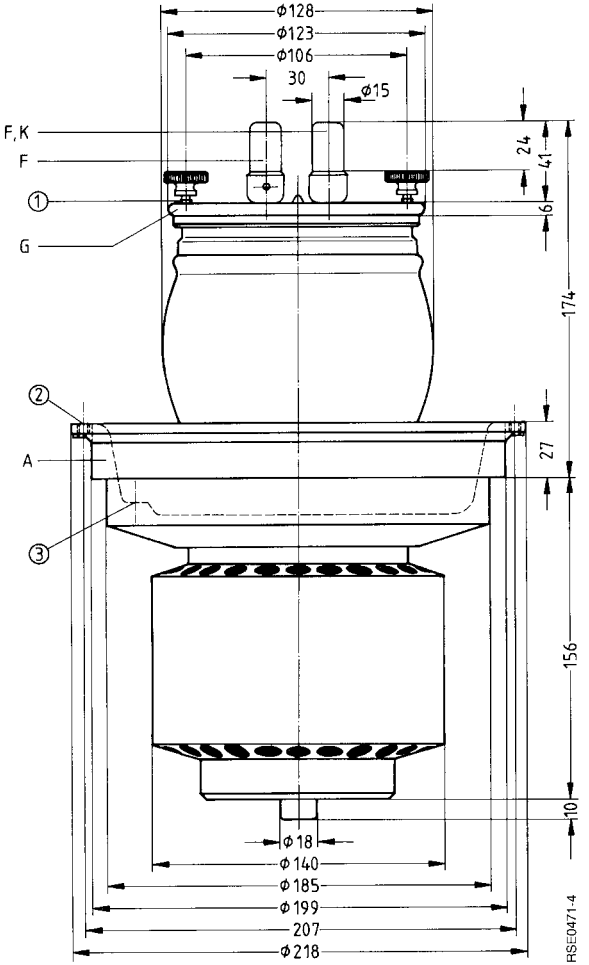
Ordering code Q53-X1081

Vapor-cooled triode with coaxial grid lead-through, particularly suitable for RF amplifiers and modulators.

When used as RF amplifier, the tube can be operated at 15 kV up to 10 MHz and at 12 kV up to 30 MHz.



Dimensions in mm

① 12 tapholes M5 (12 × 30°)
② Taphole M6 for screw-in handle RöZub31V
③ Taphole M5 for tube fuse RöSich4

Approx. weight 13 kg

Heating

Heater voltage	U_F	8,0	V
Heater current	I_F	≈ 115	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_G = 450$ V	I_{em}	30	A
Amplification factor at $U_A = 1$ to 6 kV, $I_A = 1$ A	μ	45	
Transconductance at $U_A = 3$ kV, $I_A = 1$ A	s	35	mA/V

Capacitances

Cathode/grid	c_{kg}	≈ 80	pF
Cathode/anode	c_{ka}	≈ 1,0	pF [1])
Grid/anode	c_{ga}	≈ 33	pF

Accessories		**Ordering code**
Mounting instruction	RöMo64	
Mounting instruction	RöMo75	
Cathode connecting strip (2 for each tube)	RöKat221	Q81-X1136
Socket wrench for tube fuse	RöZub10	Q81-X2110
Handle	RöZub31V	Q81-X2133
Tube fuse	RöSich4	Q81-X1404
Pull switch for tube fuse	RöKt11	Q81-X1311
Boiler	RöKüV221	Q81-X1681
Insulating pipe at water inlet	RöKüV31Zub4	Q81-X1634
Union at water inlet	RöKüV31Zub7	Q81-X1637
Insulating pipe at vapor outlet	RöKüV201Zub3	Q81-X1673
Gasket at vapor outlet	RöKüV201Zub8	Q81-X1678
Insulator	RöKüV221Zub5K	Q81-X1686
Water level stabilizer with control electrodes	RöZubV4	Q81-X2105
LL electrolytic target	RöEl21	C65055-A667-A21
Gasket ring for boiler	RöN9373	C65051-A182-C506

1) Measured by means of a 30 cm × 30 cm screening plate in the grid terminal plane.

RF amplifier,
class B operation, grounded cathode circuit

Maximum ratings

Frequency	f	10	30	MHz
Anode voltage (dc)	U_A	15	12,5	kV
Grid voltage (dc)	U_G	– 1000	– 1000	V
Cathode current (dc)	I_K	8,0	8,0	A
Peak cathode current	$I_{K M}$	30	30	A
Anode dissipation	P_A	45	45	kW
Grid dissipation	P_G	500	500	W

Operating characteristics

Frequency	f	≤ 30	≤ 30	≤ 30	MHz
Output power	P_2	45	45	35	kW [1])
Anode voltage (dc)	U_A	12	10	8,0	kV
Grid voltage (dc)	U_G	– 250	– 200	– 160	V
Peak grid voltage (ac)	$U_{g m}$	560	550	510	V
Anode current (dc)	I_A	5,15	6,25	6,2	A
Grid current (dc)	I_G	1,0	1,25	1,35	A
Anode input power	$P_{B A}$	61,8	62,5	49,6	kW
Drive power	P_1	500	630	620	W [1])
Anode dissipation	P_A	16,8	17,5	14,6	kW
Grid dissipation	P_G	260	380	400	W
Efficiency	η	73	72	71	%
Anode load resistance	R_A	1470	1000	800	Ω

1) Circuit losses are not included.

RF amplifier,
class C operation, grounded cathode circuit

Maximum ratings

Frequency	f	10	30	MHz
Anode voltage (dc)	U_A	15	12,5	kV
Grid voltage (dc)	U_G	– 1000	– 1000	V
Cathode current (dc)	I_K	8,0	8,0	A
Peak cathode current	$I_{K M}$	30	30	A
Anode dissipation	P_A	45	45	kW
Grid dissipation	P_G	500	500	W

Operating characteristics

Frequency	f	≤ 30	≤ 30	≤ 30	MHz
Output power	P_2	45	35	26	kW [1])
Anode voltage (dc)	U_A	12	10	8,0	kV
Grid voltage (dc)	U_G	– 450	– 415	– 380	V
Peak grid voltage (ac)	$U_{g m}$	780	740	700	V
Anode current (dc)	I_A	4,6	4,4	4,2	A
Grid current (dc)	I_G	0,95	0,95	0,95	A
Anode input power	$P_{B A}$	55,2	44	33,6	kW
Drive power	P_1	685	650	610	W [1])
Anode dissipation	P_A	10,2	9,0	7,6	kW
Grid dissipation	P_G	260	255	250	W
Efficiency	η	81,5	79,5	77,5	%
Anode load resistance	R_A	1395	1210	1000	Ω

1) Circuit losses are not included.

Anode voltage modulation, grounded cathode circuit

Maximum ratings

Frequency	f	30	MHz
Anode voltage (dc)	U_A	10,5	kV
Grid voltage (dc)	U_G	– 1000	V
Cathode current (dc)	I_K	8,0	A
Peak cathode current	$I_{K\,M}$	30	A
Anode dissipation	P_A	45	kW
Grid dissipation	P_G	500	W

Operating characteristics

Frequency	f	≤ 30	MHz
Carrier power	P_{trg}	22	kW [1]
Anode voltage (dc)	U_A	10	kV
Grid bias (dc), fixed	$U_{G\,fix}$	– 195	V
Grid resistance	R_G	300	Ω
Peak grid voltage (ac)	$U_{g\,m}$	775	V
Anode current (dc)	I_A	2,75	A
Grid current (dc)	I_G	1,0	A
Anode input power	$P_{B\,A}$	27,5	kW
Drive power	P_1	725	W [1]
Anode dissipation	P_A	5,5	kW [2]
Grid dissipation	P_G	230	W
Efficiency	η	80	%
Anode load resistance	R_A	2230	Ω
Modulation factor	m	100	%
Modulation power	P_{mod}	13,75	kW
Grid current (dc)	I_G	1,2	A [3]
Drive power	P_1	940	W [1] [3]
Grid current (dc)	I_G	0,85	A [4]
Drive power	P_1	605	W [1] [4]

1) Circuit losses are not included.
2) Even during modulation the indicated maximum ratings must not be exceeded. It has to be observed that during 100 % modulation the plate dissipation increases to about 1,5 times the power dissipation stated for the carrier value.
3) Maximum values at U_A = 0 V.
4) Maximum values at peak modulation.

AF amplifier and modulator,
class B operation, 2 tubes in push-pull circuit

Maximum ratings

Anode voltage (dc)	U_A	12	kV
Grid voltage (dc)	U_G	– 1000	V
Cathode current (dc)	I_K	8,0	A
Peak cathode current	$I_{K\,M}$	30	A
Anode dissipation	P_A	45	kW
Grid dissipation	P_G	500	W

Operating characteristics

P_2	0	80	0	60	0	55	kW
U_A	10	10	10	10	8,0	8,0	kV
U_G	– 185	– 185	– 185	– 185	– 150	– 150	V
$U_{gg\,m}$	0	2×485	0	2×425	0	2×430	V
I_A	$2 \times 0,3$	$2 \times 6,3$	$2 \times 0,3$	$2 \times 4,5$	$2 \times 0,3$	$2 \times 5,4$	A
I_G	0	$2 \times 0,9$	0	$2 \times 0,65$	0	$2 \times 0,9$	A
$I_{G\,M}$	0	$2 \times 4,5$	0	$2 \times 3,4$	0	$2 \times 4,3$	A
$P_{B\,A}$	2×3	2×63	2×3	2×45	$2 \times 2,4$	$2 \times 43,2$	kW
P_1	0	2×380	0	2×240	0	2×335	W
P_A	2×3	2×23	2×3	2×15	$2 \times 2,4$	$2 \times 15,7$	kW
P_G	0	2×220	0	2×125	0	2×200	W
η	–	63,5	–	66,6	–	64	%
R_{AA}	–	1600	–	2410	–	1535	Ω

Tube mounting

Axis vertical, anode down.

For connection of the cathode use the terminals listed under “Accessories”.

For connecting the grid, M5 tapholes are provided at the grid terminal ring; knurled head screws are included in delivery.

Maximum tube surface temperature

The temperature of the tube’s glass and metal parts and of the cathode terminals must not exceed 220 °C at any point.

Vapor cooling

Cooling data for maximum anode dissipation	$P_{A\,max}$ = 45 kW
Total power to be dissipated by the cooling system ($P_A + P_G + 0{,}8\ P_F$)	46,2 kW
Equivalent thermal output	2770 kJ/min (665 kcal/min)
Flow rate of returning water	
at returning water temperature of 20 °C	approx. 1,1 l/min
at returning water temperature of 90 °C	approx. 1,3 l/min
Volume of generated vapor	
at returning water temperature of 20 °C	approx. 1,8 m^3/min
at returning water temperature of 90 °C	approx. 2,1 m^3/min

Detailed information on vapor cooling upon request. Please observe instructions on vapor 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 0,26 mm diameter should be used to test the anode overcurrent trip circuit.

For protection against thermal anode overload the tube fuse RöSich4 is recommended. In conjunction with pull switch RöKt11 it disconnects the voltages at the tube in case of overload (see accessories).

$U_G = f(U_A)$ Parameter = I_A ——————————
Parameter = I_G — — — — — — —