Graphic OLED Module

Part Number

O9696A-F-TW3

Overview:

- 96x96 Graphic OLED
- Full Pixel Color
- Overall Size: 25.90mm x 30.10mm
- Parallel Interface

- -40C to 70C Operating Temperature
- 2.8V
- Controller: SEPS114A
- RoHS Compliant

Graphic OLED Features:

Resolution: 96 x 96

Interface: Parallel

Controller: SEPS114A

RoHS Compliant

General Information Items	Specification	Unit	Note
	Main Panel		
Viewing Area	21.852 x 21.852	mm	-
Pixel Color	Full	-	-
Viewing Direction	Full	-	-
Voltage	2.8	V	-
Resolution	96x96	-	-
Controller IC	SEPS114A	-	-
Interface	Parallel	-	-
Operating temperature	-40～+70	℃	-
Storage temperature	-40～+85	℃	-

Mechanical Information

Item		Min	Typ.	Max	Unit	Note
Module size	X (Width)	-	25.90	-	mm	-
	Y (Height)	-	30.10	-	mm	-
	Z (Depth)	-	-	1.30	mm	-

1. Outline Dimensions

Active Area 1.10"
96(RGB) x 96 Pixels

Detail "A"
Scale (10:1)
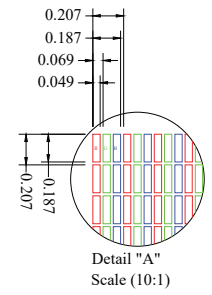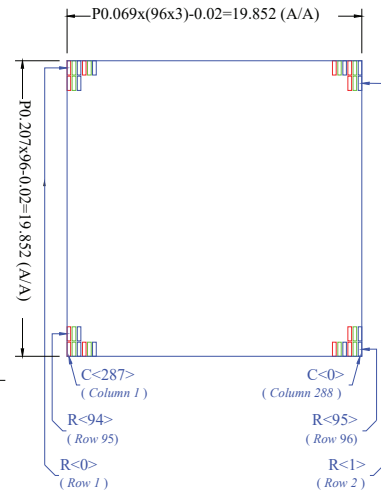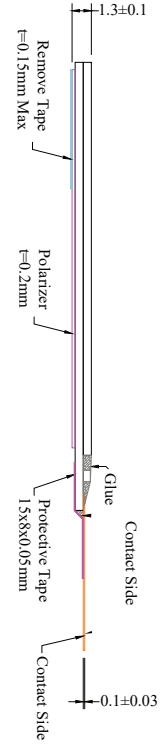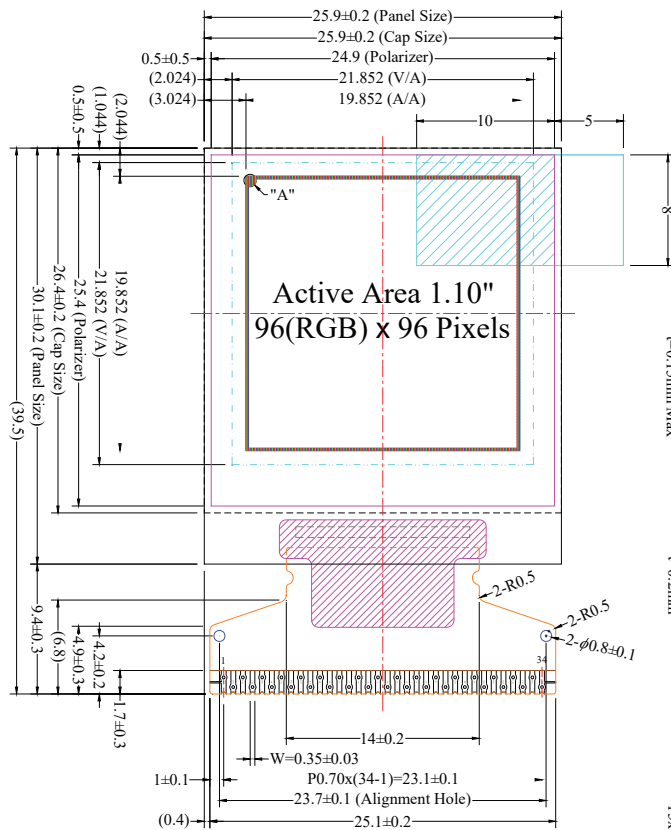
Pin	Symbol
1	N.C. (GND)
2	VSSH
3	VCC_R
4	VCC_C
5	VDDR
6	VDD
7	PSEL
8	VDDIO
9	RSTB
10	WRB
11	RDB
12	CSB
13	A0
14	D0
15	D1
16	D2
17	D3
18	D4
19	D5
20	D6
21	D7
22	PS
23	C80
24	OSC1
25	OSC2
26	IREF
27	VSS
28	BPRE
29	GPRE
30	RPRE
31	VCC_C
32	VCC_R
33	VSSH
34	N.C. (GND)

Notes:
1.) Pixel Color: Full
2.) OLED Type: Graphic
4.) Temperature Range: Wide
5.) Resolution: 96x96
6.) Interface: 8-bit 68XX/80XX Parallel, 4-wire SPI
7.) IC Controller: SEPS114A

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TOLERANCE UNLESS	X.X±0.3	PARTS NO.	O9696A-F-TW3	
		Drawn		Unit
OTHERWISE SPECIFIED	X.XX±0.2	Checked		mm
Scale 1:1		Approve		Page 1/1

2. Input Terminal Pin Assignment

NO.	Symbol	Description	I/O
1 & 34	NC	Power Supply Ground/ No Connection	-
2	VSSH	Ground of OEL Panel	P
3	VCC_R	Voltage Output High Level for Scan Signal	P
4	VCC_C	Power Supply for OEL Panel	P
5	VDDR	Power Supply for Core Logic Circuit	P
6	VDD	Power Supply for Operation	P
7	PSEL	Regulator Enable/Disable for Logic Power Supply	I
8	VDDIO	Power Supply for I/O Pin	P
9	RSTB	Power Reset for Controller and Driver	I
10	WRB	Write or Read/Write Select	I
11	RDB	Read or Read/Write Enable	I
12	CSB	Chip Select	I
13	A0	Data/Command Control	I
14-21	D0 – D7	Host Data Input/Output Bus <table><tr><td>PS</td><td>Description</td></tr><tr><td>0</td><td>D[0] SCL: Synchronous Clock Input D[1] SDI: Serial Data Input D[2] SDO: Serial Data Outpu D[3] R/W: Serial Read (High)/Write (Low)</td></tr><tr><td>1</td><td>8-bit Bus: D[7:0]</td></tr></table>	I/O
22	PS	Select Parallel/ Serial Interface Type	I
23	C80	Select the CPU Type	I
24	OSC1	Fine Adjustment for Oscillation	I
25	OSC2	Fine Adjustment for Oscillation	O
26	IREF	Current Reference For Brightness Adjustment	I/O
27	VSS	Ground of Logic Circuit	P
28	BPRE	External Voltage Reference for Pre-charge Signal	I/O
29	GPRE	External Voltage Reference for Pre-charge Signal	I/O
30	RPRE	External Voltage Reference for Pre-charge Signal	I/O
31	VCC_C	Power Supply for OEL Panel	P
32	VCC_R	Voltage Output High Level for Scan Signal	P
33	VSSH	Ground of OEL Panel	P

I: Input, O: Output, P: Power

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3. Optical Characteristics

Item	Symbol	Condition	Min	Typ.	Max	Unit
Contrast Ratio	CR	V_{DD} = 2.8V V_{CC_C} = 12.0V	--	10000:1	--	-
Peak Emission Wavelength	CIE (White) X Y	X Y	0.26 0.29	0.30 0.33	0.34 0.37	-
	CIE (Red)	X Y	0.60 0.30	0.64 0.34	0.68 0.38	
	CIE (Green)	X Y	0.27 0.58	0.31 0.62	0.35 0.66	
	CIE (Blue)	X Y	0.10 0.12	0.14 0.16	0.18 0.20	
Brightness	L_{br}	-	80	100	-	Cd/m^2
Viewing Angle		CR≥10000:1		Free		degree

4. DC Electrical Characteristics

Characteristics	Symbol	Conditions	Min	Typ.	Max	Unit
Supply Voltage for Operation	V_{DD}	-	2.4	2.8	3.3	V
Supply Voltage for I/O Pins	V_{DDIO}	-	1.65	2.8	V_{DD}	V
Supply Voltage for Display	V_{CC_C}	-	11.5	12.0	12.5	V
High Level Input	V_{IH}	-	0.8V_{DDIO}	-	V_{DDIO}	V
Low Level Input	V_{IL}	-	0	-	0.4	V
High Level Output	V_{OH}	I_{OH}= -0.1mA	V_{DDIO}-0.4	-	-	V
Low Level Output	V_{OL}	I_{OL}= -0.1mA	-	-	0.4	V
Operating Current for V_{DD}	I_{DD}	-	-	1.5	3.5	mA
Operating Current for V_{CC_C}	I_{CC_C}	-	-	19.2	24.0	mA
Sleep Mode Current for V_{DD}	$I_{DD, SLEEP}$	-	-	3	5	µA
Sleep Mode Current for V_{CC_C}	$I_{CC\_C, SLEEP}$	-	-	2	10	µA

NOTE: If the maximum rating of the above parameters is exceeded, even momentarily, the quality of the product may be degraded. The maximum ratings specify the values which the product may be physically damaged if exceeded. Be sure to use the product within the range of the specified parameters.
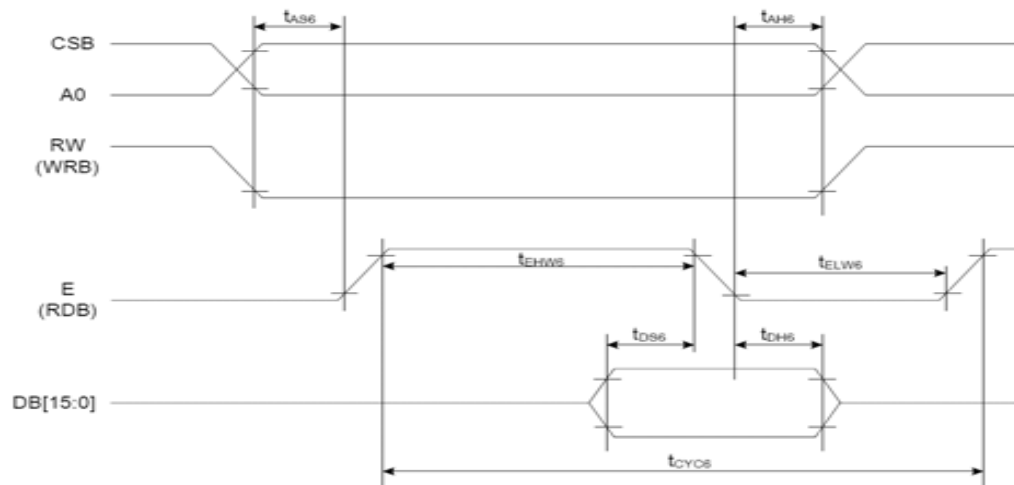
5. Timing Characteristics

5.1 68XX-Series MPU Parallel Interface Timing Characteristics

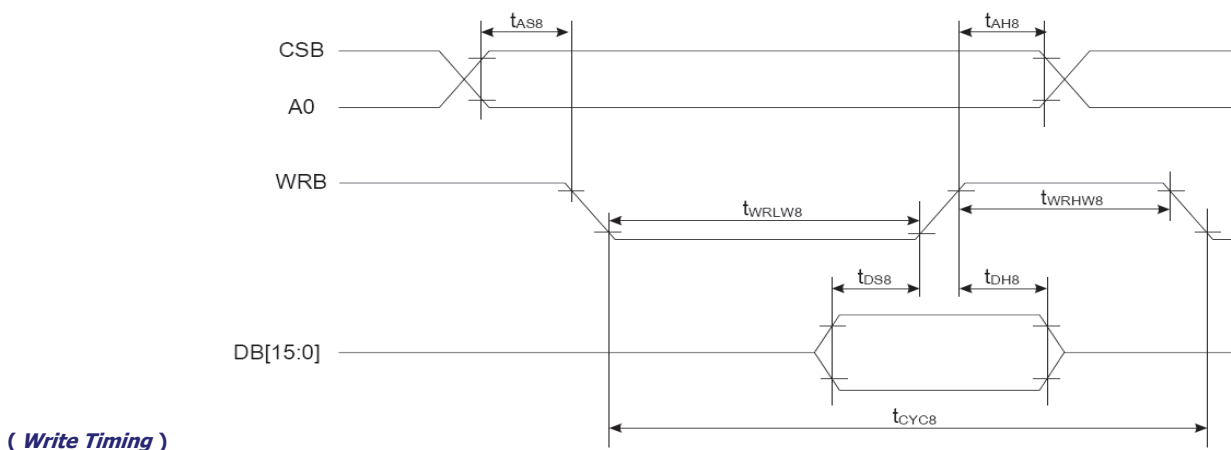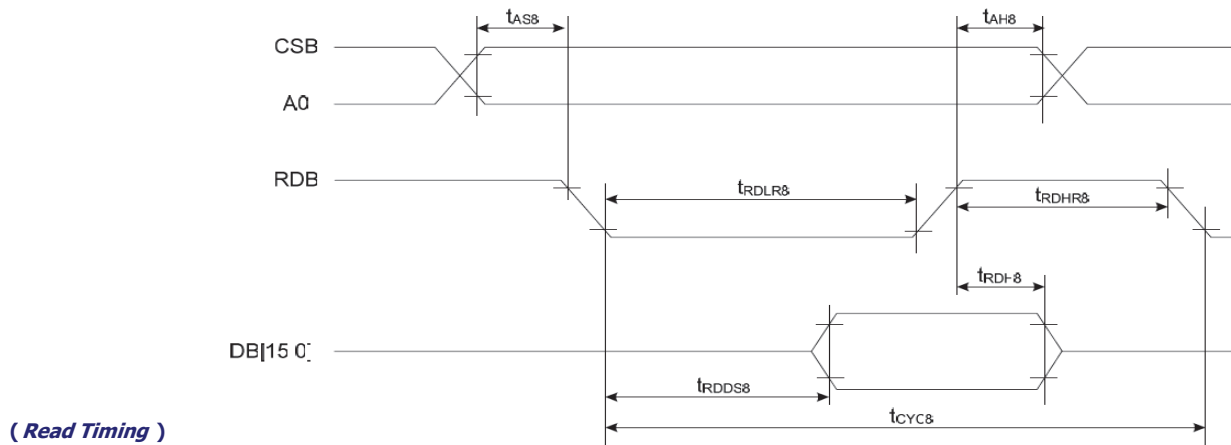| Parameter	Symbol	Min	Max	Unit	Port
Address Setup Time	t_{AH6} (Read)	10	-	ns	CSB RS
	t_{AH6} (Write)	5	-	ns	
Address Hold Time	t_{AS6} (Read)	10	-	ns	
	t_{AS6} (Write)	5	-	ns	
System Cycle Timing	t_{cyc6}	200	-	ns	E
Read "L" Pulse Width	t_{ELR6}	90	-	ns	
Read "H" Pulse Width	t_{ELR6}	90	-	ns	
System Cycle Timing	t_{cyc6}	100	-	ns	
Write "L" Pulse Width	t_{ELW6}	45	-	ns	
Write "H" Pulse Width	t_{EHW6}	45	-	ns	
Read Data Output Delay Time (*C_L=15pF)	t_{RDD6}	0	70	ns	
Data Hold Timing (*C_L=15pF)	t_{RDH6}	0	70	ns	D[7:0]
Data Setup Timing	t_{DS6}	40	-	ns	
Data Hold Timing	t_{DH6}	10	-	ns	
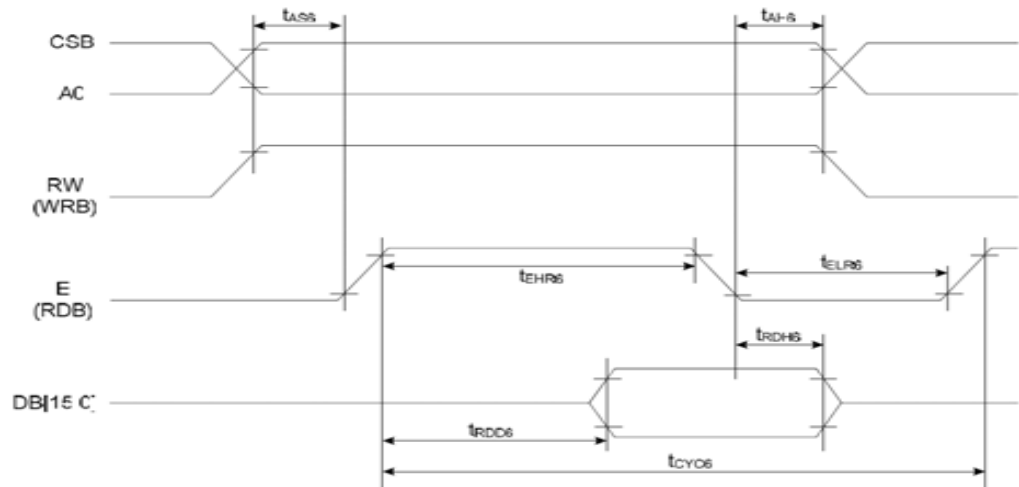
(*Read Timing*)

(*Write Timing*)

5.2 80XX-Series MPU Parallel Interface Timing Characteristics

Parameter	Symbol	Min	Max	Unit	Port
Address Setup Timing	t_{AS8}	5	-	ns	CSB A0
Address Hold Timing	t_{AH8}	5	-	ns	
System Cycle Timing	t_{cyc8}	200	-	ns	RDB
Read "L" Pulse Width	t_{RDLR8}	90	-	ns	
Read "H" Pulse Width	t_{RDHR8}	90	-	ns	
System Cycle Timing	t_{cyc8}	100	-	ns	WRB
Write "L" Pulse Width	t_{WRLW8}	45	-	ns	
Write "H" Pulse Width	t_{WRHW8}	45	-	ns	
Read Data Output Delay Time (*C_L=15pF)	t_{RDD8}	-	60	ns	D[7:0]
Data Hold Timing (*C_L=15pF)	t_{RDH8}	0	60	ns	
Data Setup Timing	t_{DS8}	30	-	ns	
Data Hold Timing	t_{DH8}	10	-	ns	

(**Read Timing**)

(**Write Timing**)

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5.3   Serial Interface Timing Characteristics

Parameter	Symbol	Min	Max	Unit	Port
Serial Clock Cycle	t_{CYCS}	200	-	ns	SCL
SCL "L" Pulse Width	t_{SLW}	90	-	ns	
SCL "H" Pulse Width	t_{SHW}	90	-	ns	
Data Setup Timing	t_{DSS}	25	-	ns	SDI
Data Hold Timing	t_{DHS}	25	-	ns	
CSB-SCL Timing	t_{CSS}	25	-	ns	CSB
CSB-Hold Timing	t_{CSH}	25	-	ns	
RS-SCL Timing	t_{RSS}	25	-	ns	A0
RS-Hold Timing	t_{RSH}	25	-	ns	
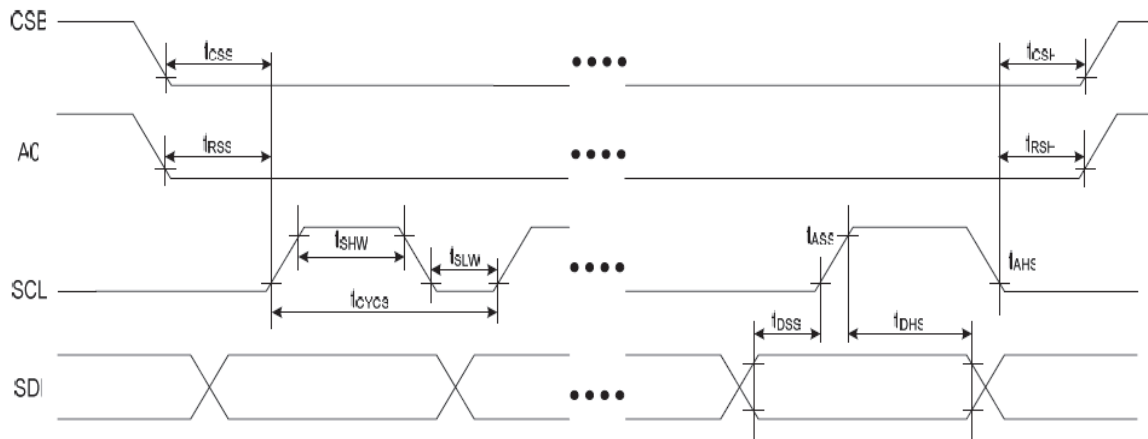
6. Cautions and Handling Precautions

6.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.
2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.
5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
8. Protect the module from static, it may cause damage to the CMOS ICs.
9. Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
10. Do not disassemble the module.
11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
12. Pins of I/F connector shall not be touched directly with bare hands.
13. Do not connect, disconnect the module in the "Power ON" condition.
14. Power supply should always be turned on/off by the item Power On Sequence & Power Off Sequence.

6.2 Storage and Transportation

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
2. Do not store the OLED module in direct sunlight.
3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.