SHENZHEN XINGYUHE CO.,LTD

SPECIFICATIONS

CUSTOMER :

PRODUCT : LCD Module

SAMPLE CODE : JGG12864A03

VER : 1.0

Customer Approved	Confirmed	Designer

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1.Subject and Scope

1.1. The specification is made for JGG12864A03 LCD, including technical requirement, test method, inspection rules and parameter specifications.

1.2. The FSTN LCD is positive transmissive type, and uses multi-driven method with 1/65duty, 1/9 bias and operation voltage of 8.70V.

2. Reference Standards

Q/IGS 0003-1998 Detailed Specification of STN-LCD for Instruments and Calculator

GB/T4619-1996 Test Method for LCD

GB7290 Test Method for Dynamic driving LCD

GB2828 Sampling Method and Sampling Table for Lots Inspection and Count

3. Conditions of Operation Guarantee

3.1.Temperature Ranges

Storage Temperature	-30 ...80	[°C]
Operating Temperature	-20 ... 70	[°C]

3.2.Relative Air Humidity

Annual Avarage	= 75	[%RH]
30Days/Year	= 85	[%RH]
Short Time	= 95	[%RH]

3.3.Component Life Cycle

Storage Life	= 8	[Years]
Overall Component Life	= 8	[Years]
Operation Life	= 150.000	[h]

3.4.Polarizer

No crack or critical light circle in V.A

3.5.Display conditions

The LCD should be driven by the specified operation voltage, tested by LCD tester. Electrode shortcut, display of Electrode lines , no display and partial display are not allowed. Contrast ratio should be consistent.

3.6 LCD pattern drawing and size

Confirm to the requirement of item 4 .

3.7 LCD structural material

3.7.1. Main material for LCD producing supplied by the manufacturers are listed in item

3.7.2.Samples or report will be presented when manufacturer alters.

3.7.3. Manufacturers

Polorizer SANLIPU Co., Ltd. (China)
ITO Glass TIAN ZE Co., Ltd. (China)
Liquid Crystal YONGSHENGHUAQING Co., Ltd (German)

3.8.1.Polarizer

3.8.1.1. Polarizer position : Polarizer should be plan ,be not awry ,and be free of bubble, peel and contaminant. Remove the protection film of the upper polorizer before use ,avoid hard object ,fingers or chemicals contacting the LCD surface.

3.8.1.2 The polarizer should cover the whole seal frame area and should not exceed the glass edge and should not cock up.

Defect specification

Item	Details	Section Dimension [mm]	defects	defect type
non display	no non display is allowed		disallowed	major
irregular operating	no irregular operatings are allowed		disallowed	major
short	no shorts are allowed		disallowed	major
open	any segments or common patterns that don't activate are rejectable		disallowed	major
over current	the total current required to activate all segments should not exceed the limit current in the specifications for approval on the test voltage		disallowed	major
maximum rating	values that don't meet the ratings noted in the specification		disallowed	major
backlight	- no lighting is rejectable - flickering and abnormal lighting is rejectable		disallowed	major
black and white spots	dust, bubbles, dents or defective aligmentin the cell or polarizer filter, also dust or dirt between glass and lens	$\varnothing \leq 0,1$ $0,10 < \varnothing \leq 0,20$ $0,20 < \varnothing \leq 0,25$ $0,25 < \varnothing \leq 0,30$ $0,30 < \varnothing$	nc 3 0 0 0	minor
black and white lines	scratches, dust in the orientation of the cell or polarizer filter	$W \leq 0,01$ $W \leq 0,02$ $L \leq 5,0$ $W \leq 0,03$ $L \leq 3,0$ $W \leq 0,05$ $L \leq 2,0$ $W \leq 0,06$ $L \leq 1,0$	nc 3 2 1 0	minor
SUM of allowable defects			5	
bubbles in the polarizer	bubbles between the polarizer and glass	$\varnothing \leq 0,2$ $0,20 < \varnothing \leq 0,50$ $0,50 < \varnothing \leq 1,00$ $1,00 < \varnothing$	n.c. 2 1 0	minor

Item	Details	Section	defects	defect type
SUM of allowable defects			3	
Misformed Dots Dents Projection without connections to adjacent dots Connection to adjacent dot Pin Hole		≤ 0.15 mm > 0.15 mm ≤ 0.05 mm > 0.05 mm (X+Y)/2: ≤ 0.2 mm (X+Y)/2: > 0.2 mm.	3 0 3 0 3 0	
SUM of allowable defects			3	
newton rings rainbow colour	no rainbow colour is allowed in the optimum contrast on state within the active area no newton rings are allowed in the plastic cover		disallowed	minor
chromaticity uniformity	uneven colour caused by uneven gaps between glass		disallowed	minor

(Note: nc = not counted)

3.8.2 Glass defect

3.8.2.1 Glass defect on ITO layer at ledge area (figure 1)

Defects allowed unit: mm

item	Thickness of defect (a)	Width of defect (b)	Length of defect (c)	Numbers
01	a ≤1 / 2 t	b ≤ 0,5	c ≤ 2	N ≤ 2

3.8.2.2 Glass defect at reverse side or non ITO layer ledge (figure2)

Defects allowed unit: mm

item	Thickness of defect (a)	Width of defect (b)	Length of defect (c)	Numbers
01	a ≤1 / 2 t	b ≤ 0,5	c ≤ 2	N ≤ 2

Outside or inside defects out of ledge area

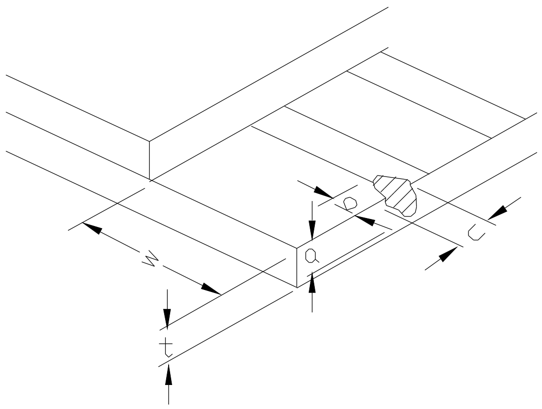


图1

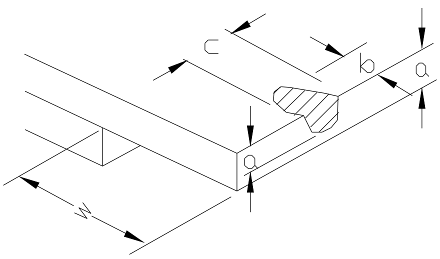


图2

For outside defects out of ledge area (figure3) unit: mm

item	Thickness of defect (a)	Width of defect (b)	Length of defect (c)	Numbers
01	a ≤ t	b ≤ S	c ≤ 1	
02	a ≤1 / 2 t	b ≤ S	c ≤ 3	N ≤ 3
03	a ≤1 / 3 t	b ≤ S	c ≤ 5	N ≤ 3

For inside defects out of the ledge area (figure4) unit mm

item	Thickness of defect (a)	Width of defect (b)	Length of defect (c)	Numbers
01	a ≤ t	b ≤ h	c ≤ 1	
02	a ≤1 / 2 t	b ≤ h	c ≤ 3	N ≤ 3
03	a ≤1 / 3 t	b ≤ h	c ≤ 5	N ≤ 3

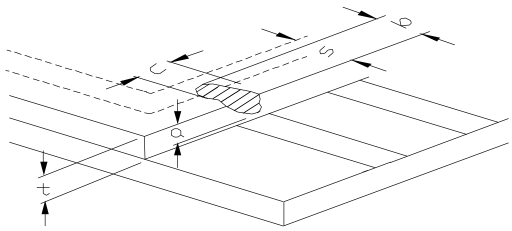


图3

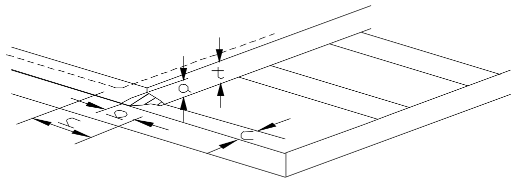


图4

3.8.2.4 Defects at the corner (figure5) unit: mm

item	Thickness of defect (a)	Width of defect (b)	Length of defect (c)	Numbers
01	a ≤ t	b ≤ 2,0	c ≤ 2	N ≤ 3

3.8.2.5 The flare (b<1/4W,C<10mm) at ledge is allowed. For short edge, b≤1/5W should be satisfied.

Defect part related silver dot:

(1) Exposure part of the silver dot exceed 1/5 is not allowed.

(2) The remains smaller than 0.44mm is not allowed.

3.8.2.6 Crack

Any kind of crack is not allowed.

3.8.2.7 Size

Exceeding the size marked in drawing is not allowed.

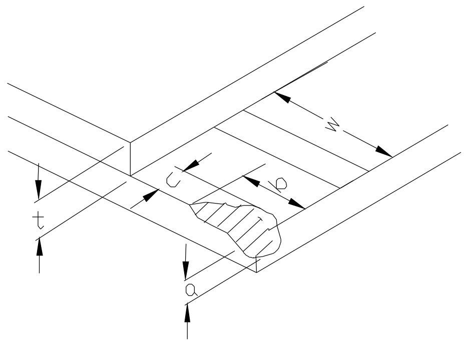


图5

3.8.3 Inside scratches and silk shape contaminant

Inside scratches and silk shape contaminant should not exceed the following regulations

Spec for small size LCD unit: mm

Length / Numbers / Width	≤1	1<L≤1.5	1.5<L≤2
W≤0.02	3	2	1
0.02<W≤0.06	2	1	
0.06<W≤0.08	1		

Spec for large size LCD unit mm

Length / Numbers / Width	≤1	1<L≤1.5	1.5<L≤2	2<L≤2.5
W≤0.02	4	3	2	1
0.02<W≤0.04	3	2	1	
0.04<W≤0.06	2	1		
0.06<W≤0.08	1			

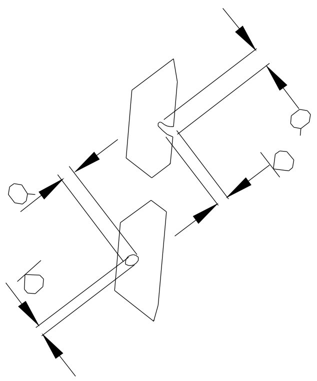
3.8.4.Epoxy frame

3.8.4.1 Crack, bubble and contaminant in epoxy frame should not be allowed.

3.8.4.2 The size of protruding and hollow should not exceed 0.3mm.

3.8.5 Pinhole

Size (mm)	Inspection requirement
(a+b)/2≤0.2	3
(a+b)/2≤0.15	neglect

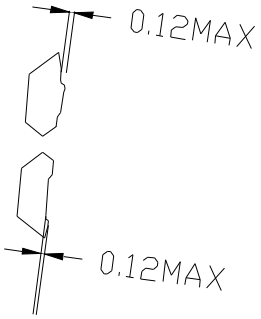


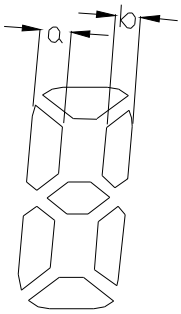
3.8.6 . Segment splinter and out of shape

3.8.6.1 Splinter

3.8.6.2. Out of shape |a-w |≤0.12 |b-w |≤0.12

Note :w is the standard width of segment.





3.9 Display characteristics(25℃)

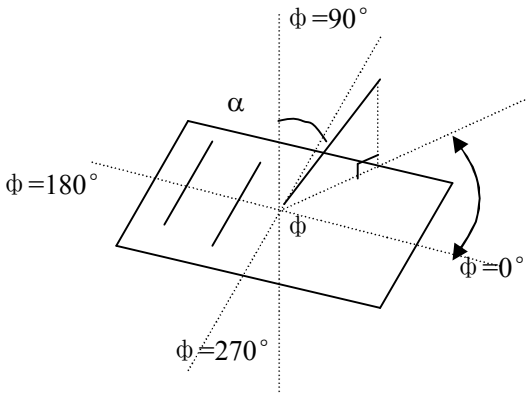
3.9.1 ELECTRO --- OPTICAL CHARACTERISTICS

Measuring conditions : Tamb = 25ºC , with Temperature Compensation.

Vop = Voptyp , f = 100 Hz

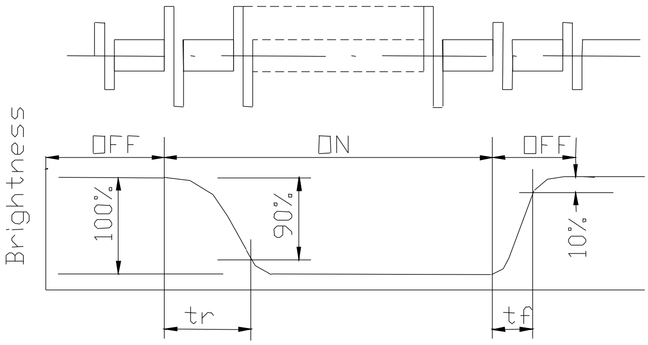
Item	Condition		Symbol	Min.*	type	max	Unit
Viewing Reflective	Cr > 3	ϕ=0°	α	30	45		deg.
		ϕ=90°	α	10	20		deg.
		ϕ=180°	α	30	45		deg.
		ϕ=270°	α	30	45		deg.
Contrast	α = 0°	ϕ=0°	Cr		5		-

* Zijing provide reference samples



ITEM	SYMBOL	CONDITIONS	TYP	MAX	UNIT	REMARKS
Response time	Ton	Tamb= + 25ºC 0ºC -10ºC	220 730 1900	400 1400 3700	ms	α=10°, ∅=∅opt
	Toff	Tamb= + 25ºC 0ºC -10ºC	100 210 600	170 750 1300	ms	

3.10.3. Response time



4 .PD drawing of LCD

See attached drawings.

5. Quality guarantee system and inspection regulations

5.1 To guarantee the LCD quality meet requirements of products standard, LCD should go through the following process of quality management, inspection and test, or regulations.

5.2 Material management

5.2.1 Main material should purchasing from decided manufacturer according to item 3.7.2.

5.2.2 The material of each lot should be confirmed by the approval of sampling test and process test. Sampling test should be employed for cosmetic character and some electric optical character testing. Process test for lot production including test in aspect of electric character , optical character, process character, reliability and conformity.

5.3 Process quality management

5.3.1 Process management conditions: To guarantee process quality of product-in-process, strict administration should be applied to process control according to process conditions stipulated by the process flow.

5.3.2 Process quality management of semi-finished product

5.3.2.1 Semi-finished product inspection within photo etching line: Carry out sampling test according to inspection standard of photo-etching line.

5.3.2.2 Cell assembly quality inspection : Carry out 100% visual inspection according to cell assembly test standard. AQL=2.5% ; test by CANON cell gap meter .

5.3.2.3 Cutting. quality inspection : Carry out 100% visual inspection according to product size and cutting inspection standard.

5.3.2.4 Electric test: For filled-cells ,carry out 100% inspection in aspect of switch-on, switch-off and power consumption characters according display quality requirement and inspection standard.

5.4 Finished product quality management:

5.4.1 Finished product inspection:Only after carrying out inspection by manufacture Dept., can the LCD be submitted to quality control Dept. For inspection. The finished product inspection should be carried out based on production lot. The products lot of the same model should be manufactured in almost the same time and process, and from almost the same material .

5.4.2 Finished product inspections include: electric inspections, optical-electric inspections, mechanic inspections and cosmetic inspections. (see table 5.4.3)

5.4.3 When any defect in table 5.4.3 occurs , the LCD should be treated as off-spec product.

5.4.4 Finished products sampling regulations and judgement procedure: according to the inspection II and one time sampling scheme of GB2828.Make the judgement of on/off spec according to the lot quantity and AQL value specified.

5.4.5 The off-spec lot should be returned to manufacturing Dept. for inspection, being repaired or selected according to the defects and record be established.

5.4.6 The above lot LCD been processed may be judged according to the AQL value stipulated in terms5.4.1, 5.4.2 and 5.4.3.

5.5 Reliability test

5.5.1 Standard Test Conditions

Unless specified, the following test conditions apply:

Temperature:	18 .. 28	[°C]
Air Pressure:	860 ... 1060	[mbar]
Relative Humidity:	45 ... 75	[%RH]

5.5.2 Air Pressure

Air pressure	150 ... 3100	[mbar]

5.5.3 Dry Heat

(Test in accordance with DIN IEC 68-2-2)

Temperature	45°C/55°C
Duration	16h

Result: 100% functionality, no change to equipment.

5.5.4 Constant cold

(Test in accordance with DIN IEC 68-2-1)

Temperature	-5°C/-10°C
Duration	16h

Result: 100% functionality, no change to equipment.

5.5.5Moist Heat Cyclic

(Test in accordance with DIN IEC 68-2-30 Var. 1)

Relative humidity	95%
Cycle time	9h + 9h
Upper temperature	40 ± 3°C/90 – 96%r.h.
Lower temperature	25 ± 3°C/95 – 100%r.h.
# of cycles	2

Result: 100% functionality, no change to equipment.

5.5.6 Moist Heat Constant

(Test in accordance with DIN IEC 68-2-3)

Relative humidity	93 +2-3%
Upper temperature	40 +-2°C
Duration	4d

Result: 100% functionality, no change to equipment.

5.5.7 Temperature Change

(Test in accordance with DIN IEC 26-2-14)

Lower temperature	-25°C
Upper temperature	+55°C
Temperature change	1°C/min +- 0.2°C/min
# of cycles	5
Sustaining time	3h

Result: 100% functionality, no change to equipment.

5.5.8 Shock

(Test in accordance with DIN IEC 68-2-27)

Pulse duration	6 ms
Acceleration	1500 m/s^2
No. of shocks	3 each axis

The shock acceleration will be performed by Siemens at the complete set.

5.5.9 Mixed gas test

(Test in accordance with SN 29065 Part 8)

Gas concentrations

SO_2	10 cm^3/m^3	Subtest1
H_2S	1 cm^3/m^3	Subtest2
Mixed gas:		Subtest3

SO_2 0.2 cm^3/m^3

H_2S 0.01 cm^3/m^3

NO_2 0.2 cm^3/m^3

CL_2 0.01 cm^3/m^3

Test climate 25°C/75%RH

Duration Subtest1: 4d (in this order!)

Subtest2: 4d

Subtest3: 10d

Result: 100% Functionality, no material ageing observed.

5.5.10 Heat with sunshine

(Test in accordance with DIN IEC 68-2-5, Test Sa, Procedure C)

Ambient temperature 55°C

Radiation 1120W/m^2

Duration 8h

Result: 100% Functionality, no material ageing observed. Contrast reduction must not exceed 20%.

Acceptance level table

Defect types	Sampling procedures	AQL (first 6 month after production start)	AQL (after 6 month of production start)	AQL (after 12 month of production start)
Major defect	ISO2859, single sampling plan (normal inspection)	0.25	0.1	0.065
Minor defect	ISO2859, single sampling plan (normal inspection)	1.0	0.65	0.25

6.Electrical Characteristics

6.1 Absolute maximum rating

AC – Voltage: <12v V_{rms}

DC – Voltage: <=50mv V_{dc}

6.2 Operating Conditions (T_{amb}: +25°C)

Frame frequency: f = 100Hz
Operating Voltage: Vop = 8.70V

6.3 Current Consumption

Drawing label

6.4 Temperature Compensation of Contrast

TC: 4.0mV/°C

深圳市兴宇合电子有限公司

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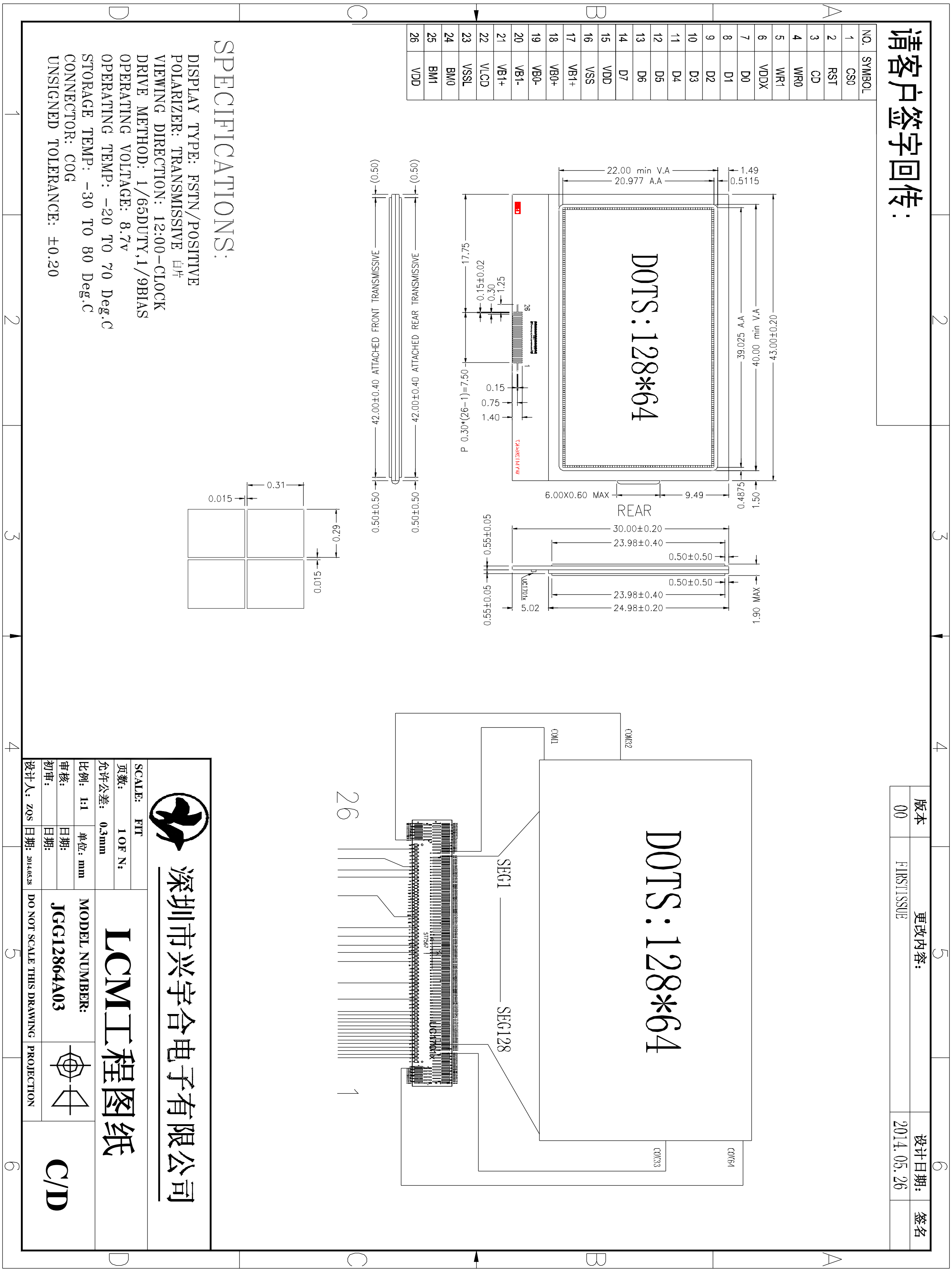

NO.	SYMBOL
1	CS0
2	RST
3	CD
4	WR0
5	WR1
6	VDDX
7	D0
8	D1
9	D2
10	D3
11	D4
12	D5
13	D6
14	D7
15	VDD
16	VSS
17	VB1+
18	VB0+
19	VB0-
20	VB1-
21	VB1+
22	VLCD
23	VSSL
24	BM0
25	BM1
26	VDD

SPECIFICATIONS:

DISPLAY TYPE: FSTN/POSITIVE
POLARIZER: TRANSMISSIVE 白片
VIEWING DIRECTION: 12:00-CLOCK
DRIVE METHOD: 1/65DUTY,1/9BIAS
OPERATING VOLTAGE: 8.7v
OPERATING TEMP: -20 TO 70 Deg.C
STORAGE TEMP: -30 TO 80 Deg.C
CONNECTOR: COG
UNSIGNED TOLERANCE: ±0.20