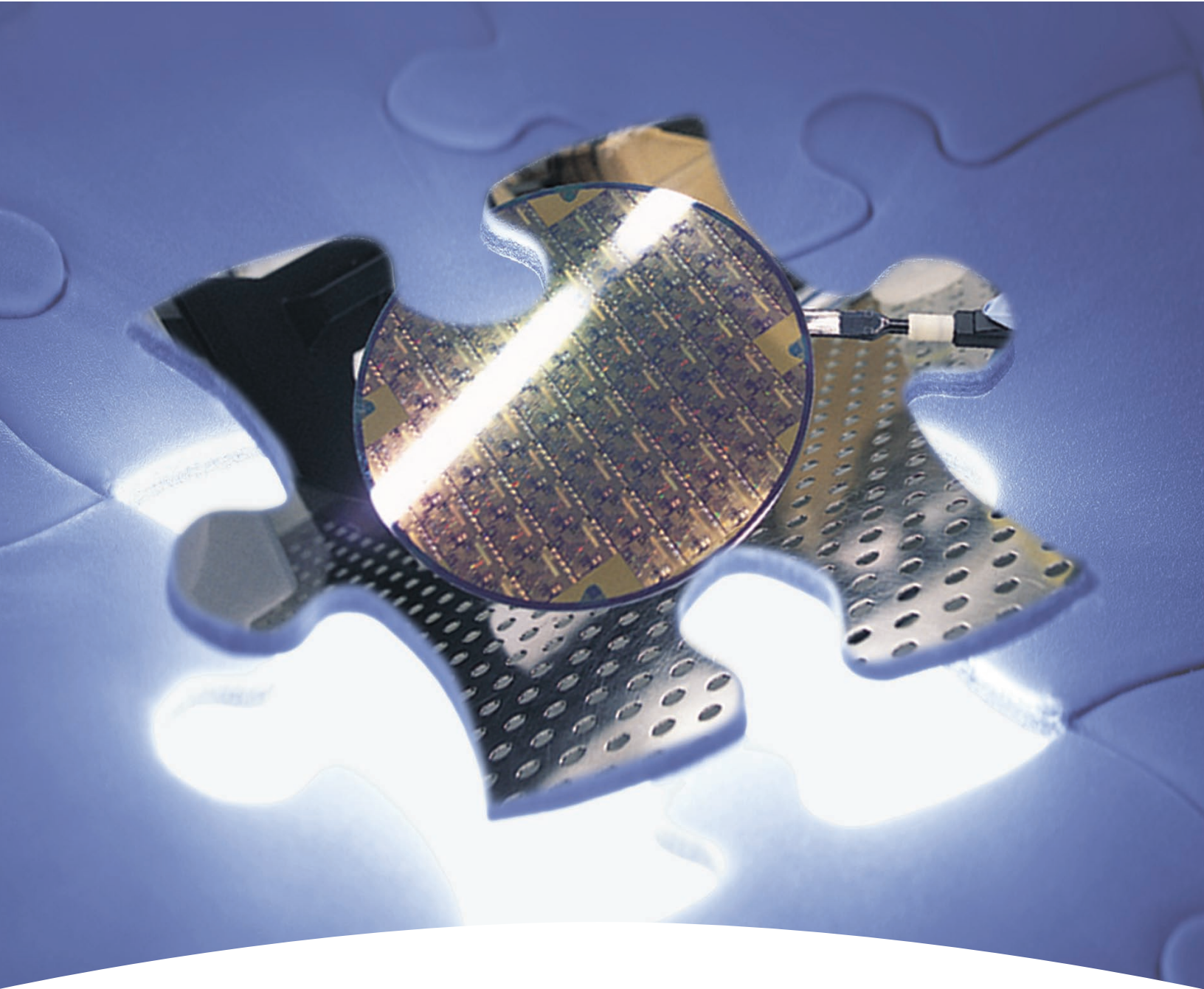




Honeywell DUO™193FS
Anti-Reflective Coating

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 ($R_xCH_3SiO_2$) 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

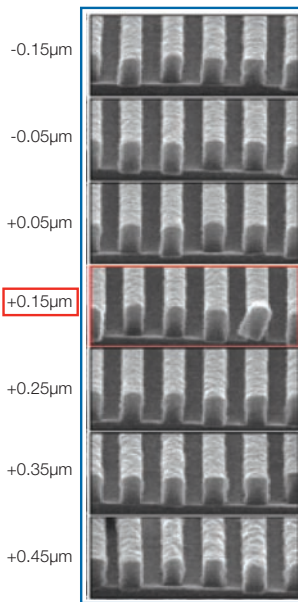
Shelf Life @ 50°C: >9 months

Bottle Sizes Available

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

ADVANCED ArF PHOTORESIST PATTERNING

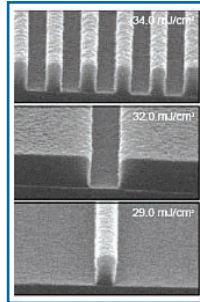
100nmS/200nmP
Dark Field



100nmS/190nmP
Dark Field

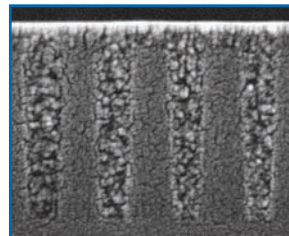
150nmI/S
(140nm Mask)

110nmI/L
(150nm Mask)



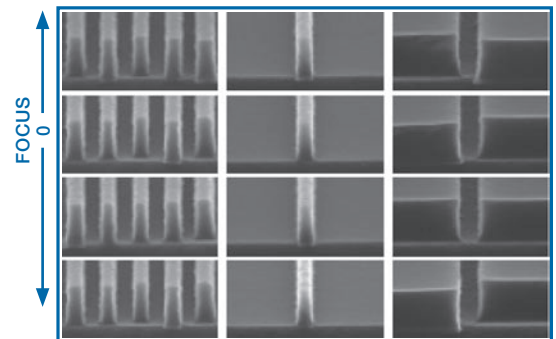
Substrate: DUO193
Resist Thickness: 0.2µm
HMDS: 150°C for 50sec
Softbake: 115°C for 90sec
Exposure: Nikon S306C
NA=0.75, 1/2 Annular
Reticle: 6% Half Tone Reticle
PEB: 115°C for 90sec
Development: 2.38% TMAH, 60sec

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



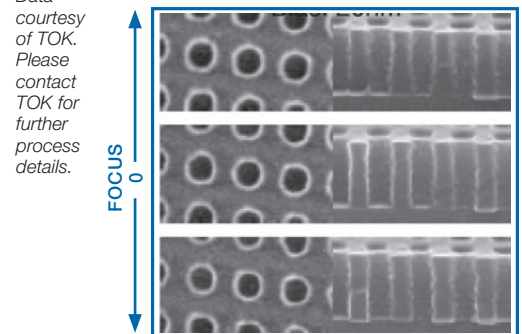
Complete
via fill of
0.16µm vias

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



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

140nm Contact/280nm Pitch
Bias: 20nm



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



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OUR COMMITMENT TO SUSTAINABILITY

Honeywell Electronic Materials

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