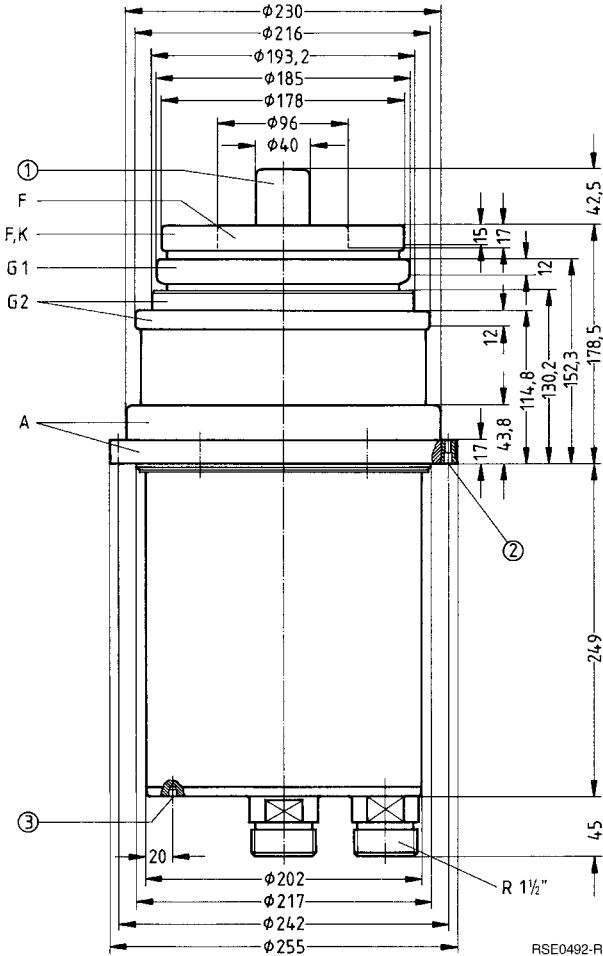


For frequencies up to 220 MHz

Ordering code Q52-X2004

Coaxial metal-ceramic tetrode, water-cooled with integrated cooling jacket, particularly suitable for RF amplifiers up to 220 MHz.



RSE0492-R

Dimensions in mm

- ① Do not use as terminal
- ② 6 tapholes M6 for handle R6Zub204
- ③ Taphole M6 for anode voltage terminal, 5 mm deep

Approx. weight 35 kg

Heating

Heater voltage	U_F	6,5	V
Heater current	I_F	≈ 680	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 600\text{ V}$	I_{em}	160	A
Amplification factor of screen grid at $U_A = 3\text{ kV}$, $U_{G2} = 800\text{ to }1200\text{ V}$, $I_A = 10\text{ A}$	μ_{g2g1}	4,0	
Transconductance at $U_A = 3\text{ kV}$, $U_{G2} = 1000\text{ V}$, $I_A = 10\text{ A}$	s	95	mA/V

Capacitances

Cathode/control grid	C_{kg1}	≈ 205	pF
Cathode/screen grid	C_{kg2}	≈ 22	pF
Cathode/anode	C_{ka}	≈ 1,2	pF ¹⁾
Control grid/screen grid	C_{g1g2}	≈ 230	pF
Control grid/anode	C_{g1a}	≈ 5,0	pF ¹⁾
Screen grid/anode	C_{g2a}	≈ 90	pF

Accessories**Ordering code**

Cathode terminal	RöKat202	C65055-A805-A61
Cathode connecting strip (4 for each tube)	RöKat221	Q81-X1136
Control grid terminal	RöGit202a	Q81-X952
Screen grid terminal	RöGit202b	Q81-X953
Handle	RöZub204	C65055-A761-A72
LL electrolytic target for 1 $\frac{1}{2}$ " hose	RöE11	Q81-X334
LL electrolytic target for 1 $\frac{1}{4}$ " hose	RöE17	Q81-X512

1) Measured by means of a 50 cm diameter screening plate in the screen grid terminal plane.

**RF amplifier,
class B operation, grounded control-grid screen-grid circuit**

Maximum ratings

Frequency	f	220	MHz
Anode voltage (dc)	U_A	9,0	kV
Screen grid voltage (dc)	U_{G2}	1200	V
Control grid voltage (dc)	U_{G1}	- 600	V
Cathode current (dc)	I_K	30	A
Peak cathode current	I_{KM}	160	A
Anode dissipation	P_A	120	kW
Screen grid dissipation	P_{G2}	1200	W
Control grid dissipation	P_{G1}	400	W

Operating characteristics

Frequency	f	200	200	MHz
Output power	P_2	129 + 11 ²⁾	117 + 10 ²⁾	kW ¹⁾
Anode voltage (dc)	U_A	8,5	8,5	kV
Screen grid voltage (dc)	U_{G2}	1100	1100	V
Control grid voltage (dc)	U_{G1}	- 400	- 400	V ³⁾
Peak control grid voltage (ac)	U_{g1m}	600	570	V
Anode current (dc)	I_A	24	23	A
Screen grid current	I_{G2}	0,9	0,6	A
Control grid current (dc)	I_{G1}	0,7	0,4	A
Anode input power	P_{BA}	204	195	kW
Drive power	P_1	0,4 + 11 ²⁾	0,2 + 10 ²⁾	kW ¹⁾
Anode dissipation	P_A	75	78	kW
Screen grid dissipation	P_{G2}	1100	740	W
Control grid dissipation	P_{G1}	120	40	W
Efficiency	η	63	60	%
Anode load resistance	R_A	200	200	Ω

1) Circuit losses are not included.

2) Power transition of the grounded control-grid screen-grid circuit.

3) For zero signal dc anode current $I_{A0} = 3$ A.

**RF amplifier, pulse operation,
class B operation, grounded control-grid screen-grid circuit**

Maximum ratings

Frequency	f	220	MHz
Anode voltage (dc)	U_A	11,5	kV
Screen grid voltage (dc)	U_{G2}	1200	V
Control grid voltage (dc)	U_{G1}	- 600	V
Cathode current (dc)	I_K	50	A
Peak cathode current	I_{KM}	160	A
Anode dissipation	P_A	180	kW
Screen grid dissipation	P_{G2}	1480	W
Control grid dissipation	P_{G1}	500	W

Operating characteristics

Frequency	f	200	MHz
Pulse duration	t_p	1,0	s
Pulse separation	t_0	3,0	s
Pulse output power	P_{2p}	215	kW 1)
Anode voltage (dc)	U_A	9,5	kV
Screen grid voltage (dc)	U_{G2}	1150	V
Control grid voltage (dc)	U_{G1}	- 400	V
Peak pulse control grid voltage (ac)	U_{g1mp}	660	V
Pulse anode current (dc)	I_{Ap}	36	A
Pulse screen grid current (dc)	I_{G2p}	1,0	A
Pulse control grid current (dc)	I_{G1p}	1,0	A
Pulse anode input power	P_{BAp}	342	kW
Pulse drive power	P_{1p}	18	kW 1)
Pulse anode dissipation	P_{Ap}	143	kW
Pulse screen grid dissipation	P_{G2p}	1150	W
Pulse control grid dissipation	P_{G1p}	250	W
Pulse efficiency	η_p	58	%
Anode load resistance	R_A	176	Ω

1) Circuit losses are not included.

Tube mounting

Axis vertical, anode up or down.

When the tube is mounted with the anode up, the connecting piece at the edge has to be used for the water inlet. When the tube is mounted with the anode down, the connecting piece in the middle has to be used.

For connection of the cathode use the terminals listed under "Accessories".

Maximum tube surface temperature

The temperature of the tube's metal-ceramic seals must not exceed 220 °C at any point. Sufficient cooling of the tube terminals has therefore to be provided.

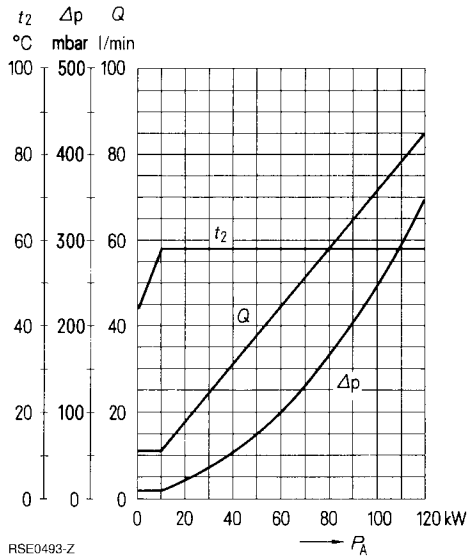
Water cooling

The cooling water diagram is valid for 35 °C water inlet temperature. The water outlet temperature must not exceed 65 °C. The maximum permissible pressure of the cooling water is 5 bar. Please observe instructions on water cooling given under "Explanations on Technical Data".

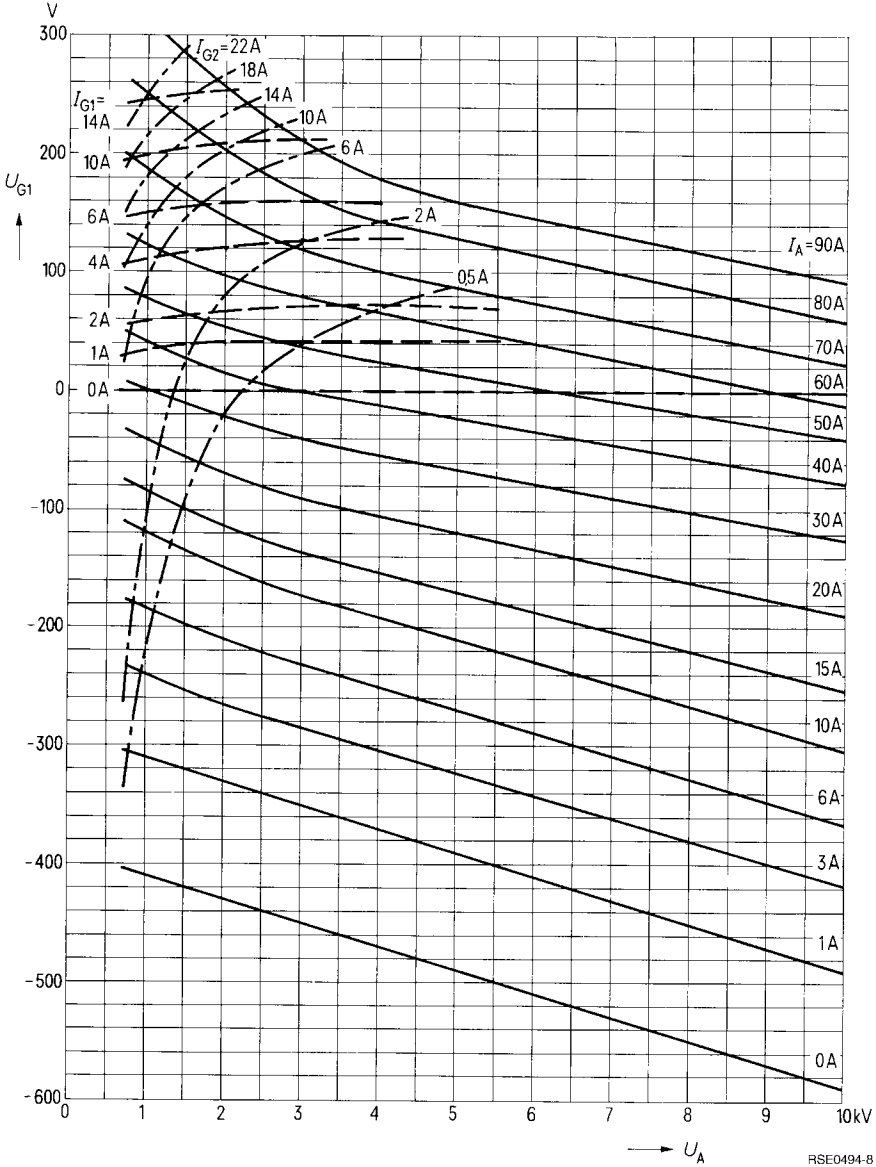
Safety precautions

The section "Safety precautions" under "Explanations on Technical Data" describes how the tube is to be protected against damage due to electric overload or insufficient cooling. A copper wire with 0,20 mm diameter should be used to test the anode overcurrent trip circuit.

Cooling water diagram



$U_{G1} = f(U_A)$
 $U_{G2} = 1100 \text{ V}$
 Parameter = I_A —————
 Parameter = I_{G2} - - - - -
 Parameter = I_{G1} - - - - -



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