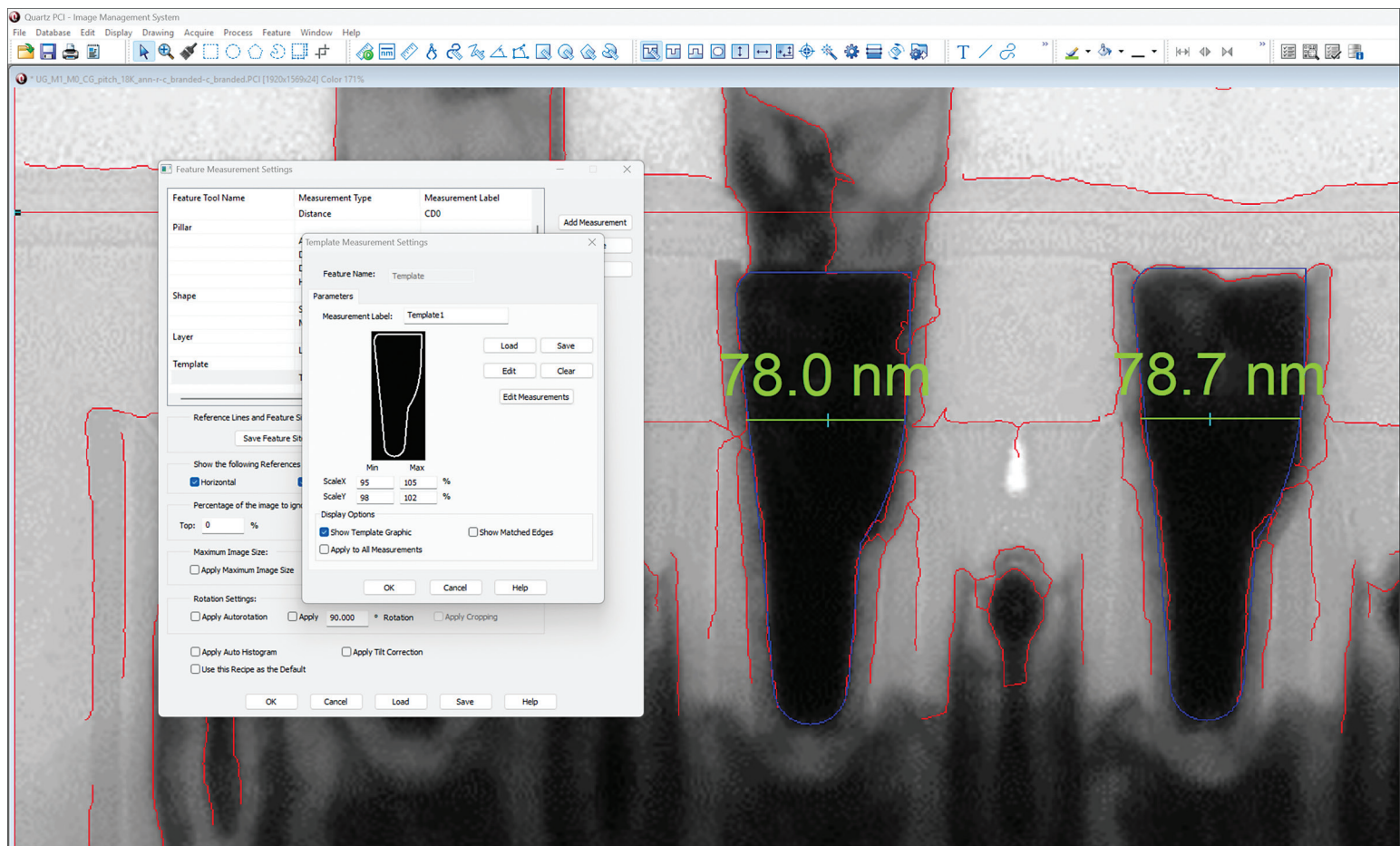




**QUARTZ IMAGING
CORPORATION**
FOR A FASTER, SMARTER LAB

QUARTZPCI-AM
VERSION 9

AUTOMATED MEASUREMENT FOR SEMICONDUCTOR FEATURES JUST CLICK... AND THAT'S IT



PCI-AM Benefits:

- ▲ Save Time
- ▲ Increase Measurement Consistency
- ▲ Generate Reports Easily with Images and Data
- ▲ Increase Measurement Accuracy
- ▲ Export Data Easily into CSV File

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What's New in Quartz PCI-AM 9

Template Matching:

At the heart of PCI-AM 9 is its new **template matching engine**, which allows users to **design templates** using an intuitive graphical editor and to specify what measurements are desired. Once designed, the software uses **machine learning to automatically identify, align, and measure** all instances of the template feature within **individual and batched microscope images**—no manual intervention required. This **dramatically reduces** measurement time, improves repeatability, and ensures consistency among users.

Lock Existing Measurements:

You can **lock or “finalize” existing measurements** so that edge detection parameters can be adjusted between measurements without affecting existing measurements and so that measurements can overlap with each other.

Labeling:

You can specify that **feature labels** should be shown on the image.

Tolerances:

Out of tolerance measurements are highlighted on the image.

Colors and Fonts:

You can specify the **colors and fonts** used for measurements within the settings for each measurement.

Vertical Reference Lines:

You can add **vertical reference lines** to your image that can be used as endpoints for horizontal measurements. You can also specify the **location of the X origin**.

Improved Point-and-Shoot:

The **point-and-shoot measurements** have been improved:

- Measurements **recalculate when moved**.
- Holding down the Ctrl key and dragging a point-and-shoot tool will **automatically perform a specified number of equidistant measurements** between the end points of the specified line.
- Holding down the Shift key and dragging a point-and-shoot tool will **automatically measure all segments** between the endpoints.
- The **endpoints of each point-and-shoot measurement** are recorded in the **measurement grid** and output to the **CSV file**.

Improved Measurements:

In addition to measuring the maximum depth and height of trenches and pillars, you can choose to measure the **depth and height at the center of the feature**.

Similarly, in addition to measuring the Maximum and minimum caliper of shapes, you can measure the **maximum width and height** or the **width and height through the geometric center** of the shape.

A **multipoint measurement** has been added to the shape tool that allows you to **Measure a specified number of widths across the shape**.

A **radius of curvature measurement** has been added.

A **pitch measurement** has been added.

The **collinearity measurement** now outputs **signed values**.

You can press the Shift key to make a **measurement on top of a reference line** instead of moving the reference line.

A checkbox is provided on the File Export dialog to **export measurements**.

Filters:

A **bilateral filter** has been added to the preprocessing filters available. The bilateral filter smooths the image while preserving edges. The speed of filtering operations has been increased.

Preprocessing:

You can choose to perform **autorotation, rotation by arbitrary angle, tilt correction or auto histogram** immediately upon entry to **AM mode** or in **batch processing**.

The Process | Rotate | Align Horizontal Reference function can be used to **rotate the image so as to make the horizontal reference line horizontal**.

Batch Mode:

Batch mode **sorts measured images** into separate Pass, Fail and Reject folders

Exact match of image sizes is no longer required in batch mode.

Menus:

The PCI-AM functions have been moved to a **separate Feature menu** for ease of access and to reduce complexity.

TYPES OF AUTOMATED MEASUREMENTS

01. Template Matching

You can design templates in our template editor and PCI-AM will find and measure all of the **template instances** in your images.

02. Trenches (Spaces) and Pillars (Lines)

- ▲ Radius of Curvature
- ▲ Line Width Roughness
- ▲ CD Width
- ▲ Distances Below and Above Reference Line
- ▲ Angles – Sidewall and Center
- ▲ Averages of the Above Measurements
- ▲ Multiple Regions in Feature
- ▲ Line Edge Roughness

03. Macro Cell

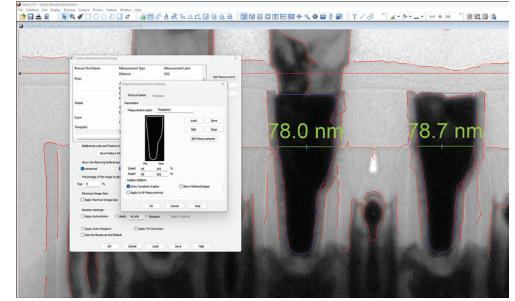
- ▲ Multiple Measurements in Complex Features with a Single Click

04. Shapes

- ▲ Area and Perimeter
- ▲ Collinearity
- ▲ Aspect Ratio
- ▲ Ideal Shape Deviation
- ▲ Major and Minor Axes
- ▲ Tilt

05. Other Valuable PCI-AM Features

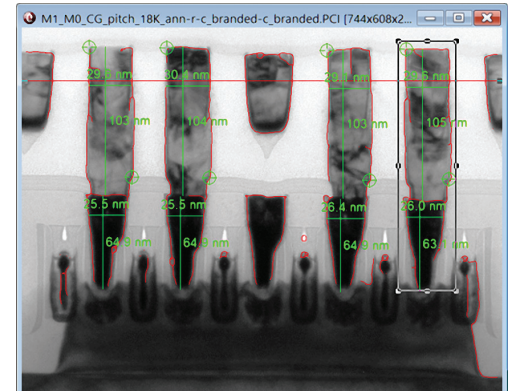
- ▲ “Point and Shoot” Horizontal and Vertical Measurement Tools Utilize Edges
- ▲ Regular PCI Measurement Tools will “Snap” to the Edges in PCI-AM
- ▲ Predetermine the Number and Exact Location of CD Measurements Relative to the Reference Line
- ▲ Advanced Edge Detection model
- ▲ Image Auto Rotation – Automatically Orient Features Horizontally and Vertically for Ease of Measurement
- ▲ Add Measurement Tolerance Specifications
 - ▲ To Determine If Any Measurements Are Out of Specification
 - ▲ Can Set Minimum and/or Maximum Values for All Measurements
 - ▲ Can Flag or Ignore Missing Measurements
- ▲ Auto Layer Detection and Measurement – If Needed These Lines Can Be Moved
- ▲ Add Additional Reference Lines – Assist in Making Desired Measurements



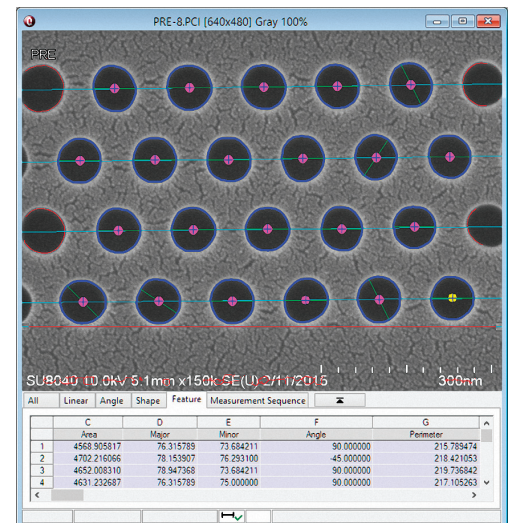
01. Template matching



02. Trench Measurements



03. Macro Cell



04. Shape Measurements

We Can Custom Develop Any Specific Measurements *YOU* Require.