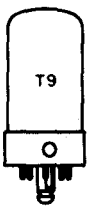
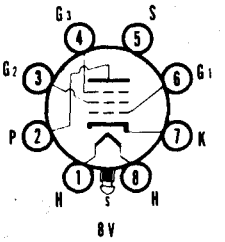
TYPES 7AB7, 7AD7, 7AF7

(See Condensed Data Section)



SYLVANIA TYPE 7AG7

SHARP CUTOFF PENTODE



MECHANICAL DATA

Bulb	T-9; Outline 9-30
Base	Lock-In 8-Pin
Basing	8V
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	150 Ma
Maximum Heater-Cathode Voltage	90 Volts

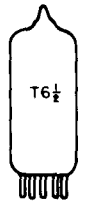
AVERAGE CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	100	250 Volts
Grid No. 2 Voltage	100	250 Volts
Grid No. 3 Voltage	Connected to Cathode at Socket	
Grid No. 1 Voltage	-1.0	Note 1
Self Bias Resistor	480	250 Ohms
Plate Current	1.6	6.0 Ma
Grid No. 2 Current	0.5	2.0 Ma
Transconductance	2300	4200 μmhos
Plate Resistance	.71	>1.0 Megohms
Control Grid Bias for I_b = 10 μa	-3.5	-10.0 Volts

NOTE: 1. Bias voltage developed is approximately 2.0 volts. Fixed bias operation is not recommended.

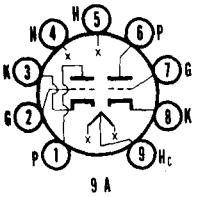
TYPE 7AH7, 7AJ7

(See Condensed Data Section)



SYLVANIA TYPE 7AU7

MEDIUM-MU DUO TRIODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	7.0/3.5 Volts
Heater Current Series/Parallel	300/600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)[1]	
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

For other rating, operation, and application data, refer to corresponding Type 12AU7, which is identical except for heater ratings.

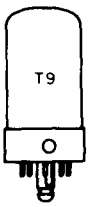
APPLICATION

The Sylvania Type 7AU7 is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

NOTE: 1. Applies to parallel connection only.

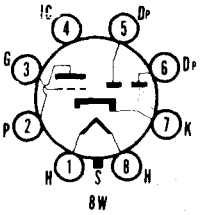
TYPES 7B4, 7B5

(See Condensed Data Section)



SYLVANIA TYPE 7B6

DUODIODE HIGH-MU TRIODE



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8W
Mounting Position	Any

ELECTRICAL DATA

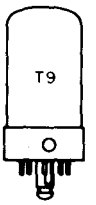
HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	300 Ma

CHARACTERISTICS

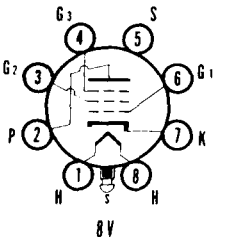
Plate Voltage	100	250 Volts
Grid No. 1 Voltage	1.0	-2.0 Volts
Plate Current	0.4	0.9 Ma
Transconductance	900	1100 μmhos
Amplification Factor	100	100
Plate Resistance	110000	91000 Ohms
Diode Drop at 0.8 Ma		10 Volts

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.



SYLVANIA TYPE 7B7

REMOTE CUTOFF PENTODE



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-in 8 Pin
Basing	8V
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	150 Ma
Maximum Heater-Cathode Voltage	90 Volts

DIRECT INTERELECTRODE CAPACITANCES (Shielded)[1]

Grid to Plate	0.004 μμf Max
Input	5.0 μμf
Output	6.0 μμf

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	300 Volts
Plate Dissipation	2.25 Watts
Grid No. 2 Voltage	100 Volts
Grid No. 2 Dissipation	0.25 Watts
Positive Grid No. 1 Voltage	0 Volts

7B7 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	100	250	Volts
Grid No. 2 Voltage	100	100	Volts
Grid No. 1 Voltage	−3.0	−3.0	Volts
Self Bias Resistor	300	300	
Suppressor	Connect to Cathode at Socket		
Plate Current	8.2	8.5	Ma
Grid No. 2 Current	1.8	1.7	Ma
Transconductance	1675	1750	μmhos
Plate Resistance	0.3	0.75	Megohm
Control Grid Bias for G_m = 10 μmhos	−40	−40	Volts

NOTE:

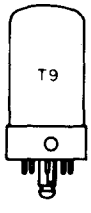
1. Shield No. 308. Internal Shield connects to Pin No. 5.

APPLICATION

Sylvania Type 7B7 is a remote cutoff pentode suitable for r f or i f service. An internal shield connects to Pin No. 5 in order to obtain a low grid to plate capacity.

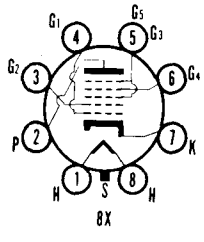
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	6.3	0	—	0	1	036	36	W
219/220	6.3	1	8	30	8	036Y	2	7



SYLVANIA TYPE 7B8

HEPTODE CONVERTER



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8X
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3	Volts
Heater Current	300	Ma

TYPICAL OPERATION

Plate Voltage	100	250	Volts
Grid No. 3 and 5 Voltage	50	100	Volts
Grid No. 2 Voltage (Note 1 for E_{c2} = 250 V)	100	250	Volts
Grid No. 1 Resistor	50000	50000	Ohms
Grid No. 4 Voltage	−1.5	−3.0	Volts
Plate Current	1.1	3.5	Ma
Grid No. 3 and 5 Current	1.3	2.7	Ma
Grid No. 2 Current	2.0	4.0	Ma
Grid No. 1 Current	0.25	0.4	Ma
Self Bias Resistor	360	300	Ohms
Conversion Transconductance	360	550	μmhos
Plate Resistance	0.6	0.36	Megohm
Grid No. 4 Bias (approx.) for g_c = 6 μmhos		−35	Volts
g_c = 3 μmhos	−20		Volts

CHARACTERISTICS

Oscillator, Non-oscillating Condition[2]

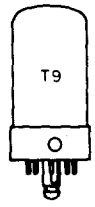
Grid No. 2 Current	4	Ma
Transconductance (Grid No. 1 to Grid No. 2)	1150	μmhos
Amplification Factor (Grid No. 1 to Grid No. 2)	75	

NOTES:

1. Applied through a 20,000 ohm resistor.
2. Measurements taken with E_b = 250 volts; E_{c2} = 100 volts; E_{c3} = 55 volts; E_{c4} = −2.0 volts; E_{c1} = −1.0 volt.

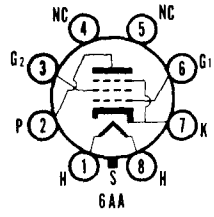
TYPE 7C4

(See Condensed Data Section)



SYLVANIA TYPE 7C5

BEAM POWER AMPLIFIER



MECHANICAL DATA

Bulb	T-9, Outline 9-31
Base	Lock-in 8-Pin
Basing	6AA
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	450 Ma

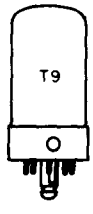
DIRECT INTERELECTRODE CAPACITANCES (With Shield No. 308)

Grid to Plate	0.4 $\mu\mu$f
Input	9.5 $\mu\mu$f
Output	9.0 $\mu\mu$f

For other rating, operation, and application data, refer to corresponding Type 6V6GT, which is identical except for mechanical data, and capacities.

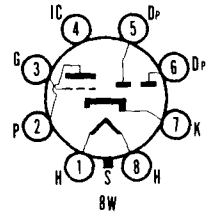
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	6.3	0	—	0	1	036	37	Y
219/220	6.3	1	8	14	8	036Y	2	7



SYLVANIA TYPE 7C6

DUODIODE HIGH-MU TRIODE



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8W
Mounting Position	Any

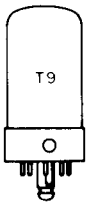
ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	150 Ma

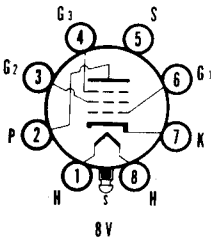
CHARACTERISTICS

Plate Voltage	100	250 Volts
Grid No. 1 Voltage	0.0	-1.0 Volts
Plate Current	1.0	1.3 Ma
Transconductance	850	1000 μmhos
Amplification Factor	85	100
Plate Resistance	1.0	0.1 Megohm
Diode Voltage Drop at 0.8 Ma		10 Volts



SYLVANIA TYPE 7C7

SHARP CUTOFF PENTODE



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8V
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	150 Ma

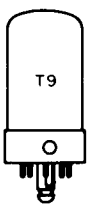
TYPICAL OPERATION

Plate Voltage	100	250 Volts
Grid No. 2 Voltage	100	100 Volts
Grid No. 1 Voltage	-3.0	-3.0 Volts
Self Bias Resistor	1350	1200 Ohms
Grid No. 3	Connected to Cathode at Socket	
Plate Current	1.8	2.0 Ma
Grid No. 2 Current	0.4	0.5 Ma
Transconductance	1250	1300 μmhos
Plate Resistance	1.2	2.0 Megohms

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.

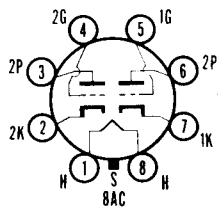
TYPES 7E5, 7E6, 7E7

(See Condensed Data Section)



SYLVANIA TYPE 7F7

HIGH-MU DUO TRIODE



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8AC
Mounting Position	Any

ELECTRICAL DATA

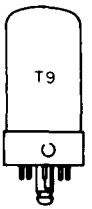
HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	300 Ma

MAXIMUM RATINGS (Design Center Values)

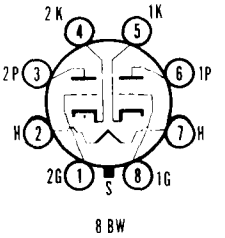
Plate Voltage	300 Volts
Plate Dissipation	1.0 Watt

For typical operation, and application data, refer to corresponding Type 6SL7GT, which is identical except for mechanical data and maximum plate voltage rating. Data for use in resistance coupled amplifier circuits is given in the appendix.



SYLVANIA TYPE 7F8

DUO TRIODE



MECHANICAL DATA

Bulb	T-9, Outline 9-32
Base	Lock-In 8-Pin
Basing	8BW
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

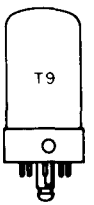
Heater Voltage	6.3 Volts
Heater Current	300 Ma

CHARACTERISTICS AND TYPICAL OPERATION (Each Section)

Plate Voltage	250 Volts
Self Bias Resistor	500 Ohms
Plate Current	6.0 Ma
Transconductance	3300 μmhos
Amplification Factor	48
Control Grid Bias for I_b = 10μa (approx.)	−11.0 Volts
Maximum Grid Circuit Resistance	0.5 Megohm

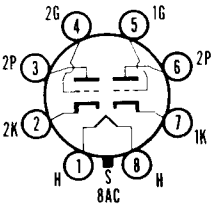
TYPES 7G7, 7G8, 7H7, 7J7, 7K7, 7L7

(See Condensed Data Section)



SYLVANIA TYPE 7N7

MEDIUM-MU DUO TRIODE



MECHANICAL DATA

Bulb	T-9, Outline 9-31
Base	Lock-in 8-Pin
Basing	8AC
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	600 Ma
Maximum Heater-Cathode Voltage	90 Volts

DIRECT INTERELECTRODE CAPACITANCES (Shielded)[1, 2]

	Section 1	Section 2
Grid to Plate	3.0	3.0 μμf
Input	3.4	2.9 μμf
Output	2.0	2.4 μμf

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	300 Volts
Plate Dissipation (Per Section)	2.5 Watts
Positive Grid Voltage	0 Volts

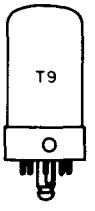
7N7 (Cont'd)

NOTES:
1. Shield No. 308 connected to cathode.
2. Section 1 connects to pins 5, 6 and 7. Section 2 connects to pins 2, 3 and 4.

For typical operation as a Class A_1 Amplifier refer to corresponding Type 6SN7GTA. Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix. Curves under Type 6SN7GTA may also be used for the Type 7N7.

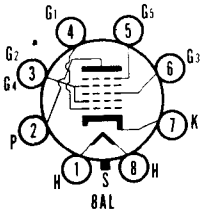
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	6.3	0	—	0	2	4	36	W
	6.3	0	—	0	5	5	36	W
219/220	6.3	1	78	25	8	4Y	3	2
	6.3	1	28	25	8	5Y	6	7



SYLVANIA TYPE 7Q7

HEPTODE CONVERTER



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	8AL
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	300 Ma

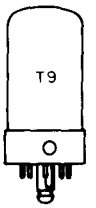
TYPICAL OPERATION

Refer to corresponding Type 6SA7 which is identical except for Conversion Transconductance.

Conversion Transconductance (Separately Excited Condition)	
E_b = 100 V., E_{c2} = 100 V., E_{c3} = -2V	525 μmhos
E_b = 250 V., E_{c2} = 100 V., E_{c3} = -2V	550 μmhos

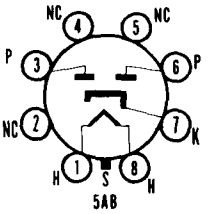
TYPES 7R7, 7S7, 7T7, 7V7, 7W7

(See Condensed Data Section)



SYLVANIA TYPE 7Y4

FULL-WAVE RECTIFIER



MECHANICAL DATA

Bulb	T-9, Outline 9-30
Base	Lock-In 8-Pin
Basing	5AB
Mounting Position	Any

ELECTRICAL DATA

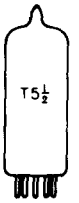
HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	500 Ma

For other rating, operation, and application data, refer to corresponding Type 6X5GT, which is identical except for heater ratings, and mechanical data.

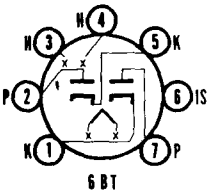
TYPES 7Y6, 7X7/XXFM, 7Z4, 10, 12A(112A), 12A4, 12A5, 12A6, 12A6GT, 12A7, 12A8, GT, 12AH7GT

(See Condensed Data Section)



SYLVANIA TYPE 12AL5

DUO DIODE

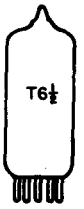


ELECTRICAL DATA

HEATER CHARACTERISTICS

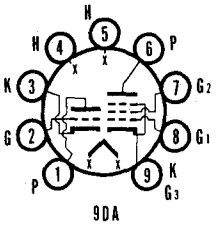
Heater Voltage	12.6 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6AL5, which is identical except for heater ratings.



SYLVANIA TYPE 10C8

TRIODE PENTODE



MECHANICAL DATA

Bulb	T-6½
Base	E9-1, Small Button 9-Pin
Outline	6-2
Basing	9DA
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	10.5 Volts
Heater Current	300 Ma
Heater Warm-up Time[1]	11 Seconds
Heater Cathode Voltage (Design Maximum Values)	
Heater Positive with Respect to Cathode, D C	100 Volts
Total D C and Peak	200 Volts
Heater Negative with Respect to Cathode	
Total D C and Peak	200 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

	Triode Section	Pentode Section
Grid No. 1 to Plate	1.6	0.04 μμf Max.
Input	2.4	7.0 μμf
Output	0.20	2.2 μμf
Coupling		
Pentode Grid No. 1 to Triode Plate		0.008 μμf Max.
Triode Grid to Pentode Plate		0.006 μμf Max.
Pentode Plate to Triode Plate		0.06 μμf Max.

MAXIMUM RATINGS (Design Maximum Values)[2]

Class A1 Amplifier

	Triode Section	Pentode Section
Plate Voltage	300	300 Volts
Grid No. 2 Supply Voltage		300 Volts
Grid No. 2 Voltage	See 6AM8 Rating Chart	
Positive Grid No. 1 Voltage	0	0 Volts
Plate Dissipation	2.0	2.2 Watts
Grid No. 2 Dissipation		0.55 Watt
Grid No. 1 Circuit Resistance		
Fixed Bias	0.5	0.25 Megohm
Cathode Bias	1.0	1.0 Megohm

Vertical Deflection Service[3]

	Triode Section Vertical Osc.	Pentode Section Vertical Amp.[4]
D C Plate Voltage	300	300 Volts
Peak Positive Pulse Plate Voltage		1000 Volts
Peak Negative Grid Voltage	400	250 Volts
Plate Dissipation	1.0	2.5[5] Watts
D C Cathode Current	12	18 Ma
Peak Cathode Current	35	55 Ma
Grid Circuit Resistance		
Fixed Bias	2.2	Megohms
Cathode Bias	2.2	2.2 Megohms
Grid Leak Bias	2.2	2.2 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

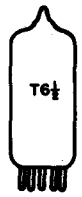
	Triode Section	Pentode Section
Plate Voltage	250	135 Volts
Grid No. 2 Voltage		135 Volts
Cathode Resistor	390	100 Ohms
Plate Current	7.3	11.5 Ma
Grid No. 2 Current		3.2 Ma
Transconductance	4400	8000 μmhos
Amplification Factor	53	40[4]
Plate Resistance (approx.)	1200	190,000 Ohms
Ec1 for Ib = 10 μa (approx.)	-10	Volts
Ec1 for Ib = 50 μa (approx.)		-6 Volts
Plate Knee Characteristics (Pentode Section—Triode Connected)		
Plate Voltage		135 Volts
Grid No. 1 Voltage		0 Volts
Plate Current (Instantaneous)		33 Ma

NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. Design-Maximum ratings are limiting values of operating and environmental conditions applicable to bogey electron device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.
   The device manufacturer chooses these values to provide acceptable serviceability of the device, taking responsibility for the effects of changes in operating conditions due to variations in device characteristics.
   The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey device under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, and environmental conditions.
3. For operation in a 525-line, 30-frame system as described in "Standards of Good Engineering Practice for Television Broadcasting Stations; Federal Communications Commission." The duty cycle of the voltage pulse is not to exceed 15% of a scanning cycle.
4. Triode connected.
5. In stages operating with grid-leak bias, an adequate cathode bias resistor or other suitable means is required to protect the tube in the absence of excitation.

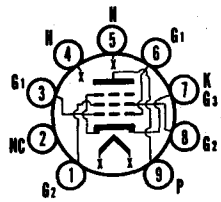
APPLICATION

The Type 10C8 has a high-mu triode and general purpose pentode contained in a miniature envelope. The pentode section is suitable for use as a vertical deflection amplifier when triode connected.
Type 10C8 has controlled heater warm-up time for series string operation.



SYLVANIA TYPE 12AB5

BEAM POWER PENTODE



9EU

MECHANICAL DATA

Bulb	T-6½
Base	E9-1, Small Button 9-Pin
Outline	6-3
Basing	9EU
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	0.2 Ampere
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	
Total D C and Peak	200 Volts Max.
Heater Positive with Respect to Cathode	
D C	100 Volts Max.
Total D C and Peak	200 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid to Plate: (g1 to p)	0.7 μμf
Input: g1 to (h + k + g2 + g3)	8.0 μμf
Output: p to (h + k + g2 + g3)	8.5 μμf

RATINGS (Design Center Values)

Class A_1 Amplifier

Plate Voltage	315 Volts Max.
Plate Dissipation	12 Watts Max.
Grid No. 2 Voltage	285 Volts Max.
Grid No. 2 Dissipation	2 Watts Max.
Grid No. 1 Circuit Resistance	
Fixed Bias	0.1 Megohm Max.
Cathode Bias	0.5 Megohm Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier (Single Tube)

Conditions:			
Plate Voltage	180	250	250 Volts
Grid No. 2 Voltage	180	200	250 Volts
Grid No. 1 Voltage	−8.5		−12.5 Volts
Cathode Bias Resistor		270	Ohms
Peak AF Grid No. 1 Voltage	8.5	10.5	12.5 Volts
Zero Signal Plate Current	29	33.5	45 Ma
Maximum Signal Plate Current	30	36.0	47 Ma
Zero Signal Grid No. 2 Current	3.0	1.6	4.5 Ma
Maximum Signal Grid No. 2 Current	4.0	3.2	7.0 Ma
Plate Resistance (approx.)	50,000		50,000 Ohms
Transconductance	3700	4000	4100 μmhos
Load Resistance	5500	6000	5000 Ohms
Maximum Signal Power Output	2.0	3.3	4.5 Watts
Total Harmonic Distortion	8	12	8 Percent

Class A_1 Push-Pull Amplifier (Values are for Two Tubes)

Conditions:	
Plate Voltage	250 Volts
Grid No. 2 Voltage	250 Volts
Grid No. 1 Voltage	−15 Volts
Peak AF Grid No. 1 to Grid No. 1 Voltage	30 Volts
Zero Signal Plate Current	70 Ma
Maximum Signal Plate Current	79 Ma
Zero Signal Grid No. 2 Current	5 Ma
Maximum Signal Grid No. 2 Current	13 Ma
Plate-to-Plate Load Resistance	10,000 Ohms
Maximum Signal Power Output	10 Watts
Total Harmonic Distortion	5 Percent

NOTE:

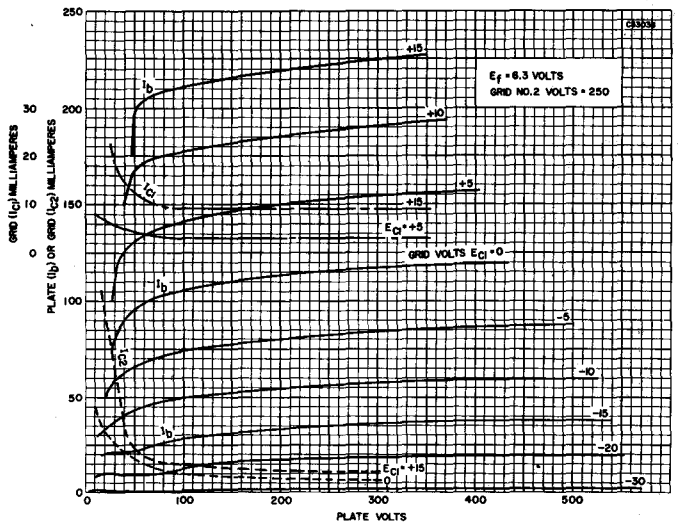
1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.

APPLICATION

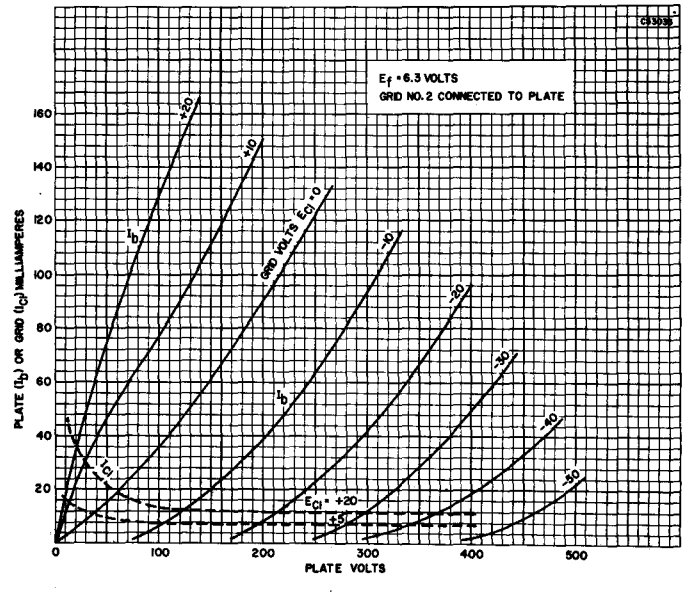
The 12AB5 is a miniature beam power pentode designed primarily for service as an audio power amplifier in auto radios having a 12 volt heater supply. Except for heater characteristics, electrically the 12AB5 is identical to the 6CM6 and the 12CM6.

12AB5 (Cont'd)

AVERAGE PLATE CHARACTERISTICS

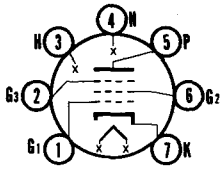


AVERAGE PLATE CHARACTERISTICS
(TRIODE CONNECTED)



SYLVANIA TYPE 12AC6

Remote Cutoff Pentode



7BK

MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7BK
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	30 Volts Max.
Heater Positive with Respect to Cathode	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES

	Shielded[2]	Unshielded
Grid No. 1 to Plate	.004	.005 μμf
Input	4.3	4.3 μμf
Output	5.0	5.0 μμf

RATINGS (Design Center Values)

Plate Voltage	30 Volts Max.
Grid No. 2 Voltage	30 Volts Max.
Cathode Current	20 Ma Max.
Grid No. 1 Circuit Resistance	10 Megohms Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	12.6 Volts
Grid No. 3 Voltage (Connected to Cathode at Socket)	0 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage[3]	
Grid No. 1 Resistor	2.2 Megohms
Plate Current	550 μa
Grid No. 2 Current	200 μa
Transconductance[4]	730 μmhos
Plate Resistance (approx.)	0.5 Megohm
Grid No. 1 Voltage for Gm = 10 μmhos (approx.), Ec3 = 0	-5.2 Volts
Grid No. 3 Voltage for Gm = 10 μmhos (approx.), Ec1 = 0	-3.7 Volts

NOTES:

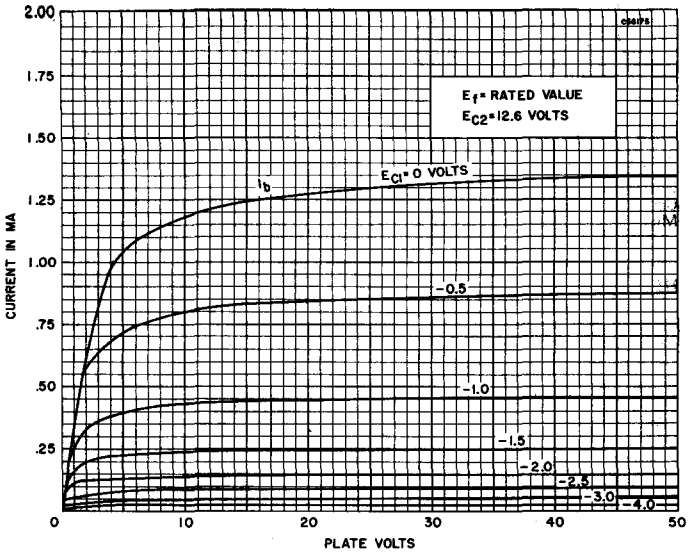
1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Shield No. 316.
3. Average contact potential is developed across the specified resistor.
4. Measured from Grid No. 1 to plate.

APPLICATION NOTES

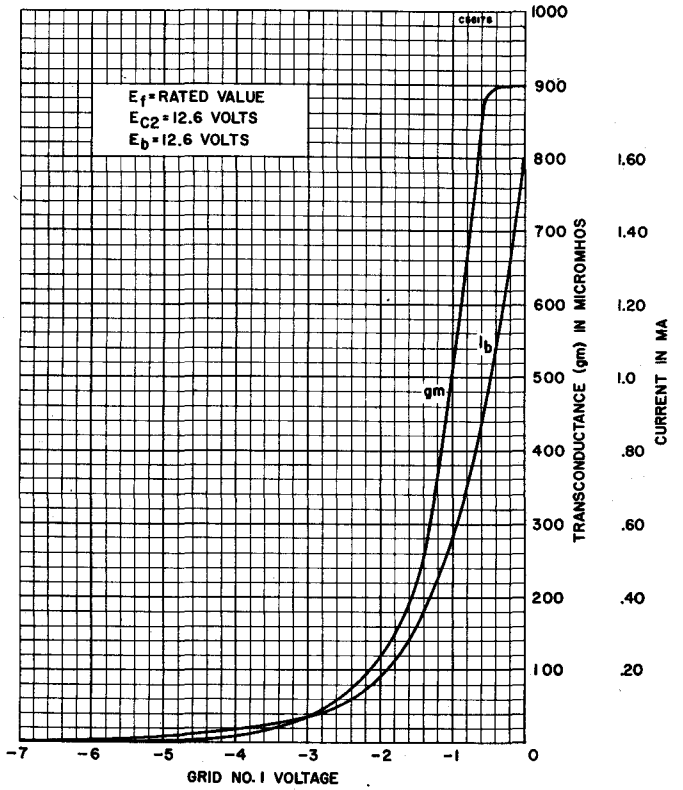
The Sylvania Type 12AC6 is a miniature remote cutoff pentode intended for use as an RF or IF amplifier.
It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12 volt automotive storage battery.

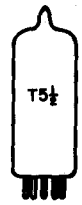
SYLVANIA TYPE 12AC6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



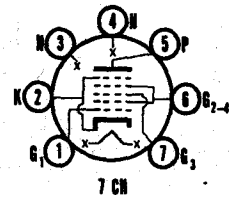
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12AD6

PENTAGRID CONVERTER



MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7CH
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	30 Volts
Heater Positive with Respect to Cathode	30 Volts

DIRECT INTERELECTRODE CAPACITANCES

	Shielded[2]	Unshielded
Grid No. 3 to Plate	0.25	0.30 μμf Max.
Grid No. 3 to Grid No. 1	0.15	0.15 μμf Max.
RF Input: g3 to (h + k + g1 + g2 & g4 + g5 + p)	8.0	8.0 μμf
Oscillator Input: g1 to (h + k + g1 + g2 & g4 + g3 + g5)	5.5	5.5 μμf
Mixer Output: p to (h + k + g1 + g2 & g4 + g3 + g5)	13.0	8.0 μμf
Oscillator Output: k to (h + g2 & g4 + g3 + p)	20.0	15.0 μμf
Oscillator Grid to Cathode g1 to (k + g5)	3.0	3.0 μμf
Oscillator Grid No. 1 to Plate	0.05	0.1 μμf Max.

RATINGS (Design Center Values)

Plate Voltage	30 Volts Max.
Grids No. 2 and No. 4 Voltage	30 Volts Max.
Grids No. 2 and No. 4 Supply Voltage	30 Volts Max.
Negative DC Grid No. 3 Voltage	30 Volts Max.
Positive DC Grid No. 3 Voltage	0 Volts Max.
Cathode Current	20 Ma Max.
Grid No. 3 Circuit Resistance	10 Megohms Max.

CHARACTERISTICS AND TYPICAL OPERATION

Converter—Self Excitation	
Plate Voltage	12.6 Volts
Grids No. 2 and No. 4 Voltage	12.6 Volts
Grid No. 3 Voltage[3]	
Grid No. 3 Resistor	2.2 Megohms
Plate Current	450 μa
Grids No. 2 and No. 4 Current	1500 μa
Grid No. 1 Resistor (Oscillator Grid)	33,000 Ohms
Grid No. 1 Voltage, RMS (Oscillator Grid)	1.6 Volts
Grid No. 1 Current (Oscillator Grid)	50 μa
Conversion Transconductance	260 μmhos
Plate Resistance (approx.)	1.0 Megohm
Cathode Current	2000 μa
Grid No. 3 Voltage for Gc = 5 μmhos (approx.)	−2.2 Volts
Grid No. 3 Voltage for Gc = 20 μmhos (approx.)	−1.8 Volts
Oscillator—Not Oscillating	
Plate Voltage	12.6 Volts
Grids No. 2 and No. 4 Voltage[4]	12.6 Volts
Grid No. 3 Voltage	0 Volts
Grid No. 1 Voltage	0 Volts
Transconductance	3800 μmhos
Amplification Factor	9.0
Cathode Current	5.0 Ma
Grid No. 1 Voltage for Ib = 10 μa (approx.)	−4.0 Volts

NOTES:

1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. External shield No. 316 connected to Pin 2.
3. Average contact potential is developed across the specified grid resistor.
4. Connected to plate.

SYLVANIA ELECTRONIC TUBES

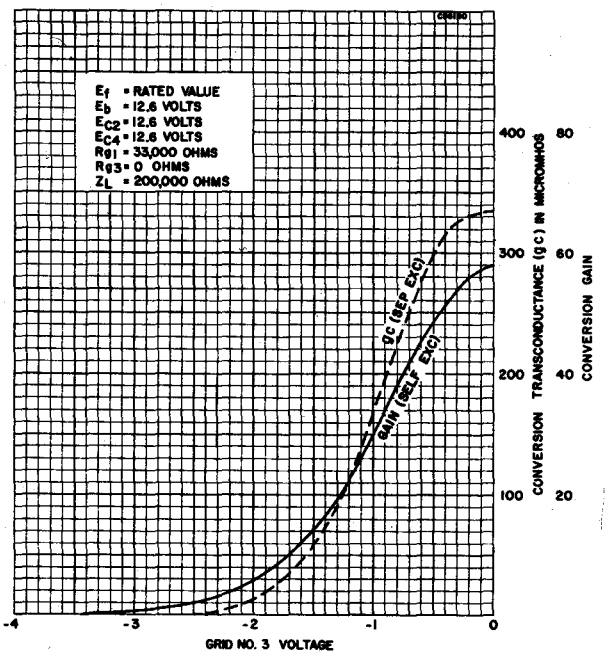
Issued as a supplement to the manual in Sylvania News for May 1957

12AD6 (Cont'd)

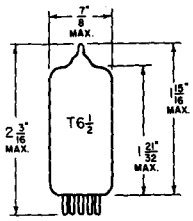
APPLICATION

The Sylvania Type 12AD6 is a miniature, pentagrid converter intended for use as a combined oscillator and mixer. It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12 volt automotive storage battery

AVERAGE PLATE CHARACTERISTICS

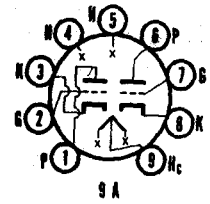


SYLVANIA



TYPE 12AD7

HIGH MU DOUBLE TRIODE



MECHANICAL DATA

Bulb	T-6½
Base	E9-1, Small Button 9-Pin
Outline	6-2
Basing	9A
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (ac or dc)	12.6/6.3 Volts
Heater Current	225/450 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	
Total D C and Peak	200 Volts Max.
Heater Positive with Respect to Cathode	
D C	100 Volts Max.
Total D C and Peak	200 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Approx.)[1]

	Shielded[2]	Unshielded
Section 1		
Grid to Plate	1.8	1.8 μμf
Input: g to (h + k + i.s. + e.s.)	1.7	1.6 μμf
Output: p to (h + k + i.s. + e.s.)	1.6	0.50 μμf
Section 2		
Grid to Plate	1.8	1.8 μμf
Input: g to (h + k + i.s. + e.s.)	1.7	1.6 μμf
Output: p to (h + k + i.s. + e.s.)	1.9	0.45 μμf

MAXIMUM RATINGS (Design Center Values) Each Section

Plate Voltage	300 Volts
Plate Dissipation	1.0 Watts
Positive D C Grid Voltage	0 Volts
Negative D C Grid Voltage	50 Volts

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier—Each Section

Plate Voltage	250 Volts
Grid Voltage	−2 Volts
Plate Current	1.25 Ma
Plate Resistance	62,500 Ohms
Transconductance	1600 μmhos
Amplification Factor	100

Resistance Coupled Amplifier[4]—Each Section

Heater Voltage[3]	6.3 Volts
Plate Supply Voltage	250 Volts
Unbypassed Cathode Resistance	3300 Ohms
Grid Circuit Resistance	470,000 Ohms
Plate Load Resistance	270,000 Ohms
RMS Hum Level at Plate, Max.	3.0 Millivolts

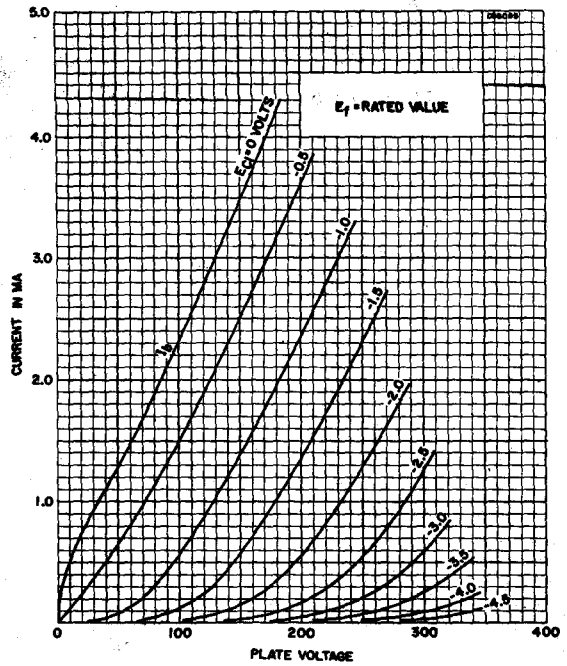
NOTES:

1. Section No. 1 connects to Pins 6, 7 and 8.
   Section No. 2 connects to Pins 1, 2 and 3.
2. Shield No. 315.
3. The heater sections are operated in parallel from a 6.3 volt supply balanced to ground.
4. See 12 X7 data (for R/C).

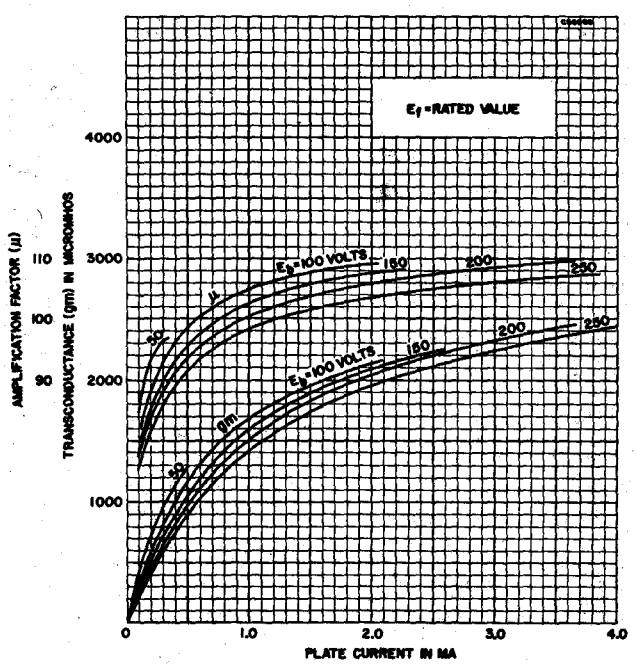
APPLICATION

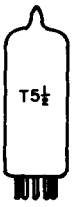
A miniature, non-microphonic low hum, high mμ double triode for audio pre-amplifier use.

AVERAGE PLATE CHARACTERISTICS



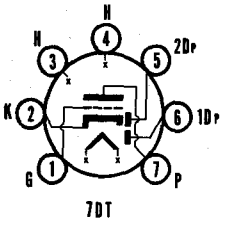
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12AE6

DOUBLE DIODE
MEDIUM MU TRIODE



7DT

MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7DT
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	
Total DC and Peak	30 Volts Max.
Heater Positive with Respect to Cathode	
Total DC and Peak	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid to Plate	2.0 μμf
Input	1.8 μμf
Output	1.1 μμf
Diode to Diode	0.9 μμf

RATINGS (Design Center Values)

Plate Voltage	30 Volts Max.
Cathode Current	20 Ma Max.
Grid Circuit Resistance	10 Megohms Max.
Average Diode Current	1.0 Ma Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier—Each Section

Plate Voltage	12.6 Volts
Grid Voltage	0 Volts
Plate Current	750 μa
Transconductance	1000 μmhos
Amplification Factor	15
Plate Resistance	15,000 Ohms
Average Diode Current, Each Diode	
With 10 Volts DC Applied (Test Condition Only)	2.0 Ma

Resistance Coupled Amplifier

Plate Supply Voltage	14.4 Volts
Grid Voltage[2]	
Grid Resistor	2.2 Megohms
Plate Load Resistor	0.47 Megohm
Input Capacitor	0.01 μf
Output Capacitor	0.01 μf
Grid Resistor of Following Stage	2.2 Megohms
Signal Source Impedance	1000 Ohms
Voltage Gain at 400 CPS[3]	10

NOTES:

1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Average contact potential is developed across the specified grid resistor.
3. Measured at an output voltage of 1.0 volt RMS.

APPLICATION

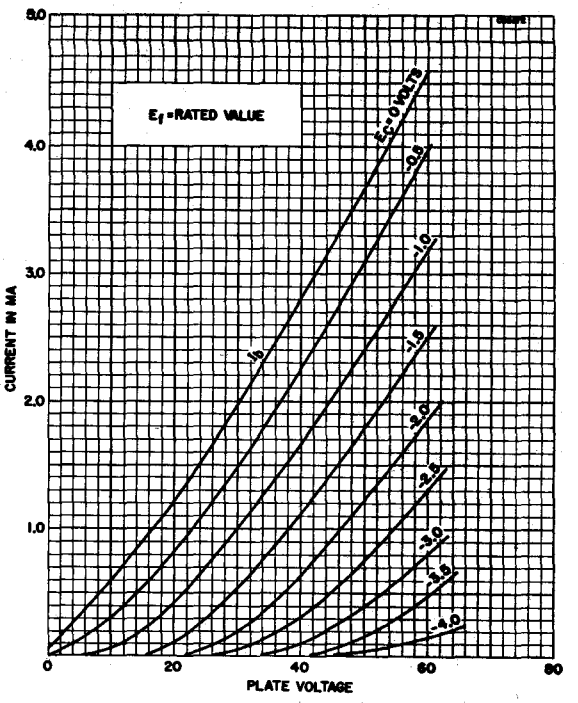
The Sylvania Type 12AE6 is a miniature double diode, medium mu triode intended for use as a second detector audio amplifier. This tube is designed for operation where the heater and plate voltages are supplied directly from a 12 volt automotive storage battery.

SYLVANIA ELECTRONIC TUBES

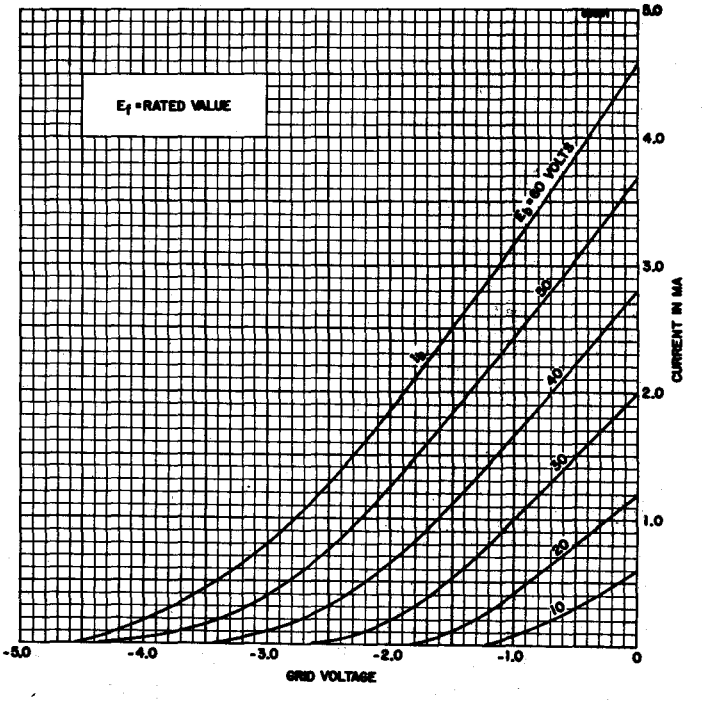
Issued as a supplement to the manual in Sylvania News for April 1957

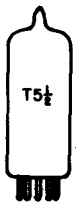
12AE6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



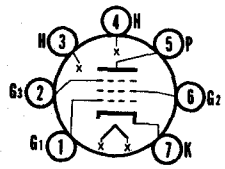
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12AF6

REMOTE CUTOFF PENTODE



7BK

MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7BK
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design Maximum Values)[2]	
Heater Negative with Respect to Cathode	16 Volts Max.
Heater Positive with Respect to Cathode	16 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid to Plate	0.006 μμf
Input	5.5 μμf
Output	4.8 μμf

RATINGS (Design Maximum Values)[2]

Plate Voltage	16 Volts Max.
Grid No. 2 Voltage	16 Volts Max.
Positive DC Grid No. 1 Voltage	0 Volts Max.
Grid No. 1 Circuit Resistance	2.2 Megohms Max.

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 3 Voltage	0 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Supply Voltage	0 Volts
Plate Current	0.8 Ma
Grid No. 2 Current	0.3 Ma
Transconductance	1250 μmhos
Plate Resistance (approx.)	0.3 Megohms
Grid No. 1 Resistor (Bypassed)	2.2 Megohms
Grid No. 1 Voltage (approx.) for Gm = 40 μmhos	−2.7 Volts

NOTES:

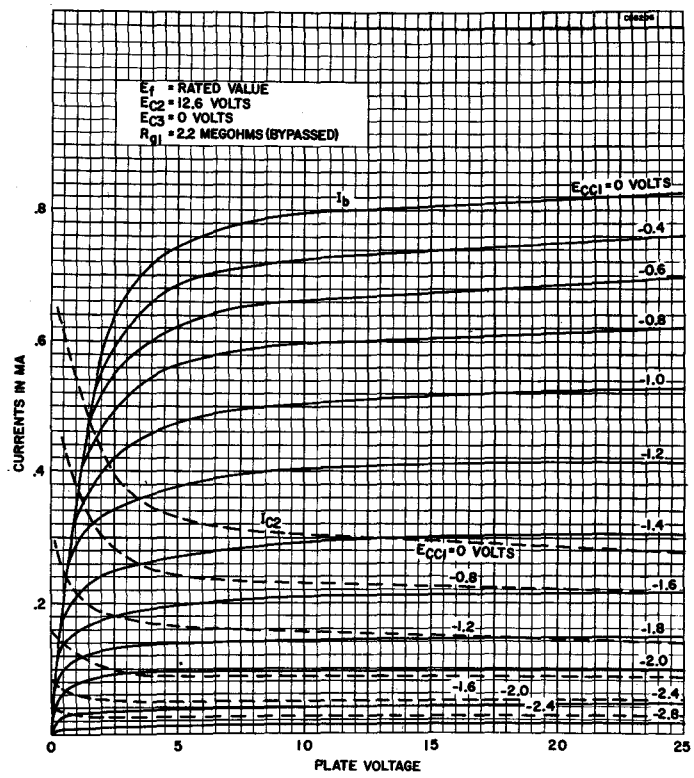
1. This tube is intended for use in automobile radios operated from a nominal 12-volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Design-Maximum Ratings are the limiting values expressed with respect to bogie tubes at which satisfactory tube life can be expected to occur. To obtain satisfactory circuit performance, therefore, the equipment designer must establish the circuit design so that no design-maximum value is exceeded with a bogie tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation and environmental conditions.

APPLICATION

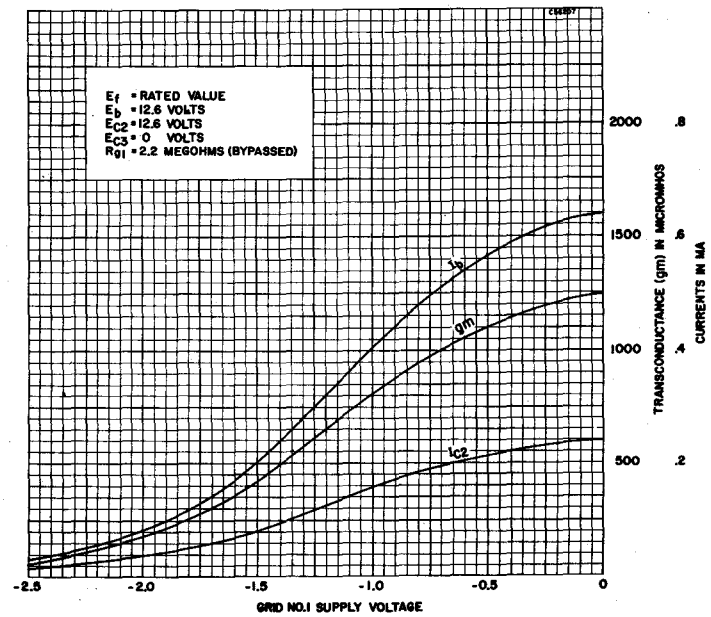
The Sylvania Type 12AF6 is a remote cutoff pentode RF or IF amplifier contained in a miniature envelope. It is designed for operation where the potentials will be supplied directly from a 12-volt automobile storage battery.

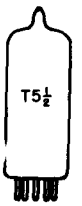
12AF6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS

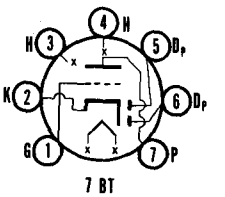


AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12AJ6



7 BT

MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7BT
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design-Center Values)	
Heater Negative with Respect to Cathode	30 Volts Max.
Heater Positive with Respect to Cathode	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid to Plate	2.0 μμf
Input: g to (h + k)	2.2 μμf
Output: p to (h + k)	0.8 μμf
Diode to Diode	0.9 μμf

RATINGS (Design-Center Values)

Plate Voltage	30 Volts Max.
Cathode Current	20 Ma Max.
Grid Circuit Resistance	10 Megohms Max.
Average Diode Current	1.0 Ma Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	12.6 Volts
Grid Voltage	0 Volts
Plate Current	750 μa
Transconductance	1200 μmhos
Amplification Factor	55
Plate Resistance	45,000 Ohms
Average Diode Current with 10 Volts Applied (Each Diode)[2]	2.0 Ma

Resistance Coupled Amplifier

Plate Supply Voltage	12.6 Volts
Grid Voltage[3]	
Grid Resistor	1.0 Megohm
Plate Load Resistor	1.0 Megohm
Input Capacitor	0.02 μf
Output Capacitor	0.01 μf
Grid Resistor of Following Stage	2.0 Megohms
Voltage Gain at 400 CPS[4]	16

NOTES:

1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Test condition only.
3. Average contact potential developed across specified grid resistor.
4. Measured at an output voltage of 1.0 volt RMS.

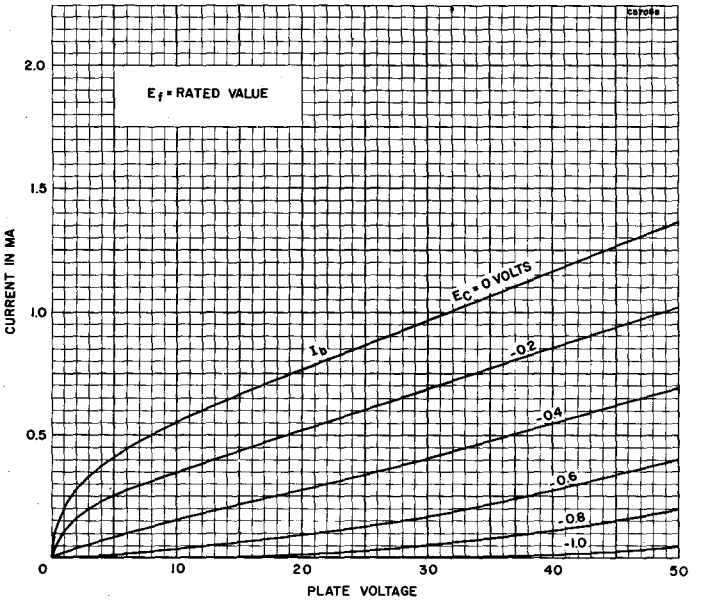
APPLICATION NOTES

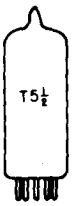
The Sylvania Type 12AJ6 is a miniature double diode, high-mu triode intended for use as a second detector audio amplifier.

It is designed for operation where the heater and plate voltages are supplied directly from a 12-volt automotive storage battery.

SYLVANIA TYPE 12AJ6 (Cont'd)

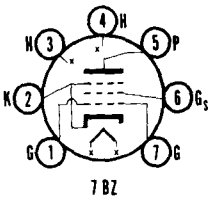
AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 12AQ5

BEAM POWER AMPLIFIER



7 BZ

ELECTRICAL DATA

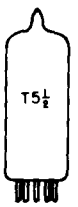
HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	225 Ma

For other rating, operation, and application data, refer to corresponding Type 6AQ5, which is identical except for heater ratings.

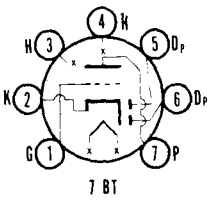
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	4	0	4	36	32	Y
	12.6	0	3	0	4	46	32	Y
219/220	12.6	3	47	25	4	16Z	5	2
	12.6	3	14	25	4	067Z	5	2



SYLVANIA TYPE 12AT6

DUO DIODE HIGH-MU TRIODE



7 BT

ELECTRICAL DATA

HEATER CHARACTERISTICS

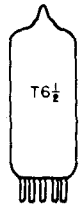
Heater Voltage	12.6 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6AT6, which is identical except for heater ratings. Data for use in resistance coupled amplifier circuits is given in the appendix.

SYLVANIA TUBE TESTER SETTINGS

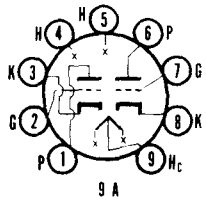
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	3	3	52	T
	12.6	0	—	0	4	—	55	T
	12.6	0	—	0	5	—	55	T
219/220	12.6	3	4	36	4	1T	7	2
	12.6	3	4	39	4	T	5*	2
	12.6	3	4	39	4	T	6*	2

* Diode gas test does not apply.



SYLVANIA TYPE 12AT7

DUO TRIODE



9 A

MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	150/300 Ma
Maximum Heater-Cathode Voltage	90 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

	Section 1[1]	Section 2	
Grid to Plate	1.5	1.5 μμf	
Input	2.2	2.2 μμf	
Output	0.5	0.4 μμf	
Grid to Grid	.005	μμf	Max
Plate to Plate	0.4	μμf	Max
Heater to Cathode	2.4	2.4 μμf	
Grounded Grid Operation			
Plate to Cathode	0.2	0.2 μμf	
Input	4.6	4.6 μμf	
Output	1.8	1.8 μμf	

MAXIMUM RATINGS (Design Center Values—Each Section)

Plate Voltage	300 Volts
Plate Dissipation	2.5 Watts

TYPICAL OPERATION

Class A_1 Amplifier—Each Section

Plate Voltage	100	180	250	Volts
Grid Voltage	−1	−1	−2	Volts
Cathode Bias Resistor	270	90	200	Ohms
Plate Current	3.7	11.0	10.0	Ma
Plate Resistance	15000	9400	10900	Ohms
Transconductance	4000	6000	5500	μmhos
Amplification Factor	60	62	60	
Grid Voltage for I_b = 10 μa	−5	−8	−12	Volts

NOTE:

1. Section No. 1 connects to pins 6, 7 and 8.

APPLICATION

A miniature, high-mu duo triode designed for use as a grounded grid amplifier at frequencies up to 300 mc. A center tapped heater permits either 6.3 or 12.6 volt operation.

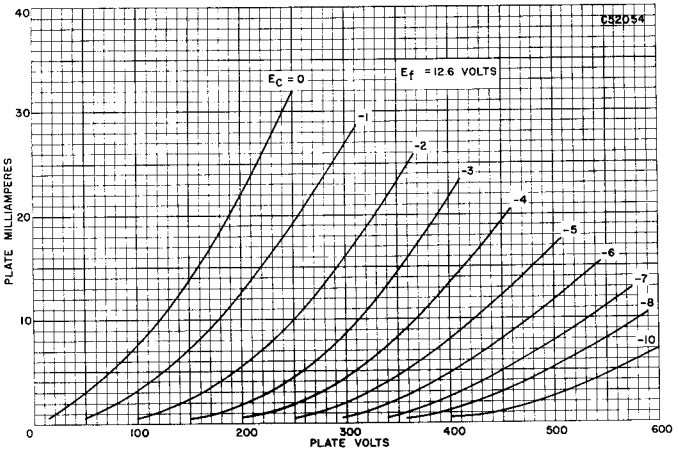
Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.

SYLVANIA TUBE TESTER SETTINGS

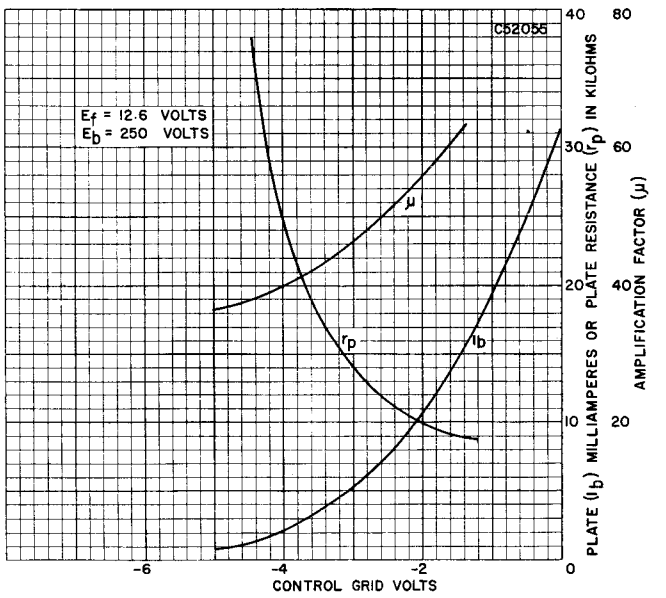
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	3	7	40	U
	12.6	0	5	0	1	3	40	U
219/220	12.6	4	589	27	5	2X	1	3
	12.6	4	359	27	5	7X	6	8

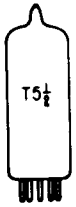
12AT7 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



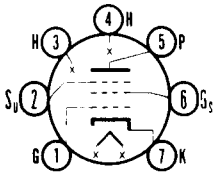
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12AU6

SHARP CUTOFF PENTODE



ELECTRICAL DATA

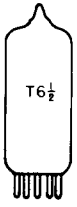
HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6AU6, which is identical except for heater ratings.

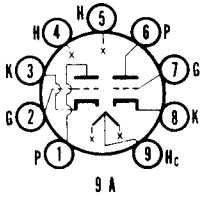
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	4	36	47	U
219/220	12.6	3	4	20	4	16Y	5	7



SYLVANIA TYPE 12AU7

MEDIUM-MU DUO TRIODE



MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	150/300 Ma
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

DIRECT INTERELECTRODE CAPACITANCES

	Shielded[1]	Unshielded
Grid to Plate: Section 1[2]	1.5	1.5 μμf
Section 2[2]	1.5	1.5 μμf
Input: (g to h + k) Section 1	1.8	1.6 μμf
Section 2	1.8	1.6 μμf
Output: (p to h + k) Section 1	2.0	0.40 μμf
Section 2	2.0	0.32 μμf

MAXIMUM RATINGS—Each Section (Design Center Values—Except as Noted)

	Class A_1 Amplifier	Vertical[3] Deflection Amplifier
Plate Voltage	300	300 Volts
Peak Positive Plate Voltage (Abs. Max.)		1200 Volts
Plate Dissipation[4]		
Each Plate	2.75	2.75 Watts
Both Plates	5.5	5.5 Watts
Peak Negative Grid Voltage		250 Volts
Average Cathode Current	20	20 Ma
Peak Cathode Current		60 Ma
Grid Circuit Resistance		
Fixed Bias	0.25	Megohm
Cathode Bias	1.0	2.2 Megohms

12AU7 (Cont'd)

MAXIMUM RATINGS — Each Section (Design Center Values—Except as Noted)

	Vertical[3] Deflection Oscillator	Horizontal[3] Deflection Oscillator	
Plate Voltage	300	300	Volts
Plate Dissipation			
Each Plate	2.75	2.75	Watts
Both Plates	5.5	5.5	Watts
Peak Negative Grid Voltage	400	600	Volts
Average Cathode Current	20	20	Ma
Peak Cathode Current	60	300	Ma
Grid Circuit Resistance	2.2	2.2	Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier (Each Section)

Plate Voltage	100	250	Volts
Grid Voltage	0	−8.5	Volts
Plate Current	11.8	10.5	Ma
Plate Resistance (approx.)	6500	7700	Ohms
Transconductance	3100	2200	μmhos
Amplification Factor	20	17	
Grid Voltage for I_b = 10 μa (approx.)		−24	Volts

NOTES:

1. External shield No. 315 connected to cathode of section under test.
2. Section No. 1 connects to pins 6, 7 and 8. Section No. 2 connects to pins 1, 2 and 3.
3. For operation in a 525-line, 30 frame system, the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.
4. In stages operating with grid leak bias, an adequate cathode bias resistor or other suitable means is required to protect the tube in the absence of excitation.

APPLICATION

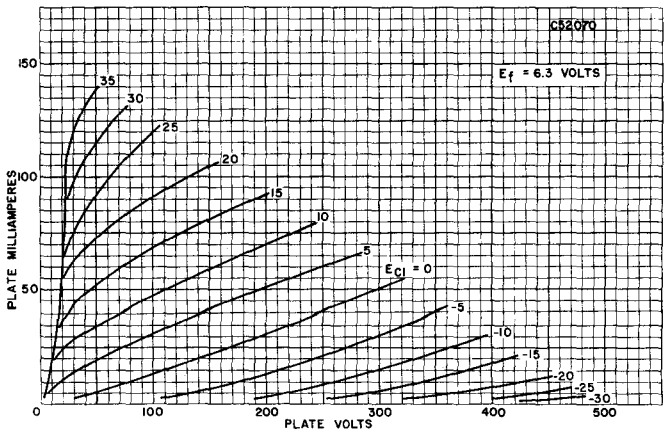
The Type 12AU7 is a T-6 ½ double triode having separate cathodes. It is intended primarily for service as a horizontal or vertical deflection oscillator, vertical deflection amplifier and Class A_1 resistance coupled amplifier. Each section of the 12AU7 is electrically similar to the Type 6C4.

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.

SYLVANIA TUBE TESTER SETTINGS

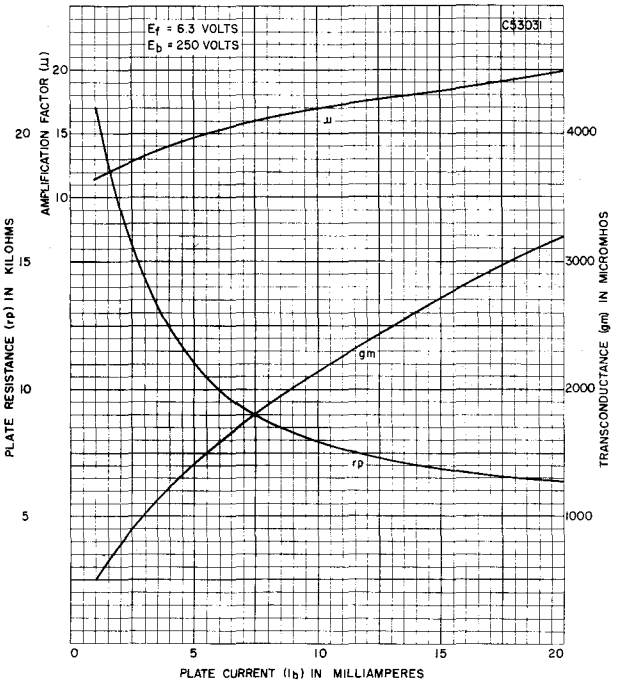
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	3	7	60	U
	12.6	0	5	0	1	3	60	U
219/220	12.6	4	589	41	5	2Z	1	3
	12.6	4	359	41	5	7Z	6	8

AVERAGE PLATE CHARACTERISTICS



12AU7 (Cont'd)

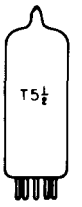
AVERAGE TRANSFER CHARACTERISTICS



SYLVANIA TYPE 12AU7A

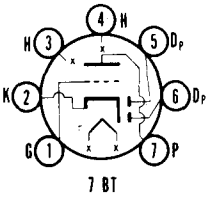
MEDIUM-MU DUO TRIODE

The Sylvania Type 12AU7A is electrically identical to Type 12AU7. Structural changes result in improved mechanical rigidity, more uniform electrical characteristics along with better life and stability.



SYLVANIA TYPE 12AV6

DUO DIODE TRIODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

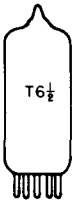
Heater Voltage	12.6 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6AV6, which is identical except for heater ratings.

SYLVANIA TUBE TESTER SETTINGS

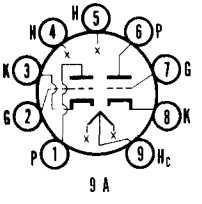
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	3	3	47	T
	12.6	0	—	0	4	—	55	T
	12.6	0	—	0	5	—	55	T
219/220	12.6	3	4	35	4	1T	7	2
	12.6	3	4	40	4	T	6*	2
	12.6	3	4	40	4	T	5*	2

* Diode gas test does not apply.



SYLVANIA TYPE 12AV7

MEDIUM-MU DUO TRIODE



MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	225/450 Ma
Maximum Heater-Cathode Voltage	90 Volts

DIRECT INTERELECTRODE CAPACITANCES

	Shielded[1]	Unshielded
Grid to Plate (Each Section)	1.9	1.9 μμf
Input (Each Section)	3.2	3.1 μμf
Output (Section 1)[2]	1.3	0.5 μμf
(Section 2)	1.6	0.4 μμf
Heater to Cathode (Each Section)	4.0	3.8 μμf
Grounded Grid Operation		
Input (Each Section)	7.0	6.9 μμf
Output (Section 1)[2]	2.8	2.0 μμf
(Section 2)	3.2	2.0 μμf
Plate to Cathode (Each Section)	0.23	0.24 μμf

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	300 Volts
Plate Dissipation (Each Section)	2.7 Watts
Negative Grid Voltage	50 Volts

12AV7 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier (Each Section)

Plate Voltage	100	150 Volts
Cathode Bias Resistor	120	56 Ohms
Plate Current	9.0	18 Ma Max
Transconductance	6100	8500 μmhos
Amplification Factor	37	41
Plate Resistance	6100	4800 Ohms
Grid Voltage for I_b = 10 μa	−9	−12 Volts

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.

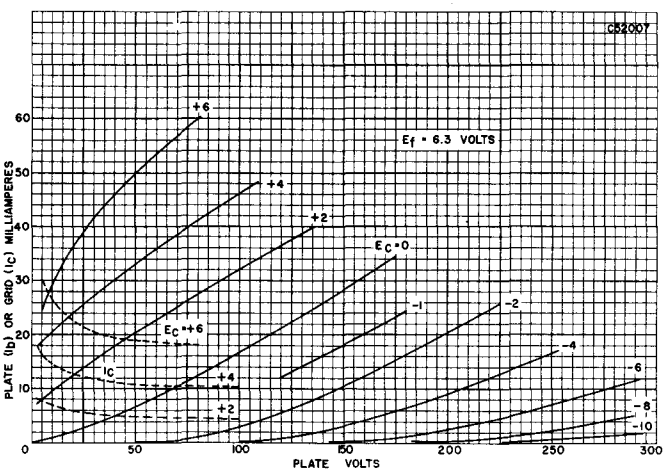
NOTES:

1. Shield No. 315 connected to cathode.
2. Section 1 connects to Pins 6, 7 and 8. Section 2 connects to Pins 1, 2 and 3.

SYLVANIA TUBE TESTER SETTINGS

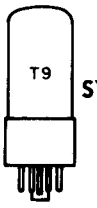
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	1	3	35	U
	12.6	0	5	0	3	7	35	U
219/220	12.6	4	589	25	5	2X	1	3
	12.6	4	359	25	5	7X	6	8

AVERAGE PLATE CHARACTERISTICS



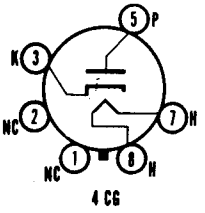
TYPE 12AW6

(See Condensed Data Section)



SYLVANIA TYPE 12AX4GT

TV DAMPER DIODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

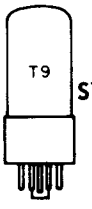
Heater Voltage	12.6 Volts
Heater Current	600 Ma

For other rating, operation, and application data, refer to corresponding Type 6AX4GT, which is identical except for heater ratings.

SYLVANIA TUBE TESTER SETTINGS

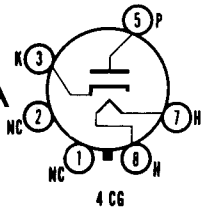
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	7	1	3	—	17	Y
219/220	12.6	7	8	11	8	Z	5*	3

* Diode gas test does not apply.



SYLVANIA TYPE 12AX4GTA

TV DAMPER DIODE



ELECTRICAL DATA

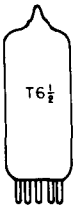
HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)	
Maximum Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	
D C	900 Volts
Total D C and Peak	4400 Volts
Heater Positive with Respect to Cathode	
D C	100 Volts
Total D C and Peak	300 Volts

For other rating, operation, and application data, refer to corresponding Type 6AX4GT, which is identical except for heater ratings.

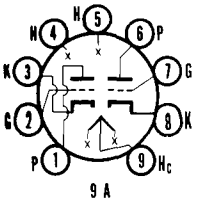
APPLICATION

The Sylvania Type 12AX4GTA is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.



SYLVANIA TYPE 12AX7

HIGH-MU DUOTRIODE



9 A

MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	150/300 Ma
Maximum Peak Heater-Cathode Voltage	180 Volts

DIRECT INTERELECTRODE CAPACITANCES

	Section 1[1]		Section 2		
	Shielded[2]	Unshielded	Shielded[2]	Unshielded	
Grid to Plate	1.7	1.7	1.7	1.7	$\mu\mu f$
Input	1.8	1.6	1.8	1.6	$\mu\mu f$
Output	1.9	0.46	1.9	0.34	$\mu\mu f$

MAXIMUM RATINGS (Design Center Values) Each Section

Plate Voltage	300 Volts
Plate Dissipation	1.0 Watt
Positive D C Grid Voltage	0 Volts
Negative D C Grid Voltage	−50 Volts

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier—Each Section

Plate Voltage	100	250 Volts
Grid Voltage	−1	−2 Volts
Plate Current	0.5	1.2 Ma
Plate Resistance	80000	62500 Ohms
Transconductance	1250	1600 μmhos
Amplification Factor	100	100

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.

NOTES:

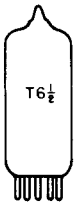
1. Section No. 1 connects to Pins 6, 7 and 8. Section No. 2 connects to Pins 1, 2 and 3.
2. External shield No. 315 connected to cathode of section under test.

APPLICATION

The Sylvania Type 12AX7 is a miniature high-mu twin triode having separate cathodes. It is designed for service as an audio voltage amplifier or phase inverter in portable or compact equipment. The center tapped filament of the Type 12AX7 permits operation on 12.6 or 6.3 volts. For characteristic curves use those under Type 6AV6, whose triode section has identical electrical characteristics to one section of the 12AX7.

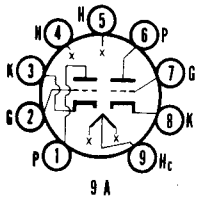
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	1	3	16	V
	12.6	0	5	0	3	7	16	V
219/220	12.6	4	589S	19	5	2U	1	3
	12.6	4	359S	19	5	7U	6	8



SYLVANIA TYPE 12AY7

HIGH-MU DUO TRIODE



MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	0.15/0.3 Ampere
Maximum Heater-Cathode Voltage	90 Volts

DIRECT INTERELECTRODE CAPACITANCES

Grid to Plate	1.3 $\mu\mu$f
Input	1.3 $\mu\mu$f
Output	0.6 $\mu\mu$f

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	300 Volts
Plate Dissipation	1.5 Watts
Cathode Current	10 Ma

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier (Each Section)

Plate Voltage	250 Volts
Grid Bias Voltage	-4.0 Volts
Amplification Factor	40
Transconductance	1750 μmhos
Plate Current	3.0 Ma

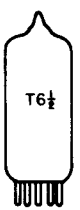
Low Level Amplifier Service (Each Section)

Heater Voltage (A C or D C) with Pin 9 to B-	6.3 Volts
Plate Supply Voltage	150 Volts
Plate Load Resistor	20000 Ohms
Cathode Resistor	2700 Ohms
Cathode Capacitor	40 μf
Grid Resistor	0.1 Megohm
Voltage Gain	12.5

APPLICATION

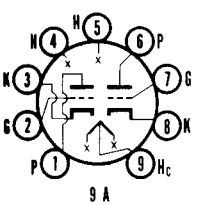
A miniature, medium mu, duo triode designed for use in the first audio stages of high gain audio frequency amplifiers. It is especially designed for low noise and low microphonic characteristics. To realize the low hum capabilities, the heaters should be operated in parallel at 6.3 volts.

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.



SYLVANIA TYPE 12AZ7

DUO TRIODE



MECHANICAL DATA

Bulb	T-6 ½, Outline 6-2
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	225/450 Ma
Maximum Heater-Cathode Voltage	90 Volts

12AZ7 (Cont'd)

DIRECT INTERELECTRODE CAPACITANCES

	Shielded[1]	Unshielded
Grid to Plate (Each Section)	1.9	1.9 μμf
Input (Each Section)	3.2	3.1 μμf
Output (Section 1)[2]	1.3	0.5 μμf
Output (Section 2)	1.6	0.4 μμf
Grounded Grid Operation		
Input (Each Section)	7.0	6.9 μμf
Output (Section 1)[2]	2.8	2.0 μμf
(Section 2)	3.2	2.0 μμf
Plate to Cathode	0.23	0.24 μμf

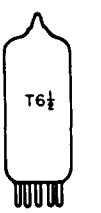
NOTES:

1. Shield No. 315.
2. Section 1 connects to pins 6, 7 and 8.

For maximum ratings and characteristics refer to Type 12AT7, which is identical except for heater ratings and interelectrode capacities.

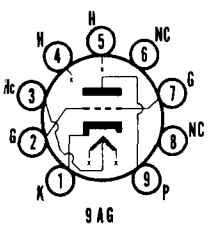
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	1	3	29	X
	12.6	0	5	0	3	7	29	X
219/220	12.6	4	589S	36	5	2V	1	3
	12.6	4	359S	36	5	7V	6	8



SYLVANIA TYPE 12B4

TRIODE



MECHANICAL DATA

Bulb	T-6 ½, Outline 6-3
Base	Small Button 9-Pin
Basing	9AG
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (Series/Parallel)	12.6/6.3 Volts
Heater Current (Series/Parallel)	300/600 Ma
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

DIRECT INTERELECTRODE CAPACITANCES

Grid to Plate	4.8 μμf
Input	5.0 μμf
Output	1.5 μμf

MAXIMUM RATINGS (Design Center Values—Except as Noted)

	Vertical[1] Deflection Amplifier	Class A_1 Amplifier
D C Plate Voltage	550	550 Volts
Peak Positive Plate Voltage (Abs. Max.)	1000	Volts
Plate Dissipation[2]	6.0	6.0 Watts
Peak Negative Grid Voltage	250	Volts
Average Cathode Current	30	Ma
Peak Cathode Current	105	Ma
Grid Circuit Resistance		
Cathode Bias	2.2	2.2 Megohms
Fixed Bias		0.47 Megohm

12B4 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	150 Volts
Grid Voltage	−17.5 Volts
Plate Current	34 Ma
Amplification Factor	6.5
Plate Resistance (approx.)	1030 Ohms
Transconductance	6300 μmhos
Plate Current at E_c = −23 Volts	9.6 Ma
Grid Volage for I_b = 200 μa	−32 Volts

NOTES:

1. For operation in a 525-line, 30 frame system, the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.
2. In stages operating with grid leak bias, an adequate cathode bias resistor or other suitable means is required to protect the tube in the absence of excitation.

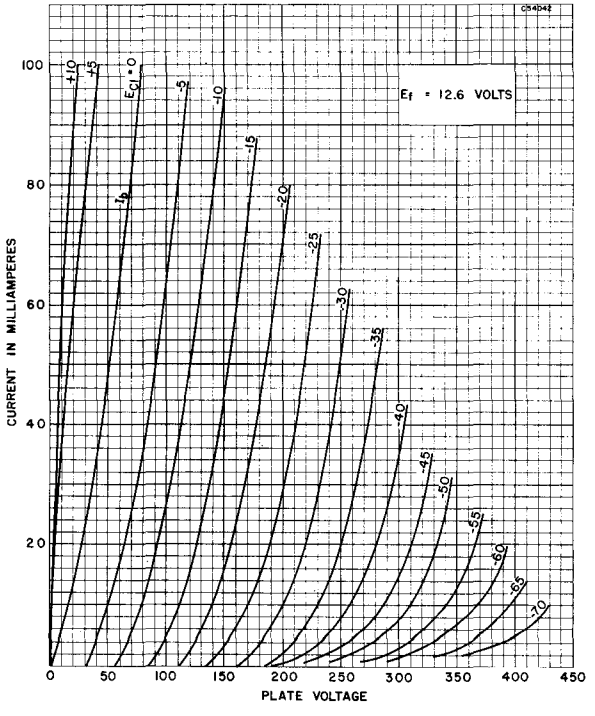
APPLICATION

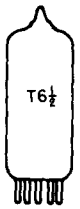
The Sylvania Type 12B4 is a miniature, low mu, high perveance triode amplifier designed for service as a Class A amplifier or vertical deflection amplifier in television receiver sync circuits. The center tapped heater permits operation from a 6.3 or 12.6 volt source.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	67	0	4	3	20	Y
	12.6	0	36	0	4	7	20	Y
219/220	12.6	4	357	13	5	2Z	9	1
	12.6	4	235	13	5	7Z	9	1

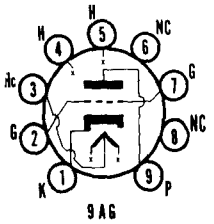
AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 12B4A

TRIODE



9 AG

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	300/600 Ma
Heater Warm-up Time[1] (See SERIES STRING HEATERS Section in Appendix)	
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

For other rating, operation, and application data, refer to corresponding Type 12B4, which is identical except for heater ratings.

APPLICATION

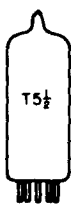
The Sylvania Type 12B4A is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

NOTE:

1. Applies to parallel heater connection only.

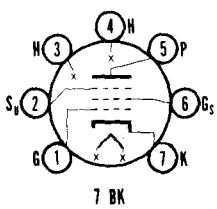
TYPES 12B7, 12B8GT

(See Condensed Data Section)



SYLVANIA TYPE 12BA6

REMOTE CUTOFF PENTODE



7 BK

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	150 Ma

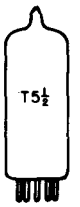
For other rating, operation, and application data, refer to corresponding Type 6BA6, which is identical except for heater ratings.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	4	36	30	W
219/220	12.6	3	4	37	4	16Z	5	7

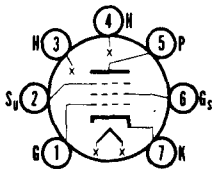
TYPE 12BA7

(See Condensed Data Section)



SYLVANIA TYPE 12BD6

REMOTE CUTOFF R F PENTODE



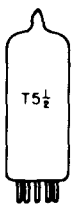
7 BK

ELECTRICAL DATA

HEATER CHARACTERISTICS

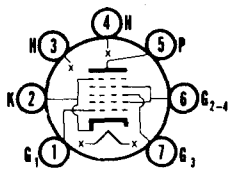
Heater Voltage	12.6 Volts
Heater Current	150 Ma

For operation and application data, refer to corresponding Type 6BD6, which is identical except for heater ratings.



SYLVANIA TYPE 12BE6

HEPTODE CONVERTER



7 CH

ELECTRICAL DATA

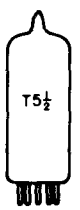
HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6BE6, which is identical except for heater ratings.

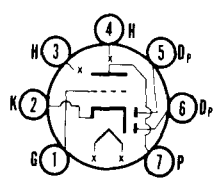
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	5	3	27	X
	12.6	0	—	0	4	64	18	V
219/220	12.6	3	4	78	4	067X	5	2
	12.6	3	4	27	4	1X	6	2



SYLVANIA TYPE 12BF6

DUODIODE TRIODE



7 BT

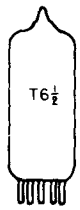
ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	150 Ma

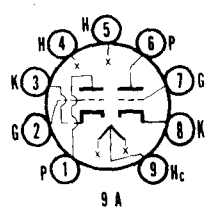
For operation and application data, refer to corresponding Type 6BF6, which is identical except for heater ratings.

Data for use in Resistance Coupled Amplifier Circuits is given in the Appendix.



SYLVANIA TYPE 12BH7

MEDIUM-MU DUOTRIODE



9 A

MECHANICAL DATA

Bulb	T-6 ½, Outline 6-3
Base	Small Button 9-Pin
Basing	9A
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	300/600 Ma
Maximum Peak Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded) [1]

	Section 1	Section 2
Grid to Plate	2.6	2.6 μμf
Input	3.2	3.2 μμf
Output	0.5	0.4 μμf
Plate to Plate	0.8	μμf

MAXIMUM RATINGS (Design Center Values—Except as Noted)

	Vertical Deflection Amplifier	Class A_1 Amplifier
Plate Voltage	450	300 Volts
Peak Positive Plate Voltage (Abs. Max.)	1500	Volts
Plate Dissipation (Each Section)	3.5	3.5 Watts
Peak Negative Pulse Grid Voltage	250	Volts
Average Cathode Current (Each Section)	20	20 Ma
Peak Cathode Current	70	Ma
Grid Circuit Resistance		
Fixed Bias		0.25 Megohm
Cathode Bias	2.2	1.0 Megohms

	Vertical[2] Deflection Oscillator	Horizontal[2] Deflection Oscillator
D C Plate Voltage	450	450 Volts
Plate Dissipation		
Each Plate	3.5	3.5 Watts
Both Plates	7.0	7.0 Watts
Peak Negative Grid Voltage	400	600 Volts
Average Cathode Current	20	20 Ma
Peak Cathode Current	70	300 Ma
Grid Circuit Resistance	2.2	2.2 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	250 Volts
Grid Voltage	−10.5 Volts
Plate Current	11.5 Ma
Transconductance	3100 μmhos
Amplification Factor	16.5
Grid Voltage for I_b = 50 μa	−23 Volts
Plate Resistance (approx.)	5300 Ohms

Vertical Deflection Amplifier[2]

Plate Voltage	350 Volts
Cathode Bias Resistor	560 Ohms
Grid Input Voltage	
Peak to Peak Sawtooth Component (approx.)	25 Volts
Negative Peaking Component (approx.)	32 Volts
Plate Current	16 Ma
Plate Output Voltage	
Peak Positive Pulse Component	670 Volts
Peak to Peak Sawtooth Component	230 Volts
Sweep Height (16RP4 or 16TP4 with 14 Kv on Anode)	10½ Inches

NOTES:

1. Section 1 connects to pins 6, 7 and 8.
2. For operation in a 525-line, 30 frame system, the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.

12BH7 (Cont'd)

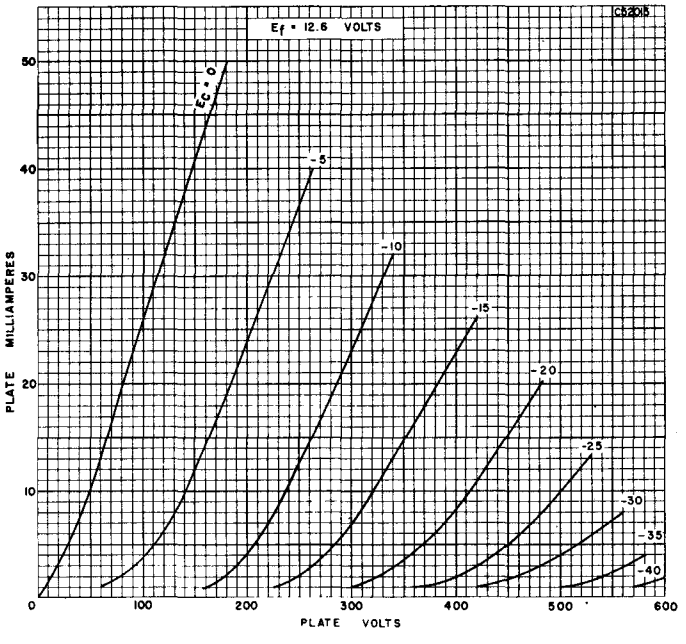
APPLICATION

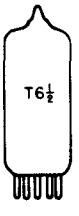
A medium-mu duo triode with separate cathodes. The tube has semi-high perveance units and is capable of operation as a vertical deflection amplifier.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	95	0	1	3	23	W
	12.6	0	65	0	3	7	23	W
219/220	12.6	4	589S	17	5	2Y	1	3
	12.6	4	539S	17	5	7Y	6	8

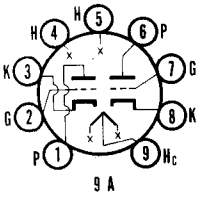
AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 12BH7A

MEDIUM-MU DUOTRIODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel.....12.6/6.3 Volts
Heater Current Series/Parallel.....300/600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)[1]
Maximum Heater-Cathode Voltage
  Total D C and Peak..... 200 Volts
  D C, Heater Positive with Respect to Cathode..... 100 Volts

For other rating, operation, and application data, refer to corresponding Type 12BH7, which is identical except for heater ratings.

12BH7A (Cont'd)

NOTE:

1. Applies to parallel connection only.

APPLICATION

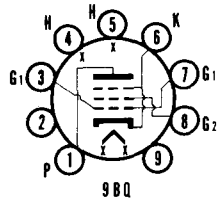
The Sylvania Type 12BH7A is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	95	0	1	3	21	W
	12.6	0	65	0	3	7	21	W
219/220	12.6	4	589S	18	5	2Y	1	3
	12.6	4	539S	18	5	7Y	6	8

SYLVANIA TYPE 12BK5

BEAM POWER AMPLIFIER



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

For other rating, operation, and application data, refer to corresponding Type 6BK5, which is identical except for heater ratings.

APPLICATION

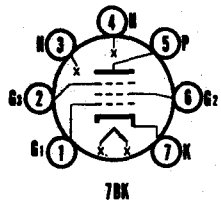
The Sylvania Type 12BK5 is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

TYPE 12BQ6GA

(See Condensed Data Section)

SYLVANIA TYPE 12BL6

SEMI-REMOTE CUTOFF PENTODE



MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-2
Basing	7BK
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts
Heater Current	150 Ma
Heater-Cathode Voltage (Design-Center Values)	
Heater Negative with Respect to Cathode	30 Volts Max.
Heater Positive with Respect to Cathode	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Shielded)

Grid No. 1 to Plate	0.006 μμf Max.
Input	5.5 μμf
Output	4.8 μμf

MAXIMUM RATINGS (Design-Center Values)

Plate Voltage	30 Volts
Grid No. 2 Voltage	30 Volts
Cathode Current	20 Ma
Grid No. 1 Circuit Resistance	10 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 3 Voltage[2]	0 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage[3]	−0.65 Volts
Plate Current	1350 μa
Grid No. 2 Current	500 μa
Transconductance[4]	1350 μmhos
Plate Resistance (approx.)	0.5 Megohm
Grid No. 1 Voltage for Gm[4] = 10 μmhos (approx.)	−6.0 Volts
Grid No. 1 and No. 3 Voltage for Gm[4] = 10 μmhos (approx.)	−5.0 Volts

NOTES:

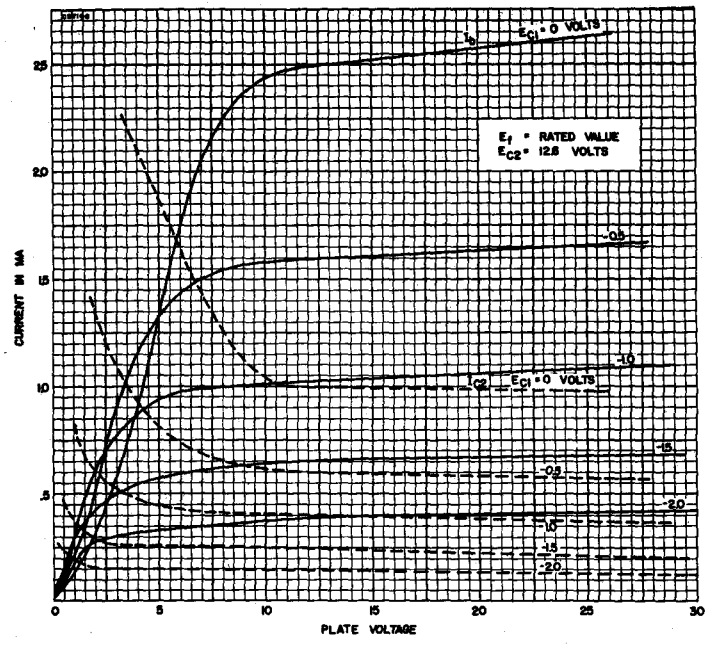
1. This tube is intended for use in automobile radios operated from a nominal 12-volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Connected to Cathode at socket.
3. Average contact potential bias developed across a 2.2 megohm grid resistor.
4. From Grid No. 1 to plate.

APPLICATION

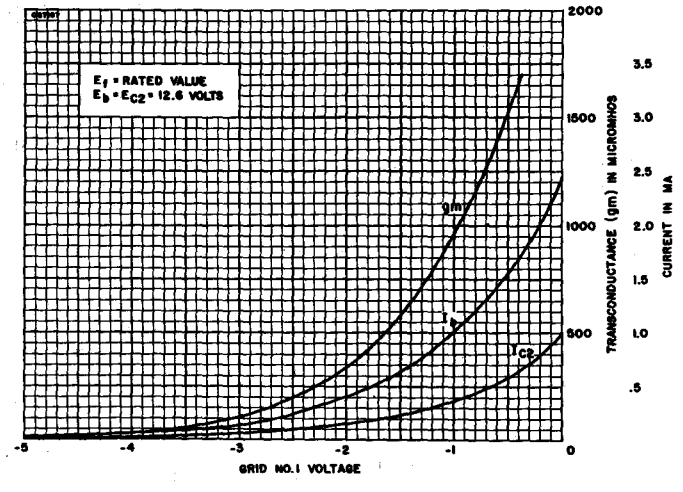
The Sylvania Type 12BL6 is a miniature semi-remote cutoff pentode intended for use as a r f or i f amplifier. It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12-volt automotive storage battery.

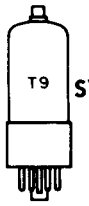
12BL6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



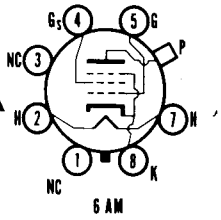
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12BQ6GTA

BEAM POWER AMPLIFIER



6 AM

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)	
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

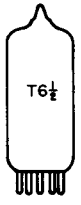
For other rating, operation, and application data, refer to corresponding Type 6BQ6GTA, which is identical except for heater ratings.

APPLICATION

The Sylvania Type 12BQ6GTA is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the appendix.

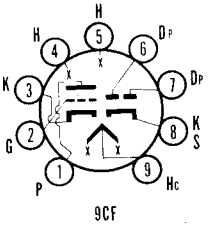
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	5	0	8	034	20	Y
219/220	12.6	2	7	10	7	045Y	9	8



SYLVANIA TYPE 12BR7

DUO DIODE TRIODE



9CF

MECHANICAL DATA

Bulb	T-6½
Base	E9-1, Small Button 9-Pin
Outline	6-2
Basing	9CF
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current	225/450 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	
Total D C and Peak	200 Volts Max.
Heater Positive with Respect to Cathode	
D C	100 Volts Max.
Total D C and Peak	200 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Shielded)[1]

Triode Grid to Plate	1.9 μμf
Triode Input	2.8 μμf
Triode Output	1.0 μμf
Diode Input (Each Diode)	2.0 μμf

12BR7 (Cont'd)

RATINGS (Design Center Values)

Plate Voltage (Triode)	300 Volts Max.
Plate Dissipation (Triode)	2.5 Watts Max.
Peak Inverse Diode Voltage	300 Volts Max.
Peak Diode Current	60 Ma Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A[1] Amplifier

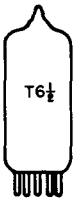
Plate Voltage	100	250 Volts
Cathode Bias Resistor	270	200 Ohms
Amplification Factor	60	60
Plate Resistance (approx.)	15000	10900 Ohms
Transconductance	4000	5500 μmhos
Plate Current	3.7	10 Ma
Grid Voltage (approx.) for Ib = 10 μa	-5	-12 Volts
Average Diode Current, Each Diode with 5.0 Volts D C Applied		17 Ma

NOTE:

1. Shield No. 315.

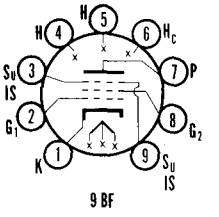
APPLICATION

The Sylvania Type 12BR7 is a miniature high mu triode duo diode intended for application in monochrome and color television receivers.



SYLVANIA TYPE 12BV7

PENTODE VIDEO AMPLIFIER



9 BF

MECHANICAL DATA

Bulb	T-6½
Base	E9-1, Miniature Button 9-Pin
Outline	6-3
Basing	9BF
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6/6.3 Volts
Heater Current	300/600 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	
Total D C and Peak	200 Volts Max.
Heater Positive with Respect to Cathode	
D C	100 Volts Max.
Total D C and Peak	200 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid No. 1 to Plate: (g1 to p)	0.055 μμf
Input: g1 to (h+k+g2+Shield and g3)	11.0 μμf
Output: p to (h+k+g2+Shield and g3)	3.0 μμf

RATINGS (Design Center Values)

Plate Voltage	300 Volts Max.
Grid No. 2 Voltage	175 Volts Max.
Negative Grid No. 1 Voltage	50 Volts Max.
Plate Dissipation	6.25 Watts Max.
Grid No. 2 Dissipation	1.0 Watt Max.
Grid No. 1 Circuit Resistance	
Fixed Bias	0.25 Megohm Max.
Self Bias	1.0 Megohm Max.

12BV7 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	250 Volts
Grid No. 2 Voltage	150 Volts
Cathode Resistor	68 Ohms
Plate Current	27 Ma
Grid No. 2 Current	6.0 Ma
Plate Resistance, approx.	85,000 Ohms
Transconductance	13,000 μmhos
Amplification Factor	1,000
Grid No. 1 Voltage for Ib = 20 μa	12 Volts
Triode Amplification Factor	28
Minimum Plate Current with Ec2 = 180 V, RK = 0 Ohms, Ec1 = 8.0 V	0.5 Ma

APPLICATION

The 12BV7 is a miniature high transconductance pentode designed for use as a video amplifier.

SYLVANIA TYPE 12BY7

PENTODE VIDEO AMPLIFIER

MECHANICAL DATA

Bulb	T-6 ½, Outline 6-3
Base	Small Button 9-Pin
Basing	9BF
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (Series/Parallel)	12.6/6.3 Volts
Heater Current (Series/Parallel)	300/600 Ma
Maximum Heater-Cathode Voltage	200 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid to Plate	0.063 μμf
Input	10.2 μμf
Output	3.5 μμf

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	300 Volts
Plate Dissipation	6.5 Watts
Grid No. 2 Voltage	180 Volts
Grid No. 2 Dissipation	1.1 Watt
Grid No. 1 Voltage	
Negative	50 Volts
Positive	0 Volts
Grid No. 1 Resistance	
Fixed Bias	0.25 Megohm
Cathode Bias	1.0 Megohm

12BY7 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	250 Volts
Grid No. 2 Voltage	180 Volts
Cathode Bias Resistor	100 Ohms
Plate Current	26 Ma
Grid No. 2 Current	5.75 Ma
Transconductance	11000 μmhos
Plate Resistance	93000 Ohms
Grid No. 1 Voltage for I_b = 20 μa	−11.6 Volts
Amplification Factor (Triode Connected)	28.5
Amplification Factor	1035

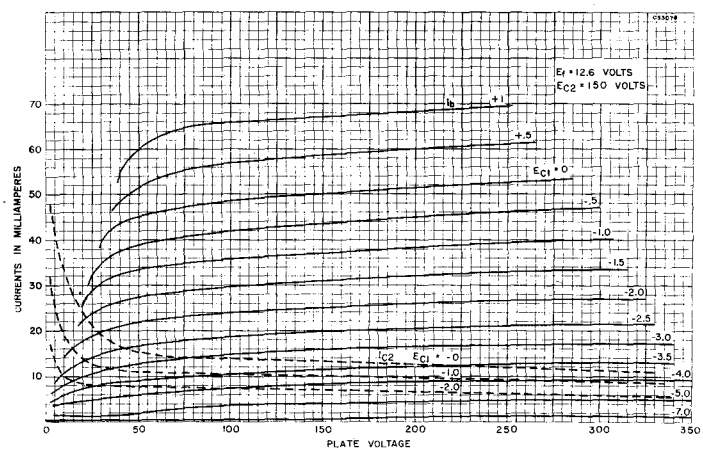
APPLICATION

The Sylvania Type 12BY7 is a miniature, high transconductance pentode designed for use as a video amplifier in television receivers. It is capable of furnishing large output voltages across low values of load resistance and supply voltages.

SYLVANIA TUBE TESTER SETTINGS

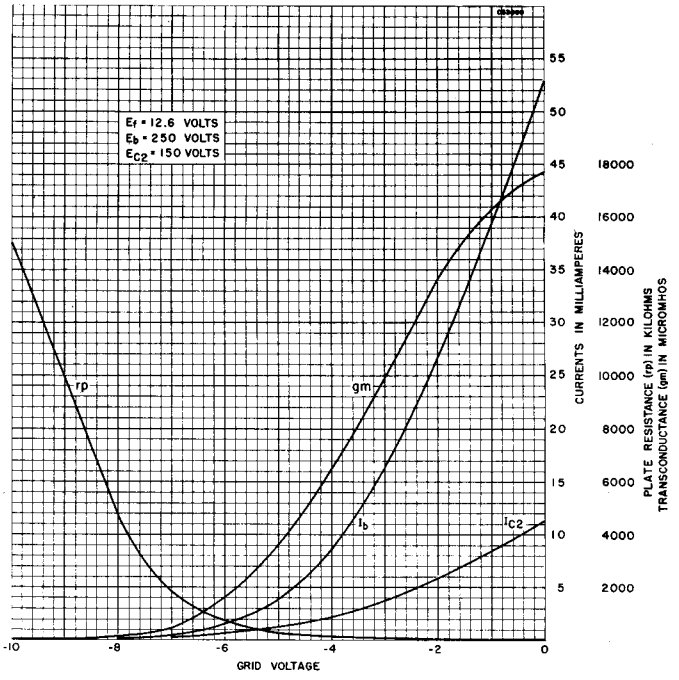
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	45	0	6	39	39	Y
219/220	12.6	4	569S	25	5	28Z	7	1

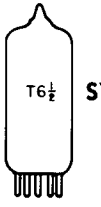
AVERAGE PLATE CHARACTERISTICS



12BY7 (Cont'd)

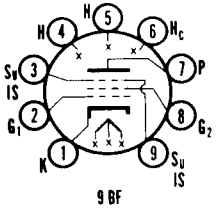
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12BY7A

VIDEO PENTODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage Series/Parallel	12.6/6.3 Volts
Heater Current Series/Parallel	300/600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)[1]	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

For other rating, operation, and application data, refer to corresponding 12BY7, which is identical except for heater ratings.

NOTE:

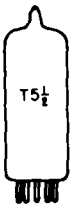
1. Applies to parallel connection only.

APPLICATION

The Sylvania Type 12BY7A is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

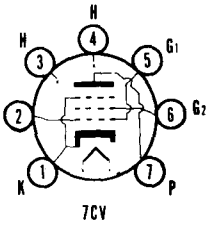
TYPES 12BZ7, 12C8

(See Condensed Data Section)



SYLVANIA TYPE 12CA5

BEAM POWER AMPLIFIER



7CV

MECHANICAL DATA

Bulb	T-5 ½, Outline 5-3
Base	Miniature Button 7-Pin
Basing	7CV
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	600 Ma
Heater Warm-up Time (See SERIES STRING HEATERS Section in Appendix)	
Maximum Heater-Cathode Voltage	
Total D C and Peak	200 Volts
D C, Heater Positive with Respect to Cathode	100 Volts

DIRECT INTERELECTRODE CAPACITANCES

Grid No. 1 to Plate	0.5 $\mu\mu$f
Input	15.0 $\mu\mu$f
Output	9.0 $\mu\mu$f

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	130 Volts
Plate Dissipation	5.0 Watts
Grid No. 2 Voltage	130 Volts
Grid No. 2 Dissipation	1.4 Watts
Positive D C Grid No. 1 Voltage	0 Volts
Grid No. 1 Circuit Resistance	
Fixed Bias	0.1 Megohm
Cathode Bias	0.5 Megohm
Bulb Temperature (At Hottest Point)	180° C

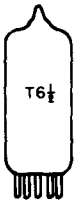
CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier

Plate Voltage	110	125 Volts
Grid No. 2 Voltage	110	125 Volts
Grid No. 1 Voltage	−4.0	−4.5 Volts
Peak A F Grid No. 1 Voltage	4.0	4.5 Volts
Plate Current (Zero Signal)	32	37 Ma
Plate Current (Maximum Signal) (approx.)	31	36 Ma
Grid No. 2 Current (Zero Signal)	3.5	4.0 Ma
Grid No. 2 Current (Maximum Signal) (approx.)	7.5	11 Ma
Transconductance	8100	9200 μmhos
Plate Resistance	16000	15000 Ohms
Load Resistance	3500	4500 Ohms
Total Harmonic Distortion (approx.)	5	6 Percent
Maximum Signal Power Output	1.1	1.5 Watts

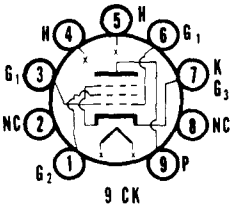
APPLICATION

Sylvania Type 12CA5 is a miniature beam pentode designed primarily for use in the audio frequency output stage of radio and television receivers. The tube features high power sensitivity at relatively low plate and screen voltages. It may be used in television receivers employing series string heaters.



SYLVANIA TYPE 12CM6

BEAM POWER AMPLIFIER



9 CK

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	12.6 Volts
Heater Current	225 Ma

For other rating, operation, and application data, refer to corresponding Type 6CM6, which is identical except for heater ratings.