TFT LCD MODULE SPECIFICATION

Model Name: KWH024Q02-F02

Date: **2007/06/15**

Version: **0.2**

For Customer's Acceptance

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CONTENTS

1. Precautions for using of LCM

2. General Features & Mechanical Specifications

3. Module Outline Drawing

4. Absolute Maximum Ratings

5. DC Electrical Characteristics

6. Optical Characteristics

7. Backlight specification

8. Read / Write characteristics

9. Reset input timing

10. Interface description

11. Revision history

12. Package

1. Precautions in use of LCM

1.1 Use Modules

1. When modules switch on or off, after accessing positive supply power with 3±0.5 voltage ,then input signal levels, if signal levels input before supply power becomes stable or switches off, IC circuits off, modules will be damaged , as a result , modules will be damaged.
2. Dot matrix modules are high path –number LCDs, they are largely related to the contrast, view angle, driving voltage when displaying, so you should adjust it to get best contrast and view angle, if it is too high, not only displays are affected, but also let life shorted.
3. When using under regulated working temperature below, the display responsiveness it too slow, when using under regulated temperature above, whole display surface turns dark, this is not damaged, when the temperature returns normal, all displays become normal

1.2 Module storage

1. Storage temperature:-20~+70℃
2. Place in dark sites to avoid strong lights
3. Don’t place other thing on their surfaces
4. Packaged in polyester materials (with anti-static electricity layers) and sealed

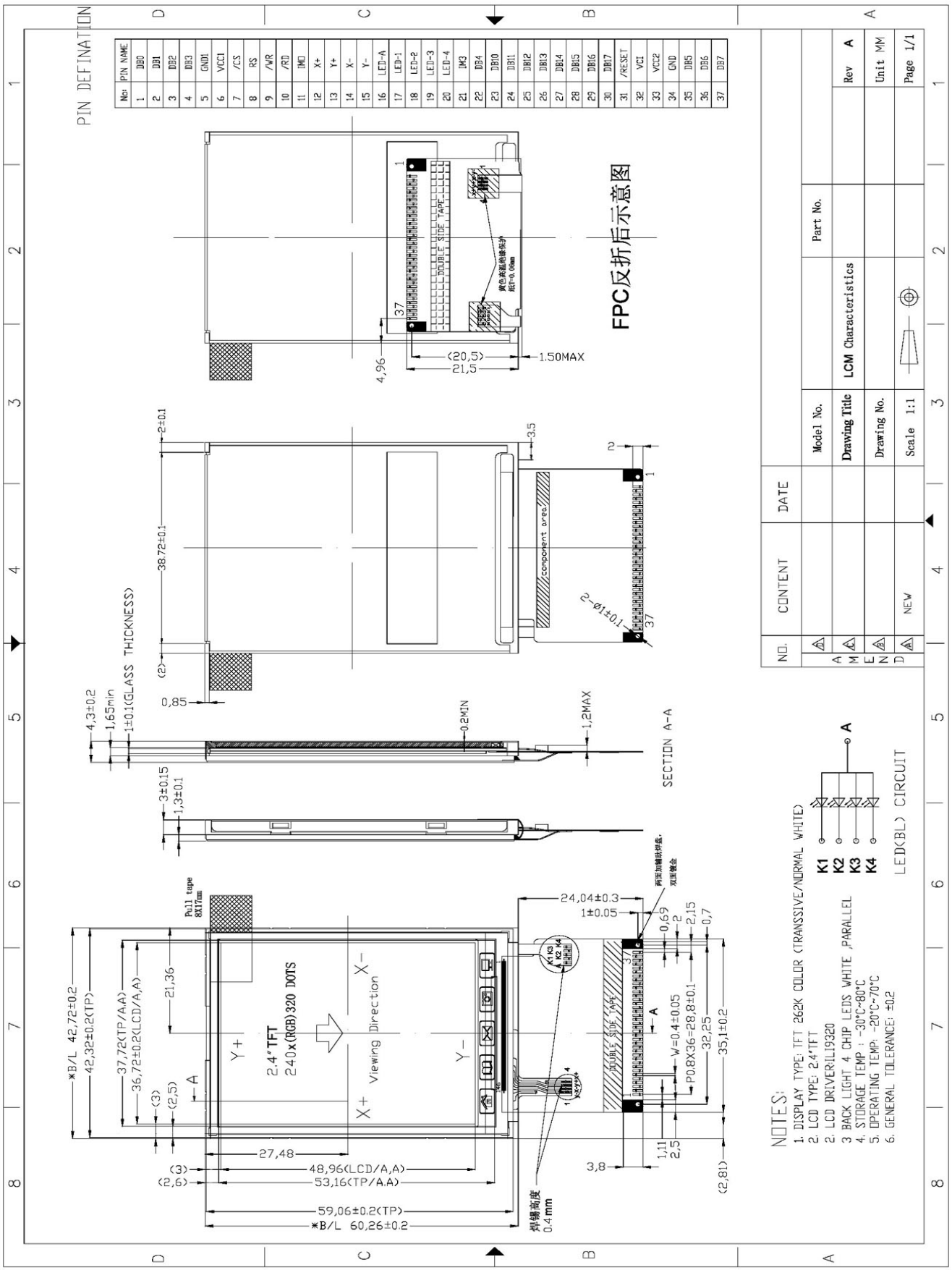
1.3 Soldering

1. Iron head temperature: 280±10℃
2. Soldering time: <3-4S
3. Soldering material: eutectic nature, low melting point
4. Don’t use acid solder
5. Soldering don’t repeat above 3 times

2. General Features & Mechanical Specifications

Item	Standard Value	Unit
LCD type	262K a-Si TFT-LCD Transmission	
Dot arrangement	240(R.G.B)*320	Dot
Module size	42.72(W)*60.26 (H)	mm
Active area	36.72(W)*48.96(H)	mm
Pixel size	51(W)*153(H)	um
Diagonal length	2.4	inch
Viewing direction	12 O'clock	-
Backlight	LED(white 4*LED)	-
Top & Tst	-20˚C - +70˚C & -30˚C - +80˚C	˚C
Drive IC & Interface	ILI9320 /8080 16-bit or 8-bit interface	-

3. MODULE OUTLINE DRAWING



4. Absolute Maximum Ratings

The absolute maximum rating is listed on following table. When ILI9320 is used out of the absolute maximum ratings, the ILI9320 may be permanently damaged. To use the ILI9320 within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the ILI9320 will malfunction and cause poor reliability.

Item	Symbol	Unit	Value	Note
Power supply voltage (1)	VCC, IOVCC	V	-0.3 ~ + 4.6	1, 2
Power supply voltage (1)	VCI - AGND	V	-0.3 ~ + 4.6	1, 4
Power supply voltage (1)	DDVDH - AGND	V	-0.3 ~ + 6.0	1, 4
Power supply voltage (1)	AGND -VCL	V	-0.3 ~ + 4.6	1
Power supply voltage (1)	DDVDH - VCL	V	-0.3 ~ + 9.0	1, 5
Power supply voltage (1)	VGH - AGND	V	-0.3 ~ + 18.5	1, 5
Power supply voltage (1)	AGND - VGL	V	-0.3 ~ + 18.5	1, 6
Input voltage	Vt	V	-0.3 ~ VCC+ 0.3	1
Operating temperature	Topr	°C	-40 ~ + 85	8, 9
Storage temperature	Tstg	°C	-55 ~ + 110	8, 9

Notes:
1. VCC, DGND must be maintained
2. (High) (VCC = VCC) ≥ DGND (Low), (High) IOVCC ≥ DGND (Low).
3. Make sure (High) VCI ≥ DGND (Low).
4. Make sure (High) DDVDH ≥ ASSD (Low).
5. Make sure (High) DDVDH ≥ VCL (Low).
6. Make sure (High) VGH ≥ ASSD (Low).
7. Make sure (High) ASSD ≥ VGL (Low).
8. For die and wafer products, specified up to 85°C.
9. This temperature specifications apply to the TCP package

5. DC Electrical Characteristics

a). LSI DC characteristics

(VCC = 2.40 ~ 3.30V, IOVCC = 1.65 ~ 3.30V, Ta= -40 ~ 85 °C)

Item	Symbol	Unit	Test Condition	Min.	Typ.	Max.	Note
Input high voltage	VIH	V	VCC= 1.8 ~ 3.3V	0.8*IOVCC	-	IOVCC	-
Input low voltage	VIL	V	VCC= 1.8 ~ 3.3V	-0.3	-	0.2*IOVCC	-
Output high voltage(1) (DB0-17 Pins)	VOH1	V	IOH = -0.1 mA	0.8*IOVCC	-	-	-
Output low voltage (DB0-17 Pins)	VOL1	V	IOVCC=1.65~3.3V VCC= 2.4 ~ 3.3V IOL = 0.1mA	-	-	0.2*IOVCC	-
I/O leakage current	ILI	μA	Vin = 0 ~ VCC	-0.1	-	0.1	-
Current consumption during normal operation (VCC – DGND)	IOP	μA	VCC=2.8V , Ta=25°C , fOSC = 376KHz (Line) GRAM data = 0000h	-	100 (VCC)	-	-
Current consumption during standby mode (VCC – DGND)	IST	μA	VCC=2.8V , Ta=25 °C	-	5	10	-
LCD Drive Power Supply Current (DDVDH-DGND)	ILCD	mA	VCC=2.8V , VREG1OUT =4.8V DDVDH=5.0V , fOSC = 376KHz (320 line) , Ta=25 °C, GRAM data = 0000h, REV=”0”, SAP=”001”, ON4-0=”0”, OP4-0=”0”, MP52-00=”0”, MN52-00=”0”, CP12-00=”0” CN12-00=”0	-	3.0	-	-
LCD Driving Voltage (DDVDH-DGND)	DDVDH	V	-	4.5	-	6	-
Output voltage deviation		mV	-	-	5	-	-
Dispersion of the Average Output Voltage	V	mV	-	-10	-	10	-

6.Optical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.		UNIT	REMARK
Transmittance	T			(6.2)			%	
Contrast Ratio	CR	*1)		(300)	-		--	Note 3
Response Time	Tr+ Tf	*3)	-	(30)	(40)		ms	Note 4
Viewing Angle	Vertical	θ *2)	CR≧ 10	(30)	(40)	-		
				(10)	(20)	-		Note 5
	Horizontal	ϕ *2)		(30)	(45)	-		
				(30)	(45)	-		
Color Filter Chromacicity	White	x y Y	θ =φ = 0°	(0.290)	(0.310)	(0.330)		
				(0.321)	(0.341)	(0.361)		Note 6
				(27.5)	(31.5)	(35.5)		
	Red	x y Y	θ =φ = 0°	(0.635)	(0.655)	(0.675)		
				(0.309)	(0.329)	(0.349)		
				(16.0)	(19.0)	(22.0)		
	Green	x y Y	θ =φ = 0°	(0.292)	(0.312)	(0.332)		
				(0.555)	(0.575)	(0.595)		
				(56.0)	(60.0)	(64.0)		
	Blue	x y Y	θ =φ = 0°	(0.114)	(0.134)	(0.154)		
				(0.115)	(0.135)	(0.155)		
				(12.5)	(15.5)	(18.5)		
	NTSC			-	(61.5 %)	-		

7.Backlight specification

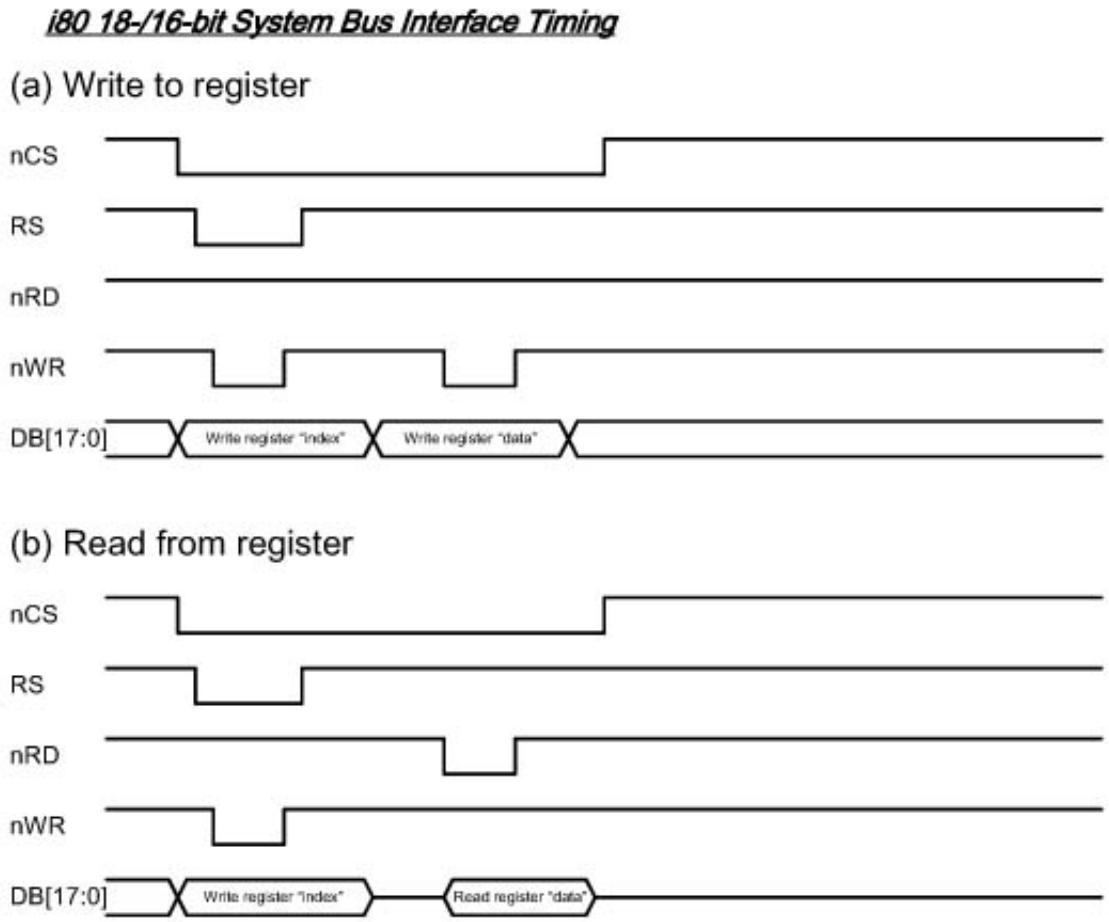
COLOR : WHITE

Item	Symbol	Min.	Typ..	Max..	Unit.
Forward voltage	Vf	2.9	3.4	3.7	V
Forward current	If	-	72	-	mA
Luminance	Lv	2800	3200	-	cd/m^2
Number of LED	-	4			Piece
Connection mode	S/P	In parallel			-

8. Read / Write characteristics (8080-series MPU)

Please refer to the driver IC specification for detail information.

9. Reset input timing



10. Interface description

Pin No.	Symbol	Description
1	DB0	Data bus DB0. When use 8bit mode, connect to GND.
2	DB1	Data bus DB1. When use 8bit mode, connect to GND.
3	DB2	Data bus DB2. When use 8bit mode, connect to GND.
4	DB3	Data bus DB3. When use 8bit mode, connect to GND.
5	GND1	Ground.
6	VCC1	A supply voltage to the internal logic
7	/CS	LCD Chip select.
8	RS	Data/Command control Pin.
9	/WR	Write execution control Pin.
10	/RD	Read execution control Pin.
11	IM0	Interface select pin. L: 16bit. H: 8bit (use DB10-17).
12	X+	Touch panel X+.
13	Y+	Touch panel Y+.
14	X-	Touch panel X-.
15	Y-	Touch panel Y-.
16	LEDA	Backlight common anode.
17	LED-1	Backlight cathode 1.
18	LED-2	Backlight cathode 2.
19	LED-3	Backlight cathode 3.
20	LED-4	Backlight cathode 4
21	IM3	Interface select pin. Must connect to GND.
22	DB4	Data bus DB4. When use 8bit mode, connect to GND.
23	DB10	Data bus DB10.
24	DB11	Data bus DB11.
25	DB12	Data bus DB12.
26	DB13	Data bus DB13.
27	DB14	Data bus DB14.
28	DB15	Data bus DB15.
29	DB16	Data bus DB16.
30	DB17	Data bus DB17.
31	/RESET	RESET Signal input.
32	VCI	A supply voltage to the analog circuit.
33	VCC2	A supply voltage to the internal logic.
34	GND	Ground.
35	DB5	Data bus DB5. When use 8bit mode, connect to GND.
36	DB6	Data bus DB6. When use 8bit mode, connect to GND.
37	DB7	Data bus DB7. When use 8bit mode, connect to GND.

11.Change history

Version	Content	Date
0.2	First release.	06 15, 2007

12. Package

TBD