

**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

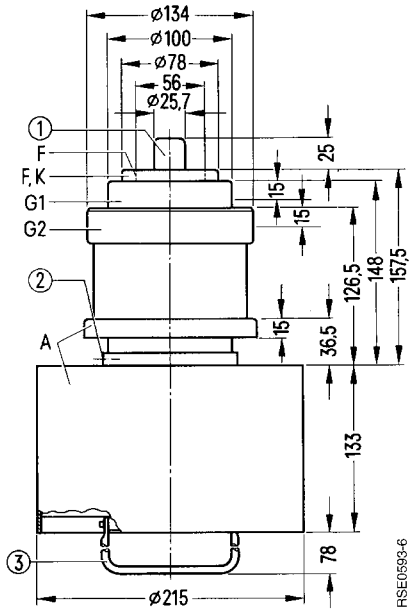
Vapor-cooled version

**RS 1082 CL**

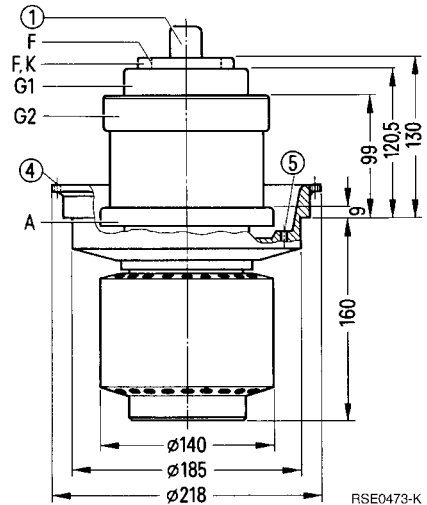
**RS 1082 CV**

Ordering code Q51-X1082

Ordering code Q53-X1082



RSE0698-6



RSE0473-K

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<br>at $U_A = U_{G2} = U_{G1} = 500\text{ V}$   | $I_{em}$     | 80  | A    |
| Amplification factor of screen grid<br>at $U_A = 3\text{ kV}$ ,<br>$U_{G2} = 800\text{ to }1200\text{ V}$ ,<br>$I_A = 2,5\text{ A}$ | $\mu_{g2g1}$ | 6,6 |      |
| Transconductance<br>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            | $C_{ka}$   | ≈ 0,2 | pF <sup>1)</sup> |
| Control grid/screen grid | $C_{g1g2}$ | ≈ 155 | pF               |
| Control grid/anode       | $C_{g1a}$  | ≈ 1,6 | pF <sup>1)</sup> |
| 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<br>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<br>against control grid  | RöKpf82G  | Q81-X1852 |
| SW header socket with screen grid blocking<br>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           | $I_{KM}$ | 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 <sup>1)</sup>   |
| Anode voltage (dc)                    | $U_A$               | 10    | kV                 |
| Screen grid voltage (dc)              | $U_{G2}$            | 800   | V                  |
| Control grid bias (dc), fixed         | $U_{G1\text{ fix}}$ | - 340 | V                  |
| Control grid resistance               | $R_{G1}$            | 300   | Ω                  |
| Peak control grid voltage (ac)        | $U_{g1\text{ m}}$   | 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 <sup>1)</sup>    |
| Anode dissipation                     | $P_A$               | 14    | kW <sup>2)</sup>   |
| Screen grid dissipation               | $P_{G2}$            | 400   | W                  |
| Control grid dissipation              | $P_{G1}$            | 40    | W                  |
| Efficiency                            | $\eta$              | 80    | %                  |
| Anode load resistance                 | $R_A$               | 780   | Ω                  |
| Modulation factor                     | $m$                 | 100   | %                  |
| Peak screen grid voltage (ac)         | $U_{g2\text{ m}}$   | 600   | V <sup>3)</sup>    |
| Modulation power                      | $P_{mod}$           | 35    | kW                 |
| Control grid current (dc)             | $I_{G1}$            | 0,51  | A <sup>4)</sup>    |
| Drive power                           | $P_1$               | 280   | W <sup>1) 4)</sup> |
| Anode dissipation at modulation       | $P_{A\ mod}$        | 23    | kW <sup>5)</sup>   |
| Screen grid dissipation at modulation | $P_{G2\ mod}$       | 400   | W <sup>5)</sup>    |

- 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  $U_A = 0\text{ V}$ .
- 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           | $I_{KM}$ | 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                          | $\eta$     | -     | 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      | $I_{KM}$ | 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                      | $P_{2SY}$   | 26    | kW 1) 2) |
| Output power, black level                     | $P_{2SW}$   | 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),<br>sync level | $U_{g1mSY}$ | 190   | V        |
| Anode current (dc), black level               | $I_{ASW}$   | 6,0   | A 3)     |
| Screen grid current (dc), black level         | $I_{G2SW}$  | 100   | mA 3)    |
| Control grid current (dc), black level        | $I_{G1SW}$  | 120   | mA 3)    |
| Anode input power, black level                | $P_{BASW}$  | 32,5  | kW 3)    |
| Drive power, sync level                       | $P_{1SY}$   | 1,2   | kW 5)    |
| Anode dissipation, black level                | $P_{ASW}$   | 18,3  | kW 3)    |
| Screen grid dissipation, black level          | $P_{G2SW}$  | 150   | W 3)     |
| Control grid dissipation, black level         | $P_{G1SW}$  | 5,0   | W 3)     |
| Anode load resistance                         | $R_A$       | 340   | Ω        |
| Sync. compression on/off                      |             | 28/25 |          |
| Differential phase                            |             | ≤ 3°  |          |
| 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 m<sup>3</sup>/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  | $P_{A\ max} = 45\ kW$           |
| Total power to be dissipated by the cooling system<br>( $P_A + P_{G2} + P_{G1} + 0,8 P_F$ ) | 47,5 kW                         |
| Equivalent thermal output   | 2850 kJ/min (680 kcal/min)      |
| Quantity of returning water<br>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<br>at returning water temperature of 20 °C                        | approx. 1,9 m <sup>3</sup> /min |
| at returning water temperature of 90 °C   | approx. 2,1 m <sup>3</sup> /min |

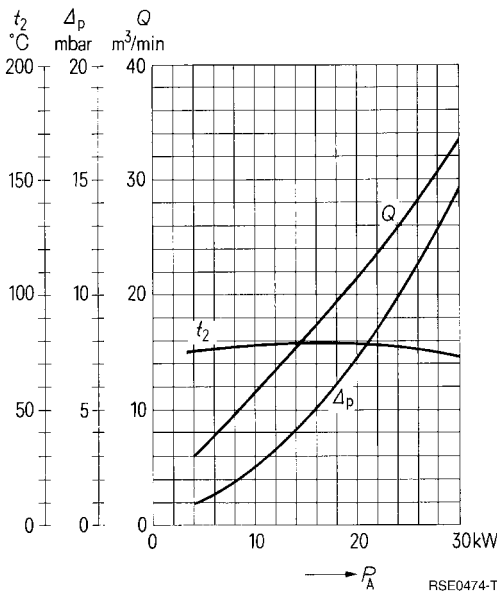
Detailed information on vapor cooling upon request. Please observe instructions on vapor cooling given under “Explanations on Technical Data”.

**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)**



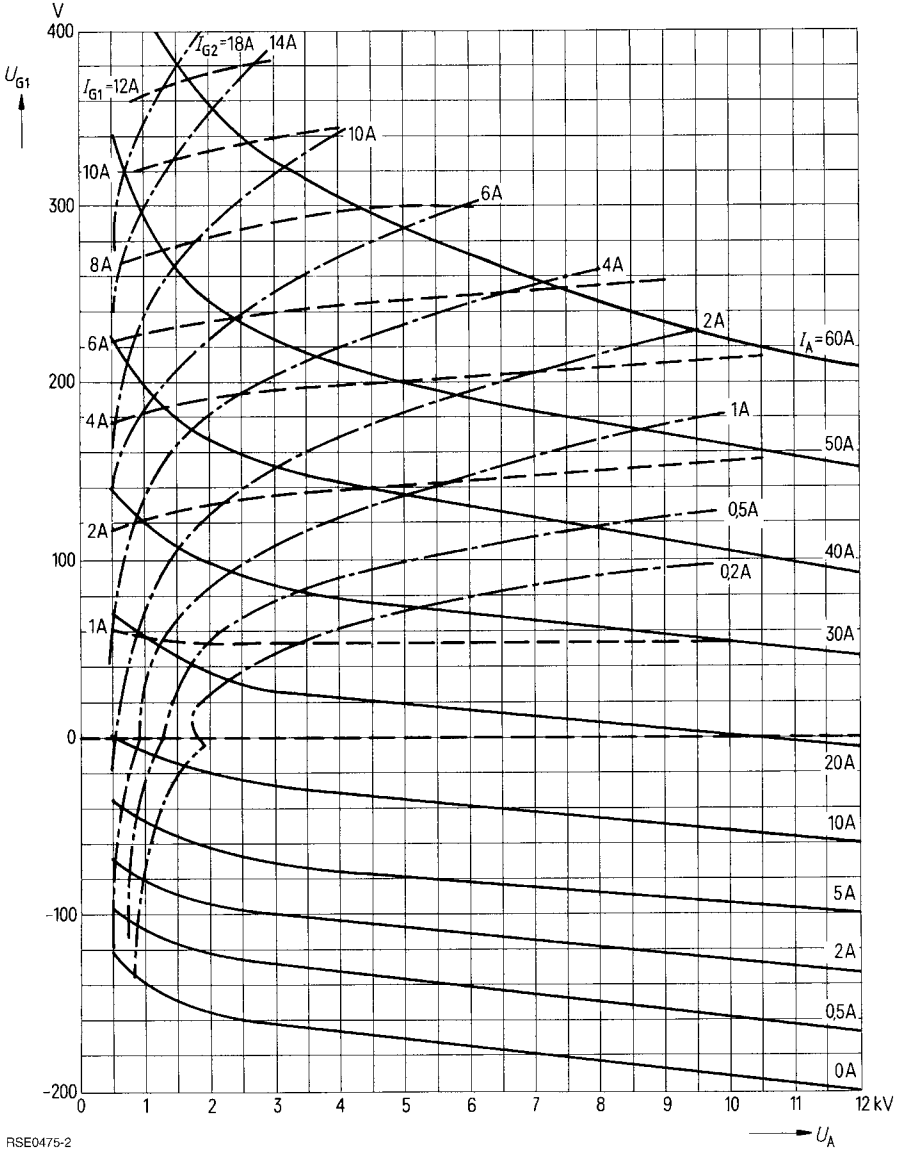
The cooling air is supplied from the electrode terminal side.

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

RSE0474-T

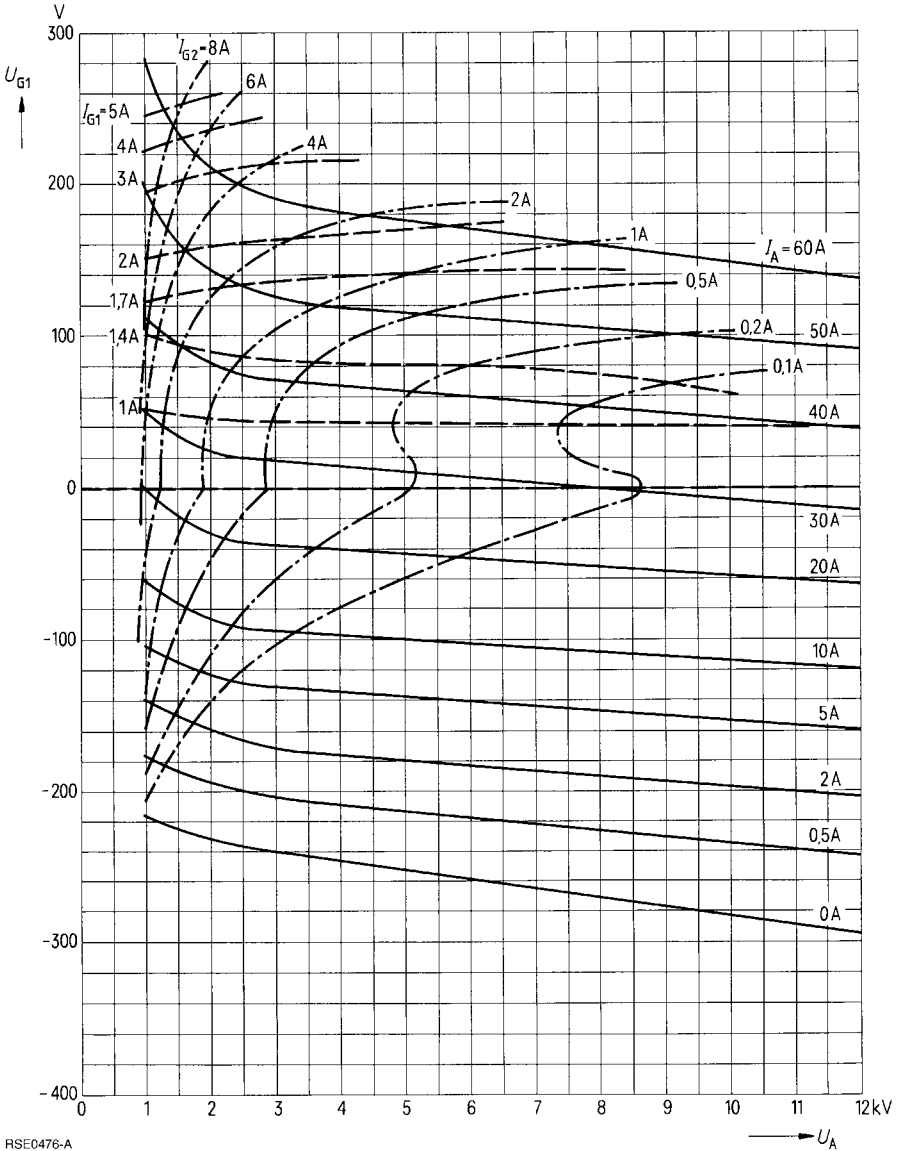


$U_{G1} = f(U_A)$   
 $U_{G2} = 800 \text{ V}$   
 Parameter =  $I_A$  —————  
 Parameter =  $I_{G2}$  - - - - -  
 Parameter =  $I_{G1}$  - - - - -



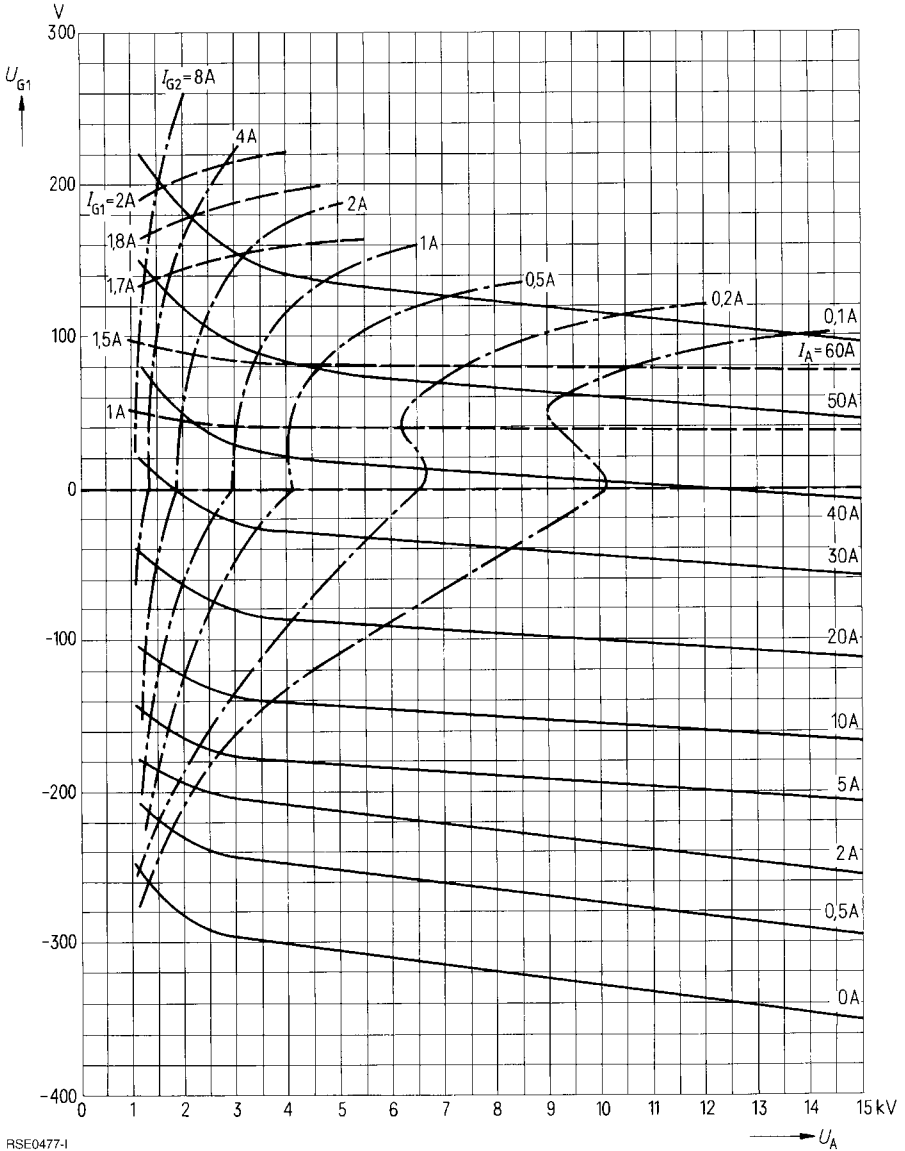
RSE0475-2

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