AZ® nLOF® 2000 Series

Negative Tone i-Line Photoresist for Metal Lift-Off Applications

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AZ nLOF 2000 Series
Summary

Process capability:

- 0.7µm CD @ 2.0 µm FT
- 0.9µm CD @ 3.5 µm FT

AZ nLOF 2020: For 2.0 µm FT, DTP = 66 mJ/cm²
AZ nLOF 2035: For 3.5 µm FT, DTP = 80 mJ/cm²
AZ nLOF 2070: For 7.0 µm FT, DTP = 180 mJ/cm²
AZ nLOF 2000 Photoresists

Processing

Softbake: 110°C for 60 sec (2.0 - 3.5 µm FT) - contact mode
Exposure: NIKON 0.54 NA i-Line Stepper
PEB: 110°C for 60 sec (2.0 - 3.5 µm FT) - contact mode
Develop: AZ 300 MIF Developer, Single puddle for 60-120 sec. @ 23°C, varied with FT.

Analysis

Hitachi S-4000 SEM: SEM pictures at 75° tilt.
CD’s measured at top of resist profile
AZ nLOF 2000 Photoresist

nLOF 2000 Spin Speed Curve
AZ nLOF 2020
Resolution @ 2.0 µm FT

DTP = 66 mJ/cm²

FT = 2.0µm, SB 110°C/60 sec, PEB 110°C/60 sec,
60 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

Linear to 0.70µm
> 3:1 Aspect Ratio

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AZ nLOF 2020
Depth of Focus @ 1.0 µm CD

FT = 2.0µm, DTP = 66 mJ/cm²

DOF for Dense L/S @ 1.0µm

DOF = 1.4µm

FT = 2.0µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec, 60 sec single puddle in AZ 300 MIF Developer @ 23°C Nikon 0.54 NA I-line

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AZ nLOF 2020
Exposure Latitude @ 1.0 µm CD

FT = 2.0µm, DTP = 66 mJ/cm²

E-Lat for Dense L/S @ 1.0µm CD
Exposure latitude = 30%

FT = 2.0µm, SB 110°C/ 60 sec, PE
60 sec single puddle in AZ 300 MIF developer @ 23°C
Nikon 0.54 NA I-line
AZ nLOF 2035
Resolution @ 3.5 µm FT

DTP = 80 mJ/cm²

FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line
AZ nLOF 2035
Depth of Focus for 2.0µm CD

FT = 3.5µm, DTP = 80 mJ/cm²

DOF for Dense L/S @ 2.0µm CD

FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line
AZ nLOF 2035
Exposure Latitude for 2.0µm CD

FT = 3.5µm, DTP = 80 mJ/cm²

52 mJ/cm²
60 mJ/cm²
68 mJ/cm²
72 mJ/cm²
76 mJ/cm²

80 mJ/cm²
84 mJ/cm²
88 mJ/cm²
92 mJ/cm²
96 mJ/cm²

E-Lat for Dense L/S @ 2.0µm CD
Exposure Latitude > 50%

FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec, 120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

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AZ nLOF 2035
PEB Sensitivity, 2.0µm Dense L/S

FT = 3.5µm, DTP = 80 mJ/cm²

PEB 105°C/60sec
Top size: 1.734µm
Bottom size: 0.726µm

PEB 110°C / 60sec
Top: 1.992 µm
Bottom : 1.439 µm

PEB 115°C / 60sec
Top: 2.062 µm
Bottom: 1.687 µm

FT = 3.5µm, SB 110°C/ 60 sec
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

![Graph showing PEB Sensitivity vs PEB Temperature with equation y = 0.0328x - 1.6787]
AZ nLOF 2035
Resolution @ 3.5 µm FT

DTP = 98 mJ/cm²

FT = 3.5µm, SB 110°C/60sec, PEB 110°C/60sec
120sec single puddle in AZ 300 MIF Developer @ 23°C
ASML 0.60 NA, 0.75 sigma
AZ nLOF 2070
Baseline Process for 7.0 µm FT

Coated Thickness: 7.0 µm
Softbake: 110°C/ 90 sec - Contact mode
PB: 110°C/ 90 sec - Contact mode
Exposure: ASML i-line, 0.60 NA
Develop: 120 sec double-puddle in AZ 300 MIF Developer @ 23°C
Data: On following page
AZ nLOF 2070
Dense Line/Spaces @ 7.0 µm FT

10µm L/S

DTP=174mJ/cm²
Top=10.80µm
Bottom=7.72µm

DTP=180mJ/cm²
Top=10.90µm
Bottom=7.73µm

DTP=186mJ/cm²
Top=11.37µm
Bottom=8.20µm

DTP=192mJ/cm²
Top=11.25µm
Bottom=8.44µm

DTP=198mJ/cm²
Top=11.25µm
Bottom=8.20µm

7.0 µm L/S

Top=8.02µm
Bottom=4.45µm

Top=8.13µm
Bottom=4.69µm

Top=8.28µm
Bottom=4.84µm

Top=8.44µm
Bottom=5.16µm

Top=8.20µm
Bottom=5.31µm

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