

Specification

LQ084S3LG01

Doc. No.: LAI-06073

Version December 2006

Note: This specification is subject to change without prior notice

1. Application

This specification applies to the color 8.4 SVGA TFT-LCD module LQ084S3LG01.

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2. Overview

This module is a color active matrix LCD module incorporating an embedded silicon TFT (Thin Film Transistor)

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	21.3 (Diagonal)	cm
	8.4 (Diagonal)	Inch
Active area	170.4 (H)×127.8 (V)	mm
Pixel format	800 (H)×600 (V)	Pixel
	(1 pixel=R+G+B dots)	
Pixel pitch	0.213 (H)×0.213 (V)	mm
Pixel configuration	R, G, B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	199.5(W)×149.5(H)×11.6(D)	mm
Mass	T.B.D	g
Surface treatment	Anti-glare and hard-coating : 3H	

*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

CN1 (Interface signals and +3.3V DC power supply)

Using connectors : 20186-020E-11 (I-PEX)

Corresponding connectors : FI-SE20ME(Japan Aviation Electronics Industry, Ltd.)
FI-SE20S (Japan Aviation Electronics Industry, Ltd.)

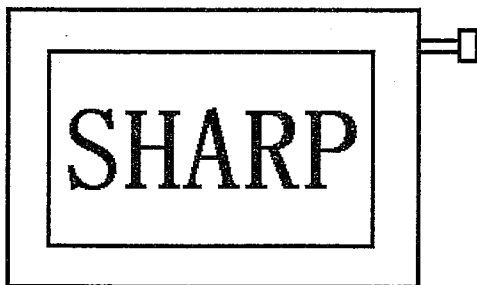
Using LVDS Receiver : Contained in a control IC. [THC63LVDF84A(Thine) compatible]

Corresponding LVDS Transmitter : THC63LVDM83R(Thine) or DSC90C385AMT(NS) or compatible

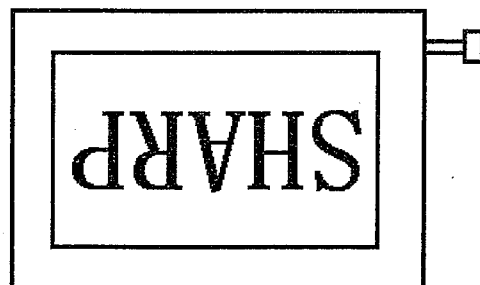
Pin No.	Symbol	Function	Remark
1	Vcc	+3.3V Power supply	
2	Vcc	+3.3V Power supply	
3	GND	Ground	
4	GND	Ground	
5	RxIN0-	LVDS CH0 data signal (-)	LVDS
6	RxIN0+	LVDS CH0 data signal (+)	LVDS
7	GND	Ground	
8	RxIN1-	LVDS CH1 data signal (-)	LVDS
9	RxIN1+	LVDS CH1 data signal (+)	LVDS
10	GND	Ground	
11	RxIN2-	LVDS CH2 data signal (-)	LVDS
12	RxIN2+	LVDS CH2 data signal (+)	LVDS
13	GND	Ground	
14	RxCLKIN-	LVDS CK- data signal (-)	LVDS
15	RxCLKIN+	LVDS CK+ data signal (+)	LVDS
16	GND	Ground	
17	RxIN3-	LVDS CH3 data signal (-)	LVDS
18	RxIN3+	LVDS CH3 data signal (+)	LVDS
19	REV	Reversing terminal	
20	LVDS_SET	SELLVDS.	【Note1】

【Note1】

REV : High



REV:Low



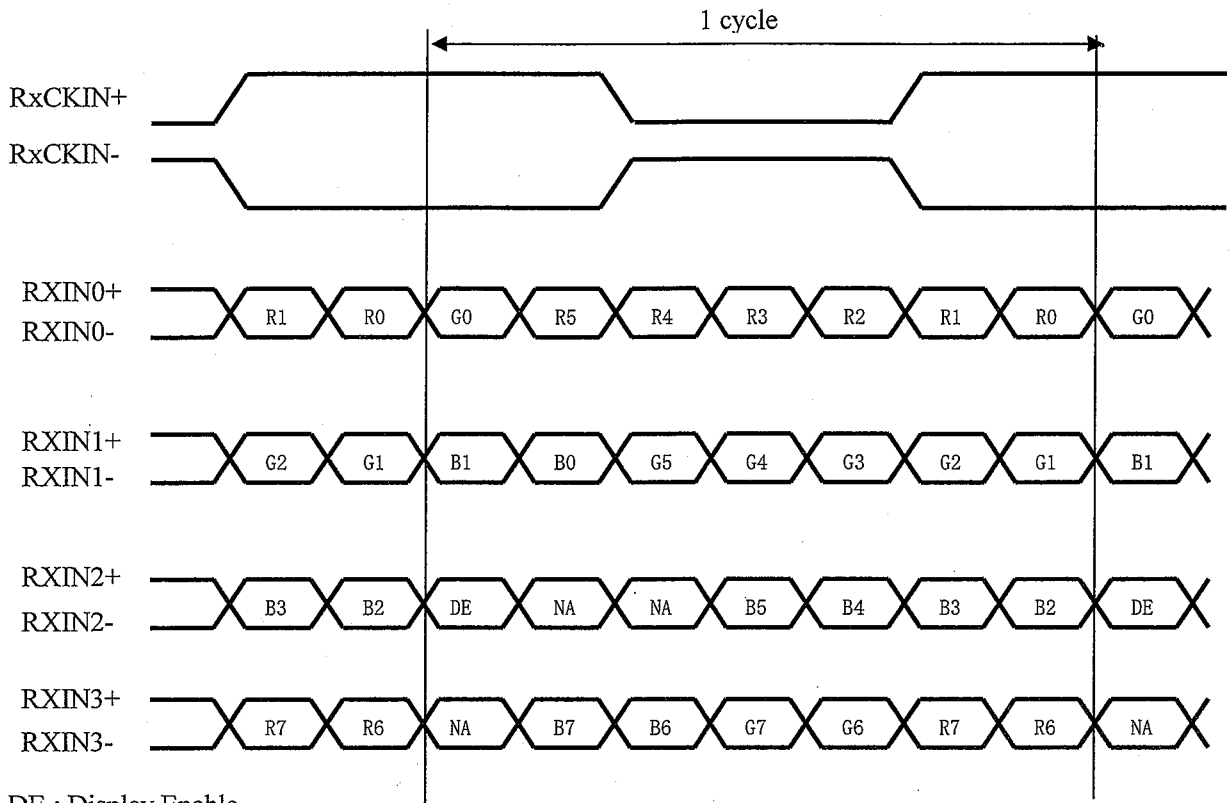
4-2 Data Mapping

1) 8 bit input

【Note1】 pin assignment with LVDS_SET pin (Thine:THC63LVDM83R)

Transmitter	20-pin LVDS SET
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< SELLVDS = H >

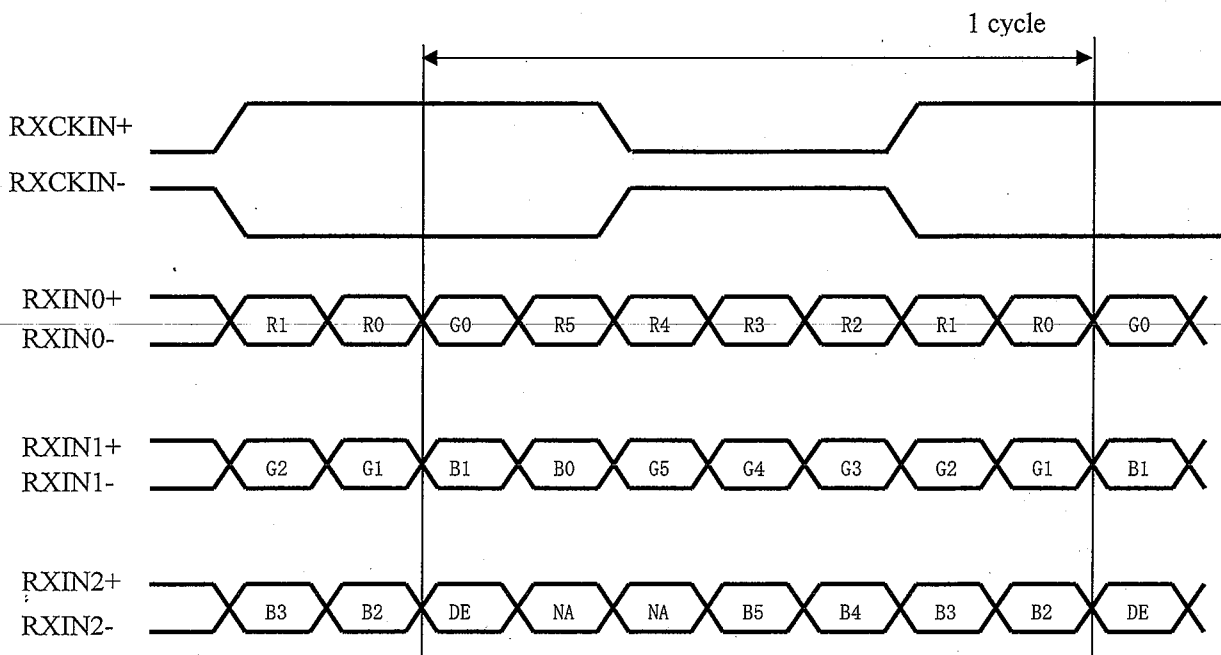


DE : Display Enable
 NA : Not Available

2) 6 bit input

【Note1】 pin assignment with LVDS_SET pin (Thine:THC63LVDM83R)

Transmitter		20pin LVDS_SET	
Pin No	Data	=H (3.3V)	=L (GND) or Open
51	TA0	—	R0 (LSB)
52	TA1	—	R1
54	TA2	—	R2
55	TA3	—	R3
56	TA4	—	R4
3	TA5	—	R5 (MSB)
4	TA6	—	G0 (LSB)
6	TB0	—	G1
7	TB1	—	G2
11	TB2	—	G3
12	TB3	—	G4
14	TB4	—	G5 (MSB)
15	TB5	—	B0 (LSB)
19	TB6	—	B1
20	TC0	—	B2
22	TC1	—	B3
23	TC2	—	B4
24	TC3	—	B5 (MSB)
27	TC4	—	(NA)
28	TC5	—	(NA)
30	TC6	—	DE
50	TD0	—	GND
2	TD1	—	GND
8	TD2	—	GND
10	TD3	—	GND
16	TD4	—	GND
18	TD5	—	GND
25	TD6	—	(NA)



DE : Display Enable
NA : Not Available

4-3 Interface block diagram

LA1-06073-7

(Computer Side)

(TFT-LCD side)

①8Bit Mode

SELLVDS=H (20 pin=3.3V)

4-4. Backlight

The module-side connector : BHR-04VS-1 (JST)

The user-side connector : SM0 4 (4.0)B-BHS (JST)

Pin no.	symbol	Function
1	VHIGH	Power supply for lamp 1 (High voltage side)
2	VHIGH	Power supply for lamp 2 (High voltage side)
3	NC	Open
4	VLOW	Power supply for lamp 1,2 (Low voltage side)

[Note]

The input voltage wave forms to terminal (1) and terminal (2) should be in a same phase.

It has the possibility to discharge abnormally between the terminals in case of input in a reversed phase.

5 Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage	V_I	$T_a=25^\circ\text{C}$	$-0.3 \sim V_{CC}+0.3$	V	[Note 11]

6. Electrical Characteristics

6-1. TFT-LCD panel driving

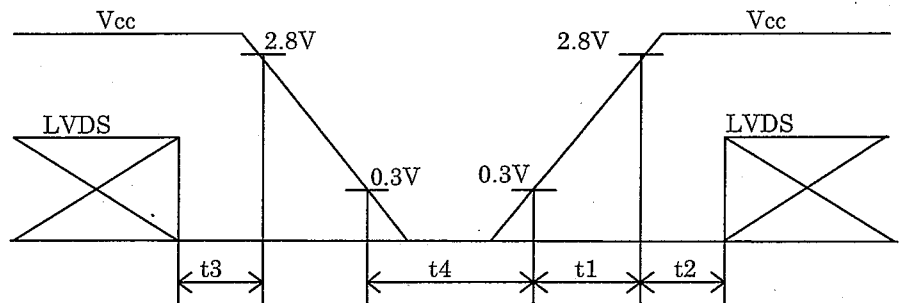
Ta=25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	V _{CC}	+3.0	+3.3	+3.6	V	【Note1】
Current dissipation	I _{CC}	—	T.B.D.	T.B.D.	mA	【Note2】
Input voltage ("High" state)	V _{RIH}	V _{CC} ×0.7			V	【Note3】
Input voltage ("Low" state)	V _{RIL}			V _{CC} ×0.3	V	
Permissible input ripple voltage	V _{RF}	—	—	100	mVp-p	
Terminal resistor	R _T	—	100	—	Ω	Differential input
Differential input threshold voltage	High	V _{IH}	—	—	mV	
	Low	V _{IL}	-100	—	mV	

【Note1】

On-off sequences of V_{CC} and data

- 0 < t₁ ≤ 15ms
- 0 < t₂ ≤ 50ms
- 0 < t₃ ≤ 50ms
- 1s ≤ t₄

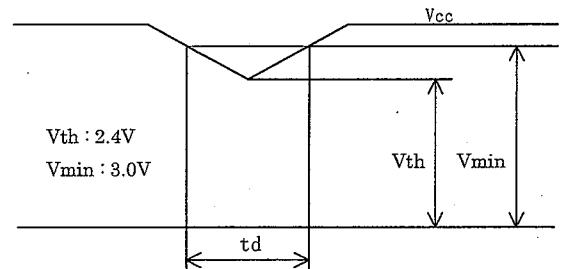


Dip conditions for supply voltage

V_{min}, V_{th} = 3.0V, 2.4V

- 1) V_{th} ≤ V_{CC} < V_{min}
T_d ≤ 10ms
- 2) V_{CC} < V_{th}

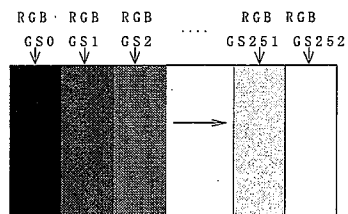
V_{CC}-dip conditions should also follow the on-off conditions.



【Note2】 Typical current situation : 253-gray-bar pattern

V_{CC} = +3.3V, f_{ck} = 65MHz, Ta = 25°C

The explanation of each gray scale is described below section 8.



【Note3】 Terminal : REV

6-2. Backlight

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

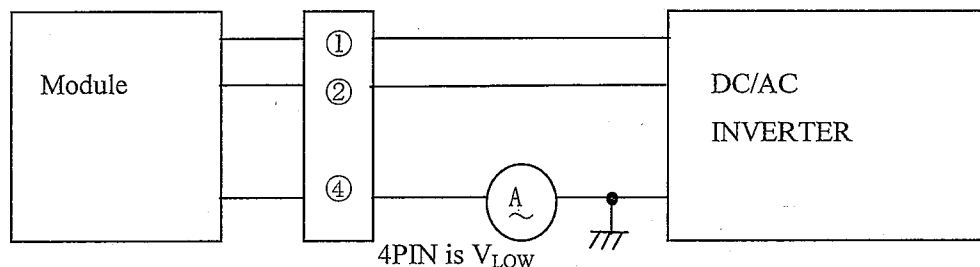
The characteristics of the lamp are shown in the following table.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp voltage	V_L	(340)	(380)	(420)	Vrms	$I_L=6\text{mA}_{\text{rms}}$
Lamp current range	I_L	3.0	6.0	6.5	mA _{rms}	【Note1】
Lamp power consumption	P_L	-	2.3	-	W	【Note2】
Lamp frequency	F_L	45	-	100	kHz	
Kick-off voltage	V_s	-	-	890	Vrms	$T_a=25^\circ\text{C}$
				1,000		$T_a=-10^\circ\text{C}$ 【Note3】
Lamp life time	L_L	-	50,000	-	hour	【Note4】

【Note1】 Lamp current is measured with current meter for high frequency as shown below.

【Note2】 At the condition of $Y_L = 400 \text{ cd/m}^2$



【Note3】 The open output voltage of the inverter shall be maintained for more than 1sec; otherwise the lamp may not be turned on.

The input voltage wave forms to terminal ① and terminal ② should be in a same phase. It has the possibility to discharge abnormally between the terminals in case of input of a reversed phase.

For the sake of the safety, please so design the inveter as to prevent abnormal discharge when one of the two lamps is broken or reaches the end of life.

【Note4】 a) Lamp life time is defined as the time until it becomes the conditions either ① or ② by continuous lighting under the standard condition ($T_a = 25^\circ\text{C}$, $I_L = 6\text{mA}_{\text{rms}}$).

① When a brightness of lamp surface became 50% of the initial value under the standard condition.

② When a kick-off voltage in $T_a = -10^\circ\text{C}$ exceeded maximum value 1,000 Vrms.

b) 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.

【Note】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 an inadequate 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.

7. Timing characteristics of input signals

7-1-1. Timing characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Frequency	1/Tc	(35)	40	(42)	MHz	
Horizontal period	TH	(832)	(1056)	(1395)	clock	
		(20.8)	(26.4)	(39.9)	μs	
Horizontal period (High)	THd	800	800	800	clock	
Vertical period	TV	(628)	(666)	(798)	line	【Note】
		-	(17.6)	-	ms	

7.0 Limit Data Signals and Display Position on the screen

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

Colors & Gray scale	Gray Scale	Data signal																							
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
Basic Color	Black	—	0	0	0	0	0	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	0	0	0	0	X	X	1	1	1	1	1
	Green	—	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0
	Cyan	—	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1
	Red	—	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	—	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1
	Yellow	—	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0
	White	—	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1	X	X	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	0	0	0	0	
	↑	GS1	1	0	0	0	0	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	0	0	0	0	
	↑	↓					↓							↓								↓			
	↓	↓					↓							↓								↓			
	Brighter	GS250	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	↓	GS251	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red	GS252	X	X	1	1	1	1	1	1	0	0	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	0	0	0	0	
	↑	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	↑	↓					↓							↓								↓			
	↓	↓					↓							↓								↓			
	Brighter	GS250	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	
	↓	GS251	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	
	Green	GS252	0	0	0	0	0	0	0	0	X	X	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	0	0	0	0	
	↑	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
	↑	↓					↓							↓								↓			
	↓	↓					↓							↓								↓			
	Brighter	GS250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	
	↓	GS251	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	
	Blue	GS252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	

0 : Low level voltage, 1 : High level voltage. X :Don't care.

Each basic color can be displayed in 253 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16-million-color display can be achieved on the screen.

9. Optical Characteristics

Ta=25°C, Vcc =+3.3V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	$\theta 21$	$CR \geq 10$	(50)	(60)	-	Deg.	【Note1,4】
		$\theta 21$		(50)	(60)	-	Deg.	
	Vertical	$\theta 11$		(45)	(55)	-	Deg.	
		$\theta 12$		(55)	(65)	-	Deg.	
Contrast ratio		CR	the best viewing angle	-	(600)	-	-	【Note2,4】
Response time	rise	τr	$\theta = 0^\circ$	-	(10)	-	ms	【Note3,4】
	fall	τd		-	(20)	-	ms	
Chromaticity of White		X	$\theta = 0^\circ$	0.263	0.313	0.363	-	【Note4】
		Y		0.279	0.329	0.379	-	
Luminance of white		YL	$\theta = 0^\circ$	320	(400)	-	cd/m ²	
Direction of the best viewing angle		-			6		o'clock	

※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.

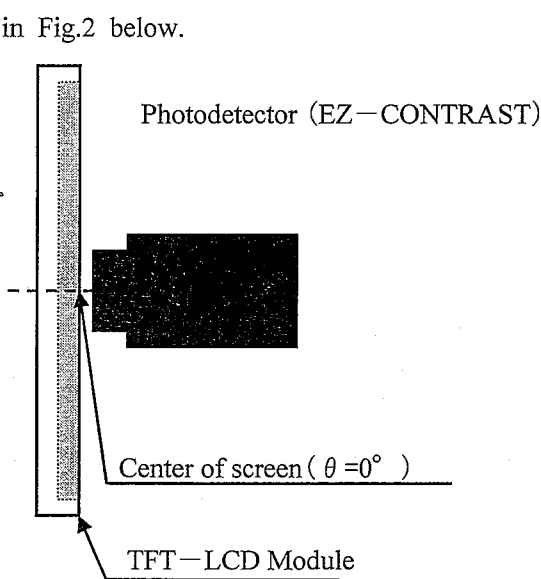


Fig2-1 Viewing angle measurement method

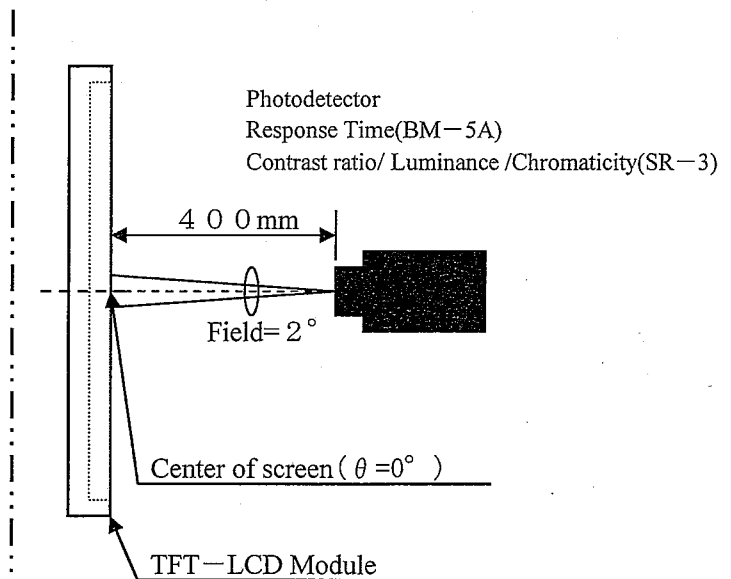
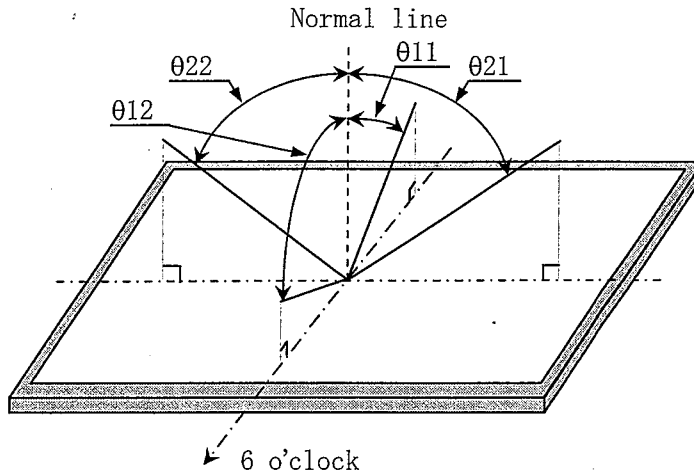


Fig2-2 Luminance/Contrast ratio/Response time/Chromaticity measurement method

Fig2 Optical characteristics measurement method

【Note1】 Definitions of viewing angle range:



The best viewing angle of this module is slightly leaned to 6 o'clock from normal line.
 In the field where θ_{12} exceeds this angle, gray-scale is reversed partially.
 The gray-scale in the field of 12 o'clock direction is brighter than that of 6 o'clock direction and isn't reversed.

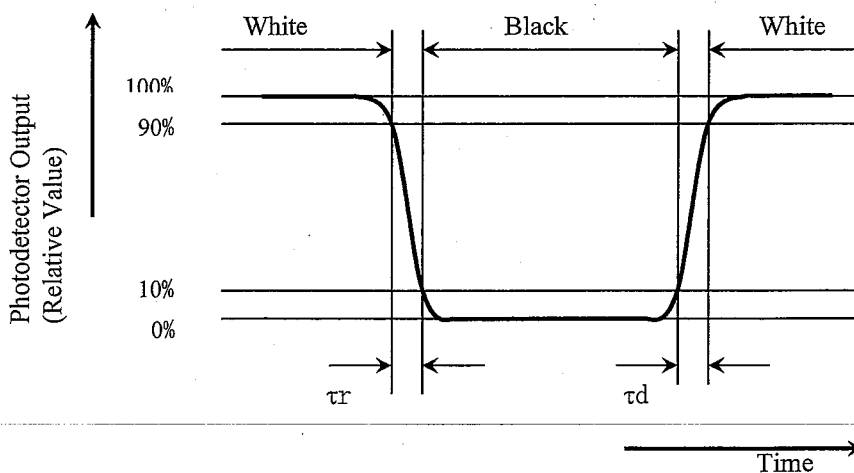
【Note2】 Definition of contrast ratio:

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".



【Note4】 This shall be measured at center of the screen.

10. 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 polarize is easily damaged, pay attention not to scratch it.
- d) Since long contact with water may cause discoloration or spots, wipe off water drop immediately.
- 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 take the human earth into consideration when handling.
- h) Make sure the four mounting holes of the module are grounded sufficiently. Take electro-magnetic interference (EMI) into consideration.
- i) The module has some printed circuit boards (PCBs) on the back side. Take care to keep them from any stress or pressure when handling or installing the module; otherwise some of electronic parts on the PCBs may be damaged.
- j) Observe all other precautionary requirements in handling components.
- k) Since it is necessary to remove the screw on the back of a module before performing lamp exchange, please take a cabinet design into consideration.
- l) When some pressure is added onto the module from rear side constantly, it causes display non-uniformity issue, functional defect, etc. So, please avoid such design.
- m) 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.

11. Packing form

T.B.D.

12. Reliability test items

T.B.D.

13. Others

1) Lot No.:

T.B.D.

2) 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.

3) Disassembling the module can cause permanent damage and should be strictly avoided.

4) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.

5) When any question or issue occurs, it shall be solved by mutual discussion.

14. Carton storage condition

Temperature 0°C to 40°C

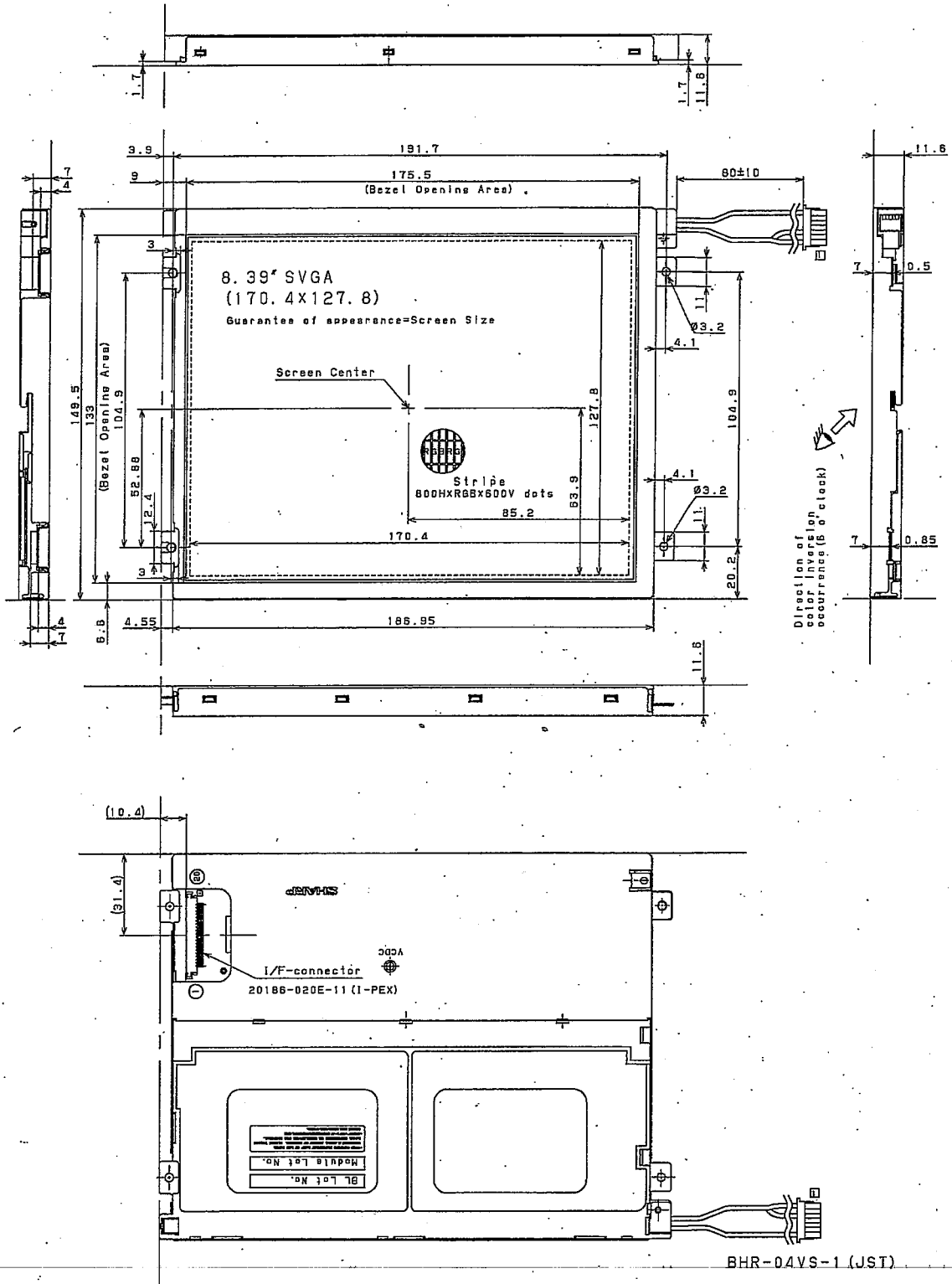
Humidity Up to 60%RH

Sunlight Be sure to shelter a product from the direct sunlight.

Ambiance: No gases bite into electronic components and wiring materials

Period: Approximately 3month

Unpacking: To prevent LCD module from damaging by ESD,
unpack the module with effective measure after controlling
humidity 50%RH or more.



General tolerance is ± 0.5 .
 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.

unit:mm	Please do not copy this material and do not disclose this to third party.		▲			
DATE	2006.12.25	SCALE	▲			
MODEL	LQ0834S3LG01	free	▲	No.	DATE	REVISION
DRAWING NO	LCM1-0644A	size A2	▲			
			▲	SHARP CO. LTD		ENGINEERING DEPARTMENT 1 MOBILE LCD DESIGN CENTER MOBILE LIQUID CRYSTAL DISPLAY GROUP



Data Modul Headquarters Munich
Landsberger-Str. 322
D-80687 Munich - Germany
Tel.: +49-89-56017-0



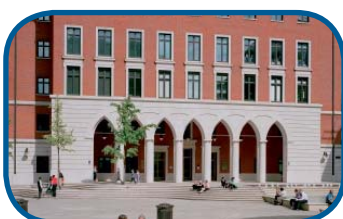
Sales Office Berlin
berlin@data-modul.com
Germany
Tel.: +49-033397/67909



Sales Office Duesseldorf
Fritz-Vomfelde-Str. 8
40547 Duesseldorf - Germany
Tel.: +49-211-52709-0



Sales Office Stuttgart
Friedrich-List-Str. 42
70771 Leinfelden-Echterdingen
Germany
Tel.: +49-711-782385-0



Data Modul France, S.A.R.L.
Bat B - Hall 204
1-3 Rue des Campanules
77185 Lognes - France
Tel.: +33-1-60378100



Data Modul Italia, S.r.l.
Regus Center Senigallia
Via Senigallia 18/2
20161 Milano - Italy
Tel.: +39-02-64672-509



Data Modul Iberia, S.L.
c/ Adolfo Pérez Esquivel 3
Edificio Las Americas III Oficiana 40
28230 Parque Empresarial
Madrid Las Rozas - Spain
Tel.: +34-609 61 80 40

Data Modul Ltd. / UK
3 Brindley Place
Birmingham B 12JB
United Kingdom
Tel.: +44-121-698-8641

Data Modul Inc. / USA
1767-46 Veterans Memorial Highway
Islandia NY 11749
USA
Tel.: +1-877-951-0800