Toshiba Matsushita Display Technology Co.,Ltd.

No. Preliminary

DATE: 08 May 2002



# REFERENCE SPECIFICATION

Description: 5.8" Wide Q-VGA TFT Color LCD Module

Customer's Parts Number

Model Number EDTCA39QRF

Notice: This Specification is "Preliminary".
The contents described in this specification may be changed without notice. Please ask us to send final version and reconfirm before you start to design.

| AV-USE LCD DIV | | ISSUE |
|---|---|---|
| AV-USE Marketing&Engineering Dept. | | |
| Approval | Check | |
| | | |
| Check | Design | |
| | | |

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Record of revision

| R/V No | Change of date | Contents of R/V | Note | Approval | Check | Design |
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CONTENT

## 1. Application

This specification is applied to the 5.8 inch wide , full colors and 400×RGB×234 dots color TFT Liquid Crystal Display Module.
Controller circuit,inverter for lamp are not included in this module.

Production Code(Part No) : EDTCA39QRF

## 2. General Specification

| CHARACTERISTIC ITEM | SPECIFICATION |
|---|---|
| 1.Display technology | a-Si TFT active-matrix |
| 2.Display mode | NW(normally white) |
| 3.Module outer dimension (note2-1) | 144.5(W) × 88.6(H) × 7.2(D) |
| 4.Effective display area | 127.20 × 71.838 ㎜ |
| 5.Number of dots | 400(W) × 3(RGB) × 234(H) |
| 6.Color-filter-array | RGB vertical stripes |
| 7.Weight | 136g ±10 g |
| 8.Backlight | CCFL with 3 wave-length spectrum ···· U Type |
| 9.Front surface treatment | AG coat (with WV film) |
| 10.Polarizer protective sheet | None |
| 11.Appearance | There are not remarkable defects. |
| 12.Metal frame condition | Not be connected to inner circuit |

note 2-1: Detailed dimensions are shown as per attached drawing.

## 3. Absolute Maximum Ratings

| CHARACTERISTICS | SYMBOL | CONDITION | MIN. | MAX. | UNIT | REMARKS |
|---|---|---|---|---|---|---|
| Logic voltage | VDD | Ta=25℃ | -0.3 | 6.5 | V | |
| Source driver voltage | VEE | Ta=25℃ | -0.3 | 6.5 | V | |
| Logic signal voltage | VIN | Ta=25℃ | -0.3 | VDD+0.3 | V | |
| Analog input voltage | VANA | Ta=25℃ | -0.3 | VEE+0.3 | V | note 3-1 |
| Gate driver positive voltage | VGON | Ta=25℃ | -0.3 | 45 | V | |
| Gate driver negative voltage | VSS | Ta=25℃ | VGON-45 | VGON+0.3 | | |
| Back light input voltage | VBL | Ta=25℃ | - | 3000 | ACV | |
| Panel surface temp | | | -30 | 80 | ℃ | |

note 3-1...Analog input voltages mean seven kinds of voltage such as VB, RED1, RED2, GREEN1, GREEN2, BLUE1,BLUE2.

Absolute maximum ratings are the limited value which must not be applied to the product even a second,and the product may have a permanent damage when it is exceeded.
Accordingly, please pay attention to the surge of input voltage, fluctuation and/or ripple of supply voltage, ambient temperature and so on.

## 4.Environmental Conditions

| ITEM | SPECIFICATION | | REMARKS |
|---|---|---|---|
| Operating Temperature (Panel surface temp.) | -20 ～ | 70 ℃ | note4-1,note4-2 |
| Storage Temperature (Panel surface temp.) | -30 ～ | 80 ℃ | note4-2 |

note 4-1...This value guarantees only operation, but doesn't guarantee all the contents of Electro-optical specification.
Electro-optical specification can be guaranteed at the condition that ambient temperature is 25℃.

note 4-2...Please refer to section 7. "Attention".

## 5.Electro-optical Specification

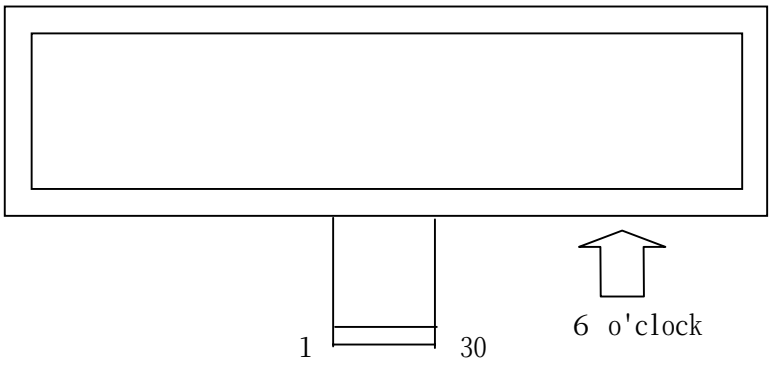
| CHARACTERISTICS | SYMBOL | CONDITION | | | STANDARD VALUE | | | UNIT | measurement method |
|---|---|---|---|---|---|---|---|---|---|
| | | θ | ϕ | C. | MIN. | TYP. | MAX. | | |
| 1.Brightness *note | B | 0° | 0° | | 240 | 300 | - | cd/m² | 5-1 |
| 2.Contrast Ratio | Cmax | best angle | | | 60 | 150 | - | - | 5-2 |
| 3.White color chromaticity | X | 0° | 0° | | 0.26 | 0.31 | 0.36 | - | 5-1 |
| | Y | 0° | 0° | | 0.27 | 0.32 | 0.37 | - | |
| 4.Brightness uniformity | - | 0° | 0° | | 0.7 | - | - | - | 5-1 |
| 5.Vertical viewing Angle | θu | - | 0° | ≧5 | 20 | 30 | - | deg. | 5-3 |
| | θD | - | 0° | ≧5 | 40 | 60 | - | deg. | |
| 6.Horizontal Viewing Angle | ΦL | 0° | - | ≧5 | 45 | 60 | - | deg. | |
| | ΦR | 0° | - | ≧5 | 45 | 60 | - | deg. | |
| 7.Response Time | τr | 0° | 0° | | - | 11 | 22 | ms | 5-4 |
| | τd | 0° | 0° | | - | 22 | 44 | ms | |

* note : Fluorescent lamp current is 2.0mA.(Measuring temperture : 25±2℃)

Measuring condition:

◇Measuring surroundings : Dark room or its coordinate
◇Measuring temperature : 25±5℃
◇Measuring humidity : 40～70%RH
◇Adjust operating voltage to get optimum contrast at the center of the display.
◇Use inverter : HIU-742A(16.5pF)

Main viewing angle direction (Contrast ratio becomes max.)



5-1. Measuring method for brightness

(1)Measuring instrument

TOPCON BM-5A(measuring field = 1° )

(2)Measuring point

center of the display area( θ =0° , φ=0° )

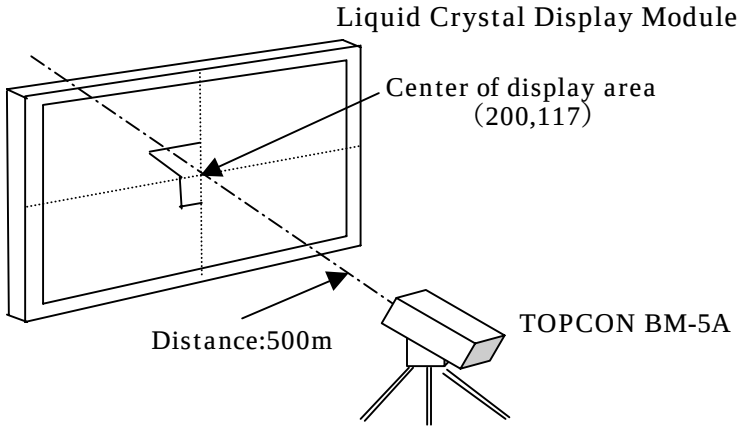
θ : viewing angle against vertical axis

φ: viewing angle against horizontal axis

(3)Measuring method

Measure the brightness B(cd/㎡) and white color chromaticity X,Y supplying signal voltage to get maximum brightness at the display pattern to be all white.

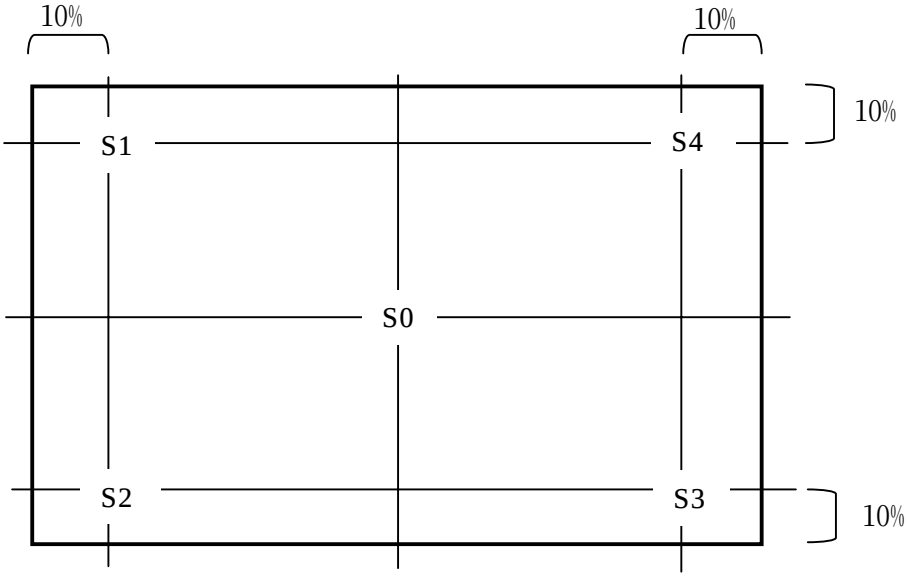
The distance from screen to "BM-5A" is 500㎜.




●Definition of the brightness uniformity

Measure 5 points (SO～S4) and define the brightness uniformity using the following formula.

Brightness uniformity = (The minimum brightness among S1～S4)/SO



5-2. Measuring method for contrast

(1)Measuring instrument
TOPCON BM-5A (measuring field = 1°)

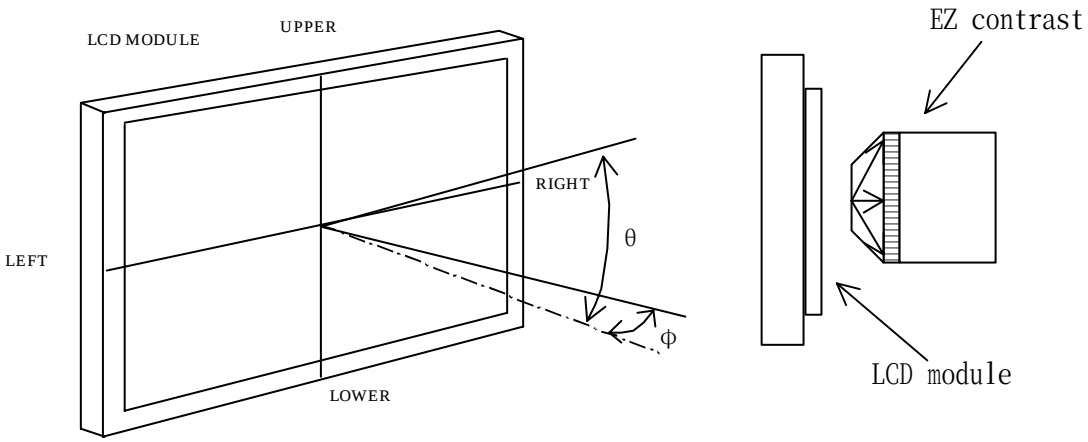
(2)Measuring point
Center of the display area

(3)Measuring method
・ Set the LCD module at $\theta = \theta 0$, $\phi = \phi 0$
$\theta$ : viewing angle in vertical axis
$\phi$ : viewing angle in horizontal axis
$\theta 0, \phi 0$ are the best angle to get the maximum contrast.
・ Measure maximum brightness "Y1"(Vlc=0v)and minimum brightness "Y2"(Vlc=5v).
・ The contrast ratio C is Y1/Y2.
Where, Vlc means the effective voltage applied to liquid crystal in LCD panel.

5-3. Measuring method for viewing angle

(1)Measuring instrument
ELDIM : EZ contrast

(2)Measuring point
Center of the display area




θ U : Upper side viewing angle θ L : Lower side viewing angle
Φ L : Left side viewing angle Φ R: Right side viewing angle

Record upper, lower, right, left angles of contrast 5 from circular chart data of EZ contrast.

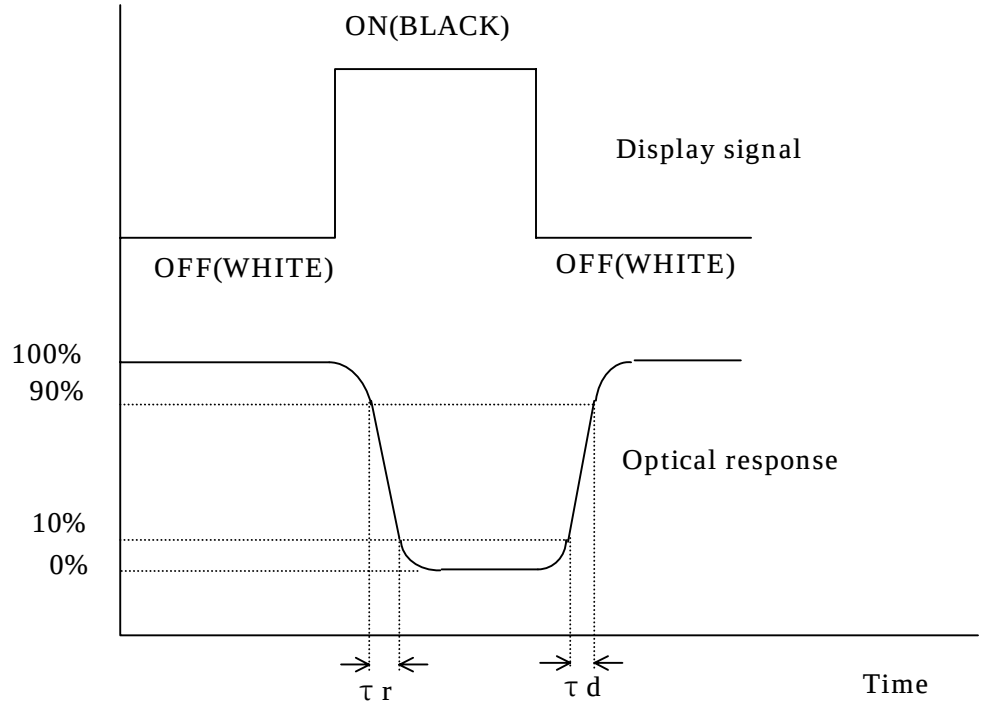
5-4. Measuring method for response Time

(1)Measuring instrument
Ohtsuka Electric. LCD evaluation equipment LCD-7000
Measuring spot size(aperture size)isφ12㎜.

(2)Measuring point
Center of the display area

(3)Measuring method
・Set LCD module at $\phi=0^{\circ}$ and $\theta=0^{\circ}$
・Apply the signal voltage at maximum contrast ratio and switch LCD-cell off/on/off.
(make screen white, then black and white)

When normalizing each brightness level corresponding to the display signal "OFF" and " ON" as shown in the figure below, the rise time τr is defined as the time until the brightness level goes down
to 10% from 90% after display signal changed from OFF to ON and also fall-time τd is defined as the time until the brightness level goes up to 90% from 10% after display signal changes from

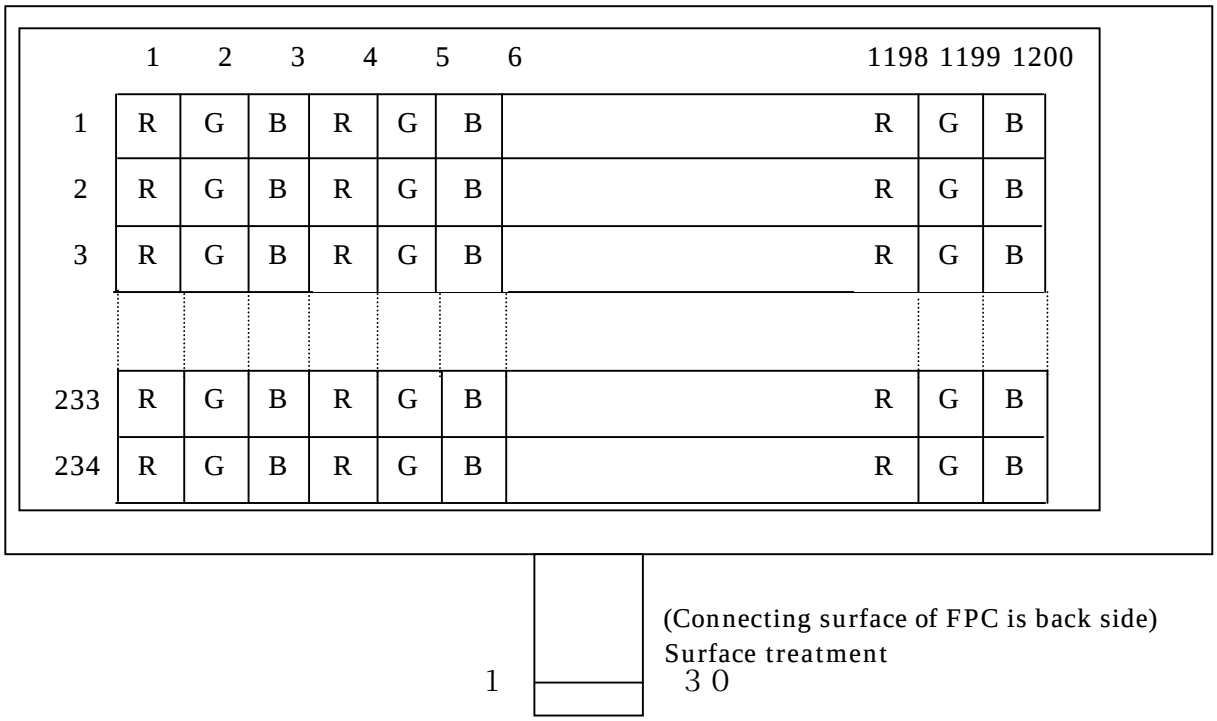


## 6. Electrical Specification

(1)Contents

| Item | Contents | Remark |
|---|---|---|
| Screen size | 15 cm (5.8 inch)wide | |
| Display mode | TN type full color(Transmitting type) | Normally white |
| Driving method | a-Si TFT active-matrix line-at-a-time scan | |
| Pixel arrangement | RGB stripe arrangement | |
| Input video signal | RGB line-inverted | (Fig 6-1) P.15/21 |
| Control voltage | CMOS level | (Fig 6-2) P.16/21 |
| Backlight | Light-guiding plate with U type lamp | P.18,19/21 |

(2)Pixel arrangement and I/O interface pin assignment



(3)Interface

| Pin NO | SYMBOL | Function |
|---|---|---|
| 1 | CLK1 | Source driver clock input 1 |
| 2 | CLK2 | Source driver clock input 2 (Set "H" at Simultaneous Mode) |
| 3 | CLK3 | Source driver clock input 3 (Set "H" at Simultaneous Mode) |
| 4 | GND | Ground |
| 5 | STH1 | Source scanning start signal 1 |
| 6 | GND | Ground |
| 7 | MOD | Sampling mode change (H: Simultaneous, L: Sequential) |
| 8 | STH2 | Source scanning start Signal 2 |
| 9 | RL | Right / Left scanning change |
| 10 | RED2 | Red video signal 2 |
| 11 | GREEN2 | Green video signal 2 |
| 12 | BLUE2 | Blue video signal 2 |
| 13 | VB | Source output current adjustment |
| 14 | BLUE1 | Blue video signal 1、 connect to 12 pin |
| 15 | GREEN1 | Green video signal 1、connect to 11 pin |
| 16 | RED1 | Red video signal 1、 connect to 10 pin |
| 17 | OEH | Source driver output enable |
| 18 | VDD | Power line for logic |
| 19 | Vcom | Voltage applied to color filter substrate |
| 20 | VEE | Power line for source driver IC |
| 21 | STV1 | Gate scanning start signal 1 |
| 22 | STV2 | Gate scanning start signal 2 |
| 23 | VGON | Gate driver positive voltage |
| 24 | OEV1 | Gate driver output enable 1 |
| 25 | OEV2 | Gate driver output enable 2 |
| 26 | OEV3 | Gate driver output enable 3 |
| 27 | U/D | Up/Down scanning change |
| 28 | CPV | Gate driver scanning clock pulse |
| 29 | VSS | Gate driver negative voltage |
| 30 | VSS | Gate driver negative voltage |

Connector : IL － FPR Series (0.5㎜ pitch 30p) (JAE) gilded type

4)Electrical Specification

Under TFT LCD Module operating condition

| ITEM | SYMBOL | MIN. | TYP. | MAX. | UNIT | REMAEKS |
|---|---|---|---|---|---|---|
| IC logic voltage | VDD | 2.70 | 3.0～3.3 | 3.60 | V | |
| Source driver IC voltage | VEE | 4.50 | 5.00 | 5.50 | V | |
| Logic signal input voltage | VIL | 0 | | 0.20*VDD | V | |
| | VIH | 0.80*VDD | | VDD | V | |
| Black input voltage(+) | VSB+ | (0.20) | 0.75 | (VSW+) | V | R,G,B, VEE=5V |
| White input voltage(+) | VSW+ | (VSB+) | 4.25 | (4.8) | V | R,G,B, VEE=5V |
| Black input voltage(-) | VSB- | (VSW-) | 4.25 | (4.8) | V | R,G,B, VEE=5V |
| White input voltage(-) | VSW- | (0.20) | 0.75 | (VSB-) | V | R,G,B, VEE=5V |
| Source signal width | VSPP | - | 3.50 | VEE-0.4 | V | R,G,B, note 6-4 |
| Source driver center voltage | VSC | 2.30 | 2.50 | 2.70 | V | R,G,B, VEE=5V |
| Source output current adjustment | VB | 2.30 | 2.50 | 2.60 | V | VEE=5.0V<br>VSPP=3.5V<br>VCOM=7.0V |
| Gate driver positive voltage | VGON | 16.00 | 17.00 | 18.00 | V | |
| Gate driver negative voltage | VSS | -14.00 | -13.00 | -12.00 | V | |
| V center applied to color filter sub. | VCOM | 0.70 | 1.70 | 2.70 | V | note 6-2 |
| V amplitude applied to color filter sub. | VCPP | 2.70 | 6.70 | 8.70 | Vpp | note 6-1 & 6-4 |
| Logic supply current | IDD | | 1.60 | 3.20 | mA | note 6-3 |
| Source driver IC supply current | IEE | | 21.20 | 42.40 | mA | note 6-3 VB=2.5V |
| Gate driver IC positive supply curren | IGH | | 0.08 | 1.00 | mA | note 6-3 |
| Gate driver IC negative supply current | ISS | | -0.01 | -1.00 | mA | note 6-3 |

note 6-1...Brightness level is adjusted by varying this amplitude.

note 6-2...Please adjust VCOM voltage between -1.5V and +2.5V to make the flicker level be minimum.

note 6-3...Current value is an average level , not a peak level.

note 6-4...VSPP/2+VCPP/2<5.5(V) Please keep this condition for picture quality.

Attention) Electrical specification guarantees the normal operation of the product. In case of using the product over electrical specification, the normal operation is not guaranteed even within absolute maximum ratings.

●The function of STV1 and STV2 is changed as follows by the U/D terminal (up/down scanning)

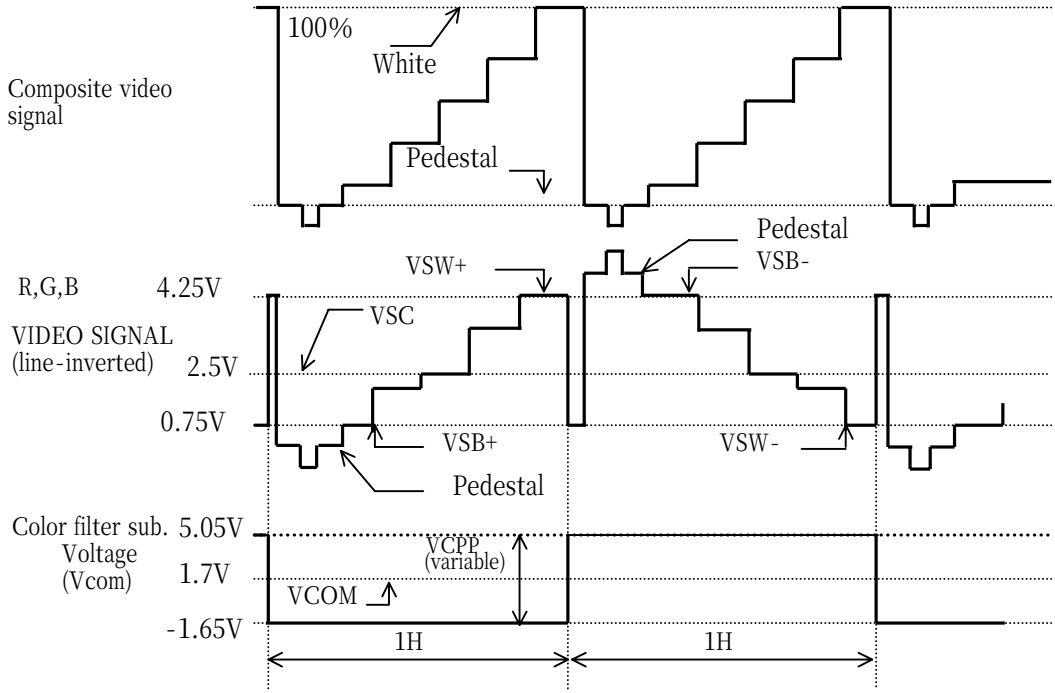
| U/V | STV1 | STV2 |
|---|---|---|
| H(VDD) | Signal Input | Signal Output |
| L(0V) | Signal Output | Signal Input |

●The function of STH1 and STH2 is changed as follows by the RL terminal (Right/Left scanning)

| RL | STH1 | STH2 |
|---|---|---|
| H(VD | Signal Input | Signal Output |
| L(0V) | Signal Output | Signal Input |

(5)Signal polarity and phase

It is needed to modulate RGB Video signal (inverted polarity line by line), the voltage applied to color filter substrate (Vcom) synchronizing inversion timing.




note･Please adjust the brightness level by varying the amplitude of Vcpp.

●Relation of Black/White display and signal Voltages

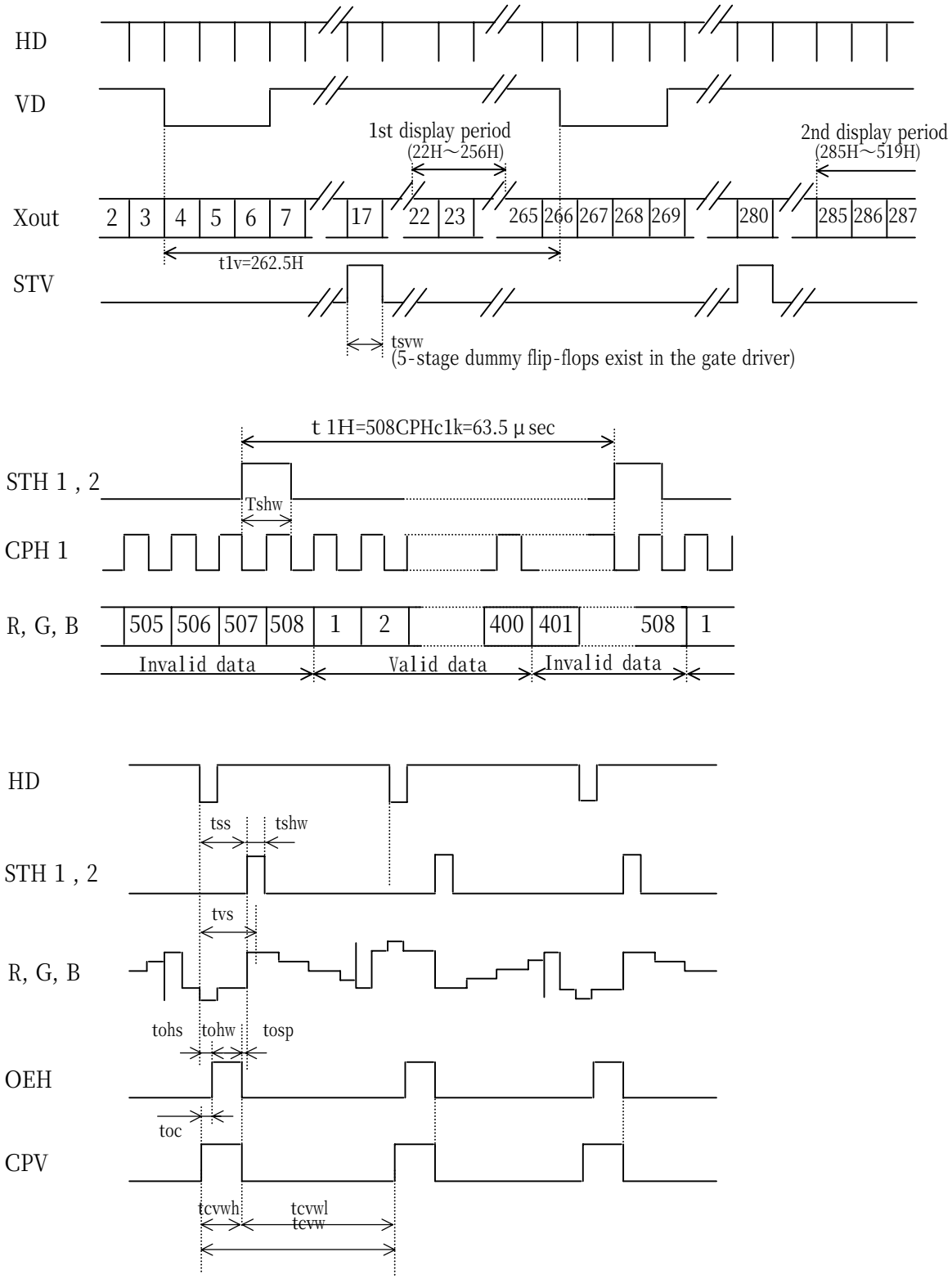
| video signal | Vcom | |
|---|---|---|
| | H level | L level |
| higher voltage | Black | White |
| lower voltage | White | Black |

(6) Timing characteristics of input signals

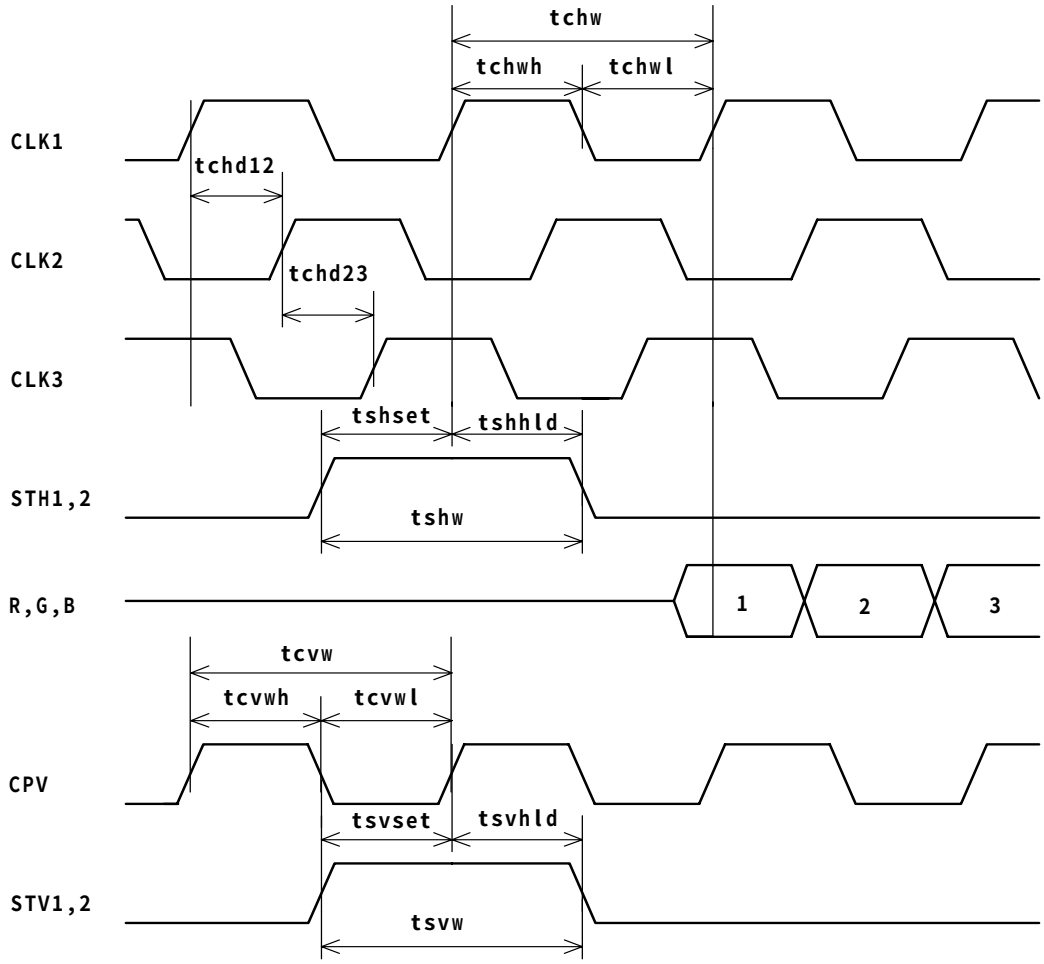
| CHARACTERISTICS | SYMBOL | MIN | TYP | MAX | UNIT | REMARKS |
|---|---|---|---|---|---|---|
| 1 Field scanning period | tlV | - | 262.5 | - | H | |
| 1 Line scanning period | tlH | - | 63.5 | - | µs | |
| Source driver operating frequency | fhc | 1.0 | 8.25 | 9.0 | MHz | full scan mode |
| | fhc | | | (13.0) | MHz | side panel area |
| Signal sampling pulse width | tchw | 110 | 121.2 | 1000 | ns | |
| Signal sampling pulse delay | tchd | 36.4 | 40.4 | 44.4 | ns | |
| Signal sampling pulse width(H) | tchwh | 54.4 | 60.6 | 66.6 | ns | tchd 12,23 |
| Signal sampling pulse width(L) | tchwl | 54.4 | 60.6 | 66.6 | ns | |
| Source start signal pulse width | tshw | 40 | 121.2 | 240* | ns | *shset=tshhld |
| Source start signal setup time | tshset | 15 | 60.6 | - | ns | |
| Source start signal hold time | tshhld | 25 | 60.6 | - | ns | |
| Source output enable pulse width | tohw | 7.5 | 8.0 | 8.5 | µs | |
| Source start signal rising time | tss | 1.45 | 9.85 | 10.96 | µs | |
| Video input signal start point | tvs | 1.59 | 10.0 | 11.11 | µs | |
| Phase difference between OEH & CPV | toc | 1.5 | 2.3 | - | µs | |
| Gate clock period | tvcvw | 10 | 63.5 | - | µs | |
| Gate clock pulse width (H) | tcvwh | 5 | 10.3 | 58.5 | µs | |
| Gate clock pulse width (L) | tsvwl | 5 | 53.2 | 58.5 | µs | |
| Gate start signal pulse width | tsvw | 5 | 63.5 | 126** | µs | **tsvset=tsvhld |
| Gate start signal setup time | tsvset | 2 | 31.75 | - | µs | |
| Gate start signal hold time | tsvhld | 2 | 31.75 | - | µs | |
| Phase difference between OEH & STH | tosp | 0 | 0.5 | - | µs | |
| Phase difference between SYNC & OEH | tohs | - | 1 | 1.9 | µs | |

note ) ·Rise time (tr) and fall time (tf) of source driver logic signal are both 6ns.
·Rise time (tr) and fall time (tf) of gate driver logic signal are both 50ns.

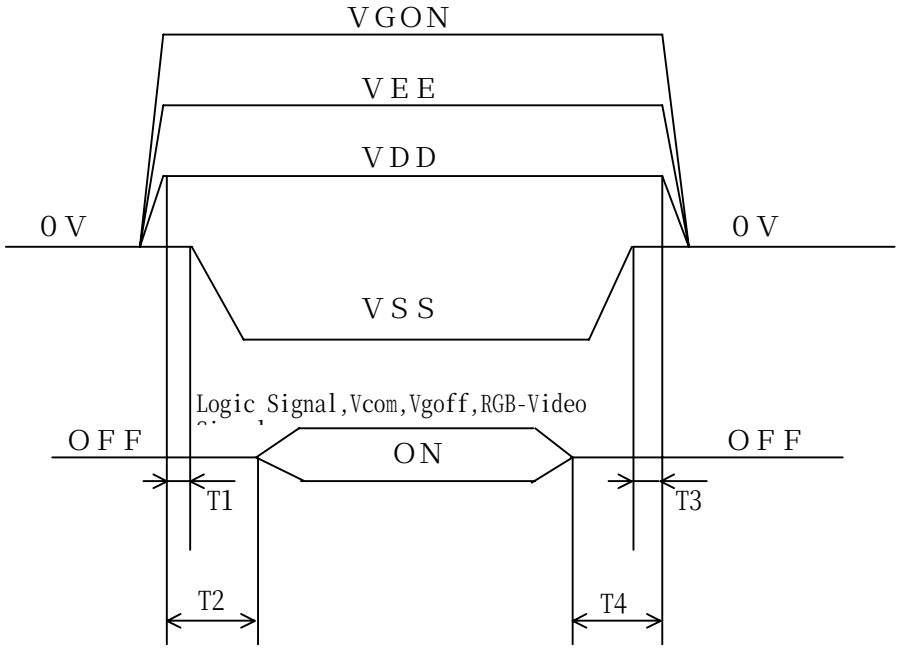
(Fig.6-1) Video signal timing chart



(Fig. 6-2)Control signal timing diagram

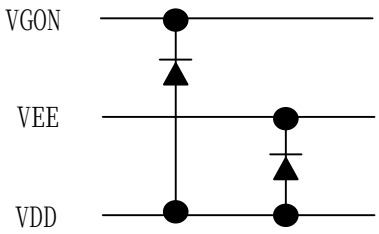


(7)Sequence for power-on /off and signal on / off




1) 10ms≦T1＜T2, 0＜T3＜T4≦10ms

2)Please use the schottky Barrier Diode among VDD ,VEE and VGON, shown as follows.



(8) Backlight

| CHARACTERISTICS | SYMBOL | MIN | TYP | MAX | UNIT | REMARKS |
|---|---|---|---|---|---|---|
| Lamp current | IL | — | 2.0 | 5.0 | mArms | |
| Lamp voltage | VL | — | 800 | — | Vrms | |
| Lamp power consumption | PL | — | 1.6 | — | Wrms | |
| Possible lighting frequency | FL | — | 30～80 | — | kHz | |
| Starting Voltage | VS | — | - | 2100 | Vrms | Ta=-20℃ |
| Life time | — | 10000 | — | — | Hour | |

Attention)

*1 Panel surface temperature should be kept less than contents of "3. Absolute Maximum Ratings".

*2 Inverter should be designed to be subject to the conditions below:
(1) Both the area and the peak under the positive and negative cycles of the waveform of the lamp current and lamp voltage should be symmetric. (The symmetric ratio should be larger than 90%)
(2) There should not be any spikes in the waveform.
(3) The waveform should be close to a sine wave whenever possible.
(4) Lamp current should not exceed the "MAX" value under the "Operating Temperature" (It is prohibited to exceed the "MAX" value even if it is operated in the non-guaranteed temperature). When lamp current exceed the maximum value for a long time, it may cause a smoking and ignition. Therefore, it is recommended that the inverter have the current limited circuit that is used as a protection circuit and/or the lamp current-controlled inverter.
(5) Please check the lamp current not to exceed the "MAX" value in the inverter open/short test.
(6) The "MIN" of "Lamp current " is the necessary value which must not be applied to the product for an stable working condition. Please pay attention to keep the "MIN" of "Lamp current" for a light dimmer.

*3 The lamp frequency should be selected as different as possible from display horizontal synchronous signal (Including harmonic frequency of this scanning frequency) to avoid "Beat "interference which may be observed on the screen as horizontal stripes like moving wave. This phenomenon is caused by interference between lamp (CCFL) lighting frequency and LCD horizontal synchronous signal.

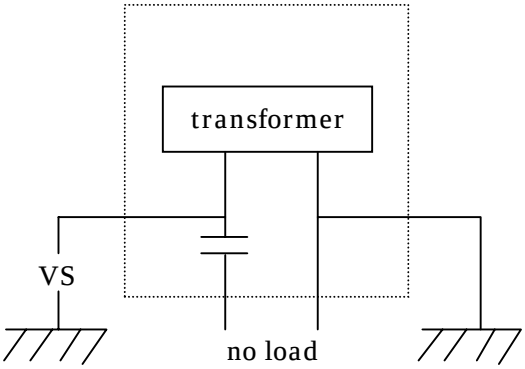
*4 "Life time" is defined as a lamp maker's warranty value which applied to CCFL only. "Life time" is defined as the lamp brightness decrease to 50% original brightness at IL=MAX; continuous lighting, Ta=25℃.

*5 Values of "Lamp Voltage", "Lamp power consumption" and "Starting voltage" are defined on conditon of the LCD module drived by Matsushita standard inverter (Harison HIU-742A; 16.5pF).
The "MAX" of "Starting voltage "means the minimum voltage to light normally in the LCD module.
However this isn't the values that we can assure stability of starting lamp on condition that the module is installed in your set.
It is careful that "Starting voltage" is changed by an increase of stray capacitance in your set, inverter method, value of ballast capacitor in your inverter and so on.
Especially, the value of "Starting voltage" is higher in low temperature condition than in normal temperature condition, because impedance of CCFL is increased.
So, please check your set in low temperature condition.

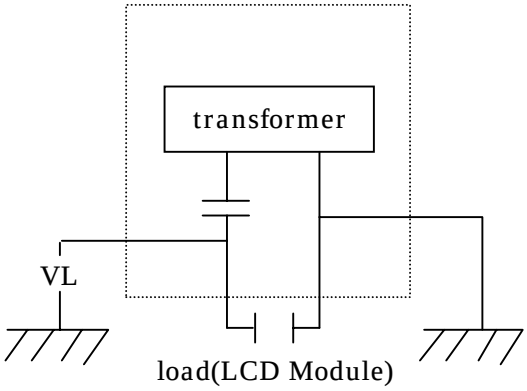
*6 Please do not bring the high voltage wire into contact with metallic frame and the GND lead wire, so as to ensure the safety and decrease the difference of brightness.

*7 "Starting Voltage" and "Lamp voltage" are defined as follows.

(1) Starting voltage
*Use inverter : HIU-742A




(2) Lamp voltage
*Use inverter : HIU-742A




Lamp Connector Use Connector : BHR−03VS−1 (JST)

| Pin No. | SYMBOL | FUNCTION | REMARKS |
|---|---|---|---|
| 1 | H | CCFL Power supply(High Voltage) | cable color : Red |
| 2 | NC | Non connect | − |
| 3 | L | CCFL power supply(Ground) | cable color : White |

7. Attention

(1)Because the liquid crystal display panel is made of glass, especially pay attention not to give it vibration, impact and so on when installing.

(2)As for liquid crystal display panel ,the thickness of the liquid crystal layer is very thin with about 5μm, and the polarizer on the panel surface is easy to get damaged.
So please pay attention to the following points.
1)Don't hold a panel surface strongly.
In case that you held a panel surface in the construction process, after leaving for a while, then turn on.
2)In installation, pay attention not to give a stress and damage to the liquid crystal display panel.

(3)Be careful not to leave long in the high temperature, the high humidity.

(4)Cleaning
Polarizer which covers a display part should be treated carefully because it is extremely delicate.

Also, when cleaning a display surface, make the following solvent into the soft cloth like the gauze and so on sufficiently and wipe it lightly.
・Isopropyl alcohol (recommend)
・Ethyl alcohol

Because it bruises the surface of polarizer, avoid cleaning with the dried cloth.

Avoid using the following solvents, because they causes the dissolving, the decoloring of the polarizer.

・Ketones (ex, Acetone) ・Aromatic compounds(ex. ; Xylene, Toluene) ・Water

(5)When inserting the flexible cable of the module to the input connecter, or pulling out it from the input connecter, always, turn off the power supply to input to the module.

(6)Because CMOS-LSI is used for the circuit in the liquid crystal display panel, pay attention to the static electricity. (Especially, be careful of the interface flexible cable.)

(7)Because LCD module does't have a protective circuit, please prepare the protective function such as fuses or shut -down circuit in user's power supply circuit.

(8)Never use in the products which have opportunity to be dropped on hard floor such as concrete. It may be regarded as defectives.

(9)Storage Condition
Don't leave LCD module unattended for long time in high temperature
In case of preservation for long time, the storage condition must be humidity of less than or equal to 70%, and not expose to direct sunlight and fluorescent light.
Also, storage condition of more thac 60℃ should be humidity of less than or equal to 45% and non condensing.

(10)Appearance defects shall be claimed at or before the customer's inspection.
After the customer's inspection, we consider that the defects are caused in the customer's production process.
Appearance defects include stains and scratches on the polarizer and fractures in the glass.

(11) Revision of specification
In case that changes in parts and materials used happen after formally signing the specification, its contents will be informed by prior written notice. Changes are implemented after confirmation of receipt.
If new problems happen concerning to this specification , they should be solved by mutual discussion.

(12) Warranty period
Warranty period of this LCD module is 12 mouths after Manufacturing date code.

(13)Caution

| ⚠ CAUTION OF TREATMENT | |
|---|---|
| ⚠CAUTION | 1. Please do not work during operating of CCFL by connecting inverter to avoid electric shock,because there is very high voltage on wiring between CCFL or EL and output terminal of switching inverter . Please do not harm cable and connectors action with care. |
| | 2. Inverter output voltage should be stopped automatically and simultaneously when open-circuit or short-circuit happened between the inverter output and CCFL. (Please design the inverter which has shutdown function in case of no load for inverter output.) Continuos voltage output from the inverter under the open or short circuit may cause excessive leak current and overheat. However inverter output voltage is required to remain for on-condition at least 3 seconds, because CCFL needs 1 or 2 seconds as start-up time. |
| | 3. Please take care burrs to be injured at the edges LCD metal frame. We would like you to design carefully to de-touch cable with frame edge section. |
| | 4. Please be careful with work to avoid injury by the edjes of LCD panel. We would like you to pay attension to design for avoiding damage of LCD glass by wiring and surrounding components. |
| | 5. To make sure safety, please install fuse or shutdown circuit as safety function at power supply section inside of customer products,because there is no protect circuit inside LCD module to coop with short circuited issue of power supply(and so on)in LCD module. |

| Sym. | Date | Revision | Slaved | Checked |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

SPEC No

PAGE

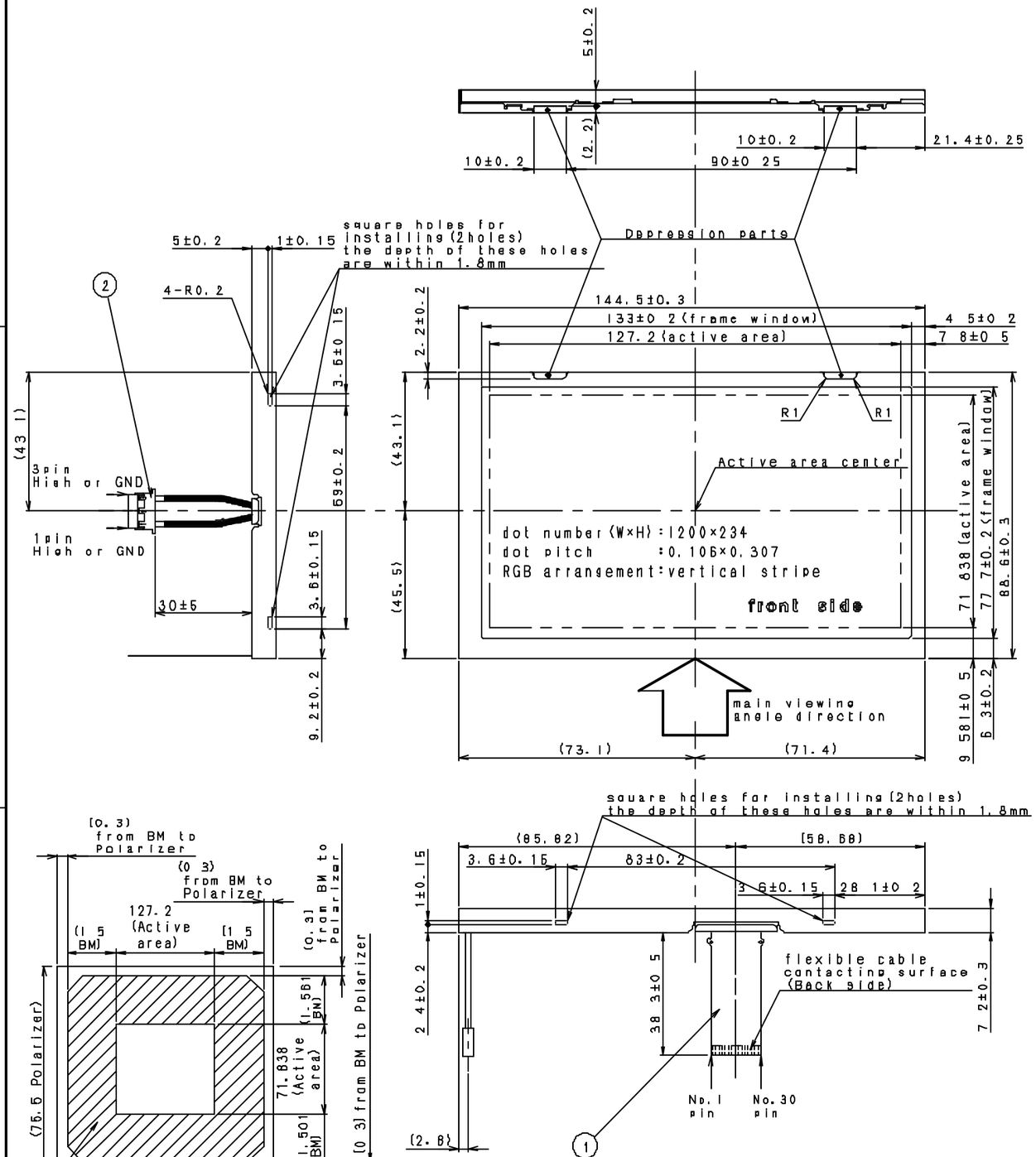
Note 1 General tolerance is ±0.3mm.

2 This dimension should be measured under the condition pressed by the force of 4.8N(1kgf) with 10mm diameter gauge. And it should not contain slight swelling.

3 Careful set design is needed to avoid unevenness in luminance caused by the strong pressure that violates regular dimensions of the module from the rear side.

4 Main viewing angle is 6 o'clock direction.

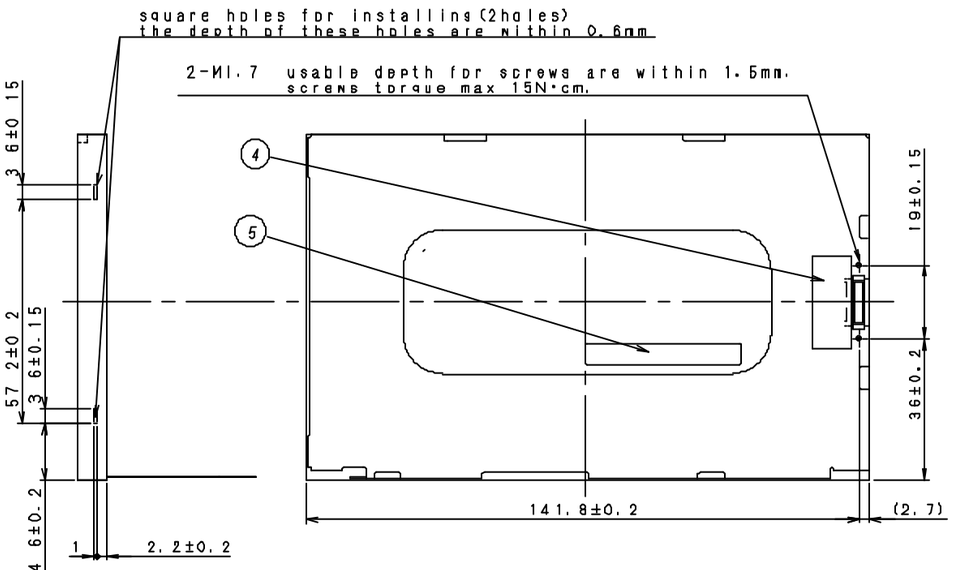
5 Keep cable any far edge of metal frame. because frame's burr toward outside.





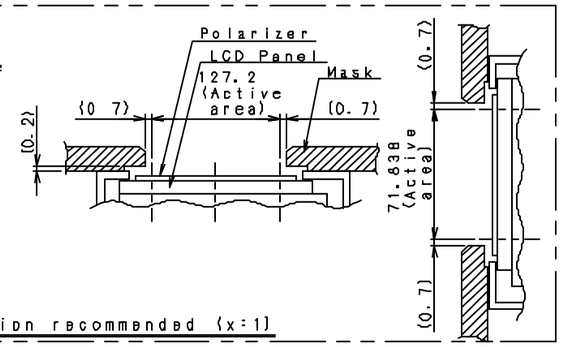





Note a) Please ask us when you design masking structure because the light leak from the outer side of active area may occur.

Note b) Keep the mask and/or its burrs away from the polarizer. The liquid crystal may look like waving when the mask is touching the polarizer.




Masking dimension recommended (x:1)

| Sym | Item or Code No. | Qt | Material & Size | |
|---|---|---|---|---|
| 4 | High voltage warning label | 1 | | |
| 3 | Serial number label | 1 | (5.5X40X0.1) | |
| 2 | BH connector | 1 | BHR-03VS-1 | |
| 1 | Flexible cable | 1 | LNF0025 | |

| Scale | Designed | Drawn | Checked | Approved | Model | EDTCA39QBM |
|---|---|---|---|---|---|---|
| 1:1 | '01.1.10 | K Wakatsuki | | | Name | 5.8'Wide LCD module outward dimension |
| | | | | | Drawing No | HN01042501 |

Matsushita Electric Industrial co.,Ltd. LCD div. 3rd angle Unit:mm