RF POWER TRIODE

Triode in metal-ceramic construction intended for use as industrial oscillator. The YD1202 has an integral water cooler.

QUICK REFERENCE DATA

Oscillator output power ($W_o - W_{feedb}$), typical	W_{osc}		163 kW
Frequency for full ratings	f	max	30 MHz

To be read in conjunction with "General Operational Recommendations Transmitting Tubes for Communication, Tubes for R.F. Heating".

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

OPERATING CONDITIONS

Frequency	f	30	30 MHz
Oscillator output power ($W_o - W_{feedb}$)	W_{osc}	120	163 kW
Anode voltage	V_a	10	12 kV
Anode current	I_a	16	18 A
Anode input power	W_{ia}	160	216 kW
Anode dissipation	W_a	36	47 kW
Anode output power	W_o	124	169 kW
Anode efficiency	η_a	77,5	78 %
Oscillator efficiency	η_{osc}	75	75,4 %
Feedback ratio	V_{gp}/V_{ap}	11,5	12,5 %
Grid resistor	R_g	200	225 Ω
Grid current, on load	I_g	3,5	4 A
Grid voltage, negative	$-V_g$	700	900 V
Grid dissipation	W_g	1,5	2 kW
Grid resistor dissipation	W_{Rg}	2,45	3,6 kW

LIMITING VALUES (Absolute maximum rating system)

Frequency	f	up to	100 MHz*
Anode voltage	V_a	max	15 kV
Anode current	I_a	max	19 A
Anode input power	W_{ia}	max	220 kW
Anode dissipation	W_a	max	80 kW
Grid voltage	$-V_g$	max	2 kV
Grid current, on load	I_g	max	5 A
Grid current, off load	I_g	max	7 A
Grid dissipation	W_g	max	2,5 kW
Grid circuit resistance	R_g	max	10 kΩ
Cathode current, mean	I_k	max	24 A
Cathode current, peak	I_{kp}	max	110 A
Envelope temperature	T_{env}	max	240 °C

HEATING: direct; thoriated tungsten filament

Filament voltage	V_f		12,2 V
Filament current	I_f		250 A
Peak filament starting current	I_{fp}	max	1500 A
Cold filament resistance	R_{fo}		5,3 mΩ

The filament is designed to accept temporary fluctuations of +5% and −10%.

To ensure that the cathode temperature remains constant irrespective of the operating frequency, it may be necessary to reduce the filament voltage at higher frequencies. When doing so it must be borne in mind that the filament voltage-to-current ratio measured with only the filament voltage applied should remain constant under all operating conditions.

It is extremely important that the filament be properly decoupled. This should be done so that the resonance of the circuit formed by the filament and the decoupling elements remain below the fundamental oscillator frequency. In grounded-grid circuits this resonance should be below the grid-cathode resonance. For further information please see Application Book "Tubes for RF heating" or contact the manufacturer.

* When the tubes are to be used at frequencies above 30 MHz the manufacturer should be consulted for more detailed information.

CAPACITANCES

Anode to filament	C_{af} 2,4 pF
Grid to filament	C_{gf} 160 pF
Anode to grid	C_{ag} 57 pF

CHARACTERISTICS measured at V_a = 10 kV, I_a = 8 A

Transconductance	S 140 mA/V
Amplification factor	μ 36

COOLING

To obtain optimum life, the temperature of the seals and the envelope should, under continuously loaded conditions, be kept below 200 °C.

At frequencies up to about 4 MHz the seals are sufficiently cooled if the filament connectors are water-cooled by a flow of about 0,5 ℓ/min.
At higher frequencies however, an additional airflow of about 4 m^3/min must be led along the seals from a 50 mm diameter nozzle positioned at a distance of 250 mm from the tube header.

Table 1 Water cooling characteristics

anode + grid dissipation $W_a + W_g$ kW	inlet temperature T_i °C	rate of flow q_{min} ℓ/min	pressure drop ΔP kPa*	outlet temperature T_o °C
100	20	52	55	49
	50	78	105	69
80	20	39	32	51
	50	60	65	70
60	20	29	19	52
	50	42	32	72
40	20	18	8	54
	50	27	15	73

Absolute maximum water inlet temperature	T_i max 50 °C
Absolute maximum water pressure	P max 600 kPa

ACCESSORIES

Filament connector with cable	type 40695A
Filament/cathode connector with cable	type 40696A
Grid connector f > 4 MHz	type 40737
f ⩽ 4 MHz	type 40694

* 100 kPa ≈ 1 at.

MECHANICAL DATA

Dimensions in mm

Mounting position: vertical, anode up or down

Net mass: approx. 11,5 kg

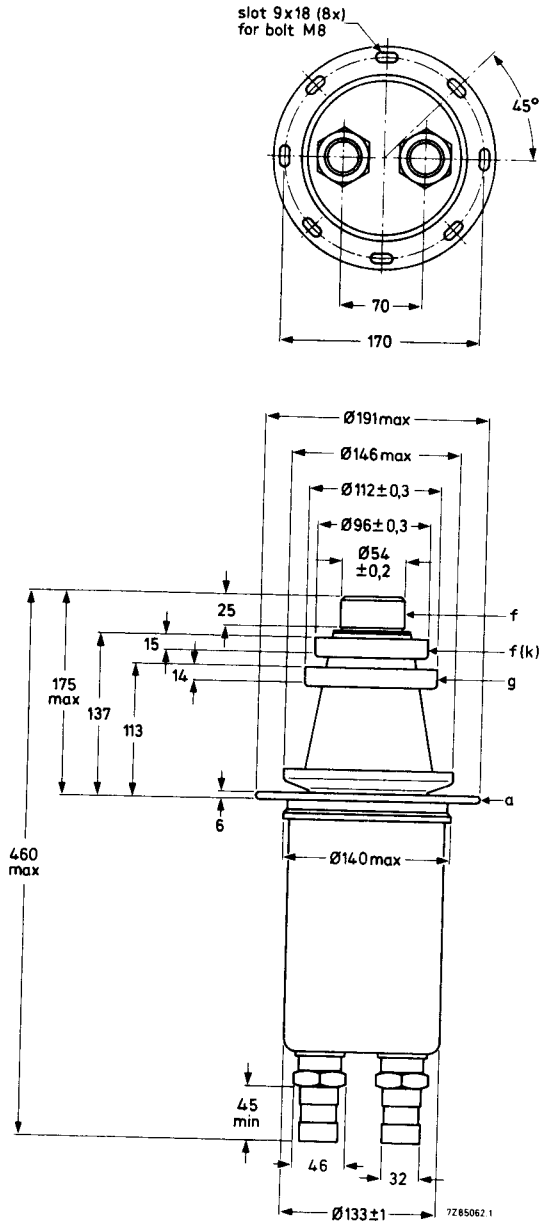

Fig. 1 Mechanical outline.

Thread of water connections 1¼ in.

With the anode up the water inlet and outlet connections should be interchanged.

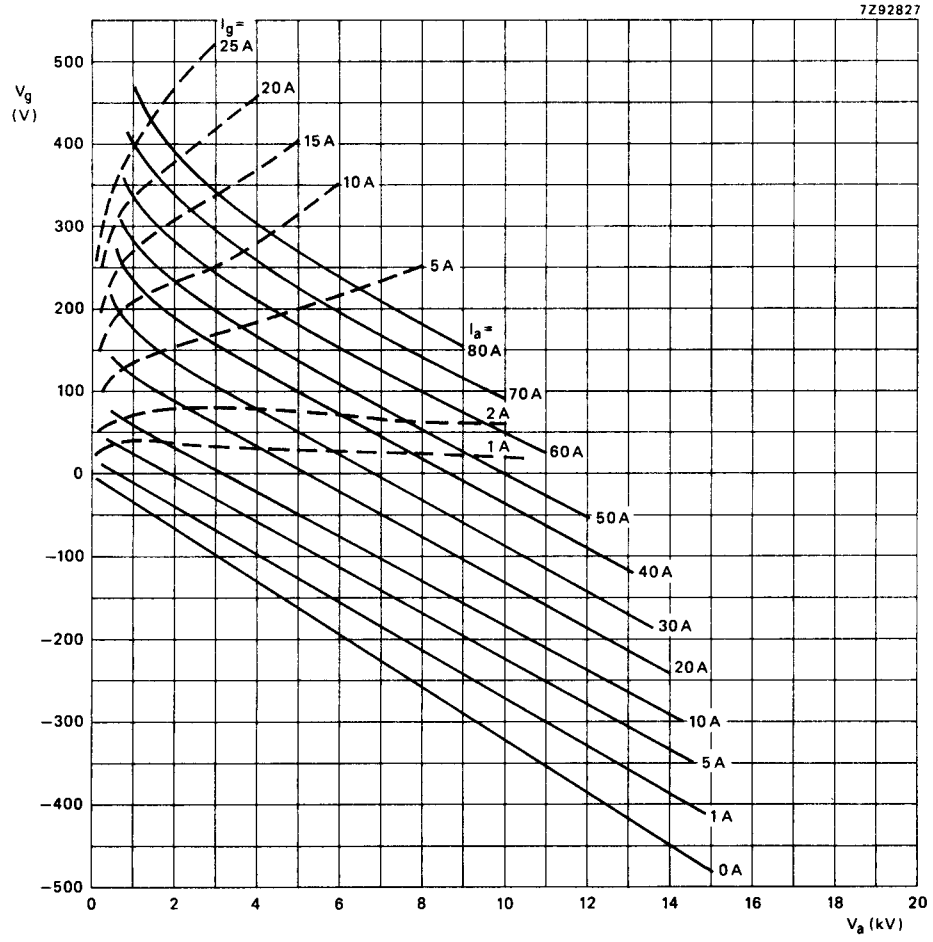

Fig. 2 Constant current characteristics.

PHILIPS

Data handbook

Electronic components and materials

YD1202

page	sheet	date
1	269	1988.02
2	270	1988.02
3	271	1988.02
4	272	1988.02
5	273	1988.02
6	FP	2000.09.09