

# SONY

1.8 cm (Type 0.71) Active Matrix Color OLED Panel Module

## ECX335SN-6

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### 1. Description

ECX335SN is a 1.8 cm (0.71in<sub>x</sub>) diagonal, 1920(RGB) × 1080 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.)

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### 2. Features

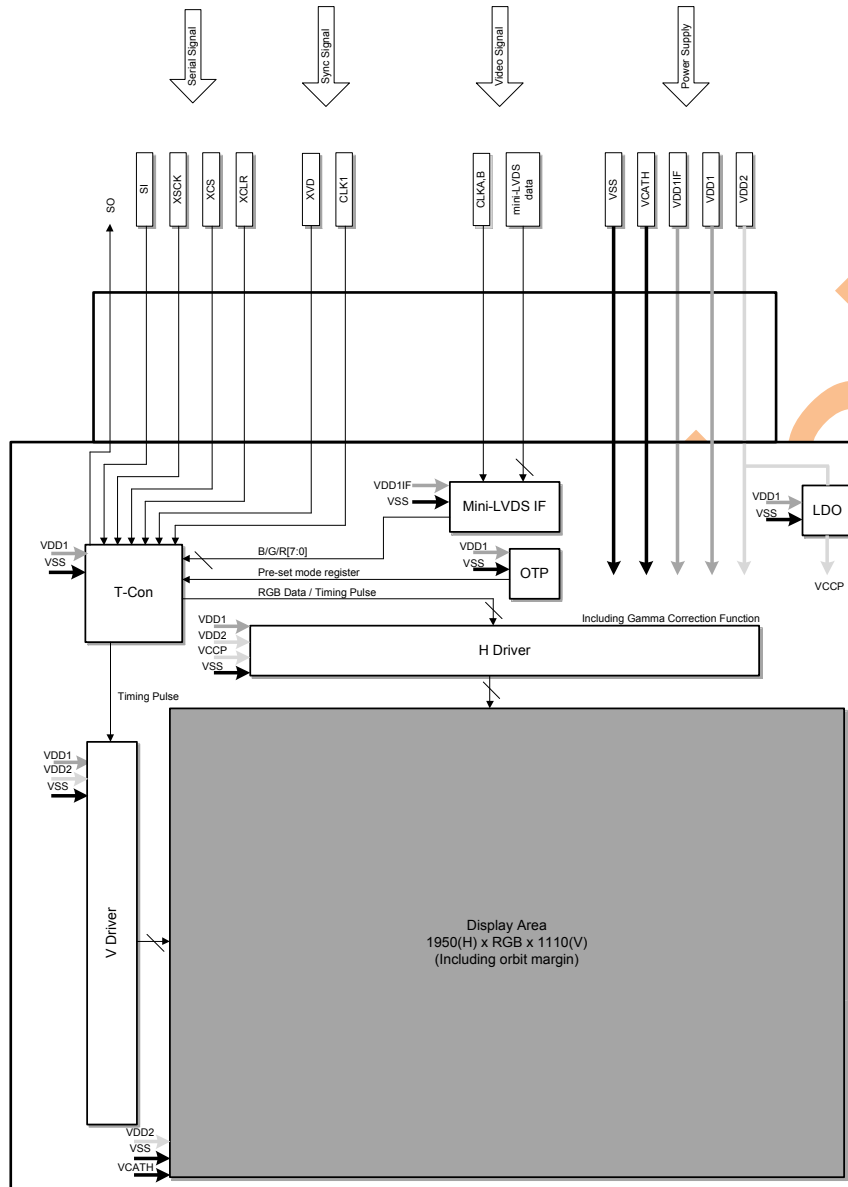
- ◆ Small size and high resolution type 0.70 display
- ◆ Effective dots: 1920 (RGB)×1080 = 6.22 M dots
- ◆ Ultra high contrast
- ◆ Wide color gamut
- ◆ Fast response speed
- ◆ Thin and light in weight
- ◆ Power saving (PS) function
- ◆ Scan direction selection, up or down and right or left.
- ◆ Orbit supported

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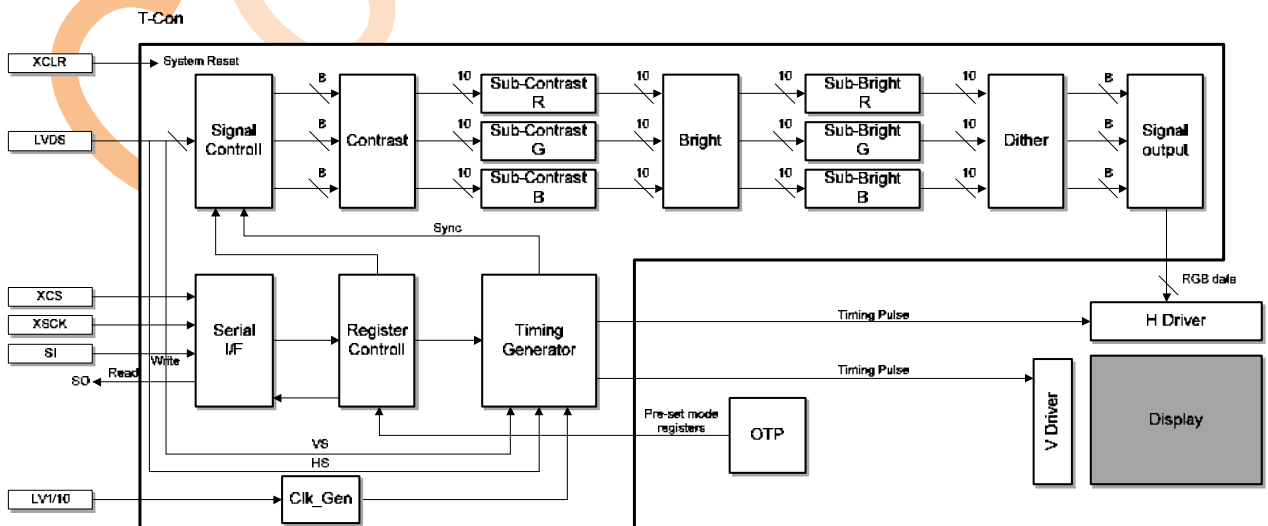
### 3. Module Structure

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

4. System Block Diagram

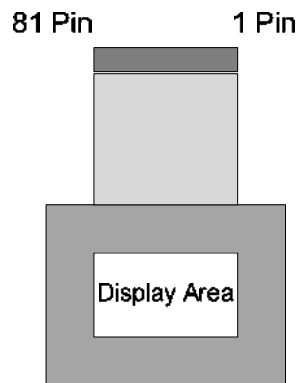


Details of "T-con"



## 5. Pin Description

### 5.1 Pin Assignment



### 5.2 Pin description (LVDS input)

Pin No. (FPC Side)	Symbol	Type	Description	Equivalent circuit
1	VCATH	Power Supply	EL cathode power supply	
2	VCATH	Power Supply	EL cathode power supply	
3	VCCP_O	Power Supply	VCCP power supply	※8
4	VCCP_I	Power Supply	VCCP power supply	
5	VCCP_I	Power Supply	VCCP power supply	
6	VDD2	Power Supply	10V power supply	
7	VDD2	Power Supply	10V power supply	
8	VSS	Power Supply	GND	
9	VSS	Power Supply	GND	
10	VSS	Power Supply	GND	
11	VSS	Power Supply	GND	
12	VDD1	Power Supply	1.8V power supply	
13	VDD1	Power Supply	1.8V power supply	
14	XCS	Input	Serial communication Chip select	※1
15	XSCK	Input	Serial communication Serial clock	※1
16	SI	Input	Serial communication Data input	※1
17	SO	Output	Serial communication Data output	※2
18	PSCNT	Input	Power save communication enable Connect to GND	※1
19	XCLR	Input	System reset	※1
20	TEST	Output	Test pin (no connect)	※3
21	TEST	-	Test pin (connect to GND)	

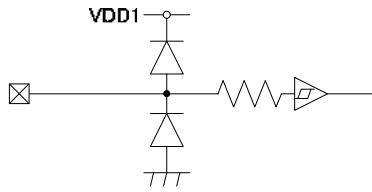
Pin No. (FPC Side)	Symbol	Type	Description	Equivalent circuit
22	TEST	Input	Test pin (connect to GND)	※4
23	TEST	Input	Test pin (connect to GND)	※5
24	TEST	Input	Test pin (connect to GND)	※1
25	TEST	Input / Output	Test pin (connect to GND)	※4
26	TEST	Output	Test pin (no connect)	※1
27	VDD1IF	Power Supply	1.8V power supply for LVDS	
28	VSSIF	Power Supply	GND for LVDS	
29	TEST	Input	Test pin (connect to GND)	※6
30	TEST	Input	Test pin (connect to GND)	※6
31	LV1A	Input	LVDS clock	※6
32	LV1B	Input	LVDS clock	※6
33	LV2A	Input	LVDS data input	※6
34	LV2B	Input	LVDS data input	※6
35	LV3A	Input	LVDS data input	※6
36	LV3B	Input	LVDS data input	※6
37	LV4A	Input	LVDS data input	※6
38	LV4B	Input	LVDS data input	※6
39	LV5A	Input	LVDS data input	※6
40	LV5B	Input	LVDS data input	※6
41	VDD1IF	Power Supply	1.8V power supply for LVDS	
42	VSSIF	Power Supply	GND for LVDS	
43	TEST	Input	Test pin (connect to GND)	※6
44	TEST	Input	Test pin (connect to GND)	※6
45	VSSIF	Power Supply	GND for LVDS	
46	VDD1IF	Power Supply	1.8V power supply for LVDS	
47	LV9A	Input	LVDS data input	※6
48	LV9B	Input	LVDS data input	※6
49	LV8A	Input	LVDS data input	※6
50	LV8B	Input	LVDS data input	※6
51	LV7A	Input	LVDS data input	※6
52	LV7B	Input	LVDS data input	※6
53	LV6A	Input	LVDS data input	※6
54	LV6B	Input	LVDS data input	※6
55	LV10A	Input	LVDS clock	※6
56	LV10B	Input	LVDS clock	※6
57	TEST	Input	Test pin (connect to GND)	※6

Pin No. (FPC Side)	Symbol	Type	Description	Equivalent circuit
58	TEST	Input	Test pin (connect to GND)	※6
59	VSSIF	Power Supply	GND for LVDS	
60	VDD1IF	Power Supply	1.8V power supply for LVDS	
61	TEST	Output	Test pin (no connect)	※1
62	IFSW	Input	Interface select pin (connect to GND)	※1
63	VDD1	Power Supply	1.8V power supply	
64	VDD1	Power Supply	1.8V power supply	
65	VSS	Power Supply	GND	
66	VSS	Power Supply	GND	
67	TEST	Input	Test pin (connect to GND)	※7
68	VCAL	Output	Output of temperature sensing circuit	※8
69	R_IB	Input / Output	Bias current adjustment resistance connect pin	※8
70	VREF	Output	VREF voltage	※8
71	VG255	Output	Gamma top voltage	※8
72	VG0	Output	Gamma bottom voltage	※8
73	VOFS	Output	Vofs voltage	※8
74	VSS	Power Supply	GND	
75	VSS	Power Supply	GND	
76	VDD2	Power Supply	10V power supply	
77	VDD2	Power Supply	10V power supply	
78	VCCP_I	Power Supply	VCCP power supply	
79	VCCP_I	Power Supply	VCCP power supply	
80	VCATH	Power Supply	EL cathode power supply	
81	VCATH	Power Supply	EL cathode power supply	

5.3 Equivalent Circuits

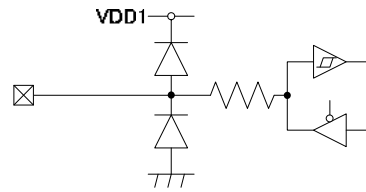
※1

- 14:XGS
- 15:XSCK
- 16:SI
- 18:PSCNT
- 19:XCLR
- 24:CLK1
- 62:IFSW



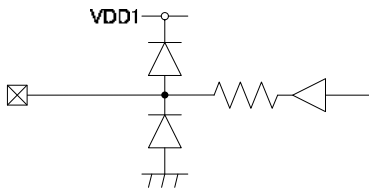
※2

- 17:SO



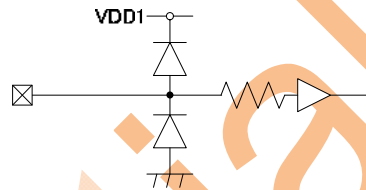
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- 20:TEST



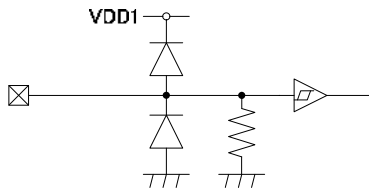
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- 22:XVD
- 25:TEST
- 28:TEST
- 61:TEST



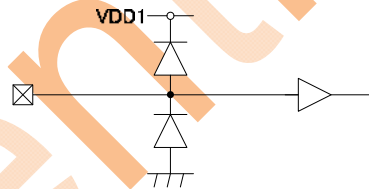
※5

- 23:TEST



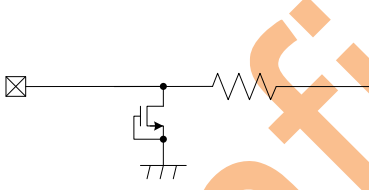
※6

- 29-40:data
- 43-44:CLKA CLKB
- 47-58:data



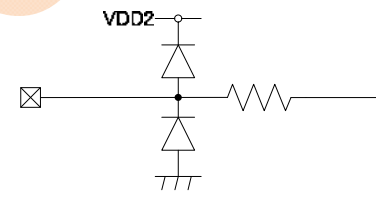
※7

- 67:TEST



※8

- 3:VCCP\_O
- 68:VCAL
- 69:RIB
- 70:VREF
- 71:VG255
- 72:VGO
- 73:VOFS



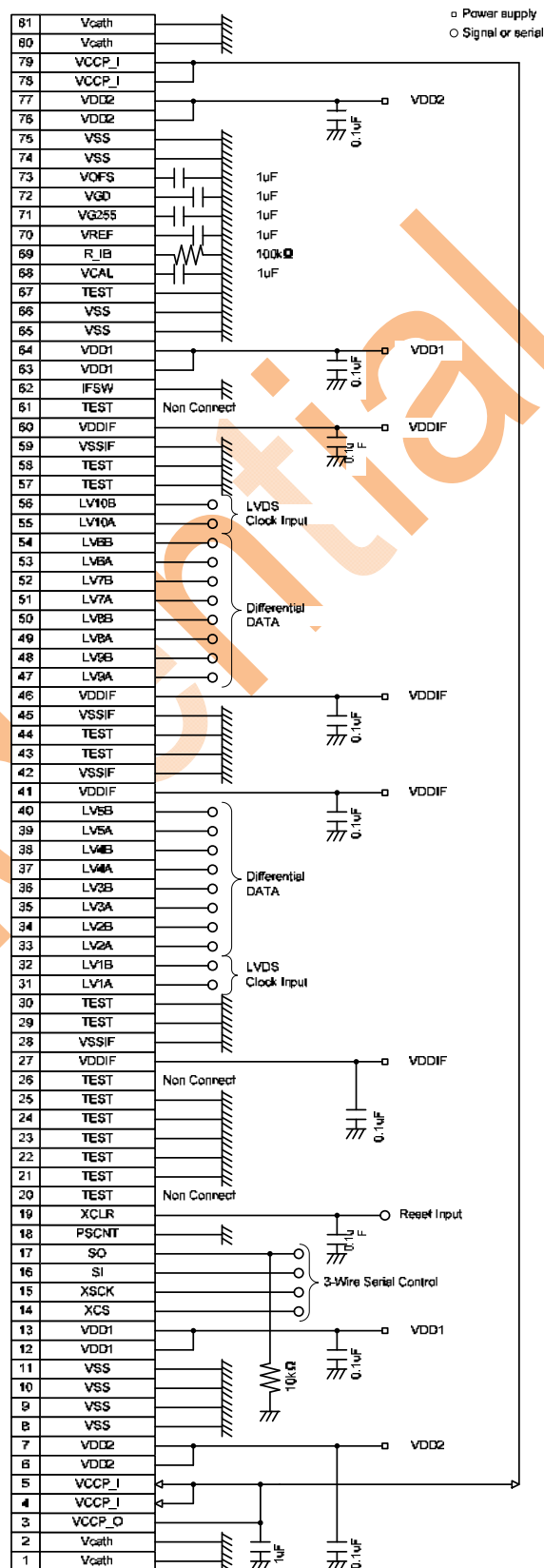
5.4 Peripheral Circuit Example

Regarding power supply capacitor connections, mount an approximately 2.2  $\mu\text{F}$  to 10  $\mu\text{F}$  capacitor for each power supply. Insufficient capacitance may affect the picture quality.

External capacitor characteristic : X5R or Class B

Notes

Regarding power supply connections, mount an appropriate capacitor as close to the connector as possible. Insufficient capacitance may affect the picture quality



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

## 6. Absolute Maximum Ratings

Item	Symbol	Min.	Maximum Ratings	Unit
1.8V power supply	VDD1	-0.3	2.0	V
1.8V power supply (IF)	VDD1IF	-0.3	2.5	V
10 V power supply	VDD2	-0.3	12.0	V
EL cathode voltage	Vcath	-0.3	0.3	V
Logic input voltage ※	Vi	-0.3	VDD1+0.3	V
IF input voltage ※※	ViIF	-0.3	VDD1IF+0.3	V
Storage temperature	Tpnl	-30	+80	°C

※ Pin no. 14,15,16,18,19,22,23,24 & 62

※※ Pin no. 29 to 40,43,44 & 47 to 58

## 7. Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit
1.8V power supply	VDD1	1.62	1.8	1.98	V
1.8V power supply (IF)	VDD1IF	1.62	1.8	1.98	V
10 V power supply	VDD2	9.7	10.0	10.3	V
EL cathode voltage	Vcath	-0.3	0	0.3	V
Operating temperature range	Tpnl	-20		70	°C



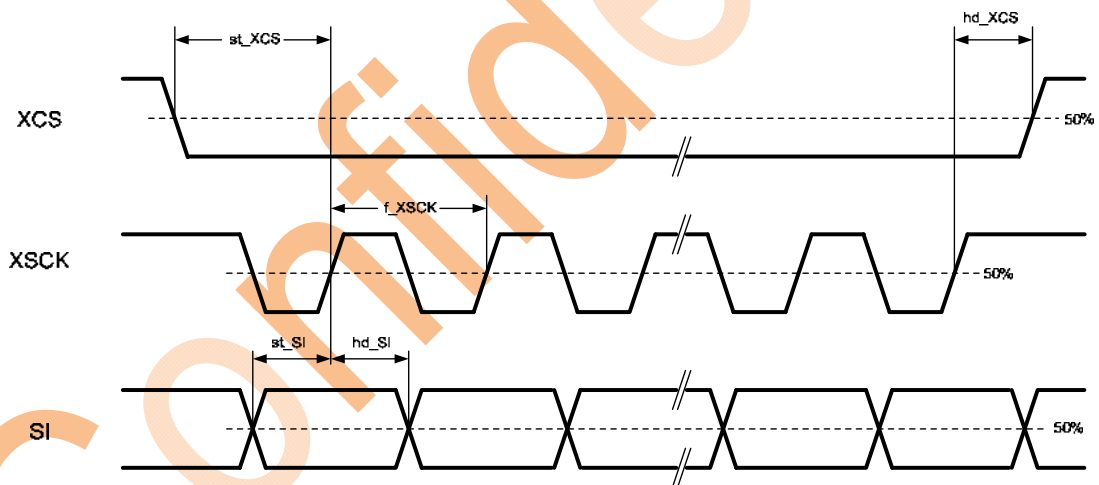
8. Electrical Characteristics

8.1. DC Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
High-level input voltage	VIH		0.7VDD1		VDD1	V
Low-level input voltage	VIL		0		0.3VDD1	V
Logic High -level Output voltage	VOH		VDD1 - 0.5			V
Logic Low -level Output voltage	VOL				0.5	V

8.2. AC Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
XSCK frequency	f_XSCK			0.8	2.5	MHz
XCS setup time	st_XCS		0.4			μs
XCS hold time	hd_XCS		0.2			μs
SI setup time	st_SI		0.2			μs
SI hold time	hd_SI		0.2			μs



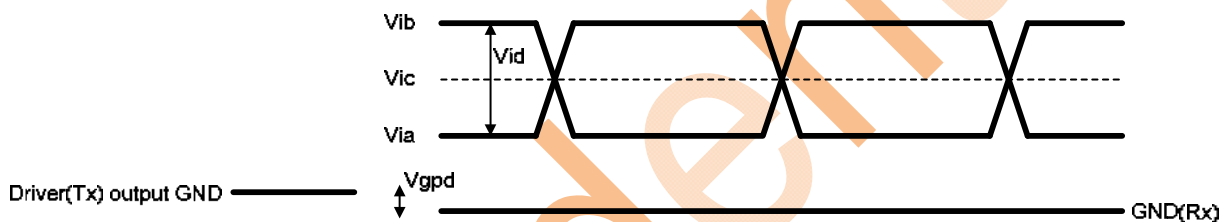
8.3. LVDS I/F Specifications

- ◆Resolution :Full-HD 1920x1080
- ◆Frame Rate :60Hz
- ◆Number of colors :24bit (16777K)
- ◆Number of pairs :Clk: 2pairs, Data:8pairs

8.4. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Voltage range (*)	$V_i$	890		1550	mV
Common Mode Voltage	$V_{ic}$	1040		1400	mV
Each DATA-DATA and DATA-CLK $V_{ic}$ difference	$\Delta V_{ic}$			35	mV
Differential Input Voltage	$V_{id}$	130		300	mV
Each DATA-DATA and DATA-CLK $V_{id}$ difference	$\Delta V_{id}$			35	mV
Driver-receiver ground potential difference	$V_{gpd}$			50	mV

(\*)Assumed driver output differential voltage =180mV



8.5. LVDS AC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Tx Timing Budget	$t_{TOP}$	-250	0	250	psec
Tx tLVT	$t_{LVT}$	300	500	600	psec
Odd and Even clock skew	OESKEW	0		500	psec

