

1234

TENTATIVE

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# FLC56UWC8V

## Specifications

★ Specifications are subject to change without notice.

|      |                          |
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| DATE | DOCUMENT CONTROL SECTION |
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|      |        |        |       |       |             |                     |                                          |   |                       |
|------|--------|--------|-------|-------|-------------|---------------------|------------------------------------------|---|-----------------------|
|      |        |        |       |       |             | TITLE<br>FLC56UWC8V |                                          |   |                       |
|      |        |        |       |       |             | DRAW. NO.           |                                          |   | CUST.                 |
|      |        |        |       |       |             |                     |                                          |   |                       |
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## 1. APPLICATION

This specification is applied to the 22-inch WUXGA supported TFT-LCD module.

## 2. PRODUCT NAME AND MODEL NUMBER

2-1 Product Name: LCD Module

2-2 Model Name: FLC56UWC8V

## 3. OVERVIEW

This LCD module has a TFT active matrix type liquid crystal panel 1920x1200 pixels, and diagonal size of 56cm(22-inch). This LCD has a LVDS dual interface and can display 16,777,216 colors.

The power supply of this LCD module is +12V DC single.

This module has the characteristics for applying TCO'99.

## 4. CONFIGURATION

This LCD module consists of a color TFT-LCD panel that is mounted with TFT driver ICs, a cold-cathode fluorescent tube back-light.

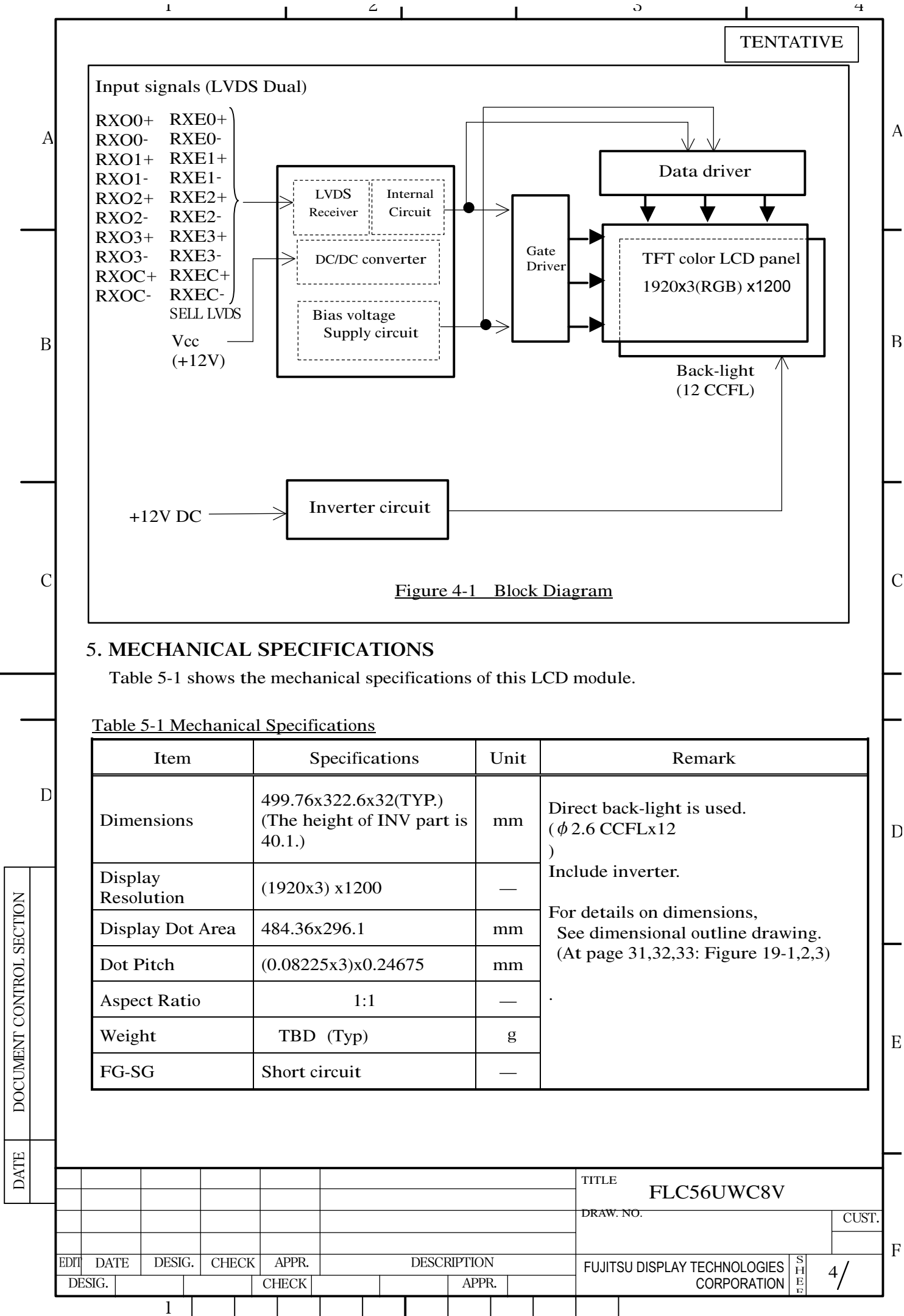
The inverter for the backlight is included.

Figure 4-1 shows a block diagram of this LCD module.

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|        |      |        |       |       |             | DRAW. NO.                                |  | CUST.      |  |
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## 6. ABSOLUTE MAXIMUM RATING

Table 6-1 shows the absolute maximum rating of this LCD module.

Table 6-1 Absolute Maximum Rating

| Item                                                    | Symbol           | Condition | MIN. | TYP. | MAX.             | Unit |
|---------------------------------------------------------|------------------|-----------|------|------|------------------|------|
| Supply Voltage                                          | V <sub>CC</sub>  | Ta=25°C   | −0.3 | —    | 14.0             | V    |
|                                                         | V <sub>INV</sub> | Ta=25°C   | −0.3 | —    | 14.0             | V    |
| Input Signal Voltage<br>(LVDS signal, PD,<br>SELI LVDS) | V <sub>IN</sub>  | Ta=25°C   | −0.3 | —    | 3.6              | V    |
| Control Voltage                                         | V <sub>CNT</sub> | Ta=25°C   | −0.3 | —    | V <sub>INV</sub> | V    |
| Brightness<br>Control Voltage                           | V <sub>VR4</sub> | Ta=25°C   | 0    | —    | 4.0              | V    |

## 7. RECOMMENDED OPERATING CONDITIONS

Table 7-1 shows the recommended operating conditions of this LCD module.

Table 7-1 Recommended Operating Conditions

| Item                      |                 | Symbol           | MIN. | TYP. | MAX. | Unit |
|---------------------------|-----------------|------------------|------|------|------|------|
| Supply Voltage (Logic)    |                 | V <sub>CC</sub>  | 11.5 | 12.0 | 12.5 | V    |
| Supply Voltage (Inverter) |                 | V <sub>INV</sub> | 10.8 | 12.0 | 13.2 | V    |
| Ripple Voltage            | V <sub>CC</sub> | V <sub>RP</sub>  | —    | —    | 0.1  | V    |

## 8. ELECTRICAL SPECIFICATIONS

Table 8-1 shows the electrical specifications of this LCD module. Figure 8-1 shows the measurement circuit. Figure 8-2(A) shows the equivalent circuit of the logic signal input area. Figure 8-2(B) shows the equivalent circuit of the supply voltage Input area.

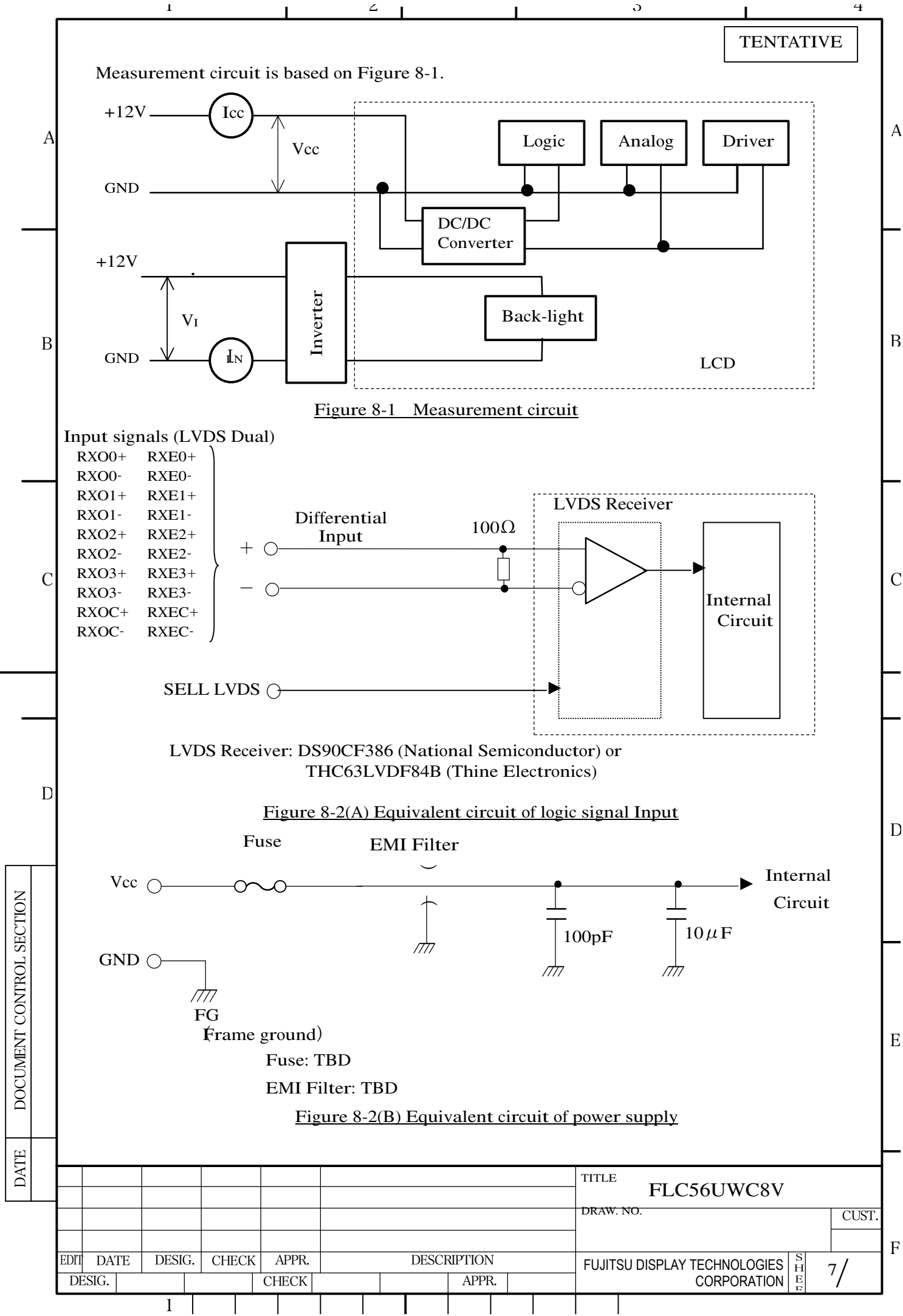
Table 8-1 Electrical Specifications

| Item                                             |                            | Symbol           | Condition                                                                | MIN. | TYP.  | MAX.             | Unit | Remark |
|--------------------------------------------------|----------------------------|------------------|--------------------------------------------------------------------------|------|-------|------------------|------|--------|
| Differential-input Voltage (High)                |                            | V <sub>IH</sub>  | V <sub>CM</sub> =+1.2V                                                   | —    | —     | 100              | mV   |        |
| Differential-input Voltage (Low)                 |                            | V <sub>IL</sub>  |                                                                          | -100 | —     | —                | mV   |        |
| Supply Current                                   |                            | I <sub>CC</sub>  | V <sub>CC</sub> =+12.0±0.5V<br>V <sub>SS</sub> =0V<br>DCLK=81MHz<br>60Hz | —    | (800) | (1500)           | mA   | *1     |
| Supply Rush Current                              |                            | I <sub>SCC</sub> |                                                                          | —    | —     | TBD              | A    | *2     |
| Supply Rush Current Duration (1A excess)         |                            | T <sub>SCC</sub> |                                                                          | —    | —     | TBD              | ms   |        |
| B<br>A<br>C<br>K<br>L<br>I<br>G<br>H<br>T<br>(*) | Supply Current             | I <sub>INV</sub> | V <sub>INV</sub> =12.0V<br>V <sub>VR4</sub> =0V                          | —    | (7.5) | TBD              | A    | *3     |
|                                                  | Brightness Control Voltage | V <sub>VR</sub>  |                                                                          | 0    | —     | 3.5              | V    |        |
|                                                  | Lighting Frequency         | f                | V <sub>INV</sub> =12.0V,<br>V <sub>VR4</sub> =0V                         | —    | TBD   | —                | kHz  |        |
|                                                  | Lighting Fix Voltage       | V <sub>cnt</sub> |                                                                          | 0    | —     | 0.8              | V    |        |
|                                                  | Non-Lighting Fix Voltage   | V <sub>cnt</sub> |                                                                          | 2.1  | —     | V <sub>INV</sub> |      |        |

(\*1) Typical current situation : Color bar pattern. V<sub>CC</sub>=12.0V  
Maximum current situation: 2pixel checker pattern. V<sub>CC</sub>=11.5V  
Without rush current.

(\*2) These items prescribe the rush current for starting internal DC/DC.  
Charging current to capacitors of V<sub>CC</sub> is not prescribed.

(\*3) External power supply for inverter shall have the current capacity more than (TBD)A of the supply current (I<sub>INV</sub>), otherwise the protective circuit of inverter (fuse) might not work.



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9. OPTICAL SPECIFICATIONS

Table 9-1 shows the optical specifications of this LCD module.

Table 9-1 Optical Specifications

Ta=25°C

| Item                                          |               | Symbol         | Condition                                                                                                    |                          | Specifications                       |       |       | Unit              | Remark                   |                   |  |  |  |  |  |
|-----------------------------------------------|---------------|----------------|--------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------|-------|-------|-------------------|--------------------------|-------------------|--|--|--|--|--|
|                                               |               |                |                                                                                                              |                          | MIN.                                 | TYP.  | MAX.  |                   | Note                     |                   |  |  |  |  |  |
| Visual Angle                                  | Horizontal    | $\theta_{L,R}$ | CR $\geq$ 10                                                                                                 | $\theta_{U,D}=0^{\circ}$ | 85                                   | —     | —     | deg               |                          | (1)(2)            |  |  |  |  |  |
|                                               | Vertical      | $\theta_{U,D}$ |                                                                                                              | $\theta_{L,R}=0^{\circ}$ | 85                                   | —     | —     | deg               |                          | (3)(5)            |  |  |  |  |  |
|                                               | All Direction | $\theta$       |                                                                                                              |                          | —                                    | 80    | —     | deg               |                          | (6)               |  |  |  |  |  |
| Contrast Ratio                                |               | CR             | $\theta_{L,R,U,D}=0^{\circ}$                                                                                 |                          | 350                                  | 600   | —     | —                 | White/Black              | (1)(2)<br>(3)(5)  |  |  |  |  |  |
| Response Time (ON)<br>(B→W)                   |               | $t_{on}$       | $\theta_{L,R,U,D}=0^{\circ}$                                                                                 | Ta=25°C                  | —                                    | 15    | 30    | ms                |                          | (1)<br>(4)<br>(5) |  |  |  |  |  |
|                                               |               |                |                                                                                                              | Ta=0°C                   | —                                    | 50    | 100   | ms                |                          |                   |  |  |  |  |  |
| Response Time (OFF)<br>(W→B)                  |               | $t_{off}$      | $\theta_{L,R,U,D}=0^{\circ}$                                                                                 | Ta=25°C                  | —                                    | 10    | 25    | ms                |                          |                   |  |  |  |  |  |
|                                               |               |                |                                                                                                              | Ta=0°C                   | —                                    | 50    | 100   | ms                |                          |                   |  |  |  |  |  |
| Response Time (ON or OFF)<br>(All gray scale) |               | $t_{avg}$      | $\theta_{L,R,U,D}=0^{\circ}$                                                                                 | Ta=25°C<br>47~63 H z     | —                                    | 15    | —     | ms                | Average of Response Time |                   |  |  |  |  |  |
| Brightness                                    |               | I              | $\theta_{L,R,U,D}=0^{\circ}$<br>V <sub>CC</sub> =12.0V<br>V <sub>INV</sub> =12.0V<br>(At maximum Brightness) |                          | 400                                  | 500   |       | cd/m <sup>2</sup> | White<br>*1              | (1)(5)            |  |  |  |  |  |
| Brightness Uniformity                         |               | $\Delta I$     |                                                                                                              |                          | 70                                   | —     | —     | %                 |                          | (1)(5)<br>(7)     |  |  |  |  |  |
| Chromaticity                                  | W             | x              |                                                                                                              |                          | 0.283.                               | 0.313 | 0.343 | —                 |                          | (1)<br>(5)        |  |  |  |  |  |
|                                               |               | y              |                                                                                                              |                          | 0.299                                | 0.329 | 0.359 | —                 |                          |                   |  |  |  |  |  |
|                                               | R<br>G<br>B   | (x y)          |                                                                                                              | Red                      | (TBD) Typ.                           |       |       |                   |                          |                   |  |  |  |  |  |
|                                               |               |                |                                                                                                              | Green                    | (TBD) Typ.                           |       |       |                   |                          |                   |  |  |  |  |  |
|                                               |               |                |                                                                                                              | Blue                     | (TBD) Typ.                           |       |       |                   |                          |                   |  |  |  |  |  |
| LCD Panel Type                                |               |                |                                                                                                              |                          | TFT Color                            |       |       |                   |                          |                   |  |  |  |  |  |
| Display Mode                                  |               |                |                                                                                                              |                          | Normally Black                       |       |       |                   |                          |                   |  |  |  |  |  |
| Wide Viewing Angle Technology                 |               |                |                                                                                                              |                          | MVA                                  |       |       |                   |                          |                   |  |  |  |  |  |
| Optimum Viewing Angle                         |               |                |                                                                                                              |                          | — (Symmetry)                         |       |       |                   |                          | (6)               |  |  |  |  |  |
| Display Color                                 |               |                |                                                                                                              |                          | 16,777,216 (8-bit color)             |       |       |                   |                          |                   |  |  |  |  |  |
| Color of non-display area                     |               |                |                                                                                                              |                          | Black                                |       |       |                   |                          |                   |  |  |  |  |  |
| Surface Treatment                             |               |                |                                                                                                              |                          | Anti-glare<br>(Haze value: 15%), 2H) |       |       |                   |                          |                   |  |  |  |  |  |

(\*1) Value at 15~20 minutes after lighting on.

(Note) CS-1000 (MINOLTA Co. Ltd.) , BM-5A (Topcon) and the like should be used as a luminance colorimeter.

Field=1° , L=500mm

Dark room condition (1 lux or less)

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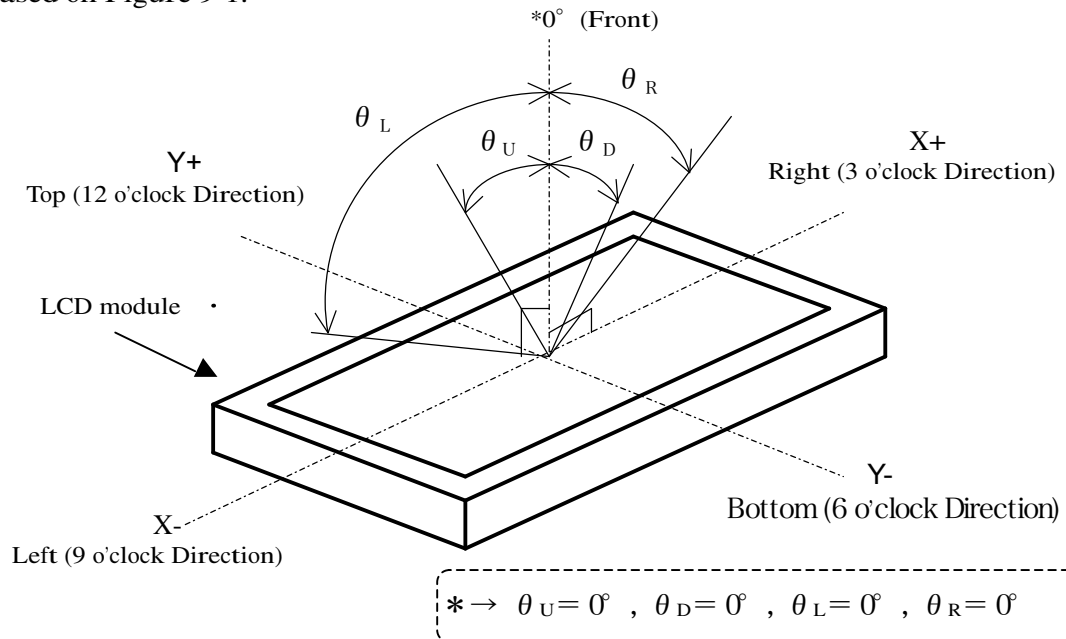
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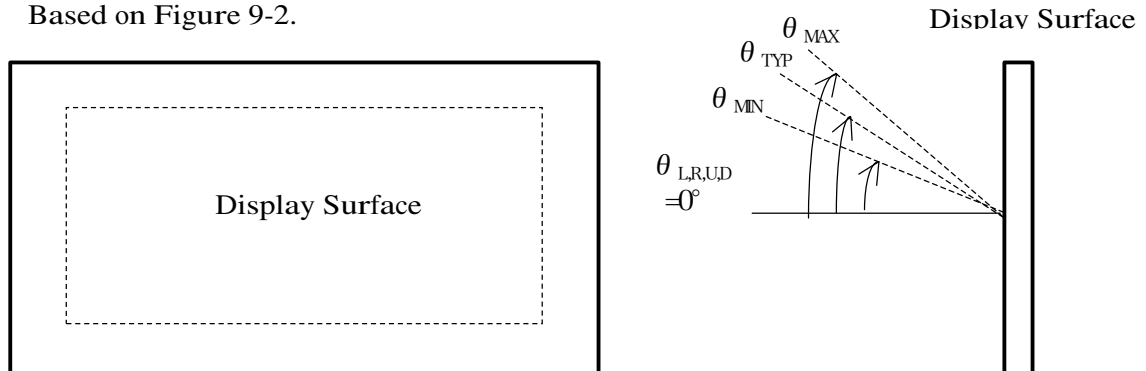
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Note 1) Definition of Viewing Angle (1)

Based on Figure 9-1.

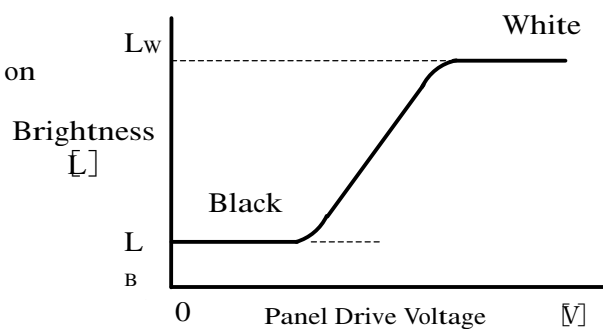
Figure 9-1 Definition of Viewing Angle (1)Note 2) Definition of Viewing Angle (2)

Based on Figure 9-2.

Figure 9-2 Definition of Viewing Angle (2)Note 3) Definition of Contrast Ratio (CR)

Determined by Formula (1) based on Figure 9-3 Voltage-Brightness characteristics.

$$= \frac{L_W (\text{Brightness at white})}{L_B (\text{Brightness at black})} \cdots \cdots (1)$$

Figure 9-3 Voltage-Brightness Characteristics

|        |      |        |       |       |             |
|--------|------|--------|-------|-------|-------------|
|        |      |        |       |       |             |
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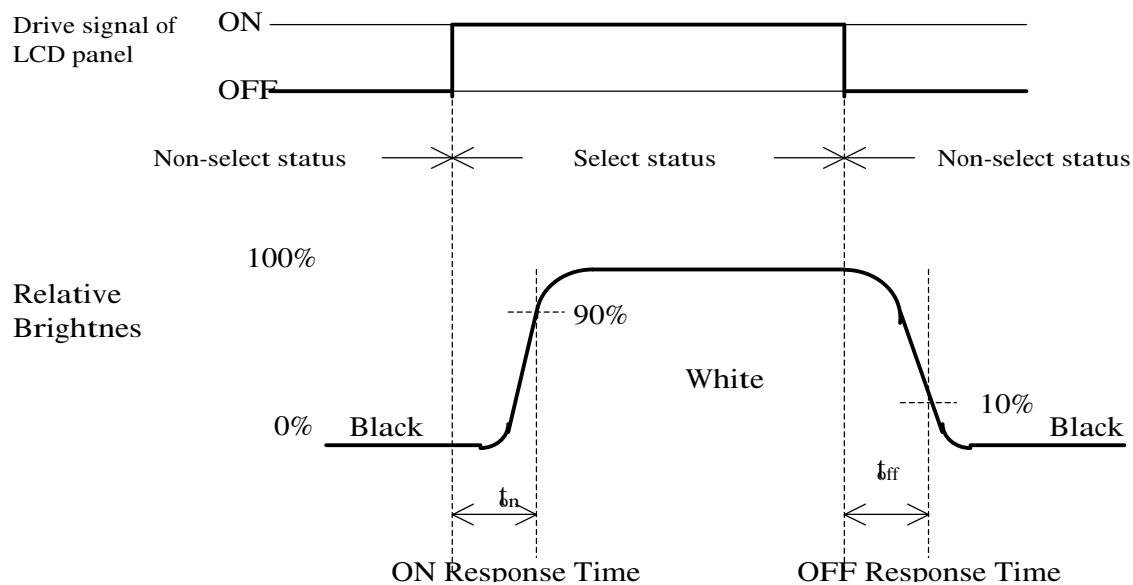
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#### Note 4) Definition of Response Time

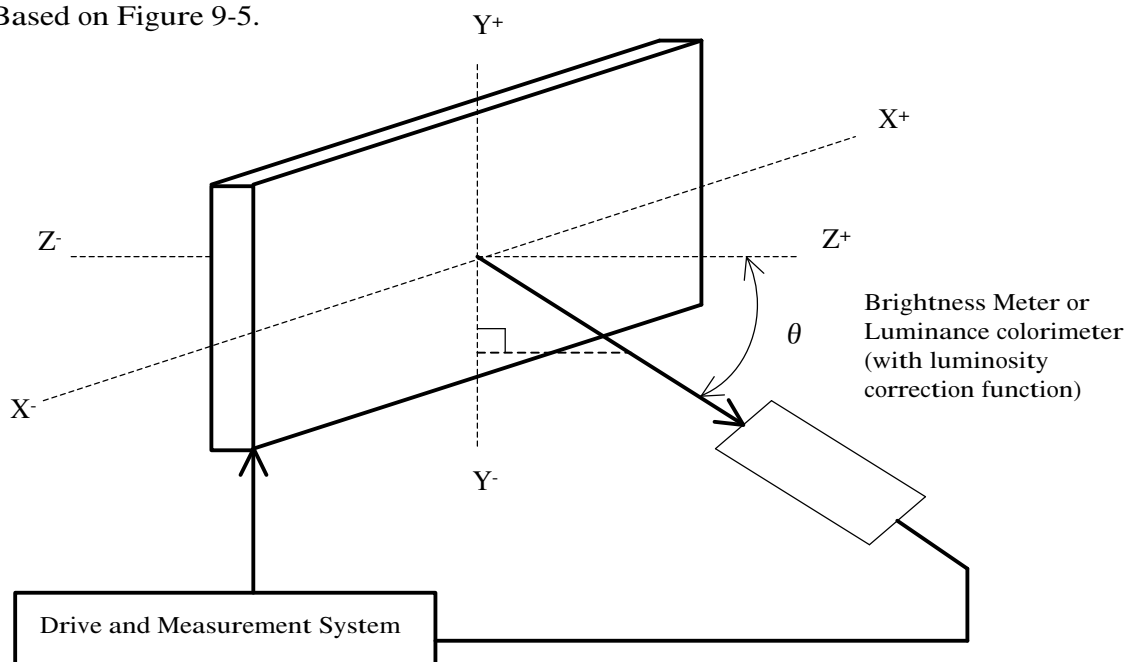
Based on Figure 9-4.



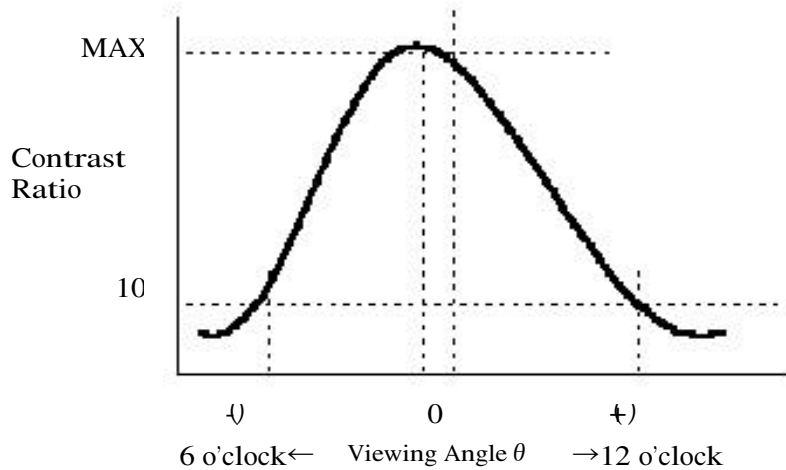
### Figure 9-4 Definition of Response Time

### Note 5) Contrast Ratio and Response Measurement System

Based on Figure 9-5.



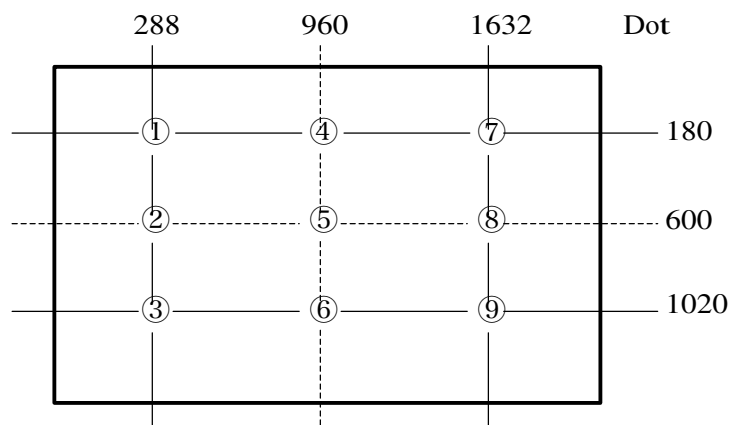
**Figure 9-5 Contrast Ratio and Response Time Measurement System**

Note 6) Definition of Optimum Viewing AngleFigure 9-6 Definition of Viewing AngleNote 7) Definition of Brightness Uniformity

Brightness uniformity is defined by the following formula.

Brightness (I1~I9) are measured at the following 9 points (①~⑨) on the display area that is shown in Figure 9-7.

$$\text{Brightness Uniformity } (\Delta L) \equiv \frac{|\text{Min. In}|}{|\text{Max. In}|} \times 100 (\%), n = 1 \text{ to } 9$$



Note) Each measurement point (①~⑨) defines the center spot of view of Brightness Meter.  
The tolerance of measurement position is  $\pm 3\text{mm}$ .

Figure 9-7 Measurement Points

## 10. INTERFACE SPECIFICATIONS

### 10-1 Signal descriptions

Table 10-1 shows the description and configuration of interface signals (CN1).

Table 10-1 Interface signals (CN1)

| Pin No. | Symbol    | I/O | Function                    |
|---------|-----------|-----|-----------------------------|
| 1       | RxO0-     | I   | Negative differential input |
| 2       | RxO0+     | I   | Positive differential input |
| 3       | RxO1-     | I   | Negative differential input |
| 4       | RxO1+     | I   | Positive differential input |
| 5       | RxO2-     | I   | Negative differential input |
| 6       | RxO2+     | I   | Positive differential input |
| 7       | GND       | —   | G round                     |
| 8       | RxOC-     | I   | Negative differential input |
| 9       | RxOC+     | I   | Positive differential input |
| 10      | RxO3-     | I   | Negative differential input |
| 11      | RxO3+     | I   | Positive differential input |
| 12      | RxE0-     | I   | Negative differential input |
| 13      | RxE0+     | I   | Positive differential input |
| 14      | GND       | —   | G round                     |
| 15      | RxE1-     | I   | Negative differential input |
| 16      | RxE1+     | I   | Positive differential input |
| 17      | GND       | —   | G round                     |
| 18      | RxE2-     | I   | Negative differential input |
| 19      | RxE2+     | I   | Positive differential input |
| 20      | RxEC-     | I   | Negative differential input |
| 21      | RxEC+     | I   | Positive differential input |
| 22      | RxE3-     | I   | Negative differential input |
| 23      | RxE3+     | I   | Positive differential input |
| 24      | GND       | —   | G round                     |
| 25      | SELL LVDS | I   | Select LVDS data order *1   |
| 26      | TST       | —   | Test pin *2                 |
| 27      | TST       | —   | Test pin *2                 |
| 28      | Vcc       | —   | +12V power supply           |
| 29      | Vcc       | —   | +12V power supply           |
| 30      | Vcc       | —   | +12V power supply           |

Connector : FI-X30S-HF (Japan Aviation Electronics)

User's connector : FI-X30M (Japan Aviation Electronics)

FI-X30H

FI-X30C

\*1: 3.3V CMOS Signal input. (High or Low)

\*2: Keep open. (Internal test use only.)

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## 10-2 LVDS Data Assignment

Table 10-2 shows the LVDS Data Assignment.

Table 10-2 LVDS Data Assignment

| Input signal *1 |      |      | Transmitter<br>DS90CF383,C385 |        | Interface connector |                          |          | Receiver<br>DS90CF386  |         | LCD input<br>(Sell LVDS) |         |
|-----------------|------|------|-------------------------------|--------|---------------------|--------------------------|----------|------------------------|---------|--------------------------|---------|
| SELL<br>LVDS    | Low  | High | pin                           | INPUT  | System side         | LCD module               |          | pin                    | OUTPUT  | Low                      | High    |
|                 |      |      |                               |        |                     | pin                      |          |                        |         |                          |         |
| LVDS<br>Odd     | RO2  | RO0  | 51                            | TxIN0  | Tx OUT0+            | 2                        | RxO0+    | 27                     | RxOUT0  | RO2                      | RO0     |
|                 | RO3  | RO1  | 52                            | TxIN1  |                     |                          |          | 29                     | RxOUT1  | RO3                      | RO1     |
|                 | RO4  | RO2  | 54                            | TxIN2  |                     |                          |          | 30                     | RxOUT2  | RO4                      | RO2     |
|                 | RO5  | RO3  | 55                            | TxIN3  |                     |                          |          | 32                     | RxOUT3  | RO5                      | RO3     |
|                 | RO6  | RO4  | 56                            | TxIN4  | Tx OUT0-            | 1                        | RxO0-    | 33                     | RxOUT4  | RO6                      | RO4     |
|                 | RO7  | RO5  | 3                             | TxIN6  |                     |                          |          | 35                     | RxOUT6  | RO7                      | RO5     |
|                 | GO2  | GO0  | 4                             | TxIN7  |                     |                          |          | 37                     | RxOUT7  | GO2                      | GO0     |
|                 | GO3  | GO1  | 6                             | TxIN8  |                     |                          |          | 38                     | RxOUT8  | GO3                      | GO1     |
|                 | GO4  | GO2  | 7                             | TxIN9  | Tx OUT1+            | 4                        | RxO1+    | 39                     | RxOUT9  | GO4                      | GO2     |
|                 | GO5  | GO3  | 11                            | TxIN12 |                     |                          |          | 43                     | RxOUT12 | GO5                      | GO3     |
|                 | GO6  | GO4  | 12                            | TxIN13 |                     |                          |          | 45                     | RxOUT13 | GO6                      | GO4     |
|                 | GO7  | GO5  | 14                            | TxIN14 |                     |                          |          | 46                     | RxOUT14 | GO7                      | GO5     |
|                 | BO2  | BO0  | 15                            | TxIN15 | Tx OUT1-            | 3                        | RxO1-    | 47                     | RxOUT15 | BO2                      | BO0     |
|                 | BO3  | BO1  | 19                            | TxIN18 |                     |                          |          | 51                     | RxOUT18 | BO3                      | BO1     |
|                 | BO4  | BO2  | 20                            | TxIN19 |                     |                          |          | 53                     | RxOUT19 | BO4                      | BO2     |
|                 | BO5  | BO3  | 22                            | TxIN20 |                     |                          |          | 54                     | RxOUT20 | BO5                      | BO3     |
|                 | BO6  | BO4  | 23                            | TxIN21 | Tx OUT2+            | 6                        | RxO2+    | 55                     | RxOUT21 | BO6                      | BO4     |
|                 | BO7  | BO5  | 24                            | TxIN22 |                     |                          |          | 1                      | RxOUT22 | BO7                      | BO5     |
|                 | RSVD | RSVD | 27                            | TxIN24 |                     |                          |          | 3                      | RxOUT24 | Not use                  | Not use |
|                 | RSVD | RSVD | 28                            | TxIN25 |                     |                          |          | 5                      | RxOUT25 | Not use                  | Not use |
|                 | ENAB | ENAB | 30                            | TxIN26 | Tx OUT2-            | 5                        | RxO2-    | 6                      | RxOUT26 | ENAB                     | ENAB    |
|                 | RO0  | RO6  | 50                            | TxIN27 |                     |                          |          | 7                      | RxOUT27 | RO0                      | RO6     |
|                 | RO1  | RO7  | 2                             | TxIN5  |                     |                          |          | 34                     | RxOUT5  | RO1                      | RO7     |
|                 | GO0  | GO6  | 8                             | TxIN10 |                     |                          |          | 41                     | RxOUT1  | GO0                      | GO6     |
|                 | GO1  | GO7  | 10                            | TxIN11 | Tx OUT3+            | 11                       | RxO3+    | 42                     | RxOUT11 | GO1                      | GO7     |
|                 | BO0  | BO6  | 16                            | TxIN16 |                     |                          |          | 49                     | RxOUT16 | BO0                      | BO6     |
|                 | BO1  | BO7  | 18                            | TxIN17 |                     |                          |          | 50                     | RxOUT17 | BO1                      | BO7     |
|                 | RSVD | RSVD | 25                            | TxIN23 |                     |                          |          | 2                      | RxOUT23 | Not use                  | Not use |
|                 |      | DCLK |                               | 31     | TxCLK IN            | TxCLK OUT+<br>TxCLK OUT- | 9<br>8   | RxCLK IN+<br>RxCLK IN- | 26      | RxCLK OUT                | DCLK    |
| LVDS<br>Even    | RE2  | RE0  | 51                            | TxIN0  | Tx OUT0+            | 13                       | RxEO+    | 27                     | RxOUT0  | RE2                      | RE0     |
|                 | RE3  | RE1  | 52                            | TxIN1  |                     |                          |          | 29                     | RxOUT1  | RE3                      | RE1     |
|                 | RE4  | RE2  | 54                            | TxIN2  |                     |                          |          | 30                     | RxOUT2  | RE4                      | RE2     |
|                 | RE5  | RE3  | 55                            | TxIN3  |                     |                          |          | 32                     | RxOUT3  | RE5                      | RE3     |
|                 | RE6  | RE4  | 56                            | TxIN4  | Tx OUT0-            | 12                       | RxEO-    | 33                     | RxOUT4  | RE6                      | RE4     |
|                 | RE7  | RE5  | 3                             | TxIN6  |                     |                          |          | 35                     | RxOUT6  | RE7                      | RE5     |
|                 | GE2  | GE0  | 4                             | TxIN7  |                     |                          |          | 37                     | RxOUT7  | GE2                      | GE0     |
|                 | GE3  | GE1  | 6                             | TxIN8  |                     |                          |          | 38                     | RxOUT8  | GE3                      | GE1     |
|                 | GE4  | GE2  | 7                             | TxIN9  | Tx OUT1+            | 16                       | RxE1+    | 39                     | RxOUT9  | GE4                      | GE2     |
|                 | GE5  | GE3  | 11                            | TxIN12 |                     |                          |          | 43                     | RxOUT12 | GE5                      | GE3     |
|                 | GE6  | GE4  | 12                            | TxIN13 |                     |                          |          | 45                     | RxOUT13 | GE6                      | GE4     |
|                 | GE7  | GE5  | 14                            | TxIN14 |                     |                          |          | 46                     | RxOUT14 | GE7                      | GE5     |
|                 | BE2  | BE0  | 15                            | TxIN15 | Tx OUT1-            | 15                       | RxE1-    | 47                     | RxOUT15 | BE2                      | BE0     |
|                 | BE3  | BE1  | 19                            | TxIN18 |                     |                          |          | 51                     | RxOUT18 | BE3                      | BE1     |
|                 | BE4  | BE2  | 20                            | TxIN19 |                     |                          |          | 53                     | RxOUT19 | BE4                      | BE2     |
|                 | BE5  | BE3  | 22                            | TxIN20 |                     |                          |          | 54                     | RxOUT20 | BE5                      | BE3     |
|                 | BE6  | BE4  | 23                            | TxIN21 | Tx OUT2+            | 19                       | RxE2+    | 55                     | RxOUT21 | BE6                      | BE4     |
|                 | BE7  | BE5  | 24                            | TxIN22 |                     |                          |          | 1                      | RxOUT22 | BE7                      | BE5     |
|                 | RSVD | RSVD | 27                            | TxIN24 |                     |                          |          | 3                      | RxOUT24 | Not use                  | Not use |
|                 | RSVD | RSVD | 28                            | TxIN25 |                     |                          |          | 5                      | RxOUT25 | Not use                  | Not use |
|                 | RSVD | RSVD | 30                            | TxIN26 | Tx OUT2-            | 18                       | RxE2-    | 6                      | RxOUT26 | Not use                  | Not use |
|                 | RE0  | RE6  | 50                            | TxIN27 |                     |                          |          | 7                      | RxOUT27 | RE0                      | RE6     |
|                 | RE1  | RE7  | 2                             | TxIN5  |                     |                          |          | 34                     | RxOUT5  | RE1                      | RE7     |
|                 | GE0  | GE6  | 8                             | TxIN10 |                     |                          |          | 41                     | RxOUT10 | GE0                      | GE6     |
|                 | GE1  | GE7  | 10                            | TxIN11 | Tx OUT3+            | 23                       | RxE3+    | 42                     | RxOUT11 | GE1                      | GE7     |
|                 | BE0  | BE6  | 16                            | TxIN16 |                     |                          |          | 49                     | RxOUT16 | BE0                      | BE6     |
|                 | BE1  | BE7  | 18                            | TxIN17 |                     |                          |          | 50                     | RxOUT17 | BE1                      | BE7     |
|                 | RSVD | RSVD | 25                            | TxIN23 |                     |                          |          | 2                      | RxOUT23 | Not use                  | Not use |
|                 |      | DCLK |                               | 31     | TxCLK IN            | TxCLK OUT+<br>TxCLK OUT- | 21<br>20 | RxCLK IN+<br>RxCLK IN- | 26      | RxCLK OUT                | Not use |

\*1 RSVD (reserved) pin on a transmitter should be connected with Ground.

\*Input odd or even data depending on the display position of the LCD module.

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## 10-3 Color Data Assignment

Table 10-3 shows the Color Data Assignment.

Table 10-3 Color Data Assignment

| Color       |          |     | R Input data |    |    |    |    |    |    |    | G Input data |    |    |    |    |    |    |    | B Input data |    |    |    |    |    |    |    |   |
|-------------|----------|-----|--------------|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|---|
|             | Odd      |     | R7           | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7           | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7           | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |
|             | Even     |     | R7           | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7           | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7           | B6 | B5 | B4 | B3 | B2 | B1 | B0 |   |
| Basic Color | Black    |     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Blue     |     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
|             | Green    |     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Cyan     |     | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  |   |
|             | Red      |     | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | Magenta  |     | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1 |
|             | Yellow   |     | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 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  | 1  | 1  | 1  | 1  | 1  | 1  |   |
| Red         | Black    | 0   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | :        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253 | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↓        | 254 | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| Red         | 255      | 1   | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  |    |   |
| Green       | Black    | 0   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | :        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253 | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 1            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↓        | 254 | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
| Green       | 255      | 0   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 0            | 0  | 0  | 0  | 0  | 0  | 0  |    |   |
| Blue        | Black    | 0   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  |   |
|             | ↑        | 1   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 1  |    |   |
|             | ↑        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | :        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | ↓        | :   | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  | :            | :  | :  | :  | :  | :  | :  | :  |   |
|             | Brighter | 253 | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 0  |   |
|             | ↓        | 254 | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 1  | 1  | 1  | 1  | 1  | 1  | 0  |   |
| Blue        | 255      | 0   | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0            | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1            | 1  | 1  | 1  | 1  | 1  | 1  |    |   |

Note.1) Definition of gray scale:Color (n)····n” indicates gray scale level.

Larger number means brighter level.

Note.2) Data; 1:High, 0:Low

Note 3) Color data consist of 8 bit red, green and blue data of odd and even number pixel data.

Total data number is 48 signals. This module is able to display 16,777,216 colors because each red, green and blue data is controlled independently.

**10-4 Input Signal Timing**

Table 10-4 and Figure 10-1 shows the Input Signal Timing at LVDS transmitter.

**Table 10-4 Timing Characteristics**

(Ta=0~45°C, Vcc=12±0.5V)

| Item                |                     | Symbol | Min.     | Typ.   | Max.     | Unit | Remark |
|---------------------|---------------------|--------|----------|--------|----------|------|--------|
| DCLK signal (Clock) | Period              | Tc     | (11.765) | 12.345 | (20.000) | ns   |        |
|                     | Frequency           | 1/Tc   | (50.000) | 81.000 | (85.000) | MHz  |        |
|                     | Duty                | Tch/Tc | 45       | 50     | 55       | %    |        |
|                     | High time           | TclkH  | 3.5      | —      | —        | ns   |        |
| DCLK-Data Timing    | Low time            | TclkL  | 3.5      | —      | —        | ns   |        |
|                     | Setup time          | Tset   | 3        | —      | —        | ns   |        |
| ENAB signal         | Hold time           | Thold  | 2        | —      | —        | ns   |        |
|                     | Horizontal Period   | Th     | (1020)   | 1080   | (1130)*1 | DCLK |        |
|                     | Hor. Period         | Th     | (13.0)   | 13.3   | (14.65)  | μs   |        |
|                     | Hor. Display period | Thd    | (960)    | 960    | (960)    | DCLK | *2     |
|                     | Vertical Period     | Tv     | 1207*1   | 1250   | 1280*1   | Th   |        |
|                     | Ver. Frequency      | 1/Tv   | 50       | 60     | 62       | Hz   | *4     |
|                     | Ver. Display period | Tvd    | 1200     | 1200   | 1200     | Th   |        |
|                     | Data-ENAB timing    | Tdn    | —        | 0      | —        | DCLK | *3     |

\*1)•horizontal display position is specified by the rise of ENAB.

The data latched at falling edge of DCLK after rise of ENAB is displayed at the left edge of the display area.

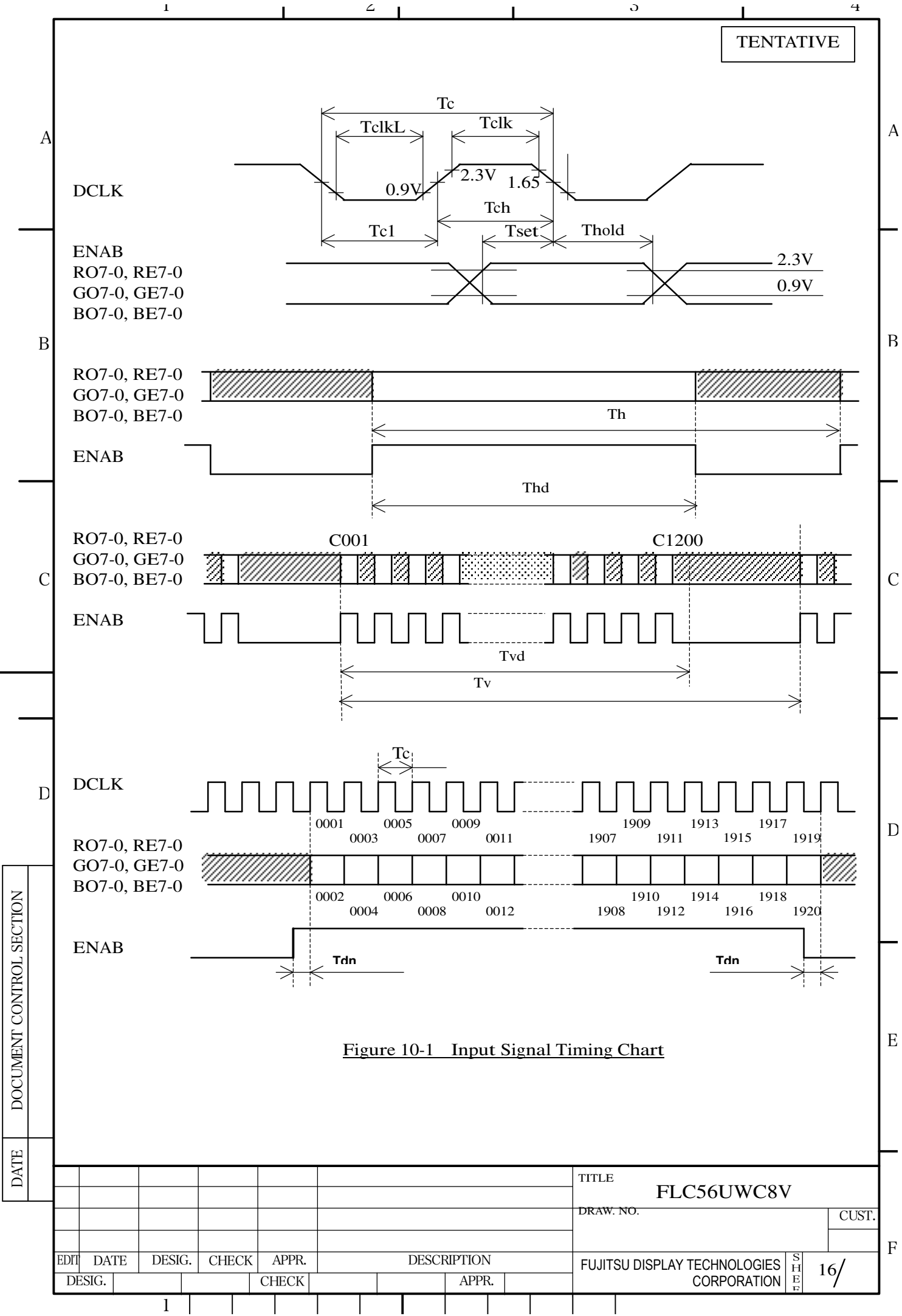
•Vertical display position is specified by the rise of ENAB after low level continuation over 5500 DCLK.

The data latched at the rise of ENAB is displayed at the top line of the display area.

\*2)•If the “High” level period of ENAB is less than 960 DCLK, black color is displayed at the rest of the display area

\*3)•If ENAB does not synchronize with the effective display data, the display position does not fit to the display area.

\*4)• Response time compensation circuit in LCD works at 50Hz to 60Hz.



#### 10-4 Correspondence between Data and Display Position

Figure 10-2 shows the Correspondence between Data and Display Position.

|       |            |            |            |            |            |            |            |             |  |            |            |
|-------|------------|------------|------------|------------|------------|------------|------------|-------------|--|------------|------------|
|       |            |            |            |            |            |            |            | S4799 S4800 |  |            |            |
| C001  | RO<br>0001 | GO<br>0001 | BO<br>0001 | RE<br>0002 | GE<br>0002 | BE<br>0002 | RO<br>0003 | GO<br>0003  |  | GE<br>1600 | BE<br>1600 |
|       |            |            |            |            |            |            |            |             |  |            |            |
| C1200 | RO<br>0001 | GO<br>0001 | BO<br>0001 | RE<br>0002 | GE<br>0002 | BE<br>0002 | RO<br>0003 | GO<br>0003  |  | GE<br>1600 | BE<br>1600 |

Figure 10-2 Correspondence Data and Display Position

#### 10-5 Power Supply Sequence

The sequence of input signals and On/Off of the power supply of this LCD module should be in the specification shown in Figure 10-3 to prevent latch-up of the driver ICs and DC driving of the LCD panel.

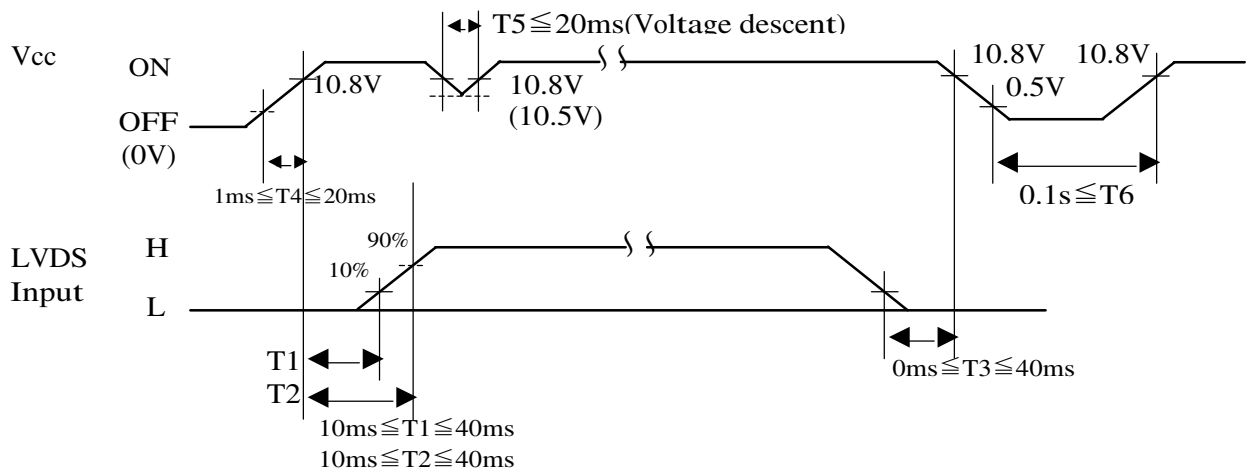


Figure 10-3 Power Supply Sequence(Logic)

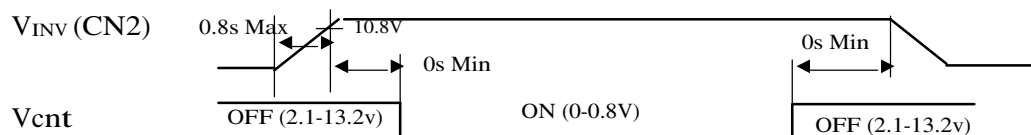


Figure 10-4 Power Supply Sequence(Inverter)

## 11. BACK-LIGHT SPECIFICATIONS

### 11-1 Pin configuration for Back-light

Table 11-1 shows the description and Pin assignment of the connectors (CN-2) for the Back-light of this LCD module.

**Table 11-1 Pin Assignment of CN-2**

| Pin No. | Signal | Function |
|---------|--------|----------|
| 1       |        |          |
| 2       |        |          |
| 3       |        |          |
| 4       |        |          |
| 5       |        |          |
| 6       |        |          |
| 7       |        |          |
| 8       |        |          |
| 9       |        |          |
| 10      |        |          |
| 11      |        |          |
| 12      |        |          |

TBD

### 11-2 CCFL

Supplier:TBD

### 11-3 Life

The life of the back-light is a minimum of 50,000 hours at the following conditions.

#### (1) Working conditions

- ①Ambient temperature :  $25 \pm 5^{\circ}\text{C}$
- ②Brightness control (Vvr) : 0V

#### (2) Definition of life

- ①Brightness becomes 50% or less than the minimum brightness value shown in Table 9-1.
- ②The lamp no longer lights
- ③Lamp being flashing or flickering.

### 11-4 Lamp assembly set (for replacement)

Lamp assembly set (with charge) is prepared for replacing old lamp to new one. This set consists of an upper lamp assembly and a lower lamp assembly.

Type number:

|      |        |        |       |       |             |                                          |            |       |
|------|--------|--------|-------|-------|-------------|------------------------------------------|------------|-------|
|      |        |        |       |       |             | TITLE                                    | FLC56UWC8V |       |
|      |        |        |       |       |             | DRAW. NO.                                |            | CUST. |
|      |        |        |       |       |             |                                          |            |       |
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## 12. APPEARANCE SPECIFICATIONS

### 12-1.Appearance

Table 12-1 shows the appearance specifications. In the case of another agreement about Specification arises, that agreement takes priority.

Table 12-1 Appearance Specifications

Length: L[mm], Width: W[mm]

Allowable number of pieces: N, Average diameter: D [mm]

| No. | Item             |                           | Judgment method and standard                    |                                        | Remarks |
|-----|------------------|---------------------------|-------------------------------------------------|----------------------------------------|---------|
| 1   | Foreign Particle | White and Black points    | $D \leq 0.5$<br>$0.5 < D$                       | $N \leq 10$<br>$N \leq 0$              |         |
|     |                  | Dark line                 | $W \leq 0.1$<br>$L \leq 12.0$                   | $N \leq 10$                            |         |
|     |                  | Bright points             | $D \leq 0.3$<br>$0.3 < D \leq 0.6$<br>$D > 0.6$ | Not count<br>$N \leq 12$<br>$N \leq 8$ |         |
| 2   | Scratch          | Scratch on polarizer film | $12.0 > L$                                      | $N \leq 15$                            |         |
| 3   | Dent             | Dent on polarizer film    | $D \leq 0.3$<br>$0.3 < D \leq 0.4$              | Not count<br>$N \leq 15$               |         |

#### Note

• Foreign particle and scratch that do not effect display image, such as foreign particle between glass and polarizer film out of the display area, scratch on metal bezel, backlight module or polarizer film out of the display area are not counted.

• Unwiped dirt out of the display area is not counted.

• These items are applied to the defects in the cell when backlight is on, and defects on the surface of the polarizer film at the display area.

• Must be observed the LCD screen from the normal direction unless specified. The distance between the LCD screen and the observing position should be 35cm or more.

One 20W fluorescent lamp is used at 50cm above the worktable.

At this time, the luminance at the vertical direction to the fluorescent lamp is 300 to 600 lux (reference value).

• Appearance Specifications are defined under the condition of frame frequency at 60Hz. (include Bright and Dark points specifications)

### 12-2.Dot defects (Bright spots, Dark spots)

#### 12-2-1.Area to be inspected

Inside display dot area (484.36 x 296.1mm)

Display dot area means active area.

One pixel consists of 3 dots (red, green and blue).

#### 12-2-2.Bright spots definition

(1) Bright spots are classified as follows. (based on brightness samples)

- Visible through 2% ND filter ..... High-bright spot ( R,G )
- Visible through 5% but invisible through 2% ND filter ..... Low-bright spot( R,G,B )
- Invisible through 5% ND filter ..... Not counted

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|      |        |        |       |       |             |  |       |                                          |  |           |            |       |
|------|--------|--------|-------|-------|-------------|--|-------|------------------------------------------|--|-----------|------------|-------|
|      |        |        |       |       |             |  |       |                                          |  | TITLE     | FLC56UWC8V |       |
|      |        |        |       |       |             |  |       |                                          |  | DRAW. NO. |            | CUST. |
|      |        |        |       |       |             |  |       |                                          |  |           |            |       |
|      |        |        |       |       |             |  |       |                                          |  |           |            |       |
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(2) Tears, breaks, etc in color filter visible by the light passing through.

- Bigger than a half dot ..... High bright spot
- A half dot or smaller ..... Not counted

(3) Tears, breaks, etc in black matrix visible by the light passing through.

- Diameter above  $50\mu\text{m}$  ..... High-bright spot
- Diameter of  $50\mu\text{m}$  or smaller ..... Not counted

### 12-2-3. Number of bright spot standard

| Item                      | Entire Screen     |                           |
|---------------------------|-------------------|---------------------------|
| Brightness classification | High-bright spots | High and Low Bright Spots |
| Number of defects         | 15 or less        | 22 or less                |

#### NOTES :

1. Display should be all black when bright spots are counted.
2. Number of two high Bright spots connections is up to 3.
3. Number of two low Bright spots connections is up to 12.
4. Number of three Bright spots connections and two high Bright spots vertical connections is 0.
5. Number of high Bright spots and low Bright spots connections is up to 5.

### 12-2-4. Distance between Bright spots

- Distance between Bright spots( not include B) ..... 15 mm or more
- Distance between Bright spots( include B) ..... 5 mm or more  
(Distance to the third defect should be 20mm or more)

### 12-2-5. Number of Dark spots standard

| Item                                  | Entire Screen                                                             |
|---------------------------------------|---------------------------------------------------------------------------|
| Number of defects                     | 24 or less                                                                |
| Number of two dark spot connections   | 12 or less<br>(Not include vertical, horizontal and diagonal connections) |
| Number of three dark spot connections | 3 or less                                                                 |

#### NOTES :

1. Display should be all white when dark spot is counted.
2. Distance between defects is 5 mm or more.  
(Distance to the third defect should be 20mm or more)
3. If dark spot size is smaller than one dot, convert with following rule and sum up.
  - (a)  $A < 1/3$  : Not counted.
  - (b)  $1/3 \leq A < 2/3$  : Considered as 0.5 dot.
  - (c)  $2/3 \leq A$  : Considered as 1 dot.

(A= Dark spot size / dot size)

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DATE

|        |      |        |       |       |             |                                          |            |       |     |
|--------|------|--------|-------|-------|-------------|------------------------------------------|------------|-------|-----|
|        |      |        |       |       |             | TITLE                                    | FLC56UWC8V |       |     |
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### 13. ENVIRONMENTAL SPECIFICATIONS

Table 13-1 show the environmental specifications.

Table 13-1 Environmental specifications

| Item        | Condition     |                                                                             | Remark                                                                   |
|-------------|---------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Temperature | Operation     | 0~45°C                                                                      | Temperature on surface of LCD panel (display area.)                      |
|             | Storage       | -20~60°C                                                                    |                                                                          |
| Humidity    | Operation     | 20~85%RH                                                                    | Maximum wet-bulb temperature should not exceed 29°C.<br>No condensation. |
|             | Storage       | 5~85%RH                                                                     |                                                                          |
| Vibration   | Non-operation | 10~500Hz, 1octave/20minute, 1G, 1.5mm max, 1hour each X, Y and Z directions | For single module without package.                                       |
| Shock       | Non-operation | 15G, 6ms, 1time each ±X, ±Y and ±Z directions.                              |                                                                          |

NOTE : Table 13-2 and Figure 13-1 show the shock resistance standard when module is packaged.

Table 13-2 Shock resistance standard when module is packaged

| Dropping location | Dropping height | Count  |
|-------------------|-----------------|--------|
| A~J               | 60cm            | 1 time |

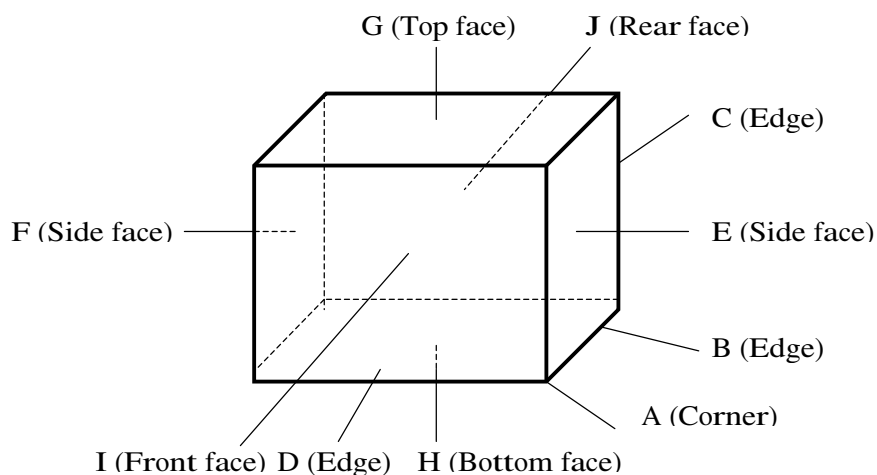


Figure 13-1 Direction to apply shock to package

|        |      |        |       |       |             |                                          |            |       |
|--------|------|--------|-------|-------|-------------|------------------------------------------|------------|-------|
|        |      |        |       |       |             | TITLE                                    | FLC56UWC8V |       |
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## 14. INDICATIONS

This module has the following indications.

- (1) Product name : LCD unit
- (2) Model Number : FLC56UWC8V
- (3) Product Drawing Number : NA19026-C151
- (4) Manufacturing Number : 2 9 0 0 0 0 1

Serial number  
(To be reset every month on 1st.)

Manufacturing month  
(Oct. = X, Nov. =Y, Dec. =Z)

Last digit of manufacturing year.

- (5) Version number : 01A (Example)  
-1st 2 digits "01" means operational version.  
-3rd alphabet means functional version.
- (6) Manufacturer Country Name : MADE IN JAPAN
- (7) Company Name : FUJITSU DISPLAY TECHNOLOGIES CORPORATION
- (8) Disposal method of cold-cathode tubes. (See Figure 14-1)
- (9) Caution when changing cold-cathode tubes. (See Figure 14-2)

・THIS TFT COLOR LCD CONTAINS COLD CATHODE FLUORESCENT LAMPS. PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR ITS DISPOSAL.  
・当該液晶ディスプレイユニットには、蛍光管が組み込まれていますので、地方自治体の条例または規則に従って廃棄して下さい。

Figure 14-1

・WHEN CHANGING COLD CATHODE FLUORESCENT LAMPS, FOLLOW OPERATING SPECIFICATIONS. ESPECIALLY BE CAREFUL ABOUT THE LAMP'S SIDE-EDGE.  
・蛍光管の交換は作業仕様書に従って行って下さい。特に蛍光管ホルダ側面のエッジに気をつけて下さい。

Figure 14-2

## 15. PACKAGING

### 15-1 Packing specifications TBD

### 15-2 Packing method TBD

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|        |      |        |       |       |  |  |  |  |  |                                          |            |       |
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1

2

3

4

TENTATIVE

A

Protective sheet

A

B

B

C

C

D

D

E

DOCUMENT CONTROL SECTION

DATE

Anti-Electric Bag

Front side

Fig.15-2 (a) Packaging Method

F

|      |        |        |       |       |             |                     |  |       |  |                                          |  |                       |       |
|------|--------|--------|-------|-------|-------------|---------------------|--|-------|--|------------------------------------------|--|-----------------------|-------|
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1

TENTATIVE

A

A

Holder (bottom)

LCD unit

B

B

C

C

Holder (top,left)

Holder (top,right)

D

D

TBD

TBD

TBD

Label (example)

|                    |               |                   |     |
|--------------------|---------------|-------------------|-----|
| 型 格 (TYPE)         | FLC56UWC8V    | -01 数 量 (QTY.)    | 4   |
| 図 番<br>(DRWG. NO.) | NA19025-C151  | 版 数<br>(REV. NO.) | 01A |
| Bar code           | 2900001       | Bar code          |     |
|                    | 2900002       |                   |     |
|                    | 2900003       |                   |     |
|                    | 2900004       |                   |     |
|                    | 2900005       |                   |     |
| Bar code           | MADE IN JAPAN |                   |     |

- Taping  
Top : H or I method  
Bottom : H method
- Top and bottom holders should be anti-electrostatic type.

Fig.15-2 (b) Packaging Method

DOCUMENT CONTROL SECTION

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E

F

|        |      |        |       |       |             |                                          |  |            |  |
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|        |      |        |       |       |             | TITLE                                    |  | FLC56UWC8V |  |
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25/

A



F

C

C

D

I

H

D

I

DATE \_\_\_\_\_

F

## 16.WARRANTY

The warranty period is one year after shipping. Products which fail during this period are repaired or replaced without charge, unless the failure is caused by user.

## 17.PRECAUTIONS

Adhere to the following precautions to use this LCD module properly.

### (1) Handling of LCD panel

#### ① Do not apply any strong mechanical shock to the LCD panel.

Since the LCD panel is made of glass, excessive shock may damage the panel or cause a malfunction.

#### ② Do not press hard on the LCD panel surface.

In the LCD panel, the gap between two glass plates is kept perfectly even to maintain display properties and reliability. The hard pressure on the LCD panel may cause the following problems.

① Ununiformity of color

② Disorder of orientation of liquid crystal

Problem ① returns to normal condition after a while. Problem ② returns to normal condition by turning the power off and turning on again.

However these operations should be avoided to insure reliability.

#### ③ Do not scratch the polarizer film on the LCD panel surface.

•Do not press or rub the display surface with a hard tool, tweezers, etc.

•For handling, use cotton or conductive gloves so that the display surface is not soiled.

•If dust or dirt soils the display surface, clean it as follows with a soft cloth (deerskin, etc.)

[Dust] Wipe off with a soft cloth. (do not rub.)

[Dirt ] Apply clear water to a soft cloth and squeeze hard out of water drops, then lightly wipe off the specified parts. Only if the dirt is hardly wiped off, use isopropyl alcohol or ethanol.

Be careful not to splash the water or the solvents on the edge of polarizer and in the LCD unit.

The polarizer possibly exfoliates due to the solvent and water penetrated between the polarizer and the LCD panel.

Do not use unspecified solvent such as ketone (acetone, etc.) and aromatics (xylene, toluene, etc.)

(Caution) Be careful not to allow the water or solvent to enter the module.

•If saliva or water drops are left for a long period of time, the part may become deformed or discolored.

Wipe off immediately in the same way as for dirt.

•Do not allow oil to adhere to the module since excessive oil is hard to clean.

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- ④ **Do not place or contact objects on the display surface for a long period of time.**

This may make some parts of the LCD module distorted and the quality of display may deteriorate.

## (2) Handling of LCD module

- ① **Do not pull the cold-cathode tube cable strongly.**

If the cable is pulled with the strength of 2kg or more, the cable may be damaged or may lose reliability.

- ② **Assemble the module into user's system in a dust free environment.**

Conductive foreign matter adheres to the module may cause failures.

- ③ **Take anti-electrostatic measures for assembling the module.**

Since the LCD module contains CMOS-ICs, the following points should be observed.

- For assembling the module, operator should be grounded and wear cotton or conductive gloves.
- Floor of work area and work table to assemble the LCD module should be covered with electrostatic shielding in order to discharge static electricity via an earth wire.
- If necessary, ground operation tools (soldering iron, radio pliers, tweezers, etc.).
- Do not take the module out of the conductive bag until the module is assembled.
- Do not assemble the module under low humidity (50%RH or less).

- ④ **Do not pull the connecting cable on the rear face of the LCD module strongly.**

- ⑤ **Do not disassemble or remodel the LCD module.**

Disassembly or remodeling of the LCD module may result in malfunctions or deterioration of the display quality and reliability.

## (3) Precautions in regards of operating the LCD module

- ① **Adhere to the specified power supply sequence.**

If not followed, the CMOS-IC may cause a latch-up, or DC voltage may be applied to the liquid crystal, which cause a failure or serious deterioration in display quality.

- ② **Do not operate the LCD module when condensation occurs.**

If the LCD module is operated when condensation is on the terminals of the LCD panel, the terminals cause electrochemical reaction, and may reach disconnection. Condensation easily occurs especially when the module is moved from cold environment to warm environment.

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- ③ The LCD module is recommended to be stored in humidity controlled, cool and dark locations.

Recommended storage environment

- Place : Dark (avoid direct sunlight)  
 Temperature : 10~35°C  
 Humidity : 50~60%RH

Note) If the module is left in an environment of 60°C and above for a long period of time, optical characteristics may deteriorate.

#### (6) Disposal Method

##### ① LCD module

The components of this LCD module can be grouped into metal, resin, glass and so on. As the backlight contains CCFL which includes mercury, it must be disposed according to the local ordinance or regulations.

##### ② Package

All the packages are made of recyclable papers except the anti-ESD bag.

#### (7) Others

- ① If the LCD panel is damaged, do not inhale and do not swallow the liquid crystal. If the liquid crystal adhere to the body or cloths, wash it off with soap immediately. Follow regular precautions for electronic components.

- ② Flux residue on the printed circuit board is harmless to the quality and reliability of LCD module.

Fujitsu has adopted non-wash technology on module assembly process.

### 18.OTHERS

Specifications of the TFT-LCD panel and other components used in this LCD module are subject to change.

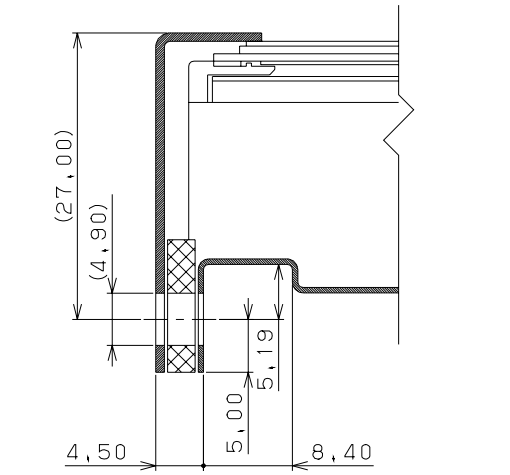
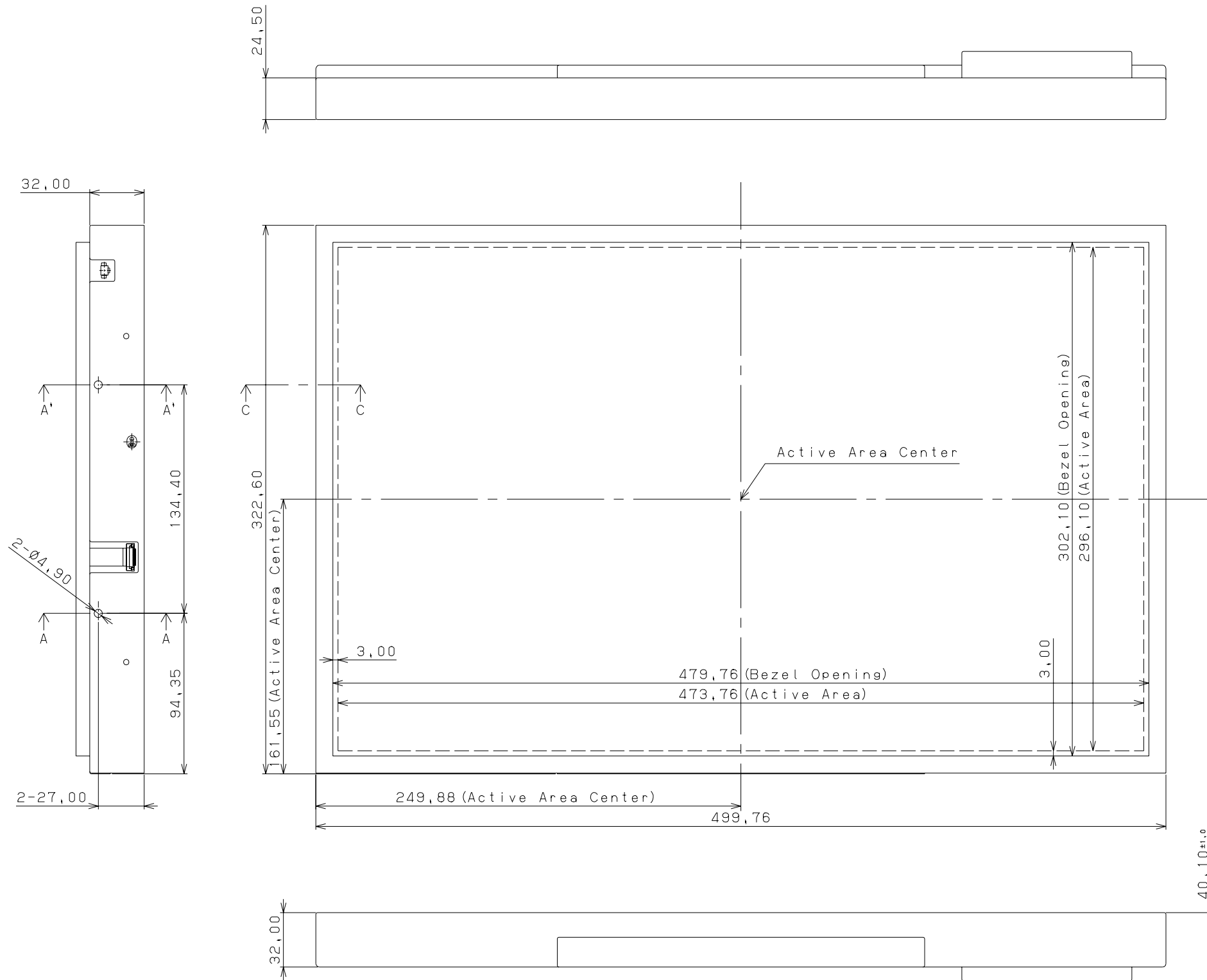
Both parties shall discuss together and make the best effort to reach agreement in case of the rising of any doubt to the contents of the specifications.

This LCD module is not designed for the purpose where high reliability is required, such as for aero-space equipment, control system of nuclear power and medical life-support equipment.

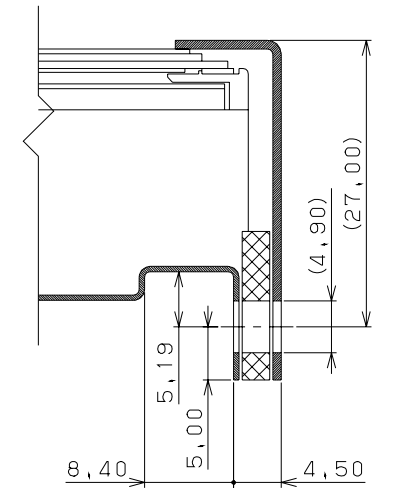
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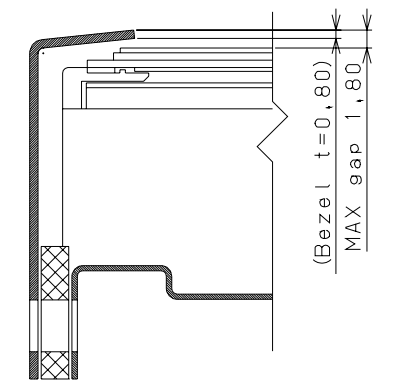
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Detail A-A, A'-A' Side Mounting



Detail B-B, B'-B' Side Mounting

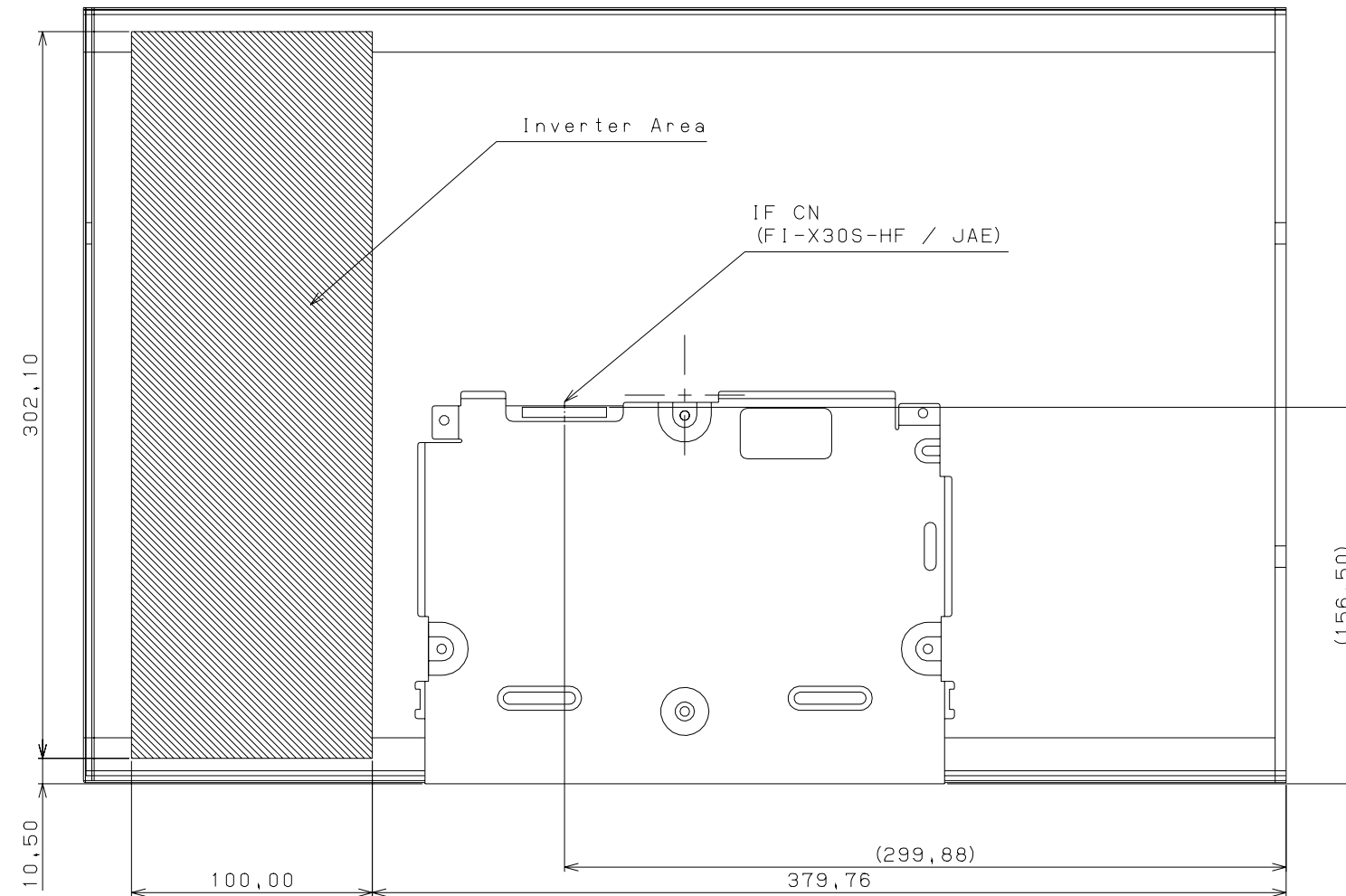


Between Surface of Polarizer and Surface of Bezel  
Detail C-C

Note  
1) Unspecified tolerance to be  $\pm 0,80$

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Note  
1) Unspecified tolerance to be  $\pm 0,80$

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