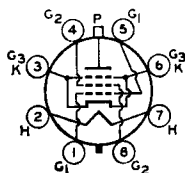


Refer to chart at end of section.  
For replacement use type 6CG3/6BW3/6DQ3.

6DQ3

Refer to chart at end of section.

6DQ4



BEAM POWER TUBE

6DQ5

Glass octal type used as horizontal-deflection amplifier in color and black-and-white television receivers. Outlines section, 21B; requires octal socket.

**8JC**

Heater Voltage (ac/dc)	6.3	volts
Heater Current	2.5	amperes
Heater-Cathode Voltage:		
Peak value	±200 max	volts
Average value	100 max	volts
Direct Interelectrode Capacitances (Approx.):		
Grid No.1 to Plate	0.5	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3	23	pF
Plate to Cathode, Heater, Grid No.2, and Grid No.3	11	pF

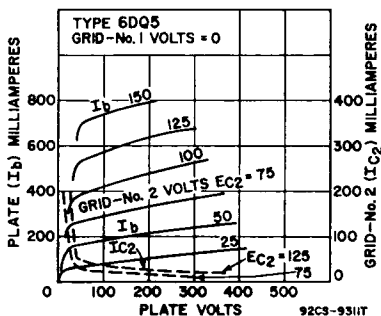
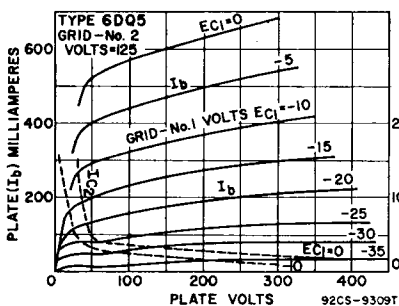
Class A<sub>1</sub> Amplifier

CHARACTERISTICS

	Pentode Connection		Triode* Connection	
Plate Voltage	70	175	125	volts
Grid No.2 (Screen-Grid) Voltage	125	125	—	volts
Grid No.1 (Control-Grid) Voltage	0	-25	-25	volts
Amplification Factor	—	—	3.3	
Plate Resistance (Approx.)	—	5500	—	ohms
Transconductance	—	10500	—	μmhos
Plate Current	550*	110	—	mA
Grid-No.2 Current	42*	5	—	mA
Grid-No.1 Voltage (Approx.) for plate mA = 1	—	-55	—	volts

\* Grid No.2 connected to plate.

\* This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.



Horizontal-Deflection Amplifier

For operation in a 525-line, 30-frame system

MAXIMUM RATINGS (Design-Maximum Values)

DC Plate Voltage	990	volts
Peak Positive-Pulse Plate Voltage#	6500	volts
Peak Negative-Pulse Plate Voltage	1100	volts
DC Grid-No.2 (Screen-Grid) Voltage	190	volts
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	250	volts
Peak Cathode Current	1100	mA
Average Cathode Current	315	mA
Grid-No.2 Input	3.2	watts
Plate Dissipation#	24	watts
Bulb Temperature (At hottest point)	220	°C

**MAXIMUM CIRCUIT VALUE**

Grid-No.1-Circuit Resistance, for grid-resistor-bias operation . . . . . 0.47 megohm  
 # Pulse duration must not exceed 15% of a horizontal scanning cycle (10 microseconds).  
 \* A bias resistor or other means is required to protect the tube in absence of excitation.

**6DQ6A**

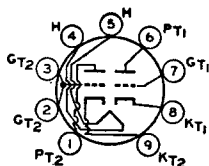
Refer to chart at end of section.

**6DQ6B**

For replacement use type 6GW6/6DQ6B.

**6DR7****10DR7, 13DR7****DUAL TRIODE**

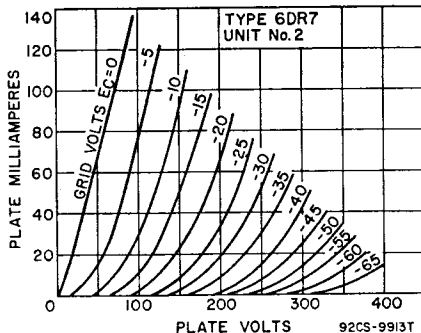
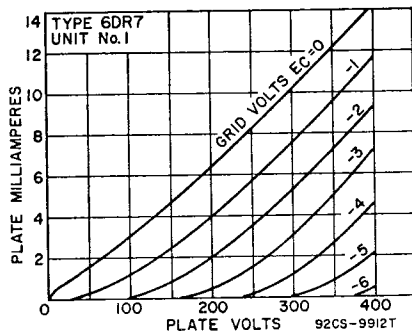
Miniature type containing high- $\mu$  and low- $\mu$  triodes; used as combined vertical-deflection-oscillator and vertical-deflection-amplifier tube in television receivers. Outlines section, 6E; requires miniature 9-contact socket. Types 10DR7 and 13DR7 are identical with type 6DR7 except for heater ratings.

**9HF**

	<b>6DR7</b>	<b>10DR7</b>	<b>13DR7</b>	
Heater Voltage (ac/dc) . . . . .	6.3	9.7	13	volts
Heater Current . . . . .	0.9	0.6	0.45	ampere
Heater Warm-up Time (Average) . . . . .	—	11	11	seconds
Heater-Cathode Voltage:				
Peak value . . . . .	±200 max	±200 max	±200 max	volts
Average value . . . . .	100 max	100 max	100 max	volts
Direct Interelectrode Capacitances (Approx.):	<b>Unit No.1</b>		<b>Unit No.2</b>	
Grid to Plate . . . . .	4.5		8.5	pF
Grid to Cathode and Heater . . . . .	2.2		5.5	pF
Plate to Cathode and Heater . . . . .	0.34		1	pF

**Class A<sub>1</sub> Amplifier****CHARACTERISTICS**

	<b>Unit No.1</b>	<b>Unit No.2</b>	
Plate Voltage . . . . .	250	150	volts
Grid Voltage . . . . .	-3	-17.5	volts
Amplification Factor . . . . .	68	6	
Plate Resistance (Approx.) . . . . .	40000	925	ohms
Transconductance . . . . .	1600	6500	$\mu$ mhos
Plate Current . . . . .	1.4	35	mA
Plate Current for grid voltage of -24 volts . . . . .	—	10	mA
Grid Voltage (Approx.) for plate current of 10 $\mu$ A . . . . .	-5.5	—	volts
Grid Voltage (Approx.) for plate current of 50 $\mu$ A . . . . .	—	-44	volts

**Vertical-Deflection Oscillator and Amplifier**

For operation in a 525-line, 30-frame system

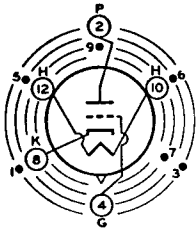
**MAXIMUM RATINGS (Design-Maximum Values)**

	<b>Unit No.1</b>	<b>Unit No.2</b>	
DC Plate Voltage . . . . .	330	275	volts
Peak Positive-Pulse Plate Voltage# . . . . .	—	1500	volts

Peak Negative-Pulse Grid Voltage .....	400	250	volts
Peak Cathode Current .....	70	175	mA
Average Cathode Current .....	20	50	mA
Plate Dissipation .....	1	7	watts

**MAXIMUM CIRCUIT VALUES**

Grid-Circuit Resistance:			
For grid-resistance-bias or cathode-bias operation	2.2	2.2	megohms
# Pulse duration must not exceed 15% of a vertical scanning cycle (2.5 milliseconds).			



INDEX=LARGE LUG  
●=PIN CUT OFF

**12AQ**

Heater Voltage (ac/dc) .....	
Heater Current .....	
Heater Warm-up Time (Average) .....	
Peak Heater-Cathode Voltage .....	

<b>2DS4</b>	<b>6DS4</b>	
2.1	6.3	volts
0.45	0.135	ampere
8	—	seconds
±100 max	±100 max	volts

**Direct Interelectrode Capacitances (Approx.)**

Grid to Plate .....	0.92	pF
Grid to Cathode, Heater, and Shell .....	4.3	pF
Plate to Cathode, Heater, and Shell .....	1.8	pF
Plate to Cathode .....	0.18	pF
Heater to Cathode .....	1.6	pF

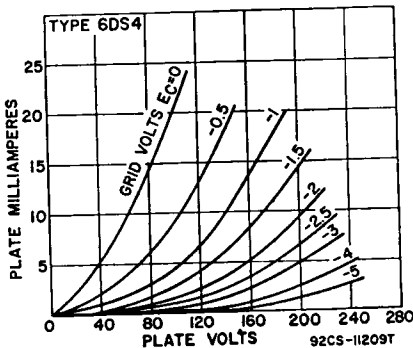
**Class A<sub>1</sub> Amplifier**

**MAXIMUM RATINGS (Design-Maximum Values)**

Plate Supply Voltage .....	300°	volts
Plate Voltage .....	135	volts
Grid Voltage, Negative-bias value .....	55	volts
Grid Voltage, Peak positive value .....	0	volts
Cathode Current .....	15	mA
Plate Dissipation .....	1.5	watt

**CHARACTERISTICS**

Plate Supply Voltage .....	110	volts
Grid Supply Voltage .....	0	volts
Cathode-Bias Resistor .....	130	ohms
Amplification Factor .....	63	
Plate Resistance (Approx.) .....	7000	ohms
Transconductance .....	9000	μmhos
Plate Current .....	6.5	mA
Grid Voltage (Approx.) for plate current of 100 μA .....	-5	volts
Grid Voltage (Approx.) for plate current of 10 μA .....	-6.8	volts



**6DS4**

2DS4

**HIGH-MU TRIODE**

Nuvistor type used as grounded-cathode, neutralized rf amplifier in vhf tuners of color and black-and-white television and FM receivers. Outlines section, 1; requires nuvistor socket. Type 2DS4 is identical with type 6DS4 except for heater ratings.

## TYPICAL OPERATION

Plate Voltage .....	70	volts
Grid Supply Voltage .....	0	volts
Grid Resistor .....	47000	ohms
Amplification Factor .....	68	
Plate Resistance (Approx.) .....	5440	ohms
Transconductance .....	12500	$\mu$ mhms
Plate Current .....	7	mA

## MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance:*		
For fixed-bias operation .....	0.5	megohm
For cathode-bias operation .....	2.2	megohm

\* A plate supply voltage of 300 volts may be used provided a sufficiently large resistor is used in the plate circuit to limit the plate dissipation to 1.5 watts under any condition of operation.

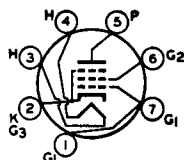
\* For operation at metal-shell temperatures up to 125°C.

## 6DS5

11DS5

## BEAM POWER TUBE

Miniature type used in the audio output stages of television and radio receivers. Outlines section, 5D; requires miniature 7-contact socket. Type 11DS5 is identical with type 6DS5 except for heater ratings.



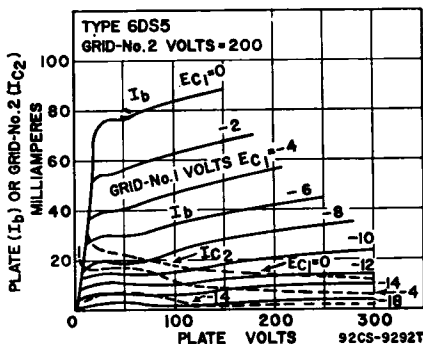
7BZ

	6DS5	11DS5	
Heater Voltage (ac/dc) .....	6.3	11.2	volts
Heater Current .....	0.8	0.45	ampere
Heater Warm-up Time .....	—	11	seconds
Peak Heater-Cathode Voltage .....	$\pm 200$ max	$\pm 200$ max	volts
Direct Interelectrode Capacitances (Approx.):			
Grid No.1 to Plate .....		0.19	pF
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3 .....		9.5	pF
Plate to Cathode, Heater, Grid No.2, and Grid No.3 .....		6.3	pF

Class A<sub>1</sub> Amplifier

## MAXIMUM RATINGS (Design-Maximum Values)

Plate Voltage .....	275	volts
Grid-No.2 (Screen-Grid) Voltage .....	275	volts
Grid-No.1 (Control-Grid) Voltage, Positive-bias value .....	0	volts
Plate Dissipation .....	9	watts
Grid-No.2 Input .....	2.2	watts
Bulb Temperature (At hottest point) .....	250	°C



## TYPICAL OPERATION AND CHARACTERISTICS

	Cathode-Bias Operation		Fixed-Bias Operation		
Plate Supply Voltage .....	200	250	200	250	volts
Grid-No.2 Supply Voltage .....	200	200	200	200	volts
Grid-No.1 Voltage .....	—	—	-7.5	-8.5	
Cathode-Bias Resistor .....	180	270	—	—	ohms

Peak AF Grid-No.1 Voltage	7.5	9.2	7.5	8.5	volts
Zero-Signal Plate Current	34.5	27	35	29	mA
Maximum-Signal Plate Current	32.5	25	36	32	mA
Zero-Signal Grid-No.2 Current	3.5	3	3	3	mA
Maximum-Signal Grid-No.2 Current	9	9	9	10	mA
Plate Resistance (Approx.)	28000	28000	28000	28000	ohms
Transconductance	6000	5800	6000	5800	μmhos
Load Resistance	6000	8000	6000	8000	ohms
Total Harmonic Distortion	10	10	9	10	per cent
Maximum-Signal Power Output	2.3	3.6	3	3.8	watts

**MAXIMUM CIRCUIT VALUES**

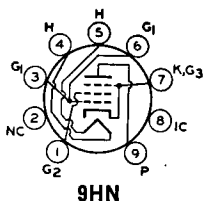
Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1	megohm
For cathode-bias operation	1	megohm

Refer to chart at end of section.  
For replacement use type 6CE3/6CD3/6DT3.

**6DT3**

**6DT5**

12DT5



**BEAM POWER TUBE**

Miniature type used as a vertical-deflection-amplifier tube in television receivers employing 110-degree picture-tube systems. Outlines section, 6E; requires miniature 9-contact socket. Type 12DT5 is identical with type 6DT5 except for heater ratings.

	<b>6DT5</b>	<b>12DT5</b>	
Heater Voltage (ac/dc)	6.3	12.6	volts
Heater Current	1.2	0.6	amperes
Heater Warm-up Time (Average)	—	11	seconds
Heater-Cathode Voltage:			
Peak value	±200 max	±200 max	volts
Average value	100 max	100 max	volts

**Class A<sub>1</sub> Amplifier**

**CHARACTERISTICS**

Plate Voltage	60	80	250	volts
Grid-No. 2 Voltage	150	250	250	volts
Grid-No.1 Voltage	0	0	-16.5	volts
Transconductance	—	—	6200	μmhos
Plate Current	95*	195*	44	mA
Grid-No.2 Current	8.5*	19*	1.5	mA
Grid-No.1 Voltage (Approx.) for plate current of 100 mA	—	—	-35	volts

\* These values can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

**Vertical-Deflection Amplifier**

For operation in a 525-line, 30-frame system

**MAXIMUM RATINGS (Design-Maximum Values)**

DC Plate Voltage	315	volts
Peak Positive-Pulse Plate Voltage#	2200	volts
Grid-No.2 (Screen-Grid) Voltage	285	volts
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	250	volts
Peak Cathode Current	190	mA
Average Cathode Current	55	mA
Plate Dissipation	9	watts
Grid-No.2 Input	2	watts

**MAXIMUM CIRCUIT VALUES**

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.5	megohm
For cathode-bias operation	1	megohm

# Pulse duration must not exceed 15% of a vertical scanning cycle (2.5 milliseconds).

Refer to chart at end of section.

**6DT6**