

Amperex

8680/YD1212 RF Power Triode

The Amperex 8680/YD1212 is an integral water cooled triode, of ceramic to metal construction, intended for use as an industrial oscillator at VHF. The anode is capable of dissipating 120 Killowatts during continuous commercial service. Cooling is accomplished by water. Maximum ratings apply at frequencies of up to 30 MHz.

GENERAL DATA

Electrical:

Filament-Thoriated Tungsten^{Note 1}

Voltage	12.6	V
Current	380	A

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

Amplification Factor	μ	40
Transconductance	S	190 mA/V

Direct Interelectrode Capacities:

Grid-Anode	C_{ag}	60	pf
Grid-Filament	C_{gf}	185	pf
Anode-Filament	C_{af}	3	pf

Mechanical:

Overall Dimensions:

Length	460	mm
Diameter	191	mm

Mounting Position Vertical, with anode up or down

Cooling Type: Water

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 50mm diameter nozzle positioned at a distance of 250mm 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 delta P 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*

*100 kPa=1 at



40W267 Keslinger Road
 LaFox, IL 60147 USA
 (630) 208-2200

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LIMITING VALUES (Absolute maximum rating system)

(Frequency for full ratings f max 30 MHz)

Frequency	f	up to	100	MHz ^{Note 2}
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
Grid current, off load	I_g	max.	8.5	A
Grid dissipation	W_g	max.	3	kW
Grid circuit resistance	R_g	max.	10	kohms
Cathode current				
mean	I_k	max.	31	A
peak	I_{kp}	max.	175	A
Envelope Temperature	T_{env}	max.	240	°C

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

OPERATING CONDITIONS

Frequency	f		30	MHz
Oscillator output power (Wo-Wfeedb)	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		250	kW
Anode efficiency	n_a		75.2	%
Oscillator efficiency	n_{osc}		73	%
Feedback ratio	V_{gp}/V_{ap}		10.4	%
Grid resistor	R_g		135	ohms
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
Peak filament starting current	I_{fp}	max.	2000	A
Cold filament resistance	R_{fo}	max.	3.6	mohms

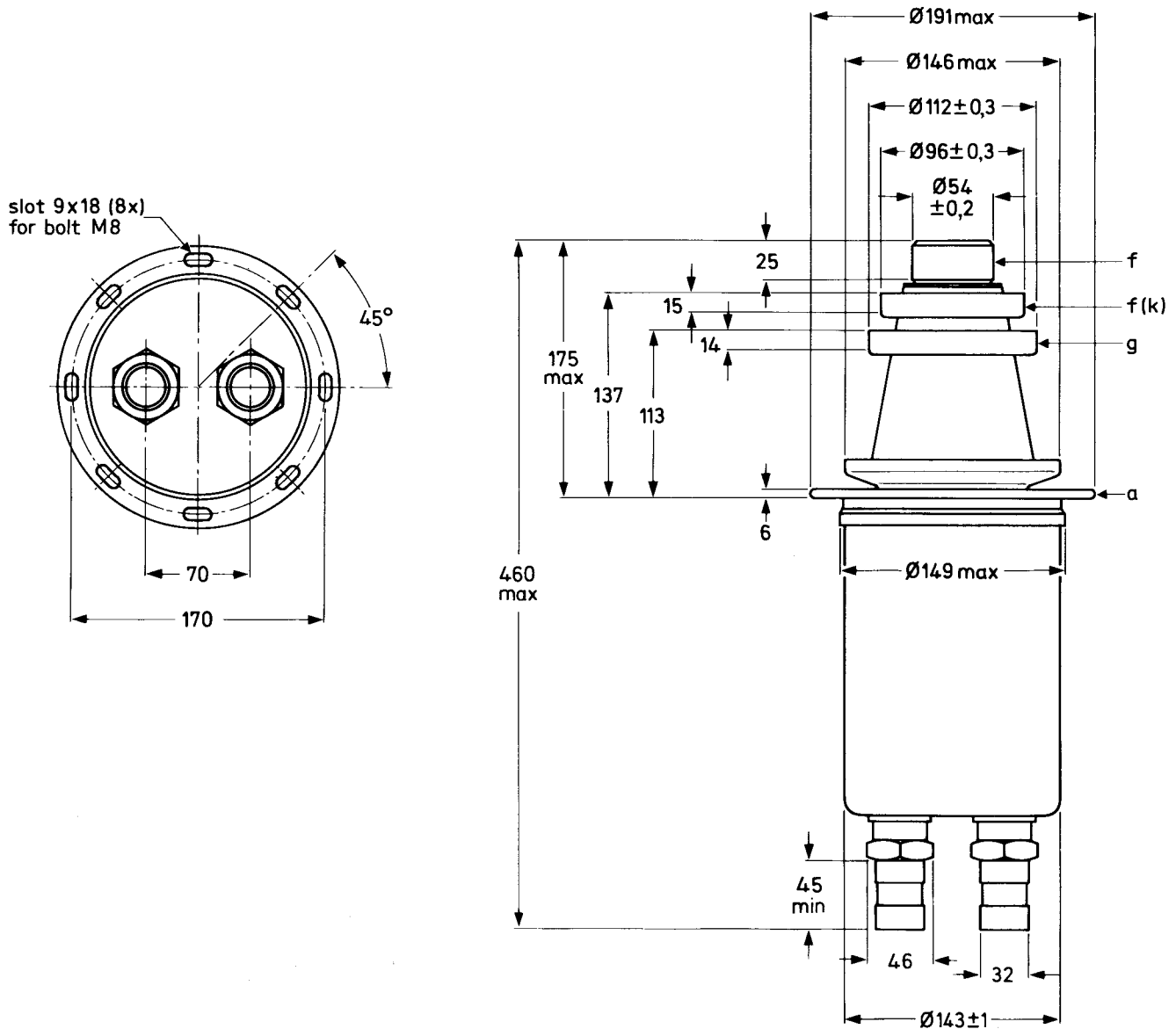
Note 1: The filament is designed to accept temporary fluctuations of +5% and -10%.

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, you must bear 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.

Note 2: When the tubes are to be used at frequencies above 30MHz the manufacturer should be consulted for more detailed information.

Figure 1 - Mechanical Outline
Dimensions in mm



MECHANICAL DATA:

Net Mass: approx. 15 kg

Thread of water connections BSP 1-1/4 in.

When using the tube in the anode up position, the input and output water connections should be reversed.

ACCESSORIES:

Filament connector with cable

type 40695A

Filament/cathode connector with cable

type 40696A

Grid Connector

f <= 4 MHz

type 40694

f > 4 MHz

type 40737

Right angle water fitting

type S3708

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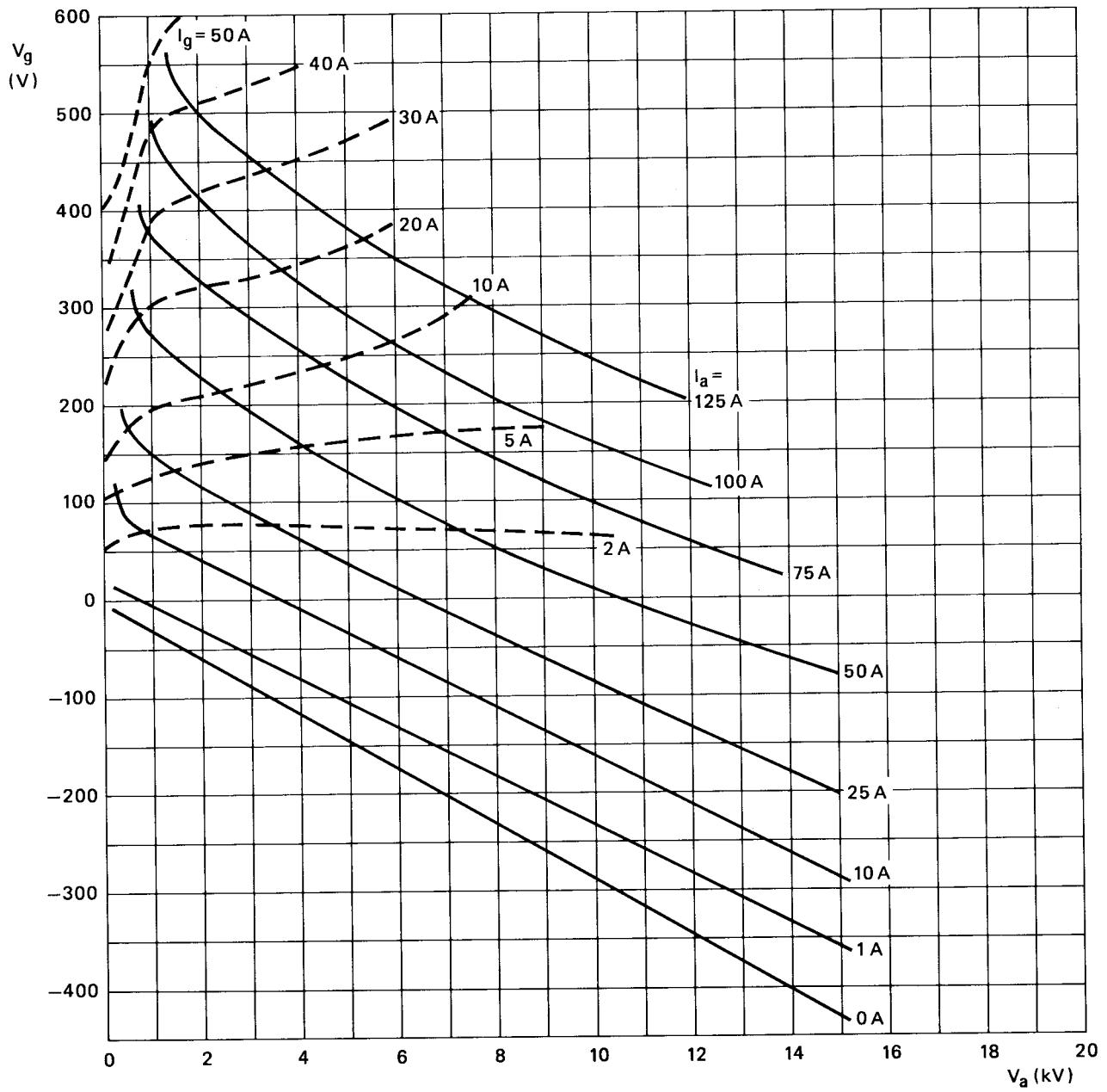


Figure 2 - Constant Current Characteristics