

Displays & Touch Screens

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DATA IMAGE CORPORATION






CTP Module Specification

Preliminary

ITEM NO.: SCX0700255GGU14

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| Customer Companies | QA Approved | DQA Check | R&D Approved | R&D Check |
|----------------------|---|---|---|---|
| |  |  |  |  |
| Customer Approved by | Version: | Issued Date: | Total Pages: | Prepared |
| | 1 | 03/NOV/16' | 23 |  |

3. GENERAL SPECIFICATIONS

Composition: A touch panel module with 7 inches Capacitive Touch Panel (CTP) .
Interface: USB for the CTP.

| Parameter | Specifications | Unit |
|---|-------------------------------|------|
| Screen Size | 7 (diagonal) | inch |
| Display Format | 800 (H) x (R,G,B) x 480 (V) | dots |
| LCD Active Area | 152.4 (H) x 91.44(V) | mm |
| Sensor Active Area | 154.6(H) x 92.4(V) | mm |
| Pixel Pitch | 0.15 (H) x 0.15 (V) | mm |
| Pixel Configuration | Stripe | |
| Outline Dimension | 180(W) x 120(H) x 10.8MAX.(D) | mm |
| Back-light | LED | |
| Surface treatment | Clear | |
| Display mode | Normally white | |
| Weight | TBD | g |
| LCM model number | FG0700GEDUSWWMG01 | |
| View Angle direction | All | |
| Our components and processes are compliant to RoHS and REACH standard | | |

4. LCD ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Min. | Max. | Unit | Remark |
|-----------------------|-----------------|---------------------------|----------------------|------|-----------------|
| Power supply voltage | V _{CC} | -0.3 | 6.0 | V | Ta=25°C |
| Logic input voltage | V _I | -0.3 | V _{CC} +0.3 | V | |
| Operating temperature | T _{OP} | -20 | +70 | °C | Module surface* |
| Storage temperature | T _{ST} | -30 | +80 | °C | - |
| Humidity | Operation | 20%~90% relative humidity | | | Ta<=60°C |
| | Non Operation | 5%~90% relative humidity | | | Ta<=60°C |

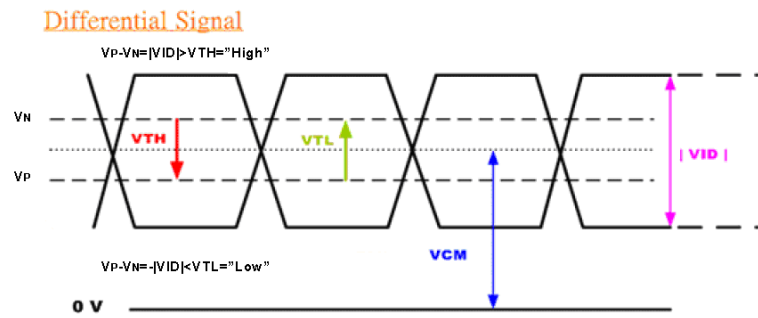
5. LCD ELECTRICAL CHARACTERISTICS

5.1 Operating Conditions

f_H=31.5KHz, f_V=60Hz, f_{CLK}=33.26MHz, Ta=25°C

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Remark |
|-----------------------------------|-----------------|--------|--------|------|-------------------|---------------------------------|
| Power Supply voltage for LCD | V _{CC} | +3.0 | +3.3 | +3.6 | V | |
| Power Supply Current for LCD | I _{CC} | | 180 | 240 | mA | V _{CC} =3.3V |
| Power Supply voltage for LED | V _{DD} | 4.5 | 5 | 5.5 | V | |
| Power Supply Current for LED | I _{DD} | | 650 | 850 | mA | V _{DD} =5.0V |
| Ripple voltage | V _{RF} | - | - | 100 | mV _{P-P} | |
| ADJ frequency | | 19K | 20K | 21K | Hz | |
| ADJ input voltage | V _{IH} | 3.0 | - | 3.3 | V | |
| | V _{IL} | 0 | - | 0.3 | V | |
| Differential Input High Threshold | V _{TH} | - | - | 100 | [mV] | V _{CM} =1.2V Note 1 |
| Differential input Low Threshold | V _{TL} | -100 | - | - | [mV] | |
| LED dice life time | | 20,000 | 30,000 | | Hr | Note 2 |

Note 1: LVDS Signal Waveform.



Note 2: The "LED dice life time" is defined as the brightness decrease to 50% original brightness that the ambient temperature is 18°C ~28°C and LED dice current=25mA.

6. LCD INPUT SIGNAL CHARACTERISTICS

6.1 AC Characteristics

6.1.1 AC Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|-----------|------|------|------|------|
| Data setup time | T_{dsu} | 6 | - | - | ns |
| Data hold time | T_{dhd} | 6 | - | - | ns |
| DE setup time | T_{esu} | 6 | - | - | ns |

6.1.2 Resolution : 800x480

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-------------------|---------------------|------|-------|------|---------------------|
| DCLK frequency | F_{CPH} | 25 | 33.26 | 40 | MHz |
| DCLK period | T_{CPH} | 25 | 30.06 | 40 | ns |
| DCLK pulse duty | T_{CWH} | 40 | 50 | 60 | % |
| DE period | $T_{DEH} + T_{DEL}$ | 1000 | 1056 | 1200 | T_{CPH} |
| DE pulse width | T_{DEH} | 800 | 800 | 800 | T_{CPH} |
| DE frame blanking | T_{DEB} | 10 | 45 | 110 | $T_{DEH} + T_{DEL}$ |
| DE frame width | T_{DE} | 480 | 480 | 480 | $T_{DEH} + T_{DEL}$ |

6.2 Timing Controller Timing Chart

6.2.1 Clock and Data input waveforms

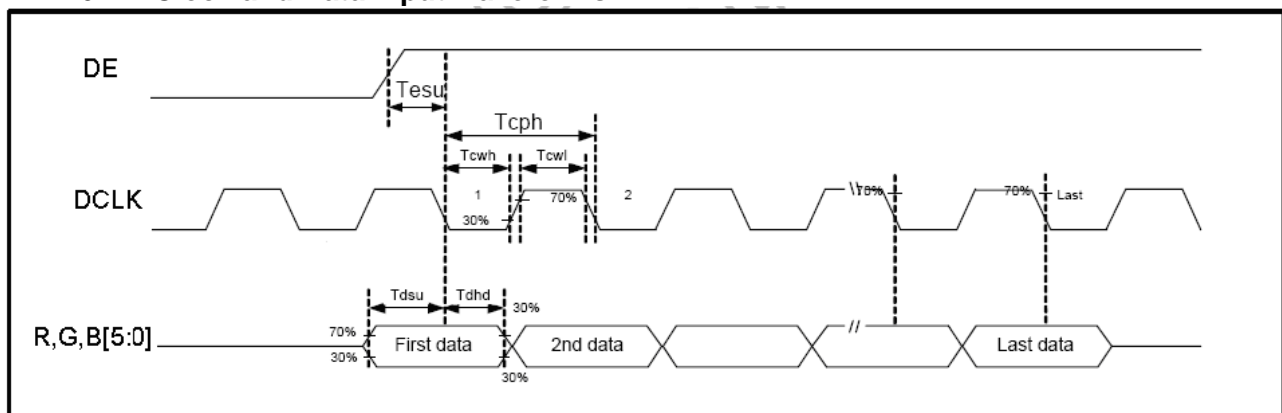
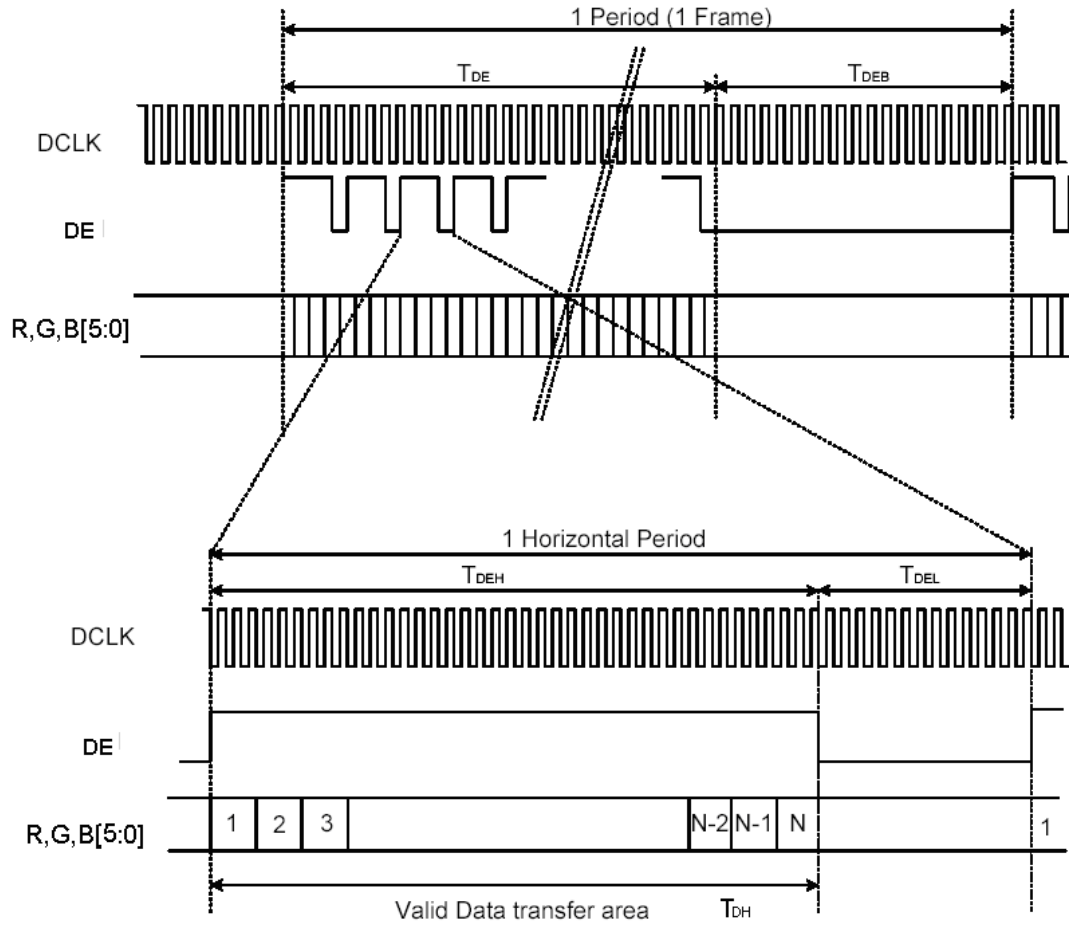
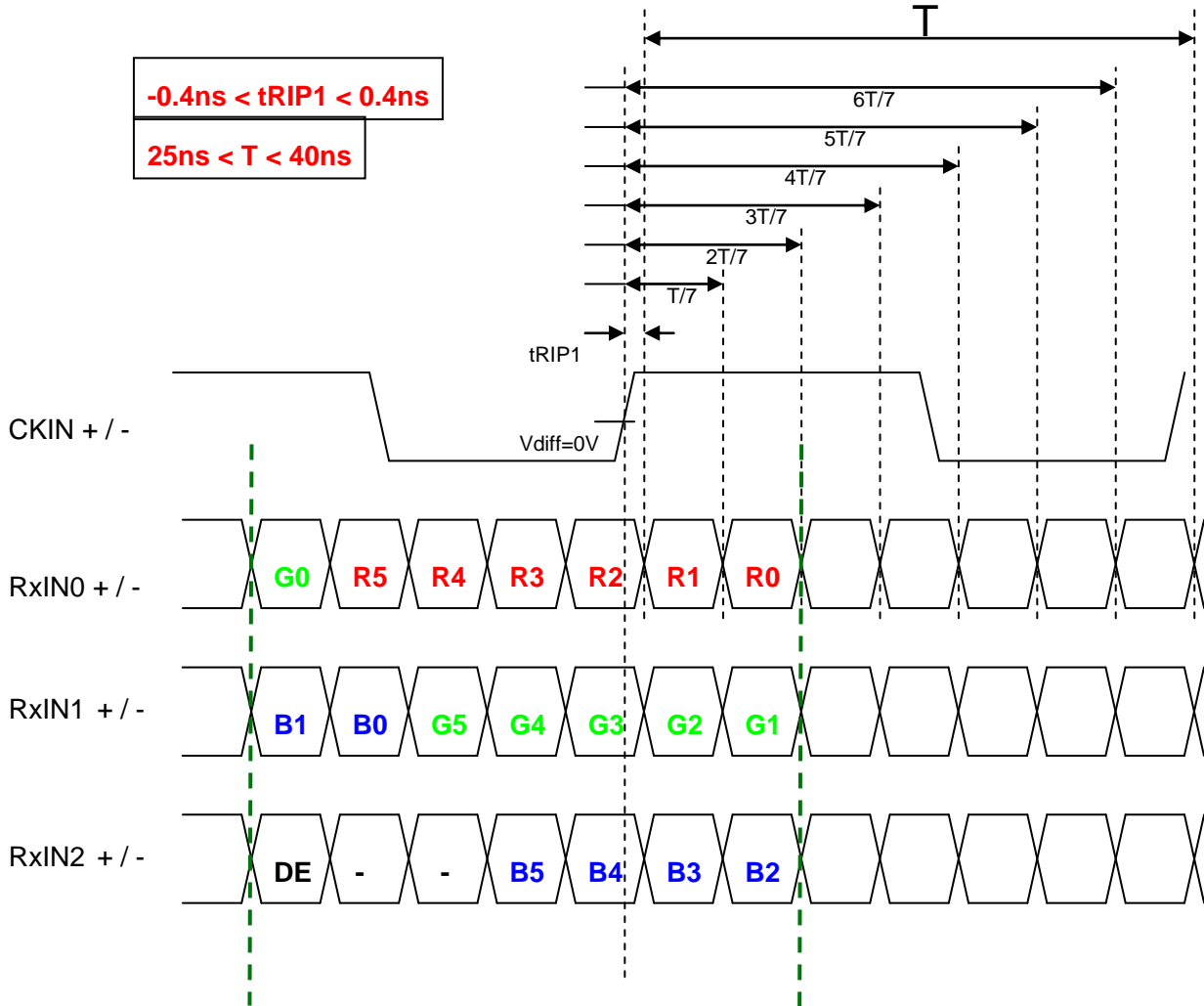


Figure 1 Clock and Data input waveforms.



6.2.2 LVDS Timing Chart



6.3 Color Data Input Assignment

| | | Data Signal | | | | | | | | | | | | | | | | | |
|---------------------|-----------------|-------------|----|----|----|----|-------|----|----|----|----|------|----|----|----|----|----|----|----|
| | | Red | | | | | Green | | | | | Blue | | | | | | | |
| Color | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Colors | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gray Scale of Red | Red(0) / Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(1) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(2) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(61) | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(62) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(63) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Green | Green(0) / Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(61) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(62) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(63) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale of Blue | Blue(0) / Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Blue (2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue (61) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| | Blue (62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| | Blue (63) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

Correspondence between Data and Display Position

| | | | | | | | | | | | |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | S0001 | S0002 | S0003 | S0004 | S0005 | S0006 | S0007 | S0008 | ----- | S2399 | S2400 |
| C001 | R001 | G001 | B001 | R002 | G002 | B002 | R003 | G003 | | G800 | B800 |
| | | | | | | | | | | | |
| C480 | R001 | G001 | B001 | R002 | G002 | B002 | R003 | G003 | | G800 | B800 |

7. LCD PIN CONNECTIONS

| Pin No | Symbol | Function | Remark |
|--------|--------|--|--------|
| 1 | VCC | power supply for Digital Circuit | |
| 2 | VCC | power supply for Digital Circuit | |
| 3 | GND | Ground | |
| 4 | GND | Ground | |
| 5 | RxIN0- | Differential Data Input ,CH0(Negative) | |
| 6 | RxIN0+ | Differential Data Input ,CH0(Positive) | |
| 7 | GND | Ground | |
| 8 | RxIN1- | Differential Data Input ,CH1(Negative) | |
| 9 | RxIN1+ | Differential Data Input ,CH1(Positive) | |
| 10 | GND | Ground | |
| 11 | RxIN2- | Differential Data Input ,CH2(Negative) | |
| 12 | RxIN2+ | Differential Data Input ,CH2(Positive) | |
| 13 | GND | Ground | |
| 14 | CKIN- | Differential Clock Input (Negative) | |
| 15 | CKIN+ | Differential Clock Input (Positive) | |
| 16 | GND | Ground | |
| 17 | VDD | Power Supply for LED Driver Circuit | |
| 18 | VDD | Power Supply for LED Driver Circuit | |
| 19 | GND | Ground | |
| 20 | ADJ | Brightness control for LED B/L | |

Remarks :

- 1) ADJ is brightness control Pin. The larger of the pulse duty is, the higher of the brightness.
- 2) ADJ signal is 0~3.3V.Operation frequency is 20KHz
- 3) GND PIN must be grounding, can not be floating.

Remarks:

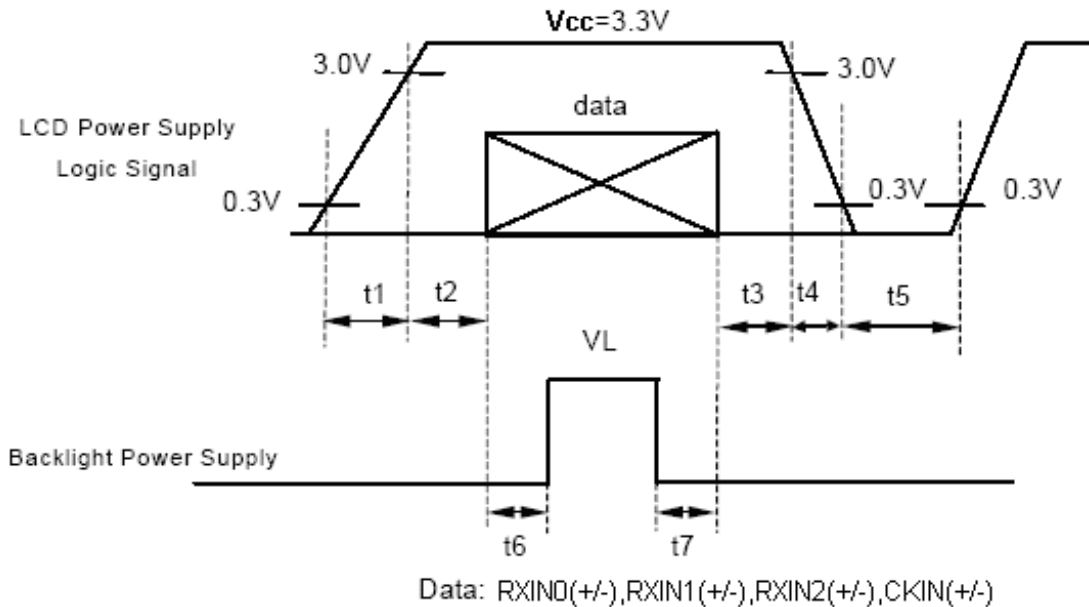
Power Signal sequence:

$t1 \leq 10ms$; $1 \text{ sec} \leq t5$

$50ms \leq t2$; $200ms \leq t6$

$0 < t3 \leq 50ms$; $200ms \leq t7$

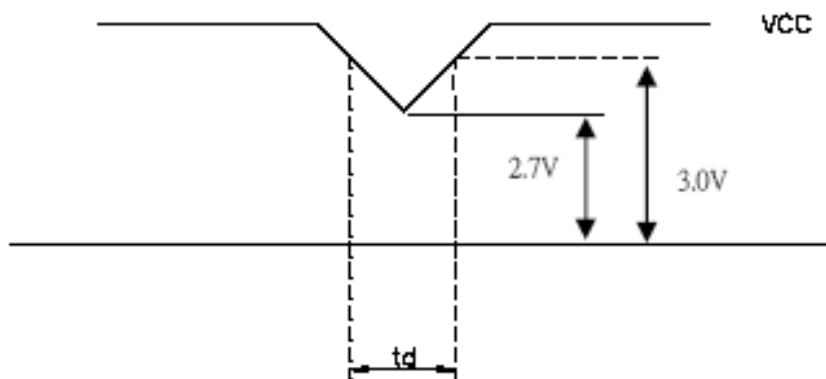
$0 < t4 \leq 10ms$



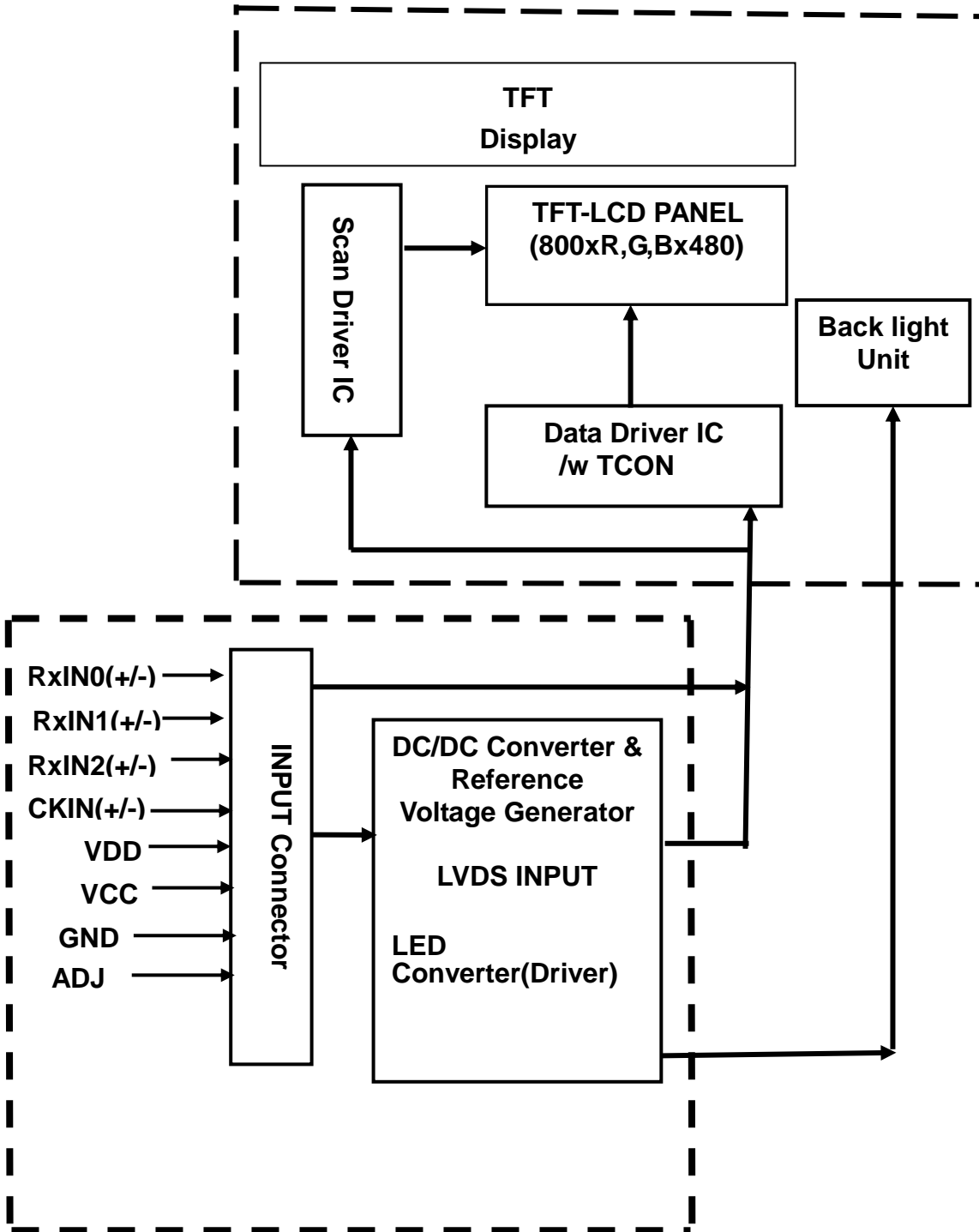
VCC-dip condition:

(1) $2.7V \leq VCC < 3.0V, t_d \leq 10ms$

(2) $VCC > 3.0V$, VCC-dip condition should be the same with VCC-turn-on condition .

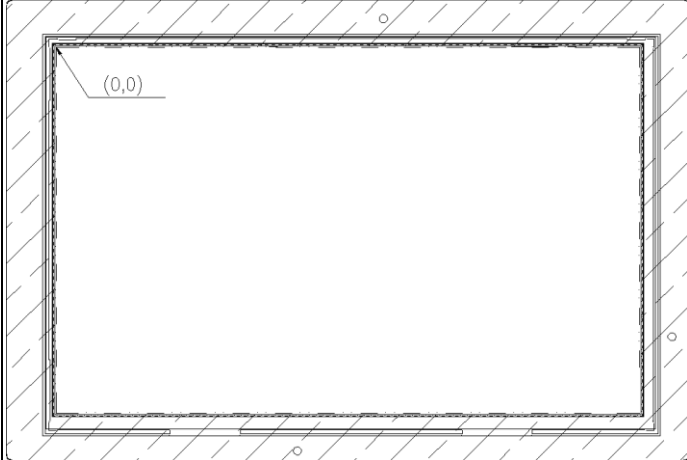


8. LCD BLOCK DIAGRAM

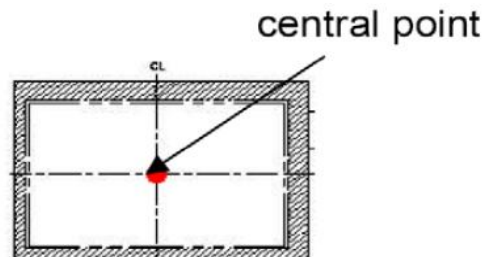


9. CTP GENERAL SPECIFICATIONS

9.1 CTP main feature

| Item | Specification | Unit |
|-------------------------|--|--------|
| Type | Transparent type projected capacitive touch panel | |
| Input mode | Human's finger | |
| Multi touch interface | 5 USB | Point |
| (X,Y) Position |  | |
| Point hitting life time | 1,000,000 times min. | Note 1 |

Note : Use 8 mm diameter silicon rubber/force 3N to knock on the central point twice per second (no-operating), function pass after test.



9.2 Electrical Characteristic

9.2.1 Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------|--------|------|------|------|------|
| Supply voltage | VCC | -0.3 | 5 | 5.5 | V |

9.2.2 DC Characteristic

VCC=5V+/-5%, GND=0V

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------|--------|------|------|------|------|
| Supply voltage | VCC | 2.5 | 5 | 5.5 | |

9.3 Pin Connections

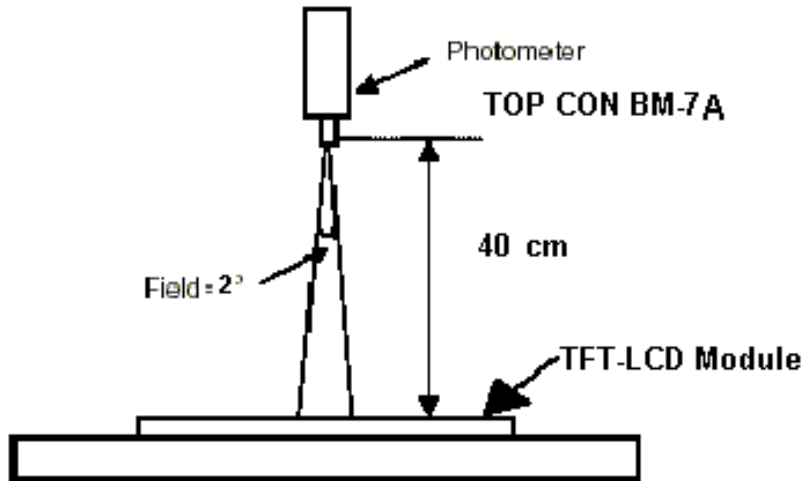
| Pin Number | Pin Name | Description |
|------------|----------|----------------------|
| 1 | CTP_VCC | Power Supply Voltage |
| 2 | D- | USB D- |
| 3 | D+ | USB D+ |
| 4 | NC | No Connection |
| 5 | GND | Ground |

10. OPTICAL CHARACTERISTIC

| Parameter | | Symbol | Condition | Min. | Typ. | Max. | Unit | Remarks |
|----------------|------------|---------------|---------------------------------------|--------------|--------------|-------|-------------------|----------|
| Viewing Angle | Horizontal | θ_{x+} | Center CR \geq 10 | 70 | 80 | -- | deg | Note 1,4 |
| | | θ_{x-} | | 70 | 80 | -- | | |
| | Vertical | θ_{y+} | | 70 | 80 | -- | | |
| | | θ_{y-} | | 70 | 80 | -- | | |
| Contrast Ratio | | CR | at optimized viewing angle | 300 | 400 | -- | | Note 1,3 |
| Response time | Rise | Tr | Center | - | 5 | 10 | ms | Note 1,6 |
| | Fall | Tf | $\theta_x=\theta_y=0^\circ$ | - | 15 | 20 | ms | |
| Uniformity | | B-uni | $\theta_x=\theta_y=0^\circ$ | 70 | 80 | -- | % | Note 1,5 |
| Brightness | | L | $\theta_x=\theta_y=0^\circ$ | 340 | 425 | -- | cd/m ² | Note 1,2 |
| Chromaticity | | x_W | Center $\theta_x=\theta_y=0^\circ$ | TYP- 0.05 | TYP+ 0.05 | 0.302 | | Note 1,7 |
| | | y_W | | | | 0.339 | | |
| | | x_R | | | | 0.575 | | |
| | | y_R | | | | 0.360 | | |
| | | x_G | | | | 0.331 | | |
| | | y_G | | | | 0.571 | | |
| | | x_B | | | | 0.149 | | |
| | | y_B | | | | 0.138 | | |
| Image sticking | | tis | 2 hours | | | 2 | Sec | Note 8 |

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤ 1 lux, and at room temperature). The operation temperature is $25^\circ\text{C} \pm 2^\circ\text{C}$ and LED Backlight Current=250mA. The measurement method is shown in Note1.

Note1: The method of optical measurement:

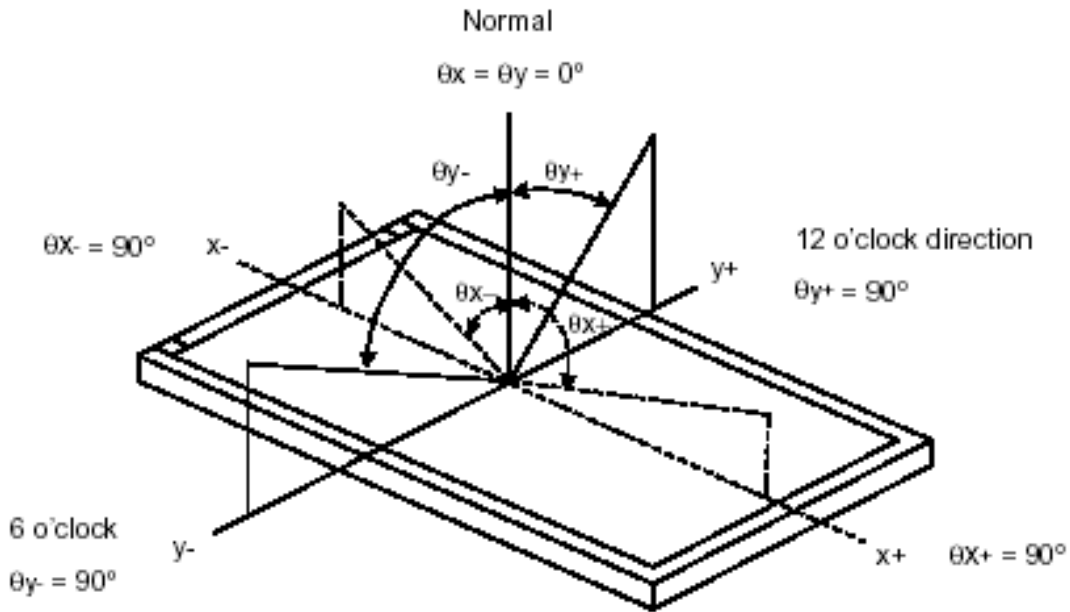


Note2: Measured at the center area of the panel and at the viewing angle of the $\theta_x = \theta_y = 0^\circ$

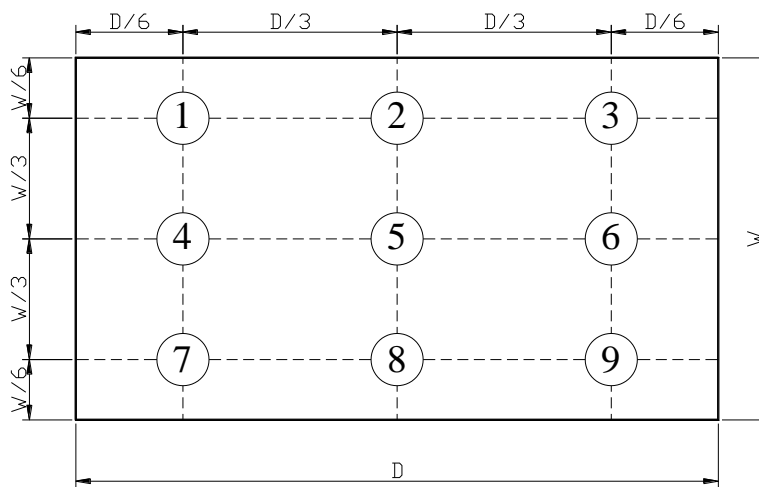
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



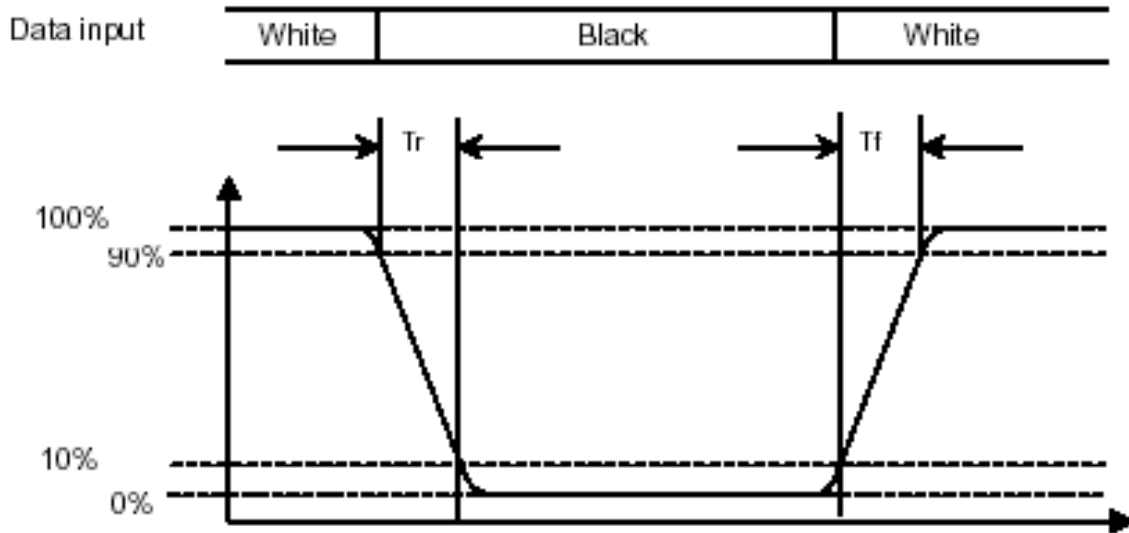
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9 points}} \quad (\text{Note 5}).$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure.



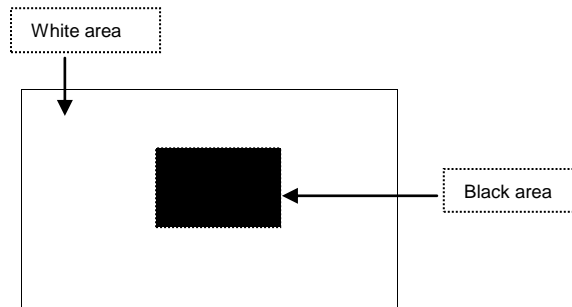
Note 7: Definition of Chromaticity:

The color coordinates (x_W, y_W) , (x_R, y_R) , (x_G, y_G) , and (x_B, y_B) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C

Image sticking pattern



11. QUALITY ASSURANCE

11.1 Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

| NO. | Test item | Test level | Remark |
|-----|---|--|--------------|
| 1 | High Temperature Storage Test | T=80°C,240hrs | IEC68-2-2 |
| 2 | Low Temperature Storage Test | T=-30°C,240hrs | IEC68-2-1 |
| 3 | High Temperature Operation Test | T=70°C,240hrs | IEC68-2-2 |
| 4 | Low Temperature Operation Test | T=-20°C,240hrs | IEC68-2-1 |
| 5 | High Temperature and High Humidity Operation Test | T=60°C,90%RH,240hrs | IEC68-2-3 |
| 6 | Thermal Cycling Test (No operation) | -30°C → +25°C → +80°C, 100 Cycles 30 min 5 min 30 min | IEC68-2-14 |
| 7 | Vibration Test (No operation) | Frequency :10 ~ 55 Hz Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z | IEC68-2-6 |
| 8 | ESD test | State: operating Standard: IEC 61000-4-2 Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 4kV Air +/-8kV Criteria: Class C | IEC61000-4-2 |

12. APPEARANCE SPECIFICATION

12.1 Inspection condition

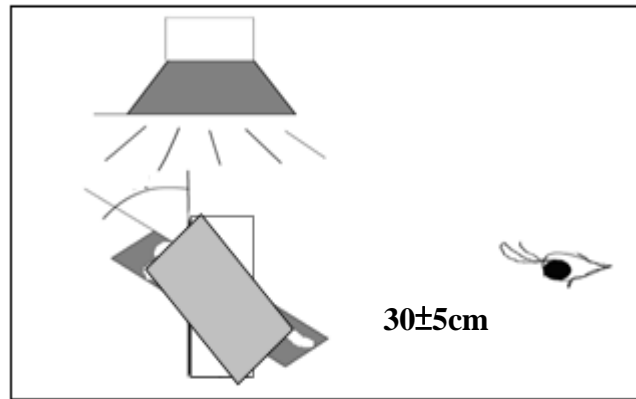
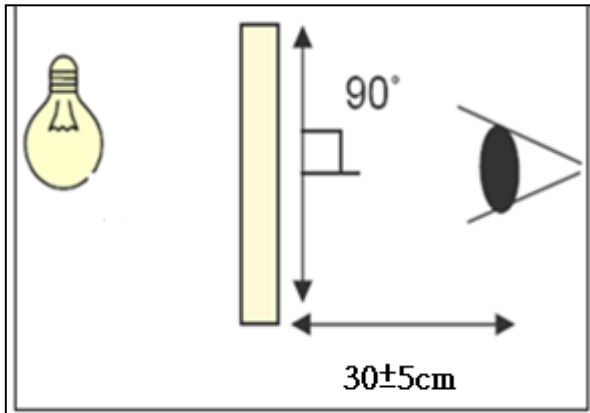
12.1.1 Inspection conditions

12.1.2 Inspection Distance : 30 ± 5 cm

12.1.3 View Angle :

(1) Inspection that light pervious to the product: $90 \pm 15^\circ$

(2) Inspection that light reflects on the product: $90 \pm 15^\circ$

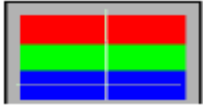


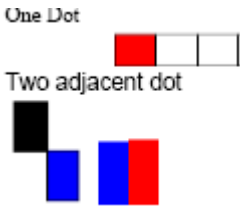
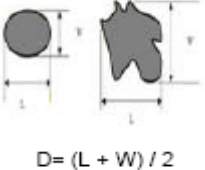
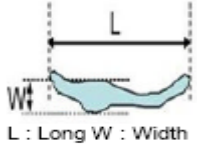
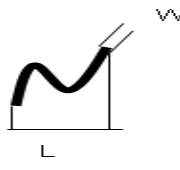
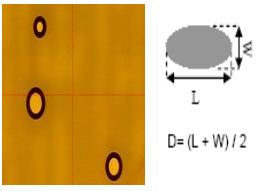
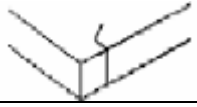
12.2 Environment conditions:

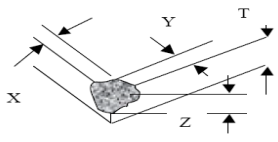
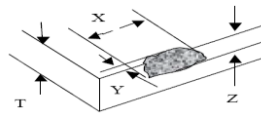
| | |
|-----------------------|--------------------------|
| Ambient Temperature : | $25 \pm 5^\circ\text{C}$ |
| Ambient Humidity : | 30~75%RH |
| Ambient Illumination | 600~800 lux |

12.3 Inspection Parameters

Appearance inspection standard (D: diameter, L: length; W: width, Z: height, T: glass thickness)

| Inspection item | Inspection standard | Description |
|-----------------|---|---|
| No image | Prohibited | |
| Image abnormal | Prohibited | |
| Bright line | Prohibited |  |
| Thin line | It is acceptable that the defect can not be seen with 2% ND filter. | |
| Mura | It is acceptable that the defect can not be seen with 2% ND filter. | |

| | | | | |
|----------------------------------|---|-------------------------|------------|---|
| Dot | Item | Acceptable Visible area | Total |  |
| | Bright dot | 3 | 6 | |
| | Dark dot | 5 | | |
| | Bright adjacent dots | 1 | 1 | |
| | Dark adjacent dots | 2 | 2 | |
| | Adjacent dots with a bright dot and a dark dot | 2 | 2 | |
| Foreign material in dot shape | SPEC (unit: mm) | | Acceptable |  |
| | $D \leq 0.5$ | | Ignored | |
| | $0.5 < D \leq 0.8$, distance > 5 | | $n \leq 5$ | |
| | $D > 0.8$ | | 0 | |
| Foreign material in line shape | SPEC | | Acceptable |  |
| | $W \leq 0.05$ and $L \leq 10$ | | Ignored | |
| | $0.05 < W \leq 0.1$, $L \leq 10$, distance > 5 | | $n \leq 5$ | |
| | $W > 0.1$ or $L > 10$ | | 0 | |
| Polarizer flaw or leak out resin | Defect is defined as the active area. | | | |
| Contamination | It is acceptable if the dirt can be wiped. | | | |
| Scratch | SPEC | | Acceptable |  |
| | $W \leq 0.05$ and $L \leq 10$ | | Ignored | |
| | $0.05 < W \leq 0.08$, $L \leq 10$, distance > 5 | | $n \leq 5$ | |
| | $0.08 < W \leq 0.1$, $L \leq 10$, distance > 5 | | $n \leq 3$ | |
| | $W > 0.1$ or $L > 10$ | | 0 | |
| Bubble | SPEC (unit: mm) | | Acceptable |  |
| | $D \leq 0.3$ | | Ignored | |
| | Non visible area | | Ignored | |
| | $0.3 < D \leq 0.5$, distance > 5 | | $n \leq 5$ | |
| | $D > 0.5$ | | 0 | |
| Cover & Sensor Crack | Prohibited | | |  |

| | | | |
|------------------------------|--|------------|---|
| Cover angle missing | SPEC (unit: mm) | Acceptable |  |
| | Side/Bottom | Ignored | |
| | It is prohibited if the defect appears on the front. | 0 | |
| Cover edge break | SPEC (unit: mm) | Acceptable |  |
| | $X \leq 3.0, Y \leq 3.0, Z \leq T$ | Ignored | |
| | $X > 3.0, Y > 3.0, Z > T$ | 0 | |
| Ink | SPEC (unit: mm) | Acceptable | |
| | word unclear, inverted, mistake, break line | 0 | |
| Bubble under protection film | SPEC (unit: mm) | Acceptable | |
| | NA | | |
| Function | Prohibited | | |

12.4 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

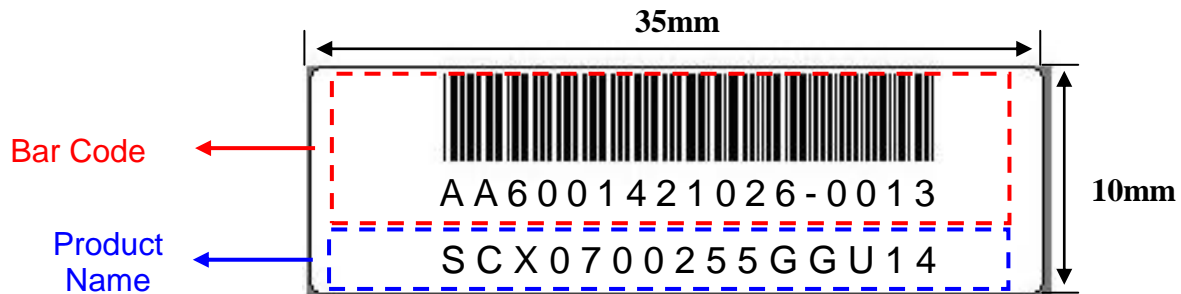
Sampling table: MIL-STD-105E

Inspection level: Level II

| Class of defects | Definition | | |
|------------------|--------------|----------|--|
| | Major | AQL 0.65 | It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function. |
| | Minor | AQL 1.5 | It is a defect that will not result in functioning problem with deviation classified. |

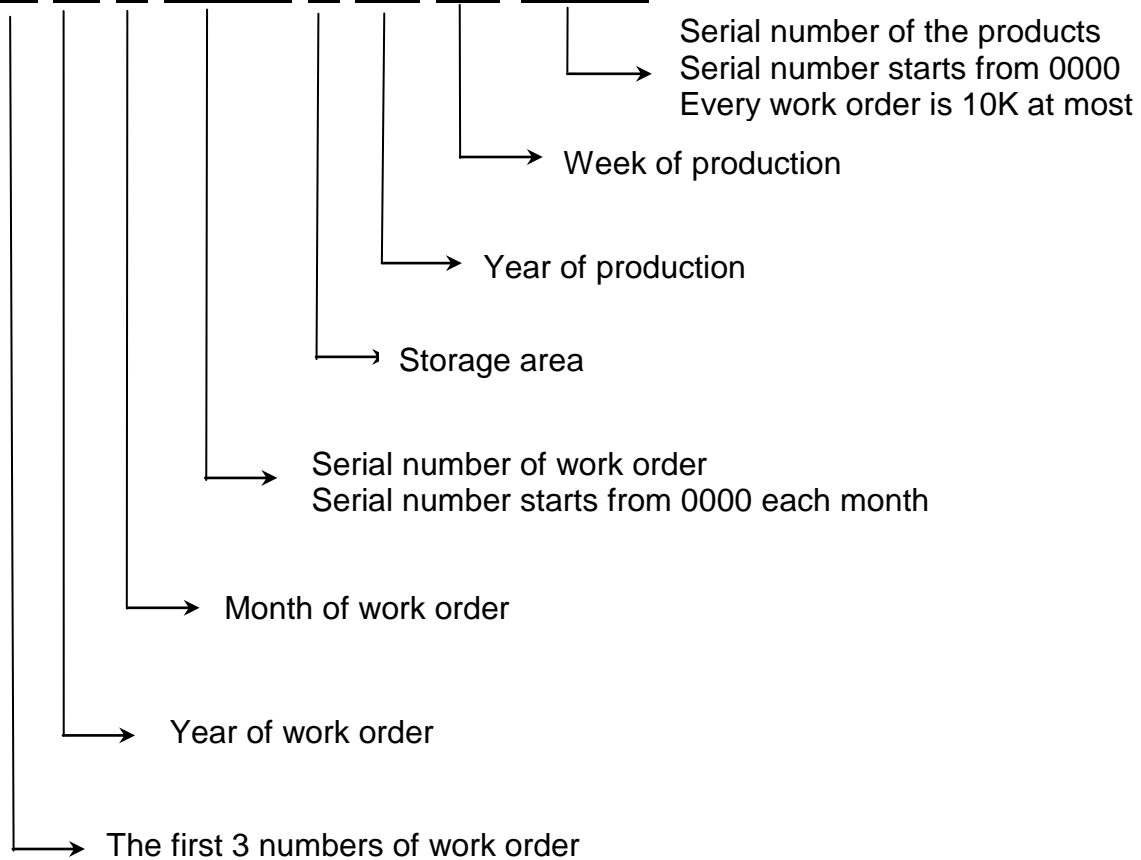
13. LCM PRODUCT LABEL DEFINE

Product Label style:

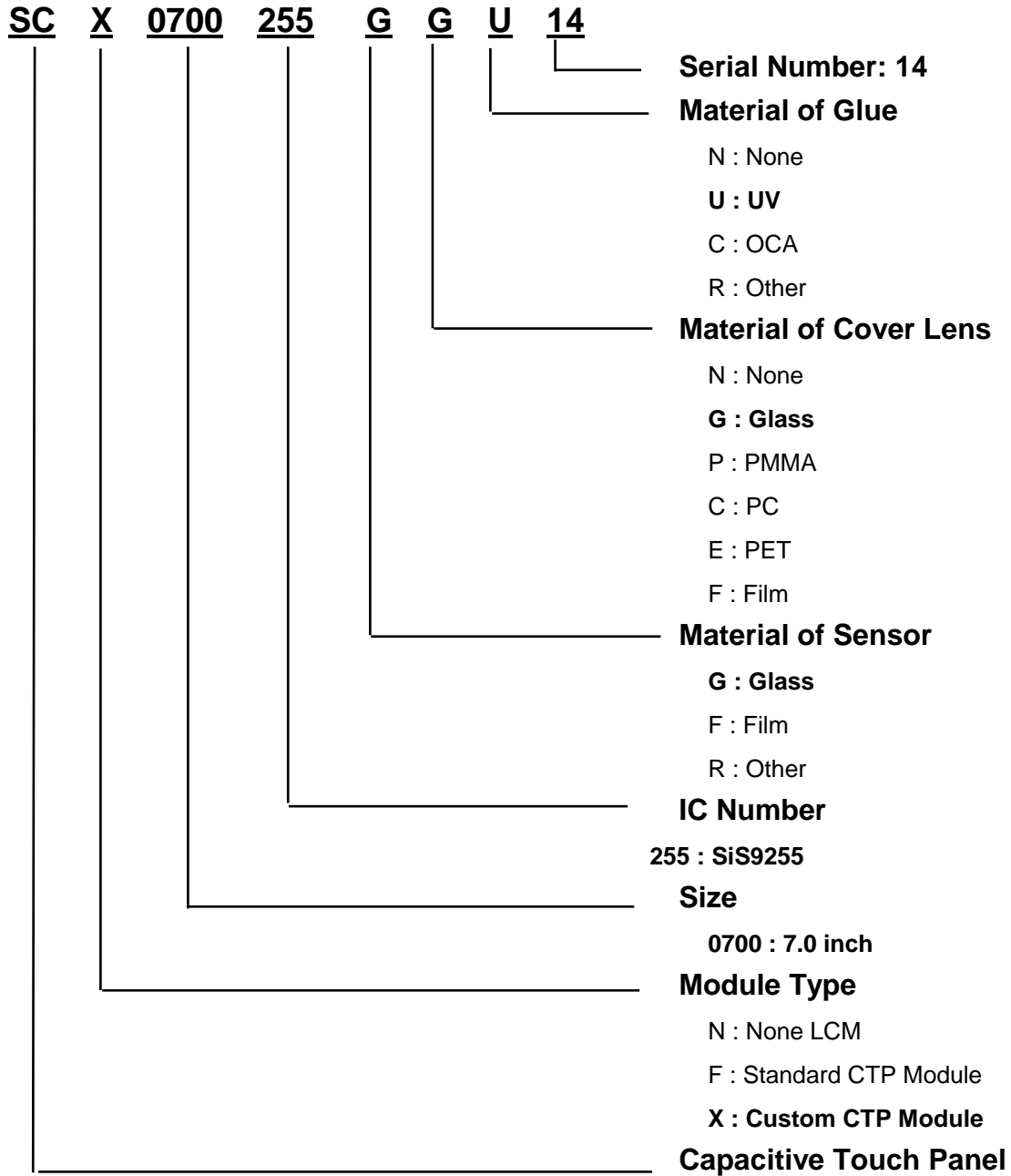


BarCode Define:

A A 6 0014 2 10 26-0013



Product Name Define:



14. PRECAUTIONS IN USE LCM

1. ASSEMBLY PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5) Do not open the case because inside circuits do not have sufficient strength.
- (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any

parts of the human body.

- (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
- (3) Only properly grounded soldering irons should be used.
- (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

4. STORAGE PRECAUTIONS

- (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

5. OTHERS

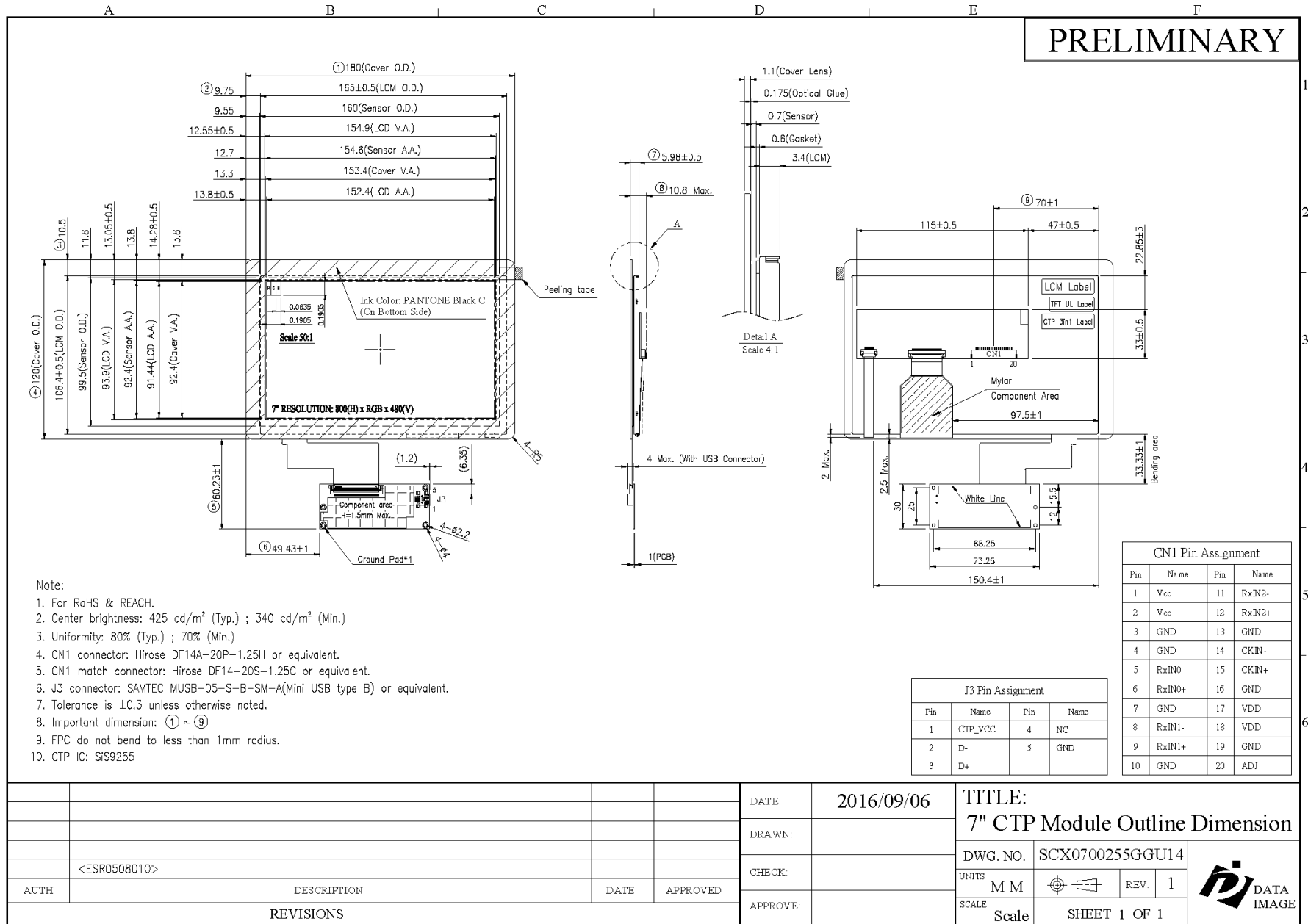
- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
 - a. Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
 - b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
 - c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)
- (4) Waste

Liquid crystal module products shall not be arbitrarily discarded, the water and soil have a negative impact on the environment, the need to be handled by a qualified unit.

6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

Confidential Document
15. OUTLINE DRAWING



16. PACKAGE INFORMATION

TBD