

# Victory RCx Pro

## RC Extractor on Realistic 3D Structures

SILVACO

### Overview

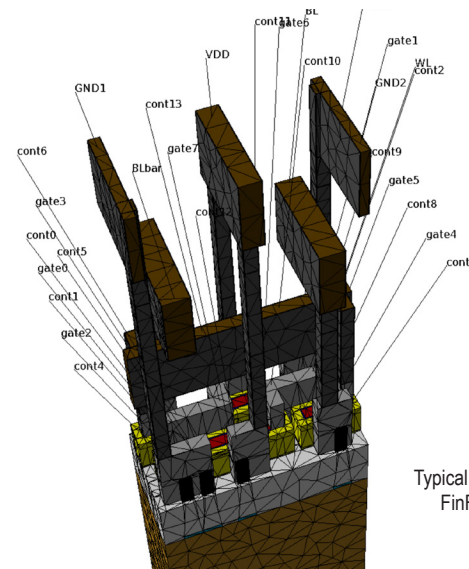
Victory RCx Pro is a physics based resistance and capacitance field solver for any arbitrary shaped 3D structure. The 3D structure is created from Silvaco's 3D Victory Process simulator. For CMOS based applications, Victory RCx Pro also includes a netlist extractor and automatically back annotates field solved resistance and capacitance parasitics to this extracted active net list. For display applications, an internal voltage dependent permittivity liquid crystal director physics solver, allows voltage dependent capacitance and optical transmittance simulations together with bias dependent director orientation.

### Features

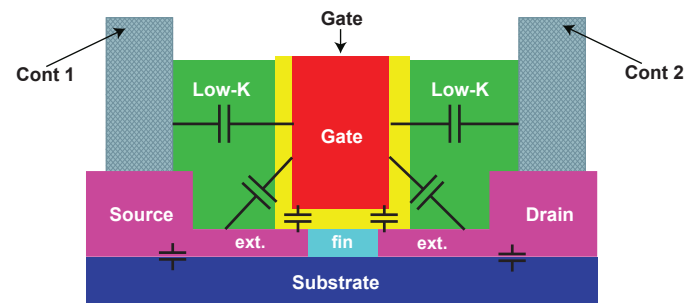
- Full 3D arbitrary shaped resistance and capacitance physics based field solver
- Locally varying field dependent, physics based, liquid crystal permittivity
- Liquid crystal, spacial and voltage dependent director orientation solver
- Voltage dependent optical transmittance solver for pattern visualization
- Integrated active net list extractor
- Automated back annotation of extracted C and R onto extracted net list
- Realistic 3D BEOL structure creation from Victory 3D TCAD products
- Layout driven GUI interface option
- Supports electrically floating and dummy conductors
- Multiple user selectable solvers available
- User selectable boundary conditions, material properties and solution tolerance
- Distributed capacitance contributions to different regions from a single conductor
- Middle End of Line (MEOL) FinFET capacitance analysis

### FinFET Applications

- Middle End Of Line (MEOL) automated distributed capacitance calculations
- Realistic 3D structures from Silvaco's Victory Process simulator



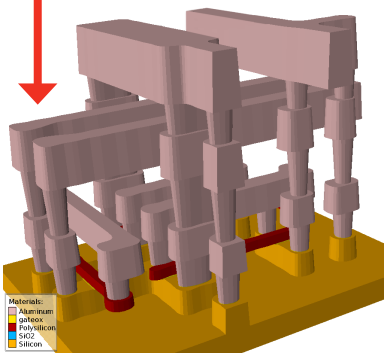
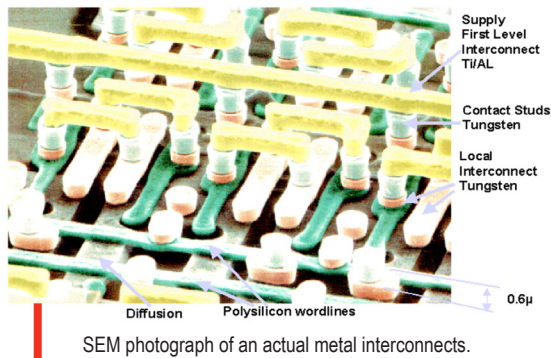
Typical high aspect ratio FinFET logic cell.



Capacitance from a single electrode can be correctly distributed to multiple connected regions.

## Planar Technology

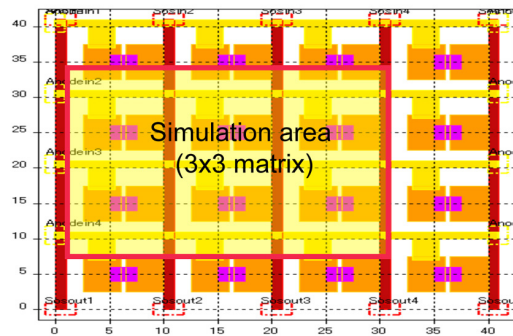
- Integrated net list extraction
- Automated back annotation of field solved back end resistance and capacitance



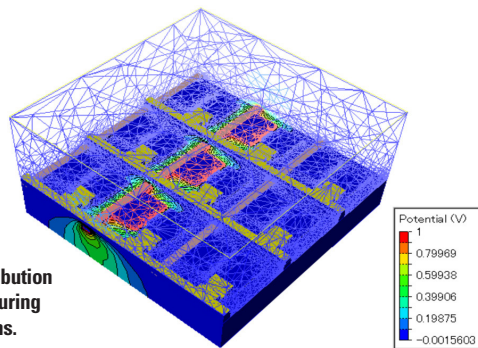
Comparison with field solved structure imported from 3D Structure Process simulator.

## TFT

- Large high aspect ratio flat panel capacitance simulations



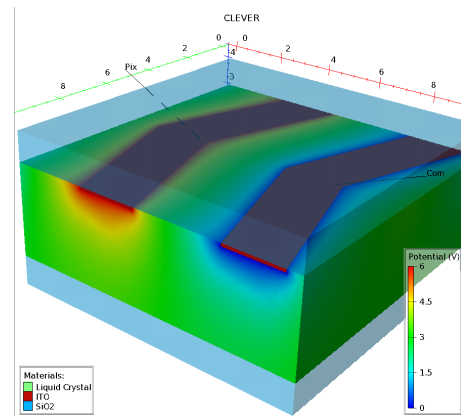
Cut out of a representative matrix of cells for simulation from the GDS-II file.



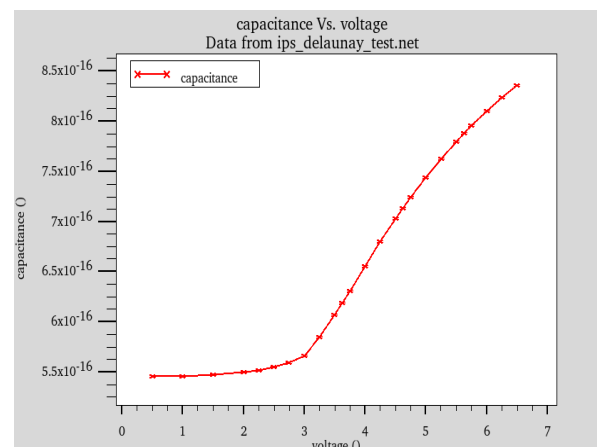
Showing potential distribution and adaptive meshing during capacitance calculations.

## LCD Technology

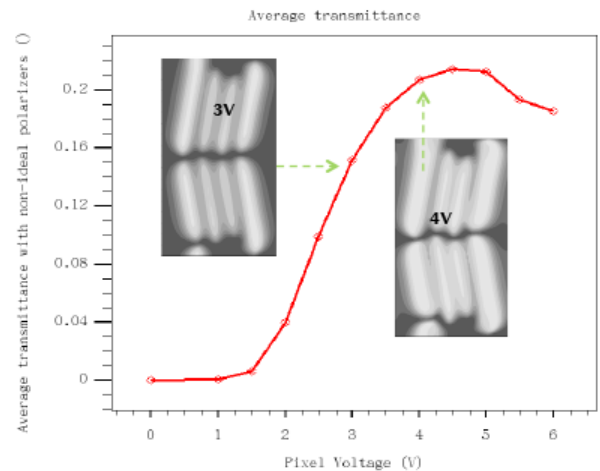
- Field dependent director distribution calculations
- Field dependent capacitance calculations (C-V plots)
- Different meshing and solver options



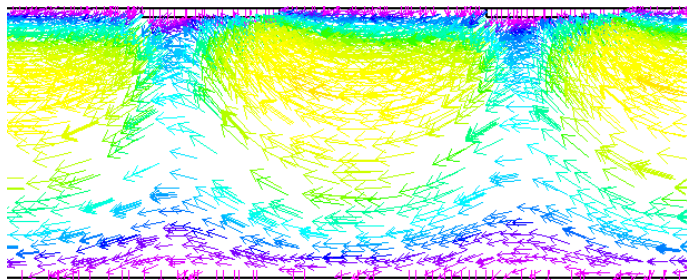
Potential distribution between two "chevron" electrodes on an LCD surface.



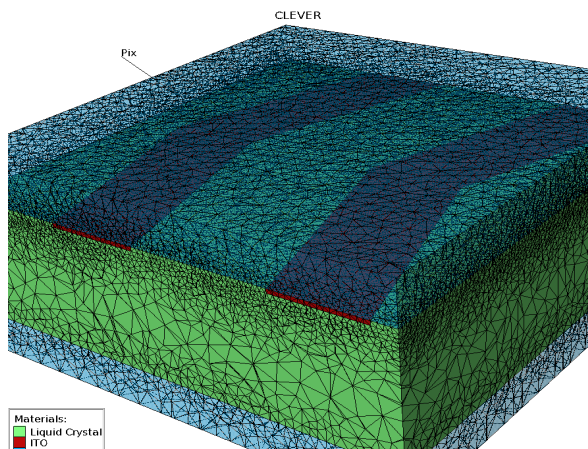
A capacitance versus voltage (C-V) plot of the structure shown in figure above.



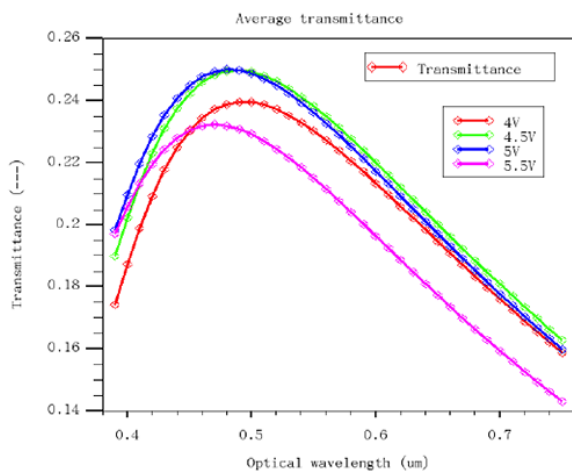
Average transmittance of a LC cell as a function of pixel voltages. Insets: Light transmission patterns viewed from the top of the LC cell at different pixel voltages.



A cut-line through the center of the figure on the left, showing LCD director positions at 6 volts.



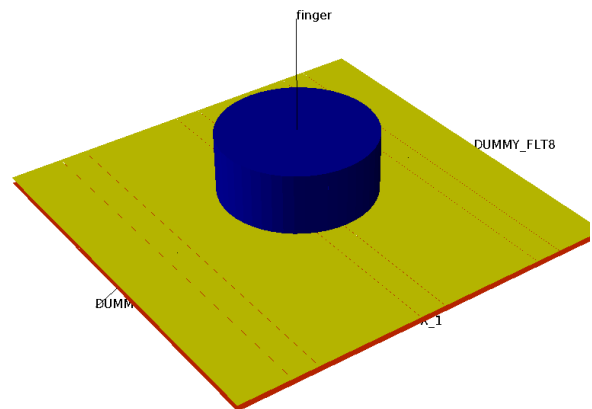
Showing one of the meshing options, a Delaunay based mesh in this case.



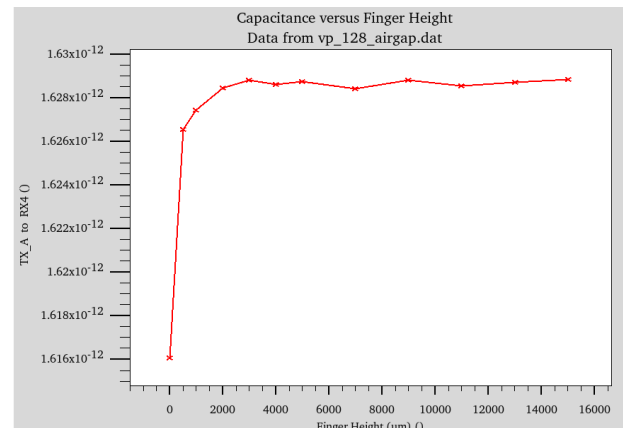
Average transmittance of a LC cell as a function of wavelengths with various pixel voltages.

## Touch Panel

- Electrically floating conductors correctly accounted for
- Input syntax can contain variables such as finger height



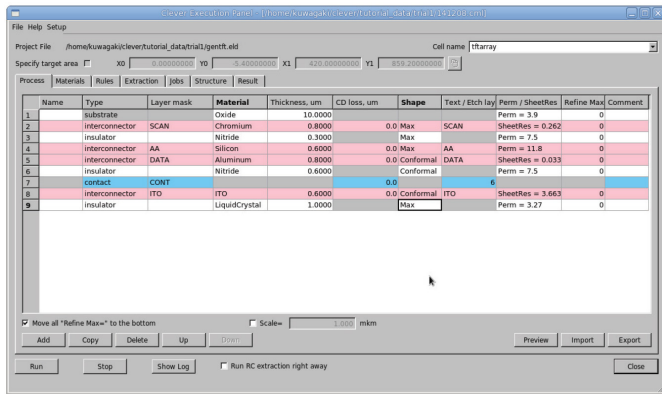
3D structure emulating the approach of a person's finger towards the touch screen.



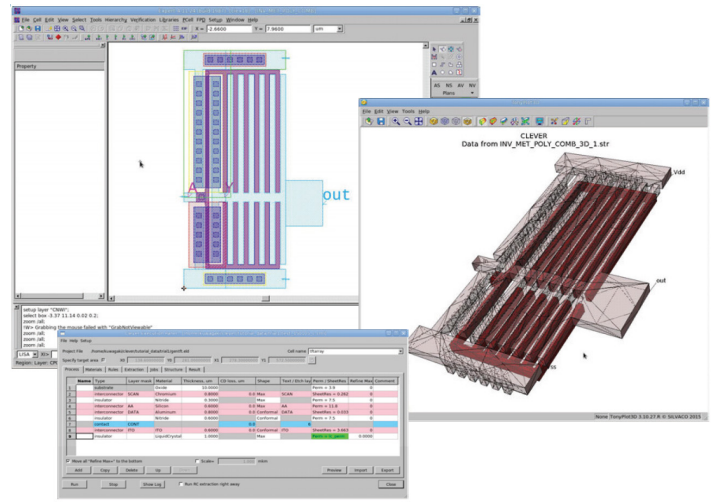
Capacitance between two electrodes versus a person's finger height above the touch screen.

## Layout Driven Option

- Victory RCx Pro can be launched directly from Silvaco's Expert layout tool
- 3D structures are constructed via a GUI interface inputting thicknesses of each layer and material properties



GUI interface invoked when using the layout driven option.



3D structures automatically generated using layout driven GUI.

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