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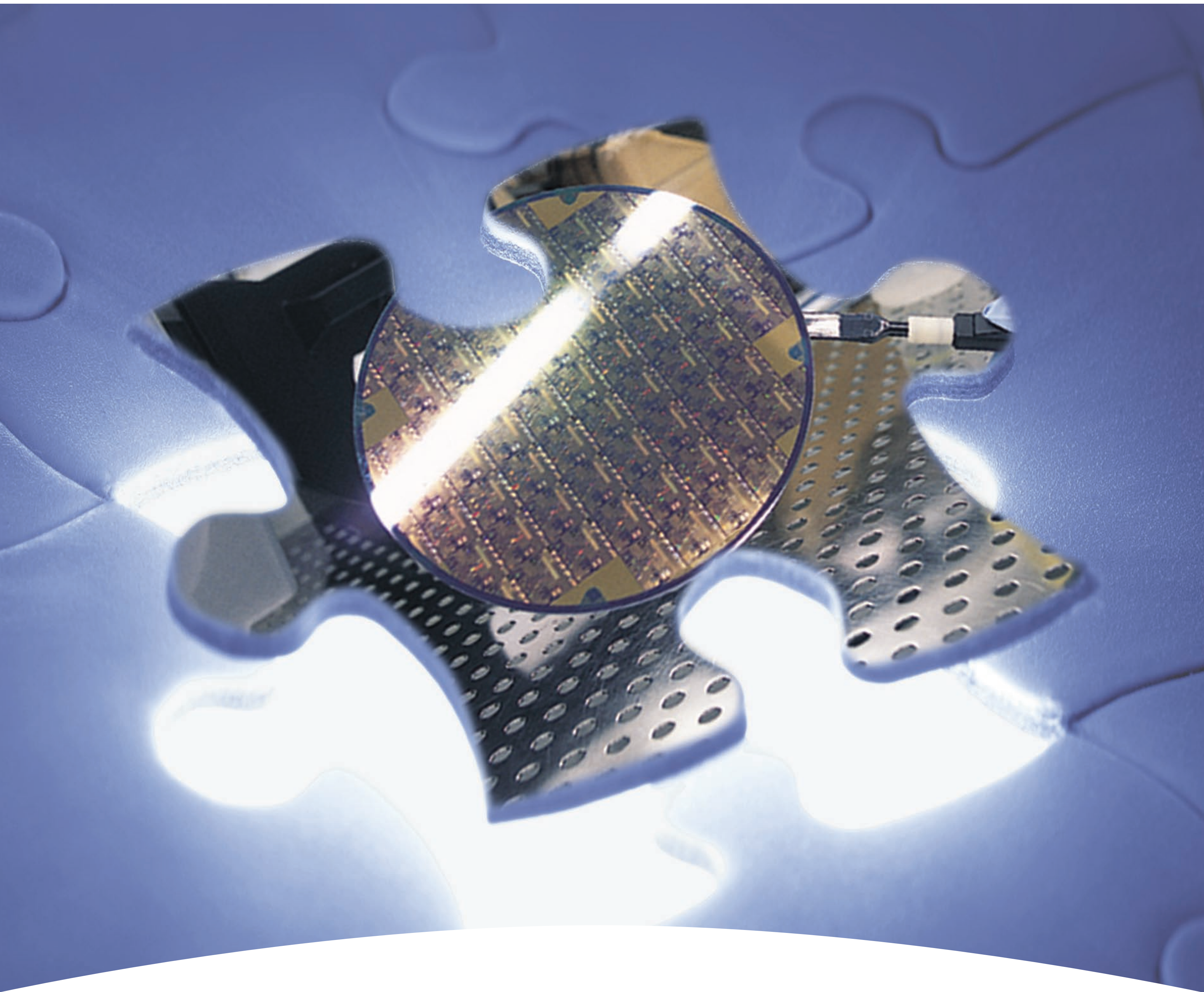


Honeywell DUO™193FS Anti-Reflective Coating

Honeywell DUO™193FS

A SILICON-RICH BARC FOR DAMASCENE AND OTHER ADVANCED PATTERNING APPLICATIONS

BENEFITS

- Anti-reflective property provides superior CD (critical dimension) control during photoresist patterning
- Polymer designed to fill (<50nm vias) and planarize topography
- High strip rate in fluoride and amine based wet stripping chemistries
- Organo-siloxane based polymer keeps the as patterned CD intact enabling a wide etch process latitude
- Industry proven technology for damascene patterning

OVERVIEW

DUO193FS is designed for use in semiconductor manufacturing to improve and extend ArF photolithography and the plasma etch process. Containing a patented* organo-siloxane ($R_XCH3_YSiO_Z$) polymer (R = organic chromophore), DUO193FS coatings meet the lithographic and etch requirements necessary for the patterning of thin film features within state-of-the-art IC devices. Properties include: bottom anti-reflective coating (BARC) for ArF lithography, fill planarization of line or via topography and a faster wet etch rate than previous inorganic BARCs.

DUO193FS offers excellent plasma etch characteristics. The organo-siloxane polymer comprising DUO193FS provides a high degree of plasma etch selectivity to photoresist. Additionally, the organo-siloxane polymer allows for matched plasma etch selectivity to Low-k SiOCH and FSG dielectric films facilitating Dual Damascene patterning. Such plasma etch selectivity is required for exact transfer of the as patterned photoresist dimensions into the underlying thin films.

As requested by customers, DUO193FS is tuned to have a high strip rate in Low-k selective fluoride and amine based wet stripping chemistries. These strippers are designed to remove the inorganic BARC without damage to the underlying ILD.

Optical Properties

n_{193nm} = 1.8
k_{193nm} = 0.35

Material Stability

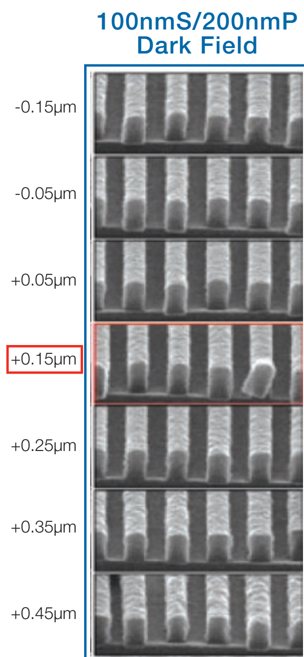
Shelf Life @ 0˚C: >12 months
Shelf Life @ 50˚C: >9 months

Bottle Sizes Available

(Glass, HDPE, NowPak)
250ml, 500ml, 1L, 2.5L

ADVANCED ArF PHOTORESIST PATTERNING

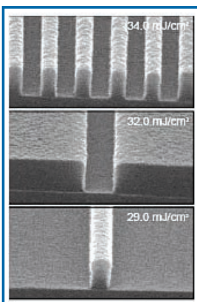
100nmS/200nmP
Dark Field



100nmS/190nmP Dark Field

150nmI/S (140nm Mask)

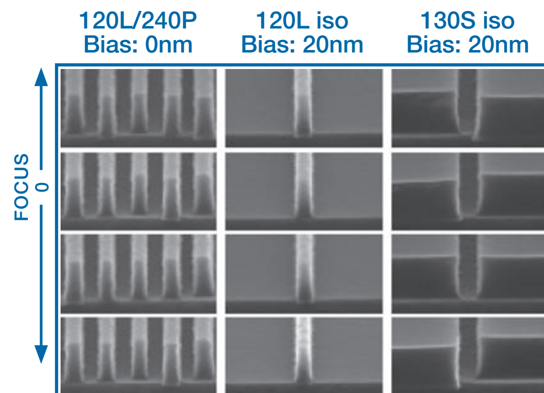
110nmI/L (150nm Mask)



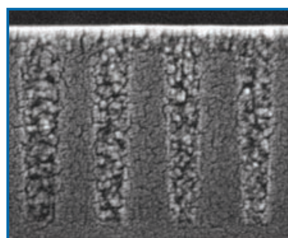
Substrate:	DUO193
Resist Thickness:	0.2µm
HMDS:	150˚C for 50sec
Softbake:	115˚C for 90sec
Exposure:	Nikon S306C NA=0.75, 1/2 Annular
Reticle:	6% Half Tone Reticle
PEB:	115˚C for 90sec
Development:	2.38% TMAH, 60sec

Patterning data courtesy of JSR Microelectronics. Please contact JSR for further process details.

120L/240P Bias: 0nm | 120L iso Bias: 20nm | 130S iso Bias: 20nm



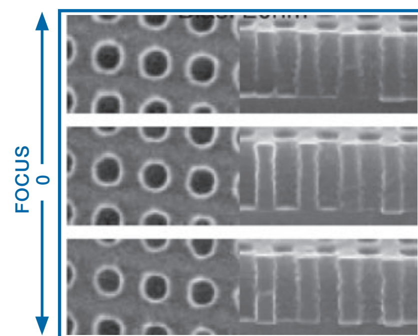
Resist Thick: 340nm Dose: 17 mJ
Illumination: NA 0.60, 2/3 Annular Mask: Binary



Complete via fill of 0.16µm vias

140nm Contact/280nm Pitch
Bias: 20nm

Data courtesy of TOK. Please contact TOK for further process details.



Resist Thick: 400nm Dose: 17 mJ
Illumination: NA 0.60, 2/3 Annular Mask: 6% HT

Honeywell Electronic Materials
USA: 1-509-252-2102
China: 86-21-28942481
Germany: 49-5137-999-9199
Japan: 81-3-6730-7092
Korea: 82-2-3483-5076
Singapore: 65-6580-3593
Taiwan: 886-3-6580300 ext.312
www.honeywell.com/sm/em

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