

Rocktech Displays Limited



Module P/N: RK050HR18H-CTG

Version: 1.0

Description : 5.0 inch TFT 800*480 Pixels with LED
backlight,All viewing angle,Capacitive
panel, 640 nits luminance

TEL: 0086-755-26065260

Fax: 0086-755-26065261

E-mail: Sales@rocktech.com.hk

Web: www.rocktech.com.hk

Revision History

Date	Rev.	Page	Description
2021-06-30	1.0	All	First issue

CONTENTS

- GENERAL FEATURES
- ABSOLUTE MAXIMUM RATINGS
- ELECTRICAL SPECIFICATIONS
- OPTICAL SPECIFICATIONS
- BLOCK DIAGRAM
- PIN DESCRIPTION
- TIMING CHARACTERISTICS
- OUTLINE DIMENSION
- RELIABILITY AND INSPECTION STANDARD
- PRECAUTIONS

1. General Features

Item	Spec	Remark
Display Mode	Normally Black transmissive	
Viewing Angle	FREE	
Input Signals	RGB 24 bit	
Outside Dimensions	120.7 (W) x76.1(H) x4.85(D)	With CTP
Active Area	108.0 mm(W)×64.8 mm(H)	
Number of Pixels	800(RGB)×480	
Dot Pitch	0.135 mm(H) × 0. 045 mm(W)	
Pixel Arrangement	RGB Vertical stripes	
Drive IC	ST7262-G4	
CTP IC	GT911	

2. Absolute Maximum Ratings

The following are maximum values which, if exceeded may cause operation or damage to the unit.

ITEM	Sym.	Min.	Typ.	Max.	Unit	Remark
Power for Circuit Driving	Vdd	-0.3	-	5	V	
Backlight Forward Current	I _{LED}	-	-	25	mA	For each LED
Storage Temperature	T _{ST}	-30	-	80	°C	
Operating Ambient Humidity	H _{OP}	10	-		%RH	
Operating Ambient temperature	T _{OP}	-20	-	70	°C	

3. Electrical Specification

3.1 Driving TFT LCD Panel

Item		Sym.	Min	Typ.	Max	Unit	Note
Power for Circuit Driving		VDD	3.0	3.3	3.6	V	
Logic Input Voltage	Low Voltage	V _{IL}	0	-	0.3Vdd	V	
	High Voltage	V _{IH}	0.7Vdd	-	Vdd	V	
Logic Output Voltage	Low Voltage	V _{OL}	-	-	GND+0.4	V	
	High Voltage	V _{OH}	Vdd-0.4	-	-	V	
Power Consumption	Black Mode	P _b	T.B.D	T.B.D	T.B.D	mW	
	Standby Mode	P _w	T.B.D	T.B.D	T.B.D	mW	

3.2 Driving Backlight

Item		Sym.	Min	Typ.	Max	Unit	Note
Backlight driving voltage		V _F	23.2	24.0	24.8	V	
Backlight driving current		I _F	-	60	-	mA	
Backlight Power Consumption		W _{BL}	-	1440	-	mW	
Life Time		-	-	30,000	-		Note 3

Note 1: (Unless specified, the ambient temperature Ta=25°C)

Note 2: The recommended operating conditions refer to a range in which operation of this product is guaranteed. Should this range is exceeded, the operation cannot be guaranteed even if the values may be without the absolute maximum ratings.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4.Optical Specifications

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 °C. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

Item	Sym.	Values			Unit	Note
		Min.	Typ.	Max.		
1)Contrast Ratio	C/R	-	1000	-		FIG.1
2)Module Luminance	L	550	640	-	cd/m ²	After CTP
3)Response time	Tr+Tf	-	30	-	ms	FIG.2
4)Viewing Angle	θ_T	-	80	-	Degree	FIG.3
	θ_B	-	80	-		
	θ_L	-	80	-		
	θ_R	-	80	-		
5)Chromaticity	Wx	0.274	0.316	0.358		
	Wy	0.294	0.336	0.378		
	Rx	-	-	-		
	Ry	-	-	-		
	Gx	-	-	-		
	Gy	-	-	-		
	Bx	-	-	-		
	By	-	-	-		

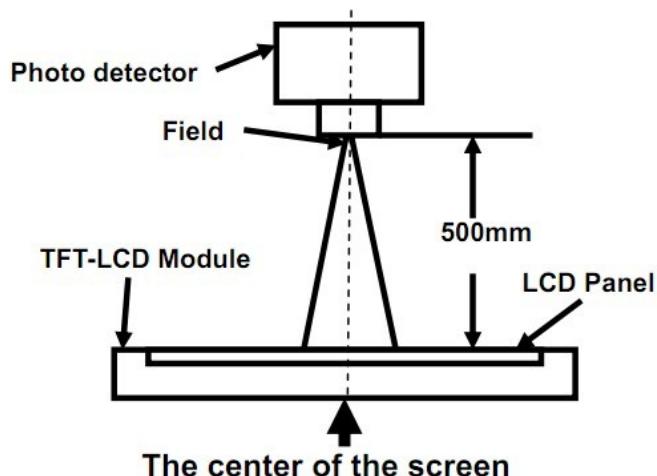
◆ Measurement System

Notes:

1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$
2. Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 1.
3. 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 see FIG 2.
4. 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. For more information see FIG 3.

FIG. 1 Optical Characteristic Measurement Equipment and Method



Item	Photo detector	Field
Contrast Ratio		
Luminance	SR-3A	1°
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

FIG. 2 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

$$\text{Response Time} = \text{Rising Time}(Tr) + \text{Falling Time}(Tf)$$

- Rising Time(Tr) : Full White 90% \rightarrow Full White 10% Transmittance.
- Falling Time(Tf) : Full White 10% \rightarrow Full White 90% Transmittance.

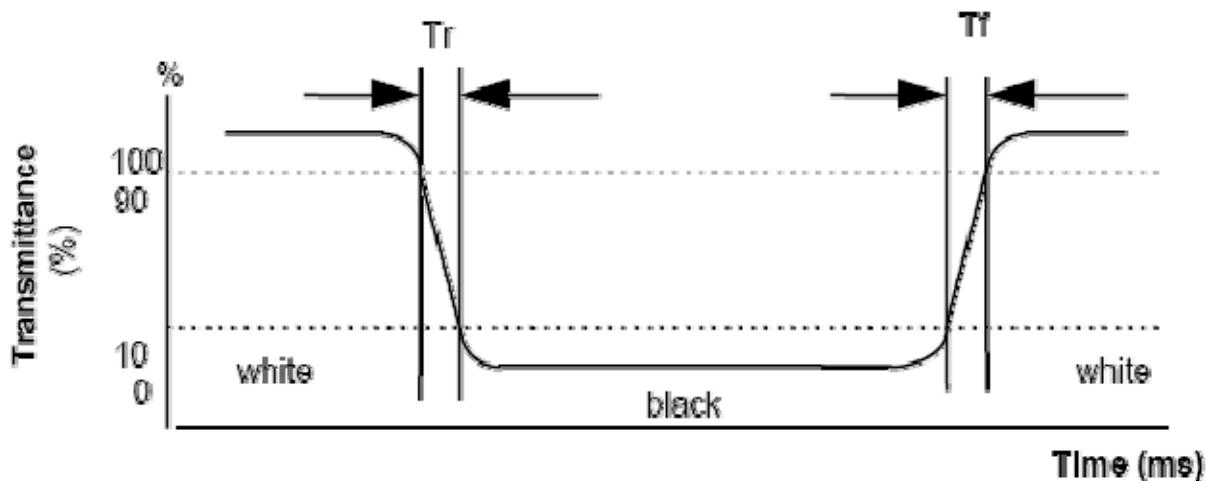
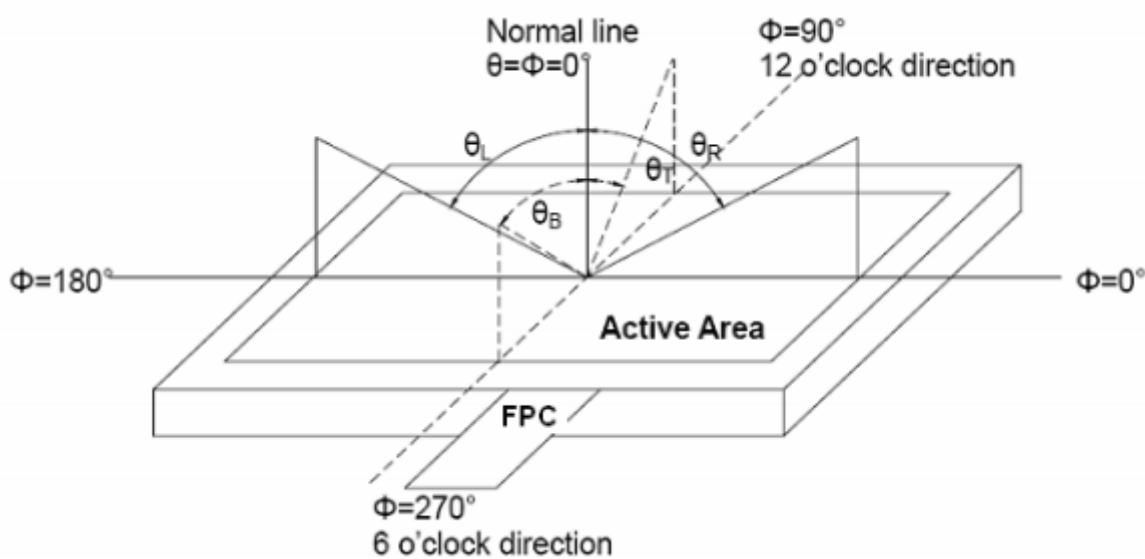
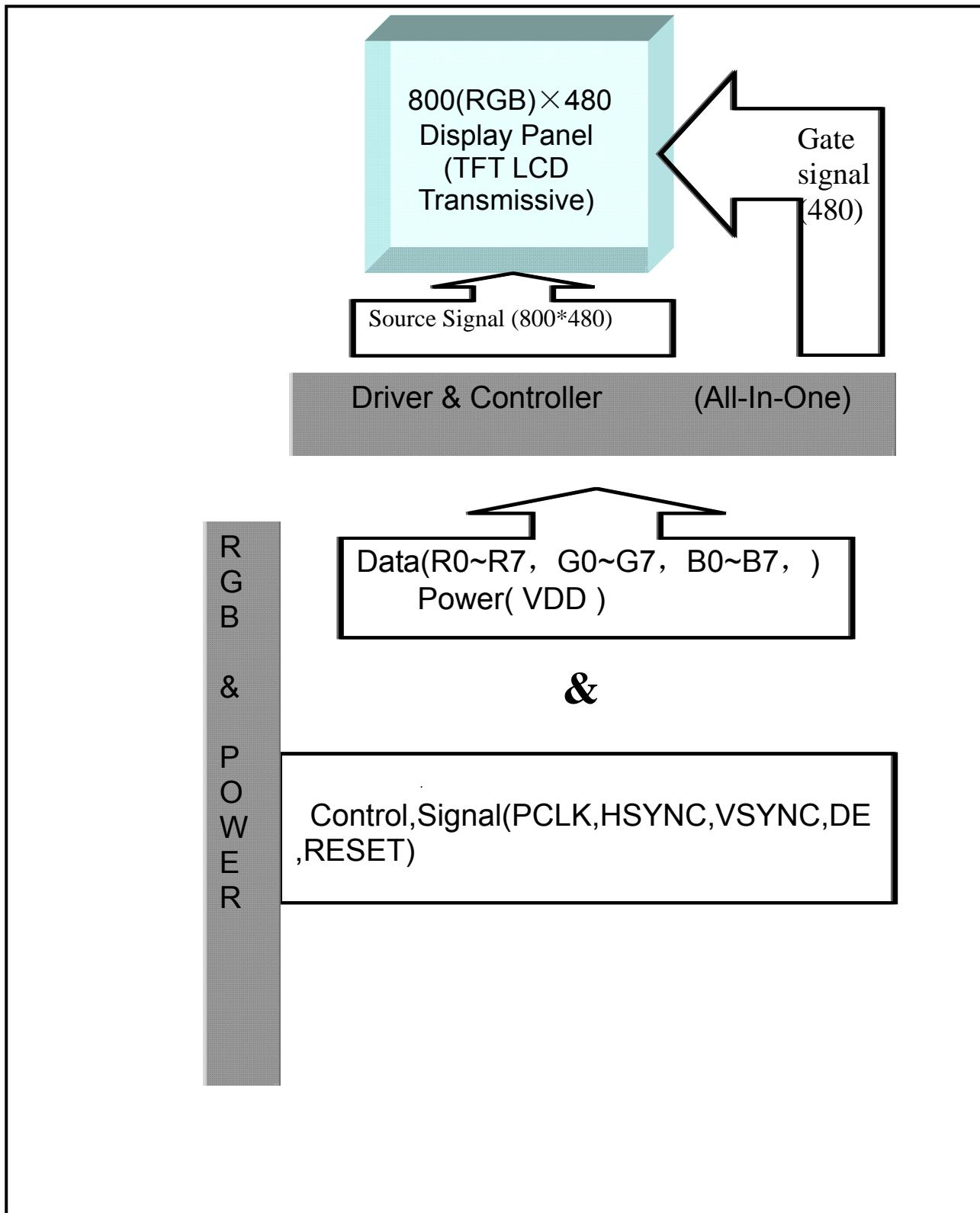


FIG. 3 The definition of Viewing Angle

Use Fig. 1(Test Procedure) under Measurement System to measure the contrast from the measuring direction specified by the conditions as the following figure.



5. Block Diagram



6.Pin Description

Item	Terminal	Functions
1	VLED-	B/L Power input PIN negative
2	VLED+	B/L Power input PIN anode
3	GND	Ground
4	VDD	Power supply
5--12	R0--R7	Display for R dot
13--20	G0--G7	Display for G dot
21--28	B0--B7	Display for B dot
29	GND	Ground
30	DCLK	Clock for input data
31	DISP	Display on/off control
32	H SYNC	Horizontal synchronizing signal
33	V SYNC	Vertical synchronizing signal
34	DE	Data input enable
35	NC	No connect
36	GND	Ground
37	NC/XR	No connect
38	NC/YD	No connect
39	NC/XL	No connect
40	NC/YU	No connect

6.2 CTP Pin interface

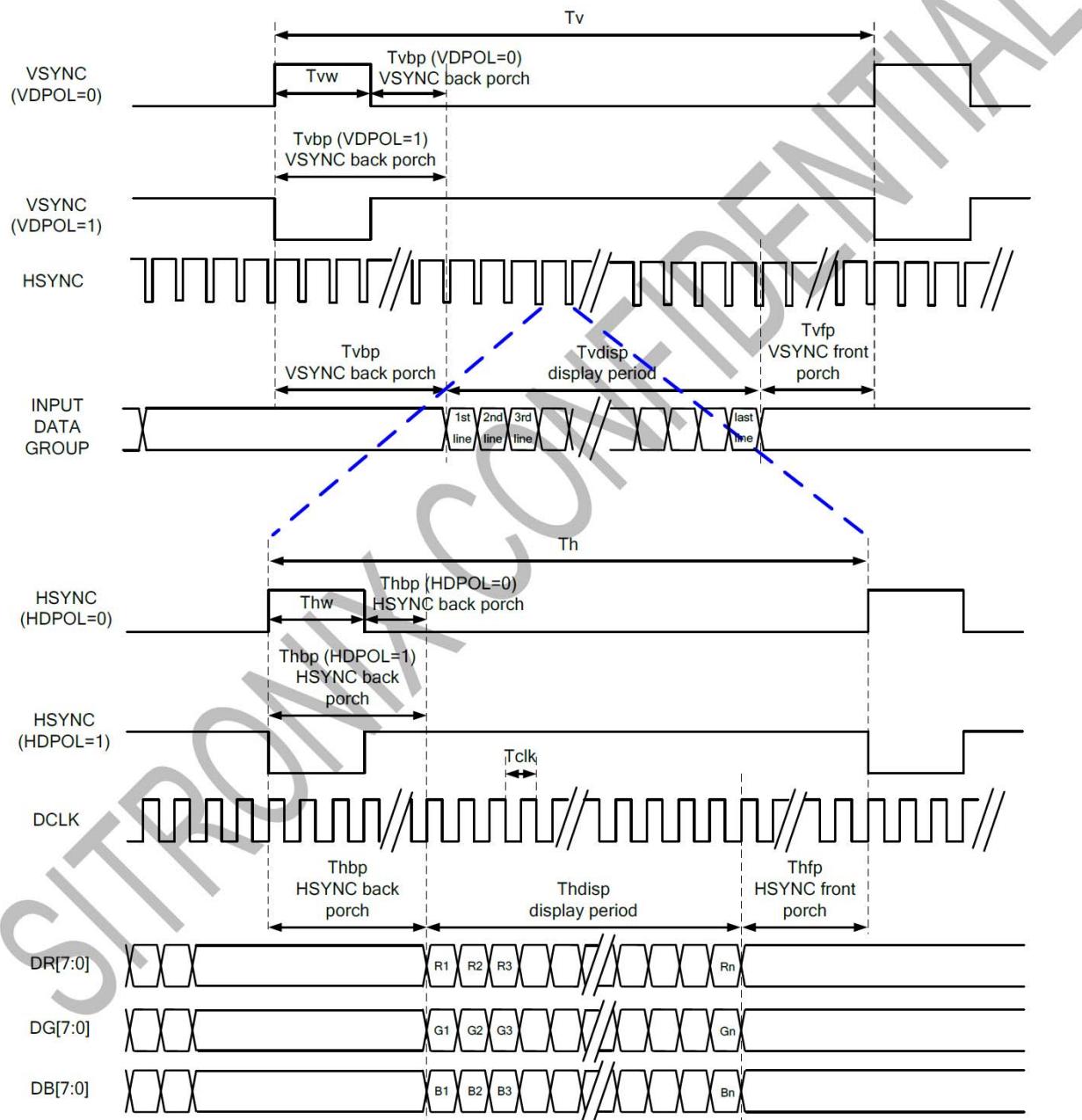
Pin	Symbol	Description
1	SCL	I2C clock
2	SDA	I2C data
3	VDD	Working voltage 2.8V~3.3V
4	WAKE	WAKEUP
5	INT	Interrupt
6	GND	GND

CTP IC driver source code will be offered separately.

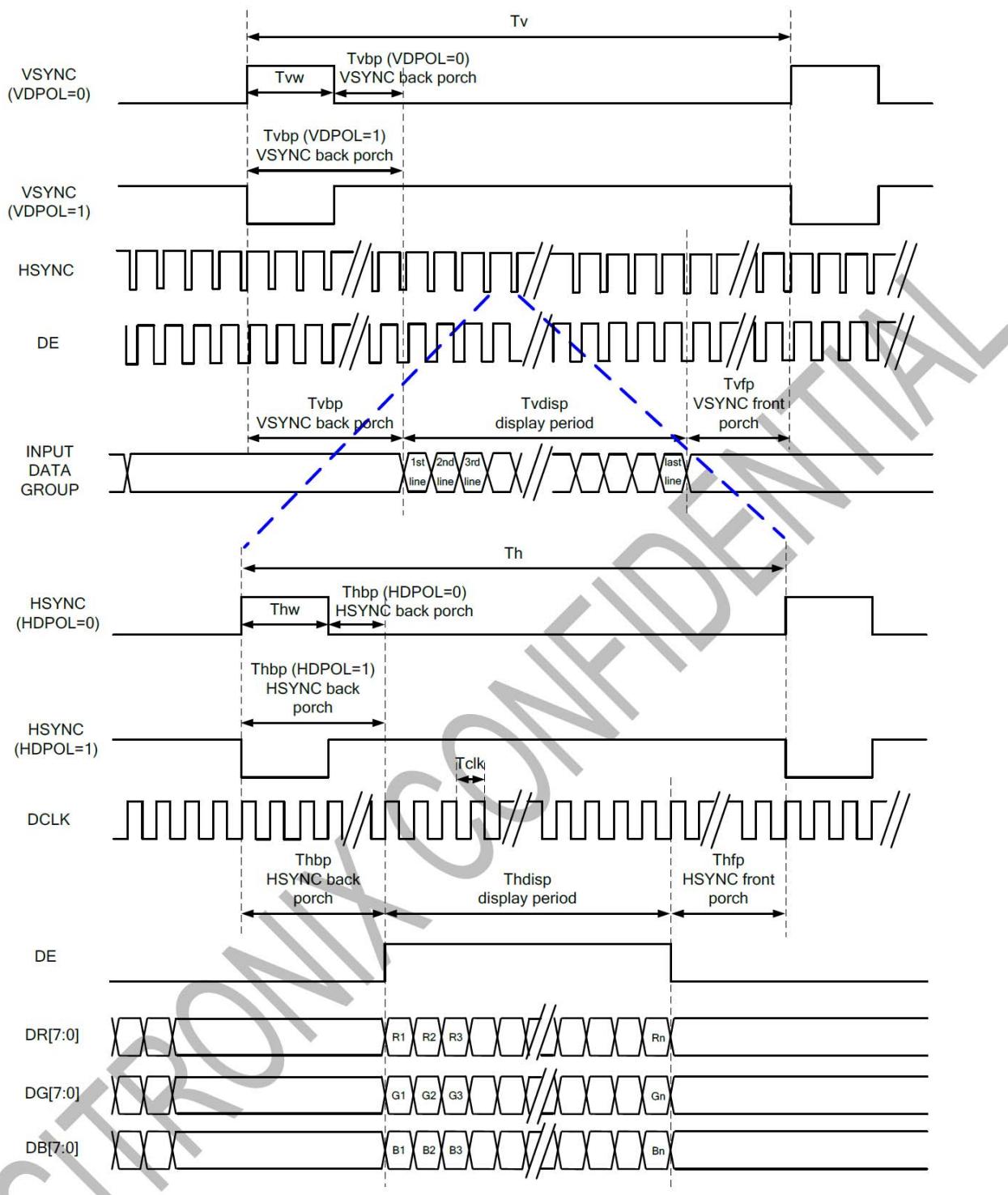
7.Timing Characteristics

7.1 System Bus Timing for RGB Interface

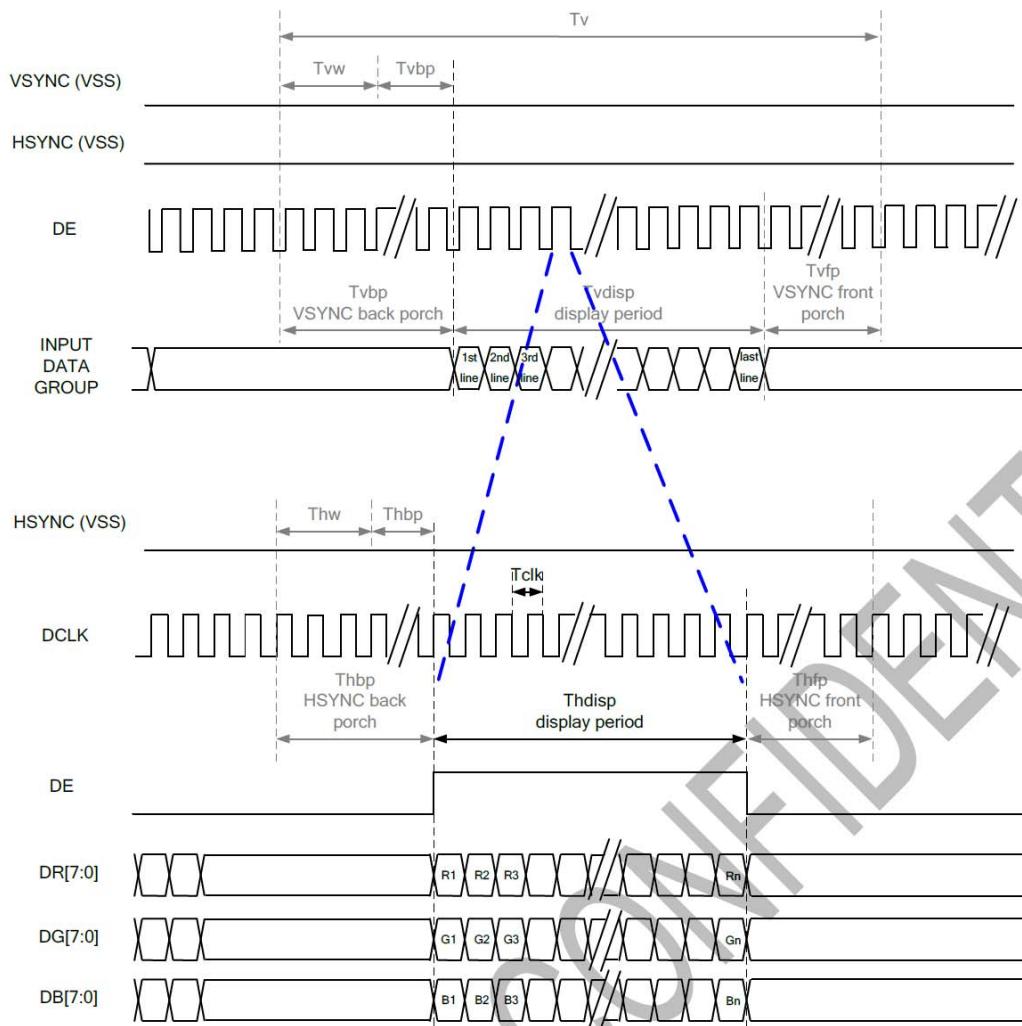
7.1.1 SYNC Mode



7.1.2 SYNC-DE Mode



7.1.3 DE Mode



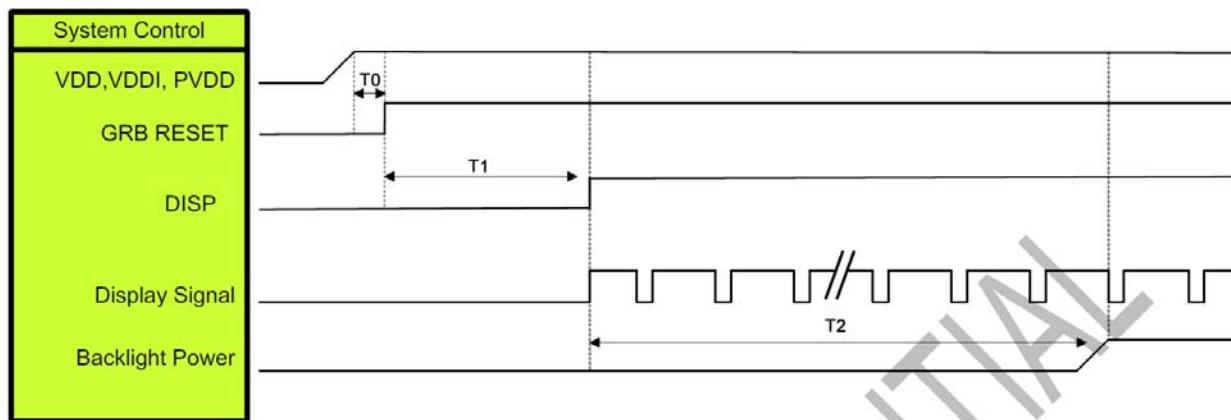
7.1.4 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency	Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK
	Display Period	Thdisp	800			DCLK
	Back Porch	Thbp	4	8	48	DCLK
	Front Porch	Thfp	4	8	48	DCLK
	Pulse Width	Thw	2	4	8	DCLK
VSYNC	Period Time	Tv	488	496	504	HSYNC
	Display Period	Tvdisp	480			HSYNC
	Back Porch	Tvbp	4	8	12	HSYNC
	Front Porch	Tvfp	4	8	12	HSYNC
	Pulse Width	Tvw	2	4	8	HSYNC

7.2 Power ON/OFF Sequence

7.2.1 Power On sequence

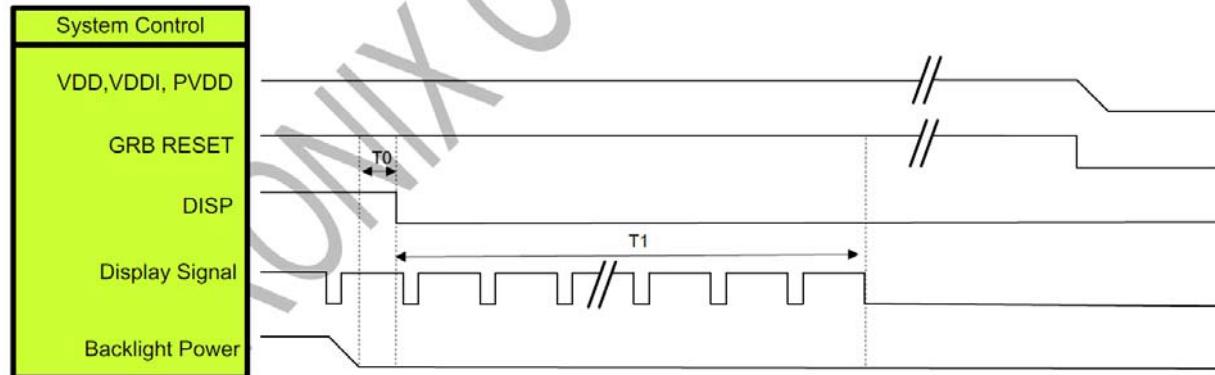


Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET = "High" to DISP = "High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

7.2.2 Power Off sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP = "Low"	5	ms
T1	DISP = "Low" to IC internal voltage discharge complete	100	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

8. Outline Dimension

ISSUE	MODIFY DESCRIPTION	DATE																																																																																																																																																																																																																
1.0	First issue	2021.06.30																																																																																																																																																																																																																
LCM Outline																																																																																																																																																																																																																		
<p>DISPLAY TYPE: Transmissive, Normally Black</p> <p>DISPLAY RESOLUTION: 800(RGB)X480</p> <p>VIEWING ANGLE: Free</p> <p>CONTROLLER/DRIVER: ST7262-G4(TFT)+GT911(CTP)</p> <p>DRIVING VOLTAGE: 3.3V(TFT)+3.3V(CTP)</p> <p>OPERATION TEMPERATURE: -20°C TO 70°C</p> <p>STORAGE TEMPERATURE: -30°C TO 80°C</p> <p>BACKLIGHT SPECIALTY: 12PCS LEDS, Vf=24.0V, If=60mA</p> <p>REMARK: Surface hardness≥6H; Structure type: G+G; CTP VDD=3V, CTP VO(VDD)=3.3V; Luminance: ≥400cd/m²; All materials in the drawing comply with the ROHS</p>																																																																																																																																																																																																																		
<p>TITLE: LCM Outline</p> <p>PROJECT NO.: RK050HR18H-CTG</p> <p>DESCRIPTION: 5.0 inch TFT-CTP</p> <p>GENERAL TOLERANCE: ±0.3</p> <p>ROCKTECH DISPLAYS LIMITED</p> <p>LED Diagram Circuit</p> <table border="1"> <caption>LED Assignment</caption> <thead> <tr> <th>PN SYMBOL</th> <th>DE</th> <th>PN SYMBOL</th> <th>DE</th> </tr> </thead> <tbody> <tr> <td>1 SC</td> <td>28 NC</td> <td>2 SC</td> <td>29 NC</td> </tr> <tr> <td>2 SC</td> <td>29 NC</td> <td>3 SC</td> <td>30 NC</td> </tr> <tr> <td>3 SC</td> <td>31 NC</td> <td>4 SC</td> <td>32 NC</td> </tr> <tr> <td>5 SC</td> <td>33 NC</td> <td>6 SC</td> <td>34 NC</td> </tr> <tr> <td>7 SC</td> <td>35 NC</td> <td>8 SC</td> <td>36 NC</td> </tr> <tr> <td>9 SC</td> <td>37 NC</td> <td>10 SC</td> <td>38 NC</td> </tr> <tr> <td>11 SC</td> <td>39 NC</td> <td>12 SC</td> <td>40 NC</td> </tr> <tr> <td>13 SC</td> <td>41 NC</td> <td>14 SC</td> <td>42 NC</td> </tr> <tr> <td>15 SC</td> <td>43 NC</td> <td>16 SC</td> <td>44 NC</td> </tr> <tr> <td>17 SC</td> <td>45 NC</td> <td>18 SC</td> <td>46 NC</td> </tr> <tr> <td>19 SC</td> <td>47 NC</td> <td>20 SC</td> <td>48 NC</td> </tr> <tr> <td>21 SC</td> <td>49 NC</td> <td>22 SC</td> <td>50 NC</td> </tr> <tr> <td>23 SC</td> <td>51 NC</td> <td>24 SC</td> <td>52 NC</td> </tr> <tr> <td>25 SC</td> <td>53 NC</td> <td>26 SC</td> <td>54 NC</td> </tr> <tr> <td>27 SC</td> <td>55 NC</td> <td>28 SC</td> <td>56 NC</td> </tr> <tr> <td>29 SC</td> <td>57 NC</td> <td>30 SC</td> <td>58 NC</td> </tr> <tr> <td>31 SC</td> <td>59 NC</td> <td>32 SC</td> <td>60 NC</td> </tr> <tr> <td>33 SC</td> <td>61 NC</td> <td>34 SC</td> <td>62 NC</td> </tr> <tr> <td>35 SC</td> <td>63 NC</td> <td>36 SC</td> <td>64 NC</td> </tr> <tr> <td>37 SC</td> <td>65 NC</td> <td>38 SC</td> <td>66 NC</td> </tr> <tr> <td>39 SC</td> <td>67 NC</td> <td>40 SC</td> <td>68 NC</td> </tr> <tr> <td>41 SC</td> <td>69 NC</td> <td>42 SC</td> <td>70 NC</td> </tr> <tr> <td>43 SC</td> <td>71 NC</td> <td>44 SC</td> <td>72 NC</td> </tr> <tr> <td>45 SC</td> <td>73 NC</td> <td>46 SC</td> <td>74 NC</td> </tr> <tr> <td>47 SC</td> <td>75 NC</td> <td>48 SC</td> <td>76 NC</td> </tr> <tr> <td>49 SC</td> <td>77 NC</td> <td>50 SC</td> <td>78 NC</td> </tr> <tr> <td>51 SC</td> <td>79 NC</td> <td>52 SC</td> <td>80 NC</td> </tr> <tr> <td>53 SC</td> <td>81 NC</td> <td>54 SC</td> <td>82 NC</td> </tr> <tr> <td>55 SC</td> <td>83 NC</td> <td>56 SC</td> <td>84 NC</td> </tr> <tr> <td>57 SC</td> <td>85 NC</td> <td>58 SC</td> <td>86 NC</td> </tr> <tr> <td>59 SC</td> <td>87 NC</td> <td>60 SC</td> <td>88 NC</td> </tr> <tr> <td>61 SC</td> <td>89 NC</td> <td>62 SC</td> <td>90 NC</td> </tr> <tr> <td>63 SC</td> <td>91 NC</td> <td>64 SC</td> <td>92 NC</td> </tr> <tr> <td>65 SC</td> <td>93 NC</td> <td>66 SC</td> <td>94 NC</td> </tr> <tr> <td>67 SC</td> <td>95 NC</td> <td>68 SC</td> <td>96 NC</td> </tr> <tr> <td>69 SC</td> <td>97 NC</td> <td>70 SC</td> <td>98 NC</td> </tr> <tr> <td>71 SC</td> <td>99 NC</td> <td>72 SC</td> <td>100 NC</td> </tr> <tr> <td>73 SC</td> <td>101 NC</td> <td>74 SC</td> <td>102 NC</td> </tr> <tr> <td>75 SC</td> <td>103 NC</td> <td>76 SC</td> <td>104 NC</td> </tr> <tr> <td>77 SC</td> <td>105 NC</td> <td>78 SC</td> <td>106 NC</td> </tr> <tr> <td>79 SC</td> <td>107 NC</td> <td>80 SC</td> <td>108 NC</td> </tr> <tr> <td>81 SC</td> <td>109 NC</td> <td>82 SC</td> <td>110 NC</td> </tr> <tr> <td>83 SC</td> <td>111 NC</td> <td>84 SC</td> <td>112 NC</td> </tr> <tr> <td>85 SC</td> <td>113 NC</td> <td>86 SC</td> <td>114 NC</td> </tr> <tr> <td>87 SC</td> <td>115 NC</td> <td>88 SC</td> <td>116 NC</td> </tr> <tr> <td>89 SC</td> <td>117 NC</td> <td>90 SC</td> <td>118 NC</td> </tr> <tr> <td>91 SC</td> <td>119 NC</td> <td>92 SC</td> <td>120 NC</td> </tr> <tr> <td>93 SC</td> <td>121 NC</td> <td>94 SC</td> <td>122 NC</td> </tr> <tr> <td>95 SC</td> <td>123 NC</td> <td>96 SC</td> <td>124 NC</td> </tr> <tr> <td>97 SC</td> <td>125 NC</td> <td>98 SC</td> <td>126 NC</td> </tr> <tr> <td>99 SC</td> <td>127 NC</td> <td>100 SC</td> <td>128 NC</td> </tr> </tbody> </table>			PN SYMBOL	DE	PN SYMBOL	DE	1 SC	28 NC	2 SC	29 NC	2 SC	29 NC	3 SC	30 NC	3 SC	31 NC	4 SC	32 NC	5 SC	33 NC	6 SC	34 NC	7 SC	35 NC	8 SC	36 NC	9 SC	37 NC	10 SC	38 NC	11 SC	39 NC	12 SC	40 NC	13 SC	41 NC	14 SC	42 NC	15 SC	43 NC	16 SC	44 NC	17 SC	45 NC	18 SC	46 NC	19 SC	47 NC	20 SC	48 NC	21 SC	49 NC	22 SC	50 NC	23 SC	51 NC	24 SC	52 NC	25 SC	53 NC	26 SC	54 NC	27 SC	55 NC	28 SC	56 NC	29 SC	57 NC	30 SC	58 NC	31 SC	59 NC	32 SC	60 NC	33 SC	61 NC	34 SC	62 NC	35 SC	63 NC	36 SC	64 NC	37 SC	65 NC	38 SC	66 NC	39 SC	67 NC	40 SC	68 NC	41 SC	69 NC	42 SC	70 NC	43 SC	71 NC	44 SC	72 NC	45 SC	73 NC	46 SC	74 NC	47 SC	75 NC	48 SC	76 NC	49 SC	77 NC	50 SC	78 NC	51 SC	79 NC	52 SC	80 NC	53 SC	81 NC	54 SC	82 NC	55 SC	83 NC	56 SC	84 NC	57 SC	85 NC	58 SC	86 NC	59 SC	87 NC	60 SC	88 NC	61 SC	89 NC	62 SC	90 NC	63 SC	91 NC	64 SC	92 NC	65 SC	93 NC	66 SC	94 NC	67 SC	95 NC	68 SC	96 NC	69 SC	97 NC	70 SC	98 NC	71 SC	99 NC	72 SC	100 NC	73 SC	101 NC	74 SC	102 NC	75 SC	103 NC	76 SC	104 NC	77 SC	105 NC	78 SC	106 NC	79 SC	107 NC	80 SC	108 NC	81 SC	109 NC	82 SC	110 NC	83 SC	111 NC	84 SC	112 NC	85 SC	113 NC	86 SC	114 NC	87 SC	115 NC	88 SC	116 NC	89 SC	117 NC	90 SC	118 NC	91 SC	119 NC	92 SC	120 NC	93 SC	121 NC	94 SC	122 NC	95 SC	123 NC	96 SC	124 NC	97 SC	125 NC	98 SC	126 NC	99 SC	127 NC	100 SC	128 NC
PN SYMBOL	DE	PN SYMBOL	DE																																																																																																																																																																																																															
1 SC	28 NC	2 SC	29 NC																																																																																																																																																																																																															
2 SC	29 NC	3 SC	30 NC																																																																																																																																																																																																															
3 SC	31 NC	4 SC	32 NC																																																																																																																																																																																																															
5 SC	33 NC	6 SC	34 NC																																																																																																																																																																																																															
7 SC	35 NC	8 SC	36 NC																																																																																																																																																																																																															
9 SC	37 NC	10 SC	38 NC																																																																																																																																																																																																															
11 SC	39 NC	12 SC	40 NC																																																																																																																																																																																																															
13 SC	41 NC	14 SC	42 NC																																																																																																																																																																																																															
15 SC	43 NC	16 SC	44 NC																																																																																																																																																																																																															
17 SC	45 NC	18 SC	46 NC																																																																																																																																																																																																															
19 SC	47 NC	20 SC	48 NC																																																																																																																																																																																																															
21 SC	49 NC	22 SC	50 NC																																																																																																																																																																																																															
23 SC	51 NC	24 SC	52 NC																																																																																																																																																																																																															
25 SC	53 NC	26 SC	54 NC																																																																																																																																																																																																															
27 SC	55 NC	28 SC	56 NC																																																																																																																																																																																																															
29 SC	57 NC	30 SC	58 NC																																																																																																																																																																																																															
31 SC	59 NC	32 SC	60 NC																																																																																																																																																																																																															
33 SC	61 NC	34 SC	62 NC																																																																																																																																																																																																															
35 SC	63 NC	36 SC	64 NC																																																																																																																																																																																																															
37 SC	65 NC	38 SC	66 NC																																																																																																																																																																																																															
39 SC	67 NC	40 SC	68 NC																																																																																																																																																																																																															
41 SC	69 NC	42 SC	70 NC																																																																																																																																																																																																															
43 SC	71 NC	44 SC	72 NC																																																																																																																																																																																																															
45 SC	73 NC	46 SC	74 NC																																																																																																																																																																																																															
47 SC	75 NC	48 SC	76 NC																																																																																																																																																																																																															
49 SC	77 NC	50 SC	78 NC																																																																																																																																																																																																															
51 SC	79 NC	52 SC	80 NC																																																																																																																																																																																																															
53 SC	81 NC	54 SC	82 NC																																																																																																																																																																																																															
55 SC	83 NC	56 SC	84 NC																																																																																																																																																																																																															
57 SC	85 NC	58 SC	86 NC																																																																																																																																																																																																															
59 SC	87 NC	60 SC	88 NC																																																																																																																																																																																																															
61 SC	89 NC	62 SC	90 NC																																																																																																																																																																																																															
63 SC	91 NC	64 SC	92 NC																																																																																																																																																																																																															
65 SC	93 NC	66 SC	94 NC																																																																																																																																																																																																															
67 SC	95 NC	68 SC	96 NC																																																																																																																																																																																																															
69 SC	97 NC	70 SC	98 NC																																																																																																																																																																																																															
71 SC	99 NC	72 SC	100 NC																																																																																																																																																																																																															
73 SC	101 NC	74 SC	102 NC																																																																																																																																																																																																															
75 SC	103 NC	76 SC	104 NC																																																																																																																																																																																																															
77 SC	105 NC	78 SC	106 NC																																																																																																																																																																																																															
79 SC	107 NC	80 SC	108 NC																																																																																																																																																																																																															
81 SC	109 NC	82 SC	110 NC																																																																																																																																																																																																															
83 SC	111 NC	84 SC	112 NC																																																																																																																																																																																																															
85 SC	113 NC	86 SC	114 NC																																																																																																																																																																																																															
87 SC	115 NC	88 SC	116 NC																																																																																																																																																																																																															
89 SC	117 NC	90 SC	118 NC																																																																																																																																																																																																															
91 SC	119 NC	92 SC	120 NC																																																																																																																																																																																																															
93 SC	121 NC	94 SC	122 NC																																																																																																																																																																																																															
95 SC	123 NC	96 SC	124 NC																																																																																																																																																																																																															
97 SC	125 NC	98 SC	126 NC																																																																																																																																																																																																															
99 SC	127 NC	100 SC	128 NC																																																																																																																																																																																																															
REV: 1.0	UNIT: MM	SCALE: 1/1 SHEET: 1 OF 1																																																																																																																																																																																																																

9. Reliability and Inspection Standard

No.	Test Item		Test Conditions	Remark
1	High Temperature	Storage	80°C, 120Hr	Note
		Operation	70°C, 120Hr	Note
2	Low Temperature	Storage	-30°C, 120Hr	Note
		Operation	-20°C, 120Hr	
3	High Temperature and High Humidity		40°C, 90%RH, 120Hr	Note
4	Thermal Cycling Test(No operation)		-20C for 30min, 70c for 30 min. 100 cycles. Then test at room temperature after 1 hour	Note
5	Vibration Test(No operation)		Frequency :10~55 HZ; Stroke :1.5 mm;Sweep:10HZ~55HZ~10HZ; 2hours for each direction of X, Y, Z(6 hours for total)	
6	Package Drop Test		Height:60 cm,1 corner, 3 edges, 6 surfaces	
7	Electro Static Discharge		±2KV,Human Body Mode, 100pF/1500Ω	

Note:

- 1) Sample quantity for each test item is 5~10pcs.
- 2) Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

10. PRECAUTIONS FOR USING LCD MODULES

Handing Precautions

- (1) The display panel is made of glass and polarizer. As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.
- (2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.
- (3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).
- (4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in contacting with room temperature air.
- (5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
 - Isopropyl alcohol
 - Ethyl alcoholDo not scrub hard to avoid damaging the display surface.
- (6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
 - Water
 - Ketone
 - Aromatic solventsWipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.
- (7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
- (8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
- (9) Do not attempt to disassemble or process the LCD module.
- (10) NC terminal should be open. Do not connect anything.
- (11) If the logic circuit power is off, do not apply the input signals.
- (12) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.
 - Do not alter, modify or change the shape of the tab on the metal frame.
 - Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
 - Do not damage or modify the pattern writing on the printed circuit board.
 - Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal

connector.

- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.

- (1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
- (2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.