



# FORMIKE ELECTRONIC CO.,LTD

## PRDUCT SPECIFICATON

TFT LCD MODULE

MODEL NO. : KWH020ST03-F01

【    】 Preliminary Specification

【 ♦  】 Finally Specification

CUSTOMER'S APPROVAL	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWD	PD REVIEWD	PREPARED BY
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- This specification is subject to change withouth notice.Please contact FORMIKE or it's representative before designing your product based on this specification.

Issued Date: Dec-30-2008



Model: KWH020ST03-F01	Date: 2008/12/29
Appliance: Mobile phone or other	Page time: 2/9

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**1. REVISION RECORD**

REV NO.	Revision Date	Contends
V0	2008/12/29	First Release

Formike Electronic Co., Ltd.



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## 2 GENERAL INFORMATION

Item	Contents	Units
Number of pixel	176 (RGB) *220	pixel
Model out size	35.7*50.6*1.8	mm
View area	-	mm
Active area	31.68(W)*39.6(H)	mm
Pixel Pitch	0.18(W)*0.18 (H)	mm
Duty compare	-	-
<b>DRIVER IC</b>	<b>LGDP4524</b>	-
Viewing Direction	12 O' clock	-
LCD mode	TFT LCD, Transmissive Type, negative mode	-
Craft	COG	-



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### 3.ABSOLUTE MAXIMUM RATINGS

Items	Symbol	Min	Type	Max	Units
Operating temperature	T <sub>OP</sub>	-20	-	+70	°C
Storage temperature	T <sub>ST</sub>	-30	-	+80	°C
Input voltage	V <sub>I</sub>	-0.3	-	V <sub>DD</sub> +0.3	V
Supply Voltage for logic	V <sub>DD</sub>		3.0		V
LCD drive voltage	V <sub>OP</sub>	-	14.0	-	V

### 4.ELECTRICAL CHARACTERISTICS

Items	Symbol	Min	Type	Max	Units
A whole machine logic supply voltage	V <sub>dd</sub> -V <sub>ss</sub>	2.80	3.0	3.20	V
LCD drive voltage	V <sub>LCD</sub> -V <sub>SS</sub>	-	14.0	-	V
Input voltage 'H' level	V <sub>IH</sub>	0.8 V <sub>dd</sub>	-	V <sub>dd</sub>	V
<b>Input voltage 'L' level</b>	V <sub>IL</sub>	V <sub>ss</sub>	-	0.2V <sub>dd</sub>	V
Output voltage 'H' level	V <sub>OH</sub>	0.8V <sub>dd</sub>	-	V <sub>dd</sub>	V
Output voltage 'L' level	V <sub>OL</sub>	V <sub>ss</sub>	-	0.2V <sub>dd</sub>	V
The logic of whole mechanism use current	I <sub>DD</sub>	-	3.0	4.0	mA

### 5.ELECTRO-OPTICAL CHARACTERISTICS

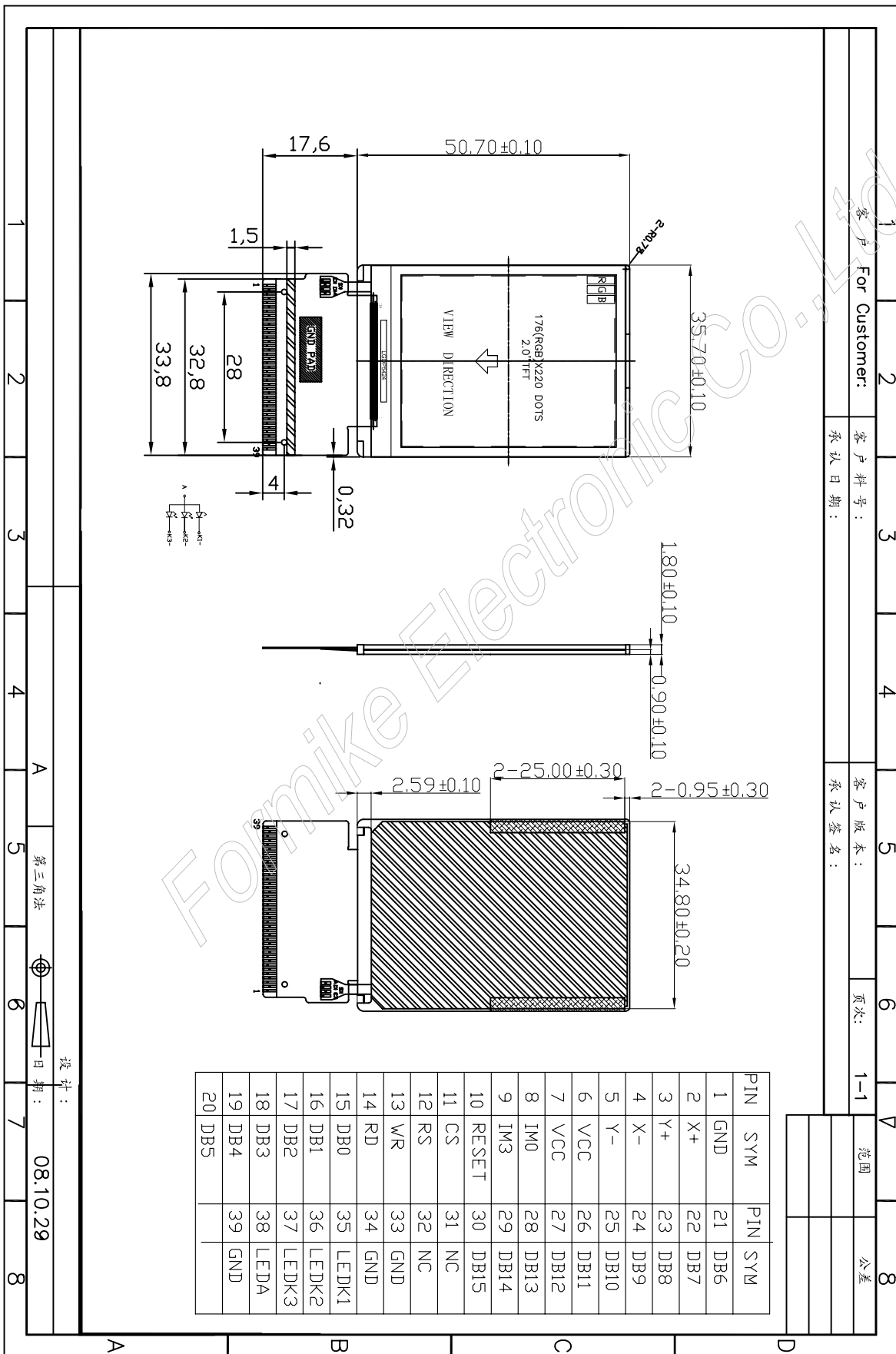
Items	Symbol	Condition	Min	Type	Max	Units
Viewing angle range (V)	θ	CR ≥ 2	-15	-	35	deg
Viewing angle range (H)	ψ	CR ≥ 2	-45	-	45	deg
Contrast ratio	Cr	-	-	200	-	-
Respond time	T <sub>r</sub>	T <sub>a</sub> =25°C	-	10	-	ms
	T <sub>d</sub>	T <sub>a</sub> =25°C	-	20	-	ms



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## 6. INTERFACE DESCRIPTION

Pin number	Symbol	Input/Output	Function description
1	GND	I	Ground
2	X+	-	No use
3	Y+	-	No use
4	X-	-	No use
5	Y-	-	No use
6	VCC	I	Power supply
7	VCC	I	Power supply
8	IM0	-	No use
9	IM3	-	No use
10	RESET	I	Reset signal
11	CS	I	Chip select pin
12	RS	I	Command/data select pin
13	WR	I	Write signal
14	RD	I	Read signal
15	DB0	I/O	Data bus
↓	↓	↓	↓
20	DB5	I/O	Data bus
21	DB6	I/O	Data bus
22	DB7	I/O	Data bus
23	DB8	I/O	Data bus
24	DB9	I/O	Data bus
25	DB10	I/O	Data bus
26	DB11	I/O	Data bus
27	DB12	I/O	Data bus
28	DB13	I/O	Data bus
29	DB14	I/O	Data bus
30	DB15	I/O	Data bus
31	NC	-	No use
32	NC	-	No use
33	GND	I	Ground
34	GND	I	Ground
35	LED-K1	I	Back light cathode1
36	LED-K2	I	Back light cathode2
37	LED-K3	I	Back light cathode3
38	LED-A	I	Back light anode
39	GND	I	Ground



1	2	3	4	5	6	7	8
客户 For Customer:	客户料号:	承认日期:	客户版本:	承认签名:	页次: 1-1	范围	公差

设计: 第三角法  
日期: 08.10.29



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8. PACKING SPECIFICATION

NO.	Material	Material number	Specification size	Number
1	Model			-
2	EPE			-
3	PSplate			-
4	Center case			-
5	Out case			-

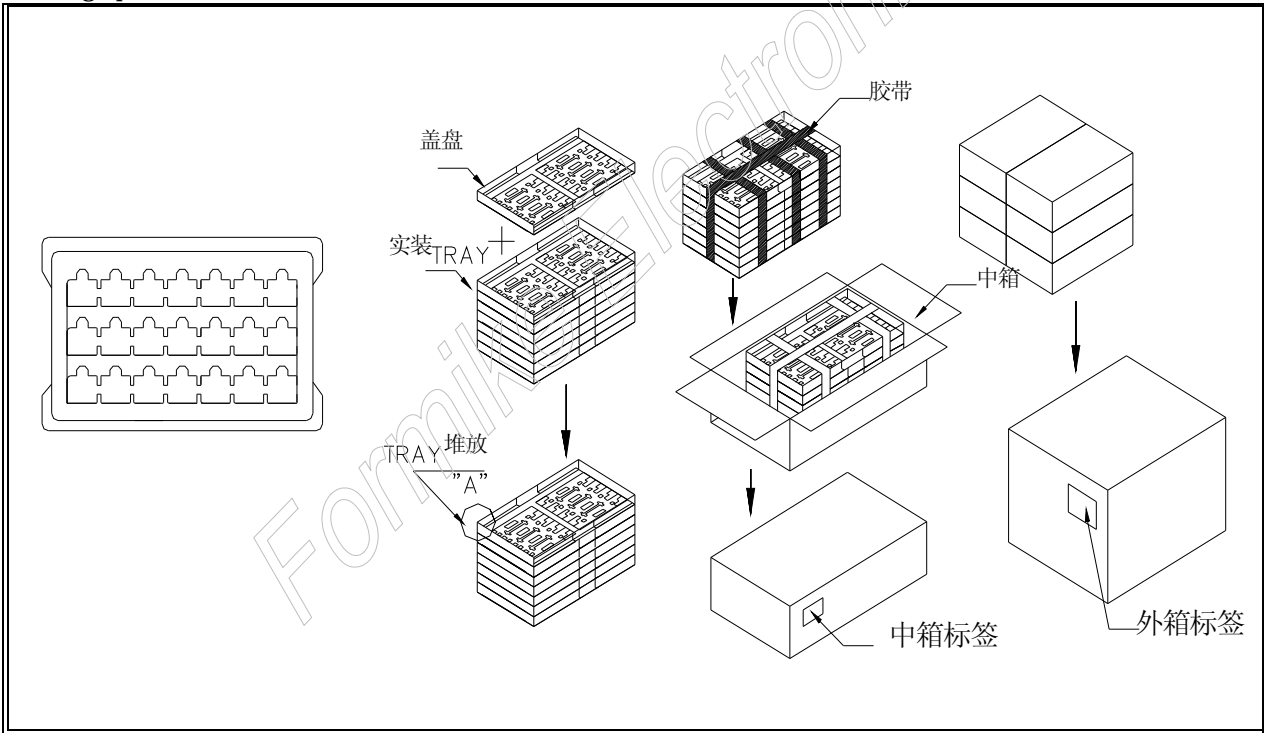
1. Packing size and number

(1) One tray number of products: 12PCS

(2) One little case number of products: 250PCS

(3) One out case of number products: 500PCS

Package picture:



2. Tag specification

(1) Products tag:

Model:
Produce date:

(2) Center tag:

Products model:	
Customers model:	
Batch number:	
Number:	QC confirm

(3) Out tag:

Products model:	
Customer model:	
Batch number:	
Number:	QC confirm



9. INITIAL CODE

Initial Code – LGDP4524 / LPL 2.0\*

\* Condition

- 1. VCI = VCC = IOVCC = 2.8V
- 2. External resistor of OSC = 30K ohm

<b>Initialization</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X07	0X0000	
0X12	0X0000	
0X13	0X0000	
0X14	0X0331	
DELAY		15
0X12	0X0009	
0X11	0X0000	
0X10	0X0104	
0X13	0X0C2A	
0X10	0X0144	
0X11	0X0000	
0X12	0X0019	
DELAY		20
0X13	0X2C2A	
0X10	0X0140	
DELAY		20
0X60	0X2000	
0X60	0X0000	
0X61	0X0002	
0X01	0X011B	
0X02	0X0700	
0X03	0X1030	
0X09	0X0000	
0X0B	0X5D2E	
0X21	0X0000	
0X30	0X0101	
0X31	0X0604	
0X32	0X0007	
0X33	0X0403	
0X34	0X0007	
0X35	0X0402	
0X36	0X0606	
0X37	0X0304	
0X38	0X070E	
0X39	0X070E	
0X3A	0X0101	
0X3B	0X0101	
0X3C	0X0101	
0X3D	0X0101	
0X3E	0X0001	
0X3F	0X0001	
0X42	0XDB00	
0X44	0XAF00	
0X45	0XDB00	
0X71	0X0040	
0X72	0X0002	
DELAY		10
0X10	0X3250	
0X07	0X0001	
DELAY		30
0X07	0X0021	
0X07	0X0023	
DELAY		30
0X07	0X0037	

Power ON sequence

Display & Gamma settings

Display ON sequence

<b>SLEEP ON</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X07	0X0036	
DELAY		20
0X07	0X0026	
DELAY		20
0X07	0X0000	
DELAY		10
0X10	0X0004	
0X12	0X0000	
0X13	0X0000	
DELAY		10
0X10	0X0006	

<b>SLEEP EXIT</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X10	0X0004	
↓		
Power ON sequence		
↓		
Display ON sequence		

<b>STAND-BY ON</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X07	0X0036	
DELAY		20
0X07	0X0026	
DELAY		20
0X07	0X0000	
DELAY		10
0X10	0X0004	
0X12	0X0000	
0X13	0X0000	
DELAY		10
0X10	0X000C	

<b>STAND-BY EXIT</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X10	0X0004	
↓		
Power ON sequence		
↓		
Display ON sequence		

<b>DEEP STAND-BY ON</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
0X07	0X0036	
DELAY		20
0X07	0X0026	
DELAY		20
0X07	0X0000	
DELAY		10
0X10	0X0004	
0X12	0X0000	
0X13	0X0000	
DELAY		10
0X10	0X0005	

<b>DEEP STAND-BY EXIT</b>		
Reg (Hex)	Data (Hex)	Delay (ms)
6 times CS pin toggle or RESET		
DELAY		20
<b>Initialization</b>		