ELECTRONIC MATERIALS
MICROELECTRONIC TECHNOLOGIES

UV™26 POSITIVE DUV PHOTORESIST

For Microlithography Applications

DESCRIPTION

UV26 is a positive DUV Photoresist developed for deep implant applications. The low viscosity of UV26 allows for reduced dispense volume and improved coating uniformity for films ranging from 1.1 µm to 3.0 µm.

FEATURES:

Sizing Energy

- 16.5 mJ/cm² for 350 nm 1:1 lines/spaces at 1.1 µm FT
- 18.5 mJ/cm² for 450 nm 1:1 trenches at 1.8 µm FT
- 20.5 mJ/cm² for 600 nm 1:1 lines/spaces at 2.5 µm FT

Depth-of-Focus

- 0.80 µm DoF for 350 nm 1:1 lines/spaces at 1.1 µm FT
- 1.35 µm DoF for 450 nm 1:1 trenches at 1.8 µm FT
- 1.00 µm DoF for 600 nm 1:1 lines/spaces at 2.5 µm FT

Resolution

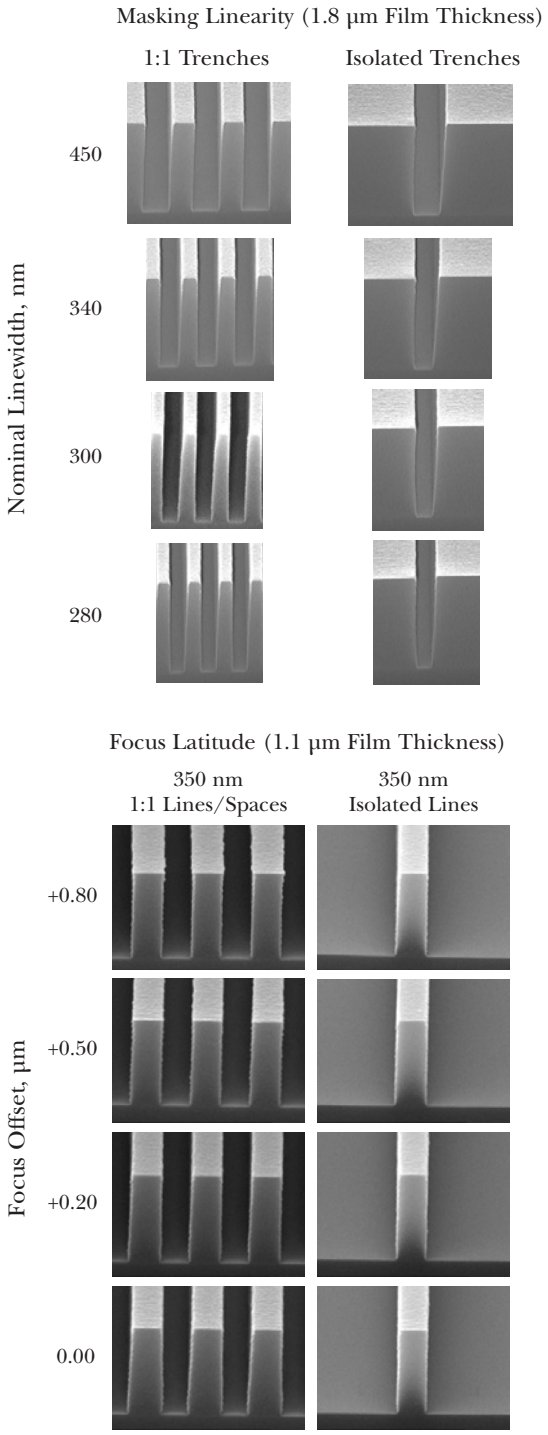
- 0.240 µm Resolution for 1:1 lines/spaces at 1.1 µm FT
- 0.280 µm Resolution for 1:1 trenches at 1.8 µm FT
- 0.500 µm Resolution for 1:1 lines/spaces at 2.5 µm FT

Other Responses

- ≥1 hour post-exposure delay stability
- <6 nm/°C post-exposure bake sensitivity
- 9-month shelf life
- 150°C thermal stability

See *Figure 1* for lithographic performance and *Table 1* (next page) for recommended process conditions.

Figure 1. Lithographic Performance



UV26 POSITIVE DUV PHOTORESIST

Table 1. Recommended Process Conditions*

	Lines/Spaces and Trenches	Lines/Spaces and Trenches
Thickness	9,700–25,000Å	25,000–41,000Å
Softbake	130°C/60 sec. Proximity Hotplate	140°C/60 sec. Proximity Hotplate
PEB	110°C/60 sec. Proximity Hotplate	110°C/90 sec. Proximity Hotplate
Developer	MEGAPOSIT™ MF CD-26 @ 21°C, 45 sec. single puddle	MEGAPOSIT MF CD-26 @ 21°C, 45 sec. single puddle

*All data shown within this flyer used the process conditions listed above unless otherwise stated.

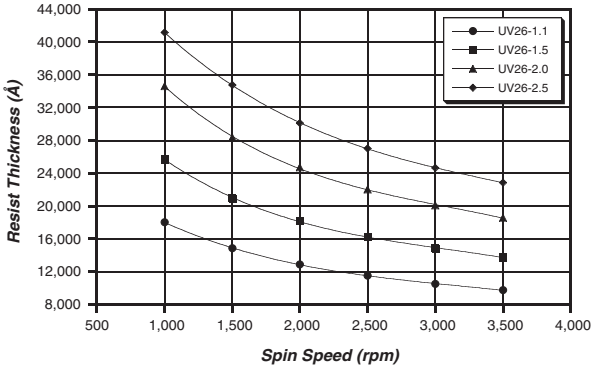
SUBSTRATE

UV26 photoresist is compatible with a wide range of substrates, including silicon and organic and inorganic anti-reflective materials. A hexamethyldisilazane (HMDS)-based MICROPOSIT™ primer is recommended to promote adhesion with substrates that require such treatment.

COAT

Figure 2 shows the relation between spin speed and resist thickness for 200 mm substrates. Nominal film thickness may vary slightly due to process, equipment and ambient conditions.

Figure 2. Spin Speed Curve



SOFTBAKE

The recommended softbake processes for reflective and non-reflective substrates are listed in *Table 2.*

Table 2. Softbake Process Conditions

	Lines/Spaces and Trenches	Lines/Spaces and Trenches
Thickness	9,700–25,000Å	25,000–41,000Å
Temperature	130°C	140°C
Time	60 sec. Proximity Hotplate	60 sec. Proximity Hotplate

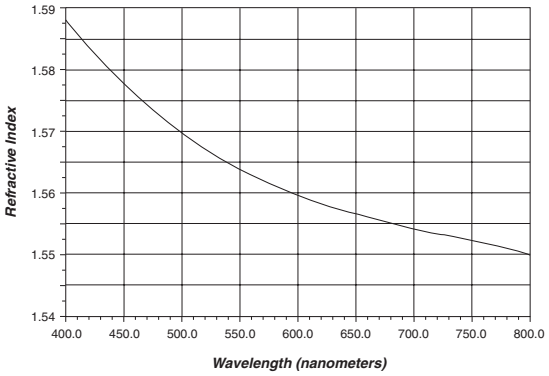
FILM THICKNESS MEASUREMENT

Cauchy coefficients are listed in *Table 3. Figure 3* shows the refractive index of UV26 as a function of wavelength. Resist thicknesses of 10,975–25,000Å were used to characterize UV26. *Figure 4* (next page) displays the E_0 and interference curves for silicon.

Table 2. Cauchy Coefficients

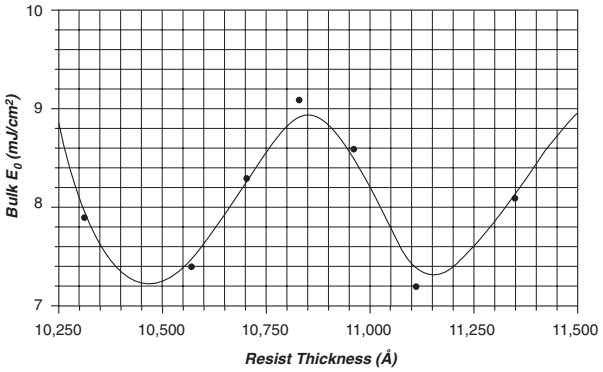
n_1	1.519
n_2	6.35e+05
n_3	2.56e+12

Figure 3. Dispersion Curve



UV26 POSITIVE DUV PHOTORESIST

Figure 4. Interference Curve



PROLITH PARAMETERS

The absorbance curve for the unexposed resist film is shown in *Figure 5*. *Table 4* lists the parameters needed for resist modeling.

Figure 5. Absorbance Curve

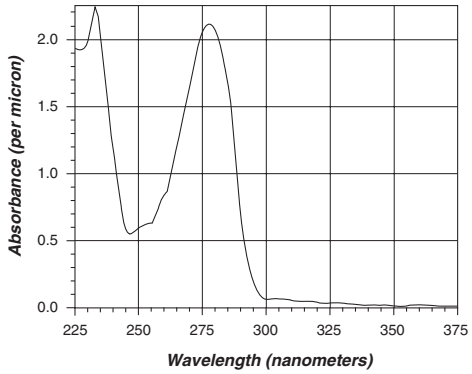


Table 4. Prolith Parameters*

Dill A	0.000 1/µm
Dill B	0.401 1/µm
Dill C	0.051 cm^2/mJ
R_{min}	0.4 Å/sec.
R_{max}	20,400 Å/sec.
RI @ 248 nm	1.724
RI @ 633 nm	1.558

*Chemically-amplified resists require additional modeling parameters currently being determined. Please contact your TSR for an updated copy of modeling parameters.

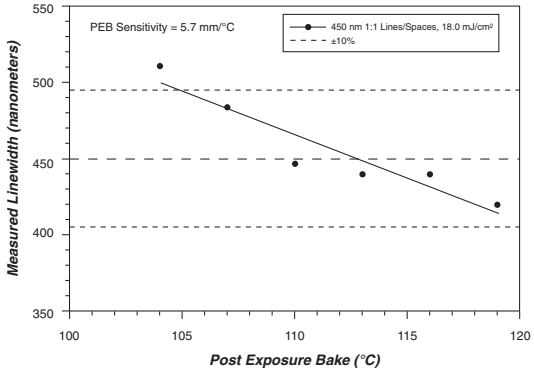
Post-exposure Bake

The recommended PEB conditions for lines/spaces and trenches on reflective and non-reflective substrates are listed in *Table 5*. *Figure 6* shows the PEB sensitivity of UV26.

Table 5. PEB Process Conditions

	Lines/Spaces and Trenches	Lines/Spaces and Trenches
Thickness	9,700–25,000Å	25,000–41,000Å
Temperature	110°C	110°C
Time	60 sec. Proximity Hotplate	90 sec. Proximity Hotplate

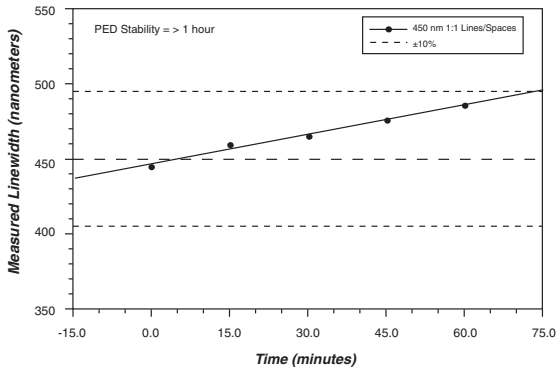
Figure 6. PEB Sensitivity



POST-EXPOSURE DELAY STABILITY

The post-exposure delay stability for UV26 is shown in *Figure 7* to be greater than ≥60 minutes in a non-filtered environment.

Figure 7. PED Stability Plot



UV26 POSITIVE DUV PHOTORESIST

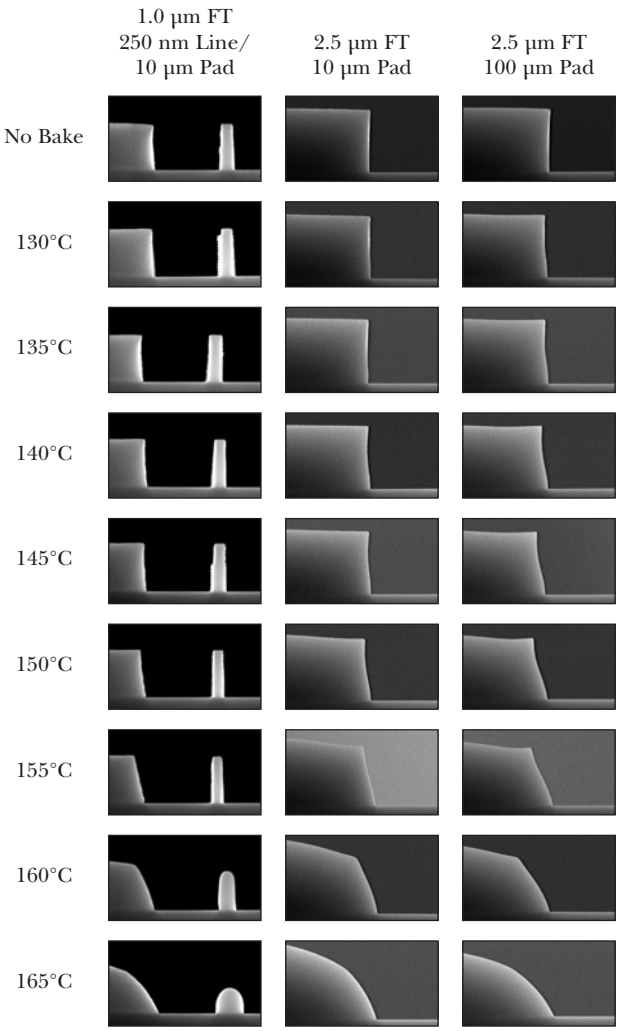
DEVELOP

UV26 is optimized for 0.26N developers. A 45 second single puddle is recommended for most applications, including lines/spaces and trenches.

HARDBAKE

Figure 8 displays the thermal flow characteristics of UV26.

Figure 8. Thermal Flow Characteristics



PHOTORESIST REMOVAL

UV26 can be removed with MICROPOSIT REMOVER 1165. A two-bath process is recommended with each bath at a temperature of 80°C. The first removes the bulk of the photoresist and the second removes residual traces of photoresist. Consult specific remover datasheets for additional process information.

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

UNITED STATES
Marlborough, MA
Tel: 800.832.6200
Fax: 508.485.9113

JAPAN
Tokyo
Tel: +81.3.5213.2920
Fax: +81.3.5213.2921

ASIA
Hong Kong
Tel: +852.2680.6888
Fax: +852.2680.6333

EUROPE
Paris, France
Tel: +33.1.40.02.54.00
Fax: +33.1.40.02.54.07

www.rohmhaas.com