OLED Driver IC

Innovative, High Resolution and Energy Efficient Solutions for Smart Display Applications

As OLED display technology and its manufacturing process become mature, more and more applications have adopted OLED as a smart display. In addition, as self-emissive OLED display comes with a wide range of operating temperatures, it is suitable for outdoor applications even under severe weather conditions. Solomon Systech offers a wide range of OLED display driver ICs for various kinds of applications.

Passive Matrix OLED Display Driver IC

Solomon Systech continues to be the market leader in the Passive Matrix OLED ("PMOLED") display driver IC, with a competitive edge in small size mobile display applications. Besides providing a full range of PMOLED display driver ICs from icon, mono and gray scale to full color with highly integrated features, Solomon Systech further expands its product portfolio by launching new display driver ICs which support higher resolution and display brightness for the fast-growing wearables market, particularly for health and fitness trackers. In addition, our portrait PMOLED display driver ICs support curved or bendable displays, making them ideal display solutions for wearable devices.

Solomon Systech's PMOLED display driver ICs employ a proprietary driving scheme to reduce system power consumption and enhance display performance. They are the ideal display solutions for devices which require high display brightness and low power consumption.

Applications: Wearable Health and Fitness Devices, Healthcare Devices, Smart Wristwear for Kids, Smart Watches, Head-up Displays, LTE Mobile Hotspots, Bank Keys, Bluetooth Headsets, Smartphones, Home Audio and Home Appliances, Optical View Finders, Smart Meters, Industrial Appliances and IoT Applications, etc.

Active Matrix OLED Display Driver IC

Nowadays, Active Matrix OLED ("AMOLED") display is widely adopted for high resolution handheld devices. Solomon Systech has rich experience in amorphous, LTPS and metal oxide driver design. To capitalize on the surging demand for AMOLED displays, Solomon Systech provides innovative AMOLED custom display driver IC solutions to fulfil the needs of our customers.

Applications: Smartphones, Tablet PC, Digital Cameras, Consumer Appliances, Portable Game Consoles, etc.

OLED Lighting Driver IC

OLED lighting offers the lighting market a new and revolutionary light source that saves energy and improves light quality and performance. To capitalize on this potential market, Solomon Systech is developing OLED lighting driver ICs that feature high constant current, smooth and wide-range dimming control capability for different OLED lighting panels and applications.

Applications: Decorative Lighting, Residential or Office Lighting, Sign Display Lighting, Medical Lighting, Automotive Lighting, Agricultural Lighting, etc.

Solomon Systech Limited welcomes enquiries on the development of custom OLED IC.

Key Features

Character
- Up to 20 Char x 4 Lines

Icⁿn
- Up to 256 Icon Lines

Character with Icon
- 120 SEG x 16 COM, up to 32 Icon Lines

Full Range of Resolution (Dot Matrix Panel)
- 160RGB x 128
- 128RGB x 160
- 128RGB x 128
- 128RGB x 96
- 128RGB x 68
- 96RGB x 96
- 96RGB x 64

- 480 x 128 16 Grayscale
- 256 x 64 16 Grayscale
- 160 x 160 Grayscale
- 160 x 160 Mono Color with Dynamic Grayscale
- 128 x 128 16 Grayscale
- 128 x 96 Mono Color with Dynamic Grayscale
- 128 x 64 Mono Color with Dynamic Grayscale
- 128 x 39 Mono Color
- 128 x 32 Mono Color
- 120 x 16 Mono Color
- 96 x 16 Mono Color

Support Low Voltage MCU Interface

256 Steps Brightness Current Control

Pin Selectable MCU Interfaces
- 4/8/9/16/18 Bits 6800-series Parallel Interface
- 4/8/9/16/18 Bits 8080-series Parallel Interface

- 3-wire and 4-wire Serial Peripheral Interface
- I²C Interface

Support Various Color Depths
- 262K Color (6:6:6)
- 65K Color (5:6:5)
- 16 Gray Scale
- Mono Color

On-chip Charge Pump
- Support Minimum 2.2V VBAT Input Voltage

Programmable Gamma Look Up Tables

RAM Write Synchronization Signal Available

Content Scrolling

Non-volatile Memory (OTP) for Panel Calibration

Row Re-mapping and Column Re-mapping

Horizontal and Vertical Scrolling

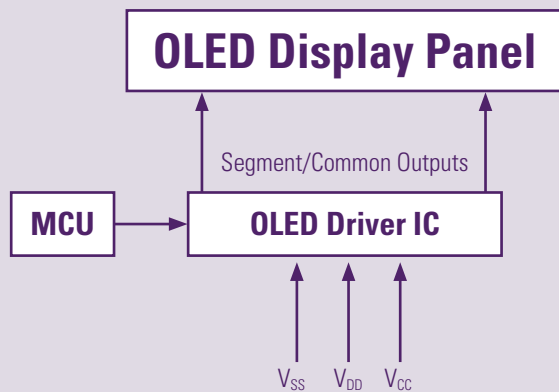**Programmable Frame Rate and Multiplexing Ratio**
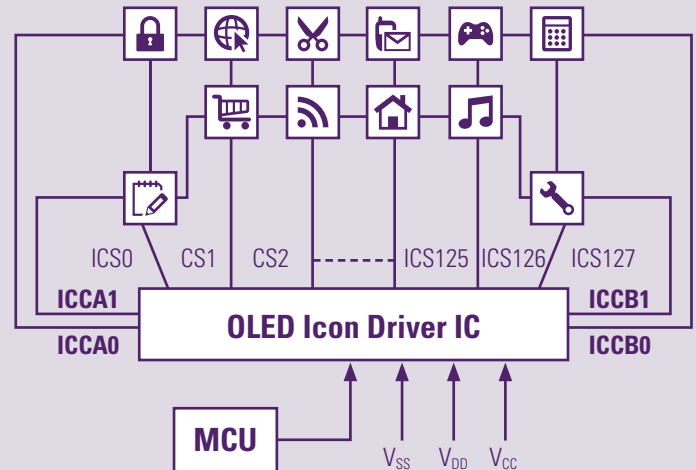
On-chip Oscillator

Slim Chip Layout for COF and COG

SOLOMON SYSTECH

solutions in silicon

OLED Driver IC

Application Diagram

Dot Matrix Panel

OLED Display Panel

Segment/Common Outputs

MCU → **OLED Driver IC**

V_{SS} V_{DD} V_{CC}

256 Icon Mode Connections

ICS0   CS1   CS2   - - - - - -   ICS125   ICS126   ICS127

ICCA1   **ICCB1**

OLED Icon Driver IC

ICCA0   **ICCB0**

MCU

V_{SS} V_{DD} V_{CC}

Dot Matrix Panel With Icon Display Connections

ICON Segment/ Common Outputs

OLED Display Panel

Dot Matrix Segment/ Common Outputs

OLED Driver IC

V_{CC}

V_{DD}

V_{SS}

ICON Segment/ Common Outputs

MCU
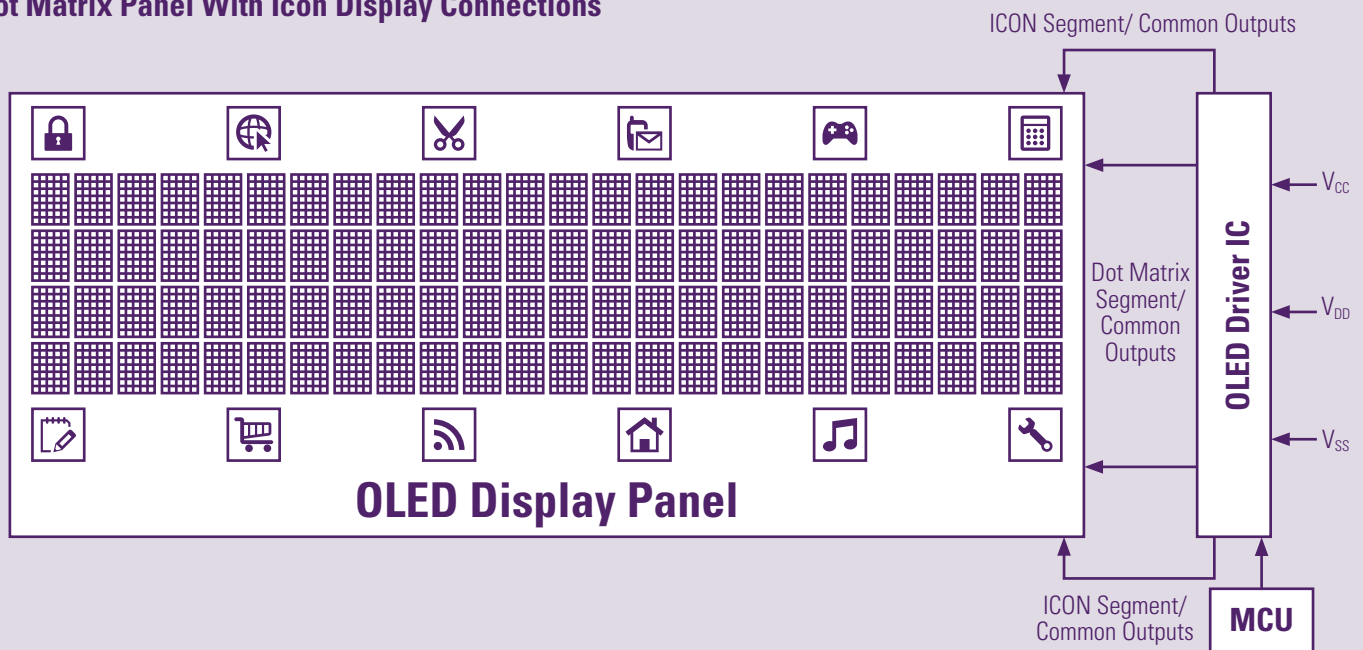
COG IC Placement On Display

Landscape IC (placed on long side of display)

Common Outputs   Common Outputs

OLED Display Panel

Segment Outputs
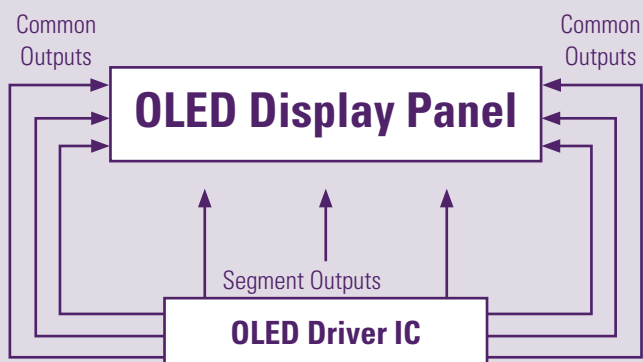
OLED Driver IC

Portrait IC (placed on short side of display)

Segment Outputs

OLED Display Panel

Common Outputs

OLED Driver IC

Segment Outputs
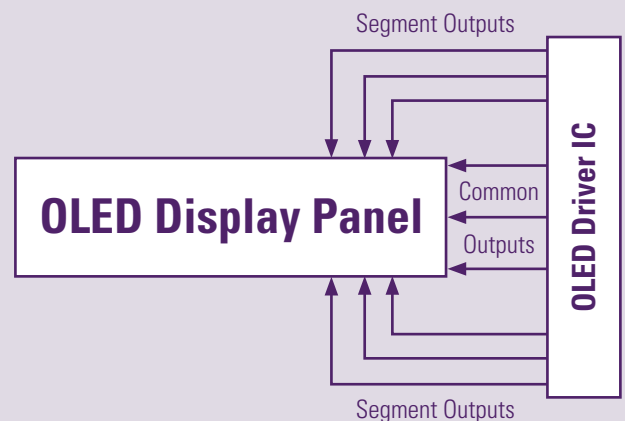
OLED Driver IC

Selection Guide - Mono/Area Color

Part Number	SSD1305*	SSD1306	SSD1307	SSD1308	SSD1309	SSD1311	SSD1313	SSD1315	SSD1316	SSD1317	SSD1319	SSD1360
Display Features												
Maximum panel resolution	132 x 64	128 x 64	128 x 39	128 x 64	128 x 64	20 Char x 4 Lines	128 / 256 Icon Lines	128 x 64	128 x 39	128 x 96	160 x 160	120 x 17 + 32 icons
Embedded SRAM display buffer	132 x 64 bits	128 x 64 bits	128 x 39 bits	128 x 64 bits	128 x 64 bits	80 x 8 bits	–	128 x 64 bits	128 x 39 bits	128 x 96 bits	160 x 160 bits	120 x 16 bits
Display color	Mono	Mono	Mono	Mono	Mono	Mono	Mono	Mono with Dynamic Grayscale	Mono	Mono with Dynamic Grayscale	Mono with Dynamic Grayscale	Mono
Contrast control	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps
DC Characteristics												
Segment maximum source current	320uA	240uA	320uA	150uA	320uA	450uA	320uA	240uA	160uA	600uA	600uA	600uA
Common maximum sink current	45mA	30mA	40mA	20mA	40mA	45mA	40mA	30mA	20mA	76.8mA	96mA	80mA
MCU interface Voltage Supply (V_{DDIO})	1.6V - V_{DD}	–	–	–	–	2.4V - 3.6V / 4.4V - 5.5V	–	–	–	–	–	2.4V - 3.6V / 4.4V - 5.5V
Core V_{DD} power supply (V_{DD})	2.4V - 3.5V	1.65V - 3.3V	1.65V - 3.3V	1.65V - 3.3V	1.65V - 3.3V	2.4V - V_{DDIO} / internally regulated	1.65V - 3.3V	1.65V - 3.5V	1.65V - 3.3V	1.65V - 3.3V	1.65V - 3.5V	2.4V - V_{DDIO} / internally regulated
High Voltage Supply (V_{CC})	7.0V - 15.0V	7.0V - 15.0V	7.0V - 15.0V	7.0V - 15.0V	7.0V - 16.0V	8.0V - 15.0V	7.0V - 16.0V	7.5V - 16.5V	7.0V - 15.0V	7.0V - 16.5V	8.0V - 18.0V	8.0V - 15.0V
IC Orientation on Panel	Landscape	Landscape	Portrait	Landscape	Landscape	Portrait	Landscape	Landscape	Portrait	Portrait	Portrait	Portrait
MCU Host Interface Supported												
4-bit parallel interface	–	–	–	–	–	✓	–	–	–	–	–	✓
8-bit parallel interface	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serial peripheral interface	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
I²C interface	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Package Information												
COG	Z	BZ	Z2	Z2	ZC / ZD	M1Z8	ZC	Z	Z2	Z	Z	Z
High Integration Controller Function												
On-chip oscillator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Programmable frame rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Programmable display MUX	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
Row/Column re-mapping	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
Horizontal scrolling	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
Vertical scrolling by RAM	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓
Content scrolling	–	✓	–	–	✓	–	–	✓	✓	✓	✓	✓
Internal charge pump regulator	–	✓	–	–	–	–	–	✓	✓	–	–	–
Internal IREF selection	–	–	–	✓	–	–	–	✓	✓	✓	–	–
On-chip Character ROM	–	–	–	–	–	✓	–	–	–	–	–	✓
Graphic mode	–	–	–	–	–	–	–	–	–	–	–	✓

* Legacy Product

Selection Guide - Gray Scale

Part Number	SSD1320	SSD1322	SSD1326	SSD1327	SSD1329	SSD1362
Display Features						
Maximum panel resolution	160 x 160	480 x 128	256 x 32	128 x 128	128 x 128, 64 icons	256 x 64
Embedded SRAM display buffer	160 x 160 x 4 bits	480 x 128 x 4 bits	256 x 32 x 4 bits	128 x 128 x 4 bits	128 x 128 x 4 bits	256 x 64 x 4 bits
Display color	16 gray scale	16 gray scale	16 gray scale	16 gray scale	16 gray scale	16 gray scale
Contrast control	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps
DC Characteristics						
Segment maximum source current	600uA	300uA	100uA	300uA	350uA	600uA
Common maximum sink current	96mA	80mA	25mA	40mA	40mA	128mA
MCU interface Voltage Supply (V_{DDIO})	–	1.65V - V_{CI}	1.7V - V_{DD}	–	1.7V - V_{DD}	1.65V - V_{CI}
Core VDD power supply (V_{DD})	1.65V - 3.5V	2.4V - 2.6V	2.4V - 3.5V	1.65V - 2.6V	2.4V - 3.5V	1.65V - 2.6V
Logic Voltage Supply (V_{CI})	–	2.4V - 3.5V	–	1.65V - 3.5V	3.2V - 4.2V (for icon)	1.65V - 3.5V
High Voltage Supply (V_{CC})	8.0V - 16.0V	10.0V - 20.0V	9.0V - 15.0V	8.0V - 18.0V	9.0V - 18.0V	10V - 20V
IC Orientation on Panel	Portrait	Landscape	Landscape	Landscape	Landscape	Portrait
MCU Host Interface Supported						
8-bit parallel interface	✓	✓	✓	✓	✓	✓
Serial peripheral interface	✓	✓	✓	✓	✓	✓
I²C interface	✓	–	✓	✓	–	✓
Package Information						
COF	–	UR1(256x64)	–	–	–	–
COG	Z	ZA	Z	ZB	Z	Z
High Integration Controller Function						
On-chip oscillator	✓	✓	✓	✓	✓	✓
On-chip DC-DC booster	–	–	–	–	for icon	–
On chip V_{DD} regulator	–	✓	–	✓	–	✓
Programmable frame rate	✓	✓	✓	✓	✓	✓
Programmable display MUX	✓	✓	✓	✓	✓	✓
Row/Column re-mapping	✓	✓	✓	✓	✓	✓
Horizontal scrolling	✓	–	✓	✓	✓	–
Vertical scrolling by RAM	✓	✓	✓	✓	✓	✓
Graphic acceleration command set: e.g. draw rectangle & copy	–	–	–	–	✓	–

OLED Driver IC

Selection Guide - Color

Part Number	SSSD1331	SSD1351	SSD1352	SSD1353	SSD1355	SSD1357
Display Features						
Maximum panel resolution	96RGB x 64	128RGB x 128	160RGB x 128	160RGB x 132	128RGB x 160	128RGB x 128
Embedded SRAM display buffer	96 x 64 x 16 bits	128 x 128 x 18 bits	160 x 128 x 18 bits	160 x 132 x 18 bits	128 x 160 x 18 bits	128 x 128 x 16 bits
Display color	65k colors	262k colors	262k colors	262k colors	262k colors	65k colors / Pseudo 262k colors
Contrast control	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps
DC Characteristics						
Segment maximum source current	200uA	200uA	300uA	160uA	200uA	320uA
Common maximum sink current	60mA	70mA	80mA	60mA	80mA	80mA
MCU interface Voltage Supply (V_{DDIO})	1.6V - V_{DD}	1.65V - V_{CI}	1.65V - V_{CI}	1.6V - V_{CI}	1.6V - V_{CI}	–
Core VDD power supply (V_{DD})	2.4V - 3.5V	–	–	2.4V - 2.6V	2.4V - 2.6V	1.65V - 3.5V
Logic Voltage Supply (V_{CI})	–	2.4V - 3.5V	2.4V - 3.5V	2.4V - 3.5V	2.4V - 3.5V	–
High Voltage Supply (V_{CC})	8.0V - 18.0V	10.0V - 18.0V	10.0V - 18.0V	10.0V - 21.0V	10.0V - 21.0V	8.0V - 18.0V
IC orientation on panel	Landscape	Landscape	Landscape	Landscape	Landscape	Landscape
MCU Host Interface Supported						
8-bit parallel interface	✓	✓	✓	✓	✓	✓
9-bit parallel interface	–	–	✓	✓	–	–
16-bit parallel interface	✓	✓	✓	✓	✓	✓
18-bit parallel interface	–	✓	✓	✓	✓	–
Serial peripheral interface	✓	✓	✓	✓	✓	✓
I²C interface	–	–	–	–	–	✓
Package Information						
COF	–	U(128x128)	–	U7(160x128)	U8(128x128)	–
COG	Z	Z	Z	Z	Z	Z
High Integration Controller Function						
On-chip oscillator	✓	✓	✓	✓	✓	✓
On chip V_{DD} regulator	–	✓	✓	✓	✓	–
Non-Volatile Memory (OTP) for calibration	–	–	✓	✓	✓	–
Programmable frame rate	✓	✓	✓	✓	✓	✓
Row/Column re-mapping	✓	✓	✓	✓	✓	✓
Horizontal scrolling	✓	✓	–	✓	✓	✓
Vertical scrolling by RAM	✓	✓	✓	✓	✓	✓
Color swapping function	✓	✓	✓	✓	✓	✓
Graphic acceleration command set: draw line & rectangle, copy & dim window, clear window, etc	✓	–	–	✓	–	–
Content Scrolling	–	–	–	–	–	✓
I-MUX Mode for segment display	–	–	–	–	–	✓

Solomon Systech Limited

Solomon Systech Limited is a leading semiconductor company providing display IC products and system solutions that enable a wide range of display and touch applications for smartphones, tablets, TVs/monitors, notebooks and other smart devices, including wearables, healthcare devices, smart home devices, as well as industrial appliances, etc. Solomon Systech (International) Limited's shares have been listed on the main board of the Stock Exchange of Hong Kong Limited since April 8th, 2004 (stock code: 2878). More information about the Group, its products and services may be obtained at _http://www.solomon-systech.com/_.

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