AZ ECI 3012 Photoresist

Universal i-Line/Crossover
Photoresist

GENERAL INFORMATION

AZ ECI 3012 photoresist is a fast positive resist with high resolution capabilities (0.4 µm CDs in production in i-line) enabling wide process latitudes. It is suited for i-line as well as broadband exposure covering g-, h- and i-line illumination wavelengths. It is designed to have superior implant and dry etch resistance. Further characterization highlights show strong wet etch adhesion and good thermal stability. This resist is specifically tailored for universal application and excellent cost of ownership.

RECOMMENDED PROCESS

Softbake:	90°C, 60 sec (contact) - 90 sec (proximity)
Exposure:	i- & g-line stepper or broadband exposure
Post Exposure Bake (PEB):	110°C, 60 sec (contact) - 90 sec (proximity)
Development:	60 sec, puddle, AZ® 300 MIF Developer (non surfactated) or AZ® 726 MIF Developer (surfactated)

SUITABLE ANCILLARIES

AZ Aquatar® top anti-reflective coating
AZ BARLi® II bottom anti-reflective coating
AZ EBR 70/30 edge bead remover
AZ 100 Remover or AZ KWIKSTRIP

Merck Performance Materials GmbH
Rheingaustrasse 190 - 196
D-65203 Wiesbaden
Germany
Tel. +49 (611) 962-4031
Email: jasmin.schmicking@merckgroup.com

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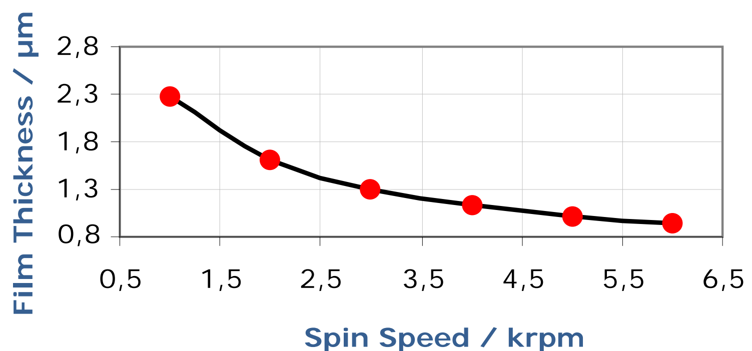
CAUCHY COEFFICIENTS	A	B	C
Unbleached	1.6018	0.0098963 µm²	0.00068636 µm⁴
	1.6018	9.8963×10^5 Å²	6.8636×10^{12} Å⁴
Bleached	1.5952	0.0084508 µm²	0.0006556 µm⁴
	1.5952	8.4508×10^5 Å²	6.556×10^{12} Å⁴

REFRACTIVE INDEX		365 nm	405 nm	435 nm	633 nm
Unbleached	n	1.7014	1.6803	1.6826	1.6308
	K	0.0202	0.0244	0.0166	0
Bleached	n	1.6913	1.6670	1.6530	1.6204
	K	0.0017	0.0010	0	0.0001

DILL PARAMETERS	A	B	C
i-line	0.64 μm^{-1}	0.075 μm^{-1}	0.0159 cm²/mJ
h-line	0.76 μm^{-1}	0.035 μm^{-1}	0.0244 cm²/mJ
g-line	0.45 μm^{-1}	0.036 μm^{-1}	0.0152 cm²/mJ

SPIN CURVE
Softbake: 90°C, 90 sec, proximity
Wafer size: 6″ (150 mm)
dynamic dispense



FILM THICKNESS	2000 rpm	3000 rpm	4000 rpm	5000 rpm
	1.61 µm	1.31 µm	1.13 µm	1.02 µm
STD DEV	1.2 nm	0.8 nm	0.5 nm	1.1 nm

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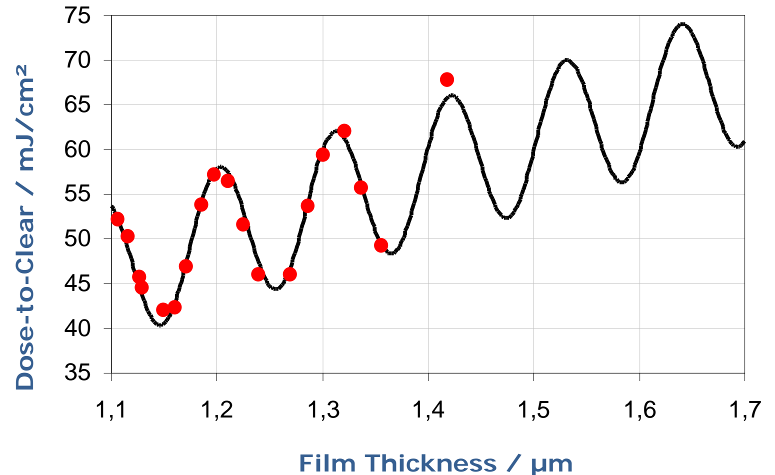
Technical Data Sheet

Technisches Datenblatt

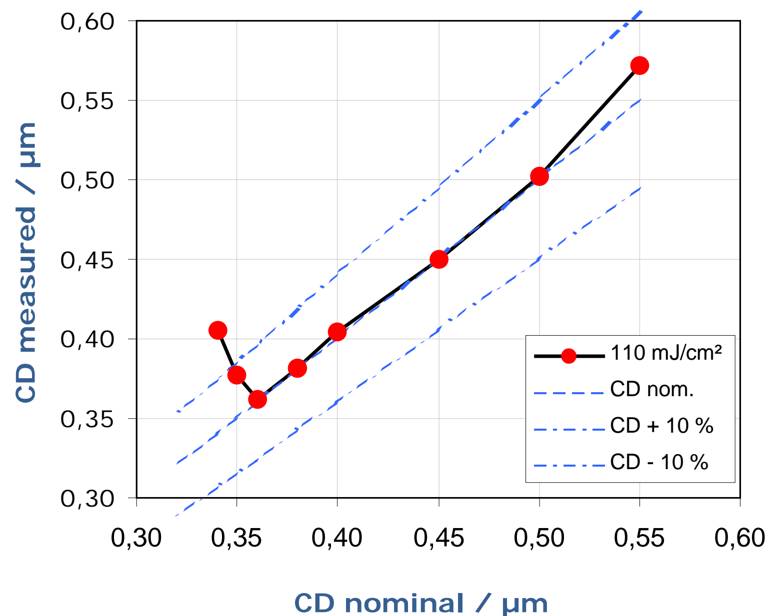
i-LINE THIN FILM INTERFERENCE
(on bare silicon)

Softbake:	90°C, 90 sec, proximity
Exposure:	Nikon NSR-1755i7B i-line stepper 0.54 NA, 0.6 s
PEB:	110°C, 90 sec, proximity
Development:	60 sec, puddle, 23°C AZ 300 MIF Developer



LINEARITY
(dense lines on bare silicon)

Softbake:	90°C, 90 sec, proximity
Film Thickness:	1.2 µm, Emax
Exposure:	Nikon NSR-1755i7B i-line stepper 0.54 NA, 0.6 s
PEB:	110°C, 90 sec, proximity
Development:	60 sec, puddle, 23°C AZ 300 MIF Developer
Measurement:	Hitachi S-8840 CD SEM



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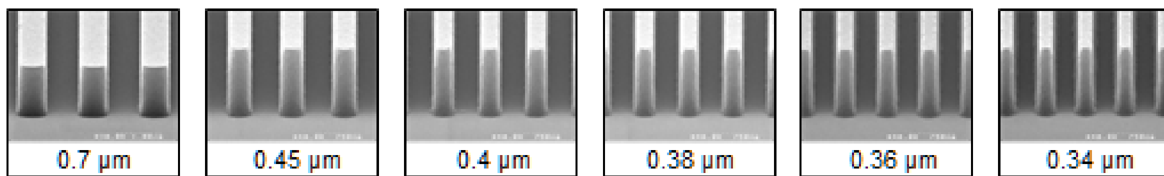
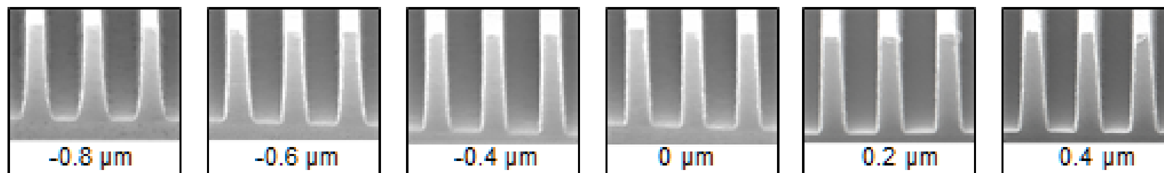
PROCESS on bare silicon substrate

Softbake: 90°C, 90 sec, proximity // 1.2 µm film thickness // Exposure: Nikon NSR-1755i7B i-line stepper, 0.54 NA, 0.6 s // PEB: 110°C, 90 sec, proximity // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C

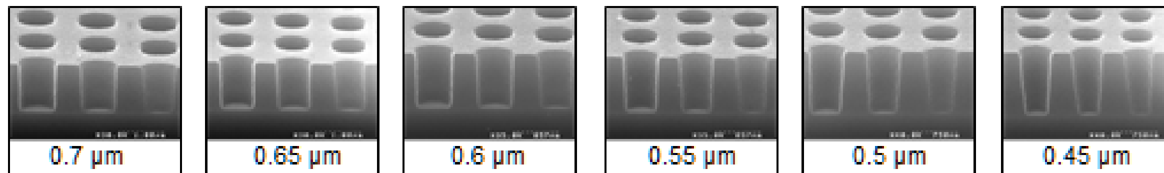
LINEARITY dense lines, 110 mJ/cm²



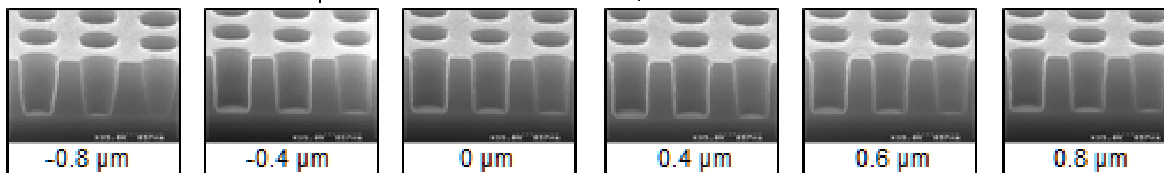
FOCUS LATITUDE 0.4 µm dense lines, 110 mJ/cm²



LINEARITY dense contact holes, 136 mJ/cm²



FOCUS LATITUDE 0.6 µm dense contact holes, 136 mJ/cm²



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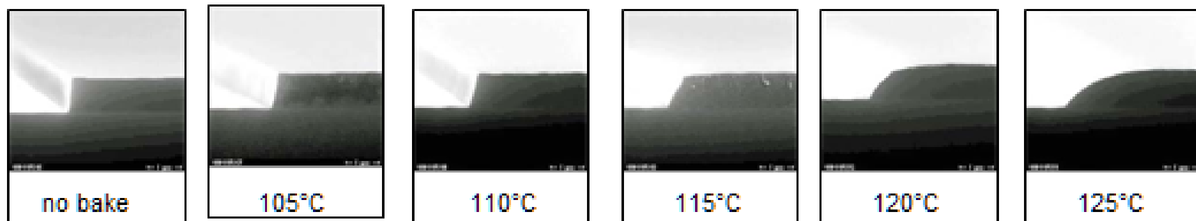
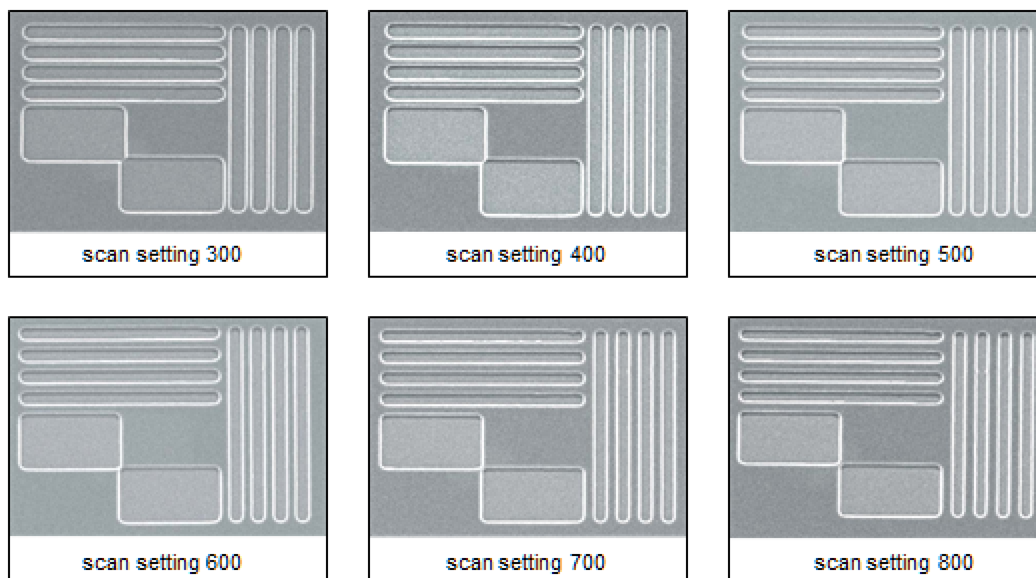
THERMAL STABILITY 100 µm edge, 1.2 µm film thickness, contact hardbake 60 sec at temperature

Softbake: 90°C, 90 sec, proximity // Exposure: Nikon NSR-1755i7B i-line stepper, 0.54 NA, 0.6 s // PEB: 110°C, 90 sec, proximity // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C



BROADBAND EXPOSURE LATITUDE 3 µm lines, 1.2 µm film thickness

Softbake: 90°C, 60 sec, contact // Exposure: Perkin Elmer 340 Series Projection Mask Aligner, Aperture: 1, Slit Width: 1 mm // PEB: 110°C, 60 sec contact // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C



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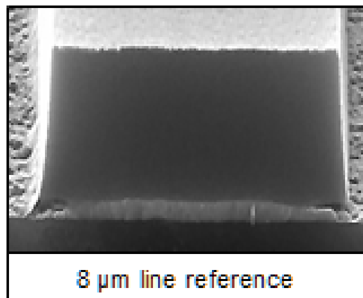
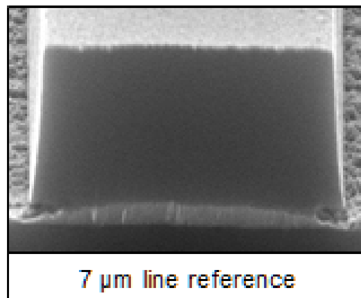
ADHESION ON ITO

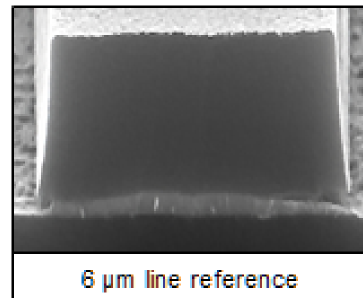
Softbake: 90°C, 90 sec, proximity // 1.7 µm film thickness // Exposure: Nikon NSR-1755i7B i-line stepper, 0.54 NA, 0.6 s // PEB: 110°C, 90 sec, proximity // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C // ITO etching: etch time (70 sec) immersion in $FeCl_3/HCl$ at 45°C, ITO thickness: 200 nm



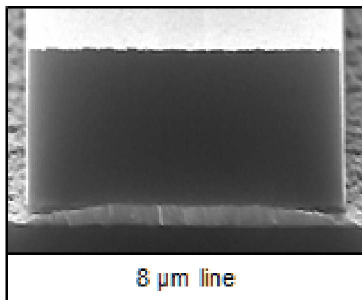
8 µm line reference



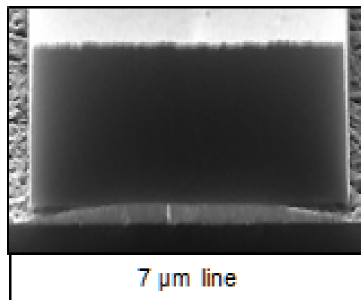
7 µm line reference



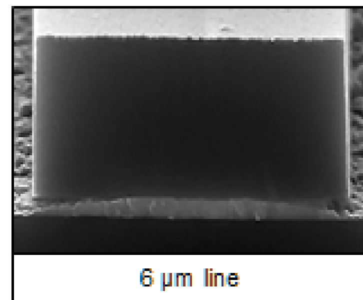
6 µm line reference



8 µm line



7 µm line



6 µm line

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D-65203 Wiesbaden
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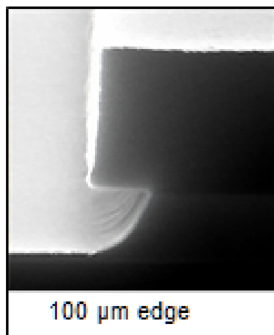
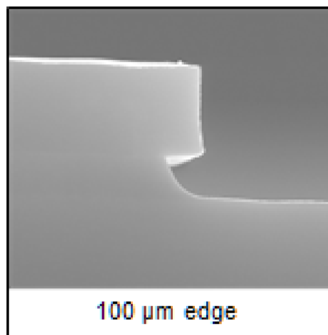
ADHESION ON THERMAL OXIDE

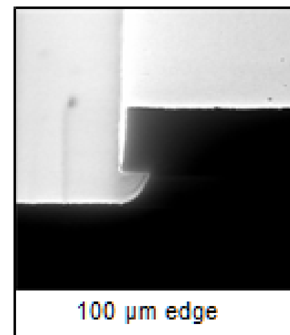
Thermal oxide thickness: 690 nm // Primer HMDS, vacuum 30 min // Resist thickness: 1.33 µm on 2" wafer // Softbake: 90°C, 60 sec, contact // Exposure: Suss MA 56 // PEB: 110°C, 60 sec, contact // Development: 60 sec, immersion, AZ® 300 MIF Developer @ 23°C // Oxide etch solution: Merck AF 87.5-12.5 @ 22°C // oxide etch time: 6 min // Remaining oxide thickness after etch: 75 nm



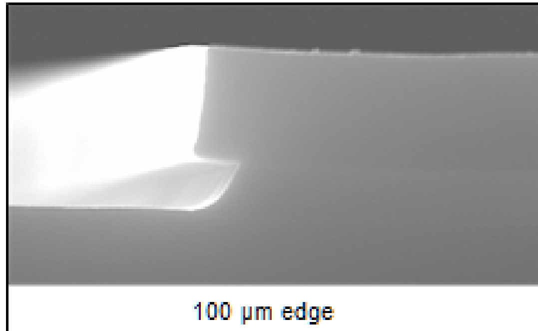
100 µm edge



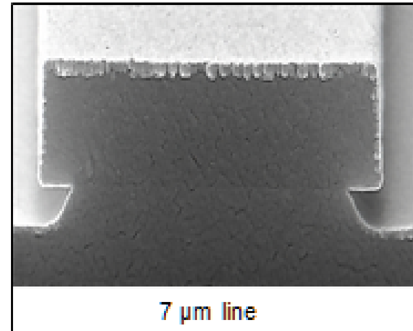
100 µm edge



100 µm edge



100 µm edge



7 µm line

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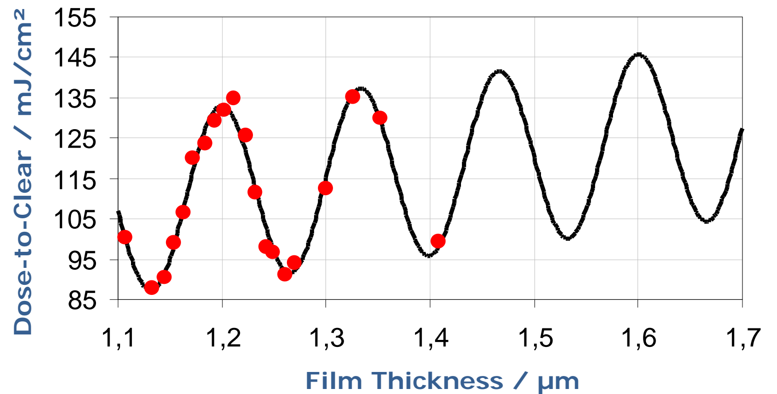
technical data sheet

technisches datenblatt

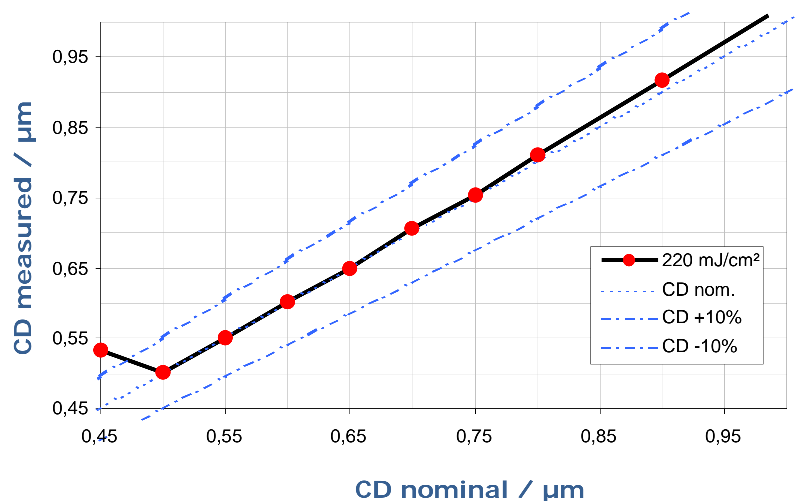
g-LINE THIN FILM INTERFERENCE
(on bare silicon)

Softbake:	90°C, 90 sec, proximity
Exposure:	Nikon NSR-1505G7E g-line stepper 0.54 NA, 0.5 s
PEB:	110°C, 90 sec, proximity
Development:	60 sec, puddle, 23°C AZ 300 MIF Developer



LINEARITY
(dense lines on bare silicon)

Softbake:	90°C, 90 sec, proximity
Film Thickness:	1.2 µm, Emax
Exposure:	Nikon NSR- 1505G7E g-line stepper 0.54 NA, 0.5 s
PEB:	110°C, 90 sec, proximity
Development:	60 sec, puddle, 23°C AZ 300 MIF Developer
Measurement:	Hitachi S-8840 CD SEM



Merck Performance Materials GmbH
Rheingaustrasse 190 - 196
D-65203 Wiesbaden
Germany
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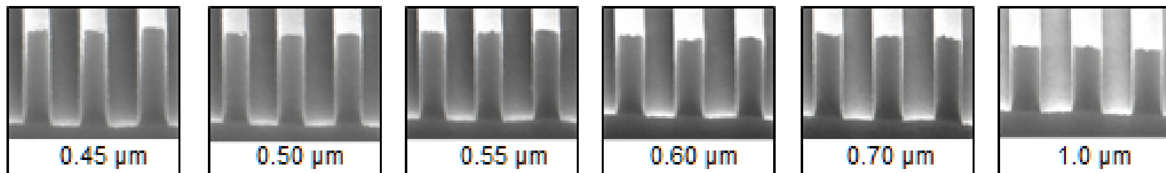
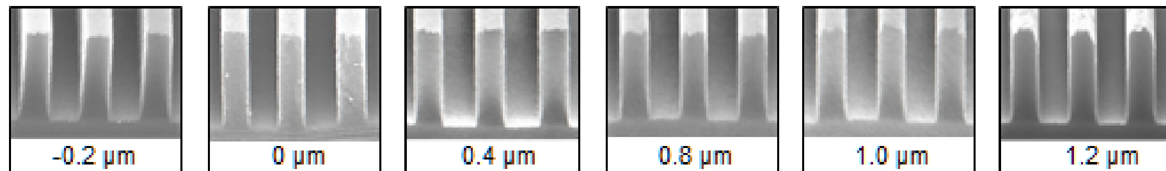
PROCESS on bare silicon substrate

Softbake: 90°C, 90 sec, proximity // 1.2 µm film thickness // Exposure: Nikon NSR-1505G7E g-line stepper, 0.54 NA, 0.5 s // PEB: 110°C, 90 sec, proximity // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C

LINEARITY dense lines, 220 mJ/cm²



FOCUS LATITUDE 0.5 µm dense lines, 220 mJ/cm²



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Rheingaustrasse 190 - 196
D-65203 Wiesbaden
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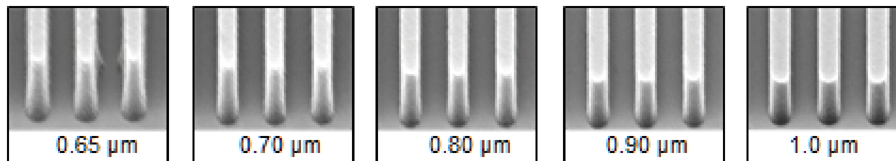
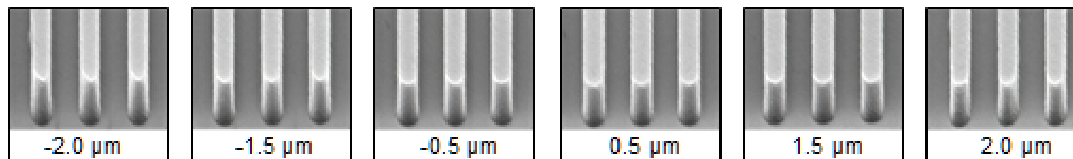
ULTRATECH 1500 PERFORMANCE on bare silicon substrate

Softbake: 90°C, 90 sec, proximity // 1.2 µm film thickness // Exposure: Ultratech 1500 1X stepper // PEB: 110°C, 90 sec, proximity // Development: 60 sec, puddle, AZ® 300 MIF Developer @ 23°C

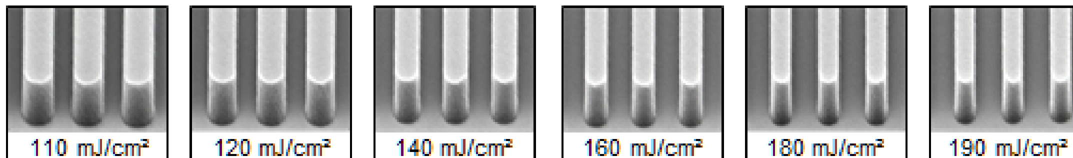
LINEARITY dense lines, 180 mJ/cm²



FOCUS LATITUDE 1.0 µm dense lines, 180 mJ/cm²



EXPOSURE LATITUDE 1.0 µm dense lines



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