

The Sekidenko MXE pyrometer combines speed and precision, enabling accurate, repeatable measurement and control of demanding MOCVD and semiconductor applications. Its high-speed performance is ideal for processes with high susceptor rotation speeds, such as HB-LED growth. For easy integration and flexible control options, the MXE unit is remarkably compact and supports a variety of I/O protocols.

## Features

- › Wafer pocket and carrier temperature measurement
- › In-situ, non-contact temperature and reflectance measurement
- › High-speed measurement ideal for high rotation speed reactors
- › 950 nm measurement wavelength (temperature + reflectance)
- › Available 405 nm and 635 nm reflectance versions
- › EtherCAT®, USB, RS-232, and analog output options

## Benefits

- › Increased productivity, yield, and throughput
- › Enhanced wafer-to-wafer and run-to-run uniformity
- › Decreased development time
- › Improved temperature-measurement accuracy and repeatability
- › Comprehensive process insight
- › Easy integration and flexible control



*MXE Pyrometer*

### INCREASED UNIFORMITY AND YIELD

Temperature control during the MQW growth stage of HB-LEDs is critical to wavelength yield, including both within-run and run-to-run variation. Reactors with high susceptor rotation speed require high-speed measurement to measure every wafer, as well as adequate signal-noise performance to cover typical MOCVD process temperatures. Specifically designed for these demands, the MXE pyrometer enables tighter process control, resulting in increased yields and faster process development cycles.

### HIGH-SPEED MEASUREMENT

With a 10 kHz read rate, the Sekidenko MXE pyrometer is ideal for reactors with high rotation speeds, especially above 600 RPM. This high data rate allows discrimination between susceptor and pocket measurements over the HB-LED growth temperature range, even at the outer radial distances.

### ACCURATE, REPEATABLE PERFORMANCE

Paired radiance and reflectance measurements allow extraction of compensated temperature for high-accuracy process monitoring and control. The availability of multiple data points per wafer ensures statistically significant temperature determination for each wafer. Moreover, built-in compensation algorithms allow stable operation over the full ambient temperature range, for repeatable and consistent measurement.

### COMPREHENSIVE PROCESS INSIGHT

Reflectance and radiance measurements, both at 950 nm, can be used together to determine wafer pocket temperatures with a transparent substrate. For opaque substrates, emissivity-compensated temperature measurements are directly available. Configurations optimized for reflectance measurements at 405 nm and 635 nm are also available.

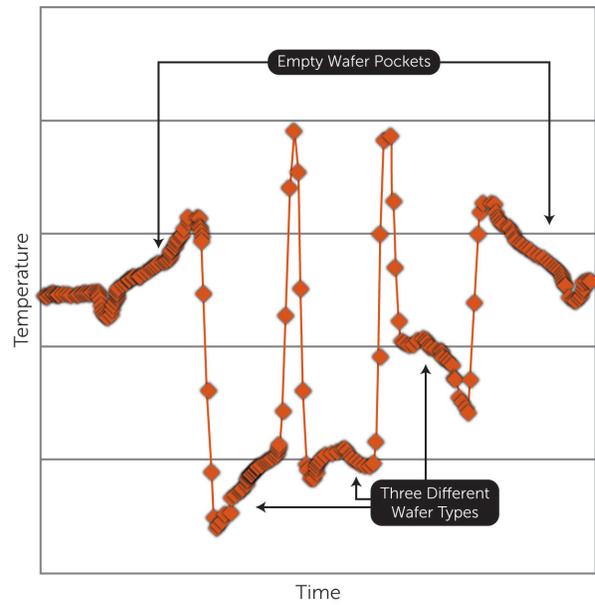
## EASY INTEGRATION AND FLEXIBLE CONTROL

Compact Design—Multiple units may be positioned side-by-side along the same radius, enabling measurements on close-packed susceptor designs for 2” wafers. The data can be used for both process monitoring and control loop input.

Multiple Interface Options—The availability of a variety of data output formats, along with buffering options, allows data to be used for both closed-loop temperature control and process monitoring. In particular, EtherCAT® protocol allows multiple devices to be chained and operated by a single controller, saving on the required infrastructure for the rest of the chamber. I/O options include:

- › EtherCAT®
- › RS-232
- › USB

Mounting Options—Optional tilt and XY translation stages allow easy integration onto MOCVD chambers, as well as customization of working distance to suit your specific chamber design.



Measurement of three different wafer types at > 1000 RPM

## SPECIFICATIONS

<b>Configurations</b>	Temperature only (950 nm)
	Temperature + reflectance (950 nm)
	Reflectance only (405 nm and 635 nm)
<b>Temperature Range</b>	500 to 1200°C (932 to 2192°F)
<b>Read Rate</b>	Up to 10 kHz
<b>Accuracy</b>	±1.5°C, typical
<b>Repeatability</b>	±0.1°C, typical
<b>Resolution</b>	0.001°C
<b>Reflectance Accuracy</b>	±1 %
<b>Reflectance Repeatability</b>	±0.5 %
<b>Working Distance Range</b>	100 to 450 mm
<b>Spot Size</b>	2 to 8 mm
<b>Power Requirements</b>	AC: 90 to 263 VAC, 47 to 63 Hz
	DC: +24 VDC
<b>Environmental</b>	Operational: 18 to 40°C (64 to 104°F), non-condensing
<b>Physical Dimensions</b>	229 mm (D) x 127 mm (W) x 46 mm (H)
	9.0" (D) x 5.0" (W) x 1.8" (H)
<b>Weight</b>	< 1.54 kg (3.4 lb)
<b>Mounting</b>	Tilt stage and XY stage optional
<b>EtherCAT® Protocol</b>	EtherCAT® standard conformance
<b>USB 2.0</b>	Up to 2 kHz transfer rate for 10 kHz data
<b>RS-232</b>	Selectable baud rate up to 460,800; 7E1 or 8N1
<b>Analog Output</b>	0 to 10 V or 4 to 20 mA outputs
<b>Control I/O</b>	Sync out, alarms out, source interlock
<b>System Requirements</b>	I5 or equivalent processor with Beckhoff qualified NIC card recommended for EtherCAT® support

**AE World Headquarters** Advanced Energy Industries, Inc. 2501 SE Columbia Way, Suite 200, Vancouver, WA 98661 U.S.A

+1 360 694 7871 › thermalapplications@aei.com › [advanced-energy.com](http://advanced-energy.com)

ENG-MXEMOCVD-250-02 01.16

Specifications are subject to change without notice.

©2016 Advanced Energy Industries, Inc. All rights reserved. Advanced Energy® is a U.S. trademark of Advanced Energy Industries, Inc. EtherCat® is a trademark of Beckhoff Automation GmbH, LLC.