LCD Specification

LQ035Q7DB05 LCD Module

Product Specification
May 2009

QVGA Portrait Transflective LCD Module
featuring 13% reflectivity, 15:1 contrast
(Reflective mode) and 160 nits brightness,
85:1 contrast (Transmissive mode).
Full Specifications Listing.

SHARP

PREPARED BY : DATE	**SHARP**	SPEC No. LD-21508A
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	SPECIFICATION	MOBILE LIQUID CRYSTAL DISPLAY GROUP

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ035Q7DB05

These parts have corresponded with the RoHS directive.

□ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED

BY _____

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RECORDS OF REVISION

LQ035Q7DB05

SPEC No.	DATE	PAGE	SUMMARY	NOTE
LD-21508A	May. 26. 2009	-	-	1 st Issue

NOTICE

(1) Application

   This specification applies to LQ035Q7DB05.

(2) Overview

   This module is a color reflective and active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, FPCs, a back light, a front sealed casing and a back sealed casing. It isn't composed control circuit. Graphics and texts can be displayed on a 240× 3× 320 dots panel with 262,144 colors by supplying.

   Optimum view angle is 6 o'clock. An inverted display mode is selective in the vertical or the horizontal direction.

  This module is Lead-free design.

Confirm "(12) Handling Precautions "(page 16 and 17) item when you use the device.

   3   Mechanical specifications

      Table 1

Parameter	Specifications	Units	Remarks
Screen size (Diagonal)	8.9 [3.52"] Diagonal	cm	
Display active area	53.64 H × 71.52 V	mm	
Pixel format	240(H)× 320(V) (1 pixel = R+G+B dots)	pixels	
Pixel pitch	0.2235 H × 0.2235 V	mm	
Pixel configuration	R,G,B vertical stripe		
Unit outline dimension	65.0(W)× 85.0(H)× 3.4(D)	mm	Note3-1
Mass	40		TYP.
Surface hardness	3H		

  Note 3-1

  Excluding protrusion.   For detailed measurements and tolerances, please refer to Fig. 1.

(4)Pixel configuration
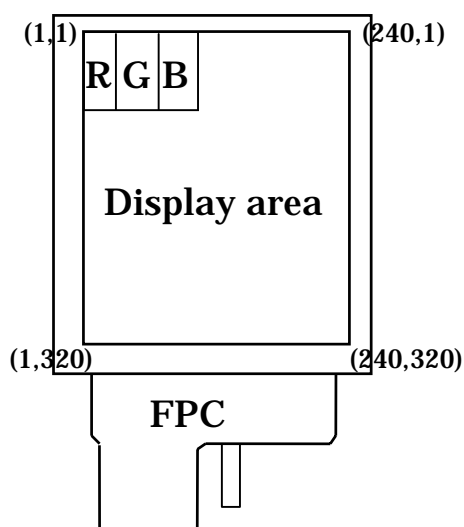
(5)Input/Output terminal

　5-1)TFT-LCD panel driving section

Table2　　　　　　　　　　　　　Recommendation CN　FH12-50S-0.5SH(55)　(HIROSE)

Pin No.	Symbol	I/O	Description	Remarks
1	VDD		Power supply of gate driver(high level)	
2	AGND			
3	MOD	I	Control signal of gate driver	Note5-1
4	MOD	I	Control signal of gate driver	Note5-1
5	U/L	I	Selection for vertical scanning direction	Note5-2
6	SPS	I	Start signal of gate driver	
7	CLS	I	Clock signal of gate driver	
8	AGND			
9	VEE		Power supply of gate driver(low level)	
10	VEE	-	Power supply of gate driver(low level)	
11	VCOM	I	Common electrode driving signal	
12	VCOM	I	Common electrode driving signal	
13	SPL	I/O	Sampling start signal	
14	R0	I	RED data signal(LSB)	
15	R1	I	RED data signal	
16	R2	I	RED data signal	
17	R3	I	RED data signal	
18	R4	I	RED data signal	
19	R5	I	RED data signal(MSB)	
20	G0	I	GREEN data signal(LSB)	
21	G1	I	GREEN data signal	
22	G2	I	GREEN data signal	
23	G3	I	GREEN data signal	
24	G4	I	GREEN data signal	
25	G5	I	GREEN data signal(MSB)	
26	B0	I	BLUE data signal(LSB)	
27	B1	I	BLUE data signal	
28	B2	I	BLUE data signal	
29	B3	I	BLUE data signal	
30	B4	I	BLUE data signal	
31	B5	I	BLUE data signal(MSB)	
32	VSHD		Power supply of digital	
33	DGND		Ground(digital)	
34	PS	I	Power save signal Please don't carry out use by "Low" fixation	
35	LP	I	Data latch signal of source driver	
36	DCLK	I	Data sampling clock signal	
37	LBR	I	Selection for horizontal scanning direction	Note5-3
38	SPR	I/O	Sampling start signal	
39	VSHA		Power supply(analog)	

Pin No.	Symbol	I/O	Description	Remarks
40	AGND			
41	AGND			
42	REV	I	reverse control signal	Note5-4
43	COM	O	Produce REV signal with the amplitude of AGND VSHA	Note5-4
44	AGND			
45	AGND			
46	AGND			
47	AGND			
48	AGND			
49	AGND			
50	AGND		Ground(Analog)	

Note5-1   See section(7-1)-(A) ” Cautions when you turn on or off the power supply”.

Note5-2   Selection for vertical scanning direction

U/L	Scanning direction (Pixel configuration)
Low	Normal scanning (X , 1) (X , 320)
High	Inverted scanning (X , 1) (X , 320)

Note5-3   Selection for horizontal scanning direction

LBR	SPL	SPR	Scanning direction (Pixel configuration)
High	Input	Output	Normal scanning (1,Y) (240,Y)
Low	Output	Input	Inverted scanning (1,Y) (240,Y)

Note5-4
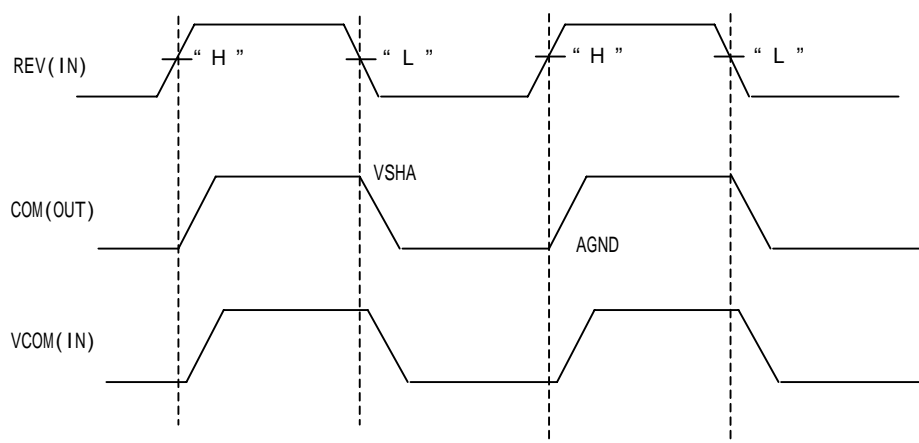
5-2)Back light driving section

Table3   Recommendation CN　CFP4605-0150F (SMK)

Pin No.	Symbol	I/O	Description	Remark
1	VL1	I	Power supply for LED　(High voltage)	
	N.C			
3	N.C			
4	VL2	I	Power supply for LED　(Low voltage)	
5	N.C			

(6)Absolute Maximum Ratings

Table 4

Parameter	Symbol	Condition	Ratings	Unit	Remark
Power supply(source/Analog)	VSHA	Ta=25	-0.3　+7.0	V	
Power supply(source/Digital)	VSHD	Ta=25	-0.3　+7.0	V	
Power supply (gate)	VDD	Ta=25	-0.3　+35.0	V	
Power supply (gate)	VDD-VEE	Ta=25	-0.3　+35.0	V	
Input voltage (Digital)	VID	Ta=25	-0.3　VSHD+0.3	V	[Terminal　]
Operating temperature (panel surface	opp		-10　60		Note6
Storage temperature	stg		-25　70		Note6-2
LED Current	I_{LED}	Ta=25	35	mA	

[Terminal　] MOD,U/L,SPS,CLS,SPL,R0　R5,G0　G5,B0　B5,LP,DCLK,LBR,SPR,PS,REV

Note6-2　Humidity: 95%RH Max.(at Ta　40　). Maximum wet-bulb temperature is less than 39 (at Ta > 40　). Condensation of dew must be avoided.

Humidity guarantee range
Wet-bulb temperature:39
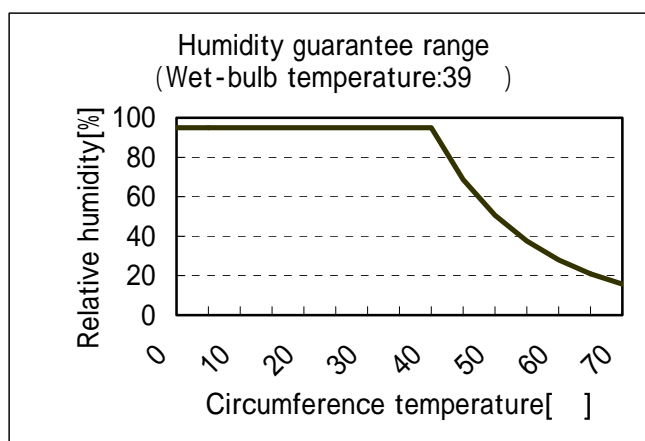
The maximum humidity in the temperature

(7)Electrical characteristics

7-1)Recommended operating conditions

A) TFT-LCD panel driving section

Table 5   GND=0V

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply voltage for source driver (Analog)		VSHA	+4.5	+5.0	+5.5	V	
Supply voltage for source driver (Digital)		VSHD	+3.0	+3.3	+3.6	V	
Supply voltage for gate driver	High voltage	VDD	+14.5	+15.0	+15.5	V	
	Low voltage	VEE	-10.5	-10.0	-9.5	V	
Input voltage for Source driver (Low)		VILS	GND	-	0.2VSHD	V	Note 7-1
Input voltage for Source driver (High)		VIHS	0.8VSHD	-	VSHD	V	Note 7-1
Input current for Source driver (Low)		IILS	-	-	30	μA	Note 7-1
Input current for Source driver (High)		IIHS1	-	-	30	μA	Note 7-2
		IIHS2	-	-	1200	μA	Note 7-3
Input voltage for Gate driver (Low)		VILG	GND	-	0.2VSHD	V	Note 7-4
Input voltage for Gate driver (High)		VIHG	0.8VSHD	-	VSHD	V	Note 7-4
Input current for Gate driver (Low)		IILG	-	-	4	μA	Note 7-4
Input current for Gate driver (High)		IIHG	-	-	4	μA	Note 7-4
Common electrode driving signal	AC component	VCOMAC	-	± 2.5	± 2.6	Vp-p	Note 7-5
	DC component	VCOMDC	-0.4	+0.6	+1.6	V	Note 7-5

Cautions when you turn on or off the power supply

Turn on or off the power supply with simultaneously or the following sequence.

The input signal of "MOD" Terminals(Pin No.3 and No.4) must be low voltage when turning on the power supply, and it is held until more than double vertical periods after VSHD is turned on completely. After then, it must be held high voltage until turning off the power supply.(Connect Pin No.3 and No.4 terminals to the same signal.)
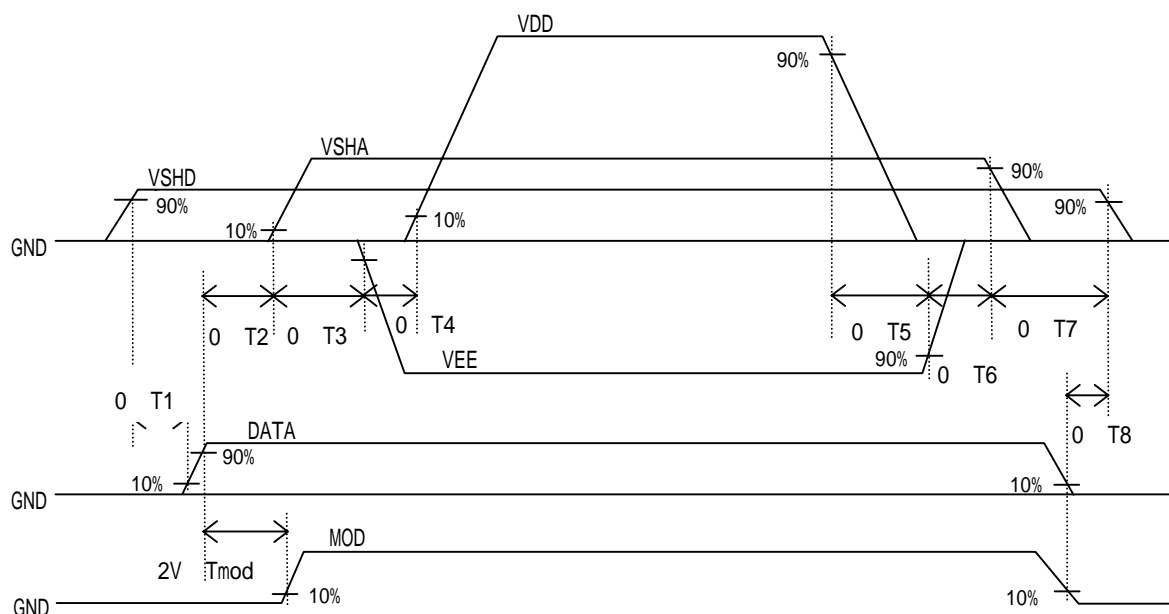
Note 7-1 DCLK,SPL,SPR,LBR,LP,PS,REV,R0　R5,G0　G5 and B0　B5 terminals are applied.

Note 7-2 DCLK,SPL,SPR,LBR,LP,REV,R0　R5,G0　G5 and B0　B5 terminals are applied.

Note 7-3 PS terminal is applied.

Note 7-4 MOD,CLS,SPS and U/L terminals are applied.

Note 7-5 VCOMAC should be alternated on VCOMDC every 1 horizontal period and 1 vertical period.
　　　　　VCOMDC bias is adjusted so as to minimize flicker or maximum contrast every each module.

B) Back light driving section

Table 6   Ta=25

Parameter	Symbol	MIN	TYP	MAX	Units	Remarks terminal
LED voltage	V_L		19.2	21	V	
LED current	I_L		20		A	
Power consumption	W_L		0.384		W	Note 7-6

Note 7-6 Calculated reference value($I_L \times V_L$)

7-2) Timing Characteristics of input signals

Table 7　AC Characteristics (1)　　　　　　　　　　(VSHA=+5V, VSHD=+3.3V, Ta=25　)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency of source driver		fCK	4.5		6.8	MHz	
Source driver	Rising time of clock	Tcr			20	ns	DCLK
	Falling time of clock	Tcf			20	ns	
	Pulse width (High level)	Tcwh	40			ns	
	Pulse width (Low level)	Tcwl	40			ns	
	Frequency of start pulse	fsp	16.5		28	kHz	SPL,SPR
	Setup time of start pulse	Tsusp	15			ns	
	Hold time of start pulse	Thsp	10			ns	Note 7-7
	Pulse width of start pulse	Twsp			1.5/fCK	ns	
	Setup time of latch pulse	Tsulp	20			ns	LP
	Hold time of latch pulse	Thlp	20			ns	
	Pulse width of latch pulse	Twlp	60			ns	
	Setup time of PS	Tsups	0			μs	PS
	Setup time of PS	Tsulps	1			μs	
	Hold time of PS	Thps	0			μs	
	Hold time of PS	Thlps	30			ns	
Set up time of data		Tsud	15			ns	R0 R5,G0 G5
Hold time of data		Thd	10			ns	,B0 B5
Gate driver	Clock frequency	fcls	16.5		28	kHz	CLS
	Pulse width of clock(Low)	Twlcls	5		(1/fcls)-30	μs	
	Pulse width of clock(High)	Twhcls	30			μs	
	Rising time of clock	Trcls			100	ns	
	Falling time of clock	Tfcls			100	ns	
	Setup time of clock	Tsucls	3			μs	
	Hold time of clock	Thcls	0			μs	
	Frequency of start pulse	fsps	58		86	Hz	SPS
	Setup time of start pulse	Tsusps	100			ns	
	Hold time of start pulse	Thsps	300			ns	
	Rising time of start pulse	Trsps			100	ns	
	Falling time of start pulse	Tfsps			100	ns	
Vcom	Setup time of Vcom	Tsuvcom	0			μs	Vcom
	Hold time of Vcom	Thvcom	1			μs	

Note 7-7　There must be only one up-edge of DCLK (includes Tsusp and Thsp time) in the period of
　　　　　SPL=”Hi”.
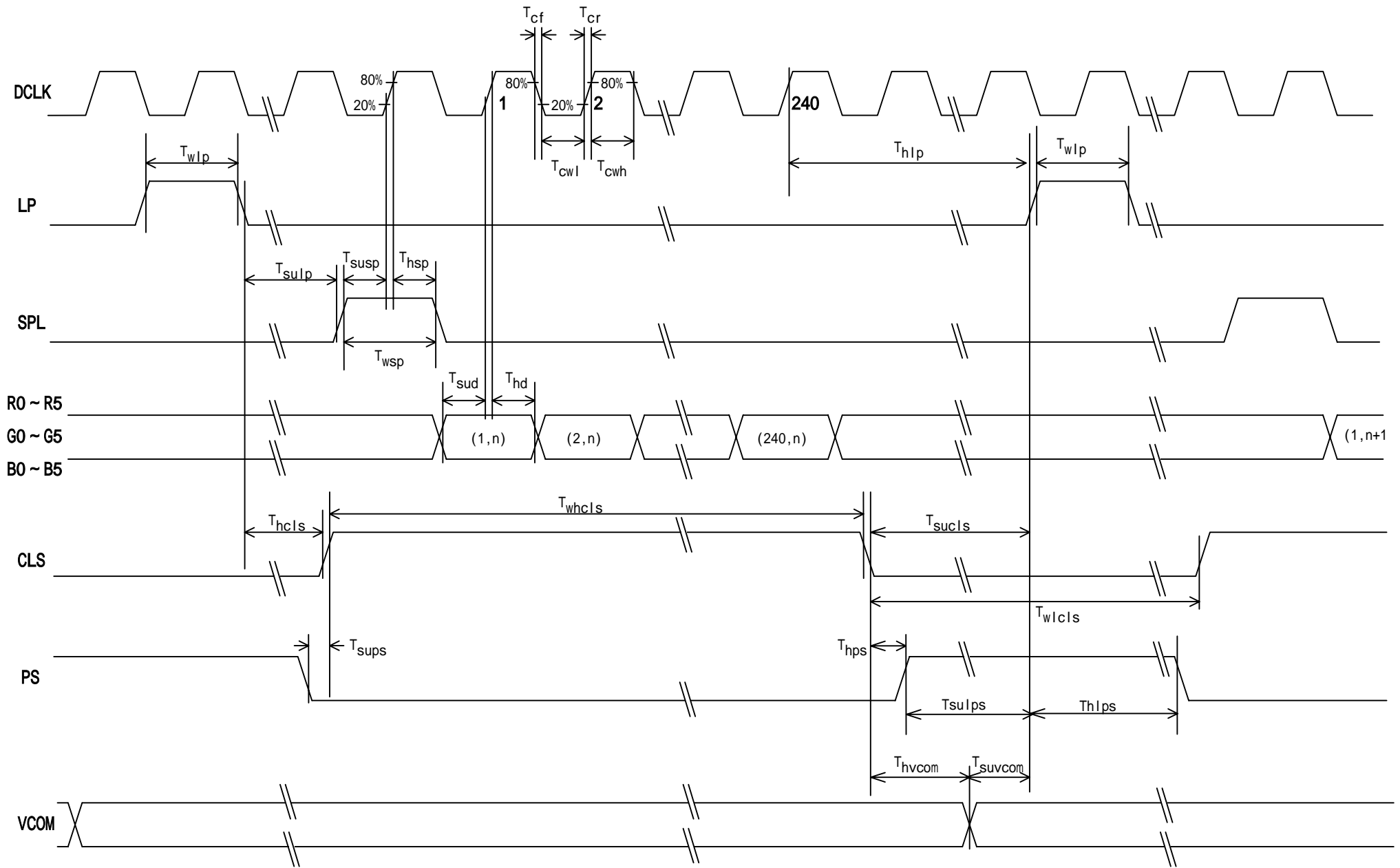
Fig.(a) Horizontal timing chart
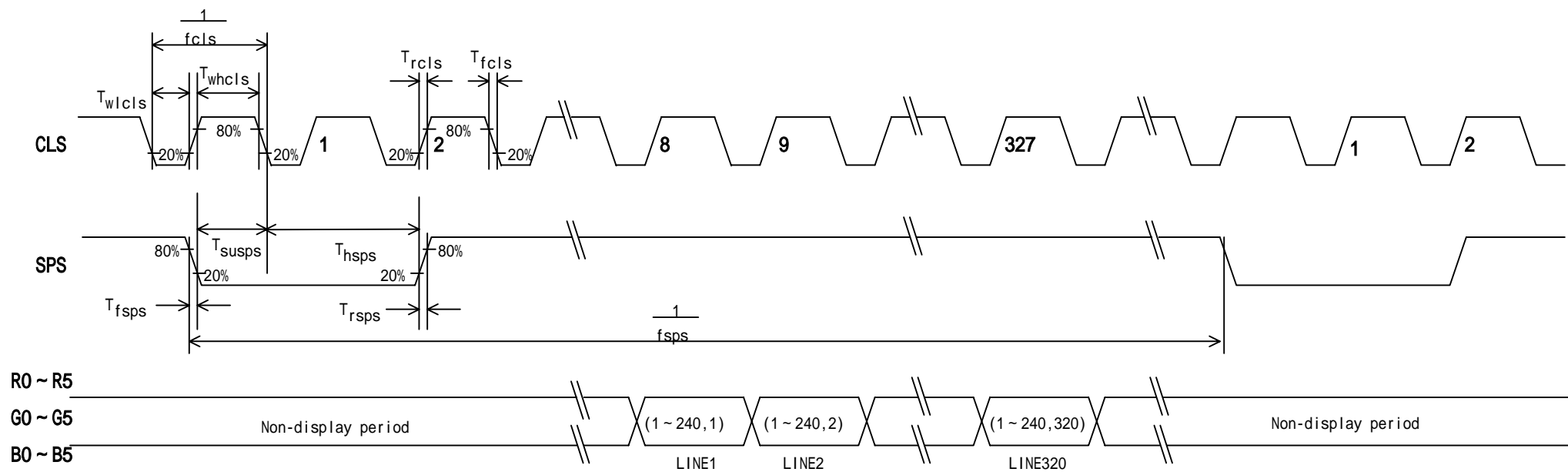
Fig.(b) Vertical timing chart

7-3)Power consumption

Measurement condition : SPS=60Hz,CLS=15.73kHz,SPL=15.73kHz,DCLK=6.3MHz

The term of PS="Lo" in one horizontal period … 37μ sec(234DCLK)

Ta=25

Table 8 　　　　　　　　　　　　　　　　　　　　　　　　when normal scan mode

Parameter		Sym	Conditions	MIN	TYP	MAX	Unit	Remarks
Source current	Analog	ISHA	VSHA=+5.0V		3.0	6.5	mA	Note 7-8
	Digital	ISHD	VSHD=+3.3V		2.0	3.5	mA	Note 7-8
Gate current	High	IDD	VDD=+15.0V		0.05	0.10	mA	Note 7-9
	Low	IEE	VEE=-10.0V		-0.05	-0.10	mA	Note 7-9

Note 7-8　Vertical stripe pattern alternating 21 gray scale (GS21) with 42 gray scale (GS42) every 1 dot.

Note 7-9　64-Gray-bar vertical pattern (GS0　　GS63 for horizontal way)

( )Input Signals, Basic Display Color and Gray Scale of Each Color

Table 9

Colors & Gray scale	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 bleu																			
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
Bleu	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.
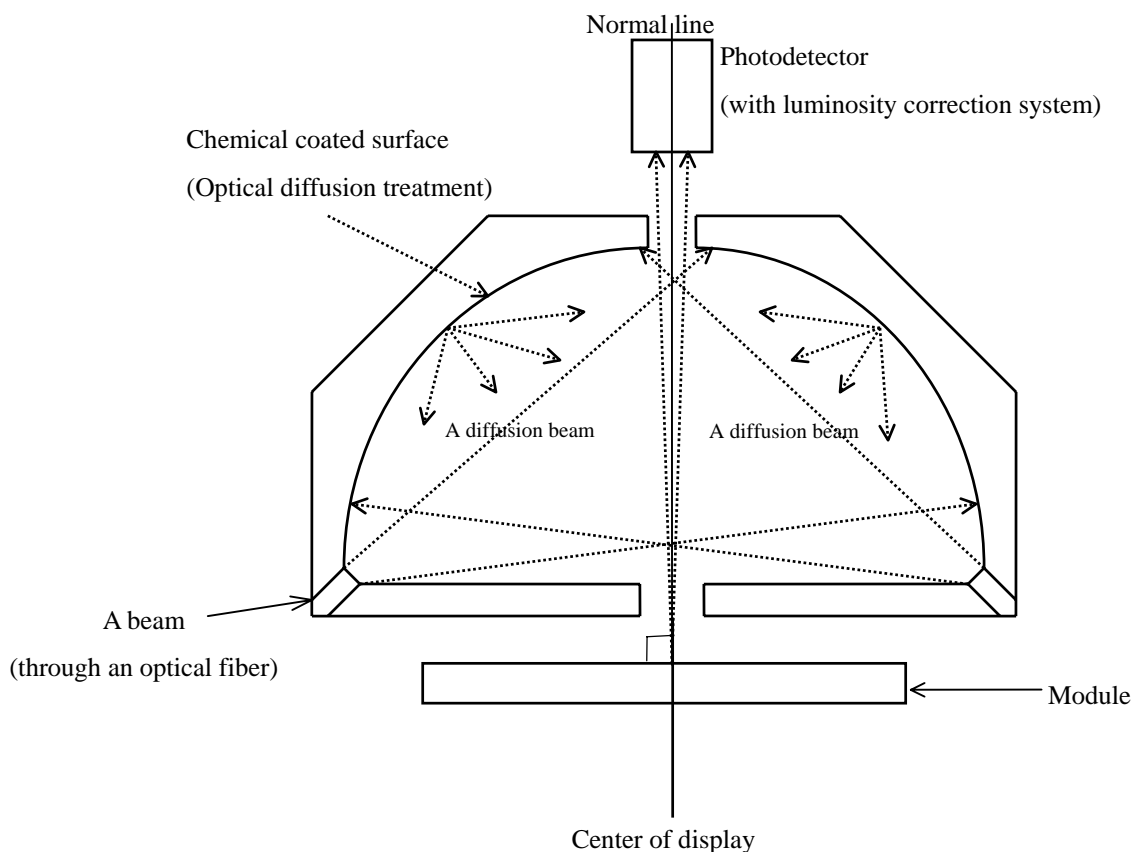
(9)Optical characteristics

9-1)Not driving the Back light condition

Table 10   **(VSHA=+5V, VSHD=+3.3V, VDD=+15V, VEE=-10V ,Ta=25   )**

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		θ21,22	CR≥2	**35**	**50**	-	degree	[Note 9-1,2]
		θ11		**35**	**50**	-	degree	
		θ12		**35**	**50**	-	degree	
Contrast ratio		CRmax	θ =0°	**6**	**15**	-		[Note 9-2,4]
Response time	Rise	τ r		-	**30**	**60**	ms	[Note 9-3]
	Fall	τ d		-	**50**	**100**	ms	
White chromaticity		x		**0.26**	**0.31**	**0.36**		[Note 9-4]
		y		**0.29**	**0.34**	**0.39**		
Reflection ratio		R		**8**	**13**	-	%	[Note 9-5]

* The measuring method of the optical characteristics is shown by the following figure.

* A measurement device is Otsuka luminance meter LCD5000.(With the diffusion reflection unit.)

Measuring method (a) for optical characteristics

9-2)Driving the Back light condition

Table 11   **(VSHA=+5V, VSHD=+3.3V, VDD=+15V, VEE=-10V ,Ta=25)**

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		$\theta21,22$		**30**	**40**	-	degree	[Note 9-1,2,6]
		$\theta11$	CR≥2	**40**	**50**	-	degree	
		$\theta12$		**30**	**40**	-	degree	
Contrast ratio		Crmax	$\theta = 0°$	**55**	**85**	-		[Note 9-2]
Response time	Rise	τr		-	**30**	**60**	ms	[Note 9-3]
	Fall	τd		-	**50**	**100**	ms	
White chromaticity		x		**0.25**	**0.30**	**0.35**		
		y		**0.27**	**0.32**	**0.37**		
Brightness		Y	$\theta = 0°$	-	**160**	-	cd/m2	I$_L$=20mA

* The measuring method of the optical characteristics is shown by the following figure.

* A measurement device is TOPCON luminance meter BM-5(A) or SR-3.(Viewing cone 1)

Photodetector(including luminosity facter)

Field=1°

LCD module

Center
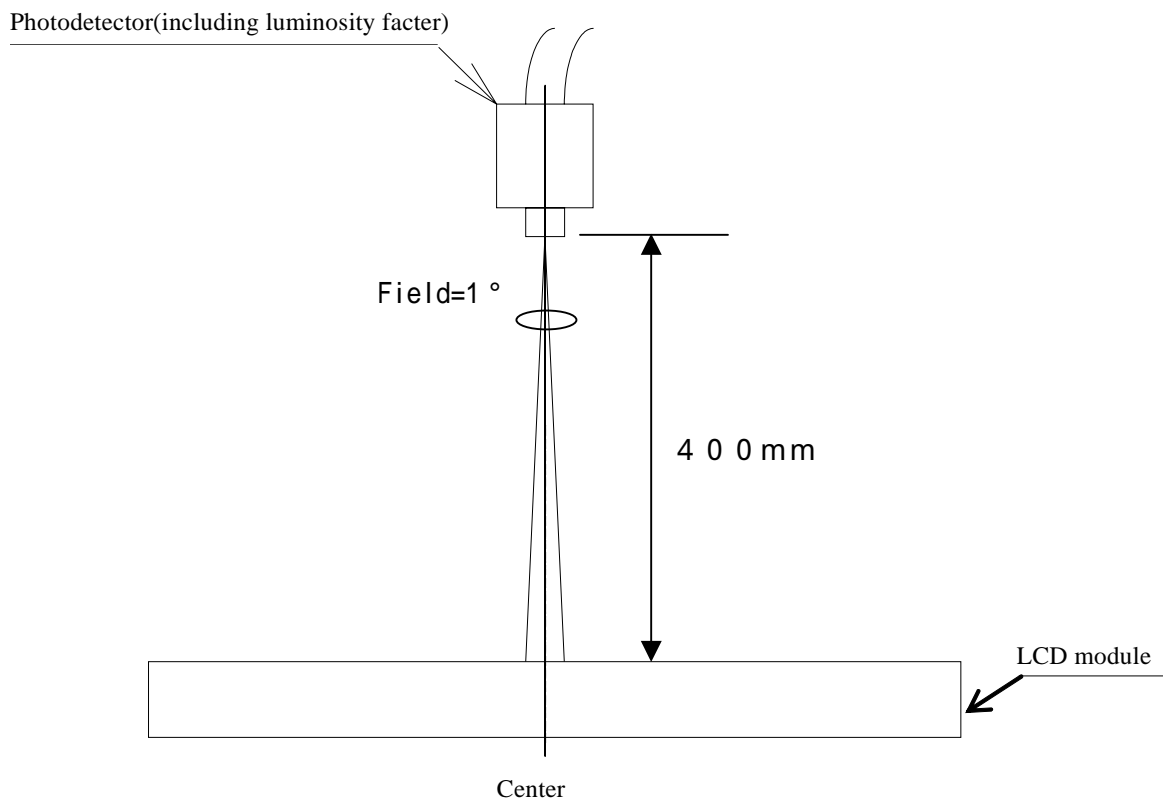
Measuring method (c) for optical characteristics

[Note 9-1] Viewing angle range is defined as follows.
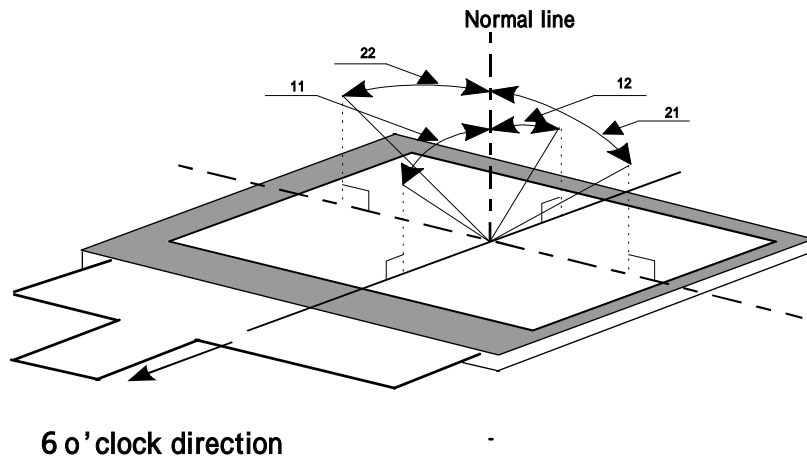
Definition for viewing angle

[Note 9-2]   Definition of contrast ratio:

The contrast ratio is defined as follows:

$$\text{Contrast ratio(CR)} = \frac{\text{Photodetecter output with all pixels white(GS63)}}{\text{Photodetecter output with all pixels black(GS0)}}$$

$V_{COMAC}=5.0Vp\text{-}p$

[Note 9-3] 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".

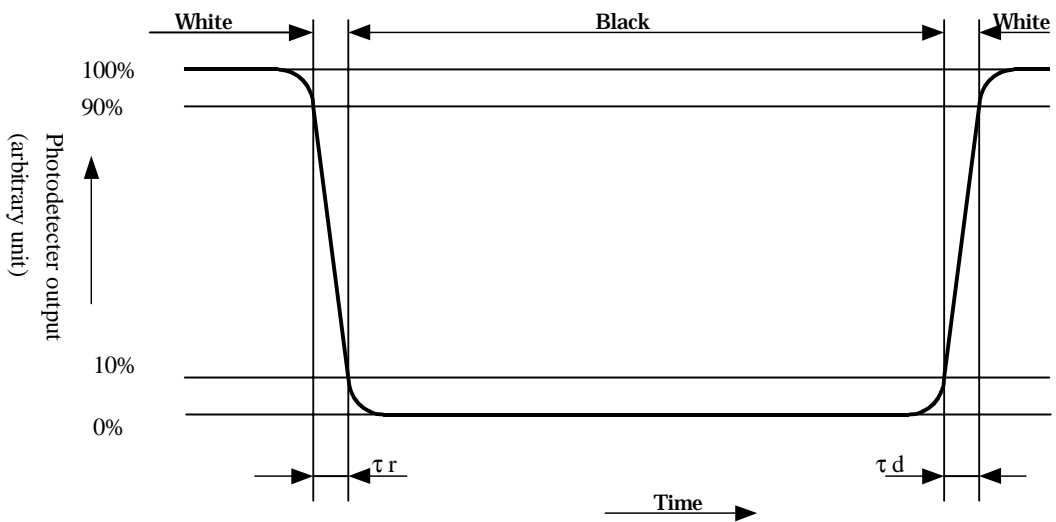[Note 9-4] A measurement device is Minolta CM-2002.

[Note 9-5] Definition of reflection ratio

$$\text{Reflection ratio} = \frac{\text{Light detected level of the reflection by the LCD module}}{\text{Light detected level of the reflection by the standard white board}}$$

[Note 9-6] A measurement device is ELDIM EZContrast

[Note 9-7] This is the reference value. The White-LED life time is defind as a time when brightness not to become under 50% of the original value(at Ta=25)

(10) Display quality

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

(11) Mechanical characteristics

11-1) External appearance

See Fig. 1

11-2) FPC (for LCD panel) characteristics

(1) Specific connector

FH12-50S-0.5SH(55) (HIROSE)

(2) Bending endurance of the bending slits portion

No line of the FPC is broken for the bending test (Bending radius=0.6mm and angle=90°) in 30 cycles.

(12) Handling Precautions

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

b) Please insert FPC in the connector carefully so that the tension should not hang.

c) The FPC for LCD panel shall be bent only slit portion. The bending slit shall be bent uniformly on the whole slit portion with bending radius larger than 0.6mm ,and only inner side (back side of the module). Don't bend it outer side (display surface side). Do not give the FPCs too large force, for example, hanging the module with holding FPC.

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

e) Since the front polarizer is easily damaged, pay attention not to scratch it. Blow away dust on the polarizer with antistatic 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.

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

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

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

i) 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.

j) 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.

k) In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.

l) Do not expose the LCD panel to direct sunlight. Lightproof shade etc. should be attached when LCD panel is used under such environment. The panel characteristic might be deteriorated and the display fineness decrease when strong light is irradiated to the liquid crystal panel.

m) When handling LCD modules and assembling them into cabinets, that long-terms 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, causes corrosion and discoloration of the modules. Therefore, please avoid these use. Epoxy resin (amine series curing agent), silicone adhesive material (dealcoholization series and oxime series), tray forming agent (azo compound) etc, in the cabinet or the packing materials may induce abnormal display with polarizer film deterioration regardress of contact or noncontact to polarizer film. Be sure to confirm the component of them.

n) If it is kept at a temperature below the rated storage temperature, it becomes coagulated and the panel may be broken. Also, if it is kept at a temperature above the rated storage temperature, it becomes isotropic liquid and does not return to its original state. Therefore, it is desirable to keep it at room temperature as much as possible.

o) The LED used for this product is very sensitive to the temperature. Luminance decreases rapidly when it issued for a long time under the environment of the high temperature. Please consult our company when it is used under the environment like the above mentioned.

p) 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.)

q) Notice:Never dismantle the module , because it will cause failure. Moreover, please do not peel off the tapes other than the creped paper tape (yellow tape) of a protection film pasted to the product.

r) 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.

s) Observe general precautions for all electronic components.

t) VCOM must be adjusted on condition of your final product. No adjustment causes the deterioration for display quality.

(13)Reliability Test Conditions for TFT-LCD Module

Table 13

No.	Test items	Test conditions
1	High temperature storage test	Ta=+70 240h
2	Low temperature storage test	Ta=-25 240h
3	High temperature and high humidity operating test	Tp=+40 , 95%RH 240h (But no condensation of dew)
4	High temperature operating test	Tp=+60 240h
5	Low temperature operating test	Ta=-10 240h
6	Electro static discharge test	± 200V 200pF(0) 1 time for each terminals
7	Shock tset	980 m/s^2, 6 ms ± X,± Y,± Z 3 times for each direction (JIS C0041, A-7 Condition C)
8	Vibration test	Frequency range: 10Hz 55Hz Stroke: 1.5 mm Sweep: 10Hz 55Hz X,Y,Z 2 hours for each direction (total 6 hours) (JIS C0040,A-10 Condition A)
9	Heat shock test	Ta=-25 +70 / 5 cycles (1h) (1h)

Note Ta = Ambient temperature, Tp = Panel temperature

Check items

In the standard condition, there shall be no practical problems that may affect the display function.

(14) Others

14-1)Indication of lot number

The lot number is shown on a label. Attached location is shown in Fig.1 (Outline Dimensions).

Indicated contents of the label

LQ035Q7DB05

model No.　　　　　lot No.

14-2) Used Regulation of Chemical Substances Breaking Ozone Stratum

Substances with the object of regulating : CFCS, Carbon tetrachloride, Halon

1,1,1-Trichloro ethane (Methyl chloroform)

(a) This LCD module, Constructed part and Parts don't contain the above substances.

(b) This LCD module, Constructed part and Parts don't contain the above substances in processes of manufacture.

14-3) If some problems arise about mentioned items in this document and other items, the user of the TFT-LCD module and Sharp will cooperate and make efforts to solve the problems with mutual respect and good will.

15)Forwarding　form(see Fig.2 Package Form)

a) Piling number of cartons : Max 20

b) Package quantity in one cartons : 50pcs

c) Carton size : 503mm x 373mm x 85mm

d) Total mass of 1 carton filled with full modules : 3600g

Conditions for storage.

Environment

(1)Temperature : 0　40

(2)Humidity : 60%RH or less (at 40　)

No dew condensation at low temperature and high humidity.

(3)Atmosphere : Harmful gas, such as acid or alkali which bites electronic components and/or wires, must not be detected.

(4)Direct sunshine :Please keep it in the state of wrapping or the darkroom so that direct sunshine should not strike directly into the product.

(5) Asking for be dewy prevention

Please do not put directly on the floor, and keep the wrapping box on the palette or the stand to avoid the be dewy. Moreover, please arrange it in a constant direction correctly to improve ventilation under the palette. Please separate from the wall in the storage warehouse and keep it.

Please note that ventilation is improved and consider the installation such as ventilators in the warehouse.

Please manage so that there is no rapid temperature change more than natural environment.

(6)Period : about 3 months

(7)Opening of the package : In order to prevent the LCD module from breakdown by electrostatic charges, please control the room humidity over 50%RH and open the package taking sufficient countermeasures against electrostatic charges, such as earth, etc.
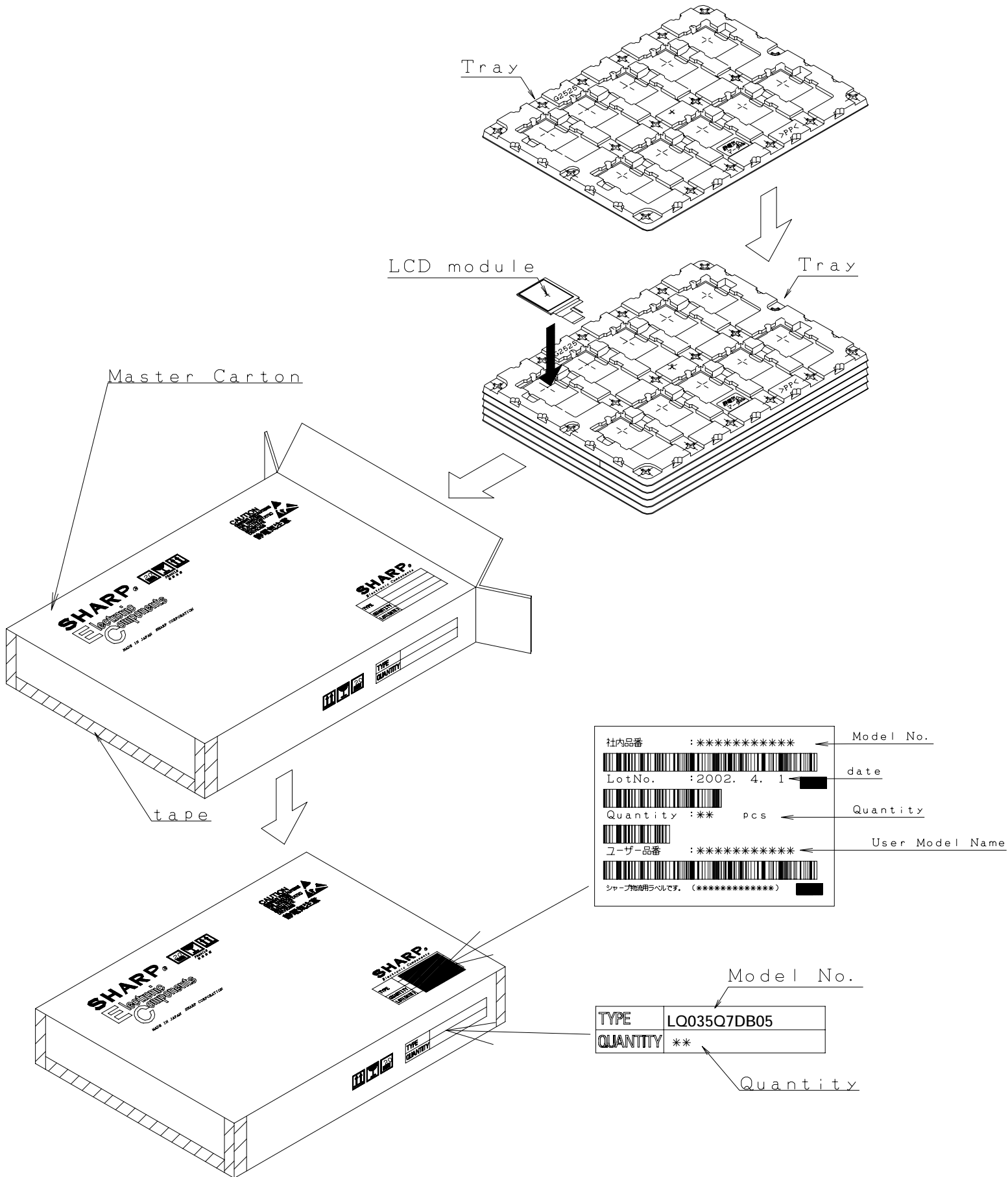
SHARP

P0.5 ±0.05
(Pitch 0.5×50)

0.5 ±0.1
50-0.35 ±0.03
(Line width)
24.5 ±0.05
25.5 ±0.07
4.1 ±0.3

LCD FPC TERMINAL'S

Fitting CN : HIROSE
FH12-50S-0.5SH(55)

HOT
NC
GND
NC
NC

3.3 ±0.3
0.3
0.35 ±0.05
P0.5 ±0.05
2 ±0.05
3 ±0.05

Detail of
LED FFC TERMINAL

Fitting CN : SMK CFP4605-0150F

0.3
0.3

65 ±0.3
33.42 ±0.4
57.4(Case opening)

Guarantee of appearance
=LCD Active Area

LCD
Active
Area
53.64

LCD
Active
Area
Center

3.52"

85 ±0.3
44.7 ±0.4
75.2(Case opening)
LCD Active Area 71.52

(5.8)
50.5
60.5max
62.5
86.6

(19.1)

Bending Area
LQ035Q7DB** 08000001
0.1 convex

1.5 (stiffener)

(25.5)
8.6
(22.25) (27.35)
3.4 ±0.3
5 (stiffener)

LED FPC
terminal
side

LCD FPC
terminal
side

31.4 ±1

LCD FPC

23.4 ±1

LED-FPC

LCD FPC

Unit is mm
CONFIDENTIAL

3.52" 240 X 320 pixel
dot pitch : 0.0745 (H) mm
: 0.2235 (V) mm

·Guarantee of appearance = LCD Active Area
·General tolerance is ±0.5
·LCD-FPC should bended only bending area.
·LCD/LED-FPC bend larger than 0.6 in radius.
·Take care in set design to hide
 the scratches and bubbles appeared on
 the polarizer or other frame area
 which is located outside of guarantee area.
·The light of Back Light is leaking from BM
 outside, please light shielding by the set.
·The tolerance of module width are
 exclude warp of case.

Fig1. Outline Dimensions

ORIGINAL MODEL   LQ035Q7DB05
画面サイズ   89.4(3.52")
ACTIVE AREA SIZE   0.2235mm 240RGBX320
尺度 SCALE 1/1   日付 DATE 25.Jan.2007
単位 Unit mm   名称 NAME   Outline Dimensions
ユーザー USER   ****

5
4
3
2
1 **   **
改訂日 改訂記事 REVISION   担当
設計 DESIGNER 製図 DRAFTER 検図 DSN CK 検図 DSN CK 承認 ENG APPD
シャープ株式会社
MB液晶第2(事本)設計C第5開発部
SHARP CORPORATION   原紙サイズ A4   図番 DRAWING NO LDM-03264A

LD-21508A-20

Tray

LCD module   Tray

Master Carton

tape

社内品番	：＊＊＊＊＊＊＊＊＊＊	Model No.
LotNo.	：2002. 4. 1	date
Quantity	：＊＊ pcs	Quantity
ユーザー品番	：＊＊＊＊＊＊＊＊＊＊	User Model Name

シャープ物流用ラベルです。（＊＊＊＊＊＊＊＊＊＊＊＊）

Model No.

| TYPE | LQ035Q7DB05 |
| QUANTITY | ＊＊ |

Quantity

Fig.2 Forwording Form

LCD Group

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TAIWAN

Sharp Electronic Components
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