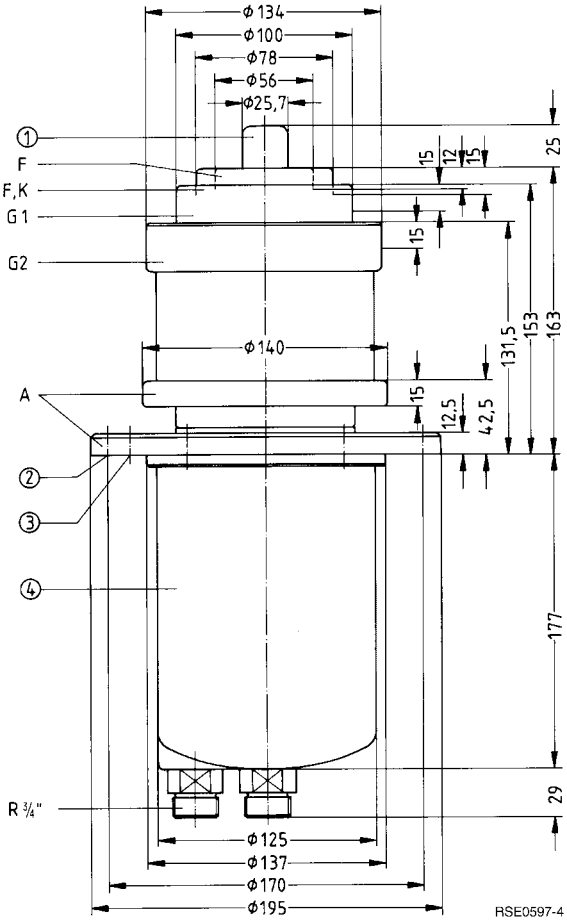
For broadcast and single-sideband transmitters Ordering code Q52-X1084

Coaxial metal-ceramic tetrode, water-cooled with integrated cooling jacket, for frequencies up to 250 MHz; particularly suitable for broadcast and single-sideband transmitters up to 60 kW medium and short wave.



Dimensions in mm

① Do not use as terminal
② 6 fixing holes, 11 mm dia. (6 × 60°)
③ Taphole M6 for screw-in handle RöZub184
④ Do not use boiler as anode terminal

Approx. weight 8,4 kg

Heating

Heater voltage	U_F	12,5	V
Heater current	I_F	≈ 200	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 550$ V	I_{em}	100	A
Amplification factor of screen grid at $U_A = 3$ kV, $U_{G2} = 800$ to 1200 V, $I_A = 3$ A	μ_{g2g1}	6,6	
Transconductance at $U_A = 3$ kV, $U_{G2} = 1200$ V, $I_A = 3$ A	s	84	mA/V

Capacitances

Cathode/control grid	c_{kg1}	≈ 136	pF
Cathode/screen grid	c_{kg2}	≈ 12	pF
Cathode/anode	c_{ka}	≈ 0,3	pF [1)]
Control grid/screen grid	c_{g1g2}	≈ 165	pF
Control grid/anode	c_{g1a}	≈ 1,9	pF [1)]
Screen grid/anode	c_{g2a}	≈ 43	pF

Accessories		**Ordering code**
Internal cathode terminal	RöKat82a	Q81-X1182
External cathode terminal	RöKat82b	Q81-X1184
Header socket for cathode and control grid with cathode blocking	RöKat82c	Q81-X1183
Control grid terminal	RöGit82a	Q81-X982
Screen grid terminal	RöGit82b	Q81-X983
Screen grid terminal with blocking	RöGit82d	Q81-X985
SW header socket with screen grid blocking against control grid	RöKpf82G	Q81-X1852
SW header socket with screen grid blocking against cathode	RöKpf82K	Q81-X1851
SW header socket with screen grid blocking against cathode	RöKpf184C	Q81-X1853
Cathode connecting strip (2 for each tube)	RöKat363	Q81-X1174
LL electrolytic target for 3/4″ hose	RöEl3	Q81-X336
Handle	RöZub184	Q81-X2119

1) Measured by means of a 40 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	10	40	MHz
Anode voltage (dc)	U_A	16	12	kV
Screen grid voltage (dc)	U_{G2}	1600	1400	V
Control grid voltage (dc)	U_{G1}	– 350	– 350	V
Cathode current (dc)	I_K	15	15	A
Peak cathode current	$I_{K\,M}$	100	100	A
Anode dissipation	P_A	70	70	kW [6])
Screen grid dissipation	P_{G2}	750	750	W
Control grid dissipation	P_{G1}	350	350	W

Operating characteristics

Frequency	f	≤ 10	≤ 40	MHz
Output power	P_2	75	55	kW [1])
Anode voltage (dc)	U_A	14	11	kV
Screen grid voltage (dc)	U_{G2}	1500	1200	V
Control grid voltage (dc)	U_{G1}	– 300 [2])	– 190 [3])	V
Peak control grid voltage (ac)	$U_{g1\,m}$	240	165	V
Anode current (dc)	I_A	7,6	7,7	A
Screen grid current (dc)	I_{G2}	0,4	0,1	A
Anode input power	$P_{B\,A}$	106	85	kW
Drive power	P_1	580 [4])	400 [5])	W [1])
Anode dissipation	P_A	31	30	kW
Screen grid dissipation	P_{G2}	600	120	W
Efficiency	η	71	65	%
Anode load resistance	R_A	1040	368	Ω

1) Circuit losses are not included.
2) For zero signal dc plate current $I_{A\,0}$ = 0,4 A.
3) For zero signal dc plate current $I_{A\,Leer}$ = 2,0 A.
4) Necessary drive power at 50 Ω tube 0 preloading.
5) Necessary drive power at 35 Ω tube input preloading.
6) Higher max. ratings may be released upon request.

Anode and screen grid modulation, class C operation, grounded cathode circuit

Maximum ratings

Frequency	f	30	MHz
Anode voltage (dc)	U_A	10,5	kV
Screen grid voltage (dc)	U_{G2}	900	V
Control grid voltage (dc)	U_{G1}	– 500	V
Cathode current (dc)	I_K	15	A
Peak cathode current	$I_{K\,M}$	100	A
Anode dissipation	P_A	70	kW [6]
Screen grid dissipation	P_{G2}	750	W
Control grid dissipation	P_{G1}	350	W

Operating characteristics

Frequency	f	≤ 30	MHz
Carrier power	P_{trg}	66	kW [1]
Anode voltage (dc)	U_A	10	kV
Screen grid voltage (dc)	U_{G2}	800	V
Control grid bias (dc), fixed	$U_{G1\,fix}$	– 300	V
Control grid resistance	R_{G1}	250	Ω
Peak control grid voltage (ac)	$U_{g1\,m}$	500	V
Anode current (dc)	I_A	8,2	A
Screen grid current (dc)	I_{G2}	550	mA
Control grid current (dc)	I_{G1}	360	mA
Anode input power	$P_{B\,A}$	82	kW
Drive power	P_1	160	W [1]
Anode dissipation	P_A	16	kW [2]
Screen grid dissipation	P_{G2}	440	W
Control grid dissipation	P_{G1}	20	W
Efficiency	η	80	%
Anode load resistance	R_A	650	Ω
Modulation factor	m	100	%
Peak screen grid voltage (ac)	$U_{g2\,m}$	500	V [3]
Modulation power	P_{mod}	41	kW
Control grid current (dc)	I_{G1}	400	mA [4]
Drive power	P_1	180	W [1] [4]
Anode dissipation at modulation	$P_{A\,mod}$	28	kW [5]
Screen grid dissipation at modulation	$P_{G2\,mod}$	660	W [5]

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) Screen grid modulation via separate transformer winding.
4) Maximum values at U_A = 0 V.
5) Average values m = 100 %.
6) Higher max. ratings may be released upon request.

RF linear amplifier,
single-sideband modulation, grounded cathode circuit, $I_{G1} = 0$

Maximum ratings

Frequency	f	30	MHz
Anode voltage (dc)	U_A	12	kV
Screen grid voltage (dc)	U_{G2}	1400	V
Control grid voltage (dc)	U_{G1}	– 350	V
Cathode current (dc)	I_K	15	A
Peak cathode current	$I_{K\,M}$	100	A
Anode dissipation	P_A	70	kW [4]
Screen grid dissipation	P_{G2}	750	W
Control grid dissipation	P_{G1}	350	W

Operating characteristics		I	II [1]	III [1]	
Output power	P_2	0	44	22	kW [2]
Anode voltage (dc)	U_A	10	10	10	kV
Screen grid voltage (dc)	U_{G2}	1200	1200	1200	V
Control grid voltage (dc)	U_{G1}	– 170	– 170	– 170	V
Peak control grid voltage (ac)	$U_{g1\,m}$	0	150	150	V
Anode current (dc)	I_A	2,6	7,0	4,5	A
Screen grid current (dc)	I_{G2}	0	300	100	mA
Anode input power	$P_{B\,A}$	26	70	45	kW
Anode dissipation	P_A	26	26	23	kW
Screen grid dissipation	P_{G2}	0	360	120	W
Efficiency	η	–	63	49	%
Anode load resistance	R_A	–	730	730	Ω
Third order intermodulation product	d_3	–	–	≥ 34	dB [3]
Fifth order intermodulation product	d_5	–	–	≥ 44	dB [3]

I No modulation
II 1-tone modulation
III 2-tone modulation

1) Carrier suppressed.
2) Circuit losses are not included.
3) Level of non-linear cross talk resulting from third and fifth order intermodulation products as measured by the 2-tone method at f = 30 MHz.
4) Higher max. ratings may be released upon request.

Tube mounting

Axis vertical, anode up or down.

For connection of the tube use the header sockets listed under “Accessories”. For application in modulators individual connectors may be used if sufficient cooling is provided.

Maximum tube surface temperature

The temperature of the tube’s metal-ceramic seals must not exceed 220 °C at any point. The header sockets for transmitter operation are equipped with an air inlet port through which the cooling air is evenly distributed over the connectors. The air flow rate required to keep below the specified maximum temperature is 0,6 m^3/min at a pressure drop of 1,5 mbar. If separate connectors are used, an evenly distributed air flow across these parts must be provided.

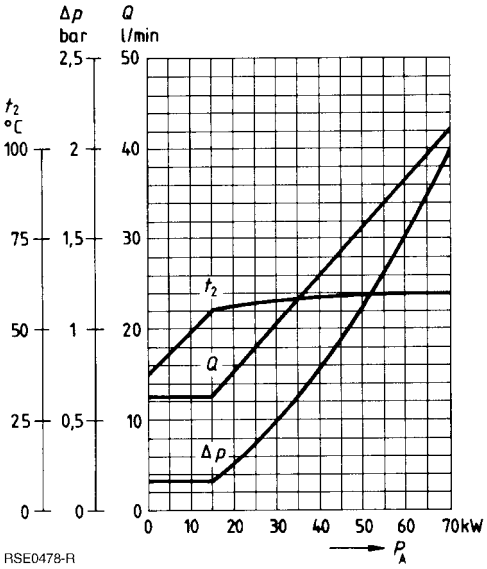
Water cooling

The cooling water diagram is valid for 35 °C water inlet temperature. The pressure of the cooling water must not exceed 6 bar. Please observe instructions on water cooling given under “Explanations on Technical Data”.

Safety precautions

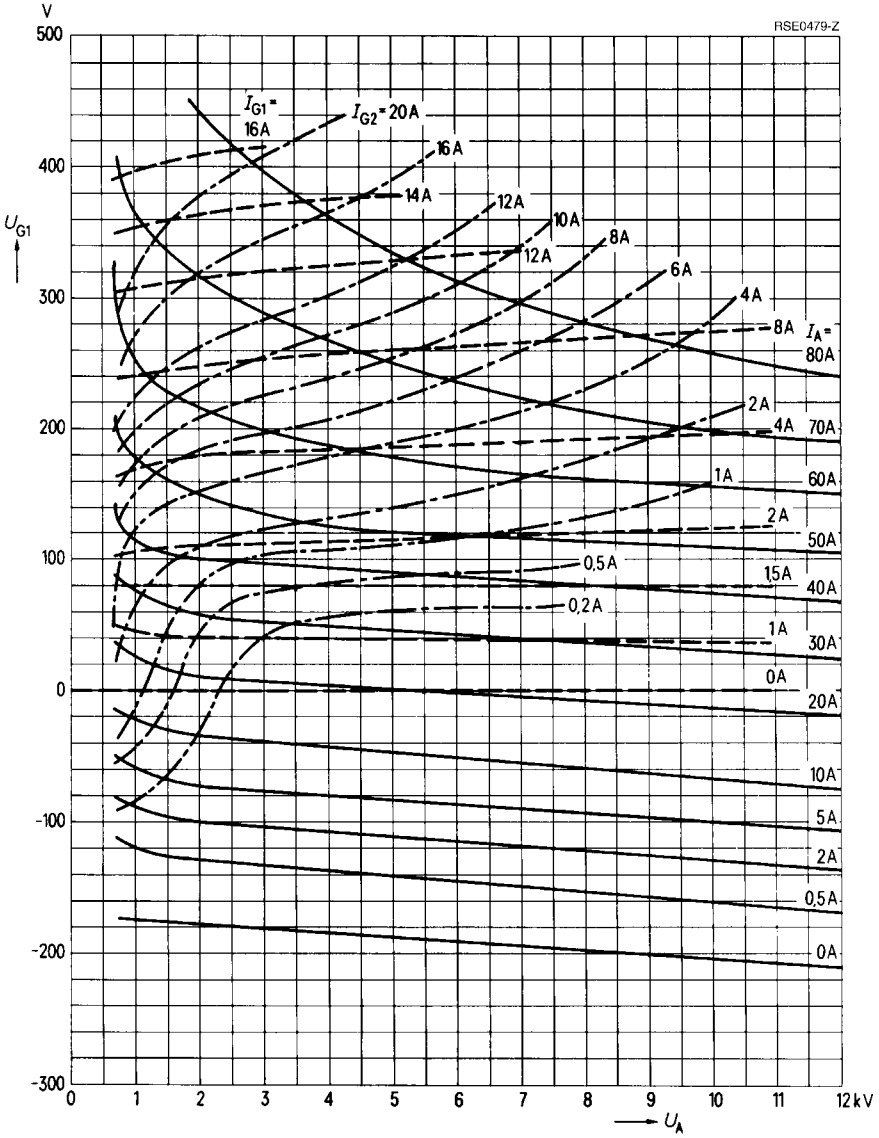
The section “Safety precautions” under “Explanations on Technical Data” describes how the tube is to be protected against damage due to electric overload or insufficient cooling. A copper wire with 0,20 mm diameter should be used to test the anode overcurrent trip circuit.

Cooling water diagram



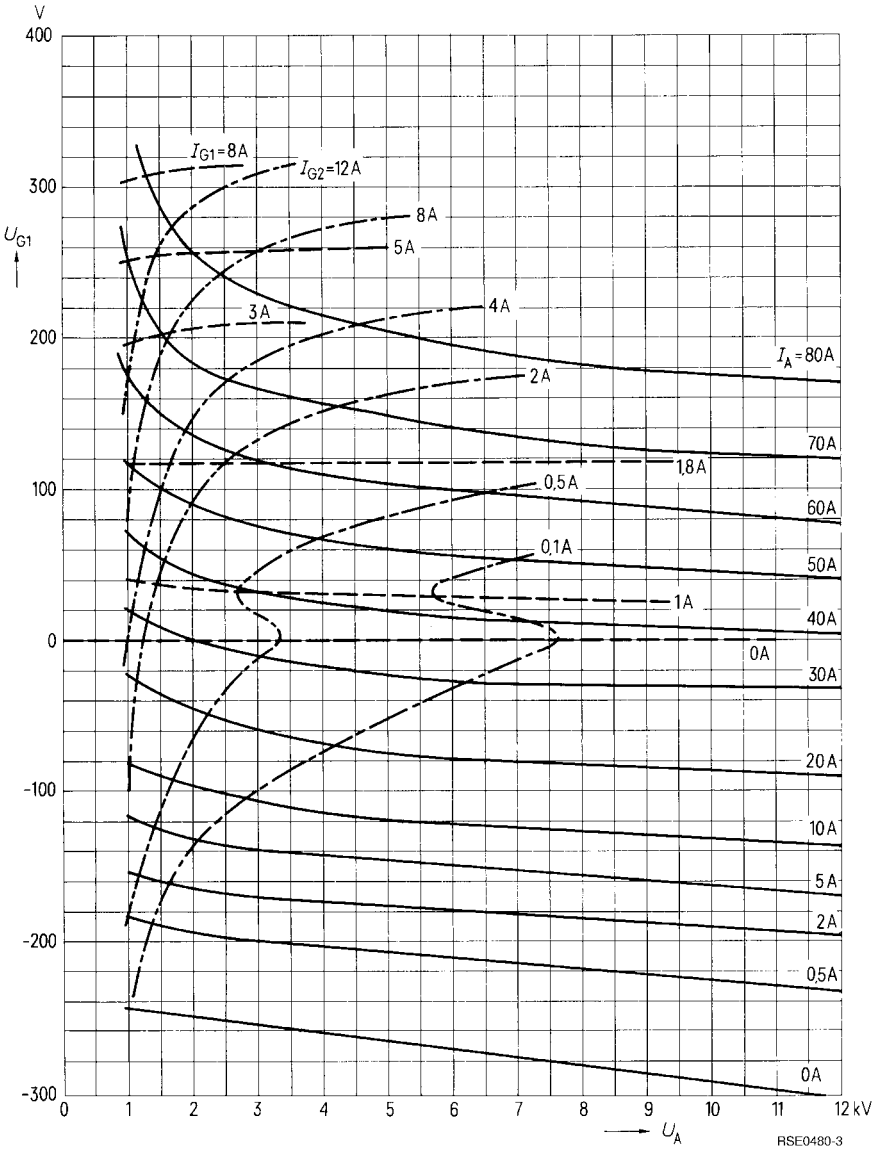
t_1 = 35 °C

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



$U_{G1} = f(U_A)$
U_{G2} = 1200 V

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



$U_{G1} = f(U_A)$ Parameter = I_A ——————
U_{G2} = 1500 V Parameter = I_{G2} —∘—∘—∘—∘—∘—
Parameter = I_{G1} — — — — — — —