Specification for Approval

PRODUCT NAME: RGC24128064WW003

PRODUCT NO.: 9OL9919706000

CUSTOMER
APPROVED BY
DATE:

RITDISPLAY CORP. APPROVED

REVISION RECORD

REV.	REVISION DESCRIPTION	REV. DATE	REMARK
X01	INITIAL RELEASE	2012. 11. 01	
A01	■ Transfer from X version ■ Add the information of module weight ■ Add tape ■ Add the packing specification	2013. 01. 31	Page 5, 15 & 16

CONTENTS

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1. SCOPE

The purpose of this specification is to define the general provisions and quality requirements that apply to the supply of display cells manufactured by RiTdisplay. This document, together with the Module Assembly Drawing, is the highest-level specification for this product. It describes the product, identifies supporting documents and contains specifications, which are either not addressed, or are exceptions to the supporting documents.

2. WARRANTY

RiTdisplay warrants that the products delivered pursuant to this specification (or order) will conform to the agreed specifications for twelve (12) months from the shipping date ("Warranty Period"). RiTdisplay is obligated to repair or replace the products which are found to be defective or inconsistent with the specifications during the Warranty Period without charge, on condition that the products are stored or used as the conditions specified in the specifications. Nevertheless, RiTdisplay is not obligated to repair or replace the products without charge if the defects or inconsistency are caused by the force majeure or the reckless behaviors of the customer.

After the Warranty Period, all repairs or replacements of the products are subject to charge.

3. FEATURES

- Small molecular organic light emitting diode.
- Color : White
- Panel matrix : 128*64
- Driver IC : SSD1303
- Excellent Quick response time : 10μs
- Extremely thin thickness for best mechanism design : 2.01 mm
- High contrast : 2000:1
- Wide viewing angle : 160°
- 8-bit 6800-series Parallel Interface, 8-bit 8080-series Parallel Interface, Serial Parallel Interface, I^2C Interface.
- Strong environmental resistance
- Wide range of operating temperature : -40 to 70℃
- Anti-glare polarizer.

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4. MECHANICAL DATA

NO	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128 (W) x 64 (H)	dot
2	Dot Size	0.4 (W) x 0.4 (H)	mm^2
3	Dot Pitch	0.43 (W) x 0.43 (H)	mm^2
4	Aperture Rate	86	%
5	Active Area	55.01 (W) x 27.49 (H)	mm^2
6	Panel Size	60.5 (W) x 37 (H)	mm^2
7*	Panel Thickness	1.82 $\pm$ 0.1	mm
8	Module Size	60.5 (W) x 92 (H) x 2.01 (D)	mm^3
9	Diagonal A/A size	2.4	inch
10	Module Weight	9.6 $\pm$ 10%	gram

* Panel thickness includes substrate glass, cover glass and UV glue thickness.

5. MAXIMUM RATINGS

ITEM	MIN	MAX	UNIT	Condition	Remark
Supply Voltage (V_{DD})	-0.3	+3.5	V	Ta = 25 ℃	IC maximum rating
Supply Voltage (Vcc)	8	16	V	Ta = 25 ℃	IC maximum rating
Operating Temp.	-40	70	℃		
Storage Temp	-40	85	℃		
Humidity		85	%		
Life Time	18,000	-	Hrs	60 cd/m^2, 50% checkerboard	Note (1)
Life Time	21,000	-	Hrs	50 cd/m^2, 50% checkerboard	Note (2)
Life Time	26,000	-	Hrs	40 cd/m^2, 50% checkerboard	Note (3)

Note:

(A) Under VCC = 12V, Ta = 25℃, 50% RH.

(B) Life time is defined the amount of time when the luminance has decayed to less than 50% of the initial measured luminance.

(1) Setting of 60 cd/m^2 :

- Contrast setting : 0x98
- Frame rate : 105Hz
- Duty setting : 1/64

(2) Setting of 50 cd/m^2 :

- Contrast setting : 0x75
- Frame rate : 105Hz
- Duty setting : 1/64

(3) Setting of 40 cd/m^2 :

- Contrast setting : 0x50
- Frame rate : 105Hz
- Duty setting : 1/64

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6. ELECTRICAL CHARACTERISTICS

6.1 D.C ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETERS	TEST CONDITION	MIN	TYP	MAX	UNIT
V_{CC}	Analog power supply (for OLED panel)	Ta=-20 °C to +70°C	11.5	12	12.5	V
V_{DD}	Digital power supply	Ta=-20 °C to +70°C	2.4	-	3.5	V
I_{DD}	Operating current for V_{DD} V_{DD} = 2.7V, V_{CC} = 12V, I_{REF} = 10uA No loading, All Display ON	Contrast=FF	-	190	300	uA
I_{CC}	Operating current for V_{CC} V_{DD} = 2.7V, V_{CC} = 12V, I_{REF} = 10uA All Display ON	Contrast=FF	-	550	1000	uA
V_{IH}	High logic input level		0.8* V_{DD}	-	V_{DD}	V
V_{IL}	Low logic input level		0	-	0.2* V_{DD}	V
V_{OH}	High logic output level		0.9* V_{DD}	-	V_{DD}	V
V_{OL}	Low logic output level		0	-	0.1* V_{DD}	V
I_{SEG}	Segment on output current V_{DD}=2.7V, V_{CC}=12V, IREF=10uA, Display on, Segment pin under test is connected with a 20K resistive load to V_{SS}	Contrast=FF	285	320	355	uA
		Contrast=AF	-	220	-	uA
		Contrast=5F	-	120	-	uA
		Contrast=0F	-	20	-	uA

6.2 ELECTRO-OPTICAL CHARACTERISTICS

PANEL ELECTRICAL SPECIFICATIONS

PARAMETER	MIN	TYP.	MAX	UNITS	COMMENTS
Normal mode current		24	26	mA	All pixels on (1)
Standby mode current		3	4	mA	Standby mode 10% pixels on (2)
Normal mode power consumption		288	312	mW	All pixels on (1)
Standby mode power consumption		36	48	mW	Standby mode 10% pixels on (2)
Normal mode Luminance	40	50		cd/m^2	Display Average
Standby mode Luminance		20		cd/m^2	
CIEx (White)	0.24	0.28	0.32		x, y (CIE 1931)
CIEy (White)	0.28	0.32	0.36		
Dark Room Contrast	2000:1				
Viewing Angle	160			degree	
Response Time		10		µs	

(1) Normal mode condition :

- Driving Voltage : 12V

- Contrast setting : 0x75

- Frame rate : 105Hz
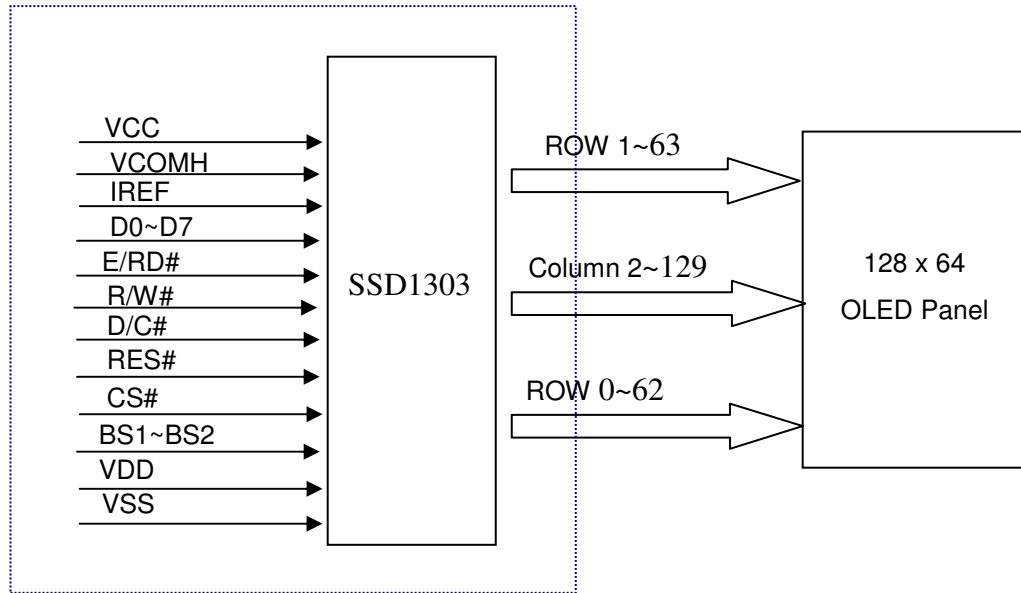
- Duty setting : 1/64

(2) Standby mode condition :

- Driving Voltage : 12V

- Contrast setting : 0x05

- Frame rate : 105Hz
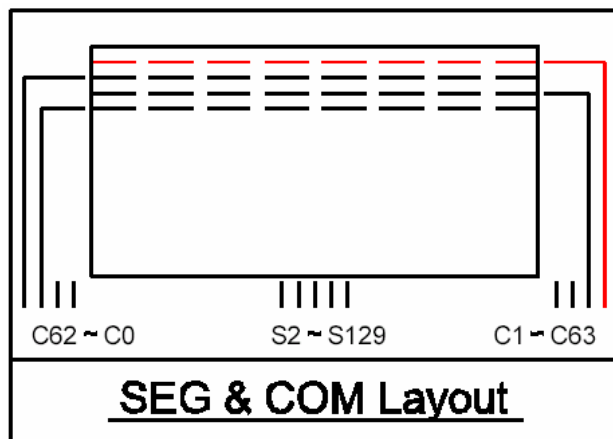
- Duty setting : 1/64
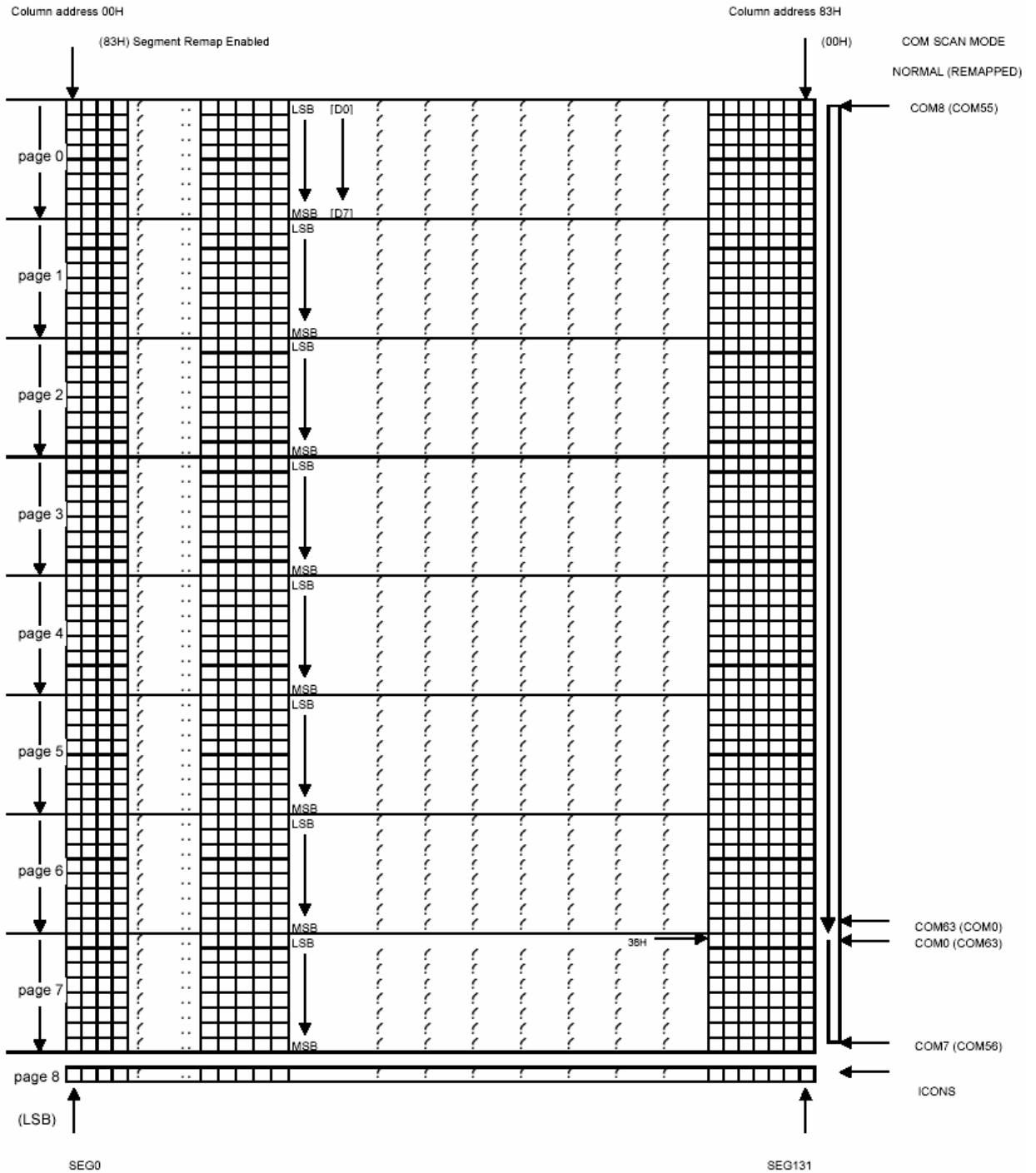
7. INTERFACE

7.1 FUNCTION BLOCK DIAGRAM

7.2 PANEL LAYOUT DIAGRAM

SEG & COM Layout

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7.3 PIN ASSIGNMENTS

Pin No.	Pin Name	Description
1	VCC	Power supply for panel driving voltage.
2	VCOMH	The COM voltage reference pin, This pin should be connected to ground through a capacitor.
3	IREF	The current reference input pin. This pin should be connected to ground through a resistor.
4	D7	These pins are bi-directional data bus connecting to the MCU data bus.

When serial interface mode is selected, D0 will be the serial clock input: SCL; D1 will be the serial data input: SDA and D2 should be kept NC.

When I2C mode is selected, D2, D1 should be tied together and serve as SDAout, SDA in application and D0 is the serial clock input, SCL |
| 5 | D6 | |
6	D5	
7	D4	
8	D3	
9	D2	
10	D1	
11	D0	
12	E/RD#	Data read operation is initiated when it's pull low.
13	R/W#	Data write operation is initiated when it's pull low.
14	D/C#	Data/Command control pin. Pull high for write/read display data. Pull low for write command or read status.
15	RES#	Reset signal input.
16	CS#	Chip select input.
17	BS2	Interface select pin.
18	BS1	Interface select pin.
19	VDD	Power supply pin for core logic operation.
20	NC	No connection.
21	VSS	This is ground pin.
22	VSS	This is ground pin.

7.4 GRAPHIC DISPLAY DATA RAM ADDRESS MAP

7.5 INTERFACE TIMING CHART

## 8080-Series MCU Parallel Interface Timing Characteristics

$(V_{DD} - V_{SS} = 2.4$ to $3.5V$, $T_A = 25°C)$

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time	300	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Write Data Setup Time	40	-	-	ns
t_{DHW}	Write Data Hold Time	7	-	-	ns
t_{DHR}	Read Data Hold Time	20	-	-	ns
t_{OH}	Output Disable Time	-	-	70	ns
t_{ACC}	Access Time	-	-	140	ns
PW_{CSL}	Chip Select Low Pulse Width (read)	150	-	-	ns
	Chip Select Low Pulse Width (write)	60			
PW_{CSH}	Chip Select High Pulse Width (read)	60	-	-	ns
	Chip Select High Pulse Width (write)	60			
t_R	Rise Time	-	-	40	ns
t_F	Fall Time	-	-	40	ns

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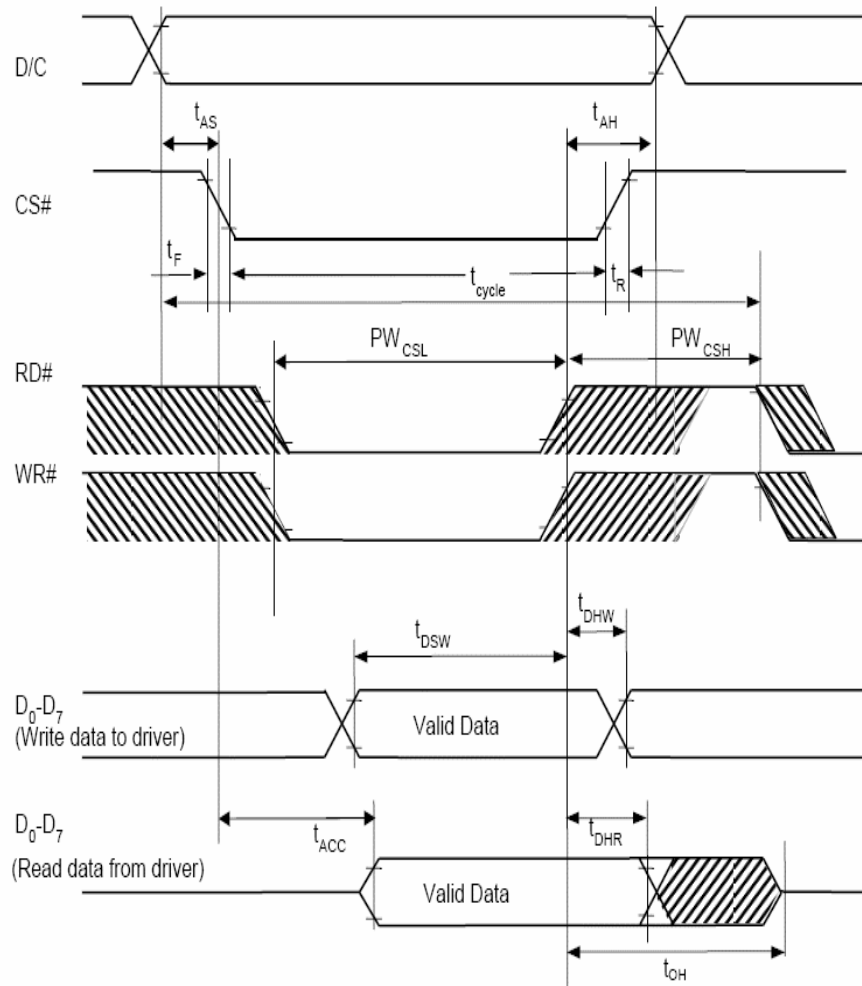
8. APPLICATION CIRCUIT

8.1 APPLICATION CIRCUIT
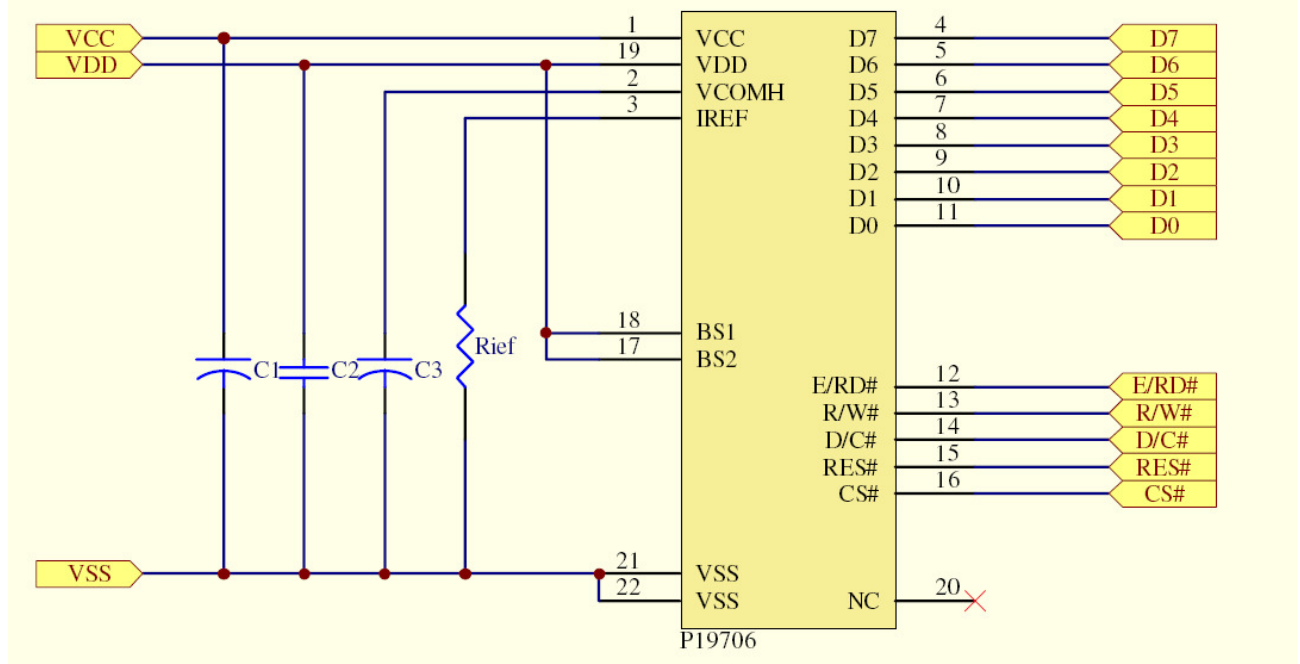
Recommended components

Rief：1M ohm /1%.(0603)

C1,C3：4.7uF/35V (Tantalum type) or VISHAY (572D475X0025A2T)

C2：4.7uF/16V(0603)

This circuit is designed for 8080 8-bits interface.

8.2 COMMAND TABLE

Refer to IC Spec.: SSD1303

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9. RELIABILITY TEST CONDITIONS

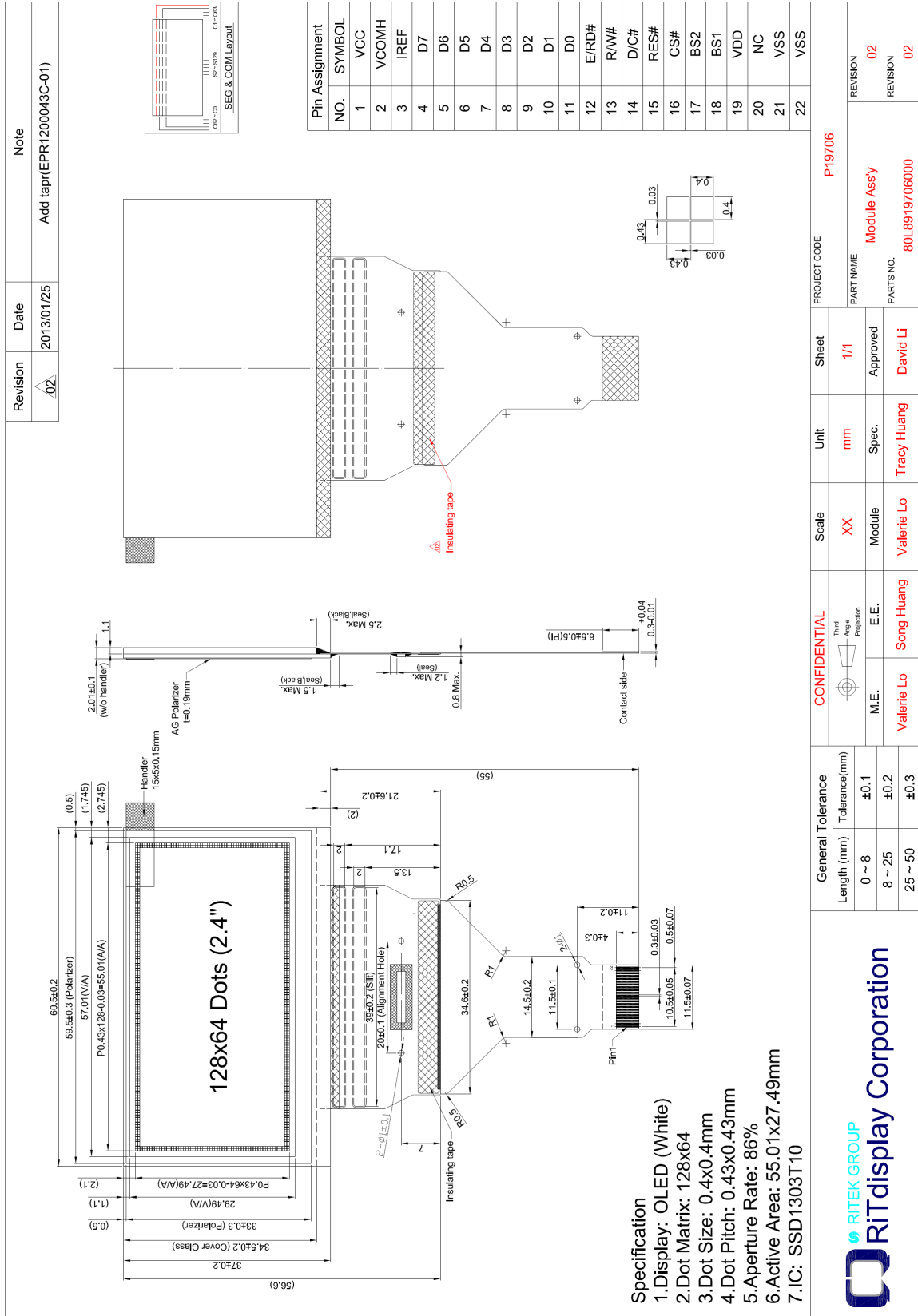| No.	Items	Specification	Quantity
1	High temp. (Non-operation)	85℃, 240hrs	5
2	High temp. (Operation)	70℃, 120hrs	5
3	Low temp. (Operation)	-40℃, 120hrs	5
4	High temp. / High humidity (Operation)	65℃, 90%RH, 120hrs	5
5	Thermal shock (Non-operation)	-40℃ ~85℃ (-40℃ /30min; transit /3min; 85℃ /30min; transit /3min) 1cycle: 66min, 100 cycles	5
6	Vibration	Frequency : 5~50HZ, 0.5G Scan rate : 1 oct/min Time : 2 hrs/axis Test axis : X, Y, Z	1 Carton
7	Drop	Height: 120cm Sequence : 1 angle、3 edges and 6 faces Cycles: 1	1 Carton
8	ESD (Non-operation)	Air discharge model, ±8kV, 10 times	5

Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability.
2. All-pixels-on is used as operation test pattern.
3. The degradation of Polarizer are ignored for item 1, 4 & 5.

Evaluation criteria

1. The function test is OK.
2. No observable defects.
3. Luminance: > 50% of initial value.
4. Current consumption: within ± 50% of initial value.

10. EXTERNAL DIMENSION

128x64 Dots (2.4")

Specification
1. Display: OLED (White)
2. Dot Matrix: 128x64
3. Dot Size: 0.4x0.4mm
4. Dot Pitch: 0.43x0.43mm
5. Aperture Rate: 86%
6. Active Area: 55.01x27.49mm
7. IC: SSD1303T10

Pin Assignment	
NO.	SYMBOL
1	VCC
2	VCOMH
3	IREF
4	D7
5	D6
6	D5
7	D4
8	D3
9	D2
10	D1
11	D0
12	E/RD#
13	R/W#
14	D/C#
15	RES#
16	CS#
17	BS2
18	BS1
19	VDD
20	NC
21	VSS
22	VSS

Revision	Date	Note
02	2013/01/25	Add tapr(EPR1200043C-01)

SEG & COM Layout

General Tolerance							
Length (mm)	Tolerance(mm)						
0 ~ 8	±0.1						
8 ~ 25	±0.2						
25 ~ 50	±0.3						

	CONFIDENTIAL	Scale	XX	Module	Valerie Lo
		Unit	mm	Spec.	Tracy Huang
	Third Angle Projection	Sheet	1/1	Approved	David Li
M.E.	Valerie Lo	E.E.	Song Huang		

PROJECT CODE: P19706
PART NAME: Module Ass'y
PARTS NO.: 80L8919706000
REVISION: 02

Third Angle Projection

RITEK GROUP
RiTdisplay Corporation

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11. PACKING SPECIFICATION

ITEM	PART No.	DESC	QTY
1	90L9919706000	Module Ass'y For P19706	1
2	80L9819706000	Module Ass'y For P19706	480
3	700P197061001	Tray 330x270x8.5 T:0.5mm PET P19706	42
4	3010000003	5G Silica Gel Desiccants	8
5	3003000012	Vacuum Bag ONY/LDPE 480x285x90	2
6	3003000016	Antistatic Bubble bag 440x(350+450)mm	2
7	3001000005	Pizza Box 345x285x88,B corrugated	2
8	3000000009	Carton 385x305x203mm	1
8	3006000000	Label	3
9	3208000125	Tape, W=48mm , L=910cm	

General Tolerance	
Length (mm)	Tolerance(mm)
0 ~ 8	±0.1
8 ~ 25	±0.2
25 ~ 50	±0.3

CONFIDENTIAL — Third Angle Projection
M.E. Iven Lee E.E. X Module Kelly Hsu Spec. Irene Fan Approved Strong Tsai
Scale 1:15 Unit mm Sheet 1/1
PART NAME: Packing Tray Instruction PROJECT CODE: P19706
PARTS NO.: 90L9919706000 VERSION 01

RITEK GROUP RiTdisplay Corporation

12. APPENDIXES

APPENDIX 1: DEFINITIONS

A. DEFINITION OF CHROMATICITY COORDINATE

The chromaticity coordinate is defined as the coordinate value on the CIE 1931 color chart for R, G, B, W.

B. DEFINITION OF CONTRAST RATIO

The contrast ratio is defined as the following formula:

$$\text{Contrast Ratio} = \frac{\text{Luminance of all pixels on measurement}}{\text{Luminance of all pixels off measurement}}$$

C. DEFINITION OF RESPONSE TIME

The definition of turn-on response time Tr is the time interval between a pixel reaching 10% of steady state luminance and 90% of steady state luminance. The definition of turn-off response time Tf is the time interval between a pixel reaching 90% of steady state luminance and 10% of steady state luminance. It is shown in Figure 2.
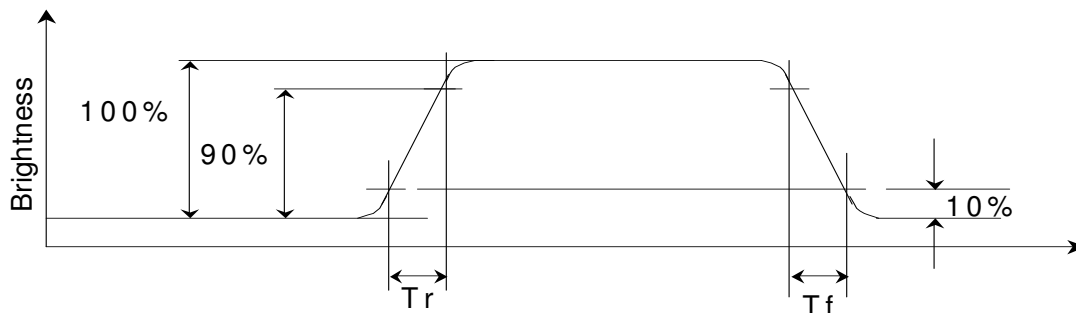
Figure 2 Response time

D. DEFINITION OF VIEWING ANGLE

The viewing angle is defined as Figure 3. Horizontal and vertical (H & V) angles are determined for viewing directions where luminance varies by 50% of the perpendicular value.
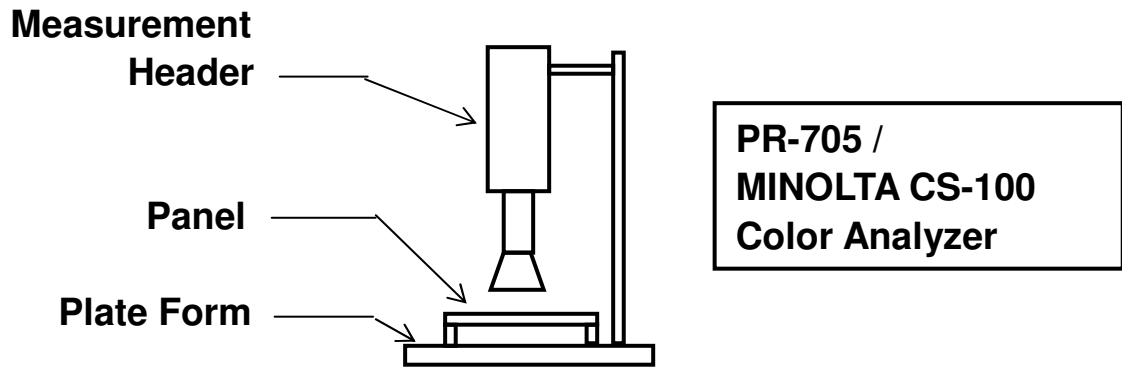

Vertical angles   **Horizontal angles**
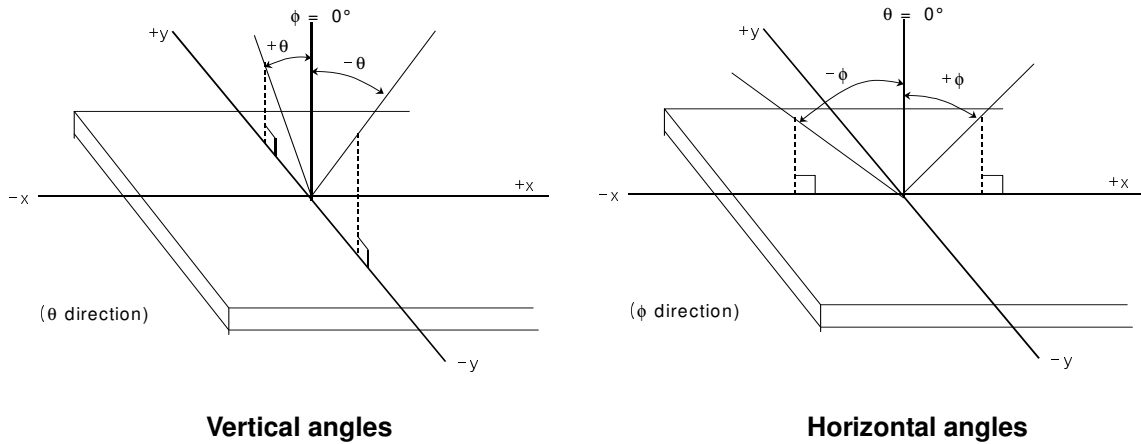
Figure 3 Viewing Angle

APPENDIX 2: MEASUREMENT APPARATUS

A. LUMINANCE/COLOR COORDINATE

PHOTO RESEARCH PR-705, MINOLTA CS-100
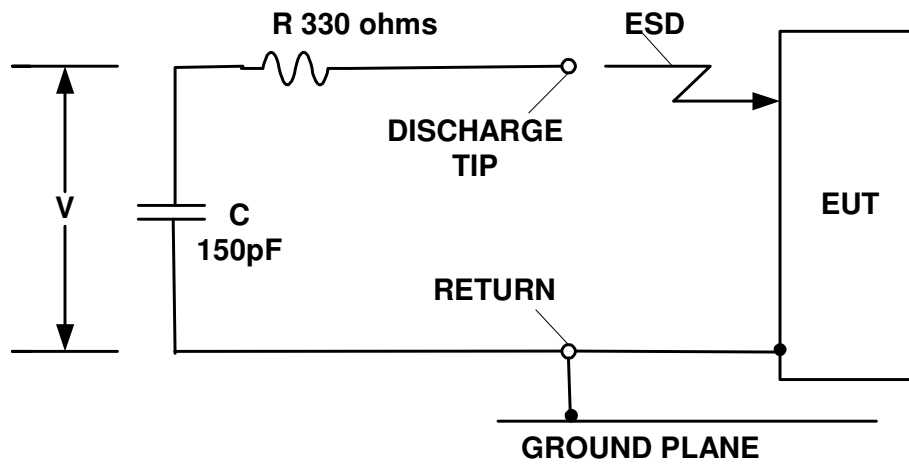
Measurement Header —

Panel —

Plate Form —

PR-705 /
MINOLTA CS-100
Color Analyzer

B. CONTRAST / RESPONSE TIME / VIEWING ANGLE

WESTAR CORPORATION FPM-510

Measurement Header —

Panel —

Plate Form —

Westar FPM-510
Display Contrast /
Response time /
View angle Analyzer

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C. ESD ON AIR DISCHARGE MODE

R 330 ohms　　　　　**ESD**

DISCHARGE TIP

V　　**C 150pF**

EUT

RETURN

GROUND PLANE

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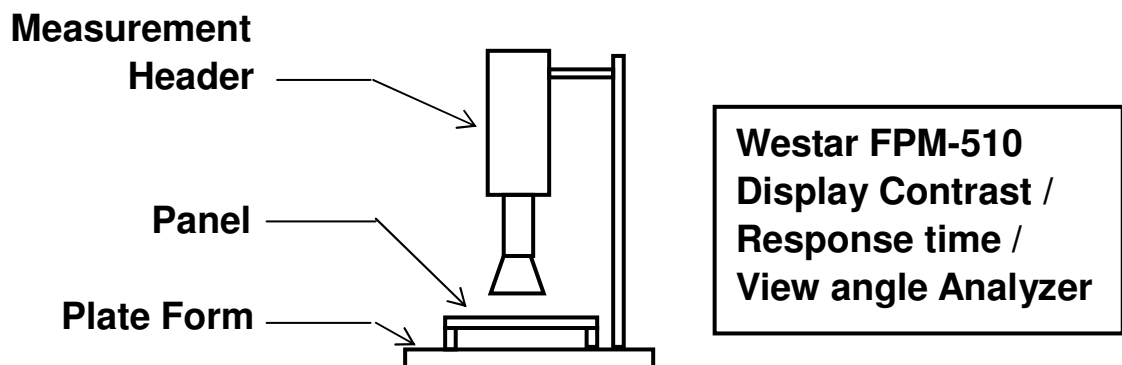
APPENDIX 3: PRECAUTIONS

A. RESIDUE IMAGE

Because the pixels are lighted in different time, the luminance of active pixels may reduce or differ from inactive pixels. Therefore, the residue image will occur. To avoid the residue image, every pixel needs to be lighted up uniformly.

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