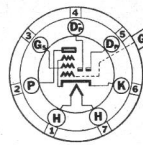
Sylvania

TYPE 6B7

DUODIODE
HIGH GAIN PENTODE



CHARACTERISTICS

Heater Voltage AC or DC	6.3 Volts
Heater Current	0.3 Ampere

Direct Interelectrode Capacitances:

Grid to Plate (with tube shield)	0.007 $\mu\mu$f
Input	3.5 $\mu\mu$f
Output	9.5 $\mu\mu$f
Maximum Over-all Length	$4\frac{17}{32}$"
Maximum Diameter	$1\frac{3}{16}$"
Bulb	ST-12
Cap	Small Metal
Base—Small 7-Pin	7-D

Operating Conditions and Characteristics:

DIODE UNITS

With an applied d-c plate voltage of 10 volts the space current per plate (no external load) should exceed 0.5 milliampere.

PENTODE UNIT

CLASS A AMPLIFIER

Heater Voltage	6.3	6.3	6.3	6.3	Volts
Plate Voltage	100	180	250	250	Volts Max.
Screen Voltage	100	75	100	125	Volts Max.
Grid Voltage	−3	−3	−3	−3	Volts
Plate Current	5.8	3.4	6.0	9.0	Ma.
Screen Current	1.7	0.9	1.5	2.3	Ma.
Grid Bias Voltage*	−17	−13	−17	−21	Volts
Plate Resistance	0.3	1.0	0.8	0.65	Megohm
Mutual Conductance	950	840	1000	1125	μmhos
Amplification Factor	285	840	800	730	

*For Cathode Current Cut-off.

CIRCUIT APPLICATION

The complex structure of this tube is such that it is called a "duodiode pentode." This name reveals the multi-service possibilities of the tube. It is designed for performing simultaneously the functions of detection, amplification, and automatic volume control.

The tube has a single cathode structure. The emitting surface on the sleeve is in two sections: one for the diodes and the other for the pentode unit. This permits independent operation of the two sections and extends the usefulness of the tube. A 7-pin base and top cap provide separate external connections for all the elements.

The 6B7 is applicable in automobile, AC, AC-DC, or DC sets. The heater rating is 0.3 ampere at 6.3 volts.

Duodiode triodes have been used extensively for the combined service as detector, amplifier and automatic volume control tubes. Types 55, 75 and 85 utilize this structural arrangement. The primary difference between this group and Type 6B7 is in the amplifier section. In the former group this is a triode unit, while in the latter it takes the form of a pentode.

Although the amplifier section of duodiode triodes is generally restricted in application to audio frequency stages, nevertheless, these types are more popular than duodiode pentodes. The primary cause for this is the saving in cost. Type 6B7 is a more expensive tube to manufacture than the 75 and, therefore, the

price is higher. Furthermore, when the former type is used, a resistor and voltage supply must be provided for the screen circuit. Nevertheless, special circuit design requirements may justify the increased expenditure of using a Type 6B7. Comparison of the application notes given below with those described under **Circuit Application** on Type 75 will prove helpful in determining which of these tubes will be superior in any given circuit.

Detection:

The diode section is readily adapted to detector service. A diode system is characterized by high rectifying efficiency. Furthermore, with proper choice of load resistance it is possible to maintain the distortion of the rectified signal at a minimum.

There being two diodes available in this tube, it is possible to use them either for independent functions (one for a.v.c. and one for detection); or they may be used in conjunction with each other, either in parallel or in a full-wave rectifier circuit. The half-wave arrangement will give nearly twice as much audio or a-v-c voltage for a given carrier as the full-wave connection, but it requires better carrier frequency filtering.

When both diodes are used separately, delayed a.v.c. may be obtained independent of squelch action so that the maximum or initial sensitivity need not be limited by early a-v-c action.

Usually the regulating voltage is applied to the control grids of the r-f or i-f amplifier, or to both. However, some circuits may permit one to secure control through the application of the regulating voltage to other elements of an r-f pentode.

Amplification (R.F. or I.F.):

Conventional circuits for a pentode are applicable to the pentode section of the 6B7. The cut-off characteristics are midway between the sharp and extended types which permits moderate gain control by means of proper grid bias variation.

Amplification (A.F.):

The pentode section may be used in a resistance coupled circuit to provide high gain. The grid bias should be obtained from a fixed voltage tap on the d-c power supply. Resistance in the grid circuit should not exceed 1.0 megohm. Suggested operating conditions for this service are:

Heater Voltage	6.3 Volts
Plate Supply Voltage	250 Volts
Screen Voltage	50 Volts
Grid Voltage	−4.5 Volts
Plate Load	0.2 Megohm
Plate Current	0.65 Ma.

Reflex operation of Type 6B7 is also possible where space is at a premium and a-v-c action is not essential. The usual method is to reflex the audio through the pentode section which is already being employed for i-f amplification. The diodes, of course, are utilized for the function of detection. For resistance coupled audio in reflexed service the following operating conditions have been found most suitable:

Heater Voltage	6.3 Volts
Plate Supply Voltage	250 Volts
Screen Voltage	40 Volts
Grid Voltage	−2 Volts
Plate Current	1.4 Ma.
Plate Load Resistor	0.1 Megohm
Diode Load Resistor	0.5 Megohm
I-F Filter Resistor	0.25 Megohm
Grid Coupling Resistor	1.0 Megohm
Diode Load By-pass	0.0002 μf
Grid Resistor By-pass	0.0001 μf
Plate Load By-pass	0.0001 μf