

# DISPLAY IC SELECTION GUIDES

## Capacitive Touch Panel Controller

Part Number	Number of ITO Layers	Maximum Number of Channels	Display Resolution Supported	Number of Touch Points Supported	Programmable Gesture	Interface	Packages
SSD2528	1	40	Up to WVGA	2	Yes	I <sup>2</sup> C	QFN-40/48
SSD2531	2	21 driving 12 sensing 4 touch keys	Up to WVGA	4	No	I <sup>2</sup> C	QFN-40/48/68
SSD2532	2	12 driving 16 sensing 4 touch keys	up to WVGA	10	No	I <sup>2</sup> C	QFN48
SSD2533	2	23 driving 41 sensing 4 touch keys	Up to FHD	10	Yes	I <sup>2</sup> C / USB	QFP-80/100
SSD2538	2	23 driving 41 sensing 4 touch keys	Up to WVGA	10	Yes	I <sup>2</sup> C	QFN/aQFN

## Smart TFT LCD Driver Controller

Part Number	Display Size (Source x Gate)	Color Depth	RAM	DBC	Interface
SSD1297N	240RGB x 320	65K/262K	√	-	SPI / MCU / RGB
SSD1268	240RGB x 320	65K/262K	√	√	SPI / MCU / RGB
SSD2220	240RGB x 432	262K	√	-	SPI / MCU / RGB
SSD2119	320RGB x 240	262K	√	-	SPI / MCU / RGB
SSD2113	320RGB x 240	262K	√	√	SPI / MCU / RGB
SSD2281	320RGB x 480	262K	√	√	SPI / MCU / RGB / MIPI / MDDI
SSD2085	480RGB x 864	16M	√	√	SPI / MCU / RGB / MIPI / MDDI

## AV TFT LCD Driver Controller

Part Number	Display Size (Source x Gate)	Color Depth	DBC	Interface
SSD2118B	320RGB x 240	16M	√	SPI / CCIR / RGB
SSD2128	480 x 272RGB	16M	√	SPI / RGB
SSD2166	800 x 480RGB	16M	-	LVDS / RGB

### Source Driver

Part Number	Number of Output Channels	Gray Scale Level	DBC	Interface
SSD2627A	1200	256	√	RGB

### Gate Driver

Part Number	Number of Output Channels	Select Shift Direction	Cascade
SSD2666	320 / 384 / 400 / 480	√	√
SSD2667	600	√	√

Resolution	Source Driver (With TCON)	Gate Driver
WVGA 800 x 480	2 x SSD2627A	1 x SSD2666
SVGA 800 x 600	2 x SSD2627A	1 x SSD2667

## STN LCD Driver Controller

Monochrome (Character) Driver	Character Support (Char X Line)	Feature	Package
SSD1803	Up to 20 char x 4 lines	1, 2 or 4 lines with 5x8 or 6x8 dot format display $V_{DDIO} = 3V$	COB
SSD1803A	Up to 20 char x 4 lines	1,2 or 4 lines with 5x8 or 6x8 dot format display $V_{DDIO} = 3V/5V, 12C$	COG

Monochrome (Graphic) Driver	Display Size (Seg X Com)	Feature
SSD1808B	132 x 68	Built-in capacitor, OTP, $V_{DDIO} = 3V/5V$ , drive up to 3.5" panel size
SSD1809	160 x 64	Built-in divider
SSD1816	130 x 130	Built-in divider capacitor, dual OTP
SSD1829B	96 x 68	Built-in capacitor, OTP (PPI/SPI)
SSD1838B	132 x 65	Built-in capacitor, OTP, $V_{DDIO} = 3V$ , drive up to 3" panel size
SSD1839B	132 x 65	Built-in capacitor, OTP, $V_{DDIO} = 3V/5V$

Gray Scale Driver	Display Size (Seg X Com)	Feature
SSD1848C	130 x 130	4 gray level graphic, built-in divider capacitor, dual OTP

APT – Alt-Pleshko Technique, MTP – Multi Time Programming, OTP – One Time Programming

## OLED Driver Controller ICs Mono / Area Color

Part Number	SSD1305	SSD1306	SSD1307	SSD1308	SSD1309	SSD1311	SSD1313
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### 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
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
Display color	Mono and 4 color selections for area color	Mono	Mono	Mono	Mono	Mono	Mono
Contrast control	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps	256 steps

### DC Characteristics

Segment maximum source current	320uA	100uA	320uA	150uA	320uA	450uA	320uA
Common maximum sink current	45mA	15mA	40mA	20mA	40mA	45mA	40mA
MCU interface voltage supply ( $V_{DDIO}$ )	1.6– $V_{DD}$	-	-	-	-	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
High voltage supply ( $V_{CE}$ )	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

### MCU Host Interface Supported

8-bit parallel interface	√	√	√	√	√	√	√
Serial peripheral interface	√	√	√	√	√	√	√
I <sup>2</sup> C interface	√	√	√	√	√	√	√

### Package Information

TAB	T7 (132x64)	-	-	-	U (128x64)	-	-
COG	Z (132x64) Z3 (132x64)	Z2 (128x64)	Z2 (128x39)	Z2 (128x64)	Z (128x64)	M1Z (100x32)	Z (128x4)

### High Integration Controller Function

On-chip oscillator	√	√	√	√	√	√	√
Programmable frame rate	√	√	√	√	√	√	√
Programmable display MUX	√	√	√	√	√	√	-
Row/Column re-mapping	√	√	√	√	√	√	-
Horizontal scrolling	√	√	√	√	√	√	-
Vertical scrolling by RAM	√	√	√	√	√	√	-

## OLED Driver Controller ICs Gray

Part Number	SSD1322	SSD1326	SSD1327	SSD1329
<b>Display Features</b>				
Maximum panel resolution	480 x 128	256 x 32	128 x 128	128 x 128, 64 hard icons
Embedded SRAM display buffer	480 x 128 x 4 bits	256 x 32 x 4 bits	128 x 128 x 4 bits	128 x 128 x 4 bits
Display color	16 gray scale	16 gray scale	16 gray scale	16 gray scale
Contrast control	256 steps	256 steps	256 steps	256 steps

### DC Characteristics

Segment maximum source current	300uA	100uA	300uA	350uA
Common maximum sink current	80mA	25mA	40mA	40mA
MCU interface voltage supply ( $V_{DDIC}$ )	1.65V – $V_{CI}$	1.7V – $V_{DD}$	-	1.7V – $V_{DD}$
Core $V_{DD}$ power supply ( $V_{DD}$ )	2.4V – 2.6V	2.4V – 3.5V	1.65V – 2.6V	2.4V – 3.5V
Logic voltage supply ( $V_{CI}$ )	2.4V – 3.5V	-	1.65V – 3.5V	3.2V – 4.2V (for icon)
High voltage supply ( $V_{CO}$ )	10.0V – 20.0V	9.0V – 15.0V	8.0V – 18.0V	9.0V – 18.0V

### MCU Host Interface Supported

8-bit parallel interface	√	√	√	√
Serial peripheral interface	√	√	√	√
I <sup>2</sup> C interface	-	√	√	-

### Package Information

COF	U (256x64)	-	-	-
COG	-	Z (256x32)	ZB (128x128)	Z (128x128,64icon)

### High Integration Controller Function

On-chip oscillator	√	√	√	√
On-chip DC-DC booster	-	-	-	for hard 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 Controller ICs Color

Part Number	SSD1331	SSD1351	SSD1353	SSD1355
<b>Display Features</b>				
Maximum panel resolution	96RGB x 64	128RGB x 128	160RGB x 132	128RGB x 160
Embedded SRAM display buffer	96 x 64 x 16 bits	128 x 128 x 18 bits	160 x 132 x 18 bits	128 x 160 x 18 bits
Display color	65k colors	262k colors	262k colors	262k colors
Contrast control	256 steps	256 steps	256 steps	256 steps

### DC Characteristics

Segment maximum source current	200uA	200uA	160uA	200uA
Common maximum sink current	60mA	70mA	60mA	80mA
MCU interface voltage supply ( $V_{DDIC}$ )	1.6V – $V_{DD}$	1.65V – $V_{CI}$	1.6V – $V_{CI}$	1.6V – $V_{CI}$
Core $V_{DD}$ power supply ( $V_{DD}$ )	2.4V – 3.5V	2.4V – 2.6V	2.4V – 2.6V	2.4V – 2.6V
Logic voltage supply ( $V_{CI}$ )	-	2.4V – 3.5V	2.4V – 3.5V	2.4V – 3.5V
High voltage supply ( $V_{CO}$ )	8.0V – 18.0V	10.0V – 20.0V	10.0V – 21.0V	10.0V – 21.0V

### MCU Host Interface Supported

8-bit parallel interface	√	√	√	√
9-bit parallel interface	√	-	√	-
16-bit parallel interface	√	√	√	√
18-bit parallel interface	-	√	√	√
Serial peripheral interface	√	√	√	√

### Package Information

COF	-	U (128x128)	U7 (160x128)	U8 (128x128) Z (128x160)
COG	Z (96x64)	Z (128x128)	Z (160x132)	-

### High Integration Controller Function

On-chip oscillator	√	√	√	√
On chip $V_{DD}$ regulator	-	√	√	√
Non-Volatile Memory (OTP) for calibration	-	-	√	√
Programmable frame rate	√	√	√	√
Programmable display MUX	√	√	√	√
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	√	-	√	-

## Bistable Display Driver Controller

Part Number	SSD1603	SSD1623	SSD1626	SSD1629
Panel type	Passive dot-matrix for Cholesteric Display	Segment direct drive for different displays (Electrophoretic, Cholesteric and more)		
Resolution	132 x 64	96 Segments (95 + 1 background segment) 1 Common	32 Segments	32 Segments (31 + 1 background segment) 1 Common
Input voltage	$V_{DD}$ : 2.4V – 3.5V (Logic & Analog) $V_{DDIO}$ : 1.6V – $V_{DD}$ (MCU Interface)	$V_{DD}$ : 2.0V – 3.6V (Logic) $V_{DDIO}$ : 2.0V – $V_{DD}$ (MCU Interface) $V_{CI}$ : 2.4V – 3.6V (Analog/Booster)	Supplied by SSD1629	$V_{DDIO}$ : 1.8V – $V_{CI}$ (MCU Interface) $V_{CI}$ : 2.4V – 3.6V (Analog/Booster)
Output voltage	10 ~ 35V	10 ~ 40V	10 ~ 30V	10 ~ 30V
No. of voltage output level	6 levels	3 levels, with programmable waveform	3 levels waveform controlled by SSD1629	3 levels, with programmable waveform
Embedded RAM	132 x 64	96 x 2	32 x 2	32 x 2
Built-in DC-DC	6X~10X programmable output voltage	Max 40V programmable output voltage	Output voltage supplied by SSD1629	Max 30V programmable output voltage
Package	SSD1603Z (Gold bump die) SSD1615U1R1 (COF)	SSD1623V (bump die) SSD1623Z (Gold bump die) SSD1623URI (COF)	SSD 1626V bare die in 100 $\mu$ m pad pitch	SSD 1629V bare die in 100 $\mu$ m pad pitch

## MIPI Bridge

Part Number	Display Size (Source x Gate)	Color Depth	Interface
SSD2805C	480RGB x864	16M	MIPI Master Bridge with 2-lane
SSD2825	1280 RGB x800	16M	MIPI Master Bridge with 4-lane
SSD2838	1280 RGB x800	16M	MIPI Slave Bridge with 4-lane

## Large Display Source Driver

Part Number	SSD3233	SSD3298
<b>Display Feature</b>		
LCD driving outputs channel	720/690/684/642	1026/966/960/900/846/840
Gray scale	Internal 6-bit DAC for 64 gray scale output	Internal 8-bit DAC for 256 gray scale output
Support resolution*1	1280xG, 1366xG, 1920xG, 1440xG, 1380xG *1	2048xG, 1366xG, 2560xG, 1920xG, 1280xG, 2400xG, 1680xG
<b>DC Characteristic</b>		
Logic operating voltage( $V_{DD}$ )	2.3V ~ 3.6V	2.3V ~ 3.6V
Maximum LCD driving voltage( $V_{DDA}$ )	6.5V ~ 13.5V	12.0V ~ 17.5V
Output dynamic range	0.2 ~ $V_{DDA}$ -0.2V	0.2~ $V_{DDA}$ -0.2V
<b>Mini-LVDS Interface</b>		
Minimum Mini-LVDS input range	200mV~600mV	100mV~
Maximum Mini-LVDS input frequency	300MHz	340MHz
Input pairs	6	6/3

### Package Information

COF	48mm, 4SPH	48mm, 4SPH
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### High Integration Controller Function

Dot- and N-line inversion	√	√
Gamma correction	7+7 Input	11+11 Input
Data mapping function	-	√
L-port and R-port exchange	-	√
2-port Architecture	-	√
Half $V_{DDA}$ architecture	-	√
Cascade mode with bi-direction shift control	√	√

\*1 : "xG" means the vertical channel number defined by the gate driver cooperation.

## Gate Driver

Part Number	SSD3263	SSD3268	SSD3273
<b>Display Feature</b>			
LCD driving outputs channel	256/267/270/300	272/262/258/242/202	400/384/360/350

<b>DC Characteristic</b>			
Logic operating voltage ( $V_{DD}$ )	2.3V ~ 3.6V	2.3V ~ 3.8V	2.3V ~ 3.6V
High voltage ( $V_{GG}$ ) max.	+35V	+35V	+35V
Negative output voltage ( $V_{EE}$ ) max.	-20V	-20V	-20V
High voltage operation ( $V_{GG}-V_{EE}$ ) max.	40V	40V	40V

<b>Interface</b>			
Maximum operating clock frequency	200KHz	200KHz	200KHz

<b>Package Information</b>			
COF	35mm, 2SPH	48mm, 2SPH	48mm, 2SPH

<b>High Integration Controller Function</b>			
Selective shift direction	√	√	√
Multiple pulse function	–	√	√

## Backlight Driver IC

Part Number	SSD1065	SSD1081	SSD1082
Input voltage	8V ~ 450V	4.5 ~ 33V	4.5 ~ 33V
Max rating	450V	50V	50V
Current max. per channel	700mA	80mA	160mA
Booster MOS-FET	External	External	External
Number of string	1	8	4
LED current balance rate	N/A	+/-1.5%	+/-1.5%
Dimming	PWM	PWM	PWM
Standby Mode	Yes (PWM=0)	Yes	Yes
Time-shift function	No need	Yes	Yes
Open/Short Pt.	Support by external design	Yes	Yes
OVP/LVP/OCP	Support by external design	Yes	Yes
LED short circuit protection threshold (Typ.)	350v	8.5V	8.5V
Fault detect	No	Yes	Yes
Package	SOP8	SOP24	SOP16