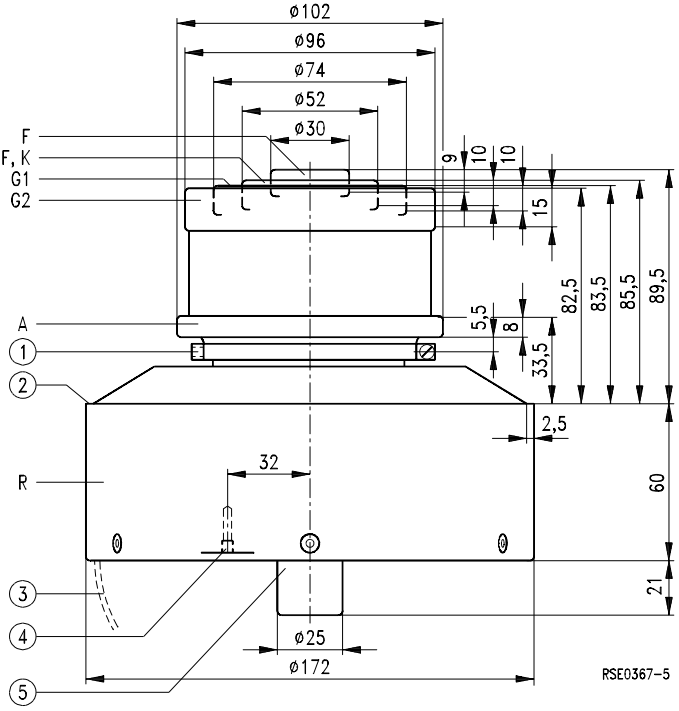
Ordering code Q51-X2016

Coaxial metal-ceramic tetrode, forced-air-cooled, for frequencies up to 300 MHz. Due to the low feedback capacitance c_{g1a} the tube is also suitable for use in grounded cathode circuit. To achieve a long service life, the cathode is especially designed for operation with controlled heating power .



Dimensions in mm

① Taphole M4 for tube fuse RöSich10
② Free for anode support
③ Handle, swingable
④ Taphole for tube fuse RöSich7
⑤ Do not use as terminal

Approx. weight 6,7 kg

The radiator and the terminals are of concentric design with the following diameters:

Radiator	Ø 173,5	Control grid terminal	Ø 75,0
Anode terminal	Ø 103,0	Heater/cathode terminal	Ø 52,6
Screen grid terminal	Ø 97,0	Heater terminal	Ø 30,6

Heating

Heater voltage	U_F	9,5	V
Heater current	I_F	≈ 80	A
Heating: direct			
Cathode: thoriated tungsten			

Kennwerte

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}	≈ 78	pF
Cathode/screen grid	c_{kg2}	≈ 5,5	pF
Cathode/anode	c_{ka}	≈ 0,04	pF [1])
Control grid/screen grid	c_{g1g2}	≈ 115	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
Socket wrench for tube fuse	RöZub10	Q81-X2110
Tube fuse	RöSich7	Q81-X1407
Tube fuse	RöSich10	Q81-X1410
Pull switch for tube fuse	RöKt11	Q81-X1311
Spring-finger contacts:		
Internal cathode terminal		C65055-A815-C901
External cathode terminal		C65055-A815-C902
Control grid terminal		C65055-A815-C903
Screen grid terminal		C65055-A815-C904

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

Maximum ratings

Frequency	f	110	MHz
Anode voltage (dc)	U_A	9,0	kV
Screen grid voltage (dc)	U_{G2}	1000	V
Control grid voltage (dc)	U_{G1}	– 250	V
Cathode current (dc)	I_K	6,0	A
Peak cathode current	$I_{K\,M}$	35	A
Anode dissipation	P_A	12	kW
Screen grid dissipation	P_{G2}	270	W
Control grid dissipation	P_{G1}	70	W

Operating characteristics

Frequency	f	≤ 110	MHz
Output power	P_2	12	kW [1])
Anode voltage (dc)	U_A	7,5	kV
Screen grid voltage (dc)	U_{G2}	800	V
Control grid voltage (dc)	U_{G1}	– 100	V [2])
Peak control grid voltage (ac)	$U_{g1\,m}$	110	V
Anode current (dc)	I_A	2,3	A
Screen grid current (dc)	I_{G2}	200	mA
Control grid current (dc)	I_{G1}	50	mA
Anode input power	$P_{B\,A}$	17,2	kW
Drive power	P_1	5,0	W [3])
Anode dissipation	P_A	5,2	kW
Screen grid dissipation	P_{G2}	160	W
Efficiency	η	70	%
Anode load resistance	R_A	1800	Ω

1) Circuit losses are not included.
2) For zero signal dc anode current $I_{A\,0}$ = 0,4 A.
3) Additional loss in the grid circuit is not taken into consideration.

Tube mounting

Axis vertical, anode up or down.

Spring-finger contacts can be ordered for cavity design (accessories).

Maximum tube surface temperature

The temperature of the tube's metal-ceramic seals must not exceed 220 °C at any point and the temperature of the internal cathode terminal must not exceed 250 °C. These requirements can 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

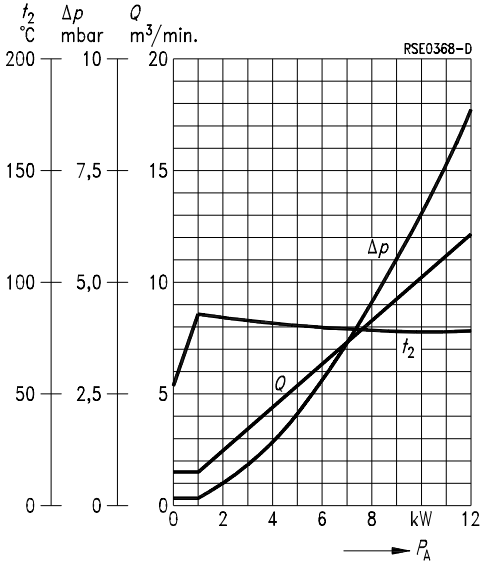
The section "Safety precautions" under "Explanations on Technical Data" describes how the tube is to be protected against damage due to electric overload or insufficient cooling. A copper wire with 0,20 mm diameter should be used to test the anode overcurrent trip circuit.

For protection against thermal anode overload the tube fuse RöSich7/RöSich10 is recommended. In conjunction with pull switch RöKt11 it disconnects the voltages at the tube in case of overload (accessories).

Service life warranty

For higher claims under warranty concerning the guaranteed service life it has to be ensured that the tube is operated in transmitters with controlled heating power.

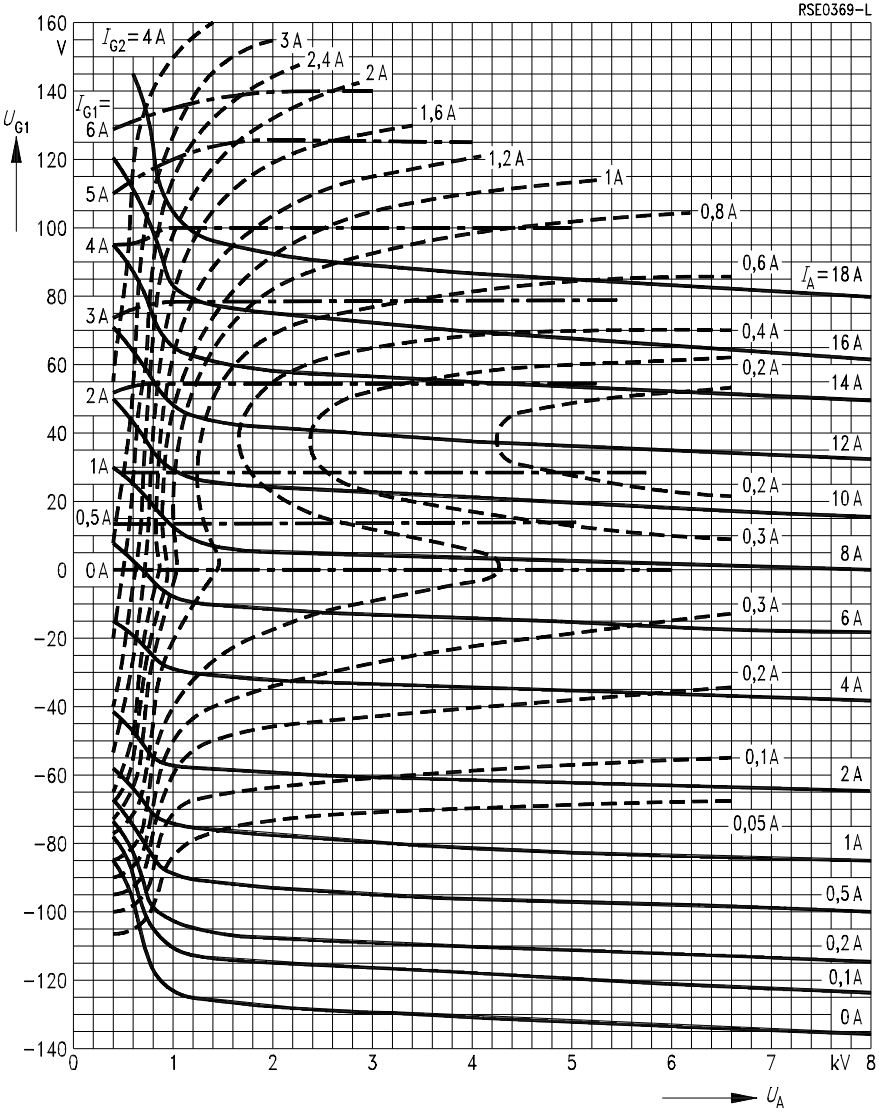
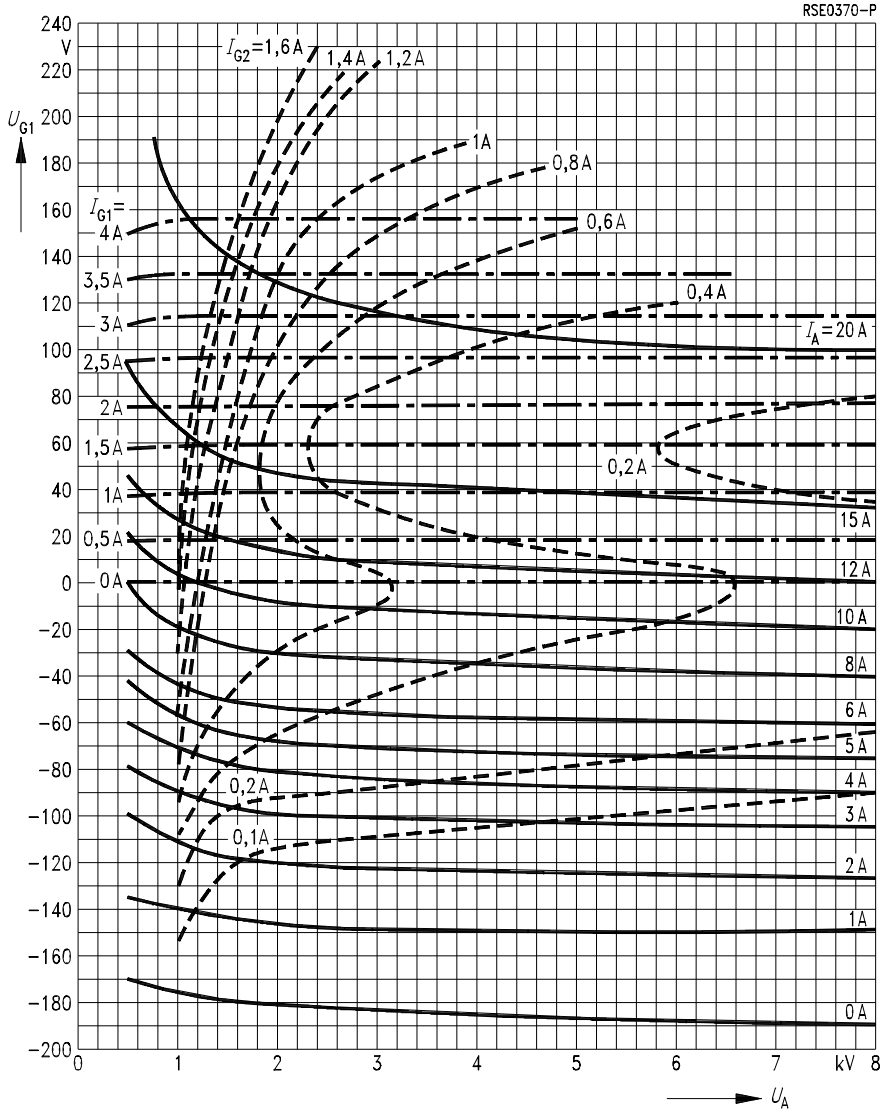
Cooling air diagram



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} —·—·—·—·—·—·—



$U_{G1} = f(U_A)$ Parameter = I_A ————————
$U_{G2} = 1000$ V Parameter = I_{G2} — — — — — — —
Parameter = I_{G1} —·—·—·—·—·—·—