TFT LCD

Specification
This module uses ROHS material

(   ) **Preliminary Specification**
(●) **Final Specification**

Title	1.77" QQVGA TFT LCD

Customer	
MODEL	

SUPPLIER	B&H Korea Co., Ltd.
MODEL	BHT177A06
Revision	Ver 1.0

SIGNATURE	DATE
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Please return 1 copy for your confirmation with your signature and comments.

SIGNATURE	DATE
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**Products Engineering Dept.
B&H Korea Co., Ltd**

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B&H Korea Co., Ltd.
Business & Honesty

Product Specification

RECORD OF REVISIONS

Revision No	Revision Date	Description
1.0	Jul. 30. 2013	First Draft

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Product Specification

1.0 General Specifications

BHT177A06 is a color active matrix LCD module incorporating amorphous sillcon TFT (Thin Film Transistor).

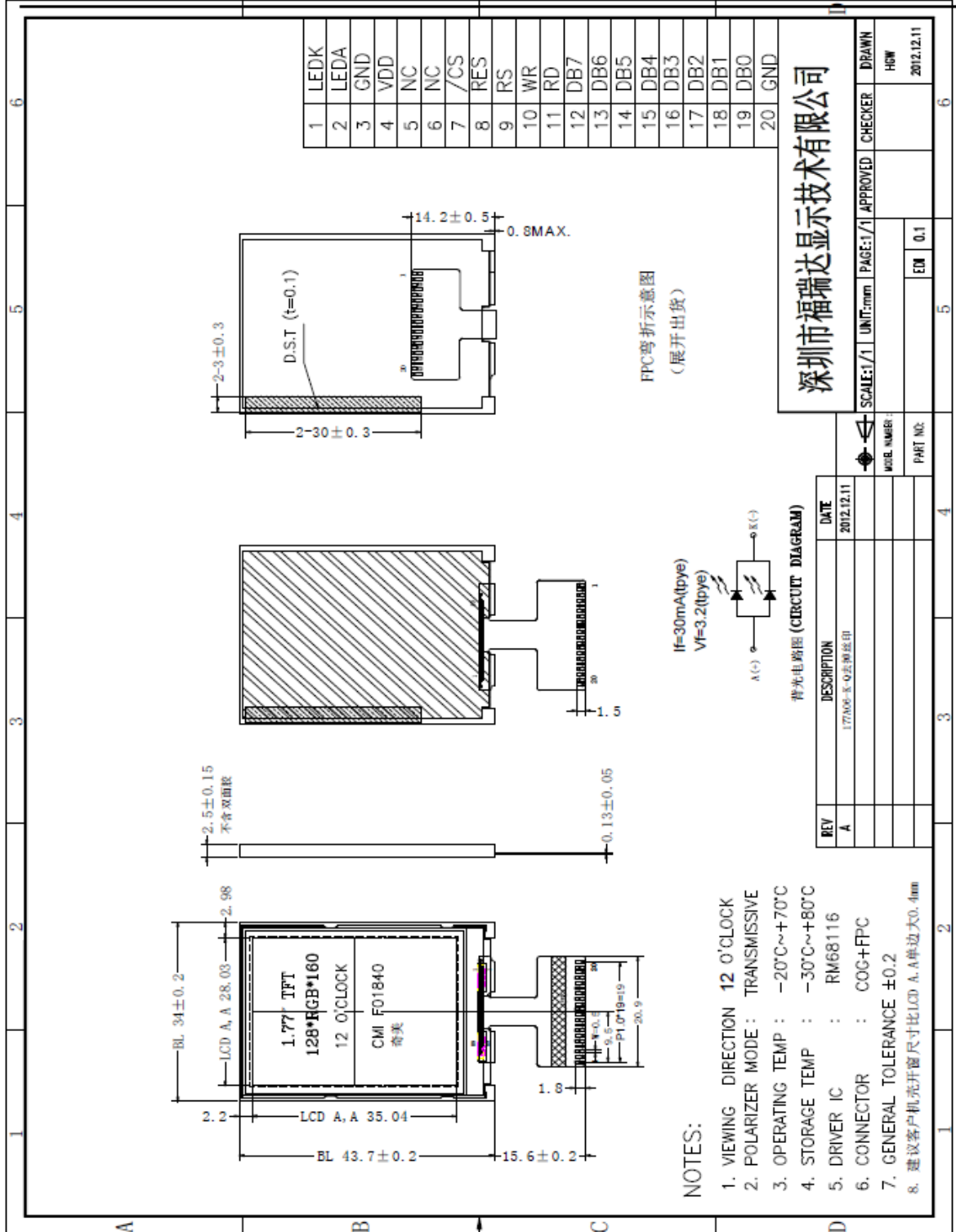It is composed of a color TFT-LCD panel, driver IC, FPC and a back light unit.

The module display area contaiins 128X160 pixels and can display up to 65K colors.

This product accords with ROHS environmentalcriterion

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	262K		1
Viewing Direction	6:00	O'Clock	
Viewing Area(W×H)	-	mm	
Active Area(W×H)	28.03 (H) × 35.04(V) mm	mm	
Number of Dots	128(H)X3(RGB) × 160(V) Dots	mm	
Dot Pitch(W×H)	0.18*0.18	mm	
Controller	RM68116	-	
VDD	2.8V	V	
Outline Dimensions	34 (W) ×43.7 (H)×2.5(D)	mm	
Backlight	LED(white)	-	
Operating Temperature	-20～+70℃	-	
Storage Temperature	-30～+80℃	-	
Weight	TBD	g	2
Polarizer Mode	Transmissive/Negative	-	

2.0 DIMENSIONAL DRAWING

	Pin
1	LEDK
2	LEDA
3	GND
4	VDD
5	NC
6	NC
7	/CS
8	RES
9	RS
10	WR
11	RD
12	DB7
13	DB6
14	DB5
15	DB4
16	DB3
17	DB2
18	DB1
19	DB0
20	GND

深圳市福瑞达显示技术有限公司

SCALE:1/1　UNIT:mm　PAGE:1/1

APPROVED　CHECKER　DRAWN HGW

MODEL NUMBER:
PART NO:
ECN　0.1
2012.12.11

背光电路图 (CIRCUIT DIAGRAM)

If=30mA(tpye)
Vf=3.2(tpye)

REV	DESCRIPTION	DATE
A	177A06-玻-Q首次承认	2012.12.11

FPC弯折示意图
（展开出货）

14.2±0.5
0.8MAX.
2-3±0.3
D.S.T (t=0.1)
2-30±0.3

1.5

2.5±0.15 不含双面胶
0.13±0.05

2.98
BL 34±0.2
LCD A,A 28.03

1.77" TFT
128*RGB*160
12 O'CLOCK
CMI F01840
奇美

RM68116

9.5
P1.0*19=19
20.9

2.2　LCD A,A 35.04
1.8
BL 43.7±0.2　15.6±0.2

NOTES:
1. VIEWING DIRECTION : 12 O'CLOCK
2. POLARIZER MODE : TRANSMISSIVE
3. OPERATING TEMP : -20℃~+70℃
4. STORAGE TEMP : -30℃~+80℃
5. DRIVER IC : RM68116
6. CONNECTOR : COG+FPC
7. GENERAL TOLERANCE ±0.2
8. 建议客户机壳开窗尺寸比LCD A.A单边大0.4mm

Product Specification

3. Absolute Maximum Ratings(Ta=25℃)

Item	Symbol	Min.	Max.	Unit	Remark
Analog power supply	V_{CI}	-0.3	+4.6	V	
Logic input voltage	V_{DD}	-0.3	+4.6	V	
Operating temperature (Ambient)	T_{opr}	-20	+60	℃	
Storage temperature (Ambient)	T_{stg}	-30	+70	℃	

Note 1: If the module exceeds the absolute maximum ratings, it may be damaged permanently.
Also, if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

Note 2: All the measurements should be operated with driver IC and experimental FPC mounted.

4. Electrical Specifications and Instruction Code
Electrical characteristics (Ta=25℃)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Logic Power supply		VDD	Ta=25℃	2.5	2.8	3.3	V	1
Input Voltage	H	VIH		0.8VDD	-	VDD	V	
	L	VIL		0	0	0.2VDD	V	
Output Voltage	H	VOH	IOH = -1.0mA	0.8VDD	-	-	V	
	L	VOL	IOL = +1.0mA	-	-	0.2VDD	V	
Current Consumption		ICC1	Normal mode	18		23	mA	2
		ICC2	Stand-by mode	-	-	-	mA	3

Note 1: The operations are guaranteed under the recommended operating conditions only. These operations are not guaranteed if a quick voltage change occurs during operation.
To prevent noise, a bypass capacitor must be inserted into the line close to the power pin.

Note 2: All the measurements should be operated with driver IC and experimental FPC

Product Specification

5. LED backlight specification

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Forward voltage		Vf	If=30mA	3.0	3.2	3.4	V	
Reverse voltage		Vr					V	
Forward current	Normal	Ipn	2-chip		15		mA	
	Dimming	Ipd						
Reverse Current		Ir	Vr=4V			15	μA	
Uniformity			If=30mA	80%	85%			

6. Interface Signals

Pin No.	Symbol	I/O	Function
1	LEDK		BL LED power-
2	LEDA		BL LED power+.
3	GND		ground.
4	VDD		power supply.2.8V
5	NC		no connect.
6	NC		no connect.
7	/CS		chip enable select pin. L: enable chip.
8	RES		system reset select pin.
9	RS		register select signal pin. L: command H: data.
10	WR		write enable select pin. L: enable.
11	RD		read enable select pin L: enable.
12	DB7		Data Bit
13	DB6		Data Bit
14	DB5		Data Bit
15	DB4		Data Bit
16	DB3		Data Bit
17	DB2		Data Bit
18	DB1		Data Bit
19	DB0		Data Bit
20	GND		ground.

7. Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time (with polarizer)	Rise	Tr	$\theta = 0°$	-	20	35	ms	Note 4, 5
	Fall	Tf		-	15	30	ms	
Contrast ratio (with polarizer)		CR	At optimized Viewing angle	150	300	-		Note 5, 6
Viewing angle (with polarizer)	Top		CR≧10	40	60	-	degree	Note 5, 7
	Bottom			10	20	-		
	Left			25	35	-		
	Right			25	35	-		
Transmittance (without polarizer)		Tm		17	17.6	-		Typ. 7% with HC polarizer
NTSC coverage		N			60%			
Color Filter coordination	Rx		$\theta = 0°$	0.56	0.60	0.64		Measured by C Light source
	Ry			0.28	0.32	0.36		
	Gx			0.27	0.31	0.35		
	Gy			0.57	0.61	0.65		
	Bx			0.11	0.15	0.19		
	By			0.04	0.08	0.12		
	Wx			0.26	0.30	0.34		
	Wy			0.27	0.31	0.35		

Optical specification (Note 1,Note 2, Note 3)

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Product Specification

8. Reliability

No.	Test Item	Test condition	Criterion
1	High Temperature Storage	80℃±2℃ 96H Restore 4H at 25℃	After testing, cosmetic defects should not happen. Total current consumption should not be over 10% of initial value.
2	Low Temperature Storage	-30℃±2℃ 96H Restore 4H at 25℃	
3	High Temperature Operation	70℃±2℃ 48H Restore 4H at 25℃	
4	Low Temperature	-20℃±2℃ 48H Restore 4H at 25℃	
5	High Temperature /Humidity Storage	40℃±2℃ 90%RH 48H	
6	Temperature Cycle	-30℃←→25℃←→80℃ 5min 30min ←→25℃ , 5min after 10cycle, Restore 4H at 25℃	
7	Vibration Test (package state)	10Hz~150Hz, 100m/s2, 120min	Not allowed cosmetic and electrical defects.
8	Shock Test (package state)	Half- sine wave, 300m/s2, 18ms	
9	Atmospheric Pressure Test	25kPa 16H Restore 2H	

Product Specification

9. 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.
a. Be sure to ground the body when handling the LCD Modules.
b. Tools required for assembly, such as soldering irons, must be properly ground.
c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
d. 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 generate

10. Storage precutions

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.

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