Nanocure™ 3 Ultraviolet Light Curing System

Silicon Systems Group
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Safe Harbor

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New Products Released At 2011 Semicon West

**TRANSISTOR-ENABLING PRODUCTS**

- Reflexion GT™ for Tungsten
- Vantage® Vulcan™ RTP
- Centura® DPN HD
- Endura® Versa™ XLR W PVD
- Endura® HAR Cobalt PVD
- Centura® Integrated Gate Stack

**INTERCONNECTION-ENABLING PRODUCTS**

- Producer® Black Diamond™ 3
- Producer® Nanocure™ 3
Ultraviolet (UV) light energy treatment introduces porosity and strengthens bond structures inside the film.
Unlock Full Potential Of Porous Low-k Films

Deliver lower k value of film for lower power consumption

Maximize mechanical strength of the film for higher packaging yield

Provide uniform film curing to lower variability in device performance

Multilevel low-k layers formed with Nanocure system
Advancing UV Curing To 2X nm Node

Uniform
*Revolutionary optics delivers uniform cure*

Robust
*Optimized UV intensity wafer to wafer*

Clean
*Unique ozone process for low defectivity*

Fast
*40% faster cure times than competition*

Nanocure 3 System
New Chamber Provides Uniform Cure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conventional UV Cure</th>
<th>Nanocure 3</th>
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<tbody>
<tr>
<td>Shrinkage Uniformity Map</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrinkage Uniformity (%,1s)</td>
<td>3.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Shrinkage Range (%) (Max-Min)</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>E&amp;H Uniformity (GPa) (Max-Min)</td>
<td>0.8 / 0.1</td>
<td>0.3 / 0.04</td>
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</tbody>
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- 50% more uniform UV cure
- Tighter modulus and hardness metrics
Ozone Technology Offers Clean Cure

- Novel UV assisted Ozone clean technology
- Leading edge solution for lower defects at small device nodes

Particle data collected over an extended run

- Average = 3 adders

Number of wafers vs. Particle adders graph showing the distribution of particle data collected over an extended run.
Process Innovations Enable Fast Cure

- Up To 40% faster curing times over conventional cure approach
- Market leading cure speed

Low Pressure Cure

1 Step Cure

Normalized Cure Time

Normalized Cure Time
Technology Leadership in Nanocure

Uniformity

Revolutionary optics provides uniform light distribution on wafer
Innovative chamber design offers uniform gas flow
Leading on-wafer uniformity

Defectivity

Novel UV-assisted Ozone clean
Most Efficient clean with low defects
Radical UV cleaning solution

Dynamic Control

Closed loop monitoring and power adjustment for consistent curing
Low variability wafer to wafer
Only provider of real time control
Nanocure 3 UV Curing
Expanding Applied Leadership in Low $\kappa$ Dielectrics

Advanced UV curing technology unlocks full potential of porous low-k films

Delivers lower k value and maximizes mechanical strength

Uniform and robust process offers lower variability in device performance
Turning innovations into industries.™