

RF POWER TRIODE

Triodes in metal-ceramic construction intended for use as industrial oscillators.
The YD1160 is forced-air cooled, with integral cooler.
The YD1162 has an integral water cooler.

QUICK REFERENCE DATA

Oscillator output power ($W_O - W_{\text{feedback}}$), typical	W_{Osc}		8,8 kW
Frequency for full ratings	f	max.	85 MHz

To be read in conjunction with "General Operational Recommendations".

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

OPERATING CONDITIONS

Frequency	f	150	27,12	27,12 MHz
Filament voltage	V_f	5,8	6,3	6,3 V
Oscillator output power ($W_O - W_{\text{feedb}}$)	W_{Osc}	7,15	8,8	7,5 kW
Anode voltage	V_a	5,0	6,5	6,0 kV
Anode current	I_a	2,0	1,8	1,6 A
Anode input power	W_{ia}	10,0	11,7	9,6 kW
Anode dissipation	W_a	2,45	2,5	1,7 kW*
Anode output power	W_O	7,55	9,2	7,9 kW
Anode efficiency	η_a	75,5	78,6	82,3 %
Oscillator efficiency	η_{osc}	71,5	75,2	78,1 %
Feedback ratio	V_{gp}/V_{ap}	15	16	15 %
Grid resistor	R_g	1,0	1,6	1,3 k Ω
Grid current, on load	I_g	480	430	480 mA
Grid voltage, negative	$-V_g$	480	688	624 V
Grid dissipation	W_g	100	110	120 W
Grid resistor dissipation	W_{Rg}	230	296	300 W

LIMITING VALUES (Absolute maximum rating system)

Frequency	f	up to	85	150 MHz
Anode voltage	V_a	max.	7,2	6,0 kV
Anode current	I_a	max.	2,2	2,2 A
Anode input power	W_{ia}	max.	12,5	11 kW
Anode dissipation	W_a	max.	5	5 kW
Grid voltage	$-V_g$	max.	1	1 kV
Grid current				
on load	I_g	max.	550	550 mA
off load	I_g	max.	750	750 mA
Grid dissipation	W_g	max.	250	250 W
Grid circuit resistance	R_g	max.	20	20 k Ω
Cathode current				
mean	I_k	max.	2,8	2,8 A
peak	I_{kp}	max.	15	15 A
Envelope temperature	T_{env}	max.	240	240 °C

HEATING: direct; filament thoriated tungsten

Filament voltage				
(f = 150 MHz)	V_f			5,8 V
(f < 150 MHz)	V_f			6,3 V
Filament current at $V_f = 6,3$ V	I_f			66 A

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

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}			0,5 pF
Grid to filament	C_{gf}			19 pF
Anode to grid	C_{ag}			14,5 pF

CHARACTERISTICS measured at $V_a = 2$ kV, $I_a = 1$ A.

Transconductance	S			22 mA/V
Amplification factor	μ			20

COOLING

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

Table 1 Air cooling characteristics**YD1160**

anode + grid dissipation $W_a + W_g$ kW	inlet temperature T_i °C	rate of flow q_{min} m ³ /min	pressure drop ΔP Pa*	outlet temperature T_o °C
3	35	3,6	90	82
3	45	4,2	110	87

Table 2 Water cooling characteristics**YD1162**

anode + grid dissipation $W_a + W_g$ kW	inlet temperature T_i °C	rate of flow q_{min} l/min	pressure drop ΔP kPa**	max. outlet temperature T_o °C
3	20	2,2	18	42
	50	4,3	38	61
5	20	4,0	40	40
	50	8,0	140	60

Absolute max. water inlet temperature

T_i max. 50 °C

Absolute max. water pressure

P max. 600 kPa(abs)

A low velocity air flow may be required for cooling of the seals

* 1 Pa \approx 0,1 mm H₂O.

** 100 kPa \approx 1 at

ACCESSORIES

Filament connector	type	40688
Filament/cathode connector	type	40689
Grid connector	type	40686
Insulating pedestal (YD1160 only)	type	40630

MECHANICAL DATA

Dimensions in mm

YD1160

Mounting position: vertical, with anode up or down

Net mass: approx. 3,5 kg

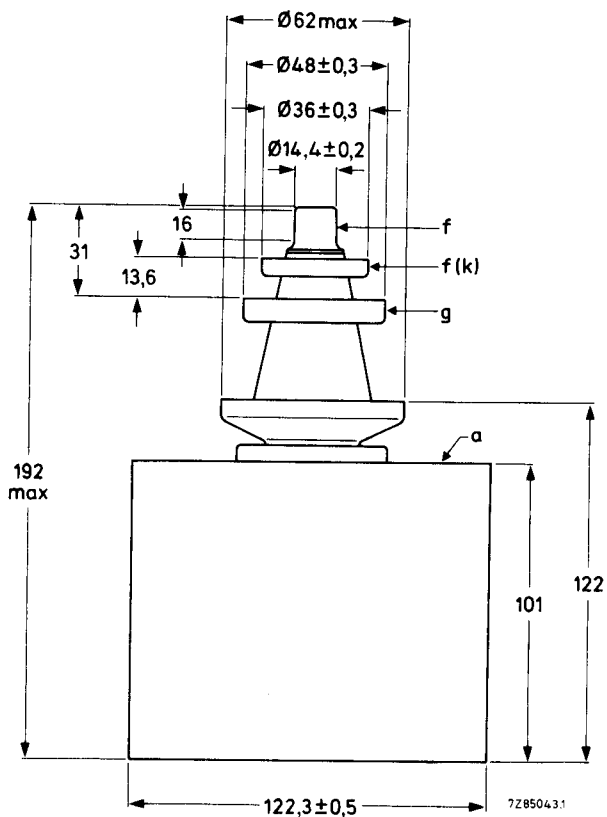


Fig. 1 Mechanical outline – YD1160.

YD1162

Mounting position: vertical with anode down

Net mass: approx. 1,6 kg

Dimensions in mm

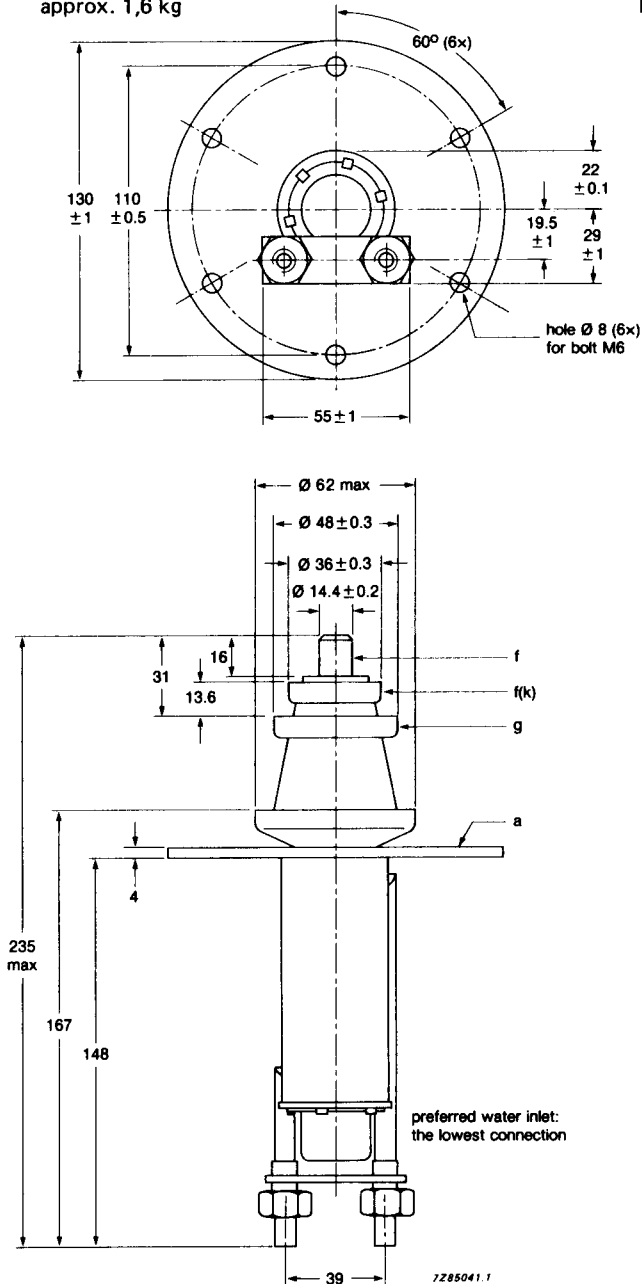


Fig. 2 Mechanical outline – YD1162.

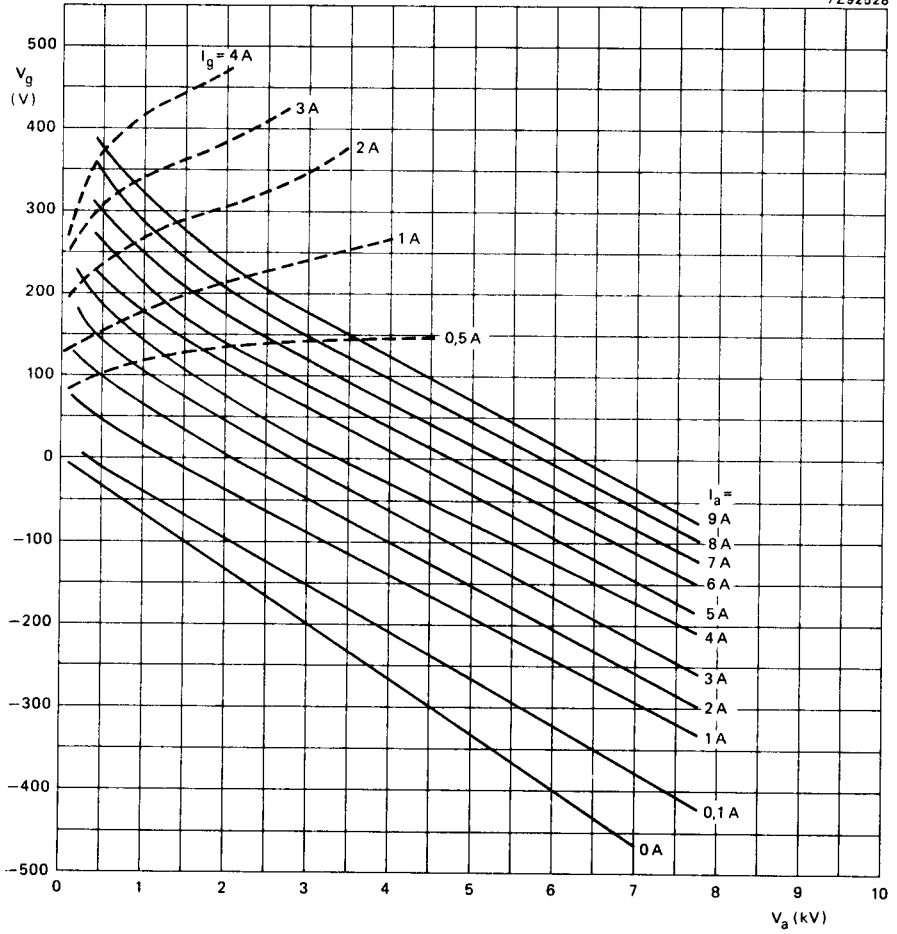


Fig. 3 Constant current characteristics.

PHILIPS

Data handbook



Electronic
components
and materials

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