SPECIFICATION

FOR

TFT LCD MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HL MODEL : HG025HV006

☐ **Preliminary Specification**

■ **Final Specification**

Customer Confirmation column:

Approved by :_____ Dept. :_____ Data :_____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by

RECORDS OF REVISION

Date	Rev.	Description	Note	Page
2024\09\28	**A**	**New sample**		

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	272(R+G+B) * 480 Dots
LCD Type	a-Si /Transmissive
Viewing Direction	ALL O'clock
Backlight	5 LED White
Interface	MCU 16bit
Controller/driver IC	ST7796

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	33.89(W) x 60.32(L) x 2.08(T)	mm
Viewing Area	30.79(W) x53.88(L)	mm
Active Area	30.19(W) x53.28(L)	mm
Pixel pitch	37(H)×111(V)	um

Note：For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V_{DD}	-	-0.3	4.6	V
LCD Driver Supply Voltage	VGH-VSS	-	-0.3	18.5	V
Input voltage	Vin		-0.3	4.6	V
Operating Temperature	T_{OP}	-	-20	+70	°C
Storage Temperature.	T_{ST}	-	-30	+80	°C
Storage Humidity	H_D	Ta < 40 °C	-	90	%RH

1.4 DC Electrical Characteristics

V_{DD} = 2.4~3.3V, V_{SS} = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Type	Max.	Unit
Logic Supply Voltage	V_{DD}	-	2.4	2.75	3.3	V
"H" Input Voltage	V_{IH}	-	0.8 V_{DD}	-	V_{DD}	V
"L" Input Voltage	V_{IL}	-	V_{SS}	-	0.2 V_{DD}	V
"H" Output Voltage	V_{OH}	-	0.8V_{DD}	-	V_{DD}	V
"L" Output Voltage	V_{OL}	-	V_{SS}	-	0.2 V_{DD}	V
Supply Current	I_{DD}	V_{DD} = 2.8V	-	-	-	mA

1.5 Optical Specification

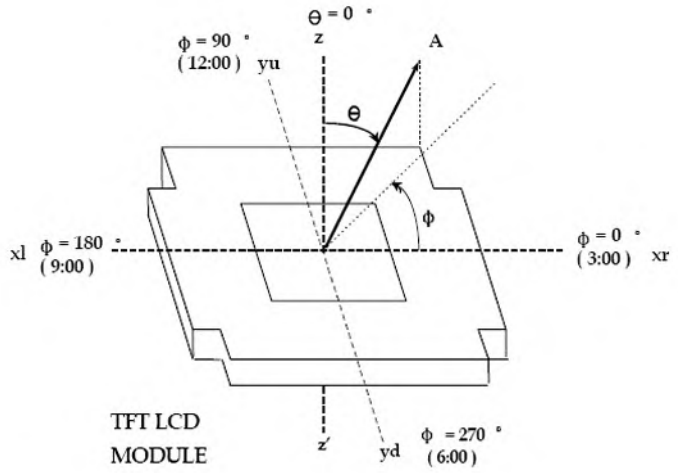
Optical characteritics are determind after the unit has been on and stable for approximately 30 minutes dark environment at 25℃.the value specified are at an approximate distance 500mm from the lcd surface at a viewing angle and θ equal to 0

1.5.1 Optical Characteristics

Ta = 25°C

parameter		Symbol	Condition	Min	Typ	Max	Unit
Viewing Angle	Φ =0° (3:00)	θ	Cr＞10	-	85	-	deg
	Φ =90° (12:00)			-	85	-	
	Φ = 180° (9:00)			-	85	-	
	Φ= 270° (6:00)			-	85	-	
Contrast ratio		Cr	θ=0 Φ=0	-	600	-	
Respone time		Tr+Tf		-	(35)	-	ms
Surface Luminance		Lv		-	(300)	-	Cd/m2

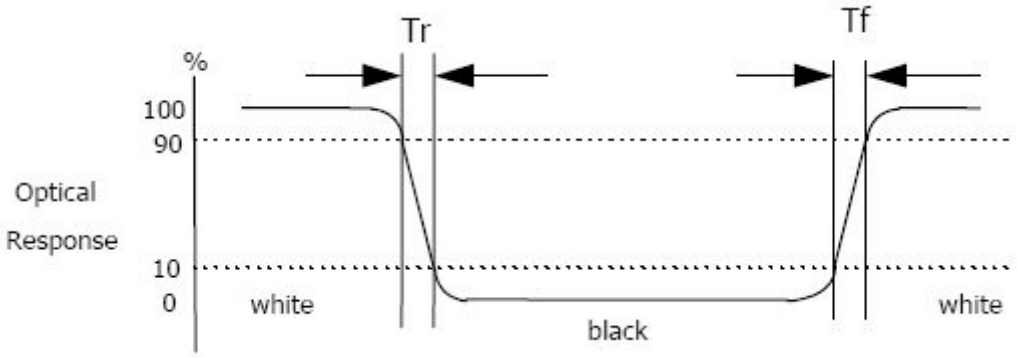
1.5.2 Measurement system



(1)LCD Viewing Angle

viewing angle is the angle at which the contrast ratio is greater than 10.the angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the lcd surface.

(2) Response time



Response time is the time required for the display to transition from white to black (Rising time, Tr) and from black to white (Falling time, Tf).for additional information

(3)Contrast Ratio(CR)

Contrast Ratio(CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

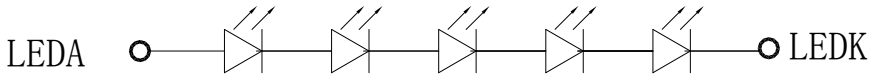
Surface luminance is the center point across the lcd surface 500mm from the surface with all pixels displaying white.

1.6 Backlight Circuit Characteristics(5 LEDs Serial connection):

Item	Symbol	Min	Typ.	Max.	Unit	Condition
Operating voltage	V_{LED}	-	15	-	V	I_{LED} =20 mA
Operating current	I_{LED}	—	80	—	mA	-
Life Time	Hr	20000				I_{LED} =20 mA

Backlight use constant current drive!

BACKLIGHT CIRCUIT:

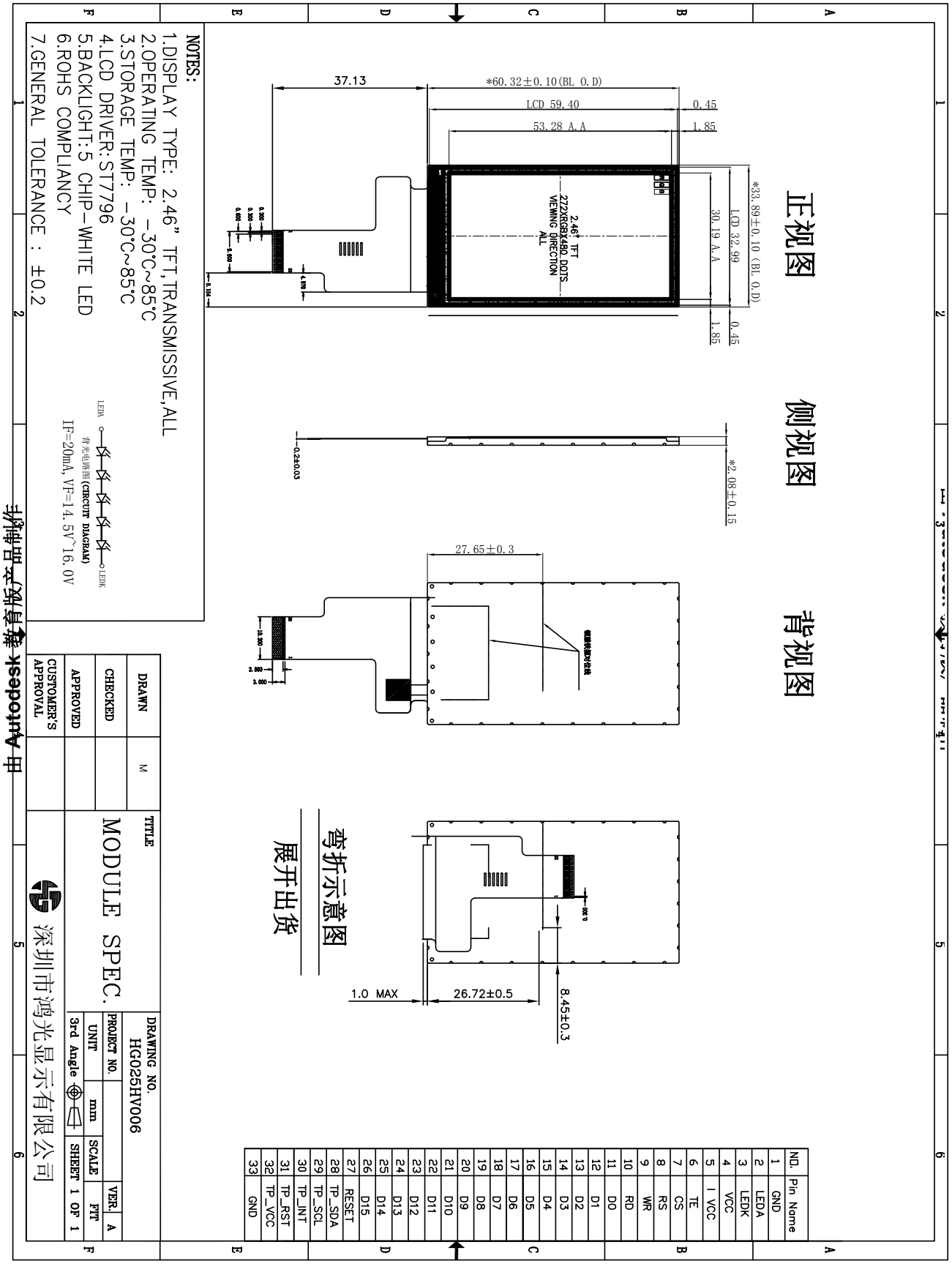


背光电路图(CIRCUIT DIAGRAM)

IF=20mA, VF=14.5V~16.0V

2. MODU1LE STRUCTURE

2.1 Counter Drawing



Interface Pin Description

NO	SYMBOL	FUNCTION
1	GND	Power ground
2	LEDA	BACK LIGHT +
3	LEDK	BACK LIGHT -
4	VCC	Power supply （2.8V-3.3V）
5	IOVCC	Power supply （1.8V-3.3V）
6	TE	Tearing effect output
7	CS	Chip select input pin (“Low” enable)
8	RS	Register selection signal
9	WR	Write select signal
10	RD	Read select signal
11-26	D0~D15	Data bus
27	RESET	Reset signal
28	TP_SDA	SDA pin for CTP
29	TP_SCL	SCL pin for CTP
30	TP_INT	INT pin for CTP
31	TP_RST	Reset Pin for CTP
32	TP_VCC	Power supply for CTP
33	GND	Power ground

2.3 Timing Characteristics

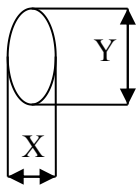
Please refer to ST7796 DATASHEET.

2.4 Display Command

Please refer to ST7796 DATASHEET.

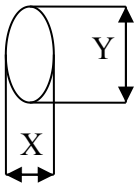
3. INSPECTION SPECIFICATIONN

NO.	项目 Item	经验标准 Inspection Standard	判断 Result	备注 Note
1	整体功能 All functional defects	1）不显示 No display 2）显示异常 Display abnormally 3）缺划（横或竖，横&竖）Missing vertical, horizontal segment 4）短路 Short circuit 5）背光不亮或闪烁 Backlight no lighting, flickering and abnormal lighting.	不允许 Reject	
2	缺失 Missing	少成分 Missing component	不允许 Reject	
3	外观尺寸 Outline dimension	同 CD 图 Overall outline dimension beyond the drawing is not allowed		

NO.	项目 Item	检验标准 Inspection Standard	备注 Note
4	清楚的黑白点 Clear Spots	ϕ=（X+Y）/2  A：AA 区（显示区） B：VA 区（可视区） C：可视区以外(Out of VA)	

区域 Zone / 尺寸 Size	接受个数 Acceptable Quantity		
	A	B	C
ϕ≤ 0.1mm	Ignore		
0.1mm<ϕ≤0.2mm	3		Ignore
0.2mm<ϕ≤0.25mm	2		
ϕ>0.25mm	0		

<table>
<tr><th>NO.</th><th>项目
Item</th><th>检验标准
Inspection Standard</th><th>备注
Note</th></tr>
<tr><td>5</td><td>不明显的黑白点
Dim Spots</td><td>
ϕ=（X+Y）/2

A：AA 区（显示区）
B：VA 区（可视区）
C：可视区以外(Out of V.A.)


<table>
<tr><th rowspan="2">区域 Zone
尺寸 Size</th><th colspan="3">接受个数
Acceptable Quantit</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>ϕ≤ 0.3mm</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.3mm<ϕ≤0.6mm</td><td colspan="2">2</td></tr>
<tr><td>ϕ>0.6mm</td><td colspan="2">0</td></tr>
</table>
</td><td></td></tr>
<tr><td>6</td><td>线不良
Line defect</td><td>
<table>
<tr><th colspan="2">尺寸 Size（mm）</th><th colspan="3">接受个数 Acceptable Quantity</th></tr>
<tr><th>L（Length）</th><th>W（width）</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>L〈5.0</td><td>0.03〈W≤0.05</td><td colspan="2">2</td></tr>
<tr><td></td><td>0.05〈W</td><td colspan="2">以脏污论
Define as spot defect</td></tr>
</table>
</td><td></td></tr>
<tr><td>7</td><td>偏光片刮伤
Polarizer Scratch</td><td>
<table>
<tr><th colspan="2">尺寸 Size（mm）</th><th colspan="3">Acceptable Quantity</th></tr>
<tr><th>L（Length）</th><th>W（width）</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>L≤10</td><td>0.03〈W≤0.05</td><td colspan="2">2</td></tr>
<tr><td>L〈5.0</td><td>0.05〈W≤0.08</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.08〈W</td><td colspan="2">0</td></tr>
</table>
</td><td></td></tr>
</table>

<table>
<tr>
<td>8</td>
<td>偏光片与玻璃间气泡
Polarize Air bubble</td>
<td>
<table>
<tr><td rowspan="2">区域 Zone
尺寸 Size</td><td colspan="3">接受个数
Acceptable Quantity</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>φ≤ 0.2mm</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.2mm<φ≤0.3mm</td><td colspan="2">2</td></tr>
<tr><td>0.3mm<φ≤0.5mm</td><td colspan="2">1</td></tr>
<tr><td>φ>0.5mm</td><td colspan="2">0</td></tr>
</table>
</td>
<td></td>
</tr>
</table>

4. PRECAUTION RELATING PRODUCT HANDLING

4.1 SAFETY

4.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

4.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

4.2 HANDLING

4.2.1 Avoid any strong mechanical shock which can break the glass.

4.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.

4.2.3 Do not remove the panel or frame from the module.

4.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, Do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

4.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.

4.2.6 Do not touch the display area with bare hands , this will stain the display area.

4.2.7 Do not use ketonic solvent & aromatic solvent. Use with a soft cloth soaked with A cleaning naphtha solvent.

4.2.8 To control temperature and time of soldering is 280 ± 10°C and 3-5 sec.

4.2.9 To avoid liquid (include organic solvent) stained on LCM.

4.3 STORAGE

4.3.1 Store the panel or module in a dark place where the temperature is 25°C ± 5°C and the humidity is below 65% RH.

4.3.2 Do not place the module near organics solvents or corrosive gases.

4.3.3 Do not crush, shake , or jolt the module.