


**Cunningham**  
**Radiotron**
  
 RCA-6F6

**Power Amplifier Pentode**

The 6F6 is a heater-cathode power-amplifier pentode of the metal type for use in the audio-output stage of a-c receivers. It is capable of giving large power output with a relatively small input voltage. Because of the heater-cathode construction, a uniformly low hum-level is attainable in power-amplifier design.

**TENTATIVE CHARACTERISTICS**

HEATER VOLTAGE (A.C. or D.C.)	6.3	Volts
HEATER CURRENT	0.7	Volts
MAXIMUM OVERALL LENGTH	3-1/4"	
MAXIMUM DIAMETER	1-5/16"	
BASE	Small Octal 7-Pin	

**Single-Tube Class A Amplifier**

	<u>Pentode Connection</u>	<u>Triode Connection</u>	
			Screen tied to plate
PLATE VOLTAGE	250	315 max.	250 max. Volts
SCREEN VOLTAGE	250	315 max.	- Volts
GRID VOLTAGE	-16.5	-22	-20 Volts
PLATE CURRENT	34	42	31 Milliampères
SCREEN CURRENT	6.5	8	- Milliampères
PLATE RESISTANCE	80000°	75000°	2600 Ohms
AMPLIFICATION FACTOR	200°	200°	7
MUTUAL CONDUCTANCE	2500	2650	2700 Micromhos
LOAD RESISTANCE	7000	7000	4000 Ohms
TOTAL HARMONIC DISTORTION	7	7	5 Per cent
POWER OUTPUT	3	5	0.85 Watts

Under the above maximum voltage conditions, transformer or impedance input-coupling devices are recommended. If resistance-coupling is used, refer to last paragraph of APPLICATION.

° Approximate.

**Push-Pull Class AB Amplifier (Pentode Connection)**

	<u>Fixed-Bias</u>	<u>Self-Bias</u>	
PLATE VOLTAGE	375 max.	375 max.	Volts
SCREEN VOLTAGE	250 max.	250 max.	Volts
GRID VOLTAGE	-26 min.	-	Volts
SELF-BIAS RESISTOR	-	340 min.	Ohms
ZERO-SIGNAL PLATE CUR. (Per tube)	17	27	Milliampères
ZERO-SIGNAL SCREEN CUR. (Per tube)	2.5	4	Milliampères
LOAD RESISTANCE (Per tube)	2500	2500	Ohms
EFFECTIVE LOAD RESISTANCE (Plate-to-plate)	10000	10000	Ohms
TOTAL HARMONIC DISTORTION	5	5	Per cent
POWER OUTPUT (2 tubes)	19 approx.*	19 approx.*	Watts

Under the above maximum voltage conditions, transformer or impedance input-coupling devices must be used.

\* With one triode-connected 6F6 as driver operated at plate volts of 250, grid volts of -20, and with a minimum plate load of approximately 10000 ohms: input transformer ratio, primary to one-half secondary, is 3.32. The plate, screen and grid supply have negligible resistance.

# With one triode-connected 6F6 as driver operated at plate volts of 250, grid volts of -20, and with a minimum plate load of approximately 10000 ohms: input transformer ratio, primary to one-half secondary, is 2.5. The plate and screen supply have negligible resistance. The value given for the self-bias resistor is determined for a minimum grid bias of -21 volts.

### Push-Pull Class AB Amplifier (Triode Connection)

	Screen tied to plate <u>Fixed-Bias</u>	<u>Self-Bias</u>	
PLATE VOLTAGE	350 max.	350 max.	Volts
GRID VOLTAGE	-38	-	Volts
SELF-BIAS RESISTOR	-	730 min.	Ohms
ZERO-SIGNAL PLATE CURRENT (Per tube)	22.5	25	Milliamperes
LOAD RESISTANCE (Per tube)	1500	2500	Ohms
EFFECTIVE LOAD RESISTANCE (Plate-to-plate)	6000	10000	Ohms
TOTAL HARMONIC DISTORTION	7	7	Per cent
POWER OUTPUT (2 tubes)	18 approx. <sup>o</sup>	14 approx. <sup>o</sup>	Watts

Under the above maximum voltage conditions, transformer or impedance input-coupling devices must be used.

° With one triode-connected 6F6 as driver operated at plate volts of 250, grid volts of -20, and with a minimum plate load of approximately 10000 ohms: input transformer ratio, primary to one-half secondary, is 1.87. The plate and grid supply have negligible resistance.

• With one triode-connected 6F6 as driver operated at plate volts of 250, grid volts of -20, and with a minimum plate load of approximately 10000 ohms: input transformer ratio, primary to one-half secondary, is 1.29. The plate supply has negligible resistance. The value given for the self-bias resistor is determined for a minimum grid bias of -36.5 volts.

### INSTALLATION

The base pins of the 6F6 fit the seven-contact octal-base socket (or the universal eight-contact socket) which may be installed to hold the tube in any position.

The heater is designed to operate at 6.3 volts. The transformer supplying this voltage should be designed to operate the heater at this recommended value for full-load operating conditions at average line voltage.

The cathode should preferably be connected directly to a mid-tap on the heater winding or to a center-tapped resistor across the heater winding. If this practice is not followed, the potential difference between heater and cathode should be kept as low as possible.

### APPLICATION

As a Class A power-amplifier pentode, the 6F6 may be used either singly or in push-pull. Recommended operating conditions are given

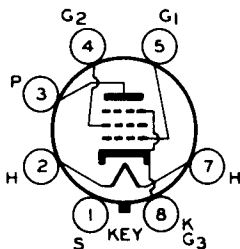
under CHARACTERISTICS. If a single 6F6 is operated at a plate voltage of 250 volts, the self-bias resistor should have a value of approximately 410 ohms; at 315 volts, 440 ohms. For two tubes in the same stage, the value of the self-bias resistor should be approximately one-half that for a single tube.

As a *Class A power-amplifier triode*, the 6F6 may be used either singly or in push-pull. For this service the screen is connected to the plate. Recommended operating conditions are given under CHARACTERISTICS. If a single 6F6 is operated as a *Class A triode* at a plate voltage of 250 volts, the self-bias resistor should have a value of approximately 650 ohms. For two tubes in the same stage, the value of the self-bias resistor should be approximately one-half that for a single stage.

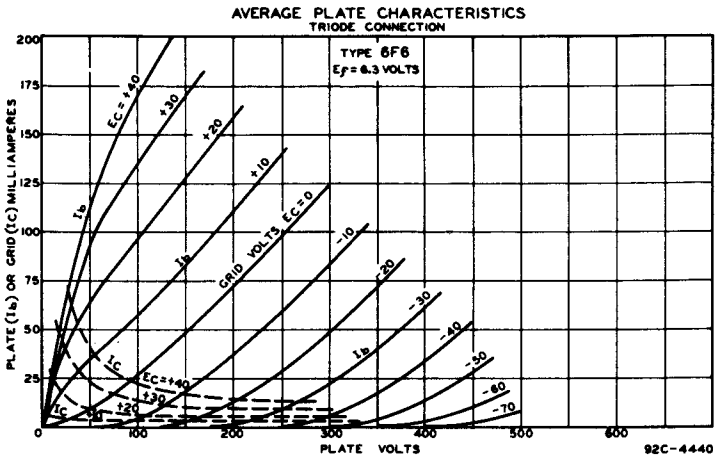
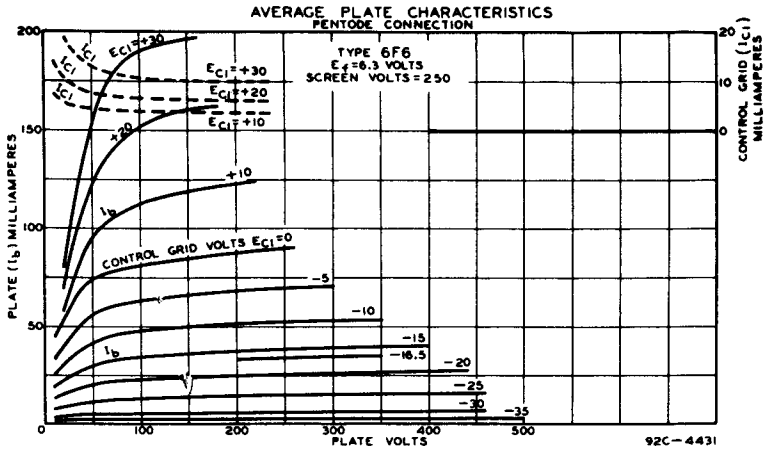
As a *Class AB power-amplifier triode or pentode*, the 6F6 should be operated as shown under the CHARACTERISTICS. The values shown cover operation with fixed-bias and with self-bias, and have been determined on the basis of some grid-current flow during the most positive swing of the input signal and of cancellation of second-harmonic distortion by virtue of the push-pull circuit.

Self-bias resistors should be shunted by a filter network to avoid degeneration at the low audio-frequencies. The filter network may be omitted for push-pull *Class A pentode* and *Class A triode* service.

The type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.05 megohm, fixed bias may be used; for higher values, self-bias is required. With self-bias, the grid circuit may have a resistance as high as, but not greater than, 0.5 megohm provided the heater voltage is not allowed to rise more than 10% above rated value under any condition of operation.



BOTTOM VIEW





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