## Version : 1.0

## TECHNICAL SPECIFICATION

MODEL NO.: PD064VT5
$\square$ Customer's Confirmation

Customer

Date

By

Confirmed By

Prepared By

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PD064VT5

## TECHNICAL SPECIFICATION

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PD064VT5

1. Application

This product applies computer peripheral , industrial meter, image communication and multi-media.
2. Features
. Compatible with VGA-480, VGA-400, VGA-350 mode
. Support the DENB mode
. Pixel in stripe configuration
. Slim and compact
. Display Colors : 262,144 colors
. Image Reversion : Up/Down and Left/Right
. Active area / Outline area $=57.02 \%$
.Viewing Direction : 6 o'clock
. Backlight lamps are Replaceable
3. Mechanical Specifications

| Parameter | Specifications | Unit |
| :---: | :---: | :---: |
| Screen Size | 6.4 (diagonal) | inch |
| Display Format | $640 \times \mathrm{R}, \mathrm{G}, \mathrm{B} \times 480$ | dot |
| Active Area | $129.6(\mathrm{H}) \times 97.4(\mathrm{~V})$ | mm |
| Dot Pitch | $0.0675(\mathrm{H}) \times 0.203(\mathrm{~V})$ | mm |
| Pixel Pitch | $0.2025(\mathrm{H}) \times 0.203(\mathrm{~V})$ | mm |
| Pixel Configuration | Stripe |  |
| Outline Dimension | $175.0(\mathrm{~W}) \times 126.5(\mathrm{H}) \times 12.0(\mathrm{D})($ Typ. $)$ | mm |
| Weight | $340 \pm 10$ | g |

PD064VT5
4. Mechanical Drawing of TFT-LCD Module


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## 5. Input / Output Terminals

5-1) TFT-LCD Panel Driving LCD module connector (Reference)
DF9A-31P-1V

| Pin No. | Symbol | Function | Remark |
| :---: | :---: | :---: | :---: |
| 1 | GND | Ground (0V) |  |
| 2 | CLK | Clock Signal for Sampling Image Digital Data |  |
| 3 | Hsync | Horizontal Synchronous Signal | Note 5-1 |
| 4 | Vsync | Vertical Synchronous Signal |  |
| 5 | GND | Ground (0V) |  |
| 6 | R0 | Red Image Data Signal (LSB) |  |
| 7 | R1 | Red Image Data Signal |  |
| 8 | R2 | Red Image Data Signal |  |
| 9 | R3 | Red Image Data Signal |  |
| 10 | R4 | Red Image Data Signal |  |
| 11 | R5 | Red Image Data Signal (MSB) |  |
| 12 | GND | Ground (0V) |  |
| 13 | G0 | Green Image Data Signal (LSB) |  |
| 14 | G1 | Green Image Data Signal |  |
| 15 | G2 | Green Image Data Signal |  |
| 16 | G3 | Green Image Data Signal |  |
| 17 | G4 | Green Image Data Signal |  |
| 18 | G5 | Green Image Data Signal (MSB) |  |
| 19 | GND | Ground (0V) |  |
| 20 | B0 | Blue Image Data Signal (LSB) |  |
| 21 | B1 | Blue Image Data Signal |  |
| 22 | B2 | Blue Image Data Signal |  |
| 23 | B3 | Blue Image Data Signal |  |
| 24 | B4 | Blue Image Data Signal |  |
| 25 | B5 | Blue Image Data Signal (MSB) |  |
| 26 | GND | Ground (0V) |  |
| 27 | DENB | Enable | Note 5-1 <br> Note 5-2 |
| 28 | VCC | DC +5.0V Power Supply | Note 5-3 |
| 29 | VCC | DC +5.0V Power Supply |  |
| 30 | R/L | Horizontal Image Shift-direction Select Signal | Note 5-4 |
| 31 | U/D | Vertical Image Shift-direction Select Signal | Note 5-5 |

Note 5-1 : The relationship between DENB \& SYNC. mode

1. DENB mode with the top priority.
2. When working with the SYNC. mode, the TFT-LCD module is compatible with three kinds of VGA timing. They are VGA-480, VGA-400 and VGA-350 mode. The polarization of Hsync and Vsync determine the timings.

| SYNC. Mode | DENB | VGA-480 | VGA-400 | VGA-350 |
| :--- | :---: | :---: | :---: | :---: |
| Hsync Polarization | Don't care | Negative / Positive | Negative | Positive |
| Vsync Polarization | Don't care | Negative / Positive | Positive | Negative |

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Note 5-2 : DENB input signal.
If customer wanted to off the DENB mode, you must keep the DENB (pin 27) always
High or Low.


Note 5-3: $\mathrm{V}_{\mathrm{CC}}$ TYP. $=+5 \mathrm{~V}$
Note 5-4, 5-5 : The definitions of U/D \& R/L

$$
\mathrm{R} / \mathrm{L}(\operatorname{PIN} 30)=\text { High }, \mathrm{U} / \mathrm{D}(\operatorname{PIN} 31)=\text { Low }
$$



R/L(PIN 30) $=$ Low , U/D(PIN 31) $=$ High


## 6. Absolute Maximum Ratings :

The followings are maximum values, which if exceeded, may cause faulty operation or damage to the unit.

|  | $\mathrm{GND}=0 \mathrm{~V}, \mathrm{Ta}=25^{\circ} \mathrm{C}$ |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Parameters | Symbol | MIN. | MAX. | Unit | Remark |
| +5 V Supply Voltage | $\mathrm{V}_{\mathrm{CC}}$ | -0.3 | +7.0 | V |  |
| Input Signals Voltage | $\mathrm{V}_{\text {sig }}$ | -0.3 | $\mathrm{~V}_{\mathrm{CC}}+0.3$ | V | Note 6-1 |
| Storage Temperature | $\mathrm{T}_{\text {stg }}$ | -30 | +70 | ${ }^{\circ} \mathrm{C}$ |  |
| Operating Temperature | $\mathrm{T}_{\text {opa }}$ | -20 | +70 | ${ }^{\circ} \mathrm{C}$ | Note 6-2 |

Note 6-1 : Input signals include CLK, Hsync, Vsync, DENB , R[0:5], G[0:5] and B[0:5].
Note 6-2 : Optical characteristics shown in Table 9-1 are measured under $\mathrm{Ta}=+25^{\circ} \mathrm{C}$.

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## 7. Electrical Characteristics

7-1) Recommended Operating Condition for TFT-LCD panel :

| GND $=0 \mathrm{~V}, \mathrm{Ta}=25^{\circ} \mathrm{C}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Parameters |  |  |  |  |  |  |  |  | Symbol | Min. | Typ. | Max. | Unit | Remark |
| +5 V | Supply Voltage | $\mathrm{V}_{\mathrm{CC}}$ | +4.75 | +5.0 | +5.25 | V |  |  |  |  |  |  |  |  |
|  | Supply Input Ripple Voltage | $\mathrm{V}_{\mathrm{CCRP}}$ |  |  | 0.1 | $\mathrm{Vp}-\mathrm{p}$ | $\mathrm{V}_{\mathrm{CC}}=+5 \mathrm{~V}$ |  |  |  |  |  |  |  |
| Input Signals Voltage (High) | $\mathrm{V}_{\mathrm{IH}}$ | +2.6 |  |  | V |  |  |  |  |  |  |  |  |  |
| Input Signals Voltage (Low) | $\mathrm{V}_{\mathrm{IL}}$ |  |  | +0.5 | V |  |  |  |  |  |  |  |  |  |

7-2) Recommended Operating Condition for backlight :

| Item | Symbol | Min. | Typ. | Max. | Unit | Remark |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lamp Current | $\mathrm{I}_{\mathrm{L}}$ | - | 6 | - | mA | Note 7-1 |
| Lamp Voltage | $\mathrm{V}_{\mathrm{L}}$ | - | 360 | - | Vrms | $\mathrm{I}_{\mathrm{L}}=6 \mathrm{~mA}$ |
| Lamp frequency | $\mathrm{P}_{\mathrm{L}}$ | - | 40 | - | KHz | Note 7-2 |
| Kick-off voltage $\left(25^{\circ} \mathrm{C}\right)$ | $\mathrm{V}_{\mathrm{S}}$ | - | 790 | - | Vrms | Note 7-3 |

Note 7-1 : In order to satisfy the quality of $B / L$, no matter use what kind of inverter, the output lamp current must between Min. and Max. to avoid the abnormal display image caused by B/L.

Note 7-2 : The waveform of lamp driving voltage should be as closed to a perfect sine wave as possible.

Note 7-3 : The Kick-off times $\geqq 1$ sec.

Backlight driving connector : JST BHR-03VS-1, Pin No. : 3 , Pitch : 4 mm

| Pin No | Symbol | Description | Remark |
| :---: | :---: | :---: | :---: |
| 1 | VL1 | Input terminal (Hi voltage side) |  |
| 2 | NC | No Connection |  |
| 3 | VL2 | Input terminal (Low voltage side) | Note 7-4 |

Note 7-4 : Low voltage side of backlight inverter connects with ground of inverter circuits.

## 7-3) Power Consumption

| Parameters | Symbol | Typ. | Max. | Unit | Remark |
| :--- | :---: | :---: | :---: | :---: | :---: |
| $+5 \mathrm{~V} \quad$ Current Dissipation | $\mathrm{I}_{\mathrm{CC}}$ | 100 | 120 | mA |  |
| LCD Panel Power Consumption |  | 0.5 | 0.6 | W | Note 7-5 |
| Backlight Power Consumption |  | 4.32 |  | W | Note 7-6 |

Note 7-5 : The power consumption of backlight is not included.

Note 7-6 : Backlight lamp power consumption is calculated by $\mathrm{I}_{\mathrm{L}} \times \mathrm{V}_{\mathrm{L}}$.

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7-4) Input / Output signal timing chart

| Parameters |  | Symbol | Format | Min. | Typ. | Max. | Unit | Note |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CLK | Frequency | $\mathrm{Fc}=1 / \mathrm{Tc}$ | All | - | 25.175 | - | MHz | Note 7-7 |
|  |  | tc | All | - | 40 | - | ns |  |
| Hsync | Period | Hp | All | - | 31.778 | - | us |  |
|  |  |  |  | - | 800 | - | tc |  |
|  | Display period | Hd | All | - | 640 | - | tc |  |
|  | Pulse width | Hpw | All | 12 | 96 | 139 | tc |  |
|  | Back-porch | Hbp | All | 12 | 48 | 139 | tc |  |
|  | Front-porch | Hfp | All | - | 16 | - | tc |  |
|  | Hpw+Hbp |  | All | 136 | 144 | 151 | tc |  |
|  | Hsync-CLK | Hhc | All | 10 | - | Tc-10 | ns |  |
|  | Vsync-Hsync | Hvh | All | 0 | 0 | 200 | tc |  |
| Vsync | Period | Vp | 480 | - | 16.8 | - | ms |  |
|  |  |  |  | 515 | 525 | 800 | Hp |  |
|  |  |  | 400 | - | 14.3 | - | ms |  |
|  |  |  |  | 446 | 449 | 480 | Hp |  |
|  |  |  | 350 | - | 14.3 | - | ms |  |
|  |  |  |  | 447 | 449 | 510 | Hp |  |
|  | Display period | Vdp | 480 | - | 480 | - | Hp |  |
|  |  |  | 400 | - | 400 | - |  |  |
|  |  |  | 350 | - | 350 | - |  |  |
|  | Pulse width | Vpw | All | 2 | 2 | 35 | Hp |  |
|  | Back-porch | Vbp | 480 | 2 | 33 | 35 | Hp |  |
|  |  |  | 400 | 2 | 35 | 38 |  |  |
|  |  |  | 350 | 2 | 60 | 63 |  |  |
|  | Front-porch | Vfp | 480 | 1 | 10 | - | Hp |  |
|  |  |  | 400 | 1 | 12 | - |  |  |
|  |  |  | 350 | 1 | 37 | - |  |  |
|  | Vpw+Vbp |  | 480 | 31 | 35 | 38 | Hp |  |
|  |  |  | 400 | 33 | 37 | 40 |  |  |
|  |  |  | 350 | 58 | 62 | 65 |  |  |
| Data | CLK-DATA | Dcd | All | 10 |  | - | ns |  |
|  | DATA-CLK | Ddc | All | 10 |  | - | ns |  |
| DENB | Horizontal scanning period | T1 | All | 780 | 800 | 900 | tc |  |
|  | Horizontal display period | T2 | All | - | 640 | - | tc |  |
|  | Vertical display period | T3 | All | - | 480 | - | T1 |  |
|  | Frame cycling period | T4 | All | 515 | 525 | 800 | T1 |  |

Note 7-7 : Tc is the period of sampling clock. In case of low-frequency, the image-flicker may occur.

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7-5) Display Time Range
(1) Vertical Timing :

(2) Horizontal Timing :

(3) DENB Timing :


PD064VT5
(4) Detail of Horizontal Timing :

(a) VGA-480 Mode (Hsync $=$ Positive $/$ Negative Polarization)

| Item | Description | Clock Cycles | Time |
| :---: | :--- | :---: | :---: |
| A | Horizontal Width | 96 | $3.813 \mu \mathrm{~s}$ |
| B | Horizontal B-Porch | 48 | $1.907 \mu \mathrm{~s}$ |
| C | Horizontal Display | 640 | $25.422 \mu \mathrm{~s}$ |
| D | Horizontal F-Porch | 16 | $0.636 \mu \mathrm{~s}$ |
| E | Horizontal Total | 800 | $31.778 \mu \mathrm{~s}$ |

(b) VGA-400 Mode $($ Hsync $=$ Negative Polarization $)$

| Item | Description | Clock Cycles | Time |
| :---: | :--- | :---: | :---: |
| A | Horizontal Width | 96 | $3.813 \mu \mathrm{~s}$ |
| B | Horizontal B-Porch | 48 | $1.907 \mu \mathrm{~s}$ |
| C | Horizontal Display | 640 | $25.422 \mu \mathrm{~s}$ |
| D | Horizontal F-Porch | 16 | $0.636 \mu \mathrm{~s}$ |
| E | Horizontal Total | 800 | $31.778 \mu \mathrm{~s}$ |

(c) VGA-350 Mode (Hsync $=$ Positive Polarization)

| Item | Description | Clock Cycles | Time |
| :---: | :--- | :---: | :---: |
| A | Horizontal Width | 96 | $3.813 \mu \mathrm{~s}$ |
| B | Horizontal B-Porch | 48 | $1.907 \mu \mathrm{~s}$ |
| C | Horizontal Display | 640 | $25.422 \mu \mathrm{~s}$ |
| D | Horizontal F-Porch | 16 | $0.636 \mu \mathrm{~s}$ |
| E | Horizontal Total | 800 | $31.778 \mu \mathrm{~s}$ |

PD064VT5
(5) Detail of Vertical Timing :

(a) VGA-480 Mode (Vsync $=$ Positive $/$ Negative Polarization)

| Item | Description | Horizontal Lines | Time |
| :---: | :--- | :---: | :---: |
| A | Vertical Width | 2 | $63.5 \mu \mathrm{~s}$ |
| B | Vertical B-Porch | 33 | 1.049 ms |
| C | Vertical Display | 480 | 15.253 ms |
| D | Vertical F-Porch | 10 | $317.8 \mu \mathrm{~s}$ |
| E | Vertical Total | 525 | 16.683 ms |

(b) VGA-400 Mode (Vsync $=$ Positive Polarization)

| Item | Description | Horizontal Lines | Time |
| :---: | :--- | :---: | :---: |
| A | Vertical Width | 2 | $63.5 \mu \mathrm{~s}$ |
| B | Vertical B-Porch | 35 | 1.112 ms |
| C | Vertical Display | 400 | 12.711 ms |
| D | Vertical F-Porch | 12 | $381.0 \mu \mathrm{~s}$ |
| E | Vertical Total | 449 | 14.268 ms |

(c) VGA-350 Mode $($ Vsync $=$ Negative Polarization $)$

| Item | Description | Horizontal Lines | Time |
| :---: | :--- | :---: | :---: |
| A | Vertical Width | 2 | $63.5 \mu \mathrm{~s}$ |
| B | Vertical B-Porch | 60 | 1.907 ms |
| C | Vertical Display | 350 | 11.122 ms |
| D | Vertical F-Porch | 37 | $1.176 \mu \mathrm{~s}$ |
| E | Vertical Total | 449 | 14.268 ms |

PD064VT5
7-6) Vertical Display Position

| Mode | Hsync | Vsync | V-Start Position | V-Display | Remark |
| :---: | :---: | :---: | :---: | :---: | :---: |
| VGA-480 | Positive / Negative | Positive / Negative | 34 | 480 lines |  |
| VGA-400 | Negative | Positive | 17 | 400 lines | Note 7-8 |
| VGA-350 | Positive | Negative | 30 | 350 lines | Note 7-9 |

Note 7-8 : As the format is VGA-400 (Hsync $=$ Negative, Vsync $=$ Positive $),$ LCD module will adjust the display area to the center of display. At this time, both of the upper and lower display areas have 40 blanking lines (the display color is black). The actual display area is center 400 lines.


Note 7-9 : As the format is VGA-350 (Hsync $=$ Positive, Vsync $=$ Negative) , LCD module will adjust the display area to the center of display. At this time, both of the upper and lower display areas have 65 blanking lines (the display color is black). The actual display area is center 350 lines .


[^0]7-7) Display Color and Gray Scale Reference


PD064VT5
7-8) Control Board Dip Switch Format
SW1

| Item | Symbol | Condition | Remark |
| :---: | :---: | :---: | :---: |
| SW 1-1 | - | No connection | Default (OFF) |
| SW 1-2 | HP3 | Horizontal Shift (8 Line) | Default (ON) |
| SW 1-3 | HP2 | Horizontal Shift (4 Line) | Default (OFF) |
| SW 1-4 | HP1 | Horizontal Shift (2 Line) | Default (OFF) |
| SW 1-5 | HP0 | Horizontal Shift (1 Line) | Default (ON) |
| SW 1-6 | VP2 | Vertical Shift (4 Line) | Default (OFF) |
| SW 1-7 | VP1 | Vertical Shift (2 Line) | Default (ON) |
| SW 1-8 | VP0 | Vertical Shift (1Line) | Default (ON) |

1. The default state is base on SYNC. mode (VGA-480)
2. Total horizontal shift line are 15 lines (HP0~HP3 on)

Total vertical shift line are 7 lines (VP0~VP2 on)
SW2

| Item | Symbol | Condition | Remark |
| :---: | :---: | :---: | :---: |
| SW 2-1 | UD | Vertical Image Shift-direction Select | Default (ON) |
| SW 2-2 | RL | Horizontal Image Shift-direction Select | Default (ON) |

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PD064VT5
8. Power On Sequence


1. The supply voltage for input signals should be same as $\mathrm{V}_{\mathrm{cc}}$.
2. When the power is off, please keep whole signals (Hsync, Vsync, CLK, Data) low level or high impedance

PD064VT5
9. Optical Characteristics

9-1) Specification :
$\mathrm{Ta}=25^{\circ} \mathrm{C}$

| Parameter |  | Symbol | Condition | MIN. | TYP. | MAX. | Unit | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Viewing <br> Angle | Horizontal | Ө21, $\theta 22$ | CR $>10$ | $\pm 45$ | $\pm 50$ | - | deg | Note 9-1 |
|  | Vertical | $\theta 12$ |  | 10 | 15 | - | deg |  |
|  |  | $\theta 11$ |  | 30 | 35 | - | deg |  |
| Contrast Ratio |  | CR | At optimized Viewing angle | 200 | 400 | - | - | Note 9-2 |
| Response time | Rise | Tr | $\theta=0^{\circ}$ | - | 15 | 30 | ms | Note 9-4 |
|  | Fall | Tf |  | - | 25 | 50 | ms |  |
| Brightness |  |  | $\theta=0^{\circ}$ | 350 | 400 | - | $\mathrm{cd} / \mathrm{m}^{2}$ | Note 9-3 |
| Transmission Ratio |  | T | $\theta=0^{\circ}$ | 6.7 | 7.2 | - | \% |  |
| Uniformity |  | U |  | 75 | 80 | - | \% | Note 9-5 |
| Cross Talk |  |  | $\theta=0^{\circ}$ | - | - | 3 | \% | Note 9-6 |
| White Chromaticity |  | x | $\theta=0^{\circ}$ | 0.264 | 0.294 | 0.324 | - | Note 9-3 |
|  |  | y |  | 0.278 | 0.308 | 0.338 | - |  |
| Lamp Life Time |  |  |  | - | 20,000 | - | hr |  |

Note 9-1 : The definitions of viewing angle diagrams :


Note 9-2:CR $=\frac{\text { Luminance when LCD is White }}{\text { Luminance when LCD is Black }}$
Contrast Ratio is measured in optimum common electrode voltage.
Note 9-3: 1. Topcon BM-7 (fast) luminance meter $2^{\circ}$ field of view is used in the testing (after 20~30 minutes operation).
2. Lamp current : 6 mA
3.Inverter model : TDK-347.

Note 9-4 : The definitions of response time


Note 9-5: The uniformity of LCD is defined as
$\mathrm{U}=\frac{\text { The Minimum Brightness of the } 9 \text { testing Points }}{\text { The Maximum Brightness of the } 9 \text { testing Points }}$
Luminance meter : BM-5A or BM-7 fast (TOPCON)
Measurement distance : $500 \mathrm{~mm}+/-50 \mathrm{~mm}$
Ambient illumination : $<1$ Lux
Measuring direction : Perpendicular to the surface of module

The test pattern is white (Gray Level 63).


Note 9-6: Cross Talk (CTK) $=\frac{|\mathrm{YA}-\mathrm{YB}|}{\text { YA }} \times 100 \%$

YA: Brightness of Pattern A
YB: Brightness of Pattern B Pattern A
(Gray Level 31)


Pattern B
(Gray Level 31, central black box exclusive)

(Gray Level 0)

## 10. Handling Cautions

10-1) Mounting of module
a) Please power off the module when you connect the input/output connector.
b) Please connect the ground pattern of the inverter circuit surely. If the connection is not perfect, some following problems may happen possibly.
1.The noise from the backlight unit will increase.
2.The output from inverter circuit will be unstable.
3.In some cases a part of module will heat.
c) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
d) Protective film (Laminator) is applied on surface to protect it against scratches and dirts. It is recommended to peel off the laminator before use and taking care of static electricity.
10-2) Precautions in mounting
a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth.
b) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.
c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.
d) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.
10-3) Adjusting module
a) Adjusting volumes on the rear face of the module have been set optimally before shipment.
b) Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described may not be satisfied.
10-4) Others
a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.
b) Store the module at a room temperature place.
c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.
d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel. Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet. Wash it out immediately with soap.
e) Observe all other precautionary requirements in handling general electronic components.
f) Please adjust the voltage of common electrode as material of attachment by 1 module.

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## 11. Reliability Test

| No | Test Item | Test Condition |
| :---: | :---: | :---: |
| 1 | Low Temperature Storage Test | $\mathrm{Ta}=-30{ }^{\circ} \mathrm{C}, 240 \mathrm{hrs}$ |
| 2 | High Temperature Operation Test | $\mathrm{Ta}=+70{ }^{\circ} \mathrm{C}, 240 \mathrm{hrs}$ |
| 3 | Low Temperature Operation Test | $\mathrm{Ta}=-20{ }^{\circ} \mathrm{C}, 240 \mathrm{hrs}$ |
| 4 | High Temperature \& High Humidity Operation Test | $\mathrm{Ta}=+60{ }^{\circ} \mathrm{C}, 90 \% \mathrm{RH}, 240 \mathrm{hrs}$ |
| 5 | Thermal Cycling Test (non-operating) | $\begin{aligned} & -25^{\circ} \mathrm{C} \rightarrow+70^{\circ} \mathrm{C}, 200 \text { Cycles } \\ & 30 \mathrm{~min} \quad 30 \mathrm{~min} \end{aligned}$ |
| 6 | Vibration Test (non-operating) | Frequency : $10 \sim 57 \mathrm{H}_{\mathrm{Z}} /$ Vibration Width : 0.075 mm $58-500 \mathrm{H} /$ / Gravity : $9.8 \mathrm{~m} / \mathrm{s}$ Sweep time: 11 minutes <br> Test period: 3 hrs for each direction of $\mathrm{X}, \mathrm{Y}, \mathrm{Z}$ |
| 7 | Shock Test (non-operating) | Gravity : 490m/s <br> Direction: $\pm \mathrm{X}, \pm \mathrm{Y}, \pm \mathrm{Z}$ <br> Pulse Width : 11 ms , half sine wave |
| 8 | Electrostatic Discharge Test (non-operating) | $150 \mathrm{pF}, 330 \Omega_{2}$ Air: $\pm 15 \mathrm{KV} ;$ Contact : $\pm 8 \mathrm{KV}$ 10 times/point, 9 points/panel face |

Ta: ambient temperature

## [Judgement Criteria]

Under the display quality test conditions with normal operation state , there should be no change which may affect practical display function.
12. Indication of Lot Number Label
a) Indicated contents of the label


Contents of lot number : 1st $\sim 3$ rd-The OEM product
5th—Production year : $1999 \Rightarrow 9,2000 \Rightarrow A, 2001 \Rightarrow B \ldots \ldots$.
6th-Production month : 1, 2, 3,....9, A, B, C
7th $\sim$ 8th—Production size : $6.4 " \Rightarrow 64$
9th~10th—Serial numbers : 01~99

PD064VT5
13. Block Diagram



PD064VT5
Revision History

| Rev. | Issued $\quad$ Date | Revised Contents |  |
| :--- | :--- | :--- | :--- |
| 1.0 | May 12, 2004 | NEW |  |


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