

FORMIKE ELECTRONIC CO.,LTD

PRODUCT SPECIFICATION

TFT LCD MODULE

MODEL: KWH080KQ10-F01

- [] Preliminary Specification
 - [] Finally Specification

			\checkmark
CUSTOMER'S APPROVAL			
SIGNATURE:	DATE:		
		ARON I	
		C	

APPROVED	PM	PD)	PREPARED
BY	REVIEWD	REVIEWD	BY
Kam		Stephen	Roy

Prepared By :

FORMIKE ELECTRONIC CO., LTD

Address :Room 14H, HanKing Building, 23# DengLiang Road, NanShan District, ShenZhen, 518054, China. TEL:(86) 755 88306921,88306931 FAX:(86) 755 88304615 Http:// www.wandisplay.com

• This specification is subject to change without notice.Please contact FORMIKE or it's representative before designing your product based on this specification.



1. Record of Revision

Version	Issued Date	Page	Content	Created or Modified by
1.0	2012/7/11	All	New Creation	Tom
				$\langle \rangle$
		_ <u>(</u>		





TABLE OF CONTENTS

NO	CONTENTS	PAGE
0	Cover Page	1
0	Table of Contents	2
1	Record of Revision	3
2	General Description and Features	<u>\</u>
3	Mechanical Information	5
4	PIN Assignment	6
5	Operation Specifcation	9
6	Optical Specification	16
7	Reliability Tests	20
8	Packing information	21
9	Handling Precautions	22
10	Precautions for use	22
	FORMUS FILS	

3/25



1. Record of Revision

Version	Issued Date	Page	Content	Created or Modified by
1.0	2012/7/11	All	New Creation	Tom
				$\langle \rangle$
		_ <u>(</u>		





2. GENERAL DESCRIPTION

2.1 Description

KWH080KQ10-F01 is a-si type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module, a driver IC and a back-light unit . Graphics and texts can be displayed on 1024 (W) x 3 x 768 (H) dots RGB data signal. The following table described the features of FORMIKE KWH080KQ10-F01

2.2 Application

Automobile products, medical treatment, instrument Device and other electronic Products Etc.

2.3 Features

Feature	Description
Size	8.0 inchs (Diagonal)
Display element	a-siTFT
Resolution	1024 x 3 (RGB) x768
Surface Treatment	Glare type
Display Format	Normally white, Transmissive
Inteface	Digital
Active Area(W x H mm)	162.048 X 121.536
LCM Size (W x H MM)	174.0 X 136.0X 2.45
Dot pitch	0.05275 X 0.15825mm
With/Without TSP	Without TSP
Contrast Ratio	700 (Type) 300(Min)
Luminance	250cd/m2 (Type) 200(Min)
View angle	75/75/75/75 (typ)



3. Mechanical Drawing





4. Pin Assignment

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	Р	Common Voltage	
2	VDD	Р	Power Voltage for digital circuit	
3	VDD	Р	Power Voltage for digital circuit	
4	NC		No connection	
5	Reset	I	Global reset pin	\$ (O) \$
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	Р	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	Р	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	Ι	+ LVDS differential data input	
13	GND	Р	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-		- LVDS differential clock input	
18	RXCLKIN+	Ĩ	+ LVDS differential clock input	
19	GND	Р	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	Ι	+ LVDS differential data input	
22	GND	Р	Ground	
23	NC		No connection	



24	NC		No connection	
25	GND	Р	Ground	
26	NC		No connection	
27	DIMO	0	Backlight CABC controller signal output	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	Р	Power for Analog Circuit	
30	GND	Р	Ground	
31	LED-	Р	LED Cathode	
32	LED-	Р	LED Cathode	$() \diamond$
33	L/R	I	Horizontal inversion	Note3
34	U/D	I	Vertical inversion	Note3
35	VGL	Р	Gate OFF Voltage	•
36	CABCEN1	I	CABC H/W enable	Note2
37	CABCEN0	I	CABC H/W enable	Note2
38	VGH	Р	Gate ON Voltage	
39	LED+	Р	LED Anode	
40	LED+	Р	LED Anode	

The recommended model is

FH12A-40S-0.5SH manufactured by Hirose.

I: input, O: output, P: Power Note1: If LVDS input data is 6 bits ,SELB must be set to High; If LVDS input data is 8 bits ,SELB must be set to Low. Note2: When CABC_EN="00", CABC OFF. When CABC_EN="01", user interface image. When CABC_EN="10", still picture. When CABC_EN="11", moving image. When CABC off, don't connect DIMO, else connect it to ba Note3: When L/R="0", set right to left scan direction. When L/R="1", set left to right scan direction. When U/D="0", set top to bottom scan direction. When U/D="1", set bottom to top scan direction.



Note: Definition of scanning direction. Refer to the figure as below:





5. Operation Specifications

5.1. Absolute Maximum Rating

(GND=AV _{SS} =UV, NOTE T)							
Itom	Symbol	Val	ues	Unit	Domork		
item	Symbol	Min.	Max.	Unit	Remark		
	V_{CC}	-0.3	5.0	V			
	AV_{DD}	6.5	13.5	X			
Power voltage	V_{GH}	-0.3	42.0	V	2		
	V_{GL}	-20.0	0.3	v			
	V_{GH} - V_{GL}	-	40.0	V			
Operation Temperature	T _{OP}	-10	50	°C			
Storage Temperature	T _{ST}	-20	60	°C			
LED Reverse Voltage	VR		(5)	V	each LED Note 2		
LED Forward Current	lf		(30)	mA	each LED		

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 2: VR Conditions: Zener Diode 20mA



5.1.1. Typical Operation Conditions

ltom	Symbol		Values	11:0:4	Domorik	
Item	Symbol	Min.	Тур.	Max.	Unit	Remark
	V _{CC}	3.0	3.3	3.6	V	Note 2
Power voltage	AV_{DD}	11.3	11.5	11.7	V	
	V_{GH}	21.7	22	22.3	V	
	V_{GL}	-7.3	-7	-6.7	X	
Input signal voltage	V _{COM}	2.3	3.3	4.3	V	Note 3
Input logic high voltage	V _{IH}	0.7V _{CC}	-	Vcc of	v	Noto 4
Input logic low voltage	V _{IL}	0	-	0.3V _{cc}	V	NOLE 4

Note 1: Be sure to apply V_{CC} and V_{GL} to the LCD first, and then apply V_{GH} .

- Note 2: V_{CC} setting should match the signals output voltage (refer to Note 3) of customer's system board .
- Note 3 Typical VCOM is only a reference value. It must be optimized according to each LCM. Please use VR and base on below application circuit..
- Note 4: RESET, STBYB, SELB, L/R, U/D, CABCEN0, CABCEN1.





5.1.2. Current Consumption

Itom	Symbol		Values			Remark	
item	Symbol	Min.	Тур.	Max.	Unit		
Current for Driver	I _{GH}	-	(0.35)	(1.0)	mA	VGH=22V	
	I _{GL}	-	(0.35)	(1.0)	mA	VGL=-7V	
	I _{CC}	-	(40)	(60)	mA	VCC=3.3V	
	IAV _{DD}	-	(20)	(30)	mA	AVDD≈11.5V	

5.1.3. Backlight Driving Conditions

Itom	Symbol		Values		Bomark	
item	Symbol	Min.	Тур.	Max.	Unit	Remark
Voltage for LED backlight	V_{L}	(8.4)	9.3	(10.2)	V	Note 1
Current for LED backlight	١ _L	(170)	180	(190)	mA	
LED life time	-	20,000	-	-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25 $^\circ\!C$ and I_L =180mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25 $^{\circ}$ C and I_L =180mA. The LED lifetime could be decreased if operating I_L is lager than 180 mA.



5.2. Power Sequence

5.2.1. Power on:





5.3. Timing Characteristics

5.3.1. AC Electrical Characteristics

Paramotor	Symbol	Values			Unit	Pomark	
Falailletei	Symbol	Min.	Тур.	Max.	Onit	Rendik	
Clock frequency	R _{xFCLK}	20	-	71	MHz		
Input data skew margin	T _{RSKM}	500	-	-	ps		
Clock high time	T _{LVCH}	-	4/(7* R _{xFCLK})	-	ns		
Clock low time	T _{LVCL}	-	3/(7* R _{xFCLK})	-	ns		

5.3.2. Input Clock and Data Timing Diagram





5.3.3. DC Electrical Characteristics

Parameter	Symbol		Values	Unit	Remark		
	Cymsei	Min.	Тур.	Max.	•		
Differential input high Threshold voltage	R _{xVTH}	-	-	+0.1	V	Bygggy=1.2V/	
Differential input low Threshold voltage	R _{xVTL}	-0.1	-	-	V	T (XVCM [—] T.2 V	
Input voltage range (singled-end)	R _{xVIN}	0	-	2.4	V		
Differential input common mode voltage	R _{xVCM}	V _{ID} /2	_	2.4- V _{ID} /2	Ŷ	4	
Differential voltage	V _{ID}	0.2	-	0.6		\triangleright	
Differential input leakage current	RV _{xliz}	-10	_	+10	UA		





5.3.4. Timing

Itom	Symbol	Values			11	Dornorda	
item		Min.	Тур.	Max.	Unit	Kemark	
Clock Frequency	fclk	52	65	71	MHz	Frame rate =60Hz	
Horizontal display area	thd		1024		DCLK		
HS period time	th	1114	1344	1400	DCLK		
HS Blanking	thb+thfp	90	320	376	DCLK	\bigcirc	
Vertical display area	tvd		768		H		
VS period time	tv	778	806	845	H		
VS Blanking	tvb+tvfp	10	38	77	Н		



6bit LVDS input



8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.



6. Optical Specifications

ltom	Symbol	Condition		Values	Unit	Domark		
item	Symbol	Condition	Min.	Тур.	Max.	Unit	Remark	
	θ∟	Φ=180°(9 o'clock)	65	75	-	degree	Note 1	
Viewing angle	θ_{R}	Φ=0°(3 o'clock)	65	75	-			
(CR≥ 10)	θτ	Φ=90°(12 o'clock)	65	75	- (
	θ_{B}	Φ=270°(6 o'clock)	65	75	-	<u> </u>		
Pesnonse time	T _{ON}		-	10	20	msec	Note 3	
Response time	T _{OFF}		-	20	30	msec	Note 3	
Contrast ratio	CR		600	700	-	-	Note 4	
	W _X	Normal θ=Φ=0°	0.26	0.31	0.36	-	Note 2	
Color chromaticity	W _Y		0.28	0.33	0.38	-	Note 5 Note 6	
Luminance	L		200	250	-	cd/m²	Note 6	
Luminance uniformity	Υ _U		70	75	-	%	Note 7	

Test Conditions:

- 1. V_{CC}=3.3V, I_L=180mA (Backlight current), the ambient temperature is 25° C.
- 2. The test systems refer to Note 2.





Fig. 6-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1°/Height: 500mm.)



Fig. 6-2 Optical measurement system setup



Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



- Note 4: Definition of contrast ratio
 - $Contrast ratio (CR) = \frac{Luminance measured when LCD on the "White" state}{Luminance measured when LCD on the "Black" state}$
- Note 5: Definition of color chromaticity (CIE1931) Color coordinates measured at center point of LCD.
- Note 6: Definition of luminance:

Measured at the center area of the panel when LCD panel is driven at "white" state. The LED driving condition is I_L =180mA.



Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 6-4). Every measuring point is placed at the center of each measuring area.



Fig. 6-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position. **B**_{min}: The measured minimum luminance of all measurement position.



7. Reliability Test Items

ltem	Test	Rem	ark	
High Temperature Storage	Ta = 60℃	240hrs	Note 1,	Note 4
Low Temperature Storage	Ta = -20℃	240hrs	Note 1,	Note 4
High Temperature Operation	Ts = 50 ℃	240hrs	Note 2,	Note 4
Low Temperature Operation	Ta = -10℃	240hrs	Note 1,	Note 4
Operate at High Temperature and Humidity	+40℃, 90%RH	240hrs	Note 4	
Thermal Shock	-10°C/30 min ~ +50° cycles, Start with co with high temperatu	C/30 min for a total 100 Id temperature and end re.	Note 4	
Vibration Test	Frequency range:10 Stroke:1.5mm Sweep:10Hz~55Hz 2 hours for each dir (6 hours for total)	0~55Hz ~10Hz ection of X. Y. Z.		
Mechanical Shock	100G 6ms,±X, ±Y, ± direction	Z 3 times for each		
Package Vibration Test	Random Vibration : 0.015G*G/Hz from & from 100-200HZ 2 hours for each dire (6 hours for total)	5-100HZ, -6dB/Octave ection of X. Y. Z.		
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6	surfaces		
Electro Static Discharge	± 2KV, Human Bo	dy Mode, 100pF/1500 Ω		

- Note 1: Ta is the ambient temperature of samples.
- Note 2: Ts is the temperature of panel's surface.
- Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
- Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.



8. Package Drawing

8.1 Package Material Table

No.	ltem	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity	Remark
1	LCM Module	KWH080KQ10	174.0 × 136.0 ×2.45	TBD	30pcs	
2	Partition	BC Corrugated paper	512 × 350 × 230	TBD	1set	\rangle
3	Corrugated Bar	B Corrugated paper	350 × 120 × 38	0.155	4pcs	
4	Dust-Proof Bag	PE	700 × 530	0.060	1pcs	
5	A/S Bag	PE	220.0 × 200.0 × 0.2	0.003	30pcs	
6	Carton	Corrugated paper	530 × 355 × 255	0.82	1pcs	
7	Total weight		TBL	<u>5</u>		

8.2 Package Quantity

Total LCM quantity in Carton: no. of Partition 2 Rows × quantity per Row 15 = 30

@



9. Handling Precautions

9.1 Mounting method

The LCD panel of FORMIKE ELECTRONIC CO,.LTD. module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

9.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

- [recommended below] and wipe lightly
- Isopropyl alcohol
- Ethyl alcohol Do not wipe the display surface with dry or hard materials that will damage the polarizer surface. Do not use the following solvent:
- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Salfur (S)

If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Salfur (S) from customer, Responsibility is on customer.

9.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

9.4 packing

- Module employ LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

9.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature, 50%Rh or less is required.



9.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no
 desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.
 It is recommended to store them as they have been contained in the inner container at the time of delivery from us

9.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

10. Precaution For Use

10.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

10.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to FORMIKE ELECTRONIC CO, LTD, and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.