AZ 9260 Photoresist

Data Package at 12um FT & 24um FT

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### AZ’s Thick Film Photoresist Roadmap [as of 11/2007]

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<td><strong>Materials in sampling</strong></td>
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<td>(all EXP products)</td>
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<td>AZ 40XT-A1</td>
<td>AZ 40XT-11</td>
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<td>AZ TX 1311 VS-01HJ</td>
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<td>AZ 5nXT</td>
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<td>AZ LExp 500</td>
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# AZ Electronic Materials

## Thick Photoresist Product Summary

<table>
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<th>λ</th>
<th>FT Range (μm)</th>
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<th>Aspect Ratio</th>
<th>Application</th>
<th>Developer Compatibility</th>
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<td>g-h</td>
<td>2 - 55</td>
<td>25</td>
<td>2:1</td>
<td>Solder, Cu, Au</td>
<td>400K / TMAH</td>
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<tr>
<td>4500</td>
<td>DNQ</td>
<td>g-h</td>
<td>2 - 55</td>
<td>25</td>
<td>2:1</td>
<td>Solder, Cu, Au</td>
<td>400K / TMAH</td>
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<tr>
<td>9200</td>
<td>DNQ</td>
<td>g-h</td>
<td>3 - 50</td>
<td>25</td>
<td>3:1</td>
<td>Solder, Cu</td>
<td>400K / TMAH</td>
</tr>
<tr>
<td>10XT</td>
<td>DNQ</td>
<td>g-h</td>
<td>4 - 50</td>
<td>25</td>
<td>3:1</td>
<td>Solder, Cu, Au</td>
<td>400K / TMAH</td>
</tr>
<tr>
<td>33XT</td>
<td>DNQ</td>
<td>g-h</td>
<td>5 - 25</td>
<td>25</td>
<td>5:1</td>
<td>Solder, Cu</td>
<td>TMAH / 400K</td>
</tr>
<tr>
<td>50XT</td>
<td>DNQ</td>
<td>g-h</td>
<td>15 - 65</td>
<td>65</td>
<td>3:1</td>
<td>Solder, Cu</td>
<td>400K</td>
</tr>
<tr>
<td>PLP-30</td>
<td>DNQ</td>
<td>g-h</td>
<td>6 - 25</td>
<td>25</td>
<td>2:1</td>
<td>Au, Cu</td>
<td>303N</td>
</tr>
<tr>
<td>PLP-40</td>
<td>DNQ</td>
<td>g-h</td>
<td>20 - 30</td>
<td>30</td>
<td>2:1</td>
<td>Au, Cu</td>
<td>303N</td>
</tr>
<tr>
<td>EXP 12XT-20P</td>
<td>CA</td>
<td>g-h</td>
<td>5 - 20</td>
<td>20</td>
<td>3:1</td>
<td>Cu</td>
<td>TMAH</td>
</tr>
<tr>
<td>EXP 5XT</td>
<td>CA</td>
<td>g-h</td>
<td>3 - 5</td>
<td>5</td>
<td>2:1</td>
<td>Si, Implant, Etch</td>
<td>TMAH</td>
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<tr>
<td>EXP 40XT</td>
<td>CA</td>
<td>g-h</td>
<td>20 - 100</td>
<td>60</td>
<td>4:1</td>
<td>Etch, Solder, Cu</td>
<td>TMAH / 400K</td>
</tr>
<tr>
<td>EXP 125nXT</td>
<td>PP</td>
<td>g-h</td>
<td>20 - 120</td>
<td>120</td>
<td>5:1</td>
<td>Cu, Au, Solder</td>
<td>TMAH / 303N</td>
</tr>
<tr>
<td>EXP 3nXT-HR</td>
<td>CA</td>
<td>g-h</td>
<td>3 - 120</td>
<td>120</td>
<td>5:1</td>
<td>Cu, NiFe, Si</td>
<td>TMAH</td>
</tr>
<tr>
<td>EXP 5nXT</td>
<td>CA</td>
<td>g-h</td>
<td>5 - 15</td>
<td>15</td>
<td>3:1</td>
<td>Cu, NiFe, Si</td>
<td>TMAH</td>
</tr>
<tr>
<td>TX 1311</td>
<td>CA</td>
<td>DUV</td>
<td>3 - 5</td>
<td>5</td>
<td>15:1</td>
<td>Cu, NiFe, Si</td>
<td>TMAH</td>
</tr>
</tbody>
</table>

- **Platform:** DNQ = Novolak, CA = Chemically Amplified, PP = Photopolymer
- **Wavelength:** Red font indicates better performance.
- **Developer Compatibility:** Bold font indicates most compatible developer, resulting in shorter develop times and lower exposure energies.

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MTI Flexifab coat and bake
Static dispense on 6” silicon
30 sec spin @ indicated rpm
SB: 110°C in proximity
10 sec @ 0.050”, 180 sec @ 0.002”

AZ 9260 Photoresist on Silicon

Film Thickness vs. Spin Speed
AZ 9260 Table of Contents

- 12µm FT Process & Performance Results
  Ultratech 1500 with AZ 300 MIF developer Pages 6 – 22
- 12µm FT Process & Performance Results
  Suss MA200 with AZ 400K 1:4 Developer Pages 23 – 35
- 24µm FT Process & Performance Results
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- 24µm FT Process & Performance Results
  Suss MA200 with AZ 300 MIF developer Pages 53 – 65
AZ 9260 Photoresist

Lithographic Evaluation by Ultratech 1500 Stepper

with AZ 300 MIF Developer

12µm FT Process
AZ 9260 Photoresist

Process Conditions:

Substrate: Bare Silicon  
Coat: Optitrac Static dispense  
Target FT: 12 µm  
Softbake: 110°C hotplate/ 180 sec. full contact  
Exposure: Ultratech 1500 gh line Stepper  
FEM: 1200 mJ/cm² with increments of 75 mJ/cm²  
Nominal Focus of -2µm in increments of 2µm in both directions  
Develop: AZ 300MIF (2.38% TMAH) continuous spray for 400 sec. @ 23°C

Analysis: Amray SEM
AZ 9260 Photoresist

Summary of Results:

<table>
<thead>
<tr>
<th>Features (1:1)</th>
<th>Film Thickness (μm)</th>
<th>DTP 10 μm (mJ/cm²)</th>
<th>Exposure Latitude 10 μm (%)</th>
<th>DOF 10 μm (μm)</th>
<th>Linearity (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Lines</td>
<td>12</td>
<td>1798</td>
<td>106</td>
<td>16.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Contact Holes</td>
<td>12</td>
<td>1539</td>
<td>90</td>
<td>&gt;8</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>
AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm L/S

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

1798 mJ/cm²
106% Exposure Latitude

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AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm L/S

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Depth of Focus @ 1725 mJ/cm², 10.0 µm L/S

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm

Depth of Focus @ 1725 mJ/cm², 10.0 µm L/S

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 1725 mJ/cm²

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 1725 mJ/cm²

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

1200 mJ/cm²
1375 mJ/cm²
1550 mJ/cm²

1725 mJ/cm²

2600 mJ/cm²
2425 mJ/cm²
2250 mJ/cm²
2075 mJ/cm²
1900 mJ/cm²

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AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:0.7 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:0.3 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Depth of Focus @ 1550mJ/cm², 10.0 µm CH, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Depth of Focus @ 1550mJ/cm², 10.0 µm CH, Various Pitch

1:1

1:0.7

1:0.3

-6.0 µm  -4.0 µm  -2.0 µm  0.0 µm  2.0 µm

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AZ 9260 Photoresist, FT=12 µm

Linearity on Silicon @ 1550 mJ/cm²
40.0 µm to 10.0 µm CH, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Develop
SB: 110°C/ 180 sec
Ultratech 1500 gh line Stepper
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 1550 mJ/cm²
40.0 µm to 10.0 µm CH, Various Pitch

1:1

1:0.7

1:0.3

40 µm 30 µm 20 µm 10 µm
AZ 9260 Photoresist

Lithographic Evaluation by Suss MA200 Mask Aligner

with AZ 300 MIF Developer
12µm FT Process
AZ 9260 Photoresist

**Process Conditions:**

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<th>Parameter</th>
<th>Specification</th>
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<td>Substrate</td>
<td>Bare Silicon</td>
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<tr>
<td>Coat</td>
<td>Optitrac Static dispense</td>
</tr>
<tr>
<td>Target FT</td>
<td>12 µm</td>
</tr>
<tr>
<td>Softbake</td>
<td>110°C hotplate/ 180 sec. full contact</td>
</tr>
<tr>
<td>Exposure</td>
<td>Suss MA200 CC Mask Aligner with 20 µm proximity gap</td>
</tr>
<tr>
<td>FEM</td>
<td>960 mJ/cm² with increments of 80 mJ/cm²</td>
</tr>
<tr>
<td>Develop</td>
<td>AZ 300MIF (2.38% TMAH) continuous spray for 400 sec. @ 23°C</td>
</tr>
</tbody>
</table>

**Analysis:** Amray SEM
# AZ 9260 Photoresist

**Summary of Results:**

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<th>Features (1:1)</th>
<th>Film Thickness (μm)</th>
<th>DTP 20 μm (mJ/cm²)</th>
<th>Exposure Latitude 20 μm (%)</th>
<th>Linearity (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Lines</td>
<td>12</td>
<td>984</td>
<td>144</td>
<td>10</td>
</tr>
<tr>
<td>Contact Holes</td>
<td>12</td>
<td>792</td>
<td>137</td>
<td>10</td>
</tr>
</tbody>
</table>
Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C

AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 20.0 µm L/S

984 mj/cm²
144% Exposure Latitude
AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 20.0 µm L/S

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 960 mJ/cm²

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 960 mJ/cm²

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 20.0 µm CH, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C

Exposure Dose (mj/cm²)

Measured Linewidth (µm)

792 mj/cm²
137% Exposure Latitude
AZ 9260 Photoresist, FT=12 µm
Exposure Latitude on Silicon, 20.0 µm CH, 1:1 Pitch

<table>
<thead>
<tr>
<th>Exposure Level (mJ/cm²)</th>
<th>Film Appearance</th>
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</thead>
<tbody>
<tr>
<td>440</td>
<td>Optitrac coat and Bake</td>
</tr>
<tr>
<td>520</td>
<td>SB: 110°C/180 sec</td>
</tr>
<tr>
<td>600</td>
<td>Suss MA200 CC Mask Aligner</td>
</tr>
<tr>
<td>720</td>
<td>20 µm proximity gap</td>
</tr>
<tr>
<td>760</td>
<td>AZ 300 MIF, 400 sec continuous spray @ 23 °C</td>
</tr>
<tr>
<td>800</td>
<td>800 mJ/cm²</td>
</tr>
<tr>
<td>1360</td>
<td>1600 mJ/cm²</td>
</tr>
<tr>
<td>1200</td>
<td>1040 mJ/cm²</td>
</tr>
<tr>
<td>1040</td>
<td>880 mJ/cm²</td>
</tr>
</tbody>
</table>

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 μm
Exposure Latitude on Silicon, 20.0 μm CH, 1:0.7 Pitch

Film Thickness: 12 μm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 μm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 800 mJ/cm², Contact Holes, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 800 mJ/cm², Contact Holes, 1:1 Pitch

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=12 µm
Linearity on Silicon @ 800 mJ/cm², Contact Holes, 1:0.7 Pitch

Film Thickness: 12 µm
Optitrac coat and Bake
SB: 110°C/ 180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 400 sec continuous spray @ 23 °C
AZ 9260 Photoresist

Lithographic Evaluation by Ultratech 1500 Stepper

with AZ 400K 1:4 Developer

24µm FT Process
AZ 9260 Photoresist

Process Conditions:

Substrate: Bare Silicon
Coat: Optitrac Static dispense
Target FT: 24 µm
Softbake: 1st layer 110°C hotplate/ 80 sec. full contact
2nd layer 115°C hotplate/ 180 sec. full contact
Exposure: Ultratech 1500 gh line Stepper
FEM: 1900 mJ/cm² with increments of 75 mJ/cm²
Nominal Focus of -6µm in increments of 2µm in both directions
Develop: **AZ 400K 1:4**, continuous spray for 600 sec. @ 27°C

Analysis: Amray SEM
AZ 9260 Photoresist

Summary of Results:

<table>
<thead>
<tr>
<th>Features (1:1)</th>
<th>Film Thickness (µm)</th>
<th>DTP 10 µm (mJ/cm²)</th>
<th>Exposure Latitude 10 µm (%)</th>
<th>DOF 10 µm (µm)</th>
<th>Linearity (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Lines</td>
<td>24</td>
<td>1900</td>
<td>22</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Contact Holes</td>
<td>24</td>
<td>1805</td>
<td>30</td>
<td>&gt;8</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>
AZ 9260 Photoresist, FT=24 μm
Exposure Latitude on Silicon, 10.0 μm L/S

Optitrac coat and Bake
SB: 1st layer 110°C/ 80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 μm
Exposure Latitude on Silicon, 10.0 μm L/S

1650 mJ/cm²  1725 mJ/cm²  1800 mJ/cm²

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
   2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

1950 mJ/cm²  2025 mJ/cm²  2100 mJ/cm²  2175 mJ/cm²

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AZ 9260 Photoresist, FT=24 µm
Depth of Focus @ 1875 mJ/cm², 10.0 µm L/S

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 µm
Depth of Focus @ 1875 mJ/cm², 10.0 µm L/S

-14.0 µm  -12.0 µm  -10.0 µm  -8.0 µm

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

-6.0 µm

2.0 µm  0.0 µm  -2.0 µm  -4.0 µm
AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1875 mJ/cm²

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
   2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1875 mJ/cm²

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
   2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

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AZ 9260 Photoresist, FT=24 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:1 Pitch

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
   2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

Exposure Dose (mj/cm²)

Measured Linewidth (µm)

1805 mj/cm²
30% Exposure Latitude
AZ 9260 Photoresist, FT=24 μm
Exposure Latitude on Silicon, 10.0 μm CH, 1:1 Pitch

Optitrac coat and Bake
SB: 1st layer 110°C/ 80 sec
   2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

1575 mJ/cm² 1650 mJ/cm² 1725 mJ/cm²
1800 mJ/cm²
2025 mJ/cm² 1950 mJ/cm² 1875 mJ/cm² 2100 mJ/cm² 2175 mJ/cm²

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AZ 9260 Photoresist, FT=24 μm
Exposure Latitude on Silicon, 10.0 μm CH, 1:0.7 Pitch

Optirac coat and Bake
SB: 1st layer 110°C/ 80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C

1575 mJ/cm² 1650 mJ/cm² 1725 mJ/cm²
1800 mJ/cm²

2175 mJ/cm² 2100 mJ/cm² 2025 mJ/cm² 1950 mJ/cm² 1875 mJ/cm²
AZ 9260 Photoresist, FT=24 µm
Exposure Latitude on Silicon, 10.0 µm CH, 1:0.3 Pitch

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
  2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 µm
Depth of Focus @ 1800 mJ/cm², 10.0 µm CH, 1:1 Pitch

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 µm
Depth of Focus @ 1800 mJ/cm², 10.0 µm CH, Various Pitch

1:1

1:0.7

1:0.3

-10.0 µm  -8.0 µm  -6.0 µm  -4.0 µm  -2.0 µm

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AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1800 mJ/cm²
40.0 µm to 10.0 µm Contact Holes, 1:1 Pitch

Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Ultratech 1500 gh line Stepper
AZ 400K 1:4, 600 sec continuous spray @ 27 °C
AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1800 mJ/cm²
40.0 µm to 10.0 µm Contact Holes, Various Pitch

1:1

1:0.7

1:0.3

40 µm  30 µm  20 µm  10 µm

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AZ 9260 Photoresist

Lithographic Evaluation by Suss MA200 Mask Aligner

with AZ 300 MIF Developer
24µm FT Process
AZ 9260 Photoresist

Process Conditions:

Substrate: Bare Silicon
Coat: Optitrac Static dispense
Target FT: 24 µm
Softbake: 1st layer 110°C hotplate/ 80 sec. full contact
2nd layer 115°C hotplate/ 180 sec. full contact
Exposure: Suss MA200 CC Mask Aligner with 20 µm proximity gap
FEM: 2200 mJ/cm² with increments of 200 mJ/cm²
Develop: **AZ 300 MIF (2.38% TMAH)** continuous spray for 720 sec. @ 23°C

Analysis: Amray SEM
AZ 9260 Photoresist

Summary of Results:

<table>
<thead>
<tr>
<th>Features (1:1)</th>
<th>Film Thickness (µm)</th>
<th>DTP 40 µm (mJ/cm²)</th>
<th>Exposure Latitude 40 µm (%)</th>
<th>Linearity (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Lines</td>
<td>24</td>
<td>2228</td>
<td>166</td>
<td>10</td>
</tr>
<tr>
<td>Contact Holes</td>
<td>24</td>
<td>1674</td>
<td>217</td>
<td>10</td>
</tr>
</tbody>
</table>
**AZ 9260 Photoresist, FT=24 µm**

**Exposure Latitude on Silicon, 40µm L/S**

Film Thickness: 24 µm  
Optitrac coat and Bake  
SB: 1st layer 110°C/ 80 sec  
  2nd layer 115°C/180 sec  
Suss MA200 CC Mask Aligner  
20 µm proximity gap  
AZ 300 MIF, 720 sec continuous spray @ 23 °C

Exposure Dose (mj/cm²) 

2228 mj/cm²  
166% Exposure Latitude
AZ 9260 Photoresist, FT=24 µm
Exposure Latitude on Silicon, 40µm L/S

<table>
<thead>
<tr>
<th>Exposure Level</th>
<th>Image</th>
<th>Image</th>
<th>Image</th>
<th>Image</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1155 mJ/cm²</td>
<td><img src="image1" alt="" /></td>
<td><img src="image2" alt="" /></td>
<td><img src="image3" alt="" /></td>
<td><img src="image4" alt="" /></td>
<td><img src="image5" alt="" /></td>
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<tr>
<td>1365 mJ/cm²</td>
<td><img src="image6" alt="" /></td>
<td><img src="image7" alt="" /></td>
<td><img src="image8" alt="" /></td>
<td><img src="image9" alt="" /></td>
<td><img src="image10" alt="" /></td>
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<tr>
<td>1575 mJ/cm²</td>
<td><img src="image11" alt="" /></td>
<td><img src="image12" alt="" /></td>
<td><img src="image13" alt="" /></td>
<td><img src="image14" alt="" /></td>
<td><img src="image15" alt="" /></td>
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<tr>
<td>1785 mJ/cm²</td>
<td><img src="image16" alt="" /></td>
<td><img src="image17" alt="" /></td>
<td><img src="image18" alt="" /></td>
<td><img src="image19" alt="" /></td>
<td><img src="image20" alt="" /></td>
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<tr>
<td>1995 mJ/cm²</td>
<td><img src="image21" alt="" /></td>
<td><img src="image22" alt="" /></td>
<td><img src="image23" alt="" /></td>
<td><img src="image24" alt="" /></td>
<td><img src="image25" alt="" /></td>
</tr>
<tr>
<td>2200 mJ/cm²</td>
<td><img src="image26" alt="" /></td>
<td><img src="image27" alt="" /></td>
<td><img src="image28" alt="" /></td>
<td><img src="image29" alt="" /></td>
<td><img src="image30" alt="" /></td>
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<tr>
<td>2400 mJ/cm²</td>
<td><img src="image31" alt="" /></td>
<td><img src="image32" alt="" /></td>
<td><img src="image33" alt="" /></td>
<td><img src="image34" alt="" /></td>
<td><img src="image35" alt="" /></td>
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<tr>
<td>2600 mJ/cm²</td>
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<td><img src="image37" alt="" /></td>
<td><img src="image38" alt="" /></td>
<td><img src="image39" alt="" /></td>
<td><img src="image40" alt="" /></td>
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<tr>
<td>3000 mJ/cm²</td>
<td><img src="image41" alt="" /></td>
<td><img src="image42" alt="" /></td>
<td><img src="image43" alt="" /></td>
<td><img src="image44" alt="" /></td>
<td><img src="image45" alt="" /></td>
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<tr>
<td>3400 mJ/cm²</td>
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<td><img src="image47" alt="" /></td>
<td><img src="image48" alt="" /></td>
<td><img src="image49" alt="" /></td>
<td><img src="image50" alt="" /></td>
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<tr>
<td>4000 mJ/cm²</td>
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<td><img src="image52" alt="" /></td>
<td><img src="image53" alt="" /></td>
<td><img src="image54" alt="" /></td>
<td><img src="image55" alt="" /></td>
</tr>
</tbody>
</table>

Film Thickness: 24 µm
Optitrack coat and Bake
SB: 1st layer 110°C/ 80 sec
2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 2200 mJ/cm²

Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
  2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 2200 mJ/cm²

Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=24 µm
Exposure Latitude on Silicon, 40µm Contact Holes, 1:1 Pitch

Film Thickness: 24 µm
Optitrac coat and Bake: 1st layer 110°C/80 sec, 2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner: 20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C

Exposure Dose (mj/cm²)
Exposure Latitude: 1674 mj/cm², 217% Exposure Latitude
### AZ 9260 Photoresist, FT=24 µm

**Exposure Latitude on Silicon, 40µm Contact Holes, 1:1 Pitch**

<table>
<thead>
<tr>
<th>Exposure (mJ/cm²)</th>
<th>Result Image</th>
</tr>
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<tbody>
<tr>
<td>1155</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>1260</td>
<td><img src="image2.png" alt="Image" /></td>
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<tr>
<td>1365</td>
<td><img src="image3.png" alt="Image" /></td>
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<tr>
<td>1470</td>
<td><img src="image4.png" alt="Image" /></td>
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<tr>
<td>1575</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>1680</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>3800</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td>3200</td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>2600</td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>2100</td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
<tr>
<td>1785</td>
<td><img src="image11.png" alt="Image" /></td>
</tr>
</tbody>
</table>

**Film Thickness:** 24 µm  
**Optitrac coat and Bake:**  
**SB:** 1st layer 110°C/80 sec  
  2nd layer 115°C/180 sec  
**Suss MA200 CC Mask Aligner:**  
**20 µm proximity gap:**  
**AZ 300 MIF, 720 sec continuous spray @ 23 °C**
AZ 9260 Photoresist, FT=24 µm
Exposure Latitude on Silicon, 40µm Contact Holes, 1:0.7 Pitch

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<td>![Image]</td>
</tr>
<tr>
<td>1785 mJ/cm²</td>
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Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=24 µm

Linearity on Silicon @ 1680 mJ/cm², Contact Holes, 1:1 Pitch

Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/ 80 sec
   2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C
AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1680 mJ/cm², Contact Holes, 1:1 Pitch

Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/ 80 sec
  2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C

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AZ 9260 Photoresist, FT=24 µm
Linearity on Silicon @ 1680 mJ/cm², Contact Holes, 1:0.7 Pitch

Film Thickness: 24 µm
Optitrac coat and Bake
SB: 1st layer 110°C/80 sec
  2nd layer 115°C/180 sec
Suss MA200 CC Mask Aligner
20 µm proximity gap
AZ 300 MIF, 720 sec continuous spray @ 23 °C

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