

RF POWER TRIODE

Triode in metal-ceramic construction intended for use as industrial oscillator. The YD1212 has an integral water cooler.

QUICK REFERENCE DATA

Oscillator output power ($W_O - W_{\text{feedb}}$), typical	W_{osc}	240 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 MHz
Oscillator output power ($W_O - W_{\text{feedb}}$)	W_{osc}	240 kW
Anode voltage	V_a	14 kV
Anode current	I_a	23,5 A
Anode input power	W_{ia}	329 kW
Anode dissipation	W_a	81,5 kW
Anode output power	W_O	247,5 kW
Anode efficiency	η_a	75,2 %
Oscillator efficiency	η_{osc}	73 %
Feedback ratio	V_{gp}/V_{ap}	10,4 %
Grid resistor	R_g	135 Ω
Grid current, on load	I_g	6 A
Grid voltage, negative	V_g	-810 V
Grid dissipation	W_g	2,6 kW
Grid resistor dissipation	W_{Rg}	4,86 kW

LIMITING VALUES (Absolute maximum rating system)

Frequency	f	up to 100 MHz*
Anode voltage	V_a	max. 16,8 kV
Anode current	I_a	max. 25 A
Anode input power	W_{ia}	max. 375 kW
Anode dissipation	W_a	max. 120 kW
Grid voltage	$-V_g$	max. 2 kV
Grid current		
on load	I_g	max. 7 A
off load	I_g	max. 8,5 A
Grid dissipation	W_g	max. 3 kW
Grid circuit resistance	R_g	max. 10 k Ω
Cathode current		
mean	I_k	max. 31 A
peak	I_{kp}	max. 175 A
Envelope temperature	T_{env}	max. 240 °C

HEATING: direct; filament thoriated tungsten

Filament voltage	V_f	12,6 V
Filament current	I_f	380 A
Peak filament starting current	I_{fp}	max. 2000 A
Cold filament resistance	R_{fo}	3,6 m Ω

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.

CAPACITANCES

Anode to filament	C_{af}	3 pF
Grid to filament	C_{gf}	185 pF
Anode to grid	C_{ag}	60 pF

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

CHARACTERISTICS measured at $V_a = 14 \text{ kV}$, $I_a = 10 \text{ A}$

Transconductance

S 190 mA/V

Amplification factor

 μ 40**COOLING**

To obtain optimum life, the seal/envelope temperature under normal operating conditions should be kept below 200 °C.

At low frequencies 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 air flow of about 4 m³/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 Air 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
120	20	60	70	50
	50	90	130	70
80	20	34	30	56
	50	54	55	72
40	20	15	7	63
	50	24	13	77

Absolute max. water inlet temperature

 T_i 50 °C

Absolute max. water pressure

P 600 kPa*

ACCESSORIES

Filament connector with cable

type 40695A

Filament/cathode connector with cable

type 40696A

Grid connector

 $f \leq 4 \text{ MHz}$

type 40694

 $f > 4 \text{ MHz}$

type 40737

* 100 kPa $\approx$ 1 at

MECHANICAL DATA

Dimensions in mm

Mounting position: vertical with anode up or down

Net mass: approx. 15,6 kg

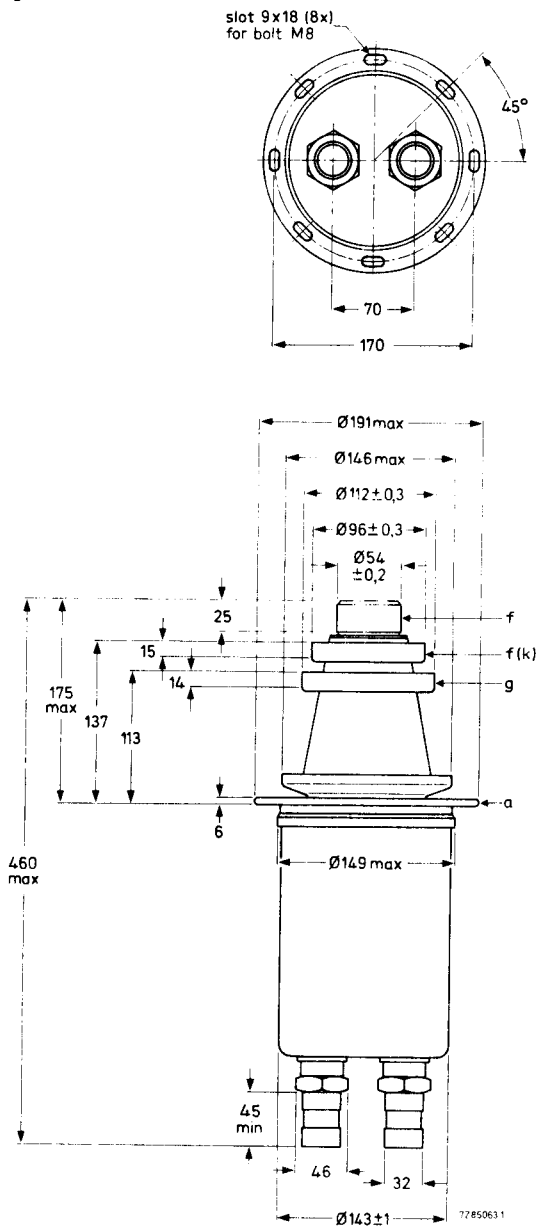


Fig. 1 Mechanical outline.

Thread of water connections BSP 1¼ in.

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

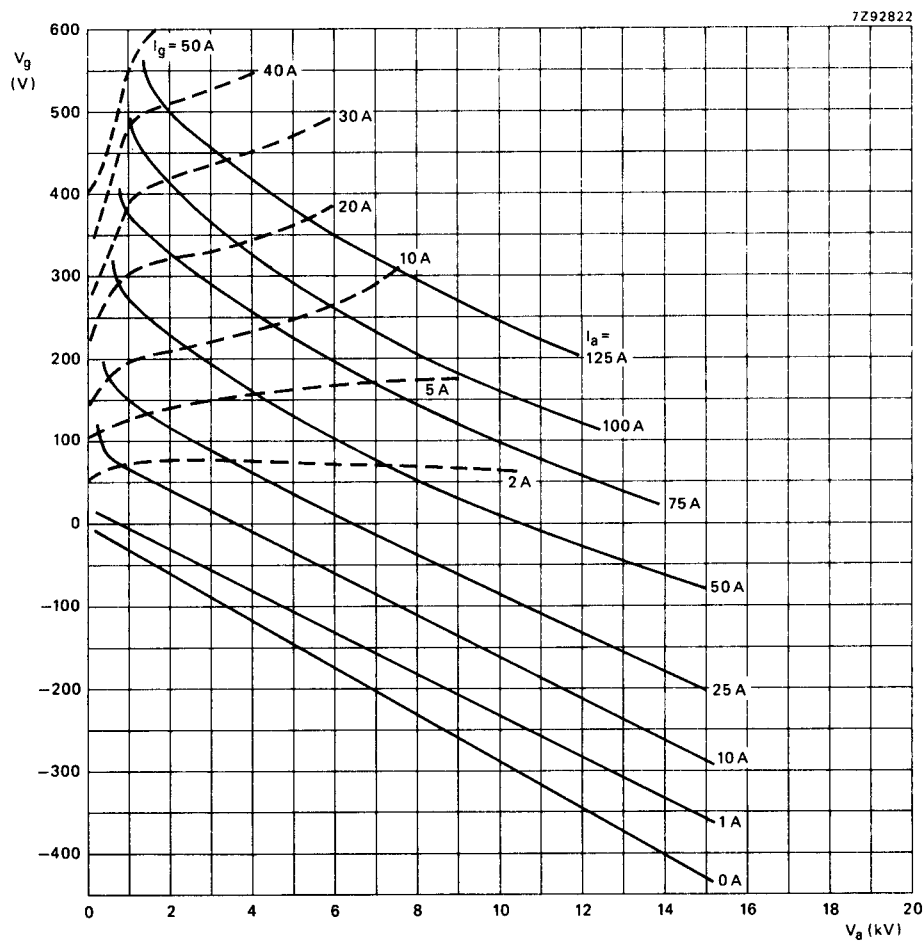


Fig. 2 Constant current characteristics.

PHILIPS

Data handbook



**Electronic
components
and materials**

YD1212

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