

Product Specification

Customer	
Model Name	RV156FHM-280-30
Ver(HW)	Ver 1.0

Date: 21.Feb.2022

(√) Preliminary Specification

() Approval Specification

Any modification is not allowed without HKC's permission

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Revision History

Version	Date	Page (New)	Section	Description	Revision by
01	2022/2/21	-	All	Preliminary Specification first update	He Xin

1. GENERAL DESCRIPTION

1.1 General Description

The specification is applied to 15.6 inch model (RV156FHM-280-30) TFT Liquid Crystal Display.

The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a 15.6 inch diagonally measured active display area with FHD resolution (1920 horizontal by 1080 vertical pixels array). All input signals are eDP1.2 interface compatible.

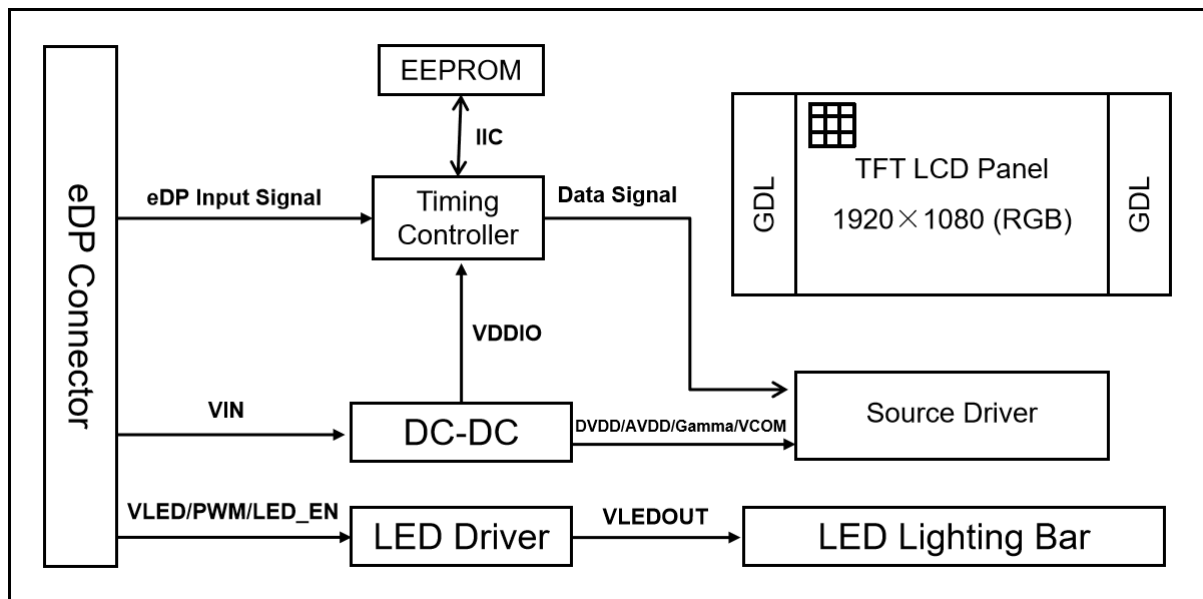


Figure 1. Drive Architecture

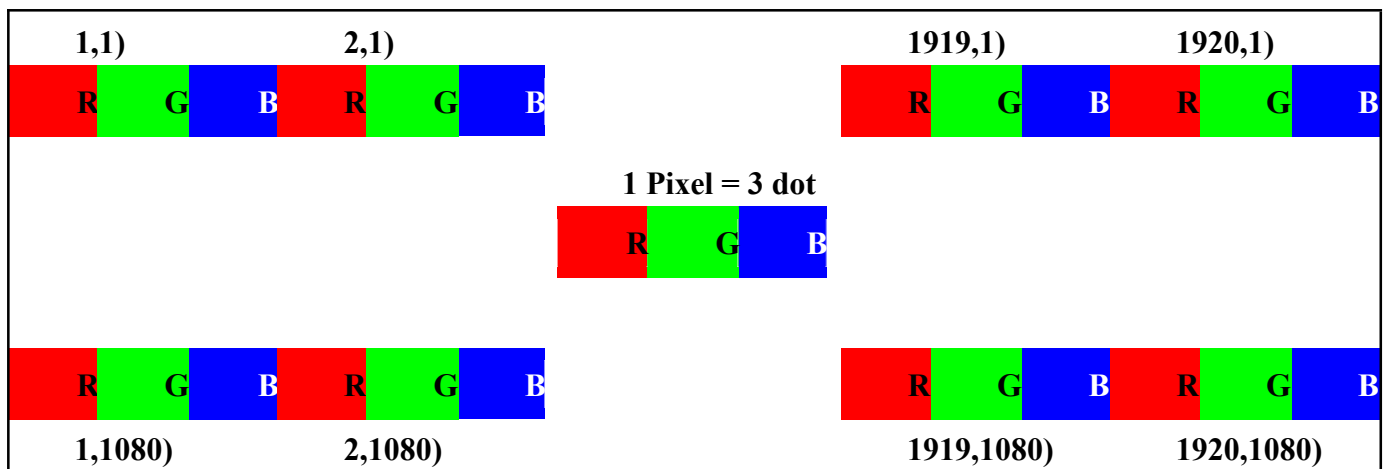


Figure 2. Pixel Mapping

1.2 Features

- (1) 2 lane eDP interface with 2.7 Gbps link rates
- (2) 16.7M(6bits+Hi FRC) color depth, color gamut 45%
- (3) Green product (RoHS & Halogen free product)
- (4) On board LED driving circuit
- (5) LED Dimming Mode DC

1.3 General Specifications

The followings are general specifications at the model PG156CS01-2. (listed in Table 1)

Table 1. General Specifications

Item		Specification	Unit	Note
Active area		344.16(H) × 193.59(V)	mm	-
Number of pixels		1920(H) × 1080(V)	pixels	-
Pixel pitch		0.17925(H) × 0.17925(V)	mm	-
Module Size		350.72*205.27*2.8	mm	
Pixel arrangement		RGB Vertical stripe	-	-
Display colors		16.7M(6bits+Hi FRC)	-	-
Color gamut		NTSC 45% Typ, 42% min	-	-
Display mode		Normally black	-	-
Outline Dimension	Without PCBA	350.72±0. 3(H)*205.25±0. 3(V)*3.2Max	mm	-
	With PCBA	350.72±0. 3(H)*214.75±0. 5(V)*3.2Max	mm	
Surface treatment		Anti-Glare	-	-
Surface hardness		3H	-	-
Power consumption		PD:0.7 (Max)	W	@Mosaic

2. ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

The operational and non-operational maximum voltage and current values are listed in Table 2.

Table 2. Absolute Maximum Ratings

Ta=25+/-5°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Logic Supply Voltage	V _{CC}	-0.3	3.6	V	(1),(2),(3),(4)
Logic Input Signal Voltage	V _{Signal}	-0.3	V _{CC}	V	
B/L Supply Voltage	V _{LED}	- 0.3	24	V	
Operating Temperature	T _{OP}	0	50	°C	
Storage Temperature	T _{ST}	-20	60	°C	

Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded.

Note (2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. All the display fineness should be inspected under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 50± 10%RH.

Note (3) Unpredictable results may occur when it was used in extreme conditions. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note (4) Temperature and relative humidity range are shown in the figure below.

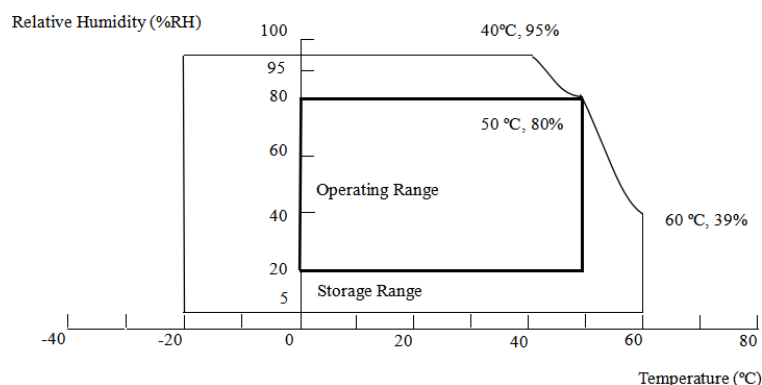


Figure 3. Absolute Ratings of Environment of the LCD Module

3. ELECTRICAL SPECIFICATIONS

3.1 Interface Connector

RJOYTEK DISPLAY LTD

Table 3. Signal Connector Type

Item	Description
Manufacturer / Type	Starconn/ 300E30-0010RA-G3

Table 4. Signal Connector Pin Assignment

PIN No.	SIGNAL NAME	DESCRIPTION
1	NC	No Connection
2	H_GND	Ground
3	LANE1_N	eDP RX Channel 1 Negative
4	LANE1_P	eDP RX Channel 1 Positive
5	H_GND	Ground
6	LANE0_N	eDP RX Channel 0 Negative
7	LANE0_P	eDP RX Channel 0 Positive
8	H_GND	Ground
9	AUX_CH_P	eDP AUX CH Positive
10	AUX_CH_N	eDP AUX CH Negative
11	H_GND	Ground
12	LCD_VCC	Power Supply, 3.3V (typ.)
13	LCD_VCC	Power Supply, 3.3V (typ.)
14	BIST	Self Test(BIST) prohibit pull up resistor on LCD side
15	GND	Ground
16	GND	Ground
17	HPD	Hot Plug Detect Output
18	BL_GND	LED Ground
19	BL_GND	LED Ground
20	BL_GND	LED Ground
21	BL_GND	LED Ground
22	BL_ENABLE	LED Enable Pin
23	BL_PWM	System PWM Signal Input
24	NC	No Connection
25	NC	No Connection
26	BL_POWER	LED Power Supply 5V-21V
27	BL_POWER	LED Power Supply 5V-21V

28	BL_POWER	LED Power Supply 5V-21V
29	BL_POWER	LED Power Supply 5V-21V
30	NC	No Connection

3.2 Signal Electrical Characteristics

Table 5. Display Port Main Link

Parameter	Description	Min.	Typ.	Max.	Unit
V_{CM}	Differential Common Mode Voltage	-	0	-	V
$V_{Diff\ P-P}$ Level	Differential Peak to Peak Voltage Level 1	0.4	-	1.3	V

Note:

- (1) Input signals shall be low or Hi- resistance state when VCC is off.
- (2) It is recommended to refer the specifications of VESA Display Port Standard.

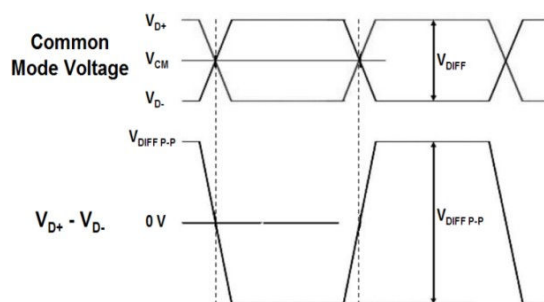


Figure 4. Display Port Main Link Signal

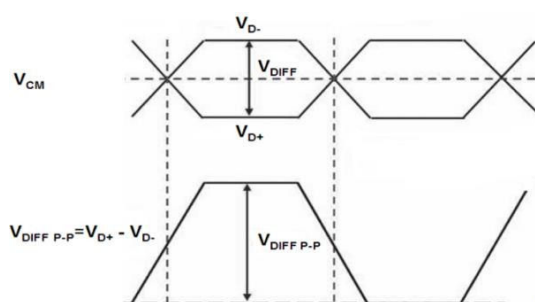


Figure 5. Display Port AUX_CH Signal

Table 6. Display Port AUX_CH

Parameter	Description	Min.	Typ.	Max.	Unit
V_{CM}	Common Mode Voltage When receiving	0	-	2.0	V
	Common Mode Voltage When transmitting	-	0.15	-	V
$V_{Diff\ P-P}$	Differential Peak to Peak Voltage	0.4	-	0.8	V

Note: Follow as VESA Display Port standard.

Table 7. Display Port V_{HPD}

Parameter	Description	Min.	Typ.	Max.	Unit
V_{HPD}	HPD Voltage	2.25	-	3.6	V

Note: Follow as VESA Display Port standard.

3.3 Interface Timings

Table 8. Interface Timings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock Frequency	Fclk	111.0	138.8	150.3	MHz
H Total Time	HT	2,040	2,080	2,120	Clocks
H Active Time	HA	1,920			Clocks
V Total Time	VT	1,104	1,112	1,120	Lines
V Active Time	VA	1,080			Lines
Frame Rate	F _V	48	60	65	Hz

Note1: $HT * VT * \text{Frame Frequency} \leq 150.3 \text{ MHz}$

Note2: All reliabilities are specified for timing specification based on refresh rate of 60Hz.

3.4 Input Power Specifications

Input power specifications are as follows.

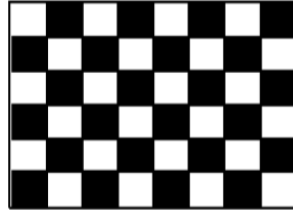
Table 9. Input Power Specifications

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
System Power Supply							
LCD Drive Voltage (Logic)		V _{CC}	3.0	3.3	3.6	V	(1),(2)
V _{CC} Current	mosaic Pattern	I _{VCC}	-	0.233	-	A	(1),(3)
V _{CC} Power Consumption	mosaic Pattern	P _{VCC}	-	-	0.75	W	
Rush Current		I _{rush}	-	-	1.5	A	(1),(4)
Allowable Logic/LCD Drive Ripple Voltage		V _{VCC-RP}	-	-	200	mV	(1)
LED Power Supply							
LED Driver Input Voltage		V _{LED}	5	12	21	V	(1),(2)
PWM Signal Voltage	High	V _{PWM}	2.5	-	V _{CC}	V	(1),(2)
	Low		-	-	0.4		
LED Enable Voltage	High	V _{LED_EN}	2.5	-	V _{CC}	V	
	Low		-	-	0.4		
Input PWM Frequency		F _{PWM}	200	-	2000	Hz	(1),(2),(6)
Duty Ratio		PWM	1	-	100	%	(1),(7)

Note (1) All of the specifications are guaranteed under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 50± 10%RH.

Note (2) All of the absolute maximum ratings specified in the table, if exceeded, may cause faulty operation or unrecoverable damage. It is recommended to follow the typical value.

Note (3) The specified V_{CC} current and power consumption are measured under the $V_{CC} = 3.3V$, $F_V = 60Hz$ condition and 8*6 mosaic Pattern.



Note (4) The figures below is the measuring condition of V_{CC} Rush current can be measured when T_{rush} is 0.5ms.

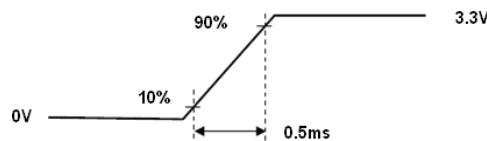
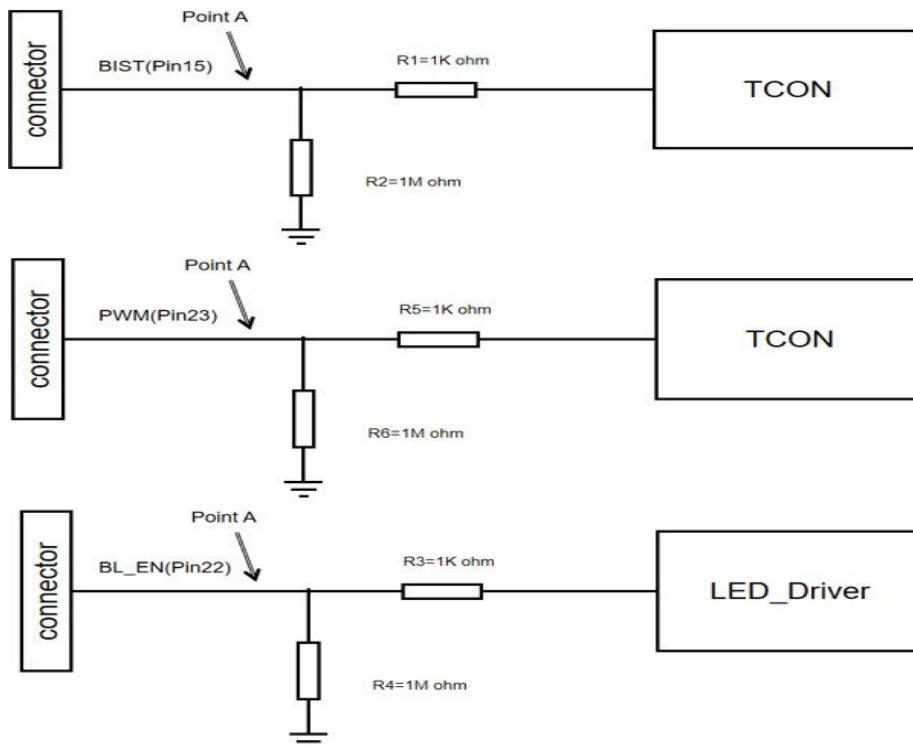


Figure 6. V_{CC} Rising Time

Note (5) Although acceptable range as defined, the dimming ratio is not effective at all conditions. The PWM frequency should be fixed and stable for more consistent luminance control at any specific level desired.

Note (6) The operation of LED Driver below minimum dimming ratio may cause flickering or reliability issue.

Note (7) Because there are voltage dividers on some control signal lines of the connector, please pay special attention when using it.



3.5 Power ON/OFF Sequence

Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when V_{CC} voltage is off.

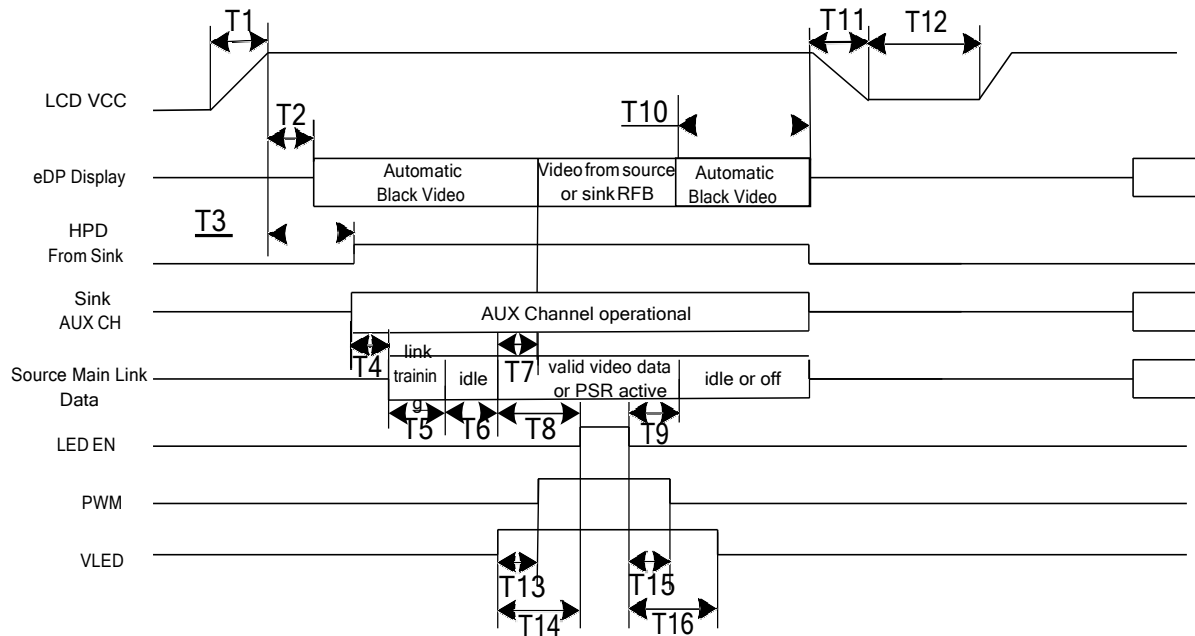


Figure 7. Power Sequence

Table 10. Power Sequencing Requirements

Parameter	Symbol	Min.	Typ.	Max.	Unit
V_{CC} Rise Time (10% to 90%)	T1	(0.5)	-	(10)	ms
Delay from V_{CC} to automatic Black Video generation	T2	(0)	-	(200)	ms
Delay from V_{CC} to HPD high	T3	(0)	-	(200)	ms
Delay from HPD high to link training initialization	T4	-	-	-	ms
Link training duration	T5	-	-	-	ms
Link idle	T6	-	-	-	ms
Delay from valid video data from Source to video on display	T7	(0)	-	(50)	ms
Delay from valid video data from Source to backlight enable	T8	(200)	-	-	ms
Delay from backlight disable to end of valid video date	T9	-	-	-	ms
Delay from end of valid video data from Source to V_{CC} off	T10	(0)	-	(500)	ms
V_{CC} fall time (90% to 10%)	T11	(0.5)	-	(10)	ms
V_{CC} off time	T12	(500)	-	-	ms
Delay from V_{LED} to PWM	T13	0	-	-	ms
Delay from V_{LED} to backlight enable	T14	0	-	-	ms
Delay from backlight disable to V_{LED} off	T15	0	-	-	ms

Delay from PWM off to V_{LED} off	T16	0	-	-	ms
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3.6 Backlight Unit

Table 11. Recommended LED Driving Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage	VF	2.7	-	2.9	V	
LED Forward Current	IF	-	18.4	-	mA	

Table 12. Pin Assignments Of BLU Connector

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Vout	LED anode connection	6	LED	LED cathode connection
2	Vout	LED anode connection	7	LED	LED cathode connection
3	NC	No Connection	8	LED	LED cathode connection
4	NC	No Connection	9	LED	LED cathode connection
5	LED	LED cathode connection	10	LED	LED cathode connection

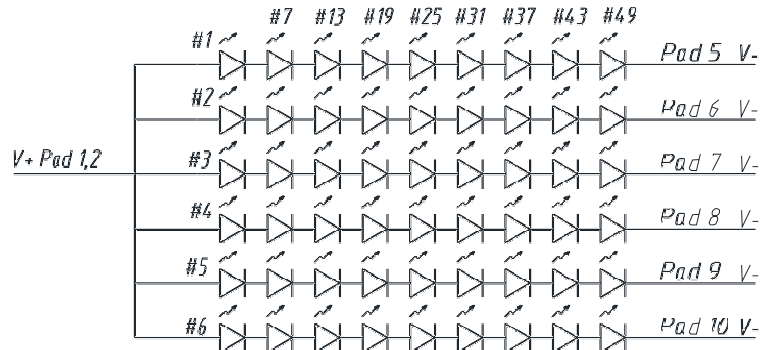


Figure 6. Recommended LED Structure

4. OPTICAL SPECIFICATION

4.1 The table below is the test condition of optical measurement.

Table 11. Test condition of optical measurement

Item	Symbol	Value	Unit
Ambient Temperature	TA	25±5	°C
Ambient Humidity	HA	50±10	% RH
Supply Voltage	V _{CC}	3.3±0.3	V

Driving Signal	Refer to the typical value in Chapter 3: ELECTRICAL SPECIFICATIONS		
Vertical Refresh Rate	Fv	60	Hz
Warm up time	Twarm	>15 min	min
Dark room	ED	<1 lux	lux

4.2 Optical Specifications

Table 12. Optical Specifications

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity(CIE1931)	Red	Rx	$\theta_x=0^\circ, \theta_y=0^\circ$	Typ. -0.03	(0.613)	Typ. +0.03	-	(1)
		Ry			(0.345)			
	Green	Gx			(0.299)			
		Gy			(0.558)			
	Blue	Bx			(0.143)			
		By			(0.204)			
	White	Wx			0.310			
		Wy			0.371			
Color Gamut		CG		42	45	-	%	
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$	(600:1)	(800:1)	-	-	(2)
Response Time		Tg		-	(25)	(30)	ms	(3)
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$	80	85	-	Deg.	(4)
		θ_{x-}		80	85	-		
	Vertical	θ_{y+}	$\theta_x=0^\circ, \theta_y=0^\circ$	80	85	-		
		θ_{y-}	80	85	-			

Notes:

(1) The color chromaticity coordinates specified in Table 12 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

(2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression,

$$\text{Contrast Ratio (CR): } CR = \frac{CR_w}{CR_D}$$

CRW : Luminance of LCD module with full screen white pattern (255,255,255) at center point.

CRD : Luminance of LCD module with full screen Dark pattern (0,0,0) at center point.

Where the measure point of to the Contrast Ratio is the center of the panel.

(3) Definition of Response time (T_g):

Average switching time of luminance ratios among 10% and 90% to each other and is optimized on frame Rate = 60Hz.

Table 13. Switching time of luminance ratios matrix

Measured Response time		To	
		10%	90%
From	10%		$T_{10\% \text{ to } 90\%}$
	90%	$T_{90\% \text{ to } 10\%}$	

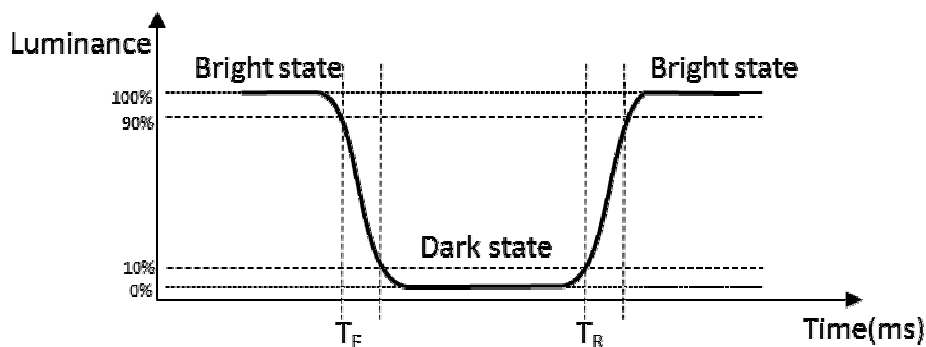


Figure 8. The definition of T_R and T_F

Measured response time is determined by 10% to 90% brightness difference of rising (T_R) or falling (T_F) time.

(4) Definition of Viewing angle:

As Note (4) the static contrast ratio definition, the viewing angles are defined at the angle that the contrast ratio is larger than 10 at four directions relative to the perpendicular direction of the HKC's module (two vertical angles: up θ_{y+} and down θ_{y-} ; and two horizontal angles: right θ_{x+} and left θ_{x-}). The standard setup of measurement is shown in Figure 9&10.

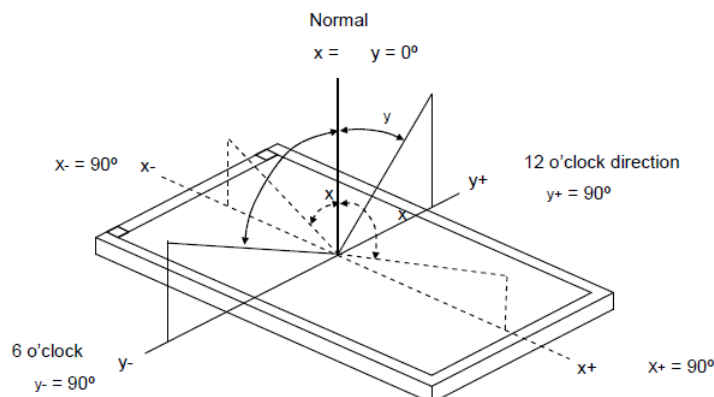


Figure 9. Definition of Viewing angle

4.3 Optical Measurements

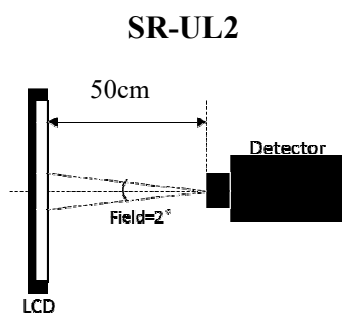


Figure 10. Measurement equipment

5. MECHANICAL OUTLINE DIMENSION

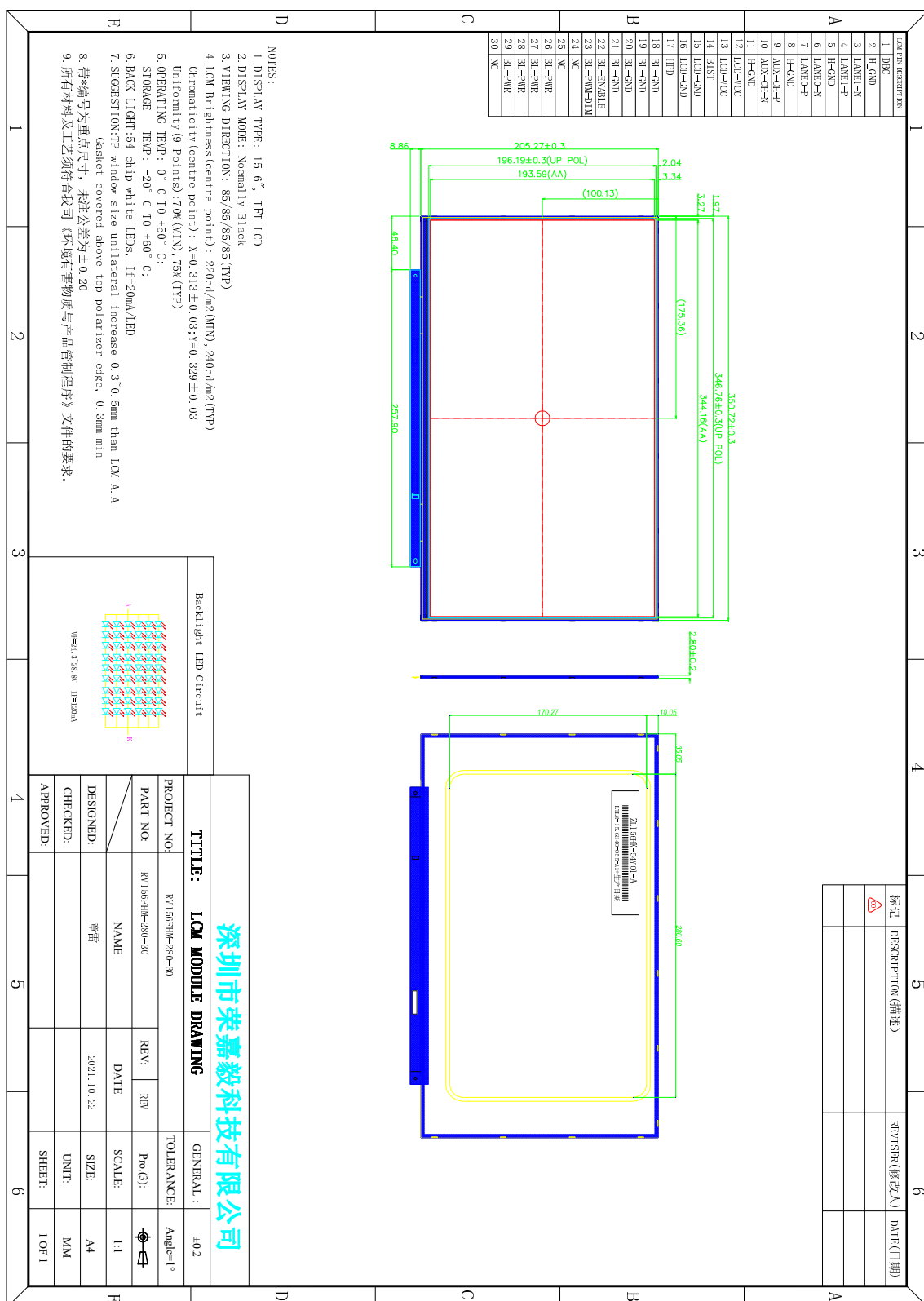


Table 14. Product Dimension Specifications

Item		Min.	Typ.	Max.	Unit
Width		350.42	350.72	351.02	mm
Height		204.95	205.27	205.55	mm
Thickness	Without PCBA	2.6	2.8	3.0	mm
	With PCBA	-	-	3.2	mm
Weight				360	g

6. EDID TABEL

Address	Field Name & Comments		Value	Value	Value
(HEX)			(HEX)	(BIN)	(DEC)
0	Header		00	00000000	0
1	Header		FF	11111111	255
2	Header		FF	11111111	255
3	Header		FF	11111111	255
4	Header		FF	11111111	255
5	Header		FF	11111111	255
6	Header		FF	11111111	255
7	Header		00	00000000	0
8	manufacture code	HKC	21	00100001	33
9			63	01100011	99
0A	Product Code	PID:5290	52	01010010	82
0B			90	10010000	144
0C	LCD module Serial No –(“0” if not used)		00	00000000	0
0D	LCD module Serial No –(“0” if not used)		00	00000000	0
0E	LCD module Serial No –(“0” if not used)		00	00000000	0
0F	LCD module Serial No –(“0” if not used)		00	00000000	0
10	Week of manufacture	week0	00	00000000	0
11	Year of manufacture	Year2021	1F	00011111	31
12	EDID Structure Ver #		01	00000001	1
13	EDID revision #		04	00000100	4
14	Video I/P definition = Digital I/P (80h)		A5	10100101	165
15	Max H image size = (Rounded	34cm	22	00100010	34

	to cm)				
16	Max V image size = (Rounded to cm)	19cm	13	00010011	19
17	Display Gamma	2.2	78	01111000	120
18	Feature support (no DPMS, Active off, RGB, timing BLK 1)		E3	11100011	227
19	Red/Green Low bits (RxRy/GxGy)	Rx:0.581 Ry:0.358 Gx:0.347 Gy:0.57 Bx:0.159 By:0.122 Wx:0.313 Wy:0.329	AF	10101111	175
1A	Blue/White Low bits (BxBY/WxWy)		80	10000000	128
1B	Red X Rx		94	10010100	148
1C	Red Y Ry		5B	01011011	91
1D	Green X Gx		58	01011000	88
1E	Green Y Gy		91	10010001	145
1F	Blue X Bx		28	00101000	40
20	Blue Y By		1F	00011111	31
21	White X Wx		50	01010000	80
22	White Y Wy		54	01010100	84
23	Established timings 1 (00h if not used)		00	00000000	0
24	Established timing 2 (00h if not used)		00	00000000	0
25	Manufacturer's timings (00h if not used)		00	00000000	0
26	Standard timing ID1 (01h if not used)		01	00000001	1
27	Standard timing ID1 (01h if not used)		01	00000001	1
28	Standard timing ID2 (01h if not used)		01	00000001	1
29	Standard timing ID2 (01h if not used)		01	00000001	1
2A	Standard timing ID3 (01h if not used)		01	00000001	1
2B	Standard timing ID3 (01h if not used)		01	00000001	1

2C	Standard timing ID4 (01h if not used)		01	00000001	1
2D	Standard timing ID4 (01h if not used)		01	00000001	1
2E	Standard timing ID5 (01h if not used)		01	00000001	1
2F	Standard timing ID5 (01h if not used)		01	00000001	1
30	Standard timing ID6 (01h if not used)		01	00000001	1
31	Standard timing ID6 (01h if not used)		01	00000001	1
32	Standard timing ID7 (01h if not used)		01	00000001	1
33	Standard timing ID7 (01h if not used)		01	00000001	1
34	Standard timing ID8 (01h if not used)		01	00000001	1
35	Standard timing ID8 (01h if not used)		01	00000001	1
36	Pixel Clock LSB	CLK:138.78	35	00110101	53
37	Pixel Clock HSB		36	00110110	54
38	Horizontal Active (lower 8 bits)	H active:1920	80	10000000	128
39	Hor blanking (lower 8 bits)	CLK H blank:160CLK LK	A0	10100000	160
3A	Horizontal Active/Horizontal blanking (upper 4:4 bits)		70	01110000	112
3B	Vertical active(lower 8 bits)	V Active:1080 Line	38	00111000	56
3C	Vertical blanking(lower 8 bits)	V blank:32Line	20	00100000	32
3D	Vertical Active : Vertical		40	01000000	64

	Blanking (upper4:4 bits)				
3E	Horizontal Sync Offset	H front porch:24LC K	18	00011000	24
3F	Horizontal Sync Pulse Width	H sync pulse:48LC K	30	00110000	48
40	Vertical Sync Offset , Sync Width	V ront porch:3Line	3C	00111100	60
41	Horizontal Vertical Sync Offset/Width upper 2 bits	V sync pulse:12Line	00	00000000	0
42	Horizontal Image Size	344mm	58	01011000	88
43	Vertical image Size	194mm	C2	11000010	194
44	Horizontal Image Size / Vertical image size		10	00010000	16
45	Horizontal Border = (0 for Notebook LCD)		00	00000000	0
46	Vertical Border = (0 for Notebook LCD)		00	00000000	0
47	Non-interlaced, Normal, no stereo, Separate sync, H/V pol Negatives,	DE only mode	19	00011001	25
48	Reserved for definition		00	00000000	0
49	Reserved for definition		00	00000000	0
4A	Reserved for definition		00	00000000	0
4B	ASCII String	Display Range Limits	FD	11111101	253
4C	Vertical Rate Offdet		00	00000000	0
4D	Minimum Vertical Rate	40Hz	28	00101000	40
4E	Maximum Vertical Rate	60Hz	3C	00111100	60
4F	Minimum Horizontal Rate	67KHz	43	01000011	67
50	Maximum Horizontal Rate	67KHz	43	01000011	67
51	Maximum Pixel Clock	130Hz	0D	00001101	13
52	Video Timing Support Flag 01h	Range Limits Only	01	00000001	1

53	Line Feed		0A	00001010	10
54	Space		20	00100000	32
55	Space		20	00100000	32
56	Space		20	00100000	32
57	Space		20	00100000	32
58	Space		20	00100000	32
59	Space		20	00100000	32
5A	Panel Supplier Manufacture Code		00	00000000	0
5B			00	00000000	0
5C			00	00000000	0
5D			FE	11111110	254
5E			00	00000000	0
5F			48	01001000	72
60			4B	01001011	75
61			43	01000011	67
62			20	00100000	32
63			4D	01001101	77
64			59	01011001	89
65			20	00100000	32
66			20	00100000	32
67			20	00100000	32
68			20	00100000	32
69	New line character indicates end of ASCII string		0A	00001010	10
6A			20	00100000	32
6B			20	00100000	32
6C	Detailed timing/monitor descriptor #4		00	00000000	0
6D			00	00000000	0
6E			00	00000000	0
6F	FE (hex) defines ASCII string		FE	11111110	254
70	Flag		00	00000000	0
71	Manufacture P/N		4D	01001101	77
72	Manufacture P/N		42	01000010	66
73	Manufacture P/N		31	00110001	49
74	Manufacture P/N		35	00110101	53
75	Manufacture P/N		36	00110110	54

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76	Manufacture P/N		43	01000011	67
77	Manufacture P/N		53	01010011	83
78	Manufacture P/N		30	00110000	48
79	Manufacture P/N		31	00110001	49
7A	Manufacture P/N		27	00100111	39
7B	Manufacture P/N		32	00110010	50
7C	Manufacture P/N		20	00100000	32
7D	Manufacture P/N		20	00100000	32
7E	Extension Flag = 00		00	00000000	0
7F	Checksum		0F	00001111	15

7. RELIABILITY TEST

The reliability test items and its conditions are shown in below.

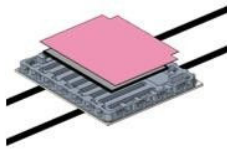
Table 14. Reliability Test

No	Test Items	Conditions
1	High temperature storage test	60°C, 240hrs
2	Low temperature storage test	-20°C, 240hrs
3	High temperature & high humidity operation test	50°C, 80%, 1000hrs
4	Low temperature operation test	0°C, 500hrs
5	Thermal shock	-20~60°C, per 30min, 100cycle, Storage
6	Vibration test-LCM	1.5G, 10~200Hz Random x, y, z each aixs/30min
7	Shock test-LCM	50G, 18msec Trapezoidal $\pm x \pm y \pm z$ each aixs/1times ; 210G, 3mshalf-sine $\pm x \pm y \pm z$ each aixs /1times ;
8	ESD test (operating)	Air: 150pF, 330 Ω , ± 15 kV Contact: 150pF, 330 Ω , ± 8 kV

8. PACKAGE SPECIFICATION

Table 15. Packing Specifications

Item	Specification			
	Quantity	Dimension(mm)	Item	Weight(kg)
Packing Box	20 pcs/box	484×340×303	Net Weight	7.4
			Gross Weight	12.96
Pallet	1	1100×1100×120	Net Weight	14.96
Stack Layer	4			
Boxes per Pallet	24			
Pallet after Packing	pcs/pallet	480	Gross Weight	326



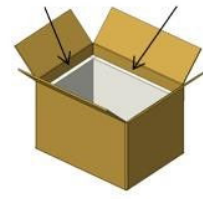
- 1.1 pcs PP Board
- 2.1 pcs Tray
- 3.1 pcs OC
- 4.2 pcs EPE Spacer
- 5.2 pcs Strapping Belt



1. 21 pcs trays for 40 pcs EP E Spacers and 20 pcs OC, to p empty tray
2. Bind with 2 shrink bands



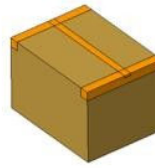
- Place a PE bag and a bag of desiccant



- Put the EPE liner in the carton



1. Place the tray into the carton
2. First fold the long side of PE bag, then fold the short side
3. Fix PE bag with tape
4. Place a piece of EPE liner



1. Adhesive tape for sealing box
2. Paste 2 pieces of box label



1. Place a PE film on the pallet
2. Place 24 boxers on the pallet



1. Fixed 4 paper corners
2. Winding three layers with winding film
3. Fix cover
4. Fix the packing belt
5. Paste 2 pieces of pallet label

Remarks: Stack not allowed

This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems and any other appliance where performance failure could be life-threatening or lead to be catastrophic.

8.1 Operation Precaution

(1) The LCD product should be operated under normal conditions.

Normal conditions are defined as below:

Temperature: 25°C

Humidity: 50±10%

Display pattern: continually changing pattern (Not stationary)

(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)

(3) It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the module. Besides, smear or spot will remain after condensate water evaporating.

(4) If the absolute maximum rating value was exceeded, it may damage the module.

(5) Do not adjust the variable resistor located on the module.

(6) Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding may be important to minimize the interference.

(7) Image sticking may occur when the module displayed the same pattern for long time.

(8) Do not connect or disconnect the module in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

(9) Ultra-violet ray filter is necessary for outdoor operation.

8.2 Mounting Precaution

(1) All the operators should be electrically grounded and with Ion-blown equipment turning on when mounting or handling. Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.

(2) It is unacceptable that the material of cover case contains acetic or chloric. Besides, any other material that could generate corrosive gas or cause circuit break by electro-chemical reaction is not desirable.

(3) The case on which a module is mounted should have sufficient strength so that external force is not transmitted to the module directly.

(4) It is obvious that you should adopt radiation structure to satisfy the temperature specification.

(5) It should be attached to the system tightly by using all holes for mounting, when the module is

assembled. Be careful not to apply uneven force to the module, especially to the PCB on the back.

(6) A transparent protective film needs to be attached to the surface of the module.

(7) Do not press or scratch the polarizer exposed with anything harder than HB pencil lead. In addition, don't touch the pin exposed with bare hands directly.

(8) Clean the polarizer gently with absorbent cotton or soft cloth when it is dirty.

(9) Wipe off saliva or water droplet as soon as possible. Otherwise, it may cause deformation and fading of color.

(10) Desirable cleaners are IPA (Isopropyl Alcohol) or hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(11) Do not disassemble or modify the module. It may damage sensitive parts in the LCD module, and cause scratches or dust remains. HKC does not warrant the module, if you disassemble or modify the module.

8.3 Handling Precaution

(1) Static electricity will generate between the film and polarizer, when the protection film is peeled off. It should be peeled off slowly and carefully by operators who are electrically grounded and with Ion-blown equipment turning on. Besides, it is recommended to peel off the film from the bonding area.

(2) The protection film is attached to the polarizer with a small amount of glue. When the module with protection film attached is stored for a long time, a little glue may remain after peeling.

(3) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

8.4 Storage Precaution

When storing modules as spares for long time, the following precautions must be executed.

(1) Store them in a dark place. Do not expose to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

8.5 Others

When disposing LCD module, obey the local environmental regulations.