

# **LJ64H034**EL Display Module

(Model Number: LJ64H034)

# **Specifications**

Spec No.: LA-05103F

Dated: Mar. 28. 2002

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		<u> </u>
PREPARED BY: DATE		SPEC No. LA-05103F
	SHARP	FILE No.
APPROVED BY: DATE	MOBILE LIQUID CRYSTAL DISPLAY GROUP	ISSUE Jan. 28. 2002
	SHARP CORPORATION	PAGE 25
	•	APPLICABLE DIVISION
	SPECIFICATION	□ DUTY DEVELOPMENT CENTER □ TFT DEVELOPMENT CENTER □ LCD PRODUCTS DEBELOPMENT CENTER ■ PRODUCTION DEPT.(EL Gr)
SPECIFICA	TION FOR	
MODEL No.	EL Display Module  L J 6 4 H 0 3 4	
☐ CUSTOMER'S APPROVAL		
DATE		
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SHARP CORPORATION

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# RECORDS OF REVISION

MODEL No. L J 6 4 H 0 3 4

DOC. FIRST ISSUE

IDENT. DATA No.

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED Na	SUMMARY	CHECK & APPROVAL
May. 12.'93	Page 14	Δ	The content of a item 4 changed	7. Ohba
Feb. 9. 94	Page 2, 4	A	Elimination of former units.	
	Page 1, 4, 12	<u> </u>	According as the revised LCD group standards.	16. Molimbula
	Page 8		Add Note 1) to item 7-3	14.
Sep. 21. '94	Page 7,8	ß	Addition of input signals timing characteristics.	E. Stutustul
Dct. 7.'97	All pages		Change the word:unit→ module	
	Page 1	<u> </u>	Change Outline dimensions in Mechanical Specifications.	
	Page 1	$\triangle$	Change Mass in Mechanical Specifications.	
i	Page 10	<u> </u>	Add Note 3)	
	Page 12	<u> </u>	Change Outline of the module configuration.	
.1	Page 13	4		n (
:	Page 16	<u>*</u>	Change of fuse model.	M. Koweguchi
	Page 19	Δ	Change Packing specification.	M. (Cowel)
	Page 20	13	Add Serial number.	
		1	Add the handling attention.	
			Old page 11 is deleted.	
	Page 4	Æ	Correct errors.	
			(Shadowing characteristics 10→2)	
Apr.19.'99	Page 4,5	16	Add Note 4)	
			Add the description about	1
			brightness measures.	anchi
	Page 12		To Omit the Bit Insert from Base plate.	M Kaurgneli
	Page 19	18	Add Barcode Label on a Packing case.	1. '
	Page 20	19	Add the items about the serial	
			number of EL module.	
				-

# RECORDS OF REVISION

MODEL No.

LJ64H034

DOC FIRST ISSUE

IDENT. DATA No.

DATE	REF. PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY	CHECK & APPROVAL
Jan.28.'02	Page 1 Page 7,8 Page 7 Page 12 Page 15 Page 16 Page 19 Page 20 Page 20		Change Mass in Mechanical Specifications.  Add the High level S clock width(t swh)  Add Note 1. Change Note to Note 2.  Change Outline of the module configuration.  Change of signal input block.  Change of fuse model.  Change the packing specification.  Add the items about the serial number of EL module.  Change content of serial number.  Add the module details chart.  Add the module details chart.  Add the module details chart.	M. Kawaguch

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#### 1. Application

This data sheet is to introduce the specification of EL display module, LJ64H034.

#### 2. Overview

The Sharp EL display module consists of a thin film EL panel, high voltage ICs for panel driving and a display control circuit. By supplying eleven input signals of CMOS level and two DC power supplies of +5 V and +12 V arbitrary graphs and characters can be displayed.

3. Mechanical Specifications 🔝

Parameter		Specification					
	Width	×	Height	×	Depth		
Outline dimensions	246	×	175	X	19	mm	
Number of matrix electrodes	640	×	400				
Active area	191.9	×	119.9			mm	
Dot pitch	0.3	×	0.3			mm	
Dot pitch ratio	1	×	1				
Dot size	0.22	×	0.22			mm	
Mass		4	150			g	

Note) Details of outline dimensions are shown at Page 12.

#### 4. Absolute Maximum Ratings

#### 4-1 Electrical absolute maximum ratings

(Ta=25 °C)

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Parameter	Symbol	Rating	Unit
Interface signal (Logic "H")	VIH	$V_{\rm L} + 0.3$	V
Interface signal (Logic "L")	VIL	- 0.3	V
Supply voltage (Logic)	$V_{\rm L}$	+ 7	V
Supply voltage (panel drive)	V <sub>D</sub>	+ 14	V

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4-2 Environmental conditions 2

Parameter	Tstg			opr	Remark		
i arameter	Min.	Max.	Note 1) Min. Max.		Remark		
Ambient temperature	-40 °C	+80 ℃	-5 °C +55 °C		Note 1)		
Humidity	Note 2)		Note 2)		No condensation		
Vibration	Note 3)		Note 3)				No operating
Shock	Not	e 4)			No operating		

Note 1) Survival: -20 °C to +65 °C

No permanent damage will occur.

Note 2)  $Ta \leq 40$  °C ······· 95 % RH Max

Ta > 40 °C ...... Absolute humidity shall be less than

Ta=40 °C/95 % RH.

Note 3) 5  $\sim$  55 Hz Frequency range

Sweep time ; 15 min each axis

Dwell at resonance; 10 min each resonance

Peak-to-peak

amplitude ; 3.17 mm over  $5 \sim 10 \, \mathrm{Hz}$  range

; 1.52 mm over 10  $\,\sim\,$  25 Hz range

; 0.38 mm over 25  $\,\sim\,$  55 Hz range

 $55 \sim 500 \, \mathrm{Hz}$  Frequency range

Sweep time ; 120 min each axis

Dwell at resonance; 30 min each resonance

Peak-to-peak

amplitude; 30 m/s<sup>2</sup> peak acceleration

Note 4) Acceleration ; 491 m/s<sup>2</sup>

Pulse width ; 11 ms

3 times for each direction of  $\pm X/\pm Y/\pm Z$ .

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#### 5. Electrical Characteristics

(Ta=25  $^{\circ}\text{C}$ , Frame frequency=120 Hz)

Donous et eu	Carrala o l		Rating		TImik
Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	$V_{\rm L}$	+ 4.75	+ 5.0	+ 5.25	V
Supply current (Logic, V <sub>L</sub> =+5 V)	IL	30	_	300	mA
Supply voltage (Panel drive)	V <sub>D</sub>	+ 11.4	+12.0	+12.6	V
Supply current (Panel drive, V D =+12 V)	ΙD	(※1)	_	1300	mA
Total power ( $V_L = +5 V, V_D = +12 V$ )	Рт	_	11	_	W

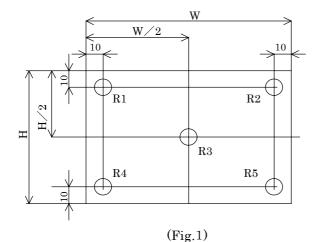
( $\mbox{\%}1$ ) 10 mA in condition with no signals nor  $V_L$  supplying.

# 6. Optical Characteristics $\triangle$

(Ta=25 °C, Frame frequency=120 Hz)

						,	rroquome	,
	Parameter	Symbol	Condition	Min.	Тур.	Max.	Unit	Remark
	Luminance	Lon	All dots lit	137	200	_	cd/m²	
	OFF luminance	Loff	All dots	I	I	3.4	cd/m²	Note 1)
<u>/16</u>	Luminance	△ Ldis	All dots lit			35	%	Note 4)
	Fill factor			_	0.54	_		Note 2)
15	Shadowing characteristics	△ Lsp	fixed pattern	_	2	_	%	Note 3)
	Viewing angle			_	160	_	0	

Note 1) Average luminance measured at the five circular windows (R1 $\sim$ R5) shown in Fig.1 (Circular window diameter :  $\phi$  13 mm)



H 119.9: Height of active area

W 191.9 : Width of active area

Unit: mm

Tolerance of

luminance:  $\pm$  10%

The following formula defines the luminance distribution:

$$\Delta L_{DIS} = \left(1 - \frac{L_{\min}}{L_{\max}}\right) \times 100(\%)$$

where  $L_{\text{max}}$  is the maximum luminance and  $L_{\text{min}}$  is the minimum luminance taken at the five locations in Fig.1.

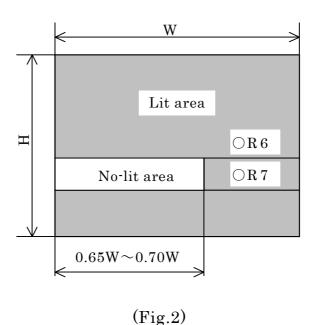
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## SHARP

Note 2) The ratio of the emission area to the display area. ······ SHARP's EL has comparatively high fill factor, and therefore, the visibility of display is excellent.

Note 3) Shadowing characteristics means the variation of luminance according to the number of dots lit on a scanning line.

Thanks to the addition of the shadowing compensation circuit, the display quality of SHARP's EL is improved.



The following formula defines the shadowing characteristics:

$$\Delta L_{SD} = \left(\frac{L_N}{L_L} - 1\right) \times 100(\%)$$

where LL is the luminance at R6, LN at R7.

# 16 Note 4) Brightness measures

We measure brightness using sharp's examination device that is proofread by standard-machine:BM-5A(TOPCON).

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## 7. Timing Characteristics

# 7-1 Input signals

This module is driven by line-at-a-time scanning method with following 11 CMOS level input signals.

Parameter	Symbol	Description		
Data input clock		Clock signal for inputting the display data into		
	CP2			
signal		the EL module.		
		Data signal	The signals are sampled at every	
	UD0~3	for the upper	falling edge of the data input	
Display		part of display	clock signal.	
data signal		Dare signal	The display is "ON" while the	
	LD0~3	for the lower	logic is "H" and "OFF" while	
		part of display	the logic is "L"	
Input data latch		This signal controls the "timing of line-at-a- time		
	CP1	scanning " and the "latch timing of the data side		
signal		shift register on falling edge."		
		This signal controls frame frequency.		
Scan start-up	S	And the contents of the display data signal are		
signal		displayed on the first line by combination with		
		this signal.		

#### 7-2 Input signals timing characteristics

(Ta=25 °C)

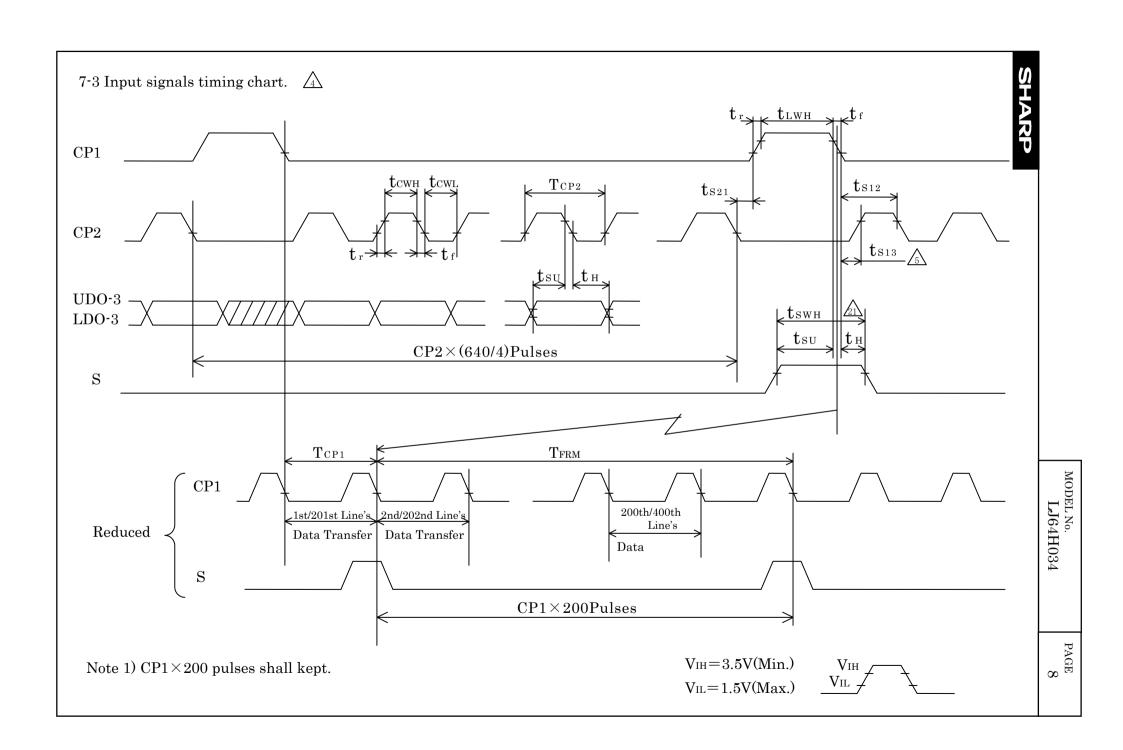
Parameter	symbol	Min.	Тур.	Max.	Unit
Frame frequency	1/Tfrm	60	_	120	$_{ m Hz}$
CP2 clock cycle	ТСР2	182	_	_	ns
High level clock width	tсwн	60	_	_	ns
Low level clock width	tcwl	60	_	_	ns
CP1 clock cycle	ТСР1	40	_	_	$\mu$ s
High level latch clock width	tьwн	60	_		ns
High level S clock width	tswн	_	_	t <sub>CP1</sub>	$\mu$ s
Data set up time	tsu	50	_		ns
Data hold time	tн	40	_		ns
CP1 ↑ clock allowance time	ts21	0	_		ns
from CP2↓					
$ ext{CP2}\downarrow  ext{ clock allowance time}$	$t_{\mathrm{S12}}$	200	_	_	ns
from CP1↓					
CP2 ↑ clock allowance time	ts13	100	_	_	ns
from CP1 ↓					
Clock rise/fall time	tr, tf	_	_	trf *	ns

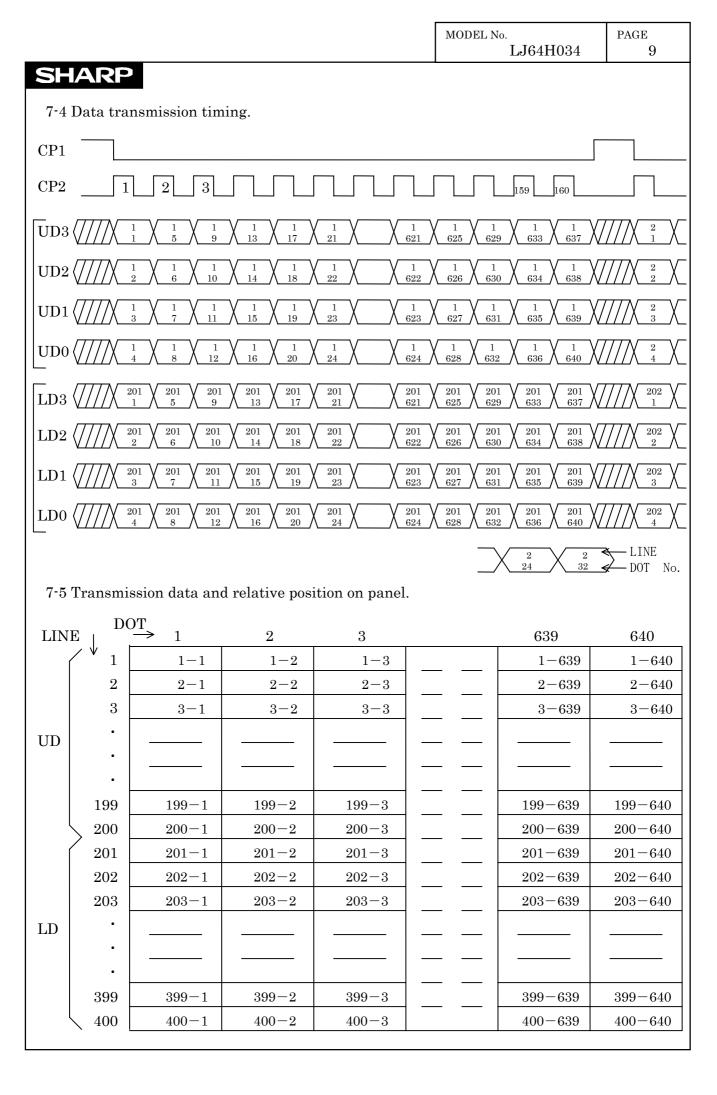
<sup>\*</sup>  $t_{rf} (T_{CP2} - t_{CWH} - t_{CWL}) / 2 \leq 30 \text{ns}$ 

 $\sqrt{5}$ 

Note 1) The High level S clock width must make it into TCP1 or less in any cases.

Note 2) The vertical blanking time (Tfrm-TcP1×200) shall be minimized to avoid the flickering lines around the center of the display. (around 200th and 201th horizontal lines)





8. Interface signals and power supply connectors

Assignment of pins of connector CN5

No.	SIGNAL	No.	SIGNAL
1	UD1	2	UD0
3	UD3	4	${ m UD2}$
5	LD1	6	${ m LD0}$
7	LD3	8	${ m LD2}$
9	CP2	10	$\operatorname{GND}$
11	CP1	12	$\operatorname{GND}$
13	S	14	$\operatorname{GND}$
15	GND	16	$\operatorname{GND}$
17	+ 5 V	18	+ 5 V
19	+12V	20	+12V

Arrangement of pins of connector CN5

1	$^3$	$\overset{5}{\square}$	7	9	11	13 	15 	17 	19	
$\frac{\square}{2}$	$\frac{\square}{4}$	□ 6	8	 10		 14	 16	 18	 20	

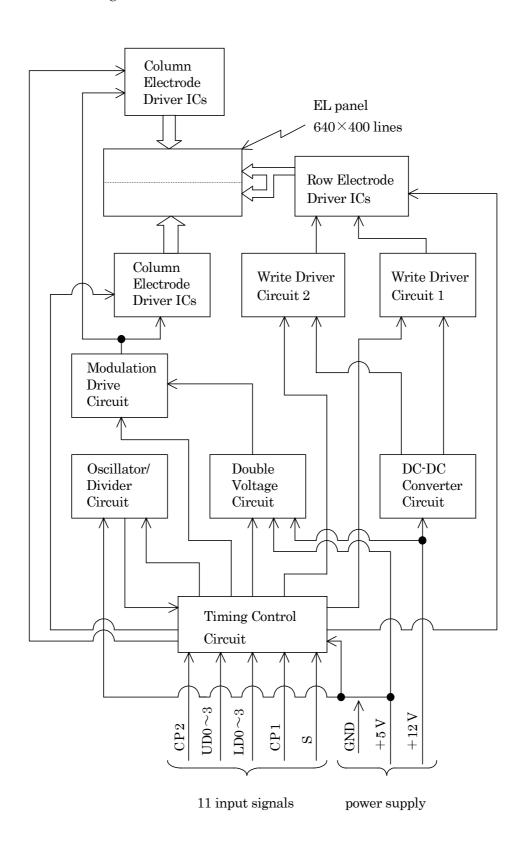
(Fig.3)

#### Connectors

	Mode	l No.	Maker
Module-side pin header	DF11-20DP-2DS	or equivalents	HIROSE ELECTRIC CO.
Fitting socket	DF11-20DS-2C	or equivalents	HIROSE ELECTRIC CO.
(crimp contact)	(DF11-2428SC)		

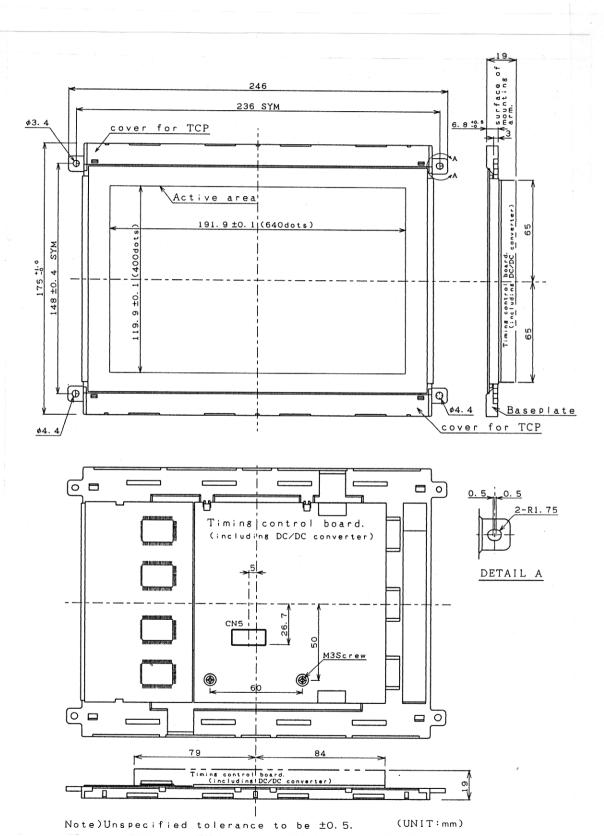
- Note 1) The length of the cable shall not exceed 50 cm.
- Note 2) This module is not supplied with the fitting socket and the cable.
- Note 3) Please connect all of each terminal of the above-mentioned input signal, supply voltage, and GND.

#### 9. Functional Block Diagram



10. Outline of the module configuration (3) (9) (23)

This module is shipped with the form drawing below.



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## 11. Handling Instructions and Cautions for Operation 🔬

- 1. Handle the module with care of ESD, The operator and the place around him must be guard against ESD. Especially, please note that the module might be destroyed by ESD when you directly touch the IC or the wiring pattern in the EL display module. Hold the mounting arms of 4 corners (of the module) when you handle it to protect you from electric shock prevention etc.
- 2. Since the EL panel is made of glass, care shall be taken to avoid the breakage caused by dropping or bumping it.
- 3. Please avoid detaching and decomposing the display control board or the flat cable because these cause the breakdown.
- 4. Do not insert nor extract the input cable when the power is supplied.
- 5. Do not touch the display control PWB on the rear side of the module while in operation. There is risk of electric shock, because it generates AC pulses of about 200V. And even after the power off, do not touch components on the PWB because high voltage might be contained in circuits.
- 6. Please use the module within the rated operational voltage and temperature specified in this literature, because the breakdown is caused by using which exceeds regulated operation voltage and temperature. The operation temperature is specified by ambient temperature. Test carefully the inner temperate of your product (module ambient temperature), and decide operational temperature of your products.
- 7. Please avoid the operation in water dew because if water dew covers connectors or circuits even a little, if may cause mis-operation and sometimes it breaks the module.
- 8. If your product is used in dusty air, or covered by oil dew, or by acid/alkaline mist, protect PWB of the module by filter etc.
- 9. Do not use the module in corrosive gas. Do not use packing that contains sulfur, or spacer that contains sulfur rubber for mounting filter.
- 10. To avoid the image retention caused by the luminance change due to time lapse, and to extend the panel life, please pay attention to the design of display, so that a fixed pattern may not be displayed as possible as you can, and by using all parts of the viewing area evenly. Also, we would recommend to use the module at the ambient temperature as low as you can because the temperature is one of the causes of acceleration of the luminance change due to time lapse.

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- 11. To prevent smoke or fire in abnormal status, this module installs the fuses. But the fuses may not be melt down, and the temperature of the parts can rise, depending on the conditions of the usage, characteristic of power supply's current capacity, or defect mode. Therefore, take care that combustibles shall be set away from the module.
- 12. When you return the module to us, and you are forced to pack it in different manner with our specification, use enough amount of packing cushion to prevent stress to the panel.
- 13. Please observe the notes for usual electronic components strictly.

#### **Others**

If any problem should arise from this specification, the supplier and user should work out a mutually acceptable solution.

LZ9GF33

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12. Circuit scheme of the signal input block  $\triangle$ 

CP1

 $390 \Omega \times 11$ 

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#### 13. Power supply input circuit

#### (a) Over current protection

This module equips fuses in power supply input circuit protecting fire accident rising from over current in internal circuit, so the fuse may melt down when the specifications are not kept or in case of short circuit.

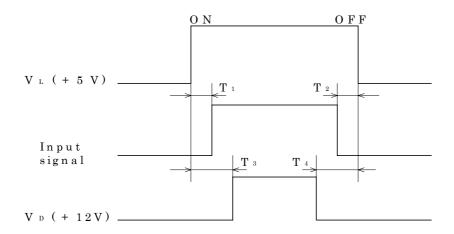
Fuse specifications 🛕 🟂

Parts No.	Model No.	Ratings	Melt type	Authorization Standard
F 1	MMCT	800 mA	slow	UL.CSA
F 2	MMCT	1.6 A	slow	11
F 3	MMCT	1.6 A	slow	II

Maker: S.O.C

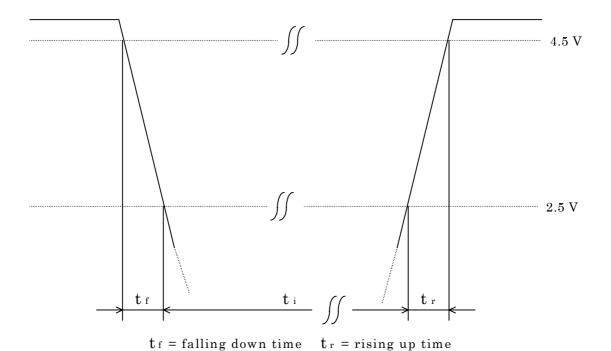
Note) Fuses is not open in the case current capacity of power supply is small. On the other hand fuses is open by surge current in case of current capacity of power supply is big or supply power to the module using relays. In consequence please you thoroughly investigate the module.

#### (b) Power on/off sequence



Note)  $T_1 \sim_4 \ge 0$  shall be kept.

(c) Take account of the scheme below for 5 V DC input rising up time and falling down time of 5 V DC



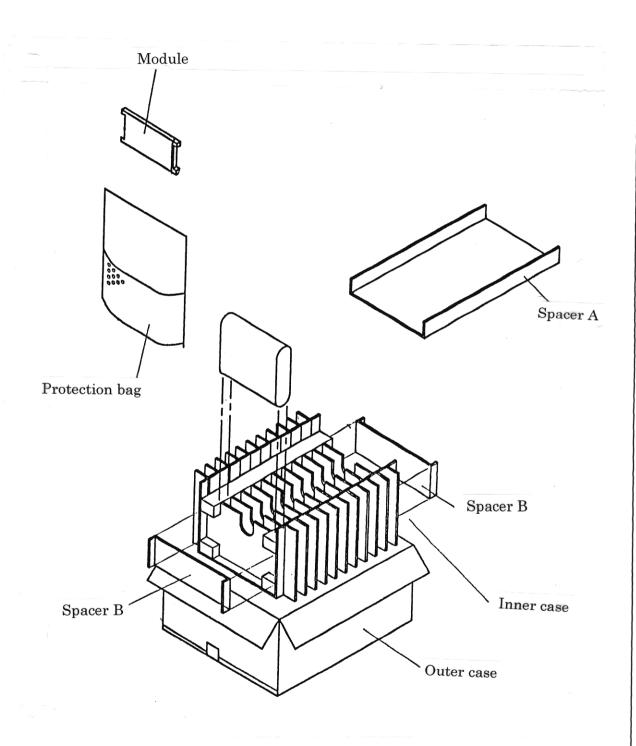
- (1)  $t_f$ ,  $t_r \leq 100 \text{ ms}$  is better to be kept.
- (2)  $t_i \ge 1 \text{ ms shall be kept.}$

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14. Packing Specification

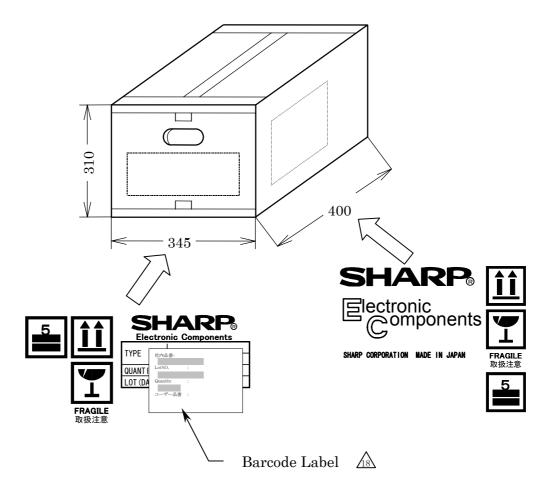
10pcs./packing



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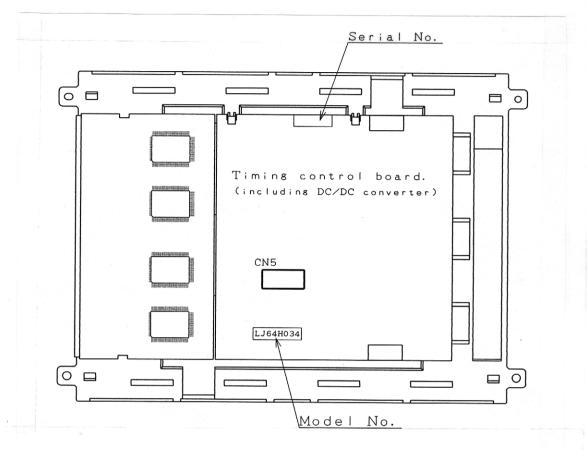
Outline 12 26



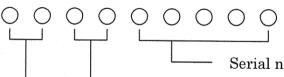
(Unit: mm)

15. Serial number 19

(1) Position



**28** (2) Content



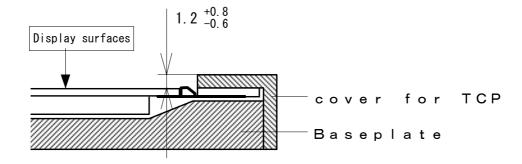
Serial number of all models.

Production month (Jan. $\rightarrow$ 01,Feb. $\rightarrow$ 02.....Dec. $\rightarrow$ 12)

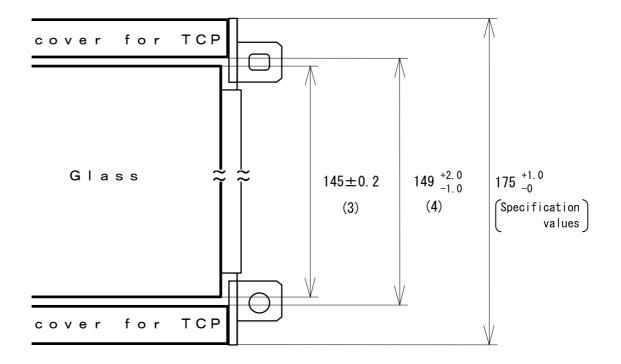
Production year (Two last digit writing at A.D.)

#### Module details chart (Unit:mm)

( 1 ) The bumps of display surfaces and cover for TCP  $\,:\,$  1 .  $2^{+0.\,8}_{-0.\,6}$   $\,$  mm



- (2) The width of cover for TCP :  $13\pm0$ . 5 mm
- (3) height measurements of the glass :  $145\pm0$ . 2 mm
- (4) The intervals of the upper part cover for TCP and the lower part cover for TCP : 1 4  $9^{+2.0}_{-1.0}$  mm



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