

# The Databeans Monthly

July 21, 2010

## RECENTLY PUBLISHED

- 2010 Temperature Sensors
- 2010 Optoelectronics
- 2010 Wireless Semiconductors
- 2010 Data Converters
- 2010 Timing Devices
- 2010 Industrial Analog ICs
- 2010 Computer Analog ICs
- 2010 RF Power Amplifiers and Transceivers
- 2010 Medical Semiconductors
- 2010 Amplifiers and Comparators

## UPCOMING STUDIES

- 2010 Interface
- 2010 LEDs
- 2010 Digital Video Interface
- 2010 Automotive Microcontrollers
- 2010 Flash Memory

## Flexible OLEDs

*“Stay committed to your decisions, but stay flexible in your approach.”*

- Tom Robbins, American Novelist (1936-present)

In recent years Organic Light Emitting Diodes or “OLEDs” have made considerable waves in the lighting market. Basically, an OLED is a self-illuminating solid-state device composed of thin films of organic molecules or polymers which are stacked between conductors. A major draw is their thinness, which can be between 100 to 500 nanometers thick or about 200 times smaller than a human hair. This feature provides an exciting possibility for flexible OLED applications.

Potentially, foldable OLED displays could be attached to fabrics to create electronic "smart" clothing. One example would be outdoor survival clothing with an integrated computer chip, cell phone, GPS receiver and OLED display sewn right into it. Another application would be in flexible e-paper, which would mimic the look and feel of a newspaper page. Once commercialized, the technology would slim down bulky daily newspapers and hopefully save tons of paper, wastewater and carbon emissions. Korea’s LG already announced its own e-paper prototype early in 2010, with more on the horizon.

However, the key road block is actually finding a commercially viable method of manufacturing. Samsung announced its initial version of the technology in 2008, it achieved this through use of a technique that coats the panel with a flexible membrane through use of an ion gun, ejecting microscopic amounts of itself into a thermodynamically unbalanced cloud of atoms. These then cling to and form a film on anything else in the vacuum chamber. While, innovative, this process was difficult to implement on any scale.

### Worldwide OLED Display Market Forecast (Revenue, Units, and ASPs)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	10-15 CAGR%	10/09 Growth
\$M	495	607	948	1,391	1,708	2,624	3,477	4,979	6,337	35%	47%
MU	74	78	97	130	155	249	348	537	810	44%	34%
ASP	\$6.68	\$7.77	\$9.77	\$10.73	\$11.00	\$10.55	\$10.00	\$9.27	\$7.82	-6%	10%

databeans estimates, July 2010



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Sony then released its own version of the ultra-thin flexible OLED with a different process in May 2010. Sony's new screen contains innovative organic thin-film transistors that are used to make the driver circuitry to run the display. These transistors are capable of being produced directly onto a flexible substrate, eliminating the need for the rigid driver chips that would prevent the screen from being bent. Sony's new prototype is so flexible that it could even be wrapped around a pencil.

Other methods, including more "traditional" processes such as vacuum thermal evaporation, are also being developed for widespread use. This all equates to a rapidly emerging potential for mass production. Even then, commercial electronics with flexible OLED displays are still a few years away. Also, the first commercial flexible OLED displays would most likely be between only 4 to 6 inches in size, with those exceeding 10 inches coming much further along. However, the market and technology potential for a whole slew of new OLED applications is certainly here and extremely exciting. Today, OLED displays both rigid and flexible continue to grow strongly with display shipments expected to reach 130 million units this year, up from 97 million units last year. The market value is expected to reach \$1.4 billion and grow to well over \$6 billion by 2015.



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