Wafer heaters

Basic values:

Parameter	Value
Dimensions	Ø 300 x 8.0 mm
Heated area	Ø 300 x 8.0 mm
T_{max}	500 °C
Remark	two heating circuits

Details of Standard:

Description

The full-ceramic heating elements made from silicon nitride by Bach RC are very suitable for use in semiconductor production plants, especially for wafer bonding: The ceramic heating elements are ground to very good flatness and parallelism. The low thermal expansion of silicon nitride ensures that even at high temperatures, this good flatness and parallelism is preserved and only minimum thermal distortion appears. In addition, the thermal expansion of silicon nitride is well in line with that of silicon, so that also, hardly any relative movement takes place between the wafer and the heating element while heating. Together with the very high-pressure resistance of the ceramic heaters, these properties form the basis for optimum bond homogeneity. The heating close to the wafer makes it possible to keep the thermal mass to be heated low, so that short cycle times and therefore high productivity can be realised. Bach RC offers heating plates for the typical wafer formats, in particular 4"/6"/8" and 12" as standard sizes. We are happy to develop and manufacture other sizes, up to 450 mm diameter, or a special layout of the heating plates, custom-designed for you. Various equipment features can therefore be integrated: Through holes for lift pins, boreholes for integrated temperature sensors, vacuum chuck function, cooling function, design with several separately adjustable heating circuits for optimising the temperature homogeneity, electrostatic discharge from the plate surface, and elements for fixing the heating plate.

- maximum temperature gradient 50 K
* The actual power depends on resistance, temperature and voltage.

Parameter	Value
Article no.	FLR 100 287
Resistance @ 20 °C edge heater	19 Ω ±50 %
Resistance @ 20 °C center heater	19 Ω ±50 %
Nominal voltage	230 V

Parameter	Value
Nominal power @ 20 °C edge heater	2 780 W*
Nominal power @ 20 °C center heater	2 780 W*

Basic Material

Parameter	Scale unit	Si_3N_4
max. temperature (T_{max})	°C	1 000
thermal conductivity (l)	W/mK	40
temperature shock resistance (ΔT)	K	500
emissivity (1 100 °C) (ε)	-	0.96
Young's modulus (E)	GPa	320
bending strength (δ_{BB})	MPa	400
compressive strength (δ_D)	MPa	2 000
coefficient of thermal expansion (α)	10^{-6} K^{-1}	3
density (g)	g/cm³	3.21
specific heat (c_p)	J/kgK	750
porosity (100 - % t.D.)	%	0
critical stress intensity factor (K_{Ic})	MPa $m^{½}$	6
Weibull – modulus (m)	-	7.9

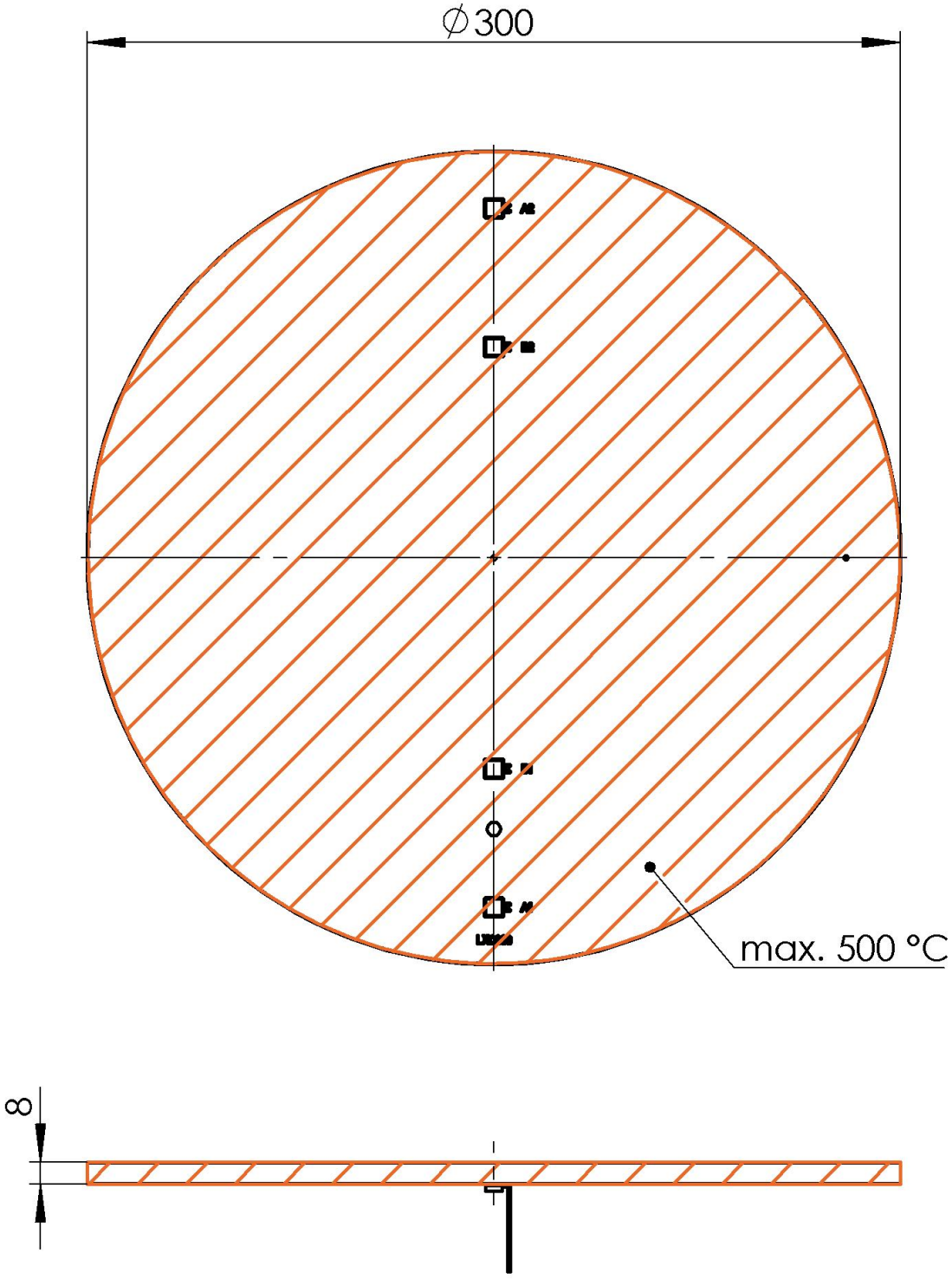
The thermal shock resistance depends on the geometric shape of the heater.

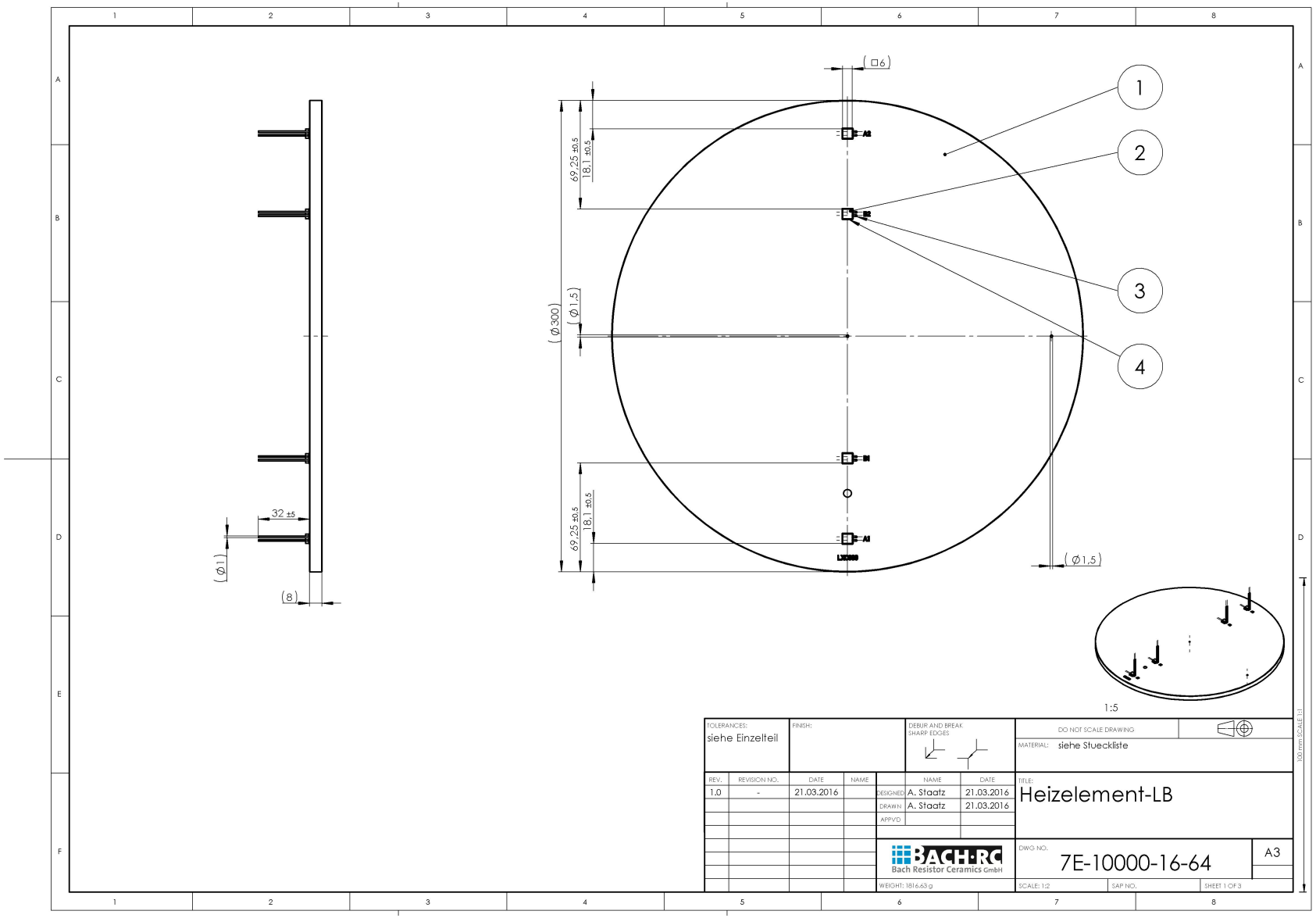
Electrical parameters

Parameter	Scale unit	Si_3N_4
resistivity	Ω cm	$5 \cdot 10^{-3}$ - $5 \cdot 10^{-1}$
isolation resistivity	Ω mm (20 °C)	10^{13}
dielectric strength	kV/mm	25

Emission spectrum

Fully ceramic heating elements are long-wave infrared heaters with a maximum emission of 5 to 10 µm and a radiation coefficient of ε > 0.9.


∅300
max. 500 °C
8


(□6)
1
2
3
4
69,25 ±0,5
18,1 ±0,5
(Ø300)
(Ø1,5)
32 ±5
(Ø1)
(8)
1:5
TOLERANCES: siehe Einzelteil
FINISH:
DEBUR AND BREAK SHARP EDGES
DO NOT SCALE DRAWING
MATERIAL: siehe Stueckliste
REV. 1.0
REVISION NO. -
DATE 21.03.2016
DESIGNED A. Staatz 21.03.2016
DRAWN A. Staatz 21.03.2016
APPVD
TITLE: Heizelement-LB
BACH·RC Bach Resistor Ceramics GmbH
DWG NO. 7E-10000-16-64
A3
WEIGHT: 1816,63 g
SCALE: 1:2
SAP NO.
SHEET 1 OF 3