SPECIFICATION OF LCD MODULE

CUSTOMER 客户名称	
PART NO. 产品型号	**JHD1313 FP/RGB-1 1.4**
PRODUCTS TYPE 产品内容	
REMARKS 备注	
SIGNATURE BY CUSTOMER 客户签署：	

APPROVED BY 林镜华 TRUESTONE		

LCM System

1 **LCD Type**

☐ S - STN   ■ F - FSTN   ☐ D - DFSTN

2 **Viewing Angle**

■ D - Lower 6:00   ☐ U - Upper 12:00   ☐ O - Others

3 **Display Mode**

☐ Yellow Green positive   ☐ Blue negative   ☐ Gray positive

■ FSTN positive   ☐ FSTN negative

4 **Polarizer Mode**

☐ Reflective   ☐ Transflective   ■ Transmissive

5 **Connector**

☐ Pin   ☐ Heat sealed   ■ Zebra

6 **Thickness of Glass**

■ 1.1mm   ☐ 0.4mm

☐ 0.55mm   ☐ 0.7mm

7 **Backlight Mode**:

■ LED   ☐ CCFL

8 **Backlight Color**

☐ Blue   ☐ Amber   ☐ Yellow Green

☐ Red   ☐ White   ■ RGB backlight

9 **Temperature Grade**

☐ Normal temperature   ■ Wide temperature   ☐ Super wide temperature

10 **CG-ROM**

■ 01 for English + Japanese Language

•REVISION RECORD

REV. NO.	REV. DATE	DESCRIPTION OF REVISION	PAGE	REMARK
1.0	12/09/13	INITIAL RELEASE	ALL	
1.1	04/01/15	背光驱动IC改为： PCA9632DP1 PCB上增加了C1-C3位电容	5\9\12\14	
1.2	17/04/15	修改了PCB上客户版本号为V3.0	23	
1.3	23/07/15	1:PCB上增加了FB1位磁珠和 C4\C5位电容; 2:修改了PCB上客户版本号为V4.0.	23	
1.4	07/05/19	增加信号线上拉电阻R9-10K,R10-10K		

CONTENTS

1. FEATURES

Display construction ……………… 16 Characters * 2 Lines
Display mode ………………………… FSTN
Display type ………………………… Positive Transmissive
Backlight ……………………………… LED(RGB)/5.0V
Viewing direction …………………… 6 o'clock
Operating temperature ……………… -20 to 70℃
Storage temperature ………………… -30 to 80℃
Controller …………………………… AIP31068L/PCA9632 or Equivalence
Driving voltage ……………………… Single power
Driving method ……………………… 1/16 duty, 1/5 bias
Type …………………………………… COB (Chip On Board)
Number of data line ………………… I^{2}C-bus interface
Connector …………………………… PIN

2. MECHANICAL DATA

ITEM		WIDTH	HEIGHT	THICKNESS	UNIT
Module size		80.0	40.0	13.5(MAX)	mm
Viewing area		64.5	14.5	-	mm
character	Construction	5*7			dots
	Size	2.95	4.35	-	mm
	Pitch	3.65	5.05	-	mm
Dot	Size	0.55	0.5	-	mm
	Pitch	0.6	0.55	-	mm
Diameter of mounting hole		Φ2.3			mm
Weight		About 50			g

3. ABSOLUTE MAXIMUM RATINGS

3.1 Electrical Absolute Maximum Rating

(TA = 25 , Vss=0V)

Item	Symbol	MIN.	Max.	Unit
Supply Voltage (Logic)	VCC-VSS	0	6.0	V
Supply Voltage (LCD Driveer)	V_{LCD}	VCC-12	VCC+0.3	V
Input Voltage	V_{IN}	4.8	5.2	V
Operating temperature	Top	-20	70	℃
Storage temperature	Tsto	-30	80	℃

3.2 Environmental Absolute Maximum Rating

Item	Operating		Storage		Comment
	Min.	Max.	Min.	Max.	
Ambient temp	−20	+70	−30	+80	Note(1)
Humidity	Note(2)		Note(2)		Without condensation
Vibration	——	4.9M/S^2	——	19.6M/S2	XYZ direction
Shock	——	29.4M/S^2	——	490M/S2	XYX direction

Note(1) Ta=0℃:   50 Hr Max.
Note(2) Ta≧40℃: 90%RH Max.
        Ta≧40℃: Absolue humidity must be lower than the humidity of 90%RH@40℃

## 3.3 Electronic Static Discharge Maximum Rating

ESD Test Method : IEC-1000-4-2

Item	Description	
Testing environment	Ambient temperature : 15℃ to 35℃ Humidity : 30% to 60% LCM(E.U.T) : Power up	
Testing equipment	Manufacture : Noiseken, Model No. ESD	
Testing condition	See drawing 1	
Direct discharge	0 to ± 4KV	Discharge point, see drawing2
Indirect discharge	0 to ± 8KV	Discharge point, see drawing1
Pass condition	No malfunction of unit. Temporary malfunction of unit which can be recovered by system reset.	
Fail condition	Non. Recoverable malfunction of LCM or system.	

FIG1 ESD Testing Equipment
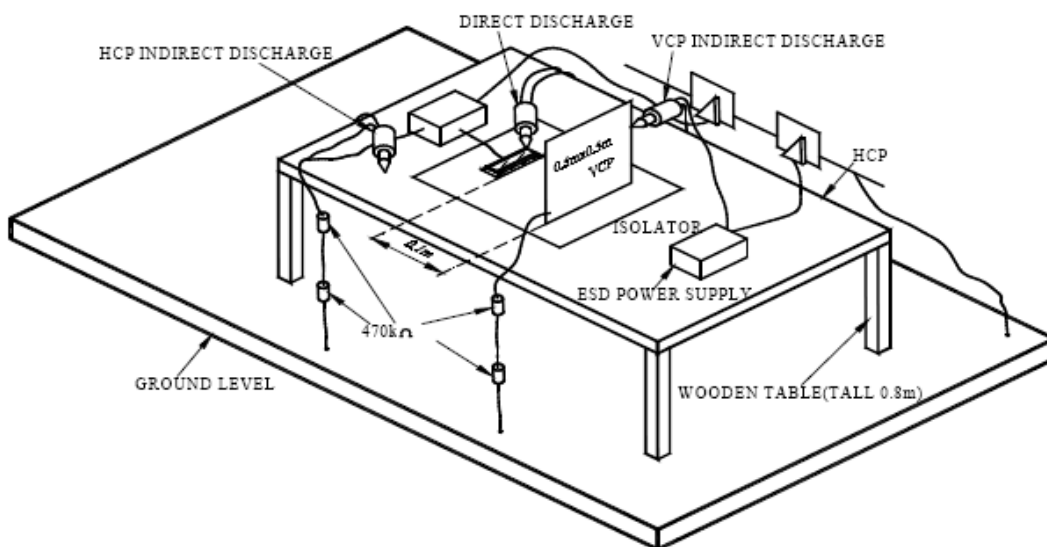
Direct Contact Discharge / Contact Point : A,B,C,D
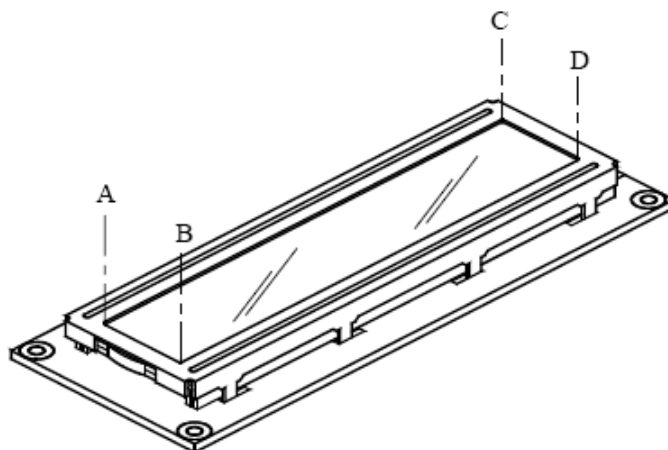
4. ELECTRICAL CHARACTERISTICS

AIP31068L IIC

(VDD = 4.5 to 5.5V , TA = 25)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Operating Voltage	VDD	—	4.5	—	5.5	V
Power Supply Current	IDD	Use internal Oscillator/external clock (VDD=5V，fosc=250KHz)	—	0.55	0.8	mA
Input High Voltage 1 (Except OSC1)	VIH1	—	2.5	—	VDD	V
	VIL1	—	−0.3	—	0.6	
Input Low Voltage 2 (Except OSC1)	VIH2	—	VDD−1.0	—	VDD	
	VIL2	—	−0.2	—	1	
Output High Voltage 1 (SDA)	VOH1	IOH=−0.205mA	2.4	—	—	
	VOL1	IOL=1.2mA	—	—	0.4	
Output High Voltage 2 (Except SDA)	VOH2	IO= −40uA	0.9VDD	—	—	
	VOL2	IO=40uA	—	—	0.1VDD	
Input Leakage Current	IIKG	VIN=0V～VDD	−1	—	1	uA

PCA9632

VDD = 2.3 V to 5.5 V; VSS = 0 V; Tamb = 40 C to +85 C; unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Supply							
V_{DD}	supply voltage			2.3	-	5.5	V
I_{DD}	supply current	operating mode; no load; f_{SCL} = 1 MHz					
		V_{DD} = 2.3 V		-	38	150	µA
		V_{DD} = 3.3 V		-	53	150	µA
		V_{DD} = 5.5 V		-	108	150	µA
I_{stb}	standby current	no load; f_{SCL} = 0 Hz; I/O = inputs; V_I = V_{DD}					
		V_{DD} = 5.5 V, MODE1[4] = 1 (Sleep mode)		-	0.005	1	µA
V_{POR}	power-on reset voltage	no load; V_I = V_{DD} or V_{SS}	[1] -		1.70	2.0	V
Input SCL; input/output SDA							
V_{IL}	LOW-level input voltage			−0.5	-	+0.3V_{DD}	V
V_{IH}	HIGH-level input voltage			0.7V_{DD}	-	5.5	V
I_{OL}	LOW-level output current	V_{OL} = 0.4 V; V_{DD} = 2.3 V		20	-	-	mA
		V_{OL} = 0.4 V; V_{DD} = 5.0 V		30	-	-	mA
I_L	leakage current	V_I = V_{DD} or V_{SS}		−1	-	+1	µA
C_i	input capacitance	V_I = V_{SS}		-	6	10	pF
LED driver outputs							
I_{OL}	LOW-level output current	V_{OL} = 0.5 V; V_{DD} = 2.3 V	[2] 12		-	-	mA
		V_{OL} = 0.5 V; V_{DD} = 3.0 V	[2] 17		-	-	mA
		V_{OL} = 0.5 V; V_{DD} = 4.5 V	[2] 25		-	-	mA
$I_{OL(tot)}$	total LOW-level output current	V_{OL} = 0.5 V; V_{DD} = 4.5 V	[2] -		-	100	mA
V_{OH}	HIGH-level output voltage	I_{OH} = −10 mA; V_{DD} = 2.3 V		1.6	-	-	V
		I_{OH} = −10 mA; V_{DD} = 3.0 V		2.3	-	-	V
		I_{OH} = −10 mA; V_{DD} = 4.5 V		4.0	-	-	V
C_o	output capacitance			-	2.5	5	pF

[1] VDD must be lowered to 0.2 V in order to reset part.
[2] Each bit must be limited to a maximum of 25 mA and the total package limited to 100 mA due to internal busing limits.

## 4.1 LED ELECTRICAL/OPTLCAL CHARACTERISTICS

Item	Symbol	Data			Unit	Condition
		Red	Green	Blue		
Forward Voltage	Vf	5.0	5.0	5.0	V	IF: R=20mA G=20mA B=20mA
Reverse Current	Ir	5	5	5	uA	
Dominant wave length	λp	615~625	520~530	465~475	nm	
Spectral Line Half width	Δλ	120	120	120	Deg	
Luminance	Lv	200	500	110	cd/m²	

4.2 LED ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Data			Unit
		Red	Green	Blue	
Reverse Voltage	Vr	5.0	5.0	5.0	V
Absolute maximum forward current	Ifm	120	70	70	mA
Spectral Line Half width	Δλ	120	120	120	Deg
Power description	pd	100	90	90	mW

4.2.1 LED ARRAY BLOCK DIAGRAM

(LED DICE 1 dices)
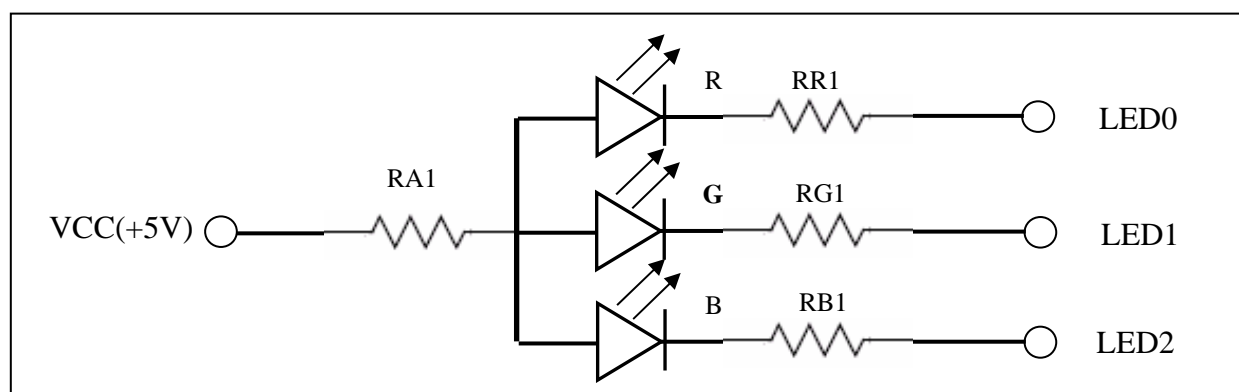
5. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast ratio	K	φ=0	1.4	4	-	-	1
Response time (rise)	Tr	φ=1	-	130	-	ms	2
Response time (fall)	Tf	φ=2		130	-	ms	2
Viewing angle	φ	K ≥1.4	-30 -- +30			deg.	3
	θ		-40 -- +20				

Note 1: Definition of Contrast Ratio "K"

$$K= \frac{\text{Brightness of non-selected segment(A)}}{\text{Brightness of selected segment(B)}}$$

Brightness Curve of selected area

Brightness Curve of non-selected area

90%

Brightness

10%

Vop   Driving Voltage

A

B
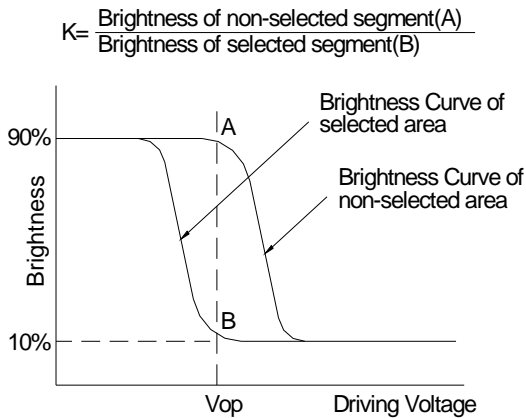
Note 2: Definition of Optical Response Time

Non-selected   Selected   Non-selected

100%
Brightness
0%

90%

10%

Tr   Tf
Rise Time   Fall Time
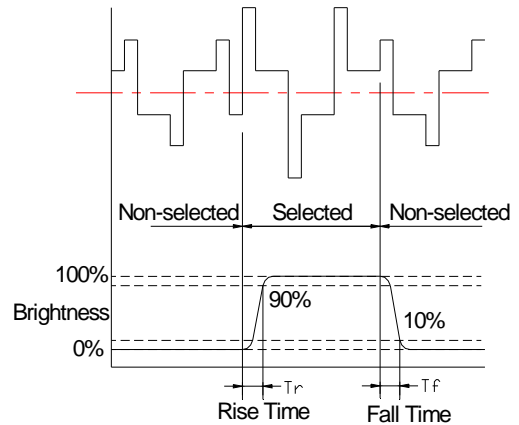
Note 3: Definition of Viewing Angle

Left   Right

∅   ∅

Top   Top Viewing Angle

Top
θ

Viewing Surface

Bottom
θ

Bottom   Bottom Viewing Angle
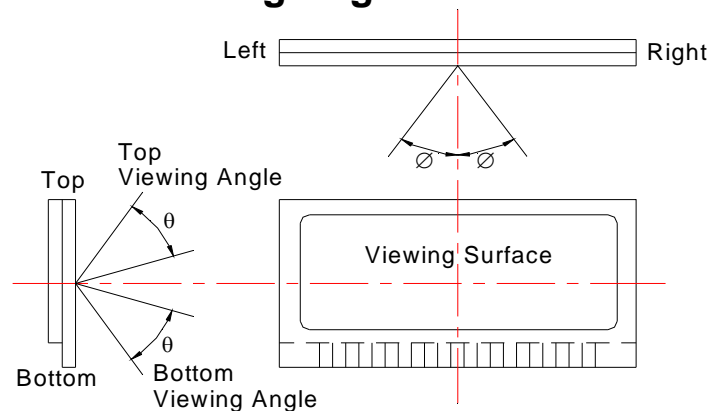
Please select either top or bottom viewing angle

6. BLOCK DIAGRAM

GND ———

VCC ———

SDA ———

SCL ———

CONTROLLER：

AIP31068L

OR

Equivalence

COM 1-16

SEG 1-40

4

LCD
16 character×2 line

SEG 41-80

SEGMENT DRIVER

CONTROLLER：
PCA9632DP1

VCC
LED0
LED1
LED2

RGB
BACKLIGHT

7. POWER SUPPLY

+5V

R7

GND

VCC   LCM

V0
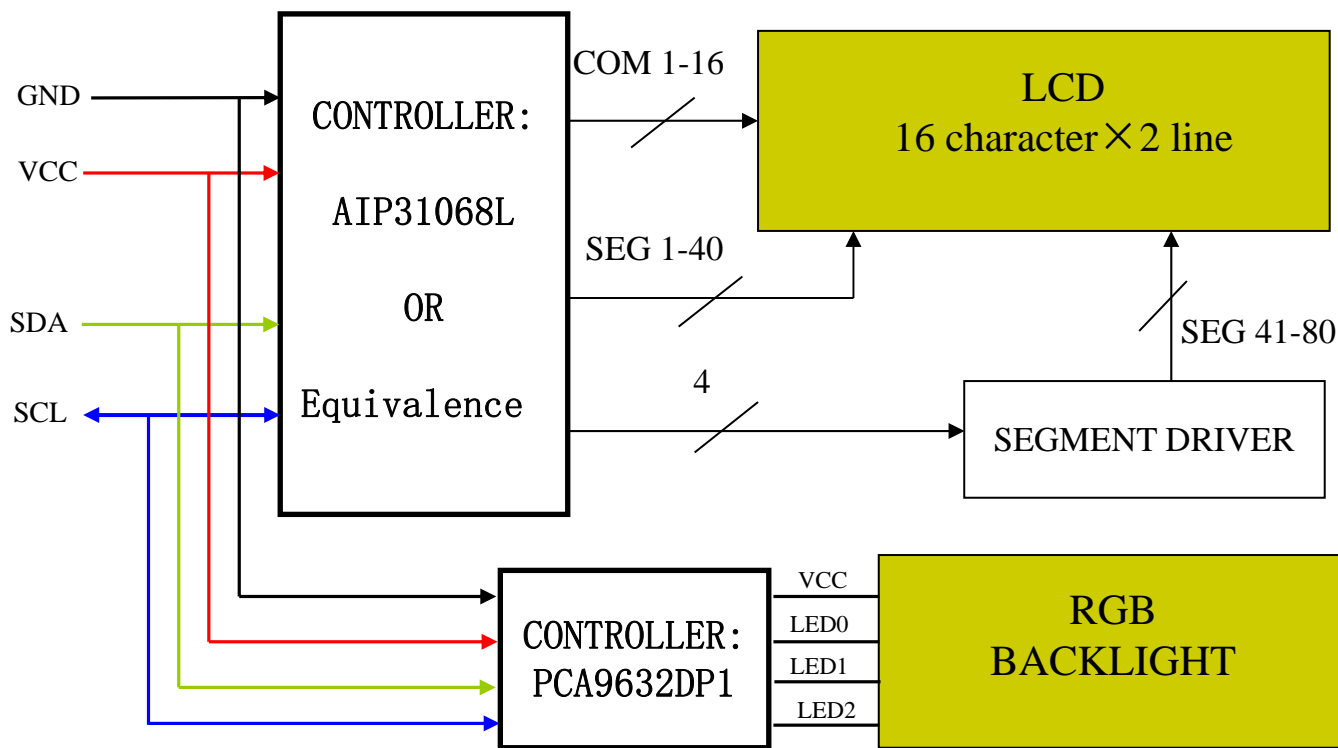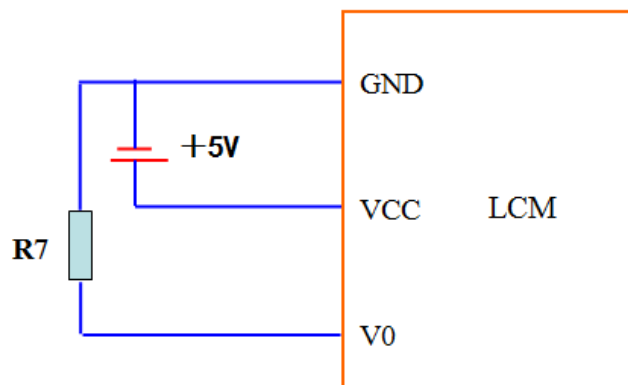
8. AC CHARACTERISTICS

AIP31068L IIC

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit
SCL Cycle Time	f_{SCLK}		–	–	400	KHz
SCL Pulse Width	t_{LOW}		1.3	–	–	us
SCL Rise/Fail Time	t_{HIGH}		0.6	–	–	
Address Setup Time	$t_{SU:DAT}$		100	–	–	ns
Address Hold Time	$t_{HD:DAT}$		0	–	0.9	us
SCL/SDA Rise/Pulse Time	t_r , t_f	I^2C	20	–	300	ns
START Steup Time	$t_{SU:STA}$		0.6	–	–	us
START Hold Time	$t_{HD:STA}$		0.6	–	–	us
STOP Steup Time	$t_{SU:STO}$		0.6	–	–	us
STOP、START Spacing Interval	t_{BUF}		1.3	–	–	us
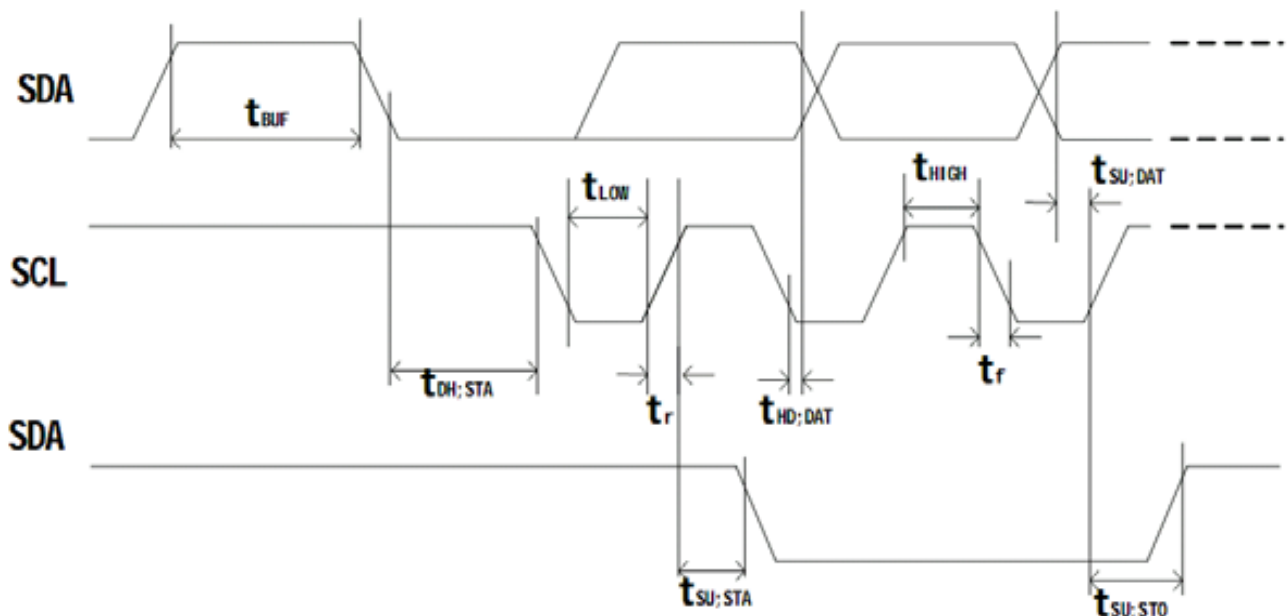
PCA9632

(VDD = 4.5 to 5.5V , TA = 25)

Symbol	Parameter	Conditions	Standard- mode I²C-bus		Fast-mode I²C-bus		Fast-mode Plus I²C-bus		Unit
			Min	Max	Min	Max	Min	Max	
f_{SCL}	SCL clock frequency	[1]	0	100	0	400	0	1000	kHz
t_{BUF}	bus free time between a STOP and START condition		4.7	-	1.3	-	0.5	-	µs
$t_{HD;STA}$	hold time (repeated) START condition		4.0	-	0.6	-	0.26	-	µs
$t_{SU;STA}$	set-up time for a repeated START condition		4.7	-	0.6	-	0.26	-	µs
$t_{SU;STO}$	set-up time for STOP condition		4.0	-	0.6	-	0.26	-	µs
$t_{HD;DAT}$	data hold time		0	-	0	-	0	-	ns
$t_{VD;ACK}$	data valid acknowledge time	[2]	0.3	3.45	0.1	0.9	0.05	0.45	µs
$t_{VD;DAT}$	data valid time	[3]	0.3	3.45	0.1	0.9	0.05	0.45	µs
$t_{SU;DAT}$	data set-up time		250	-	100	-	50	-	ns
t_{LOW}	LOW period of the SCL clock		4.7	-	1.3	-	0.5	-	µs
t_{HIGH}	HIGH period of the SCL clock		4.0	-	0.6	-	0.26	-	µs
t_f	fall time of both SDA and SCL signals	[4][5]	-	300	$20 + 0.1C_b$[6]	300	-	120	ns
t_r	rise time of both SDA and SCL signals		-	1000	$20 + 0.1C_b$[6]	300	-	120	ns
t_{SP}	pulse width of spikes that must be suppressed by the input filter	[7]	-	50	-	50	-	50	ns

[1] Minimum SCL clock frequency is limited by the bus time-out feature, which resets the serial bus interface if either SDA or SCL is held LOW for a minimum of 25 ms. Disable bus time-out feature for DC operation.
[2] $t_{VD;ACK}$ = time for Acknowledgement signal from SCL LOW to SDA (out) LOW.
[3] $t_{VD;DAT}$ = minimum time for SDA data out to be valid following SCL LOW.
[4] A master device must internally provide a hold time of at least 300 ns for the SDA signal (refer to Table 18, VIL of the SCL signal) in order to bridge the undefined region of SCL's falling edge.
[5] The maximum tf for the SDA and SCL bus lines is specified at 300 ns. The maximum fall time (tf) for the SDA output stage is specified at 250 ns. This allows series protection resistors to be connected between the SDA and the SCL pins and the SDA/SCL bus lines without exceeding the maximum specified tf.
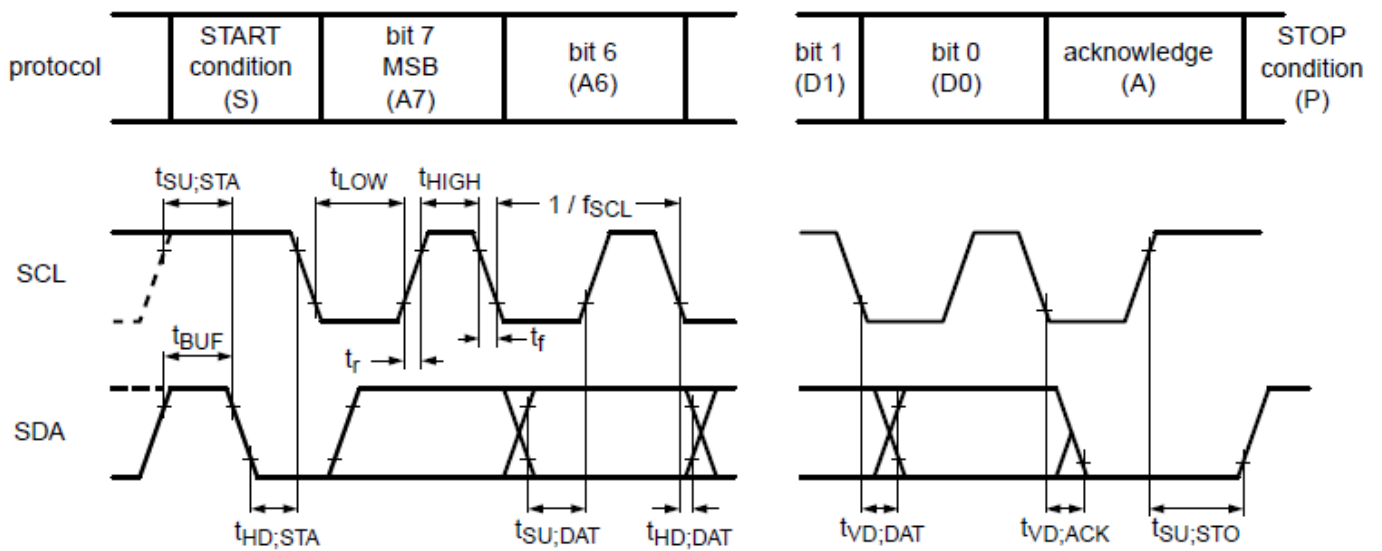[6] Cb = total capacitance of one bus line in pF.
[7] Input filters on the SDA and SCL inputs suppress noise spikes less than 50 ns.
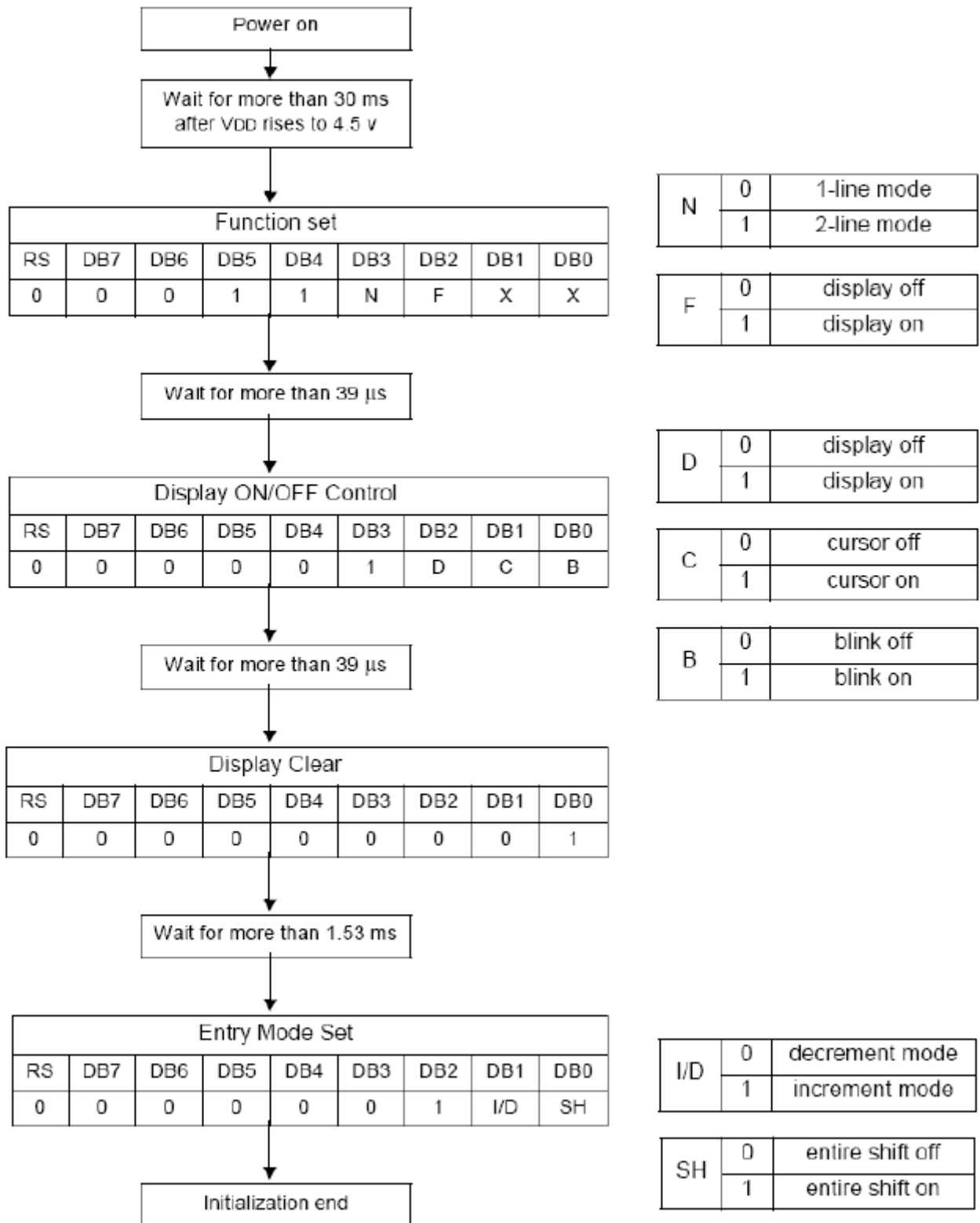
Definition of timing
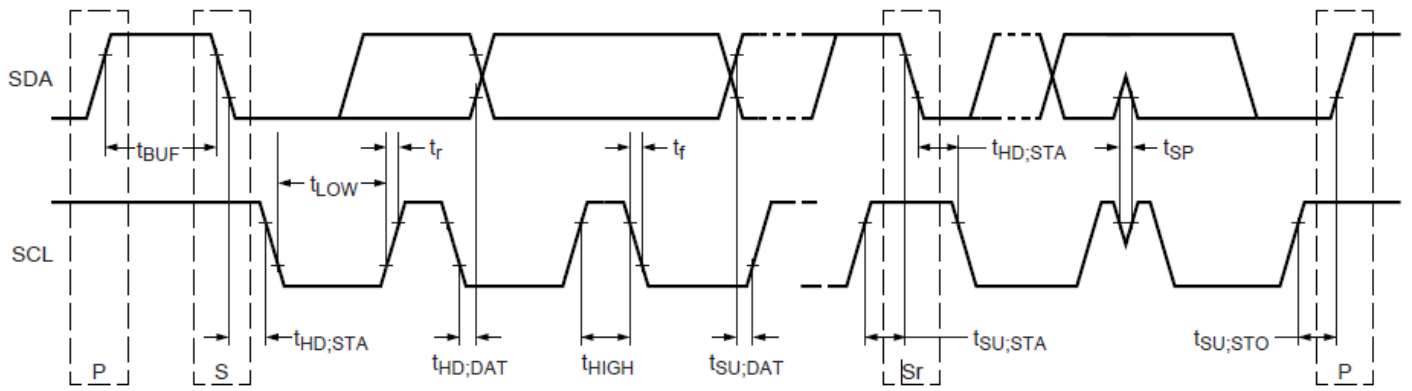
002aaa986

I2C-bus timing diagram

9. INITIALIZATION SEQUENCE

```
┌─────────────────────────┐
│        Power on         │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Wait for more than 30 ms│
│  after VDD rises to 4.5 v │
└─────────────────────────┘
            │
            ▼
```

Function set								
RS	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	1	N	F	X	X

N	0	1-line mode
	1	2-line mode

F	0	display off
	1	display on

```
            │
            ▼
┌─────────────────────────┐
│  Wait for more than 39 µs │
└─────────────────────────┘
            │
            ▼
```

Display ON/OFF Control								
RS	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	1	D	C	B

D	0	display off
	1	display on

C	0	cursor off
	1	cursor on

B	0	blink off
	1	blink on

```
            │
            ▼
┌─────────────────────────┐
│  Wait for more than 39 µs │
└─────────────────────────┘
            │
            ▼
```

Display Clear								
RS	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	1

```
            │
            ▼
┌─────────────────────────┐
│  Wait for more than 1.53 ms│
└─────────────────────────┘
            │
            ▼
```

Entry Mode Set								
RS	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	1	I/D	SH

I/D	0	decrement mode
	1	increment mode

SH	0	entire shift off
	1	entire shift on

```
            │
            ▼
┌─────────────────────────┐
│     Initialization end   │
└─────────────────────────┘
```

10. INSTRUCTION SET

COMMAND	COMMAND CODE									COMMAND CODE	E-CYCLE f_{osc}=270KHz
	RS	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
SCREEN CLEAR	0	0	0	0	0	0	0	0	1	Screen Clear, Set AC to 0 Cursor Reposition	1.53ms
CURSOR RETURN	0	0	0	0	0	0	0	1	*	DDRAM AD=0, Return, Content Changeless	1.53ms
INPUT SET	0	0	0	0	0	0	1	I/D	S	Set moving direction of cursor Appoint if move	39us
DISPLAY SWITCH	0	0	0	0	0	1	D	C	B	Set display on/off,cursor on/off, blink on/off	39us
SHIFT	0	0	0	0	1	S/C	R/L	*	*	Remove cursor and whole display,DDRAM changeless	39us
FUNCTION SET	0	0	0	1	DL	N	F	*	*	Set DL,display line,font	39us
CGRAM AD SET	0	0	1	ACG						Set CGRAM AD, send receive data	39us
DDRAM AD SET	0	1	ADD							Set DDRAM AD, send receive data	39us
CGRAM/ DDRAM DATA WRITE	1	DATA WRITE								Write data from CGRAM or DDRAM	43us
	I/D=1: Increment Mode; I/D=0: Decrement Mode S=1: Shift S/C=1: Display Shift; S/C=0: Cursor Shift R/L=1: Right Shift; R/L=0: Left Shift DL=1: 8D DL=0: 4D N=1: 2R N=0: 1R F=1: 5x10 Style; F=0: 5x7 Style									DDRAM: Display data RAM CGRAM: Character Generator RAM ACG: CGRAM AD ADD: DDRAM AD & Cursor AD AC: Address counter for DDRAM & CGRAM	E-cycle changing with main frequency. Example: If fcp or f_{osc}=270KHz 40us x 250/270 =37us

11. FONT TABLE

b7-b4 / b3-b0	0000	0010	0011	0100	0101	0110	0111	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)		0	@	P	`	p		―	タ	ミ	α	p
0001	(2)	!	1	A	Q	a	q	。	ア	チ	ム	ä	q
0010	(3)	"	2	B	R	b	r	「	イ	ツ	メ	β	θ
0011	(4)	#	3	C	S	c	s	」	ウ	テ	モ	ε	∞
0100	(5)	$	4	D	T	d	t	、	エ	ト	ヤ	μ	Ω
0101	(6)	%	5	E	U	e	u	・	オ	ナ	ユ	σ	ü
0110	(7)	&	6	F	V	f	v	ヲ	カ	ニ	ヨ	ρ	Σ
0111	CG RAM (8)	'	7	G	W	g	w	ア	キ	ヌ	ラ	g	π
1000	CG RAM (1)	(	8	H	X	h	x	イ	ク	ネ	リ	√	x̄
1001	(2)	)	9	I	Y	i	y	ゥ	ケ	ノ	ル	¨	y
1010	(3)	*	:	J	Z	j	z	エ	コ	ハ	レ	j	干
1011	(4)	+	;	K	[	k	{	オ	サ	ヒ	ロ	×	万
1100	(5)	,	<	L	¥	l			ャ	シ	フ	ワ	¢	円
1101	(6)	-	=	M	]	m	}	ュ	ス	ヘ	ン	£	÷
1110	(7)	.	>	N	^	n	→	ョ	セ	ホ	゛	ñ	
1111	CG RAM (8)	/	?	O	_	o	←	ッ	ソ	マ	゜	ö	█

12. QUALITY ASSURANCE

12.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : 20 $\pm$ 5°C

Humidity : 65 $\pm$ 5%

121.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

12.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

12.1.4 Test Frequency

In case of related to deterioration such as shock test.It will be conducted only once.

12.1.5 Test Method

No.	Parameter	Conditions	Regulations
1	High Temperature Operating	50$\pm$2℃	Note 3
2	Low Temperature Operating	0 $\pm$2℃	Note 3
3	High Temperature Storage	60$\pm$2℃	Note 3
4	Low Temperature Storage	-10$\pm$2℃	Note 3
5	Vibration Test (Non-operation state)	Total fixed amplitude : 1.5mm Vibration Frequency : 10 ~ 55Hz One cycle 60 seconds to 3 directions of X.Y.Z. for each 15 minutes	Note 3
6	Damp Proof Test (Non-operation state)	40℃$\pm$2℃, 90~95%RH, 96h	Note 1,2
7	Shock Test (Non-operation state)	To be measured after dropping from 60cm high once concrete surface in packing state	Note 3

Note 1: Returned under normal temperature and humidity for 4 hrs.

Note 2: No dew condensation to be observed.

Note 3: No change on display and in operation under the test condition

12.2Inspection condition

12.2.1 Inspection conditions
The LCD shall be inspected under 40W white fluorescent light.
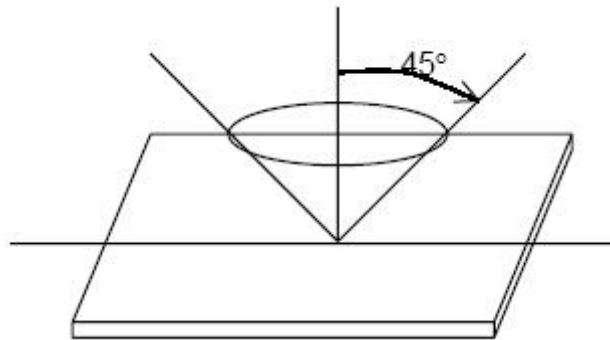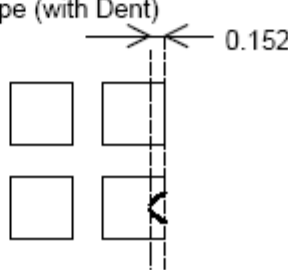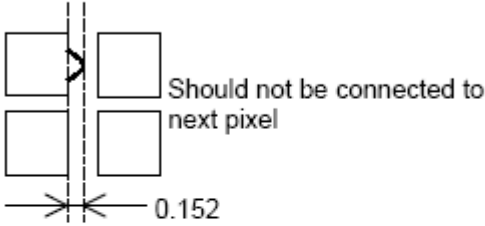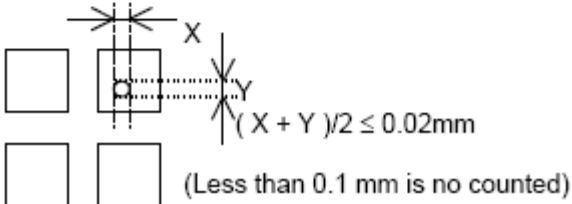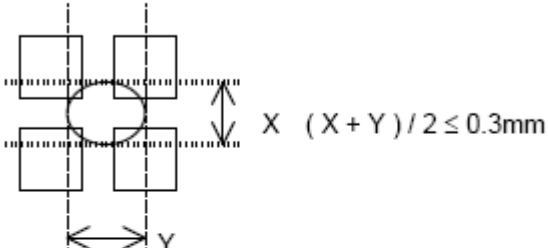
12.2.2 Definition of applicable Zones
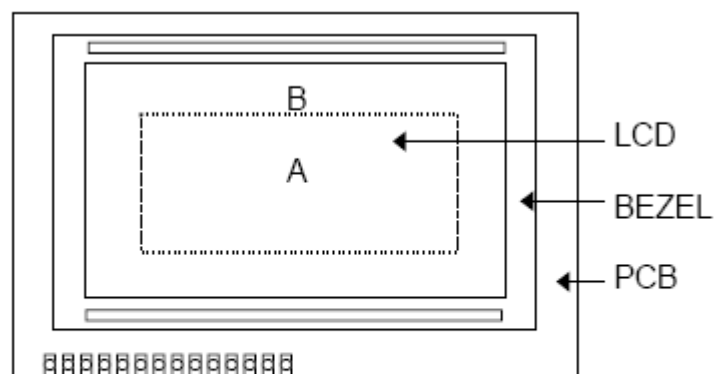
A : Display Area
B : Non-Display Area

12.2.3 Inspection Parameters

No.	Parameter	Criteria
1	Black or White spots	<table><tr><td>Dimension \ Zone</td><td colspan="2">Acceptable number</td><td>Class Of Defects</td><td>AQL Level</td></tr><tr><td></td><td>A</td><td>B</td><td></td><td></td></tr><tr><td>D < 0.15</td><td>*</td><td>*</td><td rowspan="4">Minor</td><td rowspan="4">2.5</td></tr><tr><td>0.15≤ D< 0.2</td><td>4</td><td>4</td></tr><tr><td>0.2 ≤ D ≤ 0.25</td><td>2</td><td>2</td></tr><tr><td>D ≤ 0.3</td><td>0</td><td>1</td></tr></table> D = (Long + Short) / 2 * : Disregard
2	Scratch, Substances	<table><tr><td colspan="2">Zone</td><td colspan="2">Acceptable number</td><td>Class Of Defects</td><td>AQL Level</td></tr><tr><td>X (mm)</td><td>Y(mm)</td><td>A</td><td>B</td><td></td><td></td></tr><tr><td>*</td><td>0.04 ≥ W</td><td>*</td><td>*</td><td rowspan="4">Minor</td><td rowspan="4">2.5</td></tr><tr><td>3.0 ≥ L</td><td>0.06 ≥ W</td><td>4</td><td>4</td></tr><tr><td>2.0 ≥ L</td><td>0.08 ≥ W</td><td>2</td><td>3</td></tr><tr><td>—</td><td>0.1 < W</td><td>0</td><td>1</td></tr></table> X : Length Y : Width * : Disregard Total defects should not exceed 4/module
3	Air Bubbles (between glass & polarizer)	<table><tr><td>Dimension \ Zone</td><td colspan="2">Acceptable number</td><td>Class of Defects</td><td>AQL Level</td></tr><tr><td></td><td>A</td><td>B</td><td></td><td></td></tr><tr><td>D ≤ 0.15</td><td>*</td><td>*</td><td rowspan="3">Minor</td><td rowspan="3">2.5</td></tr><tr><td>0.15 < D ≤ 0.25</td><td>2</td><td>*</td></tr><tr><td>0.25 < D</td><td>0</td><td>1</td></tr></table> * : Disregard Total defects shall not excess 3/module.
4	Uniformity of Pixel	(1) Pixel shape (with Dent) 0.152

4	Uniformity of Pixel		(2) Pixel shape (with Projection) Should not be connected to next pixel 0.152 (3) Pin hole X Y (X + Y)/2 ≤ 0.02mm (Less than 0.1 mm is no counted) (4) Deformation X (X + Y)/ 2 ≤ 0.3mm Y Total acceptable number : 1/pixel, 5/cell
Class of defects	Major	AQL 0.65%	**Definition** It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
		AQL 1.00%	It is a defect that is likely to assembly size and not result in functioning problem.
	Minor	AQL 2.5%	It is a defect that will not result in functioning problem with deviation classified.

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13. OUTLINE DRAWING

1	2	3	4
SCL	SDA	VCC	GND

14. INTERFACE

PIN NO.	SYMBOL	I/O	FUNCTION
1	SCL	I	I2C-bus serial clock
2	SDA	I/O	I2C-bus serial data
3	VCC	POWER SUPPLY	+5.0V
4	GND	POWER SUPPLY	0V (GND)

15. QC/QA PROCEDURE

Parts QA Dept.	LCD Mfg. Dept.	LCM QA Dept.

Parts

Parts Acceptance Inspection

1. Function & Appearance & Dimension: Sample Test
2. Reliability: Random Sampling

Soldering

Soldering Inspection

Soldering Condition

LCM Assembling

1. Dimension: Sample Test
2. Function: 100% Inspection

Heat Cycle Aging

-10~70℃ (1 Cycle=6 Hrs). 2 Cycle: 100% Inspection

High Temp. Test

Function & Appearance: 100% Inspection (ex. 50℃)

Inspection

1. Function & Appearance: 100% Inspection
2. Dimension: Random Sampling

Packaging

Package Condition & Label: 100% Inspection

Outgoing Inspection

1. Function,Appearance & Dimension: Random Sampling
2. Package Product & Label: Random Sampling
3.Electro-optical Characteristic: 100% Inspection
4. Reliability: Random Sampling

Storage/Shipping

16. Handling Precautions

1. Limitation of Application:

Jing handa products are designed for use in ordinary electronic devices such as business machines, telecommunications equipment,measurement devices and etc. Please handle the products with care. (see below)

Jing handa products are not designed,intended ,or authorized for use in any application which the failure of the product could result in a situation where personal injury or death may occur . these applications include, but are not limited to . life-sustaining equipment,nuclear control devices , aerospace equipment , devices related to hazardous or flammable materials , etc.[If Buyer intends to purchase or use the Jing handa Products for such unintended or unauthorized applications , Buyer must secure prior written consent to such use by a responsible officer of Jing handa Corporation.]Should Buyer purchase or use Jing handa Products for any such unintended or unauthorized application [without such consent].Buyer shall indemnify and hold Jing handa and its officers. employees. subsidiaries, affiliates and distributors harmless against all claims, costs, damages and expenses , and reasonable attorney's fees,arising out of , directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Jing handa was negligent regarding the design or manufacture of the part.

2.Industrial Rights and Patents

Jing handa shall not be responsible for any infringement of industrial property rights of third parties in any country arising out of the application or use of Jing handa products, except which directly concern the structure or production of such products.

No Press and Shock!

If pressure to LCD, orientation may be disturbed.
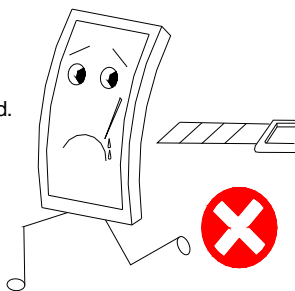LCD will broken by shock!
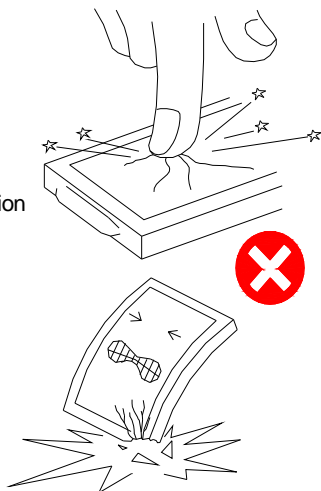
Don't Swallow or Touch Liquid Crystal!

Liquid Crystal may be leaked when display is broked.
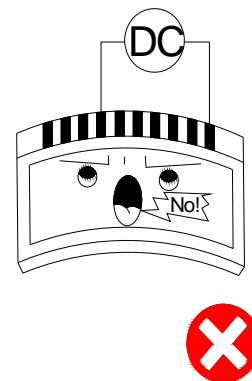If it accidentally gets your hands, wash then with water!
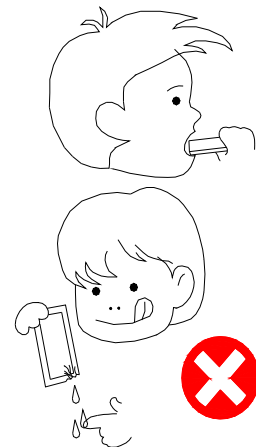
Don't not Scratch!

Polarizer is a soft material and can easily be scratched.

No DC Voltage to LCD!

DC volrage or driveing higher than the specified voltage will reduce the lifetime of the LCD.
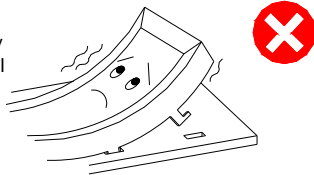
DC

No!

Don't Press the Metallic Frame and Disassemble the LCM

Pressure on the metallic frame and PCB may deform the conductive rubber or break the liquid crystal cell and back light, which will cause defects.
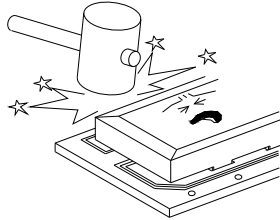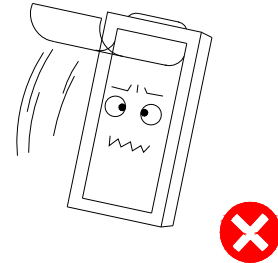
LCD may be shifted or conductive rubber may be reshaped, which will cause defects.
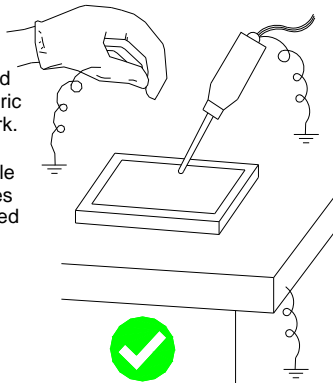
Slowly Peel Off Protective Film!

Avoid static electricity.

Avoid Static Electricity!

Please be sure to ground human body and electric apploances during work. It is preferable to use conductive mat on table and wear cotton clothes or conduction processed fiber. Synthetic fiber is not recommended.
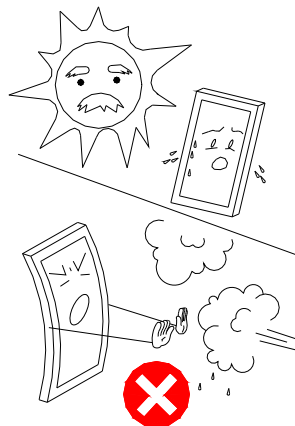
Wear Gloves While Handing!

It is preferable to wear gloves to avoid damaging the LCD.

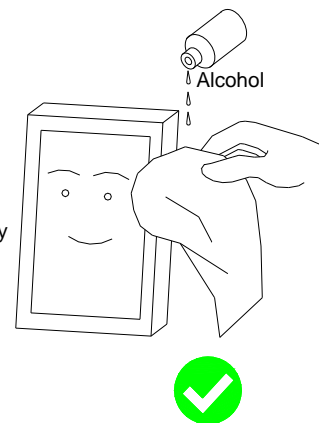Please do not touch electrodes with bare hands or make them dirty.

GLOVE
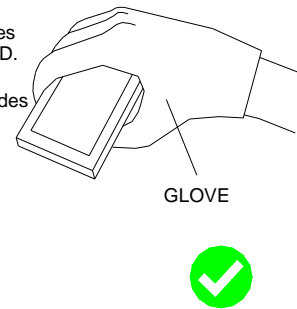
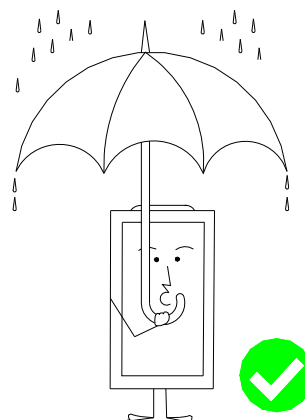## Keep Away From Extreme Heat and Humidity!

LCD deteriorates.

Use Alcohol to Clean Terminals!

Alcohol

When attaching with the heat seal or anisontropically conductive film, wipe off with alcohol before use.

Don't Drop Water on LCD!

Note that the presence of waterdrops or dew in the LCD panel may deteriorate the polarizer or corrade electrode.

Precaution in Soldering LCD Module

Basic instructions: Solder I/O terminals only.
Use soldering iron without leakage.
(1)Soldering condition to I/O terminals
　　Temperature at tip of the iron: 280±10℃
　　Soldering time: 3~4 sec.
　　Type of solder: Eutectic solder (containing colophony-flux)
　*Please do not use flux because it may soak into LCD Module or contaminate it.
　*It is preferable to peel off protective film on display surface after soldering I/O
　　terminals is finished.
(2)Remove connector or cable
　*When you remove connector or cable soldered to I/O terminals, please confirm
　　that solder is fully melted. If you remove by force, electrodes at I/O terminals may
　　be damaged(or stripped off).
　*It is recommended to use solder suction machine.

Long-term Storage

If it is necessary to store LCD modules for a long time, please comply with the
following procedures.
If storage condition is not satisfactory, display(especially polarizer) may be deteriorated
or soldering I/O terminals may become difficult(some oxide is generated at I/O
terminals plating).
1.Store as delivered by Jing handa
2.If you store as unpacked,put in anti-static bag,seal its opening and store where it is
　not subjected to direct sunshine nor fluorescent lamp.
3.Store at temperature 0 to +35℃ and at low humidity.Please refer to our specification
　sheets for storage temperature range and humidity condition.

Long-term Storage

Please use power supply with built-in surge protection circuit.