0.6 cm (Type 0.23) Active Matrix Color OLED Panel Module

1. Overview / Application

s a 0.6 cm (0.23inch) diagonal, 640(RGB) × 400 dots active matrix color OLED (Organic Light Emitting Display) panel module based on single crystal silicon transistors. The module integrates panel driver and logic driver, and achieves smaller size, light in weight and high resolution.

(Potential applications: Head mounted displays, View finders, Small monitors etc.)

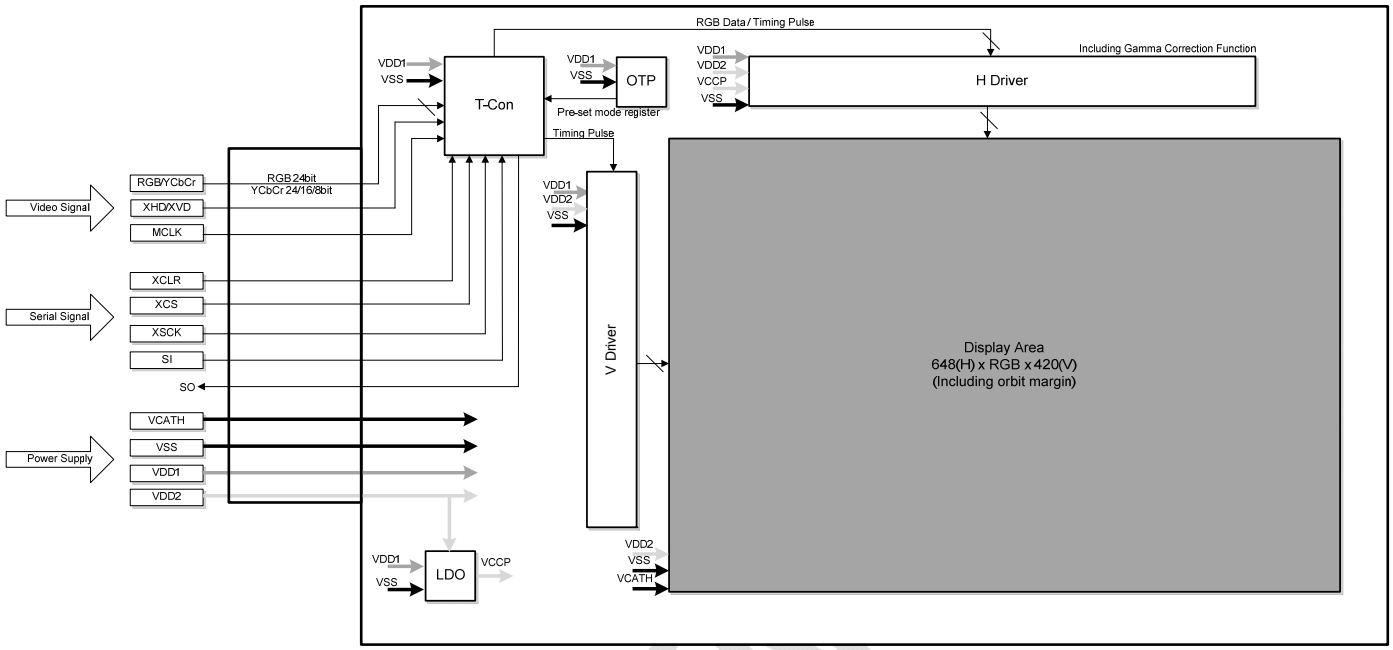
2. Features

- Small-size, high resolution 0.23 nHD+ display dots 640 (RGB) × 400 = 0.77M dots
- Ultra-high contrast
- Wide color gamut
- Fast response
- Thin and light in weight
- Power-saving (PS) mode
- Scan direction selection, up or down and right or left.
- Orbit supported
- Input interface that supports parallel RGB 24-bit, YCbCr 24-bit and YCbCr 16-bit input

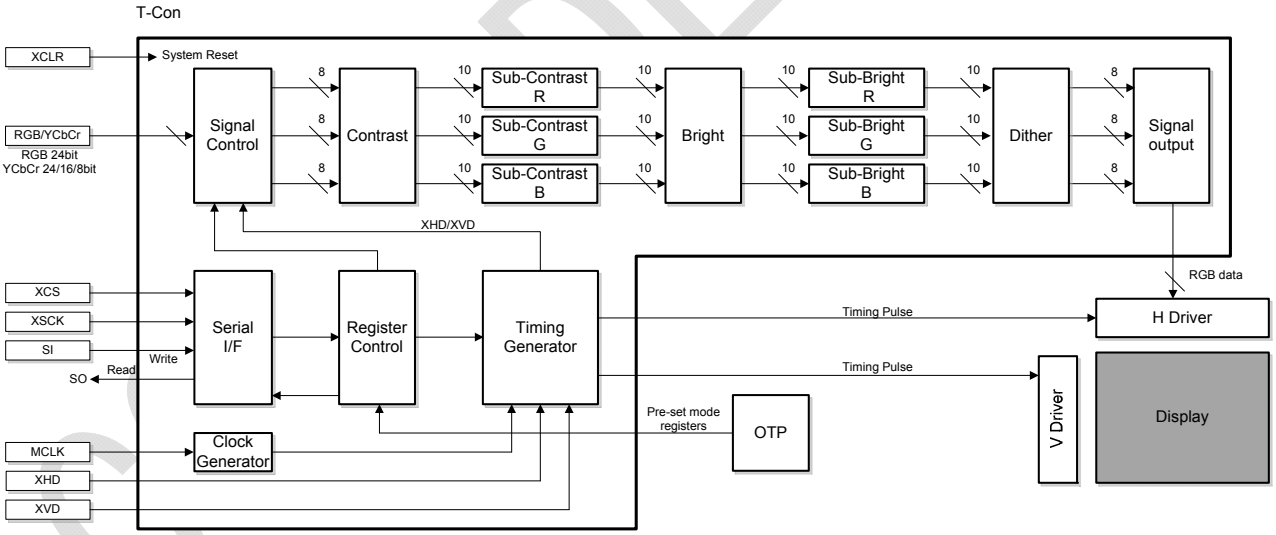
3. Module Structure

Active matrix color OLED display with on-chip driver based on single crystal silicon transistors

4. System Block Diagram

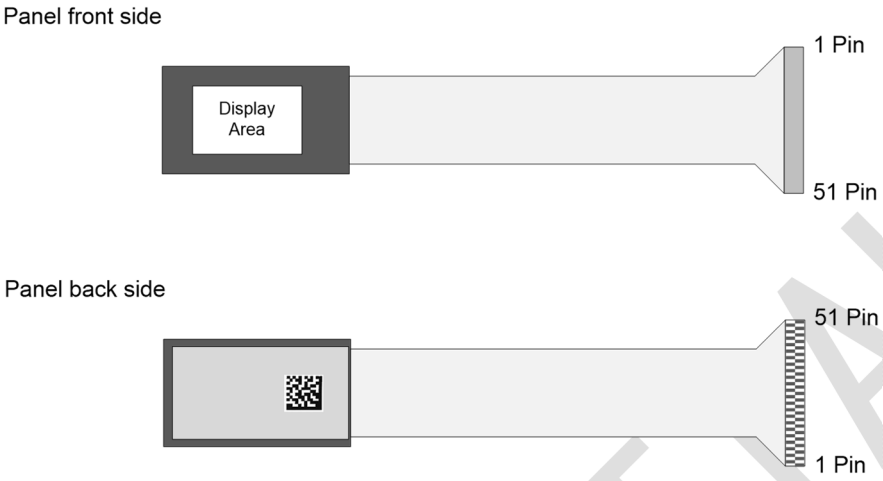


Details of T-Con Block



5. Pin Description

5.1. Pin Assignment



5.2. Pin Description

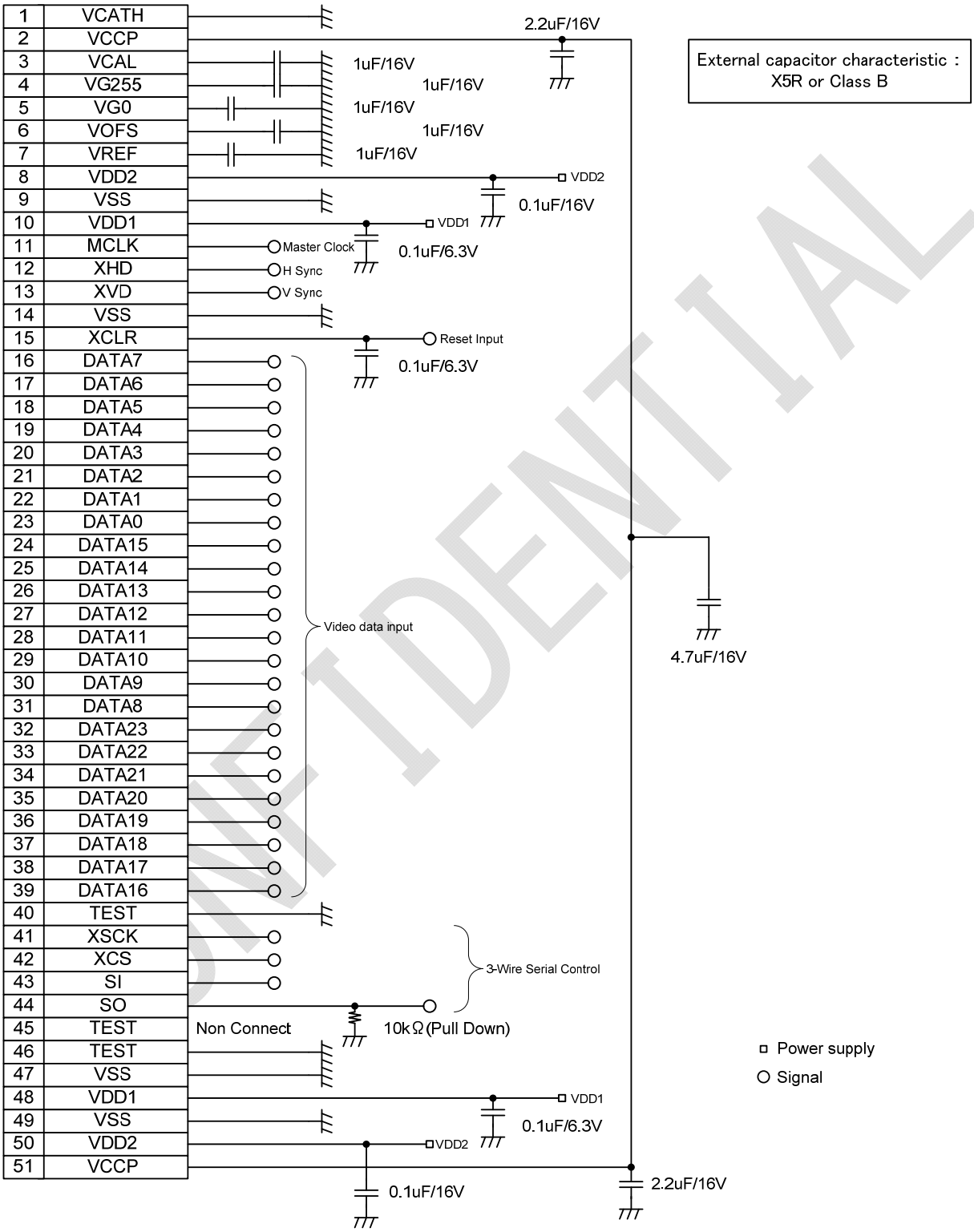
Pin No.	Symbol	Type	Pin Description	Equivalent circuit
1	VCATH	Power Supply	EL cathode power supply	
2	VCCP	Power supply	VCCP power supply	
3	VCAL	Output	Temperature sensor output voltage	*6
4	VG255	Output	Gamma top reference voltage (255)	*6
5	VG0	Output	Gamma bottom reference voltage (0)	*6
6	VOFS	Output	Gamma offset voltage	*6
7	VREF	Output	Gamma reference voltage	*6
8	VDD2	Power supply	10V power supply	
9	VSS	Power supply	GND	
10	VDD1	Power supply	1.8V power supply	
11	MCLK	Input	Master clock	*1
12	XHD	Input	Horizontal sync signal (negative polarity)	*1
13	XVD	Input	Vertical sync signal (negative polarity)	*1
14	VSS	Power supply	GND	
15	XCLR	Input	System reset (negative polarity)	*2
16	DATA7	Input	Video signal input (refer to 5.3.)	*1
17	DATA6	Input	Video signal input (refer to 5.3.)	*1
18	DATA5	Input	Video signal input (refer to 5.3.)	*1
19	DATA4	Input	Video signal input (refer to 5.3.)	*1
20	DATA3	Input	Video signal input (refer to 5.3.)	*1

Pin No.	Symbol	Type	Pin Description	Equivalent circuit
21	DATA2	Input	Video signal input (refer to 5.3.)	*1
22	DATA1	Input	Video signal input (refer to 5.3.)	*1
23	DATA0	Input	Video signal input (refer to 5.3.)	*1
24	DATA15	Input	Video signal input (refer to 5.3.)	*1
25	DATA14	Input	Video signal input (refer to 5.3.)	*1
26	DATA13	Input	Video signal input (refer to 5.3.)	*1
27	DATA12	Input	Video signal input (refer to 5.3.)	*1
28	DATA11	Input	Video signal input (refer to 5.3.)	*1
29	DATA10	Input	Video signal input (refer to 5.3.)	*1
30	DATA9	Input	Video signal input (refer to 5.3.)	*1
31	DATA8	Input	Video signal input (refer to 5.3.)	*1
32	DATA23	Input	Video signal input (refer to 5.3.)	*1
33	DATA22	Input	Video signal input (refer to 5.3.)	*1
34	DATA21	Input	Video signal input (refer to 5.3.)	*1
35	DATA20	Input	Video signal input (refer to 5.3.)	*1
36	DATA19	Input	Video signal input (refer to 5.3.)	*1
37	DATA18	Input	Video signal input (refer to 5.3.)	*1
38	DATA17	Input	Video signal input (refer to 5.3.)	*1
39	DATA16	Input	Video signal input (refer to 5.3.)	*1
40	TEST	Input	Test pin (connect to GND)	*3
41	XSCK	Input	Serial communication Serial clock (negative polarity)	*2
42	XCS	Input	Serial communication Chip select (negative polarity)	*2
43	SI	Input	Serial communication Data input	*2
44	SO	Output	Serial communication Data output	*7
45	TEST	Output	Test pin (no connect)	*4
46	TEST	Input	Test pin (connect to GND)	*5
47	VSS	Power supply	GND	
48	VDD1	Power supply	1.8V power supply	
49	VSS	Power supply	GND	
50	VDD2	Power supply	10V power supply	
51	VCCP	Power supply	VCCP power supply	*6

5.5. Reference Peripheral circuits

Regarding power supply capacitor connections, mount an approximately 2.2 μF to 10 μF capacitor for each power supply. Insufficient capacitance may affect the picture quality.

Pin No. 2 and No.51 should be connected each other as close as possible.



※Above circuit is just one of typical example for reference to drive the module. MICRODISPLAY does NOT take any liability if the circuit example causes any problem because the circuit is only for reference.

8.3. Power Consumption

Item	Symbol	Conditions	Typical						Unit
			4000	3000	2000	1250	750	Standby	cd/m^2
VDD1 power consumption	PDD1	VDD1 = 1.8V VDD2 = 10.0V Tpnl = 40°C (*)	**7**					0.10	mW
VDD2 power consumption	PDD2		203	163	128	103	83	0.02	mW
Total	PTTL		210	170	135	110	90	0.12	mW

*: All white raster display, Clock frequency = 27MHz, Frame rate = 60Hz

11. Optical Characteristics

11.1. Optical Characteristics

Item		Symbol	Measurement Method	Min.	Typ.	Max.	Unit
Luminance	Mode 1	L1	1	600	750	900	cd/m^2
	Mode 2	L2	1	1060	1250	1440	cd/m^2
	Mode 0	L0	1	1700	2000	2300	cd/m^2
	Mode 3	L3	1	2550	3000	3450	cd/m^2
	Mode 4	L4	1	3200	4000	4800	cd/m^2
Contrast		CR	1	10,000	—	—	
Chromaticity	W (L0,L2 & L3)	x	1	0.301	0.313	0.325	CIE
		y	1	0.317	0.329	0.341	CIE
	W (L1 & L4)	x	1	0.298	0.313	0.328	CIE
		y	1	0.305	0.329	0.344	CIE
	R	x	1	0.620	0.640	0.660	CIE
		y	1	0.310	0.330	0.350	CIE
	G	x	1	0.254	0.274	0.294	CIE
		y	1	0.540	0.560	0.580	CIE
	B	x	1	0.130	0.150	0.170	CIE
		y	1	0.040	0.060	0.080	CIE

Drive conditions:

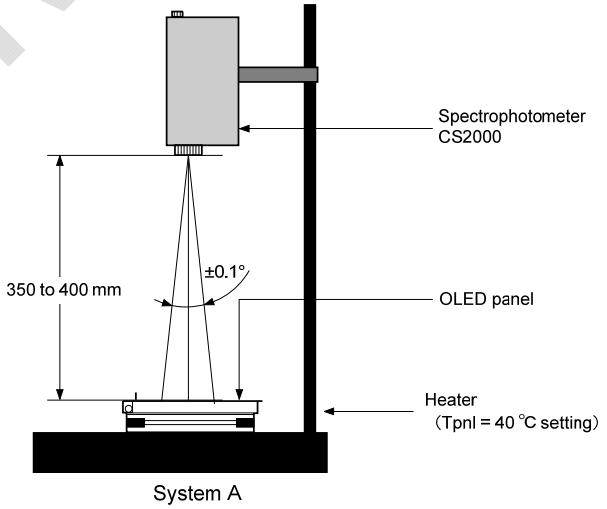
OTPDG_REGDIS=0、OTPCALDAC_REGDIS=0,
LUMINANCE=1(Mode1), 2 (Mode 2), 0 (Mode 0), 3 (Mode 3) , 4(Mode4)

11.2. Measurement System · Measurement Method 1

The luminance and chromaticity are measured in Measurement System A shown below.

Measurement temperature: Tpnl = 40°C
Measurement point: One point on the screen center
All white display: All RGB signal data is set to High.
All black display: All RGB signal data is set to Low.

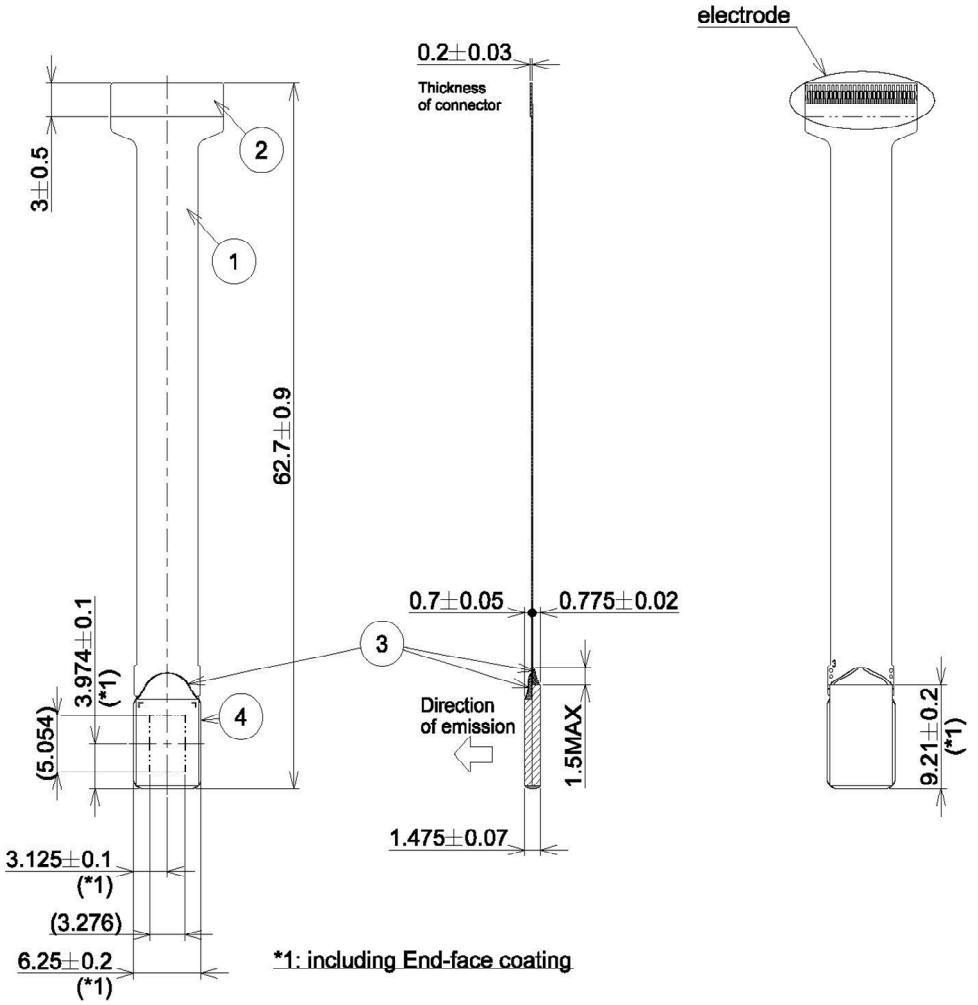
Luminance and chromaticity: Measure the luminance and chromaticity in all white display in Measurement System A.
Contrast: Measure the luminance in all white display (@ Mode0: cd/m^2) and all black display in Measurement System A, and substitute them into the formula below.
Contrast = Luminance in all white display/Luminance in all black display

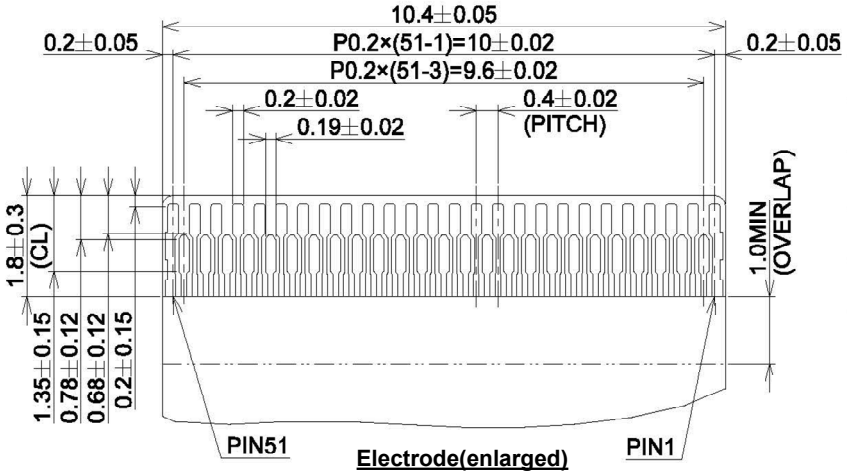


System A

13. Module Outline

(Unit: mm)





Electrode(enlarged)

No	Description
1	FPC
2	Stiffener
3	Reinforcing material
4	End-face coating

Mass 0.3g

Recommended Connector

Manufacturer	**Molex**
Part Number	**504070-5191**