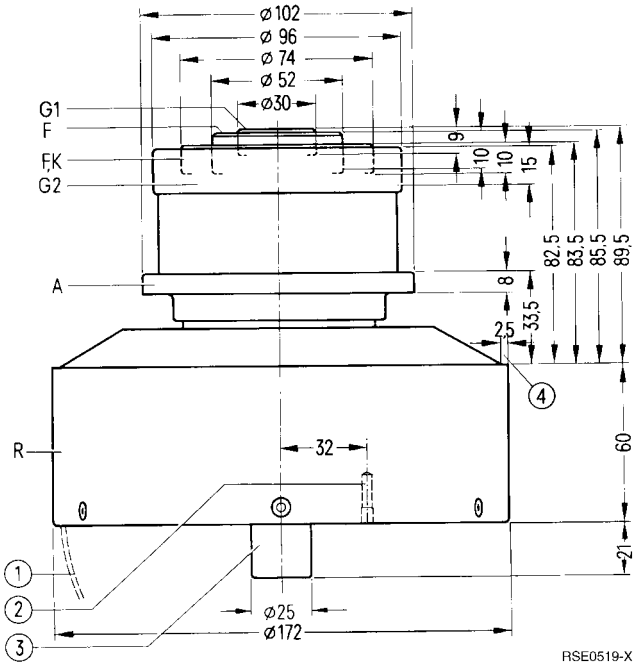
For VHF transmitters in grounded cathode circuit Ordering code Q51-X2034

Coaxial metal-ceramic tetrode, forced-air-cooled, particularly suitable for VHF satellite transmitters up to 160 MHz/8 kW in grounded cathode circuit with grid-current free modulation. For an easy design of the tuned circuit the control grid terminal is coaxially led out within the cathode terminals. A direct dc blocking of the screen grid produced by the external cathode terminal is thereby possible. This arrangement of the terminals also prevents cross coupling of the input and output circuit against the common cathode line inductance.



Dimensions in mm

① Handle, swingable
② Taphole for tube fuse RöSich7
③ Do not use as terminal
④ Free for anode support

Approx. weight 6,7 kg

Radiator and terminals are of concentric design with the following diameters:

Radiator	∅ 173,5	Control grid terminal	∅ 30,6
Anode terminal	∅ 103,0	Heater/cathode terminal	∅ 74,6
Screen grid terminal	∅ 96,6	Heater terminal	∅ 52,5

Heating

Heater voltage	U_F	10	V
Heater current	I_F	≈ 86	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 300$ V	I_{em}	35	A
amplification factor of screen grid at $U_A = 2$ kV, $U_{G2} = 600$ to 1000V, $I_A = 2$ A	μ_{g2g1}	8,0	
Transconductance at $U_A = 2$ kV, $U_{G2} = 800$ V, $I_A = 1,5$ to 2,5 A	s	53	mA/V

Capacitances

Cathode/control grid	c_{kg1}	≈ 95	pF
Cathode/screen grid	c_{kg2}	≈ 45	pF
Cathode/anode	c_{ka}	≈ 0,04	pF [1)]
Control grid/screen grid	c_{g1g2}	≈ 76	pF
Control grid/anode	c_{g1a}	≈ 0,32	pF [1)]
Screen grid/anode	c_{g2a}	≈ 22	pF

Accessories		**Ordering code**
Socket wrench for tube fuse	RöZub09	Q81-X2109
Tube fuse	RöSich7	Q81-X1407
Pull switch for tube fuse	RöKt11	Q81-X1311

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

RF amplifier,
class B operation, grounded cathode circuit, $I_{G1} = 0$

Maximum ratings

Frequency	f	160	MHz
Anode voltage (dc)	U_A	8,0	kV
Screen grid voltage (dc)	U_{G2}	1000	V
Control grid voltage (dc)	U_{G1}	– 250	V
Peak cathode current	$I_{K\,M}$	35	A
Anode dissipation	P_A	12	kW
Screen grid dissipation	P_{G2}	240	W
Control grid dissipation	P_{G1}	50	W

Operating characteristics

Frequency	f	150	MHz
Output power	P_2	9,0	kW [1])
Anode voltage (dc)	U_A	7,0	kV
Screen grid voltage (dc)	U_{G2}	800	V
Control grid voltage (dc)	U_{G1}	– 100	V [2])
Peak control grid voltage (ac)	$U_{g1\,m}$	100	V
Anode current (dc)	I_A	2,0	A
Screen grid current (dc)	I_{G2}	160	mA
Anode input power	$P_{B\,A}$	14	kW
Anode dissipation	P_A	5,0	kW
Screen grid dissipation	P_{G2}	130	W
Efficiency	η	64	%
Anode load resistance	R_A	2000	Ω

1) Circuit losses are not included.
2) For zero signal dc anode current $I_{A\,0} = 0{,}4$ A.

Tube mounting

Axis vertical, anode up or down.

Maximum tube surface temperature

The metal-ceramic seals of the tube must not exceed a temperature of 220 °C at any point, except of the centrally located control grid terminal, the temperature of which must not exceed 280 °C. These requirements can only be met without additional cooling of the terminals if an appropriate air duct and sufficient space between the individual contact springs is provided so that enough cooling air can pass through.

Forced-air cooling

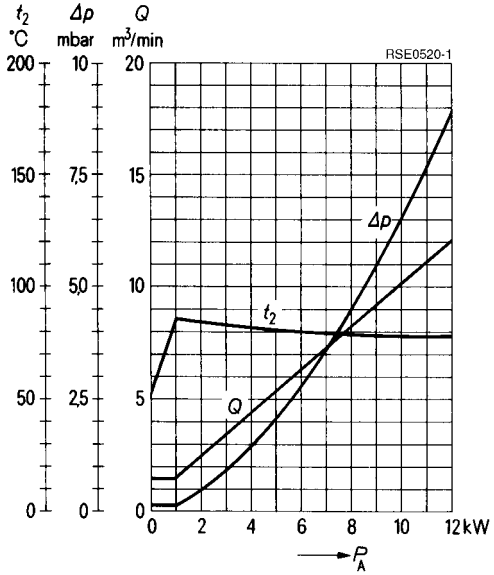
The minimum air flow rate required for maximum anode dissipation is given in the cooling air diagram valid for 25 °C inlet temperature at a normal air pressure of 1 bar (sea level). The cooling air must be supplied from the side of the electrode terminals. For further information on forced air cooling refer to “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.

For protection against thermal anode overload the tube fuse RöSich7 is recommended. In conjunction with pull switch RöKt11 it disconnects the voltages at the tube in case of overload (see accessories).

Cooling air diagram



The cooling air is supplied from the electrode terminal side.

Air pressure = 1 bar
t_1 = 25 °C

$U_{G1} = f(U_A)$ Parameter = I_A ——————————
U_{G2} = 800 V Parameter = I_{G2} — — — — — — —
Parameter = I_{G1} —·—·—·—·—·—