

TFT-Display Datenblatt

Modell FG1004B2DSSWAGL1

Kurzdaten

| | |
|-------------|-----------------------------|
| Hersteller | Data Image |
| Diagonale | 10,4" / 26,4 cm |
| Format | 4:3 |
| Auflösung | 800 x 600 |
| Backlight | LED / 250 cd/m ² |
| Interface | LVDS |
| Touchscreen | nein |
| Temperatur | -10°... +50°C (Betrieb) |

Vertrieb durch:



Confidential Document

DATA IMAGE CORPORATION

TFT Module Specification

PRELIMINARY

ITEM NO.: FG1004B2DSSWAGL1

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| Customer Companies | R&D Dept. | Q.C. Dept. | Eng. Dept. | Prod. Dept. |
| | JACK | JOE | GARY | KEN |
| Approved by | Version: | Issued Date: | Sheet Code: | Total Pages: |
| | 1 | 27/APR/11' | | 17 |

2. RECORD OF REVISION

| Rev | Date | Item | Page | Comment |
|-----|------------|------|------|---------------------|
| 1 | 27/APR/11' | | | Initial PRELIMINARY |
| | | | | |

3. SUMMARY

The module is a transmissive type color active matrix liquid crystal display (LCD), which uses amorphous thin film transistor (TFT) as switching devices. This panel has a 10.4 inches diagonally measured active display area with SVGA (800 RGB X 600) resolution. The following describes the features of this product.

4. FEATURES

- 10.4" (diagonal) inch configuration
- SVGA (800 X 600 pixels) resolution

5. GENERAL SPECIFICATIONS

| Parameter | Specifications | Unit |
|--|-----------------------------------|--------|
| Screen Size | 10.4 (Diagonal) | inch |
| Display Format | Normally white, Transmissive type | |
| Number of Pixel | 800 RGB X 600 | dot |
| Active Area | 211.2(H) x 158.4(V) | mm |
| Pixel Pitch | 88(H) x 264 (V) | um |
| Dot Configuration | RGB-Stripe | |
| Interface | LVDS | |
| View Angle direction (Gray inversion) | 6 o'clock | |
| Outline Dimension | 228.4(W) x 175.4(H) x 10.5(D) | mm |
| Weight | TBD | g |
| Temperature Range | Operation | -10~50 |
| | Storage | -20~60 |

6. ABSOLUTE MAXIMUM RATINGS

GND=0V

| Parameter | Symbol | MIN. | MAX. | Unit | Remark |
|-----------------------|--------|------|----------------------|------|--------|
| Power supply voltage | Vcc | -0.3 | 5.0 | V | |
| Logic input voltage | VI | -0.3 | V _{CC} +0.3 | V | |
| Operating temperature | Top | -10 | 50 | °C | |
| Storage temperature | Tst | -20 | 60 | °C | |

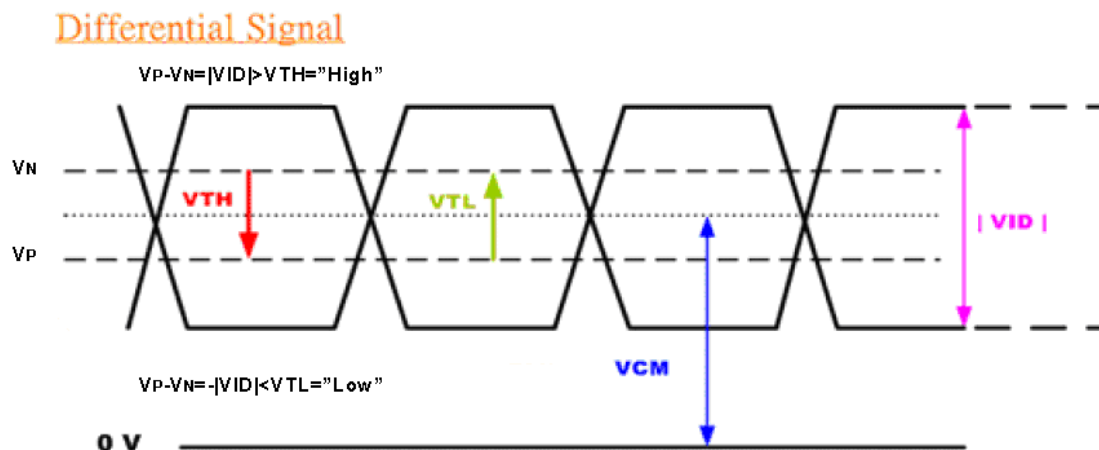
7. ELECTRICAL CHARACTERISTICS

GND=0V, f_{CLK}=40MHz, T_a=25

| 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} | | 185 | 250 | 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} | | 530 | 700 | mA | V _{DD} =5.0V |
| Ripple voltage | V _{RF} | - | - | 100 | mV _{P-P} | |
| “H” level logical input voltage | V _{IH} | 0.7V _{CC} | -- | V _{CC} | V | |
| “L” level logical input voltage | V _{IL} | 0 | -- | 0.3V _{CC} | V | |
| ADJ frequency | | 19K | 20K | 21K | Hz | |
| ADJ input voltage | V _{IH} | 3.0 | - | 3.3 | V | |
| | V _{IL} | 0 | - | 0.3 | V | |
| LED dice life time | | 10,000 | | - | Hr | Note 1 |
| Differential Input High Threshold | V _{TH} | - | - | 100 | [mV] | V _{CM} =1.2V |
| Differential input Low Threshold | V _{TL} | -100 | - | - | [mV] | V _{CM} =1.2V |
| Input Differential Voltage | V _{ID} | 100 | 400 | 600 | [mV] | |
| Differential Input Common Mode Voltage | V _{CM} | 1.1 | 1.2 | 1.45 | [V] | V _{TH} /V _{TL} =±100mV |

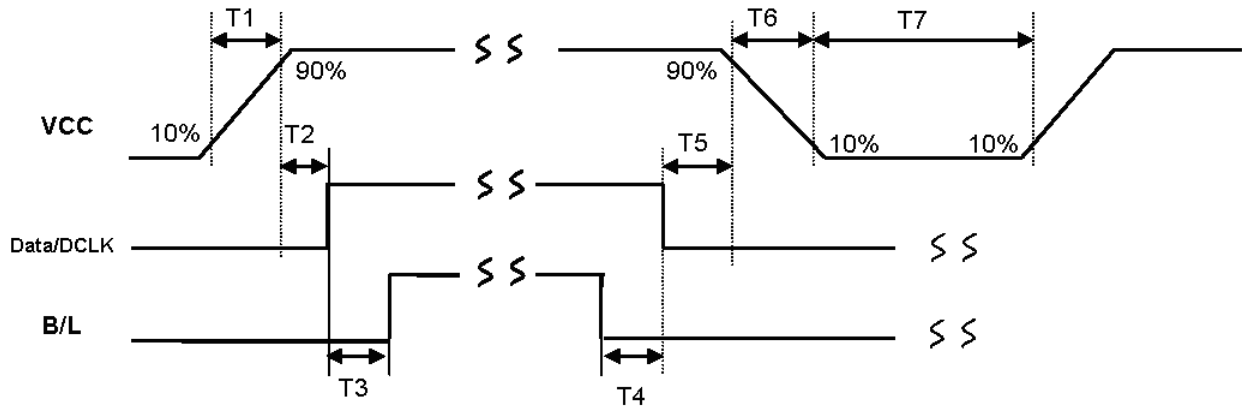
Note 1: The “LED dice life time” is defined as the brightness decrease to 50% original brightness that the ambient temperature is 18 ~28 and LED dice current=20mA.

Note 2: LVDS Signal Waveform.



8. Power sequence

The LCD panel power ON/OFF sequence is as below



| | Min. | Typ. | Max. | Unit |
|----|------|------|------|------|
| T1 | | | 20 | ms |
| T2 | 50 | | 200 | ms |
| T3 | 200 | | | ms |
| T4 | 200 | | | ms |
| T5 | 16 | | 50 | ms |
| T6 | | | 20 | ms |
| T7 | 1000 | | | ms |

9. AC CHARACTERISTICS

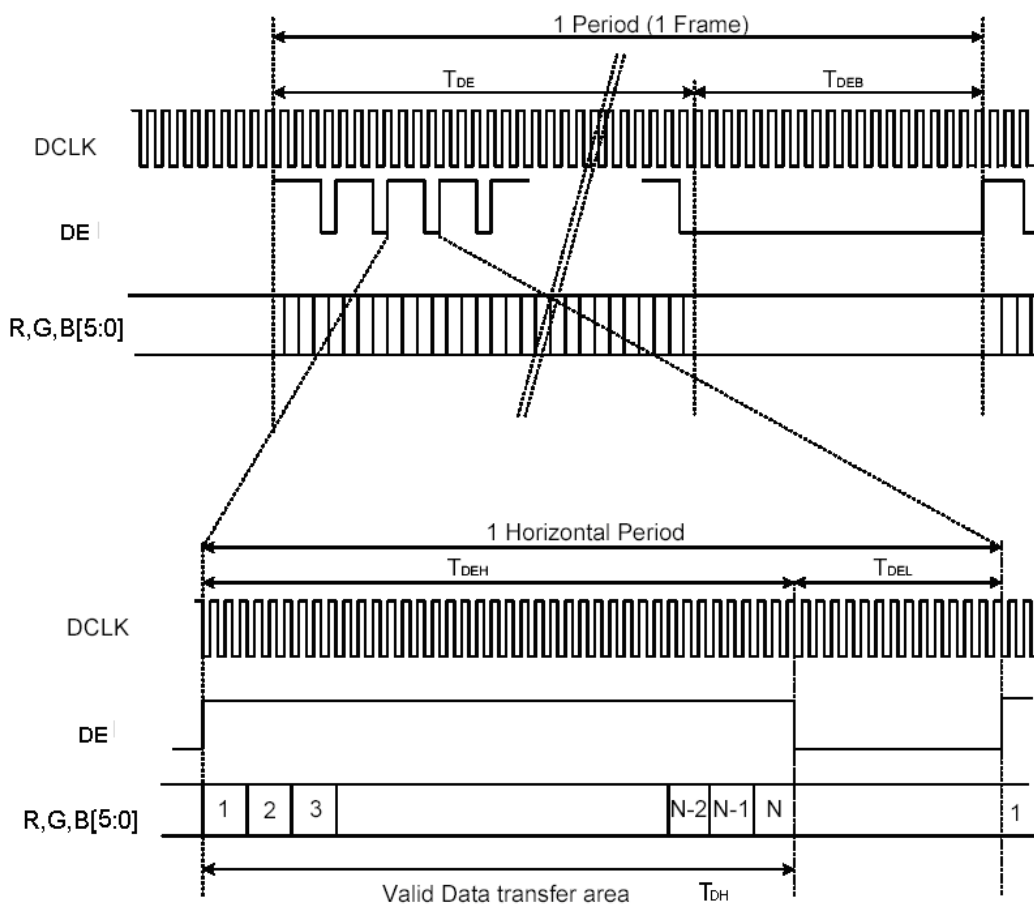
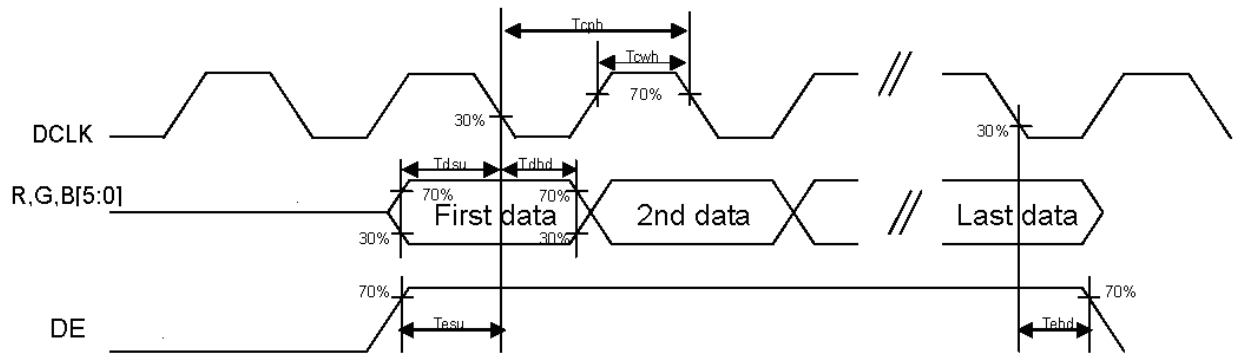
9.1 AC Electrical characteristic

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|--------|------|------|------|------|
| Data Setup Time | Tdsu | 8 | | | ns |
| Data Hold Time | Tdhd | 8 | | | ns |
| DE Setup Time | Tesu | 8 | | | ns |
| DE Hold Time | Tehd | 8 | | | ns |

9.2 Data timing

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|-------------------|------------------------------------|------|------|------|------------------------------------|
| DCLK frequency | F _{CPH} | 35 | 40 | 45 | MHz |
| DCLK period | T _{CPH} | 23 | 25 | 28.5 | ns |
| DCLK pulse duty | T _{CWH} | 40 | 50 | 60 | % |
| DE period | T _{DEH} +T _{DEL} | 862 | 1056 | 1200 | T _{CPH} |
| DE pulse width | T _{DH} | 800 | 800 | 800 | T _{CPH} |
| DE frame blanking | T _{DEB} | 24 | 35 | 100 | T _{DEH} +T _{DEL} |
| DE frame width | T _{DE} | 600 | 600 | 600 | T _{DEH} +T _{DEL} |

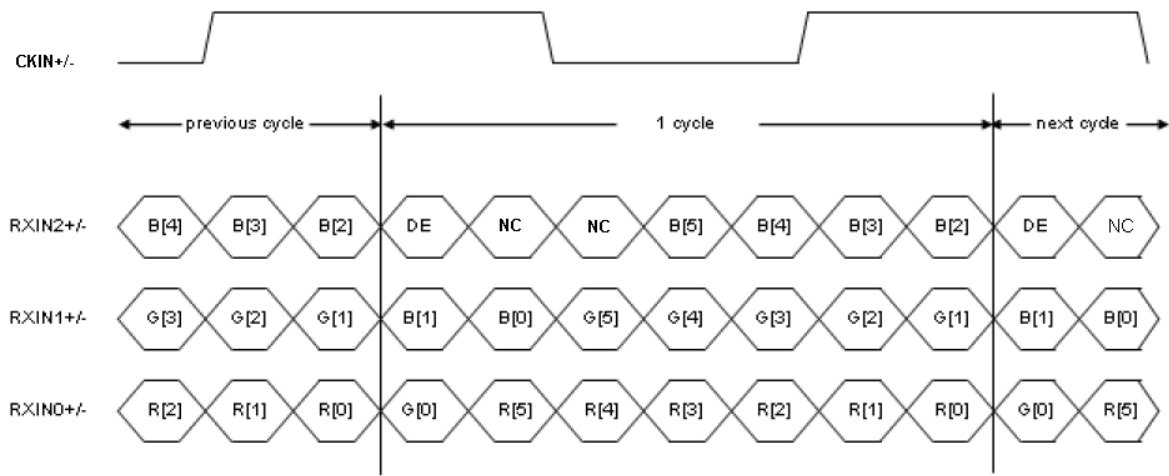
9.3 Timing wave form



N=800

Figure 1 DE Mode Data Format

9.4 LVDS Input Data Mapping



10. OPTICAL CHARACTERISTIC

Ta=25

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Note | |
|--------------------|--------|--|-------|-------|-------|-------------------|--------|--------|
| Response time | Tr | Viewing normal angle $\Theta=\Psi=0^\circ$, Center of Display | - | 5 | 10 | ms | Note:3 | |
| | Tf | | - | 15 | 20 | ms | | |
| Contrast ratio | CR | | 300 | 500 | - | - | Note:4 | |
| Color Chromaticity | White | | Wx | 0.26 | 0.31 | 0.36 | - | Note:5 |
| | | | Wy | 0.28 | 0.33 | 0.38 | | |
| | Red | | Rx | 0.523 | 0.573 | 0.623 | | |
| | | | Ry | 0.300 | 0.350 | 0.400 | | |
| | Green | | Gx | 0.286 | 0.336 | 0.386 | | |
| | | Gy | 0.547 | 0.597 | 0.647 | | | |
| | Blue | Bx | 0.102 | 0.152 | 0.202 | | | |
| | | By | 0.062 | 0.112 | 0.162 | | | |
| Viewing Angle | Hor. | Θ_R | CR 10 | 60 | 70 | - | Degree | Note:1 |
| | | Θ_L | | 60 | 70 | - | | |
| | Ver. | Φ_T | | 40 | 50 | - | | |
| | | Φ_B | | 50 | 60 | - | | |
| Brightness | - | - | 200 | 250 | - | Cd/m ² | Note:6 | |
| Uniformity | | | | 80 | | % | Note:7 | |

Note 1: Definition of viewing angle range

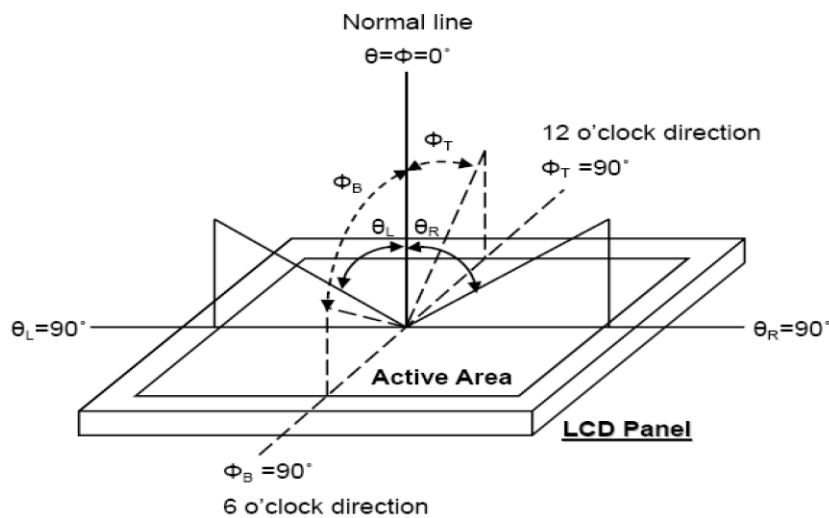


Fig.10-1 Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature and Adj=3.3V for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7A luminance meter 1.0° field of view at a distance of 50cm and normal direction.

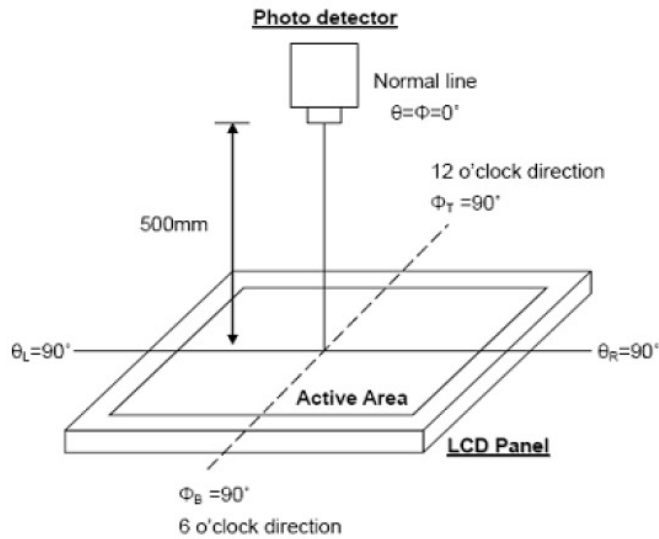


Fig. 10-2 Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between and “Black” state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%.

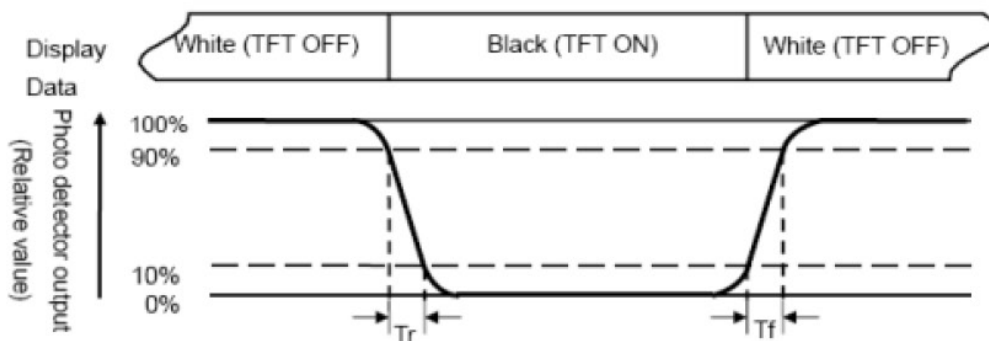


Fig 10-3 Definition of response time

Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$CR = \frac{\text{Luminance measured when LCD on the "white" state}}{\text{Brightness measured when LCD on the "black" state}}$$

Note 5: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 6: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 7:

$$\text{Uniformity} = \frac{\text{Brightness}(\text{min})}{\text{Brightness}(\text{max})} \times 100\%$$

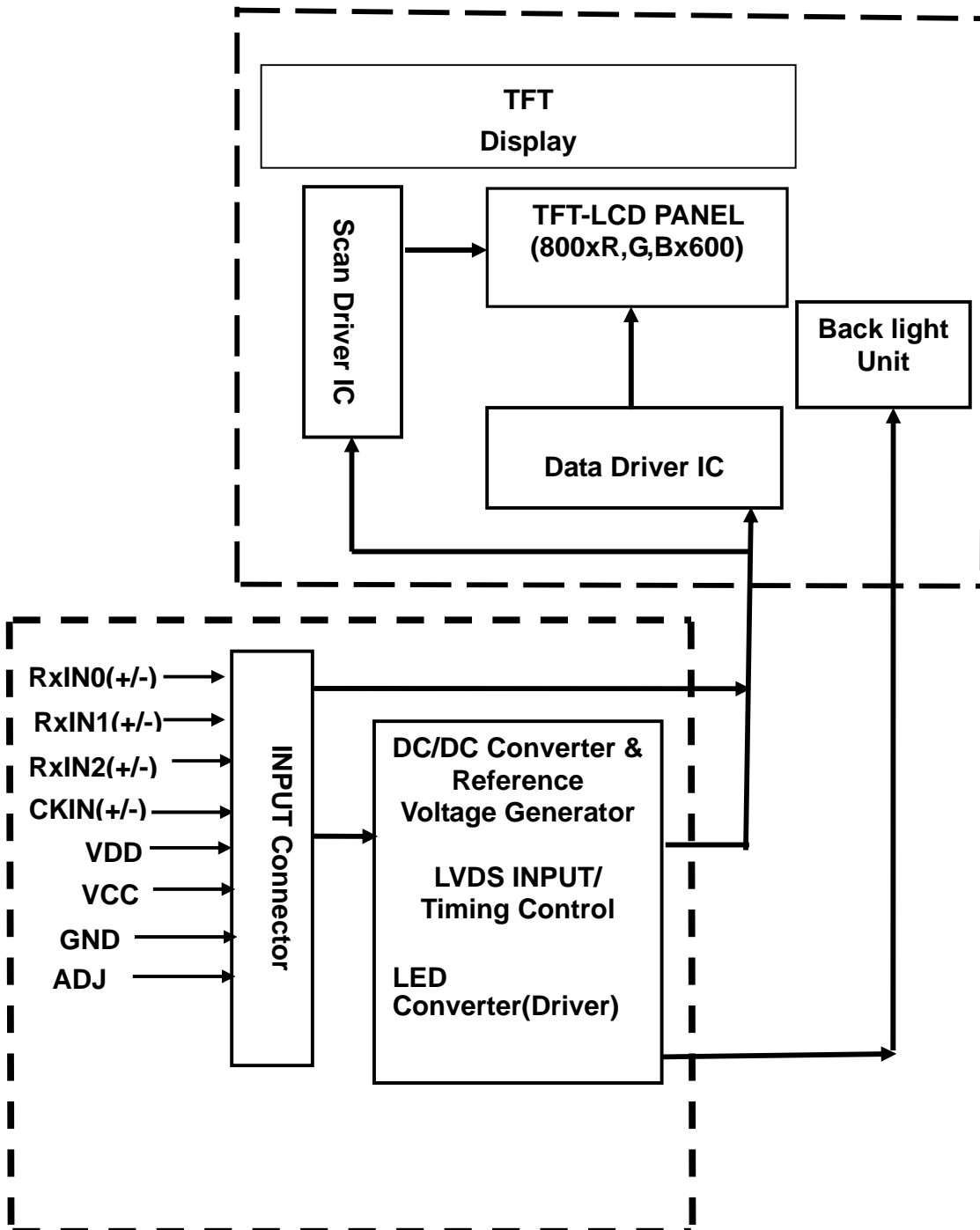
11. INTERFACE

| 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 20 KHz
- 3) GND PIN must be grounding, can not be floating.

12. BLOCK DIAGRAM



13.QUALITY ASSURANCE

13.1 Test Condition

13.1.1 Temperature and Humidity(Ambient Temperature)

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

Humidity : $65 \pm 5\%$

13.1.2 Operation

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

13.1.3 Container

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

13.1.4 Test Frequency

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

13.1.5 Test Method

| Reliability Test Item & Level | | Test Level |
|-------------------------------|---|---|
| No. | Test Item | |
| 1 | High Temperature Storage Test | Ta=60 , Dry 240hrs |
| 2 | Low Temperature Storage Test | Ta=-20 , Dry 240hrs |
| 3 | High Temperature Operation Test | Ta=50 , Dry 240hrs |
| 4 | Low Temperature Operation Test | Ta=-10 , Dry 240hrs |
| 5 | High Temperature and High Humidity Operation Test | Ta=50 ,80%RH,240hrs |
| 6 | Electro Static Discharge Test (No operation) | 150pF, 330 , $\pm 6\text{KV}(\text{Contact})/\pm 8\text{KV}(\text{Air})$, |
| 7 | Thermal Cycling Test (No operation) | -20 \rightarrow +25 , \rightarrow 60 100 Cycles (Dry) 30 min 5 min 30 min |
| 8 | 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 |
| 9 | Shock Test (No operation) | 100G, 6ms Direction: $\pm X, \pm Y, \pm Z$ Cycle: 3 times |

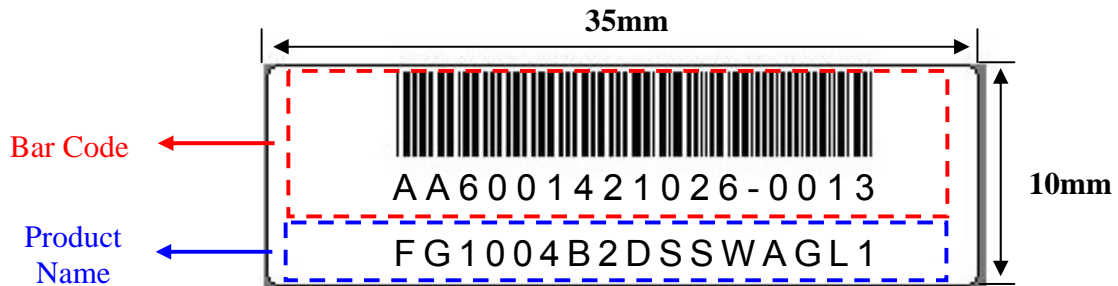
* Ta= Ambient Temperature

Note 1: The test samples have recovery time for 4 hours at room temperature before the function check. In the standard conditions, there is no display function NG issue occurred.

Note 2: All the cosmetic specifications are judged before the reliability stress.

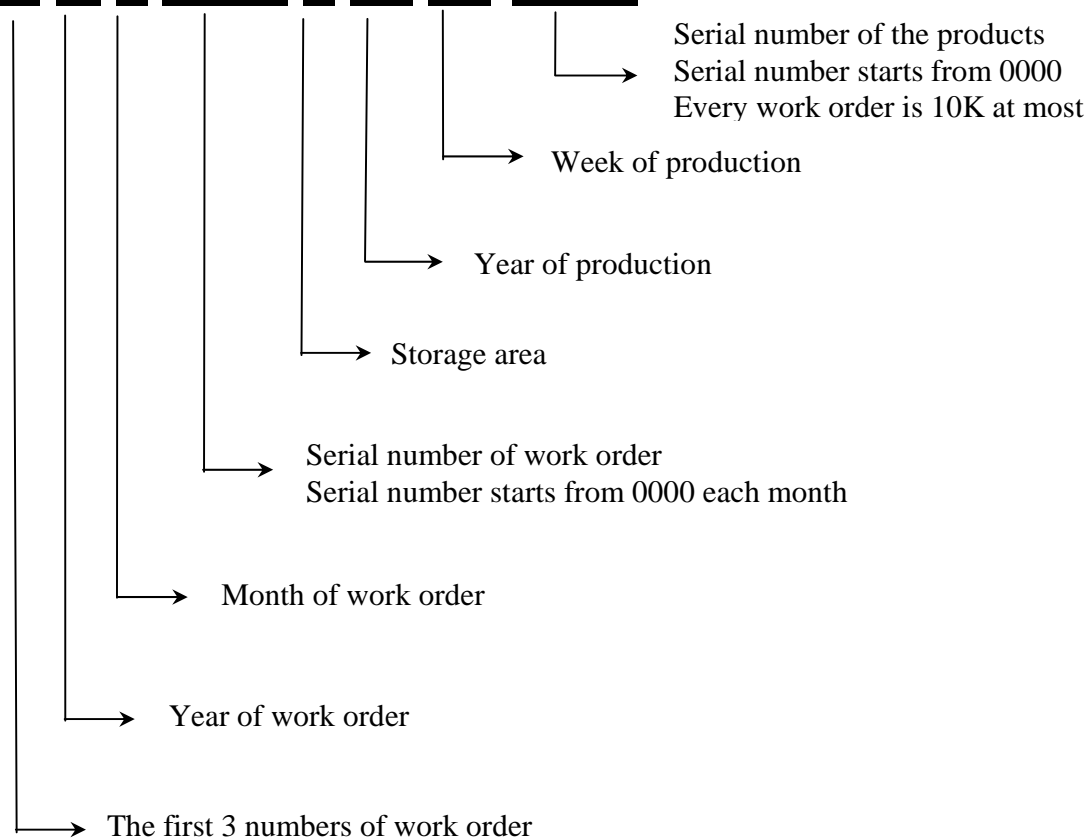
14. LCM PRODUCT LABEL DEFINE

Product Label style:

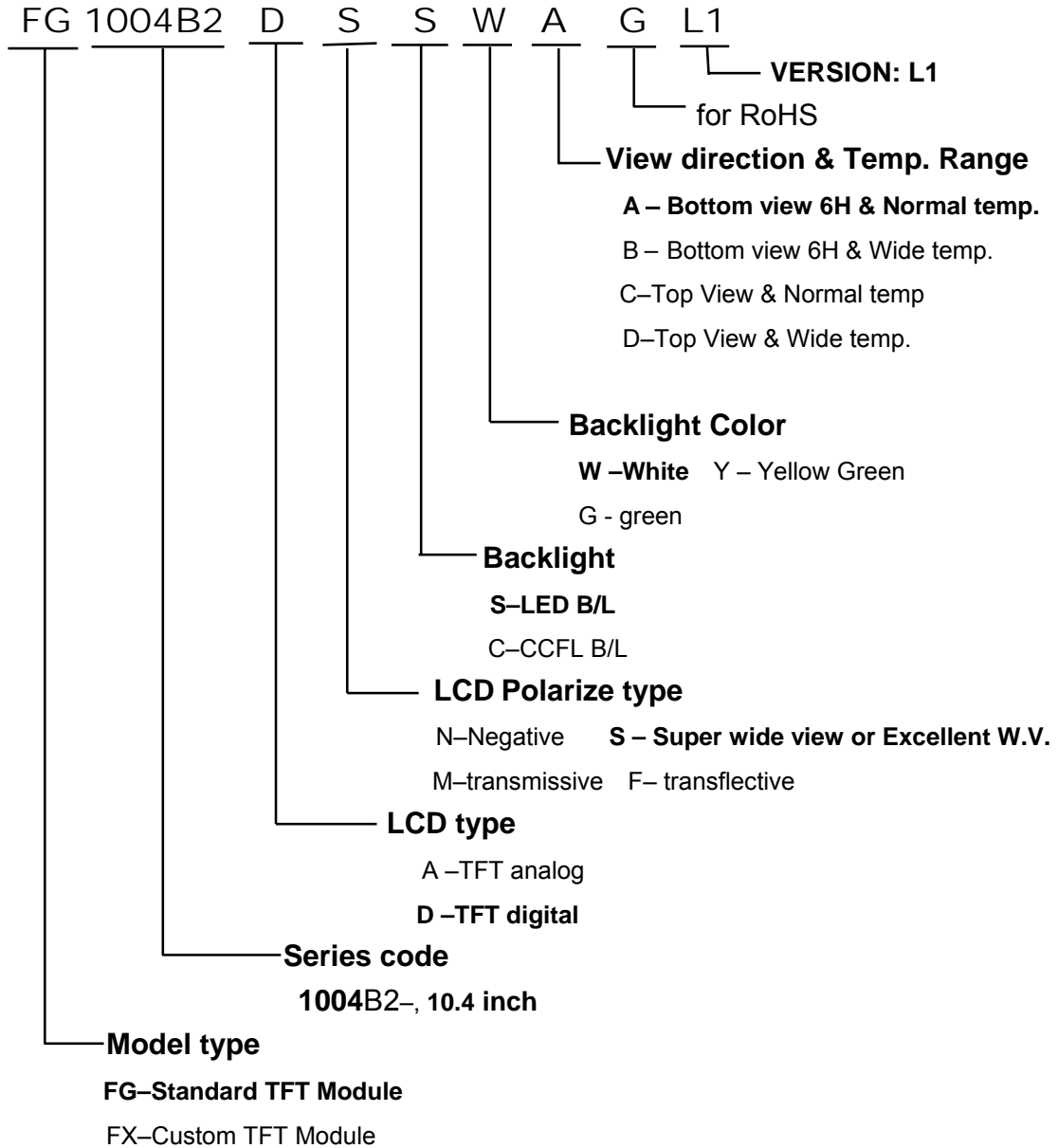


BarCode Define:

A A 6 0014 2 10 26-0013



Product Name Define:



15. 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.

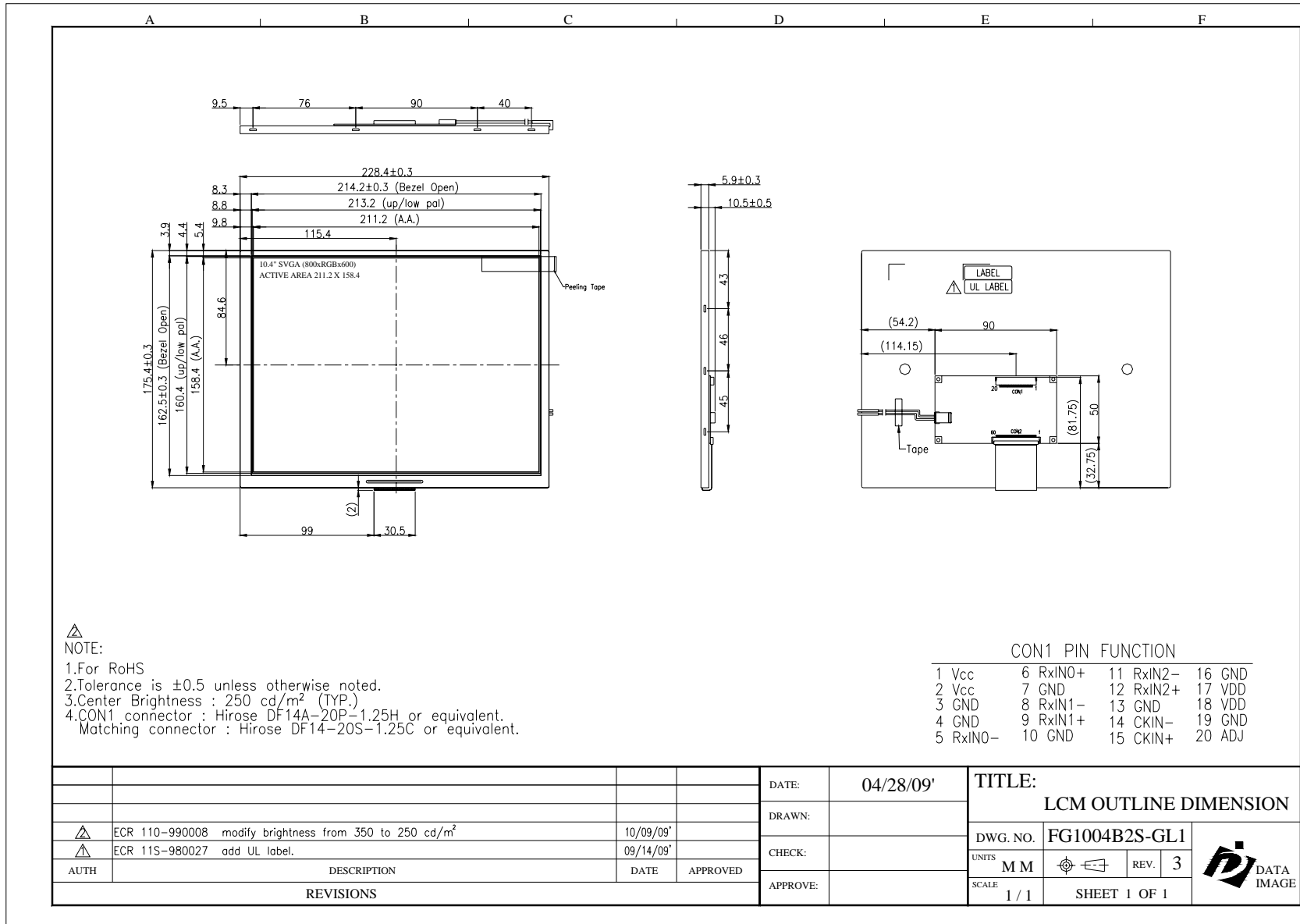
5. OTHERS

- (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.)

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.

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16. OUTLINE DRAWING



17.PACKAGE INFORMATION

TBD