

# SPEC

|          |                       |
|----------|-----------------------|
| Spec No. | TQ3C-8EAF0-E1YAH14-00 |
| Date     | November 18, 2011     |

## **TYPE : TCG104SVLPAANN-AN20**

< 10.4 inch SVGA transmissive color TFT with LED backlight  
and constant current circuit for LED backlight>

### CONTENTS

1. Application
2. Construction and outline
3. Mechanical specifications
4. Absolute maximum ratings
5. Electrical characteristics
6. Optical characteristics
7. Interface signals
8. Input timing characteristics
9. Lot number identification
10. Warranty
11. Precautions for use
12. Reliability test data
13. Outline drawing



KYOCERA CORPORATION  
SHIGA YASU PLANT  
LCD DIVISION

This specification is subject to change without notice.  
Consult Kyocera before ordering.

| Original<br>Issue Date | Designed by: Engineering dept. |                 |                | Confirmed by: QA dept. |                |
|------------------------|--------------------------------|-----------------|----------------|------------------------|----------------|
|                        | Prepared                       | Checked         | Approved       | Checked                | Approved       |
| November 18, 2011      | <i>H. Mori</i>                 | <i>Y. Ikeda</i> | <i>H. Yogo</i> | <i>I. Hamada</i>       | <i>T. Ishi</i> |

## **Warning**

1. This Kyocera LCD module has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting in any way to the use of the module in such applications.
2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

## **Caution**

1. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera modules for which no Purchase Orders have been received from the Customer in a two-year period.

Spec No.

TQ3C-8EAF0-E1YAH14-00

Part No.

TCG104SVLPAANN-AN20

Page

-

**Revision record**

| Date    |      | Designed by : Engineering dept. |              |          | Confirmed by : QA dept. |          |
|---------|------|---------------------------------|--------------|----------|-------------------------|----------|
|         |      | Prepared                        | Checked      | Approved | Checked                 | Approved |
|         |      |                                 |              |          |                         |          |
| Rev.No. | Date | Page                            | Descriptions |          |                         |          |
|         |      |                                 |              |          |                         |          |

|                                   |                                 |           |
|-----------------------------------|---------------------------------|-----------|
| Spec No.<br>TQ3C-8EAF0-E1YAH14-00 | Part No.<br>TCG104SVLPAANN-AN20 | Page<br>1 |
|-----------------------------------|---------------------------------|-----------|

## 1. Application

This document defines the specification of TCG104SVLPAANN-AN20. (RoHS Compliant)

## 2. Construction and outline

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| LCD                | : Transmissive color dot matrix type TFT                |
| Backlight system   | : LED                                                   |
| Polarizer          | : Anti-Glare treatment                                  |
| Interface          | : LVDS                                                  |
| Additional circuit | : Timing controller, Power supply (3.3V input)          |
|                    | : Constant current circuit for LED Backlight(12V input) |

## 3. Mechanical specifications

| Item                  | Specification                                     | Unit |
|-----------------------|---------------------------------------------------|------|
| Outline dimensions 1) | 240.7(W)×(180.2)(H)×9(D)                          | mm   |
| Active area           | 211.2(W)×158.4(H)<br>(26.4cm/10.4 inch(Diagonal)) | mm   |
| Dot format            | 800×(R,G,B)(W)×600(H)                             | dot  |
| Dot pitch             | 0.088(W)×0.264(H)                                 | mm   |
| Base color 2)         | Normally White                                    | -    |
| Mass                  | 460                                               | g    |

1) Projection not included. Please refer to outline for details.

2) Due to the characteristics of the LCD material, the color varies with environmental temperature.

## 4. Absolute maximum ratings

### 4-1. Electrical absolute maximum ratings

| Item                  |                                                | Symbol          | Min. | Max.                 | Unit |
|-----------------------|------------------------------------------------|-----------------|------|----------------------|------|
| Supply voltage(+3.3V) |                                                | V <sub>DD</sub> | -0.3 | 4.0                  | V    |
| Supply voltage(+12V)  |                                                | V <sub>IN</sub> | -0.3 | 14.0                 | V    |
| Input signal voltage  | RxIN <sub>i</sub> +, RxIN <sub>i</sub> - 1) 2) | V <sub>I1</sub> | -0.3 | 2.8                  | V    |
|                       | CK IN+, CK IN-                                 | V <sub>I2</sub> | -0.3 | 2.8                  | V    |
|                       | SELLVDS                                        | V <sub>I3</sub> | -0.3 | V <sub>DD</sub> +0.5 | V    |
|                       | BLBRT, BLEN                                    | V <sub>I4</sub> | -0.3 | V <sub>IN</sub>      | V    |

1) i=0,1,2,3

2) V<sub>DD</sub> must be supplied correctly within the range described in 5-1.

### 4-2. Environmental absolute maximum ratings

| Item                     | Symbol           | Min. | Max. | Unit |
|--------------------------|------------------|------|------|------|
| Operating temperature 1) | T <sub>OP</sub>  | -20  | 70   | °C   |
| Storage temperature 2)   | T <sub>STO</sub> | -30  | 80   | °C   |
| Operating humidity 3)    | H <sub>OP</sub>  | 10   | 4)   | %RH  |
| Storage humidity 3)      | H <sub>STO</sub> | 10   | 4)   | %RH  |
| Vibration                | -                | 5)   | 5)   | -    |
| Shock                    | -                | 6)   | 6)   | -    |

1) Operating temperature means a temperature which operation shall be guaranteed. Since display performance is evaluated at 25°C, another temperature range should be confirmed.

2) Temp. = -30°C < 48h , Temp. = 80°C < 168h

Store LCD at normal temperature/humidity. Keep them free from vibration and shock.

An LCD that is kept at a low or a high temperature for a long time can be defective due to other conditions, even if the low or high temperature satisfies the standard.

(Please refer to “Precautions for Use” for details.)

3) Non-condensing

4) Temp. 40°C, 85%RH Max.

Temp. > 40°C, Absolute humidity shall be less than 85%RH at 40°C.

5)

|                 |             |                                                   |
|-----------------|-------------|---------------------------------------------------|
| Frequency       | 10 ~ 55 Hz  | Acceleration value<br>(0.3 ~ 9 m/s <sup>2</sup> ) |
| Vibration width | 0.15mm      |                                                   |
| Interval        | 10-55-10 Hz | 1 minutes                                         |

2 hours in each direction X, Y, Z (6 hours total)

EIAJ ED-2531

6) Acceleration: 490 m/s<sup>2</sup>, Pulse width: 11 ms

3 times in each direction: ±X, ±Y, ±Z

EIAJ ED-2531

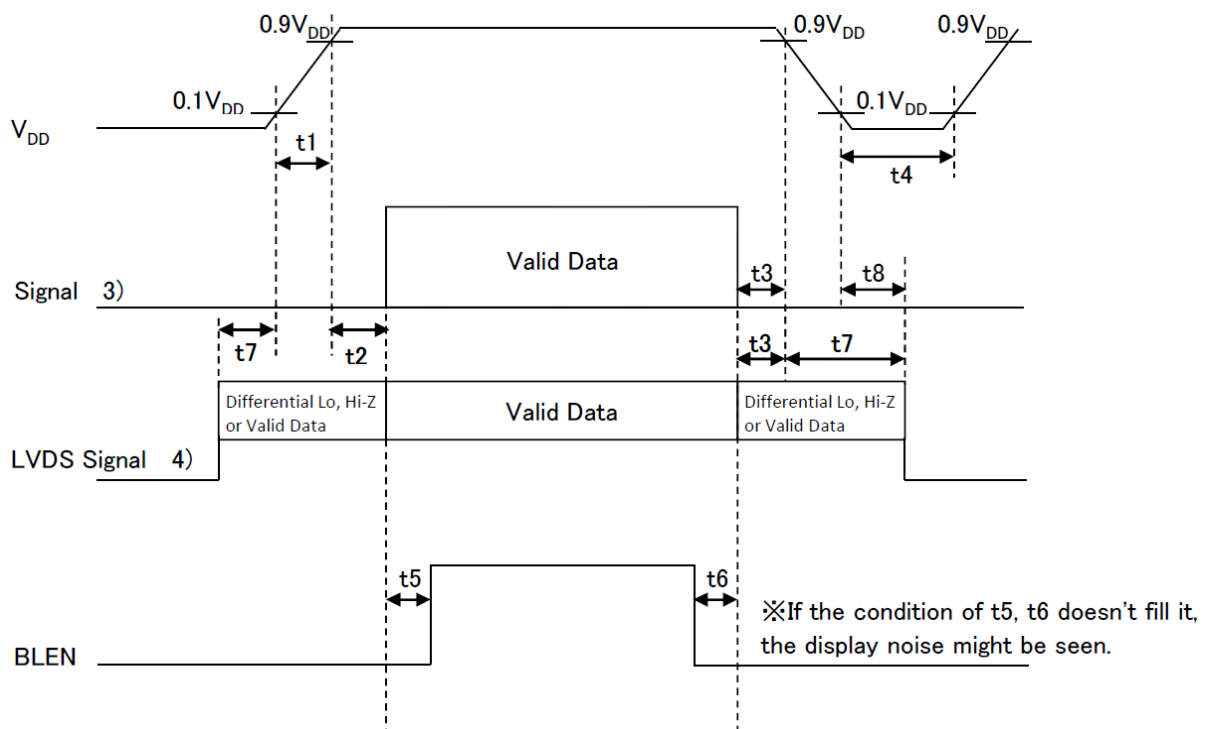
## 5. Electrical characteristics

### 5-1. LCD

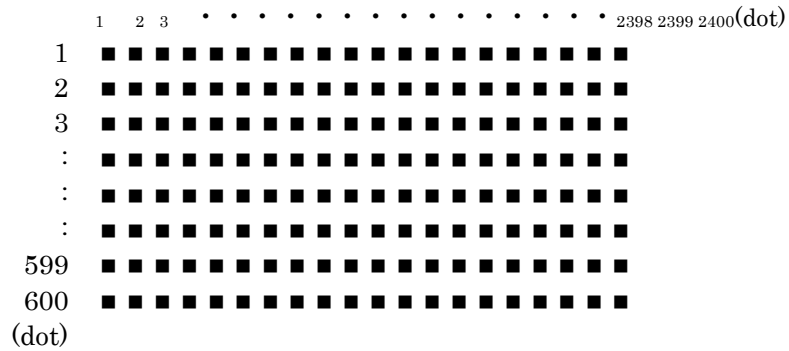
Temp. = -20 ~ 70°C

| Item                                       | Symbol   | Condition     | Min.         | Typ. | Max.         | Unit     |
|--------------------------------------------|----------|---------------|--------------|------|--------------|----------|
| Supply voltage 1)                          | $V_{DD}$ | -             | 3.0          | 3.3  | 3.6          | V        |
| Current consumption                        | $I_{DD}$ | 2)            | -            | 270  | 330          | mA       |
| Permissive input ripple voltage            | $V_{RP}$ | $V_{DD}=3.3V$ | -            | -    | 100          | mVp-p    |
| Input signal voltage 3)                    | $V_{IL}$ | "Low" level   | 0            | -    | 0.8          | V        |
|                                            | $V_{IH}$ | "High" level  | 2.0          | -    | $V_{DD}$     | V        |
| Input reek current                         | $I_{OL}$ | $V_{I3}=0V$   | -10          | -    | 10           | $\mu A$  |
|                                            | $I_{OH}$ | $V_{I3}=3.3V$ | -            | -    | 400          | $\mu A$  |
| LVDS Input voltage 4)                      | $V_L$    | -             | 0            | -    | 1.9          | V        |
| Differential input voltage 4)              | $V_{ID}$ | -             | 250          | 350  | 450          | mV       |
| Differential input threshold voltage 4) 5) | $V_{TL}$ | "Low" level   | $V_{CM}-100$ | -    | -            | mV       |
|                                            | $V_{TH}$ | "High" level  | -            | -    | $V_{CM}+100$ | mV       |
| Terminator                                 | $R_1$    | -             | -            | 100  | -            | $\Omega$ |
| $V_{DD}$ -turn-on conditions 1)            | $t_1$    | -             | 0.1          | -    | 10           | ms       |
|                                            | $t_2$    | -             | 0            | -    | -            | ms       |
|                                            | $t_3$    | -             | 0            | -    | -            | ms       |
|                                            | $t_4$    | -             | 1.0          | -    | -            | s        |
|                                            | $t_5$    | -             | 200          | --   | -            | ms       |
|                                            | $t_6$    | -             | 200          | -    | -            | ms       |
|                                            | $t_7$    | -             | 0            | -    | 10           | s        |
|                                            | $t_8$    | -             | 0            | -    | -            | ms       |

#### 1) $V_{DD}$ -turn-on conditions

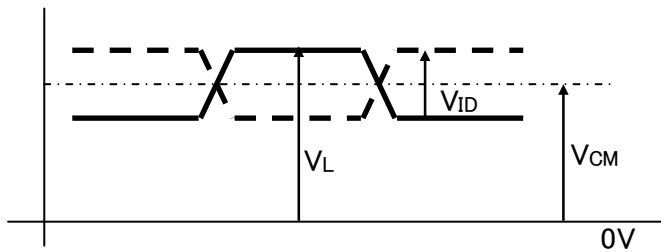


- 2) Display pattern:

 $V_{DD} = 3.3V, \text{Temp.} = 25^{\circ}C$ 

- 3) Input signal : SELLVDS

- 4) Input signal : RxIN3+, RxIN3-, RxIN2+, RxIN2-, RxIN1+, RxIN1-, RxIN0+, RxIN0-  
CK IN+, CK IN-



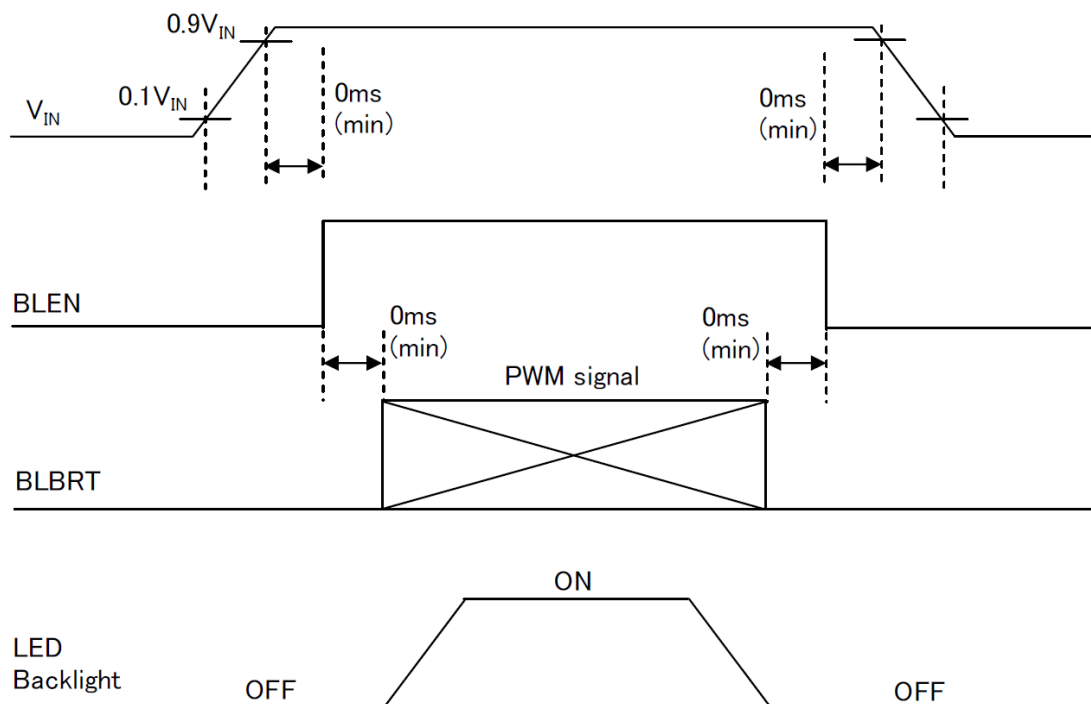
- 5)  $V_{CM}$  : LVDS Common mode voltage ( $V_{CM}=1.25V$ )

## 5-2. Constant current circuit for LED Backlight

Temp. = -20 ~ 70°C

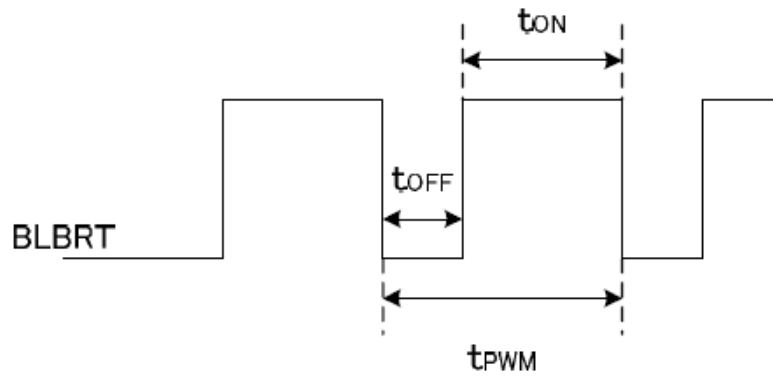
| Item                             | Symbol          | Condition       | Min. | Typ.   | Max.     | Unit       |
|----------------------------------|-----------------|-----------------|------|--------|----------|------------|
| Supply voltage 1)                | $V_{IN}$        | -               | 10.8 | 12.0   | 13.2     | V          |
| Current consumption              | $I_{IN}$        | 2)              | -    | 290    | 450      | mA         |
| Permissive input ripple voltage  | $V_{RP\_BL}$    | $V_{IN}=12.0V$  | -    | -      | 100      | mVp-p      |
| BLBRT Input signal voltage       | $V_{IL\_BLBRT}$ | "Low" level     | 0    | -      | 0.8      | V          |
|                                  | $V_{IH\_BLBRT}$ | "High" level    | 2.3  | -      | $V_{IN}$ | V          |
| BLBRT Input pull-down resistance | $R_{IN\_BLBRT}$ | -               | 100  | 300    | 500      | k $\Omega$ |
| BLEN Input signal voltage        | $V_{IL\_BLEN}$  | "Low" level     | 0    | -      | 0.8      | V          |
|                                  | $V_{IH\_BLEN}$  | "High" level    | 2.3  | -      | $V_{IN}$ | V          |
| BLEN Input pull-down resistance  | $R_{IN\_BLEN}$  | -               | 100  | 300    | 500      | k $\Omega$ |
| PWM Frequency 3)                 | $f_{PWM}$       | -               | 200  | -      | 10k      | Hz         |
| PWM Duty ratio 3)                | $D_{PWM}$       | $f_{PWM}=200Hz$ | 1    | -      | 100      | %          |
|                                  |                 | $f_{PWM}=2kHz$  | 10   | -      | 100      | %          |
|                                  |                 | $f_{PWM}=10kHz$ | 50   | -      | 100      | %          |
| Operating life time 4), 5)       | T               | Temp.=25°C      | -    | 70,000 | -        | h          |

### 1) $V_{IN}$ -turn-on conditions



### 2) $V_{IN} = 12V$ , Temp. = 25 , $D_{PWM} = 100\%$

### 3) PWM Timing Diagram



$t_{ON}, t_{OFF} = 50 \mu s$ .

In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.

- 4) When brightness decrease 50% of minimum brightness.  
The average life of a LED will decrease when the LCD is operating at higher temperatures.
- 5) Life time is estimated data.(Condition :  $I_F=60mA$ ,  $T_a=25$  in chamber).

## 6. Optical characteristics

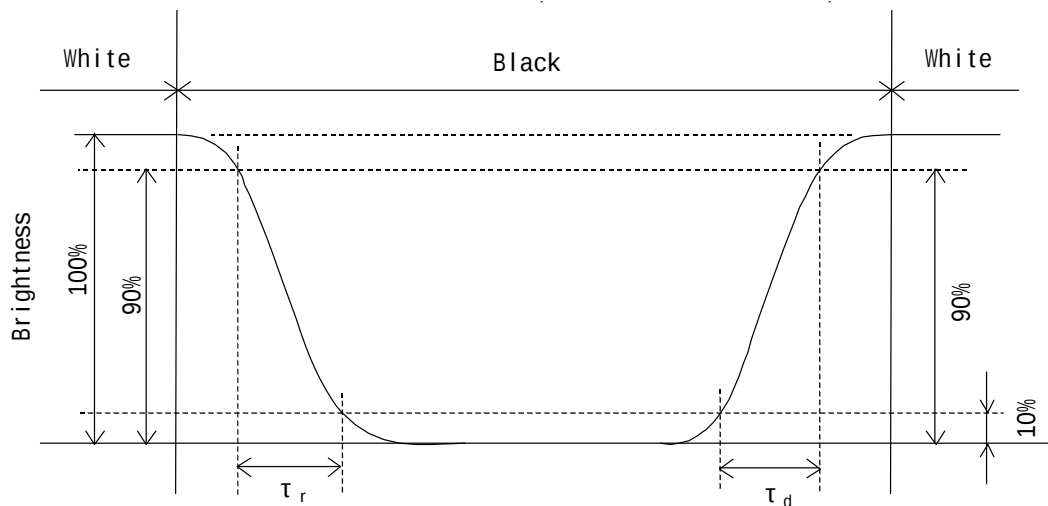
Measuring spot =  $\phi$  6.0mm, Temp. = 25°C

| Item                                                                     |       | Symbol           | Condition                 | Min.  | Typ.  | Max.  | Unit              |
|--------------------------------------------------------------------------|-------|------------------|---------------------------|-------|-------|-------|-------------------|
| Response time                                                            | Rise  | $\tau_r$         | $\theta = \phi = 0^\circ$ | -     | 8     | -     | ms                |
|                                                                          | Down  | $\tau_d$         | $\theta = \phi = 0^\circ$ | -     | 22    | -     | ms                |
| Viewing angle range<br>View direction<br>: 6 o'clock<br>(Gray inversion) |       | $\theta_{UPPER}$ | CR 10                     | -     | 80    | -     | deg.              |
|                                                                          |       | $\theta_{LOWER}$ |                           | -     | 60    | -     |                   |
|                                                                          |       | $\phi_{LEFT}$    |                           | -     | 80    | -     | deg.              |
|                                                                          |       | $\phi_{RIGHT}$   |                           | -     | 80    | -     |                   |
| Contrast ratio                                                           |       | CR               | $\theta = \phi = 0^\circ$ | 630   | 900   | -     | -                 |
| Brightness                                                               |       | L                | IF=60mA/Line              | 315   | 450   | -     | cd/m <sup>2</sup> |
| Luminance(Brightness)                                                    |       | LU               | -                         | 70    | -     | -     | %                 |
| Chromaticity coordinates                                                 | Red   | x                | $\theta = \phi = 0^\circ$ | 0.550 | 0.600 | 0.650 | -                 |
|                                                                          |       | y                |                           | 0.300 | 0.350 | 0.400 |                   |
|                                                                          | Green | x                | $\theta = \phi = 0^\circ$ | 0.280 | 0.330 | 0.380 |                   |
|                                                                          |       | y                |                           | 0.520 | 0.570 | 0.620 |                   |
|                                                                          | Blue  | x                | $\theta = \phi = 0^\circ$ | 0.105 | 0.155 | 0.205 |                   |
|                                                                          |       | y                |                           | 0.065 | 0.115 | 0.165 |                   |
|                                                                          | White | x                | $\theta = \phi = 0^\circ$ | 0.250 | 0.300 | 0.350 |                   |
|                                                                          |       | y                |                           | 0.265 | 0.315 | 0.365 |                   |

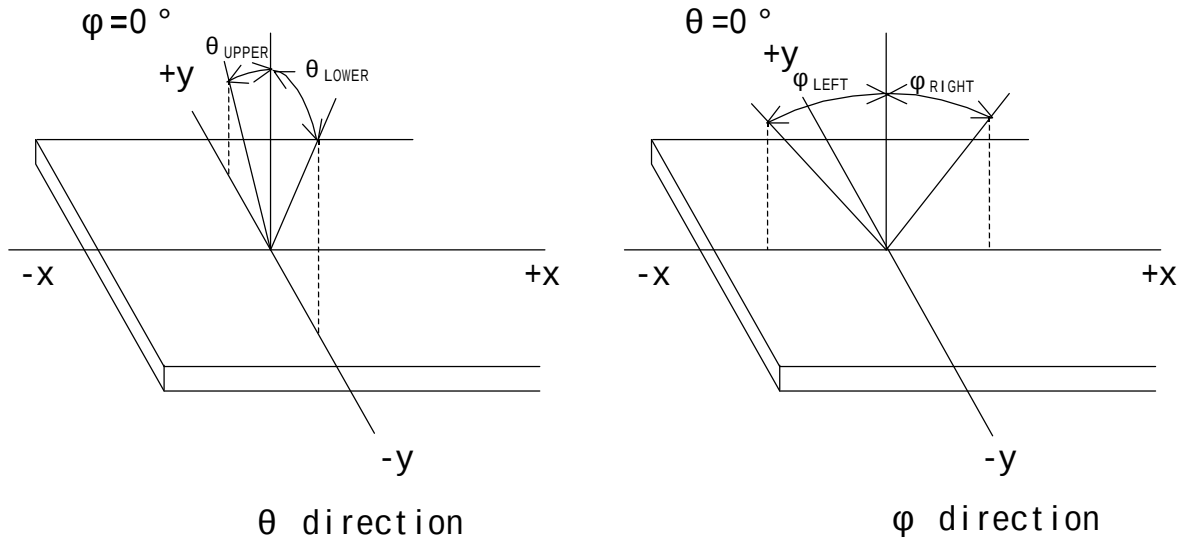
### 6-1. Definition of contrast ratio

$$CR(\text{Contrast ratio}) = \frac{\text{Brightness with all pixels "White"}}{\text{Brightness with all pixels "Black"}}$$

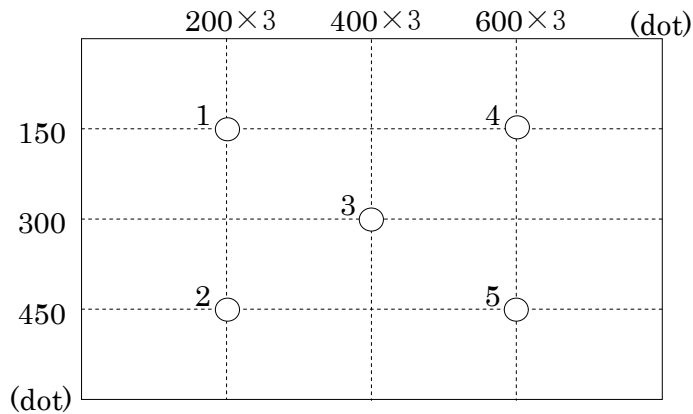
### 6-2. Definition of response time



### 6-3. Definition of viewing angle



### 6-4. Brightness measuring points



- 1) Rating is defined as the white brightness at center of display screen(3).
- 2) The brightness uniformity is calculated by using following formula.

$$\text{Brightness uniformity} = \frac{\text{Minimum brightness from 1 to 5}}{\text{Maximum brightness from 1 to 5}} \times 100 [\%]$$

- 3) 5 minutes after LED is turned on. (Ambient Temp.=25 )

## 7. Interface signals

### 7-1. Interface signals

| No. | Symbol          | Description                           | Note |
|-----|-----------------|---------------------------------------|------|
| 1   | GND             | GND                                   |      |
| 2   | SELLVDS         | Mode select signal(LVDS Data mapping) |      |
| 3   | GND             | GND                                   |      |
| 4   | GND             | GND                                   |      |
| 5   | RxIN3+          | LVDS receiver signal CH3(+)           | LVDS |
| 6   | RxIN3-          | LVDS receiver signal CH3(-)           | LVDS |
| 7   | GND             | GND                                   |      |
| 8   | CK IN+          | LVDS receiver signal CK(+)            | LVDS |
| 9   | CK IN-          | LVDS receiver signal CK(-)            | LVDS |
| 10  | GND             | GND                                   |      |
| 11  | RxIN2+          | LVDS receiver signal CH2(+)           | LVDS |
| 12  | RxIN2-          | LVDS receiver signal CH2(-)           | LVDS |
| 13  | GND             | GND                                   |      |
| 14  | RxIN1+          | LVDS receiver signal CH1(+)           | LVDS |
| 15  | RxIN1-          | LVDS receiver signal CH1(-)           | LVDS |
| 16  | GND             | GND                                   |      |
| 17  | RxIN0+          | LVDS receiver signal CH0(+)           | LVDS |
| 18  | RxIN0-          | LVDS receiver signal CH0(-)           | LVDS |
| 19  | GND             | GND                                   |      |
| 20  | GND             | GND                                   |      |
| 21  | V <sub>DD</sub> | +3.3V power supply                    |      |
| 22  | V <sub>DD</sub> | +3.3V power supply                    |      |
| 23  | GND             | GND                                   |      |
| 24  | BLBRT           | PWM signal(Brightness adjustment)     |      |
| 25  | BLEN            | ON/OFF terminal voltage               |      |
| 26  | GND             | GND                                   |      |
| 27  | V <sub>IN</sub> | +12V power supply                     |      |
| 28  | V <sub>IN</sub> | +12V power supply                     |      |
| 29  | GND             | GND                                   |      |
| 30  | GND             | GND                                   |      |

LCD connector : FI-X30SSLA-HF (JAE)  
 Matching connector : FI-X30HL (JAE)  
                               : FI-X30HL-T (JAE)  
                               : FI-X30C2L-NPB (JAE)  
                               : FI-X30C2L-T-NPB (JAE)

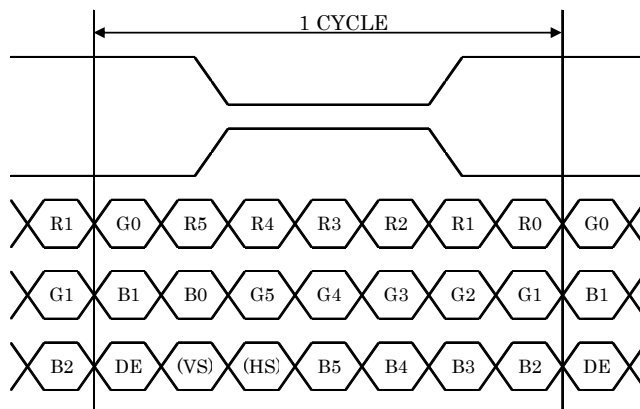
LVDS receiver : Embedded in ASIC  
 Matching LVDS transmitter : THC63LVDM83R(THine Electronics) or compatible

## 7-2. Data mapping(6bit RGB input)

### 1) Location of SELLVDS (THC63LVDM83R(THine Electronics) or compatible)

| Transmitter |      | 2Pin SELLVDS     |           |
|-------------|------|------------------|-----------|
| Pin No.     | Data | = L(GND) or OPEN | = H(3.3V) |
| 51          | TA0  | -                | R0(LSB)   |
| 52          | TA1  | -                | R1        |
| 54          | TA2  | -                | R2        |
| 55          | TA3  | -                | R3        |
| 56          | TA4  | -                | R4        |
| 3           | TA5  | -                | R5(MSB)   |
| 4           | TA6  | -                | G0(LSB)   |
| 6           | TB0  | -                | G1        |
| 7           | TB1  | -                | G2        |
| 11          | TB2  | -                | G3        |
| 12          | TB3  | -                | G4        |
| 14          | TB4  | -                | G5(MSB)   |
| 15          | TB5  | -                | B0(LSB)   |
| 19          | TB6  | -                | B1        |
| 20          | TC0  | -                | B2        |
| 22          | TC1  | -                | B3        |
| 23          | TC2  | -                | B4        |
| 24          | TC3  | -                | B5(MSB)   |
| 27          | TC4  | -                | (HS)      |
| 28          | TC5  | -                | (VS)      |
| 30          | TC6  | -                | DE        |
| 50          | TD0  | -                | GND       |
| 2           | TD1  | -                | GND       |
| 8           | TD2  | -                | GND       |
| 10          | TD3  | -                | GND       |
| 16          | TD4  | -                | GND       |
| 18          | TD5  | -                | GND       |
| 25          | TD6  | -                | GND       |

SELLVDS=H(3.3V)



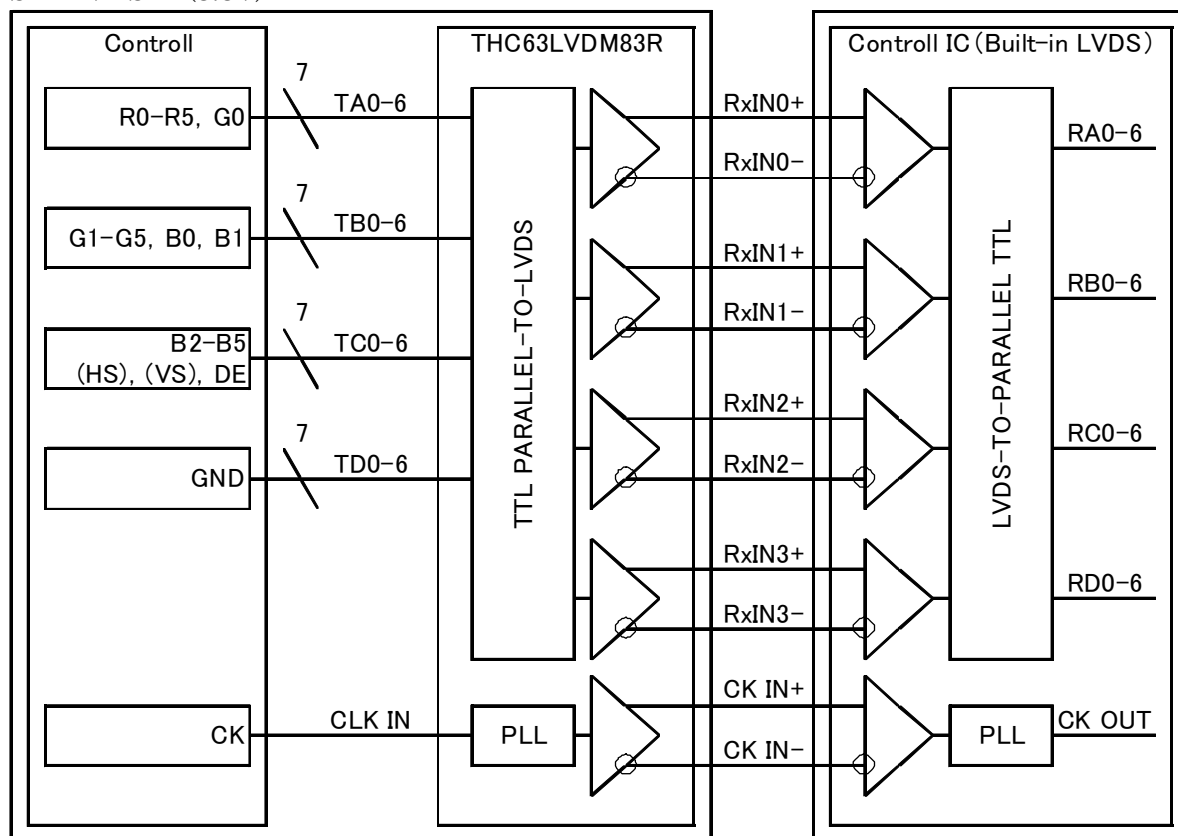
DE : DATA ENABLE

HS : H<sub>SYNC</sub>

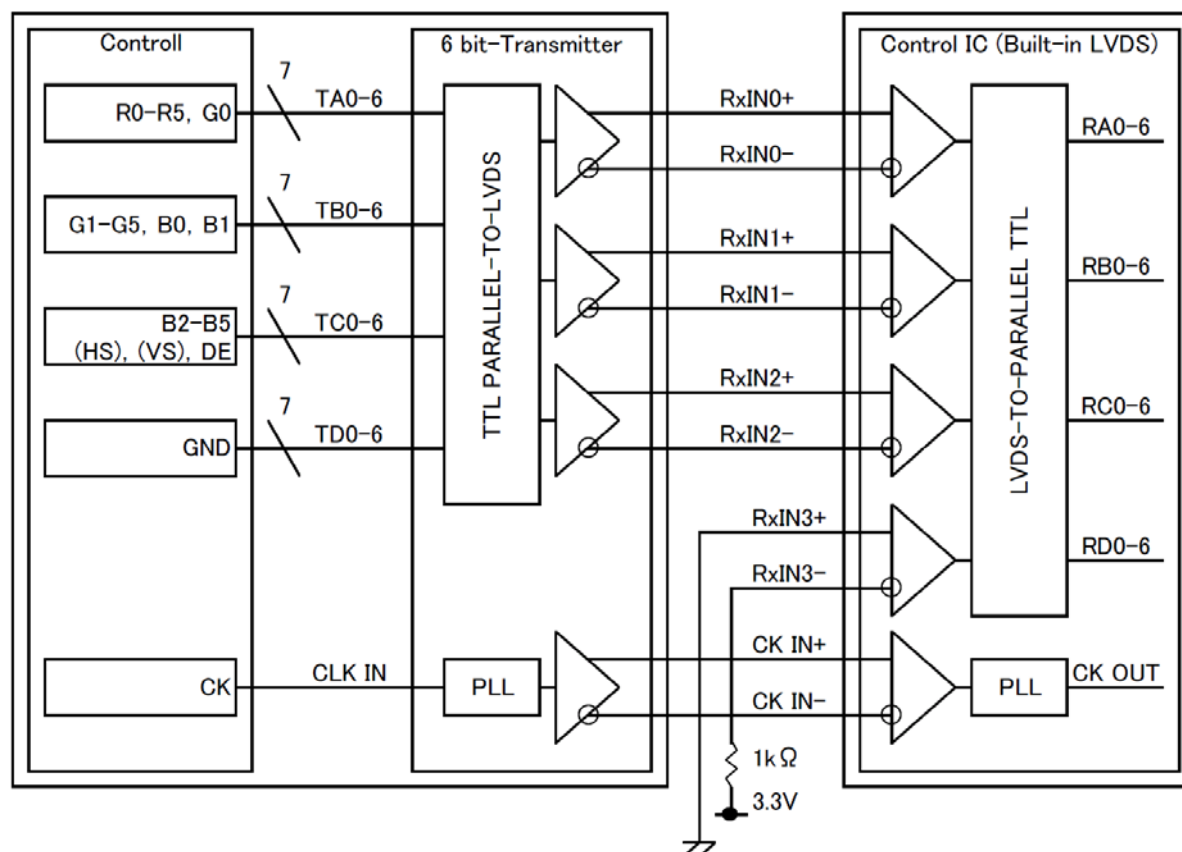
VS : V<sub>SYNC</sub>

## 2) Block Diagram

SELLVDS=H(3.3V)



When using "6-bit Transmitter", please note that you are required to do the process of "surplus receiver" as following chart.

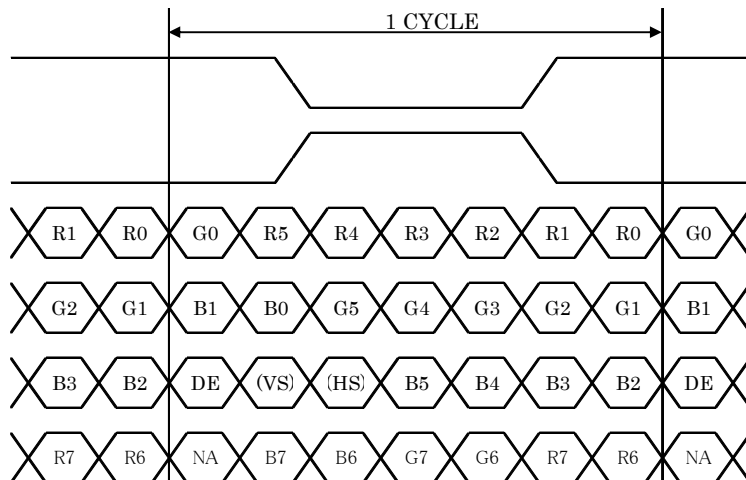


### 7-3. Data mapping(8bit RGB input)

#### 1) Location of SELLVDS (THC63LVDM83R(THine Electronics) or compatible)

| Transmitter |      | 2Pin SELLVDS     |           |
|-------------|------|------------------|-----------|
| Pin No.     | Data | = L(GND) or OPEN | = H(3.3V) |
| 51          | TA0  | R0(LSB)          | R2        |
| 52          | TA1  | R1               | R3        |
| 54          | TA2  | R2               | R4        |
| 55          | TA3  | R3               | R5        |
| 56          | TA4  | R4               | R6        |
| 3           | TA5  | R5               | R7(MSB)   |
| 4           | TA6  | G0(LSB)          | G2        |
| 6           | TB0  | G1               | G3        |
| 7           | TB1  | G2               | G4        |
| 11          | TB2  | G3               | G5        |
| 12          | TB3  | G4               | G6        |
| 14          | TB4  | G5               | G7(MSB)   |
| 15          | TB5  | B0(LSB)          | B2        |
| 19          | TB6  | B1               | B3        |
| 20          | TC0  | B2               | B4        |
| 22          | TC1  | B3               | B5        |
| 23          | TC2  | B4               | B6        |
| 24          | TC3  | B5               | B7(MSB)   |
| 27          | TC4  | (HS)             | (HS)      |
| 28          | TC5  | (VS)             | (VS)      |
| 30          | TC6  | DE               | DE        |
| 50          | TD0  | R6               | R0(LSB)   |
| 2           | TD1  | R7(MSB)          | R1        |
| 8           | TD2  | G6               | G0(LSB)   |
| 10          | TD3  | G7(MSB)          | G1        |
| 16          | TD4  | B6               | B0(LSB)   |
| 18          | TD5  | B7(MSB)          | B1        |
| 25          | TD6  | (NA)             | (NA)      |

SELLVDS=L(GND) or OPEN

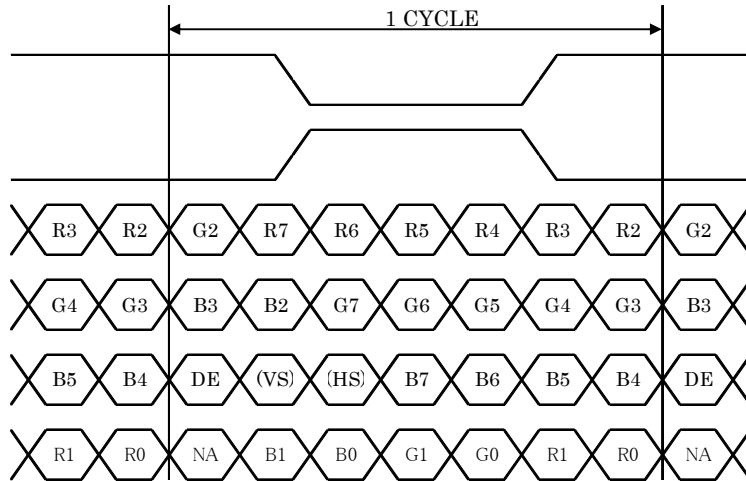


DE : DATA ENABLE

HS : H<sub>SYNC</sub>

VS : V<sub>SYNC</sub>

SELLVDS=H(3.3V)



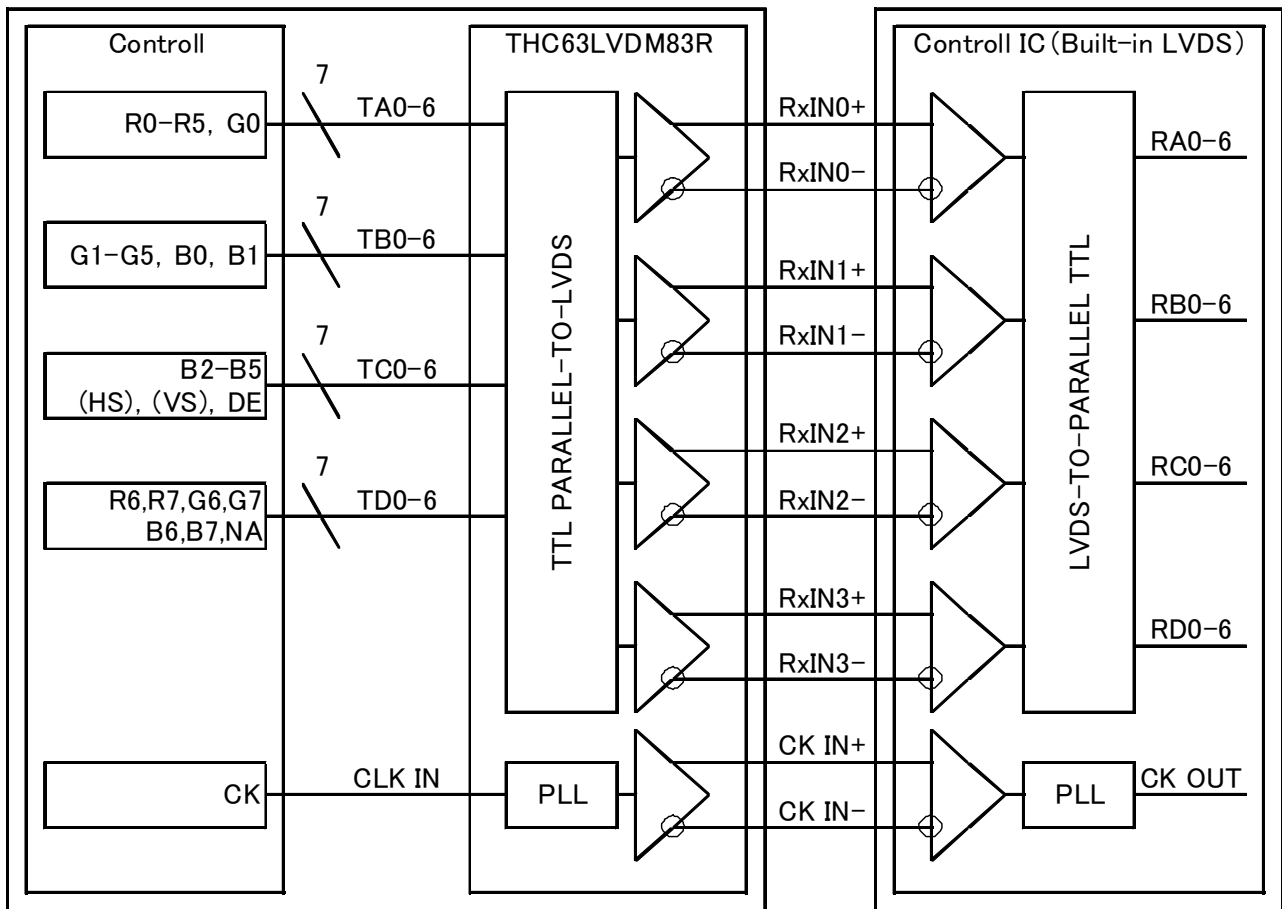
DE : DATA ENABLE

HS : H<sub>SYNC</sub>

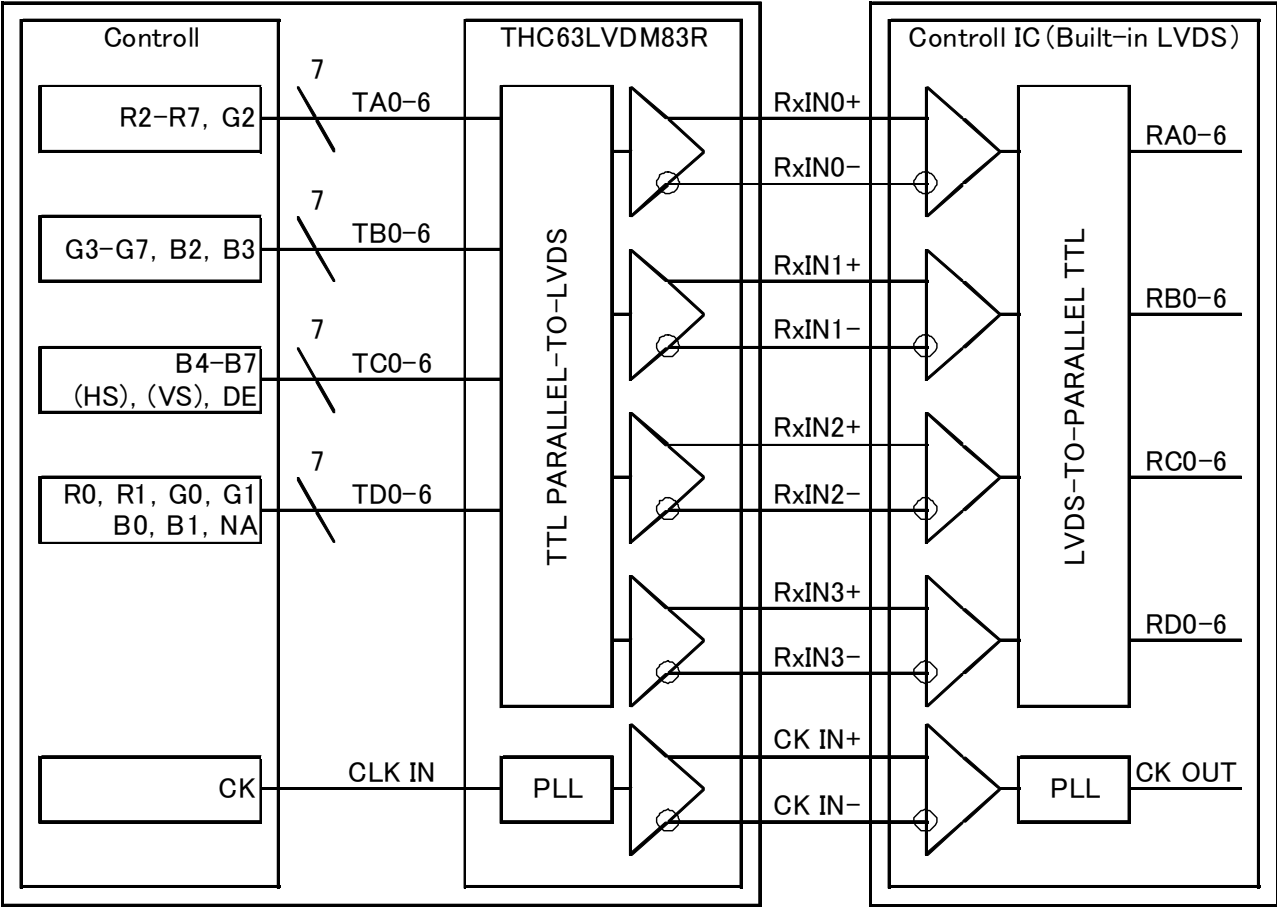
VS : V<sub>SYNC</sub>

## 2) Block Diagram

SELLVDS=L(GND) or OPEN



SELLVDS=H(3.3V)



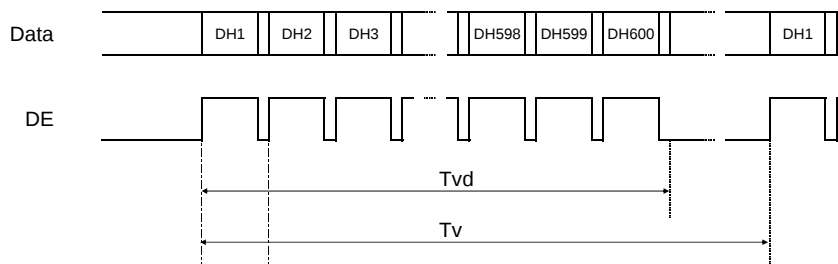
## 8. Input timing characteristics

### 8-1. Timing characteristics

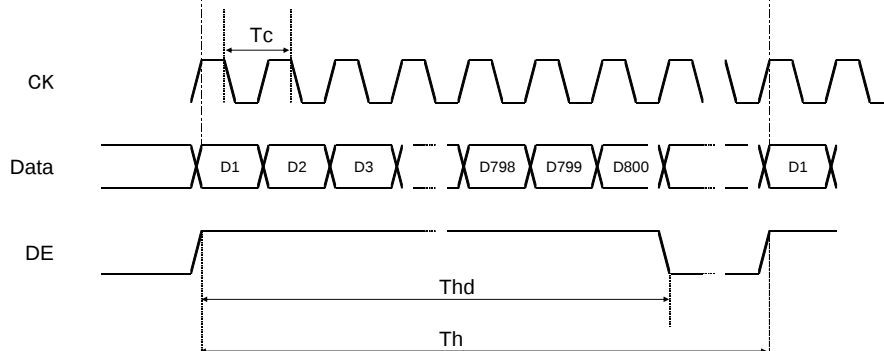
|                    | Item                      | Symbol | Min. | Typ. | Max. | Unit | Note |
|--------------------|---------------------------|--------|------|------|------|------|------|
| Clock (CK)         | Frequency                 | 1/Tc   | 30   | 40   | 48   | MHz  |      |
| Enable signal (DE) | Horizontal Period         | Th     | 860  | 1056 | 1395 | Tc   |      |
|                    |                           |        | 24.0 | 26.4 | -    | μs   | 1)   |
|                    | Horizontal display period | Thd    | 800  |      |      | Tc   |      |
|                    | Vertical Period           | Tv     | 610  | 628  | 1024 | Th   |      |
|                    | Vertical display period   | Tvd    | 600  |      |      | Th   |      |
| Refresh rate       |                           | fv     | 50   | 60   | 70   | Hz   | 2)   |

- 1) Please set a clock frequency, a vertical dormant period, and the horizontal dormant period so that the Horizontal Period should not reach less than Min. value.
- 2) If the refresh rate reach less than Min. value, the deterioration of the display quality, flicker etc., may occur.(fv=1/Tv)

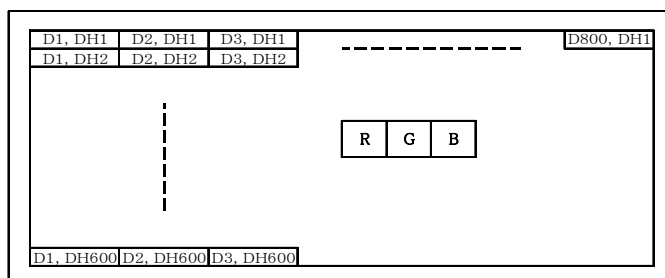
#### Vertical Timing Diagram



#### Horizontal Timing Diagram



### 8-2. Input Data Signals and Display position on the screen



## 9. Lot number identification

The lot number shall be indicated on the back of the backlight case of each LCD.

TCG104SVLPAANN-AN20    - □□ - □□ - □    MADE IN    □□□□□  
                                          ↓ ↓    ↓    ↓                                           ↓  
                                          1 2    3    4                                           5

|                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------|
| No1. - No5. above indicate<br>1. Year code<br>2. Month code<br>3. Date<br>4. Version Number<br>5. Country of origin (Japan or China) |
|--------------------------------------------------------------------------------------------------------------------------------------|

|      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|
| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Code | 1    | 2    | 3    | 4    | 5    | 6    |

|       |      |      |      |      |     |      |
|-------|------|------|------|------|-----|------|
| Month | Jan. | Feb. | Mar. | Apr. | May | Jun. |
| Code  | 1    | 2    | 3    | 4    | 5   | 6    |

|       |      |      |      |      |      |      |
|-------|------|------|------|------|------|------|
| Month | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| Code  | 7    | 8    | 9    | X    | Y    | Z    |

## 10. Warranty

### 10-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

### 10-2. Production warranty

Kyocera warrants its LCD's for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective LCD's that are shown to be Kyocera's responsibility.

|                                   |                                 |            |
|-----------------------------------|---------------------------------|------------|
| Spec No.<br>TQ3C-8EAF0-E1YAH14-00 | Part No.<br>TCG104SVLPAANN-AN20 | Page<br>17 |
|-----------------------------------|---------------------------------|------------|

## 11. Precautions for use

### 11-1. Installation of the LCD

- 1) Please ground either of the mounting (screw) holes located at each corner of an LCD, in order to stabilize brightness and display quality.
- 2) A transparent protection plate shall be added to protect the LCD and its polarizer.
- 3) The LCD shall be installed so that there is no pressure on the LSI chips.
- 4) The LCD shall be installed flat, without twisting or bending.
- 5) A transparent protection sheet is attached to the polarizer. Please remove the protection film slowly before use, paying attention to static electricity.

### 11-2. Static electricity

- 1) Since CMOS ICs are mounted directly onto the LCD glass, protection from static electricity is required.
- 2) Workers should use body grounding. Operator should wear ground straps.

### 11-3. LCD operation

- 1) The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.

### 11-4. Storage

- 1) The LCD shall be stored within the temperature and humidity limits specified.  
Store in a dark area, and protect the LCD from direct sunlight or fluorescent light.
- 2) Always store the LCD so that it is free from external pressure onto it.

### 11-5. Usage

- 1) **DO NOT** store in a high humidity environment for extended periods. Polarizer degradation bubbles, and/or peeling off of the polarizer may result.
- 2) The front polarizer is easily scratched or damaged. Prevent touching it with any hard material, and from being pushed or rubbed.
- 3) The LCD screen may be cleaned by wiping the screen surface with a soft cloth or cotton pad using a little Ethanol.
- 4) Water may cause damage or discoloration of the polarizer. Clean condensation or moisture from any source immediately.
- 5) Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizer.
- 6) Do not disassemble LCD because it will result in damage.
- 7) This Kyocera LCD has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas. Hence, when the LCD is supposed to be used in a special environment, evaluate the LCD thoroughly beforehand and do not expose the LCD to chemicals such as an active gas.
- 8) Please do not use solid-base image pattern for long hours because a temporary afterimage may appear. We recommend using screen saver etc. in cases where a solid-base image pattern must be used.
- 9) Liquid crystal may leak when the LCD is broken. Be careful not to let the fluid go into your eyes and mouth. In the case the fluid touches your body; rinse it off right away with water and soap.

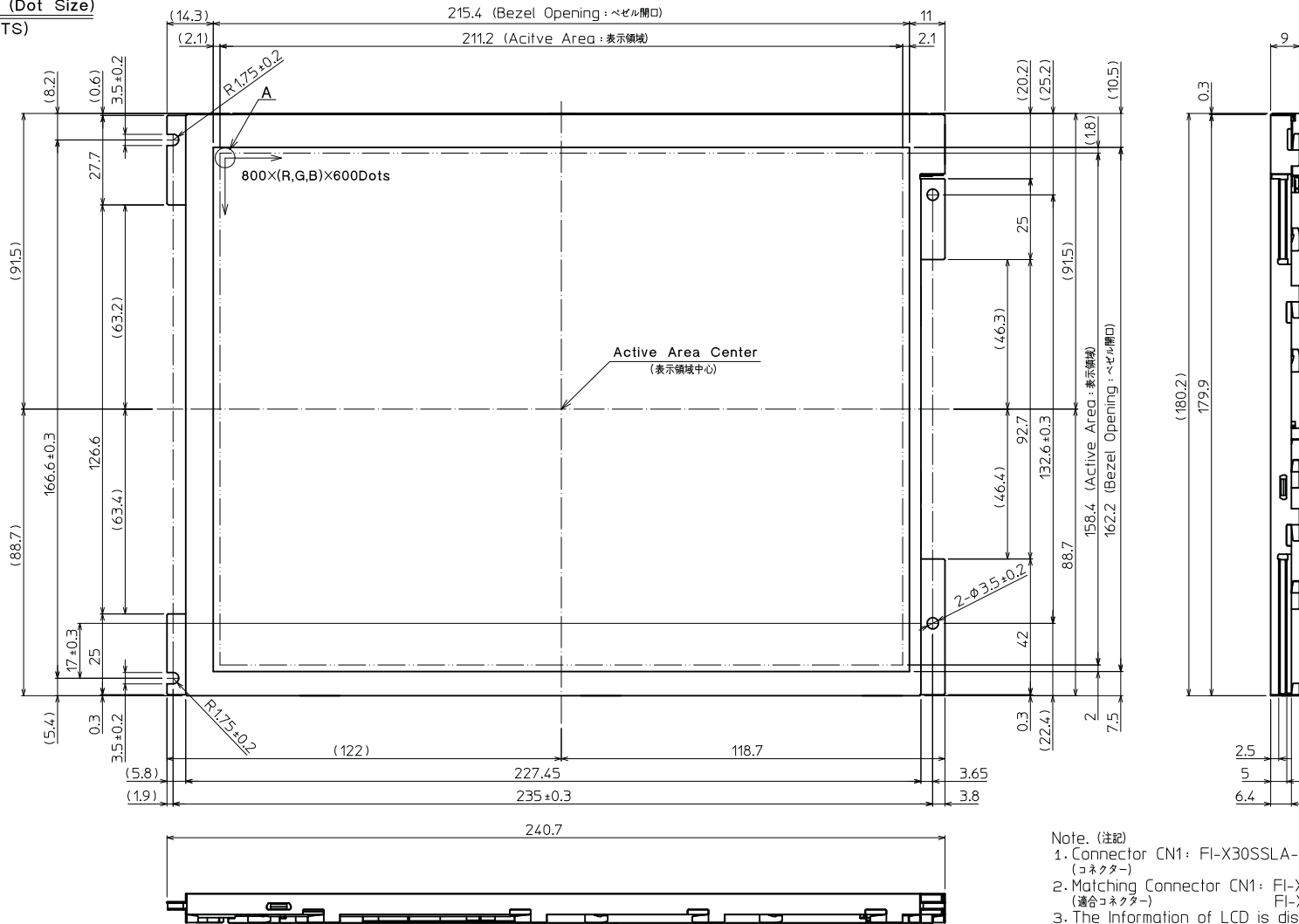
## 12. Reliability test data

| Test item                      | Test condition                       | Test time | Judgement                                                                                      |
|--------------------------------|--------------------------------------|-----------|------------------------------------------------------------------------------------------------|
| High temp. atmosphere          | 80°C                                 | 240h      | Display function : No defect<br>Display quality : No defect<br>Current consumption : No defect |
| Low temp. atmosphere           | -30°C                                | 240h      | Display function : No defect<br>Display quality : No defect<br>Current consumption : No defect |
| High temp. humidity atmosphere | 40°C 90% RH                          | 240h      | Display function : No defect<br>Display quality : No defect<br>Current consumption : No defect |
| Temp. cycle                    | -30°C 0.5h<br>R.T. 0.5h<br>80°C 0.5h | 10cycles  | Display function : No defect<br>Display quality : No defect<br>Current consumption : No defect |
| High temp. operation           | 70°C                                 | 500h      | Display function : No defect<br>Display quality : No defect<br>Current consumption : No defect |

- 1) Each test item uses a test LCD only once. The tested LCD is not used in any other tests.
- 2) The LCD is tested in circumstances in which there is no condensation.
- 3) The reliability test is not an out-going inspection.
- 4) The result of the reliability test is for your reference purpose only.  
The reliability test is conducted only to examine the LCD's capability.



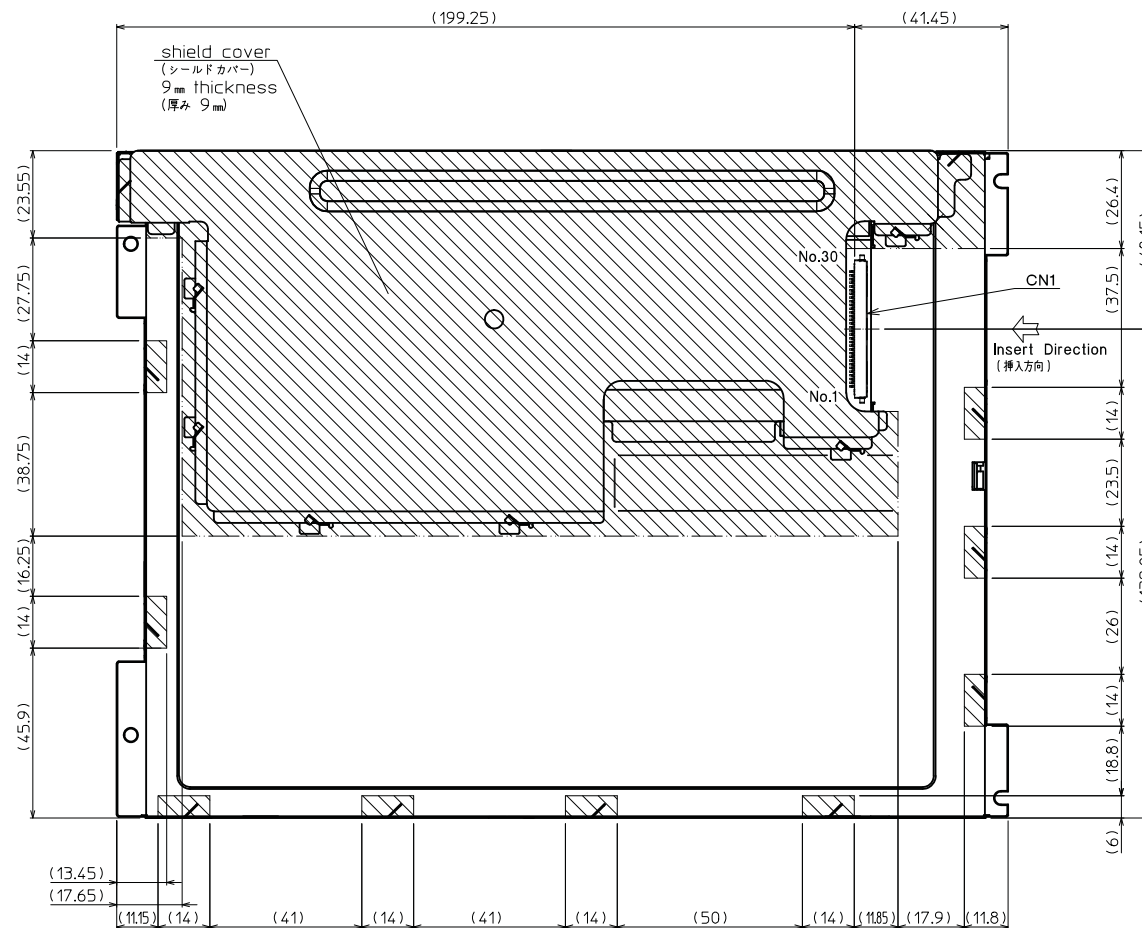
DETAIL A (Dot Size)  
(NTS)



Note. (注記)  
1. Connector CN1: FI-X30SLA-HF (JAE)  
(コネクタ)  
2. Matching Connector CN1: FI-X30HL, FI-X30HL-T  
(適合コネクタ)  
FI-X30C2L-NPB, FI-X30C2L-T-NPB (JAE)  
3. The Information of LCD is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.  
(LCDにおいて、画像データの表示は左上コーナーから始まり、右へ進み下へ送られ右下コーナーへ向かう。)  
4. Tolerance without indication : ±0.5  
(指示無き公差)

|                 |                   |                       |                      |            |                    |                         |                            |                             |           |
|-----------------|-------------------|-----------------------|----------------------|------------|--------------------|-------------------------|----------------------------|-----------------------------|-----------|
| Material<br>材質  | Treatment<br>処理   | Approved<br>'11.11.16 | Checked<br>'11.11.15 | Drawn<br>車 | Scale<br>1:1 (NTS) | Title<br>TCG104SVLPAANN | KYOCERA                    | Year-Month-Day<br>'11.11.12 | Size<br>2 |
| Quantity<br>製作数 | Description<br>備考 | RoHS                  | 朝倉                   | 倉元         |                    | Outline Dimensions      | Drawing No.<br>121A8051300 |                             | 1/2       |

| No | Description | Drawn | Checked | Checked | Approved |
|----|-------------|-------|---------|---------|----------|
|    |             |       |         |         |          |
|    |             |       |         |         |          |
|    |             |       |         |         |          |



Note. (注記)  
1.  Projected part is 9mm thickness.  
(厚み 9mm)

|                 |                   |                       |         |                      |       |                                                                                       |                         |                                                                                       |                             |           |
|-----------------|-------------------|-----------------------|---------|----------------------|-------|---------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------|-----------------------------|-----------|
| Material<br>材質  | Treatment<br>処理   | Approved<br>'11.11.16 | Checked | Checked<br>'11.11.15 | Drawn | Scale<br>1:1                                                                          | Title<br>TCG104SVLPAANN |  | Year-Month-Day<br>'11.11.12 | Size<br>2 |
| Quantity<br>製作数 | Description<br>備考 | 朝倉                    |         | 倉元                   | 車     |  | Outline Dimensions      | Drawing No.                                                                           | 121A8051300                 | 2/2       |

|          |                       |
|----------|-----------------------|
| Spec No. | TQ3C-8EAF0-E2YAH14-00 |
| Date     | November 18, 2011     |

## **KYOCERA INSPECTION STANDARD**

**TYPE : TCG104SVLPAANN-AN20**

KYOCERA CORPORATION  
SHIGA YASU PLANT  
LCD DIVISION

| Original<br>Issue Date | Designed by : Engineering dept. |                 |                | Confirmed by : QA dept. |                 |
|------------------------|---------------------------------|-----------------|----------------|-------------------------|-----------------|
|                        | Prepared                        | Checked         | Approved       | Checked                 | Approved        |
| November 18, 2011      | <i>H. Mori</i>                  | <i>Y. Ikeda</i> | <i>H. Yogo</i> | <i>I. Hamada</i>        | <i>T. Ishii</i> |

Spec No.

TQ3C-8EAF0-E2YAH14-00

Part No.

TCG104SVLPAANN-AN20

Page

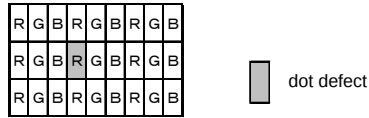
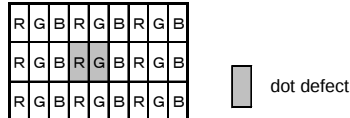
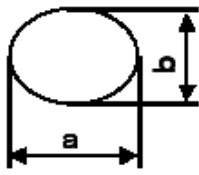
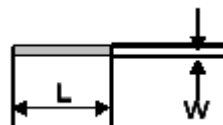
-

**Revision record**

| Date    |      | Designed by : Engineering dept. |              |          | Confirmed by : QA dept. |          |
|---------|------|---------------------------------|--------------|----------|-------------------------|----------|
|         |      | Prepared                        | Checked      | Approved | Checked                 | Approved |
|         |      |                                 |              |          |                         |          |
| Rev.No. | Date | Page                            | Descriptions |          |                         |          |
|         |      |                                 |              |          |                         |          |

## Visuals specification

### 1) Note

|                               | Note                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General                       | <ol style="list-style-type: none"> <li>Customer identified anomalies not defined within this inspection standard shall be reviewed by Kyocera, and an additional standard shall be determined by mutual consent.</li> <li>This inspection standard about the image quality shall be applied to any defect within the active area and shall not be applicable to outside of the area.</li> <li>Inspection conditions <ul style="list-style-type: none"> <li>Luminance : 500 Lux min.</li> <li>Inspection distance : 300 mm.</li> <li>Temperature : 25 ± 5</li> <li>Direction : Directly above</li> </ul> </li> </ol> |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                               |
| Definition of inspection item | Dot defect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Bright dot defect                                                                                                                                                                                                                                                     | <p>The dot is constantly “on” when power applied to the LCD, even when all “Black” data sent to the screen.<br/>Inspection tool: 5% Transparency neutral density filter.<br/>Count dot: If the dot is visible through the filter.<br/>Don't count dot: If the dot is not visible through the filter.</p>  |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Black dot defect                                                                                                                                                                                                                                                      | <p>The dot is constantly “off” when power applied to the LCD, even when all “White” data sent to the screen.</p>                                                                                                                                                                                                                                                                              |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Adjacent dot                                                                                                                                                                                                                                                          | <p>Adjacent dot defect is defined as two or more bright dot defects or black dot defects.</p>                                                                                                                                                                                                             |
|                               | External inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Bubble, Scratch, Foreign particle (Polarizer, Cell, Backlight)                                                                                                                                                                                                        | Visible operating (all pixels “Black” or “White”) and non operating.                                                                                                                                                                                                                                                                                                                          |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Appearance inspection                                                                                                                                                                                                                                                 | Does not satisfy the value at the spec.                                                                                                                                                                                                                                                                                                                                                       |
|                               | Definition of size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <div>Definition of circle size</div>  $d = (a + b) / 2$ <div>Definition of linear size</div>  |                                                                                                                                                                                                                                                                                                                                                                                               |

## 2) Standard

| Classification                                                                           |                     | Inspection item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Judgement standard                                         |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-------------------|-------------------|-------------------|-------------------|-------------|-------------|---------|-------------|-------------|-------------|----------|---------|-------|---------|-------------|-------------|-------------|---------|---|---|---------|---------|---|---|---------|---|---|--|-------------------------------|--|
| Defect<br>(in LCD<br>glass)                                                              | Dot<br>defect       | Bright dot defect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number : 4<br>Bright dot spacing : 5 mm or more |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | Black dot defect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number : 5<br>Black dot spacing : 5 mm or more  |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | 2 dot join                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bright dot defect                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Acceptable number : 2                                      |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Black dot defect                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Acceptable number : 3                                      |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | 3 or more dots join                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number : 0                                      |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | Total dot defects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number : 5 Max                                  |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | Others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | White dot, Dark dot (Circle)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                            | <table><tr><td colspan="2">Size (mm)</td><td colspan="2">Acceptable number</td></tr><tr><td>d</td><td>0.2</td><td colspan="2">(Neglected)</td></tr><tr><td>0.2 &lt; d</td><td>0.4</td><td colspan="2">5</td></tr><tr><td>0.4 &lt; d</td><td>0.5</td><td colspan="2">3</td></tr><tr><td>0.5 &lt; d</td><td></td><td colspan="2">0</td></tr></table> |            |            |                   | Size (mm)         |                   | Acceptable number |             | d           | 0.2     | (Neglected) |             | 0.2 < d     | 0.4      | 5       |       | 0.4 < d | 0.5         | 3           |             | 0.5 < d |   | 0 |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | Size (mm)           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | d                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (Neglected)                                                |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.2 < d                                                                                  | 0.4                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.4 < d                                                                                  | 0.5                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.5 < d                                                                                  |                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| External inspection<br>(Defect on<br>Polarizer or<br>between Polarizer<br>and LCD glass) | Polarizer (Scratch) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <table><tr><td colspan="2">Width (mm)</td><td colspan="2">Length (mm)</td><td colspan="2">Acceptable number</td></tr><tr><td>W</td><td>0.1</td><td colspan="2">-</td><td colspan="2">(Neglected)</td></tr><tr><td rowspan="2">0.1 &lt; W</td><td rowspan="2">0.3</td><td colspan="2">L 5.0</td><td colspan="2">(Neglected)</td></tr><tr><td colspan="2">5.0 &lt; L</td><td colspan="2">0</td></tr><tr><td colspan="2">0.3 &lt; W</td><td colspan="2">-</td><td colspan="2">0</td></tr></table> |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            | Width (mm) |                   | Length (mm)       |                   | Acceptable number |             | W           | 0.1     | -           |             | (Neglected) |          | 0.1 < W | 0.3   | L 5.0   |             | (Neglected) |             | 5.0 < L |   | 0 |         | 0.3 < W |   | - |         | 0 |   |  |                               |  |
|                                                                                          | Width (mm)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Length (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                            | Acceptable number                                                                                                                                                                                                                                                                                                                                  |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | W                   | 0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            | (Neglected)                                                                                                                                                                                                                                                                                                                                        |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | 0.1 < W             | 0.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | L 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                            | (Neglected)                                                                                                                                                                                                                                                                                                                                        |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5.0 < L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                            | 0                                                                                                                                                                                                                                                                                                                                                  |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | 0.3 < W             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            | 0                                                                                                                                                                                                                                                                                                                                                  |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | Polarizer (Bubble)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <table><tr><td colspan="2">Size (mm)</td><td colspan="2">Acceptable number</td></tr><tr><td>d</td><td>0.2</td><td colspan="2">(Neglected)</td></tr><tr><td>0.2 &lt; d</td><td>0.3</td><td colspan="2">5</td></tr><tr><td>0.3 &lt; d</td><td>0.5</td><td colspan="2">3</td></tr><tr><td>0.5 &lt; d</td><td></td><td colspan="2">0</td></tr></table>                                                                                                                                             |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            | Size (mm)  |                   | Acceptable number |                   | d                 | 0.2         | (Neglected) |         | 0.2 < d     | 0.3         | 5           |          | 0.3 < d | 0.5   | 3       |             | 0.5 < d     |             | 0       |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | Size (mm)           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | d                   | 0.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (Neglected)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          | 0.2 < d             | 0.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.3 < d                                                                                  | 0.5                 | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.5 < d                                                                                  |                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| Foreign particle<br>( Circular shape )                                                   |                     | <table><tr><td colspan="2">Size (mm)</td><td colspan="2">Acceptable number</td></tr><tr><td>d</td><td>0.2</td><td colspan="2">(Neglected)</td></tr><tr><td>0.2 &lt; d</td><td>0.4</td><td colspan="2">5</td></tr><tr><td>0.4 &lt; d</td><td>0.5</td><td colspan="2">3</td></tr><tr><td>0.5 &lt; d</td><td></td><td colspan="2">0</td></tr></table>                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    | Size (mm)  |            | Acceptable number |                   | d                 | 0.2               | (Neglected) |             | 0.2 < d | 0.4         | 5           |             | 0.4 < d  | 0.5     | 3     |         | 0.5 < d     |             | 0           |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| Size (mm)                                                                                |                     | Acceptable number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| d                                                                                        | 0.2                 | (Neglected)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.2 < d                                                                                  | 0.4                 | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.4 < d                                                                                  | 0.5                 | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.5 < d                                                                                  |                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| Foreign particle<br>( Linear shape )<br>Scratch                                          |                     | <table><tr><td colspan="2">Width (mm)</td><td colspan="2">Length (mm)</td><td colspan="2">Acceptable number</td></tr><tr><td>W</td><td>0.03</td><td colspan="2">-</td><td colspan="2">(Neglected)</td></tr><tr><td rowspan="3">0.03 &lt; W</td><td rowspan="3">0.1</td><td colspan="2">L 2.0</td><td colspan="2">(Neglected)</td></tr><tr><td colspan="2">2.0 &lt; L 4.0</td><td colspan="2">3</td></tr><tr><td colspan="2">4.0 &lt; L</td><td colspan="2">0</td></tr><tr><td colspan="2">0.1 &lt; W</td><td colspan="2">-</td><td colspan="2">(According to circular shape)</td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                                                                                                                                                                                                    | Width (mm) |            | Length (mm)       |                   | Acceptable number |                   | W           | 0.03        | -       |             | (Neglected) |             | 0.03 < W | 0.1     | L 2.0 |         | (Neglected) |             | 2.0 < L 4.0 |         | 3 |   | 4.0 < L |         | 0 |   | 0.1 < W |   | - |  | (According to circular shape) |  |
| Width (mm)                                                                               |                     | Length (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Acceptable number                                          |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| W                                                                                        | 0.03                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (Neglected)                                                |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.03 < W                                                                                 | 0.1                 | L 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (Neglected)                                                |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | 2.0 < L 4.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3                                                          |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
|                                                                                          |                     | 4.0 < L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0                                                          |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |
| 0.1 < W                                                                                  |                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (According to circular shape)                              |                                                                                                                                                                                                                                                                                                                                                    |            |            |                   |                   |                   |                   |             |             |         |             |             |             |          |         |       |         |             |             |             |         |   |   |         |         |   |   |         |   |   |  |                               |  |

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Kyocera:](#)

[TCG104SVLPAANN-AN20](#)