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	MOBILE LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION SPECIFICATION	APPLICABLE GROUP MOBILE LIQUID CRYSTAL DISPLAY GROUP

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ104V1DG33

These parts have corresponded with the RoHS directive.

☐ CUSTOMER'S APPROVAL

DATE ____________________

BY ____________________

PRESENTED
BY T. Naka

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SHARP CORPORATION

RECORDS OF REVISION

LQ104V1DG33

SPEC No.	DATE	REVISED No.	SUMMARY		NOTE
			PAGE		
LD-21403A	April.17.2009	-	-	-	1 st Issue

1. Application

This specification applies to color TFT-LCD module, LQ104V1DG33.

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The device listed in specification sheets was designed and manufactured for use in general electronic 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.

SHARP assumes no responsibility for any damage resulting from the use of the device which does not comply with the instructions and the precautions specified in these specification sheets.

Confirm "11. Handling Precautions "(page 14) item when you use the device.

Contact and consult with a SHARP sales representative for any questions about this device.

2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control circuit and power supply circuit and a backlight unit. Graphics and texts can be displayed on a 640×3×480 dots panel with 262,144 colors by supplying 18 bit data signal (6bit/color), four timing signals,+3.3V/ +5.0V DC supply voltage for TFT-LCD panel driving and supply voltage for backlight.
The TFT-LCD panel used for this module is a low-reflection and higher-color-saturation type.
Therefore, this module is also suitable for the multimedia use.
Optimum viewing direction is 6 o'clock.
Backlight-driving DC/AC inverter is not built in this module.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	26 (10.4") Diagonal	cm
Active area	211.2(H)×158.4(V)	mm
Pixel format	640(H)×480(V)	pixel
	(1 pixel＝R＋G＋B dots)	
Pixel pitch	0.330(H)×0.330(V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	243.0(W)×183.8(H)×11.0max(D)	mm
Mass	520(max)	g
Surface treatment	Anti-glare and hard-coating 3H	

*1.Note: excluding backlight cables and pet sheets.

Outline dimensions is shown in page 18.

4. Input Terminals

4-1. TFT-LCD panel driving

Using connector : DF9MA-31P-1V(32) (Hirose Electric Co., Ltd.)

Corresponding connector : DF9-31S-1V(32) (〃)

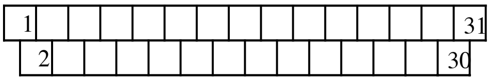
DF9A-31S-1V(22) (〃)

DF9B-31S-1V(32) (〃)

DF9M-31S-1V(32) (〃)

(※) Please do not use it besides corresponding conector.

CN1



CN1 pin arrangement from module surface (Transparent view)

Pin No.	Symbol	Function	Remark
1	GND		
2	CK	Clock signal for sampling each data signal	
3	Hsync	Horizontal synchronous signal	【Note1】
4	Vsync	Vertical synchronous signal	【Note1】
5	GND		
6	R0	RED data signal(LSB)	
7	R1	RED data signal	
8	R2	RED data signal	
9	R3	RED data signal	
10	R4	RED data signal	
11	R5	RED data signal(MSB)	
12	GND		
13	G0	GREEN data signal(LSB)	
14	G1	GREEN data signal	
15	G2	GREEN data signal	
16	G3	GREEN data signal	
17	G4	GREEN data signal	
18	G5	GREEN data signal(MSB)	
19	GND		
20	B0	BLUE data signal(LSB)	
21	B1	BLUE data signal	
22	B2	BLUE data signal	
23	B3	BLUE data signal	
24	B4	BLUE data signal	
25	B5	BLUE data signal(MSB)	
26	GND		
27	ENAB	Signal to settle the display position	【Note2】
28	Vcc	＋3.3/5.0V power supply	
29	Vcc	＋3.3/5.0V power supply	
30	DE_MODE	“H” Fixed mode , “L” DE mode	
31	HANTEN	Horizontal/Vartical display mode select signal	【Note3】

※The shielding case is connected with GND.

【Note1】 The polarity of both synchronous signals are negative

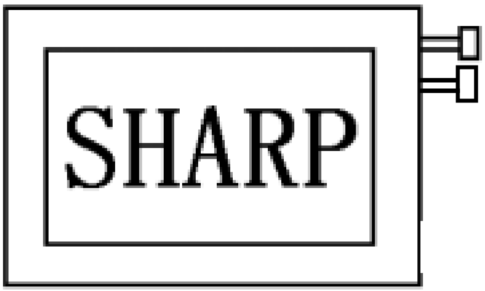
【Note2】 **Fixed mode**：

The horizontal display start timing is settled in accordance with a rising timing of ENAB signal. In case ENAB is fixed “Low”, the horizontal start timing is determined as described in 7-2. Do not keep ENAB “High” during operation.

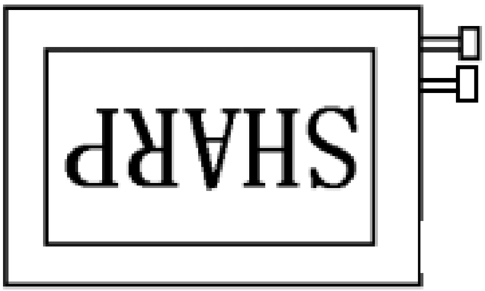
DE mode：

Display start timing is settled in accordance with a rising timing of ENAB signal as described in 7-3.

【Note3】



HANTEN = Low



HANTEN = High

4-2. Backlight driving

Using connector : BHR-05VS-1 (JST)

CN2 Corresponding connector :SM04(9-E2)B-BHS-1-TB (JST)

Pin no.	Symbol	Function	Cable color
1	V_{LOW}	Power supply for lamp1 (Low voltage side)	Gray
2	V_{LOW}	Power supply for lamp2 (Low voltage side)	White
3	NC	OPEN	－
4	V_{HIGH}	Power supply for lamp1 (High voltage side)	Pink
5	V_{HIGH}	Power supply for lamp2 (High voltage side)	Blue

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage	V_I	Ta=25℃	－0.3 ～ Vcc＋0.3	V	【Note1】
supply voltage	Vcc	Ta=25℃	0 ～ ＋ 6	V	
Storage temperature	Tstg	－	－30 ～ ＋70	℃	【Note2】
Operating temperature (PanelSurface)	Topa	－	－30 ～ ＋70	℃	【Note3】

【Note1】 CK, R0～R5, G0～G5, B0～B5, Hsync, Vsync, ENAB, DE_MODE, HANTEN

【Note2】 Humidity：95%RH Max. at Ta≦40℃.

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

No condensation.

【Note3】 There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness when preserving or using it from 60 to 70℃.

6. Electrical Characteristics

6-1.TFT-LCDpaneldriving

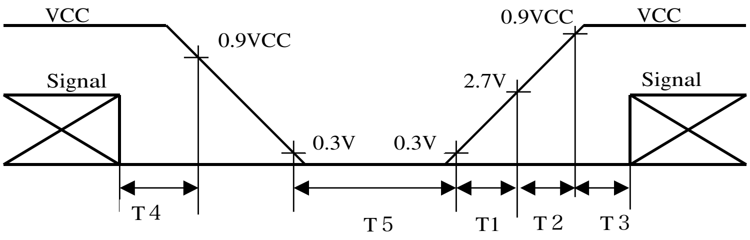
Ta＝25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply	Supply voltage	Vcc	+3.0	+3.3 +5.0	+5.5	V	【Note1】
	Current dissipation	Icc	－	200	300	mA	Vcc=3.3V【Note2】
		Icc	－	130	200	mA	Vcc=5.0V【Note2】
Permissive input ripple voltage		V_{RF}	－	－	100	mVp-p	
Input voltage (Low)		V_{IL}	－	－	0.8	V	【Note3】
Input voltage (High)		V_{IH}	2.1	－	－	V	
Input current (low)		I_{OL1}	-10	－	10	μA	V_I=0V 【Note4, Note6】
		I_{OL2}	-10	－	10	μA	V_I=0V 【Note5, Note6】
Input current (High)		I_{OH1}	－	－	10	μA	V_I=Vcc【Note4, Note6】
		I_{OH2}	－	－	800	μA	V_I=Vcc【Note5, Note6】

【Note1】

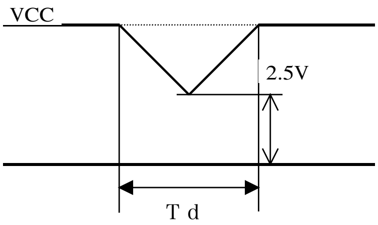
Vcc-turn-on conditions

０＜Ｔ１≦１５ｍｓ
０＜Ｔ２≦１０ｍｓ
０＜Ｔ３≦１００ｍｓ
０＜Ｔ４≦１ｓ
Ｔ５＞２００ｍｓ

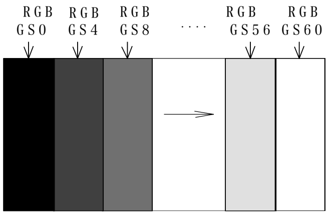

VCC
0.9VCC
Signal
0.3V
0.3V
0.9VCC
VCC
2.7V
Signal
T4
T5
T1
T2
T3

Vcc-dip conditions

１） ２．５Ｖ≦Ｖｃｃ
Ｔｄ≦１０ｍｓ
２） Ｖｃｃ＜２．５Ｖ
Vcc-dip condition should also follow
the Vcc-turn-on conditions.



【Note2】 Typical current situation : 16-gray-bar pattern.
Vcc=+3.3V/＋5.0V

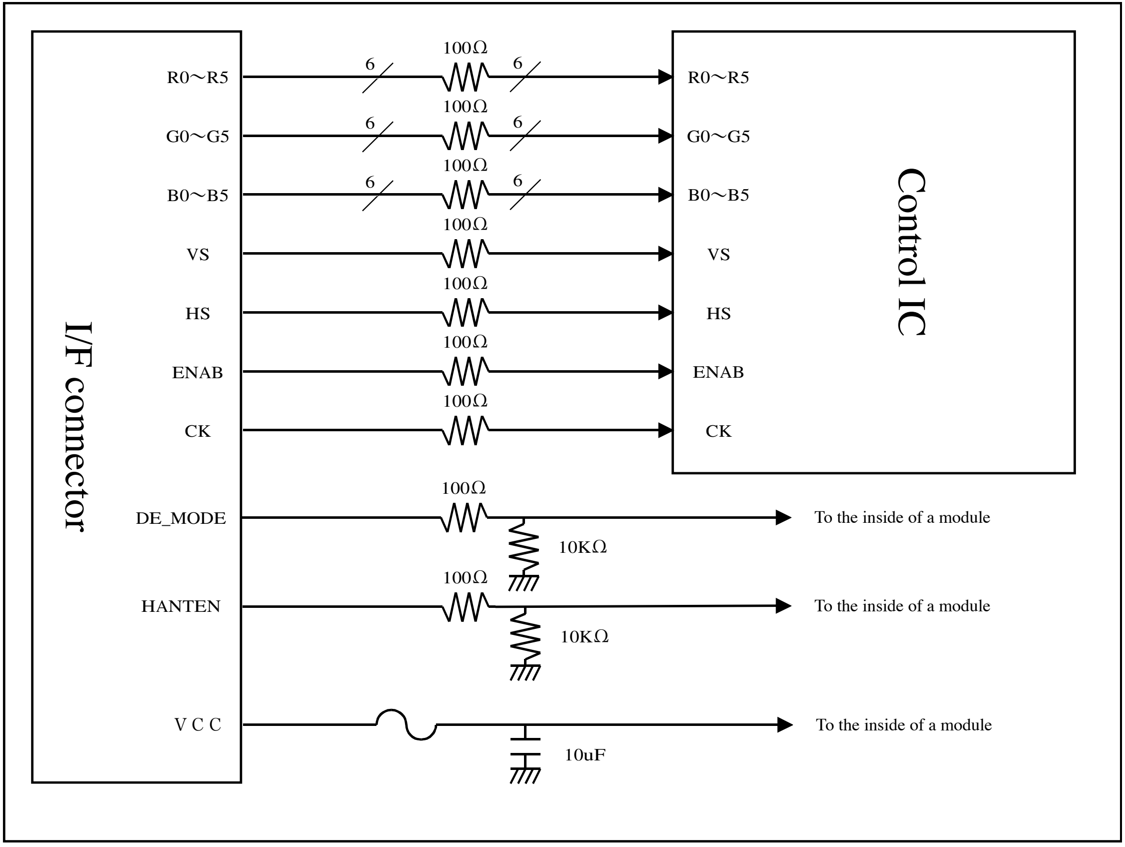

RGB GS0
RGB GS4
RGB GS8
····
RGB GS56
RGB GS60

【Note3】 CK, R0~R5, G0~G5, B0~B5, Hsync, Vsync, ENAB, DE_MODE, HANTEN

【Note4】 CK, R0~R5, G0~G5, B0~B5, Hsync, Vsync, ENAB

【Note5】 DE_MODE, HANTEN

【Note6】 See below block diagram of input interface

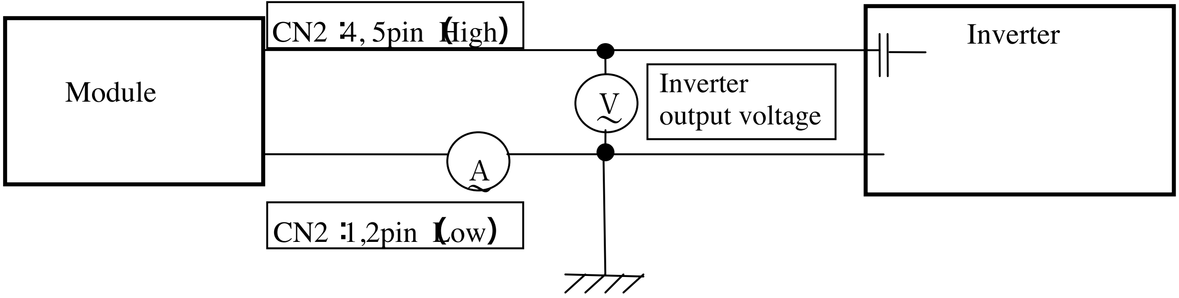

I/F connector
R0～R5
G0～G5
B0～B5
VS
HS
ENAB
CK
DE_MODE
HANTEN
V C C
6
100Ω
10KΩ
10uF
Control IC
To the inside of a module

6-2. Backlight driving

The backlight system is an edge-lighting type with double CCFT (Cold Cathode Fluorescent Tube).
The characteristics of single lamp are shown in the following table.
(It is usually required to measure under the following condition. I_L=6.0mA,Ta=25℃±2℃,F_L=60kHz.)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp current	I_L	3.0	6.0	6.5	mArms	【Note1】
Lamp power consumption	P_L	—	2.82	—	W	【Note2】
Lamp frequency	F_L	35	60	70	KHz	【Note3】
Kick-off voltage	Vs	—	—	1300	Vrms	Ta = -30℃ 【Note4】

[Note1] Lamp current is measured with current meter for high frequency as shown below.



[Note2] Referential data per one CCFT by calculation. (I_L × V_L)
The data do not include loss at inverter. (I_L=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 open output voltage of the inverter shall be maintained for more than 1s; otherwise the lamp may not be turned on.

[Note5] Lamp is consumables. In the following condition, the life time is 50,000 hour as the reference value and it is not guaranteed in this specification sheets by SHARP.
Above value is applicable when lamp is placed horizontally
lamp lifetime is defined that it applied either ① or ② under this condition.
(Continuous turning on at Ta=25 °C, I_L=6.0mA rms.)
① Brightness becomes 50% of the original value under standard condition.
② Kick-off voltage at Ta= -30 °C exceeds maximum value.
(Lamp lifetime may vary if lamp is in portrait position due to the change of mercury density inside the lamp.) .) Lamp life time shortens according to the state of mounting and use.
In case of operating under lower temp environment, the lamp exhaustion is accelerated and the brightness becomes lower.
(Continuous operating under lower temp condition for around 1 month 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] Please make it to the structure not touching directly insulating the high voltage part.
Please stop the circuit by the protection element such as fuses for generation of heat and the ignition prevention, and use a flame resisting and high material for the substrate and the resin material.

[Note9] Under the environment of 10lx or less, miss-lighting delay may occur.

7. Timing Characteristics of input signals

Timing diagrams of input signal are shown in Fig.2-1, Fig.2-2

7-1. Timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/Tc	-	25.18	28.33	MHz	-
	High time	Tch	5	-	-	ns	-
	Low time	Tcl	10	-	-	ns	-
	Duty ratio	Th/T	40	50	60	%	-
Data	Setup time	Tds	5	-	-	ns	-
	Hold time	Tdh	10	-	-	ns	-
Horizontal display period		THd	640	640	640	clock	-
Enable signal	Setup time	Tes	5	-	Tc-10	ns	-
	Pulse width	Tep	2	640	Th-10	clock	-
Vertical display period		TVd	480	480	480	line	-

[Note] In case of lower frequency, the deterioration of display quality, flicker etc.,may be occurred.

7-2. Horizontal display position (Fixed mode)

The horizontal display position is determined by ENAB signal and the input data corresponding to the rising edge of ENAB signal is displayed at the left end of the active area.

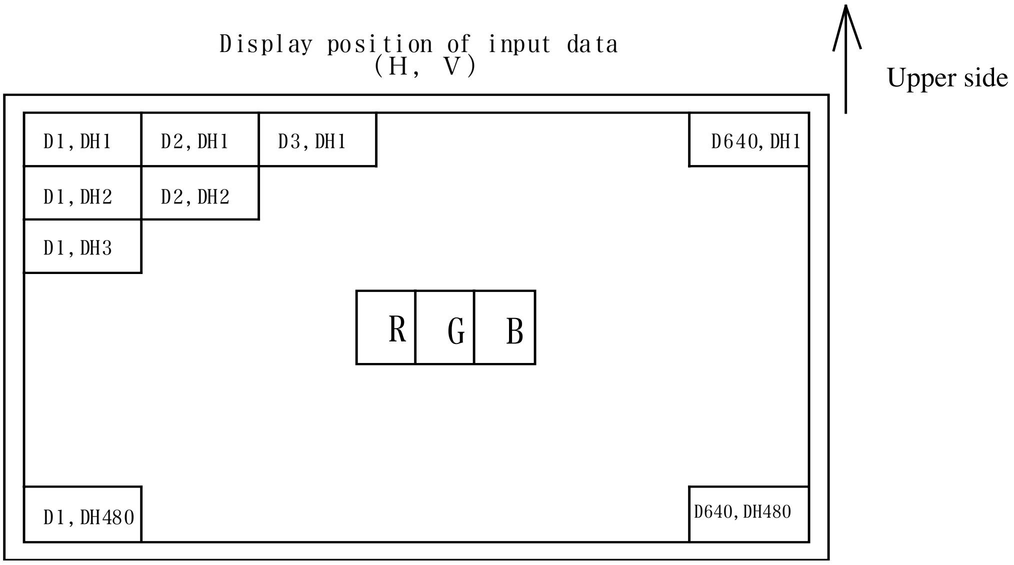
Parameter		symbol	Min.	Typ.	Max.	Unit	Remark
Horizontal sync. signal	Cycle	TH	30.0	31.78	-	μs	-
			750	800	900	clock	-
	Pulse width	THp	2	96	200	clock	-
Vertical sync. signal	Cycle	TV	515	525	560	line	-
	Pulse width	TVp	1	-	34	line	-
Hsync-Clock phase difference		THc	10	-	Tc-10	ns	
Hsync-Vsync phase difference		TVh	0	-	TH-THp	clock	
Hsync-Enable signal phase difference		THe	44	-	TH-664	clock	-

[Note] When ENAB is fixed "Low", the display starts from the data of C104(clock) as shown in Fig.2-1. The vertical display position, TVs is fixed “34” (line).

7-3. Horizontal /Vertical display position（DE mode）

Display start timing is settled in accordance with a rising timing of ENAB signal as shown in Fig.2-2.

7-4. Input Data Signals and Display Position on the screen



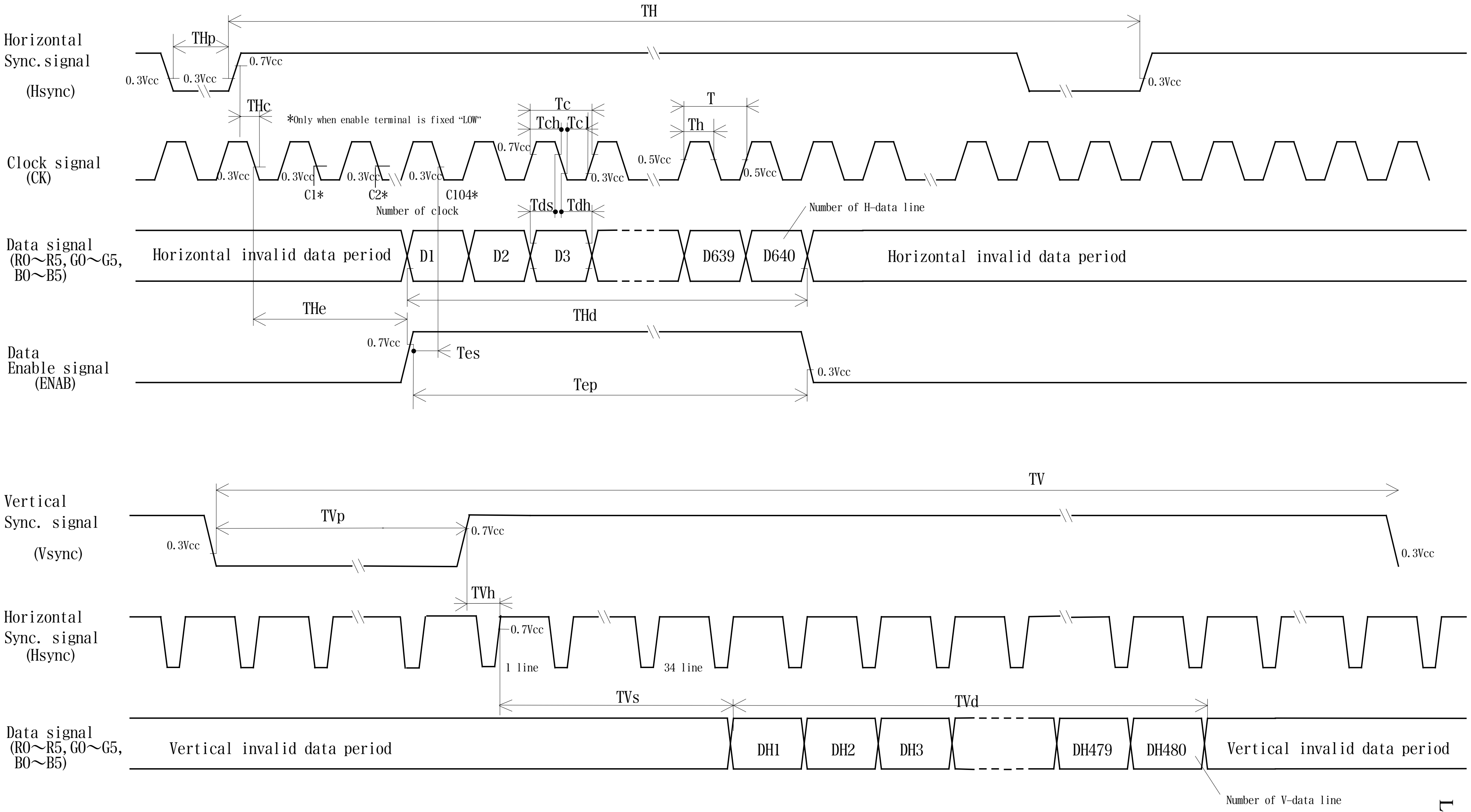
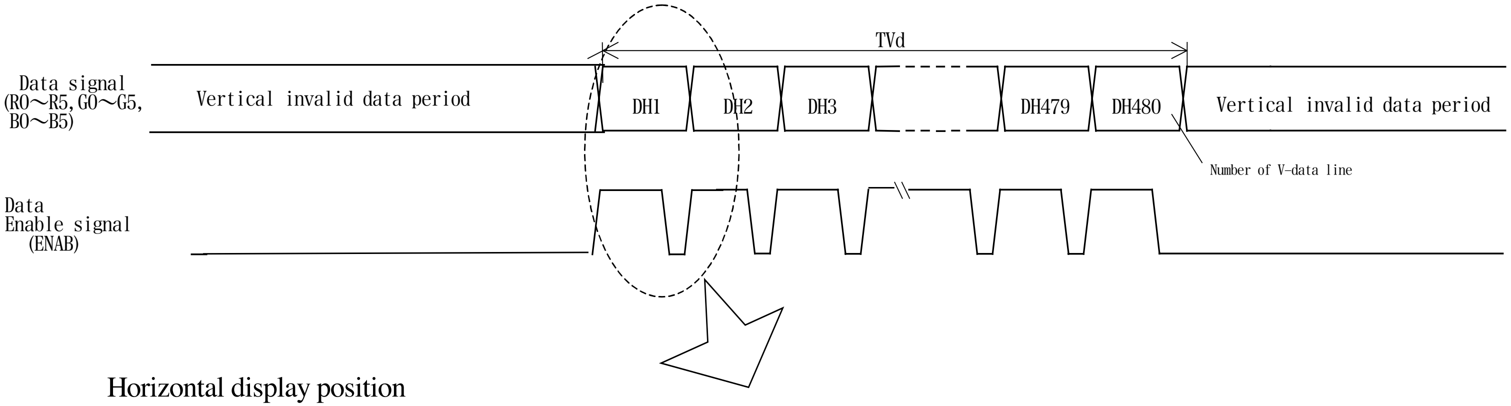

TH
Horizontal Sync.signal (Hsync)
THp
0.3Vcc
0.3Vcc
0.7Vcc
0.3Vcc
THc
*Only when enable terminal is fixed "LOW"
Tc
Tch
Tcl
T
Th
Clock signal (CK)
0.3Vcc
0.3Vcc
0.3Vcc
0.3Vcc
0.7Vcc
0.3Vcc
0.5Vcc
0.5Vcc
C1*
C2*
C104*
Number of clock
Tds
Tdh
Number of H-data line
Data signal (R0~R5,G0~G5, B0~B5)
Horizontal invalid data period
D1
D2
D3
D639
D640
Horizontal invalid data period
THe
THd
Data Enable signal (ENAB)
0.7Vcc
Tes
0.3Vcc
Tep
TV
Vertical Sync. signal (Vsync)
TVp
0.3Vcc
0.7Vcc
0.3Vcc
TVh
Horizontal Sync. signal (Hsync)
0.7Vcc
1 line
34 line
TVs
TVd
Data signal (R0~R5,G0~G5, B0~B5)
Vertical invalid data period
DH1
DH2
DH3
DH479
DH480
Vertical invalid data period
Number of V-data line

Fig. 2-1 Input signal waveforms (Fixed mode)

vertical display position


TVd
Data signal
(R0～R5,G0～G5,
B0～B5)
Vertical invalid data period
DH1
DH2
DH3
DH479
DH480
Vertical invalid data period
Number of V-data line
Data
Enable signal
(ENAB)

Horizontal display position

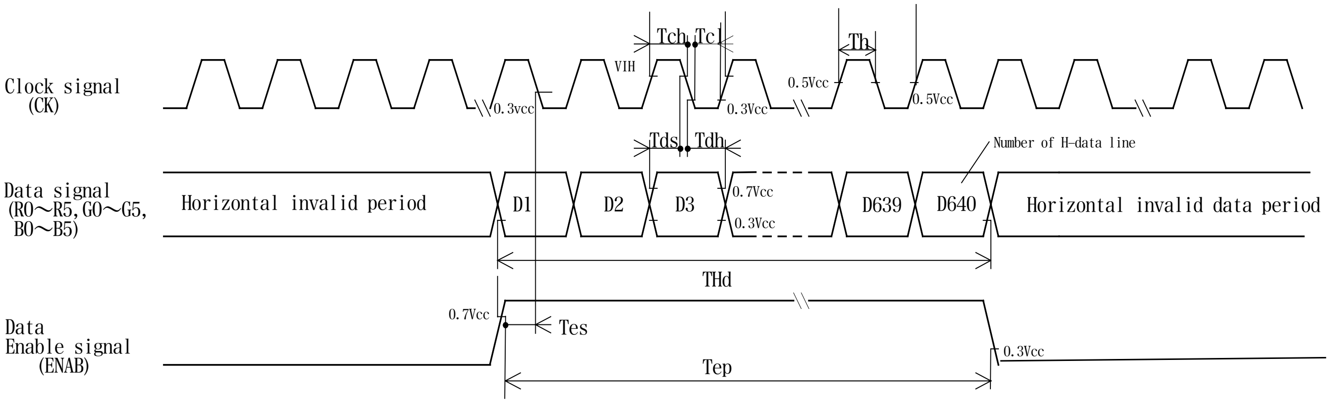

Tch
Tcl
Th
VIH
Clock signal
(CK)
0.3Vcc
0.3Vcc
0.5Vcc
0.5Vcc
Tds
Tdh
Number of H-data line
Data signal
(R0～R5,G0～G5,
B0～B5)
Horizontal invalid period
D1
D2
D3
0.7Vcc
0.3Vcc
D639
D640
Horizontal invalid data period
THd
0.7Vcc
Tes
Data
Enable signal
(ENAB)
Tep
0.3Vcc

Fig. 2-2 Input signal waveforms (DE mode)

8. Input Signals, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray scale	Data signal																		
		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic Color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	–	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓						↓						↓					
	⇩	↓	↓						↓						↓					
	Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓						↓						↓					
	⇩	↓	↓						↓						↓					
	Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	⇩	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	⇧	↓	↓						↓						↓					
	⇩	↓	↓						↓						↓					
	Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	⇩	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 :Low level voltage, 1 : High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. According to the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

9. Optical Characteristics

Ta=25℃, Vcc=+3.3V/+5V

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle Range	Horizontal	θ21, θ22	CR＞10	50	60	－	Deg.	【Note1,4】
	Vertical	θ11		35	45	－	Deg.	
		θ12		45	55	－	Deg.	
Contrast ratio		CR	Optimum Viewing Angle	600	800	－	－	【Note2】
Response Time	Rise	τr	θ=0°	－	5	－	ms	【Note3,4】
	Decay	τd		－	20	－	ms	
Chromaticity of White		x		0.263	0.313	0.363		【Note4】
		y		0.279	0.329	0.379		I_L=6.0mArms
Chromaticity of Red		x		0.546	0.596	0.646		F_L=60kHz
		y		0.279	0.329	0.379		
Chromaticity of Green		x		0.260	0.310	0.360		
		y		0.502	0.551	0.602		
Chromaticity of Blue		x		0.117	0.167	0.217		
		y		0.132	0.182	0.232		
Luminance of white		Y_L		350	450	－	cd/m²	
White Unifomity		δ_W		－	－	1.33	－	【Note5】

[Note] The measurement shall be executed 30 minutes after lighting at rating. (condition:IL=6.0mA rms)
The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.3 below.

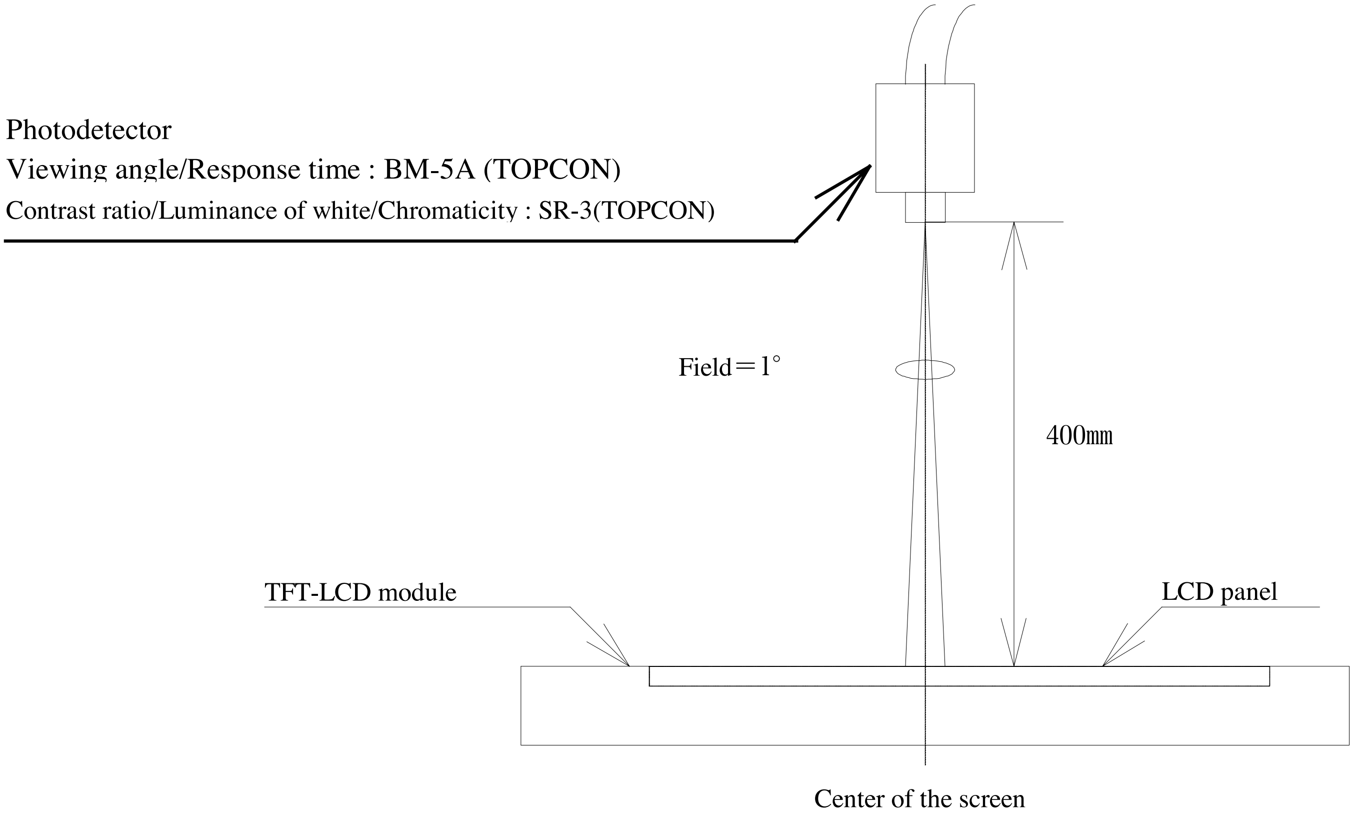
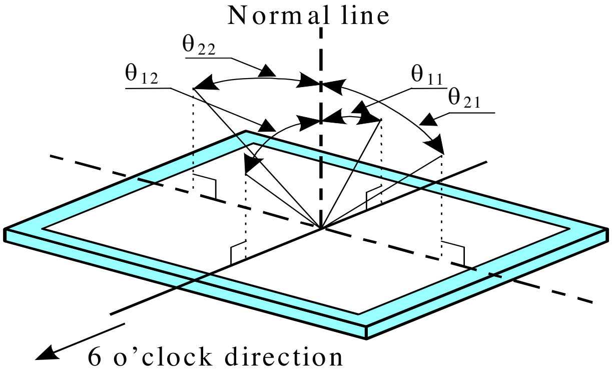

Photodetector
Viewing angle/Response time : BM-5A (TOPCON)
Contrast ratio/Luminance of white/Chromaticity : SR-3(TOPCON)
Field＝1°
400㎜
TFT-LCD module
LCD panel
Center of the screen

Fig.3 Optical characteristics measurement method

【Note1】 Definitions of viewing angle range:


Normal line
θ_{22}
θ_{12}
θ_{11}
θ_{21}
6 o'clock direction

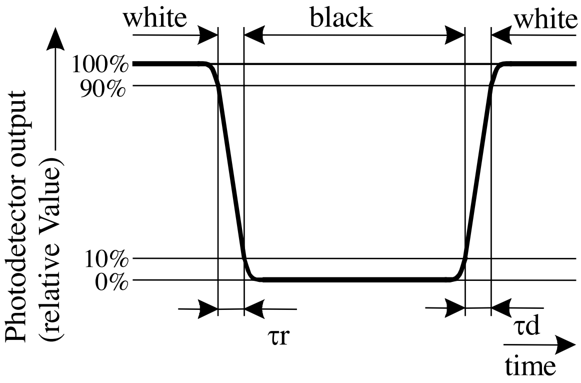
【Note2】 Definition of contrast ratio:

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:

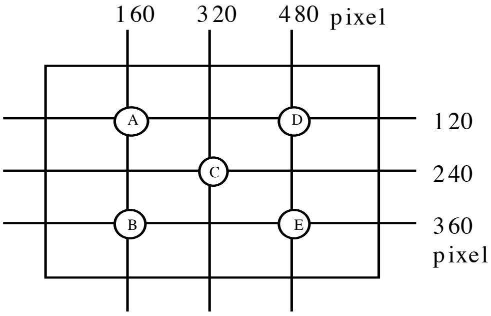
The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white" .


white
black
white
100%
90%
10%
0%
Photodetector output
(relative Value)
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).


160
320
480
pixel
120
240
360
pixel
A
B
C
D
E

$$\delta_W = \frac{\text{Maximum Luminance of five points (brightness)}}{\text{Minimum Luminance of five points (brightness)}}$$

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.
Blow away dust on the polarizer with antistatic N_2 blow. It is undesirable to wipe off because a polarizer is sensitive. It is recommended to peel off softly using the adhesive tape when soil or finger oil is stuck to the polarizer. When unavoidable, wipe off carefully with a cloth for wiping lenses.

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 fail.

n) When handling LCD modules and assembling them into cabinets, please avoid 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) When install LCD modules in the cabinet, please tighten with “torque=0.294±0.02N・m(3.0±0.2kgf・cm)”.
Be sure to confirm it in the same condition as it is installed in your instrument.

r) 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.

s) 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.)

t) Be careful when using it for long time with fixed pattern display as it may cause afterimage.
(Please use a screen saver etc., in order to avoid an afterimage.)

u) 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.

v) 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.

w) The lamp used for this product is very sensitive to the temperature.
Luminance decreases rapidly when it is used for a long time or repeatedly under the environment of the low temperature or the module is being cooled. Please avoid the continuous or repeating use of it under such an environment. It may decrease up to 50% of the initial luminance in about one month under the low temperature environment. Please consult our company when it is used under the environment like the above mentioned.

12.Packing form

Product countries / Areas	JAPAN, CHINA
Piling number of cartons	6 (MAX)
Packing quantity in one carton	20pcs
Carton size [mm]	486(W) × 403(D) × 322(H)
Total mass of one carton filled with full modules	13kg (MAX)
Packing form is shown	Page 19

13. Reliability test items

No.	Test item	Conditions	Remark
1	High temperature storage test	Ta=70℃ 240h	Panel surface
2	Low temperature storage test	Ta= -30℃ 240h	
3	High temperature & high humidity operation test	Ta=40℃ ; 95%RH 240h (No condensation)	
4	High temperature operation test	Ta=70℃ 240h	Panel surface
5	Low temperature operation test	Ta= -30℃ 240h	
6	Vibration test (non- operating)	Frequency: 10～57Hz/Vibration width (one side):0.153mm : 57～500Hz/Gravity:19.6m/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, half sine wave Direction : ±X,±Y,±Z once for each direction.	
8	ESD test	Contact discharge (150pF 330Ω) non-operating = ±10kV, operating = ±8kV Atmospheric discharge (150pF 330Ω) non-operating = ±20kV, operating = ±15kV	
9	EMI	Measurement in 10m site Display position on the screen = “H”(full-screen) GND to 4 place = un-connect, Vcc / Vsignal = typ.	VCCI (Class B)

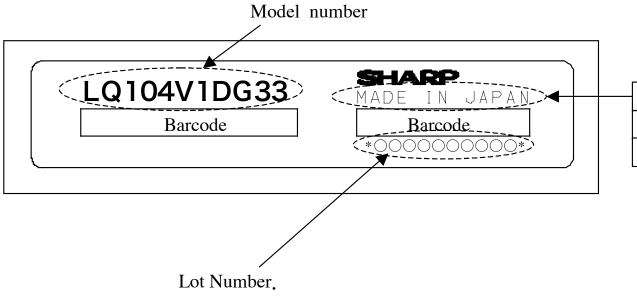
[Result Evaluation Criteria]

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function. (normal operation state：Temperature:15～35℃, Humidity:45～75%, Atmospheric pressure:86～106kpa)

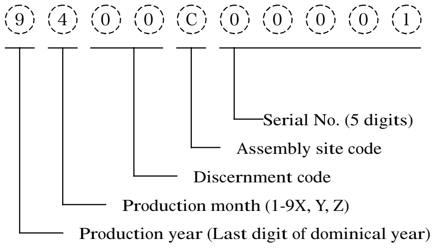
14.Others

14-1. Label

Lot No. Label:

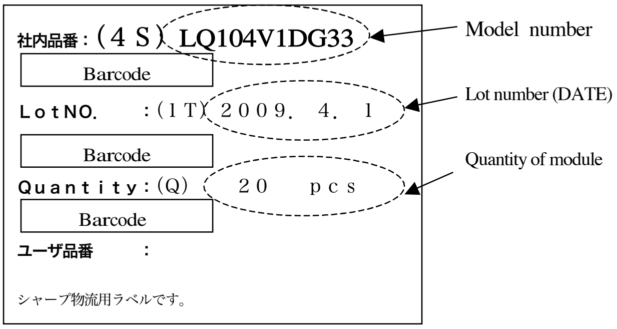

Model number
LQ104V1DG33
SHARP
MADE IN JAPAN
Barcode
Barcode
OOOOOOOOOO
Lot Number.

Product countries / Areas	
Japan	MADE IN JAPAN
China	MADE IN CHINA


9 4 0 0 C 0 0 0 0 1
Serial No. (5 digits)
Assembly site code
Discernment code
Production month (1-9X, Y, Z)
Production year (Last digit of dominical year)

Packing box Label:

Quantity of module : Japan or China


社内品番：（4 S）LQ104V1DG33
Barcode
LotNO. ：(1T) 2009. 4. 1
Barcode
Quantity：(Q) 20 pcs
Barcode
ユーザ品番 ：
シャープ物流用ラベルです。
Model number
Lot number (DATE)
Quantity of module

The figure right below is written to the packing box of the settlement for the RoHS restriction.
R.C.（RoHS Compliance） means it suits the RoHS directive.
This LCD module is compliant with RoHS Directive.

Internal Use Only
R. C.

14-2. If any problem occurs in relation to the description of this specification, it shall be resolved through discussion with spirit of cooperation.

15. Storage conditions

<Environmental condition range of storage temperature and humidity>

Temperature	0 to 40 degrees Celsius
Relative humidity	95% and below

【Note】 Please refer below as a mean value of the environmental conditions.

Summer time	temperature	20 to 35 degrees Celsius
	humidity	85% and below
Winter time	temperature	5 to 15 degrees Celsius
	humidity	85% and below

Please maintain within 240 hours of accumulated length of storage time, with conditions of 40 degrees Celsius and room humidity of 95%.

Direct sun light

Please keep the product in a dark room or cover the product to protect from direct sun light.

Atmospheric condition

Please refrain from keeping the product with possible corrosive gas or volatile flux.

Prevention of dew

* Please store the product carton either on a wooden pallet or a stand / rack to prevent dew. Do not place directly on the floor. In addition, to obtain moderate ventilation in between the pallet's Top and bottom surfaces, pile the cartons up in a single direction and in order.

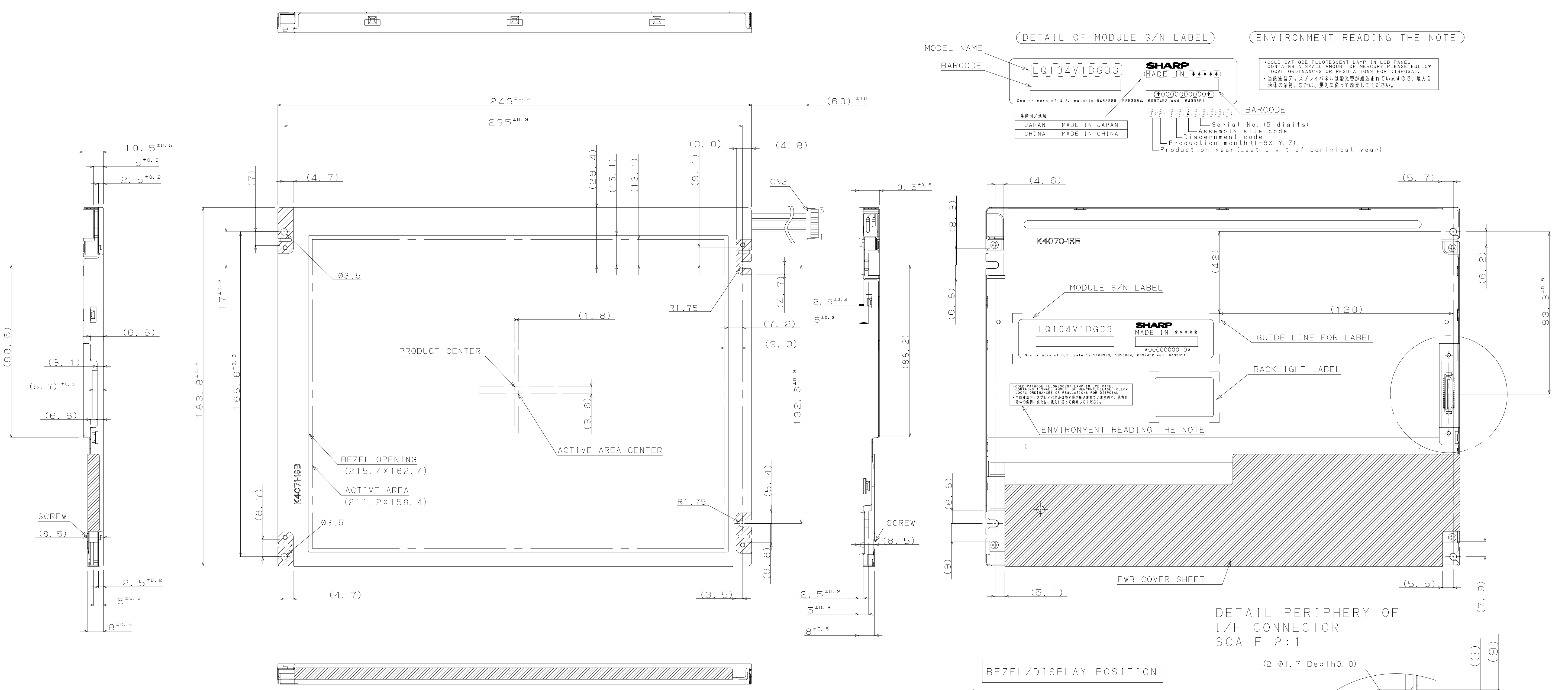
* Please place the product cartons away from the storage wall.

* Please maintain the storage area with an appropriate ventilation. It is recommendable to furnish the storage area with equipments such as ventilation systems.

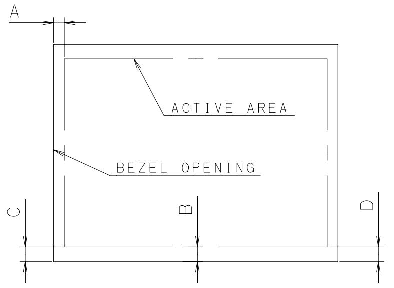
* Please maintain the ambient temperature within the range of natural environmental fluctuation.

Storage period

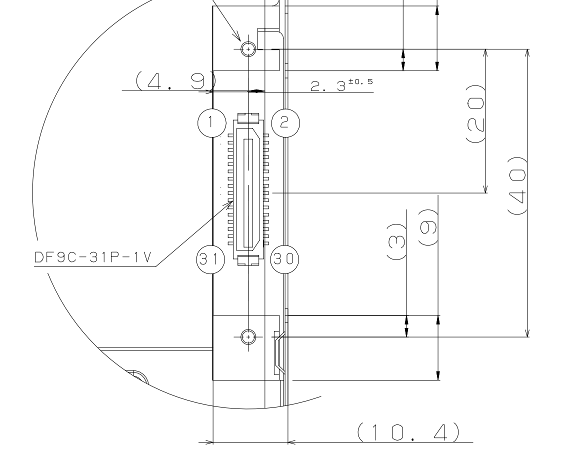
Within above mentioned conditions, maximum storage period should be one year.


DETAIL OF MODULE S/N LABEL
MODEL NAME
BARCODE
LQ104V1DG33
SHARP
MADE IN *****
0000000000
One or more of U.S. patents 5489999, 5953084, 6097452 and 6433851
BARCODE
生産国/地域
JAPAN | MADE IN JAPAN
CHINA | MADE IN CHINA
6 9 0 0 4 0 0 0 0 1
Serial No. (5 digits)
Assembly site code
Discernment code
Production month (1-9X, Y, Z)
Production year (Last digit of dominical year)
ENVIRONMENT READING THE NOTE
•COLD CATHODE FLUORESCENT LAMP IN LCD PANEL CONTAINS A SMALL AMOUNT OF MERCURY, PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR DISPOSAL.
•当該液晶ディスプレイパネルは蛍光管が組込まれていますので、地方自治体の条例、または、規則に従って廃棄してください。
243±0.5
235±0.3
(60)±10
(3.0)
(4.8)
CN2
(4.7)
(7)
(29.4)
(15.1)
(13.1)
(9.1)
10.5±0.5
5±0.3
2.5±0.2
Ø3.5
R1.75
(4.7)
(7.2)
(9.3)
(1.8)
PRODUCT CENTER
(3.6)
ACTIVE AREA CENTER
17±0.3
183.8±0.5
166.6±0.3
132.6±0.3
(88.6)
(88.2)
(6.6)
(3.1)
(5.7)±0.5
(6.6)
BEZEL OPENING (215.4x162.4)
ACTIVE AREA (211.2x158.4)
K4071-1SB
(8.7)
Ø3.5
R1.75
(5.4)
(9.8)
SCREW
(8.5)
(4.7)
(3.5)
2.5±0.2
5±0.3
8±0.5
(4.6)
(5.7)
(8.3)
(6.8)
(6.6)
(9)
K4070-1SB
(42)
(6.2)
83.3±0.5
(120)
MODULE S/N LABEL
GUIDE LINE FOR LABEL
BACKLIGHT LABEL
ENVIRONMENT READING THE NOTE
PWB COVER SHEET
(5.1)
(5.5)
(7.9)
DETAIL PERIPHERY OF I/F CONNECTOR SCALE 2:1

BEZEL/DISPLAY POSITION


A
ACTIVE AREA
BEZEL OPENING
C
B
D

1) TOLERANCE X DIRECTION A: 2.1±0.8
2) TOLERANCE Y DIRECTION B: 2.0±0.8
3) OBLIQUITY OF DISPLAY AREA |C-D|<0.8


(2-Ø1.7 Depth3.0)
(3)
(9)
(4.9)
2.3±0.5
(20)
(40)
①
②
DF9C-31P-1V
(31)
(30)
(3)
(9)
(10.4)

CN1: DF9MA-31P-1V (HIROSE Electric)

pin	1	2	3	4	5	6	7	8	9	10
	GND	CK	Hsync	Vsync	GND	R0	R1	R2	R3	R4
11	12	13	14	15	16	17	18	19	20	21
R5	GND	G0	G1	G2	G3	G4	G5	GND	B0	B1
22	23	24	25	26	27	28	29	30	31	
B2	B3	B4	B5	GND	ENAB	Vcc	Vcc	DE_Mode	HANTEN	

CN2:
BHR-05VS-1 (JST)

1	GND
2	GND
3	NC
4	High
5	High

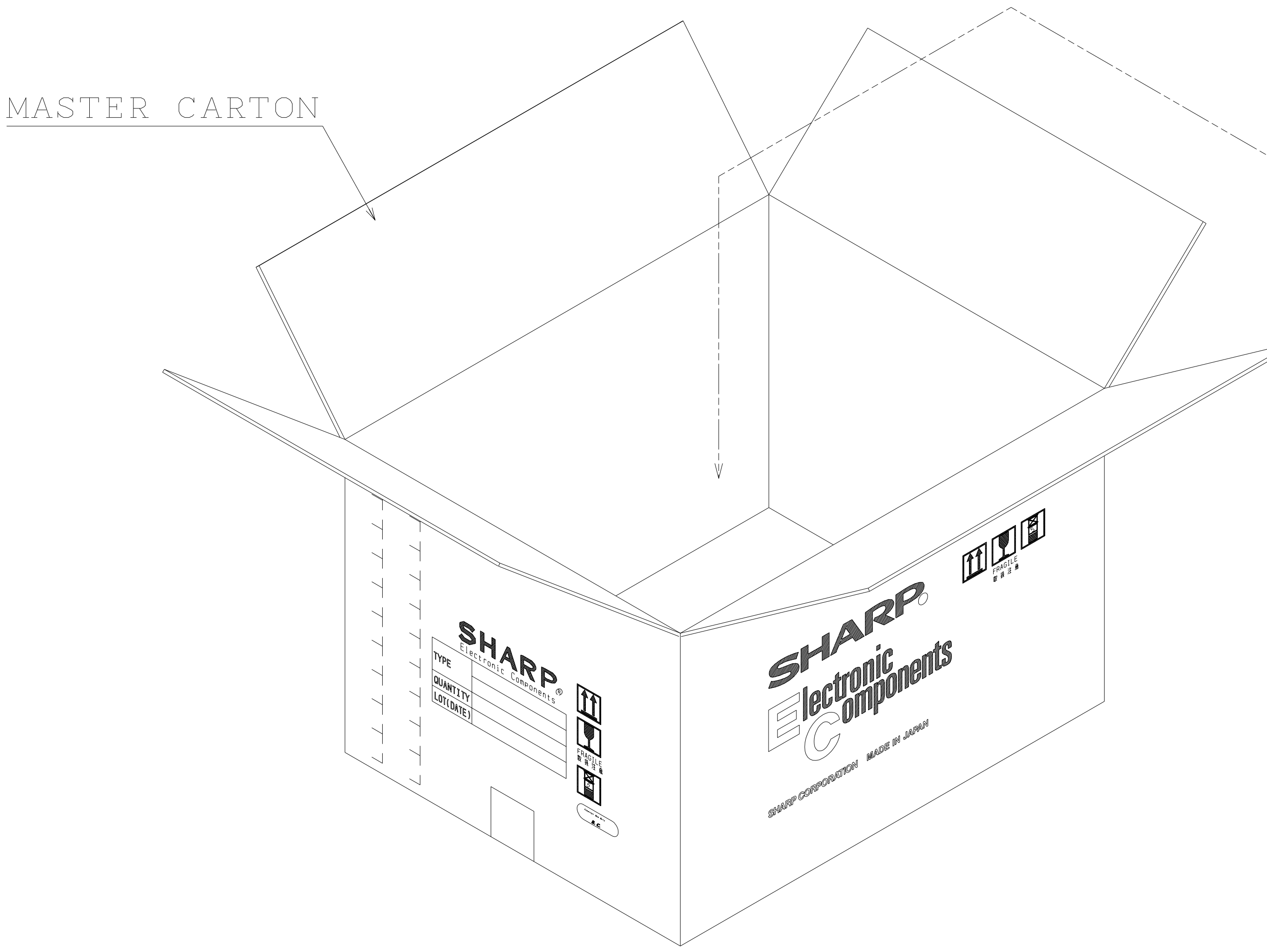
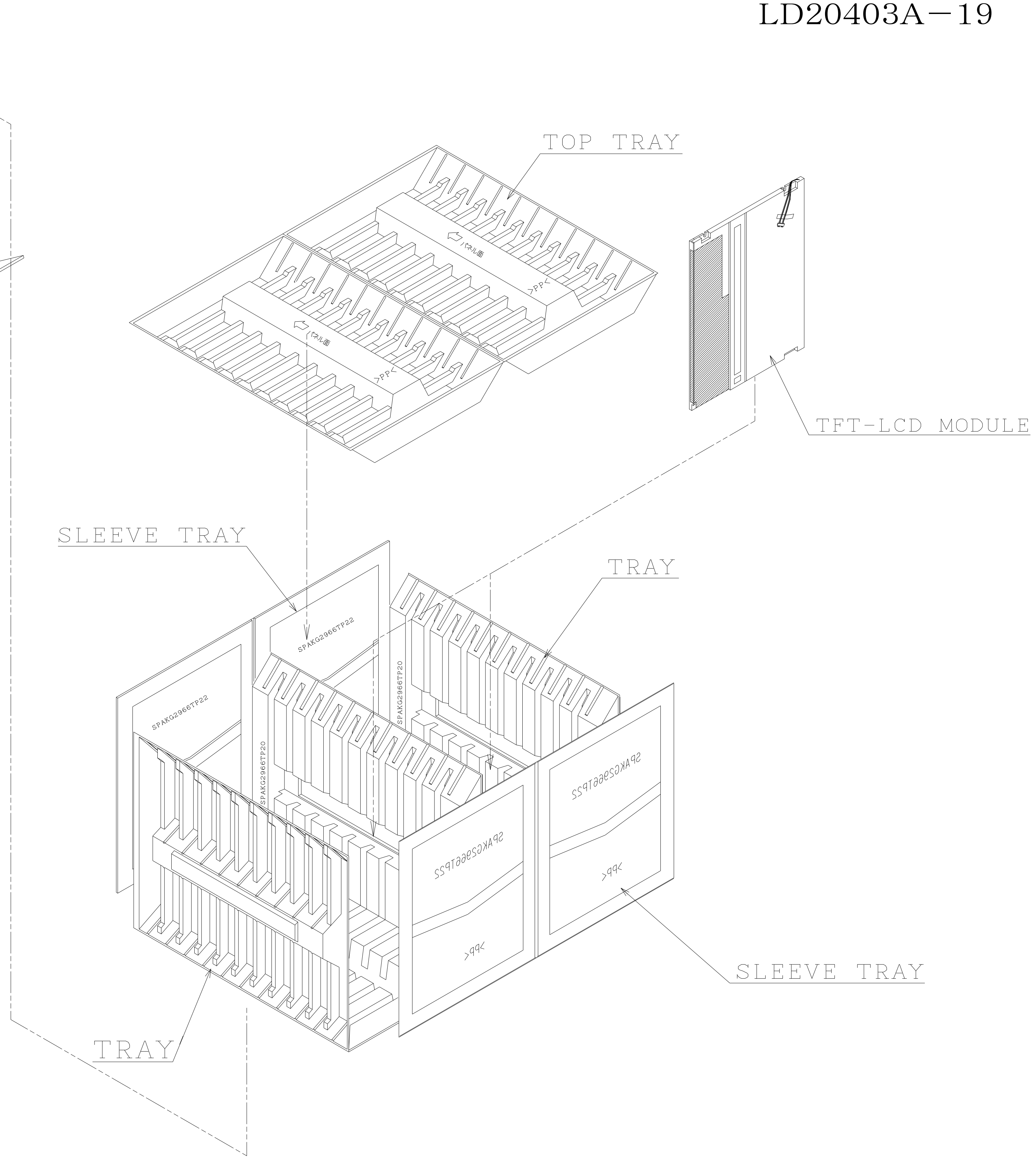
CORRESPONDING CONNECTOR: DF9-31S-1V, DF9A-31S-1V, DF9B-31S-1V, DF9C-31S-1V (HIROSE Electric)

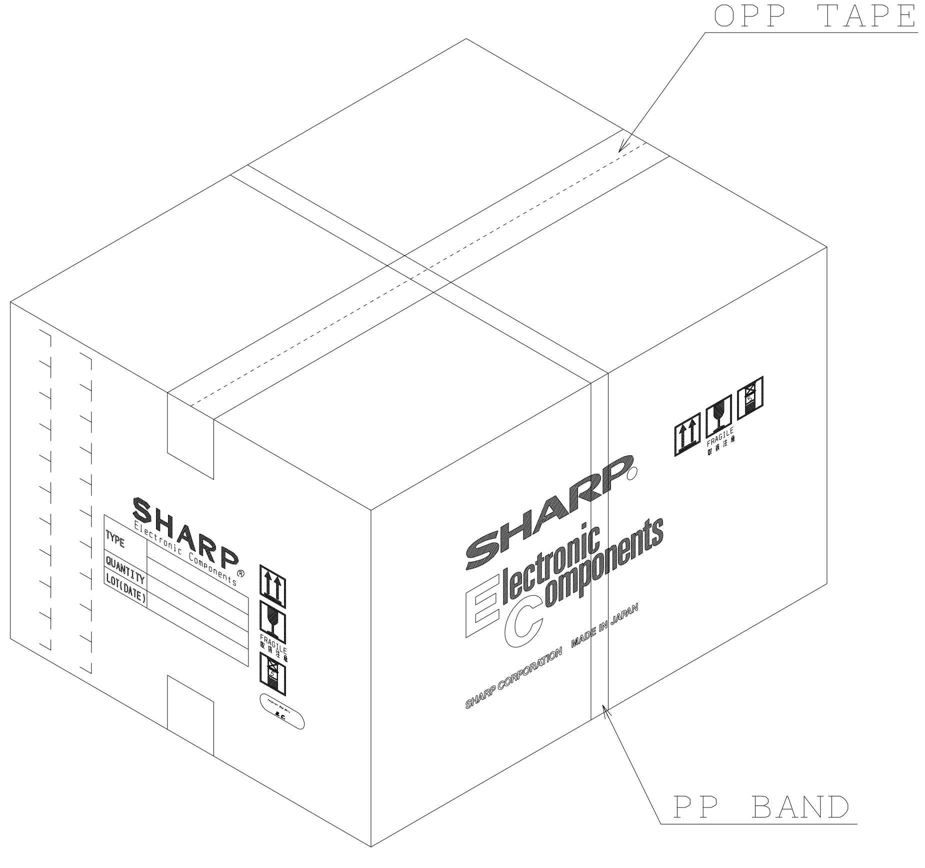
LQ104V1DG33 OUTLINE DIMENSIONS

NOTES)

1) UNSPECIFIED TOLERANCE TO BE ±0.5.
2) WARPING OF COMPONENTS SUCH AS TAPE, BEZEL, PCB, CHASSIS, FPC, PROTECTION COVER, ETC. ARE EXCLUDED FROM THICKNESS AND DIMENSIONS OF THE MODULE.
3) RECOMMENDED TIGHTEN TORQUE FOR MOUNTING 0.294±0.02N•m (3.0±0.2kgf•cm)

LD20403A−19



MASTER CARTON
SHARP
Electronic Components
TYPE
QUANTITY
LOT(DATE)
SHARP CORPORATION MADE IN JAPAN
TOP TRAY
>PP<
TFT-LCD MODULE
SLEEVE TRAY
SPAKG2966TP22
SPAKG2966TP20
TRAY
SLEEVE TRAY
TRAY


OPP TAPE
SHARP
Electronic Components
TYPE
QUANTITY
LOT(DATE)
SHARP CORPORATION MADE IN JAPAN
PP BAND

< PACKING FORM >