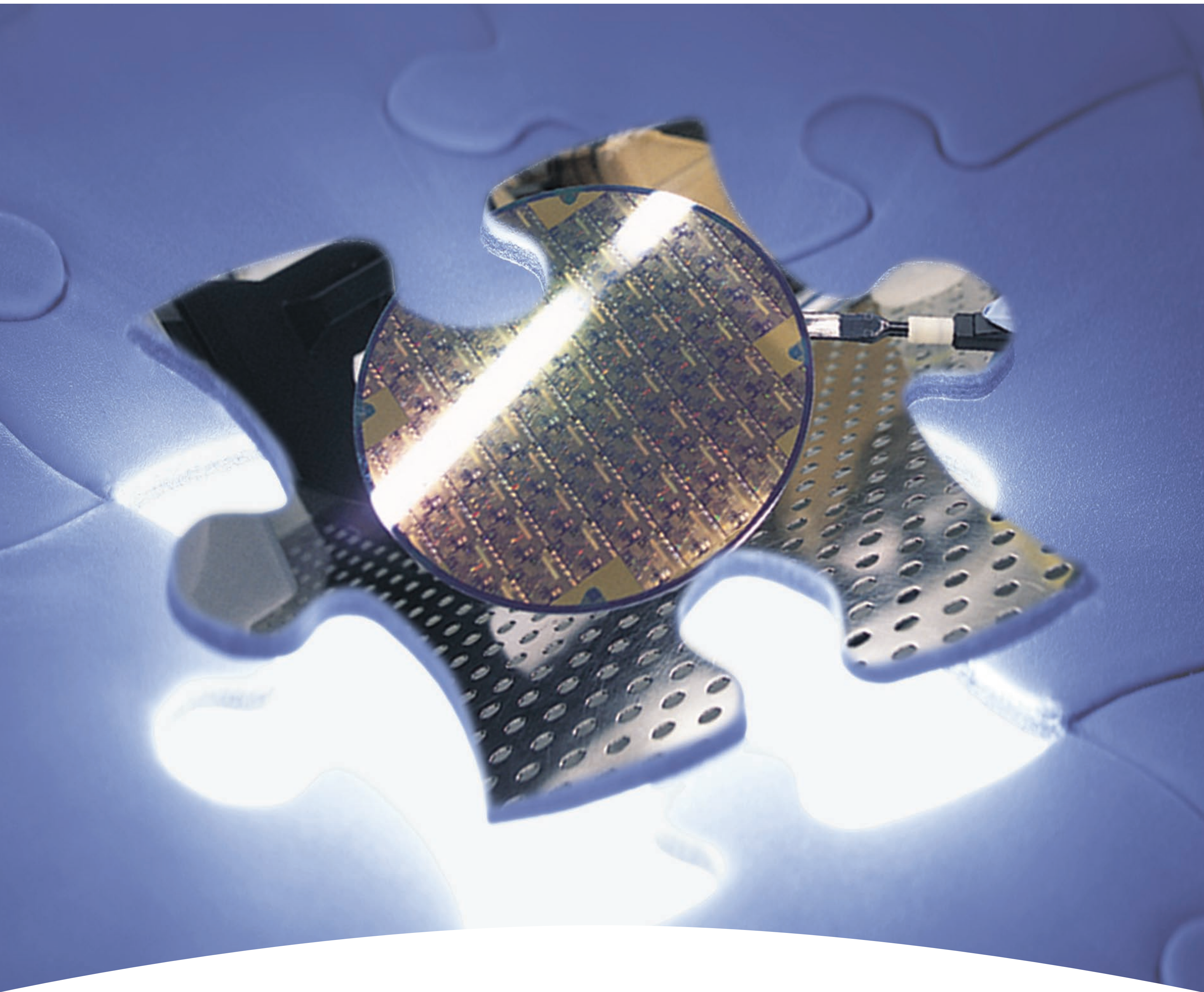
Electronic Polymers

Honeywell



Honeywell DUO™248 Anti-Reflective Coating

Honeywell DUO™248

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

BENEFITS

- Anti-reflective property provides superior CD (critical dimension) control during photoresist patterning
- Organo-siloxane based polymer keeps the as patterned CD intact enabling a wide etch process latitude
- Lower defectivity and higher etch-selectivity than OBARC
- Polymer designed to fill and planarize topography
- Compatible with top-tier 248nm photoresist platforms
- Industry proven technology for damascene patterning

OVERVIEW

DUO248 is designed for use in semiconductor manufacturing to improve and extend KrF photolithography and the plasma etch process. Containing a patented* organo-siloxane ($R_xCH3_ySiO_z$) polymer (R = organic chromophore), DUO248 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, and fill planarization of line or via topography.

DUO248 offers excellent plasma etch characteristics. The organo-siloxane polymer comprising DUO248 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.

DUO248 is selectively removed using appropriate photoresist strip and wet etch chemistries.

Tunable Optical Properties

n_{248nm} = 1.49
k_{248nm} = 0.41

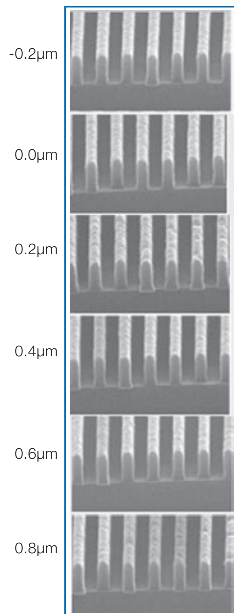
Material Stability

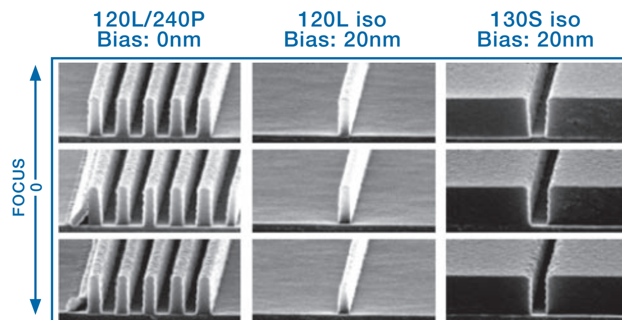
Shelf Life @ 5°C: >6 months

Bottle Sizes Available

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

ADVANCED KrF PHOTORESIST PATTERNING





Resist Thickness: 380nm
Dose: 27 mJ
Illumination: NA 0.68, 2/3 Annular
Mask: 6% HT-PSM

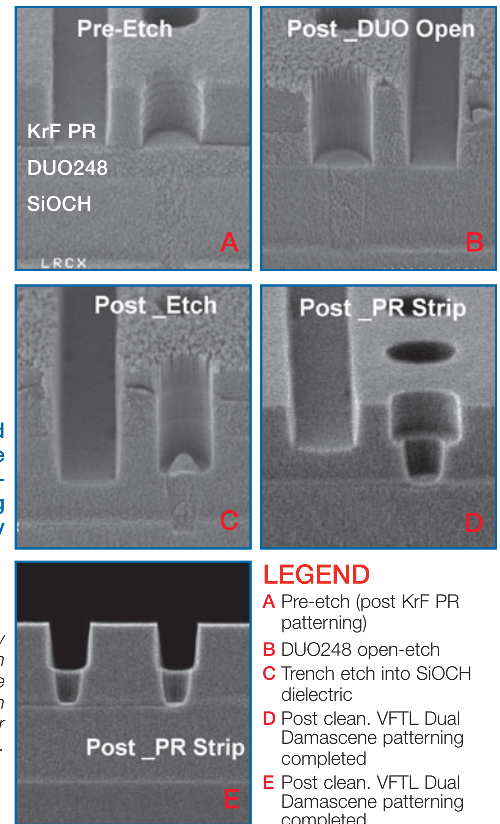
Data courtesy of TOK. Please contact TOK for further process details.

160L/320P
Resist Thickness: 420nm
Dose: 30 mJ
Illumination: NA 0.6, 2/3 Annular
Mask: 6% PSM

Data courtesy of JSR Microelectronics. Please contact JSR for further process details.

VFTL DUAL DAMASCENE PATTERNING

κ = 2.7 CVD SiOCH, DUO248 as the Via Fill Material



A–C: Photoresist and DUO248 Stripped in One Step Using a Commercially Available Cleaning Chemistry

SEM data courtesy of Lam Research Corporation. Please contact Lam Research Corporation for further process details.

LEGEND

- **A** Pre-etch (post KrF PR patterning)
- **B** DUO248 open-etch
- **C** Trench etch into SiOCH dielectric
- **D** Post clean. VFTL Dual Damascene patterning completed
- **E** Post clean. VFTL Dual Damascene patterning completed

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