

Preliminary

Ver.: 0.10

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TFT LCD Specification

Model Name: TD070WGCB2

| |
|---------------------------|
| Customer Signature |
| |
| Date |
| |

This technical specification is subjected to change without notice.

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Record of Revision

| Rev | Issued Date | Description |
|------|--------------|--|
| 0.00 | Nov 28, 2003 | New Create |
| 0.10 | Dec 16, 2003 | Modify as below 1. Page 4: Weight Add 1. Page 15: Package Drawing |
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1. FEATURES

The 7.0"(17.8 cm) LCD module is an active matrix color TFT LCD module. LTPS (Low Temperature Poly Silicon) TFT technology is used. Horizontal drivers are built on the panel. NTSC and PAL format are compatible. Horizontal scan can be from left to right or from right to left and Vertical scan can be from up to down or from down to up.

2. GENERAL SPECIFICATIONS

| Item | Description | Unit |
|-----------------------------|---------------------|-----------|
| Display Size (Diagonal) | 7.0 (17.8) | Inch (cm) |
| Display Type | Transmissive | |
| Active Area (HxV) | 155.00 X 87.12 | mm |
| Number of Dots (HxV) | 854 X RGB X 480 | dot |
| Dot Pitch (HxV) | 0.0605 X 0.1815 | mm |
| Color Arrangement | RGB Stripe | |
| Color Numbers | 262K | |
| Outline Dimension (HxVxT) * | 166.4 x 106.3 x 8.5 | mm |
| Weight | 215+/-5 | g |

* Exclude protrusions

3. INPUT/OUTPUT TERMINALS

3.1 TFT LCD Panel

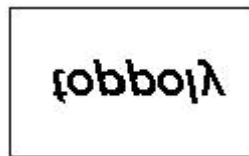
Recommend Connector Type: OMRON XF2H-4015-1LW

| Pin | Symbol | Description | Remark |
|-----|--------|---------------------------|--------|
| 1 | VDD | Power Supply: +3.3V | |
| 2 | VDD | Power Supply: +3.3V | |
| 3 | VDD | Power Supply: +3.3V | |
| 4 | VDD | Power Supply: +3.3V | |
| 5 | NC | No Connection | |
| 6 | DE | Data Enable | |
| 7 | GND | GND | |
| 8 | VS | VSYNC | |
| 9 | GND | GND | |
| 10 | HS | HSYNC | |
| 11 | GND | GND | |
| 12 | B5 | Digital Input Data Blue5 | |
| 13 | B4 | Digital Input Data Blue4 | |
| 14 | B3 | Digital Input Data Blue3 | |
| 15 | GND | GND | |
| 16 | B2 | Digital Input Data Blue2 | |
| 17 | B1 | Digital Input Data Blue1 | |
| 18 | B0 | Digital Input Data Blue0 | |
| 19 | GND | GND | |
| 20 | G5 | Digital Input Data Green5 | |
| 21 | G4 | Digital Input Data Green4 | |
| 22 | G3 | Digital Input Data Green3 | |
| 23 | GND | GND | |
| 24 | G2 | Digital Input Data Green2 | |
| 25 | G1 | Digital Input Data Green1 | |
| 26 | G0 | Digital Input Data Green0 | |
| 27 | GND | GND | |
| 28 | R5 | Digital Input Data Red5 | |
| 29 | R4 | Digital Input Data Red4 | |
| 30 | R3 | Digital Input Data Red3 | |
| 31 | GND | GND | |
| 32 | R2 | Digital Input Data Red2 | |
| 33 | R1 | Digital Input Data Red1 | |

| | | | |
|----|------|-----------------------------------|---------|
| 34 | R0 | Digital Input Data Red0 | |
| 35 | NC | No Connection | |
| 36 | CSV | Up/Down Inverse Control Signal | Note3-1 |
| 37 | GND | GND | |
| 38 | NCLK | Input Clock | |
| 39 | GND | GND | |
| 40 | CSH | Right/Left Inverse Control Signal | Note3-2 |

Note 3-1: H: Normal scan,

L: Reverse scan



Note 3-2: H: Normal scan,

L: Reverse scan



3.2 Light Source

Light Source Type: CCFL Backlight

Recommend Connector Type: JST BHSR-02VS-01

3.2.1 CCFL 1

| Pin | Symbol | Description | Remark |
|-----|----------------|----------------------------|--------------|
| 1 | V _H | High Voltage for Backlight | Color: Pink |
| 2 | V _L | Low Voltage for Backlight | Color: White |

3.2.2 CCFL2

| Pin | Symbol | Description | Remark |
|-----|----------------|----------------------------|--------------|
| 1 | V _H | High Voltage for Backlight | Color: Pink |
| 2 | V _L | Low Voltage for Backlight | Color: Black |

4. ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Min | MAX | Unit |
|-------------------------|--------|------|-----|------|
| Power Supply for Driver | VDD | -0.3 | 4.0 | V |
| Back Light Lamp Current | I_L | -- | 10 | mA |
| Operating Temperature | Topr | -30 | +85 | |
| Storage Temperature | Tstg | -30 | +85 | |

5. ELECTRICAL CHARACTERISTICS

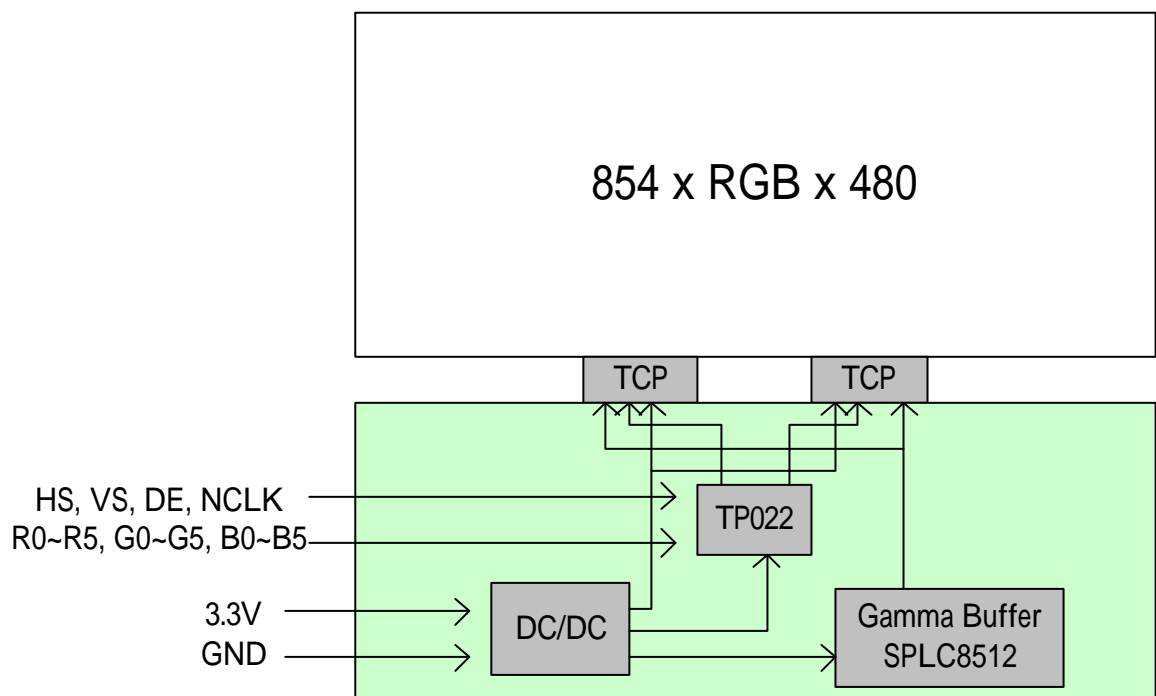
5.1 TFT LCD Module

VSS=0V, Ta=25

| Item | Symbol | MIN | TYP | MAX | Unit | Remark |
|-----------------------------|----------|--------|--------|-----|------------|----------------|
| Power Supply for Driver | VDD | 3.0 | 3.3 | 3.6 | V | |
| Module Power Consumption | W_p | TBD | TBD | TBD | mW | Panel + System |
| B/L Lamp Current | I_L | 3 | 5 | 8 | mA_{rms} | |
| B/L Lamp Voltage | V_L | -- | 400 | -- | V_{rms} | $I_L=5mA$ |
| B/L Frequency | F_L | 45 | 50 | 55 | kHz | $I_L=5mA$ |
| Kick -off Voltage | V_s | -- | -- | 470 | V_{rms} | $I_L=5mA$ |
| Backlight Power Consumption | W_{BL} | -- | 4.0 | -- | W | CCFL*2 |
| Backlight Life Time | L_{BL} | 10,000 | 15,000 | -- | hrs | Note 5-1 |

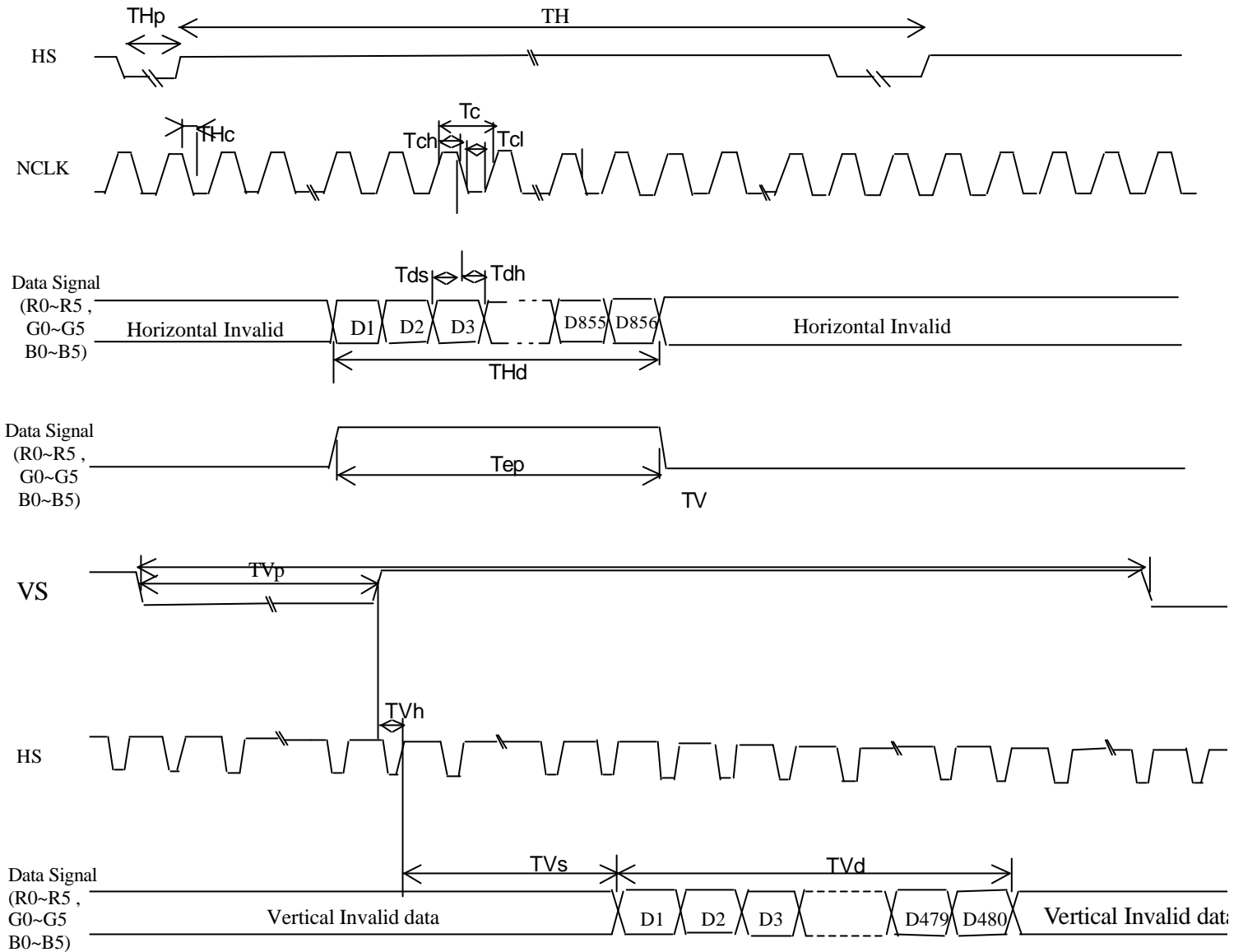
Note 5-1: Backlight luminance is not less than 50% of initial value at $I_L=5mA$.

5.2 TFT LCD Module Block Diagram



6. TIMING CHART

6.1 Timing Chart



6.2 Timing Characteristics

| Parameter | | Symbol | MIN | TYP | MAX | Unit | Remarks |
|---------------------------------|-------------|--------|------|------|--------|-------|-----------------------|
| Clock(NCLK) | Frequency | 1/Tc | -- | 33.2 | 36.2 | MHz | Tc=t _{ncclk} |
| | High Time | Tch | 5 | -- | -- | ns | |
| | Low Time | Tcl | 5 | -- | -- | ns | |
| Data | Setup Time | Tds | 3 | -- | -- | ns | |
| | Hold Time | Tdh | 10 | -- | -- | ns | |
| Horizontal sync. Signal | Cycle | TH | 30.0 | 31.8 | -- | us | |
| | | | 1010 | 1056 | 1088 | clock | |
| | Pulse Width | THp | 2 | 115 | 177 | clock | |
| Vertical sync. Signal | Cycle | TV | 515 | 525 | 560 | line | |
| | Pulse Width | TVp | 1 | 4 | 6 | line | |
| Horizontal display period | | THd | 856 | 856 | 856 | clock | |
| Hsync-Clock phase difference | | THc | 10 | -- | Tc-10 | ns | |
| Hsync-Vsync phase difference | | TVh | 0 | -- | TH-THp | ns | |
| Vertical display start position | | TVs | 23 | 23 | 23 | line | |
| Vertical display period | | TVd | 480 | 480 | 480 | line | |
| Enable signal | Setup time | Tes | 5 | -- | Tc-10 | ns | |
| | Pulse width | Tep | 2 | 856 | TH-10 | clock | |

7. OPTICAL CHARACTERISTICS

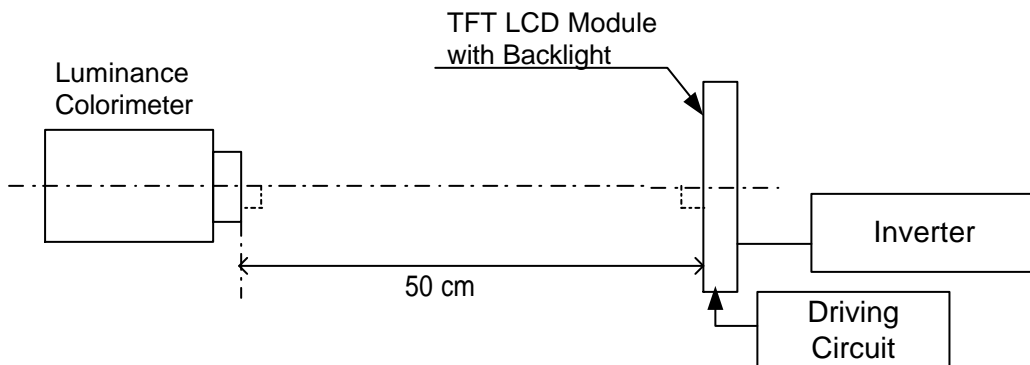
7.1 Optical Specification

Ta=25

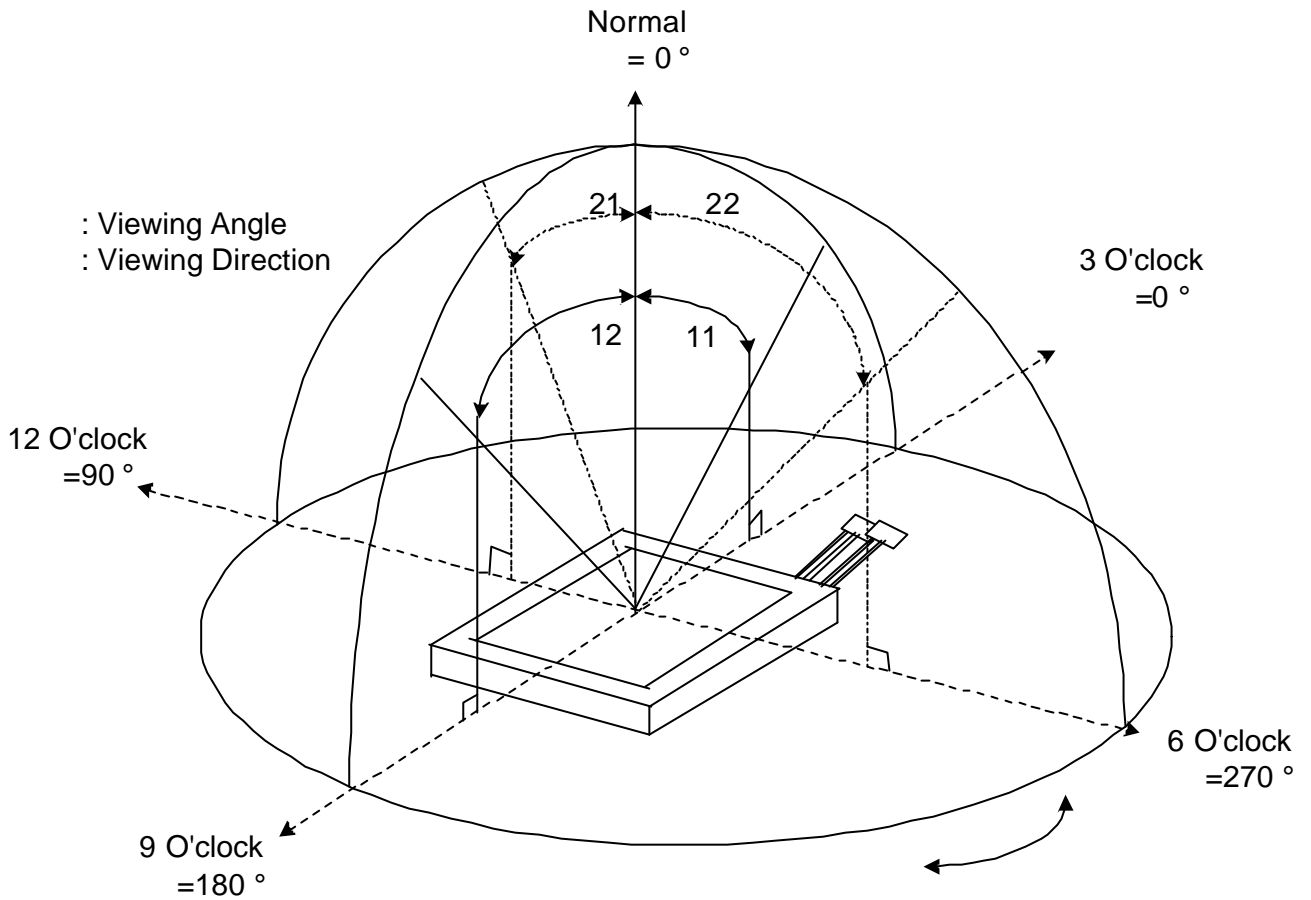
| Item | Symbol | Condition | MIN | TYP | MAX | Unit | Remarks | |
|---------------------------------|---------|----------------|----------------|------|------|--------------------|----------|----------|
| Viewing Angles | 11 | CR = 10 | 55 | 65 | -- | Degree | Note 7-1 | |
| | 12 | | 55 | 65 | -- | | | |
| | 21 | | 40 | 50 | -- | | | |
| | 22 | | 50 | 60 | -- | | | |
| | 11 | CR = 5 | -- | 70 | -- | | | |
| | 12 | | -- | 70 | -- | | | |
| | 21 | | -- | 70 | -- | | | |
| | 22 | | -- | 70 | -- | | | |
| Contrast Ratio | CR | =0° | 350 | 450 | -- | | Note 7-2 | |
| Response Time | Rising | | Tr | -- | 7 | 10 | ms | Note 7-3 |
| | Falling | | Tf | -- | 18 | 25 | | |
| Luminance (I _L =5mA) | L | | 350 | 400 | -- | cd//m ² | Note 7-4 | |
| Chromaticity | White | | x _w | 0.28 | 0.31 | 0.34 | | Note 7-5 |
| | | y _w | 0.30 | 0.33 | 0.36 | | | |

7.2 Basic Measure Conditions

- (1) Driving voltage
VDD= 3.3V
- (2) Ambient Temperature: Ta=25
- (3) Testing Point: Measure in the display center point and the test angle =0 °
- (4) Measurement System
 - a. Environmental illumination: = 1 Lux
 - b. Using the TOPCON BM-5A luminance meter
 - c. Using the Harison HIU 757 inverter



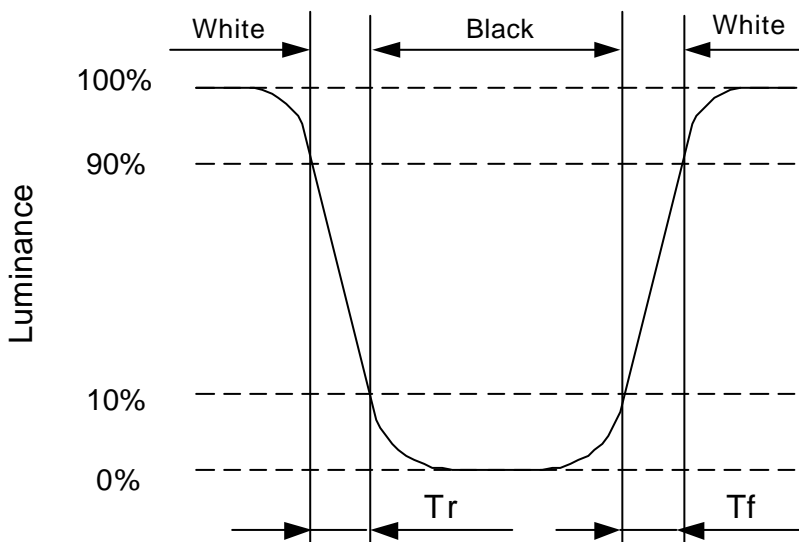
Note 7-1: Viewing angle diagrams:



Note 7-2: Contrast ratio is measured in optimum common electrode voltage.

$$CR = \frac{\text{Luminance with white image}}{\text{Luminance with black image}}$$

Note 7-3: Definition of response time:



Note 7-4: Luminance:

L = White luminance at the center of the panel

Note 7-5: Chromaticity: The same test condition as Note 7-4.

8. REILIABILITY

| No | Test Item | Condition |
|----|--|---|
| 1 | High Temperature Operation | Tp=+85 , 240hrs |
| 2 | High Temperature & High Humidity Operation | Ta=+40 , 95% RH, 240hrs |
| 3 | Low Temperature Operation | Ta=-30 , 240hrs |
| 4 | High Temperature Storage (non-operation) | Ta=+85 , 240hrs |
| 5 | Low Temperature Storage (non-operation) | Ta=-30 , 240hrs |
| 6 | High Temperature & High Humidity Storage | Ta=+60 , 90% RH, 240hrs |
| 7 | Thermal Shock (non-operation) | Test between -30 (duration 30 min.) and 85 (duration 30 min.), 50 cycles |
| 8 | Resistance to Static Electricity Discharge (non-operation) | C=200pF, R=0Ω; Discharge: ±150V 3 times / Terminal |
| 9 | Surface Discharge (non-operation) | C=150pF, R=330Ω; Discharge: Air: ±15kV; Contact: ±15kV 5 times / Point; 5 Points / Panel |
| 10 | Vibration (non-operation) | Frequency range: 8~33.3Hz Amplitude: 1.3mm Sweep: 33.3~400Hz Acceleration: 3G Cycle: 15 Min X/Z 2 hrs for etch directions, 4 hrs for Y direction |
| 11 | Shock (non-operation) | Acceleration: 100G; Period: 6ms Directions: ±X, ±Y, ±Z; Cycles: Twice |

Tp: Panel Temperature

Ta: Ambient Temperature

9. HANDLING CAUTIONS

9.1 ESD (Electrical Static Discharge) Strategy

ESD will cause serious damage of the panel, ESD strategy is very important in handling. Following items are the recommended ESD strategy

- (1) In handling LCD panel, please wear non-charged material gloves. Connect the wrist conduction ring to the earth and the conducting shoes to the earth are necessary.
- (2) The machine and working table for the panel should have ESD protection strategy.
- (3) In handling the panel, using ionized air to decrease the charge in the environment is necessary.
- (4) In the process of assembly the module, shield case should connect to the ground.

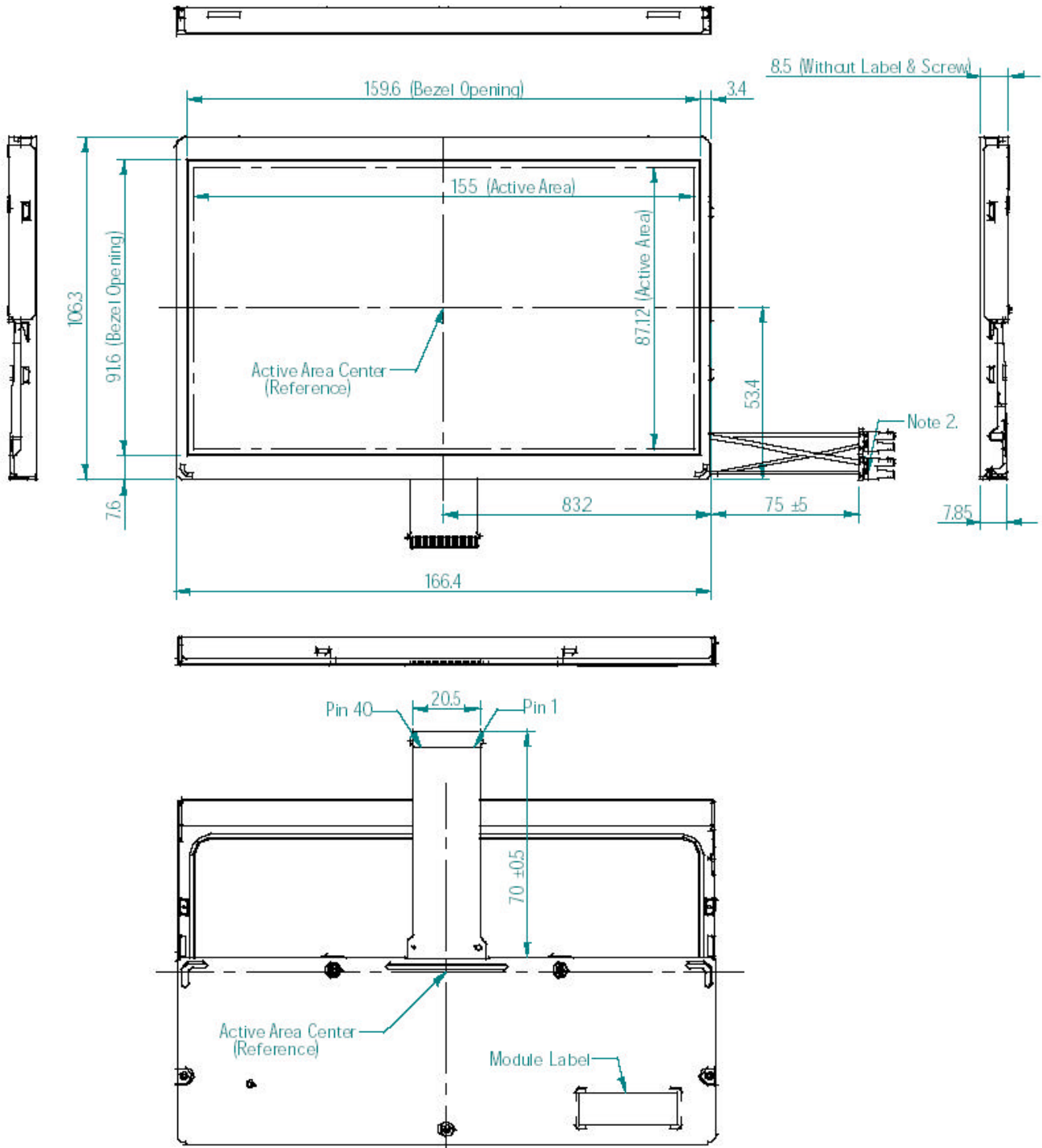
9.2 Environment

- (1) Working environment of the panel should be in the clean room.
- (2) The front polarizer is easy to be damaged. Handle it carefully and do not scratch it by sharp material.
- (3) Panel has polarizer protective film in the surface. Please remove the protection film of polarizer slowly with ionized air to prevent the electrostatic discharge.

9.3 Others

- (1) Turn off the power supply before connecting and disconnecting signal input cable.
- (2) The connection area of FPC and panel is very weak, do not handle panel only by FPC or bend FPC.
- (3) Water drop on the surface or condensation as panel power on will corrode panel electrode.
- (4) As the packing bag open, watch out the environment of the panel storage. High temperature and high humidity environment is prohibited.
- (5) When the TFT LCD module is broken, please watch out whether liquid crystal leaks out or not. If your hand touches liquid crystal, wash your hand cleanly by water and soap as soon as possible.

10. MECHANICAL DRAWING



Note :

1. The tolerance of size which isn't being indicated is ± 0.4 ◊
2. CN Type : JST BHSR-02VS-01 ◊

11. PACKING DRAWING

