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# HITACHI

KAOHSIUNG HITACHI ELECTRONICS CO., LTD.

FOR MESSRS: \_\_\_\_\_

DATE: Jan. 27<sup>th</sup> 2010

## CUSTOMER'S ACCEPTANCE SPECIFICATIONS

### TX20D26VM0AAA

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ACCEPTED BY: \_\_\_\_\_

PROPOSED BY: Ken Chen

## 2. RECORD OF REVISION

| DATE                        | SHEET No.                                        | SUMMARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
|-----------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|------------------|-----------------------|------------|-----------------|---------------------|------------------|-----------------------------|-----------------|----------------------------------------|---------------------|-----------------------|-----------|------------------|---------------------|------------------------|-----------------|---------------|------------------|-----------------------------|------------------------|-----------|---------------------|-----------|-----------|--|-----|-----------------------------------------------|----------------------------------|
| Sep.16,'09                  | 7B64PS 2704 –<br>TX20D26VM0AAA-2<br>Page 4 – 1/1 | <p>4. ABSOLUTE MAXIMUM RATINGS</p> <p>Changed</p> <table border="1" data-bbox="644 284 1184 412"> <thead> <tr> <th>ITEM</th> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Operating Temperature</td> <td>-40</td> <td>85</td> </tr> <tr> <td>Storage Temperature</td> <td>-40</td> <td>95</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="644 450 1184 577"> <thead> <tr> <th>ITEM</th> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>Operating Temperature</td> <td>-30</td> <td>80</td> </tr> <tr> <td>Storage Temperature</td> <td>-40</td> <td>90</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ITEM      | Min.      | Max.             | Operating Temperature | -40        | 85              | Storage Temperature | -40              | 95                          | ITEM            | Min.                                   | Max.                | Operating Temperature | -30       | 80               | Storage Temperature | -40                    | 90              |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| ITEM                        | Min.                                             | Max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Operating Temperature       | -40                                              | 85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Storage Temperature         | -40                                              | 95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| ITEM                        | Min.                                             | Max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Operating Temperature       | -30                                              | 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Storage Temperature         | -40                                              | 90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
|                             | 7B64PS 2708 –<br>TX20D26VM0AAA-2<br>Page 8 – 1/1 | <p>8. RELIABILITY TESTS</p> <p>Changed</p> <table border="1" data-bbox="639 658 1267 945"> <thead> <tr> <th>Test Item</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>High Temperature</td> <td>2)85 °C</td> </tr> <tr> <td>Heat Cycle</td> <td>2)-40 °C ~70 °C</td> </tr> <tr> <td>Thermal Shock</td> <td>2)-40 °C ↔ 85 °C</td> </tr> <tr> <td>High Temperature &amp; Humidity</td> <td>2)60 °C &amp; 90%RH</td> </tr> <tr> <td>Vibration</td> <td>2)20~100 Hz<br/>3)2G</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="639 983 1284 1270"> <thead> <tr> <th>Test Item</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>High Temperature</td> <td>2)80 °C</td> </tr> <tr> <td>Heat Cycle</td> <td>2)-30 °C ~85 °C</td> </tr> <tr> <td>Thermal Shock</td> <td>2)-35 °C ↔ 85 °C</td> </tr> <tr> <td>High Temperature &amp; Humidity</td> <td>2)50 °C &amp; 85%RH</td> </tr> <tr> <td>Vibration</td> <td>2)10~150 Hz<br/>3)3G</td> </tr> </tbody> </table> <p>Delete</p> <table border="1" data-bbox="628 1344 1449 1458"> <thead> <tr> <th>Test Item</th> <th>Condition</th> <th></th> </tr> </thead> <tbody> <tr> <td>ESD</td> <td>5)Contact discharge for LCD interface: ± 100V</td> <td>3) Connector: all pins (CN1&amp;CN2)</td> </tr> </tbody> </table> <p>Added Note 3</p> | Test Item | Condition | High Temperature | 2)85 °C               | Heat Cycle | 2)-40 °C ~70 °C | Thermal Shock       | 2)-40 °C ↔ 85 °C | High Temperature & Humidity | 2)60 °C & 90%RH | Vibration                              | 2)20~100 Hz<br>3)2G | Test Item             | Condition | High Temperature | 2)80 °C             | Heat Cycle             | 2)-30 °C ~85 °C | Thermal Shock | 2)-35 °C ↔ 85 °C | High Temperature & Humidity | 2)50 °C & 85%RH        | Vibration | 2)10~150 Hz<br>3)3G | Test Item | Condition |  | ESD | 5)Contact discharge for LCD interface: ± 100V | 3) Connector: all pins (CN1&CN2) |
| Test Item                   | Condition                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| High Temperature            | 2)85 °C                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Heat Cycle                  | 2)-40 °C ~70 °C                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Thermal Shock               | 2)-40 °C ↔ 85 °C                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| High Temperature & Humidity | 2)60 °C & 90%RH                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Vibration                   | 2)20~100 Hz<br>3)2G                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Test Item                   | Condition                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| High Temperature            | 2)80 °C                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Heat Cycle                  | 2)-30 °C ~85 °C                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Thermal Shock               | 2)-35 °C ↔ 85 °C                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| High Temperature & Humidity | 2)50 °C & 85%RH                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Vibration                   | 2)10~150 Hz<br>3)3G                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Test Item                   | Condition                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| ESD                         | 5)Contact discharge for LCD interface: ± 100V    | 3) Connector: all pins (CN1&CN2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
|                             | 7B64PS 2709 –<br>TX20D26VM0AAA-2<br>Page 9 – 1/5 | <p>9.1 INTERFACE PIN CONNECTIONS</p> <p>Changed</p> <table border="1" data-bbox="633 1610 1302 1803"> <thead> <tr> <th>Pin No.</th> <th>Signal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>31</td> <td>NC</td> <td rowspan="2">No Connection</td> </tr> <tr> <td>32</td> <td>NC</td> </tr> <tr> <td>35</td> <td>Reset</td> <td>Reset of timing controller (Low=Reset)</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="633 1841 1302 1995"> <thead> <tr> <th>Pin No.</th> <th>Signal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>31</td> <td>VDD</td> <td rowspan="2">Power Supply for Logic</td> </tr> <tr> <td>32</td> <td>VDD</td> </tr> <tr> <td>35</td> <td>VDD</td> <td>Power Supply for Logic</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Pin No.   | Signal    | Function         | 31                    | NC         | No Connection   | 32                  | NC               | 35                          | Reset           | Reset of timing controller (Low=Reset) | Pin No.             | Signal                | Function  | 31               | VDD                 | Power Supply for Logic | 32              | VDD           | 35               | VDD                         | Power Supply for Logic |           |                     |           |           |  |     |                                               |                                  |
| Pin No.                     | Signal                                           | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 31                          | NC                                               | No Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 32                          | NC                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 35                          | Reset                                            | Reset of timing controller (Low=Reset)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| Pin No.                     | Signal                                           | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 31                          | VDD                                              | Power Supply for Logic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 32                          | VDD                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |
| 35                          | VDD                                              | Power Supply for Logic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |           |                  |                       |            |                 |                     |                  |                             |                 |                                        |                     |                       |           |                  |                     |                        |                 |               |                  |                             |                        |           |                     |           |           |  |     |                                               |                                  |

## 2. RECORD OF REVISION

| DATE                        | SHEET No.                                         | SUMMARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
|-----------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|-------------------|-------------------------------------|-----------------------------|-----------------------------------|-------------------|-------------------------------------|------------|---------------|-----------------------------|----------------|
| Jan.25,'10                  | 7B64PS 2703 –<br>TX20D26VM0AAA-3<br>Page 3 – 1/1  | <p>3.1 DISPLAY FEATURES<br/>Changed</p> <table border="1" data-bbox="641 273 1449 362"> <tr> <td>Power Supply Voltage</td> <td>3.3V for LCD; 26.6V for Backlight</td> </tr> <tr> <td>Power Consumption</td> <td>1.32 W for LCD; 10.6W for backlight</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="641 398 1449 488"> <tr> <td>Power Supply Voltage</td> <td>3.3V for LCD; 21.7V for Backlight</td> </tr> <tr> <td>Power Consumption</td> <td>1.32 W for LCD; 8.68W for backlight</td> </tr> </table>                                    | Power Supply Voltage | 3.3V for LCD; 26.6V for Backlight | Power Consumption | 1.32 W for LCD; 10.6W for backlight | Power Supply Voltage        | 3.3V for LCD; 21.7V for Backlight | Power Consumption | 1.32 W for LCD; 8.68W for backlight |            |               |                             |                |
| Power Supply Voltage        | 3.3V for LCD; 26.6V for Backlight                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Power Consumption           | 1.32 W for LCD; 10.6W for backlight               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Power Supply Voltage        | 3.3V for LCD; 21.7V for Backlight                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Power Consumption           | 1.32 W for LCD; 8.68W for backlight               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
|                             | 7B64PS 2705 –<br>TX20D26VM0AAA-3<br>Page 5 – 1/1  | <p>5.2 BACKLIGHT CHARACTERISTICS<br/>Changed</p> <table border="1" data-bbox="842 582 1228 672"> <tr> <th>Item</th> <th>Typ.</th> </tr> <tr> <td>LED Input Voltage</td> <td>-</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="842 707 1228 797"> <tr> <th>Item</th> <th>Typ.</th> </tr> <tr> <td>LED Input Voltage</td> <td>21.7</td> </tr> </table>                                                                                                                                                                                      | Item                 | Typ.                              | LED Input Voltage | -                                   | Item                        | Typ.                              | LED Input Voltage | 21.7                                |            |               |                             |                |
| Item                        | Typ.                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| LED Input Voltage           | -                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Item                        | Typ.                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| LED Input Voltage           | 21.7                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
|                             | 7B64PS 2708 –<br>TX20D26VM0AAA-3<br>Page 8 – 1/1  | <p>8. RELIABILITY TESTS<br/>Changed</p> <table border="1" data-bbox="641 882 1267 1012"> <tr> <th>Test Item</th> <th>Condition</th> </tr> <tr> <td>Heat Cycle</td> <td>2)-30°C ~85°C</td> </tr> <tr> <td>High Temperature &amp; Humidity</td> <td>2)50°C &amp; 85%RH</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="641 1048 1267 1178"> <tr> <th>Test Item</th> <th>Condition</th> </tr> <tr> <td>Heat Cycle</td> <td>2)-20°C ~70°C</td> </tr> <tr> <td>High Temperature &amp; Humidity</td> <td>2)65°C &amp; 85%RH</td> </tr> </table> | Test Item            | Condition                         | Heat Cycle        | 2)-30°C ~85°C                       | High Temperature & Humidity | 2)50°C & 85%RH                    | Test Item         | Condition                           | Heat Cycle | 2)-20°C ~70°C | High Temperature & Humidity | 2)65°C & 85%RH |
| Test Item                   | Condition                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Heat Cycle                  | 2)-30°C ~85°C                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| High Temperature & Humidity | 2)50°C & 85%RH                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Test Item                   | Condition                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| Heat Cycle                  | 2)-20°C ~70°C                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
| High Temperature & Humidity | 2)65°C & 85%RH                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
|                             | 7B64PS 2710 –<br>TX20D26VM0AAA-3<br>Page 10 – 1/2 | <p>10. Dimension Outline<br/>Add new traits of upper frame and PCB cover.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |
|                             |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |                                   |                   |                                     |                             |                                   |                   |                                     |            |               |                             |                |

### 3. GENERAL DATA

#### 3.1 DISPLAY FEATURES

This module is a 8" WVGA of 16:9 format amorphous silicon TFT. The pixel format is vertical stripe and sub pixels are arranged as R(red), G(green), B(blue) sequentially. This display is RoHS compliant, and COG (chip on glass) technology and LED backlight are applied on this display.

|                         |                                               |
|-------------------------|-----------------------------------------------|
| Part Name               | TX20D26VM0AAA                                 |
| Module Dimensions       | 190.0(W) mm x 120.0(H) mm x 12.8(D) mm typ.   |
| LCD Active Area         | 174.0(W) mm x 104.4(H) mm                     |
| Dot Pitch               | 0.0725(W) mm x 3(R, G, B)(W) x 0.2175(H) mm   |
| Resolution              | 800 x 3(RGB)(W) x 480(H) dots                 |
| Color Pixel Arrangement | R, G, B Vertical stripe                       |
| LCD Type                | Transmissive Color TFT; Normally Black        |
| Display Type            | Active Matrix                                 |
| Number of Colors        | 262k Colors                                   |
| Backlight               | 7 LEDs parallel x 4 serial (28 LEDs in total) |
| Weight                  | 370 g (typ.)                                  |
| Interface               | C-MOS; 6-bit RGB; 40 pins                     |
| Power Supply Voltage    | 3.3V for LCD; 21.7V for Backlight             |
| Power Consumption       | 1.32 W for LCD; 8.68W for backlight           |
| Viewing Direction       | Super Wide Version (In-Plane Switching)       |

## 4. ABSOLUTE MAXIMUM RATINGS

| Item                    | Symbol | Min. | Max.    | Unit | Remarks |
|-------------------------|--------|------|---------|------|---------|
| Supply Voltage          | VDD    | -0.3 | 4.0     | V    | -       |
| Input Voltage of Logic  | VI     | -0.3 | VDD+0.3 | V    | Note 1  |
| Operating Temperature   | Top    | -30  | 80      | °C   | Note 2  |
| Storage Temperature     | Tst    | -40  | 90      | °C   | Note 2  |
| Backlight Input Voltage | VLED   | -    | 26.6    | V    | -       |
|                         | ILED   | -    | 180     | mA   | -       |

Note 1: The rating is defined for the signal voltages of the interface such as DE, DCLK and RGB data bus.

Note 2: The maximum rating is defined as above based on the temperature on the panel surface, which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Background color, contrast and response time would be different in temperatures other than 25°C.
- Operating under high temperature will shorten LED lifetime.

# 5. ELECTRICAL CHARACTERISTICS

## 5.1 LCD CHARACTERISTICS

$T_a = 25\text{ }^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$

| Item                   | Symbol    | Condition | Min.    | Typ.  | Max.    | Unit | Remarks |
|------------------------|-----------|-----------|---------|-------|---------|------|---------|
| Power Supply Voltage   | VDD       | -         | 2.97    | 3.3   | 3.6     | V    | -       |
| Input Voltage of Logic | VI        | "H" level | 0.7VDD  | -     | VDD+0.3 | V    | Note 1  |
|                        |           | "L" level | VSS-0.3 | -     | 0.3VDD  |      |         |
| Power Supply Current   | IDD       | VDD=3.3V  | -       | 400   | 500     | mA   | Note 2  |
| Vsync Frequency        | $f_v$     | -         | 47      | 60    | 75      | Hz   | -       |
| Hsync Frequency        | $f_H$     | -         | 16.7    | 31.5  | 41.7    | KHz  | -       |
| CLK Frequency          | $f_{CLK}$ | -         | 25.00   | 33.26 | 36.00   | MHz  | -       |

Note 1: The rating is defined for the signal voltages of the interface such as DE, DCLK and RGB data bus.

Note 2: An all black check pattern is used when measuring IDD.  $f_v$  is set to 60 Hz.

## 5.2 BACKLIGHT CHARACTERISTICS

$T_a = 25\text{ }^\circ\text{C}$

| Item              | Symbol | Condition  | Min. | Typ. | Max. | Unit | Remarks |
|-------------------|--------|------------|------|------|------|------|---------|
| LED Input Voltage | VLED   | Per Series | -    | 21.7 | 26.6 | V    | Note 1  |
| LED Input Current | ILED   | Per Series | -    | 100  | 110  | mA   | -       |
| LED Lifetime      | -      | 400mA      | -    | 70K  | -    | hrs  | Note 2  |

Note 1: Fig. 5.1 shows the LED backlight circuit. The circuit has 28 LEDs in total. Please keep pin8~pin10 open electrically, Hitachi test use only.

Note 2: The estimated lifetime is specified as the time to reduce 50% brightness by applying 400mA at 25°C.

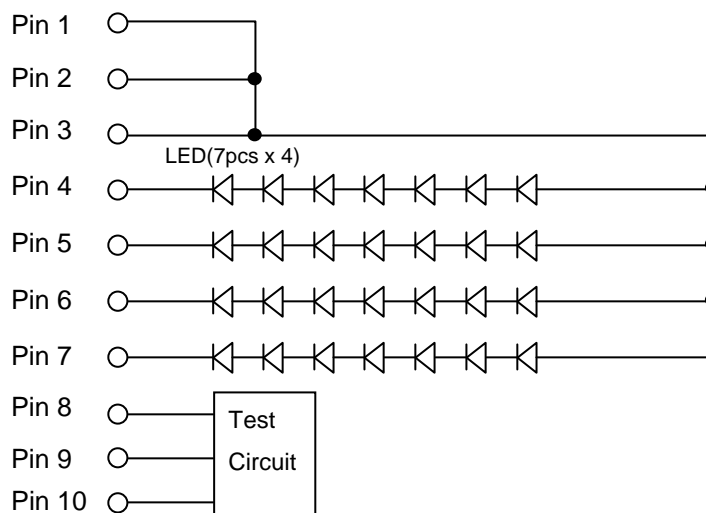


Fig. 5.1

## 6. OPTICAL CHARACTERISTICS

The optical characteristics are measured based on the conditions as below:

- Supplying the signals and voltages defined in the section of electrical characteristics.
- The backlight unit needs to be turned on for 15 minutes.
- The ambient temperature is 25 °C .
- In the dark room around 500~1000 lx, the equipment has been set for the measurements as shown in Fig 6.1.

$$T_a = 25\text{ }^\circ\text{C}, f_v = 60\text{ Hz}, VDD = 3.3\text{V}$$

| Item                                | Symbol        | Condition                            | Min.                               | Typ.  | Max.  | Unit              | Remarks |        |
|-------------------------------------|---------------|--------------------------------------|------------------------------------|-------|-------|-------------------|---------|--------|
| Brightness of White                 | -             | $\phi = 0^\circ, \theta = 0^\circ$ , | 380                                | 600   | -     | cd/m <sup>2</sup> | Note 1  |        |
| Brightness Uniformity               | -             | ILED= 100                            | 60                                 | 70    | -     | %                 | Note 2  |        |
| Contrast Ratio                      | CR            | mA/series                            | 400                                | 600   | -     | -                 | Note 3  |        |
| Response Time<br>(Rising + Falling) | $T_r + T_f$   | $\phi = 0^\circ, \theta = 0^\circ$   | -                                  | 26    | -     | ms                | Note 4  |        |
| Viewing Angle                       | $\theta_x$    | $\phi = 0^\circ, CR \geq 10$         | -                                  | 85    | -     | Degree            | Note 5  |        |
|                                     | $\theta_{x'}$ | $\phi = 180^\circ, CR \geq 10$       | -                                  | 85    | -     |                   |         |        |
|                                     | $\theta_y$    | $\phi = 90^\circ, CR \geq 10$        | -                                  | 85    | -     |                   |         |        |
|                                     | $\theta_{y'}$ | $\phi = 270^\circ, CR \geq 10$       | -                                  | 85    | -     |                   |         |        |
| Color<br>Chromaticity               | Red           | X                                    | $\phi = 0^\circ, \theta = 0^\circ$ | 0.560 | 0.610 | 0.660             | -       | Note 6 |
|                                     |               | Y                                    |                                    | 0.270 | 0.320 | 0.370             |         |        |
|                                     | Green         | X                                    |                                    | 0.290 | 0.340 | 0.390             |         |        |
|                                     |               | Y                                    |                                    | 0.500 | 0.550 | 0.600             |         |        |
|                                     | Blue          | X                                    |                                    | 0.100 | 0.150 | 0.200             |         |        |
|                                     |               | Y                                    |                                    | 0.060 | 0.110 | 0.160             |         |        |
|                                     | White         | X                                    |                                    | 0.260 | 0.310 | 0.360             |         |        |
|                                     |               | Y                                    |                                    | 0.260 | 0.310 | 0.360             |         |        |

Note 1: The brightness is measured from the panel center point, P3 in Fig. 6.2, for the typical value.

Note 2: The brightness uniformity is calculated by the equation as below:

$$\text{Brightness uniformity} = \frac{\text{Min. Brightness}}{\text{Max. Brightness}} \times 100\%$$

, which is based on the brightness values of the 5 points measured by BM-5 as shown in Fig. 6.2.

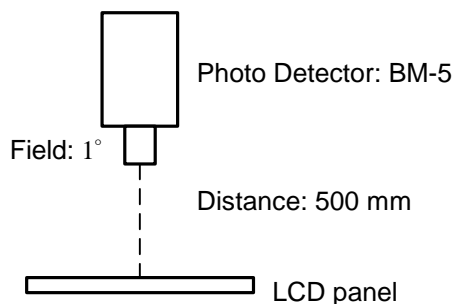


Fig. 6.1

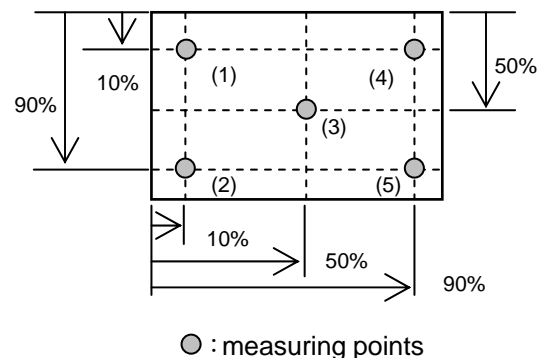


Fig. 6.2

Note 3: The Contrast Ratio is measured from the center point of the panel, P3, and defined as the following equation:

$$CR = \frac{\text{Brightness of White}}{\text{Brightness of Black}}$$

Note 4: The definition of response time is shown in Fig. 6.3. The rising time is the period from 10% brightness to 90% brightness when the data is from black to white. Oppositely, falling time is the period from 90% brightness rising to 10% brightness.

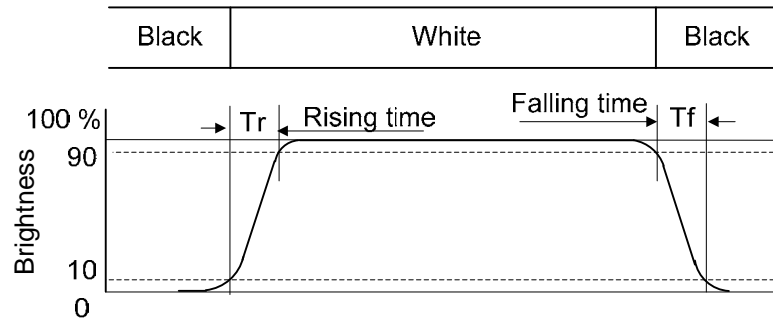


Fig 6.3

Note 5: The definition of viewing angle is shown in Fig. 6.4. Angle  $\phi$  is used to represent viewing directions, for instance,  $\phi = 270^\circ$  means 6 o'clock, and  $\phi = 0^\circ$  means 3 o'clock. Moreover, angle  $\theta$  is used to represent viewing angles from axis Z toward plane XY.

The display is super wide viewing angle version, so that the best optical performance can be obtained from every viewing direction.

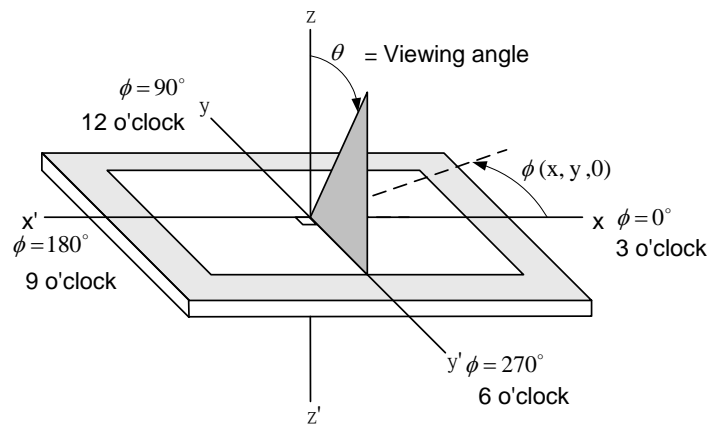
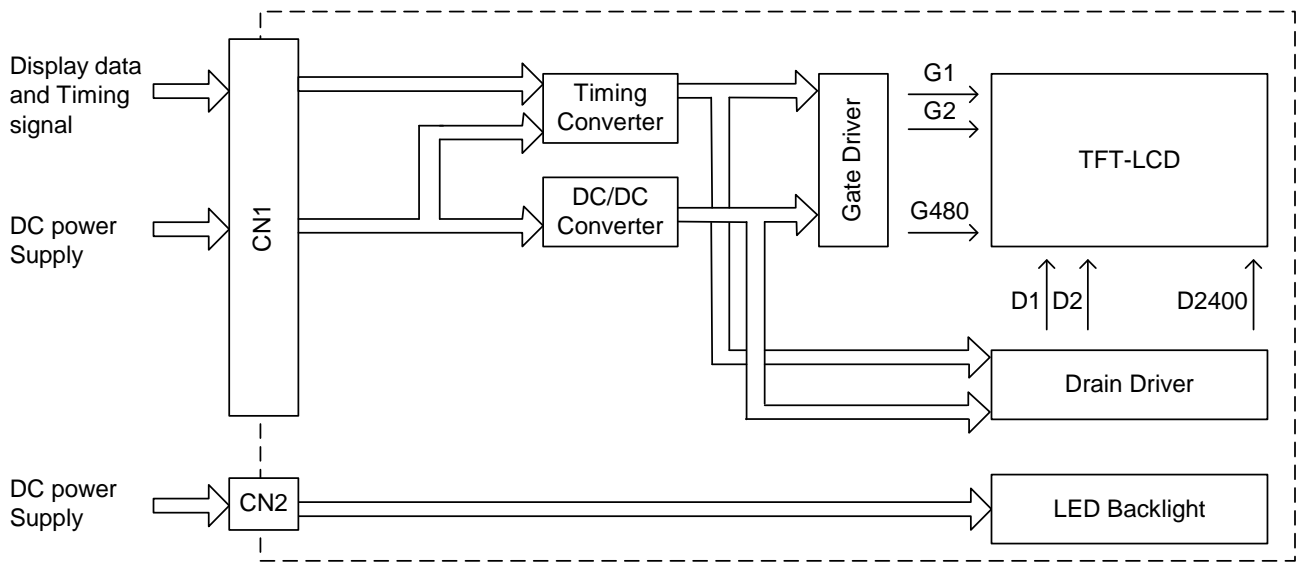


Fig 6.4

Note 6: The color chromaticity is measured from the center point of the panel, P3, as shown in Fig. 6.2.



# 7 BLOCK DIAGRAM



## 8. RELIABILITY TESTS

| Test Item                   | Condition                                                                                                                 |                                                            |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| High Temperature            | 1) Operating<br>2) 80 °C                                                                                                  | 240 hrs                                                    |
| Low Temperature             | 1) Operating<br>2) -30 °C                                                                                                 | 240 hrs                                                    |
| High Temperature            | 1) Storage<br>2) 90 °C                                                                                                    | 240 hrs                                                    |
| Low Temperature             | 1) Storage<br>2) -40 °C                                                                                                   | 240 hrs                                                    |
| Heat Cycle                  | 1) Operating<br>2) -20 °C ~70 °C<br>3) 3hrs~1hr~3hrs                                                                      | 200 cycles                                                 |
| Thermal Shock               | 1) Non-Operating<br>2) -35 °C ↔ 85 °C<br>3) 0.5 hr ↔ 0.5 hr                                                               | 100 cycles                                                 |
| High Temperature & Humidity | 1) Operating<br>2) 65 °C & 85%RH<br>3) Without condensation                                                               | 240 hrs                                                    |
| Vibration                   | 1) Non-Operating<br>2) 10~150 Hz<br>3) 3G<br>4) X, Y, and Z directions                                                    | 1 hr for each direction                                    |
| Mechanical Shock            | 1) Non-Operating<br>2) 10 ms<br>3) 50G<br>4) ±X, ±Y and ±Z directions                                                     | Once for each direction                                    |
| ESD                         | 1) Operating<br>2) Tip: 200 pF, 250 Ω<br>3) Air discharge for glass: ± 8KV<br>4) Contact discharge for metal frame: ± 8KV | 1) Glass: 9 points<br>2) Metal frame: 8 points<br>3) Note3 |

Note 1: Display functionalities are inspected under the conditions defined in the specification after the reliability tests.

Note 2: The display is not guaranteed for use in corrosive gas environments.

Note 3: All pins of LCD interface (CN1) have been tested by ± 100V contact discharge of ESD under non-operating condition.

## 9. LCD INTERFACE

### 9.1 INTERFACE PIN CONNECTIONS

The display interface connector is 40FLZ-SM2-R-GB-TB(LF)(SN) made by JST (Thickness:  $0.3 \pm 0.05\text{mm}$ ; Pitch:  $0.5 \pm 0.05\text{mm}$ ) and more details of the connector are shown in the section of outline dimension.

Pin assignment of LCD interface is as below:

| Pin No. | Signal | Function   | Pin No. | Signal | Function               |
|---------|--------|------------|---------|--------|------------------------|
| 1       | VSS    | GND        | 21      | B3     | Blue Data              |
| 2       | DCLK   | Dot Clock  | 22      | B4     |                        |
| 3       | VSS    | GND        | 23      | B5     |                        |
| 4       | R0     | Red Data   | 24      | VSS    | GND                    |
| 5       | R1     |            | 25      | NC     | No Connection          |
| 6       | R2     |            | 26      | DE     | Data Enable            |
| 7       | R3     |            | 27      | NC     | No Connection          |
| 8       | R4     |            | 28      | VSS    | GND                    |
| 9       | R5     |            | 29      | NC     | No Connection          |
| 10      | VSS    | GND        | 30      | NC     | Power Supply for Logic |
| 11      | G0     | Green Data | 31      | VDD    |                        |
| 12      | G1     |            | 32      | VDD    |                        |
| 13      | G2     |            | 33      | VSS    | GND                    |
| 14      | G3     |            | 34      | VSS    | Power Supply for Logic |
| 15      | G4     |            | 35      | VDD    |                        |
| 16      | G5     | 36         | VDD     |        |                        |
| 17      | VSS    | GND        | 37      | VDD    | GND                    |
| 18      | B0     | Blue Data  | 38      | VDD    |                        |
| 19      | B1     |            | 39      | VSS    |                        |
| 20      | B2     |            | 40      | VSS    |                        |

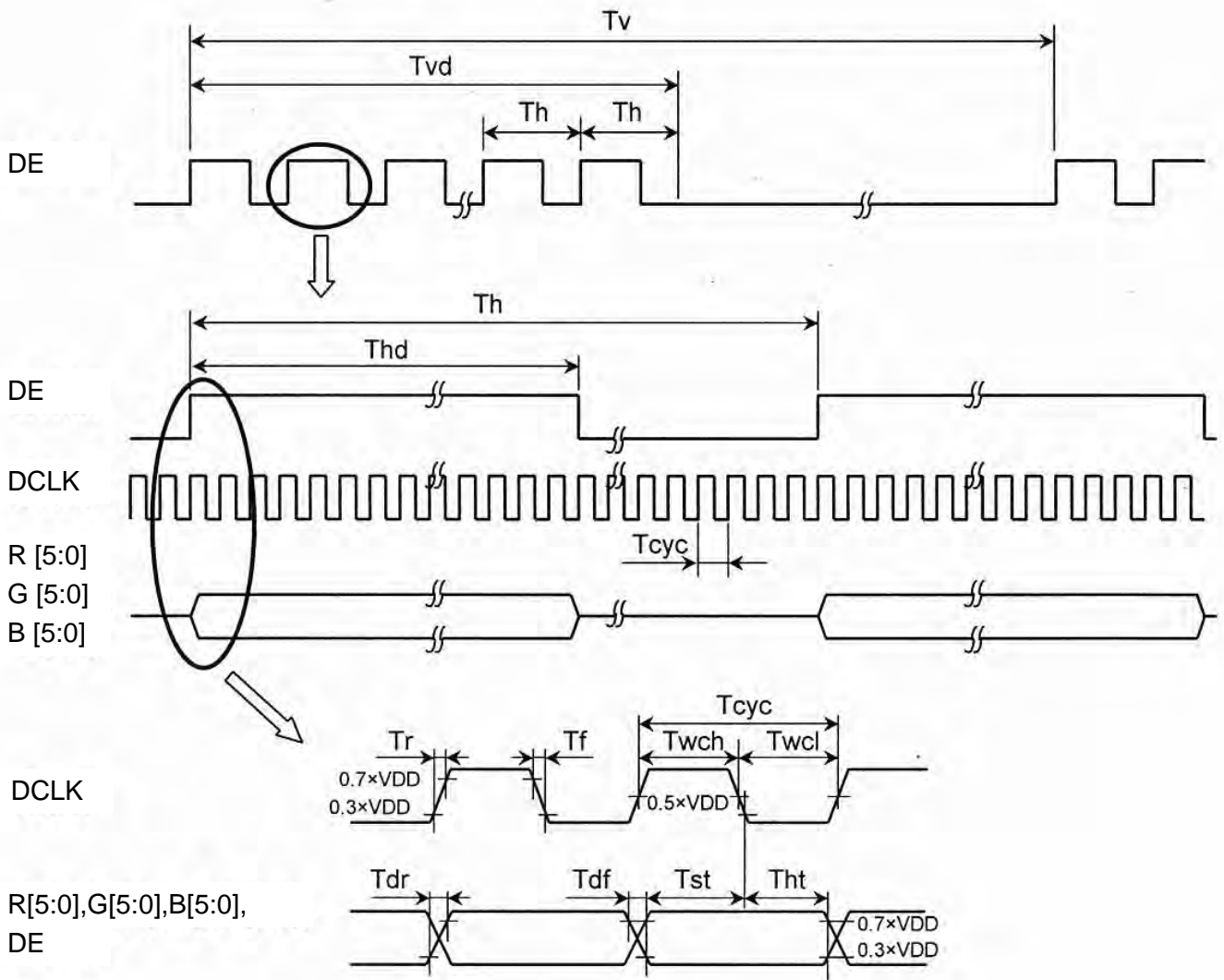
Note 1: All VDD pins shall be connected to +3.3V, and VSS pins shall be grounded.

The recommend backlight connector (CN2) is 10pin-0.5mm pitch and pin assignment is as below:

| Pin No. | Symbol | Description       |
|---------|--------|-------------------|
| 1       | VLA    | Anode Chain1(+)   |
| 2       | VLA    | Anode Chain2(+)   |
| 3       | VLA    | Anode Chain3(+)   |
| 4       | VLC1   | Cathode Chain1(-) |
| 5       | VLC2   | Cathode Chain2(-) |
| 6       | VLC3   | Cathode Chain3(-) |
| 7       | VLC4   | Cathode Chain4(-) |
| 8       | (IC)   | Note 1            |
| 9       | (IC)   | Note 1            |
| 10      | (IC)   | Note 1            |

Note 1: Please keep open electrically, Hitachi test use only.

## 9.2 TIMING CHART



### 9.3 INTERFACE TIMING SPECIFICATIONS

The parameter sets including minimum, typical, and maximum column as below are based on frame frequency (Vsync) = 60 Hz and 50Hz to adjust timing. In order to obtain better optical performance, 47~75 Hz for Vsync should be applied at least by other parameter combination if 60 Hz and 50Hz are not the aim to set.

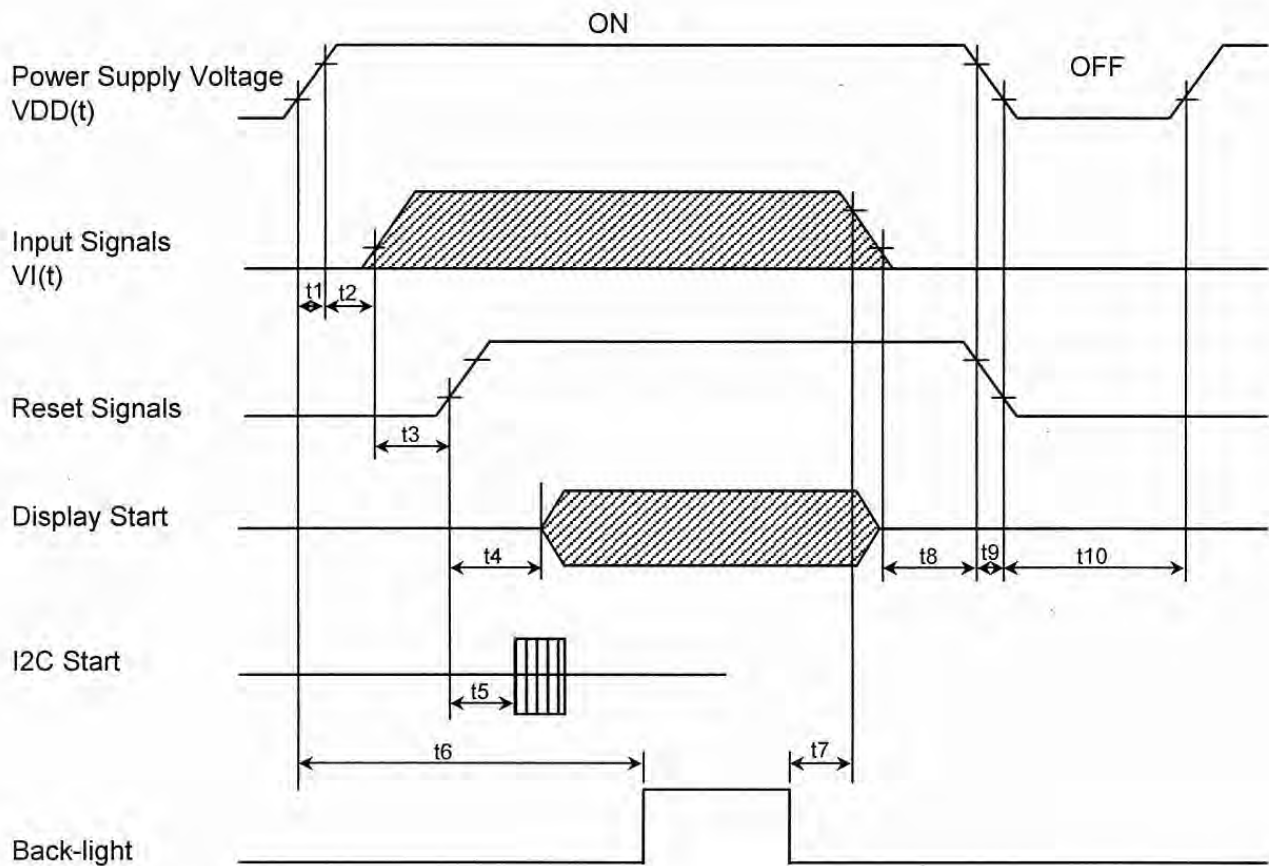
#### AC characteristic(60Hz)

|             | Item                    | Symbol | Min.  | Typ.  | Max.  | Unit |
|-------------|-------------------------|--------|-------|-------|-------|------|
| DCLK        | Frequency               | 1/Tcyc | 30.00 | 33.26 | 36.00 | M Hz |
|             | High Width              | Twch   | 8     | -     | -     | ns   |
|             | Low Width               | Twcl   | 8     | -     | -     |      |
|             | Rise Time               | Tr     | -     | -     | 4     |      |
|             | Fall Time               | Tf     | -     | -     | 4     |      |
|             | Duty(D=Twcl / Twch)     | D      | 0.45  | 0.50  | 0.55  |      |
| R,G,B<br>DE | Set Up Time             | Tst    | 4     | -     | -     | ns   |
|             | Hold Time               | Tht    | 4     | -     | -     |      |
|             | Rise Time               | Tdr    | -     | -     | 4     |      |
|             | Fall Time               | Tdf    | -     | -     | 4     |      |
|             | Horizontal Cycle Time   | Th     | 840   | 1,056 | 1,500 | Tcyc |
|             | Horizontal Active Width | Thd    | 800   | 800   | 800   |      |
|             | Vertical Cycle Time     | Tv     | 482   | 525   | 640   | Th   |
|             | Vertical Active Width   | Tvd    | 480   | 480   | 480   |      |

#### AC characteristic(50Hz)

|             | Item                    | Symbol | Min.  | Typ.  | Max.  | Unit |
|-------------|-------------------------|--------|-------|-------|-------|------|
| DCLK        | Frequency               | 1/Tcyc | 25.00 | 33.00 | 36.00 | M Hz |
|             | High Width              | Twch   | 8     | -     | -     | ns   |
|             | Low Width               | Twcl   | 8     | -     | -     |      |
|             | Rise Time               | Tr     | -     | -     | 4     |      |
|             | Fall Time               | Tf     | -     | -     | 4     |      |
|             | Duty(D=Twcl / Twch)     | D      | 0.45  | 0.50  | 0.55  |      |
| R,G,B<br>DE | Set Up Time             | Tst    | 4     | -     | -     | ns   |
|             | Hold Time               | Tht    | 4     | -     | -     |      |
|             | Rise Time               | Tdr    | -     | -     | 4     |      |
|             | Fall Time               | Tdf    | -     | -     | 4     |      |
|             | Horizontal Cycle Time   | Th     | 840   | 1,056 | 1,500 | Tcyc |
|             | Horizontal Active Width | Thd    | 800   | 800   | 800   |      |
|             | Vertical Cycle Time     | Tv     | 482   | 525   | 640   | Th   |
|             | Vertical Active Width   | Tvd    | 480   | 480   | 480   |      |

## 9.4 POWER SEQUENCE



### POWER ON

$t_1 \leq 15\text{ms}$   
 $0\text{ms} < t_2 \leq 45\text{ms}$   
 $0\text{ms} < t_3 \leq 45\text{ms}$   
 $t_4 (\text{max}) = 60\text{ms}$   
 $t_5 (\text{min}) = 25\text{ms}$   
 $t_6 (\text{min}) = 100\text{ms}$

### POWER OFF

$t_7 (\text{max}) = 5\text{ms}$   
 $0\text{ms} < t_8 \leq 45\text{ms}$   
 $0\text{ms} < t_9 \leq 20\text{ms}$   
 $t_{10} (\text{min}) = 500\text{ms}$

Note 1: Set  $0\text{V} \leq V_I(t) \leq V_{DD}(t)$

Here,  $V_I(t)$ ,  $V_{DD}(t)$  indicate the transitional state of  $V_I$ ,  $V_{DD}$  when power supply is turned ON or OFF.

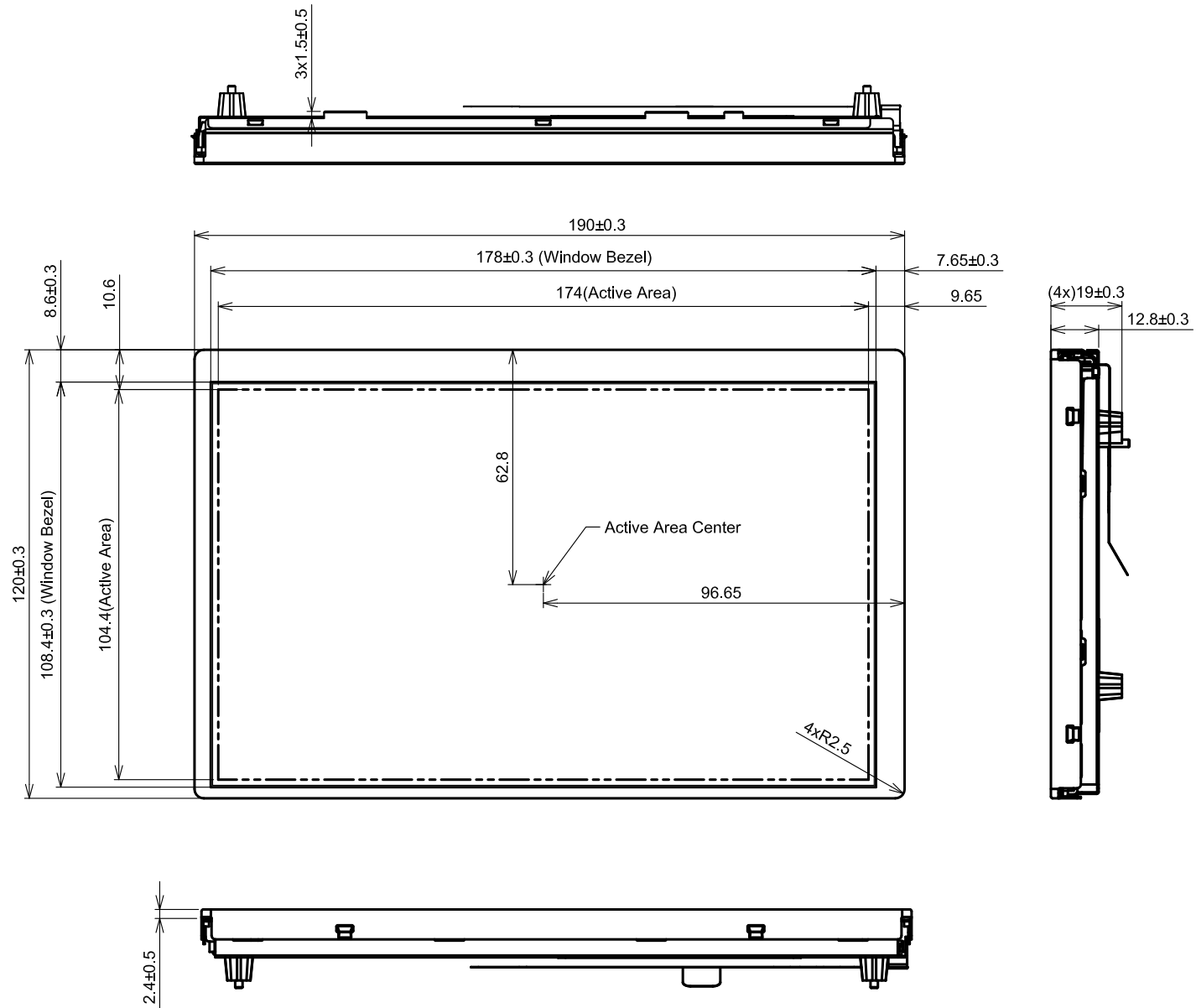
Note 2: Do not keep interface signal high-impedance when power on.

### 9.5 DATA INPUT for DISPLAY COLOR

|             | COLOR & Gray Scale | Data Signal |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------|--------------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|             |                    | R5          | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | 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  |
|             | Red (0)            | 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  | 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  | 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  |
| Red         | Black              | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |    |
|             | Red (62)           | 0           | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |    |
|             | Red (61)           | 0           | 0  | 0  | 0  | 1  | 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  | 0  |
| Red (0)     | 1                  | 1           | 1  | 1  | 1  | 1  | 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  |    |
|             | Green (62)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  |    |
|             | Green (61)         | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  |    |
|             | :                  | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  |    |
|             | :                  | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  |    |
|             | Green (1)          | 0           | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| Green (0)   | 0                  | 0           | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 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  |    |
|             | Blue (62)          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  |    |
|             | Blue (61)          | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  |    |
|             | :                  | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  |    |
|             | :                  | :           | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  | :  |    |
|             | Blue (1)           | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1  | 0  |    |
| Blue (0)    | 0                  | 0           | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1  | 1  |    |    |

# 10. OUTLINE DIMENSIONS

## 10.1 FRONT VIEW



Note : Dimensions without tolerance are reference values.

Scale : NTS  
Unit : mm

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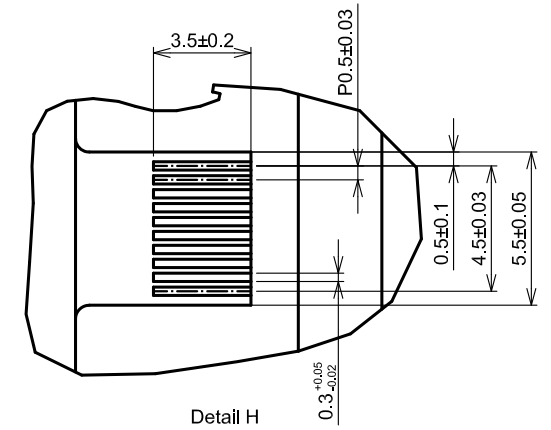
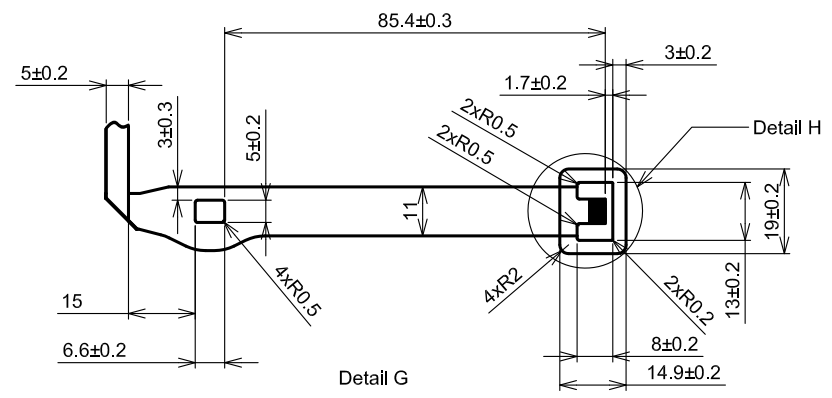
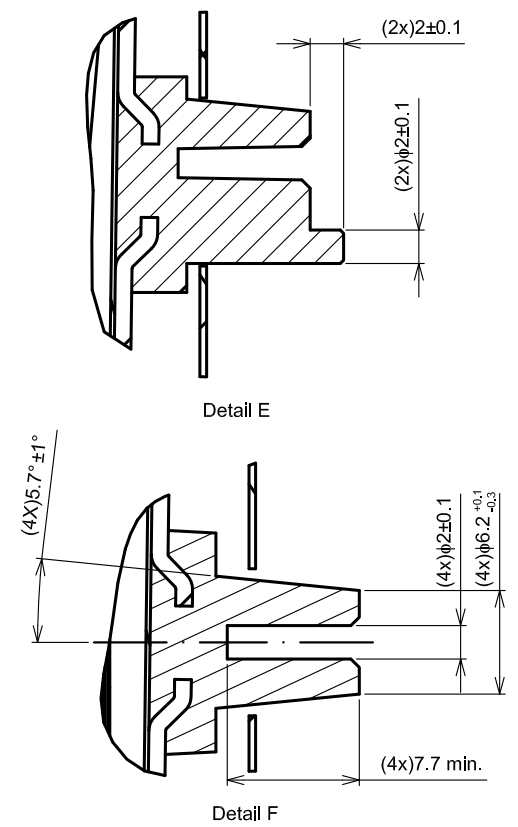
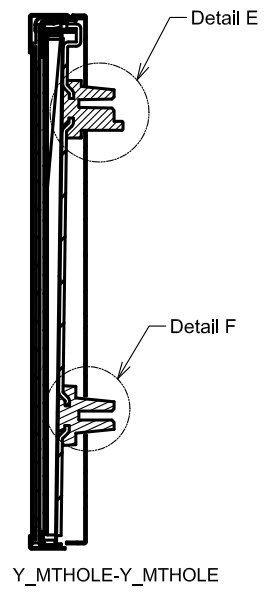
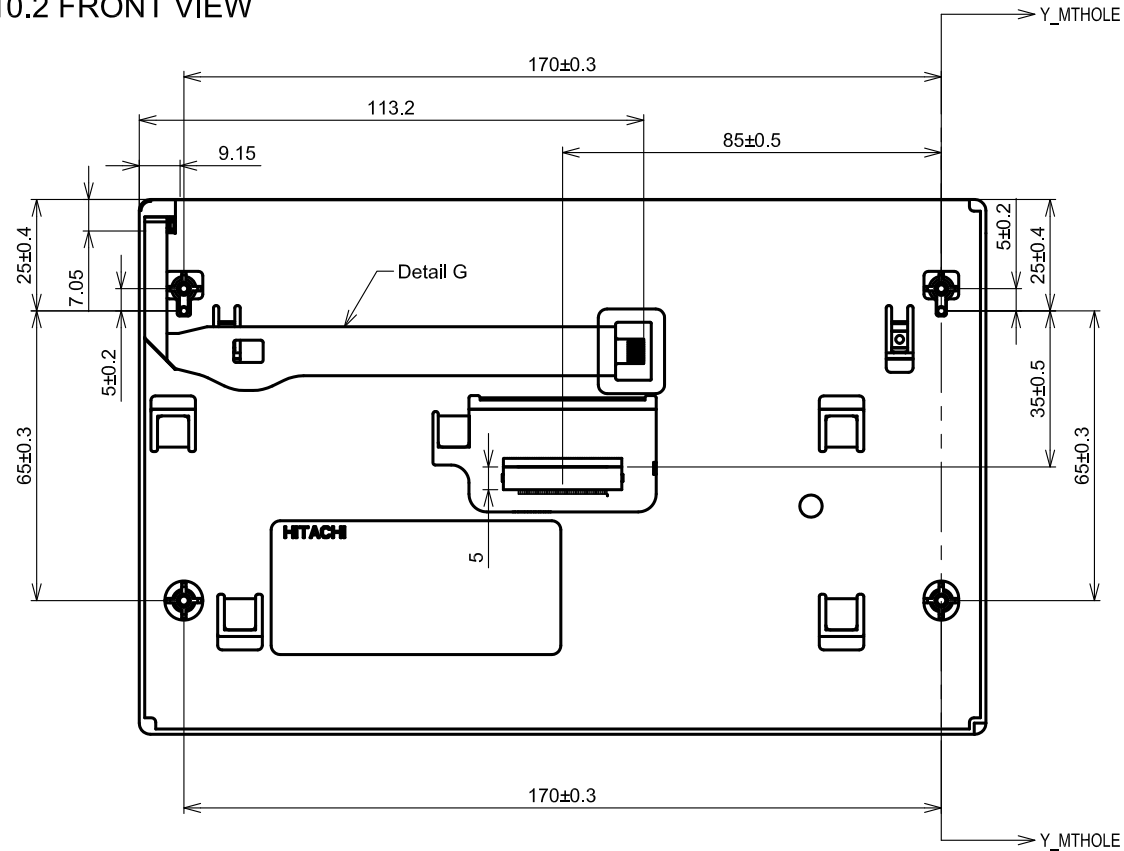
Sh. No. 7B64PS 2710-TX20D26VM0AAA-3

PAGE

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10.2 FRONT VIEW



Scale : NTS  
Unit : mm

# 11. APPEARANCE STANDARD

The appearance inspection is performed in a dark room around 2000 lx based on the conditions as below:

- The distance between inspector's eyes and display is 30 cm.
- The viewing zone is defined with angle  $\theta$  shown in Fig. 11.1 The inspection should be performed within  $45^\circ$  when display is shut down. The inspection should be performed within  $5^\circ$  when display is power on.

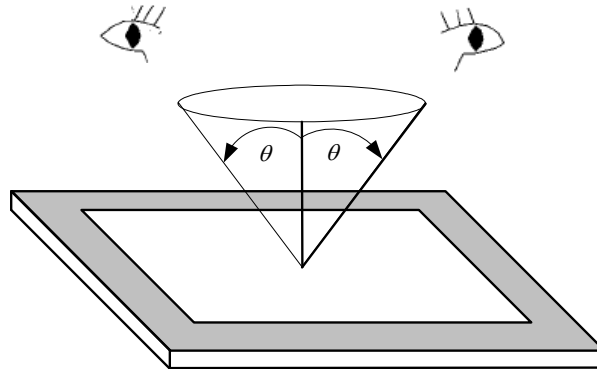


Fig 11.1

## 11.1 THE DEFINITION OF LCD ZONE

LCD panel is divided into 3 areas as shown in Fig.11.2 for appearance specification in next section. A zone is the LCD active area (dot area); B zone is the area, which extended 1 mm out from LCD active area; C zone is the area between B zone and metal frame.

In terms of housing design, B zone is the recommended window area customers' housing should be located in.

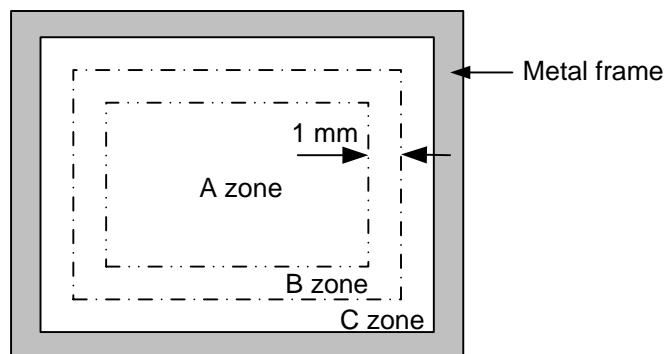


Fig 11.2

## 11.2 LCD APPEARANCE SPECIFICATION

The specification as below is defined as the amount of unexpected phenomenon or material in different zones of LCD panel. The definitions of length, width and average diameter using in the table are shown in Fig. 11.3 and Fig. 11.4.

| Item                                              | Criteria                              |                            |                        |                       | Applied zone   |   |
|---------------------------------------------------|---------------------------------------|----------------------------|------------------------|-----------------------|----------------|---|
|                                                   | Length (mm)                           | Width (mm)                 | Maximum number         | Minimum space         |                |   |
| Scratches                                         | Ignored                               | $W \leq 0.01$              | Ignored                | -                     | A              |   |
|                                                   | $L \leq 40$                           | $W \leq 0.02$              | 10                     | -                     |                |   |
|                                                   | $L \leq 20$                           | $W \leq 0.04$              | 10                     | -                     |                |   |
|                                                   | Round (Dot Shape)                     |                            |                        |                       |                |   |
|                                                   | Average diameter (mm)                 |                            | Maximum number         | Minimum space         |                |   |
|                                                   | $D \leq 0.2$                          |                            | Ignore                 | -                     |                |   |
|                                                   | $D \leq 0.4$                          |                            | 10                     | -                     |                |   |
|                                                   | Dent                                  | Serious one is not allowed |                        |                       |                | A |
| Wrinkles in polarizer                             | Serious one is not allowed            |                            |                        |                       | A              |   |
| Bubbles on polarizer                              | Average diameter (mm)                 |                            | Maximum number         |                       | A              |   |
|                                                   | $D \leq 0.3$                          |                            | Ignored                |                       |                |   |
|                                                   | $D \leq 0.5$                          |                            | 10                     |                       |                |   |
|                                                   | $D \leq 1.0$                          |                            | 5                      |                       |                |   |
| 1) Stains<br>2) Foreign Materials<br>3) Dark Spot | Filamentous (Line shape)              |                            |                        |                       | A              |   |
|                                                   | Length (mm)                           |                            | Width (mm)             |                       |                |   |
|                                                   | Ignored                               |                            | $W \leq 0.02$          |                       |                |   |
|                                                   | $L \leq 2.0$                          |                            | $W \leq 0.03$          |                       |                |   |
|                                                   | $L \leq 1.0$                          |                            | $W \leq 0.06$          |                       |                |   |
|                                                   | Round (Dot shape)                     |                            |                        |                       | A              |   |
|                                                   | Average diameter (mm)                 |                            | Maximum number         |                       |                |   |
|                                                   | $D \leq 0.22$                         |                            | Ignored                |                       |                |   |
|                                                   | $D \leq 0.33$                         |                            | 5                      |                       |                |   |
|                                                   | $D > 0.33$                            |                            | 0                      |                       |                |   |
|                                                   | In total                              |                            | Filamentous + Round=10 |                       |                |   |
|                                                   | Those wiped out easily are acceptable |                            |                        |                       |                |   |
|                                                   | Dot-Defect<br>(Note 1)                | Bright dot-defect          |                        | Type                  | Maximum number | A |
|                                                   |                                       |                            |                        | 1 dot                 | 4              |   |
| 2 adjacent dot                                    |                                       |                            |                        | 1                     |                |   |
| 3 adjacent dot or above                           |                                       |                            |                        | Not allowed           |                |   |
| Density                                           |                                       |                            |                        | $2(\phi 20\text{mm})$ |                |   |
| In total                                          |                                       | 5                          |                        |                       |                |   |
| Dark dot-defect                                   |                                       | 1 dot                      | 5                      |                       |                |   |
|                                                   |                                       | 2 adjacent dot             | 2                      |                       |                |   |
|                                                   |                                       | 3 adjacent dot or above    | Not allowed            |                       |                |   |
|                                                   |                                       | Density                    | $3(\phi 20\text{mm})$  |                       |                |   |
|                                                   |                                       | In total                   |                        | 5                     |                |   |
| In total                                          |                                       | 10                         |                        |                       |                |   |

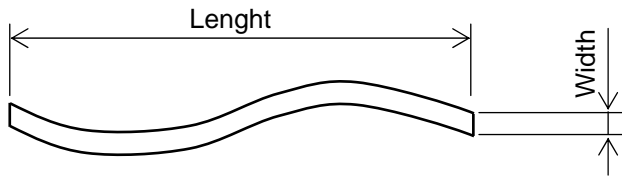


Fig 11.3

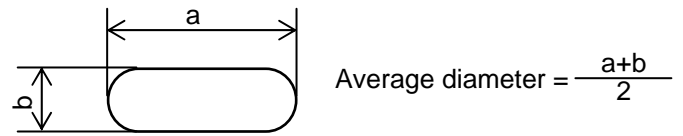


Fig 11.4

Note 1: The definitions of dot defect are as below:

- The defect area of the dot must be bigger than half of a dot.
- For bright dot-defect, showing black pattern, the dot's brightness must be over 30% brighter than others.
- For dark dot-defect, showing white pattern, the dot's brightness must be under 70% darker than others.
- The definition of 1-dot-defect is the defect-dot, which is isolated and no adjacent defect-dot.
- The definition of adjacent dot is shown as Fig. 11.5.
- The Density of dot defect is defined in the area within diameter  $\phi = 20\text{mm}$ .

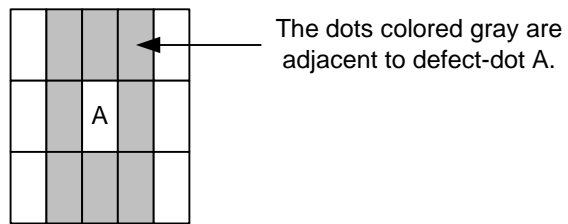


Fig 11.5

## 12. PRECAUTIONS

### 12.1 PRECAUTIONS of ESD

- 1) Before handling the display, please ensure your body has been connected to ground to avoid any damages by ESD. Also, do not touch display's interface directly when assembling.
- 2) Please remove the protection film very slowly before turning on the display to avoid generating ESD.

### 12.2 PRECAUTIONS of HANDLING

- 1) In order to keep the appearance of display in good condition, please do not rub any surfaces of the displays by sharp tools harder than 3H, especially touch panel, metal frame and polarizer.
- 2) Please do not pile the displays in order to avoid any scars leaving on the display. In order to avoid any injuries, please pay more attention for the edges of glasses and metal frame, and wear finger cots to protect yourself and the display before working on it.
- 3) Touching the display area or the terminal pins with bare hand is prohibited. This is because it will stain the display area and cause poor insulation between terminal pins, and might affect display's electrical characteristics furthermore.
- 4) Do not use any harmful chemicals such as acetone, toluene, and isopropyl alcohol to clean display's surfaces.
- 5) Please use soft cloth or absorbent cotton with ethanol to clean the display by gently wiping. Moreover, when wiping the display, please wipe it by horizontal or vertical direction instead of circling to prevent leaving scars on the display's surface, especially polarizer.
- 6) Please wipe any unknown liquids immediately such as saliva, water or dew on the display to avoid color fading or any permanently damages.
- 7) Maximum pressure to the surface of the display must be less than  $1.96 \times 10^4$  Pa. If the area of adding pressure is less than  $1 \text{ cm}^2$ , the maximum pressure must be less than 1.96N.

### 12.3 PRECAUTIONS OF OPERATING

- 1) Please input signals and voltages to the displays according to the values defined in the section of electrical characteristics to obtain the best performance. Any voltages over than absolute maximum rating will cause permanent damages to this display. Also, any timing of the signals out of this specification would cause unexpected performance.
- 2) When the display is operating at significant low temperature, the response time will be slower than it at  $25 \text{ C}^\circ$ . In high temperature, the color will be slightly dark and blue compared to original pattern. However, these are temperature-related phenomenon of LCD and it will not cause permanent damages to the display when used within the operating temperature.
- 3) The use of screen saver or sleep mode is recommended when static images are likely for long periods of time. This is to avoid the possibility of image sticking.
- 4) Spike noise can cause malfunction of the circuit. The recommended limitation of spike noise is no bigger than  $\pm 100 \text{ mV}$ .

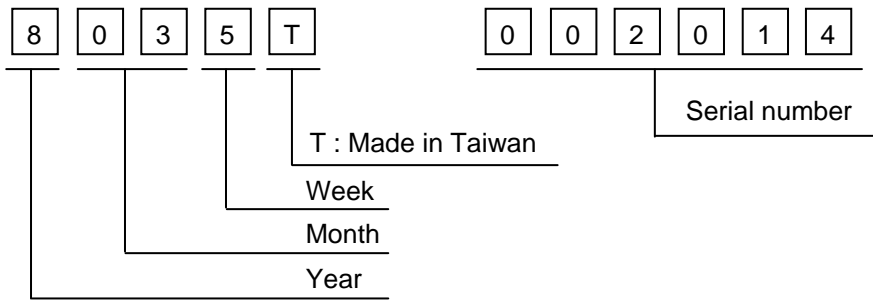
## 12.4 PRECAUTIONS of STORAGE

If the displays are going to be stored for years, please be aware the following notices.

- 1) Please store the displays in a dark room to avoid any damages from sunlight and other sources of UV light.
- 2) The recommended long term storage temperature is between 10 C° ~35 C° and 55%~75% humidity to avoid causing bubbles between polarizer and LCD glasses, and polarizer peeling from LCD glasses.
- 3) It would be better to keep the displays in the container, which is shipped from Hitachi, and do not unpack it.
- 4) Please do not stick any labels on the display surface for a long time, especially on the polarizer.

### 13. DESIGNATION of LOT MARK

1) The lot mark is showing in Fig.13.3. First 4 digits are used to represent production lot, T represented made in Taiwan, and the last 5 digits are the serial number.



2) The tables as below are showing what the first 4 digits of lot mark are shorted for.

| Year | Mark |
|------|------|
| 2009 | 9    |
| 2010 | 0    |
| 2011 | 1    |
| 2012 | 2    |
| 2013 | 3    |

| Month | Mark | Month | Mark |
|-------|------|-------|------|
| 1     | 01   | 7     | 07   |
| 2     | 02   | 8     | 08   |
| 3     | 03   | 9     | 09   |
| 4     | 04   | 10    | 10   |
| 5     | 05   | 11    | 11   |
| 6     | 06   | 12    | 12   |

| Week (Days) | Mark |
|-------------|------|
| 1~7         | 1    |
| 8~14        | 2    |
| 15~21       | 3    |
| 22~28       | 4    |
| 29~31       | 5    |

3) Except letters I and O, revision number will be shown on lot mark and following letters A to Z.

4) The location of the lot mark is on the back of the display shown in Fig. 13.3.



Fig 13.3