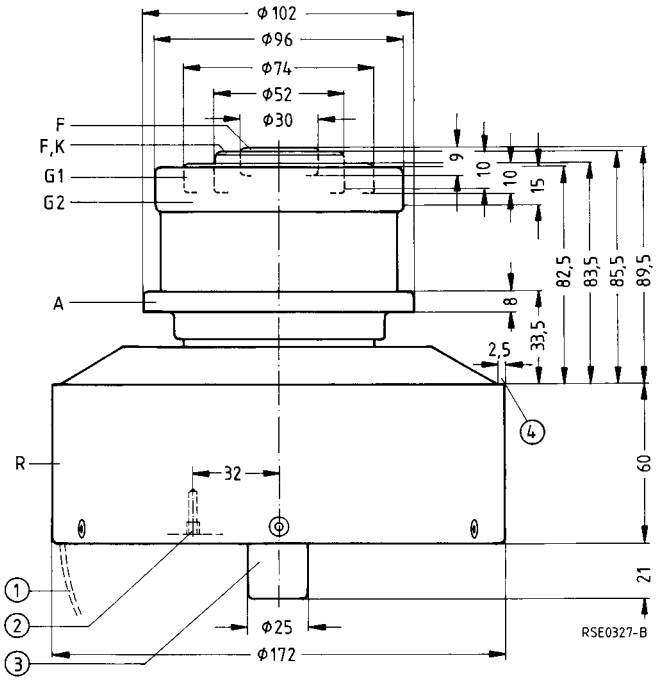
For frequencies up to 300 MHz Ordering code Q51-X2022

Coaxial metal-ceramic tetrode for frequencies up to 300 MHz, forced-air-cooled; particularly suitable for TV transmitters in grounded control-grid screen-grid circuit.



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

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	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 1000 V, $I_A = 3$ A	μ_{g2g1}	8,4	
Transconductance at $U_A = 2$ kV, $U_{G2} = 800$ V, $I_A = 2{,}5$ to 3,5 A	s	70	mA/V

Capacitances

Cathode/control grid	c_{kg1}	≈ 76	pF
Cathode/screen grid	c_{kg2}	≈ 5,5	pF
Cathode/anode	c_{ka}	≈ 0,07	pF [1])
Control grid/screen grid	c_{g1g2}	≈ 126	pF
Control grid/anode	c_{g1a}	≈ 0,75	pF [1])
Screen grid/anode	c_{g2a}	≈ 21	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
Cavity band III, 10 kW vision	TK4801	Q94-X4801
5 kW vision/sound	TK4801	Q94-X4801
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 30 cm diameter screening plate in the screen-grid terminal plane.

TV vision transmitter,
grounded control-grid screen-grid circuit, negative modulation

Maximum ratings

Frequency	f	250	MHz
Anode voltage (dc)	U_A	5,5	kV [1]
Screen grid voltage (dc)	U_{G2}	1000	V [1]
Control grid voltage (dc)	U_{G1}	– 250	V
Cathode current (dc)	I_K	8,0	A
Peak cathode current	$I_{K\,M}$	35	A
Anode dissipation	P_A	12	kW
Screen grid dissipation	P_{G2}	150	W
Control grid dissipation	P_{G1}	50	W

Operating characteristics

Frequency	f	220	220	220	MHz
Bandwidth (– 3 dB)	B	12	18	12	MHz [2]
Bandwidth (– 1,2 dB)	B	7,0	10	7,0	MHz [2]
Output power, sync. level	$P_{2\,SY}$	16+0,63[3])[8]	12+0,53[3]	12+0,42[3]	kW [4]
Output power, black level	$P_{2\,SW}$	9+0,36[3]	6,6+0,29[3]	6,6+0,22[3]	kW [4] [5]
Anode voltage (dc)	U_A	5,2	4,0	4,8	kV [1]
Screen grid voltage (dc)	U_{G2}	900	800	800	V [1]
Control grid voltage (dc)	U_{G1}	– 85	– 75	– 75	V [6]
Peak control grid voltage (ac), sync. level	$U_{g1\,m\,SY}$	170	140	130	V
Anode current (dc), black level	$I_{A\,SW}$	3,8	3,7	3,1	A [5]
Screen grid current (dc), black level	$I_{G2\,SW}$	120	110	100	mA [5]
Control grid current (dc), black level	$I_{G1\,SW}$	50	60	30	mA [5]
Anode input power, black level	$P_{B\,A\,SW}$	19,8	14,9	14,9	kW [5]
Drive power, sync. level	$P_{1\,SY}$	46+630[3]	30+530[3]	10+420[3]	W [7]
Anode dissipation, black level	$P_{A\,SW}$	10,8	8,3	8,3	kW [5]
Screen grid dissipation, black level	$P_{G2\,SW}$	110	88	80	W [5]
Control grid dissipation, black level	$P_{G1\,SW}$	2,0	25	2,0	W [5]
Anode load resistance	R_A	570	400	600	Ω

1) Voltage measurement against cathode.
2) Bandwidth calculated from tube capacitance c_{g2a}.
3) Power transition of grounded grid circuit.
4) Circuit losses are not included.
5) Black level with gated sync. pulses.
6) For zero signal dc anode current $I_{A\,0}$ = 1,6 A.
7) Output power required from driver stage.
8) 5 % compression of the sync. pulse can be expected. Linearity of color subcarrier ≥ 0,9.

Combined vision and sound amplifier for TV translators, grounded control-grid screen-grid circuit, vision-to-sound ratio 10:1

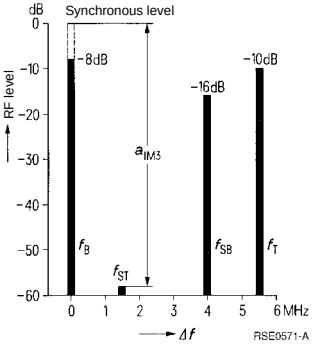
Maximum ratings

Frequency	f	250	MHz
Anode voltage (dc)	U_A	5,5	kV
Screen grid voltage (dc)	U_{G2}	1000	V
Control grid voltage (dc)	U_{G1}	– 250	V
Cathode current (dc)	I_K	8,0	A
Peak cathode current	$I_{K\,M}$	35	A
Anode dissipation	P_A	12	kW
Screen grid dissipation	P_{G2}	150	W
Control grid dissipation	P_{G1}	50	W

Operating characteristics

Frequency	f	220	220	MHz
Bandwidth	B	10	10	MHz
Output power, sync. level	$P_{2\,SY}$	5,5/0,55	2,2/0,22	kW [1]
3-tone intermodulation ratio	a_{IM3}	≥ 58	≥ 60	dB [2]
Anode voltage (dc)	U_A	4,7	3,6	kV
Screen grid voltage (dc)	U_{G2}	850	850	V
Control grid voltage (dc)	U_{G1}	– 70	– 70	V [3]
Anode current (dc), black level	$I_{A\,SW}$	2,8	2,25	A
Screen grid current (dc), black level	$I_{G2\,SW}$	80	0	mA
Control grid current (dc), black level	$I_{G1\,SW}$	20	0	mA
Anode input power, black level	$P_{B\,A\,SW}$	13,2	8,1	kW
Drive power, sync. level	$P_{1\,SY}$	150	90	W
Drive power, sound	$P_{1\,Ton}$	15	9,0	W
Anode dissipation, black level	$P_{A\,SW}$	9,6	6,7	kW
Anode load resistance	R_A	600	500	Ω

Level diagram



1) Power at transmitter output with 90 % circuit efficiency.
2) Level of the largest in-band intermodulation product below the peak sync. level, as measured in accordance with specification FTZ 176 Pfl 2 of the German Telekom , with a distortionless input signal;
f_B: – 8 dB,
f_{SB}: – 16 dB,
f_T: – 10 dB.
3) For zero signal dc anode current $I_{A\,0}$ = 2,2 A.

Tube mounting

Axis vertical, anode up or down.

The cavity TK 4801 is available for tube operation in TV band III (see accessories).

Maximum tube surface temperature

The temperature of the 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

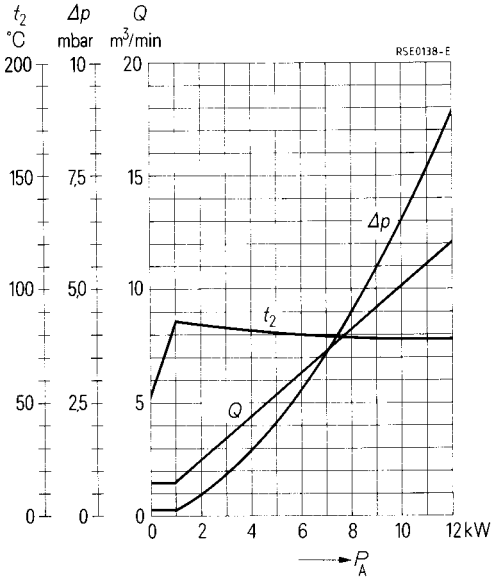
The minimum air flow rate required for maximum anode dissipation is given in the cooling air diagram valid for 25 °C inlet temperature at a normal air pressure of 1 bar (sea level). The cooling air must be supplied from the side of the electrode terminals. For further information on forced-air cooling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

$U_{G1} = f(U_A)$
U_{G2} = 800 V

Parameter = I_A ——————
Parameter = I_{G2} —∘—∘—∘—∘—∘—
Parameter = I_{G1} — — — — — — —