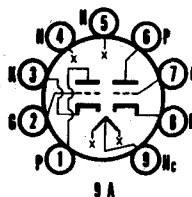




SYLVANIA TYPE 12BZ7
HIGH-MU TWIN TRIODE



MECHANICAL DATA

Bulb.....	T-6 $\frac{1}{2}$
Base.....	E9-1, Small Button 9-Pin
Outline.....	6-3
Basing.....	9A
Cathode.....	Coated Unipotential
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	
Heater Negative with Respect to Cathode.....	180 Volts Max.
Heater Positive with Respect to Cathode.....	180 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

	Section 1	Section 2
Grid to Plate.....	2.5	2.5 $\mu\mu\text{f}$
Input.....	6.5	6.5 $\mu\mu\text{f}$
Output.....	0.7	0.55 $\mu\mu\text{f}$
Plate to Plate.....	1.3	$\mu\mu\text{f}$

MAXIMUM RATINGS (Design Center Values) Each Section

Plate Voltage.....	300 Volts
Plate Dissipation.....	1.5 Watts
Positive D C Grid Voltage.....	0 Volts
Negative D C Grid Voltage.....	50 Volts
Grid No. 1 Circuit Resistance ¹	5.0 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ Amplifier—Each Section

Plate Voltage.....	250 Volts
Grid Voltage.....	-2 Volts
Plate Current.....	2.5 Ma
Plate Resistance.....	31,800 Ohms
Transconductance.....	3200 μmhos
Amplification Factor.....	100

NOTES:

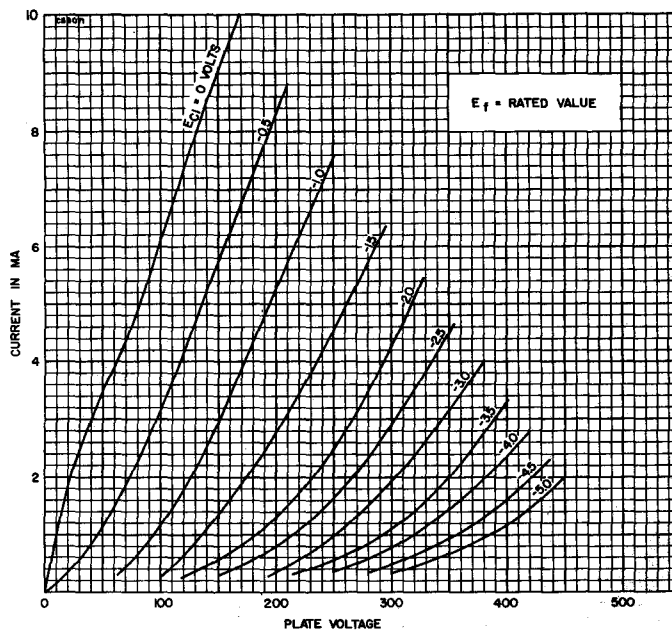
1. Maximum Value that can be used where Grid No. 1 bias is developed by means of contact potential.

APPLICATION

The Sylvania Type 12BZ7 is a miniature high mu twin triode designed primarily for use as a sync separator and sync amplifier in television receivers. It is also useful in clipping circuits and as a general purpose audio amplifier.

SYLVANIA TYPE 12BZ7 (Cont'd)

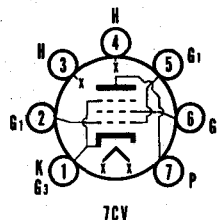
AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 12CN5

SHARP CUTOFF PENTODE



MECHANICAL DATA

Bulb	T-5 1/2
Base	E7-1, Miniature Button 7-Pin
Outline	5-3
Basing	7CV
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage ¹	12.6 Volts
Heater Current	450 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Negative with Respect to Cathode	16 Volts Max.
Heater Positive with Respect to Cathode	16 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES

	Shielded	Unshielded
Grid No. 1 to Plate	0.2	0.25 μ f Max.

MAXIMUM RATINGS (Design Center Values)

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

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage ²	
Grid No. 1 Resistor	2.2 Megohms
Plate Current	4.5 Ma
Grid No. 2 Current	0.35 Ma
Transconductance	3800 μ mhos
Plate Resistance (approx.)	40,000 Ohms

NOTES:

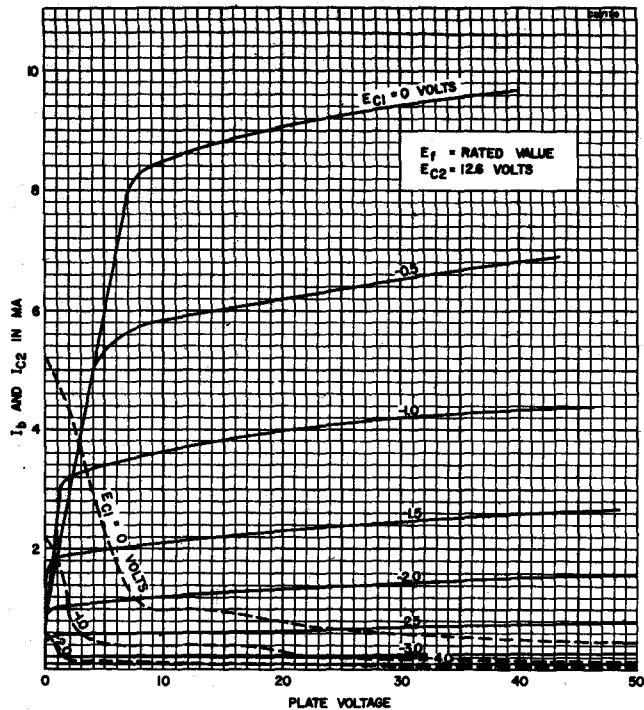
1. This tube is intended for use in automobile radios operated from a nominal 12-volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered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

APPLICATION

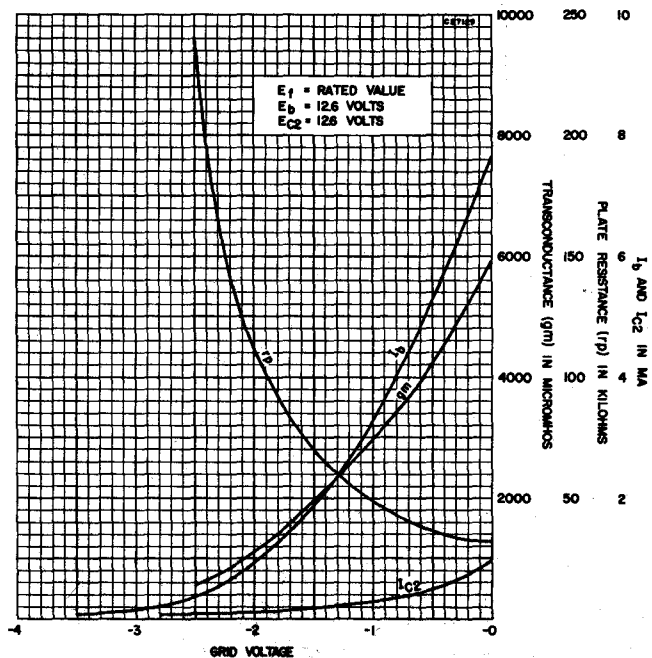
The Sylvania Type 12CN5 is a miniature sharp-cutoff pentode intended for use as an 1 F amplifier in automobile radio receivers. It is designed primarily to operate where the heater, plate, and screen voltages are obtained directly from a 12-volt automotive storage battery.

12CN5 (Cont'd)

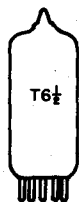
AVERAGE PLATE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS

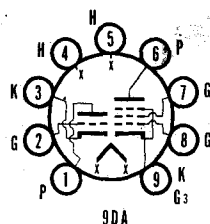


SYLVANIA ELECTRONIC TUBES



SYLVANIA TYPE 12CT8

MEDIUM MU TRIODE
PENTODE VIDEO AMPLIFIER



MECHANICAL DATA

Bulb.....	T-6 $\frac{1}{2}$
Base.....	E9-1, Small Button 9-Pin
Outline.....	6-2
Basing.....	9DA
Cathode.....	Coated Unipotential
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	12.6 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.....	2.2	0.044 μ f
Input.....	2.4	7.5 μ f
Output.....	0.19	2.4 μ f
Coupling		
Pentode Grid No. 1 to Triode Plate.....		0.010 μ f Max.
Triode Grid to Pentode Plate.....		0.016 μ f Max.
Pentode Plate to Triode Plate.....		0.16 μ f Max.

MAXIMUM RATINGS (Design Maximum Values)²

	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.....	2.5	2.75 Watts
Grid No. 2 Dissipation.....		0.9 Watts
Grid No. 1 Circuit Resistance Fixed Bias.....	0.5	0.25 Megohm
Self Bias.....	1.0	1.0 Megohm

CHARACTERISTICS AND TYPICAL OPERATION

	Triode Section	Pentode Section
Plate Voltage.....	150	200 Volts
Grid No. 2 Voltage.....		125 Volts
Cathode Resistor.....	150	82 Ohms
Plate Current.....	9.0	15 Ma
Grid No. 2 Current.....		3.4 Ma
Transconductance.....	4900	7000 μ mhos
Amplification Factor.....	40	
Plate Resistance (approx.).....	8200	150,000 Ohms
Ec1 for Ib = 100 μ a (approx.).....	-6.5	-8 Volts

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.

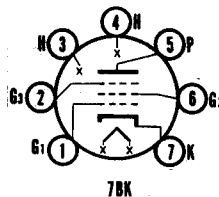
12CT8 (Cont'd)

APPLICATION

Type 12CT8 has a medium triode and pentode amplifier contained in a miniature envelope. The pentode section is intended for use as a video amplifier. Type 12CT8 has controlled heater warm-up time for series string operation.



SYLVANIA TYPE 12CX6



MECHANICAL DATA

Bulb	T-5 1/2
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	30 Volts
Heater Positive with Respect to Cathode	30 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid No. 1 to Plate	0.050 μ f Max.
Input: g1 to (h + k + g2 + g3)	7.6 μ f
Output: p to (h + k + g2 + g3)	6.2 μ f

MAXIMUM RATINGS (Design-Maximum Values)²

Plate Voltage	33 Volts
Grid No. 2 Voltage	33 Volts
Positive D C Grid No. 1 Voltage	0 Volts
Grid No. 1 Circuit Resistance	10 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage ³	
Grid No. 1 Resistor	2.2 Megohms
Plate Current	3.0 Ma
Grid No. 2 Current	1.4 Ma
Transconductance ⁴	3100 μ mhos
Plate Resistance (approx.)	40,000 Ohms
Grid No. 1 Voltage for $I_b = 10 \mu$ a (approx.)	-4.5 Volts

NOTES:

- 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 from 10.0 to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variations encountered with this type of supply.
- Design-Maximum ratings are the limiting values expressed with respect to bogey 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 bogey tube under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, equipment control adjustment, load variation, and environmental conditions.
- Average contact potential developed across specified grid resistor.
- Signal applied in series with 1.0 μ f grid-leak capacitor.

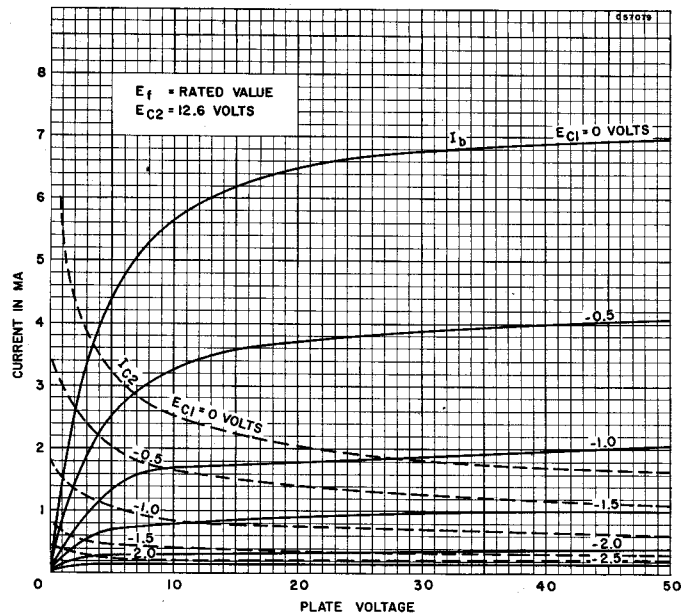
APPLICATION NOTES

The Sylvania Type 12CX 6 is a miniature, sharp-cutoff pentode intended for use as an rf amplifier.

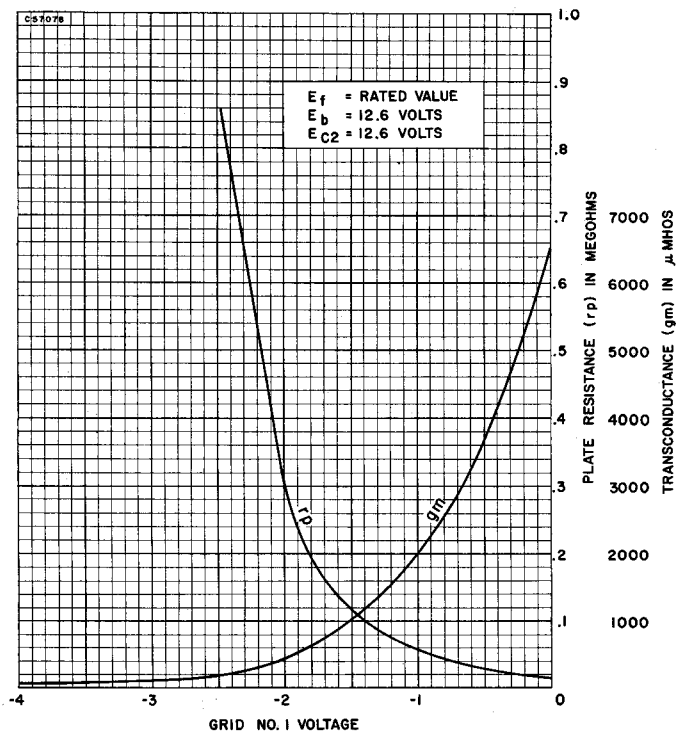
It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12-volt automotive storage battery.

SYLVANIA TYPE 12CX6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



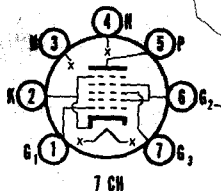
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12EG6

DUAL-CONTROL HEPTODE



MECHANICAL DATA

Bulb	T-5 $\frac{1}{2}$
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 Max.
Heater Positive with Respect to Cathode	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Shielded)²

Grid No. 3 to Plate	0.25 μ mf Max.
Grid No. 3 to Grid No. 1	0.15 μ mf Max.
RF Input:	
g3 to (h+k+g1+g2+4+g5+p)	6.5 μ mf
Grid No. 1	
to (h+k+g1+g2+4+g3+g5+p)	5.7 μ mf
RF Output:	
p to (h+k+g1+g2+4+g3+g5)	12 μ mf
Grid No. 1 to Cathode	3.2 μ mf
Grid No. 1 to Plate	0.04 μ mf
Cathode to All Electrodes, Except Grid No. 1	23 μ mf

MAXIMUM RATINGS (Design Center Values)

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

CHARACTERISTICS AND TYPICAL OPERATION

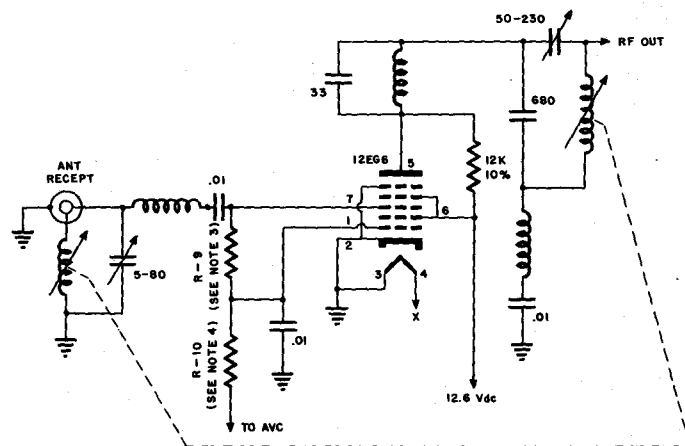
Plate Voltage	12.6 Volts
Grid No. 2 and Grid No. 4 Voltage	12.6 Volts
Grid No. 3 Voltage ³	-0.8 Volts
Grid No. 1 Voltage ⁴	-0.8 Volts
Plate Current	0.4 Ma
Grid No. 2 and Grid No. 4 Current	2.4 Ma
Transconductance ⁵	800 μ mhos
Plate Resistance (approx.)	0.15 Megohms
Grid No. 3 Voltage and Grid No. 1 Voltage	
for $Gm^3 = 10 \mu$ mhos (approx.)	-3.0 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 cathode or Pin No. 2.
3. Grid No. 3 Voltage is obtained through a resistor (R-9) connected to Grid No. 1 which obtains its voltage from an AVC circuit. The value of the resistor connecting Grid No. 1 to Grid No. 3 is influenced by circuit and AVC voltage variations.
4. Bias voltage for Grid No. 1 is normally obtained from an AVC circuit, therefore, the value of the resistor (R-10) connected to Grid No. 1 is influenced by circuit and AVC voltage variations. Bias voltage for Grid No. 1 can also be developed across a 2.2 megohm resistor by means of contact potential.
5. From Grid No. 3 to Plate.

SYLVANIA TYPE 12EG6 (Cont'd)

TYPICAL DUAL CONTROL R-F AMPLIFIER CIRCUIT



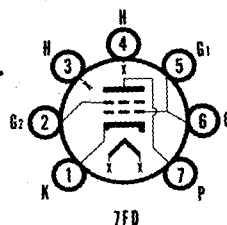
APPLICATION

The Sylvania Type 12EG6 is a dual control heptode contained in a T-6 $\frac{1}{2}$ envelope. It is intended for use as an RF amplifier where the application of AVC control voltage to two control grids is a definite advantage in reducing back biasing of the AVC line (a condition encountered when receiving strong RF signals.) It is designed for operation where the heater plate, and grids No. 2 and No. 4 voltages are supplied directly from a 12-volt automotive storage battery.



SYLVANIA TYPE 12EL6

DOUBLE DIODE
HIGH MU TRIODE



MECHANICAL DATA

Bulb	T-5 1/2
Base	E7-1, Miniature Button 7-Pin
Outline	S-2
Basing	7FB
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	1.8 μf
Input: g to (h + k)	2.2 μf
Output: p to (h + k)	1.0 μf
Diode Plate to Diode Plate	1.0 μf

MAXIMUM RATINGS (Design Center Values)

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

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ 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) ³	2.0 Ma

Resistance Coupled Amplifier

Plate Supply Voltage	12.6 Volts
Grid Voltage ²	0 Volts
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:

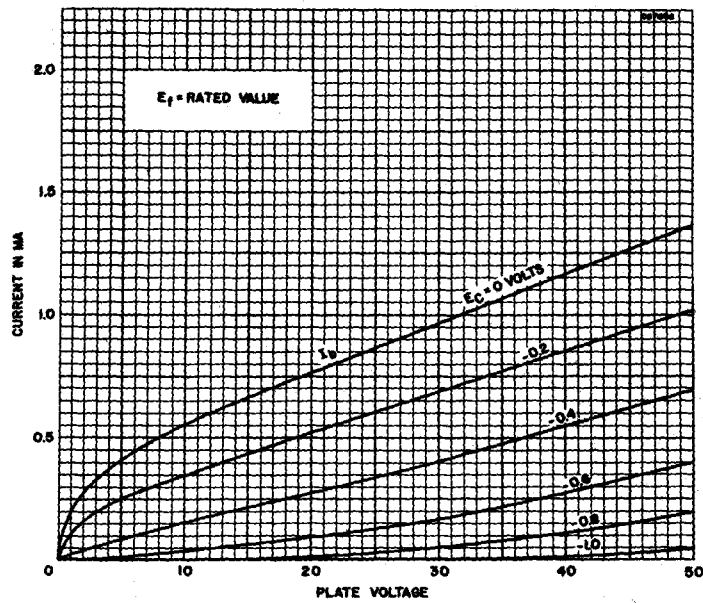
- This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered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

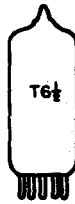
APPLICATION

The Sylvania Type 12EL6 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.

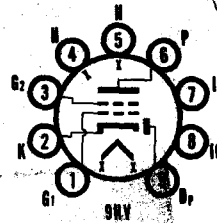
12EL6 (Cont'd)

AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 12EM6
DIODE-TETRODE



MECHANICAL DATA

Bulb	T-6 1/2
Base	EH-1, Miniature Button 9-Pin
Outline	6-3
Basing	9HV
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage ¹	12.6 Volts
Heater Current	500 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Positive with Respect to Cathode	30 Volts Max.
Heater Negative with Respect to Cathode	30 Volts Max.

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	30 Volts
Grid No. 2 Voltage	30 Volts
Plate Dissipation	0.5 Watts
Grid No. 1 Resistance	15 Megohms
Average Diode Current	10 Ma.

CHARACTERISTICS

Class A₁ Amplifier

Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage ²	
Grid No. 1 Resistor	2.2 Megohms
Plate Current	6.0 Ma
Grid No. 2 Current	1.0 Ma
Transconductance	5000 μ mhos
Plate Resistance (approx.)	4000 Ohms
Average Diode Current at 10 Volt D.C. Cathode	1.0 Ma

TYPICAL OPERATION

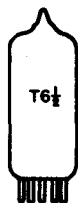
Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage ³	
AF Grid No. 1 Voltage (RMS)	1.0 Volts
AF Signal Source Resistance	200,000 Ohms
Plate Current ⁴ (Signal Applied)	2.5 Ma
Load Resistance	3500 Ohms
Power Output	10 Mw
Total Harmonic Distortion	10 Percent

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. Contact potential bias developed across a 2.2 megohm resistor.
3. Bias voltage is developed across a 15 megohm resistor by means of Grid No. 1 rectification (obtained when applying the specified signal voltage) and contact potential.
4. With no signal applied to Grid No. 1 and bias developed solely by contact potential, the plate current is 6.0 ma.

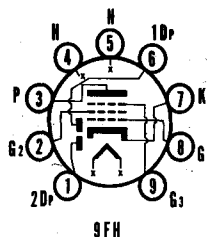
APPLICATION

The Sylvania Type 12EM6 is a miniature diode-tetrode designed for use in automobile receivers. The diode section is intended for use as a detector while the tetrode section is designed to be used as a power amplifier driver. It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12 volt automotive storage battery.



SYLVANIA TYPE 12F8

Duo Diode Pentode



MECHANICAL DATA

Bulb	.....	T-6½
Base	.....	E9-1, Miniature Button 9-Pin
Outline	.....	6-2
Basing	.....	9FH
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

Grid to Plate	.....	0.06 μf
Input g^1 to ($g^2 + g^3 + h + k$)	.....	4.5 μf
Output p to ($g^2 + g^3 + h + k$)	.....	3.0 μf
Diode to Diode	.....	0.3 μf

RATINGS (Design Center Values)

Plate Voltage	.....	30 Volts Max.
Grid No. 2 Voltage	.....	30 Volts Max.
Positive D C Grid No. 1 Voltage	.....	0 Volts Max.
Grid No. 1 Circuit Resistance	.....	10 Megohms Max.
Average Diode Current	.....	1.0 Ma Max.

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	.....	12.6 Volts
Grid No. 2 Voltage	.....	12.6 Volts
Grid No. 1 Voltage	.....	0 Volts
Plate Current	.....	1.0 Ma
Grid No. 2 Current	.....	0.38 Ma
Transconductance	.....	1000 μmhos
Plate Resistance (approx.)	.....	0.33 Megohm
Grid No. 1 Voltage (approx.) for $g_m = 10 \mu\text{mhos}$	.....	-5 Volts
Average Diode Current with 10 Volts D C applied	.....	2 Ma
(Test Condition Only)		

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 NOTES

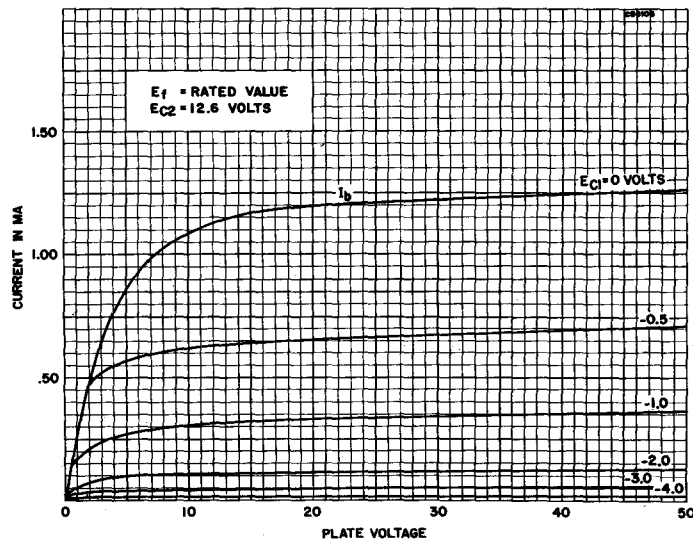
The Sylvania Type 12F8 is a double detector diode and remote cutoff pentode with a common cathode. The pentode section is intended for use as an AF voltage amplifier. It is designed for operation where the heater and plate potentials are supplied directly from a 12 volt automotive battery.

SYLVANIA ELECTRONIC TUBES

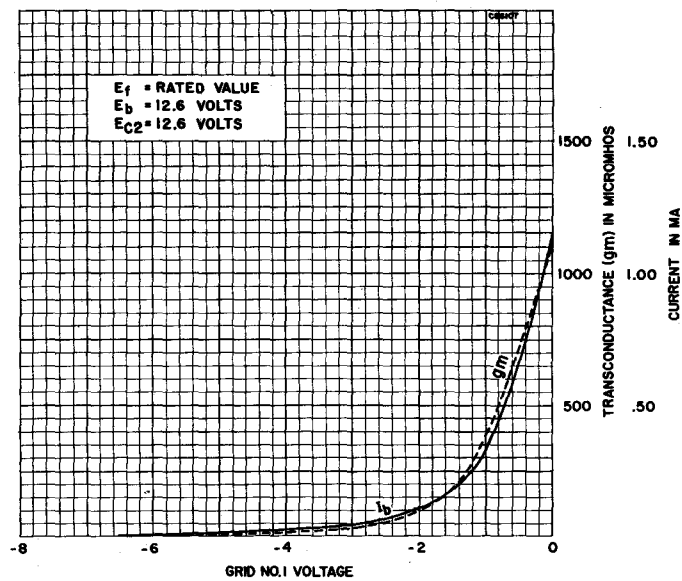
Issued as a supplement to the manual in Sylvania News for July 1957

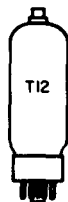
SYLVANIA TYPE 12F8 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



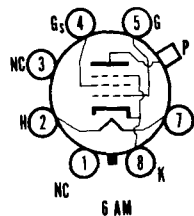
AVERAGE TRANSFER CHARACTERISTICS





SYLVANIA TYPE 12CU6

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)	
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 6CU6, which is identical except for heater ratings.

APPLICATION

The Sylvania Type 12CU6 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	—	0	8	034	22	Y
219/220	12.6	2	7	13	7	045Z	9	8

TYPE 12DQ6—See 6DQ6

TYPES 12F5GT, 12G4, 12H4, 12H6

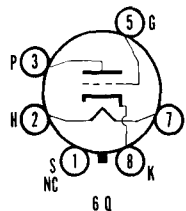
(See Condensed Data Section)



SYLVANIA TYPE 12J5

12J5GT

MEDIUM-MU TRIODE



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

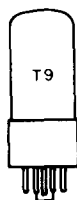
For other rating, operation, and application data, refer to corresponding Type 6J5GT, which is identical except for heater ratings.

SYLVANIA TUBE TESTER SETTINGS

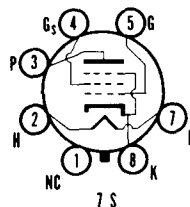
	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	1	4	36	W
219/220	12.6	2	7	31	7	5V	3	8

TYPES 12J7GT, G, 12K7GT, G, 12K8, GT

(See Condensed Data Section)



SYLVANIA TYPE 12L6GT 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)	
Maximum Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	
Total D C and Peak.....	300 Volts
Heater Positive with Respect to Cathode	
D C.....	100 Volts
Total D C and Peak.....	200 Volts

For other rating, operation, and application data, refer to corresponding Type 25L6GT, which is identical except for heater ratings.

APPLICATION

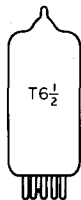
The Sylvania Type 12L6GT is intended for service in television receivers employing series connected heaters. For information on specially controlled heaters for series string operation refer to the SERIES STRING HEATERS section of the Appendix.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	0	0	1	034	18	W
219/220	12.6	2	7	13	7	045Z	3	8

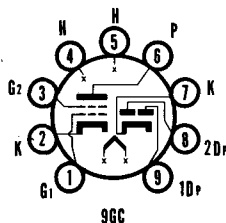
TYPES 12L8GT, 12Q7GT, G, 12S8

(See Condensed Data Section)



SYLVANIA TYPE 12J8

Duo Diode Tetrode



MECHANICAL DATA

Bulb	T-6 $\frac{1}{2}$
Base	E9-1, Miniature Button 9-Pin
Outline	6-2
Basing	9GC
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage ¹	12.6 Volts
Heater Current	325 Ma
Heater-Cathode Voltage (Design Center Values)	
Heater Positive with Respect to Cathode	30 Volts Max.
Heater Negative with Respect to Cathode	30 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Tetrode	
Grid to Plate	0.7 μmf
Input: g1 to (h + Tk + g2)	10.5 μmf
Output: p to (h + Tk + g2)	4.4 μmf
Coupling	
No. 1 Diode Plate to Tetrode Grid No. 1	0.04 μmf Max.
No. 2 Diode Plate to Tetrode Grid No. 1	0.015 μmf Max.

RATINGS (Design Center Values)

Plate Voltage	30 Volts Max.
Grid No. 2 Voltage	30 Volts Max.
Grid No. 1 Resistance	10 Megohms Max.
Average Diode Current (Each Diode)	5.0 Ma Max.

TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage ²	
Grid No. 1 Resistor	2.2 Megohms
AF Grid No. 1 Voltage (RMS)	1.6 Volts
Grid No. 1 Resistor Bypass Condenser	1.0 μf
Plate Current (Zero Signal)	12 Ma
Grid No. 2 Current (Zero Signal)	1.5 Ma
Transconductance	5500 μmhos
Plate Resistance (approx.)	6000 Ohms
Load Resistance	2700 Ohms
Maximum Signal Power Output	20 Mw
Total Harmonic Distortion	5 Per cent
Average No. 1 Diode Current at 5 Volts DC ³	8.5 Ma
Average No. 2 Diode Current at 5 Volts DC ³	12.0 Ma

NOTES:

- 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.
- Average contact potential is developed across the specified grid resistor.
- Test condition only.

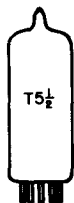
APPLICATION NOTES

The Sylvania Type 12J8 is a miniature double-diode, tetrode intended for use as a detector and audio power amplifier driver. It is designed for operation where the heater, plate and screen voltages are supplied directly from a 12 volt automotive storage battery.

SYLVANIA ELECTRONIC TUBES

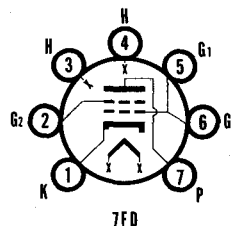
Issued as a supplement to the manual in Sylvania News for September 1957

SYLVANIA ELECTRONIC TUBES



SYLVANIA TYPE 12K5

SPACE-CHARGE TETRODE



MECHANICAL DATA

Bulb	T-5½
Base	E7-1, Miniature Button 7-Pin
Outline	5-3
Basing	7FD
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage ¹	12.6 Volts
Heater Current	400 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.

MAXIMUM RATINGS (Design Center Values—Except as Noted)

Plate Voltage	30 Volts
Positive Grid No. 1 Voltage (Abs. Max.)	16 Volts
Negative Grid No. 2 Voltage	20 Volts
Grid No. 2 Circuit Resistance	10 Megohm

CHARACTERISTICS

Plate Voltage	12.6 Volts
Grid No. 1 (Space-charge Grid) Voltage	12.6 Volts
Grid No. 2 (Control Grid) Voltage ²	0.5 Volts
Plate Current	40 Ma
Grid No. 1 (Space-charge Grid) Current	75 Ma
Transconductance	15,000 μ mhos
Amplification Factor	7.2
Plate Resistance	480 Ohms

TYPICAL OPERATION

Plate Voltage	12.6 Volts
Grid No. 1 (Space-charge Grid) Voltage	12.6 Volts
Grid No. 2 (Control Grid) Voltage ³	2.0 Volts
Peak AF Grid No. 2 Voltage	2.5 Volts
AF Signal Source Resistance	100,000 Ohms
Load Resistance	800 Ohms
Plate Current ⁴	8.0 Ma
Grid No. 1 (Space-charge Grid) Current	75 Ma
Power Output	40 Mw
Total Harmonic Distortion	10 Percent

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 bias developed across a 2.2 megohm resistor.
3. Bias voltage is developed across a 2.2 megohm resistor by means of Grid No. 2 rectification (obtained when applying the specified signal voltage) and contact potential.
4. With no signal applied to Grid No. 2 and bias developed solely by contact potential, the plate current is 40 Ma.

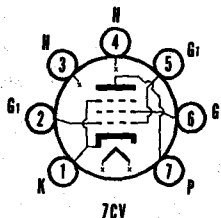
APPLICATION

Sylvania Type 12K5 is a space-charge tetrode. It is designed for use where plate, space-charge grid and heater potentials are obtained directly from a 12 volt automotive battery.





**SYLVANIA TYPE 12R5
17R5**
BEAM POWER PENTODE



MECHANICAL DATA

Bulb.....	T-5 1/2
Base.....	E7-1, Miniature Button 7-Pin
Outline.....	5-3
Basing.....	7CV
Cathode.....	Coated Unipotential
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

	12R5	17R5
Heater Voltage (A C or D C).....	12.6	16.8 Volts
Heater Current.....	600	450 Ma
Heater Warm-up Time ¹	11	11 Seconds
Heater-Cathode Voltage (Design Center Values)		
Heater Negative with Respect to Cathode		
Total D C and Peak.....	300	300 Volts Max.
Heater Positive with Respect to Cathode		
D C.....	100	100 Volts Max.
Total D C and Peak.....	200	200 Volts Max.

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Grid No. 1 to Plate.....	0.55 μ f
Input.....	13 μ f
Output.....	9.0 μ f

MAXIMUM RATINGS (Design Center Values—Except as Noted)

Vertical Deflector Amplifier²—Pentode Connected

Plate Voltage.....	150 Volts
Grid No. 2 Voltage.....	150 Volts
Peak Positive Pulse Plate Voltage (Abs. Max.).....	1500 Volts
Plate Dissipation ³	4.5 Watts
Grid No. 2 Dissipation ³	1.0 Watt
Peak Negative Pulse Grid No. 1 Voltage.....	150 Volts
Average Cathode Current.....	45 Ma
Peak Cathode Current.....	155 Ma
Grid No. 1 Circuit Resistance	
Self Bias.....	2.2 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage.....	110 Volts
Grid No. 2 Voltage.....	110 Volts
Grid No. 1 Voltage.....	-8.5 Volts
Plate Current.....	40 Ma
Grid No. 2 Current.....	3.3 Ma
Transconductance.....	7000 μ mhos
Plate Resistance.....	13,000 Ohms
Grid No. 1 Voltage for $I_b = 0.5$ Ma (approx.).....	-22 Volts

INSTANTANEOUS PLATE KNEE VALUES

$E_b = 45$ V, $E_{c2} = 110$ V, and $E_{c1} = 0$
 $I_b = 120$ Ma and $I_{c2} = 17$ Ma.

NOTES:

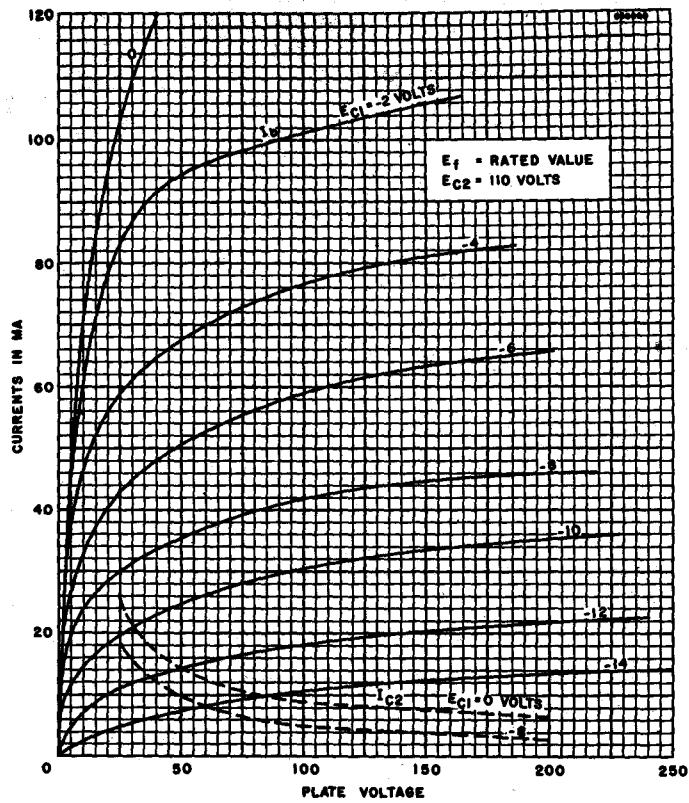
1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times the rated heater voltage divided by the rated heater current.
2. For operation in a 525-line, 30-frame system as described in "Standards of Good Engineering Practice for Television Broadcast Stations; Federal Communications Commission," the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.
3. 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 Types 12R5 and 17R5 are miniature, beam power pentodes designed for use as vertical deflection amplifiers. Types 12R5 and 17R5 have controlled heater warm-up time for series string operation.

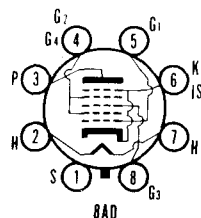
12R5, 17R5, (Cont'd)

AVERAGE PLATE CHARACTERISTICS



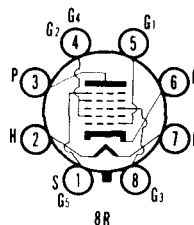
SYLVANIA ELECTRONIC TUBES

12SA7GT SYLVANIA TYPE



HEPTODE CONVERTER

12SA7



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6SA7GT, 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	1	037	85	W
	12.6	0	—	0	2	4	42	U
219/220	12.6	2	7	83	7	048V	3	6
	12.6	2	7	22	7	5V	4	6

TYPES 12SC7, 12SF5 GT

(See Condensed Data Section)

SYLVANIA TYPE 12SF7

DIODE REMOTE CUTOFF R F PENTODE

MECHANICAL DATA

Bulb.....	Metal, Outline 8-1
Base.....	Small Wafer Octal 8-Pin
Basing.....	7AZ
Mounting Position.....	Any

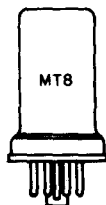
ELECTRICAL DATA

HEATER CHARACTERISTICS

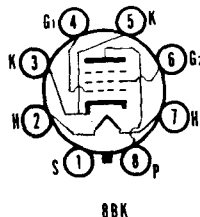
Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

TYPICAL OPERATION

Plate Voltage.....	100	250 Volts
Grid No. 2 Voltage.....	100	100 Volts
Grid No. 1 Voltage.....	-1.0	-1.0 Volts
Self Bias Resistor.....	65	65 Ohms
Plate Resistance (approx.).....	0.2	0.7 Megohm
Transconductance.....	1975	2050 μ mhos
Plate Current.....	12.0	12.4 Ma
Grid No. 2 Current.....	3.4	3.3 Ma
Grid No. 1 Voltage for $g_m = 10 \mu$ mhos.....	-35	-35 Volts



SYLVANIA TYPE 12SG7
SEMI-REMOTE CUTOFF R F PENTODE



ELECTRICAL DATA

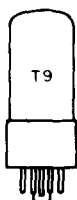
HEATER CHARACTERISTICS

Heater Voltage..... 12.6 Volts
Heater Current..... 150 Ma

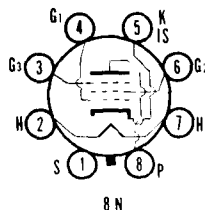
For other rating, operation, and application data, refer to corresponding Type 6SG7, which is identical except for heater ratings.

TYPES 12SH7, 12SJ7, GT

(See Condensed Data Section)



SYLVANIA TYPE 12SK7GT
REMOTE CUTOFF PENTODE



ELECTRICAL DATA

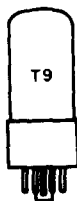
HEATER CHARACTERISTICS

Heater Voltage..... 12.6 Volts
Heater Current..... 150 Ma

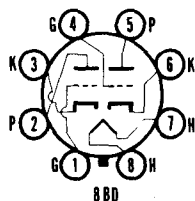
For other rating, operation, and application data, refer to corresponding Type 6SK7GT, which is identical except for heater ratings.

TYPE 12SL7GT

(See Condensed Data Section)



SYLVANIA TYPE 12SN7GT
MEDIUM-MU DUOTRIODE



ELECTRICAL DATA

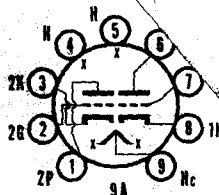
HEATER CHARACTERISTICS

Heater Voltage..... 12.6 Volts
Heater Current..... 300 Ma

For other rating, operation, and application data, refer to corresponding Type 6SN7GT, which is identical except for heater ratings.



SYLVANIA TYPE 12U7
MEDIUM MU DUO TRIODE



MECHANICAL DATA

Bulb.....	T-6 1/2
Base.....	ES-1, Miniature Button 9-Pin
Outline.....	6-2
Basing.....	9A
Cathode.....	Coated Unipotential
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

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

DIRECT INTERELECTRODE CAPACITANCES

	Section 1 ²		Section 2	
	Shielded ²	Unshielded	Shielded	Unshielded
Grid to Plate.....	1.5	1.5	1.5	1.5 μf
Input: g to (h+k)....	1.8	1.6	1.8	1.6 μf
Output: p to (h+k)....	2.0	0.4	2.0	0.32 μf

MAXIMUM RATINGS (Design Center Values)

Plate Voltage.....	30 Volts
Cathode Current.....	15 Ma
Grid Circuit Resistance	
Fixed Bias.....	0.25 Megohm
Cathode Bias.....	1.0 Megohm

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ Amplifier—Each Section

Plate Voltage.....	12.6 Volts
Grid Voltage.....	0 Volts
Plate Current.....	1.0 Ma
Transconductance.....	1600 μmhos
Amplification Factor.....	20
Plate Resistance (approx.).....	12,500 Ohms
Grid Voltage for $i_b = 10 \mu\text{a}$ (approx.).....	-1.5 Volts

NOTES:

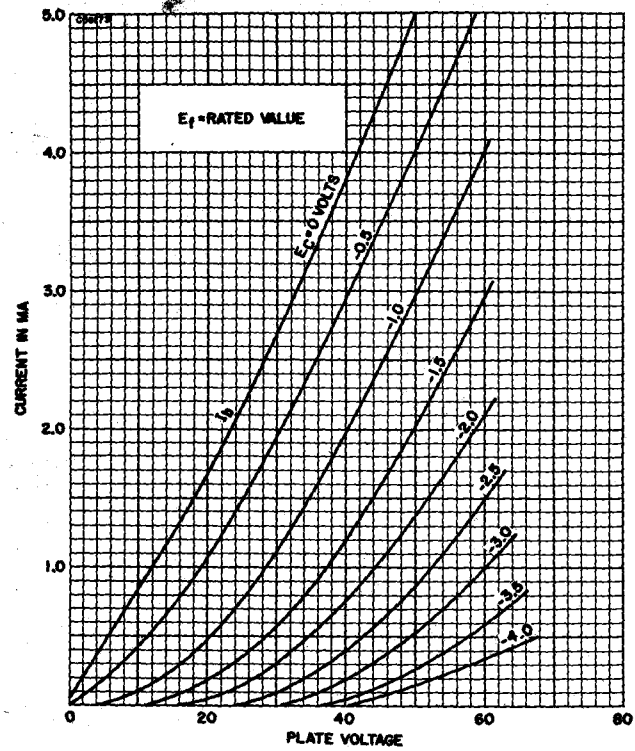
1. This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.
2. Section 1 connects to pins 6, 7 and 8. Section 2 connects to pins 1, 2 and 3.
3. External shield No. 315 connected to cathode of section under test.

APPLICATION

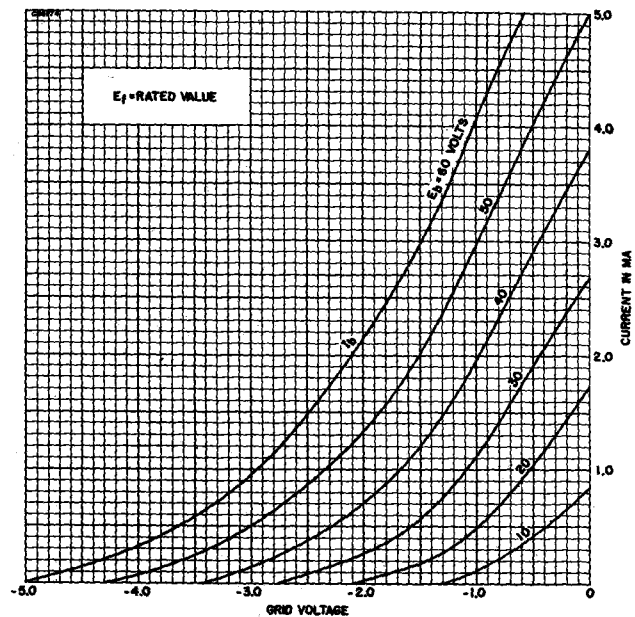
The Sylvania Type 12U7 is a general purpose, medium μ , dual triode, having separate cathodes for each section. It is designed for operation where the heater and plate voltages are supplied directly from a 12-volt automotive storage battery.

12U7 (Cont'd)

AVERAGE PLATE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS

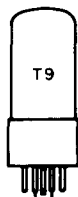


SYLVANIA ELECTRONIC TUBES

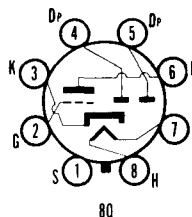
12SN7GT (Cont'd)

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	78	1	7	5	36	W
	12.6	0	78	1	3	3	36	W
219/220	12.6	7	68	23	8	1Y	2	3
	12.6	7	38	23	8	4Y	5	6



SYLVANIA TYPE 12SQ7GT
DUODIODE HIGH-MU TRIODE



ELECTRICAL DATA

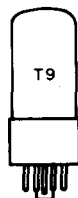
HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

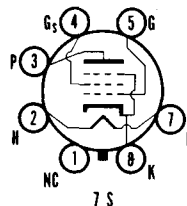
For other rating, operation, and application data, refer to corresponding Type 6SQ7GT, which is identical except for heater ratings.

TYPES 12SR7, 12V6GT

(See Condensed Data Section)



SYLVANIA TYPE 12W6GT
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)	
Maximum Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	
Total D C and Peak.....	300 Volts
Heater Positive with Respect to Cathode	
D C.....	100 Volts
Total D C and Peak.....	200 Volts

For other rating, operation, and application data, refer to corresponding Type 6W6GT, which is identical except for heater ratings.

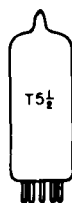
APPLICATION

The Sylvania Type 12W6GT 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.

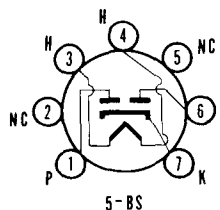
12W6GT (Cont'd)

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	1	034	20	X
219/220	12.6	2	7S	12	7	045Z	3	8



SYLVANIA TYPE 12X4
FULL-WAVE RECTIFIER



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	300 Ma

For other rating, operation, and application data, refer to corresponding Type 6X4, which is identical except for heater ratings.

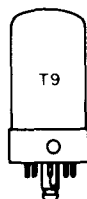
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	12.6	0	—	0	2	—	19	Y
	12.6	0	—	0	5	—	19	Y
219/220	12.6	3	4	11	4	Z	1*	7
	12.6	3	4	11	4	Z	6*	7

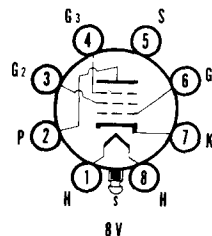
* Diode gas test does not apply.

TYPES 12Z3, 12Z5, 13, 14A4, 14A5

(See Condensed Data Section)



SYLVANIA TYPE 14A7
REMOTE CUTOFF R F PENTODE



ELECTRICAL DATA

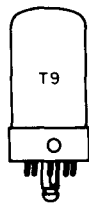
HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

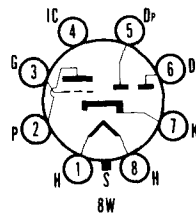
For operation and application data, refer to corresponding Type 7A7, which is identical except for heater ratings.

TYPE 14AF7/XXD

(See Condensed Data Section)



SYLVANIA TYPE 14B6
DUODIODE HIGH-MU TRIODE



ELECTRICAL DATA

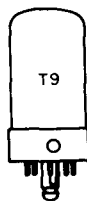
HEATER CHARACTERISTICS

Heater Voltage.....	12.6 Volts
Heater Current.....	150 Ma

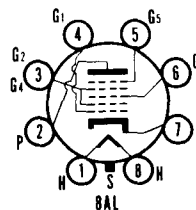
For operation and application data, refer to corresponding Type 7B6, which is identical except for heater ratings.

TYPES 14B8, 14C5, 14C7, 14E6, 14E7, 14F7, 14F8, 14H7, 14J7, 14N7

(See Condensed Data Section)



SYLVANIA TYPE 14Q7
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.....	12.6 Volts
Heater Current.....	150 Ma

TYPICAL OPERATION

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

Conversion Transconductance (Separately Excited Condition)

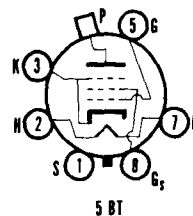
$E_b = 100 \text{ V.}, E_{c2} = 100 \text{ V.}, E_{c3} = -2 \text{ V.}$	525 μmhos
$E_b = 250 \text{ V.}, E_{c2} = 100 \text{ V.}, E_{c3} = -2 \text{ V.}$	550 μmhos

TYPES 14R7, 14S7, 14W7,
14X7, 14Y4, 14Z3, 15,
16, 16B, 18, 19

(See Condensed Data Section)



SYLVANIA TYPE 19BG6G
BEAM POWER AMPLIFIER



ELECTRICAL DATA

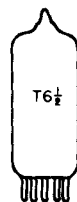
HEATER CHARACTERISTICS

Heater Voltage.....	18.9 Volts
Heater Current.....	300 Ma

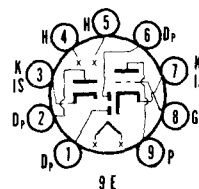
For other rating, operation, and application data, refer to corresponding Type 6BG6G, which is identical except for heater ratings.

TYPES 19C8, 19J6

(See Condensed Data Section)



SYLVANIA TYPE 19T8
TRIPLE-DIODE TRIODE

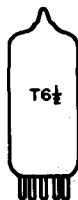


ELECTRICAL DATA

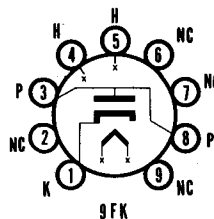
HEATER CHARACTERISTICS

Heater Voltage.....	18.9 Volts
Heater Current.....	150 Ma

For other rating, operation, and application data, refer to corresponding Type 6T8, which is identical except for heater ratings.



SYLVANIA TYPE 17H3 DAMPER DIODE



MECHANICAL DATA

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

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	17.5 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 Max.
Total D C and Peak.....	200 Volts Max.
Heater Negative with Respect to Cathode	
D C.....	500 Volts Max
Total D C and Peak.....	2000 Volts Max

DIRECT INTERELECTRODE CAPACITANCES (Approx.)

Plate to Heater and Cathode.....	4.0 μ f
Cathode to Heater and Plate.....	5.5 μ f
Heater to Cathode.....	2.0 μ f

MAXIMUM RATINGS (Design Maximum Values)²

Damper Service ³	
Peak Inverse Plate Voltage.....	2000 Volts
Steady-State Peak Plate Current.....	450 Ma
D C Plate Current.....	75 Ma
Plate Dissipation.....	3.0 Watts

AVERAGE CHARACTERISTICS

Tube Voltage Drop	
I _b = 140 Ma D C.....	22 Volts

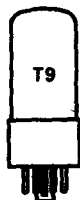
NOTES:

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 a 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 must not exceed 15% of on-g scanning cycle.

APPLICATION

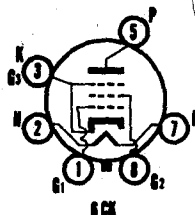
The Type 17H3 is a half-wave diode designed for use as a damping diode in horizontal deflection circuits of series string TV receivers.





SYLVANIA TYPE 18A5

HORIZONTAL DEFLECTION AMPLIFIER



MECHANICAL DATA

Bulb.....	T-9
Base.....	B6-8, Intermediate-Shell Octal, 6-Pin B6-60, Short Intermediate-Shell Octal, 6-Pin
Outline.....	9-15 or 9-43
Basing.....	6CK
Cathode.....	Coated Unipotential
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	18.5 Volts
Heater Current.....	300 Ma
Heater Warm-up Time ¹	11 Seconds
Heater-Cathode Voltage (Design Maximum 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.....	0.7 μ f
Input.....	13 μ f
Output.....	7.0 μ f

MAXIMUM RATINGS (Design Maximum Values)²

Horizontal Deflection Amplifier Service³	
D C Plate Supply Voltage	
(Boost + D C Power Supply).....	350 Volts
Peak Positive Pulse Plate Voltage.....	3000 Volts
Peak Negative Pulse Plate Voltage.....	600 Volts
D C Grid No. 2 Voltage.....	160 Volts
Peak Negative Grid No. 1 Voltage.....	250 Volts
Plate Dissipation ⁴	9 Watts
Grid No. 2 Dissipation.....	2.5 Watts
Average Cathode Current.....	90 Ma
Peak Cathode Current.....	310 Ma
Grid No. 1 Circuit Resistance.....	1.0 Megohm
Bulb Temperature (At Hottest Point).....	190 Degrees C

AVERAGE CHARACTERISTICS

Plate Voltage.....	200 Volts
Grid No. 2 Voltage.....	125 Volts
Grid No. 1 Voltage.....	-17 Volts
Plate Current.....	40 Ma
Grid No. 2 Current.....	1.1 Ma
Transconductance.....	4800 μ mhos
Plate Resistance.....	27,000 Ohms
Ec1 for Ib = 1.0 Ma (approx.).....	-36 Volts
Triode Amplification Factor:	
With Eb = Ec2 = 125 V and Ec1 = -17 V.....	4.6

INSTANTANEOUS PLATE KNEE VALUES

Eb = 60 V, Ec2 = 125 V, Ec1 = 0, Ib = 165 Ma and Ic2 = 15 Ma

NOTES:

- 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.
- Design-Maximum Ratings are limiting values of operating and environmental conditions applicable to a 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.

18A5 (Cont'd)

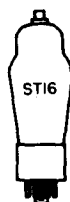
3. For operation in a 525-line, 30-frame system as described in "Standards of Good Engineering Practice for Television Broadcasting Stations; Federal Communications Commission." The duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.
4. In stages operating with grid-leak bias, an adequate cathode bias resistor or other suitable means is required to protect the tube in the absence of excitation.

APPLICATION

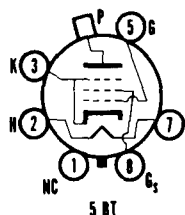
Sylvania Type 18A5 is a beam power pentode contained in a T-9 bulb. It is designed for use as a horizontal deflection amplifier in compact series string TV receivers.

TYPES 19V8, 19X8, 20, 22,
 24A, 25, 25A6, G,
 GT, 25A7GT, 25AC5GT,
 25AV5GT, 25AX4GT,
 25B5, 25B6G, 25B8,
 25BK5, 25BQ6GA,
 25C6G, 25CD6G

(See Condensed Data Section)



SYLVANIA TYPE 25CD6GA
 BEAM POWER AMPLIFIER



ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	25 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 6CD6G, which is identical except for heater ratings.

APPLICATION

The Sylvania Type 25CD6GA 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.

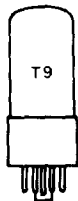
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	25.0	0	—	0	8	47	20	Y
219/220	25.0	2	7	14	7	58Z	9	3

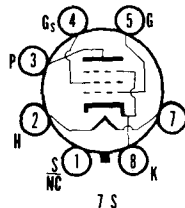
TYPE 25D8GT

(See Condensed Data Section)

TYPE 25DN6—See 6DN6



**SYLVANIA TYPE 25L6
25L6GT**
BEAM POWER AMPLIFIER



MECHANICAL DATA

	25L6	25L6GT
Bulb.....	Metal, Outline 8-6	T-9, Outline 9-11
Base.....	Small Wafer Octal 7-Pin	Intermediate Octal 7-Pin
Basing.....	7S	7S
Mounting Position.....	Any	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	25 Volts
Heater Current.....	300 Ma
Maximum Heater-Cathode Voltage.....	90 Volts

MAXIMUM RATINGS (Design Center Values)

Plate Voltage.....	200 Volts
Plate Dissipation.....	10 Watts
Grid No. 2 Voltage.....	125 Volts
Grid No. 2 Dissipation.....	1.25 Watts
Grid No. 1 Circuit Resistance.....	
Cathode Bias.....	0.5 Megohm
Fixed Bias.....	0.1 Megohm

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ Amplifier

Plate Voltage.....	110	200 Volts
Grid No. 2 Voltage.....	110	125 Volts
Grid No. 1 Voltage.....	-7.5	Volts
Cathode Bias Resistor ¹	0	180 Ohms
Peak A F Grid No. 1 Voltage.....	7.5	8.5 Volts
Plate Current (Zero Signal).....	49	46 Ma
Grid No. 2 Current (Zero Signal).....	4.0	2.2 Ma
Plate Current (Maximum Signal).....	50	47 Ma
Grid No. 2 Current (Maximum Signal).....	10.0	8.5 Ma
Transconductance.....	8000	8000 μmhos
Plate Resistance (approx.).....	13,000	28,000 Ohms
Load Resistance.....	2000	4000 Ohms
Power Output.....	2.1	3.8 Watts
Total Harmonic Distortion (approx.).....	10	10 Percent

NOTE:

1. Fixed bias operation at maximum ratings is not recommended.

APPLICATION

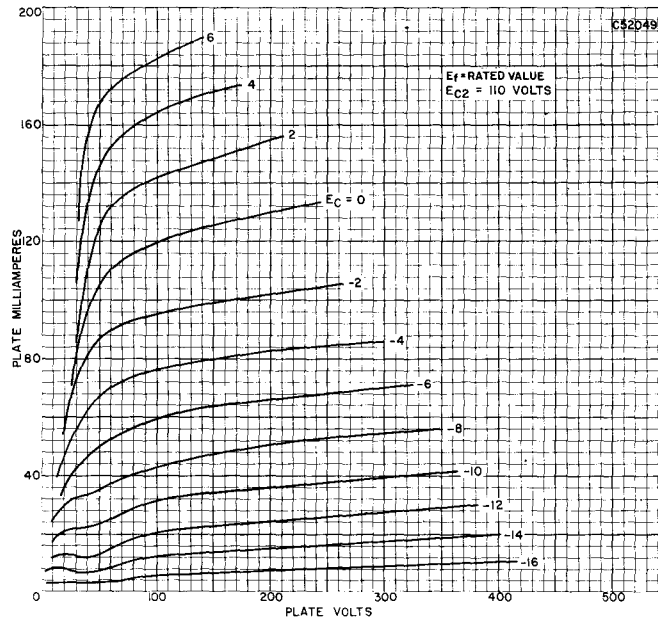
The Sylvania Types 25L6 and 25L6GT are pentode audio power amplifiers designed for series string operation, capable of delivering relatively high power output with low supply voltages.

SYLVANIA TUBE TESTER SETTINGS

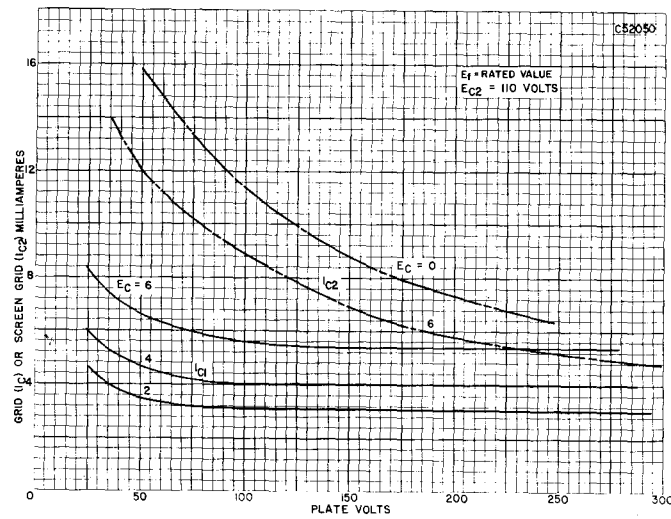
	A	B	C	D	E	F	G	Test or K
139/140	25	0	—	0	1	034	18	W
219/220	25	2	7	13	7	045Z	3	8

25L6, 25L6GT (Cont'd)

AVERAGE PLATE CHARACTERISTICS

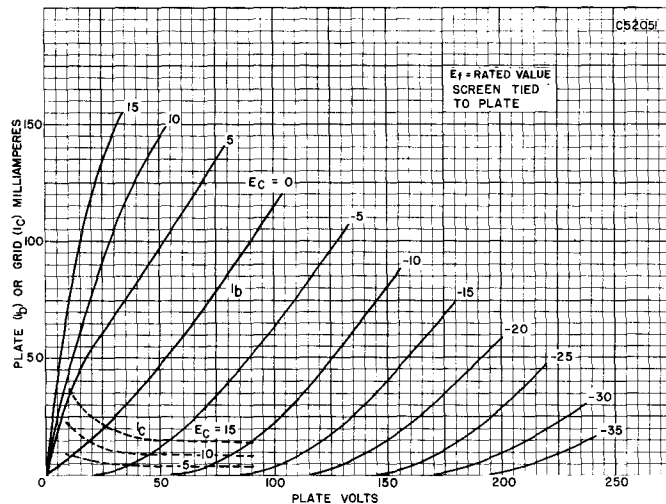


AVERAGE CHARACTERISTICS



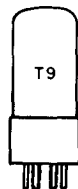
25L6, 25L6GT (Cont'd)

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTED

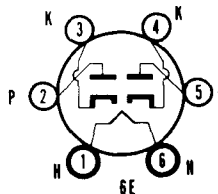


TYPES 25N6G, 25Y5, 25W6GT

(See Condensed Data Section)



SYLVANIA TYPE 25Z5 HIGH-VACUUM RECTIFIER



MECHANICAL DATA

Bulb	T-9 or ST-12
Base	Small 6-Pin
Basing	6E
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	25.0 Volts
Heater Current	300 Ma
Maximum Heater-Cathode Voltage	350 Volts

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage	700 Volts
Steady State Peak Current Per Plate	450 Ma
A C Plate Voltage Per Plate (R M S)	235 Volts
D C Output Current Per Plate	75 Ma
Tube Voltage Drop at 150 ma Per Plate	22 Volts

25Z5 (Cont'd)

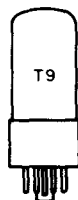
TYPICAL OPERATION

Half-Wave Rectifier—Single Section Capacitor Input Filter

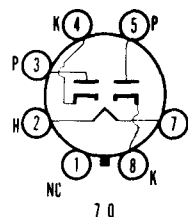
A C Plate Supply Voltage (R M S)	117	150	235 Volts
Filter Input Capacitor	16	16	16 μ f
Minimum Total Effective Plate			
Supply Impedance	15	40	100 Ohms
D C Output Current Per Plate	75	75	75 Ma

Voltage Doubler

	Half Wave	Full Wave
A C Plate Voltage Per Plate (R M S)	117	117 Volts
Filter Input Capacitor	16	16 μ f
Minimum Total Effective Plate		
Supply Impedance	30	15 Ohms
D C Output Current	75	75 Ma



SYLVANIA TYPE 25Z6GT
HIGH-VACUUM RECTIFIER



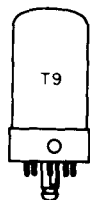
MECHANICAL DATA

Bulb	T-9, Outline 9-11
Base	Intermediate Octal 7-Pin
Basing	7Q
Mounting Position	Any

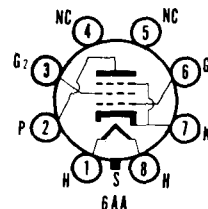
For other rating, operation, and application data, refer to corresponding Type 25Z5, which is identical except for mechanical data.

TYPES 26, 26A6, 26A7, 26C6,
26D6, 27, 28Z5, 30, 31,
32, 32L7GT, 33, 34,
35/51

(See Condensed Data Section)



SYLVANIA TYPE 35A5
BEAM POWER AMPLIFIER



MECHANICAL DATA

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

SYLVANIA ELECTRONIC TUBES

35A5 (Cont'd)

ELECTRICAL DATA

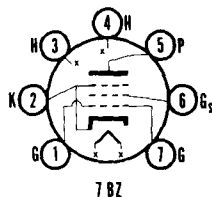
HEATER CHARACTERISTICS

Heater Voltage..... 35.0 Volts
 Heater Current..... 150 Ma

For other rating, operation and application data, refer to corresponding Type 35L6GT, which is identical except for mechanical ratings.



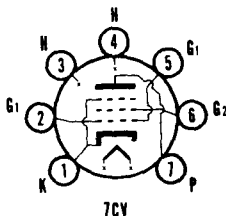
SYLVANIA TYPE 35B5
 BEAM POWER AMPLIFIER



The Type 35B5 has a lower plate voltage rating but identical operating characteristics to the Type 35L6GT. Refer to the 35L6GT for operation and application data under the 110 volt plate voltage condition only.



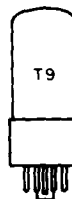
SYLVANIA TYPE 35C5
 BEAM POWER AMPLIFIER



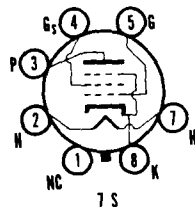
The Type 35C5 has a lower plate voltage rating but identical operating characteristics to the Type 35L6GT. Refer to the 35L6GT for operation and application data under the 110 volt plate voltage condition only.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	35	0	5	0	3	26	16	W
	35	0	2	0	3	56	16	W
219/220	35	3	24	14	4	56Z	7	1
	35	3	54	14	4	26Z	7	1



SYLVANIA TYPE 35L6GT
 BEAM POWER AMPLIFIER



MECHANICAL DATA

Bulb..... T-9, Outline 9-11 or 9-41
 Base..... Short or Intermediate Octal, 7-Pin
 Basing..... 7S
 Mounting Position..... Any

35L6GT (Cont'd)

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage.....	35 Volts
Heater Current.....	150 Ma
Maximum Heater-Cathode Voltage.....	90 Volts

MAXIMUM RATINGS (Design Center Values)

Plate Voltage.....	200 Volts
Plate Dissipation.....	8.5 Watts
Grid No. 2 Voltage.....	125 Volts
Grid No. 2 Dissipation.....	1.0 Watt
Grid No. 1 Circuit Resistance.....	
Cathode Bias.....	0.5 Megohm
Fixed Bias.....	0.1 Megohm

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ Amplifier

Plate Voltage.....	110	200 Volts
Grid No. 2 Voltage.....	110	125 Volts
Grid No. 1 Voltage.....	-7.5	0 Volts
Cathode Bias Resistor ¹	0	180 Ohms
Peak A F Grid No. 1 Voltage.....	7.5	8.0 Volts
Plate Current (Zero Signal).....	40	43 Ma
Grid No. 2 Current (Zero Signal).....	3.0	2.0 Ma
Plate Current (Maximum Signal).....	41	43 Ma
Grid No. 2 Current (Maximum Signal).....	7.0	5.5 Ma
Transconductance.....	5800	6100 μ mhos
Plate Resistance (approx.).....	14,000	34,000 Ohms
Load Resistance.....	2500	5000 Ohms
Power Output.....	1.5	3.0 Watts
Total Harmonic Distortion (approx.).....	10	10 Percent

NOTE:

1. Fixed bias operation at maximum ratings is not recommended.

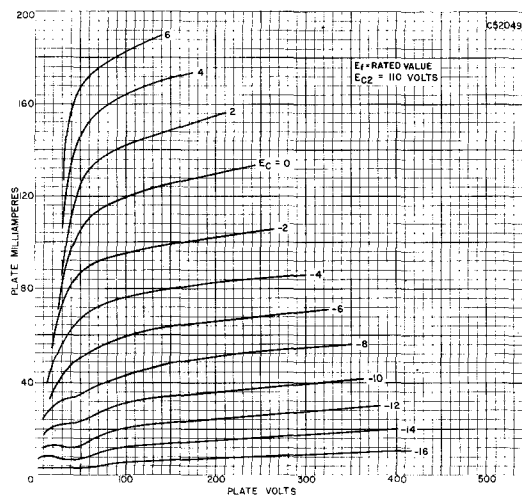
APPLICATION

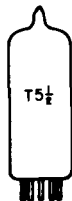
The Sylvania Type 35L6GT is a pentode audio power amplifier designed for series string operation, capable of delivering relatively high power output with low supply voltages. It is similar, except for filament operation, to the Types 25L6GT and 50L6GT.

SYLVANIA TUBE TESTER SETTINGS

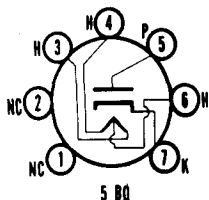
	A	B	C	D	E	F	G	Test or K
139/140	35	0	—	0	1	034	20	W
219/220	35	2	7S	16	7	045Z	3	8

AVERAGE PLATE CHARACTERISTICS





SYLVANIA TYPE 35W4 HALF-WAVE RECTIFIER



MECHANICAL DATA

Bulb	T-5 1/2, Outline 5-3
Base	Miniature Button 7-Pin
Basing	5BQ
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (Maximum)	35 Volts
Heater Voltage	32 Volts
Heater Current	150 Ma

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage	330 Volts
Peak Plate Current	600 Ma
D C Output Current	
With Panel Lamp (No Shunting Resistor)	60 Ma
(With Shunting Resistor)	90 Ma
Without Panel Lamp	100 Ma
Panel Lamp Section Voltage (Panel Lamp Open)	15 Volts
Peak Heater-Cathode Voltage	330 Volts
Tube Voltage Drop at 200 Ma Plate Current	18 Volts

TYPICAL OPERATION (Half-Wave Rectifier Service)

Capacitor Input to Filter

Panel Lamps No. 40 or 47 and C input = 40 μ f

Heater Voltage	32	32	32	32	Volts
Heater Current	150	150	150	150	Ma
Plate Supply (R M S)	117	117	117	117	Volts
Minimum Effective Plate Supply Impedance	15	15	15	15	Ohms
Panel Lamp Shunting Resistor		300	150		100 Ohms
D C Output Current	60	70	80		90 Ma

Without Panel Lamp and C input = 40 μ f

Heater Voltage	35	Volts
Heater Current	150	Ma
Plate Supply Voltage (R M S)	117	Volts
Minimum Effective Plate Supply Impedance	15	Ohms
D C Output Current	100	Ma
Maximum Value of Panel Lamp Shunting Resistor		
70 Ma Output	800	Ohms
80 Ma Output	400	Ohms
90 Ma Output	250	Ohms

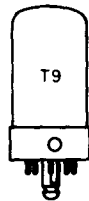
APPLICATION

Miniature half-wave rectifier with tapped heater for panel lamp operation. Connect panel lamp to pins 4 and 6. It is similar in application to Types 35Z5GT and 35Y4. The characteristic curves for the lower voltage condition under Type 35Z5GT may also be applied to Type 35W4.

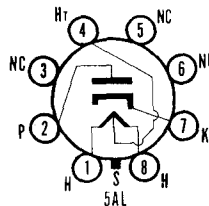
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	35	0	6	0	4	—	21	Y
	35	0	6	2	4	—	21	Y
219/220	35	3	46	10	4	Z	5*	7
	35	3	46	10	6	Z	5*	7

* Diode gas test does not apply.



SYLVANIA TYPE 35Y4
HALF-WAVE RECTIFIER



MECHANICAL DATA

Bulb..... T-9, Outline 9-31
 Base..... Lock-In 8-Pin
 Basing..... 5AL
 Mounting Position..... Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage..... 35 Volts
 Heater Current..... 150 Ma

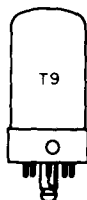
For other rating, operation, and application data, refer to corresponding Type 35Z5GT, which is identical except for mechanical data.

SYLVANIA TUBE TESTER SETTINGS

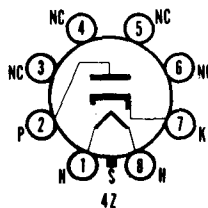
	A	B	C	D	E	F	G	Test or K
139/140	35	0	4	0	1	—	18	X
	35	0	4	4	1	—	18	X
219/220	35	8	14	9	1	Z	2*	7
	35	8	14	9	4	Z	2*	7

* Diode gas test does not apply.

Connect panel lamp to pins 1 and 4.



SYLVANIA TYPE 35Z3
HALF-WAVE RECTIFIER



MECHANICAL DATA

Bulb..... T-9, Outline 9-31
 Base..... Lock-In 8-Pin
 Basing..... 4Z
 Mounting Position..... Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage..... 35.0 Volts
 Heater Current..... 150 Ma
 Maximum Heater-Cathode Voltage..... 350 Volts

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage..... 700 Volts
 Steady State Peak Plate Current..... 600 Ma
 Tube Voltage Drop at 200 Ma D C Plate Current..... 18 Volts

TYPICAL OPERATION

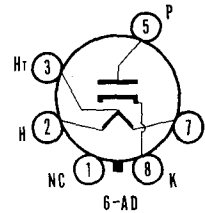
Half-Wave Rectifier

A C Plate Voltage (R M S)..... 117 235 Volts
 Minimum Total Effective Plate Supply Impedance..... 15 100 Ohms
 D C Output Current..... 100 100 Ma

Characteristics are the same as those of 35Z4GT and 35Y4 except that the latter makes provision for the use of a pilot lamp.

SYLVANIA TYPE 35Z5GT

HALF-WAVE RECTIFIER



MECHANICAL DATA

Bulb.....	T-9
Outline.....	9-11 or 9-41
Base.....	Intermediate Shell Octal 6-Pin
Basing.....	Short Intermediate Shell Octal 6-Pin
Mounting Position.....	6AD
	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

	Without Panel Lamp	With No. 40 or 47 Panel Lamp
Heater Voltage		
Entire Heater (Pins 2 and 7).....	35	35 Volts
Panel Lamp Section (Pins 2 and 3).....	7.5	5.5 Volts
Heater Current		
Between Pins 2 and 7.....	150	Ma
Between Pins 3 and 7.....		150 Ma
Maximum Heater-Cathode Voltage (D C).....	350	350 Volts

MAXIMUM RATINGS (Design Center Values)

A C Plate Voltage (R M S).....	235 Volts
Peak Inverse Plate Voltage.....	700 Volts
Steady State Peak Plate Current.....	600 Ma
Panel Lamp Section R M S Voltage	
When Panel Lamp Fails.....	15 Volts
Steady State D C Output Current:	
With Panel Lamp and no Shunting Resistor.....	60 Ma
With Panel Lamp and Shunting Resistor.....	90 Ma
Without Panel Lamp.....	100 Ma
Panel Lamp Shunting Resistor:	
D C Output Current of 70 Ma.....	800 Ohms
D C Output Current of 80 Ma.....	400 Ohms
D C Output Current of 90 Ma.....	250 Ohms
Tube Voltage Drop with Tube Conducting	
200 Ma D C Plate Current.....	18 Volts

CHARACTERISTICS AND TYPICAL OPERATION

Half-Wave Rectifier with No. 40 or 47 Panel Lamp Capacitor Input to Filter

A C Plate Supply Voltage (R M S).....	117	117	117	117	235 Volts
Filter Input Capacitance.....	40	40	40	40	40 μ f
Minimum Total Effective Plate Supply Impedance..	15	15	15	15	100 Ohms
Panel Light Shunting Resistor.....		300	150	100	Ohms
D C Output Current.....	60	70	80	90	60 Ma

Half-Wave Rectifier Without Panel Lamp Capacitor Input to Filter

A C Plate Supply Voltage (R M S).....	117	235 Volts
Filter Input Capacitance.....	40	40 μ f
Minimum Total Effective Plate Supply Impedance.....	15	100 Ohms
D C Output Voltage at Input to Filter (Approx.):		
At 50 Ma (Half Load).....	140	280 Volts
At 100 Ma (Full Load).....	120	235 Volts
Percent Regulation.....	14	16 Percent
D C Output Current.....	100	100 Ma

NOTE:

1. Plate Current must not flow through tap section (Pins 2 and 3).

APPLICATION

The Sylvania Type 35Z5GT is a half-wave rectifier designed for use in a c/d c line operated radio receivers. The heater is tapped to permit operation of a panel lamp. Connect panel lamp to pins 2 and 3.

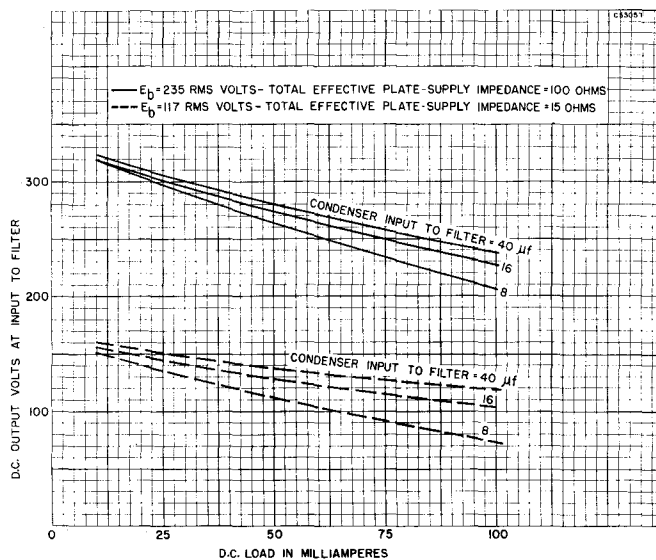
35Z5GT (Cont'd)

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	35	0	2	0	3	—	18	Y
	35	0	2	6	3	—	18	Y
219/220	35	7	23	10	2	Z	5*	8
	35	7	23	10	3	Z	5*	8

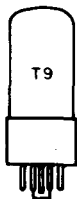
* Diode gas test does not apply.

AVERAGE OPERATING CHARACTERISTICS

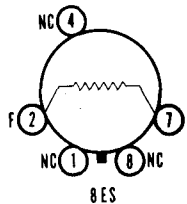


TYPES 35Z6G, 36, 37,
38, 39/44, 40

(See Condensed Data Section)



SYLVANIA TYPE 40A1
HORIZONTAL STABILIZER



MECHANICAL DATA

Bulb	T-9, Outline 9-9
Base	Intermediate Shell Octal 5-Pin
Basing	8ES
Mounting Position	Vertical, Base Down
Filament	Iron
Type of Cooling	Radiation

40A1 (Cont'd)

MAXIMUM RATINGS (Absolute Maximum Values)

Current Range.....	70 to 90 Ma
Voltage Range.....	20 to 60 Volts
Ambient Temperature.....	65° C

TYPICAL OPERATION (Average)

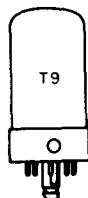
Current at 40 Volts.....	80 Ma
Current at 20 Volts.....	74 Ma
Current at 60 Volts.....	90 Ma

APPLICATION

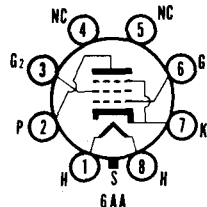
The Type 40A1 is a gas filled ballast tube designed to maintain relatively constant current over a specified operating voltage range. The type is designed for application as a horizontal deflection stabilizer in television receivers.

TYPES 40B2, 40Z5/45Z5GT,
41, 42, 43, 44, 45,
45A, 45Z3, 46, 47,
48, 49, 50, 50A1

(See Condensed Data Section)



SYLVANIA TYPE 50A5
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.....	50 Volts
Heater Current.....	150 Ma

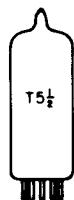
For other rating, operation, and application data, refer to corresponding Type 50L6GT, which is similar except for mechanical data.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	50	0	—	0	1	036	20	X
219/220	50	1	8	13	8	036Z	2	7

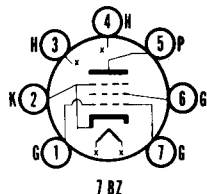
TYPE 50AX6G

(See Condensed Data Section)



SYLVANIA TYPE 50B5

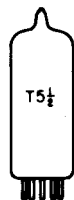
BEAM POWER AMPLIFIER



For other rating, operation, and application data, refer to corresponding Type 50C5, which is identical except for the base diagram.

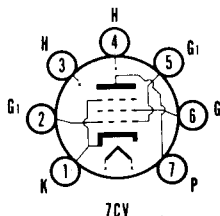
SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	50	0	4	0	4	36	18	W
219/220	50	3	14	14	4	067Z	5	2
	50	3	74	14	4	16Z	5	2



SYLVANIA TYPE 50C5

BEAM POWER AMPLIFIER



MECHANICAL DATA

Bulb	T-5 1/2
Base	Miniature Button 7-Pin
Outline	5-3
Basing	7CV
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	50 Volts
Heater Current	150 Ma
Maximum Heater-Cathode Voltage	180 Volts

MAXIMUM RATINGS (Design Center Values)

Plate Voltage	135 Volts
Grid No. 2 Voltage	117 Volts
Plate Dissipation	5.5 Watts
Grid No. 2 Dissipation	1.25 Watts
Control Grid Circuit Resistance	
Fixed Bias	0.1 Megohm
Cathode Bias	0.5 Megohm

50C5 (Cont'd)

CHARACTERISTICS AND TYPICAL OPERATION (Single Tube)

Class A₁ Amplifier

Plate Voltage	110 Volts
Grid No. 2 Voltage	110 Volts
Grid No. 1 Voltage	-7.5 Volts
Peak A F Grid No. 1 Voltage	7.5 Volts
Plate Current (Zero-Signal)	49 Ma
Plate Current (Maximum-Signal)	50 Ma
Grid No. 2 Current (Zero-Signal)	4.0 Ma
Grid No. 2 Current (Maximum-Signal)	8.5 Ma
Plate Resistance (approx.)	10,000 Ohms
Transconductance	7,500 μ mhos
Load Resistance	2,500 Ohms
Maximum-Signal Power Output	1.9 Watts
Total Harmonic Distortion (approx.)	9.0 Percent

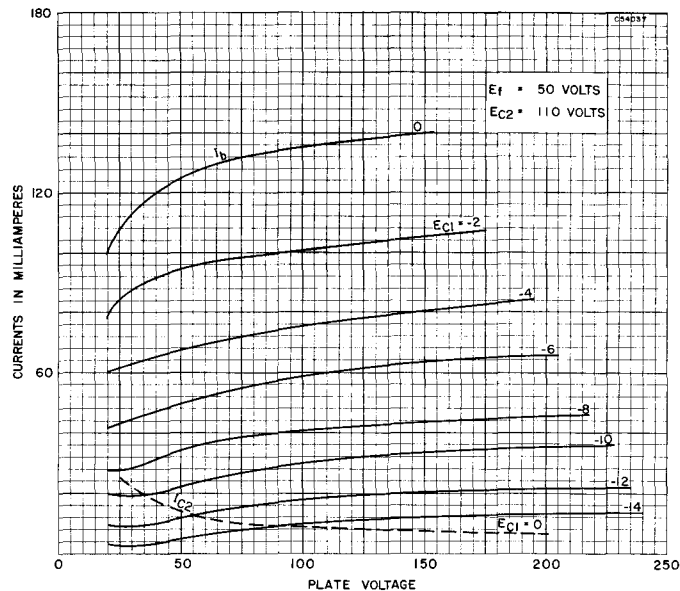
APPLICATION

The Sylvania Type 50C5 is a miniature, beam power amplifier designed for service as the audio power output stage of a c/d c receivers. The Type 50C5 features relatively high power output at low B supply voltage.

SYLVANIA TUBE TESTER SETTINGS

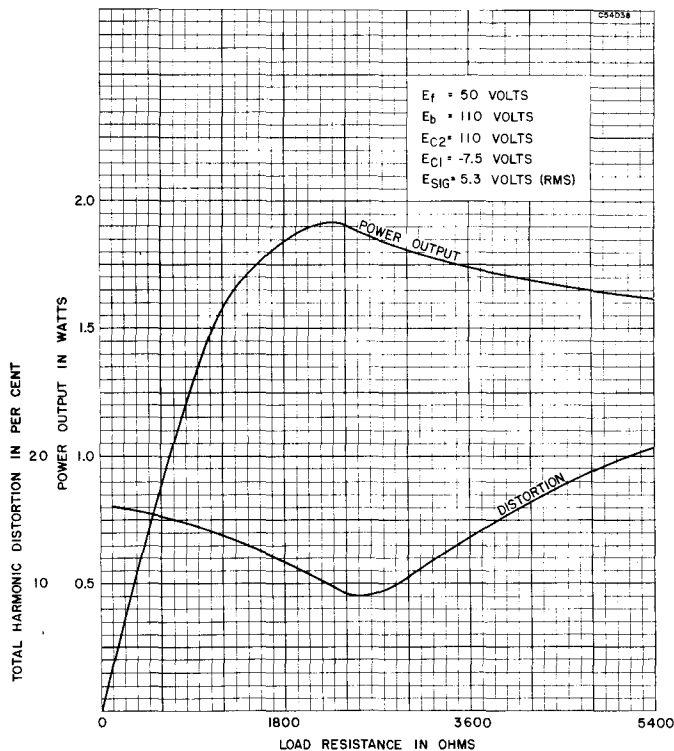
	A	B	C	D	E	F	G	Test or K
139/140	50	0	5	0	3	26	18	Y
	50	0	2	0	3	56	18	Y
219/220	50	3	24	13	4	56Z	7	1
	50	3	54	13	4	26Z	7	1

AVERAGE PLATE CHARACTERISTICS



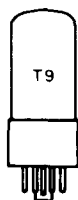
50C5 (Cont'd)

AVERAGE OPERATION CHARACTERISTICS

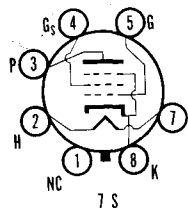


TYPE 50C6G

(See Condensed Data Section)



SYLVANIA TYPE 50L6GT
BEAM POWER AMPLIFIER



MECHANICAL DATA

Bulb	T-9, Outline 9-11
Base	Intermediate Octal 7-Pin
Basing	7S
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

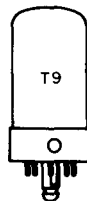
Heater Voltage	50 Volts
Heater Current	150 Ma

For other rating, operation, and application data, refer to corresponding Type 25L6GT, which is identical except for heater and mechanical ratings.

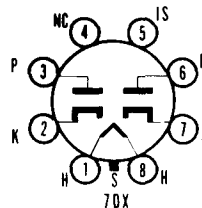
50L6GT (Cont'd)

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	50	0	—	0	1	034	20	X
219/220	50	2	7	14	7	045Z	3	8



SYLVANIA TYPE 50X6
HIGH-VACUUM RECTIFIER



MECHANICAL DATA

Bulb.....	T-9, Outline 9-31
Base.....	Lock-In 8-Pin
Basing.....	7DX
Mounting Position.....	Any

ELECTRICAL DATA

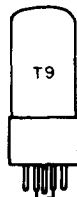
HEATER CHARACTERISTICS

Heater Voltage.....	50.0 Volts
Heater Current.....	150 Ma
Maximum Heater-Cathode Voltage.....	350 Volts

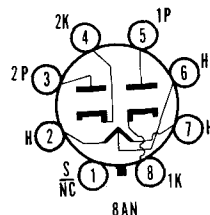
For other rating, operation, and application data, refer to corresponding Type 25Z5, which is identical except for heater ratings and mechanical data.

TYPE 50Y6GT

(See Condensed Data Section)



SYLVANIA TYPE 50Y7GT
HIGH-VACUUM RECTIFIER DOUBLER



MECHANICAL DATA

Bulb.....	T-9, Outline 9-11
Base.....	Intermediate Octal 8-Pin
Basing.....	8AN
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (A C or D C).....	50 Volts
Heater Current.....	150 Ma

50Y7GT (Con'td)

TYPICAL OPERATION

Full Wave Voltage Doubler

	No Lamp	With Lamp ¹
A C Plate Supply Voltage (R M S).....	117	117 Volts
D C Output Current.....	75	65 Ma
Plate Supply Impedance (Minimum).....	15	15 Ohms
Panel Lamp Shunting Resistor.....		250 Ohms
Panel Lamp Voltage.....		5.5 Volts

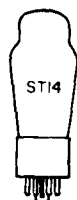
	No Lamp			With Lamp		
A C Plate Supply Voltage (R M S).....	117	150	235	117	150	235 Volts
Filter Input Capacitor.....	16	16	16	16	16	16 μ f
Plate Supply Impedance Minimum.....	15	40	100	15	40	100 Ohms
D C Output Current.....	75	75	75	65	65	65 Ma
Panel Lamp Voltage.....				5.5	5.5	5.5 Volts
Panel Lamp Shunting Resistor.....				250	250	250 Ohms

NOTE:

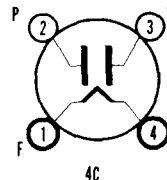
1. With No. 40 or 47 Panel Lamp.
Connect panel lamp to pins 6 and 7.

TYPES 50Z7G, 51, 51S, 52,
53, 55, 55S, 56,
56AS, 57, 57AS, 58,
58AS, 59, 64, 64A,
65, 65A, 67, 67A,
68, 68A, 70A7GT,
70L7GT, 71, 71A, 71B,
75, 76, 77, 78, 79

(See Condensed Data Section)



SYLVANIA TYPE 80
FULL-WAVE RECTIFIER



MECHANICAL DATA

Bulb.....	ST-14, Outline 14-1
Base.....	Medium 4-Pin
Basing.....	4C
Mounting Position.....	Vertical ¹

ELECTRICAL DATA

FILAMENT CHARACTERISTICS

Filament Voltage.....	5.0 Volts
Filament Current.....	2.0 Amperes

80 (Cont'd)

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage (A C or D C).....	1400 Volts
A C Plate Supply Voltage Each Plate (R M S)	
Capacitor Input at 125 Ma Max. Load.....	350 Volts
Choke Input at 125 Ma Max. Load.....	500 Volts
Steady State Peak Plate Current Each Plate.....	400 Ma
Transient Peak Plate Current Each Plate.....	2.2 Amperes
Tube Voltage Drop (125 Ma Per Plate).....	60 Volts

TYPICAL OPERATION

Full-Wave Rectifier Service

	Input to Filter	
	Capacitor	Choke
A C Plate Supply Voltage Each Plate.....	350	500 Volts
Input Capacitor.....	10	μf
Input Choke.....		10 Henry
Effective Plate Supply Impedance Each Plate.....	50	Ohms
D C Output Current.....	125	125 Ma
D C Output Voltage.....	350	390 Volts

NOTE:

1. Horizontal operation permitted if pins 1 and 2 are in a vertical plane.

SYLVANIA TUBE TESTER SETTINGS

	A	B	C	D	E	F	G	Test or K
139/140	5.0	0	—	0	1	—	22	Y
	5.0	0	—	0	2	—	22	Y
219/220	5.0	1	4	13	4	Z	2*	—
	5.0	1	4	13	4	Z	3*	—

* Diode gas test does not apply.

TYPE 81

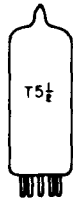
(See Condensed Data Section)

TYPE 82V

(See Condensed Data Section)

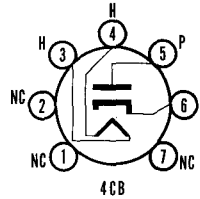
TYPES 84/6Z4, 85, 85AS,
88, 89, 89Y, 95, 96,
98, X99, 117L7/M7GT,
117L7GT, 117N7GT,
117P7GT, 117Z4GT

(See Condensed Data Section)



SYLVANIA TYPE 117Z3

HALF-WAVE RECTIFIER



MECHANICAL DATA

Bulb T-5 1/2, Outline 5-3
 Base Miniature Button 7-Pin
 Basing 4CB
 Mounting Position Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage (A C or D C) 117 Volts
 Heater Current 40 Ma
 Maximum Peak Heater-Cathode Voltage
 Heater Negative with Respect to Cathode 175 Volts
 Heater Positive with Respect to Cathode 100 Volts

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage 330 Volts
 A C Plate Supply Voltage (R M S) 117 Volts
 Steady State Peak Plate Current 540 Ma
 Transient Peak Plate Current 2.5 Amperes
 D C Output Current 90 Ma
 Tube Voltage Drop at 180 Ma D C 22.5 Volts

CHARACTERISTICS AND TYPICAL OPERATION

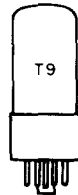
Half-Wave Rectifier—Capacitor Input Filter

A C Plate Supply Voltage (R M S) 117 Volts
 Filter Input Capacitor 30 μ f
 Total Effective Plate Supply Impedance 20 Ohms
 D C Output Current 90 Ma
 D C Output Voltage at Filter Input (approx.)
 D C Output Current 90 Ma 110 Volts
 D C Output Current 45 Ma 130 Volts

SYLVANIA TUBE TESTER SETTINGS

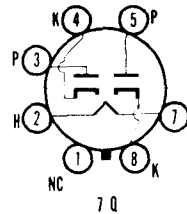
	A	B	C	D	E	F	G	Test or K
139/140	117	0	3	0	4	—	16	X
219/220	117	3	14	10	4	Z	5*	6

* Diode gas test does not apply.



SYLVANIA TYPE 117Z6GT

HIGH-VACUUM RECTIFIER



MECHANICAL DATA

Bulb T-9, Outline 9-11
 Base Intermediate Octal 7-Pin
 Basing 7Q
 Mounting Position Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage 117 Volts
 Heater Current 75 Ma
 Maximum Heater-Cathode Voltage 350 Volts

MAXIMUM RATINGS (Design Center Values)

Peak Inverse Plate Voltage 700 Volts
 Peak Plate Current Per Plate 360 Ma
 D C Output Current Per Plate 60 Ma
 Average Tube Drop at 120 Ma Output Current 15 Volts

117Z6GT (Cont'd)

TYPICAL OPERATION

Half-Wave Rectifier with Capacitor Input Filter¹

Plate Supply Voltage (R M S)	117	150	235 Volts
Input Filter Capacitor	40	40	40 μ f
Minimum Effective Plate Supply Impedance (Per Plate)	15	40	100 Ohms
D C Output Current (Per Plate)	60	60	60 Ma

Voltage Doubler

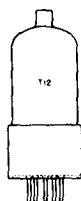
	Half Wave	Full Wave
Plate Supply Voltage Per Plate (R M S)	117	117 Volts
Input Filter Capacitor	40	40 μ f
Minimum Effective Plate Supply Impedance Per Plate	30	15 Ohms
D C Output Current (Per Plate)	60	60 Ma

NOTE:

1. The Sections may be used separately or in parallel.

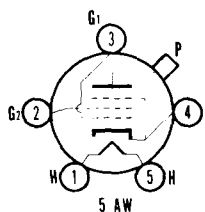
TYPES 182B/482B, 183/483, 210T, 401, 484

(See Condensed Data Section)



SYLVANIA TYPE 807 807W

BEAM POWER AMPLIFIER



	807	807W
Bulb	ST-16	T-12
Outline	16-2	12-107
Base	Medium Shell Small 5-Pin	5-Pin Low Loss Phenolic
Basing	5AW	5AW
Cap.	Small	Small
Mounting Position	Any	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage	6.3 Volts
Heater Current	0.9 Amperes
Maximum Peak Heater-Cathode Voltage	± 135 Volts

DIRECT INTERELECTRODE CAPACITANCES

Grid No. 1 to Plate (Shielded)	0.2 μ f Max
Input (Unshielded)	12 μ f
Output (Unshielded)	7 μ f

MAXIMUM RATINGS (Design Center Values)

	Class AB ₁ Triode Connected ¹ A F Power Amplifier and Modulator	
	CCS ²	ICAS ³
Plate Voltage	400	400 Volts
D C Plate Current at Max. Sig. ⁴	125	125 Ma
Plate Plus Grid 2 Input at Max. Sig. ⁴	50	50 Watts
Plate Plus Grid 2 Input ⁴	25	30 Watts
Class AB ₂ A F Power Amplifier and Modulator		
D C Plate Voltage	600	750 Volts
Grid 2 Voltage	300	300 Volts
D C Plate Current at Max. Sig. ⁴	120	120 Ma
Plate Input at Max. Sig. ⁴	60	90 Watts
Grid 2 Input at Max. Sig. ⁴	3.5	3.5 Watts
Plate Dissipation	25	30 Watts

807, 807W (Cont'd)

Class C R F Power Amplifier and Oscillator (Values Apply to 60 Mc)

D C Plate Voltage.....	600	750 Volts
D C Grid 2 Voltage.....	300	300 Volts
D C Grid 1 Voltage.....	-200	-200 Volts
D C Plate Current.....	100	100 Ma
D C Grid 1 Current.....	5	5 Ma
Plate Input.....	60	75 Watts
Grid 2 Input.....	3.5	3.5 Watts
Plate Dissipation.....	25	30 Watts

TYPICAL OPERATION

Class AB₁ A F Power Amplifier and Modulator

(2 Tubes Triode Connected)

	CCS ²	ICAS ³
D C Plate Voltage.....	400	400 Volts
D C Grid 1 Voltage ⁵	-45	-45 Volts
Peak A F Grid 1 to Grid 1 Voltage ⁶	90	90 Volts
D C Plate Current (Zero Signal).....	60	60 Ma
D C Plate Current (Maximum Signal).....	140	140 Ma
Effective Load Resistance (Plate to Plate).....	3000	3000 Ohms
Maximum Signal Driving Power (Approx.).....	0	0 Watts
Total Harmonic Distortion.....	3	3 Percent
Maximum Signal Power Output (Approx.).....	15	15 Watts

Class AB₂ A F Power Amplifier and Modulator (Values are for two tubes)

	CCS ²			ICAS ³
D C Plate Voltage.....	400	500	600	750 Volts
D C Grid 2 Voltage ⁷	300	300	300	300 Volts
D C Grid 1 Voltage (Fixed Bias).....	-25	-29	-30	-32 Volts
Peak Grid to Grid Signal Voltage.....	78	86	78	92 Volts
Plate Current (Zero Signal).....	90	72	60	52 Ma
Plate Current (Maximum Signal).....	240	240	200	240 Ma
Grid 2 Current (Zero Signal).....	2.0	0.9	0.7	0.5 Ma
Grid 2 Current (Maximum Signal).....	15	12	16	17 Ma
Load Resistance (Plate to Plate).....	3200	4240	6400	6950 Ohms
Driving Power (Maximum Signal) (Approx.) ⁸	0.2	0.2	0.1	0.2 Watts
Power Output (Approx.) ⁹	55	75	80	120 Watts

Class C Unmodulated R F Power Amplifier or Oscillator (Single Tube)

	CCS ²			ICAS ³
D C Plate Voltage.....	400	500	600	750 Volts
Grid 2 Voltage ⁷	250	250	250	250 Volts
Grid 2 Dropping Resistor.....	20000	42000	50000	85000 Ohms
Grid 1 Voltage ¹⁰	-45	-45	-45	-45 Volts
Peak Signal Voltage.....	65	65	65	65 Volts
Plate Current.....	100	100	100	100 Ma
Grid 2 Current.....	7.5	6.0	7.0	6.0 Ma
Grid 1 Current (Approx.).....	3.5	3.5	3.5	3.5 Ma
Driving Power (Approx.).....	0.2	0.2	0.2	0.2 Watt
Power Output (Approx.).....	25	30	40	50 Watts

NOTES:

- Grid 2 connected to plate.
- CCS—Continuous Commercial Service.
- ICAS—Intermittent Commercial and Amateur Service.
- Averaged over any audio frequency cycle of sine-wave form.
- The d c grid 1 circuit resistance should be limited to 100,000 ohms with fixed bias or 500,000 ohms with cathode bias.
- The driver stage should be capable of supplying the No. 1 grids of the class AB₁ stage with the specified driving voltage at low distortion.
- May be obtained from a separate well regulated source or from the plate supply voltage if a voltage divider is used.
- The effective grid circuit resistance should not exceed 500 ohms per grid, or the impedance 700 ohms.
- Distortion in practical circuits should not exceed 5%, 5% and 3% respectively, under CCS conditions.
- Bias may be provided by use of 12,800 ohm grid leak, 410 ohm cathode resistor, fixed separate source or a combination of these. The grid circuit resistance should not exceed 30,000 ohms.

SYLVANIA TUBE TESTER SETTINGS

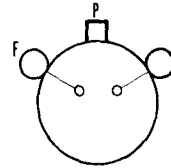
	A	B	C	D	E	F	G	Test or K
139/140	6.3	0	—	0	8	023	30	Y
219/220	6.3	1	5	20	5	023Z	9	4

TYPES 950, 951

(See Condensed Data Section)



SYLVANIA TYPE 5642 HALF-WAVE RECTIFIER



5642

MECHANICAL DATA

Bulb.....	T-3
Base.....	Flexible Leads
Basing.....	5462
Lead Diameter.....	0.017" +0.002
	-0.001
Cathode.....	Filamentary
Mounting Position.....	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Filament Voltage.....	1.25 Volts
Filament Current (Per Tube).....	200 Ma

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

Filament to Plate.....	0.6 μ f
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MAXIMUM RATINGS (Design Center Values)

Half Wave Rectifier Service

Peak Inverse Voltage.....	10000 Volts
Steady State D C Output Current.....	0.25 Ma
Steady State Peak Plate Current ¹	5 Ma
Minimum Frequency of Supply Voltage.....	5 Kc

CHARACTERISTICS

Tube Voltage Drop ²	30 Volts
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TYPICAL OPERATION

Pulse Type Rectifier Doubler in Television Scanning Circuit²

Peak Plate Pulse Voltage.....	8000 Volts
D C Output Current.....	150 μ a
Output Voltage (Two Tubes).....	12000 Volts

NOTES:

1. The duration of the voltage pulse should not exceed 15% of one horizontal scanning cycle. In a 525 line interlaced two to one 30 frame per second system, 15% of one horizontal scanning cycle is 10 microseconds.
2. Measured with applied d c voltage at 4.0 ma.

APPLICATION

The Sylvania Type 5642 is a subminiature half-wave rectifier designed for service in high efficiency, compact high voltage power supplies. The long flexible leads allow it to be wired in, thus reducing insulation and leakage problems.

TYPES 9002, 9003, 9006, XXB, XXD, XXFM, XXL

(See Condensed Data Section)