



FORMIKE ELECTRONIC CO.,LTD

PRDUCT SPECIFICATON

TFT LCD MODULE

MODEL : KWH057GM03-F01

【 】 Preliminary Specification

【 ♦ 】 Finally Specification

CUSTOMER'S APPROVAL	
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Preliminary Specification of LCM

Product No.: **KWH057GM03-F01**

Issue date: 2008/12/12



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1. ENERAL DESCRIPTION

KWH057GM03-F01 is a trans-missive type color active matrix liquid crystal display (LCD), which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs, FPC, Bezel and a backlight unit.

2. FEATURES

Display Mode	Transmissive Type
	TFT LCD, Positive mode
Screen Size	5.7 inch
Display Format	Graphic 320 (RGB) * 240 Strip type
Color	16.7M color
Input Data	24 bit parallel (RGB)
Interface	Digital RGB
Driver IC	HX8218C04 * 1 & HX8615C * 1
Backlight Color	White (LED*12)
Viewing Direction	6 O'clock

3. MECHANICAL SPECIFICATION

Item	Specifications	Unit
Dimensional outline	126.08(W)×101.54(H)*×6.6(D)	mm
Resolution	320(R, G, B)×240	dot
Active area	115.2(W)×86.4(H)	mm
Dot pitch	0.12(W)×0.36(H)	mm

* Without FPC



5. MAXIMUM RATINGS

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently. PGND=VSS=0V, Ta=25°C

Item	Symbol	Values		Unit	Condition
		Min.	Max.		
Power voltage	VCC	-0.3	+7	V	
Power voltage	VDD	-0.3	+7	V	
Power voltage	VEE	-22.0	+0.3	V	
Logic Output Voltage	V _{OUT}	-0.3	+7	V	
Input voltage	V _{in}	-0.3	VDD+0.3	V	
Gate On Voltage	VGH	-0.3	+32	V	
Power Supply Voltage	VGH-V _{EE}	-0.3	+45	V	
Operation Temperature	T _{op}	-10	60	°C	
Storage Temperature	T _{stg}	-20	70	°C	
Humidity	-	-	90	%RH	Note1

Note1: T_A ≤ 40°C Without dewing

6. ELECTRICAL CHARACTERISTIC

a. Typical operating conditions

Item		Symbol	Values			Unit	Remark
			Min.	Typ.	Max.		
Supply Voltage		VCC	3.0	3.3	3.6	V	
		VDD	3.8	5	5.5	V	
		VGH	7	-	VEE+40	V	
		VEE	-20	-	-5	V	
Source driver Input signal voltage	H level	V _{IH}	0.8 VCC	-	VCC	V	
	L Level	V _{IL}	0	-	0.2 VCC	V	
Source driver output signal voltage	H level	V _{OH}	0.8 VCC	-	VCC	V	
	L Level	V _{OL}	0	-	0.3VCC	V	
Gate driver Input	H level	V _{IH}	0.7VDD	-	VDD	V	



signal voltage	L Level	V_{IL}	VSS	-	0.3VDD	V	
Gate driver output signal voltage	H level	V_{OH}	VDD-0.3	-	VDD	V	
	L Level	V_{OL}	VSS	-	VSS+0.3	V	

b. Current consumption

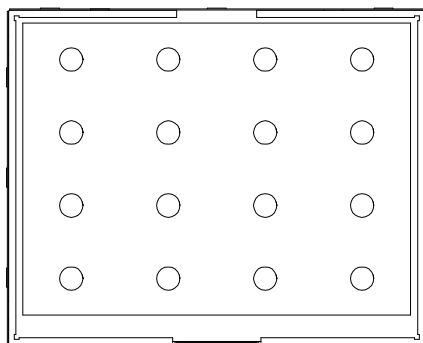
Parameter	Symbol	Condition	Typ.	Max.	Unit	Remark
Supply current	IDD	VCC=+3.3V	10	15	mA	-

7. BACKLIGHT CHARACTERISTIC

7.1. Characteristic

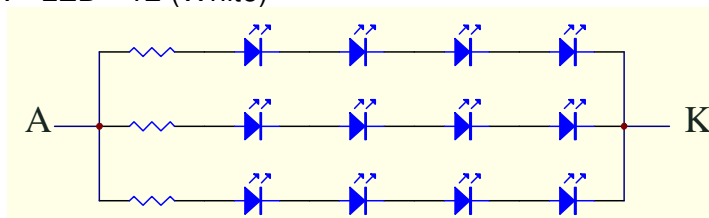
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power Consumption	VLED	11	-	15	V	
LED Current	I_F	-	60	-	mA	
LCM Brightness		300	350	-	Cd/m ²	$I_F=60mA$

7.2. Lightguide Specification



a. Test Instrument: BM-7 (Distance =500mm; Field = 1°)

b. Light Source: LED * 12 (White)

c. Conditions: $I_F=60\text{ mA}$, VLED (Typ.) = 13V

d. Uniformity = (Min. Brightness / Max. Brightness)*100%

e. Uniformity $\geq 70\%$



8. MODULE FUNCTION DESCRIPTION

8.1. PIN Description

Pin	Symbol	I/O	Function	Remark
1	DGND	I	Digital Ground	
2	VCOM	I	VCOM Power	
3	VCC	I	Digital Power. 3V to 3.6V	
4	VCC	I	Digital Power. 3V to 3.6V	
5	DEN	I	Input data enable control	
6	VSNC	I	Vertical sync input	
7	HSNC	I	Horizontal sync input	
8	DCLK	I	Clock signal	
9	R0	I	Data Input : LSB	
10	R1	I	Data Input :	
11	R2	I	Data Input :	
12	R3	I	Data Input :	
13	R4	I	Data Input :	
14	R5	I	Data Input :	
15	R6	I	Data Input :	
16	R7	I	Data Input : MSB	
17	AGND	I	Analog Ground	
18	VDD	I	Analog Power. 4.5V to 5.5V	
19	VDD	I	Analog Power. 4.5V to 5.5V	
20	G0	I	Data Input : LSB	
21	G1	I	Data Input :	
22	G2	I	Data Input :	
23	G3	I	Data Input :	
24	LEDK	I	Backlight LED Ground	
25	LEDK	I	Backlight LED Ground	
26	LEDA	I	Backlight LED Power	
27	LEDA	I	Backlight LED Power	
28	G4	I	Data Input :	
29	G5	I	Data Input :	



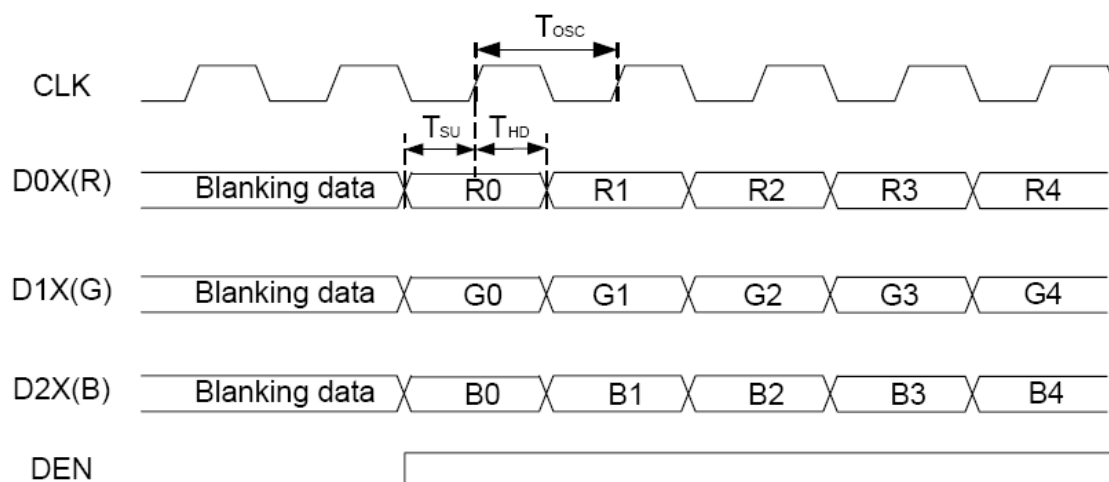
30	G6	I	Data Input :	
31	G7	I	Data Input : MSB	
32	B0	I	Data Input : LSB	
33	B1	I	Data Input :	
34	B2	I	Data Input :	
35	B3	I	Data Input :	
36	B4	I	Data Input :	
37	B5	I	Data Input :	
38	B6	I	Data Input :	
39	B7	I	Data Input : MSB	
40	DGND	I	Digital Ground	
41	POL	O	Polarity select for the line inversion control signal	
42	SPDA	I/O	Serial port Data input/output	
43	SPCK	I	Serial port Clock	
44	SPENA	I	Serial port Data Enable Signal	
45	/RESET	I	Hardware global reset	
46	DGND	I	Digital Ground	
47	VGH	I	Power supply for LCM drive output High	
48	DGND	I	Digital Ground	
49	VGL	I	Power supply for LCM drive output Low	
50	DGND	I	Digital Ground	

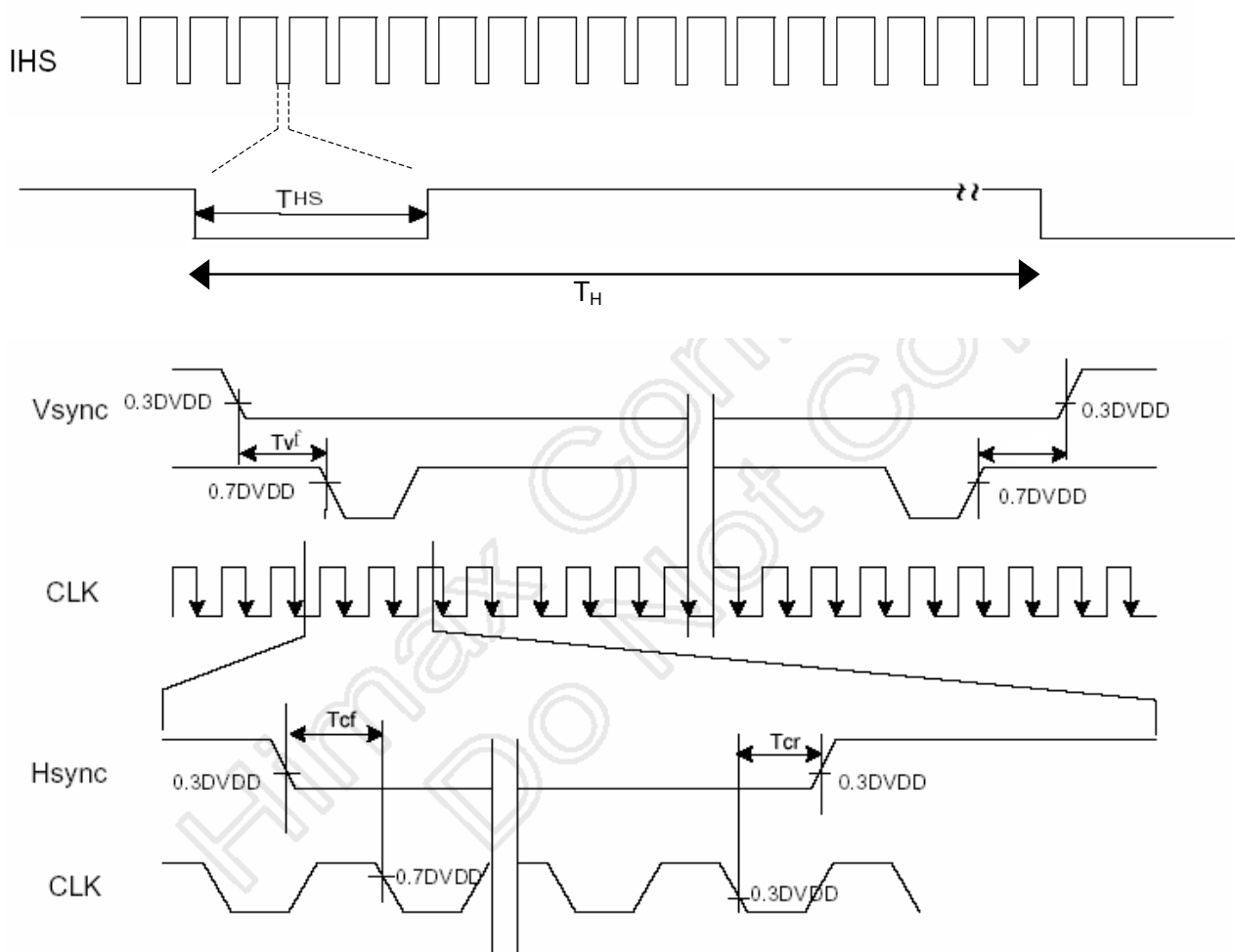
I: Input O: Output I/O: Serial communication data input/output



8.2.AC characteristics

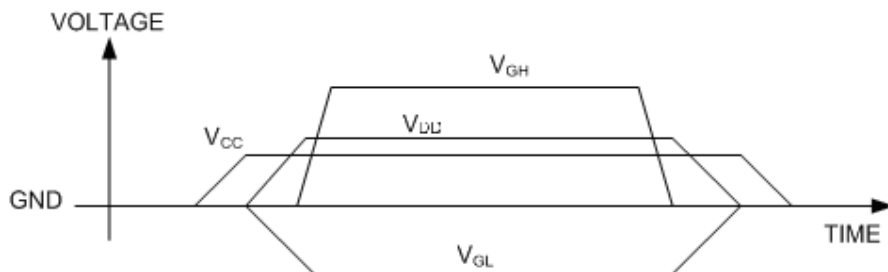
PARAMETER	Symbol	Min.	Typ.	Max.	Unit
CLK period	T_{OSC}	-	156	-	ns
Data setup time	T_{SU}	12	-	-	ns
Data hold time	T_{HD}	12	-	-	ns
IHS period	T_H	-	408	-	T_{OSC}
IHS pulse width	T_{HS}	5	30	-	T_{OSC}
IHS rising time	T_{Cr}	-	-	700	ns
IHS falling time	T_{Cf}	-	-	300	ns
IVS pulse width	T_{VS}	1	3	5	T_H
IVS rising time	T_{Vr}	-	-	700	ns
IVS falling time	T_{Vf}	-	-	1.5	μs
IVS falling to IHS rising time for odd field	T_{HVO}	1	-	-	T_{OSC}
IVS falling to IHS falling time for even field	T_{HVE}	1	-	-	T_{OSC}
IVS-DEN time	NTSC	T_{VSE}	-	18	T_H
	PAL	T_{VSE}	-	26	T_H
IHS-DEN time	T_{HE}	36	68	88	T_{OSC}
DEN pulse width	T_{EP}	-	320	-	T_{OSC}
DEN-STH time	T_{DES}	-	1	-	T_{OSC}
IVS period	NTSC	-	262.5	-	T_H
	PAL	-	312.5	-	T_H

Note:(1)When SYNC mode is used, 1st data start from 68th CLK after IHS falling.



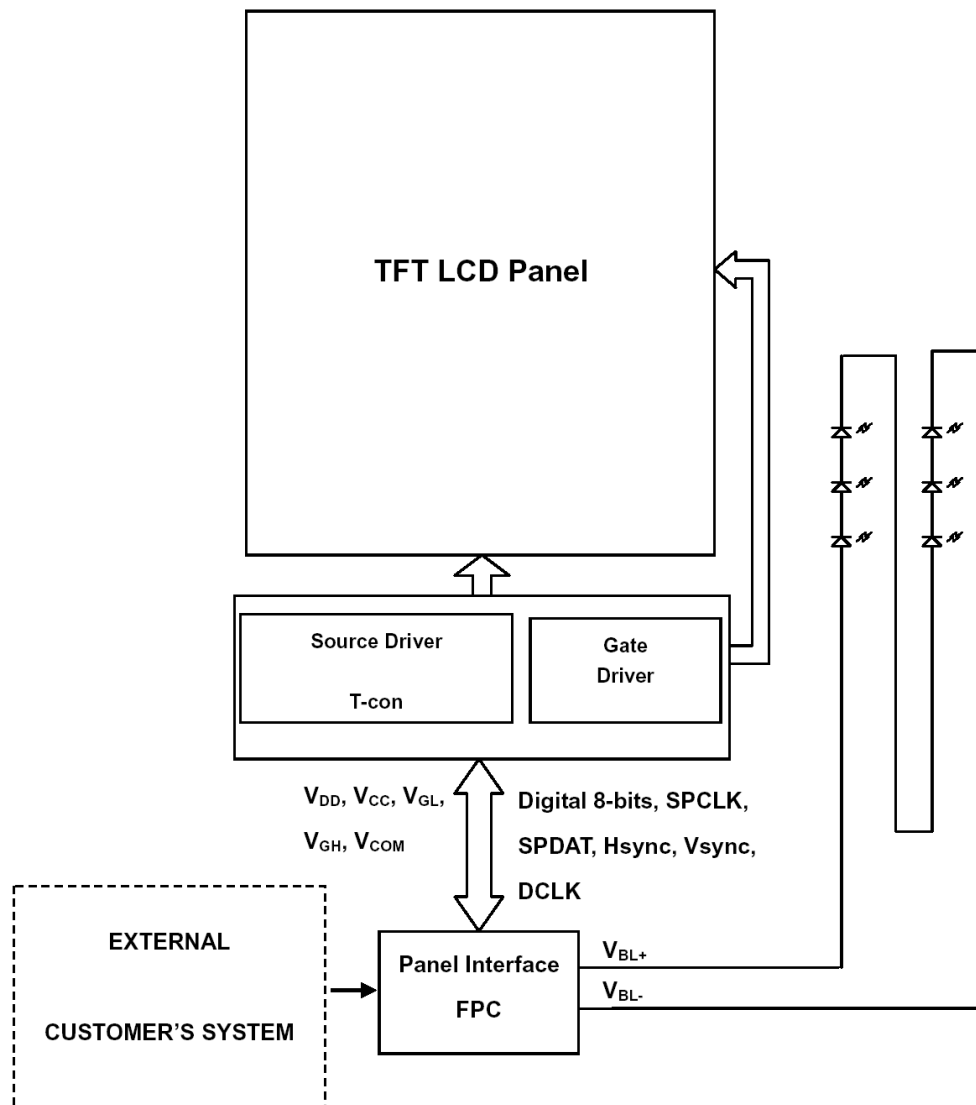
8.2.1. Power Sequence

The LCD panel adopts high voltage driver ICs, so it could be permanently damaged if a wrong power on/off sequence is used. When powering on the LCD, V_{CC} should go up firstly, and then turn on V_{GL} and V_{DD} , and finally V_{GH} . Turn off the LCD panel with reversed order or shut off all the power supplies simultaneously.





8.2.2. Block diagram of LC





8.2.3. Display Color and Gray Scale Reference

Color		Input Color Data																							
		Red								Green								Blue							
		MSB				LSB				MSB				LSB				MSB				LSB			
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Red(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255) Bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255) Bright	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue	Blue(0) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0
	Blue(255) Bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1



10. ELECTRO-OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in dark room or equivalent state with the methods shown in Note 1, Note2, Note3.

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
Response time		T _R + T _F	Θ=0	-	25	-	ms	Note 4,6
Contrast ratio		CR	At optimized viewing angle	-	350	-	-	Note 5,6
Viewing Angle	Hor.	Θ _R	CR ≥ 10	50	70	-	Degree	Note 6,7
		Θ _L		50	70	-		
	Ver.	Φ _H		70	70	-		
		Φ _L		70	70	-		
Transmission		Y _L	Θ=0	-	8.2	-	%	Note8
White Chromaticity shift		X	Θ=0	0.28	0.33	0.38	-	
		Y		0.31	0.36	0.41		
Brightness			Θ=0	300	350	-	Cd/m ²	

Note1: Ambient temperature=25℃

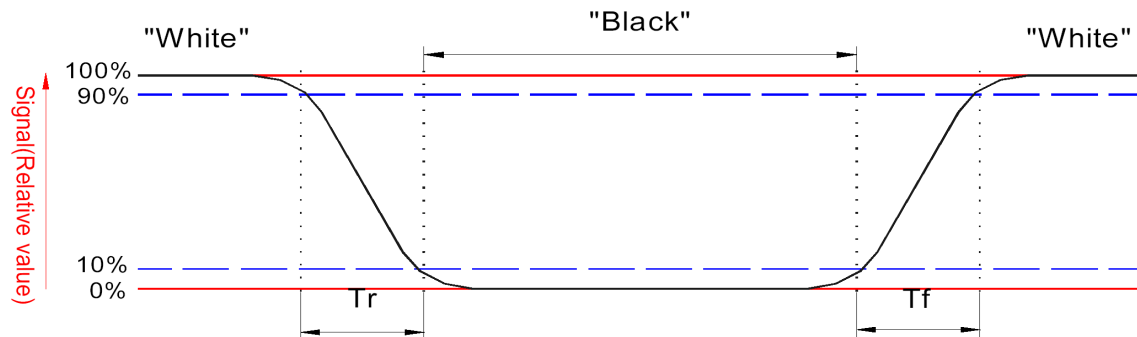
Note2: To be measured in the dark room.

Note3: To be measured on the center area of panel with a field angle of 1° by Topcon luminance meter BM-7, after 10 minutes operation.

Note4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (falling time) and from “white” to “black” (rising time), respectively.

The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note5: Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness measured when LCD is at "white state"}}{\text{Brightness measured when LCD is at "black state"}}$$

Note6: White $V_i = V_{i50} + 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

" $\pm$ " means that the analog input signal swings in phase with COM signal.

"+" means that the analog input signal swings out of phase with COM signal.

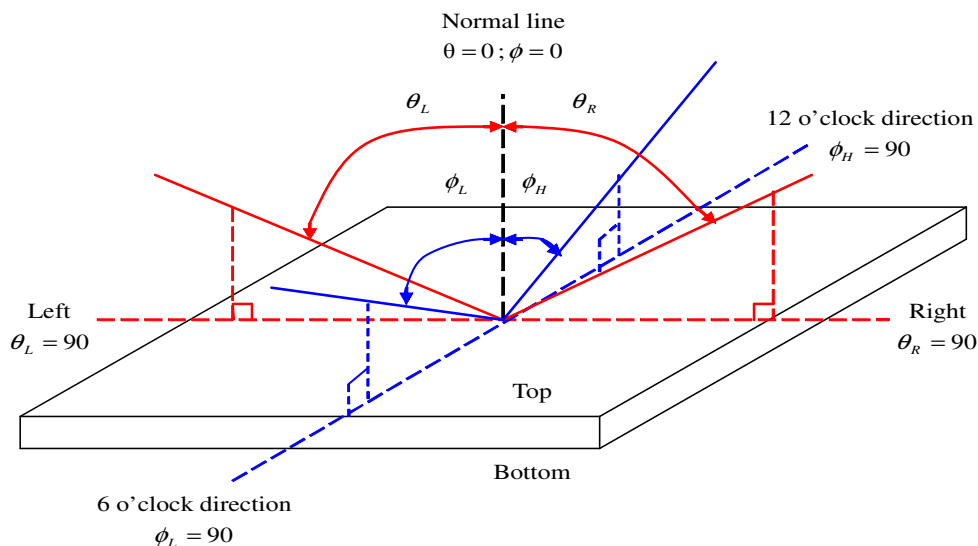
V_{i50} : The analog input voltage when transmission is 50%

The 100% transmission is defined as the transmission of LCD panel when all

The input terminals of module are electrically opened.

Note7: Definition of viewing angle:

Refer to figure as below.



Note8: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.



11. RELIABILITY

11.1.MTTF

The LCD module shall be designed to meet a minimum MTTF value of 50,000 hours with normal condition. (25°C in the room without sunlight; not include life time of backlight)

11.2.Tests

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Operating	60°C 240 hrs	No Defect Of Operational Function In Room Temperature Are Allowable. Leakage current should be below double of initial value.
2	Low Temperature Operating	0°C 240 hrs	
3	High Temperature Non-Operating	80°C 240 hrs	
4	Low Temperature Non-Operating	-25°C 240 hrs	
5	High Temperature/ Humidity Non-Operating	60°C ,90%RH 240 hrs	
6	Temperature Shock Non-Operating	-30°C $\longleftrightarrow$ 80°C (30min) (5min) (30min) 100CYCLES	
7	Electrostatic Discharge Test Non-Operating	HBM:±2Kv	
8	Vibration test (Carton)	Random Frequency 5-500Hz 0.015G ² /Hz 2 ~5、500-600Hz ± 6dB/oct(Slope) 2.95Grms ,1hrs for each direction of X,Y,Z	
9	Drop test (Carton)	One corner /three edge/ six face. Drop height : 40cm	

Note 1: Test after 24 hours in room temperature.

Note 2: The sampling above is individually for each reliability testing condition.

Note 3: The color fading of polarizing filter should not care.

Note 4: All of the reliability testing chamber above, is using D.I. water.(Min value: 1.0Mohm-cm)

Note 5: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

11.3.Color performance

No.	ITEM	Criterion (initial)
1	Luminance	>50%
2	NTSC	>70%
3	Contrast Ratio	>50%

12. INSPECTION CRITERIA

12.1.Inspection Conditions

12.1.1. Environmental conditions

The environmental conditions for inspection shall be as follows

Room temperature: $23\pm5^{\circ}\text{C}$

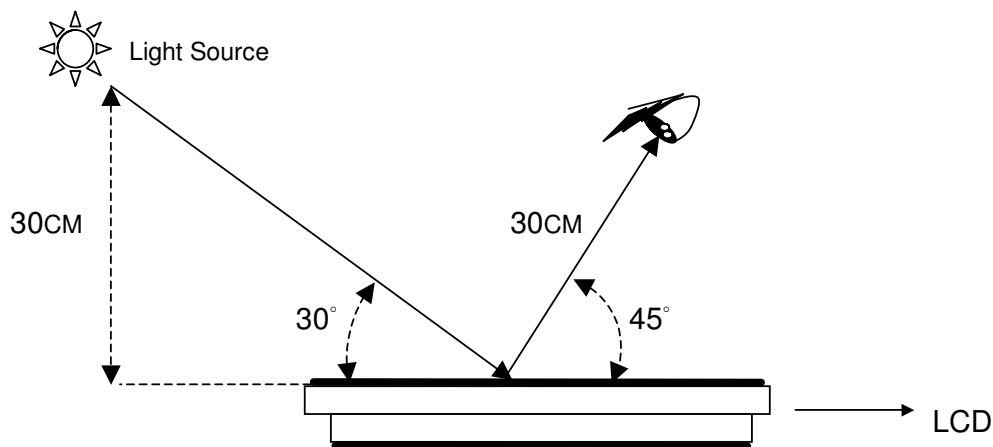
Humidity: $50\pm20\%\text{RH}$

12.1.2. The external visual inspection

With 1000 ± 200 lux fluorescent lamp as the light source, the inspection was in the distance of 30cm or more from the LCD to the inspector's eyes .

12.2.Light Method

1. Inspection is implemented over 30cm vertical distance and 30° incidence under 1000 ± 200 lux. (As showed below)
2. Viewing direction for inspection over 30cm far and is 45° against from LCD (As showed below)





12.3. Classification Of Defects

12.3.1. Major defect

A major defect refers to a defect that may substantially degrade usability for product applications.

12.3.2. Minor defect

A minor defect refers to a defect which is not considered to be able substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation.

Notes: If the LCD/LCM's cosmetic and display performance do not specify in "inspection criterion", it should be based on these delivered samples.

12.4. Sampling & Acceptable Quality Level

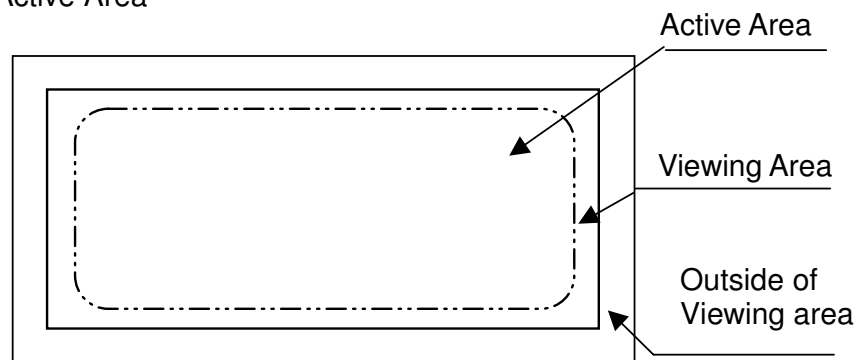
Level II, MIL-STD-105E

Inspection Item	Major defect	Minor defect
Appearance	0.4 %	0.65 %
Electrical test	0.4 %	0.65 %

12.5. Definition Of Inspection Area

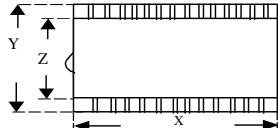
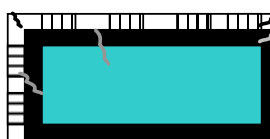
V.A: Viewing Area

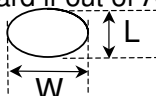
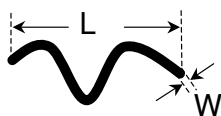
A.A: Active Area



12.6.Items And Criteria

12.6.1. Visual inspection criterion in cosmetic

Glass defect			
No	Item	Criteria	Remark
1	Dimension (Minor)	By engineering diagram	
2	Crack (Major)	Extensive crack 【Reject】	

LCD appearance defect				
No	Item	Criteria		Remark
1	Round type (Minor)	Defect Spec.	Permissible Q'ty	1: $\phi = (L+W)/2$, L: Length, W: Width 2: Disregard if out of A.A. 
		$\phi \leq 0.2\text{mm}$	Disregard	
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$	2	
		$\phi > 0.3\text{mm}$	0	
2	Line type (Minor)	Defect Spec.	Permissible Q'ty	1: L: Length, W: Width 2: Disregard if out of A.A. 
		$W \leq 0.5\text{mm}, L \leq 2.0\text{mm}$	2	
		$W \leq 0.5\text{mm}, L > 2.0\text{mm}$	0	
3	Polarizer bubble (Minor)	Defect Spec.	Permissible Q'ty	1: $\phi = (L+W)/2$, L: Length, W: Width. 2: Disregard if out of A.A.
		Out of A.A	Disregard	
		Within A.A	0	

FPC			
No	Item	Criteria	Remark
1	Copper peeling (Minor)	Copper peeling 【Reject】	
2	No release film or Peeling (Minor)	No release film or peeling 【Reject】	

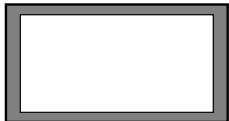
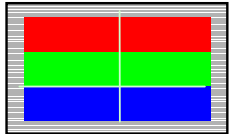
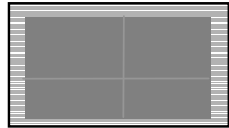


FPC				
3	Finger Spots, Impurities defect (Minor)	Defect Spec.	Permissible Q'ty	1.No bridge
		$\phi \leq 0.35\text{mm}$	2	2. Disregard if the
		$\phi > 0.35\text{mm}$	0	dirty removed

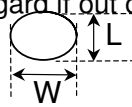
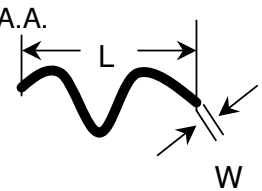
Silicon			
No	Item	Criteria	Remark
1	Amount of silicon (Minor)	ITO exposed 【Reject】	

Bezel			
No	Defect	Criteria	Remark
1	Oxidized spot (Minor)	Oxidized spot, rust 【Reject】	
2	Outline deformation (Minor)	By engineering diagram	
3	Greasiness (Minor)	Greasiness 【Reject】	
4	Spots, round Type (Minor)	$H \leq$ By engineering diagram 【Disregard】	H=Total height (thickness)
5	Plating (Minor)	Bubble, peeling 【Reject】	

12.6.2. Visual inspection criterion in electrical display

No	Defect	Criteria	Remark
1	No display (Major)	Not allowed	
2	Missing line (Major)	Not allowed	
3	Darker or lighter line (Major)	Not allowed	



No	Defect	Criteria				Remark
4	Weak line (Minor)	By limit sample				
5	Bright / Dark point (Minor)		A Area	B Area	Total	1:1sub-pixel: 1R or 1G or 1B 2:Point defect area $\geq$ 1/2 sub pixel. 2.Point distance $\geq$ 5mm 3.Refer to Note 1
		Bright point	0	1	1	
		Dark dot point	1	1	2	
		Bright +Dark point	1	2	3	
6	Round type (Minor)	Spec.		Permissible Qty		1. $\phi=(L+W)/2$, L: Length, W: Width 2. Disregard if out of A.A. 
		$\phi \leq 0.2\text{mm}$		Disregard		
		$0.2\text{mm}< \phi \leq 0.3\text{mm}$		2		
		$\phi > 0.3\text{mm}$		0		
7	Line type (Minor)	Spec.		Permissible Qty		1. L: Length, W: Width 2. Disregard if out of A.A. 
		$W \leq 0.5\text{mm}, L \leq 2.0\text{mm}$		2		
		$W \leq 0.5\text{mm}, L > 2.0\text{mm}$		0		
8	Mura (Minor)	By 5% ND filter invisible				

Note 1

1/4	1/2	1/4	
B	B	B	1/4
B	A	B	1/2
B	B	B	1/4

Please Follow the section separate to judgment the Bright or Dark Dots



12.6.3. Others

1. Issues that are not defined in this document shall be discussed and agreed with both parties. (Customer and supplier)
2. Unless otherwise agreed upon in writing, the criteria shall be applied to both parties. (Customer and supplier)



13. RoHS COMPLIANT WARRANTY

RoHs Hazardous substances including:

- Cd < 100 ppm
- Pb < 1000 ppm
- Hg < 1000 ppm
- Cr +6 < 1000 ppm
- PBDE < 1000 ppm
- PBB < 1000 ppm

14. PRECAUTIONS FOR USE

14.1. Safety

- (1) Do not 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.

14.2. Storage Conditions

- (1) Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.
- (6) Do not exposed to direct sun light of fluorescent lamps.

14.3. Installing LCD Module

Attend to the following items when installing the LCM.

- (1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.
- (2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be $\pm 0.1\text{mm}$.

14.4. Precautions For Operation

- (1) Viewing angle varies with the change of liquid crystal driving voltage (V_0). Adjust



Vo to show the best contrast.

- (2) Driving the LCD in the voltage above the limit will shorten its lifetime.
- (3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
- (4) When turning the power on, input each signal after the positive/negative voltage becomes stable.
- (5) Do not apply water or any liquid on product which composed of T/P.

14.5.Handling Precautions

- (1) Avoid static electricity which can damage the CMOS LSI; please wear the wrist strap when handling.
- (2) The polarizing plate of the display is very fragile. so, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface; it may cause display abnormal .
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) Do not apply water or any liquid on product, which composed of T/P.

14.6.Warranty

- (1) The period is within 12 months since the date of shipping out under normal using and storage conditions.
- (2) The warranty will be avoided in case of defect induced by customer.



15. FACTORY

For the consideration of mass production convenience, this model will be manufactured in Below factory:

FACTORY NAME:

FORMIKE ELECTRONIC CO.,LTD

FACTORY ADDRESS:

Building 10#, Penghua Industrial Park, Heping West Road, Longhua Town, Shenzhen,

16. REVISION HISTORY

Version	Revise record	Date
A	New version	2008/12/12