



MODEL NO. : TM035KDH05
ISSUED DATE: 2009-05-11
VERSION : Ver 3.0

- Preliminary Specification
 Final Product Specification

Customer : PCC

Approved by	Notes

SHANGHAI TIANMA Confirmed :

Prepared by	Checked by	Approved by

This technical specification can not change optionally.



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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2008-10-22	Preliminary release	Peng Lei
1.1	2008-11-11	Modify model name and customer name in page1 Add LED lifetime in page 10 Add TIANMA IIS in page 42	Peng Lei
1.2	2008-11-25	Modify customer name in page 1 Update part list in page 28	Peng Lei
1.3	2008-11-30	Add procedure about defect product handing for in page 40	Peng Lei
1.4	2008-12-25	Modify VSYNC and HSYNC set up time and hold time in page12 Update RoHS part list in page 28 Update signal voltage of logical input and output in page12 Update CLK frequency in page13	Peng Lei
1.5	2009-01-06	Update IC setup time and hold time in page 12 Update Power on and off sequence in page18 and page19 Add module weight in page 5 Modify product spec follow Tianma Product spec criterion in all pages	Jianbin Zhu
1.6	2009-01-07	Add standby mode sequence in page18 and page19 Cancel output signal voltage in page10	Jianbin Zhu
1.7	2009-01-13	Update SPI and B/L sequence of power on/off sequence in page18 and page 19 Add Drive IC model name in page 5 Modify standby mode command in page18 and page19 Update version description in page 3 Add the reliability test report in page 48 Modify the part list in page 27	Jianbin Zhu
1.8	2009-01-20	Update vendor name of solder in page 28	Jianbin Zhu
1.9	2009-01-21	Modify up polarizer type in page 5	Jianbin Zhu
2.0	2009-02-04	Change Cosmetic spec to Incoming Inspection Standard in page 42 Change No to FPC Pin No in page 6 Change Driving TFT LCD Panel to Typical Operation Conditions in page 10 Delete 2.1 TFT panel title in page 6 Change Driving TFT LCD Panel to Driving TFT LCD Module in page 9 Add maximal backlight power consumption in page 9 Add LED lifetime under current is 25mA in page 10 Add the FPC Drawing in page 27 Update timing frequency drawing in page 12 Add DDLY and offset description in page 15 Modify Power on/off command in page 18 and page 19 Update product name criterion in page 30 Update part list in page 28 Add CF, PLZ, and LC description in page 31	Jianbin Zhu

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		Add Vwhite and Vblack Voltage in page 22 Add note item about Outgoing Inspection Report in page 39 Add aging test detailed conditions in page 24 Add power consumption about module in page 10 Update register value in page 16	
2.1	2009-02-12	Modify description about Note item in page 1 Delete view direction explanation in page 2 Add UV glue description in page 29 Modify product manufacture area in page 31	Jianbin Zhu
2.2	2009-02-25	Update aging test detailed condition in page 24 Add label information in the part list in page 29 Update Mechanical Drawing of LCM in page 26 Add Note item information in page 45	Jianbin Zhu
2.3	2009-03-05	Update aging test condition in page 24 Delete PFOS item in page 29 Add Note item about Product Name Criterion in page 30 Modify Matching to recommend in page 6 Update mechanical drawing of LCM in page 26 Update defect product handling procedure in page 40 Add special RA test report in page 62 Add FPC test report in page 66 Change product code to product label in page 30 Delete Cross pattern item in page 25	Jianbin Zhu
2.4	2009-03-11	Update defect product handling procedure in page 40	Jianbin Zhu
2.5	2009-03-16	Update product manufacture area in page 31 Update part list in page 29	Jianbin Zhu
2.6	2009-03-19	Change aging test to heating test in page 25 Update label information in page 30 Update part list in page 29	Jianbin Zhu
2.7	2009-04-17	Update drive backlight parameter 10 Update RA condition and PCC RA temperature in page 24 and 64 Update part list and Note item about Part list in page 29 Add YUV parameter in page 22 Update mechanical drawing in page 26	Jianbin Zhu
2.8	2009-4-21	Update the note in page 29 Update the mechanical drawing in page 26	Jianbin Zhu
2.9	2009-04-27	Final product spec release in page 1	Jianbin Zhu
3.0	2009-05-11	Add note item in page 31	Jianbin Zhu



1 General Specifications

Feature		Spec
Display Spec	Size	3.5 inch
	Resolution	320(RGB) x 240
	Interface	RGB/CCIR656/601
	Color Depth	16.7M
	Technology Type	a-Si
	Pixel Pitch (mm)	0.219x0.219
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	TM with Normally White
	Surface Treatment(Up Polarizer)	Clear-type(3H)
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	76.90 x 63.90 x 2.80
	Active Area(mm)	70.08 x 52.56
	With /Without TSP	Without TSP
	Weight (g)	30.00
	LED Numbers	6LEDs
Electronic	Driver IC	Novatek NT39016D

Note 1: Requirements on Environmental Protection: RoHS.

Note 2: LCM weight tolerance: +/- 5%.



2 Input/Output Terminals

Recommend connector: Hirose FH28-60S-0.5SH

FPC Pin No	Symbol	I/O	Description	Remarks
1	LED_Cathode	P	LED_Cathode	Note2-1
2	LED_Cathode	P	LED_Cathode	
3	LED_Anode	P	LED_Anode	
4	LED_Anode	P	LED_Anode	
5	GND	P	Ground	
6	X1	--	No Connection	
7	Y1	--	No Connection	
8	X2	--	No Connection	
9	Y2	--	No Connection	
10	GND	P	Ground	
11	NC	--	No Connection	
12	NC	--	No Connection	
13	NC	--	No Connection	
14	RESET	I	Reset	
15	SPENA	I	Serial Port Data Enable Signal	
16	SPCK	I	SPI Serial Clock	Note2-2
17	SPDA	I	SPI Serial Data Input	
18	D00	I	Data 00	
19	D01	I	Data 01	
20	D02	I	Data 02	
21	D03	I	Data 03	
22	D04	I	Data 04	
23	D05	I	Data 05	
24	D06	I	Data 06	
25	D07	I	Data 07	
26	D08	I	Data 08	
27	D09	I	Data 09	
28	D10	I	Data 10	
29	D11	I	Data 11	
30	D12	I	Data 12	

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31	D13	I	Data 13	
32	D14	I	Data 14	
33	D15	I	Data 15	
34	D16	I	Data 16	
35	D17	I	Data 17	
36	D18	I	Data 18	
37	D19	I	Data 19	
38	D20	I	Data 20	
39	D21	I	Data 21	
40	D22	I	Data 22	
41	D23	I	Data 23	
42	HSYNC	I	Horizontal Synchronous Signal	
43	VSYNC	I	Vertical Synchronous Signal	
44	CLK	I	Data Clock	
45	NC	--	No Connection	
46	NC	--	No Connection	
47	VCC	P	Digital Power Supply	
48	VCC	P	Digital Power Supply	
49	NC	--	No Connection	
50	NC	--	No Connection	
51	NC	--	No Connection	
52	NC	--	No Connection	
53	NC	--	No Connection	
54	NC	--	No Connection	
55	NC	--	No Connection	
56	NC	--	No Connection	
57	NC	--	No Connection	
58	DEN	I	Data Enabling Signal	
59	GND	P	Ground	
60	GND	P	Ground	

Note2-1: I/O definition:

I----Input O----Output P----Power/Ground

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Note2-2: Interface controlled by SPI, please refer to the SPI command list.

Mode	D(23:16)	D(15:08)	D(07:00)	HSYNC	VSYNC	DEN
CCIR 656	D(23:16)	GND	GND	NC	NC	NC
CCIR 601	D(23:16)	GND	GND	HSYNC	VSYNC	NC
8 Bit RGB	D(23:16)	GND	GND	HSYNC	VSYNC	NC for HV Mode
						DEN for DEN Mode
24 Bit RGB	R(7:0)	G(7:0)	B(7:0)	HSYNC	VSYNC	NC for HV Mode
						DEN for DEN Mode



3 Absolute Maximum Ratings

3.1 Driving TFT LCD Module

GND=0V, Ta = 25°C

Item	Symbol	Min	Max	Unit	Remark
Power Supply Voltage	VCC	-0.3	5.0	V	
Logic Input Signal Voltage	D00~D23,RESET SPENA,SPCK SPDA,HSYNC VSYNC,CLK,DEN	-0.3	VCC+0.3	V	
Back Light Forward Current	I _{LED}	--	25	mA	For each LED
Operating Temperature	T _{OPR}	-20	60	°C	
Storage Temperature	T _{STG}	-30	70	°C	



4 Electrical Characteristics

4.1 Typical Operation Conditions

GND=0V, Ta=25°C

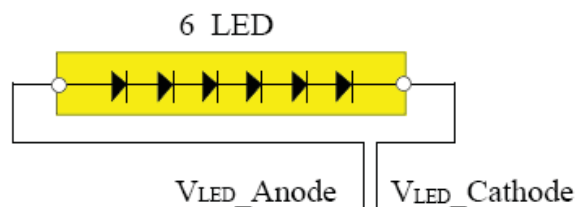
Item	Symbol	Min	Typ	Max	Unit	Remark	
Power Supply Voltage	VCC	3.0	3.3	3.6	V		
Input Signal Voltage	Low Level	V _{IL}	0	--	0.2xVCC	V	D00~D23,RESET ,DEN SPENA,SPCK,SPDA HSYNC,VSYNC ,CLK
	High Level	V _{IH}	0.8xVCC	--	VCC	V	
(Panel+ LSI) Power Consumption	Black Mode (60Hz)	--	41.50	45.00	mW		
	Standby Mode	--	0.15	0.20	mW		

4.2 Driving Backlight

Ta=25°C

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I _F	--	20	25	mA	For each LED
Forward Voltage	V _F	--	3.2	3.6	V	
Power Consumption	W _{BL}	--	384	540	mW	Note1,2,3
Reverse LED Current	I _R	--	--	50	uA	V _R =5V

Note 1: The figure below shows the connection of backlight LED.



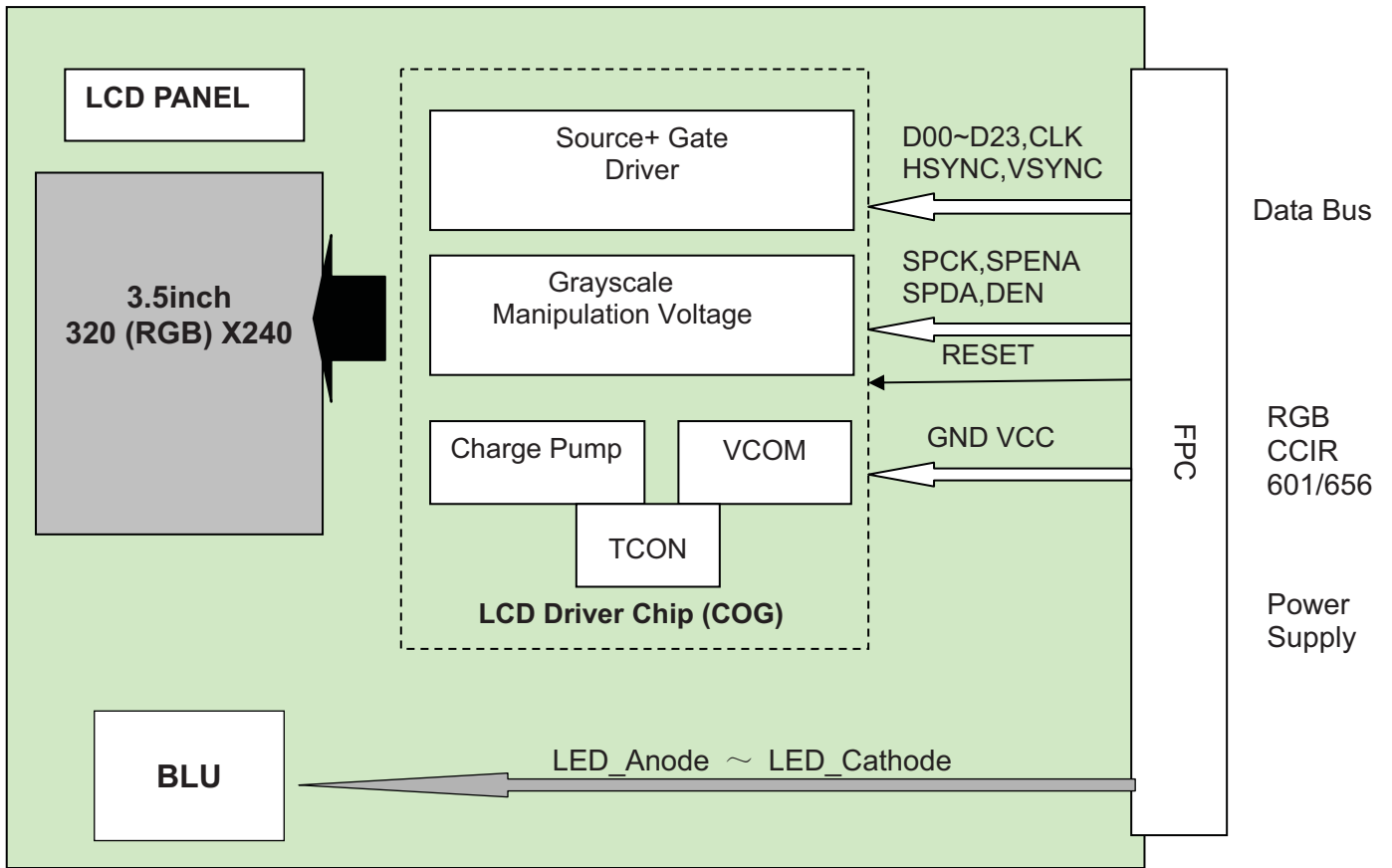
Note 2: One LED : I_F =20 mA, V_F =3.2V

Note 3: The minimal life of LED : 12,000 hours(I_F =20 mA ,one LED).

The minimal life of LED : 10,000 hours(I_F =25 mA ,one LED).



4.3 Block Diagram





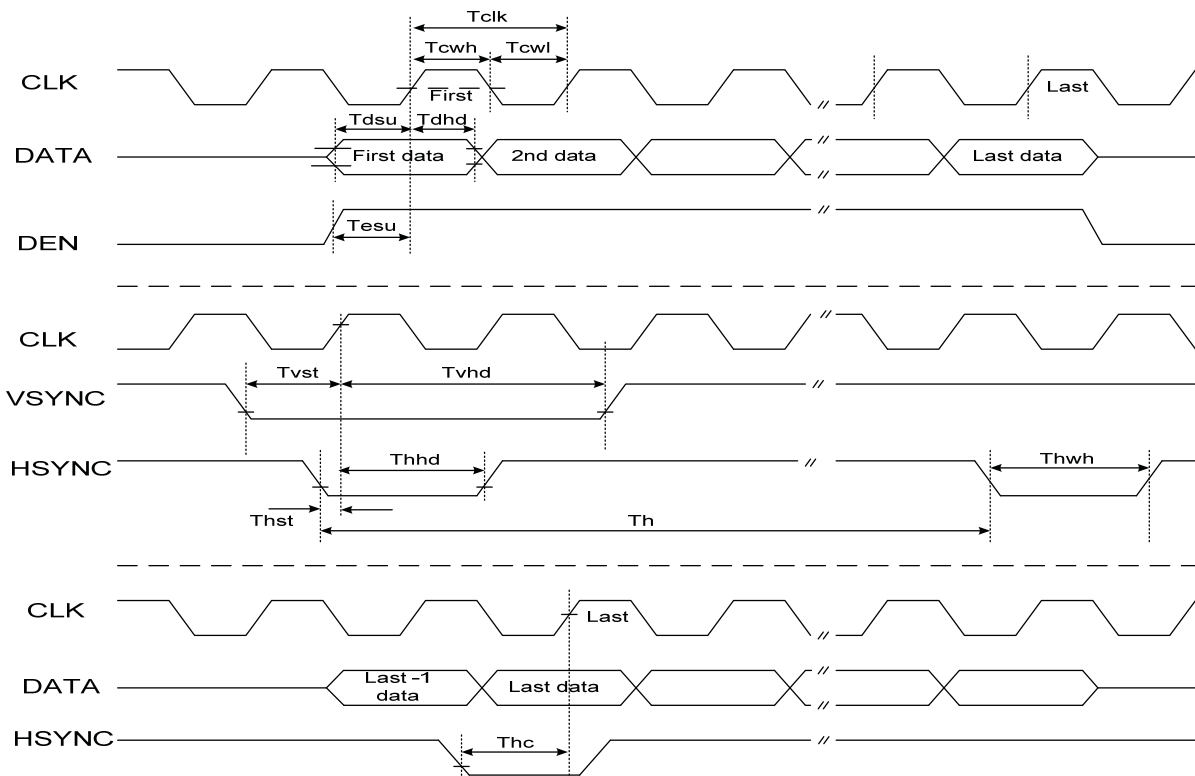
5 Timing Chart

5.1 Timing Parameter

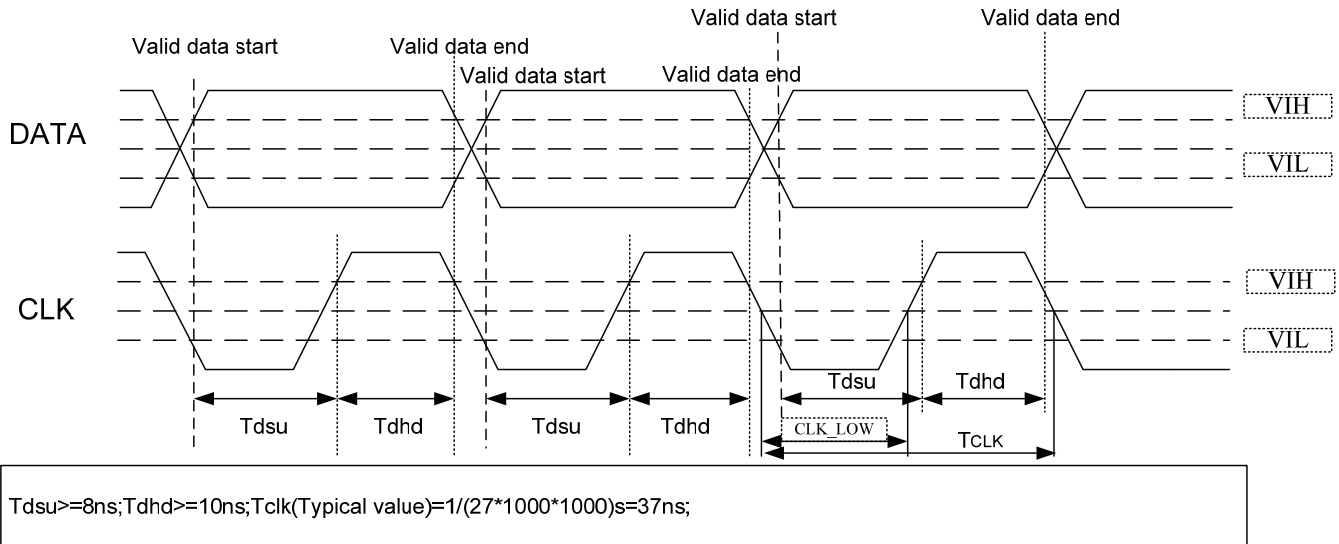
(VCC=3.3V GND =0V,Ta=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Clock Time	T_{clk}	1/Max(F_{clk})	--	1/Min(F_{clk})	ns	
CLK Pulse Duty	T_{chw}	40	50	60	%	T_{clk}
HSYNC to CLK	T_{hc}	--	--	1	CLK	--
HSYNC Width	T_{hwh}	1	--	--	CLK	--
VSYNC Width	T_{vwh}	1	--	--	ns	--
HSYNC Period Time	T_h	60	63.56	67	ns	--
VSYNC Set-up Time	T_{vst}	8	--	--	ns	--
VSYNC Hold Time	T_{vhd}	10	--	--	ns	--
HSYNC Setup Time	T_{hst}	8	--	--	ns	--
HSYNC Hold Time	T_{hhd}	10	--	--	ns	--
Data Set-up Time	T_{dsu}	8	--	--	ns	D00~D23 to CLK
Data Hold Time	T_{dhd}	10	--	--	ns	D00~D23 to CLK
DEN Set up Time	T_{esu}	12	--	--	ns	DEN to CLK

Note: Each CLK Frequency of 24 Bit RGB Mode,8 Bit RGB Mode,CCIR601and CCIR656 are different.

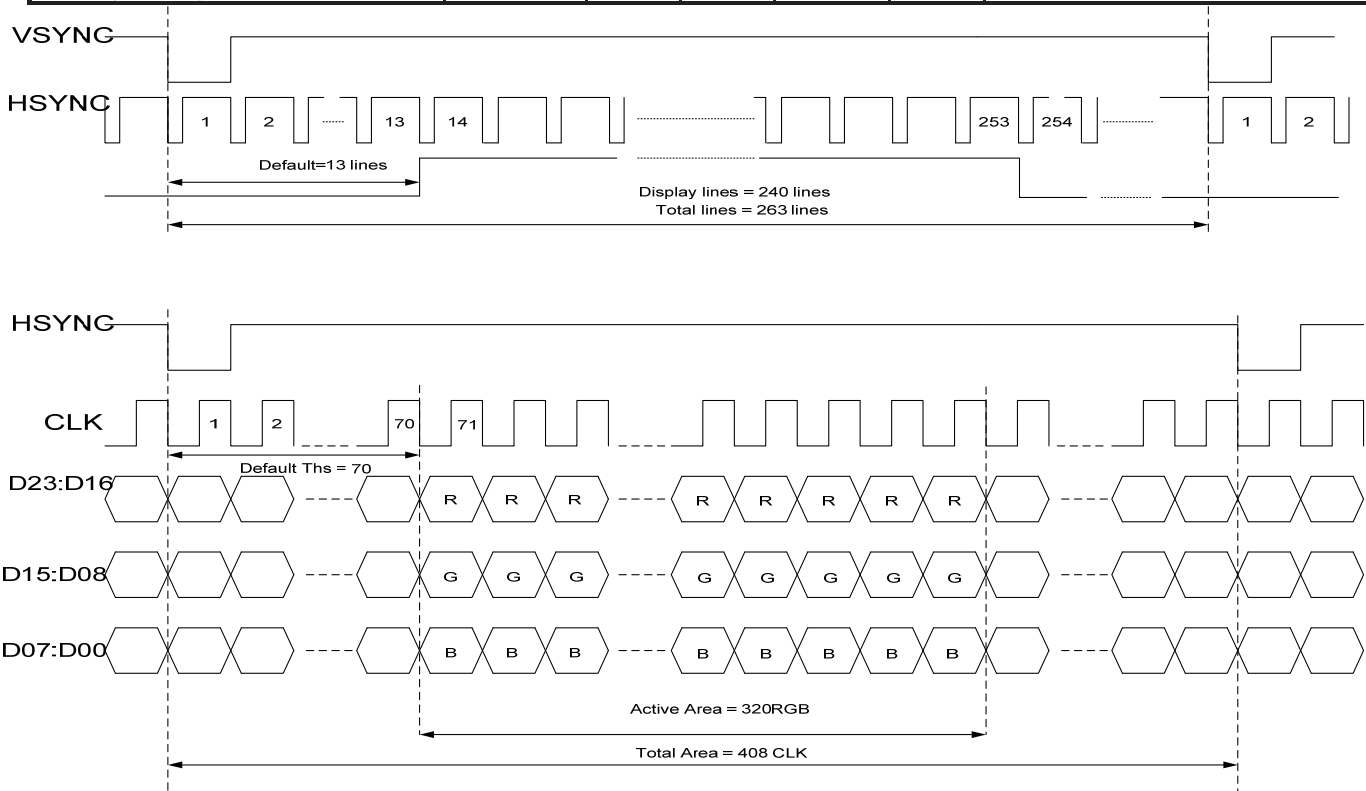


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5.2 24 Bit RGB Mode for 320RGB x 240

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	F_{clk}	6.1	6.4	8.0	MHz	VCC=3.0V~3.6V
CLK Cycle Time	T_{clk}	125	156	164	ns	
CLK Pulse Duty	T_{cwh}	40	50	60	%	
Time that HSYNC to 1st data input(NTSC)	T_{hs}	40	70	255	CLK	DDLY = 70, Offset = 0 (fixed)

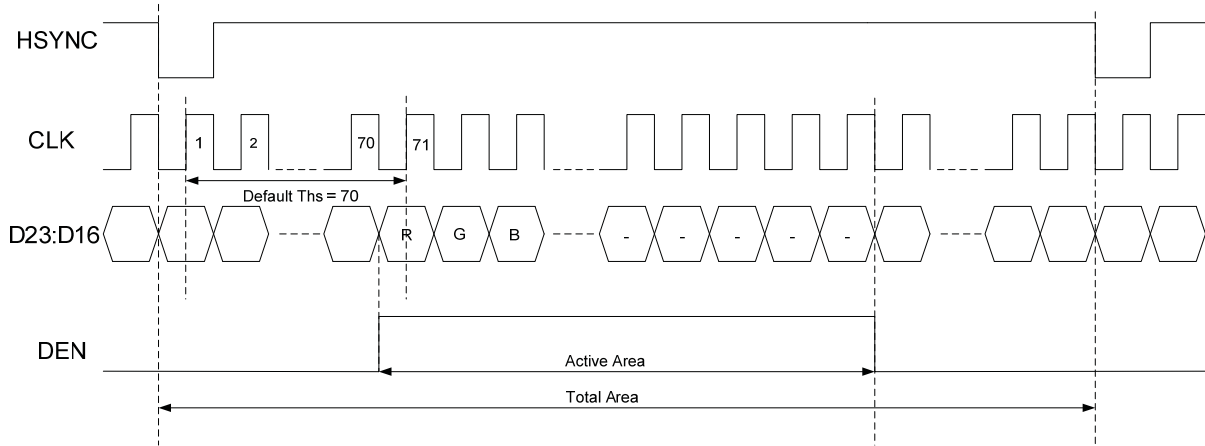


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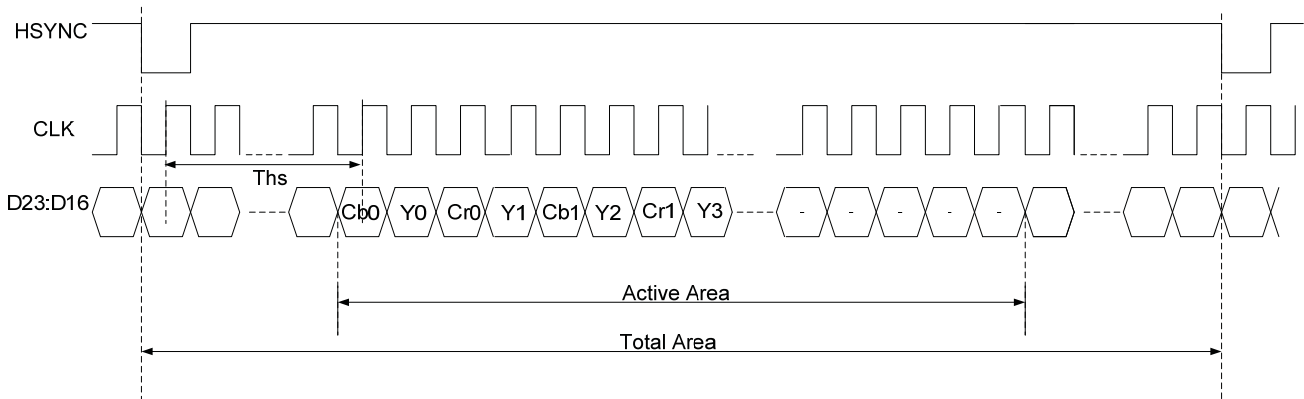
5.3 8 Bit RGB Mode for 320RGB x 240

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	F _{clk}	--	27	30	MHz	VCC=3.0~3.6V
CLK Cycle Time	T _{clk}	--	37	--	ns	
Time that HSYNC to 1 st data input(NTSC)	T _{hs}	35	70	255	CLK	DDLY = 70, Offset = 0 (fixed)



5.4 CCIR601

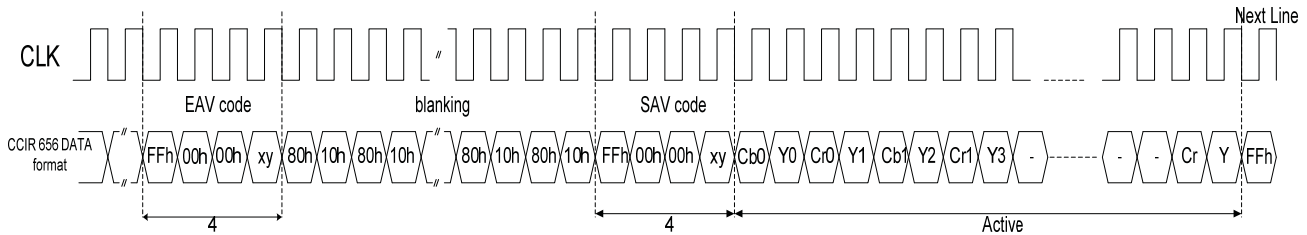
Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	F _{clk}	--	24.54/ 27	30	MHz	VCC=3.0V~3.6V
CLK Cycle Time	T _{clk}	--	40/37	--	ns	
Time From HSYNC to 1 st data input(PAL)	T _{hs}	128	264	--	CLK	DDLY = 136, Offset = 128 (fixed)
Time From HSYNC to 1 st data input(NTSC)	T _{hs}	128	244	--	CLK	DDLY = 116, Offset = 128 (fixed)





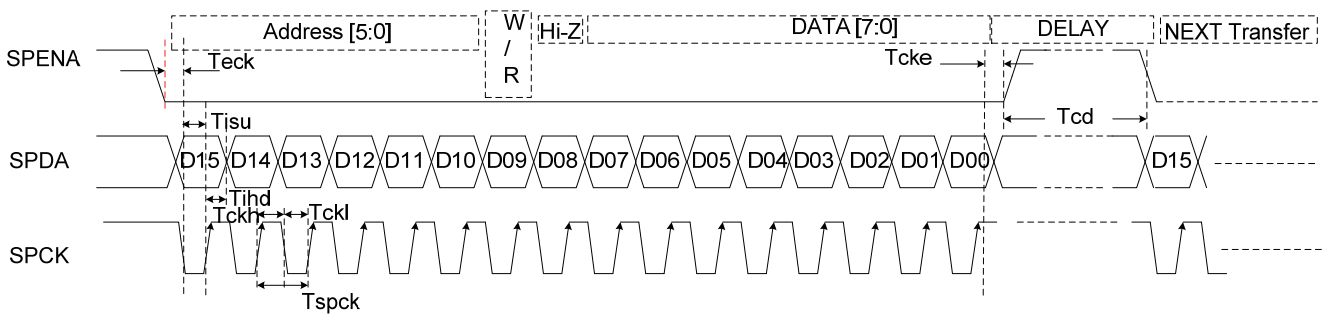
5.5 CCIR656

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	Fclk	--	27	30	MHz	VCC=3.0V~3.6V
CLK Cycle Time	Tclk	--	37	--	ns	
Time that EVA to 1'st data input(PAL)	Ths	128	288	--	CLK	DDLY = 152, Offset = 128 (fixed)
Time that EVA to 1'st data input(NTSC)	Ths	128	276	--	CLK	DDLY = 140, Offset = 128 (fixed)



5.6 3-Wire Serial Communication AC Timing

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Serial Clock	T _{SPCK}	320	--	--	ns	
SPCK Pulse Duty	T _{scdut}	40	50	60	%	
Serial Data Setup Time	T _{isu}	120	--	--	ns	
Serial Data Hold Time	T _{ihd}	120	--	--	ns	
Serial Clock High/Low	T _{ssw}	120	--	--	ns	
Chip Select Distinguish	T _{cd}	1	--	--	us	



Note: DDLY Description (Ths= DDLY+ Offset)

R04: Source Timing Delay Control Register

Bit	Name	Initial	Description
Bit [7:0]	DDLY[7:0]	46h	Select the HSD signal to 1'st input data delay timing Under CCIR601 mode, Ths = DDLY[7:0] + 128, (Unit = CLKIN) Under CCIR656 mode, Ths = DDLY[7:0] + 136, (Unit = CLKIN) Under RGB 8/24 bit mode, Ths = DDLY[7:0], (Unit = CLKIN) The register value will be update to the different mode,such as 24RGB,8RGB,CCIR mode. Read the section of "24RGB, 8RGB, CCIR mode" for the detail.

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5.7 3-Wire Control Registers List

3-Wire Registers		Register Description		
D[15:10]	Name	Init	R/W	Function Description
000000b	R00	07h	R/W	System control register
000001b	R01	00h	R/W	Timing controller function register
000010b	R02	03h	R/W	Operation control register
000011b	R03	CCh	R/W	Input data Format control register
000100b	R04	46h	R/W	Source timing delay control register
000101b	R05	0Dh	R/W	Gate timing delay control register
000110b	R06	00h	R/W	Reserved
000111b	R07	00h	R/W	Internal function control register
001000b	R08	08h	R/W	RGB contrast control register
001001b	R09	40h	R/W	RGB brightness control register
001010b	R0A	88h	R/W	Hue/Saturation control register
001011b	R0B	88h	R/W	R/B sub-contrast control register
001100b	R0C	20h	R/W	R sub-brightness control register
001101b	R0D	20h	R/W	B sub-brightness control register
001110b	R0E	10h	R/W	VCOMDC level control register
001111b	R0F	24h	R/W	VGL/VGH VOCMAC level control register
010000b	R10	04h	R/W	VGAM2 level control register
010001b	R11	24h	R/W	VGAM3/4 level control register
010010b	R12	24h	R/W	VGAM5/6 level control register
011110b	R1E	00h	R/W	VCOMDC Trim function control register
100000b	R20	00h	R/W	Wide and narrow display mode control register

Note :

R03: c4h:CCIR656 Mode

c2h:CCIR601 Mode

c8h:8 bit RGB Mode(HV Mode)

c9h:8 bit RGB Mode(DEN Mode)

cch(default):24 bit RGB Mode (HV mode)

cdh:24 bit RGB Mode (DEN mode)

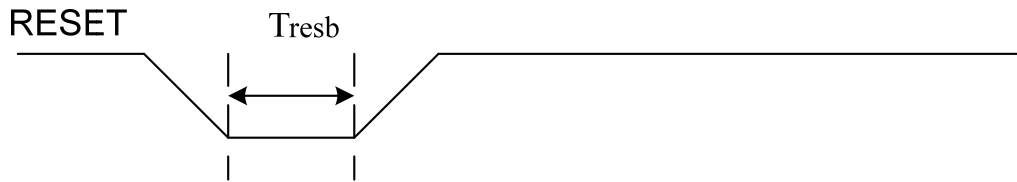
R0F: A4h(default):VGH=15V,VGL=-10V.

24h(recommend): VGH=15V,VGL=-7V.

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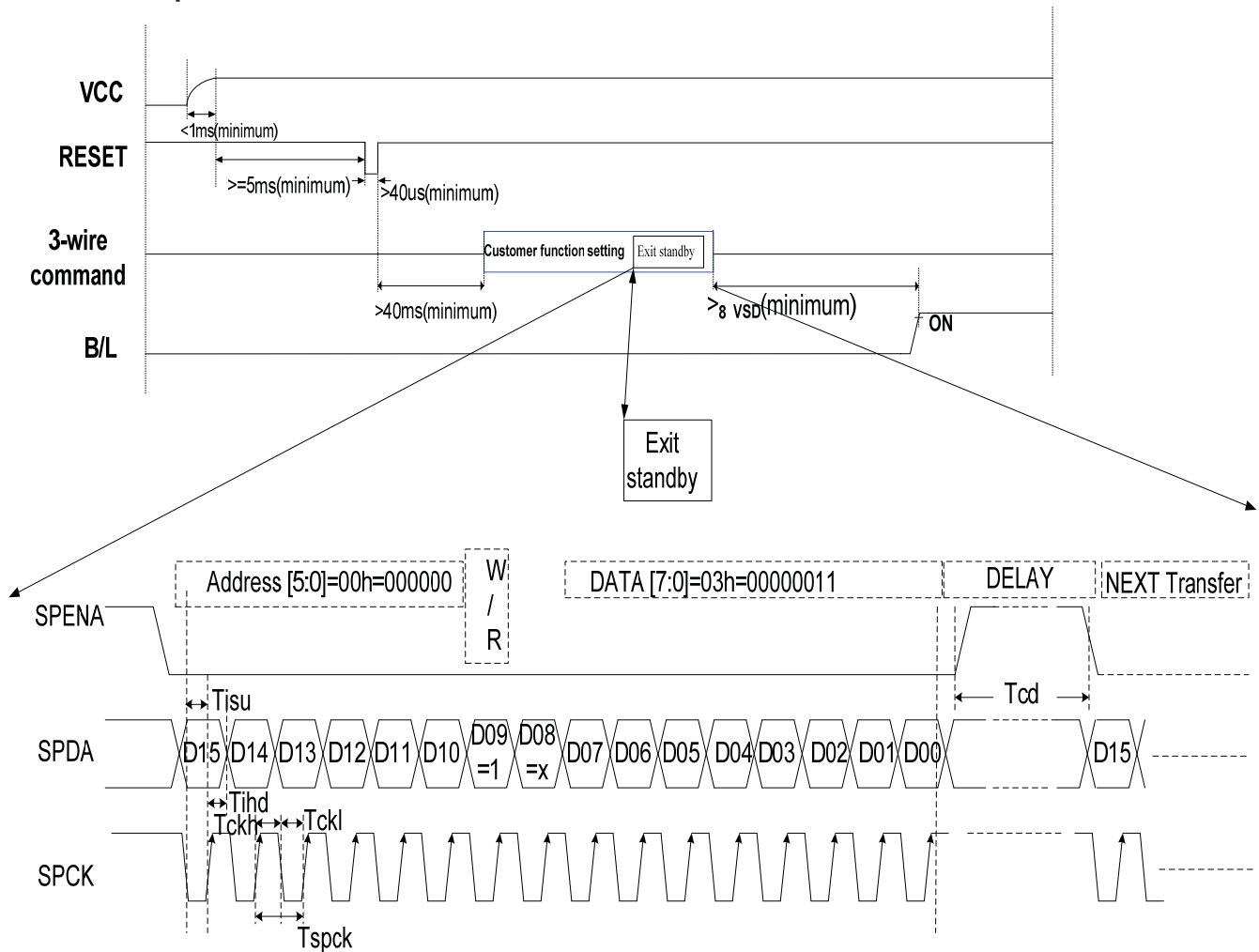
5.8 Reset Timing



Parameter	Min	Typ	Max	Unit	Conditions
T_{resb}	40	-----	----	us	VCC = 3.3V



5.9 Power On Sequence



Note

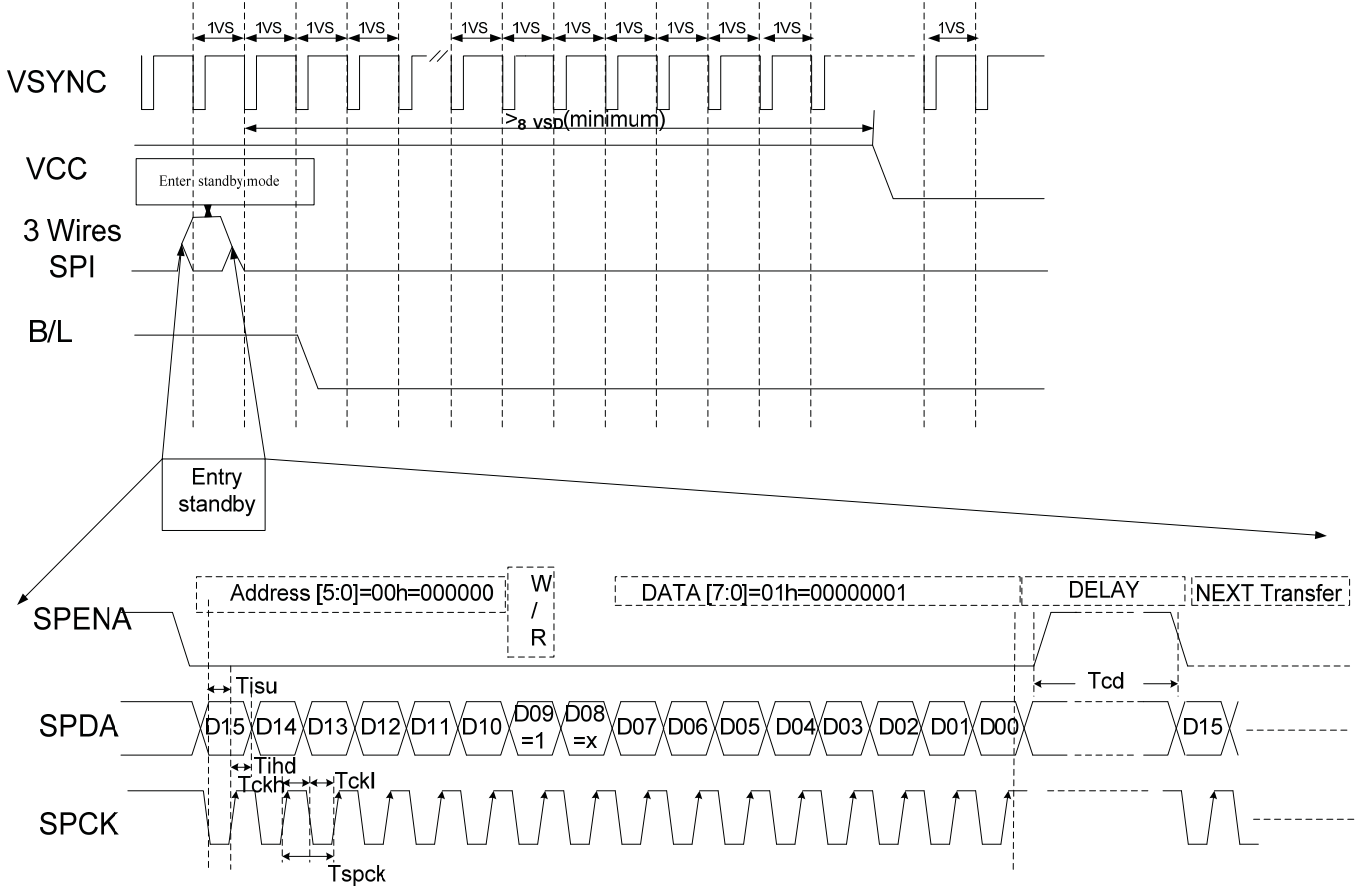
1. Please exit to Standby Mode through 3-wire command, detail sequence that exit to Standby Mode under power on mode presentation as below.
2. Exit to standby mode, you can write data "0x03" to register "R00", D09=1 for writing data to register. D09=0 for reading data from register.
Under SPI write mode, D08=X, and 'X' means don't care D08='1' or '0'.

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Serial Clock	Tspck	320	-	-	ns	
SPCK Pulse Duty	Tscdut	40	50	60	%	
Serial Data Setup Time	Tisu	120	-	-	ns	
Serial Data Hold Time	Tihd	120	-	-	ns	
Serial Clock High/Low	Tssw	120	-	-	ns	Tckh or Tckl
Chip Select Distinguish	Tcd	1	-	-	us	

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5.10 Power off Sequence



Note

- 1VSYNC=1VSYNC. Please entry Standby Mode through 3-wire command, detail sequence which enter Standby Mode under power off mode presentation as below.
- Enter to standby mode, you can write data "0x01" to register "R00", D09=1 for writing data to register. D09=0 for reading data from register. Under SPI write mode, D08=X, and 'X' means don't care D08='1' or '0'.

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Serial clock	Tspck	320	-	-	ns	
SPCK pulse duty	Tscdut	40	50	60	%	
Serial data setup time	Tisu	120	-	-	ns	
Serial data hold time	Tihd	120	-	-	ns	
Serial clock high/low	Tssw	120	-	-	ns	Tckh or Tckl
Chip select distinguish	Tcd	1	-	-	us	

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6 Optical Characteristics

6.1 Optical Specification

Ta=25°C

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	
View Angles	θT	$CR \geq 10$	40	50	--	Degree	Note 2	
	θB		50	60	--			
	θL		50	60	--			
	θR		50	60	--			
Contrast Ratio	CR	$\theta = 0^\circ$	200	350	--		Note1 Note3	
Response Time	T_{ON}	25°C	--	25	40	ms	Note1	
	T_{OFF}						Note4	
Chromaticity	White	Backlight is on	x	0.260	0.310	0.360		Note5 Note1
			y	0.283	0.333	0.383		
	Red		x	0.574	0.624	0.674		
			y	0.318	0.368	0.418		
	Green		x	0.300	0.350	0.400		
			y	0.505	0.555	0.605		
	Blue		x	0.093	0.143	0.193		
			y	0.069	0.119	0.169		
Uniformity	U		75	80	--	%	Note1 Note6	
NTSC			--	50	--	%	Note 5	
Luminance	L		350	420	--	cd/m ²	Note1 Note7	

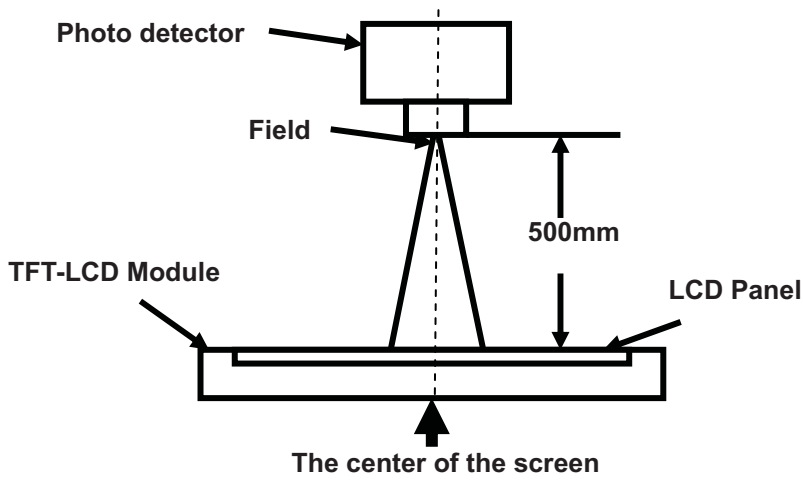
Test Conditions:

1. $V_F = 3.2V$, $I_F = 20mA$ (LED current), the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note2.



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

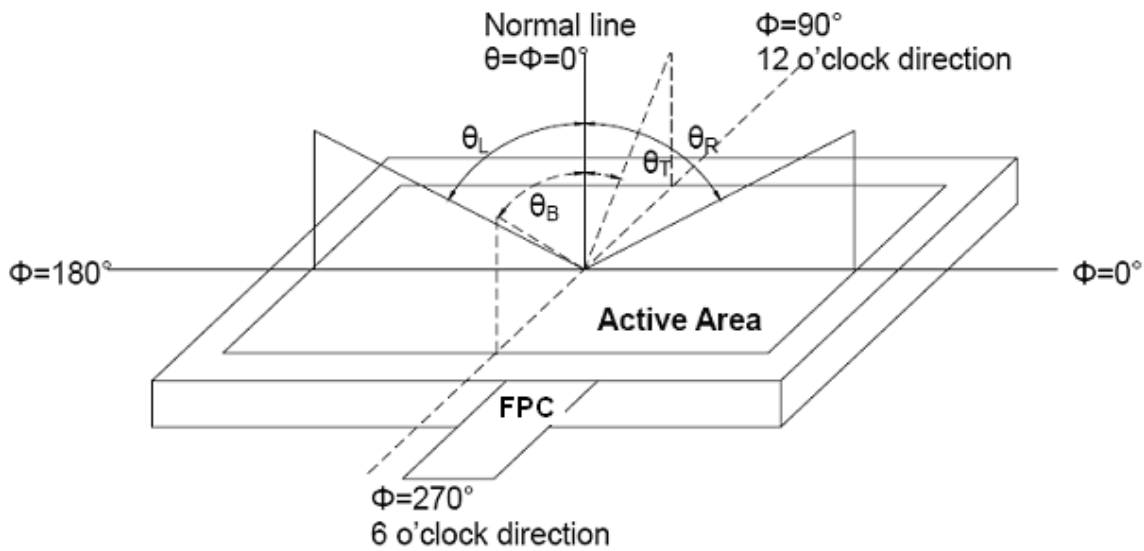


Fig. 1 Definition of viewing angle



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

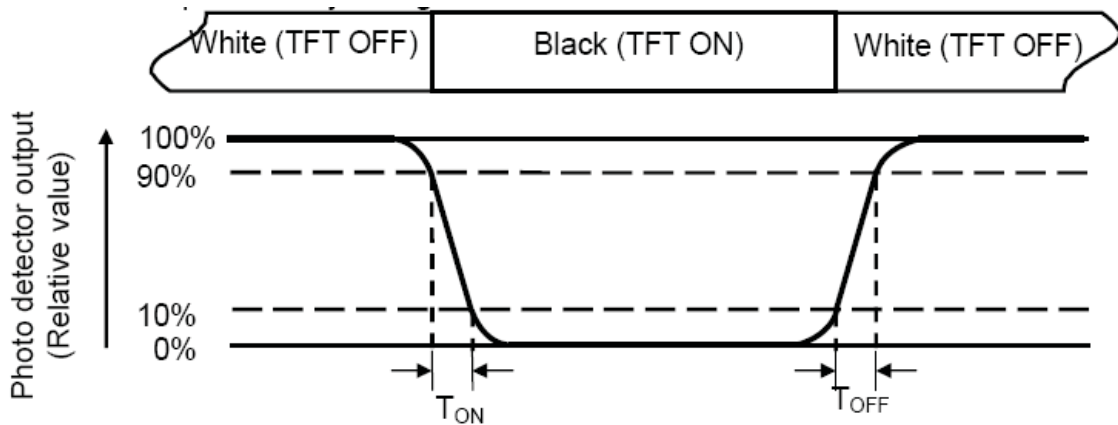
“White state”: The state is that the LCD should driven by Vwhite. Y=235/Cb=128/Cr=128

“Black state”: The state is that the LCD should driven by Vblack. Y=16/Cb=128/Cr=128

Vwhite=0.4 v Vblack=4.7 v

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

L and W are active area dimensions , and active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max}$$

L-----Active area length W----- Active area width

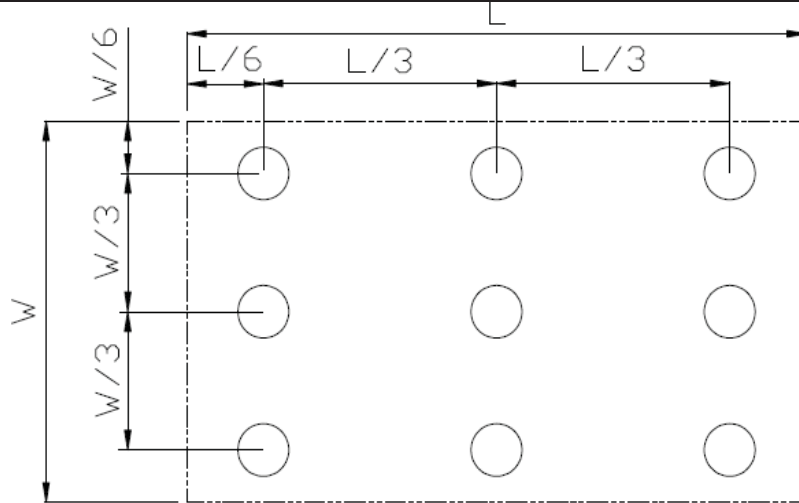


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance.

Measure the luminance of white state at center point.



7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts=+60°C,240hrs	Note1 IEC60068-2-2,GB2423.2—89
2	Low Temperature Operation	Ta=-20°C, 240hrs	IEC60068-2-1 GB2423.1—89
3	High Temperature Storage	Ta=+70°C, 240hrs	IEC60068-2-2, GB2423.2—89
4	Low Temperature Storage	Ta=-30°C, 240hrs	IEC60068-2-1 GB2423.1—89
5	High Temperature & High Humidity Storage	+60°C,90% RH max, 240 hours	Note2 IEC60068-2-3, GB/T2423.3—2006
6	Thermal Shock (Non-operation)	-30°C 30 min~+70°C 30 min, Change time:5min,30 Cycle.	Start with cold temperature, end with high temperature IEC60068-2-14,GB2423.22—87
7	Electro Static Discharge (Operation)	C=150pF, R=330Ω, 5points/panel Air:±15KV,5times;Contact:±4KV,5times; (Environment:15°C ~ 35°C,30% ~ 60%,86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2—1998
8	Vibration (Non-operation)	Frequency range:10~55Hz,Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.(6 hours for total)(package condition)	IEC60068-2-6 GB/T2423.10—1995
9	Shock (Non-operation)	60G 6ms,± X,± Y,± Z 3times for each direction	IEC60068-2-27 GB/T2423.5—1995
10	Package Drop Test	Height:90 cm 1 corner, 3 edges, 1surfaces (bottom surface toward to the ground) Height:75 cm 1 corner, 5(other)surfaces	IEC60068-2-32 GB/T2423.8—1995
11	PCC RA Test	T=+40°C,90%RH max, 72 hours, 100 samples	PCC RA spec
12	FPC Test	1. Bending Degree:90 Deg, Heaven Laden:500g, Bending time 30times, Quantity3 2. Bending Degree:180 Deg, HeavenLaden:500g, Bending time 30times, Quantity3 (assemble simulation) 3. Bending Degree:90 Deg, Heaven Laden:500g, Bending time 30times, Quantity3 (assemble simulation) 4. Peeling Degree:90 Deg, Heaven Laden:500g, Bending time 30times, Quantity3	PCC FPC Bending and Peeling Test



Note1: T_s is the temperature of panel's surface.

Note2: T_a is the ambient temperature of sample.

Note3: TM035KDH05 has been tested by high temperature inspection, and detail test way as below.

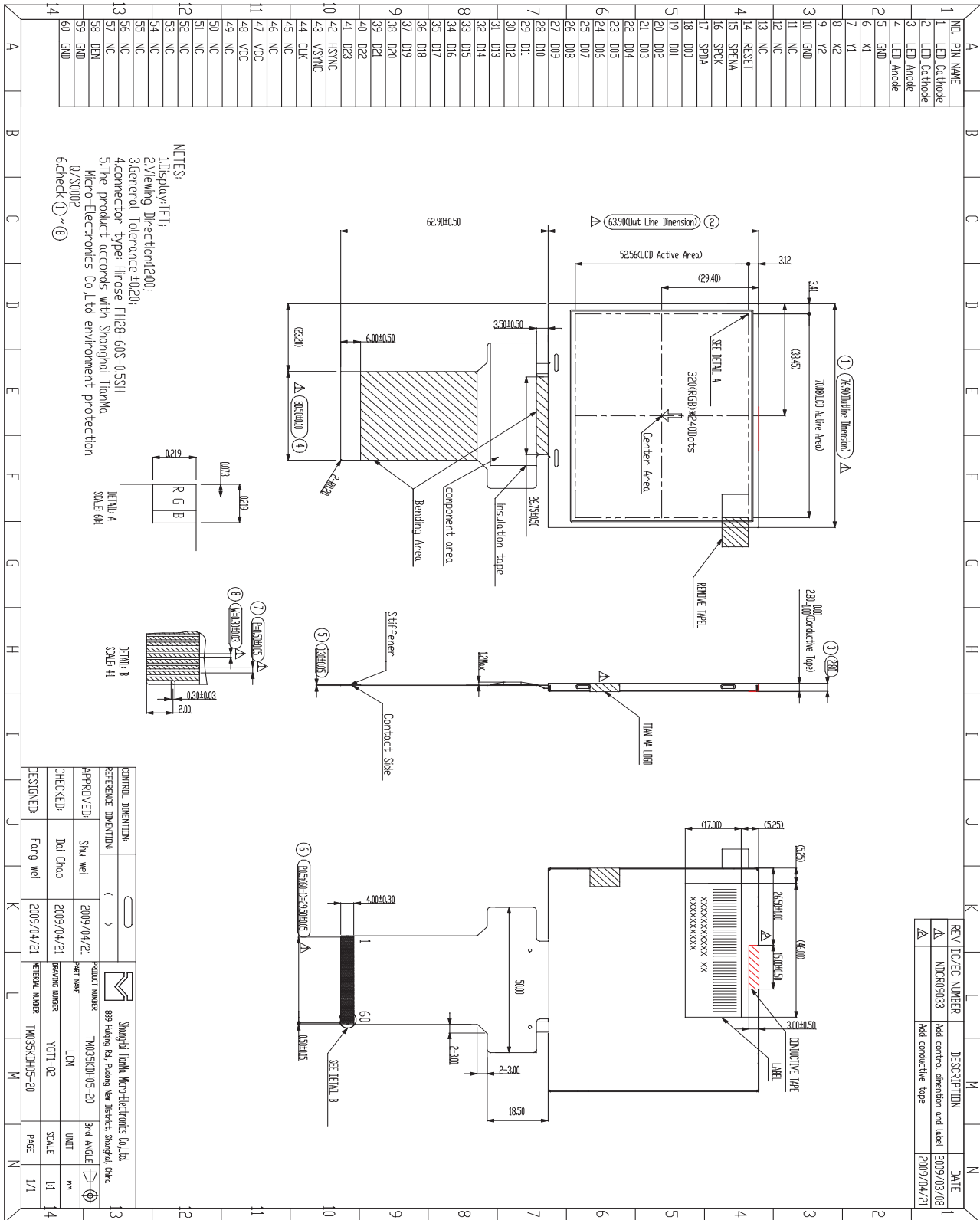
- a. Heating test conditions :70°C temperature, normal humidity, module display with dynamic picture, minimal aging time 20 seconds.
- b. Operator must be check whether module display normally when module is aging test.
- c. Module display effect must be tested and checked when modules are heating.

Note4: The MTBF of LCM is 50568hours.



8 Mechanical Drawing

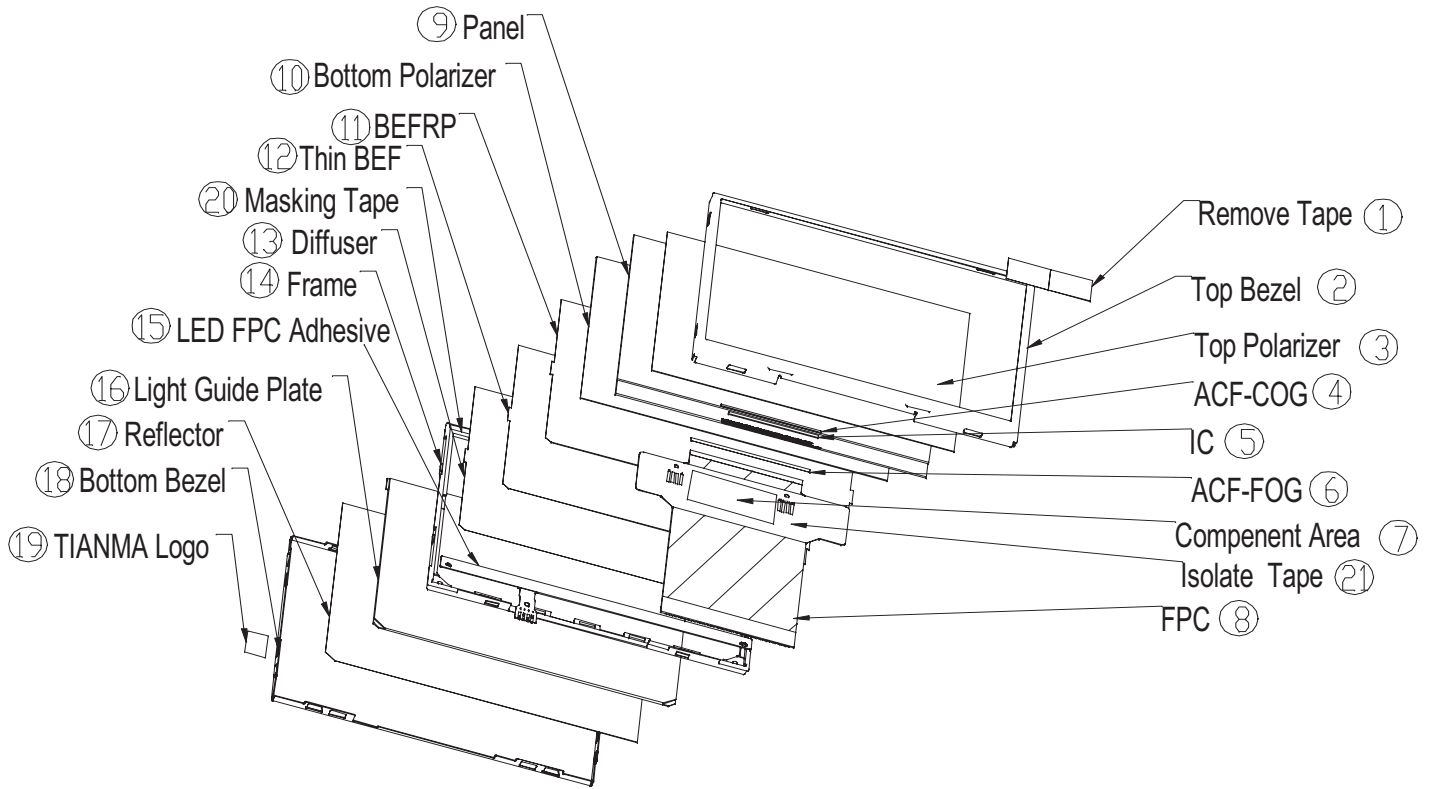
8.1 Mechanical Drawing of LCM



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8.3 The Structure of LCM



Part List

ROHS Parts List					
NO	Parts	Parts No.	Material Name	Supplier	Parts NO.of Supplier
1	Remove Tape	1670000940	Tape	JXEC	808015A
		1670000941			808015B
2	Top Bezel	1610000101	Bezel	Sankyoseiko	SB38120A30
3	Protective Film	1040000810	PVA+TAC+Film	Nitto	NWF-LRSEGHC
	Top Polarizer				NWF-LRSEGAGS1
10	Bottom Polarizer	1040001320			
9	Panel	TM035KYH01	Glass	Conning	C3350B020
			Liquid Crystal	Merck	
			Glass	Conning	
			Red resist	TOYO	
			Green resist	TOYO	
5	Driver IC	1590000270	IC	Novatek	NT39016D
4	ACF-COG	1510000010	ACF	SONY	CP6920F
6	ACF-FOG	1510000130	ACF	SONY	CP1231SD
21	Insulation Tape	1670000570	Tape	JXEC	13TM056A
		1670000571			13TM113A
8	FPC	1540001980	CCL	AEM	ATIDR01301NH

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			Coverlay	AEM	AFICX025X1CM
			PI Stiffener	AEM	AHIPI625XSS1
			Printing Ink	SAMWO	XZ81
			Prepreg	Haiso	ADI-40
			Solder Paste	SENJU	M705
			Capacitor	TDK	C1005X5R1A105K
			Capacitor		C1608X5R1E105K
			Capacitor		C1608X5R1A475K
			Capacitor		C1608X5R1C105K
			Capacitor		GRM219R61C475K
			Diode	ROHM	RB520S-30
			Au. Chemic liquid	UYEMURA	GOBR1GHT TCL-61-M5
			Ni. Chemic liquid	UYEMURA	11120680-SZ
22	UV Glue	1520000100	UV Glue	Shin-Etsu	KJC 7805X
23	UV Glue	1520000050	UV Glue	HITACHI	TF-3348-19F
14	Backlight Unit	1580001780	Frame	Idemitsu Kosan	URZ2502
16			LGP	Idemitsu Kosan	LC1500
13			Diffuser	KIMOTO	38LSE
11			BEF RP	3M	BEF RP II 90/24r
12			Thin BEF	3M	TBEF2-M-65I
20			Masking/Double side tape	SEKISUI	#550R6BW-2FX
17			Reflector	3M	ESR
			Double side tape	TERAOKA TAPE	707
15			FPC	ANYUANDA	SB3812-6P10
			LED	Unity Opto	MSL-516TW-W15
			Solder	SENJU	M705
18			Bottom Bezel	Sankyoseiko	SB3812-4OA40
			Printing Ink	Huiquan	JP-K72
			Ink of "number"	Liberty	S1-55
24	Label Paper	4040000270	Label Paper	Barcode	AW3209
	Char-Strip	4050000860	Char-Black	Barcode	B110A
19	Tianma Logo	1680000050	Paper	Zhongshan	13TM014A
			Ink	DIC	
25	Conductive Tape	1670002110 1670002120	Fabric Tape	3M	CN-3190

Note:

1. The material of sealant is 736K.
2. All changes to delivery specifications will be notified in advance, and all change include project specification, material, manufacture, and management system.
3. UV glue (1520000100) is gelatinized in the COG and FOG area of Panel and protects circuit around IC, UV glue (1520000050) is gelatinized in the rear of FPC, and prevents FPC lacerating by panel edge.
4. The resistance of the top bezel and bottom bezel should be less than 100ohm.

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8.4 Product Label

Panel Label Format



Note: Panel label format definition

Definition of first line of label is Panel ID, and it is unique and includes manufacture relevant information, for instance **M1P88....001**.

From the fourteen number to the nineteen number of Label definition as below

8A9001

8 meaning is **2008** year.

A meaning is October (1~9 meaning is January to September, B meaning is November, C meaning is December)

9 meaning is date 9 (1 to 9 and A to V is 1 date to 31)

001 is series number(From 000 to ZZZ are series number)

20 meaning is series number and it will change to **21. 22** if product materials change.

Definition of second line of label is customer product name.

Dimension of Label is 46mm x 77mm.

8.4.1 Product Name Criterion

TFT Module Code		Active Area(size)	Resolution	Product Type	Producing Area	Serial NO.1		Serial NO.2	
T	M	XXX	X	X	X	X	X	X	X

Note: Serial NO.2 will vary as product material change, and serial number manage product inside of factory.

For Instance:

TM:TIANMA Active Area(size): 3.5inch ---035;10.4inch---104;

Resolution	480x240	640x240	960x240	96x64	128x128	128x160	176x220	240x320
Symbol	A	B	C	D	E	F	G	H
Kind	Delta	Delta	Delta	Stripe	Stripe	Stripe	Stripe	Stripe
Resolution	240x240	320x320	320x240	240x400	400x240	480x272	480x234	320x480

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Symbol	V	J	K	L	M	N	U	P
Kind	Stripe	Stripe	Stripe	Stripe	Stripe	Stripe	Stripe	Stripe
Resolution	480x640	800x480	800x600	1024x768	others			
Symbol	Q	R	S	T	X			
Kind	Stripe	Stripe	Stripe	Stripe	--			

8.4.2 Product Type

TSP+BL(CCFL)+FPC+M4	A
TSP+BL(LED)+FPC+M4	B
BL(CCFL)+FPC+M4	C
BL(LED)+FPC+M4	D
BL(LED)+FPC+M4.Dual Display	E
FPC+M4	F
M4	G
M3	H
M2	Y
M1	J
BL(CCFL)+FPC+M4+PCB	K
BL(LED)+FPC+M4+PCB	L
TSP+BL(CCFL)+FPC+M4+PCB	M
TSP+BL(LED)+FPC+M4+PCB	N
Others	X
M1:Panel(array+CF)	
M2:Panel(array+CF+LC)	
M3:Panel(array+CF+LC+PLZ)	
M4:Panel(array+CF+LC+PLZ+Driver)	

Note:

CF: Color Filter, LC: Liquid Crystal, PLZ: Polarization Plate.

8.4.3 Product Manufacture Area

Shanghai H

Note:

Manufacturer: Shanghai Tianma Micro-Electronics Co.,Ltd.

Address: No.889, Huiqing Rd, Pudong New Area, Shanghai China 201201

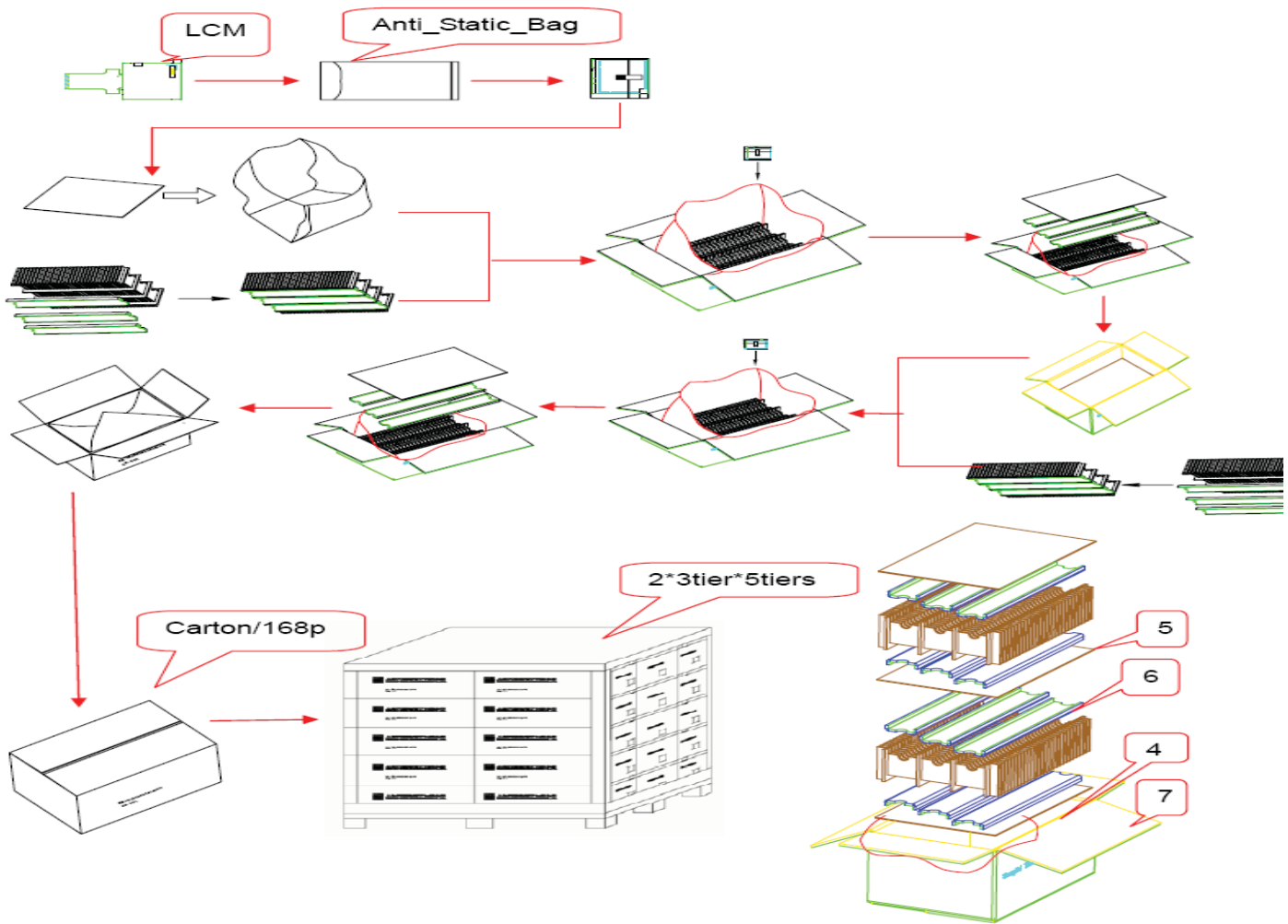
Country of Origin: China

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9 Packing Drawing

No	Item	Model (Material)	Dimension(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM Module	TM035KDH05	76.90×63.90×2.8	0.030	168	
2	Partition_1	Corrugated Paper	511×333×106	0.782	2	Anti-static
3	Anti-Static Bag	PE	165×90×0.05	0.003	168	
4	Dust-Proof bag	PE	700×530	0.060	1	
5	Partition_2	Corrugated Paper	505×332×4.0	0.095	3	
6	Corrugated Bar	Corrugated Paper	513×117×4	0.032	12	
7	Carton	Corrugated Paper	530×350×250	1.100	1	
8	Total weight(Kg)	(8.933±0.45)Kg				



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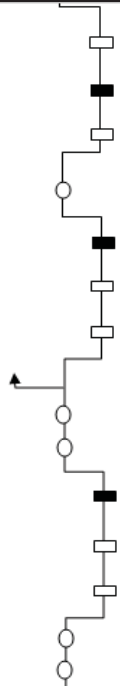
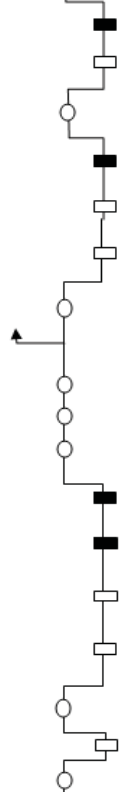
Note :The resistance of Anti-Static Bag is $10^9 \sim 10^{11}$ ohm.

10 QC Flow Chart

10.1 Array QC Flow Chart

Layer	Process chart			Operation Description	PQC check list					Online sampling rate	
	Input	Main Process	Test & Inspection		No.	Content	Check method	Determine method	Frequency		
									First sampling		Sampling rate
Cleaning				Bare glass input	1	Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Cleaner input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Initial clean		Clean condition	Visual check	Check when running		1time/day	
				Contact angle measurement	1	PNC EQ	SPC control	According to process Spec	✓	1lot/day, 3pcs/lot	
Gate Layer				AI-Nd target input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Mo target input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Gate deposition		Deposition condition	Visual check	Check when running		1time/day	
				RS meter	2	RSM EQ	SPC control	According to process Spec	✓	1lot/day, 3pcs/lot	3pcs/day
				Macro inspection		MAC EQ	Visual check	Check when running			All, 12pcs/lot
				PR input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Developer input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Thinner input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Gate inline photo		Exposure & PR condition	Visual check	Check when running		1time/day	
				After develop CD & total pitch	3	CDC EQ	SPC control	According to process Spec	✓	1lot/5lot, 2pcs/lot	All, 2pcs/lot
				ADI	4	ADI EQ	Auto optical inspection	According to process Spec	✓	1lot/5lot, 4pcs/lot	1lot/5lot, 4pcs/lot
				Macro/Micro inspection	5	MIC EQ	Visual check	Check when running	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
				AI etchant 1 input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Stripper input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Gate wet etching		Etchant condition	Visual check	Check when running		1time/day	
				PR stripper		Stripper condition	Visual check	Check when running		1time/day	
Gate film thickness measurement	6	PRF EQ	SPC control	According to process Spec	✓	1lot/day, 1pcs/lot	All, 1pcs/lot				
CD after stripper	7	CDC EQ	SPC control	According to process Spec	✓	1lot/5lot, 2pcs/lot	All, 3pcs/lot				
AEI	8	AEI EQ	Auto optical inspection	According to process Spec	✓	1lot/5lot, 4pcs/lot	All				
Macro/Micro inspection	9	MIC EQ	Visual check	Check when running	✓	1lot/10lot, 4pcs/lot	All, 3pcs/lot				

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Active Layer		Clean before deposition	Clean condition	Visual check	Check when running		1time/day		
		CVD gas input	Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All		
		Active deposition	Deposition condition	Visual check	Check when running		1time/day		
		AOI	10	AOI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/2lot, 5pcs/lot
		Thickness measurement	11	ELL EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/2lot, 5pcs/lot
		Macro inspection		MAC EQ	Visual check	Check when running			All, 10pcs/lot
		Active inline photo		Exposure & PR condition	Visual check	Check when running		1time/day	
		After develop CD & overlay	12	CDC EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	All, 2pcs/lot
		ADI	13	ADI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Macro/Micro inspection	14	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Dry & ashing material input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		Active dry etching and ashing		Etchant condition	Visual check	Check when running		1time/day	
		PR stripper		Stripper condition	Visual check	Check when running		1time/day	
		Thickness measurement	15	PRF EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		AEI	16	AEI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 6pcs/lot	1lot/5lot, 6pcs/lot
		Macro/Micro inspection	17	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Source/Drain Layer		Clean before deposition	Clean condition	Visual check	Check when running		1time/day
S/D deposition	Deposition condition			Visual check	Check when running		1time/day		
RS meter	18			RSM EQ	SPC control	According to process Spec	✓	1lot/day, 3pcs/lot	3pcs/day
Macro inspection				MAC EQ	Visual check	Check when running			All, 12pcs/lot
S/D inline photo				Exposure & PR condition	Visual check	Check when running		1time/day	
After develop CD/overlay	19			CDC EQ	SPC control	According to process Spec	✓	1lot/5lot, 4pcs/lot	All, 2pcs/lot
ADI	20			ADI EQ	Auto optical inspection	According to process Spec	✓	1lot/5lot, 4pcs/lot	1lot/5lot, 4pcs/lot
Macro/Micro inspection	21			MIC EQ	Visual check	Check when running	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
Hard bake				Harder condition	Visual check	Check when running		1time/day	
AL etchant2. dry etching gas input				Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
S/D wet etching				Etchant condition	Visual check	Check when running		1time/day	
n+ α-si dry etching				Etchant condition	Visual check	Check when running		1time/day	
PR stripper				Stripper condition	Visual check	Check when running		1time/day	
Thickness measurement (S/D & Channel)	22			PRF EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/3lot, 3pcs/lot
CD after stripper	23			CDC EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	All, 2pcs/lot
AEI	24			AEI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 6pcs/lot
Macro/Micro inspection	25			MIC EQ	Visual check	Check when running	✓	1lot/10lot, 4pcs/lot	1lot/3lot, 3pcs/lot
Clean before open/short test		Clean condition	Visual check	Check when running		1time/day			
Open/short test	26	OST check	Electrical test	Check when running	✓	1lot/10lot, 4pcs/lot			

Passivation Layer		Clean before deposition		Clean condition	Visual check	Check when running		1time/day	
		Passivation deposition		Deposition condition	Visual check	Check when running		1time/day	
		AOI	27	AOI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 5pcs/lot
		Thickness measurement	28	ELL EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 5pcs/lot
		Macro inspection		MAC EQ	Visual check	Check when running			All, 10pcs/lot
		Passivation inline photo		Exposure & PR condition	Visual check	Check when running		1time/day	
		ADI	29	ADI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Macro/Micro inspection	30	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Hard bake		Harder condition	Visual check	Check when running		1time/day	
		SiNx dry etching & ashing		Etchant condition	Visual check	Check when running		1time/day	
		PR stripper		Stripper condition	Visual check	Check when running		1time/day	
		Thickness measurement	31	ELL EQ	SPC control	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		AEI	32	AEI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 6pcs/lot
Macro/Micro inspection	33	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 4pcs/lot	1lot/5lot, 4pcs/lot		
ITO Layer		Clean before deposition		Clean condition	Visual check	Check when running		1time/day	
		ITO target input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		ITO deposition		Deposition condition	Visual check	Check when running		1time/day	
		Thickness and transmission ratio Measurement	34	SPR EQ	SPC control	According to process Spec	✓	1lot/day, 4pcs/lot	4pcs/day
		RS meter	35	RSM EQ	SPC control	According to process Spec	✓	1lot/day, 4pcs/lot	4pcs/day
		Anneal		Anneal condition	Visual check	Check when running		1time/day	
		Transmission ratio Measurement	36	SPR EQ	SPC control	According to process Spec	✓	1lot/day, 4pcs/lot	4pcs/day
		Macro inspection		MAC EQ	Visual check	Check when running			All, 10pcs/lot
		ITO inline photo		Exposure & PR condition	Visual check	Check when running		1time/day	
		After develop CD/overlay	37	CDC EQ	SPC control	According to process Spec	✓	1lot/10lot, 2pcs/lot	All, 2pcs/lot
		ADI	38	ADI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		Macro/Micro inspection	39	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 4pcs/lot	1lot/5lot, 4pcs/lot
		ITO etchant input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		ITO wet etching		Etchant condition	Visual check	Check when running		1time/day	
		PR stripper		Stripper condition	Visual check	Check when running		1time/day	
AEI	40	AEI EQ	Auto optical inspection	According to process Spec	✓	1lot/10lot, 4pcs/lot	1lot/5lot, 4pcs/lot		
Macro/Micro inspection	41	MIC EQ	Visual check	Check when running	✓	1lot/15lot, 3pcs/lot	All, 3pcs/lot		
Test		Clean before anneal		Clean condition	Visual check	Check when running		1time/day	
		Anneal		Anneal condition	Visual check	Check when running		1time/day	
		Total pitch	42	CDC EQ	SPC control	According to process Spec	✓	1lot/14lot, 1pcs/lot	1lot/7lot, 1pcs/lot
		Array test	43	ART	Electrical test	Check when running	✓	All	
		TEG test	44	TEG	SPC control	According to process Spec	✓	1lot/20lot, 1pcs/lot	1lot/5lot, 5pcs/lot

- ← 投入物料
- 作业工程
- 检查工程
- SPC管控

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10.2 Cell QC Flow Chart

Cell QC Flow Chart

Layer	Process chart			Operation description	PQC check list					Online sampling rate	
	Input	Main process	Test & Inspection		No.	Content	Check method	Determine method	Frequency		
									First sampling		Sampling rate
Clean				TFT input		Array production	Practical check	According to material Spec		All	
				CF input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Cleaner input		Refer material (Name, Amount, Lot No.)	Visual check	According to material Spec		All	
				CF initial clean		Clean condition (flux, temperature, pressure)	Visual check	Check when running		1time/day	
				CF AOI	1	AOI EQ	Auto optical inspection	According to process Spec	√	1lot/5lot, 4pcs/lot	
				CF total pitch	2	CDC EQ	SPC control	According to process Spec	√	1lot/5lot, 4pcs/lot	
TFT/CF PI				PI input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Clean before PI print		Clean condition (flux, temperature, pressure)	Visual check	Check when running		1time/day	
				PI print		Coating condition (PI drop quantity, running condition)	Visual check	Check when running		1time/day	
				Pre-cure		Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
				PI inspection	3	AOI EQ	Auto optical inspection	According to process Spec	√	All, 2pcs/lot	All, 2pcs/lot
				Macro inspection	4	MAC EQ	Visual check	Check when running	√	1lot/week, 3pcs/lot	3pcs/week
				Main-cure		Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
				PI thickness measurement	5	ELL EQ	SPC control	According to process Spec	√	1lot/5lot, 4pcs/lot	
TFT/CF Rubbing				PI shift position check	6	CDC EQ	SPC control	According to process Spec	√	1lot/5lot, 4pcs/lot	
				Rubbing cloth input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Rubbing		Rubbing condition	Visual check	Check when running		1time/day	
				Rubbing inspection		Rubbing check	Visual check	According to process Spec	√	All, 1pcs/lot	All, 1pcs/lot
TFT PHS				ESD measurement	7	ESD measurement	SPC control	According to process Spec	√	All, 1pcs/lot	All, 1pcs/lot
				Clean after rubbing		Clean condition (flux, temperature, pressure)	Visual check	Check when running		1time/day	
				Spacer input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Spacer spray		Dispense condition	Visual check	Check when running		1time/day	
				Spacer count	8	Spacer counter EQ	SPC control	According to process Spec	√	All	All
				Spacer agglomeration remove		Stripper condition	Visual check	Check when running		1time/day	
				Spacer cure		Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
				USC		Clean condition (flux, pressure, coating position)	Visual check	Check when running		1time/day	
				Sealant input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
				Short spacer input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		Short dispense		Coating condition (pressure, coating position)	Visual check	Check when running		1time/day			

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CF ODF		Clean after rubbing		Clean condition (flux, temperature, pressure)	Visual check	Check when running		1time/day	
		Sealant spacer input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		Sealant dispense		Coating condition (pressure, coating position)	Visual check				
		Seal inspection	9	Gluewater quantity before assembly	SPC control	According to process Spec	/	All	
		USC		Cleaning condition (flux, pressure, coating position)	Visual check	Check when running		1time/day	
		Liquid crystal input		Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
		LC dispense		Running condition (pressure)	Visual check	Check when running		1time/day	
		TFT/CF vacuum assembly		Assembly condition (pressure)	Visual check	Check when running		1time/day	
		UV cure		Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
		后工段		Mis-alignment check	10	MA check	SPC control	According to process Spec	/
Seal Oven				Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
Visual check	11			Visual check EQ	Visual check	Check when running	/	All	All
Cell gas measurement	12			Cell thickness measurement EQ	SPC control	According to process Spec	/	All	All
First 1/4(1/6)Sheet Cutting				Running condition (pressure, speed)	Visual check	Check when running		1time/day	
Visual check	13			Visual check EQ	Visual check	Check when running	/	All	
Sheet electrical measurement	14			VIN electrical measurement EQ	Electrical test	According to process Spec	/	1lot/15lot, 4pcs/lot	
Stick Cutting				Running condition (pressure, speed)	Visual check	Check when running		1time/day	
Visual check	15			MSR Visual check EQ	Visual check	Check when running	/	All	
Stick electrical measurement	16			VIN electrical measurement EQ	Electrical test	According to process Spec	/	1lot/15lot, 4pcs/lot	
Third Cell Cutting				Running condition (pressure, speed)	Visual check	Check when running		1time/day	
Visual check	17			Visual check EQ	Visual check	Check when running	/	All	
Cutting & outside size accuracy measurement	18			Measurement EQ	SPC control	According to process Spec	/	1lot/15lot, 4pcs/lot	
Bend intensity check	19			Inspection EQ	SPC control	According to process Spec	/	1lot/15lot, 4pcs/lot	
Cell Electrical measurement	20			VIN electrical measurement EQ	Electrical test	According to process Spec	/	1lot/15lot, 4pcs/lot	
Edge Grind				Running condition (pressure, flux)	Visual check	According to process Spec		1time/day	
Dipping clean				Clean condition (flux, pressure, coating position)	Visual check	According to material Spec		All	
Clean before Polarizer input				Clean condition (flux, pressure, coating position)	Practical check	Check when running		1time/day	
Polarizer input				Refer material (Name, Amount, Lot No.)	Practical check	According to material Spec		All	
Polarizer attach				Running condition (pressure, temperature)	Visual check	Check when running		1time/day	
Polarizer Inspection	21			Polarizer check EQ	Visual check	According to material Spec	/	All	
Auto Clave				Running condition (pressure, temperature, time)	Visual check	Check when running		1time/day	
Laser Trimmer		Laser output, moving speed	Visual check	Check when running		1time/day			
Gross Test	22	ET check EQ	Visual check	Check when running	/	All			

投入物料
○ 作业工程
□ 检查工程



10.3 Module QC Flow Chart

Module QC Flow Chart												
Layer	Project Line Chart			Operation Description	PQC Check List					On Line Sampling Rate		
	In Put	Main process	Test point		NO.	CONTENT	Check Method	Determinant Method	Frequency			
									Frist sampling		Sampling Rate	
Cleaning				Input cleaning	1	Refer Materiel (Name, Amounnt, Lot No) Glass Cleaning status	Affirm Matter Eye Check	According to materiel spec According to technics request	✓ -	Each Lot	All Lot	
				COG Bonding	COG (IC bonding)		COG Parameter Refer Materiel (Name, Amounnt, Lot No)	Field work check Affirm Matter	According to materiel spec According to materiel spec	✓ -	1time/2H	
Macro inspection					2	Bonding Precision&ACF Spacer status	Macro inspection	According to technics request	✓	1time/2H	All Lot	
					3	AOI Inspection	Macro inspection	According to technics request	✓	1time/2H	All Lot	
FOG Adhesive				ACF Adhesive		Refer Materiel (Name, Amounnt, Lot No)	Field work check	According to materiel spec				
				FPC Bonding		Refer Materiel (Name, Amounnt, Lot No)	Field work check	According to materiel spec				
				Macro inspection	4	Bonding Precision	Affirm Matter	According to technics request	✓	1time/4H	All Lot	
					5	ACF Spacer status	Affirm Matter	According to technics request	✓	1time/4H	All Lot	
					6	Pull testing	testing	According to technics request	✓	1time/4H	All Lot	
				Elec inspection	7	Elec testing Condition Product inspection	Fieldwork check testing	According to Work instructor According to materiel spec	✓ ✓	Each Lot GB2828	All Lot	
					UV Glue		Refer Materiel (Name, Amounnt, Lot No) Process	Affirm Matter Affirm Matter	According to materiel spec According to Work instructor	✓ -	1time/2H	All Lot
Polarizer Adhesive	Macro inspection		Refer Materiel (Name, Amounnt, Lot No) Adhesive Precision Apperance inspection	Affirm Matter Eye Check Eye Check		According to materiel spec According to technics request According to quality determinant	✓ - -	Each Lot Each Lot	All Lot All Lot			
	Ass'y	B/L Assembly		Screen inspection Refer Materiel (Name, Amounnt, Lot No)	testing Fieldwork check	According to technics request According to materiel spec	✓ -	Each Lot	All Lot			
			B/L Assembly status	Fieldwork check	According to quality determinant	✓						
B/L soldering E/T			B/L soldering status Elec test condition	testing testing	According to quality determinant According to Work instructor	✓ ✓	GB2828	All Lot				
		9	Refer Materiel (Name, Amounnt, Lot No)	Fieldwork check	According to materiel spec							
Touch Panel Adhesive			Refer Materiel (Name, Amounnt, Lot No)	Fieldwork check	According to materiel spec	✓						
Aging&Insp	Inspection		Apperance inspection Elec testing condition Product Elec Inspection	Eye Check Fieldwork check testing	According to quality determinant According to Work instructor According to quality determinant	✓ ✓ ✓	GB2828 GB2828	All Lot All Lot				
		10										
Packin g	Boxing		Boxing Spec Boxing Apperance status	Fieldwork check Eye Check	According to Work instructor According to quality determinant	✓ -	Each Lot	All Lot				
11												

← In Put Materiel
 ○ Operation Project
 □ Inspection Project



11 Outgoing Inspection Report

	OQC成品出货检验报告 OUTGOING INSPECTION REPORT
--	--

物料名称 Model NO		检查日期 Check Date		出货数量 Outgoing Numbers	
客户 Customer P/N		订单号 Order NO		结果 Result	[]OK []NG
供应商 Supplier P/N		<input type="checkbox"/> 正常检查 Normal Inspection <input type="checkbox"/> 放宽检查 Reduced Inspection <input type="checkbox"/> 加严检查 Tightened Inspection <input type="checkbox"/> 全数检查注 Total Inspection			

检查项目 Items of Inspection	规格标准 Standard	检验结果记录 Result
外观检查 Visual Inspection	TFT-LCD成品检验标准	[]OK []NG
电性检查 Functional Insepection	TFT-LCD成品检验标准	[]OK []NG
包装检查 Packaging Inspection	LCM产品内外包装质量检验规范	[]OK []NG

包装检查项目 Item of Packaging Inspection	
检查项目 Items of Inspection	检查结果记录 Result
1、外包装箱外观是否清洁、平整、无明显破损、变形。	[]OK []NG
2、外包装箱字迹图案是否正确、清晰。	[]OK []NG
3、出货数量是否与出货通知单一致。	[]OK []NG
4、出货包装方式是否与包装式样书规范一致。	[]OK []NG

备注:

OQC Prepared	Check	Approved

FM05700604 Rev1.1

Note: This Outgoing Inspection Report is suitable for all lot of modules.

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13 Incoming Inspection Standard

13.1 Scope

The incoming inspection standards shall be applied to TFT-LCD Modules (hereinafter called "Modules") that supplied by Shanghai Tianma Micro-Electronics Corporation.

13.2 Incoming Inspection

This item is only reference for PCC.

13.3 Inspection Sampling Method

13.3.1. Lot size : Quantity per shipment lot per model

13.3.2. Sampling type: Normal inspection, Single sampling

13.3.3. Inspection level: II

13.3.4. Sampling table : MIL-STD-105D

13.3.5. Acceptable quality level (AQL)

Major defect : AQL=0.65

Minor defect: AQL=1.00

13.4 Inspection Conditions

13.4.1 Ambient Conditions:

- a. Temperature: Room temperature $25\pm 5^{\circ}\text{C}$
- b. Humidity: $(60\pm 10)\% \text{RH}$
- c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)

13.4.2 Viewing Distance

The distance between the LCD and the inspector's eyes shall be at least 35 ± 5 cm.

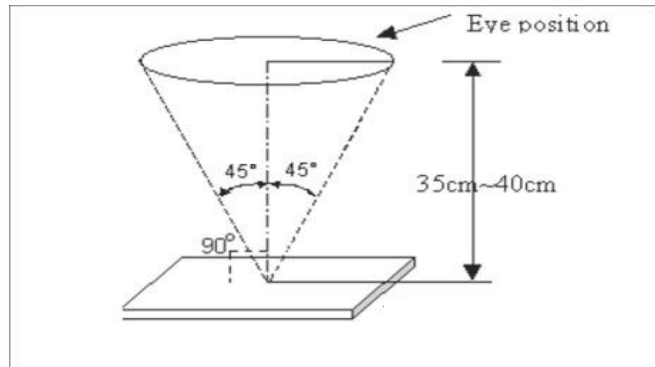
13.4.3 Viewing Angle

U/D: $45^{\circ}/45^{\circ}$, L/R: $45^{\circ}/45^{\circ}$



13.5 Inspection Criteria

Defects are classified as major defects and minor defects according to the degree of defectiveness defined herein.



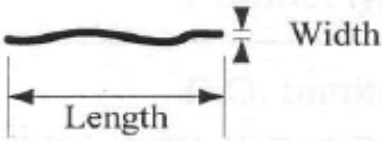
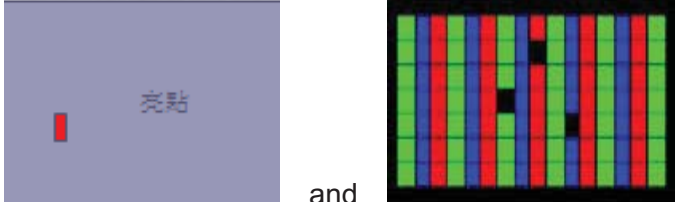
13.5.1 Major Defect

Item No	Items to be inspected	Inspection Standard
a	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
b	missing	Missing function component
c	Crack	Glass Crack

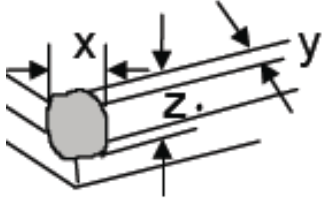
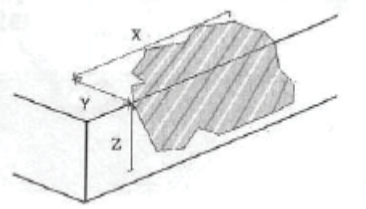
13.5.2 Minor Defect

Item No	Items to be inspected	Inspection standard	
a	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $\varphi = (x+y) / 2$	
		Size φ (mm)	Acceptable Quantity
		$\varphi \leq 0.10$	Ignore
		$0.10 < \varphi \leq 0.20$	3



		$0.20 < \varphi$	Not allowed
b	Line defect Including black line white line and Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.02$	Ignore
		$0.02 < W \leq 0.05$ $L \leq 3.0$	2
		$0.05 < W$	Follow 5.2.1
c	Polarizer Dent/Bubble	Size φ (mm)	Acceptable Quantity
		$\varphi \leq 0.2$	Ignore
		$0.2 < \varphi \leq 0.3$	2
		$0.3 < \varphi \leq 0.5$	1
		$0.5 < \varphi$	Not allowed
		Total QTY	3
d	Electrical Dot Defect	Bright and Black dot define: 	
		Inspection pattern: Full white、Full black、Red、green and blue screens	
		Item	Acceptable Quantity
		Black dot defect	2
		Bright dot defect	0
Total Dot	2		



e	Glass defect		
		1. Corner Fragment:	
		Size(mm)	Acceptable Quantity
		$X \leq 3\text{mm}$ $Y \leq 3\text{mm}$ $Z \leq T$	Ignore T : Glass thickness X: Length Y: Width Z: thickness
			
		2. Side Fragment:	
Size(mm)	Acceptable Quantity		
$X \leq 5.0\text{mm}$ $Y \leq 1\text{mm}$ $Z \leq T$	Ignore T : Glass thickness X: Length Y: Width Z: thickness		

- Note: 1. Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.
2. The distance between two bright dot defects (red, green, blue, and white) should be larger than 15mm.
3. The distance between black dot defects or black and bright dot defects should be more than 5mm apart.
4. Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.
5. Incoming Inspection standard the same as Outgoing inspection standard.

13.6 Mechanics Specification

As for the outside dimension, weight of the modules, please refer to product specification for more details



13.7 Precaution

Please pay attention to the following items when you use the LCD Modules:

- 13.7.1 Do not twist or bend the module and prevent the unsuitable external force for display module during assembly.
- 13.7.2 Adopt measures for good heat radiation. Be sure to use the module with in the specified temperature.
- 13.7.3 Avoid dust or oil mist during assembly.
- 13.7.4 Following the correct power sequence while operating. Do not apply the invalid signal, otherwise, it will cause improper shut down and damage the module.
- 13.7.5 Less EMI: it will be more safety and less noise.
- 13.7.6 Please operate module in suitable temperature. The response time & brightness will drift by different temperature.
- 13.7.7 Avoid to display the fixed pattern (exclude the white pattern) in a long period, otherwise, it will cause image stains.
- 13.7.8 Be sure to turn off the power when connection of disconnecting the circuit.
- 13.7.9 Polarizer scratches easily, please handle it carefully.
- 13.7.10 Display surface never likes dirt of stains.
- 13.7.11 A dew drop may lead to destruction. Please wipe off and moisture before using module.
- 13.7.12 Sudden temperature changes cause condensation, and it will cause Polarizer damaged.
- 13.7.13 High temperature and humidity may degrade performance. Please do not expose the module to the direct sunlight and so on.
- 13.7.14 Acetic acid or chlorine compounds are not friends with TFT display module.
- 13.7.15 Static electricity will damage the module, please do not touch the module without any ground device
- 13.7.16 Do not disassemble and reassemble the module by self.
- 13.7.17 Be careful do not touch the rear side directly.
- 13.7.18 Not strong vibration or shock. It will cause module broken.
- 13.7.19 Storage the modules in suitable environment with regular packing.
- 13.7.20 Be careful or injury from a broken display module.
- 13.7.21 Please avoid the pressure adding to the surface (front or rear side) of modules, because it will cause the display non-uniformity of other function issue.



14 Precautions For Use of LCD Modules

Handling Precautions

The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol、
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

Do not attempt to disassemble the LCD Module.

If the logic circuit power is off, do not apply the input signals.

To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

Be sure to ground the body when handling the LCD Modules.

Tools required for assembly, such as soldering irons, must be properly ground.

To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

Storage precautions

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

The LCD modules should be stored in the room without acid, alkali and harmful gas.

Transportation Precautions:

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.



New Product Development Document

 DR0 DR1 DR2 DR3 DR4 DR5

Product Model: TM035KDH05-20
Document Name: ES TEST REPORT-V1.0

Prepared by	Checked by	Approved by
Lu Kai 09.01.13	Yu Jiangli 09.01.13	Yu Jiangli 09.01.13



Test purpose : ES reliability tests in New Product Development

	No.	Test Item	Qty	Test Condition	Conclusion	Page	Issue
	1	Optical Characteristic Measuremen	15	Normal Temperature and Humidity	PASS	2	-
Reliability Test	2	High Temperature and Humidity	5	Ta=+60°C,90% RH max,240hours	PASS	3	-
	3	Thermal Shock (non-operation)	5	Ta=-30°C~70°C,30min,change time:5 min 30cycle.	PASS	4	-
	4	Low Temperature Operation	5	Ta=-20°C,240hrs	PASS	5	-
	5	Low Temperature Storage	5	Ta=-30°C,240hrs	PASS	6	-
	6	High Temperature Operation	5	Ts=+60°C,240hrs	PASS	7	-
	7	High Temperature Storage	5	Ta=+70°C,240hrs	PASS	8	-
	Mechanical Test	8	Vibration Test	128	Sine Wave Frequency Range:10~55Hz,Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2hours for each direction of X.Y.Z(6 hours for total)	PASS	9
9		Package Drop Test	128	Hight:Bottom and Prism 90cm corner side top 75cm 1corner,3edges,6 surfaces	PASS	10	-
10		ESD Test	4	Contact:±4KV,Air:±15KV;150pF/330Ω	PASS	11	-
Conclusion	PASS						

Problem list

ISSUE No.	Test Item	Content
		NA

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Optical Inspection

Test purpose

Evaluation of the LCD module's optical properties in accordance with the design specification

Test condition

Room Temp&Humi.Dark Room

Test Equipment

- 1、Conoscope,BM-7A,SR-3A,3-axis
- 2、Pattern Generator:ITES,51 Board
- 3、DC power, Oscilloscope

Optical Measurement Result

	Chromaticity								Luminance		Uniformity	Contrast	Cross Talk				Viewing Angle(CR>10)				
	Wx	Wy	Rx	Ry	Gx	Gy	Bx	By	White	Black	9 pts		Up	Down	Left	Right	Top	Bottom	Left	Right	
Spec.	Max	0.360	0.383	0.674	0.418	0.400	0.600	0.193	0.169	--	--	--	--	1.20%	1.20%	1.20%	1.20%	--	--	--	--
	Typ	0.310	0.333	0.624	0.368	0.350	0.550	0.143	0.119	420	--	80	350	--	--	--	--	40	60	60	60
	Min	0.260	0.283	0.574	0.318	0.300	0.500	0.093	0.089	350	--	75	200	--	--	--	--	30	50	50	50
Measured Result	Max	0.294	0.323	0.613	0.368	0.341	0.593	0.152	0.102	557.0	0.72	90.9	867.5	0.48%	0.50%	1.15%	1.06%	65	80	80	80
	Avg	0.290	0.315	0.610	0.367	0.340	0.588	0.152	0.098	520.3	0.63	87.5	822.6	0.26%	0.25%	0.98%	0.91%	65	80	80	80
	Min	0.283	0.304	0.606	0.366	0.338	0.580	0.151	0.093	464.7	0.56	82.8	741.5	0.03%	0.04%	0.60%	0.58%	65	80	80	80
	1#	0.283	0.304	0.606	0.366	0.338	0.585	0.152	0.095	506.9	0.63	89.1	804.6	0.15%	0.17%	0.62%	0.60%	65	80	80	80
	2#	0.287	0.310	0.612	0.368	0.340	0.592	0.151	0.099	533.1	0.69	85.4	772.6	0.26%	0.39%	1.06%	0.90%	65	80	80	80
	3#	0.287	0.309	0.611	0.367	0.339	0.591	0.151	0.093	511.8	0.59	89.0	867.5	0.29%	0.50%	1.10%	1.04%	65	80	80	80
	4#	0.287	0.312	0.608	0.366	0.339	0.588	0.152	0.098	533.9	0.72	83.3	741.5	0.30%	0.16%	1.02%	1.01%	65	80	80	80
	5#	0.291	0.317	0.609	0.368	0.340	0.590	0.152	0.098	533.5	0.66	90.2	808.3	0.40%	0.26%	1.08%	0.86%	65	80	80	80
	6#	0.294	0.323	0.612	0.367	0.340	0.593	0.152	0.101	520.3	0.62	90.4	839.2	0.48%	0.41%	1.06%	0.99%	65	80	80	80
	7#	0.286	0.307	0.610	0.366	0.339	0.588	0.152	0.095	464.7	0.56	88.3	829.8	0.39%	0.22%	1.02%	0.96%	65	80	80	80
	8#	0.291	0.316	0.610	0.366	0.341	0.582	0.152	0.098	531.8	0.65	88.8	818.2	0.07%	0.23%	1.03%	0.58%	65	80	80	80
	9#	0.294	0.322	0.610	0.368	0.341	0.590	0.151	0.102	517.4	0.63	86.3	821.3	0.15%	0.15%	1.13%	1.03%	65	80	80	80
	10#	0.293	0.323	0.612	0.367	0.341	0.584	0.152	0.100	527.1	0.61	90.9	864.1	0.35%	0.35%	1.04%	0.89%	65	80	80	80
	11#	0.292	0.314	0.610	0.367	0.341	0.590	0.151	0.098	520.5	0.62	88.7	839.5	0.18%	0.16%	1.09%	0.96%	65	80	80	80
	12#	0.290	0.314	0.610	0.367	0.339	0.591	0.152	0.097	502.0	0.58	84.3	865.5	0.34%	0.14%	0.77%	1.06%	65	80	80	80
13#	0.289	0.313	0.610	0.367	0.340	0.580	0.151	0.095	516.4	0.63	85.5	819.7	0.35%	0.39%	0.80%	1.02%	65	80	80	80	
14#	0.288	0.313	0.610	0.367	0.339	0.590	0.152	0.099	557.0	0.70	82.8	795.7	0.03%	0.04%	0.96%	0.88%	65	80	80	80	
15#	0.294	0.322	0.613	0.368	0.341	0.592	0.151	0.099	528.0	0.62	89.7	851.6	0.21%	0.15%	1.15%	0.83%	65	80	80	80	

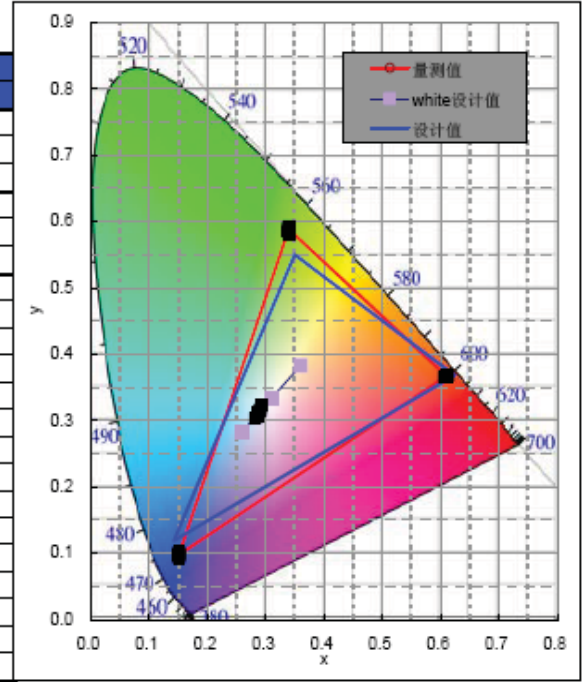
Problem list

ISSUE NO.	Content
	NA

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		White		Red		Green		Blue	
		x	y	x	y	x	y	x	y
Spec	Max	0.360	0.383	0.674	0.418	0.400	0.600	0.193	0.169
	Typ	0.310	0.333	0.624	0.368	0.350	0.550	0.143	0.119
	Min	0.260	0.283	0.574	0.318	0.300	0.500	0.093	0.069
Measure	Max	0.294	0.323	0.613	0.368	0.341	0.593	0.152	0.102
	Average	0.290	0.315	0.610	0.367	0.340	0.588	0.152	0.098
	Min	0.283	0.304	0.606	0.366	0.338	0.580	0.151	0.093
	#1	0.283	0.304	0.606	0.366	0.338	0.585	0.152	0.095
	#2	0.287	0.310	0.612	0.368	0.340	0.592	0.151	0.099
	#3	0.287	0.309	0.611	0.367	0.339	0.591	0.151	0.093
	#4	0.287	0.312	0.608	0.366	0.339	0.588	0.152	0.098
	#5	0.291	0.317	0.609	0.368	0.340	0.590	0.152	0.098
	#6	0.294	0.323	0.612	0.367	0.340	0.593	0.152	0.101
	#7	0.286	0.307	0.610	0.366	0.339	0.588	0.152	0.095
	#8	0.291	0.316	0.610	0.366	0.341	0.582	0.152	0.098
	#9	0.294	0.322	0.610	0.368	0.341	0.590	0.151	0.102
	#10	0.293	0.323	0.612	0.367	0.341	0.584	0.152	0.100
	#11	0.292	0.314	0.610	0.367	0.341	0.590	0.151	0.096
	#12	0.290	0.314	0.610	0.367	0.339	0.591	0.152	0.097
#13	0.289	0.313	0.610	0.367	0.340	0.580	0.151	0.095	
#14	0.288	0.313	0.610	0.367	0.339	0.590	0.152	0.099	
#15	0.294	0.322	0.613	0.368	0.341	0.592	0.151	0.099	



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High Temperature high humidity Test

Test purpose

Evaluation of the LCD module's optical properties in accordance with the design specification after High Temp&Humi Test

Test Condition

Ta=+60℃,90% RH max,240hours

Test Equipment

- 1、Nieoexy stage,BM-7A,SR-3,CONOSCOPE
- 2、 Pattern Generator:ITES
- 3、 DC power
- 4、 Reactor :KTHD-515TBS

	Before RA					After RA					Δ	Judgement	NOTE	
	1#	2#	3#	4#	5#	1#	2#	3#	4#	5#				
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	/	OK	-	
Picture quality	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	/	OK	-	
luminance	Black	0.63	0.69	0.59	0.72	0.66	0.58	0.65	0.58	0.66	0.62	0.06	OK	-
	White	506.9	533.1	511.8	533.9	533.5	483.0	523.8	509.3	526.6	534.0	4.71%	OK	-
Chromaticity	Wx	0.283	0.287	0.287	0.287	0.291	0.280	0.282	0.282	0.283	0.288	0.006	OK	-
	Wy	0.304	0.310	0.309	0.312	0.317	0.295	0.297	0.297	0.301	0.309	0.013	OK	-
	Rx	0.606	0.612	0.611	0.608	0.609	0.606	0.609	0.610	0.608	0.609	/	Ref.	-
	Ry	0.366	0.368	0.367	0.366	0.368	0.365	0.365	0.366	0.365	0.367			
	Gx	0.338	0.340	0.339	0.339	0.340	0.339	0.338	0.339	0.339	0.340			
	Gy	0.585	0.592	0.591	0.588	0.590	0.583	0.588	0.589	0.586	0.589			
	Bx	0.152	0.151	0.151	0.152	0.152	0.152	0.152	0.152	0.152	0.152			
By	0.095	0.099	0.093	0.098	0.098	0.091	0.090	0.087	0.093	0.094				
Contrast Ratio(Lw/Lb)	804.6	772.6	867.5	741.5	808.3	832.8	805.8	878.1	797.9	861.3	/			
Crosstalk	Top	0.15%	0.26%	0.29%	0.30%	0.40%	0.29%	0.03%	0.26%	0.11%	0.31%	0.23%	OK	-
	Bottom	0.17%	0.39%	0.50%	0.16%	0.26%	0.23%	0.78%	0.04%	0.29%	1.20%	0.94%		
	Left	0.62%	1.06%	1.10%	1.02%	1.08%	0.50%	0.72%	0.89%	0.70%	0.76%	0.34%		
	Right	0.60%	0.90%	1.04%	1.01%	0.86%	0.71%	0.74%	1.06%	0.98%	1.03%	0.17%		
View Angle (CR>10)	Top	65	65	65	65	65	68	63	63	64	66	3	OK	-
	Bottom	80	80	80	80	80	80	80	80	80	80	0		
	Left	80	80	80	80	80	80	80	80	80	80	0		
	Right	80	80	80	80	80	80	80	80	80	80	0		
UNIFORMITY	9Pts	89.1	85.4	89.0	83.3	90.2	88.0	83.3	88.5	83.2	88.6	2.1	OK	-

Conclusion	PASS
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Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

Problem list

ISSUE No.	Content
	NA

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Thermal Shock Test

Test purpose

Evaluation of the LCD module's optical properties in accordance with the design specification after Thermal Shock.

Test Condition

Thermal Shock: -30°C~70°C,30min,change time:5 min 30cycles.

Test Equipment

- 1、Nieoexy stage,BM-7A,SR-3,CONOSCOPE
- 2、Pattern Generator:ITES,51 Board
- 3、DC power
- 4、Thermal Shock Reactor: KSKD-315TBS

	Before RA					After RA					Δ	Judgemen +	ISSUE	
	6#	7#	8#	9#	10#	6#	7#	8#	9#	10#				
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	/	OK	-	
Picture quality	OK	OK	OK	OK	OK	Butterfly mura(B)	Butterfly mura(B)	Butterfly mura(B)	Butterfly mura(B)	Butterfly mura(B)	/	OK	-	
luminance	Black	0.62	0.56	0.65	0.63	0.61	0.59	0.54	0.59	0.63	0.60	0.06	OK	-
	White	520.3	464.7	531.8	517.4	527.1	518.0	465.3	529.9	526.8	530.2	1.82%	OK	-
Chromaticity	Wx	0.294	0.286	0.291	0.294	0.293	0.295	0.288	0.293	0.296	0.294	0.002	OK	-
	Wy	0.323	0.307	0.316	0.322	0.323	0.325	0.309	0.319	0.325	0.322	0.003	OK	-
	Rx	0.612	0.610	0.610	0.610	0.612	0.612	0.611	0.611	0.611	0.613	/	Ref.	-
	Ry	0.367	0.366	0.366	0.368	0.367	0.367	0.367	0.367	0.368	0.367			
	Gx	0.340	0.339	0.341	0.341	0.341	0.341	0.340	0.342	0.342	0.342			
	Gy	0.593	0.588	0.582	0.590	0.584	0.593	0.588	0.583	0.590	0.584			
	Bx	0.152	0.152	0.152	0.151	0.152	0.152	0.152	0.152	0.151	0.152			
By	0.101	0.095	0.098	0.102	0.100	0.102	0.096	0.099	0.104	0.100				
Contrast Ratio(Lw/Lb)	839.2	829.8	818.2	821.3	864.1	878.0	861.7	898.1	836.2	883.7	/			
Crosstalk	Top	0.48%	0.39%	0.07%	0.15%	0.35%	0.04%	0.00%	0.18%	0.15%	0.16%	0.45%	OK	-
	Bottom	0.41%	0.22%	0.23%	0.15%	0.35%	0.19%	0.05%	0.31%	0.04%	0.31%	0.22%		
	Left	1.06%	1.02%	1.03%	1.13%	1.04%	1.05%	0.92%	0.83%	0.93%	1.19%	0.20%		
	Right	0.99%	0.95%	0.58%	1.03%	0.89%	1.15%	1.09%	1.17%	0.94%	1.03%	0.59%		
View Angle (CR>10)	Top	65	65	65	65	65	64	66	66	65	64	1	OK	-
	Bottom	80	80	80	80	80	68	71	70	69	73	12		
	Left	80	80	80	80	80	70	74	71	71	72	10		
	Right	80	80	80	80	80	75	77	80	75	77	5		
UNIFORMITY	9Pts	90.4	88.3	88.8	90.9	86.3	89.8	87.0	89.8	86.7	86.5	4.3	OK	-
Conclusion	PASS													

Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

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Low Temperature Operation Test

Test purpose

Evaluation of the LCD module's optical properties in accordance with the design specification after Low Temperature Operation.

Test Condition

Low Temperature operation: Ta=-20℃,240hrs

Test Equipment

- 1、Nieoee xy stage, BM-7A, SR-3, CONOSCOPE
- 2、Pattern Generator: ITES, 51 Board
- 3、DC power
- 4、Low Temperature Reactor: KTHE-515TBS

	Before RA					After RA					Δ	Judgement	ISSUE														
	11#	12#	13#	14#	15#	11#	12#	13#	14#	15#																	
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	/	OK	-														
Picture quality	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	/	OK	-														
luminance	Black	0.62	0.58	0.63	0.70	0.62	0.61	0.56	0.59	0.65	0.59	0.05	OK	-													
	White	520.5	502.0	516.4	557.0	528.0	520.0	481.7	507.1	533.5	512.7	4.22%	OK	-													
Chromaticity	Wx	0.292	0.290	0.289	0.288	0.294	0.285	0.284	0.285	0.283	0.288	0.007	OK	-													
	Wy	0.314	0.314	0.313	0.313	0.322	0.306	0.306	0.307	0.305	0.313	0.009	OK	-													
	Rx	0.610	0.610	0.610	0.610	0.613	0.609	0.609	0.609	0.609	0.611	/	Ref.	-													
	Ry	0.367	0.367	0.367	0.367	0.368	0.367	0.367	0.366	0.366	0.368																
	Gx	0.341	0.339	0.340	0.339	0.341	0.338	0.337	0.338	0.337	0.338																
	Gy	0.590	0.591	0.580	0.590	0.592	0.590	0.591	0.579	0.589	0.592																
	Bx	0.151	0.152	0.151	0.152	0.151	0.151	0.152	0.151	0.152	0.151																
	By	0.096	0.097	0.095	0.099	0.099	0.093	0.093	0.093	0.096	0.096																
Contrast Ratio(Lw/Lb)															839.5	865.5	819.7	795.7	851.6	852.5	860.2	859.5	820.8	869.0	/	OK	-
Crosstalk	Left	0.18%	0.34%	0.35%	0.03%	0.21%	0.18%	0.47%	0.29%	0.13%	0.14%				0.14%	OK	-										
	Right	0.16%	0.14%	0.39%	0.04%	0.15%	0.52%	0.71%	0.36%	0.04%	0.12%	0.57%															
	Top	1.09%	0.77%	0.60%	0.96%	1.15%	1.04%	0.32%	0.68%	0.94%	1.12%	0.46%															
	Bottom	0.95%	1.06%	1.02%	0.88%	0.83%	1.33%	0.20%	0.98%	0.10%	1.14%	0.86%															
View Angle (CR>10)	Top	65	65	65	65	65	64	66	64	66	66	1	OK	-													
	Bottom	80	80	80	80	80	80	80	80	80	80	0															
	Left	80	80	80	80	80	80	80	80	80	80	0															
	Right	80	80	80	80	80	80	80	80	80	80	0															
UNIFORMITY	9Pts	88.7	84.3	85.5	82.8	89.7	88.1	84.3	87.0	82.1	90.4	1.5	OK	-													

Conclusion	PASS
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Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

Problem list

ISSUE No.	Content
NA	

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Low Temperature Storage Test

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after Low Temperature Storage

Test condition

Low Temperature Storage: Ta=-30℃,240hrs

Test Equipment

- 1、Microscope
- 2、Pattern Generator:ITES,51 Board
- 3、Low Temperature Reactor: KTHD-415TBS

	Before RA					After RA					Judgement	NOTE
	16#	17#	18#	19#	20#	16#	17#	18#	19#	20#		
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	-
Conclusion	PASS											

Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

Problem list

ISSUE No.	Content
	NA



High Temperature Operation Test

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after High Temperature Storage.

Test Condition

High Temperature Operation:Ts=+60℃,240hrs

Test Equipment

- 1、Magnifier
- 2、Pattern Generator:ITES,51 Board
- 3、High Temperature Reactor: KTHD-415TBS

	Before RA					After RA					Judgement	NOTE
	21#	22#	23#	24#	25#	21#	22#	23#	24#	25#		
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	OK	-
Conclusion	PASS											

Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

Problem list

ISSUE No.	Content
	NA



High Temperature Storage Test

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after High Temperature Storage.

Test Condition

High Temperature Storage: Ta=+70°C, 240hrs

Test Equipment

- 1、Microscope
- 2、Pattern Generator: ITES, 51 Board
- 3、High Temperature Reactor: KTHD-415TBS

	Before RA					After RA					Judgement	NOTE
	26#	27#	28#	29#	30#	26#	27#	28#	29#	30#		
Appearance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	Butterfly mura(C)	OK	-

Conclusion	PASS											
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Firefly ,Butterfly mura Grade

A	B	C	D	E
Perfect	Good	Average	Minor Defect	Major Defect

Problem list

ISSUE No.	Content
NA	

**Vibration Test****Test purpose**

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after Vibration Test.

Test Condition

Sine Wave Frequency Range:10~55Hz,Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2hours for each direction of X.Y.Z(6 hours for total)

Test Equipment

Pattern Generator:ITES 51board

Vibration Equipment:SY-100

Test Record

Sample No.	Appearance		Electrical Test		Result
	Before Test	After Test	Before Test	After Test	
Sample 1	OK	OK	OK	OK	OK
Sample 2	OK	OK	OK	OK	OK
Sample 3	OK	OK	OK	OK	OK
...
Sample 38	OK	OK	OK	OK	OK
Sample 39	OK	OK	OK	OK	OK
Sample 40	OK	OK	OK	OK	OK
...
Sample 126	OK	OK	/	/	OK
Sample 127	OK	OK	/	/	OK
Sample 128	OK	OK	/	/	OK
Conclusion	PASS				

Problem list

ISSUE No.	Content
	NA

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Package Drop Test

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after Package Test.

Test Condition

Hight:Bottom and Prism 90cm corner side top 75cm 1corner,3edges,6 surfaces

Test Equipment

Pattern Generator:ITES 51board

Test Equipment:SY40-315

Test Record

Sample No.	Appearance		Electrical Test		Result
	Before Test	After Test	Before Test	After Test	
Sample 1	OK	OK	OK	OK	OK
Sample 2	OK	OK	OK	OK	OK
Sample 3	OK	OK	OK	OK	OK
...
Sample 38	OK	OK	OK	OK	OK
Sample 39	OK	OK	OK	OK	OK
Sample 40	OK	OK	OK	OK	OK
...
Sample 126	OK	OK	/	/	OK
Sample 127	OK	OK	/	/	OK
Sample 128	OK	OK	/	/	OK
Conclusion	PASS				

Problem list

ISSUE No.	Content
	NA

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ESD TEST

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after ESD test

Test Condition

Contact:±4KV,Air:±15KV;150pF/330Ω

Test Equipment

- 1、3C-TEST ESD-30
- 2、Pattern Generator:ITES

Test Record								
Test point								
Sample No.	Electronic static voltage							
Sample 40(contact)	2 kv	-2 kv	2.5kv	-2.5kv	3 kv	-3 kv	3.5kv	-3.5kv
	A	A	A	A	A	A	A	A
	4 kv	-4 kv	/	/	/	/	/	/
Sample 41(contact)	2 kv	-2 kv	2.5kv	-2.5kv	3 kv	-3 kv	3.5kv	-3.5kv
	A	A	A	A	A	A	A	A
	4 kv	-4 kv	/	/	/	/	/	/
Sample 42(Air)	4 kv	-4 kv	5kv	-5kv	6kv	-6 kv	7kv	-7kv
	A	A	A	A	A	A	A	A
	8kv	-8 kv	9kv	-9kv	10 kv	-10kv	11kv	-11kv
	A	B	B	B	B	D	B	B
	12kv	-12kv	13kv	-13kv	14kv	-14kv	15kv	-15kv
Sample 43(Air)	4 kv	-4 kv	5kv	-5kv	6kv	-6 kv	7kv	-7kv
	A	A	A	A	A	A	A	A
	8kv	-8 kv	9kv	-9kv	10 kv	-10kv	11kv	-11kv
	A	B	B	B	B	B	B	B
	12kv	-12kv	13kv	-13kv	14kv	-14kv	15kv	-15kv
Conclusion	B	B	B	B	B	B	B	B(OK)
	PASS							

备注 Remark	1.The criteria of judgement:
	A:No image defect after ESD test
	B:Image recovers itself automatically without re-sending image, toggling the RESET signal externally or power cycle
	C:Image cannot be re-sending image but can be recovered by toggling RESET signal externally
	D:Image can only be recovered by power cycle
E:Permanent Damage (ex: low contrast, flicker, etc) that cannot be recovered by power cycle	
3.The system ground is connect to mother earth	

Problem list	
ISSUE No.	Content
NA	

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New Product Development Document

 DR0 DR1 DR2 DR3 DR4 DR5Product Model: TM035KDH05-20Document Name: For PCC TEST REPORT-V1.0

Prepared by	Checked by	Approved by
Jiangli Yu 2009.01.23	Kai Lu 2009.01.23	Wenhui Yao 2009.01.23



High Temp&Humi Operation Test

Test Purpose

Evaluation of the LCD module's optical properties in accordance with the design specification after High Temp&Humi Operation Test

Test Condition

Ta=+40℃,90% RH max,72hours

Test Equipment

- 1、 Pattern Generator:51 demo
- 2、 DC power
- 3、 Reactor :KTHD-515TBS

Test Record					
Sample No.	Appearance		Electric Test		Result
	Before Test	After Test	Before Test	After Test	
Sample 1	OK	OK	OK	OK	OK
Sample 2	OK	OK	OK	OK	OK
Sample 3	OK	OK	OK	OK	OK
Sample 4	OK	OK	OK	OK	OK
Sample 5	OK	OK	OK	OK	OK
Sample 6	OK	OK	OK	OK	OK
Sample 7	OK	OK	OK	OK	OK
Sample 8	OK	OK	OK	OK	OK
Sample 9	OK	OK	OK	OK	OK
Sample 10	OK	OK	OK	OK	OK
Sample 11	OK	OK	OK	OK	OK
Sample 12	OK	OK	OK	OK	OK
Sample 13	OK	OK	OK	OK	OK
Sample 14	OK	OK	OK	OK	OK
Sample 15	OK	OK	OK	OK	OK
Sample 16	OK	OK	OK	OK	OK
Sample 17	OK	OK	OK	OK	OK
Sample 18	OK	OK	OK	OK	OK
Sample 19	OK	OK	OK	OK	OK
Sample 20	OK	OK	OK	OK	OK
Sample 21	OK	OK	OK	OK	OK
Sample 22	OK	OK	OK	OK	OK
Sample 23	OK	OK	OK	OK	OK
Sample 24	OK	OK	OK	OK	OK
Sample 25	OK	OK	OK	OK	OK
Sample 26	OK	OK	OK	OK	OK
Sample 27	OK	OK	OK	OK	OK
Sample 28	OK	OK	OK	OK	OK
Sample 29	OK	OK	OK	OK	OK
Sample 30	OK	OK	OK	OK	OK
Sample 31	OK	OK	OK	OK	OK
Sample 32	OK	OK	OK	OK	OK
Sample 33	OK	OK	OK	OK	OK
Sample 34	OK	OK	OK	OK	OK
Sample 35	OK	OK	OK	OK	OK
Sample 36	OK	OK	OK	OK	OK
Sample 37	OK	OK	OK	OK	OK
Sample 38	OK	OK	OK	OK	OK
Sample 39	OK	OK	OK	OK	OK
Sample 40	OK	OK	OK	OK	OK
Sample 41	OK	OK	OK	OK	OK
Sample 42	OK	OK	OK	OK	OK
Sample 43	OK	OK	OK	OK	OK
Sample 44	OK	OK	OK	OK	OK
Sample 45	OK	OK	OK	OK	OK
Sample 46	OK	OK	OK	OK	OK
Sample 47	OK	OK	OK	OK	OK
Sample 48	OK	OK	OK	OK	OK
Sample 49	OK	OK	OK	OK	OK

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Sample 50	OK	OK	OK	OK	OK
Sample 51	OK	OK	OK	OK	OK
Sample 52	OK	OK	OK	OK	OK
Sample 53	OK	OK	OK	OK	OK
Sample 54	OK	OK	OK	OK	OK
Sample 55	OK	OK	OK	OK	OK
Sample 56	OK	OK	OK	OK	OK
Sample 57	OK	OK	OK	OK	OK
Sample 58	OK	OK	OK	OK	OK
Sample 59	OK	OK	OK	OK	OK
Sample 60	OK	OK	OK	OK	OK
Sample 61	OK	OK	OK	OK	OK
Sample 62	OK	OK	OK	OK	OK
Sample 63	OK	OK	OK	OK	OK
Sample 64	OK	OK	OK	OK	OK
Sample 65	OK	OK	OK	OK	OK
Sample 66	OK	OK	OK	OK	OK
Sample 67	OK	OK	OK	OK	OK
Sample 68	OK	OK	OK	OK	OK
Sample 69	OK	OK	OK	OK	OK
Sample 70	OK	OK	OK	OK	OK
Sample 71	OK	OK	OK	OK	OK
Sample 72	OK	OK	OK	OK	OK
Sample 73	OK	OK	OK	OK	OK
Sample 74	OK	OK	OK	OK	OK
Sample 75	OK	OK	OK	OK	OK
Sample 76	OK	OK	OK	OK	OK
Sample 77	OK	OK	OK	OK	OK
Sample 78	OK	OK	OK	OK	OK
Sample 79	OK	OK	OK	OK	OK
Sample 80	OK	OK	OK	OK	OK
Sample 81	OK	OK	OK	OK	OK
Sample 82	OK	OK	OK	OK	OK
Sample 83	OK	OK	OK	OK	OK
Sample 84	OK	OK	OK	OK	OK
Sample 85	OK	OK	OK	OK	OK
Sample 86	OK	OK	OK	OK	OK
Sample 87	OK	OK	OK	OK	OK
Sample 88	OK	OK	OK	OK	OK
Sample 89	OK	OK	OK	OK	OK
Sample 90	OK	OK	OK	OK	OK
Sample 91	OK	OK	OK	OK	OK
Sample 92	OK	OK	OK	OK	OK
Sample 93	OK	OK	OK	OK	OK
Sample 94	OK	OK	OK	OK	OK
Sample 95	OK	OK	OK	OK	OK
Sample 96	OK	OK	OK	OK	OK
Sample 97	OK	OK	OK	OK	OK
Sample 98	OK	OK	OK	OK	OK
Sample 99	OK	OK	OK	OK	OK
Sample 100	OK	OK	OK	OK	OK
Conclusion	PASS				

Problem list	Content
ISSUE No.	
	NA

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New Product Development Document

 DR0 DR1 DR2 DR3 DR4 DR5

Product Model:

TM035KDH05-20

Document Name:

FPC Bending & Peeling
Test Report-V1.0

Prepared by	Checked by	Approved by
Tianhao Yao 09.02.26	Xiuyun Yang 09.02.26	Jiangli Yu 09.02.27



Test purpose : ES Reliability Tests in New Product Development

	No.	Test Item	Qty	Test Condition	Conclusion	Page	Issue
Module	1	Module FPC Bending Test	3	Bending Degree: 0°~90°~0°, total: 30cycle Heavy Laden: 500g	PASS	3	-
	2	Module FPC Bending Test	3	Bending Degree: 0°~180°~0°, total: 30cycle	PASS	4	-
Cell	3	Cell FPC Bending Test	3	Bending Degree: 0°~90°~0°, total: 30cycle Heavy Laden: 500g	PASS	5	-
	4	Cell FPC Peeling Test	3	Peeling Degree: 0°~90°~0°, total: 30cycle Heavy Laden: 500g	PASS	6	-
Appendix	Step of Test Item 1、 2、 3、 4					7~10	-
Conclusion	PASS						

Problem list

ISSUE No.	Test Item	Content
		NA

**Module FPC Bending Test****Test purpose**

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after FPC bending

Test condition

Bending Degree: 0°~90°~0°, total: 30cycle

Heavy Laden: 500g

Test step

Refer to Appendix 1

	Before RA			After RA			Judgement	NOTE
	1#	2#	3#	1#	2#	3#		
Appearance	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	OK	OK	-
Conclusion	PASS							

Problem list

ISSUE No.	Content
NA	

**Module FPC Bending Test**

Test purpose

Evaluation of the LCD module's appearance and picture quality in accordance with the specification after FPC bending

Test condition

Bending Degree: 0°~180°~0°, total: 30cycle

Test step

Refer to Appendix 2

	Before RA			After RA			Judgement	NOTE
	4#	5#	6#	4#	5#	6#		
Appearance	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	OK	OK	-
Conclusion	PASS							

Problem list

ISSUE No.	Content
NA	



Cell FPC Bending Test

Test purpose

Evaluation of the LCD cell's appearance and picture quality in accordance with the specification after FPC bending

Test condition

Bending Degree: 0°~90°~0°, total: 30cycle

Heavy Laden: 500g

Test step

Refer to Appendix 3

	Before RA			After RA			Judgement	NOTE
	1#	2#	3#	1#	2#	3#		
Appearance	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	OK	OK	-
Conclusion	PASS							

Problem list

ISSUE No.	Content
NA	



Cell FPC Peeling Test

Test purpose

Evaluation of the LCD cell's appearance and picture quality in accordance with the specification after FPC peeling

Test condition

Peeling Degree: 0°~90°~0°, total: 30cycle

Heavy Laden: 500g

Test step

Refer to Appendix 4

	Before RA			After RA			Judgement	NOTE
	4#	5#	6#	4#	5#	6#		
Appearance	OK	OK	OK	OK	OK	OK	OK	-
Picture quality	OK	OK	OK	OK	OK	OK	OK	-
Conclusion	PASS							

Problem list

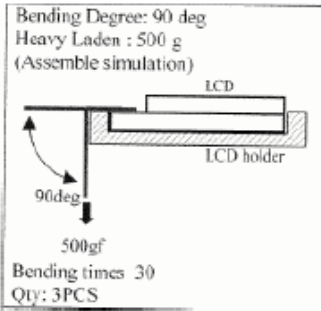
ISSUE No.	Content
NA	



Appendix 1

Test pattern

(1) Test condition



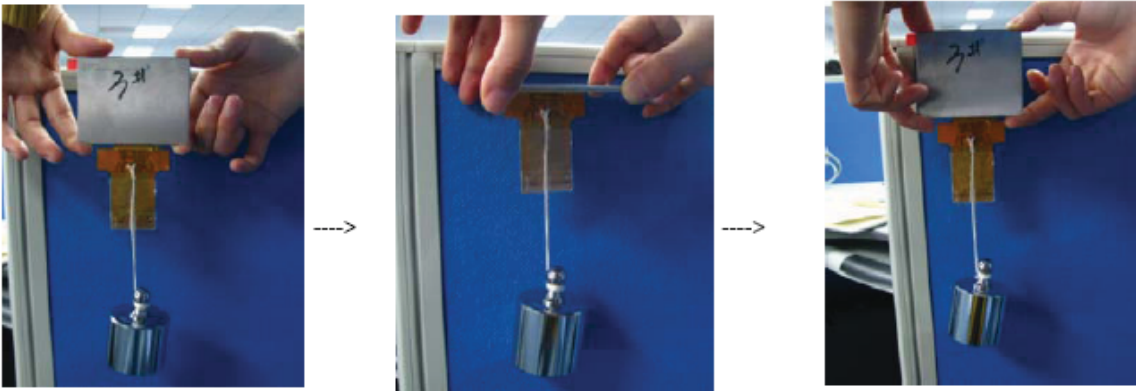
(2) 500g weights



(3) Before the test, inspect the image quality



(4) Start to test (0°~90°~0°, total: 30cycle)



(5) After the test, inspect the image quality

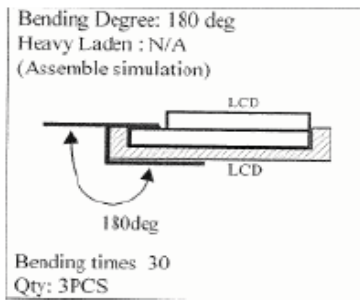




Appendix 2

Test pattern

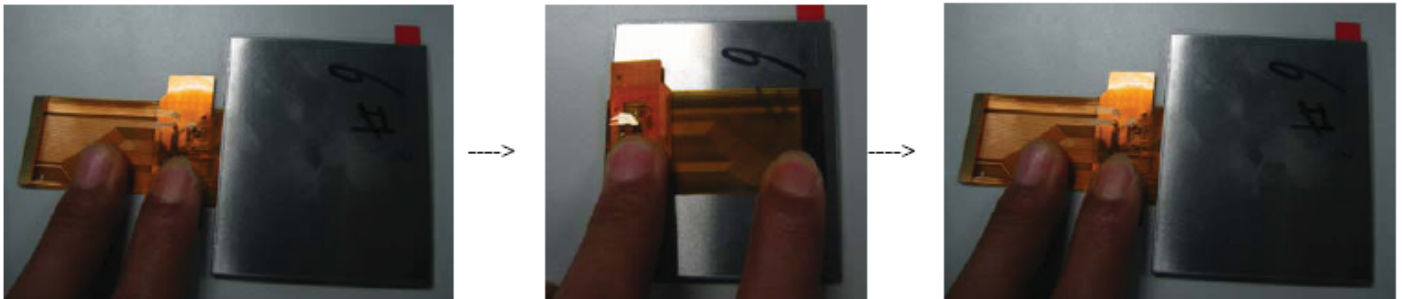
(1) Test condition



(3) Before the the test, inspect the image quality



(4) Start to test (0°~180°~0°, total: 30cycle)



(5) After the the test, inspect the image quality

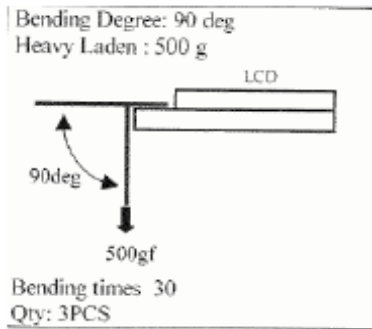




Appendix 3

Test pattern

(1) Test condition



(2) 500g weights



(3) Before the test, inspect the image quality:



(4) Start to test (0° ~90° ~0° , total: 30cycle)



(5) After the test, inspect the image quality

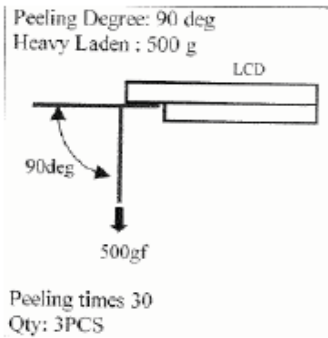




Appendix 4

Test pattern

(1) Test condition



(2) 500g weights



(3) Before the test, inspect the image quality



(4) Start to test (0° ~90° ~0° , total: 30cycle)



(5) After the test, inspect the image quality

