

For single-sideband transmitters and TV transmitters

Coaxial metal-ceramic tetrode for frequencies up to 250 MHz, forced-air-cooled or vapor-cooled, particularly suitable for single-sideband transmitters in professional communications engineering, for broadcast transmitters up to 50 kW and TV transmitters, band III.

Forced-air-cooled version

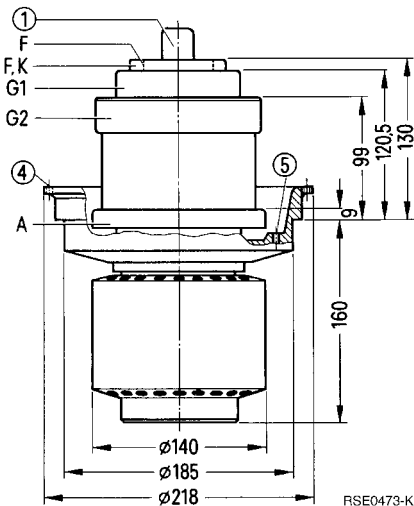
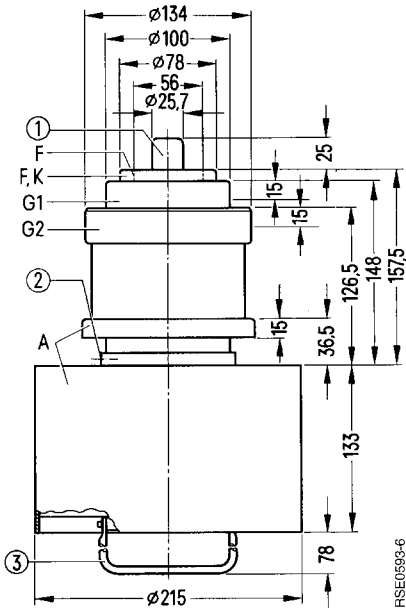
RS 1082 CL

Ordering code Q51-X1082

Vapor-cooled version

RS 1082 CV

Ordering code Q53-X1082



Dimensions in mm

- ① Do not use as terminal
- ② Taphole M5 for tube fuse R6Sich1
- ③ Handle, swingable
- ④ Taphole M6 for screw-in handle R6Zub31V
- ⑤ Taphole M5 for tube fuse R6Sich4

Approx. weight 16 kg

Approx. 14,5 kg

Heating

Heater voltage	U_F	10	V
Heater current	I_F	≈ 200	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 500 \text{ V}$	I_{em}	80	A
Amplification factor of screen grid at $U_A = 3 \text{ kV}$, $U_{G2} = 800 \text{ to } 1200 \text{ V}$, $I_A = 2,5 \text{ A}$	μ_{g2g1}	6,6	
Transconductance at $U_A = 3 \text{ kV}$, $U_{G2} = 1200 \text{ V}$, $I_A = 2,5 \text{ A}$	S	65	mA/V

Capacitances

Cathode/control grid	C_{kg1}	≈ 125	pF
Cathode/screen grid	C_{kg2}	≈ 10	pF
Cathode/anode	C_{ka}	$\approx 0,2$	pF ¹⁾
Control grid/screen grid	C_{g1g2}	≈ 155	pF
Control grid/anode	C_{g1a}	$\approx 1,6$	pF ¹⁾
Screen grid/anode	C_{g2a}	≈ 40	pF

Accessories**RS 1082 CL****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
Socket wrench for tube fuse	RöZub10	Q81-X2110
Tube fuse	RöSich1	Q81-X1401
Pull switch for tube fuse	RöKt11	Q81-X1311
Joining piece for air duct	RöAnst360	Q81-X744

1) Measured by means of a 40 cm × 40 cm screening plate in the screen grid terminal plane.

Accessories**RS 1082 CV****Ordering code**

Mounting instruction	RöMo64	
Mounting instruction	RöMo75	
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
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 for boiler	RöN9373	C65051-A182-C506

**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	$I_{K\ M}$	80	A
Anode dissipation (RS 1082 CL)	P_A	30	kW
Anode dissipation (RS 1082 CV)	P_A	45	kW
Screen grid dissipation	P_{G2}	600	W
Control grid dissipation	P_{G1}	300	W

Operating characteristics

Frequency	f	≤ 30	MHz
Carrier power	P_{trg}	55	kW ¹⁾
Anode voltage (dc)	U_A	10	kV
Screen grid voltage (dc)	U_{G2}	800	V
Control grid bias (dc), fixed	$U_{G1\ fix}$	– 340	V
Control grid resistance	R_{G1}	300	Ω
Peak control grid voltage (ac)	$U_{g1\ m}$	610	V
Anode current (dc)	I_A	6,9	A
Screen grid current (dc)	I_{G2}	0,5	A
Control grid current (dc)	I_{G1}	0,36	A
Anode input power	$P_{B\ A}$	69	kW
Drive power	P_1	200	W ¹⁾
Anode dissipation	P_A	14	kW ²⁾
Screen grid dissipation	P_{G2}	400	W
Control grid dissipation	P_{G1}	40	W
Efficiency	η	80	%
Anode load resistance	R_A	780	Ω
Modulation factor	m	100	%
Peak screen grid voltage (ac)	$U_{g2\ m}$	600	V ³⁾
Modulation power	P_{mod}	35	kW
Control grid current (dc)	I_{G1}	0,51	A ⁴⁾
Drive power	P_1	280	W ^{1) 4)}
Anode dissipation at modulation	$P_{A\ mod}$	23	kW ⁵⁾
Screen grid dissipation at modulation	$P_{G2\ mod}$	400	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 the plate dissipation will increase to about 1,5 times the power dissipation stated for the carrier value during 100 % modulation.

3) Modulation of screen grid via separate transformer winding.

4) Maximum values at $U_A = 0\ V$.

5) Average values at $m = 100\ \%$.

**RF linear amplifier,
SSB 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	$I_{K M}$	80	A
Anode dissipation (RS 1082 CL)	P_A	30	kW
Anode dissipation (RS 1082 CV)	P_A	45	kW
Screen grid dissipation	P_{G2}	600	W
Control grid dissipation	P_{G1}	300	W

Operating characteristics

		I	II ¹⁾	III ¹⁾	
Output power	P_2	0	33	16,5	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}	– 185	– 185	– 185	V
Peak control grid voltage (ac)	$U_{g1 m}$	0	160	160	V
Anode current (dc)	I_A	2,0	5,2	3,3	A
Screen grid current (dc)	I_{G2}	0	250	80	mA
Anode input power	$P_{B A}$	20	52	33	kW
Anode dissipation	P_A	20	19	16,5	kW
Screen grid dissipation	P_{G2}	0	300	96	W
Efficiency	η	–	63	50	%
Third order intermodulation product	d_3	–	–	≥ 36	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.

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

Maximum ratings

Frequency	f	230	MHz
Anode voltage (dc)	U_A	6,0	kV
Screen grid voltage (dc)	U_{G2}	1200	V
Control grid voltage (dc)	U_{G1}	– 250	V
Cathode current (dc)	I_K	15	A
Peak cathode current	$I_{K M}$	80	A
Anode dissipation	P_A	30	kW
Screen grid dissipation	P_{G2}	300	W
Control grid dissipation	P_{G1}	150	W

Operating characteristics

Frequency	f	≤ 230	MHz
Bandwidth (– 3 dB)	B	10	MHz
Output power, sync level	$P_{2 SY}$	26	kW ^{1) 2)}
Output power, black level	$P_{2 SW}$	14,2	kW ^{1) 3)}
Anode voltage (dc)	U_A	5,4	kV
Screen grid voltage (dc)	U_{G2}	800	V
Control grid voltage (dc)	U_{G1}	– 95	V ⁴⁾
Peak control grid voltage (ac), sync level	$U_{g1 m SY}$	190	V
Anode current (dc), black level	$I_{A SW}$	6,0	A ³⁾
Screen grid current (dc), black level	$I_{G2 SW}$	100	mA ³⁾
Control grid current (dc), black level	$I_{G1 SW}$	120	mA ³⁾
Anode input power, black level	$P_{B A SW}$	32,5	kW ³⁾
Drive power, sync level	$P_{1 SY}$	1,2	kW ⁵⁾
Anode dissipation, black level	$P_{A SW}$	18,3	kW ³⁾
Screen grid dissipation, black level	$P_{G2 SW}$	150	W ³⁾
Control grid dissipation, black level	$P_{G1 SW}$	5,0	W ³⁾
Anode load resistance	R_A	340	Ω
Sync. compression on/off		28/25	
Differential phase		$\leq 3^\circ$	
Differential gain		≤ 90	%

1) Circuit losses are not included.

2) Only dynamically permissible.

3) Black level with gated sync. pulses.

4) For zero signal dc plate current of $I_{A0} = 1,8$ A.

5) Output power required from driver stage.

Tube mounting

Axis vertical, anode down. The forced-air-cooled version RS 1082 CL can also be mounted anode-up in the cavity. For this reason the tube is provided with a swingable handle at the anode base.

For connection of the tube use the terminals listed under "Accessories". The complete header sockets for broadcast and communications transmitters in the medium and short-wave range can be selected corresponding to the required circuit. For grounded cathode operation in communications transmitters the two-part short-wave header sockets (RöKat82c in conjunction with RöGit82d) can be used, if a stable base as support for the screen-grid connector flange is provided in the transmitter. The individual connectors are intended for modulator applications.

Maximum tube surface temperature

The temperature of the metal-ceramic seals of the tube must not exceed 220 °C at any point. The header sockets for transmitter applications are provided 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 m³/min at a pressure drop of approx. 1,5 mbar. If separate connectors are used, an evenly distributed air flow across these parts must be provided especially at higher frequencies.

Forced-air cooling (RS 1082 CL)

The minimum air flow rate required for the maximum anode dissipation is given in the cooling air diagram, valid for an air inlet temperature of 25 °C and a normal air pressure of 1 bar (sea level). The cooling air is supplied from the electrode terminal side. For further details on forced-air cooling refer to "Explanations on Technical Data".

Vapor cooling (RS 1082 CV)

Cooling data for maximum anode dissipation	$P_{A \max} = 45 \text{ kW}$
Total power to be dissipated by the cooling system ($P_A + P_{G2} + P_{G1} + 0,8 P_F$)	47,5 kW
Equivalent thermal output	2850 kJ/min (680 kcal/min)
Quantity 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. 1,9 m³/min
at returning water temperature of 90 °C	approx. 2,1 m³/min

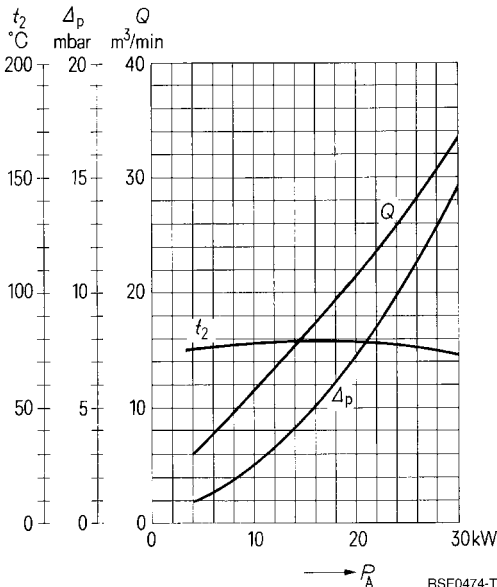
Detailed information on vapor cooling upon request. Please observe instructions on vapor cooling given under "Explanations on Technical Data".

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 0,20 mm diameter should be used to test the anode overcurrent trip circuit.

For protection against thermal anode overload the tube Rösich1/Rösich4 is recommended. In conjunction with pull switch RökT11 it disconnects the voltages at the tube in case of overload (see accessories).

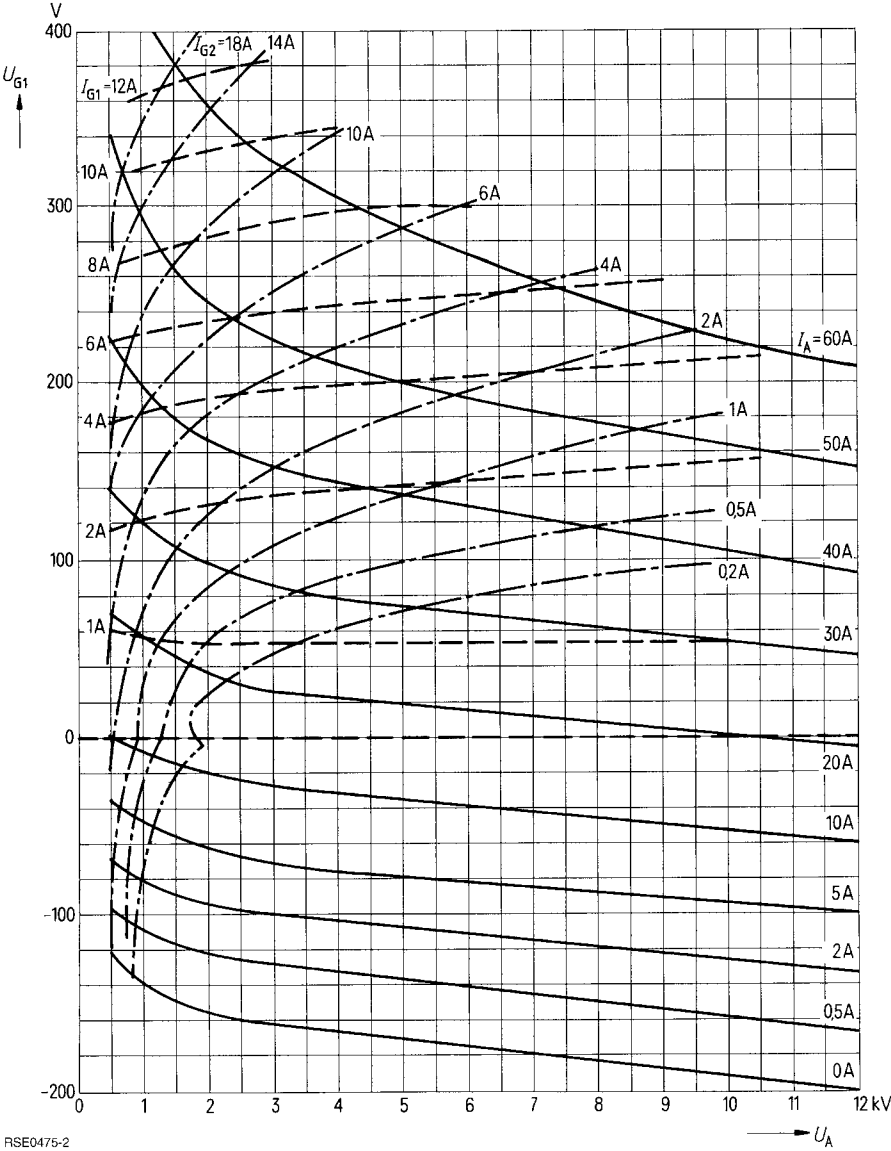
Cooling air diagram (RS 1082 CL)



The cooling air is supplied from the electrode terminal side.

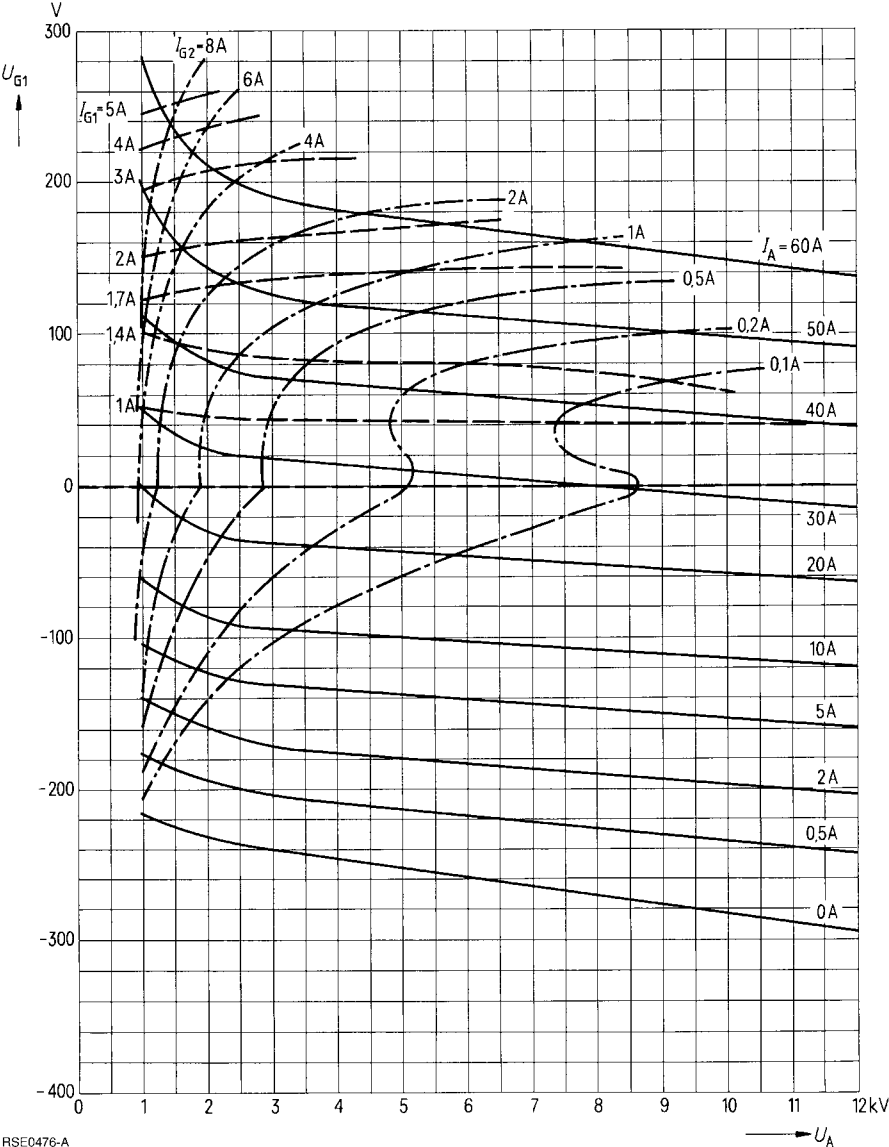
Air pressure = 1 bar
 $t_1 = 25^{\circ}\text{C}$

$U_{G1} = f(U_A)$ Parameter = I_A _____
 $U_{G2} = 800 \text{ V}$ Parameter = I_{G2} - - - - -
 Parameter = I_{G1} - - - - -



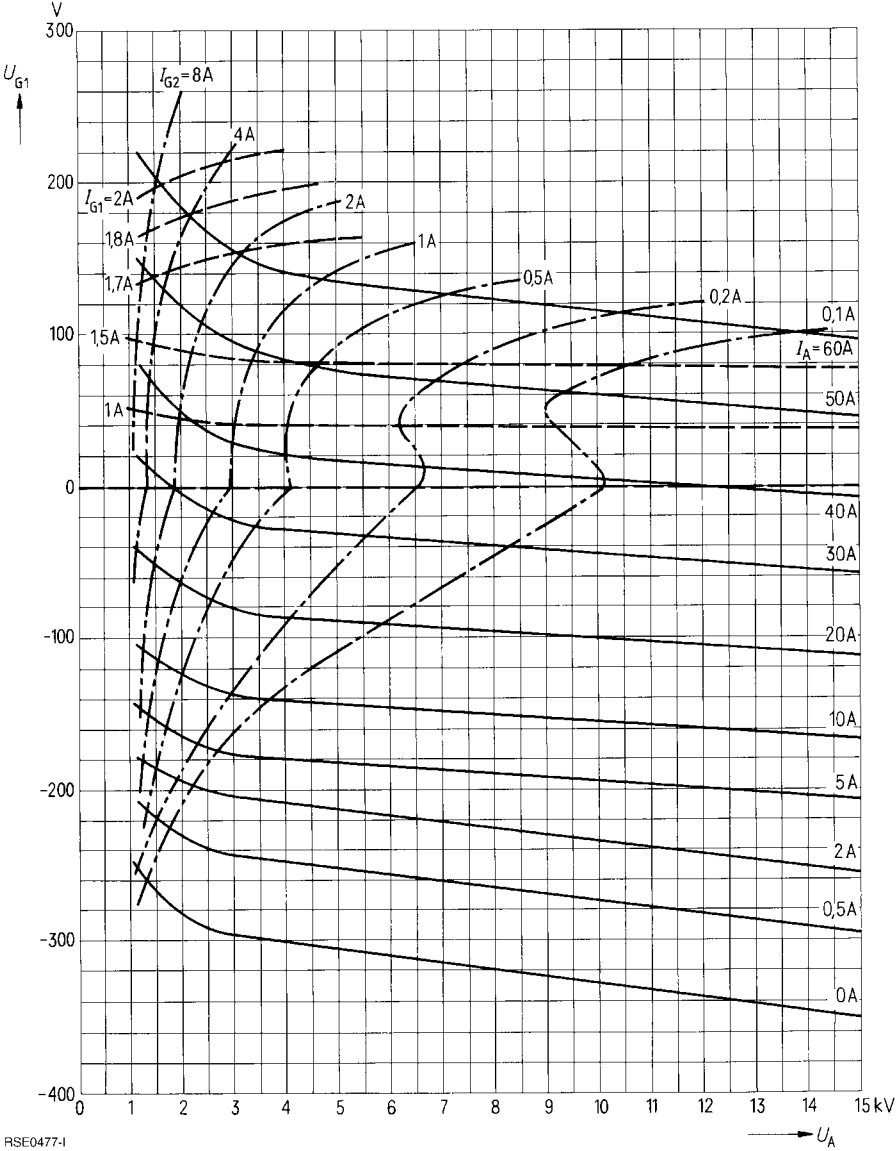
$U_{G1} = f(U_A)$
 $U_{G2} = 1200 \text{ V}$

Parameter = I_A _____
Parameter = I_{G2} - - - - -
Parameter = I_{G1} - - - - -



RSE0476-A

$U_{G1} = f(U_A)$
 $U_{G2} = 1500 \text{ V}$
Parameter = I_A _____
Parameter = I_{G2} - - - - -
Parameter = I_{G1} - - - - -



RSE0477-I