

客户名称(CUSTOMER) : \_\_\_\_\_

型号名称(LCM CODE (Ver.)) : **ST032D0P-R63 (Ver: 0)**

描述(Description) : **3.2" a-Si TFT 液晶显示屏**

<p>客户确认: <b>CUSTOMER APPROVED:</b></p>	
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APPROVED BY	CHECK BY	PREPARED BY

# LCM SPECIFICATION

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## RECORDS OF REVISION

Date	Rev.	Description	Note	Page
2011/09/15	0	New sample		

# **LCM SPECIFICATION**

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# LCM SPECIFICATION

## 1. SPECIFICATIONS

### 1.1 Features

Item	Standard Value
Display Type	240(R+G+B) * 400 Dots
LCD Type	a-Si TFT, Positive, Transmissive
Viewing Direction	12 O'clock
Backlight	6-LED White Color
Interface	8080 MPU interface 8 bit bus
Controller/driver IC	RM68080

### 1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	80.70 (L) x 47.60(W) x 3.4(T)	mm
Viewing Area	71.50(L)X43.76(W)	Mm
Active Area	69.60 (L) x41.76 (W)	mm
Pixel pitch	0.174 (H) x 0.174 (V)	mm

Note : For detailed information please refer to LCM drawing

### 1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V <sub>DD</sub>	-	-0.3	4.6	V
LCD Driver Supply Voltage	V <sub>GH-VSS</sub>	-	-0.3	18.5	V
Input voltage	V <sub>in</sub>		-0.3	4.6	V
Operating Temperature	T <sub>OP</sub>	-	-20	+70	°C
Storage Temperature.	T <sub>ST</sub>	-	-30	+80	°C
Storage Humidity	H <sub>D</sub>	Ta < 40 °C	-	90	%RH

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## 1.4 DC Electrical Characteristics

$V_{DD} = 2.4 \sim 3.3V$ ,  $V_{SS} = 0V$ ,  $T_a = 25^\circ C$

Item	Symbol	Condition	Min.	Type	Max.	Unit
Logic Supply Voltage	$V_{DD}$	-	2.4	2.8	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	$I_{DD}$	$V_{DD} = 2.8V$	-	4	6	mA

## 1.5 Optical Characteristics

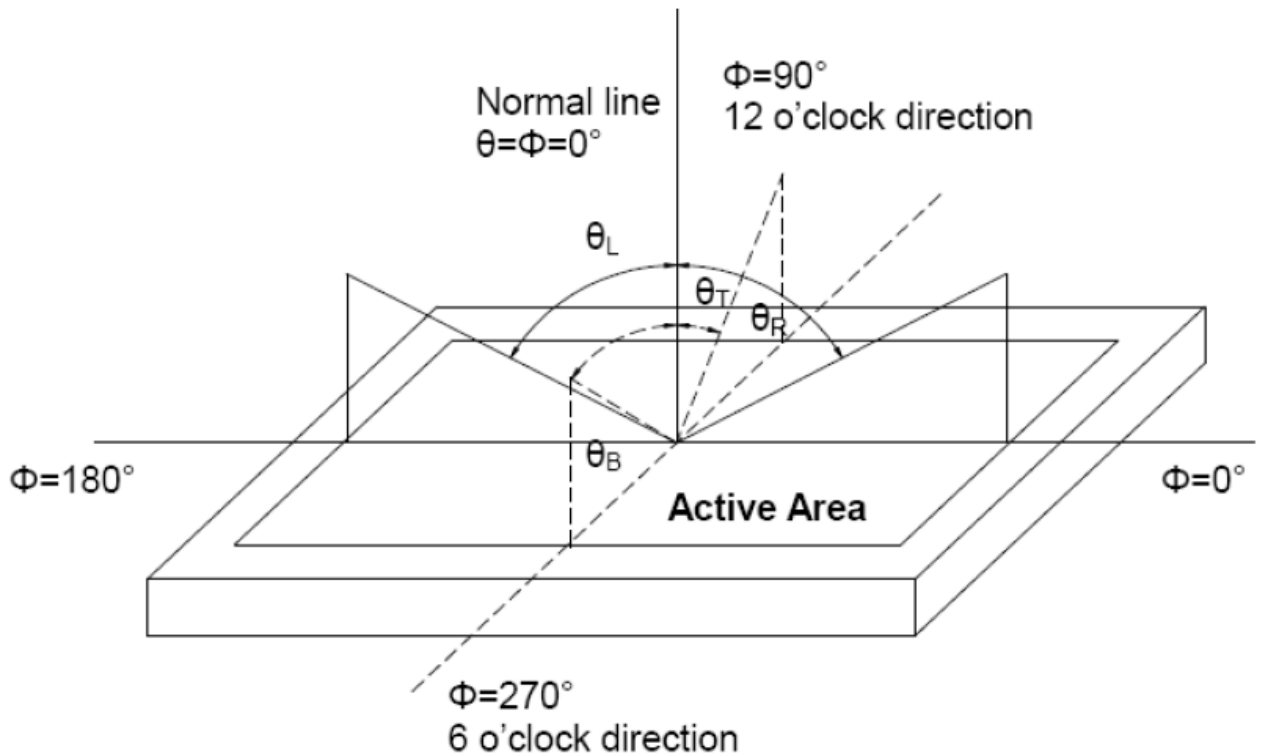
$T_a = 25^\circ C$

Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	$\theta T$	$C \geq 10, \phi = 0^\circ$	--	45	--	Note 2
	$\theta B$		--	45	--	Note 2
	$\theta L$		--	45	--	Note 2
	$\theta R$		--	20	--	Note 2
Contrast Ratio	C	$\theta = 0^\circ, \phi = 0^\circ$	--	250	--	--
Response Time	Ton	25°C	--	30ms	--	Note 4
	Toff		--		--	
Luminance	B	$\theta = 0^\circ, \phi = 0^\circ$	-	180	-	cd/m <sup>2</sup>

# LCM SPECIFICATION

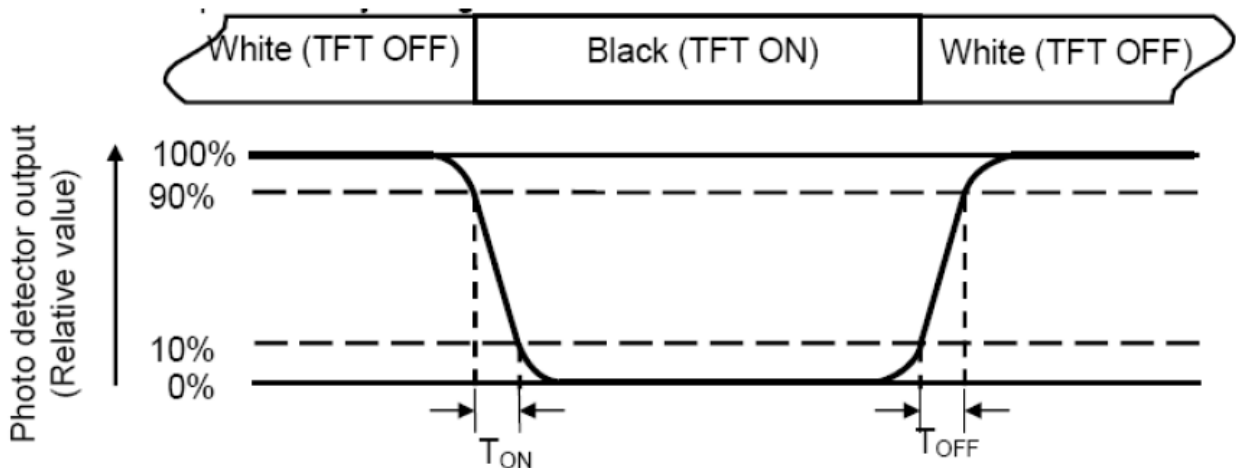
Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).



Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time ( $T_{ON}$ ) is the time between photo detector output intensity changed from 90% to 10%. And fall time ( $T_{OFF}$ ) is the time between photo detector output intensity changed from 10% to 90%.



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## 1.6 Backlight & LED Characteristics

### Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	20 (1 LED)	mA
Reverse Voltage	VR	Ta =25℃	-	5	V
Power Dissipation	PO	Ta =25℃	-	320	mW
Operating Temperature	T <sub>OP</sub>	-	-20	70	℃
Storage Temperature	T <sub>ST</sub>	-	-30	80	℃
Solder Temp. for 3 Seconds	-	-	-	260	℃

### Electrical / Optical Characteristics

VSS = 0V, Ta =25℃

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 15mA*6	2.9	3.1	3.3	V
Reverse Current	IR	VR= 5V	-	-	50	uA
Average Brightness (without LCD)	IV	IF= 15mA*6	-	3300	-	cd/m <sup>2</sup>
CIE Color Coordinate (without LCD)	X	IF= 15mA*6	0.283	-	0.330	—
	Y		0.276	-	0.328	
Color	WHITE					

\*1 This value will be changed while mass production.

# LCM SPECIFICATION

## 2. MODULE STRUCTURE

### 2.1 Interface Pin Description

NO	SYMBOL	FUNCTION
1	GND	GROUND
2	NC/YU	OPEN/ TOUCH PANEL PIN
3	NC/XL	OPEN/ TOUCH PANEL PIN
4	NC/YD	OPEN/ TOUCH PANEL PIN
5	NC/XR	OPEN/ TOUCH PANEL PIN
6	GND	GROUND
7	IM0	OPEN
8	IM1	OPEN
9	NC	OPEN
10	NC	OPEN
11	LCD_ID	OPEN
12	RESET	Chip reset signal ("L" →Active)
13-22	DB17-DB8	OPEN
23-30	DB7-DB0	DATA BUS
31	RD	Read signal ("L" →Active)
32	WR	Write signal ("L" →Active)
33	RS	Data / Command select signal("L"→ register index; "H"→data)
34	CS	Chip select signal ("L" →Active)
35	GND	GROUND
36	IOVCC	POWER SUPPLY FOR INTERFACE PINS(1.8V/2.8V)
37	VCC	POWER SUPPLY(2.8V)
38-42	LED-K	BACK LIGHT K
43	LED-A	BACK LIGHT A+
44	GND	GROUND

### 2.2 Timing Characteristics

Please refer to RM68080 DATASHEET.

### 2.3 Display Command

Please refer to RM68080 DATASHEET.



# LCM SPECIFICATION

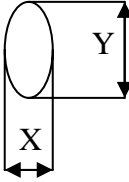
## 2.4 Touchpanel Characteristics

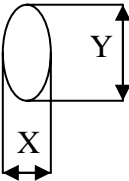
NO.	项目 Item	单位	规格尺寸 Value	备注 Note
1	最大电压值 Max voltage	V	DC 5V	
2	线性度 Linearity	%	±1.5	Load 120gf
3	回路阻抗 Terminal resistance	Ω	Film side: 150~500	
			Glass side: 400~900	
4	绝缘阻抗 Insulation resistance	MΩ	≥10	DC25V
5	操作荷重 Operation force	g	40~100	R0.8 TP Pen
6	表面硬度 Hardness	H	≥3	
7	笔划寿命 Pen sliding life	次	≥ 50, 000	150g, 60mm/s, R0.8 POM

## 3. INSPECTION SPECIFICATION

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		

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NO.	项目 Item	检验标准 Inspection Standard	备注 Note																			
4	清楚的黑白点 Clear Spots	$\phi = (X+Y) / 2$ A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of VA) 																				
		<table border="1"> <thead> <tr> <th rowspan="2">区域 Zone 尺寸 Size</th> <th colspan="3">接受个数 Acceptable Quantity</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\phi \leq 0.1\text{mm}</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1\text{mm} &lt; \phi \leq 0.2\text{mm}</math></td> <td>3</td> <td colspan="2" rowspan="3">Ignore</td> </tr> <tr> <td><math>0.2\text{mm} &lt; \phi \leq 0.25\text{mm}</math></td> <td>2</td> </tr> <tr> <td><math>\phi &gt; 0.25\text{mm}</math></td> <td>0</td> </tr> </tbody> </table>		区域 Zone 尺寸 Size	接受个数 Acceptable Quantity			A	B	C	$\phi \leq 0.1\text{mm}$	Ignore			$0.1\text{mm} < \phi \leq 0.2\text{mm}$	3	Ignore		$0.2\text{mm} < \phi \leq 0.25\text{mm}$	2	$\phi > 0.25\text{mm}$	0
		区域 Zone 尺寸 Size			接受个数 Acceptable Quantity																	
				A	B	C																
		$\phi \leq 0.1\text{mm}$		Ignore																		
		$0.1\text{mm} < \phi \leq 0.2\text{mm}$		3	Ignore																	
$0.2\text{mm} < \phi \leq 0.25\text{mm}$	2																					
$\phi > 0.25\text{mm}$	0																					

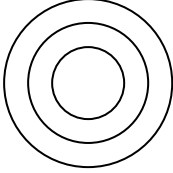
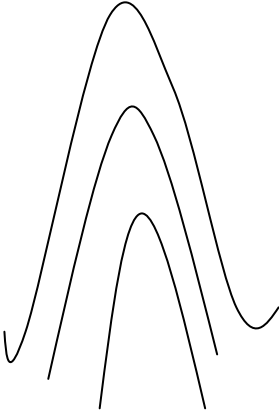
NO.	项目 Item	检验标准 Inspection Standard	备注 Note																	
5	不明显的黑白点 Dim Spots	$\phi = (X+Y) / 2$ A: AA 区 (显示区) B: VA 区 (可视区) C: 可视区以外(Out of V.A.) 																		
		<table border="1"> <thead> <tr> <th rowspan="2">区域 Zone 尺寸 Size</th> <th colspan="3">接受个数 Acceptable Quantit</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\phi \leq 0.3\text{mm}</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.3\text{mm} &lt; \phi \leq 0.6\text{mm}</math></td> <td>2</td> <td colspan="2" rowspan="2">Ignore</td> </tr> <tr> <td><math>\phi &gt; 0.6\text{mm}</math></td> <td>0</td> </tr> </tbody> </table>		区域 Zone 尺寸 Size	接受个数 Acceptable Quantit			A	B	C	$\phi \leq 0.3\text{mm}$	Ignore			$0.3\text{mm} < \phi \leq 0.6\text{mm}$	2	Ignore		$\phi > 0.6\text{mm}$	0
		区域 Zone 尺寸 Size			接受个数 Acceptable Quantit															
				A	B	C														
		$\phi \leq 0.3\text{mm}$		Ignore																
		$0.3\text{mm} < \phi \leq 0.6\text{mm}$		2	Ignore															
$\phi > 0.6\text{mm}$	0																			

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6	线不良 Line defect	尺寸 Size (mm)		接受个数 Acceptable Quantity		
		L (Length)	W (width)	A	B	C
		Ignore	$W \leq 0.03$	Ignore		
		$L < 5.0$	$0.03 < W \leq 0.05$	2		Ignore
			$0.05 < W$	以脏污论 Define as spot defect		
7	偏光片刮伤 Polarizer Scratch	尺寸 Size (mm)		Acceptable Quantity		
		L (Length)	W (width)	A	B	C
		Ignore	$W \leq 0.03$	Ignore		
		$L \leq 10$	$0.03 < W \leq 0.05$	2		Ignore
		$L < 5.0$	$0.05 < W \leq 0.08$	1		
			$0.08 < W$	0		
8	偏光片与玻璃间气泡 Polarize Air bubble	区域 Zone 尺寸 Size		接受个数 Acceptable Quantity		
				A	B	C
		$\phi \leq 0.2\text{mm}$		Ignore		
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$		2		Ignore
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$		1		
		$\phi > 0.5\text{mm}$		0		

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## 牛顿环/干涉纹 Newton Ring

NO.	项目 Item	检验标准 Inspection Standard	备注 Note
9	规则 Inerratic	1. 在整个触摸屏检查区域内（可视区）超过 1/3 范围，不可；When Newton ring dimension is more than 1/3 of sample dimension, it is regarded as a defect.  2. 直径 $\leq 5\text{mm}$ ，且在整个触摸屏检查区（可视区）域小于 1/3 范围，不影响透过率及失真；不计 When Newton ring dimension is less than 1/3 of sample dimension is not affect font effect and line distortion under a ceiling fluorescent light, it is acceptable.	
10	不规则 Atactic	1. 在照明环境下牛顿环有影响清晰度和透过率，失真；不可。As long as Newton ring affects font effect and line distortion under a ceiling fluorescent light, it is regarded as a defect.  在整个触摸屏检查区域（可视区）内，超过 1/2，不可。 $\phi \leq 10\text{mm}$ ；不计。When $\phi \leq 10\text{mm}$ , it is acceptable	

### 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  $280 \pm 10^{\circ}\text{C}$  and 3-5 sec.
- 4.2.9 To avoid liquid (include organic solvent) stained on LCM.

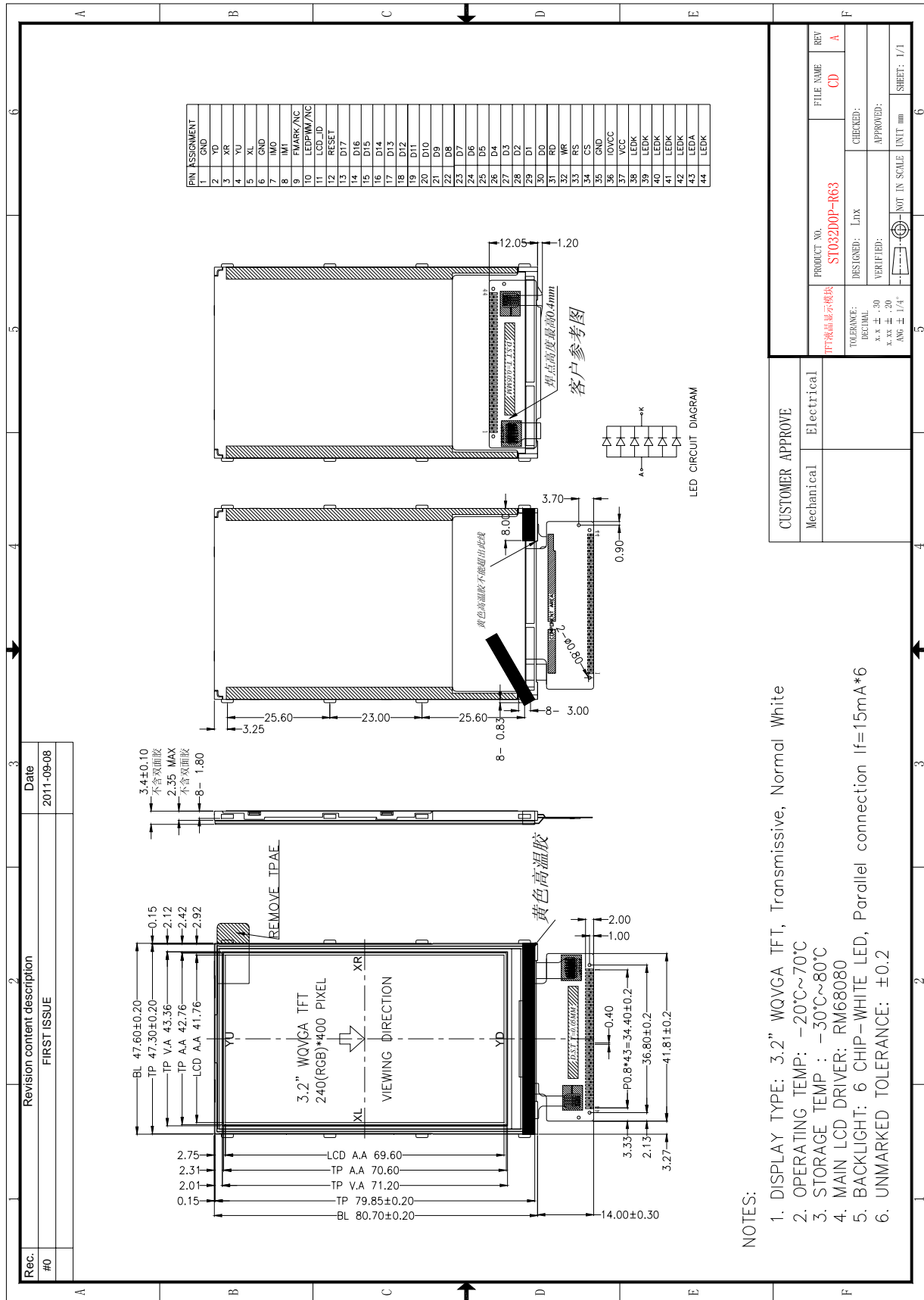
#### 4.3 STORAGE

- 4.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  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.

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## 5. MODULE STRUCTURE

### 5.1 Counter Drawing



**NOTES:**

1. DISPLAY TYPE: 3.2" WQVGA TFT, Transmissive, Normal White
2. OPERATING TEMP: -20°C~70°C
3. STORAGE TEMP: -30°C~80°C
4. MAIN LCD DRIVER: RM68080
5. BACKLIGHT: 6 CHIP-WHITE LED, Parallel connection If=15mA\*6
6. UNMARKED TOLERANCE: ±0.2