

## 2367

## Broadband Patterned Wafer Inspection System

**The 2367 Broadband UV/VISIBLE Brightfield Inspector** delivers the sensitivity and high sampling throughput required for effective inline patterned defect inspection for design nodes  $\geq 65\text{nm}$ . Based on the widely adopted 23XX platform, the 2367 captures yield-impacting defects on critical front-end-of-line (FEOL) and back-end-of-line (BEOL) layers and serves as a critical process qualification and systematic defect learning enabler for lithography patterning. The versatile and flexible 2367 inspector complements KLA's 28XX full-spectrum DUV/UV/visible brightfield inspectors for a mix-and-match inspection strategy.

**High Sampling Rate**

The 2367 features a powerful image computer and breakthrough time-delay integration (TDI) sensor to enable faster throughput. Compared with the previous-generation tool, the 2367 delivers a 2X faster data rate (up to 1.7Xwph improvement). Enabling increased sampling of work in progress, the 2367 helps chipmakers achieve tighter process control across more layers and drive higher wafer fab yields.

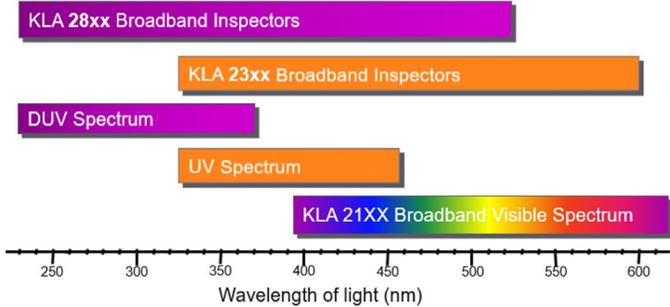
**Highly Sensitive Defect Capture**

Leveraging selectable broadband illumination modes from the 23XX platform (Broadband UV, Broadband visible, I-line, and G-line) along with a high numerical aperture (NA), the 2367 delivers superior resolution and material contrast. These capabilities are particularly suited for detection of smaller defect types on resolution-limited layers. The 2367 also integrates sensitivity-improving technologies from the 2800. For example, the tool features multi-die auto threshold, mixed mode, advanced binning, and a high NA edge contrast mode.

**Low Cost of Ownership and Capital Investment Protection**

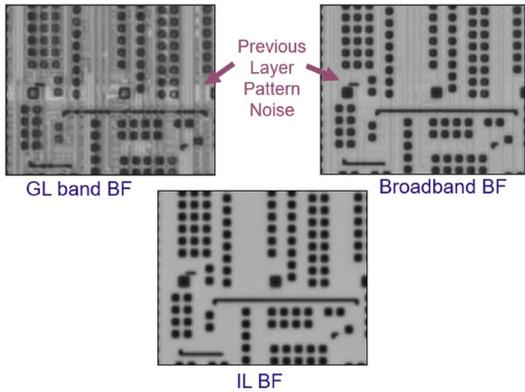
Given its speed and effective defect capture capabilities, the 2367 represents a low cost of ownership (CoO) inspection solution. By enabling dense wafer sampling, the tool empowers chipmakers to resolve and monitor yield-impacting problems on critical process layers earlier in their production process. Advanced binning provides improved data accuracy and purity, resulting in a smaller defect set requiring scanning electron microscopy (SEM) review for classification. The 2367 is upgradeable from prior generations of the 23XX platform, thereby protecting a fab's capital investment and requiring no additional floor space.

# Key Technologies

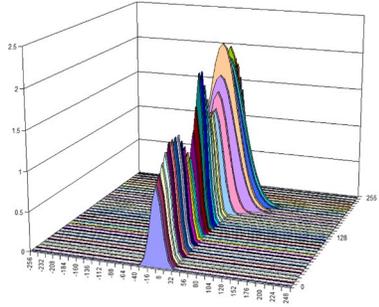


**Broadband Spectrum:** 2367 covers multiple spectral bands in the UV through visible spectrum. Along with illumination and collection apertures, the 2367 can be tailored to inspect a wide variety of substrates, layers and materials for maximum performance.

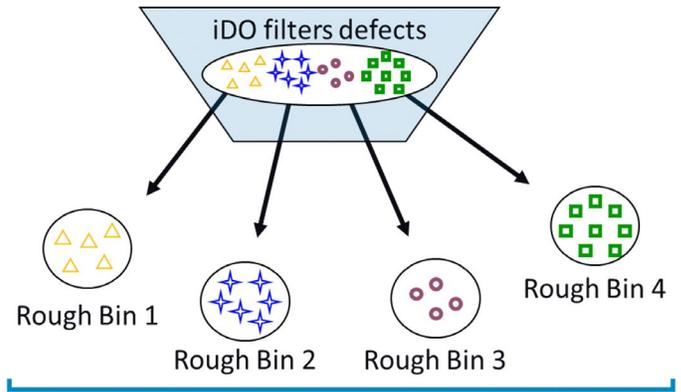
A shorter i-line wavelength improves the 2367's sensitivity to smaller defect types on resolution-limited layers, while a higher power illuminator emits more photons to help resolve dense geometries that require additional light.



**Selectable Illumination and Optical Modes** can help to suppress previous layer process and material noise, thereby increasing current layer defect sensitivity. Leverage the many modes/pixels/filters of the 2367 to achieve the performance required on each of your critical layers.

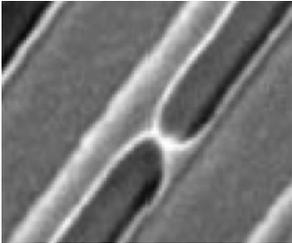


**Multi-Die Auto Threshold (MDAT) Detection Algo:** utilizes multiple die information as the reference to reduce process noise and improve defect extraction. The MDAT reference is constantly being recalculated while scanning in real time to minimize impact from localized process variations. The above image depicts a 2D histogram of Candidate (C) minus MDAT Reference (R) vs. inspection mode which helps to drive maximum S:N for recipe optimization.

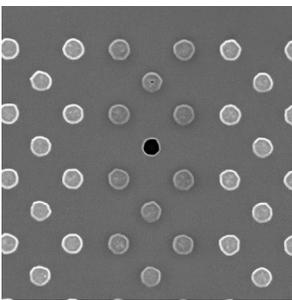


**Inline Defect Organizer (iDO) Filtering** uses feature vectors and defect attributes to classify defects. This classification engine happens in real time while running an inspection without loss in system throughput. When the inspection is completed, defects are automatically sorted and tagged into their respective groups (or bins), enabling more efficient SEM review for final classification.

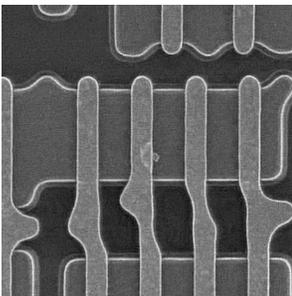
## Defect Examples



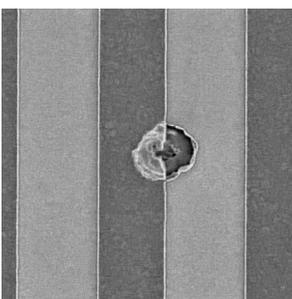
Bridge



Missing Contact



Residue



Embedded

## Benefits

- Delivers sensitivity required to monitor and control full range of layers and defect types
- Enables high sampling rates and effective capture of yield-impacting FEOL and BEOL defects
- Provides superior material contrast required for the detection of smaller defect types on resolution-limited layers
- Protects capital investments with field upgrades from previous-generation tools
- Complements KLA's 28XX broadband DUV brightfield tool in a mix-and-match inspection strategy to provide the most effective and lowest overall CoO
- Integrates quickly into a production environment, sharing commonalities with KLA's vast inspection suite of products. Contact KLA for additional details
- Able to inspect GaN on Si application

## Applications

### Critical Pattern Layers (FEOL/BEOL/GaN on Si)

Signal enhancement and noise-suppression technologies provide high sensitivity inline to critical defects for all pattern transfer layers, such as critical dimension (CD) variation, line thinning, and missing contacts, stringers at gate etch, voids at shallow trench isolation (STI), CMP, and copper CMP, corrosion at copper CMP and GaN on Si.

### Line Monitoring/Engineering Analysis

Selectable illumination and noise-suppression modes increase sensitivity by improving defect signal-to-noise (S/N) ratios to maximize defect capture rates on FEOL and BEOL layers while minimizing false signal events.

### Photo Cell Monitoring (PCM)

PCM accelerates learning on new lithography processes, helping fabs to rapidly identify and eliminate lithography-related patterning defects before committing product wafers. With PCM, IC manufacturers can easily transfer lithography defect control methodologies and defect density metrics between development and production, or between fabs, decreasing the time it takes to ramp a new product.

### Process Window Qualification (PWQ)

PWQ enables lithographers to quantify the defect process window to variability (like a CD focus-exposure matrix) by comparing die with modified lithography parameters vs. nominal die for many millions of reticle design features. Lithographers can then identify problems that cause failure within, or just outside of, the nominal process window and take early corrective action.

### On Product ADI (After-Develop Inspection)

Many defects occur only on production integrated wafers, necessitating on product ADI. Noise-suppression technologies used during ADI reduce sensitivity to process-induced noise and enable the 2367 to efficiently detect these yield-limiting defects, such as poisoned photoresists, micro-bridges, and resist bubbles.

#### KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

© 2021 KLA Corporation. All brands or product names may be trademarks of their respective companies. KLA reserves the right to change the hardware and/or software specifications without notice.

KLA Corporation  
One Technology Drive  
Milpitas, CA 95035  
www.kla.com

Printed in the USA  
Rev 1.0 2021-05-11