DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQODZA0150

These parts have corresponded with the RoHS directive.

RECORDS OF REVISION

LQODZA0150

SPEC No.	DATE	REVISED		SUMMARY	NOTE
		No.	PAGE		
LD-19Y05	Nov. 21. 2007	-	-	-	1 st Issue

1. Application

This specification applies to the monochrome 20.1 UXGA TFT-LCD module LQ0DZA0150.

The device listed in these specification sheets was designed and manufactured for use in OA equipment.

In case of using the device for applications such as control and safety equipment for transportation(aircraft, trains, automobiles, etc.), rescue and security equipment and various safety related equipment which require higher reliability and safety, take into consideration that appropriate measures such as fail-safe functions and redundant system design should be taken.

Do not use the device for equipment that requires an extreme level of reliability, such as aerospace applications, telecommunication equipment (trunk lines), nuclear power control equipment and medical or other equipment for life support.

2. Overview

This module is a active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a monochrome TFT-LCD panel, driver ICs, control circuit, power supply circuit and a back light unit. Graphics and texts can be displayed on a 1600× XYZ× 1200 dots panel with about 256 gray scales (8bit) by supplying 48 bit data signals(8bit× 2pixel× XYZ) , two display enable signals, two dot clock signals, +12V DC supply voltages for TFT-LCD panel driving and supply voltage for back light.

It is a wide viewing-angle-module (Vertical viewing angle:170° Horizontal viewing angle:170° ,CR 10).

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	51 (Diagonal)	cm
	20.1 (Diagonal)	Inch
Active area	408.0 (H)× 306.0 (V)	mm
Pixel format	1600 (H)× 1200 (V)	Pixel
	(1 pixel dots)	
Pixel pitch	0.255(H)× 0.255 (V)	mm
Pixel configuration	X,Y,Z vertical stripe	
Display mode	Normally black	
Unit outline dimensions *1	436(W)× 335 (H)× 27.5 (D)	mm
Mass	3.8 (MAX)	kg
Surface treatment	Anti-glare And hard-coating 2H	

*1.Note: excluding back light cables.

The thickness of module (D) doesn't contain the projection.

Outline dimensions are shown in Fig.1.

4. Input Terminals

4-1. TFT-LCD panel driving

CN7A,CN7B (Interface signals and +12VDC power supply)

Using connectors	DF19G-20P-1H (Hirose Electric Co., Ltd.)	
Corresponding connectors	DF19G-20S-1C (Hirose Electric Co., Ltd.)	
	DF19G-20S-1F (Hirose Electric Co., Ltd.)	
Using LVDS receiver	Contained in a control IC	
Corresponding LVDS transmitter	THC63LVDM83R(Thine) or compatible	

CN A

Pin No.	Symbol	Function	Remark
1	Vcc	+12V power supply	
2	Vcc	+12V power supply	
3	Vss	Gnd	
4	Vss	Gnd	
5	RAIN0-	Negative (-) LVDS differential data input (A port)	LVDS
6	RAIN0+	Positive (+) LVDS differential data input (A port)	LVDS
7	Vss	Gnd	
8	RAIN1-	Negative (-) LVDS differential data input (A port)	LVDS
9	RAIN1+	Positive (+) LVDS differential data input (A port)	LVDS
10	Vss	Gnd	
11	RAIN2-	Negative (-) LVDS differential data input (A port)	LVDS
12	RAIN2+	Positive (+) LVDS differential data input (A port)	LVDS
13	Vss	Gnd	
14	CKAIN-	Negative (-) LVDS differential clock input (A port)	LVDS
15	CKAIN+	Positive (+) LVDS differential clock input (A port)	LVDS
16	Vss	Gnd	
17	RAIN3-	Negative (-) LVDS differential data input (A port)	LVDS
18	RAIN3+	Positive (+) LVDS differential data input (A port)	LVDS
19	Vss	Gnd	
20	BLON	Back light ON signal (output) Note1	Pull Up

Note1   BLON:It change from   L to H at   7 frames after Vcc ON.

CN B

Pin No.	Symbol	Function	Remark
1	Vcc	+12V power supply	
2	Vcc	+12V power supply	
3	Vss	Gnd	
4	Vss	Gnd	
5	RBIN0-	Negative (-) LVDS differential data input (B port)	LVDS
6	RBIN0+	Positive (+) LVDS differential data input (B port)	LVDS
7	Vss	Gnd	
8	RBIN1-	Negative (-) LVDS differential data input (B port)	LVDS
9	RBIN1+	Positive (+) LVDS differential data input (B port)	LVDS
10	Vss	Gnd	
11	RBIN2-	Negative (-) LVDS differential data input (B port)	LVDS
12	RBIN2+	Positive (+) LVDS differential data input (B port)	LVDS
13	Vss	Gnd	
14	CKBIN-	Negative (-) LVDS differential clock input (B port)	LVDS
15	CKBIN+	Positive (+) LVDS differential clock input (B port)	LVDS
16	Vss	Gnd	
17	RBIN3-	Negative (-) LVDS differential data input (B port)	LVDS
18	RBIN3+	Positive (+) LVDS differential data input (B port)	LVDS
19	Vss	Gnd	
20	SELLVDS	Select LVDS data order Note2	Pull Up

Note2   This module has dual pixel port to receive dual pixel data at the same time . A port receives first pixel data and B port receives second pixel data in dual pixel data.
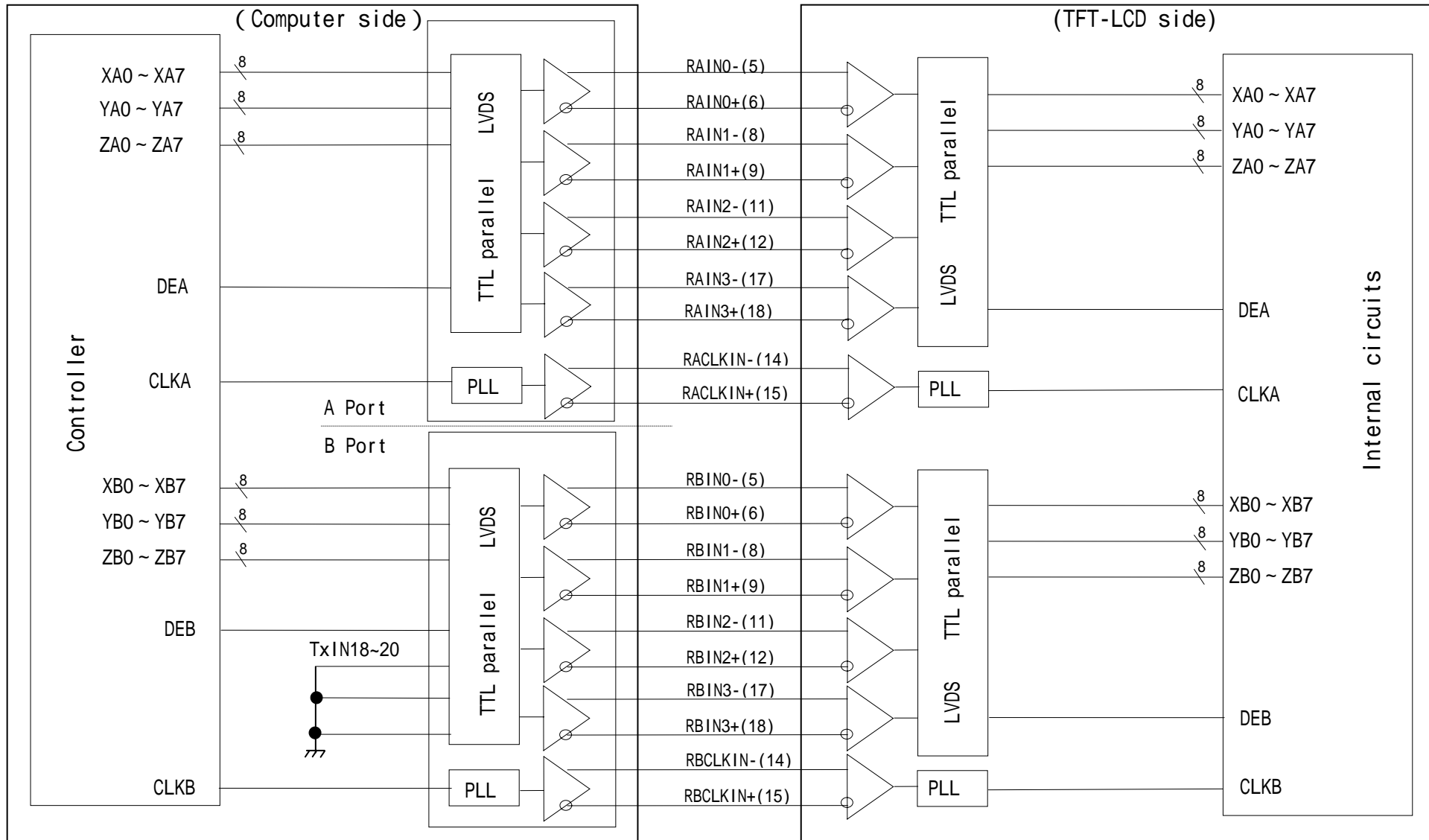
Note2   SELLVDS(Thine:THC63LVDM83R)

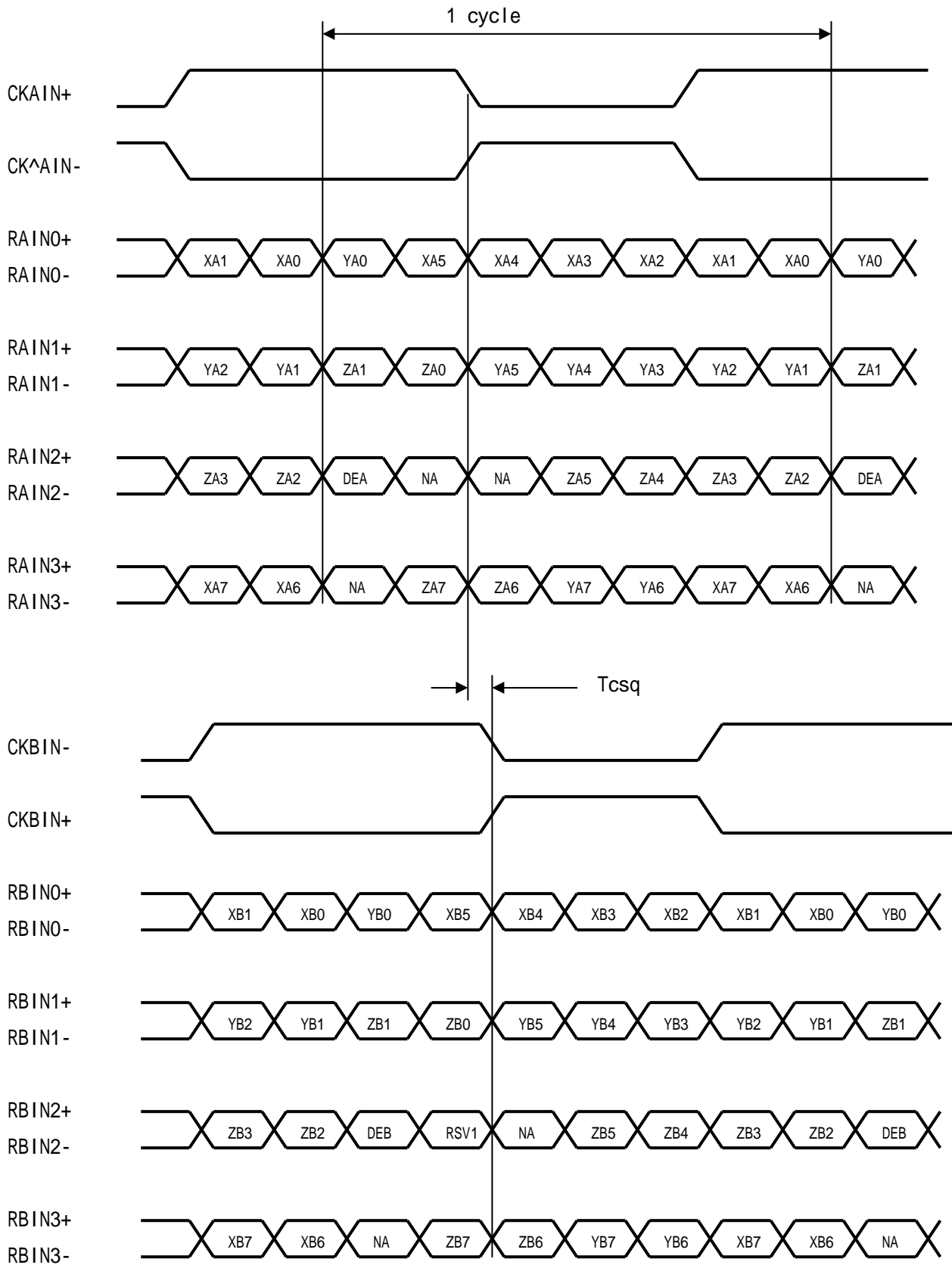| Transmitter		SELLVDS	
Pin No	Data	=L	=H
51	TA0	X0(LSB)	X2
52	TA1	X1	X3
54	TA2	X2	X4
55	TA3	X3	X5
56	TA4	X4	X6
3	TA5	X5	X7(MSB)
4	TA6	Y0(LSB)	Y2
6	TB0	Y1	Y3
7	TB1	Y2	Y4
11	TB2	Y3	Y5
12	TB3	Y4	Y6
14	TB4	Y5	Y7(MSB)
15	TB5	Z0(LSB)	Z2
19	TB6	Z1	Z3
20	TC0	Z2	Z4
22	TC1	Z3	Z5
23	TC2	Z4	Z6
24	TC3	Z5	Z7(MSB)
27	TC4	(NA)	(NA)
28	TC5	(RSV1)	(RSV1)
30	TC6	DE	DE
50	TD0	X6	X0(LSB)
2	TD1	X7(MSB)	X1
8	TD2	Y6	Y0(LSB)
10	TD3	Y7(MSB)	Y1
16	TD4	Z6	Z0(LSB)
18	TD5	Z7(MSB)	Z1
25	TD6	(NA)	(NA)

4-2 Interface block diagram

Using receiver   Contained in a control IC.

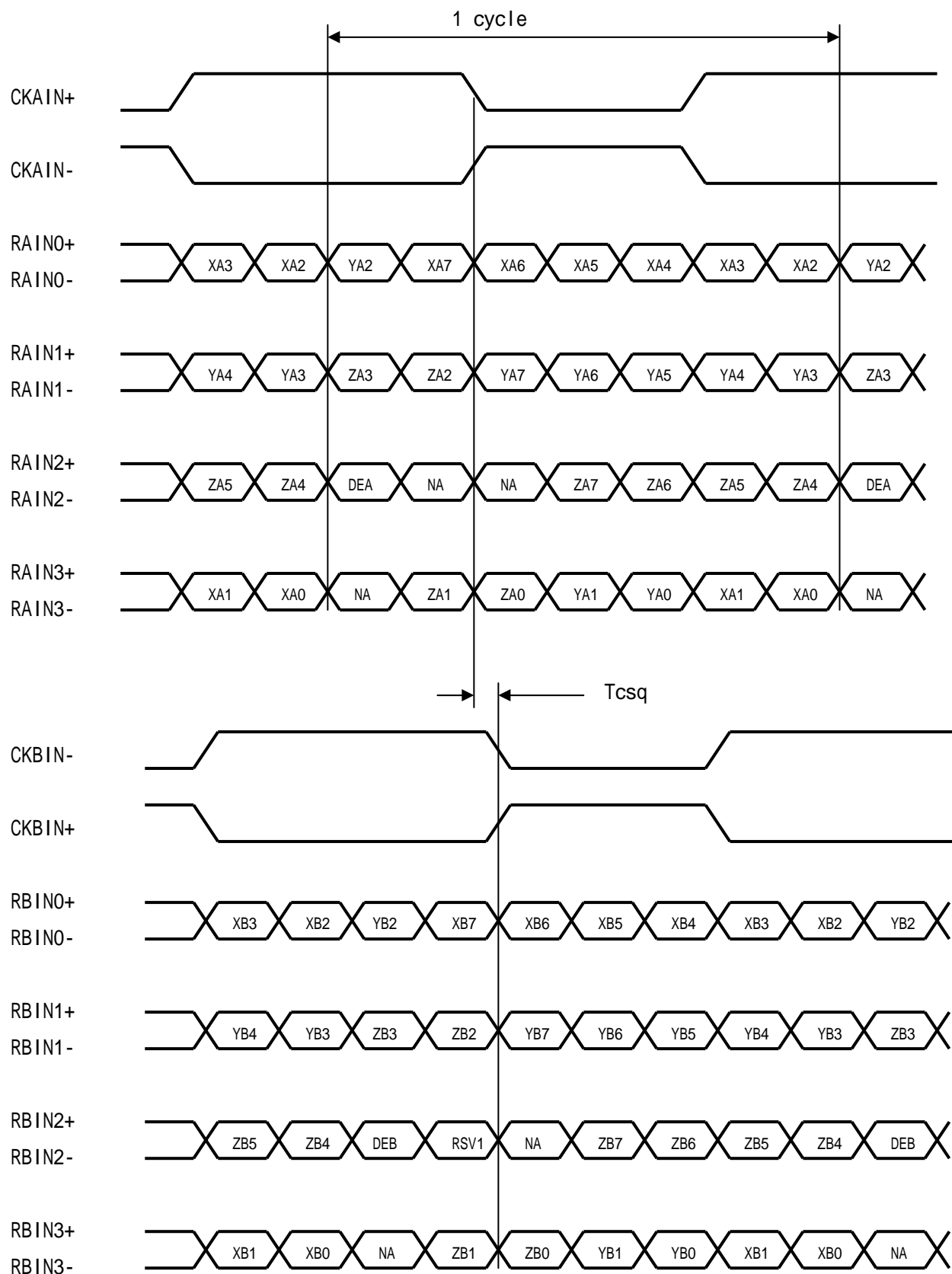Corresponding Transmitter   THC63LVDM83R(THine electronics),DS90C383,DS90C383A(National semiconductor)

< SELLVDS= Low >

1 cycle

CKAIN+

CK^AIN-

RAIN0+
RAIN0-

| XA1 | XA0 | YA0 | XA5 | XA4 | XA3 | XA2 | XA1 | XA0 | YA0 |

RAIN1+
RAIN1-

| YA2 | YA1 | ZA1 | ZA0 | YA5 | YA4 | YA3 | YA2 | YA1 | ZA1 |

RAIN2+
RAIN2-

| ZA3 | ZA2 | DEA | NA | NA | ZA5 | ZA4 | ZA3 | ZA2 | DEA |

RAIN3+
RAIN3-

| XA7 | XA6 | NA | ZA7 | ZA6 | YA7 | YA6 | XA7 | XA6 | NA |

Tcsq

CKBIN-

CKBIN+

RBIN0+
RBIN0-

| XB1 | XB0 | YB0 | XB5 | XB4 | XB3 | XB2 | XB1 | XB0 | YB0 |

RBIN1+
RBIN1-

| YB2 | YB1 | ZB1 | ZB0 | YB5 | YB4 | YB3 | YB2 | YB1 | ZB1 |

RBIN2+
RBIN2-

| ZB3 | ZB2 | DEB | RSV1 | NA | ZB5 | ZB4 | ZB3 | ZB2 | DEB |

RBIN3+
RBIN3-

| XB7 | XB6 | NA | ZB7 | ZB6 | YB7 | YB6 | XB7 | XB6 | NA |

DE: Display Enable
RSV1: Reserve (Fixed GND)
NA: Not Available

< SELLVDS= High >

1 cycle

CKAIN+

CKAIN-

RAINO+ RAINO-	XA3	XA2	YA2	XA7	XA6	XA5	XA4	XA3	XA2	YA2

RAIN1+ RAIN1-	YA4	YA3	ZA3	ZA2	YA7	YA6	YA5	YA4	YA3	ZA3

RAIN2+ RAIN2-	ZA5	ZA4	DEA	NA	NA	ZA7	ZA6	ZA5	ZA4	DEA

RAIN3+ RAIN3-	XA1	XA0	NA	ZA1	ZA0	YA1	YA0	XA1	XA0	NA

Tcsq

CKBIN-

CKBIN+

RBINO+ RBINO-	XB3	XB2	YB2	XB7	XB6	XB5	XB4	XB3	XB2	YB2

RBIN1+ RBIN1-	YB4	YB3	ZB3	ZB2	YB7	YB6	YB5	YB4	YB3	ZB3

RBIN2+ RBIN2-	ZB5	ZB4	DEB	RSV1	NA	ZB7	ZB6	ZB5	ZB4	DEB

RBIN3+ RBIN3-	XB1	XB0	NA	ZB1	ZB0	YB1	YB0	XB1	XB0	NA

DE: Display Enable

RSV1: Reserve (Fixed GND)

NA: Not Available

4-2. Back light driving

 CN 1, 2, 3 (Upside)

 CN 4, 5, 6 (Downside)

   The module-side connector ：BHSR　02VS　01　　　(JST)

   The user-side connector　　：SM02B　BHSS　1　TB　(JST)

Pin no.	symbol	I/O	Function
1	high	I	Power supply (High voltage side)
2	low	I	Power supply (Low voltage side)
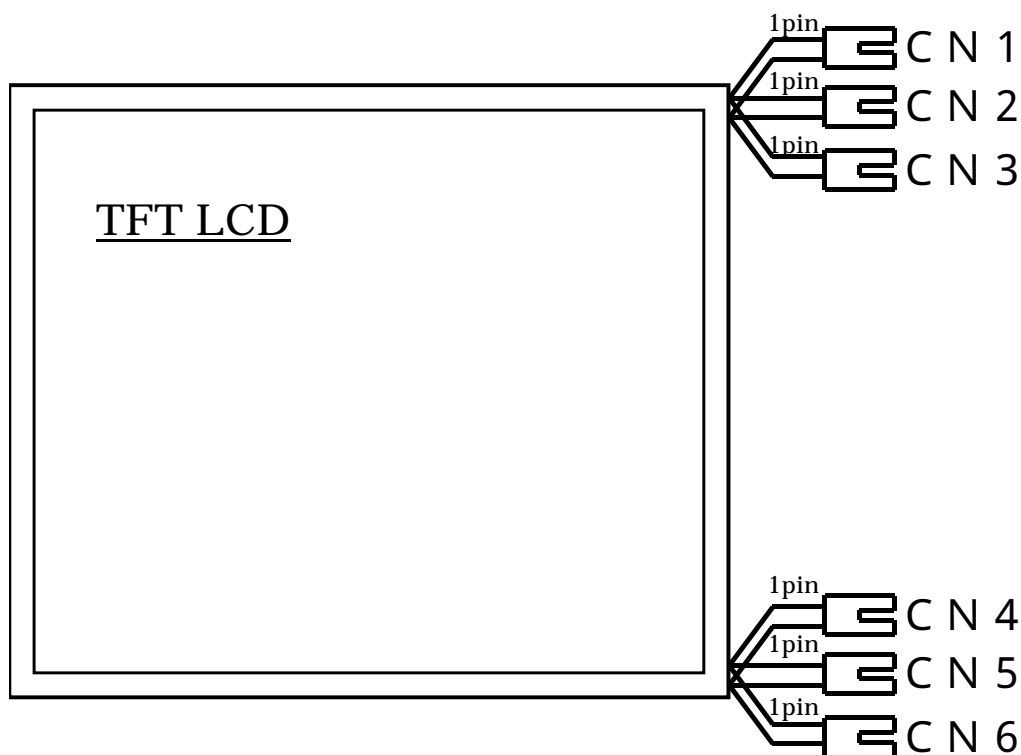
5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings		Unit	Remark
Input voltage	V_I	Ta=25	0.3	+3.6		SELLVDS
+12.0V supply voltage	Vcc	Ta=25	0	14.0		
Storage temperature	Tstg		25	60		Note1
Operating temperature (Ambient)	Topa		0	50		

 Note1　Humidity　95%RH Max.　(Ta　40　)

　　　　　　　Maximum wet-bulb temperature at 39　　or less.　(Ta>40　)

　　　　　　　No condensation.

6. Electrical Characteristics

6-1. TFT-LCD panel driving

Ta 25

	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Vcc	Supply voltage	Vcc	+11.4	+12.0	+12.6	V	Note1
	Current dissipation	Icc		390	600	mA	Note2
Permissive input ripple voltage		V_{RF}			100	mVp-p	
Input voltage (Low)		V_{IL}	0		+0.6	V	SELLVDS
Input voltage (High)		V_{IH}	+2.7		+3.3	V	SELLVDS
Input current (Low)		I_{IL}			500	μ A	V_I=GND
Input current (High)		I_{IH}			10	μ A	V_I=Vcc
Output voltage (Low)		V_{OL}			0.4	V	BLON:I_{OL}=-1mA
Output voltage (High)		V_{OH}	2.4			V	BLON:I_{OH}=1mA

Note1

1 On-off sequences of Vcc and data

    0   t1   60ms

    0   t2   10ms

    0   t3   1s

       t4   100ms
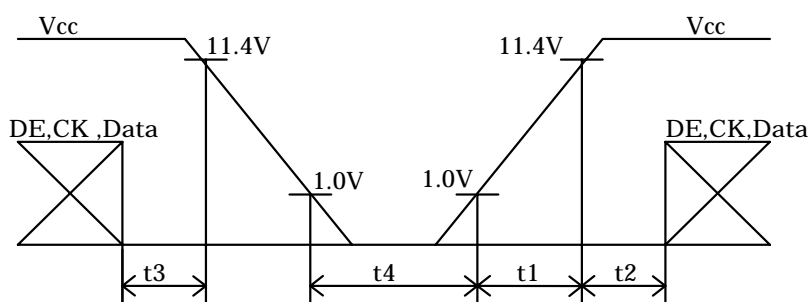
2 Dip conditions for supply voltage

Vmin = 11.4V, Vth= 9.6V

  1) Vth   Vcc   Vmin

     td   20ms

  2) Vcc   Vth
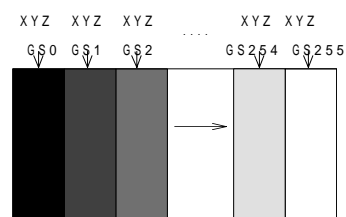
     The LCD module shuts down.
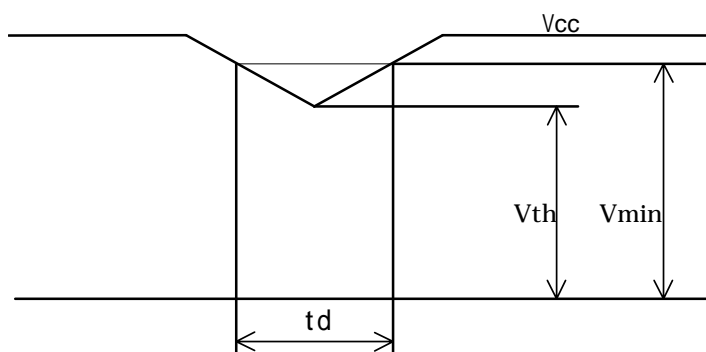
Note2   Typical current situation : 16-gray-bar pattern

        Vcc=+12.0V

     The explanation of each gray scale, GS ,

      is described   below section 8.

6-2. Back light driving

The back light system is an edge-lighting type with six CCFTs (Cold Cathode Fluorescent Tube).

The characteristics of the lamp are shown in the following table.

The value mentioned below is at the case of one CCFT.

CCFT Model Name   KTBE26MSTF-A424NE209-Z-3 (STANLEY.ELECTRIC.CO.,LTD)

| Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
Lamp current range	I_L	3.0	6.0	6.5	mArms	Note1	
Lamp voltage	V_L		790		Vrms	Ta=25	
Lamp power consumption	P_L		4.7		W	Note2	
Lamp frequency	F_L	30	60	70	KHz	Note3	
Kick-off voltage	Vs			1,500	Vrms	Ta=25	Note4
				2,000	Vrms	Ta=0	Note4
Lamp life time	T_L	50,000			hour	Note5	

Note1   A lamp can be light in the range of lamp current shown above.

Maximum rating for current is measured by high frequency current measurement equipment connected to V_{LOW} at circuit showed below.

(Note : To keep enough kick-off voltage and necessary steady voltage for CCFT.)

Lamp frequency : 30   70kHz

Ambient temperature : 0   50
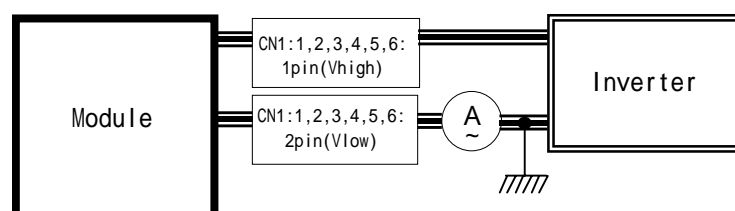
[Note2] Referential data per one CCFT by calculation. ($I_L \times V_L$)

The data don't include loss at inverter.   (IL=6.0mArms)

[Note3] Lamp frequency may produce interference with horizontal synchronous frequency, and this may cause beat on the display. Therefore lamp frequency shall be detached as much as possible from the horizontal synchronous frequency and from the harmonics of horizontal synchronous to avoid interference.

[Note4] The voltage above this value should be applied to the lamp for more than 1 second to start-up. Otherwise the lamp may not be turned on.

[Note5] Above value is applicable when lamp (the long side of LCD module) is placed horizontally. (Landscape position)

Lamp life time is defined that it applied either   or   under this condition

(Continuous turning on at Ta=25 °C, IL=6.0mArms)

Brightness becomes 50% of the original value under standard condition.

Kick-off voltage at Ta=-10 °C exceeds maximum value,1500Vrms.

(Lamp lifetime may vary if lamp is in portrait position due to the change of mercury density inside the lamp.)

In case of operating under lower temp environment, the lamp exhaustion is accelerated and the brightness becomes lower. (Continuous operating for around 1 month under lower temp condition may reduce the brightness to half of the original brightness.)

In case of such usage under lower temp environment, periodical lamp exchange is recommended.

[Note6] The performance of the backlight, for example life time or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the backlight and the inverter (miss-lighting, flicker, etc.) never occur. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

Be sure to use a back light power supply with the safety protection circuit such as the detection circuit for the excess voltage, excess current and or electric discharge waveform.

Be sure to use the detect circuit by which one side of the CCFT lamps can be controlled independently. Otherwise, when one side of the CCFT is open, the excess current may possibly be applied to the other side of the lamp.

[Note7] It is required to have the inverter designed so that to allow the impedance deviation of the

two CCFT　lamps and the capacity deviation of barast capacitor.

[Note8] Under the environment of 10lx or less, miss-lighting or lighting delay may occur.

7. Timing characteristics of input signals

　　7-1-1. Timing characteristics

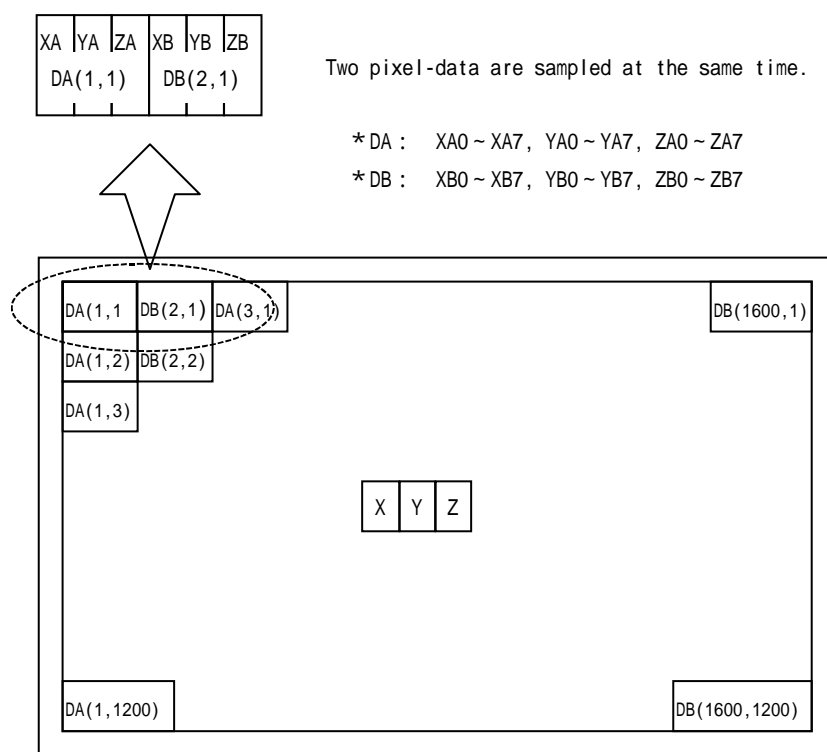| Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/Tc	60.0	81.0	85.0	MHz	
	Skew	Tcsq	–4	0	4	ns	Note1
Data enable signal	Horizontal period	TH	830	1080	1600	clock	
			10.0	13.3		μs	
	Horizontal period (High)	THd	800	800	800	clock	
	Vertical period	TV	1205	1250	2000	line	Note2
			12.1	16.7		ms	
	Vertical period (High)	TVd	1200	1200	1200	line	

Note1　Lvds (A port)– Lvds (B port) phase difference

Note2　In case of using the long vertical period, the deterioration of display quality, flicker etc. may occur.
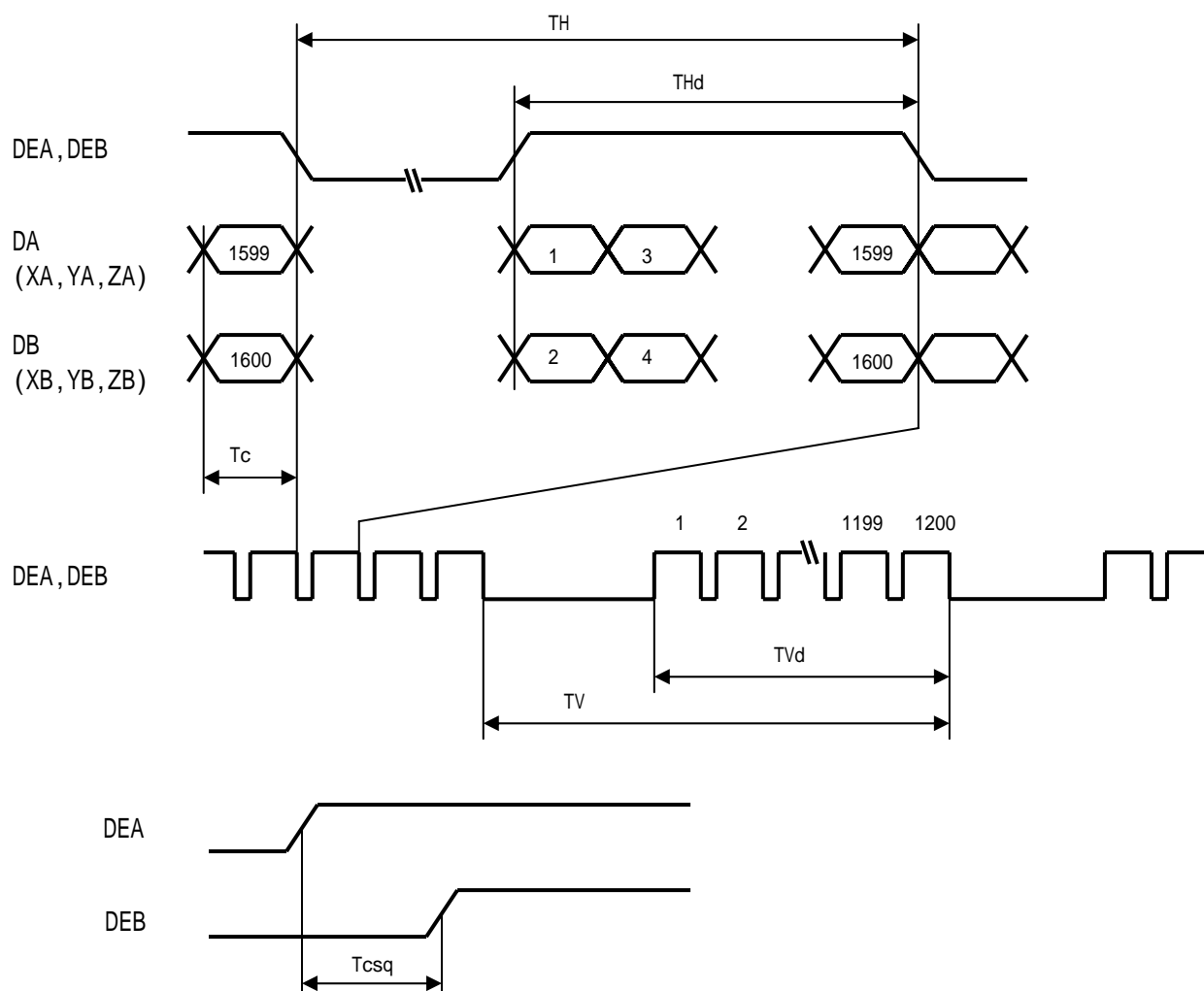
7-2 Input Data Signals and Display Position on the screen

Graphics and texts can be displayed on a 1600 × 3 × 1200 dots panel.

Two pixel-data are sampled at the same time.

DA   XA0 XA7, YA0 YA7, ZA0 ZA7
DB   XB0 XB7, YB0 YB7, ZB0 ZB7

| XA | YA | ZA | XB | YB | ZB |
| DA(1, 1) | | | DB(2, 1) | | |

DA(1, 1)	DB(2, 1)	DA(3, 1)		DB(1600, 1)
DA(1, 2)	DB(2, 2)			
DA(1, 3)				

| X | Y | Z |

| DA(1, 1200) | | | DB(1600, 1200) |

Display position of input data H,V

8. Input Signals, Basic Display Color and Gray Scale

	Color & Gray scale	Gray Scale	Data signal																								
			XA0	XA1	XA2	XA3	XA4	XA5	XA6	XA7	YA0	YA1	YA2	YA3	YA4	YA5	YA6	YA7	ZA0	ZA1	ZA2	ZA3	ZA4	ZA5	ZA6	ZA7
			XB0	XB1	XB2	XB3	XB4	XB5	XB6	XB7	YB0	YB1	YB2	YB3	YB4	YB5	YB6	YB7	ZB0	ZB1	ZB2	ZB3	ZB4	ZB5	ZB6	ZB7
Gray Scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	⇩				⇩								⇩								⇩				
	⇩	⇩				⇩								⇩								⇩				
	Brighter	253	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1
	⇩	254	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
	White	255	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

0 : Low level voltage,   1 : High level voltage.

Basic color can be displayed in 256 gray scales from 8 bit data signals.

9. Optical Characteristics

Ta=25　, Vcc =+12V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Vertical	11	(CR 10)	70	85		Deg.	Note1,4
		12		70	85		Deg	
	Horizontal	21, 22		70	85		Deg.	
Contrast ratio					1000			Note2,4
Response Time	Rise	d			5	25		Note3,4
	Decay	r			20	50		
Chromaticity of white	Wx		=0°	0.264	0.294	0.324		Note4
	Wy			0.279	0.309	0.339		
Luminance of white		YL		560	700		cd/m^2	IL=6.0mA rms FL=60kHz Note4
White Uniformity		w				1.25		Note5

The measurement shall be executed 30 minutes after lighting at rating.

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.2 below.
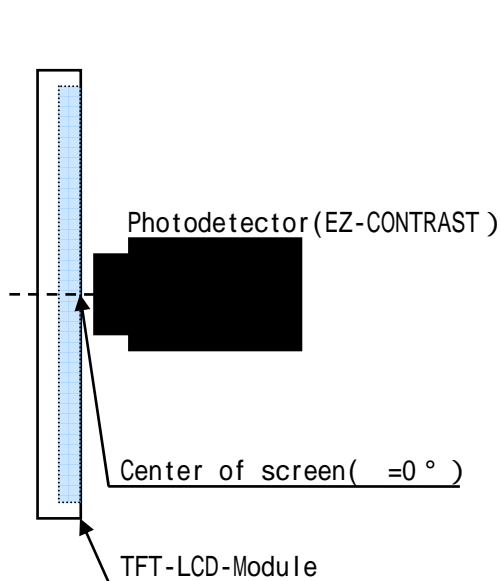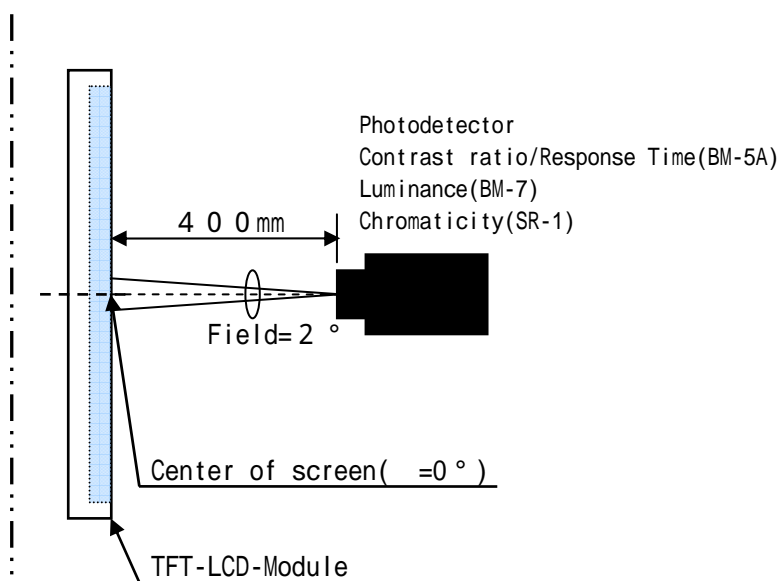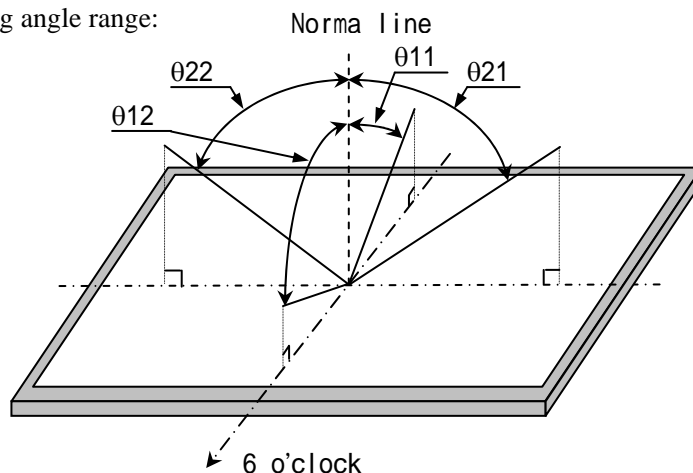
Fig.2-1 Viewing angle measurement method

Fig.2-2 Luminance/Contrast ratio/Response time/Chromaticity measurement method

Fig.2 Optical characteristics measurement method

Note1   Definitions of viewing angle range:

Normal line

θ22   θ11   θ21

θ12

6 o'clock

Note2   Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

Note3   Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

White   black   white

100%
90%

Photodetector Output
(Relative Value)

10%
0%

τr τd

time
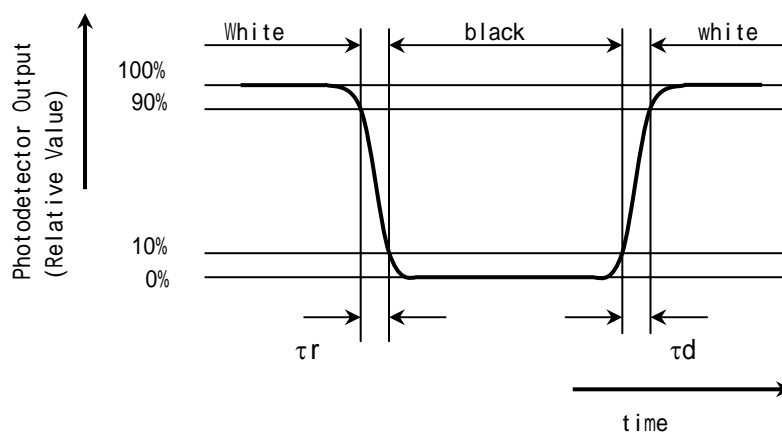
Note4   This shall be measured at center of the screen.

Note5   Definition of white uniformity:

White uniformity is defined as the following with five measurements (A～E).

400   800   1200   pixel

A   D   300

C   600

B   E   900

pixel

$$w = \frac{\text{Maximum Luminance of five points (brightness)}}{\text{Minimum Luminance of five points (brightness)}}$$
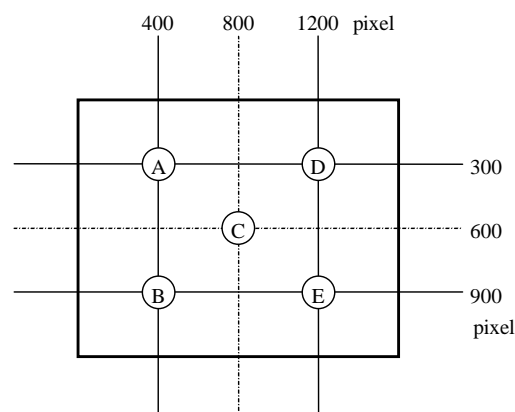
10. Display Quality

    The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standard.

11.Handling Precautions

    a) Be sure to turn off the power supply when inserting or disconnecting the cable.

    b) Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.

    c) Since the front polarizer is easily damaged, pay attention not to scratch it.

    d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

    e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

    f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.

    g) Since CMOS LSI is used in this module, take care of static electricity and injure the human earth when handling.Observe all other precautionary requirements in handling components.

    h) Since there is a circuit board in the module back, stress is not added at the time of a design assembly. Please make it like. If stress is added, there is a possibility that circuit parts may be damaged.

    i) Protection film is attached to the module surface to prevent it from being scratched . Peel the film off slowly , just before the use, with strict attention to electrostatic charges. Blow off 'dust' on the polarizer by using an ionized nitrogen.

    j) The polarizer surface on the panel is treated with Anti-Glare for low reflection. In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.

    k) Do not expose the LCD panel to direct sunlight. Lightproof shade etc. should be attached when LCD panel is used under such environment

    l) Connect GND to 4 place of mounting holes to stabilize against EMI and external noise.

    m) There are high voltage portions on the backlight and very dangerous. Careless touch may lead to electrical shock. When exchange lamps or service, turn off the power without tail.

    n) When handling LCD modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent,solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the LCD modules.

    o) Cold cathode fluorescent lamp in LCD panel contains a small amount of mercury, please follow local ordinances or regulations for disposal.

    p) Be careful of a back light lead not to pull by force at the time of the wiring to an inverter, or line processing.

    q) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if it gets inside your eye or mouth by mistake.

    r) Notice:Never dismantle the module , because it will cause failure. Please don't remove the fixed tape, insulateing tape etc that was pasted on the original module. (except for protection film of the panel and the crepe tape(yellow tape) of fixing lamp cable temporarily.)

    s) Be careful when using it for long time with fixed pattern display as it may cause afterimage.

    t) Adjusting volume have been set optimally before shipment, so do not change any adjusted value. If adjusted value is changed, the specification may not be satisfied.

    u) If a minute particle enters in the module and adheres to an optical material, it may cause display non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole if you intend to install a fan.

12. Packing form

    a) Piling number of cartons : maximum 8 cartons

    b) Packing quantity in one carton : 2 module

    c) Carton size : 592mm(W) $\times$ 486mm(H) $\times$ 215(D)

    d) Total mass of one carton filled with full modules : 10.5kg

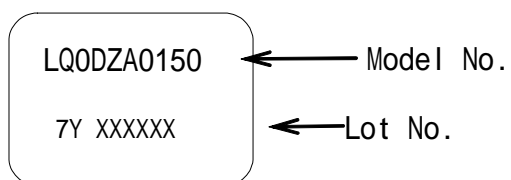   e) Packing form is shown in Fig.3

13　Reliability test items

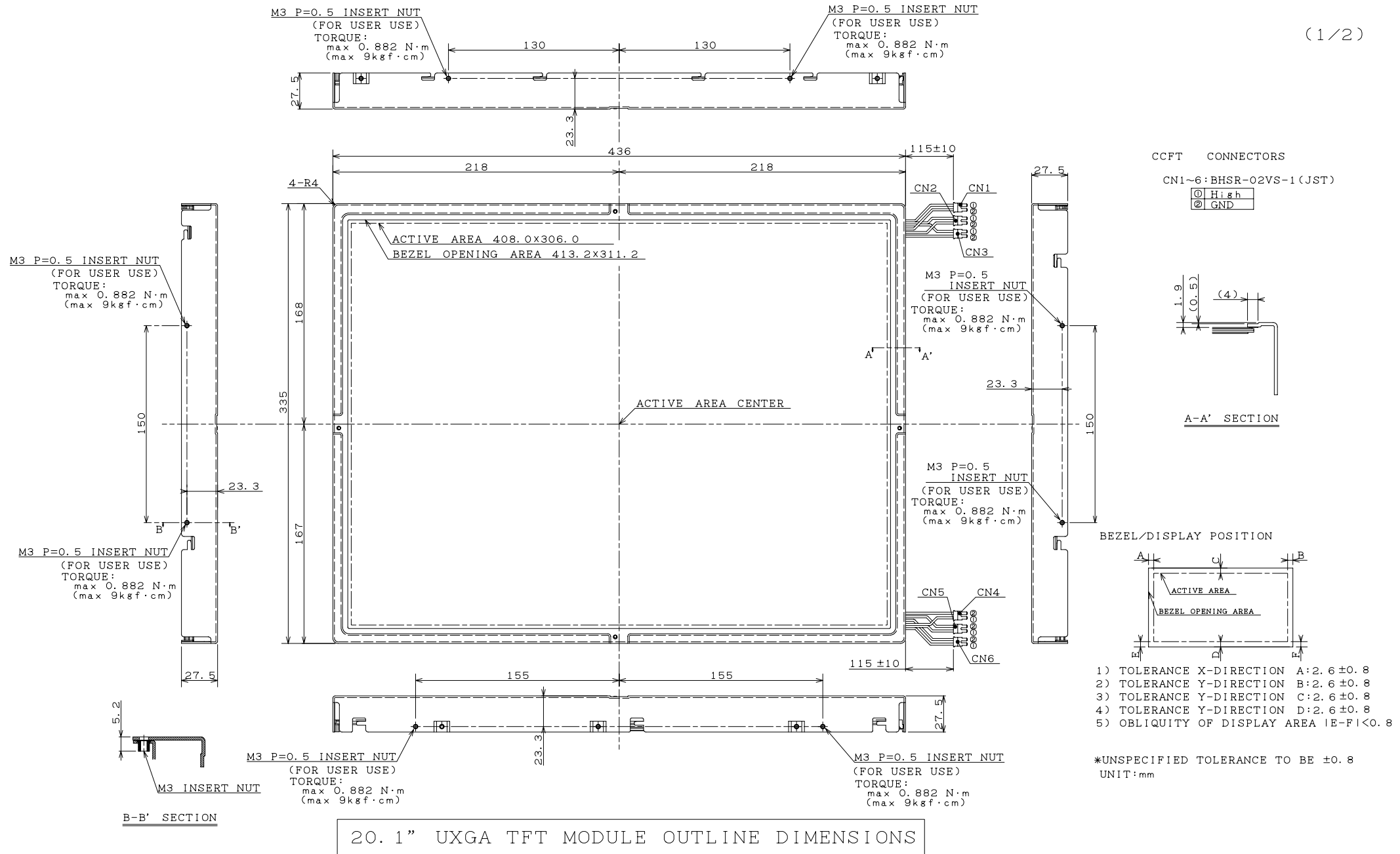| No.	Test item	Conditions
1	High temperature storage test	Ta = 60　　240h
2	Low temperature storage test	Ta = -25　　240h
3	High temperature & high humidity operation test	Ta= 40　; 95%RH　240h (No condensation)
4	High temperature operation test	Ta=50　　240h (The panel temp. must be less than 60　)
5	Low temperature operation test	Ta=0　　240H
6	Vibration test (non- operating)	Frequency : 10　57Hz/Vibration width (one side) : 0.075mm : 58　500Hz/Gravity : 9.8m/s^2 Sweep time : 11 minutes Test period : 3 hours (1 hour for each direction of X,Y,Z)
7	Shock test (non- operating)	Max. gravity : 490m/s^2 Pulse width : 11ms, sine wave Direction : ± X, ± Y, ± Z, once for each direction.

Result Evaluation Criteria

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.
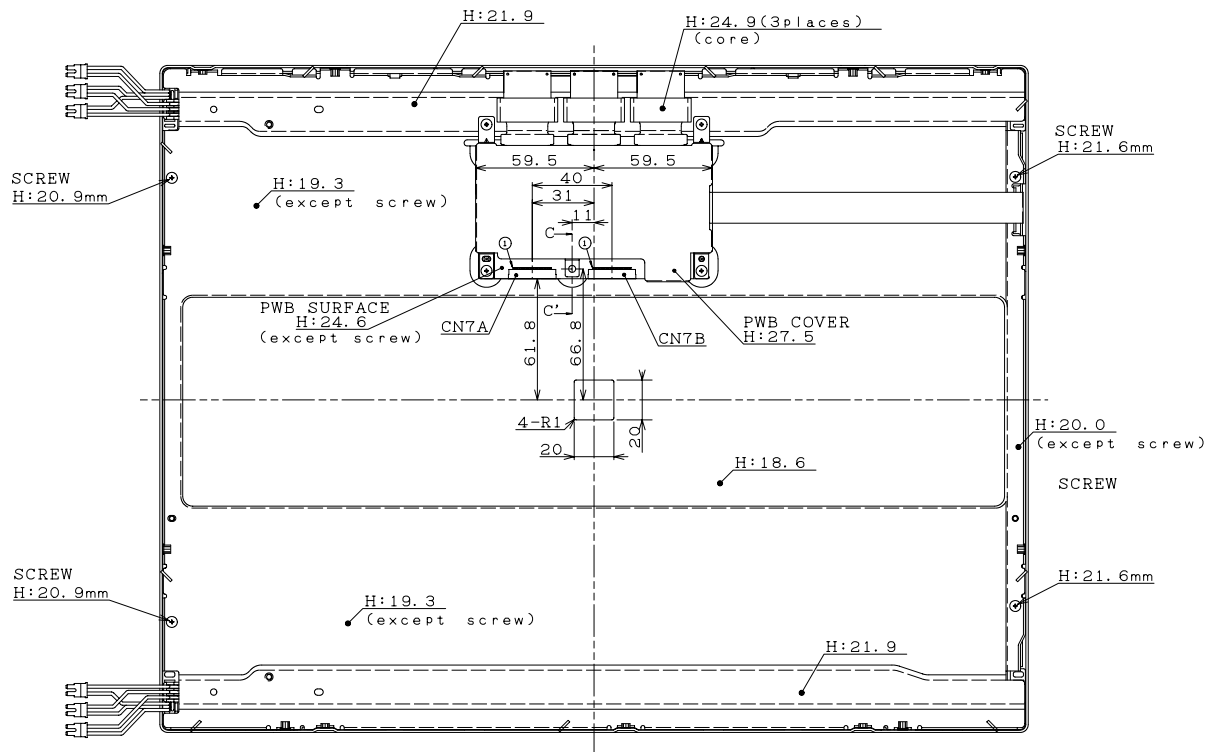
14　Others

14-1 Lot number Label:

LQ0DZA0150　←—— Model　No.

7Y XXXXX　←—Lot　No.

M3 P=0.5 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

M3 P=0.5 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

130 130

27.5

23.3

436
218 218
115±10
27.5

CCFT CONNECTORS

CN1~6:BHSR-02VS-1(JST)

| ① | High |
| ② | GND |

4-R4

CN2 CN1

CN3

ACTIVE AREA 408.0×306.0
BEZEL OPENING AREA 413.2×311.2

M3 P=0.5 INSERT NUT
(FOR USER USE)

M3 P=0.5
 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

168

A' A'

1.9
(0.5)
(4)

23.3

A-A' SECTION

150

335

ACTIVE AREA CENTER

150

23.3

167

M3 P=0.5
 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

B' B'

M3 P=0.5 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

BEZEL/DISPLAY POSITION

A B
C
ACTIVE AREA
BEZEL OPENING AREA

CN5 CN4

CN6

115 ±10

1) TOLERANCE X-DIRECTION A:2.6 ±0.8
2) TOLERANCE Y-DIRECTION B:2.6 ±0.8
3) TOLERANCE Y-DIRECTION C:2.6 ±0.8
4) TOLERANCE Y-DIRECTION D:2.6 ±0.8
5) OBLIQUITY OF DISPLAY AREA |E-F|<0.8

27.5

5.2

155 155

23.3

27.5

M3 INSERT NUT

M3 P=0.5 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

M3 P=0.5 INSERT NUT
(FOR USER USE)
TORQUE:
 max 0.882 N·m
 (max 9kgf·cm)

*UNSPECIFIED TOLERANCE TO BE ±0.8
 UNIT:mm

B-B' SECTION

20.1" UXGA TFT MODULE OUTLINE DIMENSIONS

H:21.9

H:24.9(3places)
(core)

SCREW
H:21.6mm

SCREW
H:20.9mm

H:19.3
(except screw)

59.5   59.5

40

31

11

C

I/F CONNECTOR

CN7A:DF19G-20P-1H(HIROSE)
CN7B:DF19G-20P-1H(HIROSE)

PWB SURFACE
H:24.6
(except screw)

CN7A

C'

61.8

66.8

CN7B

PWB COVER
H:27.5

(24.6)

5.3   0.5

PWB

PWB COVER

4-R1
(except screw)

20

20

20

H:18.6

H:20.0
(except screw)

SCREW

MODULE SARFACE

(5)

SCREW
H:20.9mm

H:19.3
(except screw)

H:21.6mm

FITTING SCREW:M3 P=0.5
TORQUE:0.176±0.02N·m
(1.8±0.2kgf·cm)

USER PWB or FPC

H:21.9

REAR ANGLE
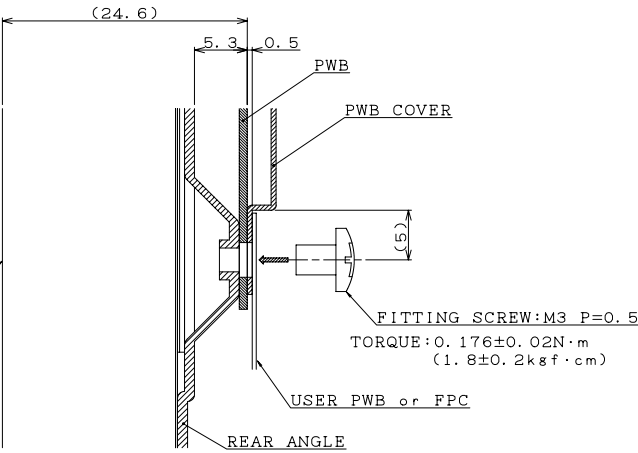
SECTION C-C'

20.1" UXGA TFT MODULE OUTLINE DIMENSIONS

TRAY

LCD MODULE

TRAY

PARTITION

LCD MODULE

TRAY

PP BAND   TAPE

BOTTOM PAD

SLEEVE

CARTON

TAPE

<Packing Form>