



Surenoo SRG1010A-1024600 Series RGB Interface TFT LCD Module User Manual

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Surenoo[®] Display

SRG1010A-1024600 Series RGB Interface TFT LCD Module
User Manual



Model No.: SRG1010A-1024600
SRG1010A-1024600 Series
RGB Interface TFT LCD Module USER MANUAL

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SRG1010A-1024600 Series RGB Interface TFT LCD Module



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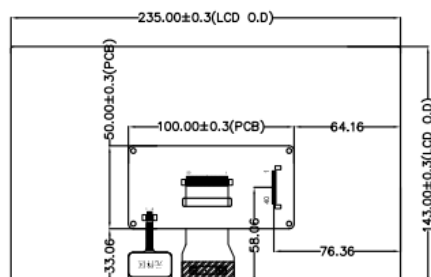
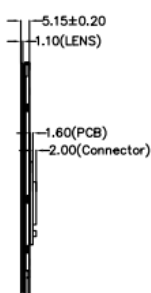
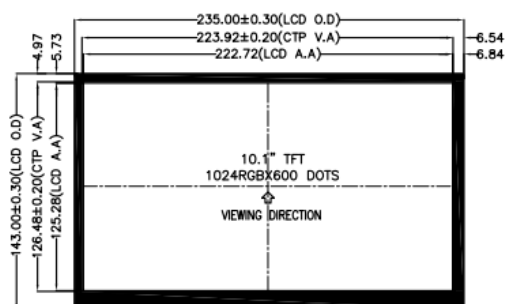
Reference Controller Datasheet

RGB Interface LCD Module Selection Guide

GENERAL INFORMATION

Item of general information	Contents	Unit
LCD Display Size (Diagonal)	10.1	inch
LCD Display Type	TFT/TRANSMISSIVE	—
LCD Display Mode	Normally White	—
Recommended Viewing Direction	12	o'clock
Gray inversion Direction	6	o'clock
Module size (W×H×T)	235.00×143.00×5.15	mm
Active area (W×H)	222.72×125.28	mm
Number of pixels (Resolution)	1024RGB×600	pixel
Pixel pitch (W×H)	0.2175×0.2088	mm
Color Pixel Arrangement	RGB Stripe	—
CTP Driver IC	GT9271	—
Interface Type	24bit Parallel RGB interface	—
Power consumption	—	mA
Color Numbers	16.7M	—
Backlight Type	White LED	—

EXTERNAL DIMENSIONS



Interface

NO.	SYMBOL
1	VDDSV
2	VDDSV
3	R0
4	R1
5	R2
6	R3
7	R4
8	R5
9	R6
10	R7
11	GND
12	G0
13	G1
14	G2
15	G3
16	G4
17	G5
18	G6
19	G7
20	GND
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	HSYNC
32	VSYSNC
33	DE
34	BL_CTR
35	CTP_RST
36	CTP_SDA
37	NC
38	CTP_SCL
39	CTP_INT
40	LOD_RST

ABSOLUTE MAXIMUM RATINGS

Parameter of absolute maximum ratings	Symbol	Min	Max	Unit
Power voltage	VDD	-0.3	5	V
	AVDD	-0.5	15	
	VGH	-0.3	40	
	VGL	-20	0.3	
	VGH-VGL	-0.3	40	
Operating temperature	Top	-20	70	°C
Storage temperature	TSgt	-30	80	°C
Humidity	RH	—	90%(Max 60°C)	RH

Note: Absolute maximum ratings means the product can withstand short-term, not more than 120 hours. If it is a long time to withstand these conditions, the life time would be shorter.

ELECTRICAL CHARACTERISTICS(DC CHARACTERISTICS)

Parameter of DC characteristics	Symbol	Min.	Typ.	Max.	Unit
Digital operating voltage	VDD	3.0	3.3	3.6	V
Analog Supply Voltage	AVDD	9.4	9.6	9.8	V
Gate On Voltage	VGH	17	18	19	V
Gate Off Voltage	VGL	-6.6	-6	-5.4	V
Common Voltage	VCOM	3.5	3.6	3.7	V
Input voltage 'H' level	VIH	0.8*VDD	—	VDD	V
Input voltage 'L' level	VIL	VSS	—	0.2*VDD	V
Output voltage 'H' level	VOH	VDD-0.4	—	VDD	V
Output voltage 'L' level	VOL	VSS	—	VSS+0.4	V
Digital current	<i>IVDD</i>	—	40	50	mA
Analog current	<i>I AVDD</i>	—	35	45	mA
Gate On current	<i>IVGH</i>	—	0.5	1	mA
Gate Off current	<i>IVGL</i>	—	0.5	1	mA

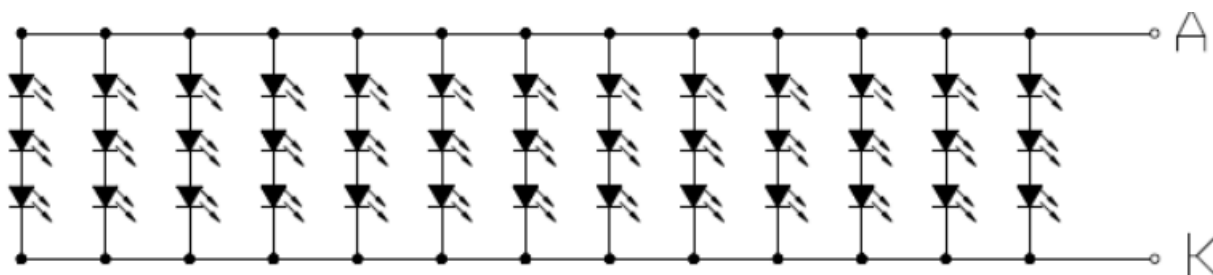
Note 1: Please adjust VCOM voltage to make the flicker level be minimum.

BACKLIGHT CHARACTERISTICS

Item of backlight characteristics	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Voltage	If	8.4	9.0	9.6	V	Note1
Forward Current	If	—	260	—	mA	—
Number of LED	—	—	3*13=39	—	Piece	—
LED Connection mode	P/S	—	Serial/Parallel	—	—	—
Lifetime of LED	—	—	10000	—	hour	Note2

Note:

- **Note1:** The LED Supply Voltage is defined by the number of LED at Ta=25°C and If=260mA.
- **Note2:** The LED lifetime define as the estimated time to 50% degradation of initial luminous. The LED lifetime could be decreased if operating If is larger than 260mA.
- Backlight circuit:



$$V_f = 9.0 \pm 0.6V. \quad I_f = 260mA$$

CTP CHARACTERISTICS

Item of CTP characteristics	Specification	Unit	Remark
Panel Type	Glass Cover + Glass Sensor	—	—
Resolution	1024 × 600	pixel	—
Surface Hardness	≥6H	—	—
Transparency	82%	—	—
Driver IC	GT9271	—	—
Interface Type	I2C	—	—
Support Points	10	—	—
Sampling Rate	20~100	Hz	—
Supply voltage	3.3	V	—

ELECTRO-OPTICAL CHARACTERISTICS

Item of electro-optical characteristics		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Trot	$\theta=0$ $\Delta E=0$ $T_a=25^{\circ}\text{C}$	—	20	40	mms	FIG 1.	4
Contrast Ratio		CR		—	350	—	—	FIG 2.	1
Luminance uniformity		whit		—	80	—	%	FIG 2.	3
Surface Luminance		Lb		—	300	—	cd/m2	FIG 2.	2
CIE (x, y) chromaticity	White	White x	$\theta=0$	0.273	0.313	0.353	—	FIG 2.	5
		White y	$\Delta E=0$ $T_a=25^{\circ}\text{C}$	0.289	0.329	0.369			
Viewing angle range	$\Delta E=90$ (12 o'clock)		$\text{CR} \geq 10$	50	60	—	dig	FIG 3.	6
	$\Delta E=270$ (6 o'clock)			50	60	—	dig		
	$\Delta E=0$ (3 o'clock)			60	70	—	dig		
	$\Delta E=180$ (9 o'clock)			60	70	—	dig		
NTSC ratio		—	—	—	50	—	%	—	—

Note 1. Contrast Ratio(CR) is defined mathematically by the following formula. For more information see FIG 2.:

$$\text{Contrast Ratio(CR)} = \frac{\text{Average Surface Luminance with all white pixels(P1,P2,P3,P4,P5,P6,P7,P8,P9)}}{\text{Average Surface Luminance with all black pixels(P1,P2,P3,P4,P5,P6,P7,P8,P9)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

Lb=Average Surface Luminance with all white pixels (P1,P2,P3,P4,P5,P6,P7,P8,P9)

Note 3. The uniformity in surface luminance Δ Whitelist determined by measuring luminance at each test position 1 through 9, and then dividing the maximum luminance of 9points luminance by minimum luminance of 9 points luminance. For more information see FIG 2.

$$\Delta_{\text{WHITE}} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5, P6, P7, P8, P9)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5, P6, P7, P8, P9)}}$$

Note 4. Response time is the time required for the display to transition from White to black(Rise Time, Try) and from black to white(Decay Time, Ft). For additional information see FIG 1.

Note 5. CIE (x, y) chromaticity ,The x,y value is determined by screen active area position 5.
For more information see FIG 2.

Note 6. Viewing angle is the angle at which the contrast ratio is greater than a specific value.

For TFT module, the specific value of contrast ratio is 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. For more information see FIG 3.

Note 7. For Viewing angle and response time testing, the testing data is base on

Aaronic-Melchers's Iconoscope. Series Instruments. For contrast ratio, Surface Luminance, Luminance uniformity

and CIE the testing data is base on BM-7 photo detector.

Note 8. For TN type TFT transmissive module, Gray scale reverse occurs in the direction of panel viewing angle.

FIG.1. The definition of Response Time

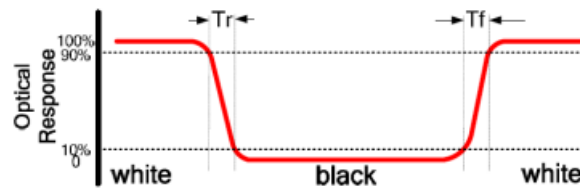


FIG.2. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x , y) chromaticity

A : $H/6$;

B : $V/6$;

H,V : Active Area(AA) size

Measurement instrument: BM-7; Light spot size=5mm, 350mm distance from the LCD surface to detector lens.

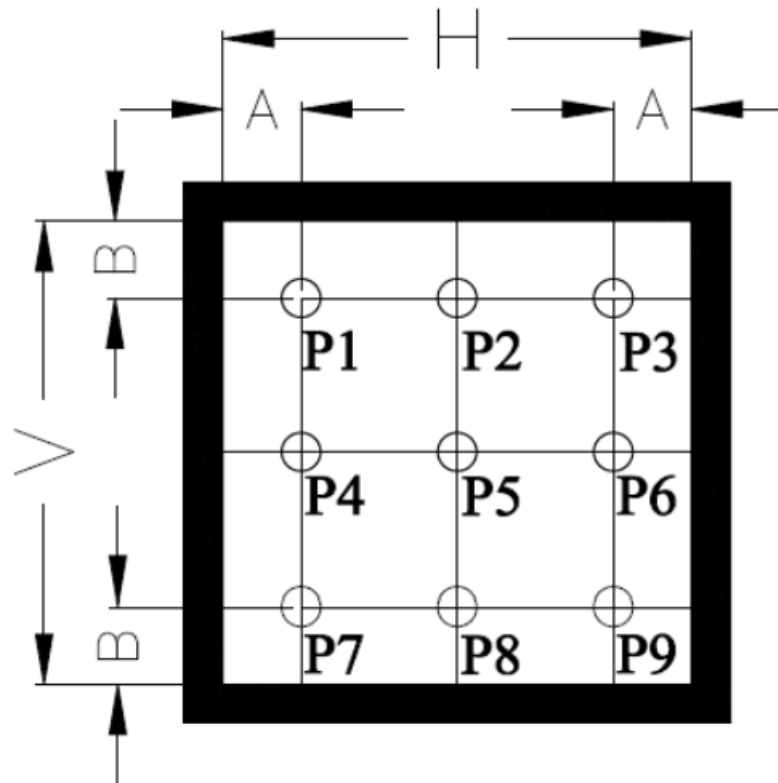
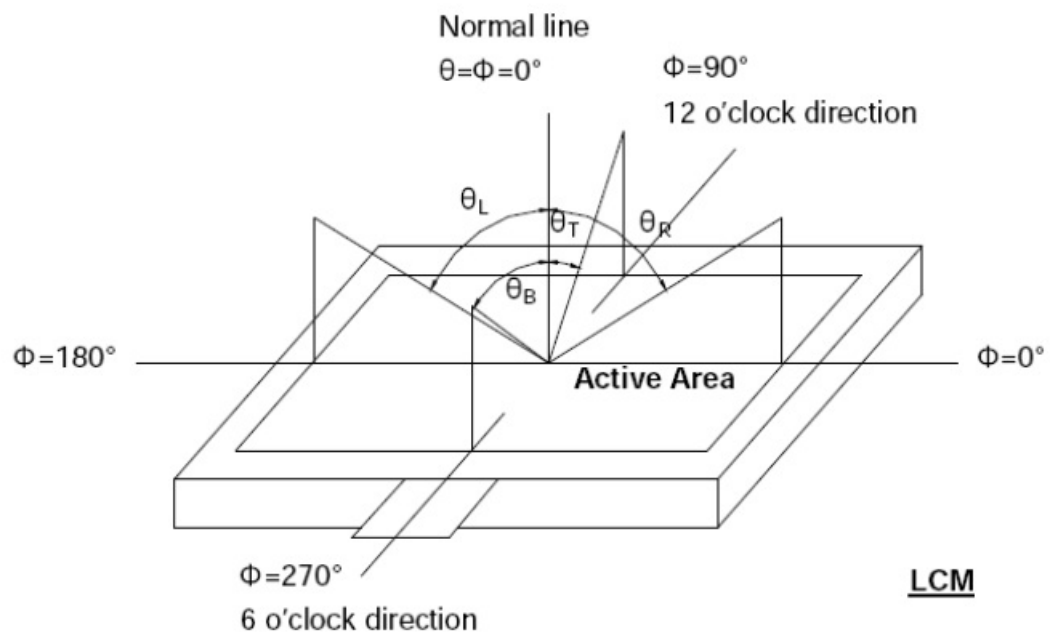


FIG.3. The definition of viewing angle



INTERFACE DESCRIPTION

NO.	Symbol	I/O	DESCRIPTION
1~2	VCC5V	Power supply	Module Power supply(5V Typ.)
3~10	R0~R7	I	8bit digital Red data input(R0:LSB; R7:MSB)
11	GND	Power supply	Power ground
12~19	G0~G7	I	8bit digital Green data input(G0:LSB; G7:MSB)
20	GND	Power supply	Power ground
21~28	B0~B7	I	8bit digital Blue data input(B0:LSB; B7:MSB)
29	GND	Power supply	Power ground
30	DCLK	I	Clock signal. Latching data at the rising edge.
31	HSYNC	I	Horizontal Sync input. Negative polarity.
32	VSYNC	I	Vertical Sync input. Negative polarity.
33	DEN	I	Data input Enable. Active high to enable the data input Bus.
34	BL_CTRL	I	Backlight control pin
35	CTP_RST	I	CTP external reset signal, Low is active
36	CTP_SDA	I/O	CTP I2C data input and output
37	NC	—	No connection
38	CTP_SCL	I	CTP I2C clock input
39	CTP_INT	I	CTP External interrupt to the host
40	LCD_RST	I	LCD RESET signal, Low is active

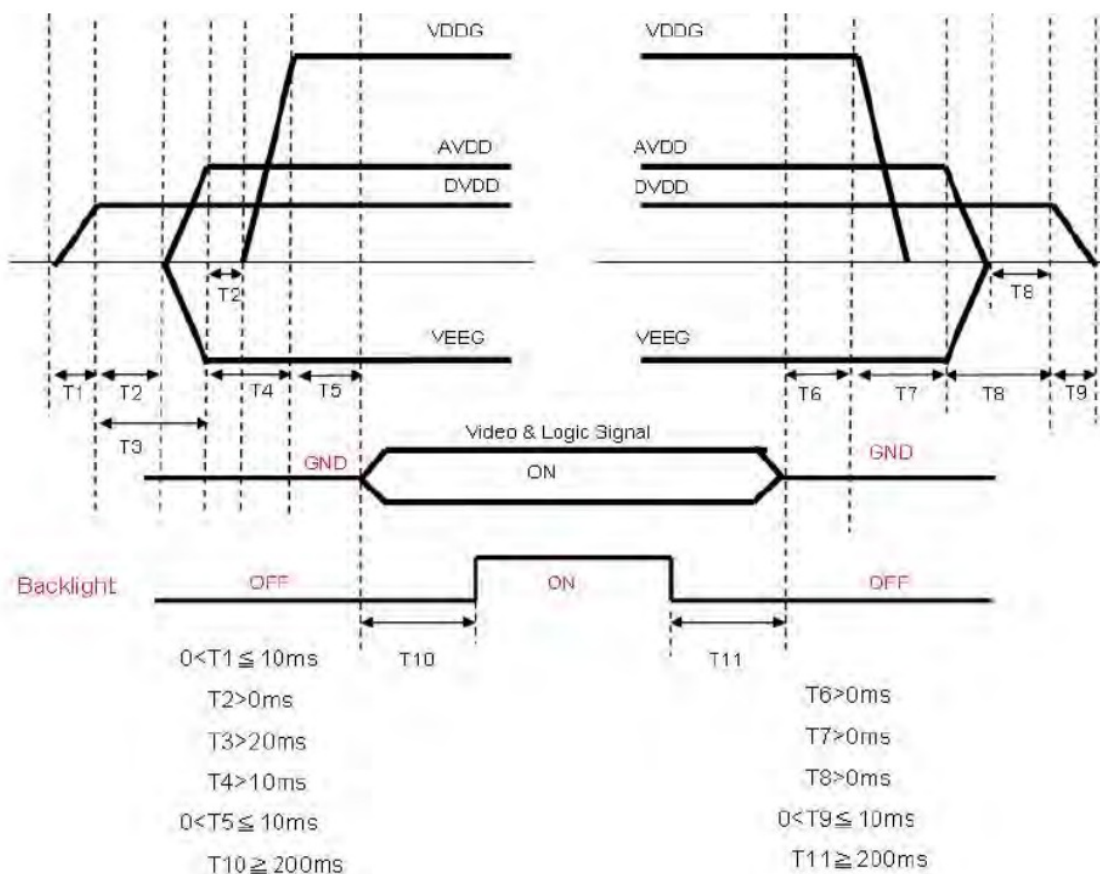
INPUT TIMING

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency@ Frame rate=60Hz	DCLK	45	51.2	57	MHz
Horizontal display area	thud	1024			DCLK
1 Horizontal Line	the	1324	1344	1364	DCLK
HSYNC pulse width	thaw	1	–	140	DCLK
HSYNC Back Porch(Blanking)	tub	160	160	160	DCLK
HSYNC Front Porch	theft	16	160	216	DCLK
Vertical display area	tad	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	top	1	–	20	H
VSYNC Back Porch(Blanking)	tab	23	23	23	H
VSYNC Front Porch	tiff	1	12	127	H

POWER ON/OFF SEQUENCE

Power On: VDD→AVDD/VGL→ VGH →Video & Logic Signal

Power Off: Video & Logic Signal→ VGH→ AVDD/VGL→ VDD



RELIABILITY TEST CONDITIONS

No.	Test Item	Test Condition
1	High Temperature Storage	80°C/120 hours
2	Low Temperature Storage	-30°C/120 hours
3	High Temperature Operating	70°C/120 hours
4	Low Temperature Operating	-20°C/120 hours
5	Temperature Cycle Storage	-20°C(30min.)~25(5min.)~70°C(30min.)×10cycles

A Inspection after test:

Inspection after 2~4 hours storage at room temperature, the sample shall be free from defects:

- Ø Air bubble in the LCD;
- Ø Selleck;
- Ø Non-display;
- Ø Missing segments;
- Ø Glass crack;
- Ø Current is twice higher than initial value.

Premark:

- Ø The test samples should be applied to only one test item.
- Ø Sample size for each test item is 5~10pcs.
- Ø Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

INSPECTION CRITERION

This specification is made to be used as the standard of acceptance/rejection criteria for TFT-LCD/IPS TFT-LCD module product, and this specification is applicable only in the case that the size of module equal to or exceed than 3.5 inch.

12.1 Sample plan

Sampling plan according to GB/T2828.1-2003/ISO 2859-1 1999 and ANSI/ASQC Z1.4-1993,normal level 2 and based on:

Major defect: AQL 0.65

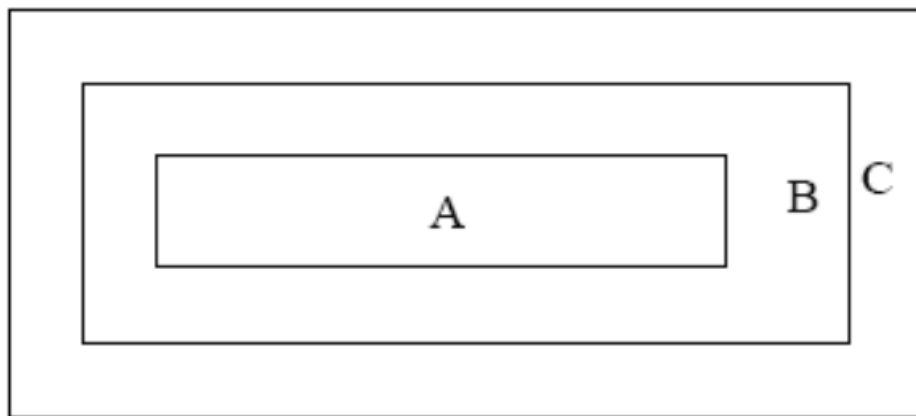
Minor defect: AQL 1.5

12.2 Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45°against perpendicular line. (Normal temperature 20~25°Cand normal humidity 60 ±15%RH)

12.3 Definition of Inspection Item.

A Definition of inspection zone in LCD.



Zone A: character/Digit area

Zone B: viewing area except Zone A (Zone A + Zone B=minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

Fig.1 Inspection zones in an LCD

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

Definition of some visual defect

Bright dot	Because of losing all or part function, bad pixel dots appear bright and the size is more than 50% of one dot in which LCD panel is displaying under black pattern.
Dark dot	Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture, or pure whiter picture.

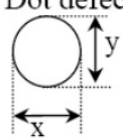
12.4 Major Defect

Item No.	Items to be inspected	Inspection standard	Classification of defects
1	Functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Excess power consumption 6) Backlight no lighting, flickering and abnormal lighting	major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	

12.5 Minor Defect

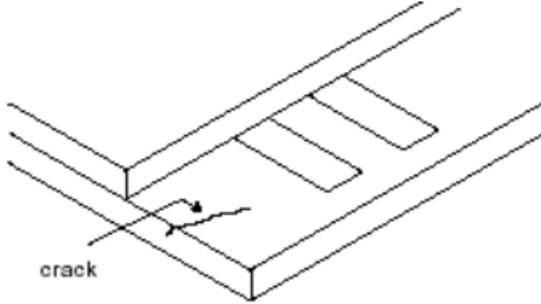
Item No.	Items to be inspected	Inspection standard						Classification of defects
			Zone	Acceptable Qty				
				A+B			C	
				3.5 7"	7 10.1"	10.1"		

1	Bright dot /dark dot defect	Bright pixel dot	1	2	3	Acceptable	Minor
		Dark pixel dot	4	4	4		
		2bright dots adjacent	0	0	0		
		2dark dots adjacent	0	0	0		
		Total bright and dark dots	5	6	7		
		Note: Minimum distance between defective dots is more than 5mm; Pixel dots' function is normal, but bright dots caused by foreign material and other reasons are judged by the dot defect of 5.2.					

2	<div>Dot defect</div>  <div>Φ=(x+y)/2</div>	Acceptable Qty				Acceptable	Minor	
		Zone Size(mm)	A+B					C
			3.5" 7"	7 10.1"	10.1"			
		Φ≤0.2	Acceptable	Acceptable	Acceptable			
		0.2 Φ≤0.5	4	5	6			
		Φ 0.5	0	0	0			
Note: 1. Minimum distance between defective dots is more than 5 mm; 2. The quantity of defect is zero in operating condition.								

3	Linear defect	Zone		Acceptable Qty			Acceptable	Minor
		Size (mm)		A+B				
		Length	Width	3.5" 7"	7 10.1"	10.1"		
		Ignore	W≤0.05	Acceptable	Acceptable	Acceptable		
		L≤5.0	0.05 W≤0.1	4	5	6		
		L 5.0	W 0.1	0	0	0		

4	Polarizer defect	5.4.1 Polarizer Position (i) Shifting in position should not exceed the glass outline dimension. (ii) Incomplete covering of the viewing area due to shifting is not allowed. 5.4.2 Dirt on polarizer Dirt which can be wiped easily should be acceptable. 5.4.3 Polarizer Dent & Air bubble 5.4.4 Polarizer scratch (i) If the polarizer scratch can be seen after cover assembling or in the operating condition, judge by the linear defect of 5.3. (ii)If the polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following:					Minor																																	
		<table><tr><td colspan="2">Zone</td><td colspan="3">Acceptable Qty</td><td rowspan="2">C</td></tr><tr><td colspan="2">Size (mm)</td><td colspan="3">A+B</td></tr><tr><td>Length</td><td>Width</td><td>3.5" 7"</td><td>7 10.1"</td><td>10.1"</td><td></td></tr><tr><td>Ignore</td><td>W≤0.05</td><td>Acceptable</td><td>Acceptable</td><td>Acceptable</td><td rowspan="3">Acceptable</td></tr><tr><td>1.0 L ≤5.0</td><td>0.05 W≤0.20</td><td>4</td><td>5</td><td>6</td></tr><tr><td>L 5.0</td><td>W 0.2</td><td>0</td><td>0</td><td>0</td></tr></table>						Zone		Acceptable Qty			C	Size (mm)		A+B			Length	Width	3.5" 7"	7 10.1"	10.1"		Ignore	W≤0.05	Acceptable	Acceptable	Acceptable	Acceptable	1.0 L ≤5.0	0.05 W≤0.20	4	5	6	L 5.0	W 0.2	0	0	0
		Zone		Acceptable Qty				C																																
		Size (mm)		A+B																																				
Length	Width	3.5" 7"	7 10.1"	10.1"																																				
Ignore	W≤0.05	Acceptable	Acceptable	Acceptable	Acceptable																																			
1.0 L ≤5.0	0.05 W≤0.20	4	5	6																																				
L 5.0	W 0.2	0	0	0																																				
5	MURA	Using 3% ND filter, it's NG if it can be seen in R,G,B picture.					Minor																																	
	White/Black dot MURA	Visible under ND3% D≤0.15mm, Acceptable 0.15mm<D≤0.5mm, N≤4 D>0.5mm, Not allowable.																																						

		<p>(i) Crack Cracks are not allowed.</p> 	Minor

6

Glass defect

(ii) TFT chips on corner

X	Y	Z	Acceptable
≤ 3.0	≤ 3.0	Not more than the thickness of glass	$N \leq 3$

Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.

Minor

(iii) Usual surface crack


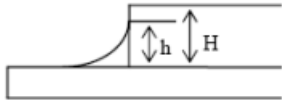
It is only applicable to the upper glass of LCD.

X	Y	Z	Acceptable
≤ 1.5	≤ 1.5	Not more than the thickness of glass	$N \leq 4$


Minor

12.6 Module Cosmetic Criteria

Item No	Items to be inspected	Inspection Standard	Classification of defects
1	Difference in Spec.	Not allowable	Major

2	Pattern peeling	No substrate pattern peeling and floating	Major
3	Soldering defects	No soldering missing	Major
		No soldering bridge	Major
		No cold soldering	Minor
4	Resist flaw on PCB	Visible copper foil ($\Phi 0.5$ mm or more) on substrate pattern is not allowed	Minor
5	FPC gold finger	No dirt, breaking, oxidation lead to black	Major
6	Backlight plastic frame	No deformation, crack, breaking, backlight positioning column breaking, obvious nick.	Minor
7	Marking printing effect	No dark marking, incomplete, deformation lead to unable to judge	Minor
8	Accretion of metallic Foreign matter	No accretion of metallic foreign matter (Not exceed $\Phi 0.2$ mm)	Minor
9	Stain	No stain to spoil cosmetic badly	Minor
10	Plate discoloring	No plate fading, rusting and discoloring	Minor
11	1. Lead parts	a. Soldering side of PCB Solder to form a 'Filet' all around the lead. Solder should not hide the lead form perfectly.	Minor
		b. Components side(In case of 'Through Hole PCB') Solder to reach the Components side of PCB.	Minor
	2. Flat packages	Either 'Toe'(A) or 'Seal'(B) of the lead to be covered by "Filet". Lead form to be assume over Solder. 	Minor
	3. Chips	$(3/2) H \geq h \geq (1/2) H$ 	Minor
	4. Solder ball/Solder splash	a. The spacing between solder ball and the conductor or solder pad $h \geq 0.13$ mm. The diameter of solder ball $d \leq 0.15$ mm.	Minor
		b. The quantity of solder balls or solder splashes isn't beyond 5 in 600 mm ² .	Minor
		c. Solder balls/Solder splashes do not violate minimum electrical clearance.	Major

Documents / Resources

	<p>Surenoo SRG1010A-1024600 Series RGB Interface TFT LCD Module [pdf] User Manual SRG1010AA3-1024600, SRG1010A-1024600 Series, SRG1010A-1024600 Series RGB Interface TFT LCD Module, SRG1010A-1024600 Series TFT LCD Module, RGB Interface TFT LCD Module, Interface TFT LCD Module, RGB TFT LCD Module, TFT LCD Module, RGB LCD Module, LCD Module, LCD, Module</p>
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References

- [S Surenoo Tech: Professional LCD Module Supplier Since 2005](#)