

CHIMEI INNOLUX DISPLAY CORPORATION**LCD MODULE****APPLICATION NOTE**

Customer: 宇华微科技

LCD SIZE: 5.6D

Date: 2010.01.22

Version: J

Remark
■ with PCB

Approved by	Reviewed by	Prepared by
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深圳市宇华微科技有限公司，专业供应群创液晶显示屏，尺寸从3.5-10.4寸

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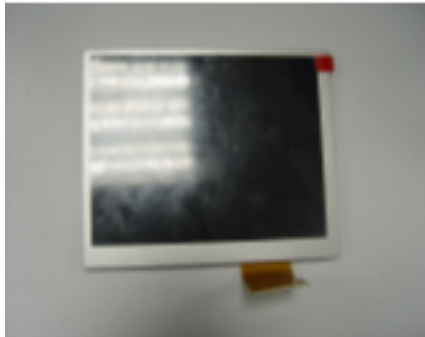
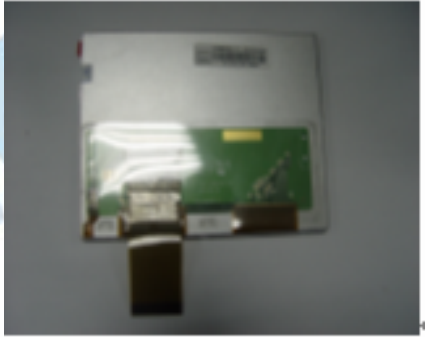
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Record of Revision

Version	Revise Date	Page	Content
A	2007/01/03		Initial Release
B	2007/05/28		Add SIB Content
C	2007/11/16		New System Board
D	2008/03/10		Add Reference Circuit of the Control Board
E	2008/04/08		New Version and Standardization
F	2008/12/01		Add recommended LED driver MPS3302
G	2009/03/28		Modify the format
H	2009/07/30		Update the IC vender
I	2009/08/31		Modify DC-DC Reference Circuit and add Bom List
J	2010/01/22		Modify LED driver IC , reference Circuit and bom Lis

1. Module introduction

1.1 Module Photo

Model name	Top Side	Bottom Side
AT056TN52 V.3		

1.2 Module comparison table

Model name	PCBA	Brightness (nit)	Pin Num.	Recommended Connector
AT056TN52 V.3	Without component	200	50 Pin	FH12A-50S-0.5SH

2. Pin assignment comparison table

Pin No.	Symbol	Function	Remark
1	VLED+	Power for LED backlight anode	
2	VLED+	Power for LED backlight anode	
3	VLED-	Power for LED backlight cathode	
4	VLED-	Power for LED backlight cathode	

5	GND	Power ground	
6	VCOM	V _{COM} input	
7	VCC	Digital power supply(+3.3V)	
8	MODE	DE or HV mode control	
9	DE	Data Enable	
10	VS	Vsync signal input	
11	HS	Hsync signal input	
12	B7	Blue data input (MSB)	
13	B6	Blue data input	
14	B5	Blue data input	
15	B4	Blue data input	
16	B3	Blue data input	
17	B2	Blue data input	
18	B1	Blue data input	
19	B0	Blue data input(LSB)	
20	G7	Green data input(MSB)	
21	G6	Green data input	
22	G5	Green data input	
23	G4	Green data input	
24	G3	Green data input	
25	G2	Green data input	
26	G1	Green data input	
27	G0	Green data input(LSB)	

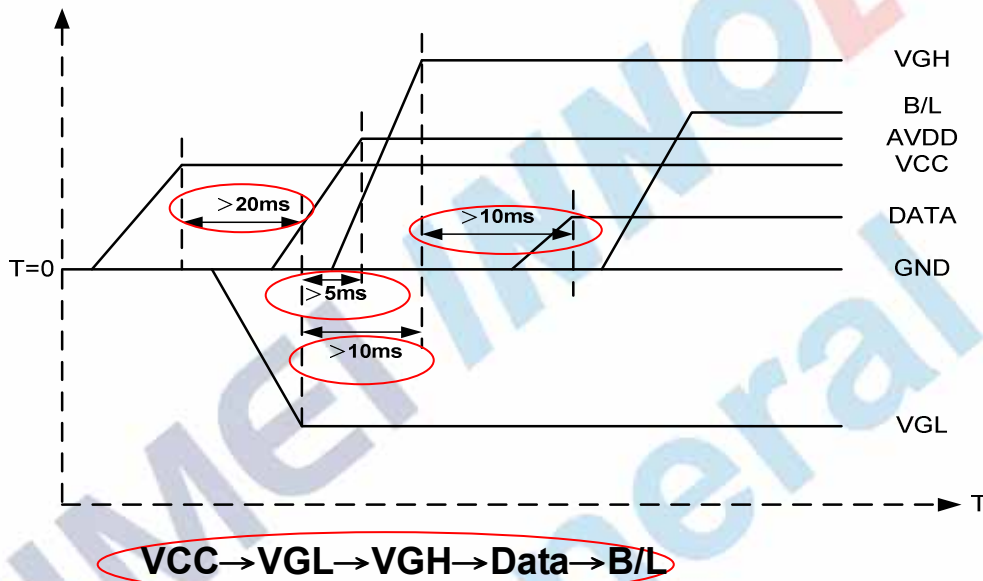
28	R7	Red data input(MSB)	
29	R6	Red data input	
30	R5	Red data input	
31	R4	Red data input	
32	R3	Red data input	
33	R2	Red data input	
34	R1	Red data input	
35	R0	Red data input(LSB)	
36	GND	Power ground	
37	DCLK	Sample clock	
38	GND	Power ground	
39	L/R	Select left to right scanning direction	
40	U/D	Select up or down scanning direction	
41	VGH	Positive power for scan driver	
42	VGL	Negative power for scan driver	
43	AVDD	Power supply for analog circuit	
44	RESET	Reset	
45	POL	Polarity select for the line inversion control signal	
46	VCOM	V _{COM} input	
47	NC	No Connector	
48	NC	No Connector	
49	NC	No Connector	
50	NC	No Connector	

3. Power & Timing Characteristic

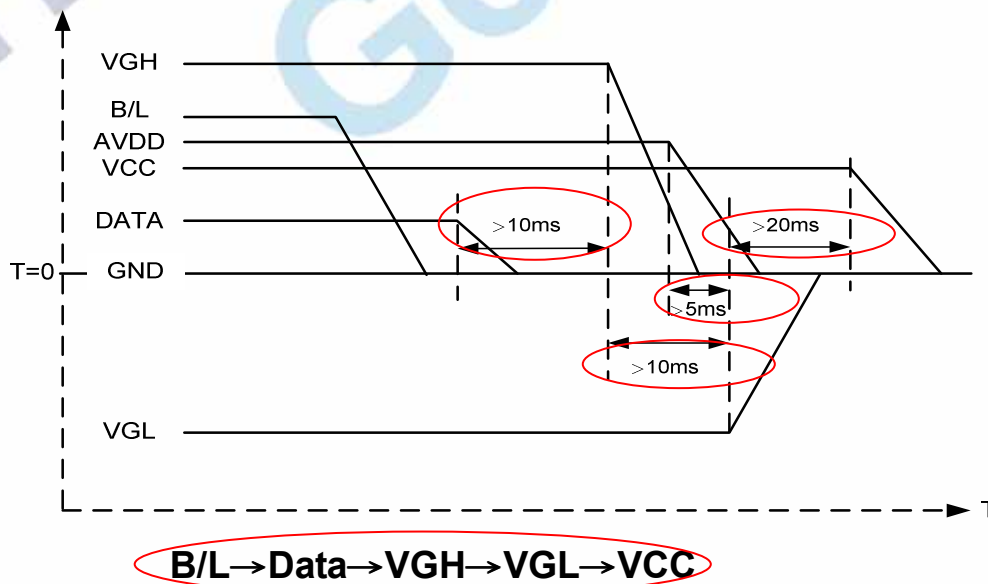
3.1 Power sequence

Customer should follow our product power sequence, other it would lead to display abnormal, please refer to the figures as below.

Power On:



Power Off :



Note: Data includes DE, VS ,HS, B0~B7, G0~G7, R0~R7, DCLK.

3.2 Power Operation Conditions

Customer should notice the red mark specially, if you do not follow it, it would lead to display abnormal.

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V_{CC}	3.0	3.3	3.6	V	Note 1
	AV_{DD}	4.8	5.0	5.2	V	
	V_{GH}	14.3	15.0	15.7	V	
	V_{GL}	-10.5	-10.0	-9.5	V	
V_{COM}	V_{CAC}	-	5.50	-	V	
	V_{CDC}	0.72	0.92	1.12	V	
Input logic high voltage	V_{IH}	$0.7V_{CC}$	-	$1V_{CC}$	V	Note 2
Input logic low voltage	V_{IL}	0	-	$0.3V_{CC}$	V	

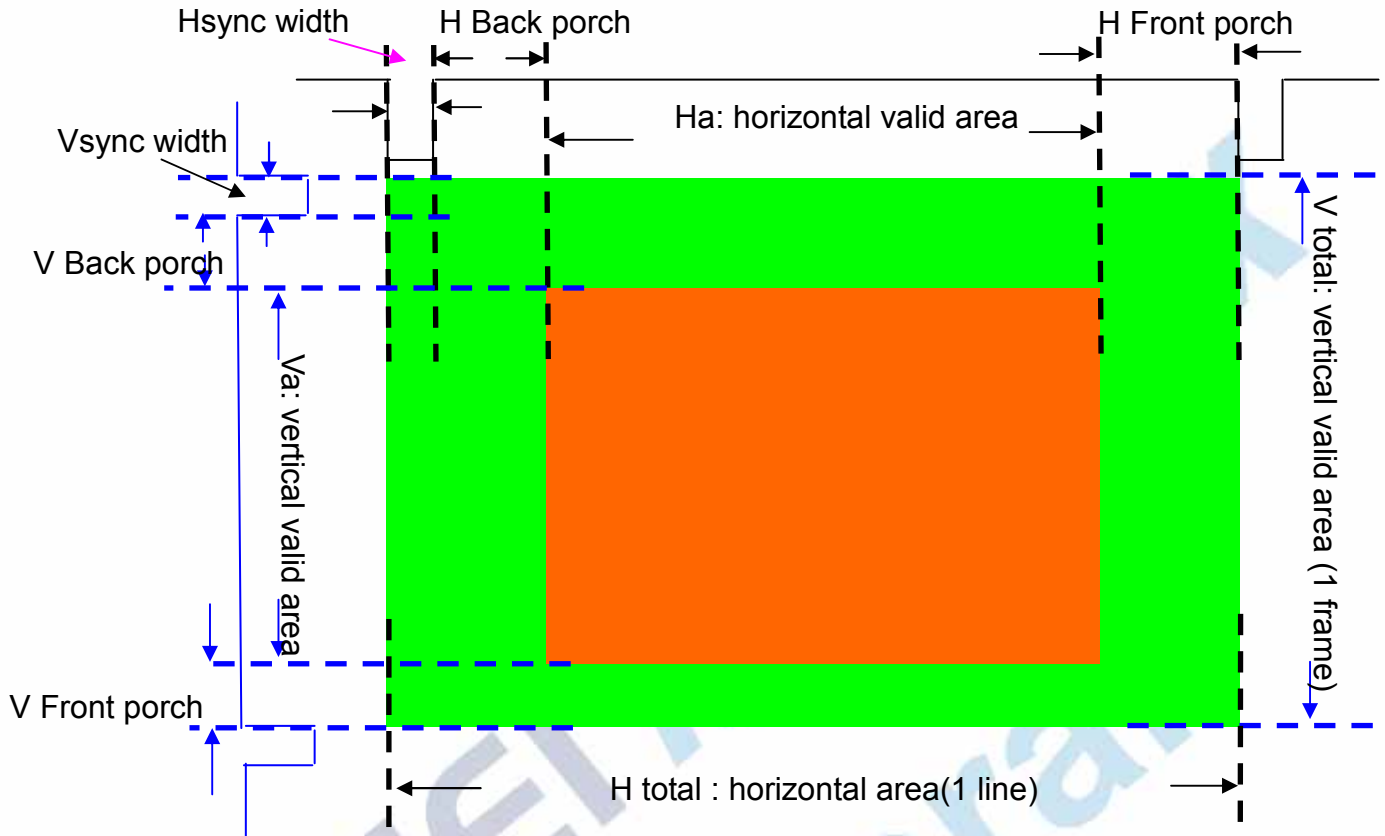
Note 1: V_{CC} setting should match the signals output voltage (refer to Note 2) of customer's system board.

Note 2: DCLK, DE, HS, VS, R0~ R7, G0~ G7, B0~ B7.

3.3 Timing Description

Our LCM has integrated T-con IC into our driver IC, so customer only input DCLK, HS, VS, DE and R/G/B data signals to our LCM from their system solution. But these signals must follow our timing specification. Otherwise the LCM will display abnormally.

We provide the Timing Drawing and Timing Formula for customer to how to set their parameters of LCD controller. About the detail timing parameters of LCD display, please follow the product specification.



Timing Drawing

Timing Formula:

$$DCLK = (Hw + Hbp + Ha + Hfp) * (Vw + Vbp + Va + Vfp) * Fvsync \quad (\text{Unit : Hz})$$

$$Fhsync = (Vw + Vbp + Va + Vfp) * Fvsync \quad (\text{Unit: Hz})$$

Remark: 1. Fhsync is Hsync frequency, and Fvsync is Vsync frequency.

2. Parameter Table .

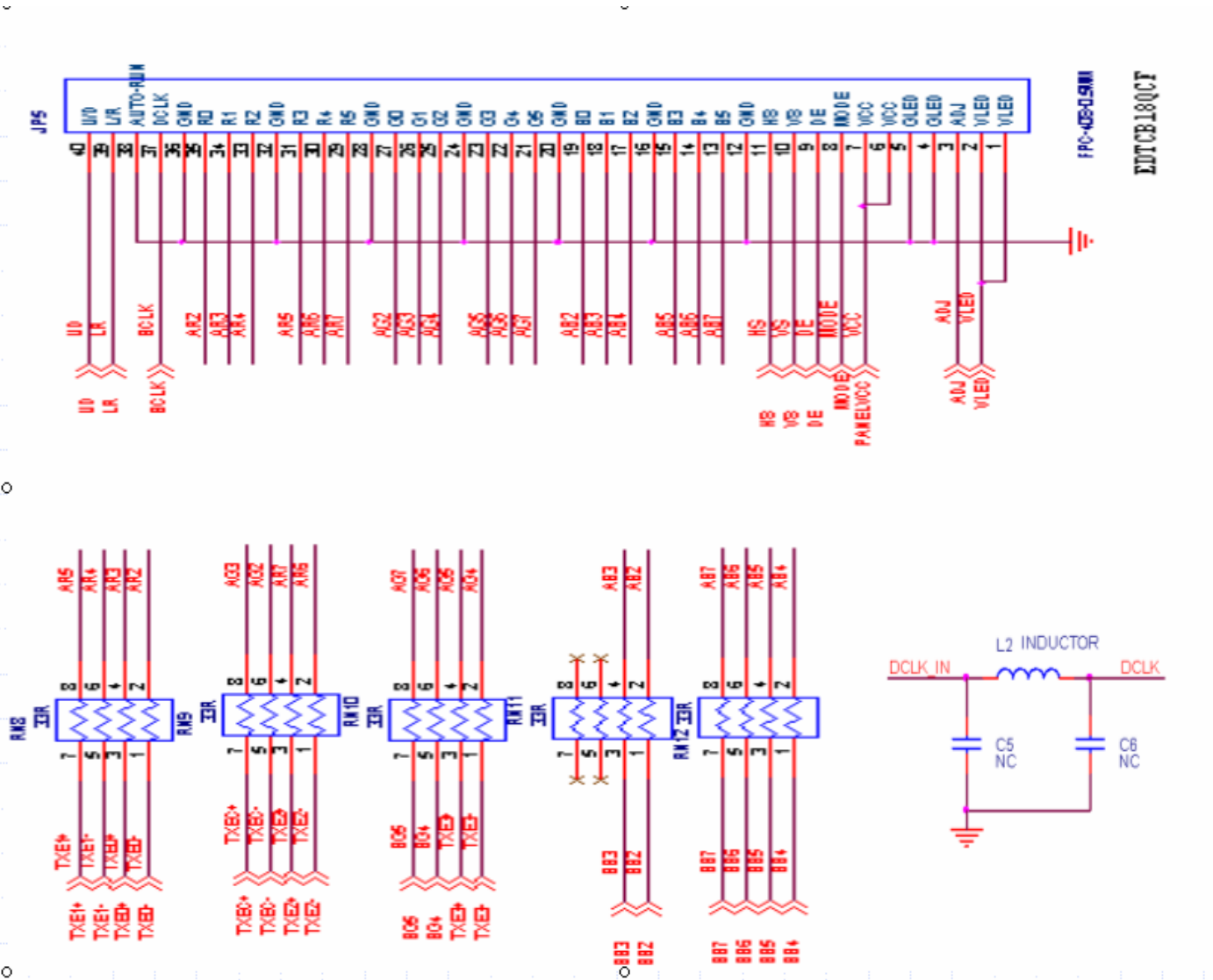
Parameter	Description	Typ.	Unit
Hw	Hsync Width	10	DCLK
Hbp	Horizontal back porch	134	DCLK
Ha	Horizontal valid area	640	DCLK
Hfp	Horizontal front porch	16	DCLK
Vw	Vsync Width	2	Hsync(Line)
Vbp	Vertical back porch	11	Hsync(Line)
Va	Vertical valid area	480	Hsync(Line)
Vfp	Vertical front porch	32	Hsync(Line)
DCLK	Dot clock	25.2	MHz

4. Software Introduce

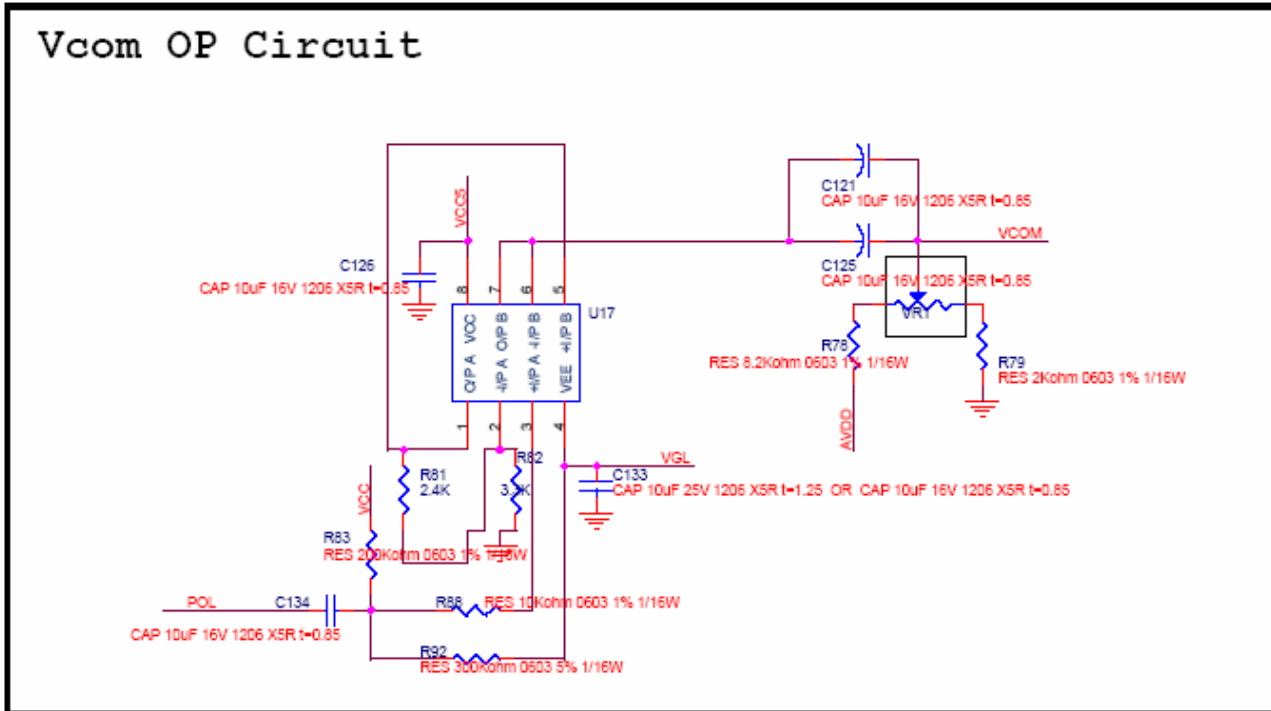
NA

5. Reference Circuit

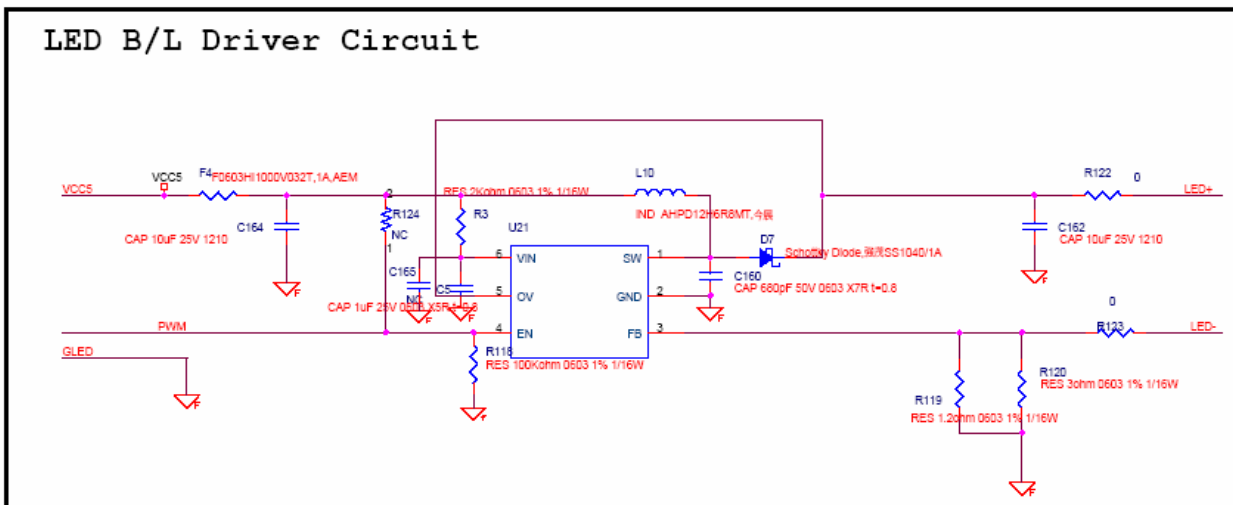
5.1 Interface reference circuit



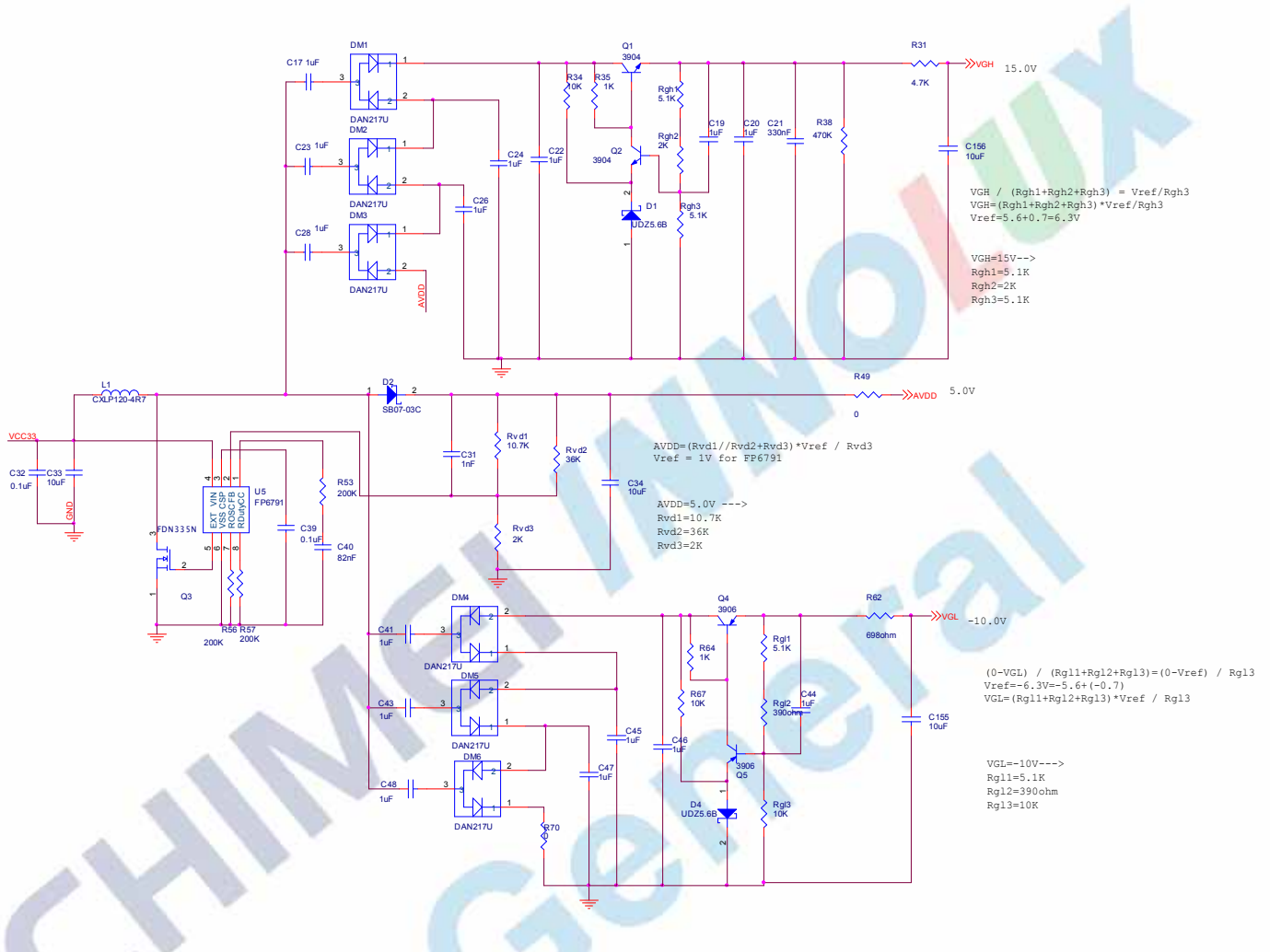
5.2 Vcom Reference Circuit



5.3 Backlight Driver Reference Circuit



5.4 DC/DC Reference Circuit



DC-DC reference circuit BOM

Item	Quantity	Reference	Description
1	1	U5	PWM IC FP6791, 8 PIN, TSSOP, Fiti power
2	6	DM1,DM2,DM3,DM4,DM5,DM6	Diode module,DAN217U
3	2	Q1,Q2	Transistor (NPN),MM ST3904,SC-59,Rohm
4	2	Q4,Q5	Transistor (PNP),MM ST3906,SC-59,Rohm
5	1	Q3	MOSFET N-channel,FDN335N,SOT-23,Fairchild
6	2	D1,D4	Zener Diode,UDZ5.6B, SOD-323,Rohm
7	1	D2	Schottky barrier diode ,SB07-03C,Sanyo

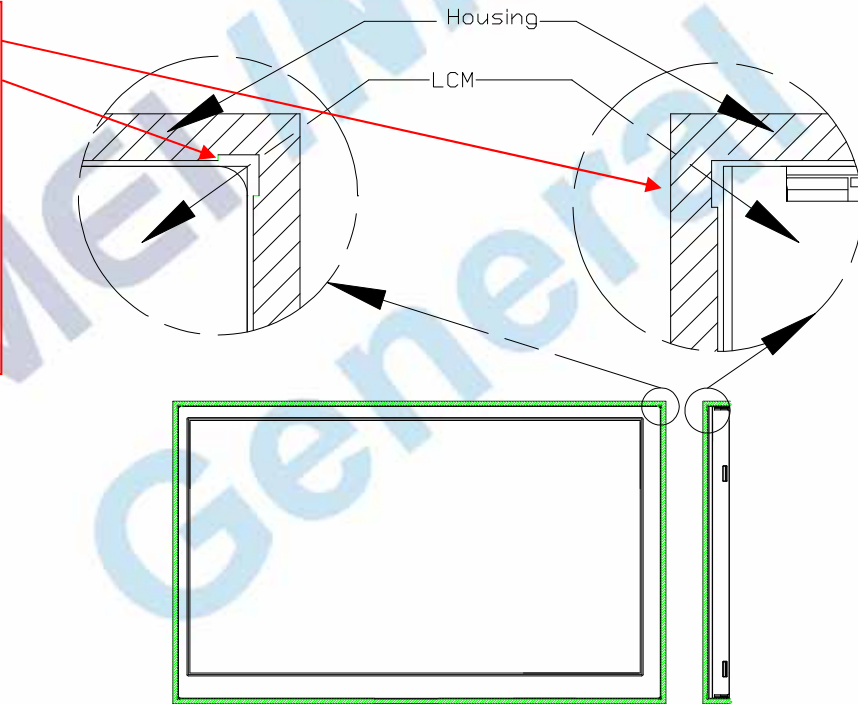
5.5 Vendor Recommend

Item	Vendor	Type	Remark
Vcom OP	TI	TL3414	Or other IC with the same function
DC/DC	Fiti Power	FP6791	
LED Driver	Fiti Power	FP6745	1. PWM Frequency:100Hz~50KHz 2. Or other IC with the same function

6. Mechanics Design Guide

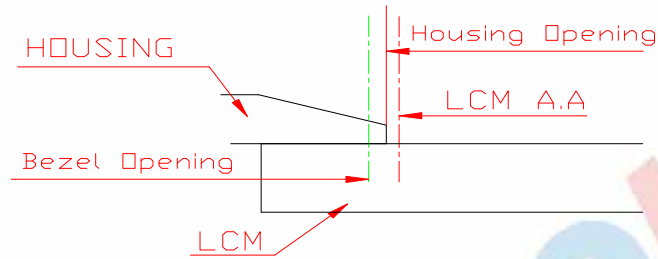
6.1. LCM corner /edge avoidable cutting.

If you design a avoidable cutting as the right drawing. LCM will easier to assemble in the housing.
When you use the LCM with TSP, the cutting will avoid damage the edge or corner of TSP during the assembly.



Suggestions of housing design

6.2. Housing opening design guide.

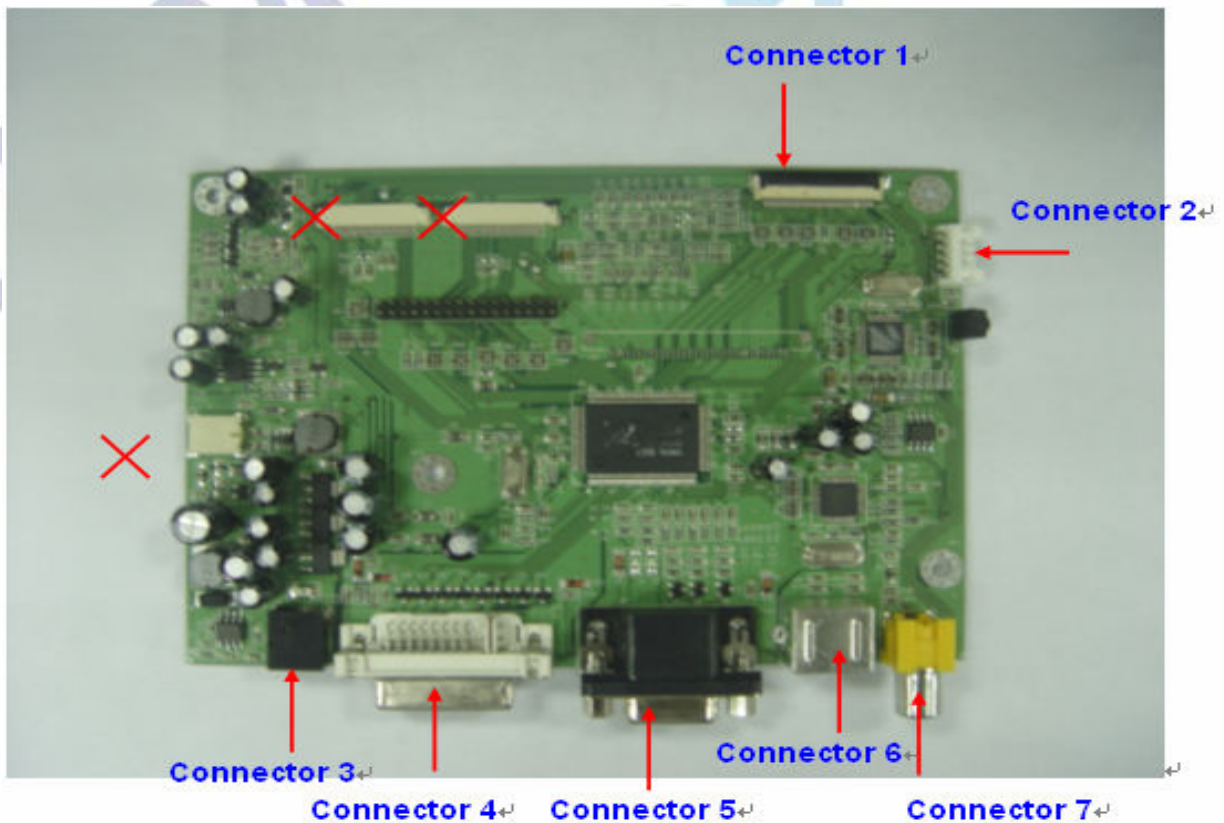


Section sketch(without TSP)

- Notes:
1. Housing opening must be bigger than LCMA.A and cover the bezel .
 2. If you want to provide more protection for LCM, you can add some buffer material on the top or bottom of LCM.

7. Control Board Introduce

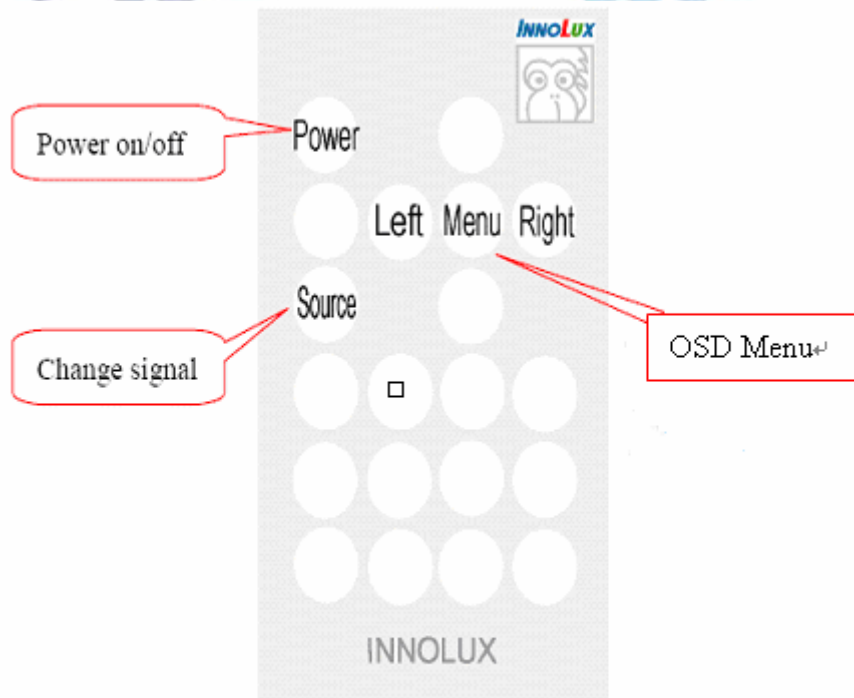
7.1 Interface of demo board



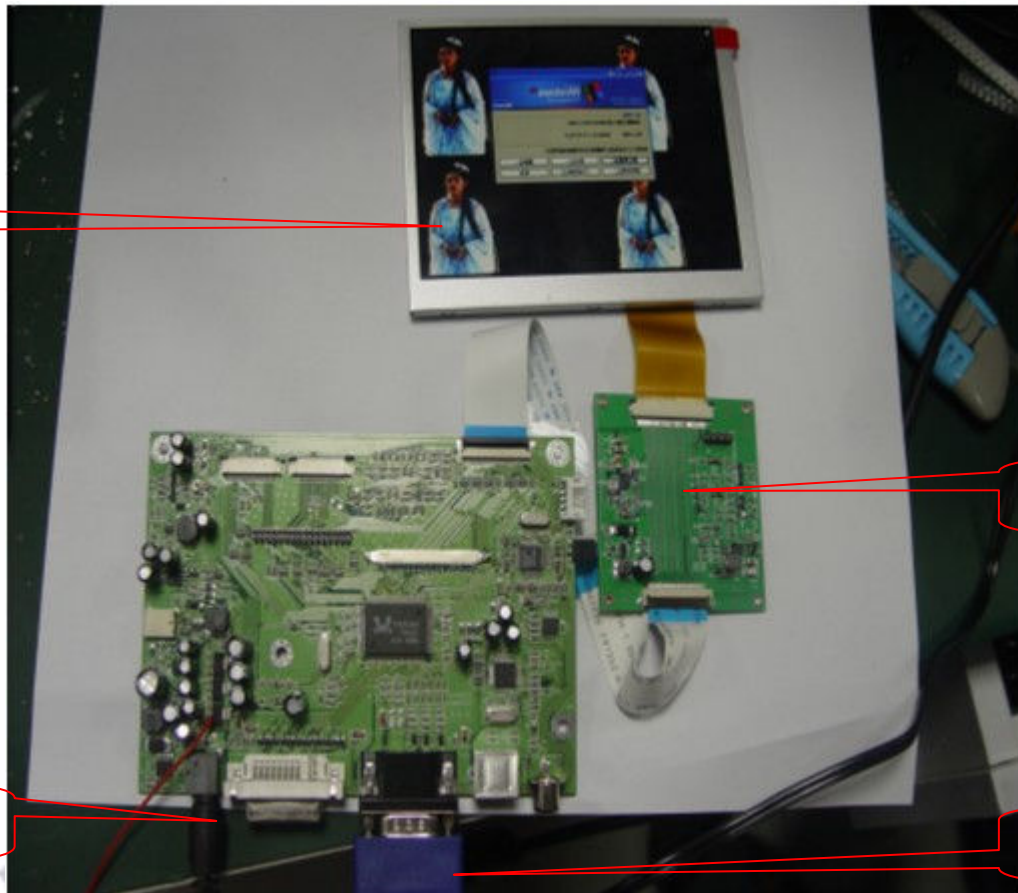
Connector 1 is the connector which connect with the Innolux 5.6" LCM interface. The detailed pins function introduction refer to the Spec of Innolux 5.6" LCM or the specification of this PCBA.

Connector	I/O	Function
1	O	5.6"D connector
2	I	The hand-off controller of CVBS and D-Sub
3	P	12V DC input
4	I	DVI signal input
5	I	VGA signal input
6	I	S-video
7	I	CVBS

7.2 Interface of Remote control



7.3 Linking LCM



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