Reaper™ **Reaper International Co.,Ltd**

APPROVAL SHEET
承 认 书

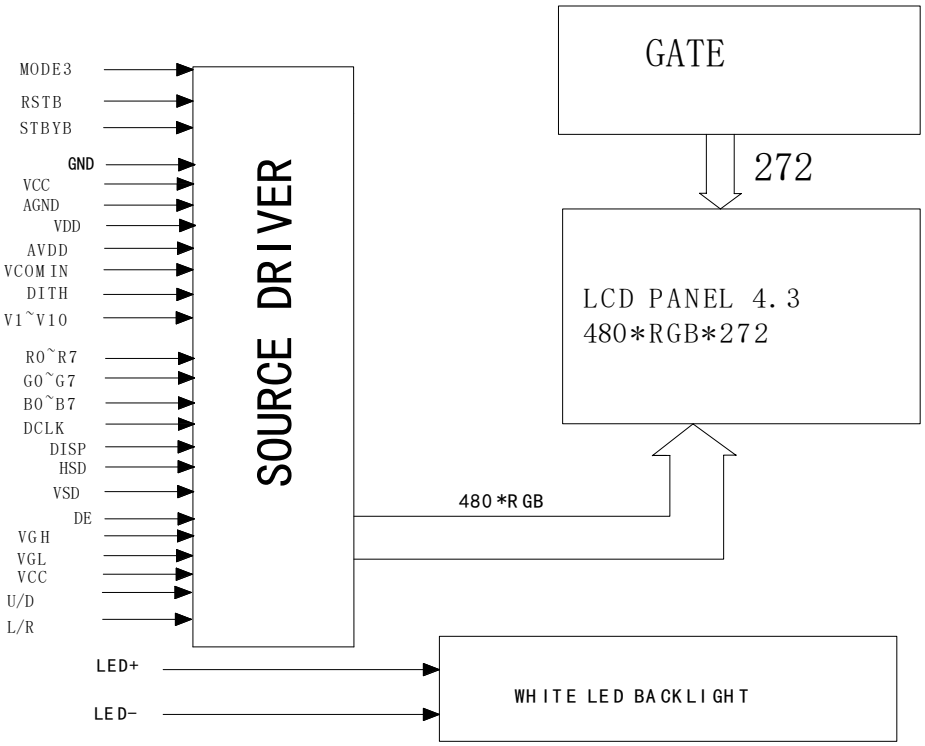
Customer 客户名称	
Part NO. 产品型号	RP04340B-V1 TN
Product type 产品内容	Mode: Transmissive type .Normally white. TFT LCD Module LCD Module: Graphic 480RGB*272Dot-matrix
Remarks 备注栏	☐APPROVAL FOR SEPCIFICATIONS ONLY ■APPROVAL FOR SEPCIFICATIONS AND SAMPLE
Signature by Customer: 客户确认签章	

Issued by	Checked by	Approved by
	Lr.Yin	GF.Zhang

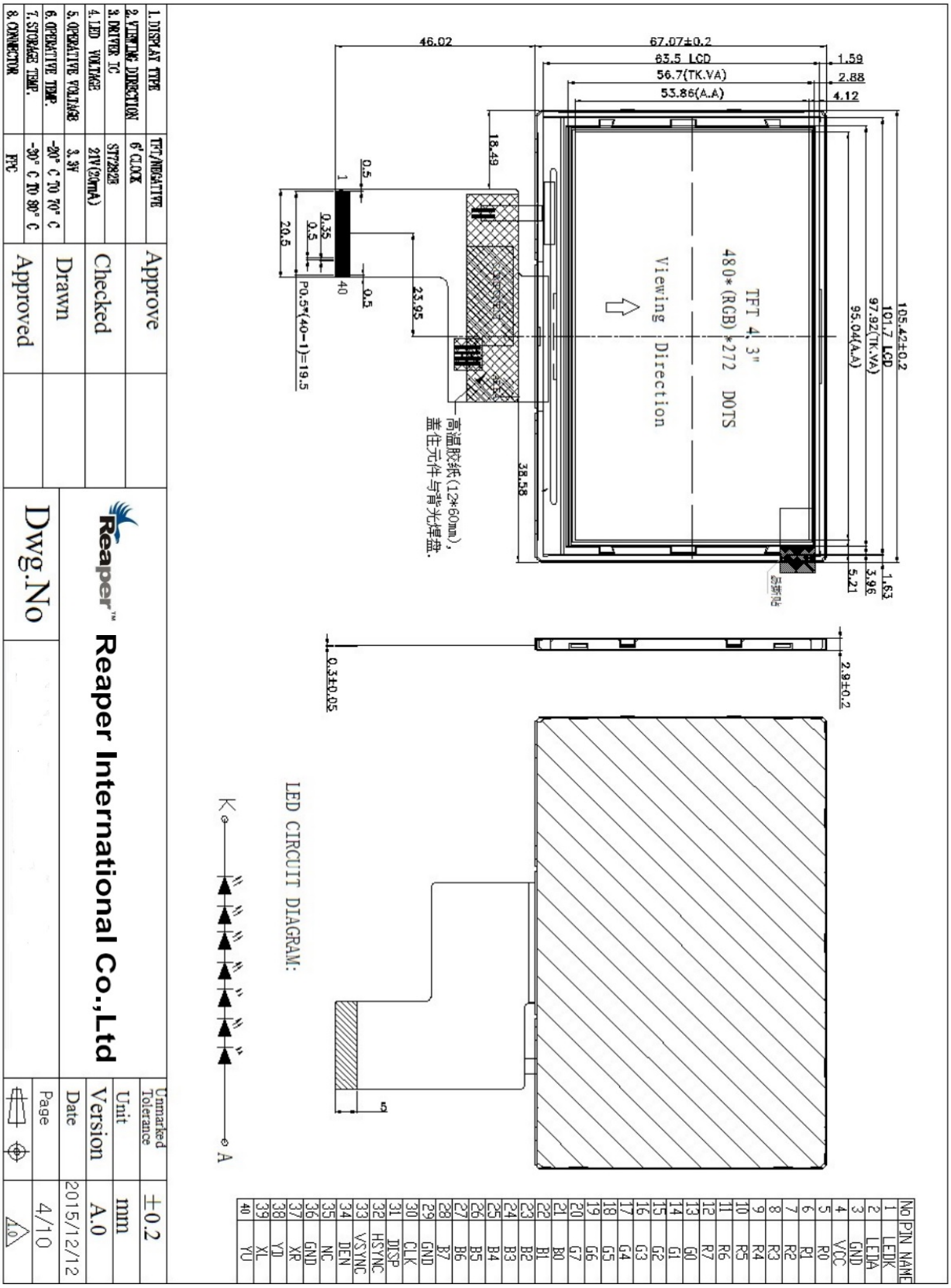
1. PHYSICAL DATA

Item	Contents	Unit
LCD type	TFT TRANSMISSIVE	---
Viewing direction	6	o'clock
Module size (W×H×T)	105.40 × 67.10 × 2.9	mm^3
Active area(W×H)	95.04×53.856	mm^2
Number of dots(W×H)	480(RGB) ×272	dots
Pixel Pitch(H×V)	0.198×0.198	mm
Driver IC	ST7282E	---
Colors	16.7M	---
Backlight Type	7 white leds Serial	---
Interface Type	Parallel RGB 24-BIT	---

2. BLOCK DIAGRAM



3. Mechanical Dimension



4. Pin Descriptions

Pin.No	Symbol	Function
1	LEDK	back light power supply negative
2	LEDA	back light power supply positive
3	GND	Ground
4	VCC	Power supply
5-12	R0-R7	Red Data
13-20	G0-G7	Green Data
21-28	B0-B7	Blue Data
29	GND	Ground
30	CLK	Colock signal
31	DISP	Display on/off
32	HSYNC	Horizontal sync input in RGB mode(short to GND if not used)
33	VSYNC	Vertical sync input in RGB mode(short to GND if not used)
34	DE	Data enable
35	NC	No Connection
36	GND	Ground
37	XR	touch panel X-right
38	YD	touch panel Y-bottom
39	XL	touch panel X-left
40	YU	touch panel Y-up

5. ABSOLUTE MAXIMUM RATINGS

5.1 (GND=AGND=0V)

Parameter	Symbol	Min	Max	Unit
Power supply1	V_{DD}	-0.3	+3.6	V
Power supply2	Avdd	-0.3	VCC+0.3	V
Operating temperature	T_{OPR}	-20	70	℃
Storage temperature	T_{STG}	-30	80	℃

5.2 Input voltage refer list

Parameter	Symbol	Value	Unit	Remarks
TFT Gate ON Voltage	VGH	21	V	
TFT Gate Off Voltage	VGL	-8	V	
TFT Common Electrode Voltage	VCOM	3.8	V	NOTE
Analog Power Supply Voltage	AVDD	10.85	V	

*Note: Please adjust Vcom to make the flicker level be minimum

6. DC ELECTRICAL CHARACTERISTICS

6.1 Recommended Operating Range

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3.0	3.3	3.6	V	
IO Supply Voltage	VDDI	1.65	-	VDD	V	
Charge Pump Supply Voltage	PVDD	3.0	3.3	3.6	V	
NVM Supply Voltage	VPP	7.4	7.5	7.6	V	

6.2 DC Characteristics for Digital Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic-High Input Voltage	Vih	0.7VDDI	-	VDDI	V	VDDI=3.3V
Logic-Low Input Voltage	Vil	DGND	-	0.3VDDI	V	VDDI=3.3V
Logic-High Output Voltage	Voh	VDDI-0.4	-	VDDI	V	VDDI=3.3V
Logic-Low Output Voltage	Vol	DGND	-	DGND+0.4	V	VDDI=3.3V

6.3 DC Characteristics for Analog Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive High-voltage power	VGH	13	15	16	V	PVDD=3.3V
Negative High-voltage power	VGL	-11	-10	-7	V	PVDD=3.3V
Output Voltage Deviation	Vod		±35	±45	mV	
Standby Current	Isc			50	uA	VDD=PVDD=3.3V
Operation Current	Ioc		20		mA	No Load, VDD=VDDI=PVDD=3.3V @ FR=60Hz

7. TTL MODE AC ELECTRICAL CHARACTERISTICS

VDD=VDDI= 3.3V, AGND= 0V

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
Input/ Output timing						
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1	-	-	DCLK	
Hsync period	Th	55	60	65	us	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data setup time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE setup time	Tdest	10	-	-	ns	
DE setup time	Tdehd	10	-	-	ns	
SD output stable time	Tst	-	-	12	us	Output settled within +20mV Loading = 6.8k+28.2pF.
GD output rise and fall time	Tgst	-	-	6	us	Output settled (5%~95%), Loading = 4.7k+29.8pF

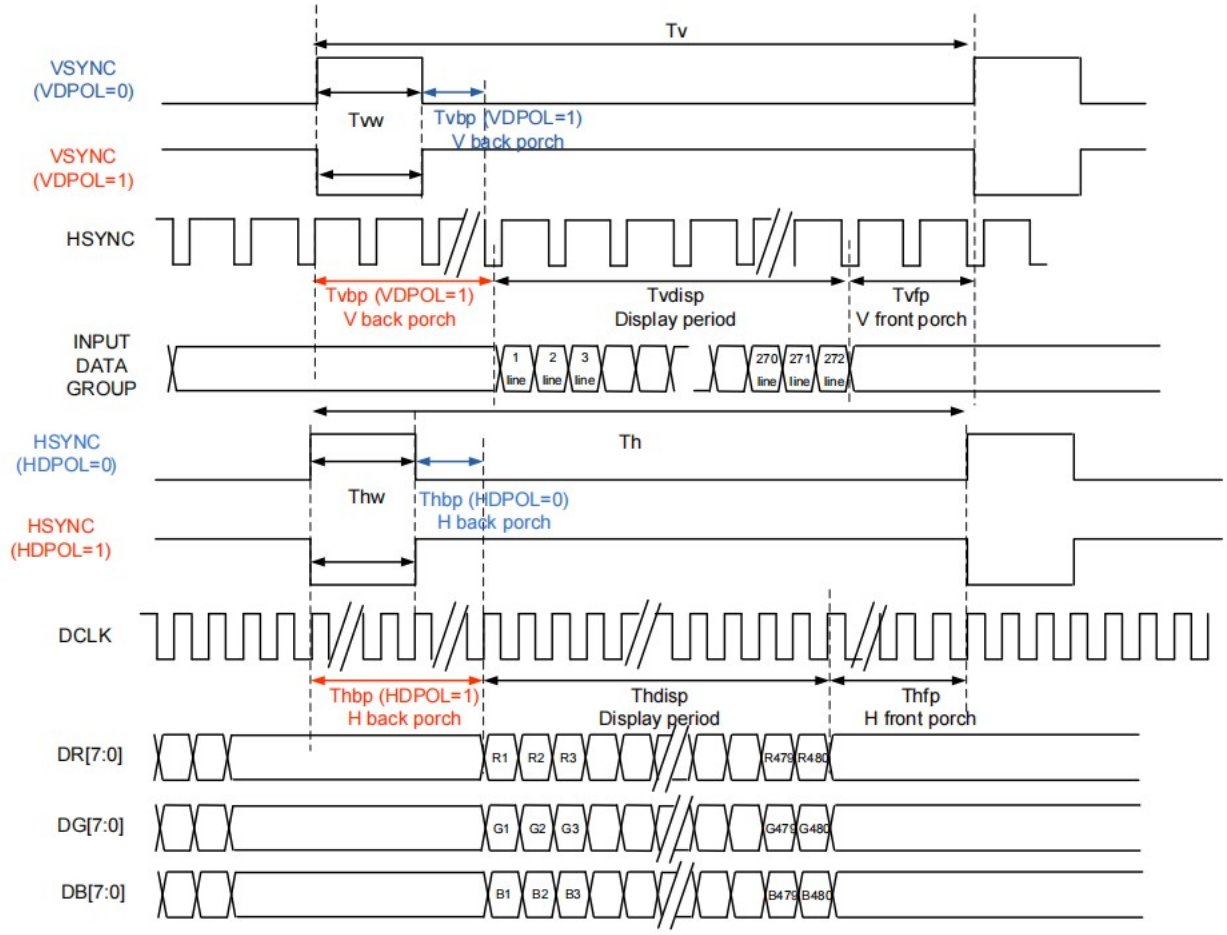
8. Data input format for RGB

8.1 Parallel 24-bit RGB Timing Table

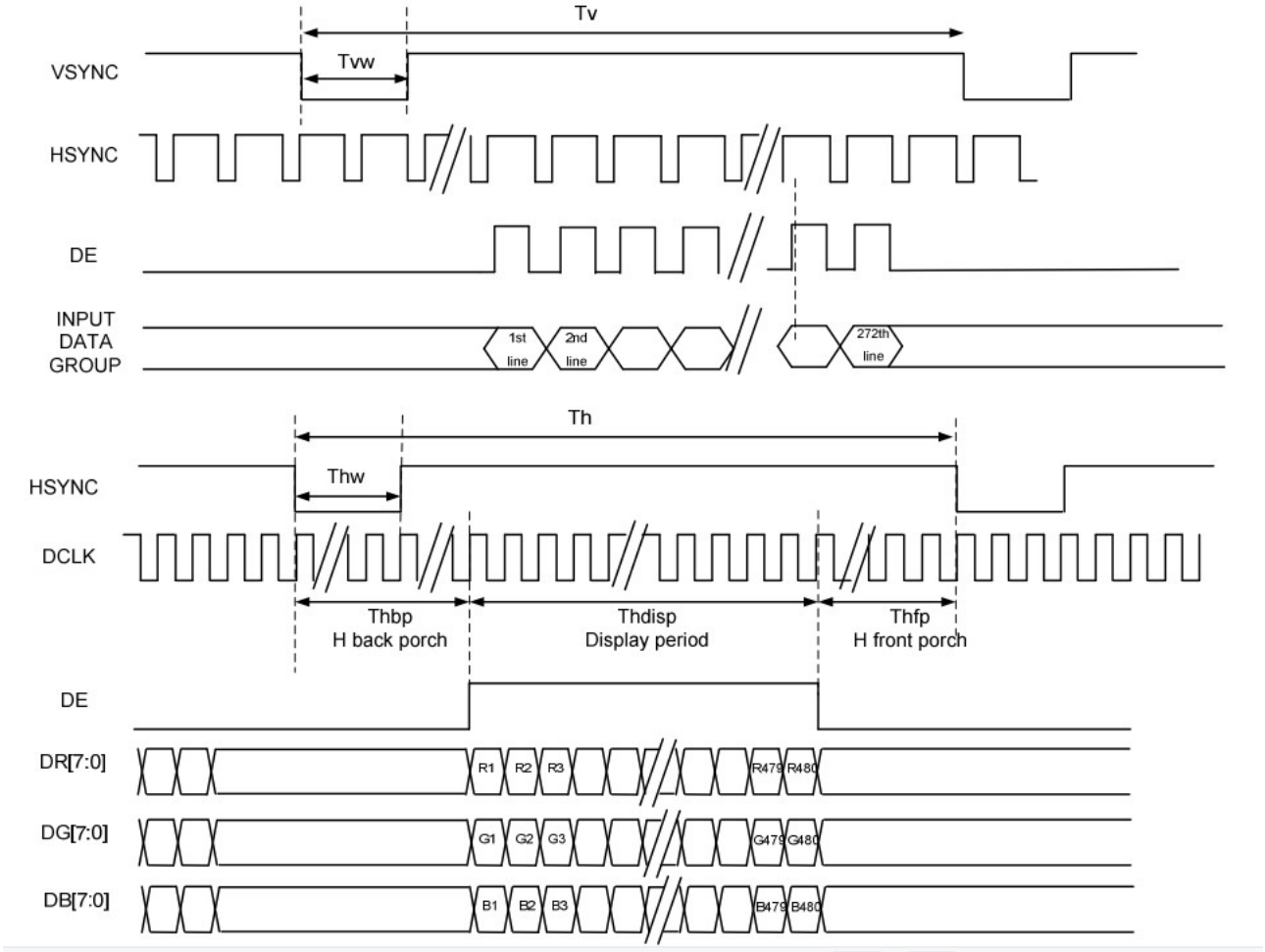
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	8	9	12	MHz	
DCLK Period		Tclk	83	111	125	Ns	
HSYNC	Period Time	Th	485	531		DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43		DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8		DCLK	
	Pulse Width	Thw	2	4		DCLK	
VSYNC	Period Time	Tv	276	292		H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12		H	By V_Blanking setting
	Front Porch	Tvfp	2	8		H	
	Pulse Width	Tvw	2	4		H	

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

8.2 SYNC Mode Timing Diagram



8.3 SYNC-DE Mode Timing Diagram



9. Backlight Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V_{LED}	--	21	--	V
LED module current	I_{LED}	--	20	--	mA
L/G Surface Luminance ★1	L_S	--	TBD	--	mcd
LCM Surface brightness uniform ★2	L_D	80	--	--	%

★ 1 Test condition is:

(a) Center point on active area.

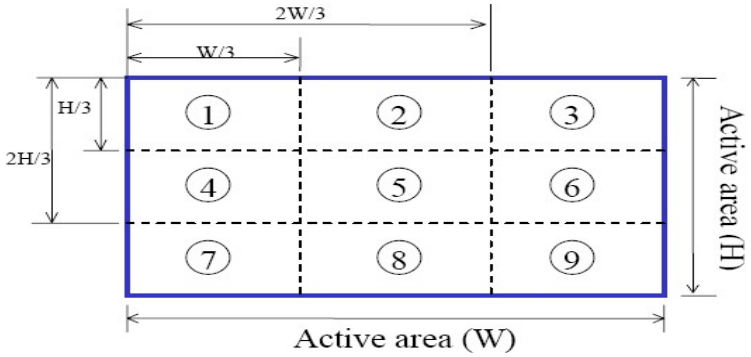
(b)Best Contrast.

★2 Uniform measure condition:

(1) Measure 9 point. Measure location show below;

(2) Uniform=(Min. brightness /Max. brightness)*100%

(3)Best Contrast.



10.Electro-optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Hor.	ϕ3	CR≥10		60		Deg.	
		ϕ9			60		Deg.	
	Ver.	ϕ12			70		Deg.	
		ϕ6			60		Deg.	
Color gamut(C light)					50		%	
Luminance Contrast ratio		T(%)	ϕ0°		600			
Response Time		TRT	Temp=25° C		8		ms	

11. Reliability

11.1 Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal

11.2 Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	60℃*240Hrs	。No Defect Of Operational
2	Low Temperature Non-Operating Test	-20℃*240Hrs	Function In Room
3	High Temperature/Humidity Non Operating Test	60℃*90%RH*240Hrs	Temperature Are Allowable 。IDD of LCM in Pre-and
4	High Temperature Operating Test	50℃*240Hrs	Post-Test ShouldFollow
5	Low Temperature Operating Test	-10℃*240Hrs	Specification
6	Thermal Shock Test	-10 ℃ (30Min)- 50 ℃ (30Min)	
		*10CYCLES	

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

12. Inspection standards

1.AQL(Acceptable Quality Level

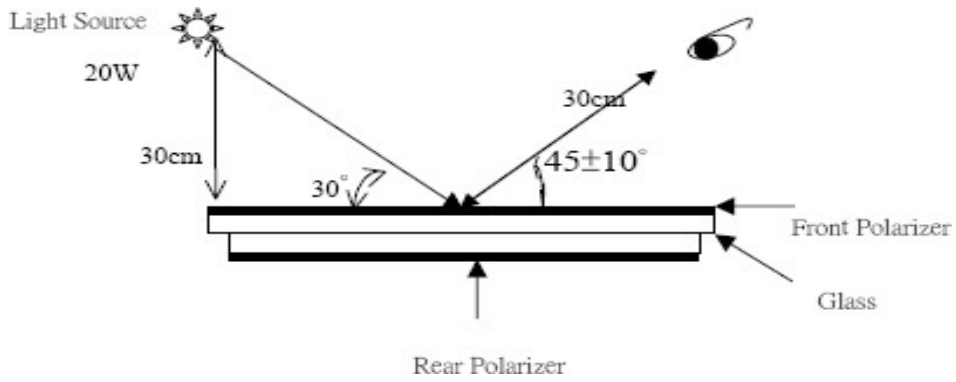
AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.5

2. Basic conditions for inspection

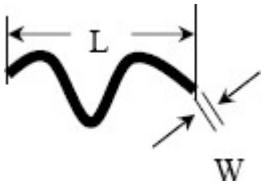
The LCM face to us, in normal environment, the lux is 1000±200.(Darkroom's lux: 100±50),About an angle of incidence 30,a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!

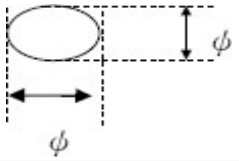
(As shown below)



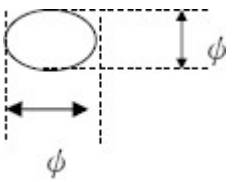
3.Inspection item and criteria

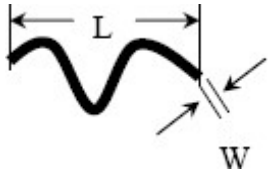
3.1 LCD appearance defect(View area)

NO	Defect item	Criteria		Remark
1	Fiber 、 glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		W≦0.03mm	disregard	
		0.03mm<W≦0.05mm; L≦3.0mm	2	
		0.05mm<W≦0.1mm; L≦3.0mm	1	
		W>0.1mm;L>3.0mm	0	
2	Polarizer bubble、concave and convex (minor defect)	φ≦0.2mm	disregard	note1: φ=(L+W)/2, L:Length, W :Width note2:disregard if out of AA
		0.2mm<φ≦0.3mm	2	
		0.3mm<φ≦0.5mm	1	
		0.5mm<φ	0	

3	Black dots、dirty dots、impurities、eye winker (minor defect)	ϕ ≦0.15mm	disregard	note2:disregard if out of AA 
		0.15mm< ϕ ≦0. 25mm	2	
		0.25mm< ϕ ≦0. 3mm	1	
		0.3mm< ϕ	0	
4	Polarizer prick (minor defect)	ϕ ≦0.1mm	disregard	note1: ϕ=(L+W)/2, L=Length, W=Width note2:the distance between two dots>5mm
		0.1mm< ϕ ≦0. 25mm	3	
		ϕ >0. 25mm	0	

3.2 Electrical criteria

NO	Defect item	Criteria	Remark	
1	No display (major defect)	No display 【Reject】		
2	Missing line (major defect)	Missing line 【Reject】		
3	Seg-com light and dark (major defect)	Seg-com light and dark 【Reject】	ND filter 2% test	
4	No display in immobility (major defect)	No display in immobility 【Reject】		
5	Flicker of Pattern (major defect)	Flicker of Pattern 【Reject】		
6	Mura (major defect)	ND filter 2%test		
7	Over current (major defect)	Over current 【Reject】		
8	Voltage out of specification (major defect)	Voltage out of specification 【Reject】		
9	Pattern blur, error code (major defect)	Pattern blur, error code 【Reject】		
10	Dark light, Flicker (major defect)	Dark light, Flicker 【Reject】		
11	Black/white dots 、 Dirty dots、 eye winker (major defect)	Specification	Allowable	Note1:disregard if out of AA 
		ϕ ≦0.15mm	disregard	
		0.15mm< ϕ ≦0. 25mm	2	
		0.25mm< ϕ ≦0. 3mm	1	
		0.3mm< ϕ	0	
12	Fiber、glass crutch、Polarizer scratch/folded	W≦0.03mm	disregard	Note1:L: Length, W: Width Note2: disregard if out of AA
		0.03mm<W≦0. 0. 05mm	2	

	(major defect)	L≤3.0mm		
		0.05mm<W≦0.1mm L≤3.0mm	1	
		W>0.1mm;L>3.0mm	0	

13. Precautions for using LCD modules.

13.1 Safety

(1)Do mot swallow any liquid crystal ,even if there is no proof that liquid crystal is poisonous.
(2)If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

13.2 Storage Conditions

(4) Store the panel or module in a dark place where the temperature is 23±5℃and the humidity is below 45 ±20%RH.
(5) Store in anti-static electricity container.
(6) Store in clean environment, free from dust, active gas, and solvent.
(7)Do not place the module near organics solvents or corrosive gases.
(8))Do not crush, shake, or jolt the module.

13.3Handling Precautions

(9) Avoid static electricity, which can damage the CMOS LSI.
(10) The polarizing plate of the display is very fragile, please handle if very carefully.
(11)Do not give external shock.
(12) DO mot apply excessive force on the surface.
(13) Bo not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(14) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(15) Do not operate it above the absolute maximum rating.
(16)Do not remove the panel or frame from the module.

13.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.