

# FLCOS Technology

## Brilliant, True-to-Life Image Quality

### 5 Reasons FLCOS is Best for Microdisplays

#### Better Color Fidelity

Field sequential color produces brighter, more fully saturated colors.

#### Better Image Quality

Field sequential color allows each pixel to show the true color, creating fine pixel borders and high resolution for high-quality displays.

#### Low Power

At less than 100mW, our FLCOS microdisplays use a fraction of the power required by competing display technologies like micromirror.

#### Smaller Footprint

Because FLCOS microdisplays are built on advanced CMOS technology, critical image processing and memory functions can be integrated onboard.

#### Broad Operating Temperature Range

Enables microdisplays to operate at temperatures as low as -10°C versus LCOS displays that only work well at high temperatures.

### The Ultimate Microdisplay Technology

FLCOS technology brings unprecedented speed and clarity to Micron's Displaytech® family of microdisplays.

Microdisplays are currently developed based on a handful of competing technologies, including liquid crystal on silicon (LCOS), laser scanning, and micromirror. Unfortunately, each of these technologies requires design compromises with regard to operating temperature, image quality, power efficiency, system cost, and board footprint. Our high-speed ferroelectric LCOS (FLCOS) technology, on the other hand, enables our tiny, single-chip microdisplays to draw very little power, perform beautifully across a wide range of temperatures, and provide a compelling combination of clarity, brightness, and color fidelity.

### Advanced Capabilities

Because FLCOS microdisplays are built on a CMOS process, the display panel, image processing, memory, and LED drivers can be integrated on a single chip, significantly shrinking the footprint. In addition to their diminutive size, these displays draw less than 100mW of power, making them perfect for mobile display applications like camera viewfinders, heads-up displays, and miniature projectors for cell phones and handhelds. FLCOS also enables microdisplays to operate at temperatures as low as -10°C compared to LCOS displays that only work well at high temperatures (low-temp startups require power heaters that delay boot-up and drain battery power).

### Speed Makes the Difference

The "F" in FLCOS stands for ferroelectric—a description of how the liquid crystal is chemically organized and activated—but it might as well stand for fast. Incredibly fast pixel switching technology enables FLCOS to switch the liquid crystal pixels on and off much faster than typical LCOS displays—as much as 100 times faster, which translates to a switching speed of 1/10,000 of a second.

### Applications

- Pico projectors
- Head-mounted displays
- Digital still camera viewfinders
- Video camcorder viewfinders
- Wireless communication devices
- Ultra-portable display applications



Micron's Sequential Color FLCOS

Running at these speeds enables our microdisplays to use field sequential color—a superior imaging technique that eliminates the RGB pixel split. Showing 60 frames per second, each frame has a red, green, and blue subframe that is displayed twice per frame in sequence to create millions of possible colors. To create the image for each subframe, the brightness of each pixel is varied by controlling its exposure to a colored light. Our microdisplays provide 256 different exposure levels for each pixel (8-bit grayscale per color). This method gives each pixel its own color value, providing better light output, higher resolution, and more efficient power use, while eliminating the color-saturation-versus-brightness tradeoff inherent in spatial color systems.

The difference FLCOS makes can be seen in the two images above. The left image, produced using sequential color pixels, looks clear and crisp. The right image, produced using standard spatial color, shows the light loss and color separation typical of spatial color systems.



Competitor's Spatial Color LCOS

## Transforming What's Possible

With a world-class portfolio that now includes Displaytech FLCOS microdisplays, we're helping to transform the way people use visual content. This miniaturized FLCOS technology is enabling innovations in everything from pico projection to electronic camera viewfinders, to heads-up displays and even holographic projection displays. And it has the potential to unlock other entirely new applications as we build worldwide sales support, drive new design research, and introduce more solutions for the microdisplay market.

## Contact Us

To find out more about product specifications and availability, visit [micron.com/flcos](http://micron.com/flcos).

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