

Sylvania

# TYPE 6A3

## POWER AMPLIFIER TRIODE



### CHARACTERISTICS

Filament Voltage AC or DC . . . . .	6.3 Volts
Filament Current . . . . .	1.0 Ampere

#### Direct Interelectrode Capacitances (Approx.):

Grid to Plate . . . . .	16 $\mu\text{f}$
Input . . . . .	7 $\mu\text{f}$
Output . . . . .	3.5 $\mu\text{f}$
Maximum Over-all Length . . . . .	5 $\frac{1}{2}$ "
Maximum Diameter . . . . .	2 $\frac{1}{8}$ "
Bulb . . . . .	ST-16
Base—Medium 4-Pin . . . . .	4-D

#### Operating Conditions and Characteristics:

##### CLASS A AMPLIFIER (One Tube)

Filament Voltage . . . . .	6.3 Volts
Plate Voltage . . . . .	250 Volts Max.
Grid Voltage* . . . . .	-45 Volts
Plate Current . . . . .	60 Ma.
Plate Resistance . . . . .	800 Ohms
Mutual Conductance . . . . .	5250 $\mu\text{mhos}$
Amplification Factor . . . . .	4.2
Load Resistance . . . . .	2500 Ohms
Power Output (with 5% 2nd Harmonic) . . . . .	3.2 Watts

##### PUSH-PULL CLASS A AMPLIFIER (Two Tubes)

	Fixed-Bias	Self-Bias
Filament Voltage . . . . .	6.3	6.3 Volts
Plate Voltage . . . . .	325	325 Volts Max.
Grid Voltage* . . . . .	-68	... Volts
Self-Bias Resistor . . . . .	...	750 Ohms
Plate Current Per Tube† . . . . .	40	40 Ma.
Plate to Plate Load Resistance . . . . .	3000	5000 Ohms
Power Output . . . . .	15	10 Watts
Total Harmonic Distortion . . . . .	2.5	5 Per Cent

\*NOTE: Grid volts measured from mid-point of filament when operated on a.c.

†For zero input signal.

### CIRCUIT APPLICATION

Sylvania 6A3 is a three electrode high vacuum type power amplifier for use in the output stage of a-c operated receivers and public address systems. An outstanding feature is the ability of the tube to deliver very large amounts of power under Class A operating conditions. This is accomplished by proper design which provides a very high mutual conductance (5250 micromhos).

It should be noted that the plate current is comparatively high, the grid bias voltage large, the amplification factor relatively small, and the plate resistance exceptionally low in value. This is characteristic of power amplifiers of the triode type.

Any of the conventional methods may be used for the input coupling provided that the resistance added in the grid return is not excessive. The d-c resistance in this circuit should be less than 0.5 megohm for a self-bias arrangement; with fixed bias the limit is 10,000 ohms. If the above values are exceeded, the bias voltage may be reduced as a result of grid current. This condition will cause excessive plate current to flow which, in turn, may cause damage to the tube or output transformer.

A resistor of approximately 750 ohms will provide the appropriate bias voltage for the self-bias operation of a single Type 6A3 tube. This same value may be employed for two tubes in push-pull, since an over-biased voltage condition is recommended for this method of operation. It is essential that this self-biasing resistor be suitably by-passed to reduce bias voltage fluctuation resulting from current variations in the resistor.

In comparison with single stage service it will be noted that over-biased push-pull operation of power tubes provides greatly increased output. The operating conditions for such service are determined on the following basis: that at the most positive limit of the signal voltage swing there is to be no flow of grid current; also, that there will be cancellation of the second harmonic distortion as a result of the push-pull arrangement. The output is therefore limited almost entirely by the third harmonic content.