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AZ 3300-F Photoresist
AZ 3312-F
AZ 3330-F
<table>
<thead>
<tr>
<th>AZ 3300-F Photoresist</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AZ 3312-F</strong></td>
</tr>
<tr>
<td>Very fast resist</td>
</tr>
<tr>
<td>High resolution (<strong>i-line</strong> 0.6µm, <strong>g-line</strong> 0.8µm)</td>
</tr>
<tr>
<td>Excellent for contact holes, vias, implants, and non critical gates</td>
</tr>
<tr>
<td><strong>AZ 3330-F</strong></td>
</tr>
<tr>
<td>Great for pad layer applications</td>
</tr>
<tr>
<td>Can be coated from 2.5 to 5µm</td>
</tr>
</tbody>
</table>
AZ 3300-F Photoresist
Spin Curves
Features & Benefits

◊ Why AZ® 3300 Cross-over Resist?

⇒ Global infrastructure to support your worldwide business with expanding local support networks

⇒ Excellent Performance and Value in all our products and services

⇒ Wide selection of solutions to your problems
Features & Benefits

◊ Sensitivity to g, h, and i-line wavelengths
◊ Process relatively insensitive to bake conditions, develop times, and develop temperatures
◊ Compatible with inorganic and organic (w/ & w/o surfactant) developers
◊ Thermal stability to 125°
◊ Good depth of focus, linearity, and photospeed for crossover applications
◊ Very high stability against particle generation
◊ Excellent value for performance
AZ 3312-F Photoresist
Suggested Process Conditions

⇒ Spray/Puddle Process:
- Softbake 90° -110° C,
- 60 - 90 sec
- Expose: g-line, h-line, i-line stepper or broadband exposure source
- Develop: AZ 300 MIF developer, 60 sec. spray-puddle

⇒ Double Puddle Process:
- Softbake 90° -110°C,
- 60 - 90 sec
- Expose: g-line, h-line, i-line stepper or broadband exposure source
- Develop: AZ 917 MIF developer, 52 sec. double puddle
AZ 3312-F Photoresist
Optical Parameters

◊ Refractive Index

<table>
<thead>
<tr>
<th></th>
<th>365nm</th>
<th>405nm</th>
<th>435nm</th>
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</thead>
<tbody>
<tr>
<td><strong>Bleached</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>1.7006</td>
<td>1.6752</td>
<td>1.6611</td>
</tr>
<tr>
<td>k</td>
<td>0.00805</td>
<td>0.00433</td>
<td>0.00331</td>
</tr>
<tr>
<td><strong>Unbleached</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>1.7046</td>
<td>1.6872</td>
<td>1.6908</td>
</tr>
<tr>
<td>k</td>
<td>0.03251</td>
<td>0.03369</td>
<td>0.02028</td>
</tr>
</tbody>
</table>
AZ 3312-F Photoresist
Optical Parameters

◊ Dill Parameters

**i-line:**
- $A = 1.0870 \text{ (\mu m}^{-1})$
- $B = 0.0700 \text{ (\mu m}^{-1})$
- $C = 0.0260 \text{ (cm}^2/\text{mJ})$

**g-line:**
- $A = 0.6750 \text{ (\mu m}^{-1})$
- $B = 0.0150 \text{ (\mu m}^{-1})$
- $C = 0.0188 \text{ (cm}^2/\text{mJ})$

◊ Cauchy Coefficients

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleached</td>
<td>1.6217</td>
<td>0.01156 \text{ \mu m}^2</td>
<td>7.77E-07 \text{ \mu m}^4</td>
</tr>
<tr>
<td>Unbleached</td>
<td>1.6200</td>
<td>0.00705 \text{ \mu m}^2</td>
<td>1.64E-03 \text{ \mu m}^4</td>
</tr>
</tbody>
</table>
AZ 3312-F Photoresist
g-line Swing Curve

SB: 90°C, 60sec      PEB 110°C, 60sec
AZ300MIF developer, spray puddle, 60sec @ 23°C
AZ 3312-F Photoresist

*i-line* Swing Curve

Dose (mJ/cm²)

<table>
<thead>
<tr>
<th>Thickness (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.050</td>
</tr>
<tr>
<td>25</td>
</tr>
</tbody>
</table>

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ300MIF developer, spray puddle, 60sec @ 23°C
AZ 3312-F Photoresist
With
AZ 300 MIF Developer
Nikon i-line Stepper

AZ Electronic Materials
AZ 3312-F Photoresist
Exposure Latitude for 0.6µm Dense Lines, FT = 1.184 µm

Nominal: 62mJ/cm²
Exposure Latitude: 28%

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line

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AZ 3312-F Photoresist
Exposure Latitude for 0.7µm Dense Lines, FT = 1.184 µm

Exposure Dose [mJ/cm²]

Measured Linewidth [µm]

Nominal Energy: 63mJ/cm²
Exposure Latitude: 34%

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Exposure Latitude for 0.8µm Dense Lines, FT = 1.184 µm

Nominal Energy: 62 mJ/cm²
Exposure Latitude: 35%

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Exposure Latitude for 0.9µm Dense Lines, FT = 1.184 µm

Nominal Energy: 62mJ/cm²
Exposure Latitude: 39%

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Exposure Latitude for 1.0µm Dense Lines, FT = 1.184 µm

Nominal Energy: 64 mJ/cm²
Exposure Latitude: 48%

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Linearity for Dense Lines, Focus = - 0.20 µm, FT = 1.188 µm

SB: 90°C, 60sec PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Bossung Curve; 0.7µm Dense Lines; FT = 1.18 µm

SB: 90°C, 60sec      PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle,60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
DOF 0.7µm Dense Lines, FT = 1.18 µm, 61 mJ/cm²

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line

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AZ 3312-F Photoresist
Bossung Curve; 0.8µm Dense Lines, FT = 1.18 µm

SB: 90°C, 60sec    PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle,60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
DOF 0.8µm Dense Lines, FT = 1.18 µm, 61 mJ/cm²

-1.6µm       -1.4µm       -1.2µm       -1.0µm       -0.8µm

SB: 90°C, 60sec     PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line

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AZ 3312-F Photoresist
Bossung Curve; 0.9µm Dense Lines, FT = 1.18 µm

SB: 90°C, 60sec      PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle,60sec @ 23°C
Nikon 0.54 NA i-line

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**AZ 3312-F Photoresist**

DOF 0.9µm Dense Lines, FT = 1.18 µm, 61 mJ/cm²

-1.6µm  -1.4µm  -1.2µm  -1.0µm  -0.8µm

-0.6µm

+0.4µm  +0.2µm  0.0µm  -0.2µm  -0.4µm

SB: 90°C, 60sec  PEB 110°C, 60sec  
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C  
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
Bossung Curve; 1.0μm Dense Lines, FT = 1.18 μm

SB: 90°C, 60sec      PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line
AZ 3312-F Photoresist
DOF 1.0µm Dense Lines, FT = 1.18 µ, 64 mJ/cm²

SB: 90°C, 60sec  PEB 110°C, 60sec
AZ 300MIFDeveloper, spray puddle, 60sec @ 23°C
Nikon 0.54 NA i-line

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AZ 3312- F Photoresist
Thermal Flow

Processing Conditions:

Film Thickness: 1.188µm
Soft bake: 90°C/60sec, PEB: 110°C/60sec
Nikon i-line stepper, 0.54NA, AZ 300MIF Developer, 60sec spray/puddle @23°C

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AZ 3330-F Photoresist
With
AZ 300 MIF Developer
ASML i-line Stepper
AZ 3330-F Photoresist
Exposure Latitude for 1.50µm Dense Lines, FT = 2.99µm

SB: 110°C for 60sec contact
Exposure: ASML/250 i-line, Conventional NA=0.60 sigma=0.75
PEB: 110°C for 60sec contact
Develop: AZ 300 MIF developer / Single puddle for 60 sec @ 23°C

249 mJ/cm²
21% Exposure Latitude

Measured CD (µm)

200 220 240 260 280 300

Exposure (mJ/cm²)
AZ 3330-F Photoresist
Exposure Latitude for 1.50 μm Dense Lines, FT = 2.99μm

SB: 110°C for 60sec contact
Exposure: ASML/250 i-line, Conventional NA=0.60 sigma=0.75
PEB: 110°C for 60sec contact
Develop: AZ 300 MIF developer / Single puddle for 60 sec @ 23°C

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AZ 3330-F Photoresist
Linearity for Dense Lines @ 250 mJ/cm², FT = 2.99µm

Measured CD (µm)

Mask CD (µm)

SB : 110°C for 60sec contact
Exposure : ASML/250 i-line, Conventional NA=0.60 sigma=0.75
PEB : 110°C for 60sec contact
Develop: AZ 300 MIF developer / Single puddle for 60 sec @ 23°C
# AZ 3330-F Photoresist

**Linearity for Dense Lines, FT = 2.99µm**

<table>
<thead>
<tr>
<th>Line Width (µm)</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 µm</td>
<td>![Image 1]</td>
</tr>
<tr>
<td>1.80 µm</td>
<td>![Image 2]</td>
</tr>
<tr>
<td>1.70 µm</td>
<td>![Image 3]</td>
</tr>
<tr>
<td>1.60 µm</td>
<td>![Image 4]</td>
</tr>
<tr>
<td>1.50 µm</td>
<td>![Image 5]</td>
</tr>
<tr>
<td>1.40 µm</td>
<td>![Image 6]</td>
</tr>
<tr>
<td>1.30 µm</td>
<td>![Image 7]</td>
</tr>
<tr>
<td>1.20 µm</td>
<td>![Image 8]</td>
</tr>
<tr>
<td>1.10 µm</td>
<td>![Image 9]</td>
</tr>
<tr>
<td>1.00 µm</td>
<td>![Image 10]</td>
</tr>
<tr>
<td>0.80 µm</td>
<td>![Image 11]</td>
</tr>
</tbody>
</table>

**SB**: 110°C for 60sec contact  
**Exposure**: ASML/250 i-line, Conventional NA=0.60 sigma=0.75, **250mJ/cm²**  
**PEB**: 110°C for 60sec contact  
**Develop**: AZ 300 MIF developer / Single puddle for 60 sec @ 23°C

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AZ 3330-F Photoresist
DOF for 1.50 µm Dense Lines, FT = 2.99µm

SB : 110°C for 60sec contact
Exposure : ASML/250 i-line, Conventional  NA=0.60 sigma=0.75
PEB : 110°C for 60sec contact
Develop: AZ 300 MIF developer/ Single puddle for 60 sec @ 23°C
AZ 3330-F Photoresist
DOF for 1.50 µm Dense Lines, FT = 2.99µm

1.00 µm 0.80 µm 0.60 µm 0.40 µm 0.20 µm

SB : 110°C for 60sec contact
Exposure : ASML/250 i-line, Conventional NA=0.60 sigma=0.75, 250mJ/cm²
PEB : 110°C for 60sec contact
Develop: AZ 300 MIF Developer / Single puddle for 60 sec @ 23°C