

# SHARP

No.	LD-26957B
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TECHNICAL LITERATURE  
FOR  
TFT - LCD module

MODEL No. **LQ084S3LG12**

These parts have corresponded with the RoHS directive.

The technical literature is subject to change without notice.  
So, please contact SHARP or its representative before  
designing your product based on this literature.

**DISPLAY DEVICE BUSINESS GROUP  
SHARP CORPORATION**

No.		page
1	Application .....	1
2	Overview .....	2
3	Mechanical Specifications .....	2
4	Input Terminals .....	3
5	Absolute Maximum Ratings .....	8
6	Electrical Characteristics .....	9
7	Timing characteristics of input signals .....	11
8	Input Signals, Basic Display Colors and Gray Scale of Each Color ..	12
9	Optical Characteristics .....	14
10	Display quality .....	15
11	Handling Precautions .....	16
12	Packing form .....	17
13	Reliability test items .....	17
14	Others .....	18
15	Storage conditions .....	19
Fig.1	OUTLINE DIMENSIONS .....	20

## 1. Application

This technical literature applies to the color TFT-LCD module LQ084S3LG12.

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In case of using the device for applications such as control and safety equipment for transportation (controls of 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.

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## 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, power supply circuit and a White-LED Backlight unit. Graphics and texts can be displayed on a 800 × RGB × 600dots panel with about 16 million colors by using LVDS (Low Voltage Differential Signaling) and supplying +3.3V DC supply voltages 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.

The maximum viewing angle is in the 6 o'clock direction.

The 12 o'clock direction is difficult to reverse the grayscale.

The LED driver circuit and the PWM circuit to drive the backlight are built into the module.

## 3. Mechanical technical literatures

Parameter	technical literatures	Unit
Display size	21 (8.4inch) Diagonal	cm
Active area	170.4 (H) × 127.8 (V)	mm
Pixel format	800 (H) × 600 (V) (1pixel=R+G+B dot)	pixel
Aspect ratio	4:3	
Pixel pitch	0.213 (H) × 0.213 (V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	200.0 (W) × 152.0 (H) × 11.6 (D)	mm
Mass	TBD (Max.)	g
Surface treatment	Anti-glare and hard-coating 2H	

\*1.Note: excluding back light connector.

Outline dimensions are shown in Fig.1.

## 4. Input Terminals

### 4-1. TFT-LCD panel driving

CN1 (Interface signals and +3.3V power supply)

Corresponding connectors: FI-SE20M or FI-S20S(conector) (JAE)

(※)Please do not use it besides corresponding connector

CN1

Pin	Symbol	Function	Remark
1	RxIN3+	LVDS receiver signal CH3 (+)	【*4-1,4-5】
2	RxIN3-	LVDS receiver signal CH3 (-)	【*4-1,4-5】
3	REV	Horizontal/Vertical display mode select signal	【*4-3】
4	8/6Bit	8Bit/6Bit select terminal	【*4-4】
5	GND	GND	
6	CK IN+	LVDS receiver signal CK (+)	【*4-1】
7	CK IN-	LVDS receiver signal CK (-)	【*4-1】
8	GND	GND	
9	RxIN2+	LVDS receiver signal CH2 (+)	【*4-1】
10	RxIN2-	LVDS receiver signal CH2 (-)	【*4-1】
11	GND	GND	
12	RxIN1+	LVDS receiver signal CH1 (+)	【*4-1】
13	RxIN1-	LVDS receiver signal CH1 (-)	【*4-1】
14	GND	GND	
15	RxIN0+	LVDS receiver signal CH0 (+)	【*4-1】
16	RxIN0-	LVDS receiver signal CH0 (-)	【*4-1】
17	GND	GND	
18	LVDS_SET	LVDS_SET	【*4-6】
19	VCC	+3.3V Power supply	
20	VCC	+3.3V Power supply	

【\*4-1】 Please refer to 4-2 and 7-2 for correspondence of RxINi (i=0,1,2,3) and actual display-data.

【\*4-2】 The shielding case is connected with GND-line in the module.

【\*4-3】 REV = LOW or OPEN

REV = HIGH



"L" or Open	6Bit input mode

【\*4-5】 When use 6Bit input mode, please connects RxIN3+/- and GND-line.

## 4-2. Data Mapping

pin assignment ex) (THC63LVDM83R/D(Thine electronics) or Compatible product)

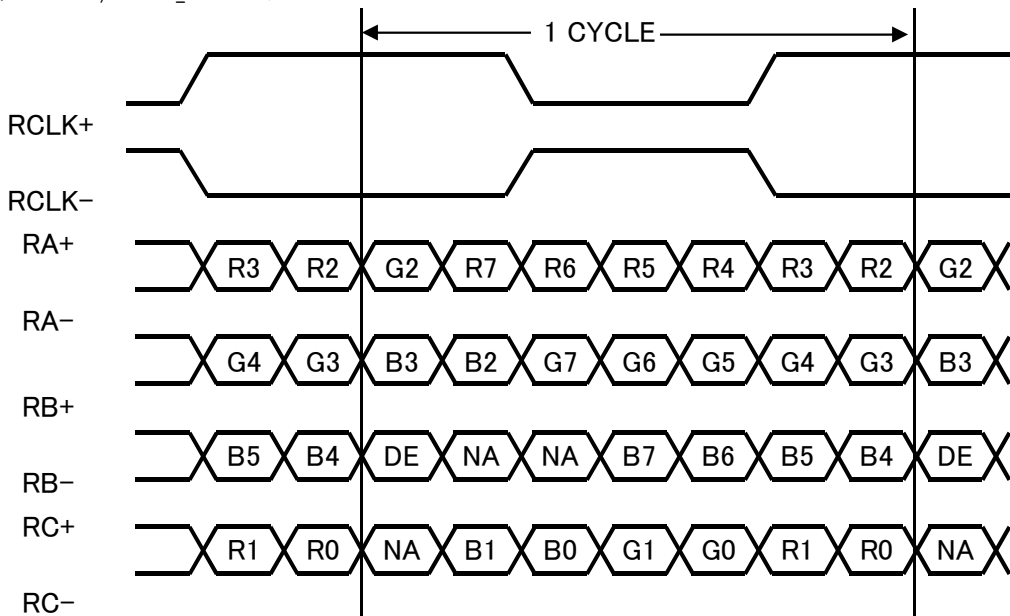
Transmitter		8/6Bit=H		8/6Bit=L
Pin No	Data	LVDS_SET=L	LVDS_SET=H	LVDS_SET=L
51	TA0	R2	R0(LSB)	R2(LSB)
52	TA1	R3	R1	R3
54	TA2	R4	R2	R4
55	TA3	R5	R3	R5
56	TA4	R6	R4	R6
3	TA5	R7(MSB)	R5	R7(MSB)
4	TA6	G2	G0(LSB)	G2(LSB)
6	TB0	G3	G1	G3
7	TB1	G4	G2	G4
11	TB2	G5	G3	G5
12	TB3	G6	G4	G6
14	TB4	G7 (MSB)	G5	G7 (MSB)
15	TB5	B2	B0(LSB)	B2 (LSB)
19	TB6	B3	B1	B3
20	TC0	B4	B2	B4
22	TC1	B5	B3	B5
23	TC2	B6	B4	B6
24	TC3	B7 (MSB)	B5	B7 (MSB)
27	TC4	(NA)	(NA)	(NA)
28	TC5	(NA)	(NA)	(NA)
30	TC6	DE	DE	DE
50	TD0	R0(LSB)	R6	R0(GND)
2	TD1	R1	R7(MSB)	R1(GND)
8	TD2	G0(LSB)	G6	G0(GND)
10	TD3	G1	G7(MSB)	G1(GND)
16	TD4	B0(LSB)	B6	B0(GND)
18	TD5	B1	B7(MSB)	B1(GND)
25	TD6	(NA)	(NA)	(NA)

**4-3. Interface block diagram**

Using LVDS receiver: Building into cotroll IC (THC63LVDF84B (Thine electronics) or Compatible product)

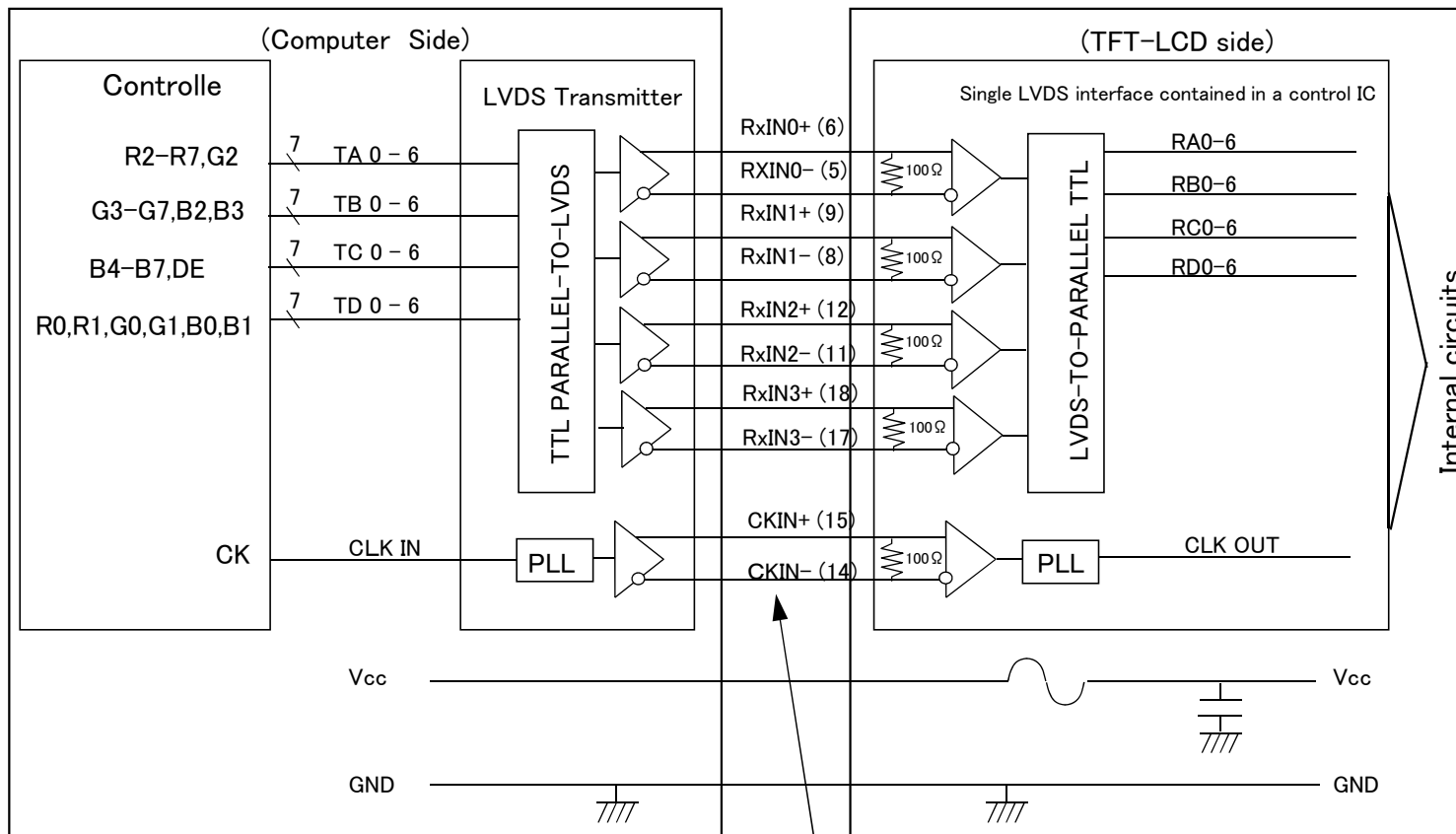
Corresponding LVDS transmitter: THC63LVDM83R/D (Thine electronics) or Compatible product

<8/6Bit=H,LVDS\_SET=L>



DE: Display Enable

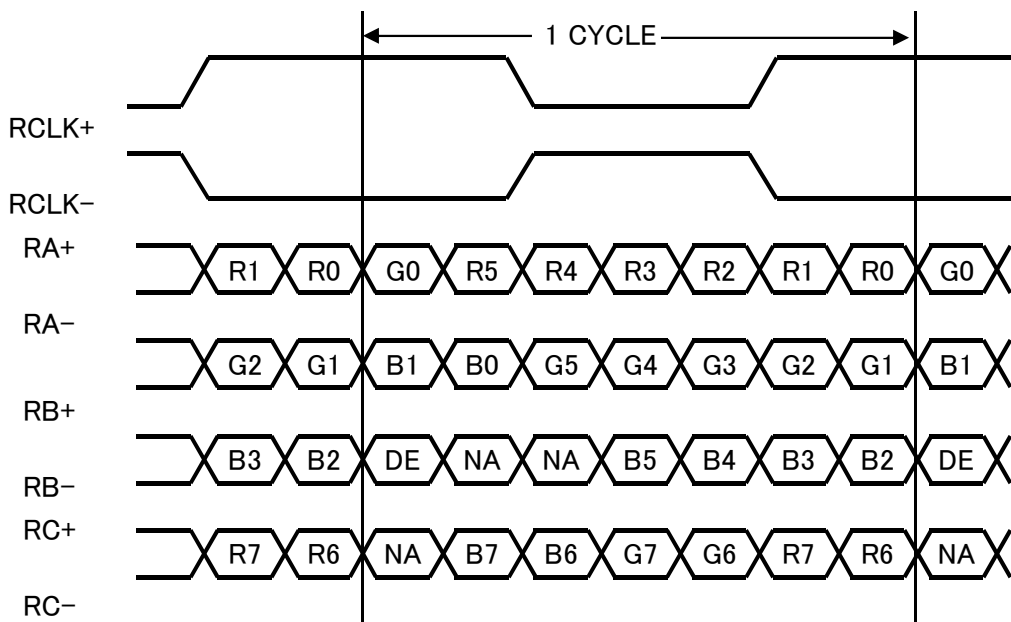
NA: Not Available



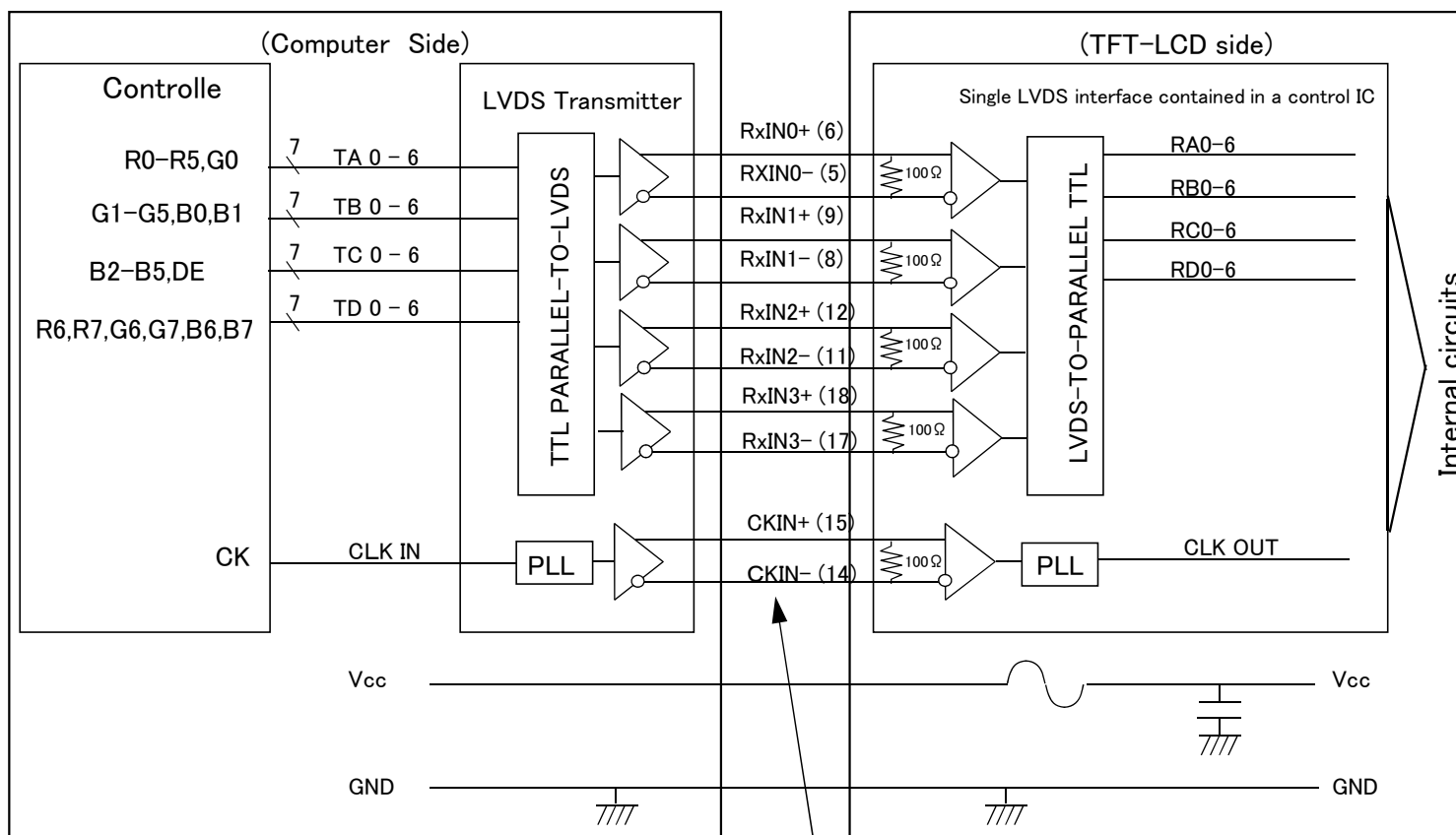
Symbol of CN1(Pin No.)

\* When use 6Bit input mode, please connects RxIN3+/- and GND-line.

<8/6Bit=H,LVDS\_SET=H>



DE : Display Enable  
NA : Not Available

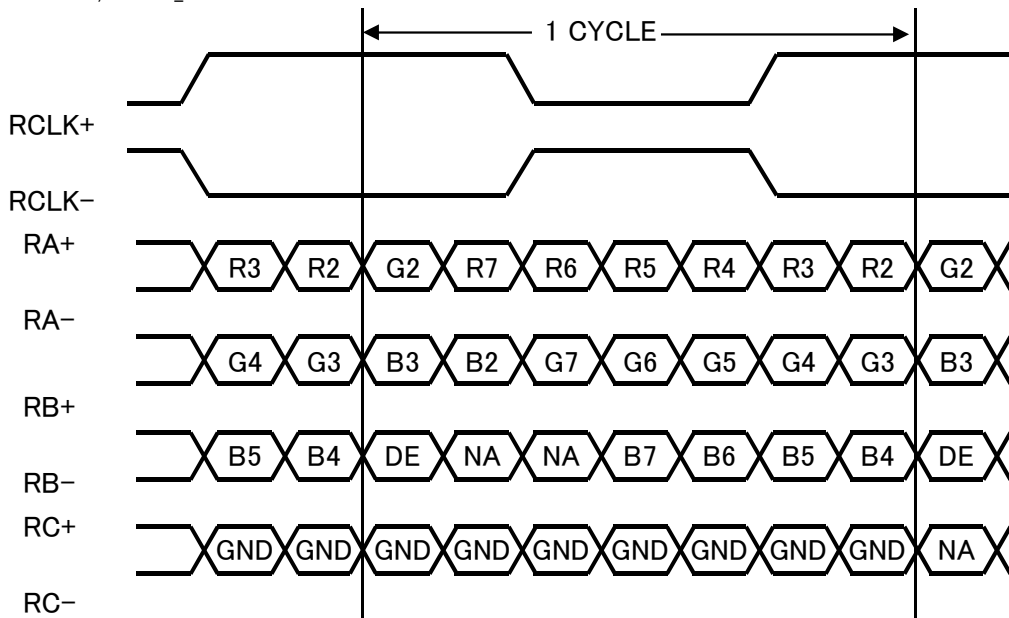


Symbol of CN1(Pin No.)

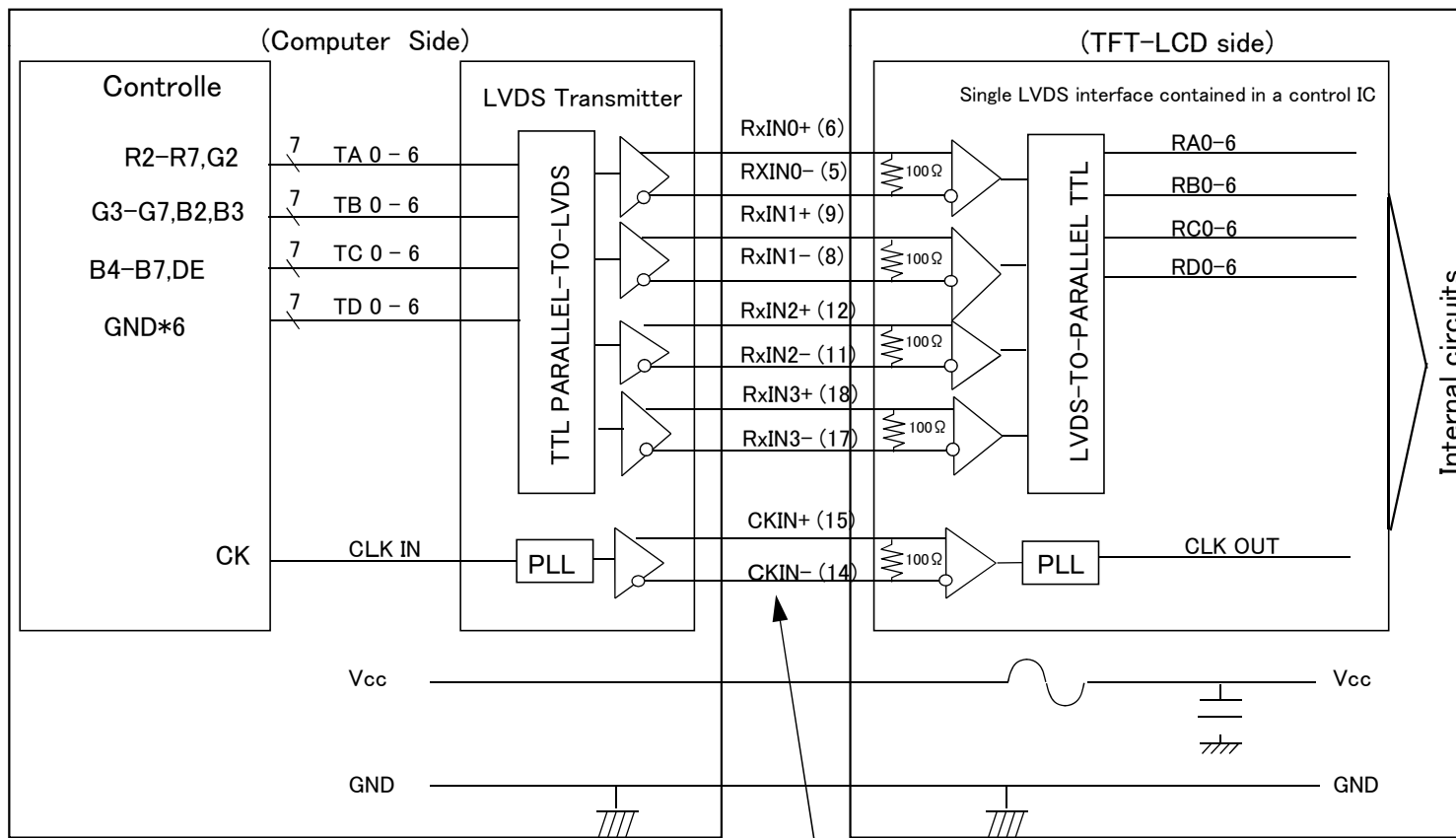
\* When use 6Bit input mode, please connects RxIN3+/- and GND-line.



<8/6Bit=L,LVDS\_SET=L>



DE: Display Enable  
NA: Not Available



Symbol of CN1(Pin No.)

\* When use 6Bit input mode, please connects RxIN3+/- and GND-line.

#### 4-4. LED backlight

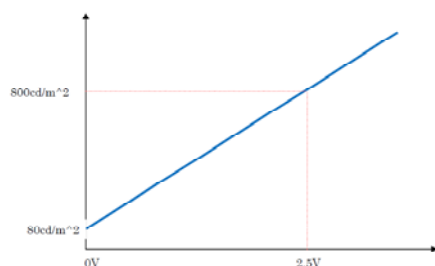
LED backlight connector(CN2)

Corresponding connector : 51021-0800

( MOLEX Inc )

Connector No.	Pin No.	symbol	function
CN2	1	VLED	+12V power supply
	2	VLED	+12V power supply
	3	GND	GND
	4	GND	GND
	5	BL_EN	Low:OFF,High:ON
	6	BRTI	Luminance control(Note1)
	7	BRTH	GND
	8	NC	Keep this pin OPEN

(Note1)



#### 5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Supply voltage	V <sub>CC</sub>	T <sub>a</sub> =25°C	0 ~ +4.0	V	
	V <sub>LED</sub>	T <sub>a</sub> =25°C	0 ~ +15	V	
Input voltage	V <sub>IN</sub>	T <sub>a</sub> =25°C	-0.3 ~ +V <sub>CC</sub> +0.3	V	【*5-1】
	BRTI	T <sub>a</sub> =25°C	-0.3~+2.5	V	【*5-2】
Storage temperature	T <sub>stg</sub>	—	-30 ~ +80	°C	【*5-3,5-4,5-6】
Operating temperature	T <sub>ope</sub>	—	-30 ~ +80 (Panel surface [display area])	°C	

【\*5-1】 RxINi-/(i=0,1,2), CK IN-/, REV, 8/6Bit,SET\_LVDS

【\*5-2】 BRTI

【\*5-3】 Humidity: 95%RH Max.( T<sub>a</sub>≤40°C ) Note static electricity.

Maximum wet-bulb temperature at 39°C or less. (T<sub>a</sub>>40°C) No condensation.

【\*5-4】 The operating temperature only guarantees operation of the circuit. For contrast, speed response, and other factors related to display quality, judgment is done using the ambient temperature T<sub>a</sub> = +25°C.

【\*5-5】 Use over the absolute maximum rating might affect reliability and might cause malfunction.

【\*5-6】 There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 65~80°C.

## 6. Electrical Characteristics

### 6-1. TFT-LCD panel driving

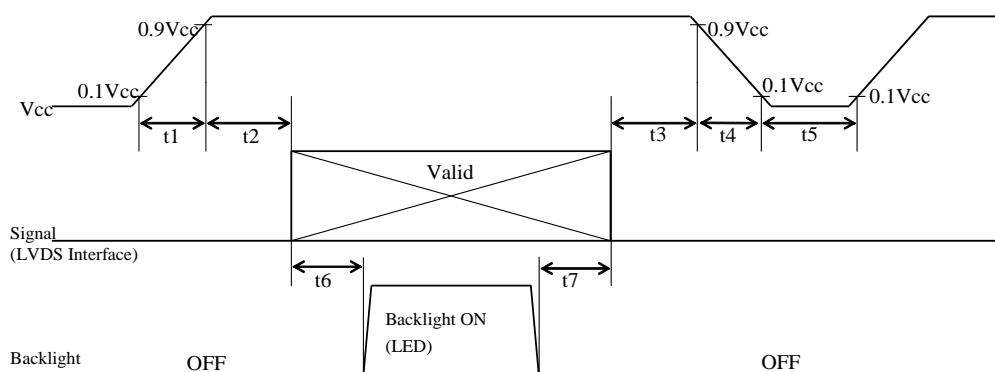
 $T_a = +25^\circ\text{C}$ 

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Input voltage	$V_{CC}$	+3.0	+3.3	+3.6	V	【*6-3】
Current dissipation	$I_{CC}$	—	(300)	TBD	mA	【*6-4】
Permissive input ripple voltage	$V_{RP}$	—	—	100	mV <sub>P-P</sub>	$V_{CC} = +3.3\text{V}$
Input voltage width for LVDS receiver	$V_I$	0	—	2.4	V	LVDS signal
Differential input Threshold voltage	High	$V_{TH}$	—	+100	mV	$V_{CM} = +1.2\text{V}$ 【*6-1】
	Low	$V_{TL}$	-100	—	mV	
Input leak current (High)	$I_{OH1}$	—	—	$\pm 10$	$\mu\text{A}$	【*6-2】 $V_I = +2.4\text{V}$ $V_{CC} = +3.6\text{V}$
	$I_{OH2}$	—	—	$\pm 500$	$\mu\text{A}$	
Input leak current (Low)	$I_{OL1}$	—	—	$\pm 10$	$\mu\text{A}$	【*6-2】 $V_I = 0\text{V}$ $V_{CC} = +3.6\text{V}$
	$I_{OL2}$	—	—	$\pm 500$	$\mu\text{A}$	
Terminal resistor	$R_T$	—	100	—	$\Omega$	Differential input

【\*6-1】  $V_{CM}$  : LVDS common mode voltage

【\*6-2】 REV, 8/6bit

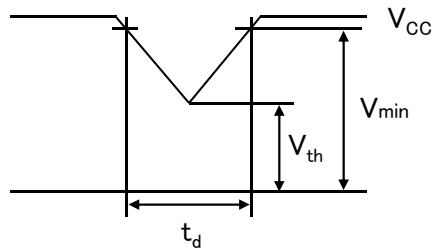
【\*6-3】 On-off conditions for supply voltage



Symbol	Min.	Max.	Unit	Remark
t1	0	25	ms	
t2	0	100	ms	
t3	0	1	s	
t4	0	400	ms	
t5	200	—	ms	
t6	180	—	ms	*1
t7	5	—	ms	*1

\*1 : As for the power sequence for backlight, it is recommended to apply above mentioned input timing. If the backlight is lit on and off at a timing other than shown above, displaying image may get disturbed. This is due to variation of output signal from timing generator when LVDS signal is changed from on to off or vice versa, but

【Note】Please do not put the input signal into the state of the High impedance for power ON period, and do not input the abnormal signal.

V<sub>CC</sub>-dip conditions

$$V_{th} = 2.5V$$

$$V_{min} = 3V$$

- 1)  $+2.5 V \leq V_{CC} < +3.0 V$ ,  $t_d \leq 10 \text{ ms}$

Under above condition, the display image should return to an appropriate figure after V<sub>CC</sub> voltage recovers.

- 2)  $V_{CC} < +2.5 V$

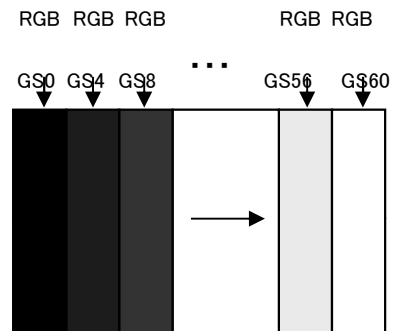
V<sub>CC</sub>-dip conditions should also follow the On-off conditions for supply voltage

## 【\*6-4】 Current dissipation

Typical current situation : 16-gray-scale-bar pattern

(V<sub>CC</sub>=+3.3V、gray-scale: GS(4n) )

However, assume n to be a natural number from 0 to 15, and refer to Chapter 8 for gray scale of RGB.



Maximum current situation : V<sub>CC</sub>=+3.0V

## 6-2. LED backlight

T<sub>a</sub>=+25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	V <sub>LED</sub>	11.2	12.0	12.6	V	—
Current dissipation	I <sub>LED</sub>	—	(375)	TBD	mA	VLED=12.0V
BL_EN signal Low voltage	V <sub>BL_EN</sub>	—	—	0.4	V	VLED=12.0V
BL_EN signal High voltage	V <sub>BL_EN</sub>	2.1	—	12	V	VLED=12.0V
BRTI voltage	BRTI				Hz	
Life time	h	—	70,000	—	hours	【Reference】【*6-5】

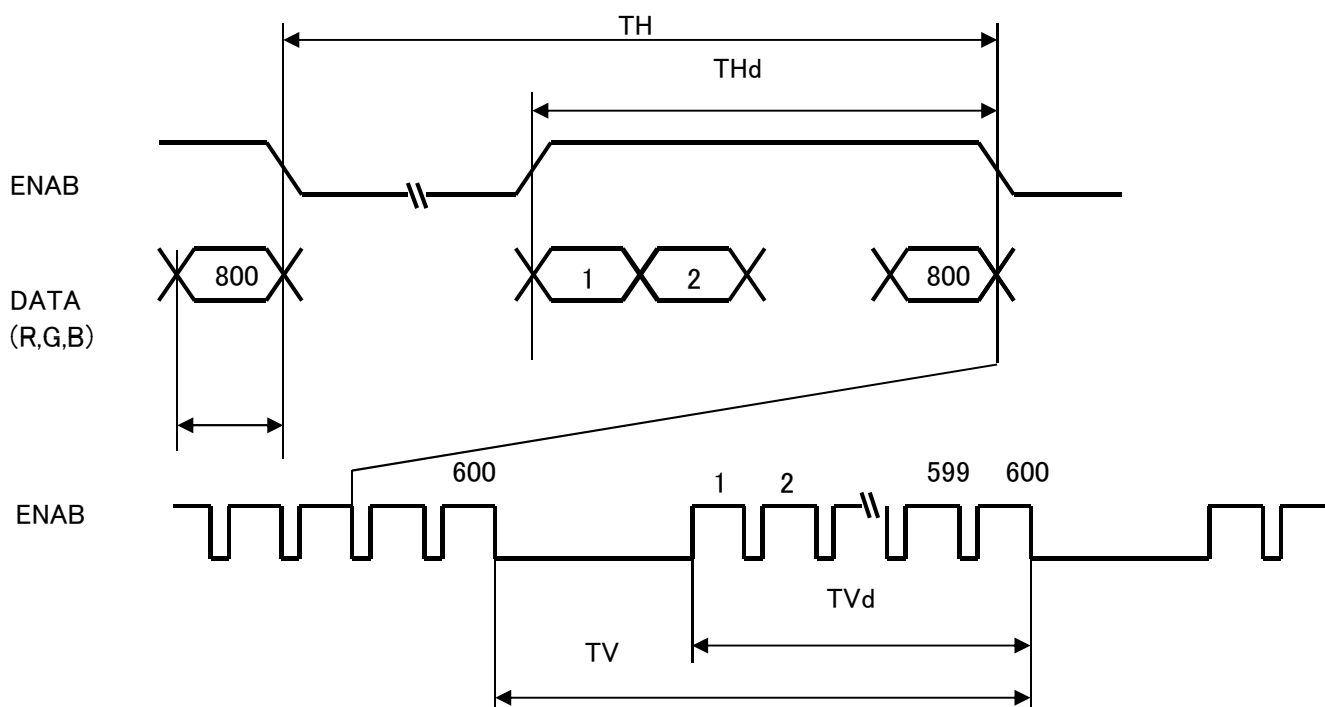
【\*6-5】 Luminance becomes 50% of the original value under standard condition.

## 7. Timing characteristics of input signals

### 7-1. Timing characteristics

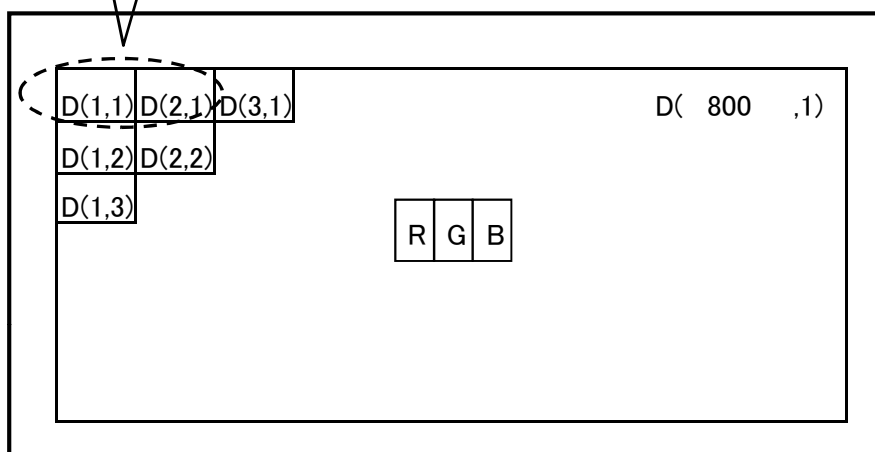
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
Clock	Frequency	1/Tc	35.0	40	42.0	MHz	
ENAB	Horizontal period	TH	832	1056	1395	clock	【*7-1】
			20.8	26.4	39.9	$\mu$ s	
	Horizontal period (High)	THd	800	800	800	clock	
	Vertical Frequency	TV	628	666	798	line	
			—	17.6	—	ms	
Vertical period (High)	TVd	600	600	600	line		

【\*7-1】 In case of using the long vertical period, the deterioration of display quality, flicker etc. may occur.



### 7-2. Input Data Signals and Display Position on the screen

R	G	B	R	G	B
( 1, 1 )		( 2, 1 )			



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

### 8-1. 8 bit input

Colors & Gray scale	Data signal																											
	Gray Scale	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	0		
	Blue	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	1		
	Green	—	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0			
	Cyan	—	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1			
	Red	—	X	X	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Magenta	—	X	X	1	1	1	1	1	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1			
	Yellow	—	X	X	1	1	1	1	1	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0			
	White	—	X	X	1	1	1	1	1	X	X	1	1	1	1	1	1	X	X	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	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	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	0			
	↑	↑	↑							↑							↑											
	↓	↓	↓							↓							↓											
	Brighter	GS250	0	1	0	1	1	1	1	1	0	0	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	0	0		
	Red	GS252	X	X	1	1	1	1	1	0	0	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	0			
	↑	GS1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Darker	GS2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	↑	↑	↑							↑							↑											
	↓	↓	↓							↓							↓											
	Brighter	GS250	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	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	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	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	0			
	↑	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0			
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0			
	↑	↑	↑							↑							↑											
	↓	↓	↓							↓							↓											
	Brighter	GS250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1		
	↓	GS251	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1		
	Blue	GS252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1		

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.

## 8-2. 6 bit input

	Colors & Gray scale	Data signal																		
		GrayScale	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	

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

$T_a=+25^{\circ}\text{C}$ ,  $V_{cc}=+3.3\text{V}$

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	$\theta_{21}, \theta_{22}$	$CR > 10$	70	80	-	Deg.	【*9-1,9-2,9-4】
	Vertical	$\theta_{11}$		45	80	-	Deg.	
		$\theta_{12}$		70	80	-	Deg.	
Contrast ratio		CR	optimized angle	300	600	-		【*9-2,9-4】
Response Time	White Black	$\tau_r + \tau_d$	$\theta = 0^{\circ}$	-	35	-	ms	【*9-3,9-4】
Chromaticity of White		$W_x$		-	TBD	-		【*9-4】
		$W_y$		-	TBD	-		
Luminance of white		$Y_{L1}$		-	400	-	$\text{cd}/\text{m}^2$	【*9-4】
White Uniformity		$\delta_w$	-	-	1.33		【*9-5】	

※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.3 below.

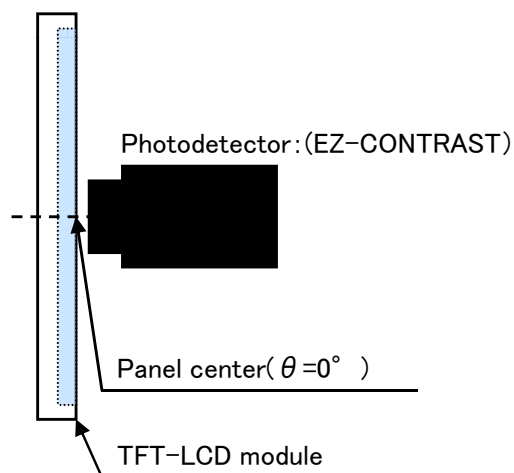


fig.3-1 Measuring method of Viewing angle range.

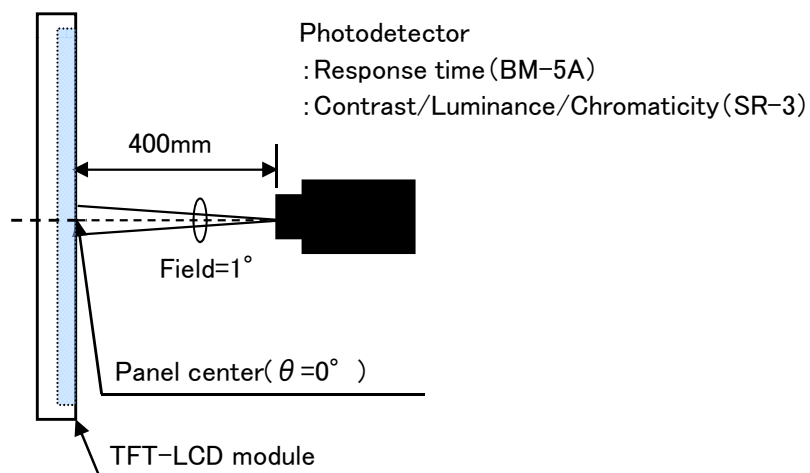
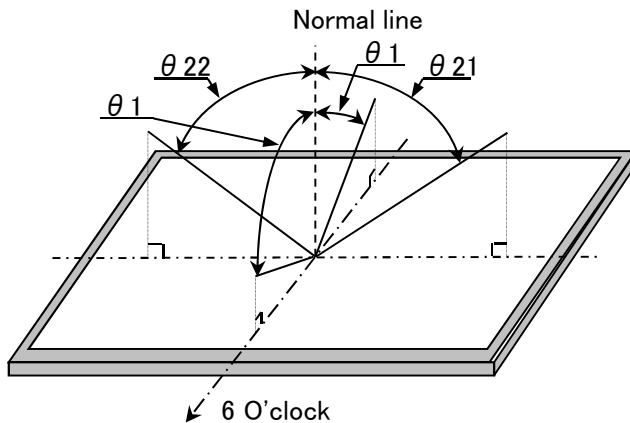


fig.3-2 Measuring method of contrast, luminance, response time, and Chromaticity.

Fig.3 Optical characteristics measurement method



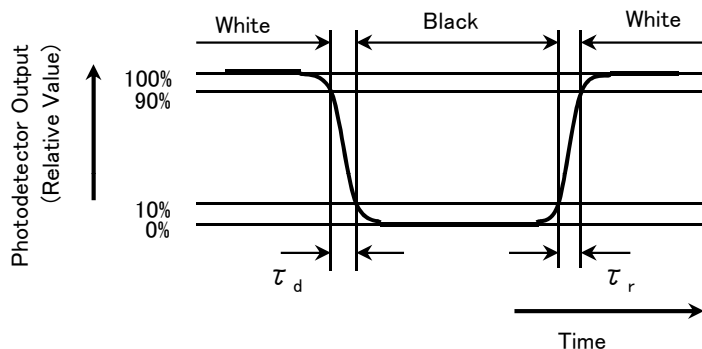


【\*9-2】Definition of contrast ratio:

The contrast ratio is defined as the following.  $Contrast (CR) = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$

【\*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".



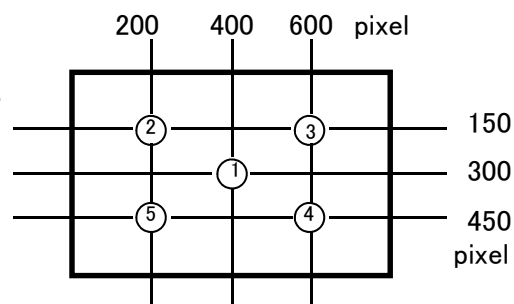
【\*9-4】This shall be measured at center of the screen.

【\*9-5】Definition of white uniformity:

White uniformity is defined as the following with five measurements.

(①~⑤)

$$\delta_w = \frac{\text{Maximum luminance of 5 points(①~⑤)}}{\text{Minimum luminance of 5 points(①~⑤)}}$$



## 10. Display quality

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

## 11. Handling Precautions

- a) Be sure to turn off the power supply when inserting or disconnecting the cable.
- b) Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.
- c) Since the front polarizer is easily damaged, pay attention not to scratch it.
- d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
- g) Since CMOS LSI is used in this module, take care of static electricity and injure the human earth when handling. Observe all other precautionary requirements in handling components.
- h) Since there is a circuit board in the module back, stress is not added at the time of a design assembly. Please make it like. If stress is added, there is a possibility that circuit parts may be damaged.
- i) Protection film is attached to the module surface to prevent it from being scratched . Peel the film off slowly , just before the use, with strict attention to electrostatic charges. Blow off 'dust' on the polarizer by using an ionized nitrogen.
- j) The polarizer surface on the panel is treated with Anti-Glare for low reflection. In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.
- k) Do not expose the LCD panel to direct sunlight. Lightproof shade etc. should be attached when LCD panel is used under such environment.
- l) Connect GND to flame of module to stabilize against EMI and external noise.
- m) If stored at the temperatures lower than the rated storage temperature, the LC may freeze and it may cause LCD panel damage. If storage temperature exceeds the specified rating, the molecular orientation of the LC may change to that of a liquid, and they may not revert to their original state. Store the module in normal room temperature.
- n) When handling LCD modules and assembling them into cabinets, please avoid 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, may cause corrosion and discoloration of the modules. Do not use the LCD module under such environment.
- o) Be careful of a back light FPC not to pull by force at the time of the connecting to a W-LED driver, or FPC processing.
- p) When install LCD modules in the cabinet, please tighten with( “torque= $0.294 \pm 0.02\text{N} \cdot \text{m}$ ( $3.0 \pm 0.2\text{kgf} \cdot \text{cm}$ )”). Be sure to confirm it in the same condition as it is installed in your instrument.
- q) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if it gets inside your eye or mouth by mistake.
- r) Notice : Never take to pieces the module , because it will cause failure. Please don't remove the fixed tape, insulating tape etc. that was pasted on the original module. (except for protection film of the panel)
- s) Be careful when using it for long time with fixed pattern display as it may cause accidental image. (Pleave use a screen saver etc., in order to avoid an afterimage.)
- t) Adjusting volume have been set optimally before shipment, so do not change any adjusted value.
- u) If a minute particle enters in the module and adheres to an optical material, it may cause display non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole if you intend to install a fan.
- v) An abnormal display by changing in quality of the polarizing plate might occur regardless of contact or no contact to the polarizing plate, because of epoxy resin (amine system curing agent) that comes out from the material and the packaging material used for the set side, the silicon adhesive (dealcoholization system and oxime system), and the tray blowing agents (azo-compound), etc. Please confirm adaptability with your employed material.

## 12. Packing form

- a) Piling number of cartons : MAX. TBD
- b) Package quantity in one carton: TBDpcs
- c) Carton size(TYP): TBDmm(W) × TBDmm(D) × TBDmm(H)
- d) Total mass of one carton filled with full modules(TBDpcs) TBDkg
- e) Packing form are shown in Fig -.

## 13. Reliability test items

No.	Test item	Conditions
1	High temperature storage test	Ambient temperature +80°C 240H
2	Low temperature strage test	Ambient temperature -30°C 240H
3	High temperature & high humidity operation test	Ambient temperature 40°C、Humidity 95% RH 240H (No condensation.)
4	High temperature operation test	Panel surface 80°C 240H
5	Low temperature operation test	Ambient temperature -30°C 240H
6	Vibration test	<Sin wave> Frequency : 10~57Hz/Vibration width (one side) : 0.075mm : 57~500Hz/Gravity:9.8m/s2 Sweep time:11minutes
7	Shock test	Max. gravity:490m/s2 Pulse width:11ms Direction: ±X,±Y,±Z Test period : 1time/1direction
8	ESD test	Contact discharge (150pF 330 Ω) non-operating = ±10kV, operating = ±8kV Atmospheric discharge (150pF 330 Ω) non-operating = ±20kV, operating = ±15kV

【\*】 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°C, Humidity:45~75%, Atmospheric pressure:86~106kpa)

## 14. Others

### 14-1. Lot No Label:

TBD

### 14-2. Packing box Label:

The label that displays ①Model number ( LQ084S3LG12) ②Lot number ③Quantity of module is stuck on the packing box. Moreover, the display of bar code also applies to this.

社内品番: (4S) LQ084S3LG12	
Barcode (①)	
Lot No. : (1T)	2014. 09. 30 * *
Barcode (②)	
Quantity : (Q)	TBD pcs
Barcode (③)	
ユーザー品番 :	
シャープ物流用ラベルです。 -----	

- ① Model number ( LQ084S3LG12)
- ② Lot number (DATE)
- ③ Quantity of module

Our management product number might be filled  
(Example: LQ084S3LG12A etc.)

A right picture is written to the packing box of module for the RoHS restriction.

※ R.C.(RoHs Compliance) means these parts have corresponded with the RoHs directive.

This module corresponds from the first sample to RoHS Directive.

**R.C.**

### 14-3. The ozone-depleting substances is not used.

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.

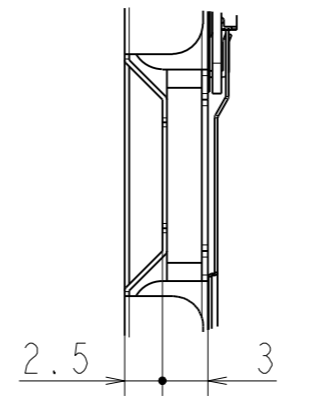
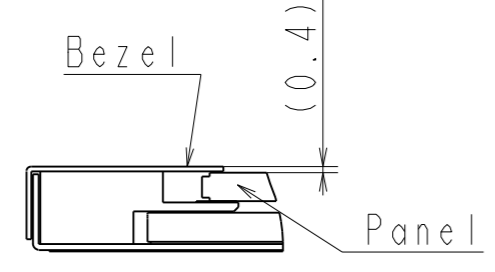
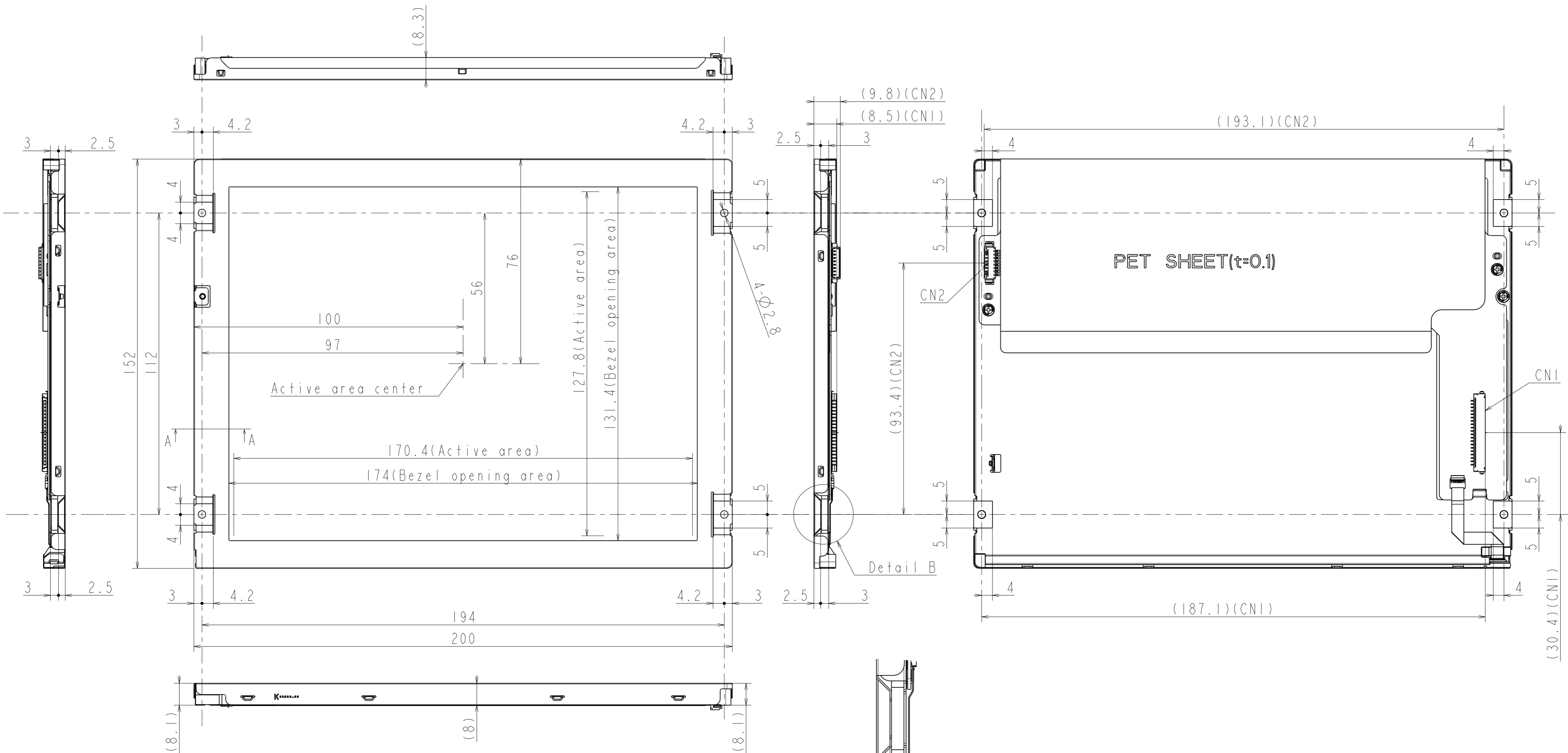
Please place the product cartons away from the storage wall.

Storage period

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

**TENTATIVE**

LQ084S3LG12 OUTLINE DIMENSIONS  
Dimensional tolerance: +/-0.5 (Unit:mm)  
Creation date:2014.11.18



Detail B  
(Same shape 4 locations mount section)  
Scale 2:1

I/F CONECTOR  
CN1:FI-SE20P-HFE(JAE)  
CN2:53261-0871(MOLEX)