PRODUCT SPECIFICATIONS

SHARP

Mobile Liquid Crystal Displays Group

LQ036Q1DA01

TFT-LCD Module

Spec. Issue Date: Sept 10, 2004

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DEVICE SPECIFICATION FOR

TFT-LCD module

MODEL No. **LQ036Q1DA01**

☐ CUSTOMER'S APPROVAL

DATA

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	NO.	PAGE	SUMMARY	NOTE
2004.06 .30	LCP－04030	-	-	1 st Issue
2004.08 .07	LCP－04030A	10	Power Consumption	Correction
2004.09 .10	LCP－04030B	12	Contrast raito (OptimumViewing angle)	Addition
		12	Contrast raito (θ = 0°)	Correction
		12	Brightness	Change
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(1) Application

This specification applies to LQ036Q1DA01.

(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, an FPC, 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 320×3×240 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.

(3) Mechanical specifications

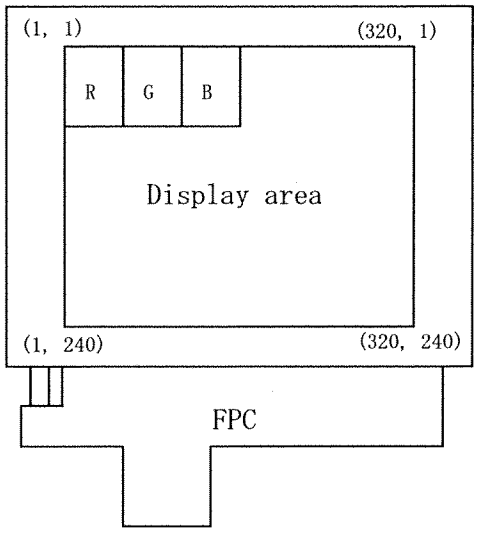
Table 1

Parameter	Specifications	Units	Remarks
Screen size (Diagonal)	9.1 [3.6"] Diagonal	cm	
Display active area	72.5 (H) ×54.4 (V)	mm	
Pixel format	320(H)×240(V) (1 pixel = R+G+B dots)	pixels	
Pixel pitch	0.076 (H) ×0.227 (V)	mm	
Pixel configuration	R,G,B vertical stripe		
Display mode	Normally white		
Unit outline dimension	82.8(W)×69.7(H)×3.3(D)	mm	【Note3-1】
Mass	37	g	
Surface treatment	3 H		

【Note 3-1】

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

(4) Pixel configuration



(5) Input / Output terminal

Table 2 Recommendation CN : FF00251SS1 (JAE)

Pin No.	Symbol	I/O	Description	Remarks
1	VEE	-	Power supply of gate driver (low level)	
2	NC	-		
3	MOD	I	Control signal of gate driver	【Note5-1】
4	U/L	I	Selection for vertical scanning direction	【Note5-2】
5	SPS	I	Start signal of gate driver	
6	CLS	I	Clock signal of gate driver	
7	VDD	-	Power supply of gate driver (high level)	
8	LBR	I	Selection for horizontal scanning direction	【Note5-3】
9	DGND	-	Ground (digital)	
10	B5	I	BLUE data signal (MSB)	
11	B4	I	BLUE data signal	
12	B3	I	BLUE data signal	
13	B2	I	BLUE data signal	
14	B1	I	BLUE data signal	
15	B0	I	BLUE data signal (LSB)	
16	DGND	-	Ground (digital)	
17	VSHD	-	Power supply of digital	
18	LP	I	Data latch signal of source driver	
19	SPR	I/O	Sampling start signal	
20	DGND	-	Ground (digital)	
21	DCLK	I	Data sampling clock signal	
22	DGND	-	Ground (digital)	
23	VSHA	-	Power supply (analog)	
24	AGND	-	Ground (Analog)	
25	V0	I	Standard voltage to generate gray scale voltage	
26	V1	I	Standard voltage to generate gray scale voltage	
27	V2	I	Standard voltage to generate gray scale voltage	
28	V3	I	Standard voltage to generate gray scale voltage	
29	V4	I	Standard voltage to generate gray scale voltage	
30	DGND	-	Ground (digital)	
31	G5	I	GREEN data signal (MSB)	
32	G4	I	GREEN data signal	
33	G3	I	GREEN data signal	
34	G2	I	GREEN data signal	
35	G1	I-	GREEN data signal	
36	G0	I	GREEN data signal (LSB)	
37	DGND	-	Ground (digital)	
38	R5	I	RED data signal (MSB)	
39	R4	I	RED data signal	
40	R3	I	RED data signal	

Pin No.	Symbol	I/O	Description	Remarks
41	R2	I	RED data signal	
42	R1	I	RED data signal	
43	R0	I	RED data signal (LSB)	
44	DGND	-	Ground (digital)	
45	SPL	I/O	Sampling start signal	
46	PS	I		
47	CS	I	CS electrode driving signal	
48	VCOM	I	Common electrode driving signal	【Note5-4】
49	LED_A	-	Power supply for LED(High voltage)	
50	NC	-		
51	LED_C	-	Power supply for LED(Low voltage)	

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

【Note5-2】 Selection for vertical scanning direction

Table 3

U/L	Scanning direction(Pixel configuration)
Low	Normal scanning (X,1) ↓ (X,240)
High	Inverted scanning (X,1) ↑ (X,240)

【Note5-3】 Selection for horizontal scanning direction

Table 4

LBR	SPL	SPR	Scanning direction(Pixel configuration
High	Input	Output	Normal scanning (1,Y) → (320,Y)
Low	Output	Input	Inverted scanning (1,Y) ← (320,Y)

【Note5-4】 See section(7-1)-(A) and 【Note7-6】 .

(6) Absolute Maximum Ratings

Table 5

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 (Analog)	VIA	Ta=25℃	-0.3～VSHA+0.3	V	[Terminal①]
Input voltage (Digital)	VID	Ta=25℃	-0.3～VSHD+0.3	V	[Terminal②]
Operating temperature (panel surface)	Topp	—	-10～60	℃	【Note6-1】
Storage temperature	Tstg	—	-20～70	℃	【Note6-1】

[Terminal①] V0,V1,V2,V3,V4

[Terminal②] MOD,SPS,CLS,U/L,SPL,R0～R5,G0～G5,B0～B5,PS,LP,DCLK,LBR,SPR

【Note6-1】 Humidity: 95%RH Max.(at Ta ≦ 40℃). Maximum wet-bulb temperature is less than 39℃ (at Ta > 40℃). Condensation of dew must be avoided.

(7) Electrical characteristics

7-1) Recommended operating conditions

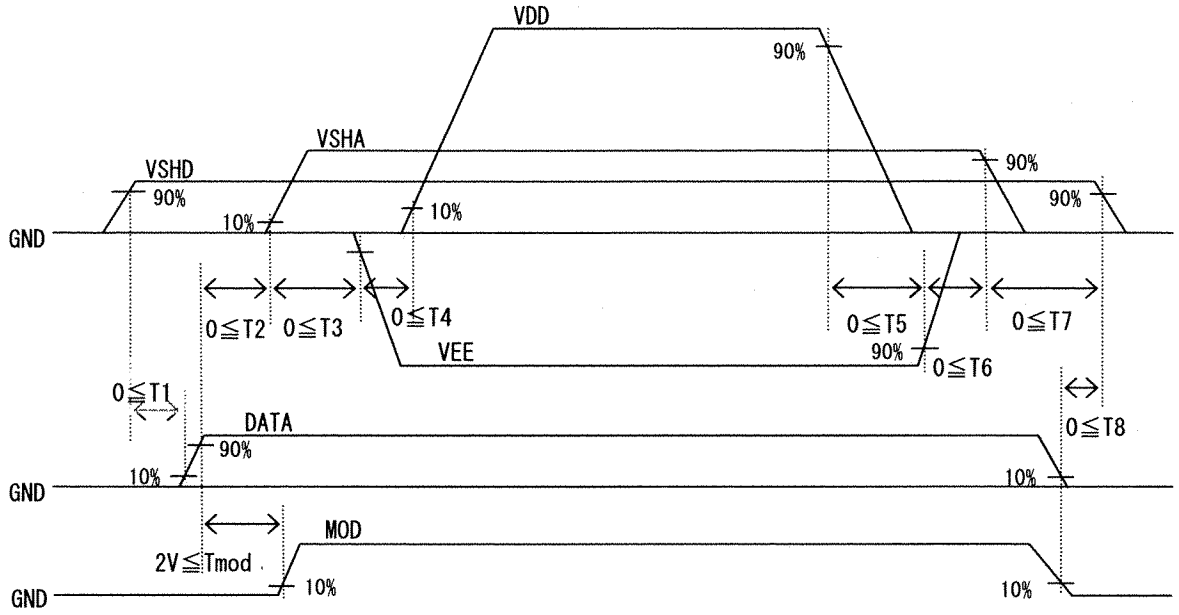
A) TFT-LCD panel driving section

Table 6 GND=0V

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage for source driver (Analog)		VSHA	+4.5	+5.0	+5.5	V	
Supply voltage for source driver (Digital)		VSHD	+2.7	+3.3	+3.6	V	
Standard input voltage		V0～V4	0	-	VSHA	V	【Note 7-1】
Supply voltage for gate driver	High voltage	VDD	+14.5	+15.0	+15.5	V	
	Low voltage	VEE	-12.5	-12.0	-11.5	V	
Input voltage for Source driver (Low)		VILS	GND	-	0.2VSHD	V	【Note 7-2】
Input voltage for Source driver (High)		VIHS	0.8VSHD	-	VSHD	V	
Input current for Source driver (Low)		IILS	-	-	30	μA	
Input current for Source driver (High)		IIHS1	-	-	30	μA	【Note 7-3】
		IIHS2	-	-	1200	μA	【Note 7-4】
Input voltage for Gate driver (Low)		VILG	GND	-	0.2VSHD	V	【Note 7-5】
Input voltage for Gate driver (High)		VIHG	0.8VSHD	-	VSHD	V	
Input current for Gate driver (Low)		IILG	-	-	15	μA	
Input current for Gate driver (High)		IIHG	-	-	15	μA	
Common electrode driving signal	AC component	VCOMAC	-	±2.5	-	Vp-p	【Note 7-6】
	DC component	VCOMDC	0	+1.0	+2.0	V	
CS electrode driving signal	AC component	VCSAC	-	VCOMAC	-	Vp-p	【Note 7-7】
	DC component	VCSDC	VCOMDC - 6.0	VCOMDC - 6.5	VCOMDC - 7.0	V	

※Cautions when you turn on or off the power supply

① Turn on or off the power supply with simultaneously or the following sequence.



② The input signal of "MOD" Terminals (Pin No.3) 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 and DATA is turned on completely. After then, it must be held high voltage until turning off the power supply.

【Note 7-1】 These are standard input voltages for gray scale. When VCOM is alternated polarity, these voltage should be alternated polarity. V0 (black) is different polarity alternating signal of VCOM. V4 (white) is the same polarity alternating signal of VCOM. Center voltage of each standard input voltage shift positive way for LCD characteristics (V0→V1→V2→V3→V4). This sift amount is adjusted so as to no flicker of each standard input voltage after DC bias voltage of VCOM and V0 is adjusted.

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

【Note 7-3】 DCLK,SPL,SPR.LBR,LP,R0～R5,G0～G5 and B0～B5 terminals are applied.

【Note 7-4】 PS terminal is applied.

【Note 7-5】 MOD,CLS,SPS and U/L terminals are applied.

【Note 7-6】 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.

【Note 7-7】 CS electrode driving signal should have the same phase and the amplitude as that for Common electrode driving signal.

B) Back light driving section

Table 7 Ta=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED voltage	VL	-	25.9	29.4	V	
LED current	IL	-	17	20	mA	
Power consumption	WL	-	440	588	mW	【Note 7-8】

【Note 7-8】 Calculated reference value(IL×VL).

7-2) Timing Characteristics of input signals

Table 8 AC Characteristics (VSHA=+5.0V, VSHD=+3.3V, Ta=25℃)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock frequency of source driver		Fck	4.5	-	12	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	12.5	-	20	kHz	SPL,SPR
	Setup time of start pulse	Tsusp	15	-	-	ns	
	Hold time of start pulse	Thsp	10	-	-	ns	
	Pulse width of start pulse	Twsp	-	-	1.5/FCK	ns	【Note 7-9】
	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
	Hold time of PS	Thps	0	-	-	μs	
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	12.5	-	20	kHz	CLS
	Pulse width of clock(Low)	Twlcls	5	-	(1/Fcls)-25	μs	
	Pulse width of clock(High)	Twhcls	25	-	-	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	50	-	78	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、CS
	Hold time of Vcom	Thvcom	1	-	-	μs	

【Note 7-9】 There must be only one up-edge of DCLK (includes Tsusp and Thsp time) in the period of SPL="Hi".

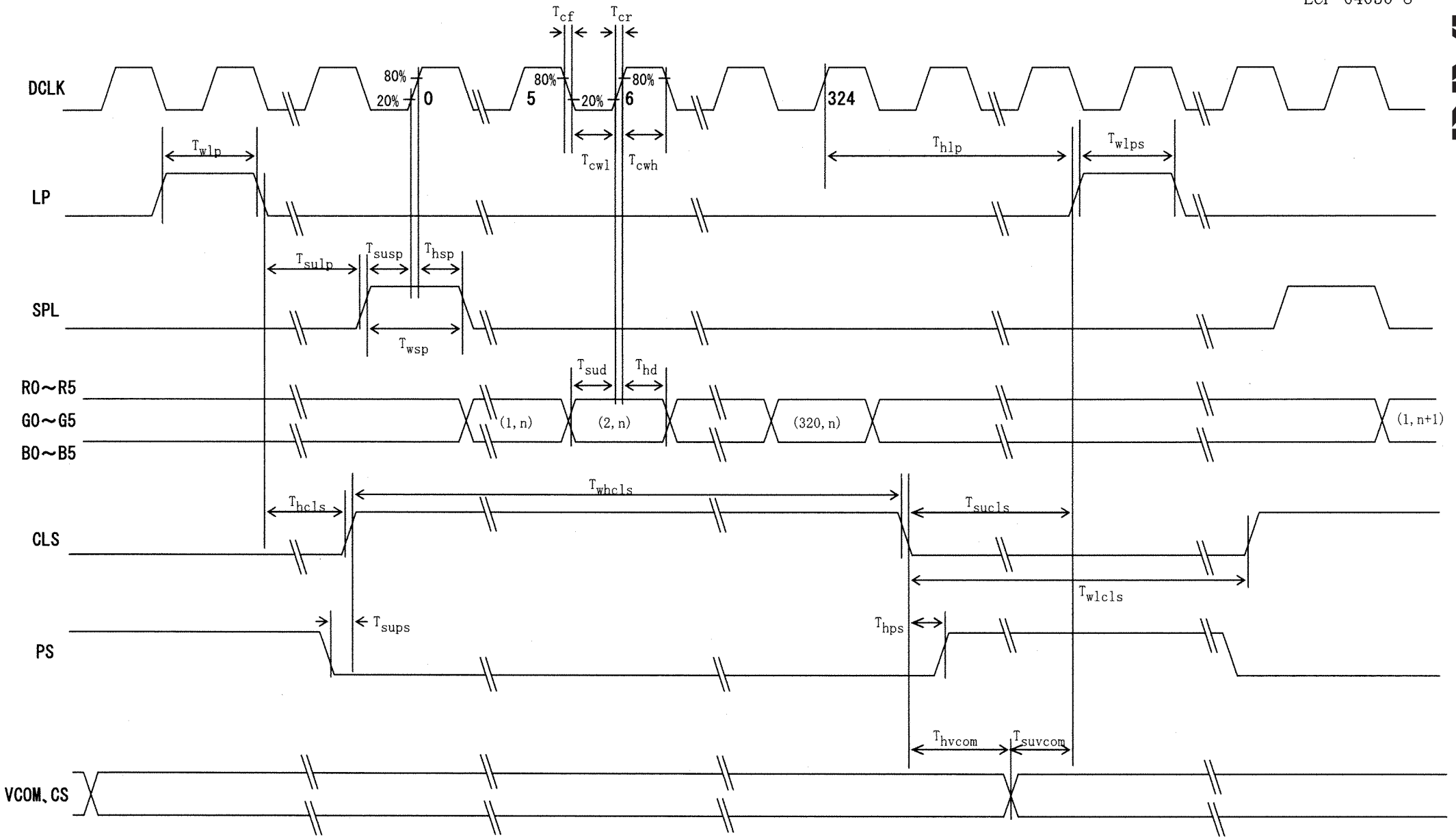


Fig.(a) Horizontal timing chart

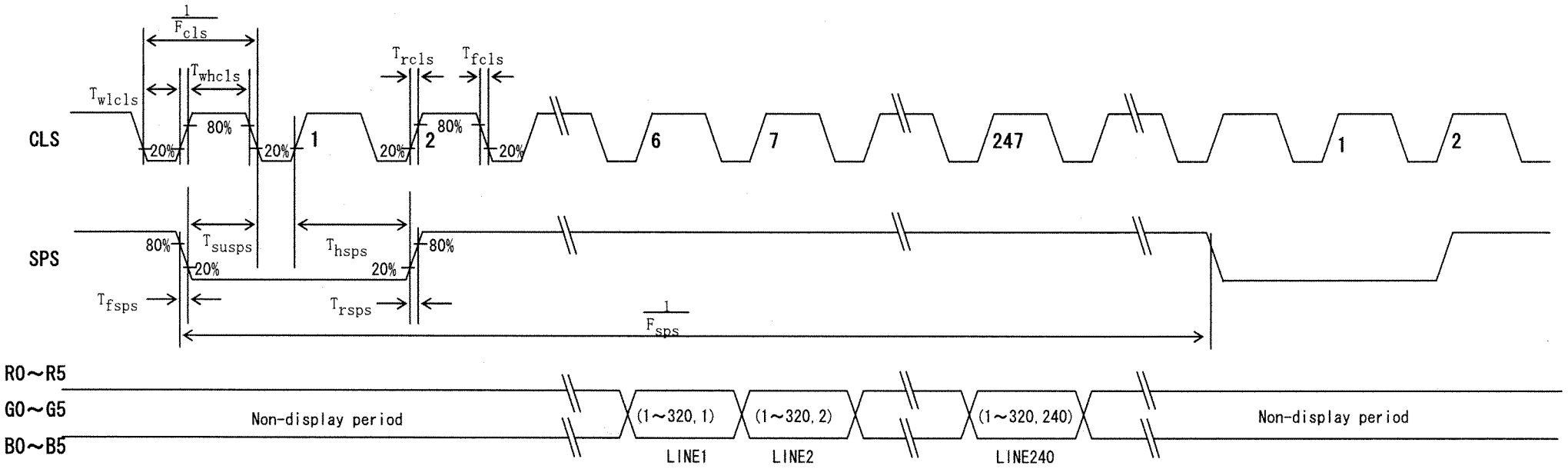


Fig.(b) Vertical timing chart

7-3) Power consumption

Measurement condition : SPS=60Hz,CLS= 15.73 kHz, SPL= 15.73 kHz, DCLK= 6.3 MHz
The term of PS="Lo" in one horizontal period ··· 44 μsec(280DCLK)
Ta=25℃

Table 9

Parameter		Symbol	Conditions	MIN	TYP	MAX	Unit	Remarks
Source current	Analog	ISHA	VSHA=+5.0V	-	3.5	4.0	mA	【Note 7-10】
	Digital	ISHD	VSHD=+3.3V	-	1.4	2.0	mA	【Note 7-11】
Gate current	High	IDD	VDD=+15.0V	-	0.04	0.1	mA	【Note 7-10】
	Low	IEE	VEE=-12.0V	-	-0.04	-0.1	mA	【Note 7-10】

【Note 7-10】 64-Gray-bar vertical pattern (GS0 ～ GS63 for horizontal way)

【Note 7-11】 Vertical stripe pattern alternating 21 gray scale (GS21) with 42 gray scale (GS42) every 1 dot.

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

Table 10

	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 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.

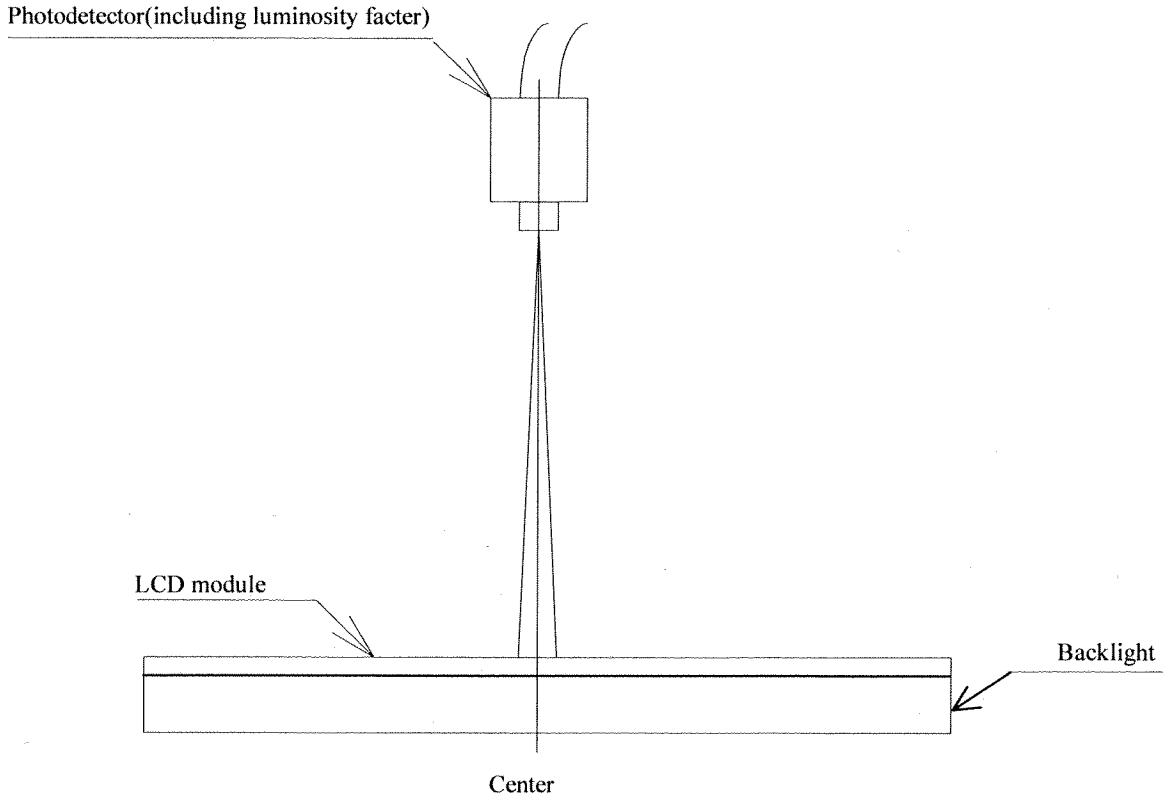
(9) Optical characteristics

Table 11 (VSHA=+5V, VSHD=+3.3V, VDD=+15V, VEE=-12V ,Ta=25℃)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range		θ21,22	CR≥5	70	80	-	degree	[Note 9-1,2,4]
		θ11		70	80	-	degree	
		θ12		40	50	-	degree	
Contrast ratio		CR	Optimum Viewing angle	400	500	-	-	[Note 9-2,4]
			θ = 0°	200	300	-	-	[Note 9-2]
Response time	Rise	τ r		-	15	30	ms	[Note 9-3]
	Fall	τ d		-	30	50	ms	
White chromaticity		x		0.250	0.300	0.350	-	
		y		0.270	0.320	0.370	-	
Red chromaticity		x		-	0.580	-	-	
		y		-	0.340	-	-	
Green chromaticity		x		-	0.330	-	-	
		y		-	0.540	-	-	
Blue chromaticity		x		-	0.140	-	-	
		y		-	0.120	-	-	
Brightness		Y		200	280	-	cd/m²	I_L=17mA

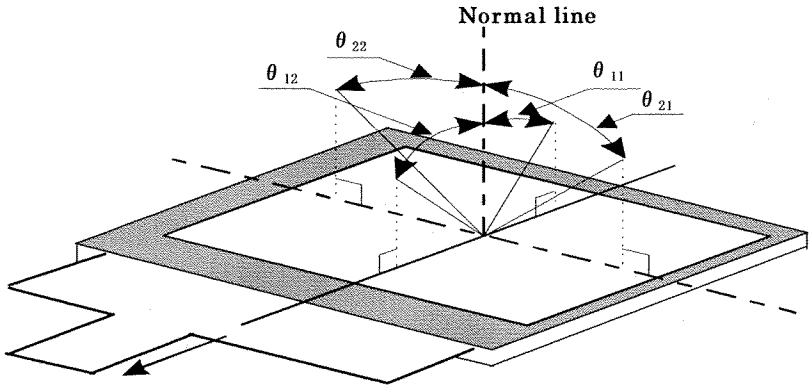
* The measuring method of the optical characteristics is shown by the following figure.

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



Measuring method (b) for optical characteristics

【Note 9-1】 Viewing angle range is defined as follows.



Definition for viewing angle

【Note 9-2】 Definition of contrast ratio:

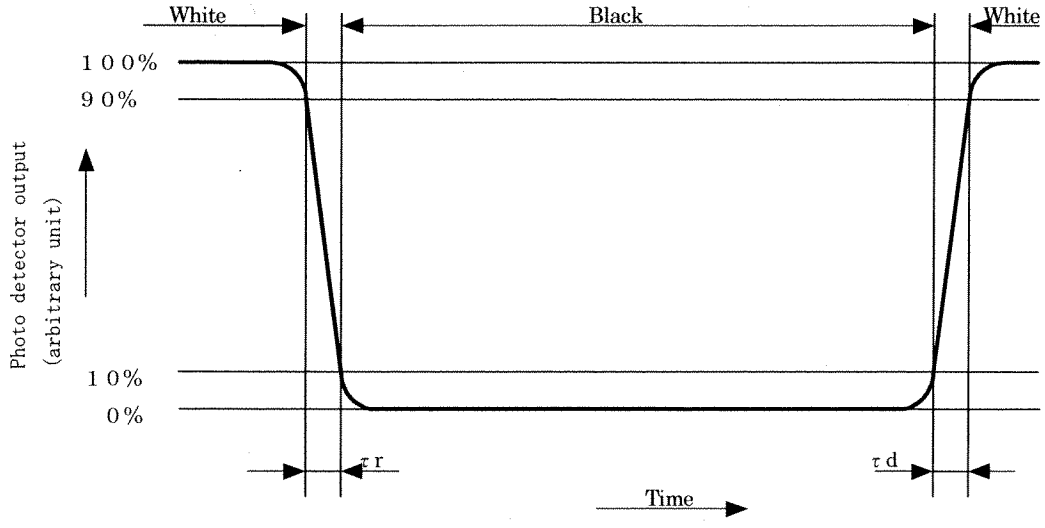
The contrast ratio is defined as follows:

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

V_{COMAC}= 5.0Vp-p,V0= 3.2Vp-p,V4= 3.5Vp-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 ELDIM EZContrast

(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 characteristics

①Specific connector

FF0251SS1(JAE)

② Bending endurance of the bending slits portion(See Fig.1):

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

(12) Handling Precautions

12-1) Insertion and taking out of FPC

Be sure insert and take out of the FPC into the connector of the set after turning off the power supply on the set side.

12-2) Handling of FPC

FPC shall be bent only slit portion. The bending slit ① 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).

Don't give the FPC too much force, for example, hanging the module with holding FPC.

12-3) Installation of the module

① On mounting the module, be sure to fix the module on the same plane. Take care not to warp or twist the module.

② In case that no protective plate is attached on the panel surface, pay attention to the following points. In order to avoid the electrostatic discharge, design the cabinet with grounded conductive sheet inside and cover the module include edge of the polarizer with it

12-4) Precaution when mounting

① The polarizer can be easily scratched. Handle it with sufficient care.

② If water droplets and oil attaches to it for a long time, discoloration and staining occurs. Wipe them off immediately.

③ Glass is used for the TFT-LCD panel. If it is dropped or bumped against a hard object, it may be broken. Handle it with sufficient care.

④ As the CMOS IC is used in this module, pay attention to static electricity when handling it. Take a measure for grounding on the human body.

12-5) Others

① The liquid-crystal is deteriorated by ultraviolet rays. Do not leave it in direct sunlight and strong ultraviolet rays for many hours.

② 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.

③ If the LCD breaks, don't put internal liquid crystal into the mouth. When the liquid crystal sticks to the hands, feet and clothes, wash it out immediately.

④ Wipe off water drop or finger grease immediately. Long contact with water may cause discoloration or spots.

⑤ Observe general precautions for all electronic components.

⑥ VCOM must be adjusted on condition of your final product. No adjustment causes the deterioration for display quality.

⑦ Static image should not be displayed more than 5 minutes in order to prevent from occurrence of residual image.

⑧ The LCD module has shield sheet to avoid light-leak from the LCD Panel's peripheral area (outside of Black Mask in the panel fringe).
However, at a dark circumstance, refracted light in the module inside can be visible through the slit between the Black Mask and Metal Bezel. Please pay attention to the above for your enclosure design.

(13) Forwarding form

a) Piling number of cartons: MAX. 8

b) Package quantity in one cartons: 1 0 0 pcs.

c) Carton size: 5 7 5 mm(W) × 3 6 0 mm(D) × 2 2 5 mm(H)

d) Total mass of 1 carton filled with full modules: 7700g

Fig.2 shows packing form.

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)Period	: about 3 months
(5)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.

(14)Reliability Test Conditions for TFT-LCD Module

Table 12

No.	Test items	Test conditions
1	High temperature storage test	Ta=+70℃ 240h
2	Low temperature storage test	Ta=-20℃ 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	Tp=-10℃ 240h
6	Electro static discharge test	±200V・200pF (0Ω) 1 time for each terminals
7	Shock test	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=-20℃～+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.

(15) Others

15-1) 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

LQ036Q1DA01 ○○○○○○○○
model No. lot No.

15-2) Used Regulation of Chemical Substances Breaking Ozone Stratum

Substances with the object of regulation : 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.

15-3) 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.

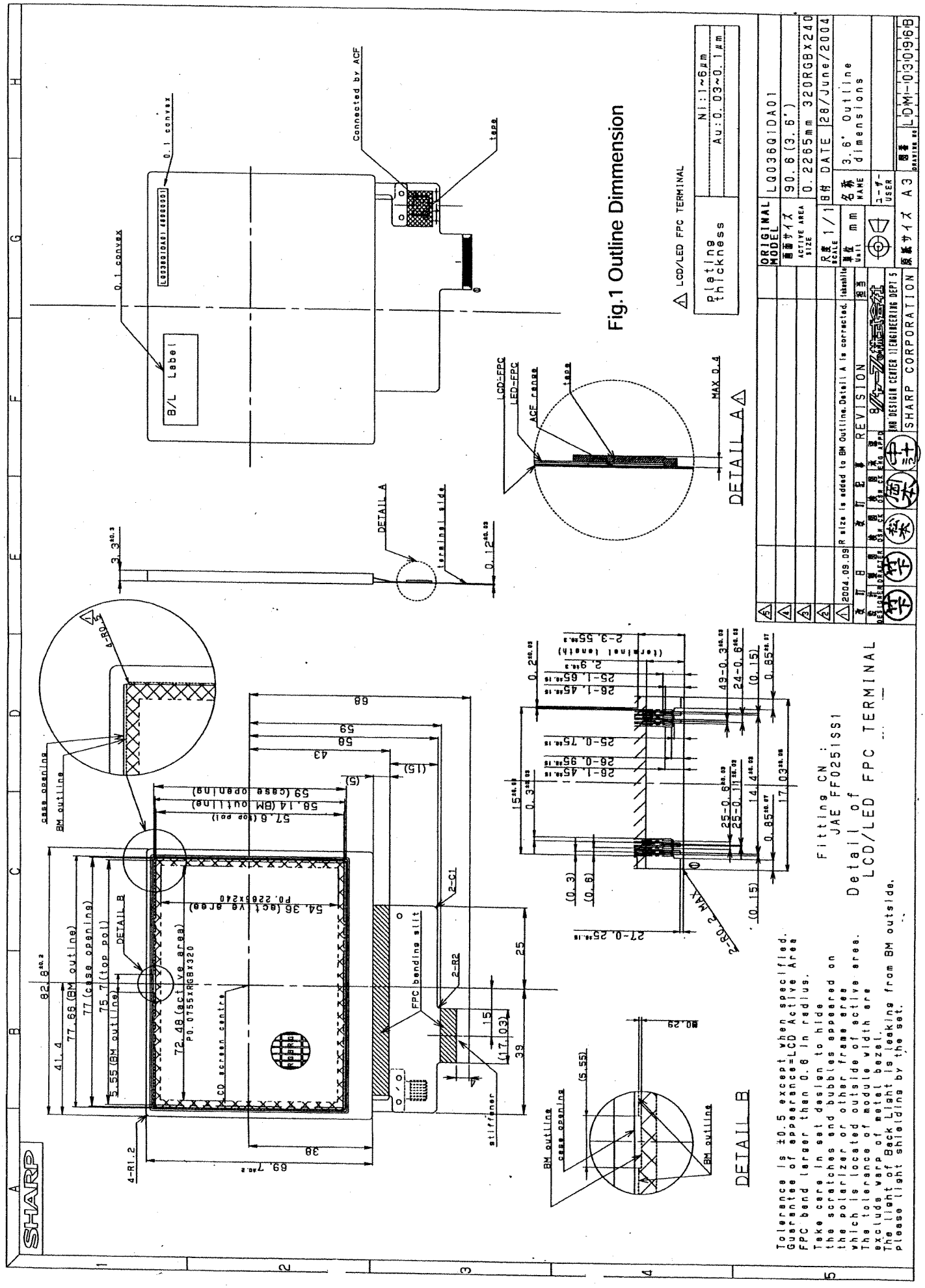


Fig.1 Outline Dimmension
LCD/LED FPC TERMINAL
Plating thickness
Ni:1~6μm
Au:0.03~0.1μm
ORIGINAL MODEL LQ036Q1DA01
90.6(3.6")
0.2265mm 320RGBx240
28/June/2004
3.6' Outline dimensions
SHARP CORPORATION
LDMI-030196B
Connected by ACF
tape
0.1 convex
B/L Label
DETAIL A
terminal side
LCD-FPC
LED-FPC
ACF range
MAX 0.4
DETAIL B
case opening
BM outline
4-R0.5
4-R1.2
68
59
58
43
(15)
(5)
59 (case opening)
58.14 (BM outline)
57.6 (top pol)
54.36 (active area)
P0.226x240
P0.075xRGBx320
72.48 (active area)
77 (case opening)
77.66 (BM outline)
75.7 (top pol)
5.55 (BM outline)
DETAIL B
82.8
41.4
69.7
39
2-C1
2-R2
FPC bending slit
stiffener
25
15
(17.03)
4
Fitting CN : JAE FF0251SS1
Detail of LCD/LED FPC TERMINAL
MAX 2.8
2-R0.2
Tolerance is ±0.5 except when specified.
Guarantee of appearance=LCD Active Area
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 active area.
The tolerance of module width are exclude warp of metal bezel.
The light of Back Light is leaking from BM outside. please light shielding by the set.

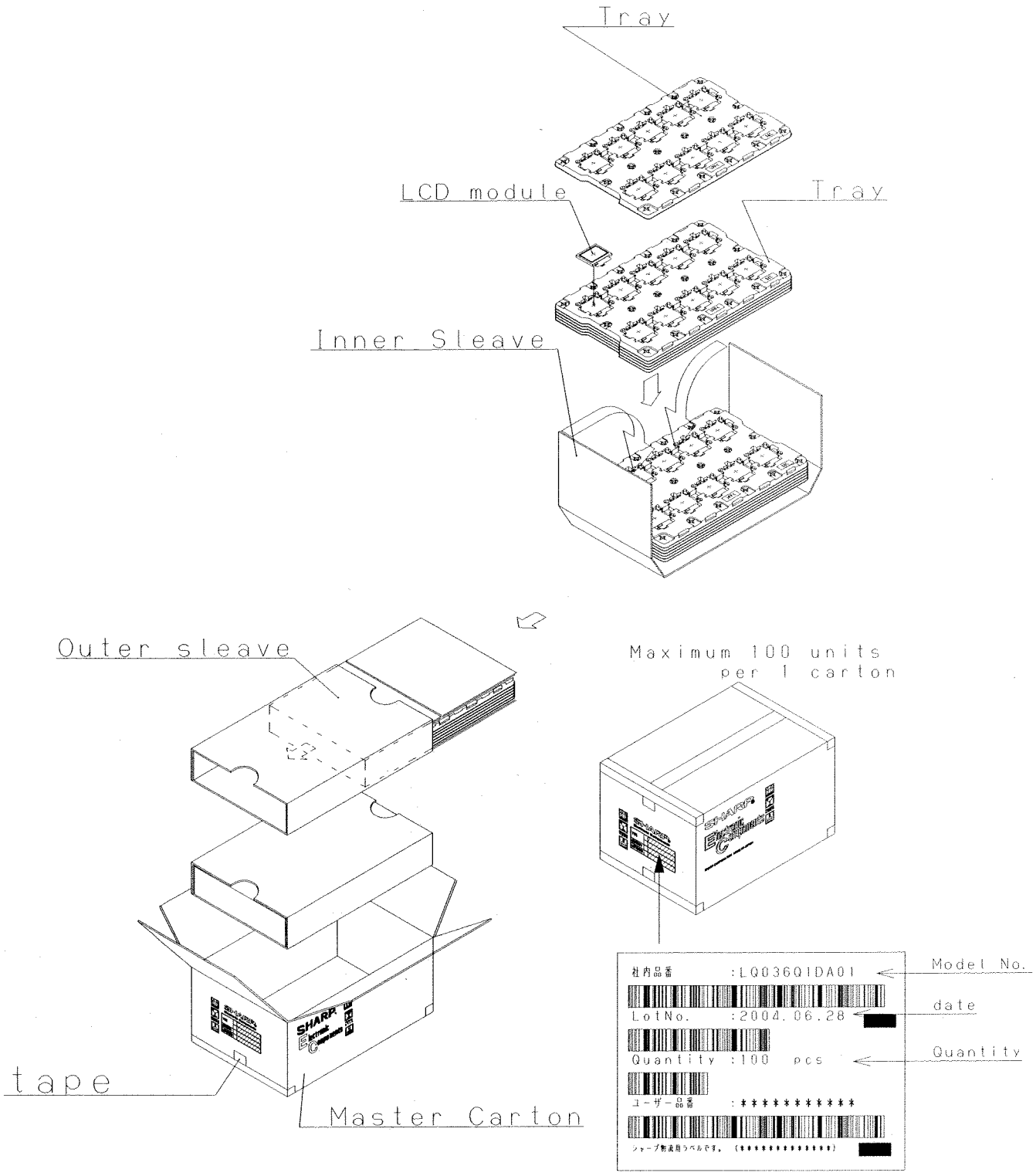


Fig.2 forwarding Form

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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