FOTURAN® II

Photostructurable Glass Wafer

FOTURAN® II is an improved photostructurable glass based on the well-known FOTURAN®. It is produced in a continuous melting process with optimal homogeneity.

FOTURAN® II is a technical, photostructurable glass that crystallizes after UV exposure and temperature processes. The crystallized areas can be etched with a high aspect ratio, resulting in extremely fine structures and vias.

Structured FOTURAN® II substrates can be applied in the semiconductor chip and semiconductor packaging processes. The process flow works without photo resist and can be used with standard semiconductor equipment.

Applications

- Interposer
- RF / MEMS, Sensor, Advanced Packaging
- Micro-Fluidics
- Micro-Optics
- 3D in-bulk structures

Standard supply forms

Supply form	**Sizes***
Round (wafer)	6" 8" 12" (in preparation)
Square (substrate)	93 x 93 mm 130 x 130 mm 150 x 150 mm 175 x 175 mm
FOTURAN® II Sample Kit	Incl. one 93 x 93 x 0.5 mm and one 6" x 0.5 mm wafer

* Standard thicknesses for each format: 0.5/0.7/1.0/1.3 mm
Other formats and thicknesses available upon request

Typical post-processing tolerances	
Roughness of the inner surface of the etched structures	1–3 µm
Roughness of surface of the non-exposed area	< 5 nm
Maximum hole density (holes / cm^2)	10,000
Tolerance of hole distance (per 100 mm)	< ± 0.3 % (100 mm ± 300 µm)

Note:
Values based on SCHOTT standard processing parameters.
Above values are an indication, not guaranteed limits.

Chemical Properties – Glass State			
			Class
Hydrolytic resistance acc. to DIN ISO 719	(µg) Na$_2$O/g	578	HGB 4
Acid resistance acc. to DIN 12116	mg/dm^2	0.48	S 1
Alkali resistance acc. to DIN ISO 695	mg/dm^2	100	A 2

Mechanical Properties – Glass and Ceramic State	**Glass State**	**Ceramic State****	
		ceramized at 560 °C	**ceramized at 810 °C**
Density ρ in g/cm^3	2.37	–	–
Knoop hardness HK 0.1/20	480	510	500
Vickers hardness HV 0.2/25	520	560	480
E-Modulus in GPa	76.6	81.2	91.0
Poisson number ν	0.20	0.19	0.18

Thermal Properties – Glass State	
Transformation temperature Tg in °C	455
Coefficient of mean linear thermal expansion α (20 °C; 300 °C) in 10^{-6} K^{-1} (Static measurement)	8.49
Thermal conductivity λ in W / (m*K)(ϑ = 90 °C)	1.28

Electrical Properties – Glass and Ceramic State	**Frequency [GHz]**	**Glass State**	**Ceramic State****	
		annealed at 40 °C/h	**ceramized at 560 °C**	**ceramized at 810 °C**
Dielectric constant (Permittivity) ε_r	1	6.4	5.8	5.4
	2	6.4	5.9	5.5
	5	6.3	5.8	5.4
	24	–	5.87	5.41
	77	–	5.61	–
Dissipation factor tan δ (* 10^{-4})	1	84	58	39
	2	90	65	44
	5	109	79	55
	24	–	146	105
	77	–	185	135

** All data subject to change

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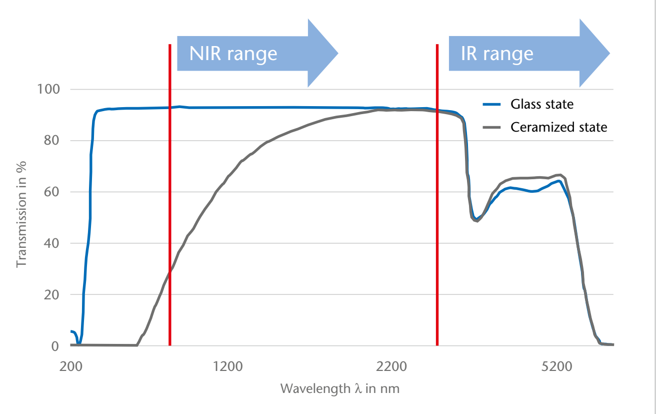
Optical Properties – Glass and Ceramic State

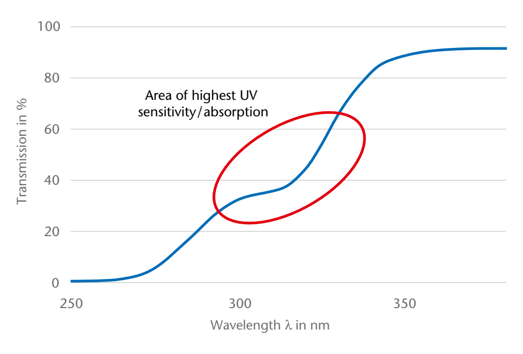
	Wavelength (nm)	Glass State annealed at 40 °C/h	Ceramic State** ceramized at 560 °C	 ceramized at 810 °C
Refractive index	300	1.549	n/a	n/a
	486.1 (n_F)	1.518	1.519	1.532
	546.1 (n_e)	1.515	1.515	1.528
	587.6 (n_d)	1.512	1.513	1.526
	656.3 (n_C)	1.510	1.511	1.523
Spectral transmittance τ (λ) [in %, 1 mm thickness]	t_{250}	0.1	–	0.02
	t_{260}	0.5	–	0.02
	t_{270}	3	–	0.01
	t_{280}	11	–	0.02
	t_{295}	29	–	0.02
	t_{314}	37	–	0.01
	t_{350}	89	–	0.01

** All data subject to change

Transmission curves for processed and unprocessed FOTURAN® II (transmission in %, substrate thickness 1 mm, ceramized at 810 °C***)



Transmission curve of unprocessed FOTURAN® II (transmission in %, substrate thickness 1 mm)



*** Ceramization according to our standard heating protocol

Version September 2017 | SCHOTT reserves the right to make specification changes in this product flyer without notice.

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