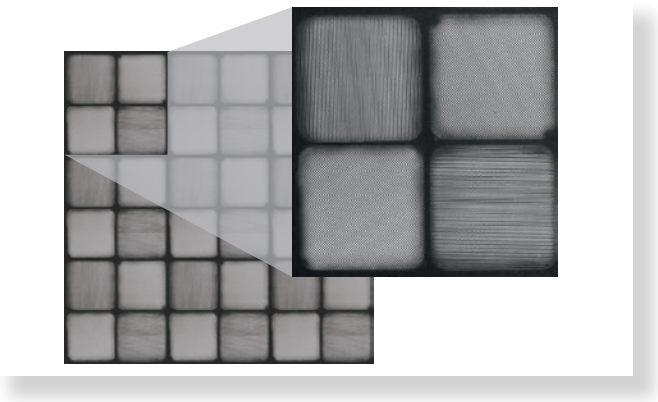
Pixelated Polarizers
PIX series



Close-up of 4 state pixelated polarizer array

Features	Benefits
Nanowire technology	Superior transmission and contrast
	±20° AOI without depolarization
	Wavelength and AOI independent
	Visible and IR wavelengths
	Broadband visible and IR wavelengths
NIL pixelation	User defined pixel geometries and layout
	Uniform cross-pixel performance
	Potential wafer-level imprint with alignment
Inorganic	High heat resistance

Standard product options		
Product name	**Pixel pitch**	**Pixel size**
PIX055C	55 µm	4.5 µm
PIX058C	5.86 µm	4.86 µm
PIX065C	6.5 µm	5.5 µm
PIX074C	7.4 µm	6.4 µm
PIX080C	8.0 µm	7.0 µm
PIX088C	8.8 µm	7.8 µm
PIX090C	9.0 µm	8.0 µm
PIX098C	9.8 µm	8.8 µm
PIX100C	10.0 µm	9.0 µm
PIX150C	15.0 µm	14.0 µm
PIX156C	15.6 µm	14.6 µm
PIX300C	30.0 µm	29.0 µm
Standard products are four state pixelated polarizers with a visible AR coating. Contact us for custom options.		

Applications
- Polarimetry and 3D Cameras
- Biometric Facial Recognition
- Polarization Microscopy
- Polarized Fiber-Optic Probes
- Remote Sensing
- Interferometry
- Pollution Detection

Micro and Nano Optics

Pixelated polarizers are designed to incorporate different polarization angles into a single array, which can be aligned with CCD/CMOS camera arrays, enabling real-time polarimetry. Traditional polarimetry requires multiple images be taken with different polarizations and multiple cameras precisely aligned to each other. The resulting image data must then be carefully overlaid and aligned which requires added time, equipment, and precision. Pixelated polarizers enable real-time imaging when speed and resolution is critical. Recently, Moxtek has further developed a NanoImprint Lithography (NIL) fabrication process, rendering improved performance and uniformity across pixels while allowing potential wafer level imprint with alignment.

Do not touch or clean the wire-grid polarizer surface otherwise the polarizer will be damaged.

General specifications		
	Visible options	**IR options**
Substrate type	Display grade glass	Silicon
Wavelength range	400-700 nm (400-2500 nm upon request)	3-5 µm, 8-12 µm
Thickness	0.7 mm ± 0.07 mm	0.675 mm ±0.095 mm
Index of refraction	1.5198 @ 435.8 nm	3.421 @ 10.33 µm
	1.5078 @ 643.8 nm	3.427 @ 4.132 µm
Thermal expansion	31.7×10^{-7}/°C (0 – 300 °C)	2.6×10^{-6}/°C
AOI (Angle of Incidence)	0° ± 20°	
AR coating	Depending on operation wavelength	
Maximum temperature	200 °C, >5,000 hours	
Transmission Axis (TA)	Referenced to long side	
TA tolerance	± 1°	
RoHS	Compliant	
Transmission	>80% @ 632 nm at pixel center	contact us for information
Contrast ratio	>200:1 @ 632 nm at pixel center	contact us for information

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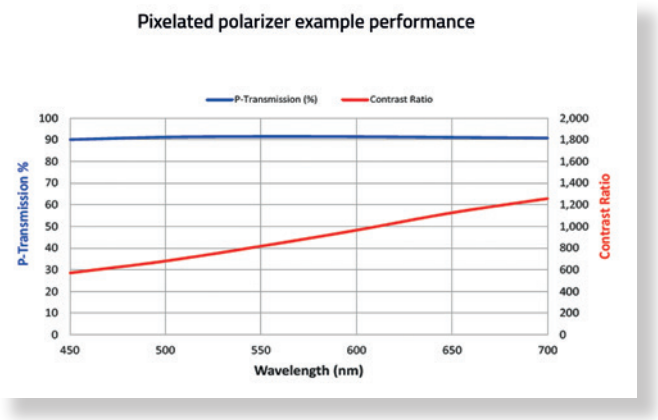
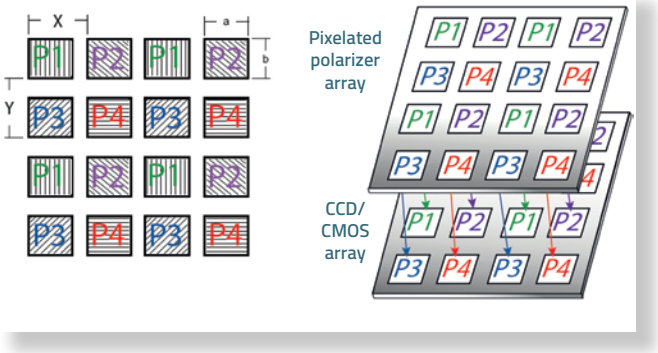


Performance assuming no cross talk between pixels. Performance data was taken from sample evaluations. Some part-to-part variation is expected.



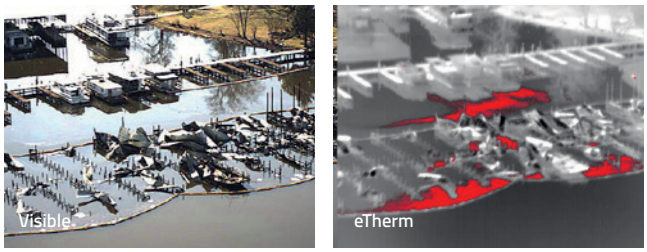
Typical layout of a 4-state pixelated polarizer array.

Pixelated polarizer aligned to camera array.

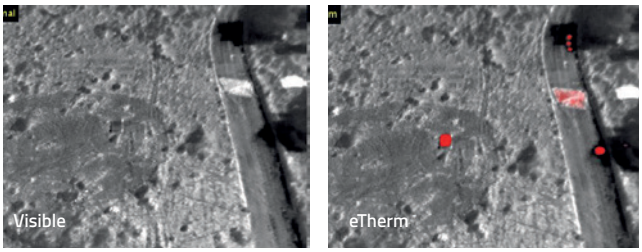
* Photos courtesy of Polaris Sensor Technologies and taken with Pyxis LWIR camera (PolarisSensor.com).

Application examples of quantitative thermal polarization imaging

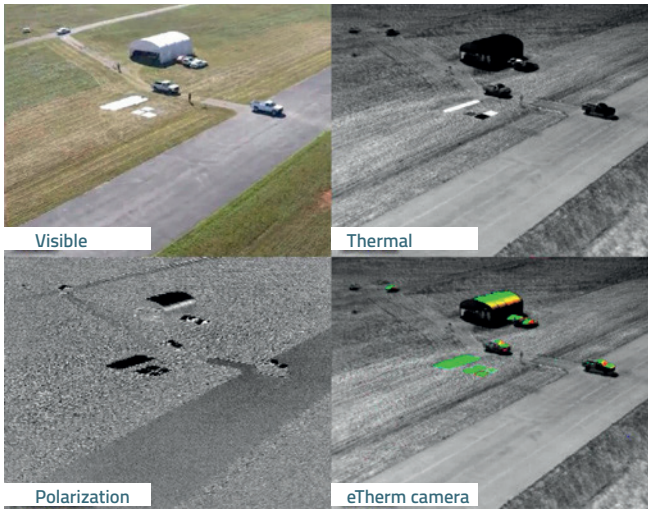
Pixelated polarizers are designed to align with CCD/ CMOS camera arrays to create imaging polarimeters, which map a scene of interest using the polarization state of light instead of color as in traditional cameras. Polarization provides high contrast information about surface features such as shape, shading, and roughness. Traditional methods require combining and precisely aligning data from two separate images which requiring added time, equipment, and space. The pixelated polarizer, when attached to an image sensor, enables a number of different types of images to be obtained simultaneously as illustrated in the figures below. Photos courtesy of Polaris Sensor Technologies and taken with Pyxis LWIR camera (PolarisSensor.com).



Visible and eTherm (Thermal + Polarization) images identifying oil spill after a marina fire near Huntsville, AL.



Thermal and eTherm images for target identification.



Thermal and eTherm images for target identification.

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