V | - | 0.6 | - | mA |
| Gate Negative Supply | VGL | | -21 | -20 | -19 | V |
| | IVGL | VGL=-20V | - | -3.0 | - | mA |
| Source Positive Supply | VPOS | | 14.6 | 15 | 15.4 | V |
| | IPOS | VPOS=15V | - | 30 | - | mA |
| Source Negative Supply | VNEG | | -15.4 | -15 | -14.6 | V |
| | INEG | VNEG=-15V | - | -30 | - | mA |
| Asymmetry Source | VASYM | VPOS+VNEG | -80 | 0 | 80 | mV |
| Common Voltage | VCOM | | -2.5 | Adjusted | -1.5 | V |
| | ICOM | | - | -2.0 | - | mA |
| Standby Power Module | PSTBY | | | - | 0.4 | mW |
| Typical Power Module | PTYP | | - | 600 | 1200 | mW |
| Operating Temperature | | | 0 | | 50 | °C |
| Operating Relative Humidity | RHop | | 0 | | 70 | % |
| Storage Temperature | | | -20 | - | 70 | °C |
| Storage Relative Humidity | RHst | | 30 | | 60 | % |
| Maximum Image Update Time at 25°C | | | | 960 | 1200 | ms |

Notes:

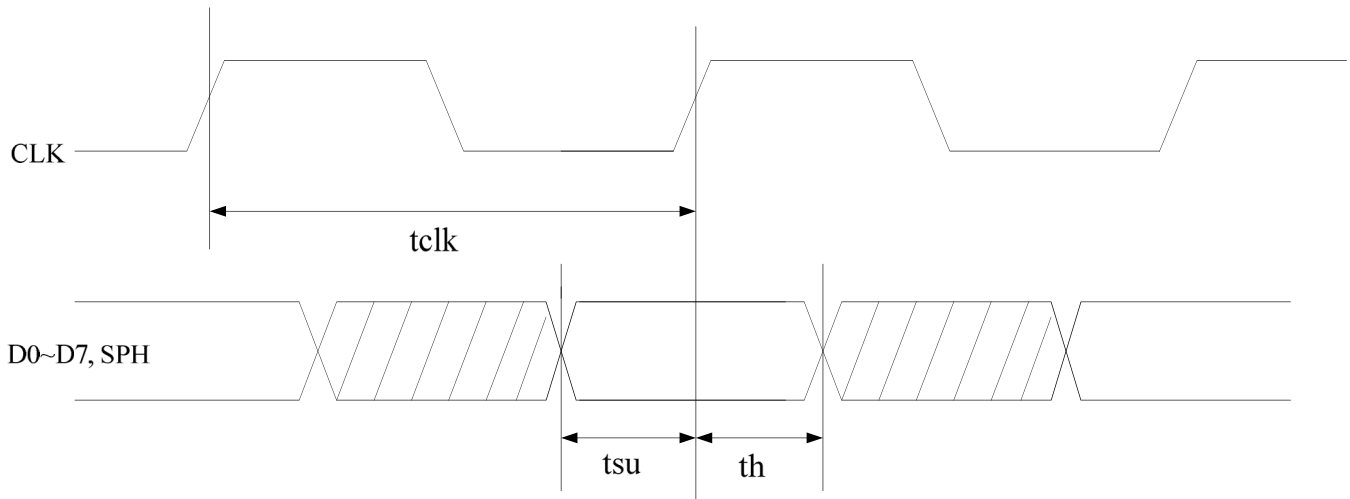
1. The maximum power and maximum current are specified for the worst case power consumption.
2. The typical power is measured when “typical images” are displayed.
3. The standby power is the consumed power when the module controller is in standby mode.
4. The listed electrical/optical characteristics are only guaranteed under the controller & waveform provided by OED.

5.3 Module AC characteristics

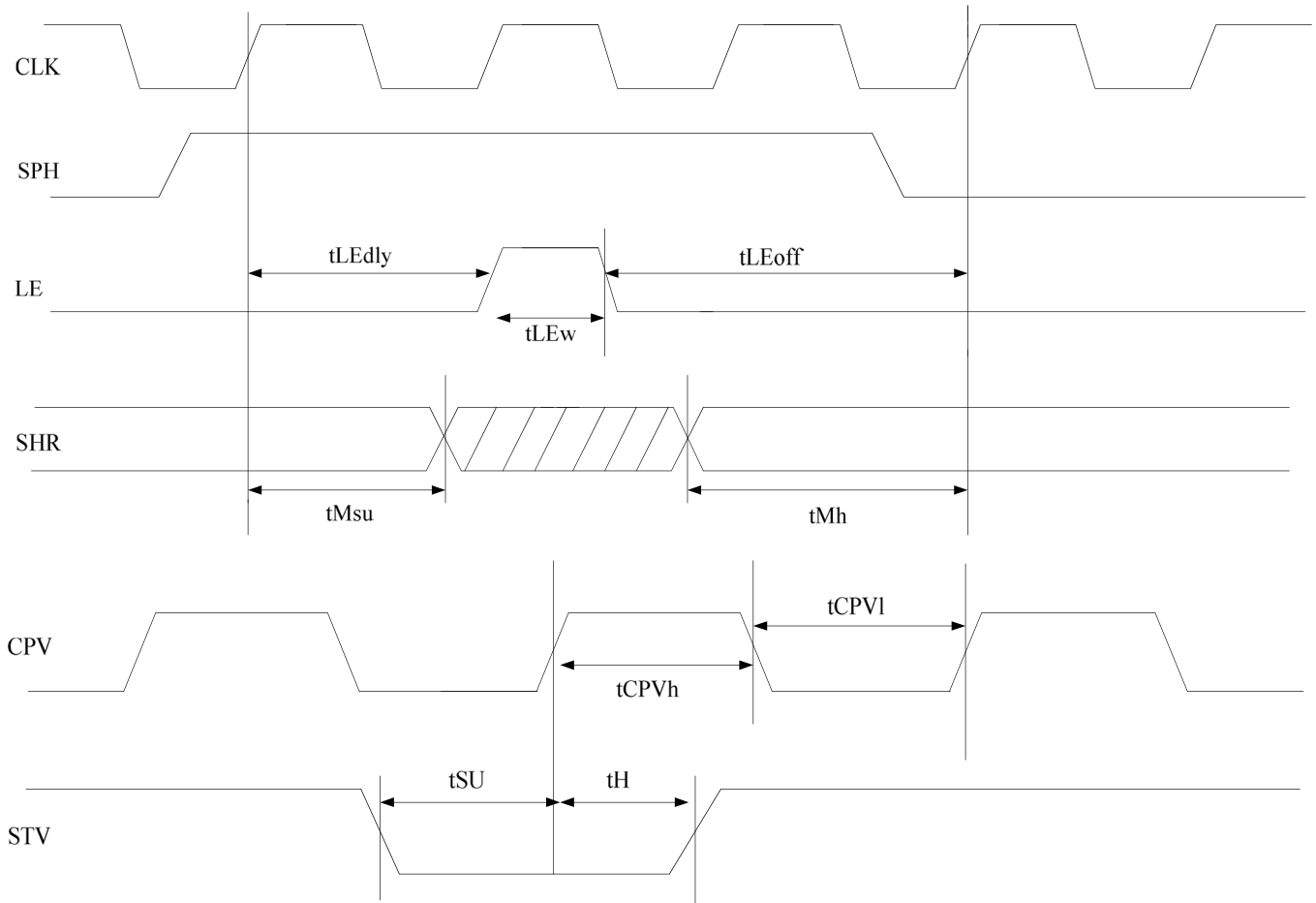
Note: VDD=3.0V to 3.6V, unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Unit | App Pin |
|---------------------------|--------|------|------|------|------|----------------|
| Clock frequency | fcpv | | | 200 | kHz | CPV |
| Clock CPV high time | tCPVh | 0.5 | - | - | us | |
| Clock CPV low time | tCPVl | 0.5 | - | - | us | |
| Data setup time | tSU | 100 | - | - | ns | CPV STV |
| Data hold time | tH | 300 | - | - | ns | |
| Clock CLK cycle time | tclk | 40 | - | - | ns | Below table |
| D0 .. D7, SPH setup time | tsu | 8 | - | - | ns | |
| D0 .. D7, SPH hold time | th | 8 | - | - | ns | |
| LE on delay time | tLEdly | 40 | - | - | ns | |
| LE high-level pulse width | tLEw | 40 | - | - | ns | |
| LE off delay time | tLEoff | 40 | - | - | ns | |
| SHR setup time | tMsu | 100 | - | - | ns | |
| SHR hold time | tMh | 10 | - | - | ns | |

Clock & Data Timing



Output Latch/Control Signals

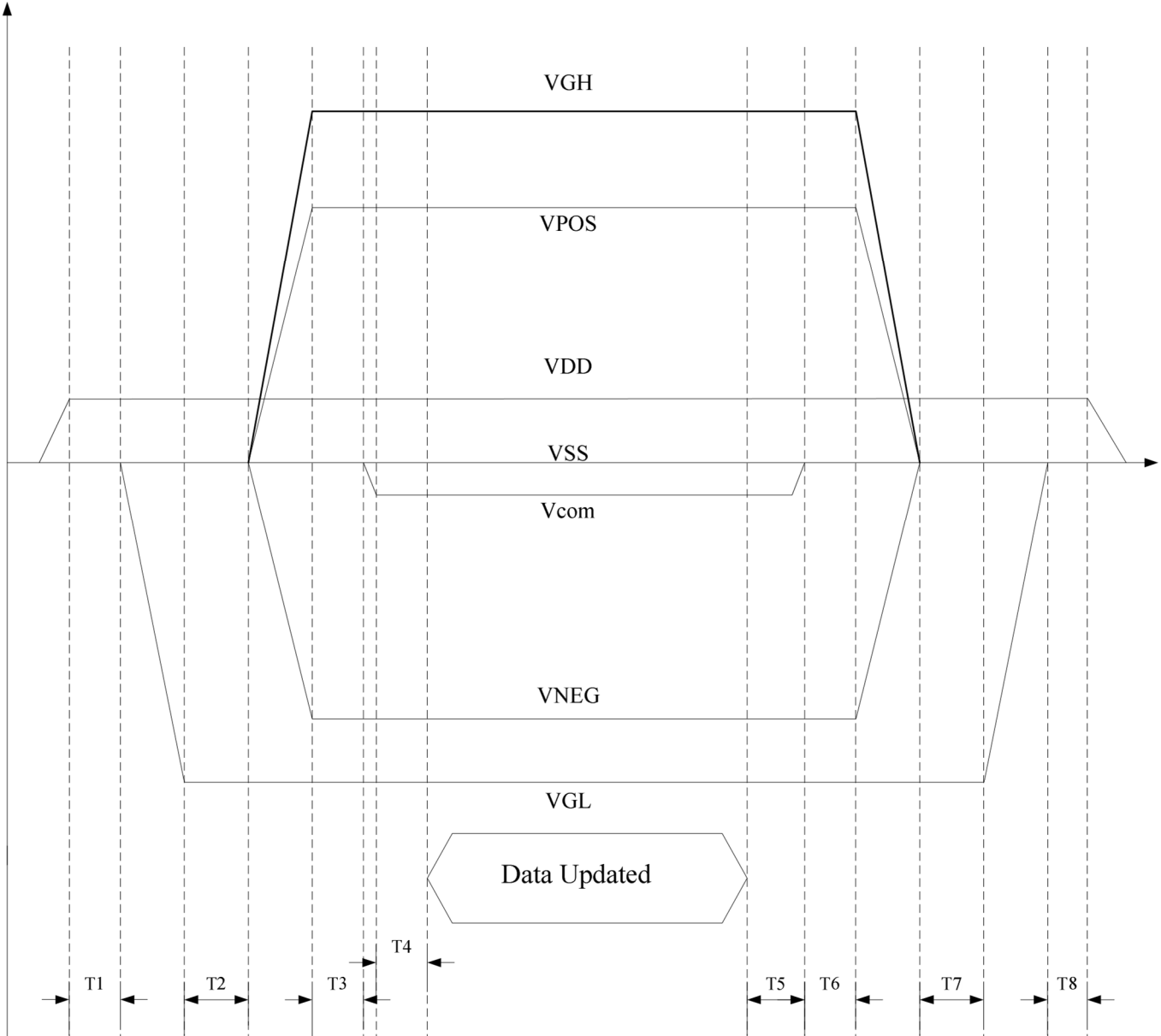


6 Power On/Off Sequence

To prevent the device from damage due to latch up, the power on/off sequence shown below must be followed.

When power on: VDD -> VGL -> VNEG/VGH/VPOS -> Vcom

When power off: Vcom -> VNEG/VGH/VPOS -> VGL -> VDD



| | Min | Max |
|----|-----|------|
| T1 | 1ms | - |
| T2 | 1ms | - |
| T3 | 1ms | - |
| T4 | 1ms | 20ms |
| T5 | 1ms | 20ms |
| T6 | 0ms | - |
| T7 | 0ms | - |
| T8 | 1ms | - |

7 Mechanical Specification

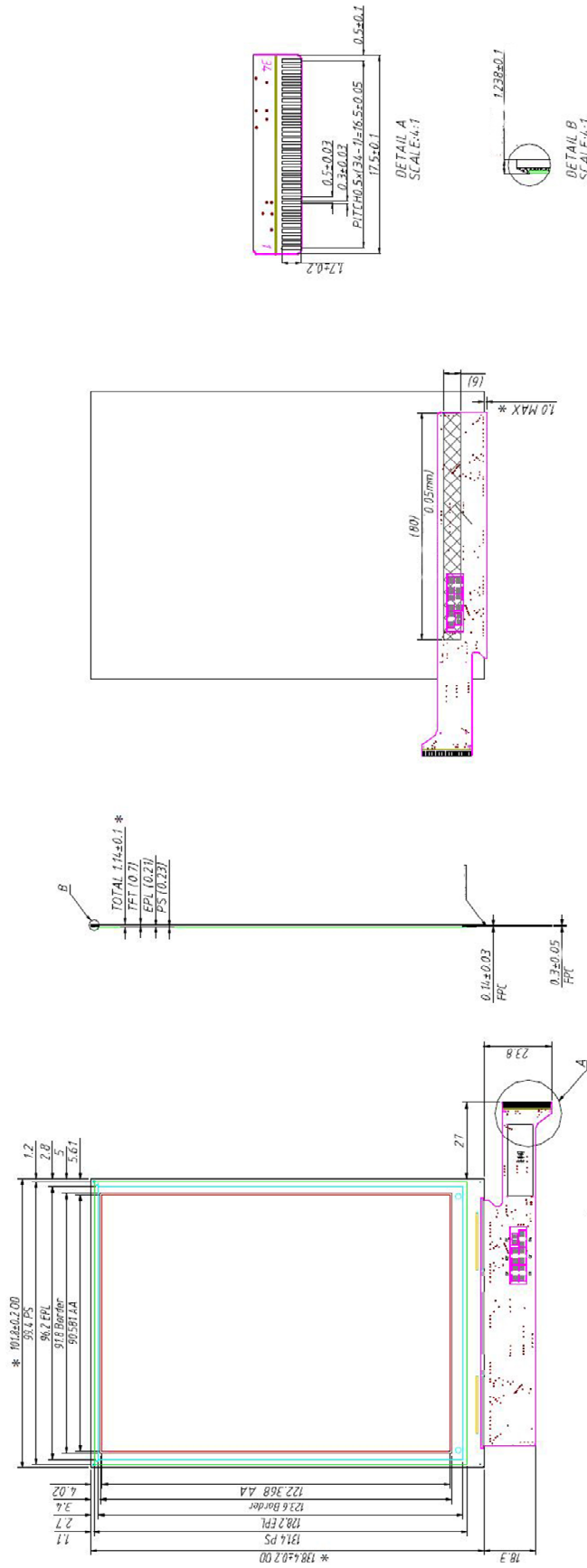
7.1 Dimension

| PARAMETER | VALUE | UNIT | Remark |
|------------------------|----------------------|------|--------|
| Display Resolution | 1024×758 | dots | |
| Active Area Dimensions | | | |
| Horizontal | 90.581 | mm | |
| Vertical | 122.368 | mm | |
| Screen Size | 6.0 (3:4 diagonal) | Inch | |
| Pixel Pitch | | | |
| Horizontal | 0.1195 | mm | |
| Vertical | 0.1195 | mm | |
| Pixel Configuration | Square | | |
| Overall Dimensions | | | |
| Width | 101.8 | mm | |
| Height | 138.4 | mm | |
| Thickness | 1.14 | mm | |
| Mass of the Module | 34.4 | g | |

7.2 Electrical Connector

| SERVICE | CONNECTOR | TYPE NUMBER | NUMBER OF PINS | MATING CONNECTOR |
|-----------|-----------|-------------|----------------|------------------|
| Interface | PANASONIC | / | 34 | FPC pitch=0.5mm |

7.3 Mechanical Drawing of EPD Module



- NOTES:**
1. Display mode 6.0" array for EPD;
 2. Drive IL: 8601 & 8708;
 3. Resolution: 1024 x 758
 4. Unspecified Tolerance: ± 0.20 ;
 5. Material conform to the RoHS standard;
 6. Mark "*" "for control DIM. Reference dimension in []
 7. Product thickness include PS+EPL+TFT.

8 Optical Characteristics

| Parameter | Conditions | Values | | | Units | Notes |
|---------------------|--------------|--------|------|------|-------|-------|
| | | Min. | Typ. | Max | | |
| White Reflectivity | 0 minute | 35 | | | % | |
| Contrast Ratio (CR) | 0 minute | 8:1 | - | - | | 1 |
| Image Update Time: | GC16(T=0°C) | - | 1500 | 1600 | ms | |
| | GC16(T=25°C) | - | 960 | 1200 | | |
| | GC16(T≥35°C) | - | 760 | 960 | | |
| | DU (T=0°C) | - | 500 | 540 | | |
| | DU(T≥20°C) | - | 300 | 360 | | |

(T_{amb}=25°C, f_v=50Hz. Measurements are made with Eye-One Pro Spectrophotometer.)

Notes:

1. CR=Surface Reflectance with all white pixel/Surface Reflectance with all black pixels;

9 Handling, Safety, and Environment Requirements

Warning

The display glass may break when it is dropped or bumped on a hard surface. Handle with care. Should the display break, do not touch the electrophoretic material. In case of contact with electrophoretic material, wash with water and soap.

Caution

The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.

Disassembling the display module can cause permanent damage and invalidates the warranty agreements.

Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged. Moreover the display is sensitive to static electricality and other rough environmental conditions.

10 Reliability test

| No. | TEST | CONDITION | METHOD | REMARK |
|-----|---|---|--------------------------|--|
| 1 | HighTemperature Operation | T = +50°C, RH = 30% for 168 hrs | IEC 60 068-2-2Bp | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 2 | Low-Temperature Operation | T = 0°C for 168 hrs | IEC 60 068-2-2Ab | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 3 | HighTemperature Storage | T = +70°C, RH=23% for 168 hrs | IEC 60 068-2-2Bp | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 4 | Low-Temperature Storage | T = -25°C for 168 hrs | IEC 60 068-2-1Ab | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 5 | High-Temperature, High-Humidity Operation | T = +40°C, RH = 90% for 168 hrs | IEC 60 068-2-3CA | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 6 | High Temperature, High- Humidity Storage | T = +60°C, RH=80% for 168hrs | IEC 60 068-2-3CA | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 7 | Thermal Shock | 1 cycle:[-25°C 30min]→[+70 °C 30 min] : 50 cycles | IEC 60 068-2-14 | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 8 | Package Vibration | 1.04G, Frequency: 10~500Hz Direction: X,Y,Z Duration: 1 hours in each direction | Full packed for shipment | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 9 | Package Drop Impact | Drop from height of 122 cm on concrete surface. Drop sequence: 1 corner, 3edges, 6 faces One drop for each | full packed for shipment | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 10 | Electrostatic Effect (non-operating) | Machine model +/- 250V, 0Ω, 200pF | IEC 62179, IEC 62180 | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |
| 11 | Stylus Tapping | POLYACETAL Pen:Top R0.8mm Load: 200gf;Speed:30times/min; Speed: 30times/min Total 13,500times, | | At the end of the test, electrical, mechanical, and optical specifications shall be satisfied. |

11 Block Diagram

