深圳市荣鑫凯电子科技有限公司

SPECIFICATION FOR LCD MODULE

REV

A

Customer : RXK16-9

Product Model:

Designed by	Checked by	Approved by
HuangZhongLe	Qinxiaozhen	

Final Approval by Customer

☐ **OK**

☐ **NG，Problem survey:**

Approved By _____

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Rev.	Descriptions	Release Date
0.1	Preliminary New release	2011-5-3

1 . General Description

- Passive matrix bistable cholesteric display, Positive, Transflective FSTN LCD graphic module.
- Color: Display Data=”1” : BLACK
  Display Data=”0” : White
- Display resolution: 128 x 64 dots.
- Viewing angle: 6:00.
- IC: “ULTRA CHIP” UC1705 128 x 64 Dot Matrix LCD Driver.
- Driving scheme: Special LCD driving scheme.
- Logic voltage: 3V.
- Interface: 8080-series parallel 8bit/4bit interface.
- FPC connection.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	46(W) x29(H) x 1.75(D)	mm
Viewing area	43.6(W) x22.4(H)	mm
Active area	41.7(W) x 20.36(H)	mm
Display format	128(Horizontal) x 64(Vertical)	dots
Dot size	0.306*0.298	mm
Dot spacing	0.02*0.02	mm
Dot pitch for characters	0.326*0.318	mm
Weight	TBD	gram

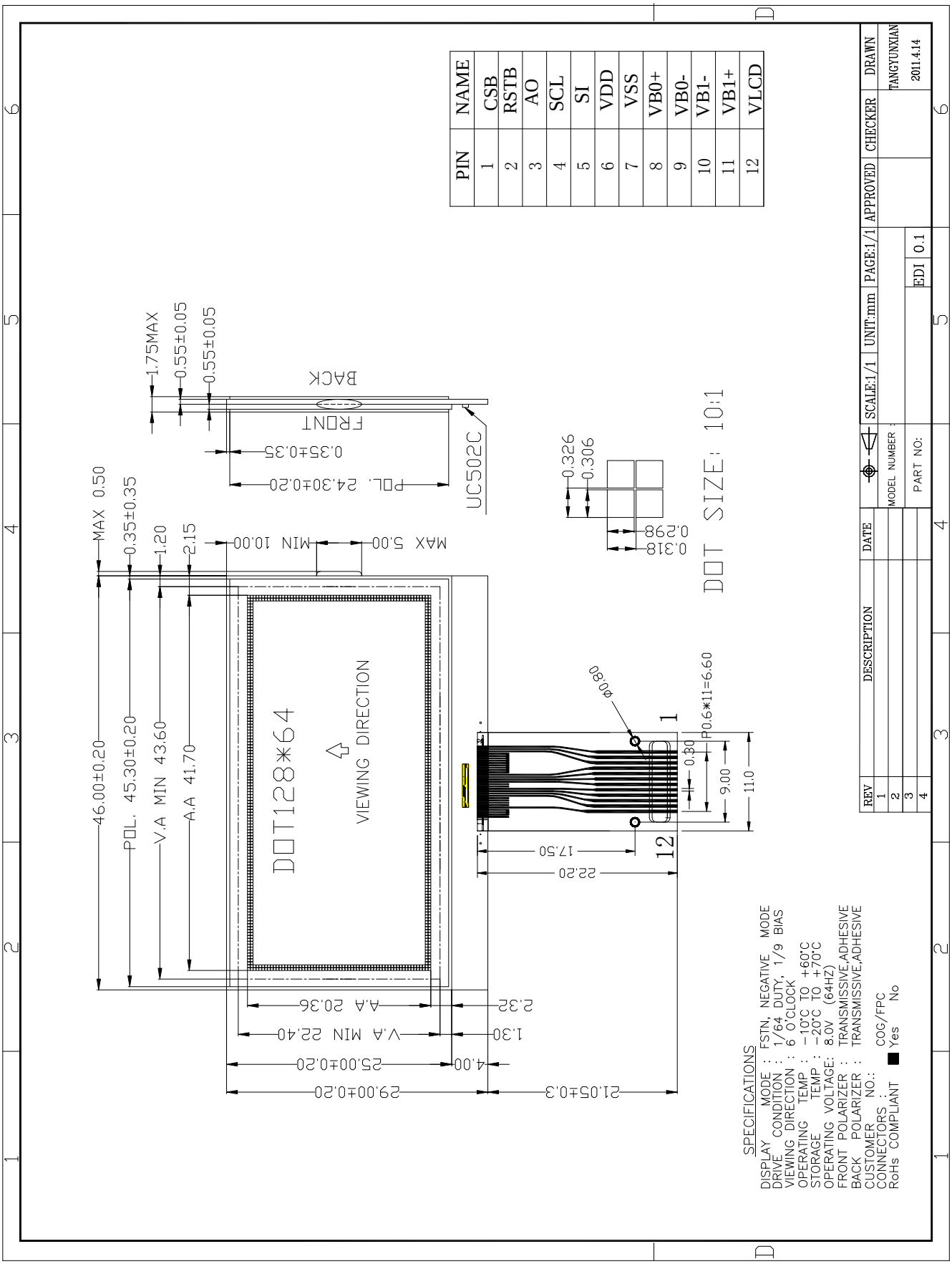
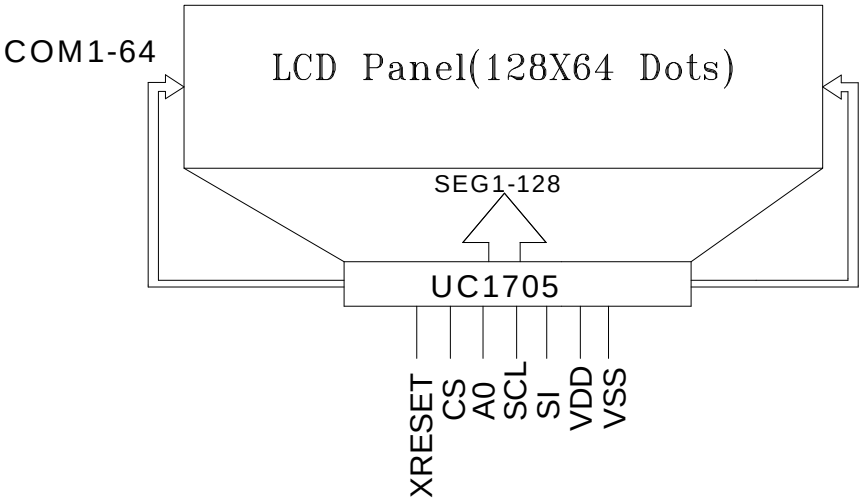


Figure 1: Mod Figure 1: Mod ule Specification

3. Block Diagram



4. Interface Signals

Table 2

Pin No.	Symbol	Function
1	CSB	Chip enable select pin L: Chip enable.
2	RSTB	System reset pin.
3	A0	Address Bus L: control data H: display data.
4	D6(SCL)	Serial pixel signal clock input pin.
5	D7(SI)	Serial data write and read input/output pin..
6	VDD	Power supply.
7	VSS	Power Ground.
8	VB0+	Connect capacitors between VB0+ and VB0-.
9	VB0-	
10	VB1-	Connect capacitors between VB1- and VB1+
11	VB1+	
12	VLCD	Power voltage supply LCD display connect capacitor to ground.

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings-For IC Only

Table 3

Parameter	Symbol	Conditions	Application pins	Min.	Max.	Unit
Power Supply voltage (Logic)	VDD	TA = +25℃, Referenced to VSS (0V)	VDD	-0.3	+3.6	V
Input voltage	Vin		D7-0, CS, RES, A0, RD, WR	-0.3	VDD +0.3	V

Note1: TA = +25℃.
Note2: The maximum applicable voltage on any pin with respect to VSS (0V).
Note3: The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	90% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55 Hz Amplitude: 0.75 mm Duration: 20 cycles in each direction.				3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Pulse duration: 11 ms Peak acceleration: 981 m/s^2 = 100g Number of shocks: 3 shocks in 3 mutually perpendicular axes.				3 directions

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

6.1 Typical Electrical Characteristics

Table 5

V_{SS}=0V, V_{DD}=3.3V, T_{OP}=25 ℃

Items	Symbol	Min.	Typ.	Max.	Unit	Condition Pin
Operating Voltage	V_{DD1}	1.65	3.0	3.6	V	VDD
	V_{DD2}	2.4	3.0	3.6	V	VDD
LCD Operating Voltage	V_{OP}	-	6.5	-	V	VO
Input High Voltage	V_{IH1}	0.8 V_{DD}	-	V_{DD}	V	RS,R/W,E,DB0~DB7
Input Low Voltage	V_{IL1}	V_{SS}	-	0.4	V	
Output High Voltage	V_{OH1}	0.7 V_{DD}	-	V_{DD}	V	DB0~DB7(V_{OH}=-0.1mA)
Output Low Voltage	V_{OL1}	V_{SS}	-	0.2	V	DB0~DB7(V_{OH}=0.1mA)
Operating Current	I_{DD}	-	-	0.05	mA	VDD,VSS

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

Timing Specifications

Table 6

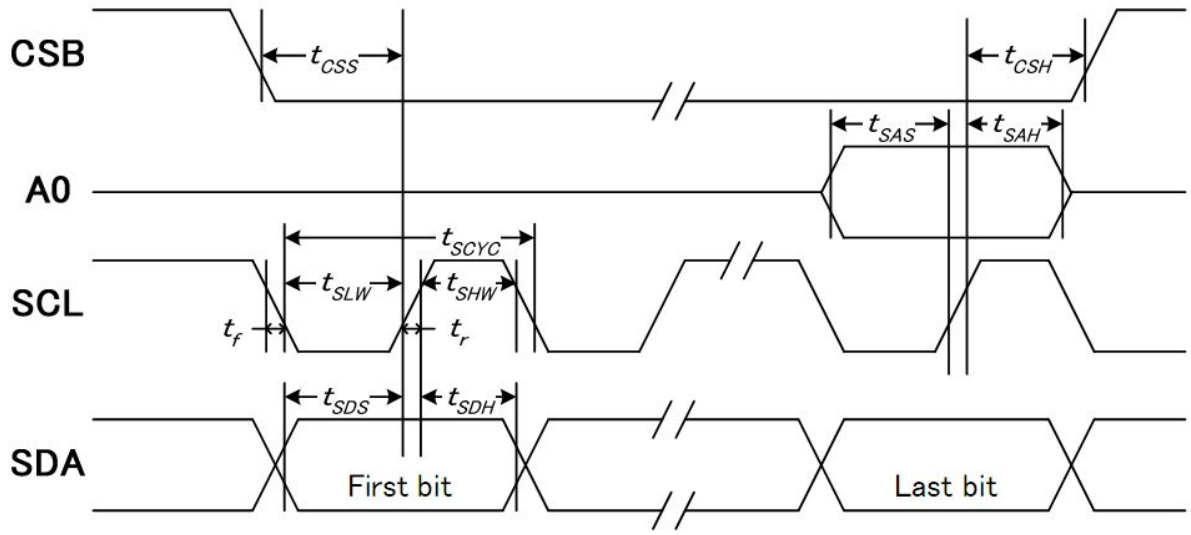
(VDD1 = 2.8V , Ta =25˚C)

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Address setup time	A0	tAW8		0	—	ns
Address hold time		tAH8		0	—	
System cycle time	/WR	tCYC8		400	—	
/WR L pulse width (WRITE)		tCCLW		220	—	
/WR H pulse width (WRITE)		tCCHW		180	—	
/RD L pulse width (READ)	RD	tCCLR		220	—	
/RD H pulse width (READ)		tCCHR		180	—	
WRITE Data setup time	D[7:0]	tDS8		40	—	
WRITE Data hold time		tDH8		20	—	
READ access time		tACC8	CL = 16 pF	—	140	
READ Output disable time		tOH8	CL = 16 pF	10	100	

(VDD1 = 3.3V , Ta =25˚C)

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period	SCLK	tSCYC		50	—	ns
SCLK “H” pulse width		tSHW		25	—	
SCLK “L” pulse width		tSLW		25	—	
Address setup time	A0	tSAS		20	—	
Address hold time		tSAH		10	—	
Data setup time	SDA	tSDS		20	—	
Data hold time		tSDH		10	—	
CSB-SCLK time	CSB	tCSS		20	—	
CSB-SCLK time		tCSH		40	—	

System Bus Timing for 4-Line Serial Interface



7. Instruction Set

Table 7

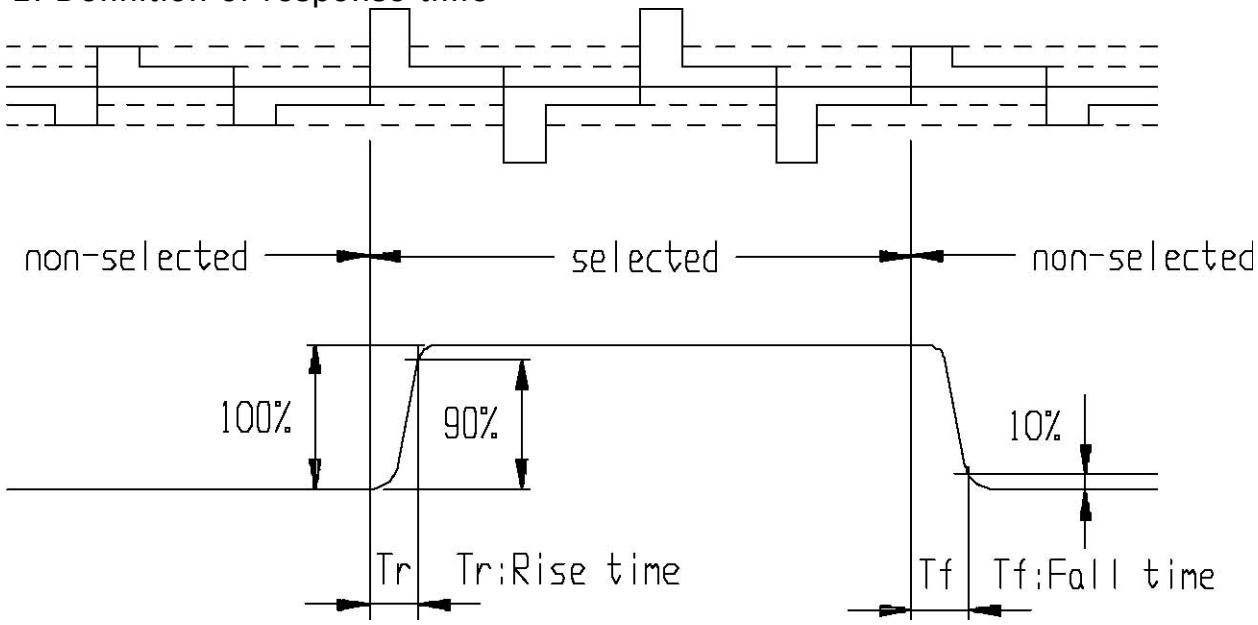
INSTRUCTION	A0	R/W (RWR)	COMMAND BYTE								DESCRIPTION
			D7	D6	D5	D4	D3	D2	D1	D0	
(1) Display ON/OFF	0	0	1	0	1	0	1	1	1	D	D=1, display ON D=0, display OFF
(2) Set Start Line	0	0	0	1	S5	S4	S3	S2	S1	S0	Set display start line
(3) Set Page Address	0	0	1	0	1	1	Y3	Y2	Y1	Y0	Set page address
(4) Set Column Address	0	0	0	0	0	1	X7	X6	X5	X4	Set column address (MSB)
	0	0	0	0	0	0	X3	X2	X1	X0	Set column address (LSB)
(5) Read Status	0	1	0	MX	D	RST	0	0	0	0	Read IC Status
(6) Write Data	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write display data to RAM
(7) Read Data	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read display data from RAM
(8) SEG Direction	0	0	1	0	1	0	0	0	0	MX	Set scan direction of SEG MX=1, reverse direction MX=0, normal direction
(9) Inverse Display	0	0	1	0	1	0	0	1	1	INV	INV =1, inverse display INV =0, normal display
(10) All Pixel ON	0	0	1	0	1	0	0	1	0	AP	AP=1, set all pixel ON AP=0, normal display
(11) Bias Select	0	0	1	0	1	0	0	0	1	BS	Select bias setting 0=1/9; 1=1/7 (at 1/65 duty)
(12) Read-modify-Write	0	0	1	1	1	0	0	0	0	0	Column address increment: Read:+0 , Write:+1
(13) END	0	0	1	1	1	0	1	1	1	0	Exit Read-modify-Write mode
(14) RESET	0	0	1	1	1	0	0	0	1	0	Software reset
(15) COM Direction	0	0	1	1	0	0	MY	-	-	-	Set output direction of COM MY=1, reverse direction MY=0, normal direction
(16) Power Control	0	0	0	0	1	0	1	VB	VR	VF	Control built-in power circuit ON/OFF
(17) Regulation Ratio	0	0	0	0	1	0	0	RR2	RR1	RR0	Select regulation resistor ratio
(18) Set EV	0	0	1	0	0	0	0	0	0	1	Double command!! Set electronic volume (EV) level
	0	0	0	0	EV5	EV4	EV3	EV2	EV1	EV0	
(19) Set Booster	0	0	1	1	1	1	1	0	0	0	Double command!! Set booster level: BL=0: 4X BL=1: 5X
	0	0	0	0	0	0	0	0	0	BL	
(20) Power Save	0	0	Compound Command								Display OFF + All Pixel ON
(21) NOP	0	0	1	1	1	0	0	0	1	1	No operation
(22) Test	0	0	1	1	1	1	1	1	1	-	Do NOT use. Reserved for testing.

8. Optical Characteristics

Table8

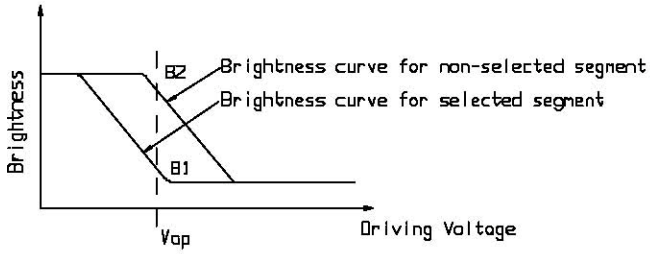
Item	Symbol	Condition	Min	Typ	Max	Unit	Remarks	Note
Response Time	Tr	-	-	-	-	ms	-	1
	Tf	-	-	-	-	ms	-	1
Contrast Ratio	Cr	-	-	-	-	-	-	2
Viewing Angle Range	q	Cr≥ 2	-	-	-	deg	Ø= 90	3
			-	-	-	deg	Ø = 270	3
			-	-	-	deg	Ø = 0	3
			-	-	-	deg	Ø = 180	3

Note 1. Definition of response time

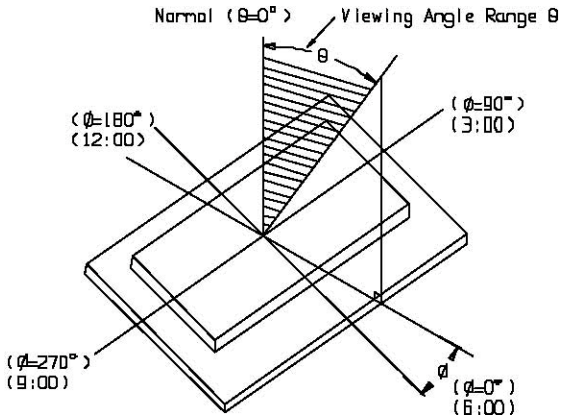


Note 2. Definition of Contrast Ratio 'Cr'

$$Cr = \frac{\text{Brightness of non-selected segment(B2)}}{\text{Brightness of selected segment(B1)}}$$



Note 3. Definition of Viewing Angle Range 'q'



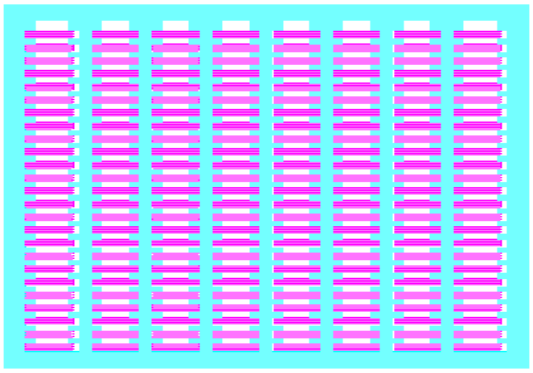
9. Design and Handing Precaution

1. The LCD panel is made by glass. Any mechanical shock (eg. Droping form high place) will damage the LCD modele.
2. Do not add excessive force on the surface of the display, which may cause the Display color change abnormally.
3. The polarizer on the LCD is easily get scratched. If possible, do not remove the LCD protective film until the last step of installation.
4. Never attempt to disassemble or rework the LCD module.
5. Only Clean the LCD with Isopropyl Alcohol or Ethyl Alcohol. Other solvent (eg. water) may damage the LCD.
6. When mounting the LCD module, make sure that is is free form twisting, warping and distortion.
7. Ensure to pro vide enough space (with cushion) between xase and LCD panel to prevent external force adding on it, or it may cause damage to the LCD or degrade the display result.
8. only hold the LCD module by its side. Never hold LCD module by add force on the heat seal or TAB.
9. Never add force to component of the LCD module. It may cause invisible damage or degrade of the reliability.
10. LCD module could be easily damaged by static electricity. Be careful to maintain an optimum anti-static work environment to protect the LCD module.
11. When peeling off the protective film from LCD, static charge may cause abnormal display pattern. It is normal and will resume to normal in a short while.
12. Take care and prevent get hurt by the LCD panel sharp edge.
13. Never operate the LCD module exceed the absolute maximum ratings.
14. Keep the signal line as short as possible to prevent noisy signal applying to LCD module.
15. Never apply signal to the LCD module exceed the absolute maximum ratings.
16. IC chip (eg. TAB or COG) is sensitive to the light. Strong lighting environment could possibly cause malfunction. Light sealing structure casing is recommend.
17. LCD module reliability may be reduced by reduced by temperature shock.
18. When storing the LCD module, avoid exposure to the direct sunlight, high humidity, high temperature or low temperature. They may damage or degrade the LCD module.

10. Packing(Refernce Only)

Packing Method

（1）



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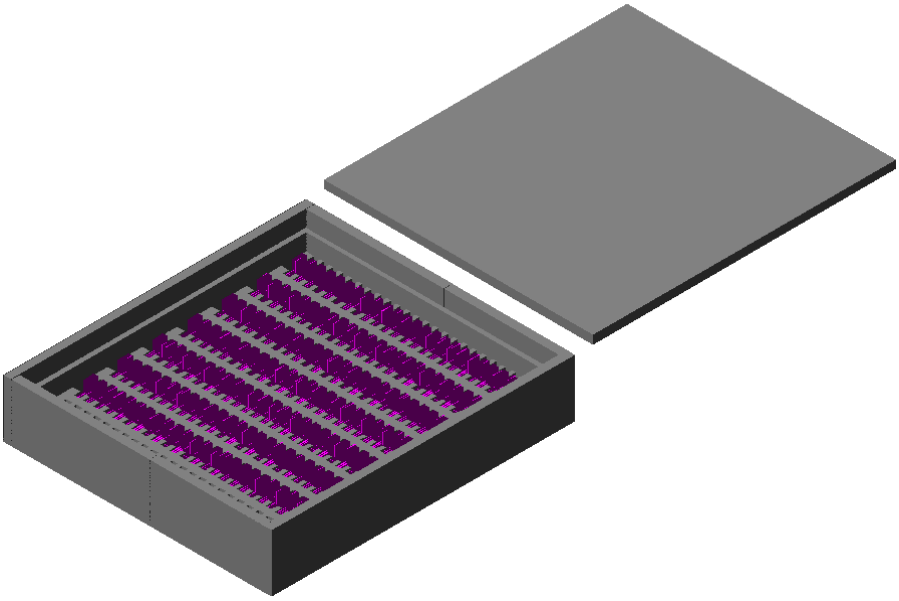

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