

SPECIFICATION OF LCD MODULE

CUSTOMER 客户名称	
PART NO. 产品型号	JHD2101Y-YG
PRODUCTS TYPE 产品内容	
REMARKS 备注	
SIGNATURE BY CUSTOMER 客户签署:	

		
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深圳市晶汉达电子有限公司

LCM System

1 LCD Type

☒ STN☐ FSTN☐ DFSTN

2 Viewing Angle

☒ Lower 6:00☐ Upper 12:00☐ Others

3 Display Mode

☒ Yellow Green positive☐ Blue Negative☐ Grey 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☐ Brilliant Green☒ Yellow Green☐ Red☐ White☐ Without 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	2021-8-12	INITIAL RELEASE	ALL	
1.1	2021-8-17	1. Put black making tape on both sides of backlight and iron frame. 2.The resistance of R9 &R10 are changed from 1100Ω to 200Ω.	22	

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1. FEATURES

•Display construction	16 Characters * 1Lines
•Display mode	STN(Y-G)
•Display type	Positive Transflective
•Backlight	LED/(Y-G)
•Viewing direction	6 o'clock
•Operating temperature	-20 to 70°C
•Storage temperature	-30 to 80°C
•Controller	AIP31066L or Equivalence
•Driving voltage	Single power
•Driving method	1/16 duty, 1/5 bias
•Type	COB (Chip On Board)
•Number of data line	6800 4/8-bit parallel
•Connector	Zebra

2. MECHANICAL DATA

ITEM		WIDTH	HEIGHT	THICKNES S	UNIT
Module size		122	33	15.5(MAX)	mm
Viewing area		99	13	-	mm
character	Construction	5*7			dots
	Size	4.84	8.06	-	mm
	Pitch	6.00	8.56	-	mm
Dot	Size	0.92	1.10	-	mm
	Pitch	0.98	1.16	-	mm
Diameter of mounting hole		Φ3.5			mm
Weight		54			g

3. ABSOLUTE MAXIMUM RATINGS

(TA = 25 , Vss=0V)

Item	Symbol	MIN.	Max.	Unit
Supply Voltage (Logic)	VDD-VSS	-0.3	5.5	V
Supply Voltage (LCD Driver)	V _{LCD} -VSS	VDD-10	VDD+0.3	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tsto	-30	80	°C

4. ELECTRICAL CHARACTERISTICS

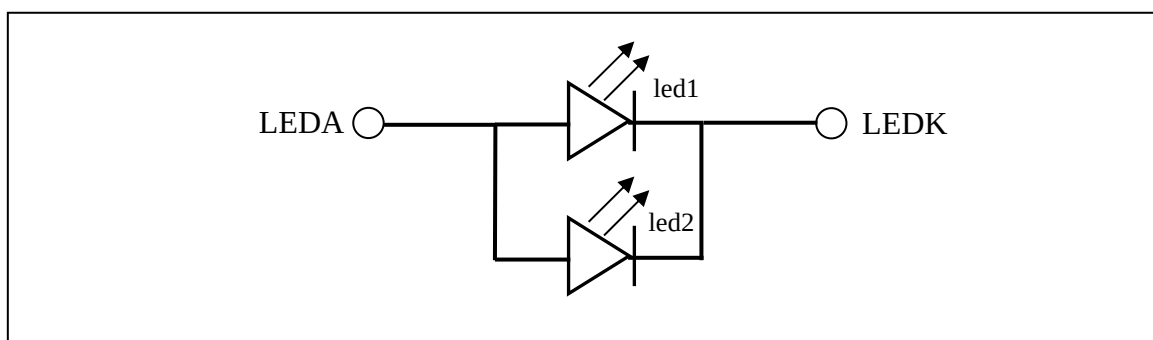
Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
V _{CC}	Operating Voltage	-	4.5	-	5.5	V
V _{LCD}	LCD Voltage	V _{CC} -V5	3.0	-	10.0	V
I _{CC}	Power Supply Current	f _{OSC} = 270KHz V _{CC} =5.0V	-	0.2	0.5	mA
V _{IH1}	Input High Voltage (Except OSC1)	-	0.7V _{CC}	-	V _{CC}	V
V _{IL1}	Input Low Voltage (Except OSC1)	-	-0.3	-	0.6	V
V _{IH2}	Input High Voltage (OSC1)	-	V _{CC} -1	-	V _{CC}	V
V _{IL2}	Input Low Voltage (OSC1)	-	-	-	1.0	V
V _{OH1}	Output High Voltage (DB0 - DB7)	I _{OH} = -0.1mA	3.9	-	V _{CC}	V
V _{OL1}	Output Low Voltage (DB0 - DB7)	I _{OL} = 0.1mA	-	-	0.4	V
V _{OH2}	Output High Voltage (Except DB0 - DB7)	I _{OH} = -0.04mA	0.9V _{CC}	-	V _{CC}	V
V _{OL2}	Output Low Voltage (Except DB0 - DB7)	I _{OL} = 0.04mA	-	-	0.1V _{CC}	V
R _{COM}	Common Resistance	V _{LCD} = 4V, I _d = 0.05mA	-	2	20	KΩ
R _{SEG}	Segment Resistance	V _{LCD} = 4V, I _d = 0.05mA	-	2	30	KΩ
I _{LEAK}	Input Leakage Current	V _{IN} = 0V to V _{CC}	-1	-	1	μA
I _{PUP}	Pull Up MOS Current	V _{CC} = 5V	-50	-110	-180	μA

4.1 LED ELECTRICAL/OPTICAL CHARACTERISTICS

Item	Symbol	min	typ	max	Unit	Condition
Forward Voltage	V _f	4.5	5.0	5.5	V	I _f =30mA
Forward Current	I _f	—	30	40	mA	V _f =5V
Dominant wave length	λ _p	—	X=0.29 Y=0.30	—	—	I _f =30mA
Luminance	L _v	—	—	—	cd/m ²	I _f =30mA

4.2.1 LED ARRAY BLOCK DIAGRAM

(LED DICE 2 dices)



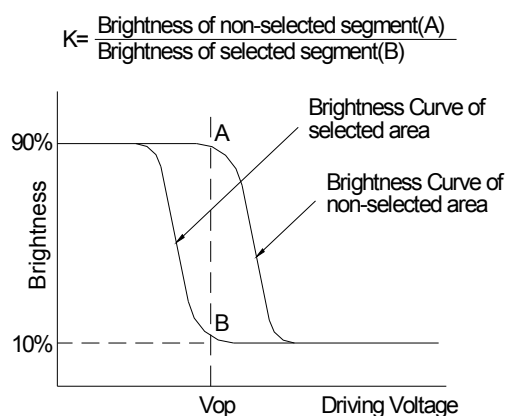
4.2.2 LED POWER SOURCE

LED	Option	Power source	Jumper setting
	1	15A/16K	R9,R10

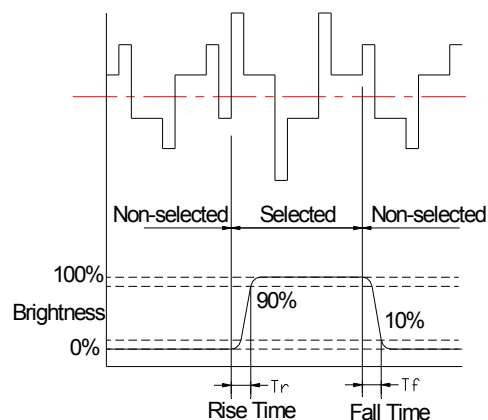
5. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast ratio	K	$\Phi=0^0$	-	4	-	-	1
Response time (rise)	Tr	$\Phi=0^0 \theta=0^0$	-	150	-	ms	2
Response time (fall)	Tf	$\Phi=0^0 \theta=0^0$		200	-	ms	2
Viewing angle	Φ	K $\geq$ 1.4	-45 -- +45			deg.	3
	θ		-45-- +30				

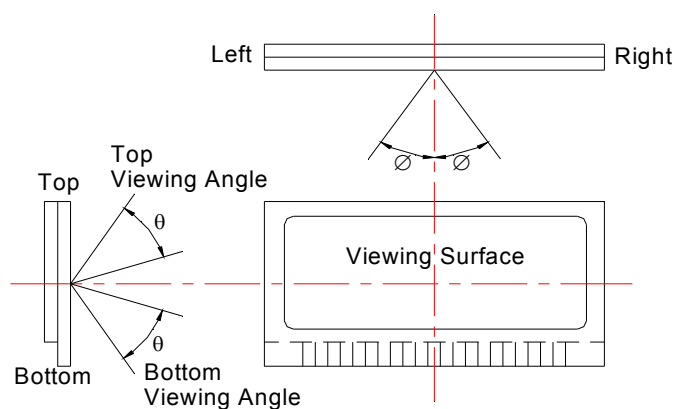
Note 1: Definition of Contrast Ratio “K”



Note 2: Definition of Optical Response Time

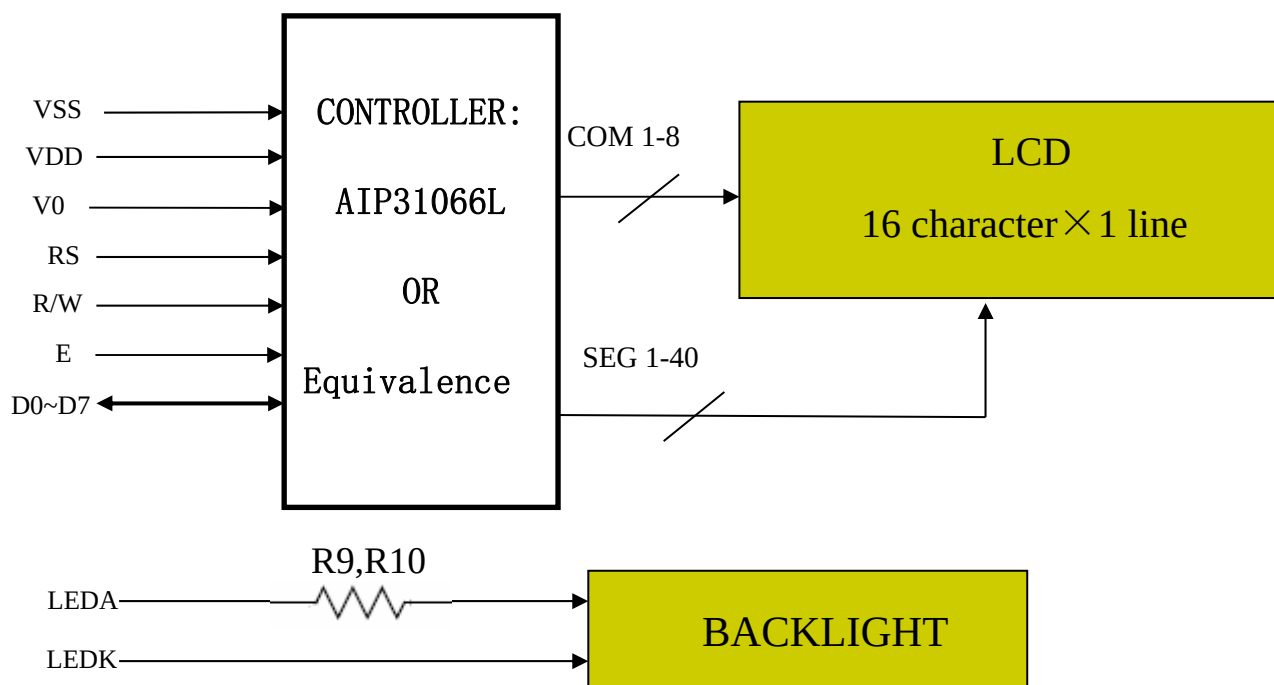


Note 3: Definition of Viewing Angle

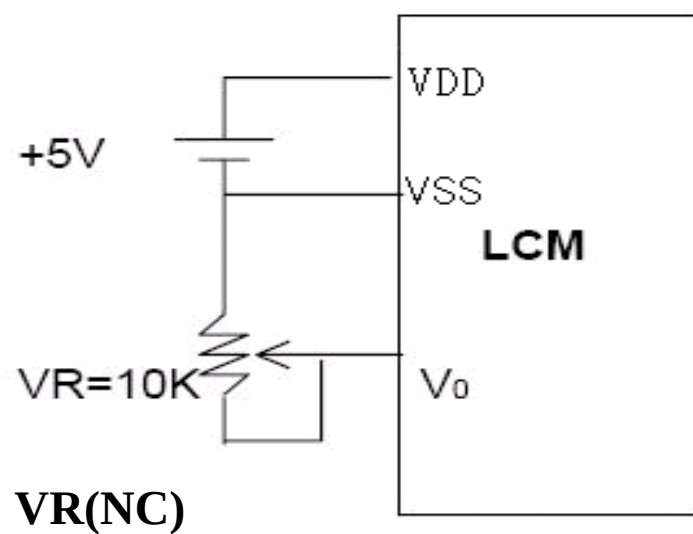


Please select either top or bottom viewing angle

6. BLOCK DIAGRAM

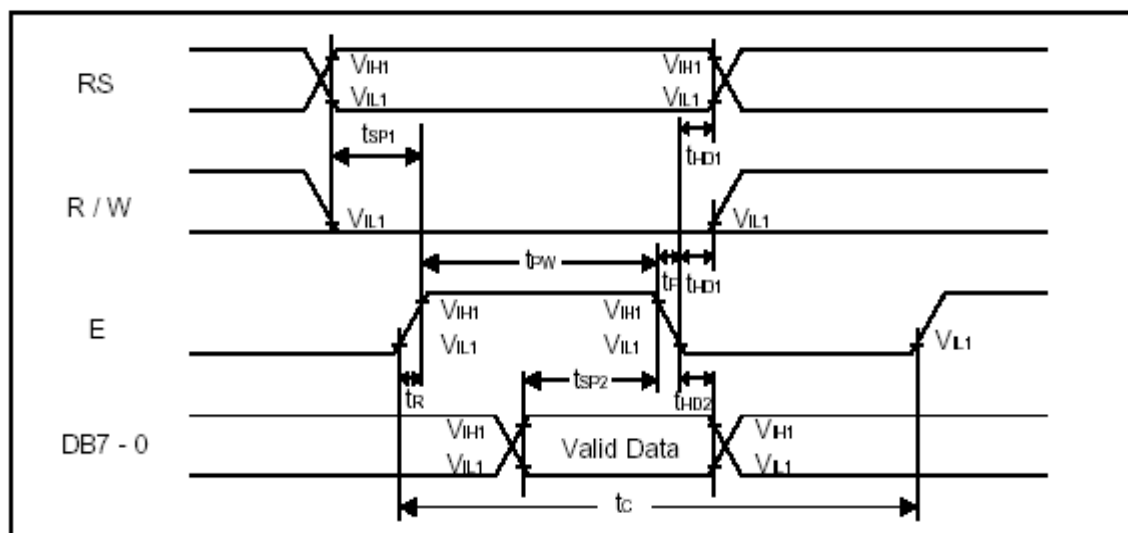


7. POWER SUPPLY

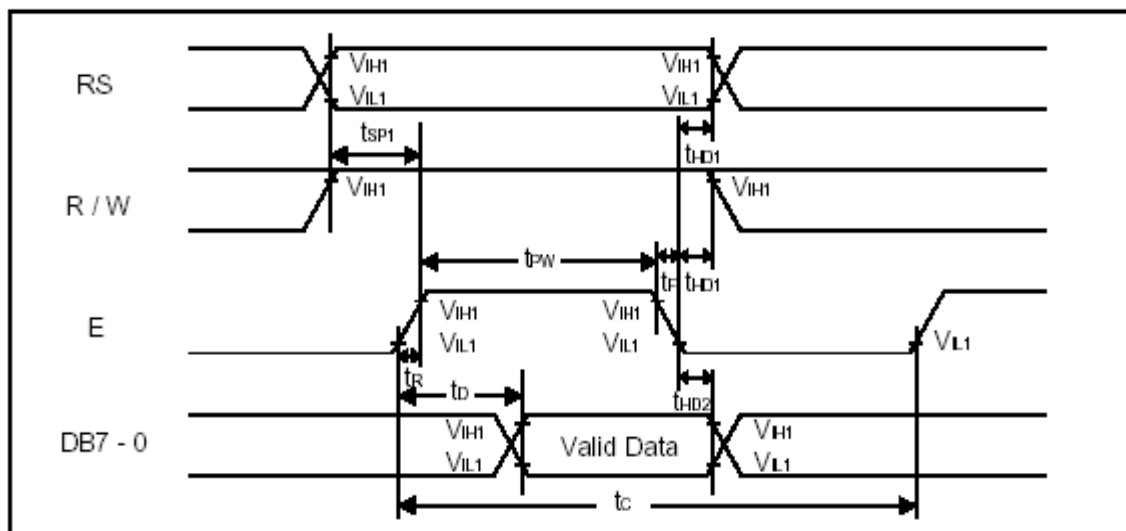


8. TIMING DIAGRAM

• WRITE OPERATION



• READ OPERATION



9. AC CHARACTERISTICS

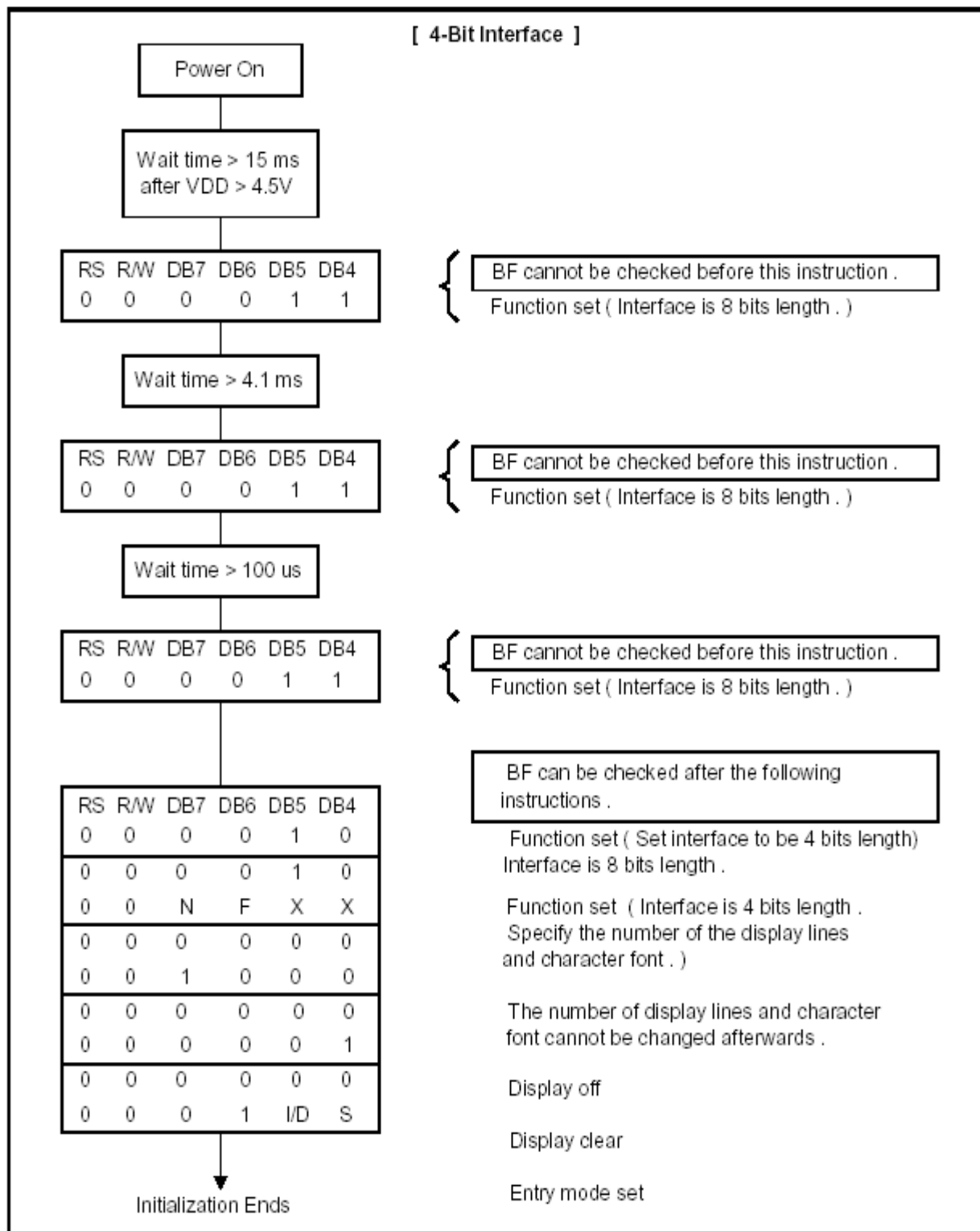
• WRITE MODE

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t_c	1000	-	-	ns	Pin E
E Pulse Width	t_{pw}	450	-	-	ns	Pin E
E Rise/Fall Time	t_r, t_f	-	-	25	ns	Pin E
Address Setup Time	t_{SP1}	60	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t_{HD1}	20	-	-	ns	Pins: RS, R/W, E
Data Setup Time	t_{SP2}	195	-	-	ns	Pins: DB7 - 0
Data Hold Time	t_{HD2}	10	-	-	ns	Pins: DB7 - 0

• READ MODE

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t_c	1000	-	-	ns	Pin E
E Pulse Width	t_w	450	-	-	ns	Pin E
E Rise/Fall Time	t_r, t_f	-	-	25	ns	Pin E
Address Setup Time	t_{SP1}	60	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t_{HD1}	20	-	-	ns	Pins: RS, R/W, E
Data Output Delay Time	t_D	-	-	360	ns	Pins: DB7 - 0
Data hold time	t_{HD2}	5.0	-	-	ns	Pin DB7 - 0

10. INITIALIZATION SEQUENCE



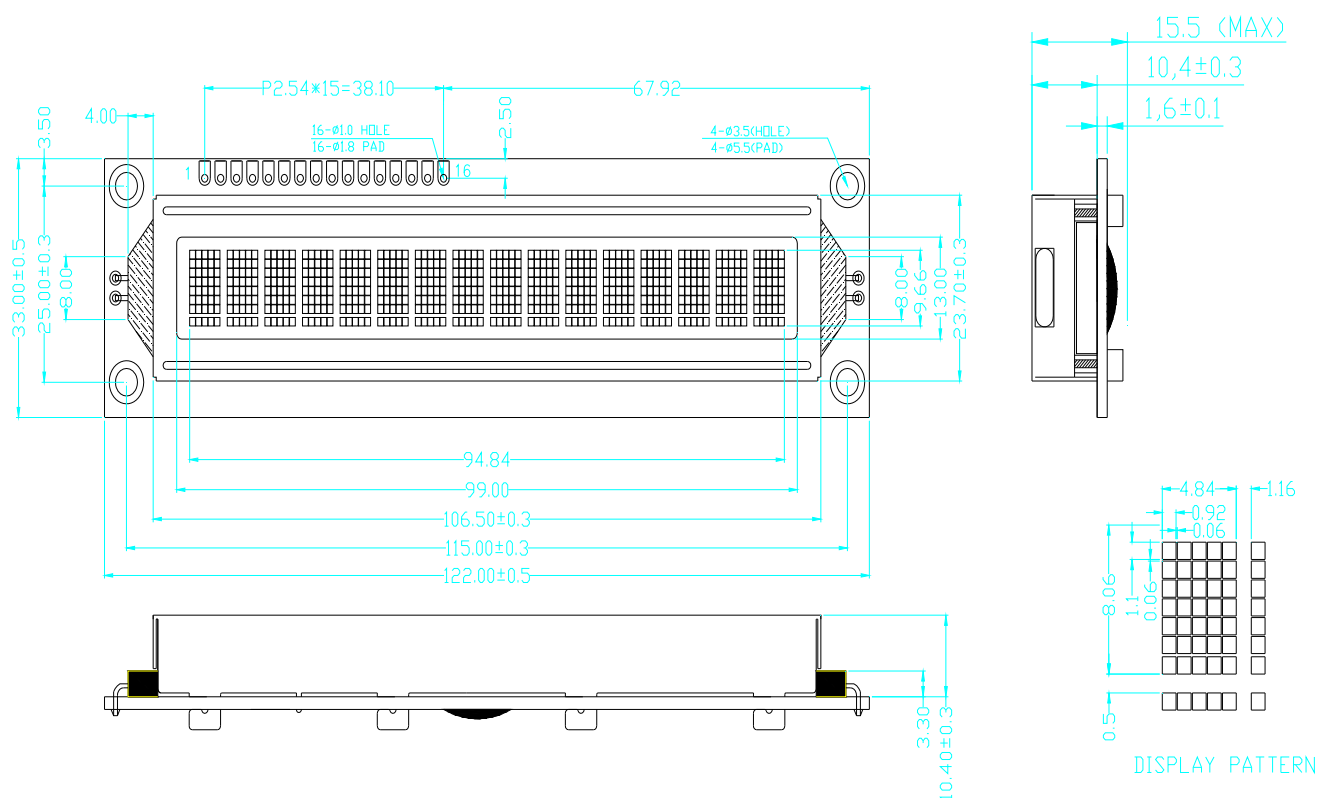
11. INSTRUCTION SET

COMMAND	COMMAND CODE										COMMAND CODE	E-CYCLE f _{osc} =250KHz
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
SCREEN CLEAR	0	0	0	0	0	0	0	0	0	1	Screen Clear, Set AC to 0 Cursor Reposition	1.64ms
CURSOR RETURN	0	0	0	0	0	0	0	0	0	1	* DDRAM AD=0, Return, Content Changeless	1.64ms
INPUT SET	0	0	0	0	0	0	0	0	1	I/D	S Set moving direction of cursor, Appoint if move	40us
DISPLAY SWITCH	0	0	0	0	0	0	0	1	D	C	B Set display on/off,cursor on/off, blink on/off	40us
SHIFT	0	0	0	0	0	0	1	S/C	R/L	*	* Remove cursor and whole display,DDRAM changeless	40us
FUNCTION SET	0	0	0	0	0	1	DL	N	F	*	* Set DL,display line,font	40us
CGRAM AD SET	0	0	0	0	1	ACG					Set CGRAM AD, send receive data	40us
DDRAM AD SET	0	0	0	1	ADD					Set DDRAM AD, send receive data	40us	
BUSY/AD READ CT	0	0	1	BF	AC					Executing internal function, reading AD of CT	40us	
CGRAM/ DDRAM DATA WRITE	1	0	DATA WRITE					Write data from CGRAM or DDRAM	40us			
CGRAM/ DDRAM DATA READ	1	1	DATA READ					Read data from CGRAM or DDRAM	40us			
	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 BF=1: Execute Internal Function; BF=0: Command Received										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

12. FONT TABLE

b7- b3 b4 -b0		0000	0010	0011	0100	0101	0110	0111	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)		0	a	P	`	F		—	タ	三		α	p
0001	(2)	!	1	A	Q	a	q	a	ア	チ	六		ä	q
0010	(3)	"	2	B	R	b	r	「	イ	ツ	×		β	θ
0011	(4)	#	3	C	S	c	s	」	ウ	テ	E		ε	∞
0100	(5)	\$	4	D	T	d	t	、	I	ト	ト		μ	Ω
0101	(6)	%	5	E	U	e	u	=	オ	ナ	一		ε	Ω
0110	(7)	&	6	F	V	f	v	ヲ	カ	ニ	ヨ		ρ	Σ
0111	CG RAM (8)	'	7	G	W	g	w	ア	キ	ヲ	ウ		g	π
1000	CG RAM (1)	(	8	H	X	h	x	イ	ウ	※	リ		γ	×
1001	(2)	)	9	I	Y	i	y	ウ	テ	リ	ル		ˆ	y
1010	(3)	*	:	J	Z	j	z	エ	コ	ハ	レ		j	〒
1011	(4)	+	;	K	[	k	[	オ	サ	ヒ	ロ		*	天
1100	(5)	,	<	L	¥	l	l	ハ	シ	フ	ワ		φ	天
1101	(6)	—	=	M	]	m	]	ユ	ズ	ハ	ン		±	÷
1110	(7)	.	>	N	^	n	→	ヨ	セ	ホ	°		ñ	
1111	CG RAM (8)	/	?	O	_	o	←	ッ	リ	マ	°		ö	■

13. OUTLINE DRAWING



PIN DESCRIPTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VSS	VDD	V0	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	LEDA	LEBK

NOTE:

DISPLAY TYPE: STN, Yellow Green, Transflective

VIEW DIRECTION: 6 O'CLOCK

DRIVER METHOD: 1/16 DUTY, 1/5 BIAS

OPERATING VOLTAGE: 5 V

Backlight Type: LED (Yellow Green)

Contrl IC: AIP31066L-001 Or Equivalent

OPERATING TEMPERATURE: -20 °C TO 70 °C

STORAGE TEMPERATURE: -30 °C TO 80 °C

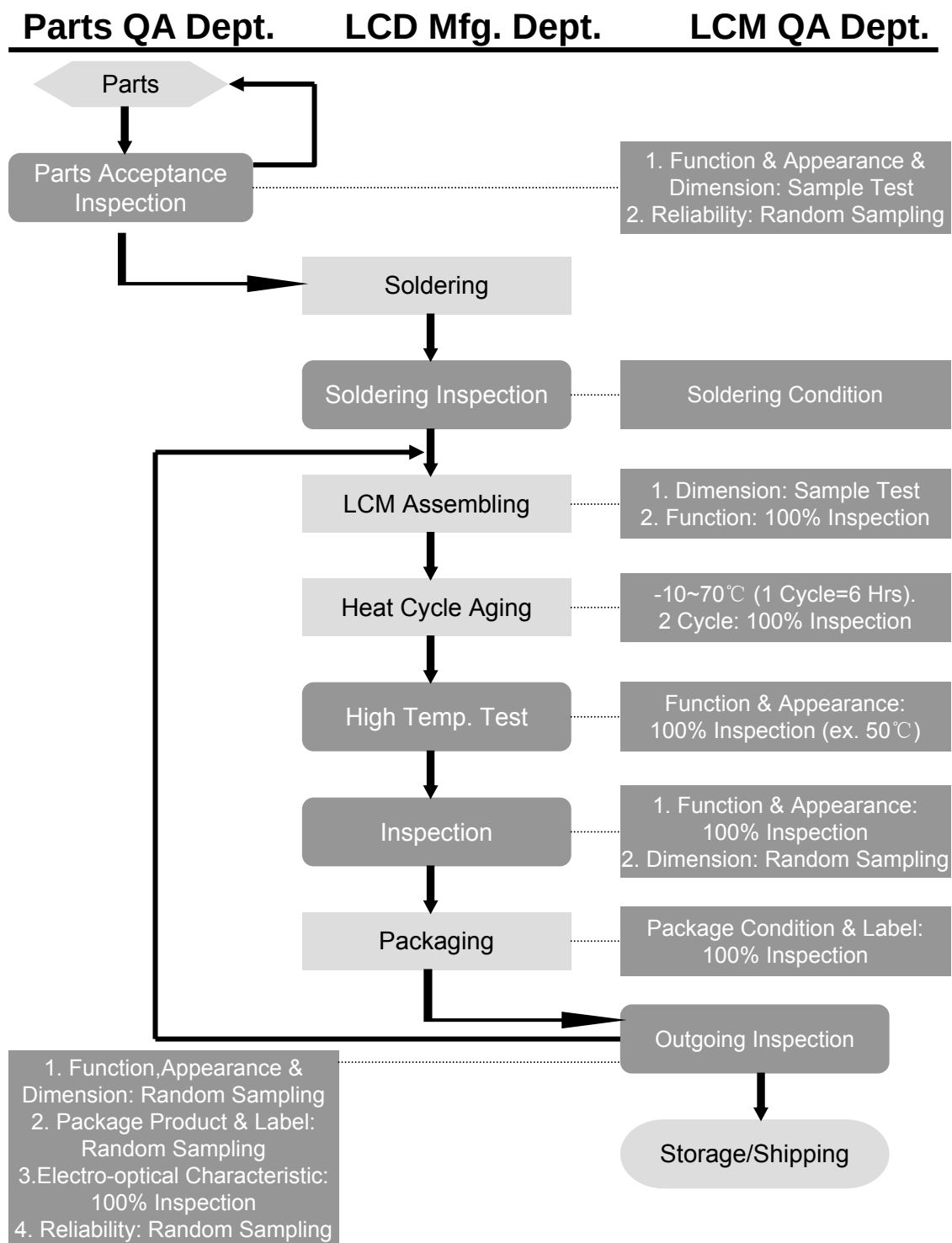
SHENZHEN JING HANDA ELECTRONICS CO., LTD

DESIGNED BY:	LJH	JHD2101Y-YG	VERSION:	VERSION
CHECKED BY:	TAN		NO.	1 OF 1
APPROVED BY:			TOL	
			UNIT:	MM
			DATE:	2021-7-8

14. INTERFACE

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5.0V
3	V0	LCD CONTRAST ADJUSTMENT	
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	R/W	READ/WRITE SELECTION	R/W = 0 : REGISTER WRITE R/W = 1 : REGISTER READ
6	E	ENABLE SIGNAL	
7	DB0	DATA INPUT/OUTPUT LINES	8 BIT: DB0-DB7
8	DB1		
9	DB2		
10	DB3		
11	DB4		
12	DB5		
13	DB6		
14	DB7		
15	LED+	SUPPLY VOLTAGE FOR LED+	+5.0V
16	LEDK	SUPPLY VOLTAGE FOR LED-	0V

15. QC/QA PROCEDURE



16. RELIABILITY

•Operating life time:

Longer than 50000 hours (at room temperature without direct irradiation of sunlight)

•Reliability Characteristics:

Item	Test	Criterion
High temp	70°C / 96 Hrs	■Total current consumption should be below double of initial value ■Contrast ratio should be within initial value$\pm 50\%$ ■No defect in cosmetic and operational function is allowable
Low temp.	-20°C / 96 Hrs	
High humidity	40°C * 90%RH / 96 Hrs	
Thermal shock	-20°C $\rightarrow$ 25°C $\rightarrow$ 70°C $\rightarrow$ 25°C / 5 Cycles (30min) (5min) (30min) (5min)	
Vibration	1.Operating time: Thirty minutes exposure in each direction (x, y, z) 2.Sweep Frequency (1min):10Hz $\rightarrow$ 55Hz $\rightarrow$ 10Hz 3.Amplitude: 0.75mm double amplitude	

17. 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)

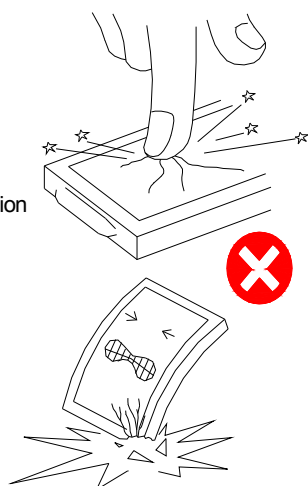
Jing Handa products are not designed, intended, or authorized for use in any application which the failure of the product could result in a situation where personal injury or death may occur. these applications include, but are not limited to. life-sustaining equipment, nuclear control devices, aerospace 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

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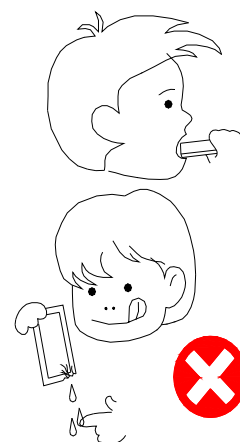
No Press and Shock!

If pressure to LCD, orientation may be disturbed.
LCD will be broken by shock!



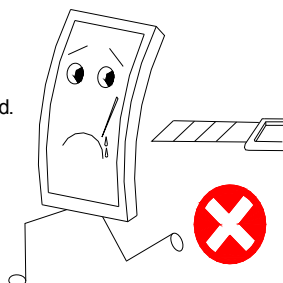
Don't Swallow or Touch Liquid Crystal!

Liquid Crystal may be leaked when display is broke.
If it accidentally gets your hands, wash then with water!



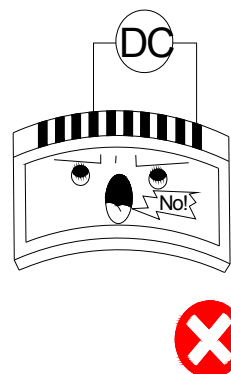
Don't not Scratch!

Polarizer is a soft material and can easily be scratched.



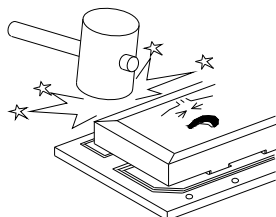
No DC Voltage to LCD!

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

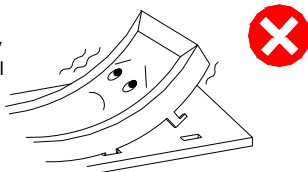


Don't Press the Metallic Frame and Disassemble the LCM

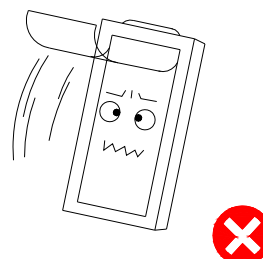
Pressure on the metallic frame and PCB may deform the conductive rubber or break the liquid crystal cell and back light, which will cause defects.



LCD may be shifted or conductive rubber may be reshaped, which will cause defects.

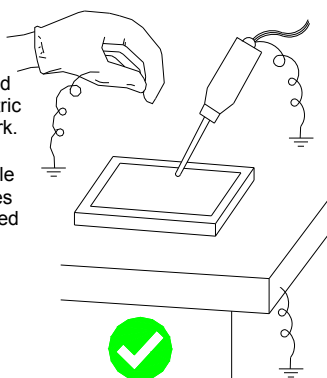
**Slowly Peel Off Protective Film!**

Avoid static electricity.

**Avoid Static Electricity!**

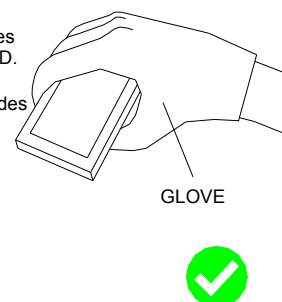
Please be sure to ground human body and electric appliances during work.

It is preferable to use conductive mat on table and wear cotton clothes or conduction processed fiber. Synthetic fiber is not recommended.

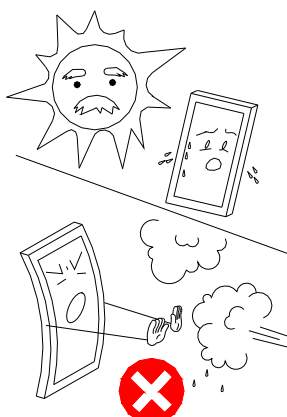
**Wear Gloves While Handling!**

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

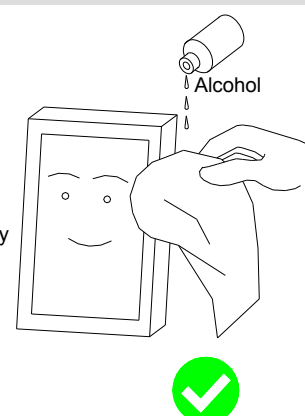
Please do not touch electrodes with bare hands or make them dirty.

**Keep Away From Extreme Heat and Humidity!**

LCD deteriorates.

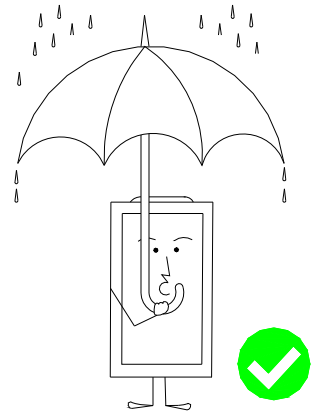
**Use Alcohol to Clean Terminals!**

When attaching with the heat seal or anisotropically 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 corrode 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: $280 \pm 10^{\circ}\text{C}$

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 Optrex

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 $+35^{\circ}\text{C}$ 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.

Put black making tape on both sides of backlight and iron frame.

