


SIEMENS

RS 1082 CL Metal-Ceramic Tetrode

A forced-air cooled power tetrode
for 25 kW TV transmitters up to 230 MHz



Fig. 1 Individual parts of the tetrode type RS 1082 CL;
from left to right: Anode, screen grid, control grid, cathode assembly



Properties

The RS 1082 CL is a metal-ceramic power tetrode designed for frequencies up to 250 MHz. The screen grid, control grid and cathode terminals are arranged in coaxial form. Amongst other applications, the RS 1082 CL is also suitable for grounded control grid screen grid operation in TV video transmitters. The peak synchron power at 230 MHz is 26 kW.

The control and screen grid are mesh type electrodes with tubular molybdenum terminals. This very stable construction assures constant characteristic curves during the tube life.

The cathode of the RS 1082 CL is likewise a mesh-type. This robust design with its tubular molybdenum supports has proved itself in Siemens power tubes for many years.

Fig. 1 shows the parts of the RS 1082 CL. On the left is the anode with ceramic isolator and screen grid terminal ring. Next to it is the screen grid mounted on the molybdenum cylinder, then the control grid of the same design. The cathode with molybdenum tube terminal is seen to the extreme right. The four rings below the cathode on the molybdenum tube keep down the temperature at the outer cathode terminals, and thus act as "thermal brakes".

The exclusive use of ceramic as insulating material further improves the mechanical and electrical stability of this power tube.

Application

As a typical application for the tetrode RS 1082 CL, fig. 3 shows the circuit diagram of a 25 kW power amplifier for a television video transmitter for frequencies up to 230 MHz. The tube is operated in the grounded control grid/screen grid configuration.

The input resonant circuit consists of the inductance L1, with the capacitance C1 and tube input capacitance in series across. The circuit is tuned by adjusting L1. The input coupling can be varied to match the input circuit to the characteristic impedance of the input line.

The plate circuit is designed as a slightly overcoupled band-pass filter producing a flat response over 6 MHz of the bandwidth. It is tuned on the primary side by the inductance L4, on the secondary by L5. With the capacitor C12 the matching and thus power can be varied within certain limits, likewise the shape of the bandpass response curve. The inductance L2 is adjusted for low RF resistance between the screen grid and ground.

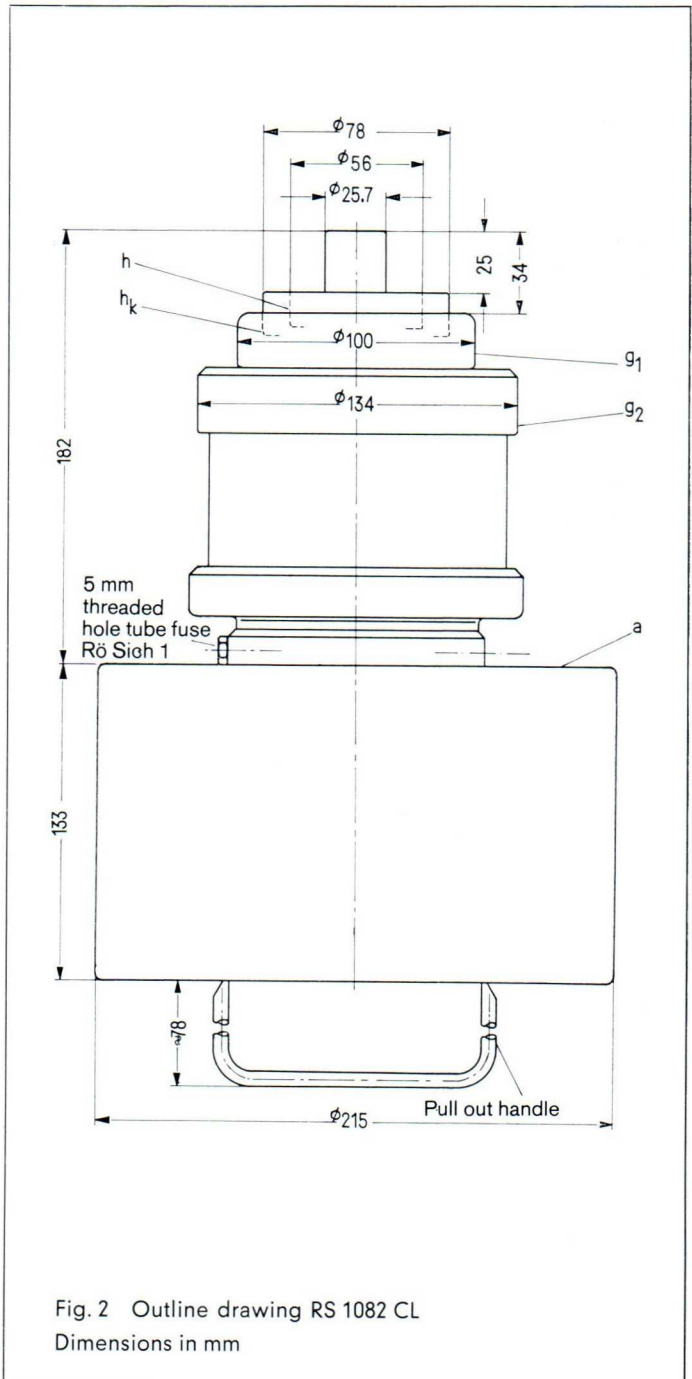


Fig. 2 Outline drawing RS 1082 CL
Dimensions in mm

Technical data RS 1082 CL

General data

Filament Characteristic values

$E_f = 10\text{ V}$ $I_e = 80\text{ A}$ at $E_b = E_{c2} = E_{c1} = 500\text{ V}$
 $I_f = 200\text{ A}$ $\mu_{g1g2} = 6.6$ at $E_b = 3\text{ kV}$, $E_{2c} = 800$ to 1200 V ,
 $I_b = 2$ to 3 A
 $S = 65,000\ \mu\text{mhos}$ at $E_b = 3\text{ kV}$, $E_{c2} = 1200\text{ V}$,
 $I_b = 2$ to 3 A

Directly heated thoriated tungsten cathode

Capacitances

$C_{kg1} = 125\text{ pF}$
 $C_{g1g2} = 155\text{ pF}$
 $C_{kg2} = 10\text{ pF}$
 $C_{g1a} = 1.6\text{ pF}$
 $C_{ka} = 0.2\text{ pF}$
 $C_{g2a} = 40\text{ pF}$

Air cooling (sea level, 25° C ambient temperature)

Plate dissipation	P_p	30	14	kW
Air flow rate	V	33	15.2	m ³ /min
		1165	526	cfm
Pressure drop	p	140	40	mm H ₂ O
		5 ^{1/2}	1 ^{1/2}	in H ₂ O

Operating data

F	230	MHz
B (3 dB)	10	MHz
$P_{o\text{syn}}$	26	kW ^{1) 2)}
$P_{o\text{black}}$	14.2	kW ^{1) 3)}
E_b	5.4	kV
E_{c2}	800	V
E_{c1}	≈ -95	V ⁴⁾
$e_{c1\text{ssyn}}$	≈ 190	V
$I_{b\text{black}}$	≈ 6	A ³⁾
$I_{c2\text{black}}$	≈ 100	mA ³⁾
$I_{c1\text{black}}$	≈ 120	mA ³⁾
$P_{a\text{black}}$	≈ 32.5	kW ³⁾
$P_{i\text{syn}}$	≈ 1.2	kW ⁵⁾
$P_{p\text{black}}$	≈ 18.3	kW ³⁾
$P_{g2\text{black}}$	≈ 150	W ³⁾
$P_{g1\text{black}}$	≈ 5	W ³⁾
R_p	340	Ω
Sync compression on/off		28/25
Differential phase		< 3 degrees
Differential gain		> 90 %

- 1) Circuit losses not included
- 2) Only admissible dynamically
- 3) Black level with gated sync pulses
- 4) For quiescent plate current of 1.8 A
- 5) Required output power of the driver stage

TV transmitter, driver stage modulated grounded control grid-screen grid circuit, negative modulation

Maximum ratings

F	230	MHz
E_b	6	kV
E_{c2}	1200	V
E_{c1}	-250	V
I_k	15	A
i_{kpk}	80	A
P_p	30	kW
P_{g2}	300	W
P_{g1}	150	W

Fig. 3 Circuit diagram of a 25 kW power amplifier for a television video transmitter

