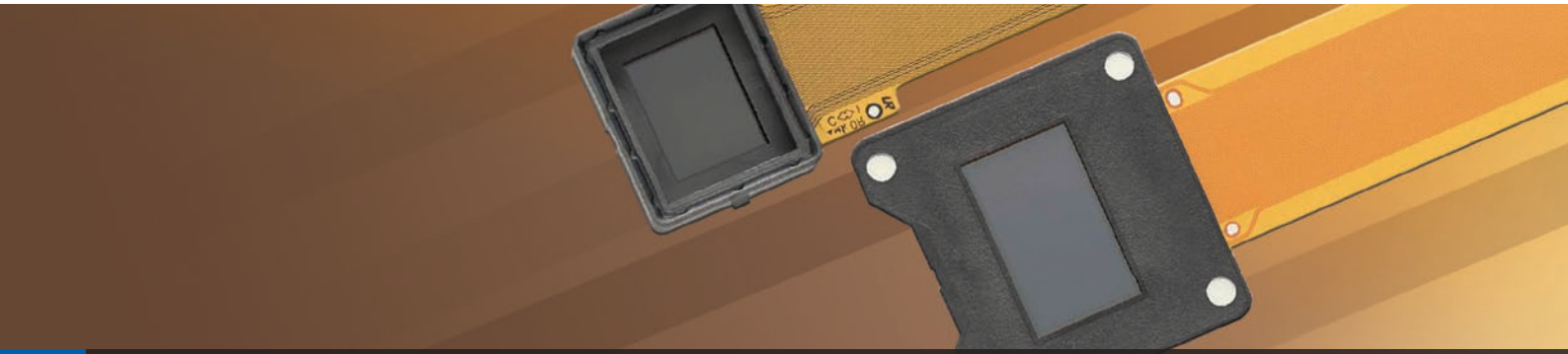
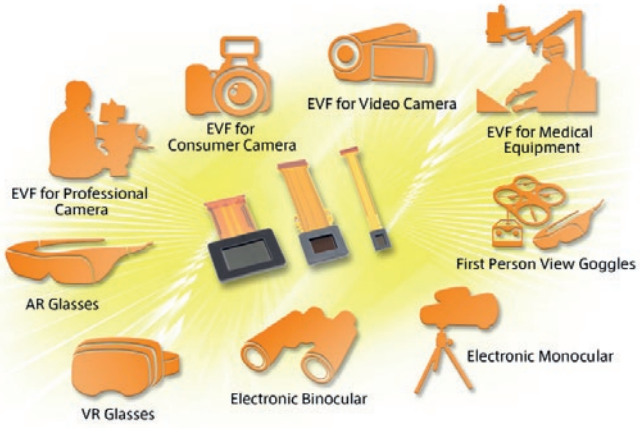
RESTAR FRAMOS TECHNOLOGIES



SONY'S OLED MICRODISPLAYS

HIGH-QUALITY DISPLAY SOLUTIONS FOR INDUSTRIAL AND CONSUMER ELECTRONICS

OLED (Organic LED) Microdisplays from Sony Semiconductor Solutions are cutting-edge small video displays providing fast response,high-contrast image technology and precise color reproduction. The very thin displays bring greater visual impact to applications in AR/VR/MR, broadcasting, electronic view finders, industrial maintenance and medical. With large aperture and high luminance, a wide color spectrum, less reflectance and a high dynamic range they operate in extreme speed without showing any motion blur.



BENEFITS OF SONY OLED MICRODISPLAYS

- Natural color reproduction with wide color gamut and true black
- Superior moving picture quality with extremely short response time
- Panel driver and logic driver on-board, to achieve small and flexible light weight display solutions
- Power-saving modes available
- Easy integration into OEM devices

ADVANTAGES OF OLED MICRODISPLAYS

The Sony OLED Microdisplays have numerous advantages compared to other display types. In addition to the picture quality, their material flexibility and module composition makes them a best-in-class candidate for easy integration into embedded vision projects. Compared to other small OLED displays on the market, Sony delivers excellent contrast ratio of 100,000:1.

Device	LCD		Sony OLED Microdisplay
	Reflective	Transmissive	
Color System	Field Sequential + LED	Color Filter + LED	Color Filter + White OLED (RGB stacked)
Contrast Ratio	150:1	300:1	100,000:1
Color Representation	No Good	No Good	Excellent
Response Time	0.2ms	5ms	≦ 0.01ms
Module Composition	Complicated	Complicated	Simple
	Back light / Polarizer / PBS / λ / 4 Plate / Display	Back light / Polarizer / Display / Analyzer	Display

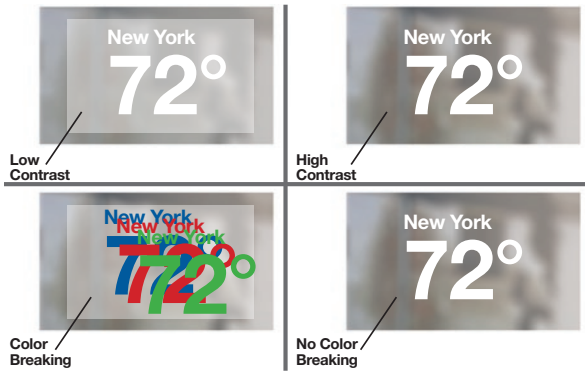
SONY OLED MICRODISPLAY SPECIFICATIONS

	Mainly for Camera EVF and Scope EVF					Mainly for AR and VR headsets				
	0.39 type		0.5 type		0.64 type	0.44 type	0.55 type	0.68 type		1.30 type
	ECX334A	ECX334E	ECX337A	ECX339A	ECX342A	ECX350F	ECX348C	ECX343EN	ECX343ENA	ECX344A
Main Application	Camera EVF, Scope EVF					AR headsets				VR headsets
Appearance										
Resolution	XGA 1024 x RGB x 768	XGA 1024 x RGB x 768	Quad VGA 1280 x RGB x 960	UXGA 1600 x RGB x 1200	Quad XGA 2048 x RGB x 1536	Full-HD 1920 x RGB x 1080	Full-HD 1920 x RGB x 1080	WUXGA 1920 x RGB x 1200	WUXGA 1920 x RGB x 1200	3.5k4k 3552 x RGB x 3840
Max. Luminance (Duty Ratio)	**500cd/m2** -90%	**3,500cd/m2** -90%	**1,000cd/m2** -90%	**1,000cd/m2** -90%	**1,000cd/m2** -90%	**10,000cd/m2** -100%	**5,000cd/m2** -90%	**5,000cd/m2** -90%	**5,000cd/m2** -90%	**1,000cd/m2** -20%
Contrast	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1	100,000:1
Video I/F	RGB 24bit YCbCr 16bit	Sub-LVDS LVDSt	Sub-LVDS LVDS	Sub-LVDS LVDS	Sub-LVDS LVDS	MIPI D-PHY +DSC	Sub-LVDS LVDS	Sub-LVDS LVDS	Sub-LVDS LVDS	MIPI D-PHY +DSC
Power Supply	1.8V (logic) 10V (analog)	1.8V (logic) 3.3V, -6.6V (analog)	1.8V (logic) 10V (analog)	1.8V (logic) ±5V (analog)	1.8V (logic) ±5V (analog)	1.2V (logic) 3.3V, -6.6V (analog)	1.8V (logic) 3.3V, -6.6V (analog)	1.8V (logic) 3.3V, -6.6V (analog)	1.8V (logic) 3.3V, -6.6V (analog)	1.8V (logic) 3.3V, -6.3V (analog)
Mass Production	**Available**	**Available**	**Available**	**Available**	**Available**	**Available**	**Available**	**Available**	**Available**	**Available**

SPECIFIC ADVANTAGES FOR WEARABLES

OLED technology demonstrates specific advantages for integration into head-mounted displays and wearables for Augmented Reality (AR) applications. The high contrast provided by OLED Microdisplays allows the additional information layer to appear seamlessly, and not as an overlay; this information is simply added to the background for a “real AR” experience. Microdisplays, with no color breakup, produces very high visibility of the additional layer with crisp, clear images, without blurring. The small package footprint allows wearables to be produced more compactly and lighter for increased usability and wearing convenience.

With its small packaging, effective and bright technology, OLED technology is suitable for many more potential applications using microsized displays in both industrial and consumer electronics to provide a very high picture quality.



LCD (left) vs. M-OLED (right) AR experience

With our practical industry and project experience, RESTAR FRAMOS serves our clients as a technical consultant, development partner and external supplier enabling our customers to develop cutting-edge imaging solutions while shortening their time-to-market.

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