

Refer to chart at end of section.

6BK5

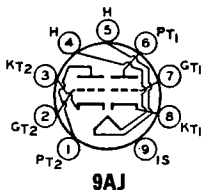
Refer to chart at end of section.

6BK7A

6BK7B

5BK7A

MEDIUM-MU TWIN TRIODE



Miniature type used as a cascode amplifier in vhf color and black-and-white television tuners and in push-pull cathode-drive rf amplifiers. Outlines section, 6B; requires miniature 9-contact socket. For typical operation as a resistance-coupled amplifier, refer to **Resistance-Coupled Amplifier** section. Type 5BK7A is identical with type 6BK7B except for heater ratings.

	5BK7A	6BK7B	
Heater Voltage (ac/dc)	4.7	6.3	volts
Heater Current	0.6	0.45	ampere
Heater Warm-up Time (Average)	11	11	seconds
Heater-Cathode Voltage:			
Peak value	±200*max	±200*max	volts
Average value	100 max	100 max	volts
Direct Interelectrode Capacitances:			
	Unit No.1	Unit No.2	
Grid to Plate	1.8	1.8	pF
Grid to Cathode, Heater, and Internal Shield	3	3	pF
Plate to Cathode, Heater, and Internal Shield	1	0.9	pF
Cathode to Grid, Heater, and Internal Shield	6	6	pF
Plate to Grid, Heater, and Internal Shield	2.4	2.4	pF
Plate to Cathode	0.22	0.22	pF
Heater to Cathode	2.8	3	pF
Grid of Unit No.1 to Grid of Unit No.2		0.004 max	pF
Plate of Unit No.1 to Plate of Unit No.2		0.075 max	pF

* Rating may be as high as 300 volts under cutoff conditions when tube is used as a cascode amplifier, the units are connected in series, and heater is negative with respect to cathode.

Class A₁ Amplifier (Each Unit)

MAXIMUM RATINGS (Design-Center Value)

Plate Voltage	300	volts
Grid Voltage, Negative-bias value	50	volts
Plate Dissipation	2.7	watts

CHARACTERISTICS

Plate Supply Voltage	150	volts
Cathode-Bias Resistor	56	ohms
Amplification Factor	43	
Plate Resistance (Approx.)	4600	ohms
Transconductance	9300	μmhos
Plate Current	18	mA
Grid Voltage (Approx.) for plate current of 10 μA	-11	volts

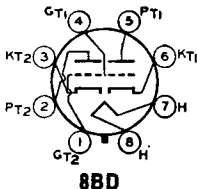
Refer to chart at end of section.

6BL4

Refer to chart at end of section.

6BL7GT

MEDIUM-MU TWIN TRIODE 6BL7GTA



Glass octal type used as combined vertical-deflection amplifier and vertical-deflection oscillator in color and black-and-white television receivers. When so operated, it is recommended that unit No.1 (pins 4, 5, and 6) be used as the oscillator. Outlines section, 13D; requires octal socket.

Heater Voltage (ac/dc)	6.3	volts
Heater Current	1.5	amperes
Heater-Cathode Voltage:		
Peak value	±200 max	volts
Average value	100 max	volts

Direct Interelectrode Capacitances (Approx.):	Unit No. 1	Unit No. 2	
Grid to Plate	6	6	pF
Grid to Cathode and Heater	4.2	4.6	pF
Plate to Cathode and Heater	0.9	0.9	pF

Class A₁ Amplifier

CHARACTERISTICS (Each Unit)

Plate Voltage	150	250	250	volts
Grid Voltage	0	-17	-9	volts
Amplification Factor	—	—	15	
Plate Resistance (Approx.)	—	—	2150	ohms
Transconductance	—	—	7000	μmhos
Plate Current	65*	4	40	mA
Grid Voltage (Approx.) for plate current of 50 μA	—	—	-23	volts

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

Vertical-Deflection Oscillator or Amplifier*

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

MAXIMUM RATINGS (Design-Center Values)

	Oscillator	Amplifier	
DC Plate Voltage	500	500	volts
Peak Positive-Pulse Plate Voltage# (Absolute Maximum)	—	2000Δ	volts
Peak Negative-Pulse Grid Voltage	400	250	volts
Peak Cathode Current	210	210	mA
Average Cathode Current	60	60	mA
Plate Dissipation:			
For either plate	10	10	watts
For both plates with both units operating	12	12	watts

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance	4.7	4.7†	megohms
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* Unless otherwise specified, values are for each unit.

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

Δ Under no circumstances should this absolute value be exceeded.

† For cathode-bias operation.

6BL8

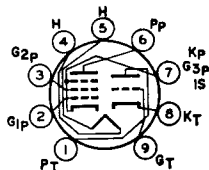
Refer to chart at end of section.

6BL8/ ECF80

4BL8/XCF80

MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

Miniature type used in frequency-changer service in color and black-and-white television receivers. Outlines section, 6B; require miniature 9-contact socket. Type 4BL8/XCF80 is identical with type 6BL8/ECF80 except for heater ratings.



9DC

	4BL8/ XCF80	6BL8/ ECF80	
Heater Voltage (ac/dc)	4.6	6.3	volts
Heater Current	0.6	0.45	ampere
Peak Heater-Cathode Voltage	±100 max	±100 max	volts

Class A₁ Amplifier

MAXIMUM RATINGS (Design-Center Values)

	Triode Unit	Pentode Unit	
Plate Supply Voltage	550	550	volts
Plate Voltage	250	250	volts
Grid-No.2 (Screen-Grid) Supply Voltage	—	550	volts
Grid-No.2 Voltage:			
With cathode current of 14 mA	—	175	volts
With cathode current less than 10 mA	—	200	volts
Cathode Current	14	14	mA
Plate Dissipation	1.5	1.7	watts
Grid-No.2 Input:			
With plate dissipation greater than 1.2 watts ..	—	0.5	watt
With plate dissipation less than 1.2 watts	—	0.75	watt

CHARACTERISTICS

Plate Voltage	100	170	volts
Grid-No.2 Voltage	—	170	volts
Grid-No.1 Voltage	-2	-2	volts
Amplification Factor	20	—	
Mu-Factor, Grid No.2 to Grid No.1	—	47	
Plate Resistance (Approx.)	—	0.4	megohm
Transconductance	5000	6200	μmhos
Plate Current	14	10	mA
Grid-No.2 Current	—	2.8	mA
Input Resistance at frequency of 50 MHz	—	0.01	megohm
Equivalent Noise Resistance	—	1500	ohms

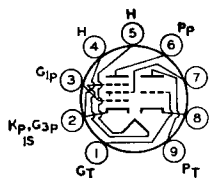
MAXIMUM CIRCUIT VALUES

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

**6BM8/
ECL82**

50BM8/UCL82

**HIGH-MU TRIODE—
POWER PENTODE**



9EX

Miniature type used in color and black-and-white television receiver applications. The pentode unit is used as an audio output tube, and the triode unit as an oscillator and af voltage amplifier. Outlines section, 6G; requires miniature 9-contact socket. Type 50BM8/UCL82 is identical with type 6BM8/ECL82 except for heater ratings.

	6BM8/ ECL82	50BM8/ UCL82	
Heater Voltage	6.3	50	volts
Heater Current	0.78	0.1	ampere
Peak Heater Cathode Voltage	100 max	±200 max	volts

Class A₁ Amplifier

MAXIMUM RATINGS (Design-Center Values)

	Triode Unit	Pentode Unit	
Plate Supply Voltage	550	900	volts
Plate Voltage	300	600	volts
Grid-No.2 Supply Voltage	—	550	volts
Grid-No.2 Voltage	—	300	volts
Cathode Current	15	50	mA
Plate Dissipation	1	7	watts
Grid-No.2 Input	—	1.8	watts

CHARACTERISTICS

Plate Voltage	100	200	volts
Grid-No.2 Voltage	—	200	volts
Grid-No.1 Voltage	0	-16	volts
Amplification Factor	70	9.5*	
Plate Resistance (Approx.)	—	0.02	megohm
Transconductance	2500	6400	μmhos
Plate Current	3.5	35	mA
Grid-No.2 Current	—	7	mA

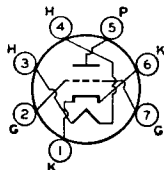
MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	1	1	megohm
For cathode-bias operation	2	2	megohms

* Grid No.2 to Grid No.1

Refer to chart at end of section.

6BN4



7EG

MEDIUM-MU TRIODE

6BN4A

2BN4A, 3BN4A

Miniature type used as rf amplifier tube in grid-drive circuits of vhf color and black-and-white television tuners. Outlines section, 5C; requires miniature 7-contact socket. Types 2BN4A and 3BN4A are identical with type 6BN4A except for heater ratings.

	2BN4A	3BN4A	6BN4A	
Heat Voltage (ac/dc)	2.35	3	6.3	volts
Heater Current	0.6	0.45	0.2	ampere
Heater Warm-up Time (Average)	11	11	—	seconds
Peak Heater-Cathode Voltage	±100 max	±100 max	±100 max	volts
Direct Interelectrode Capacitances (Approx.):*				
Grid to Plate			1.2	pF
Grid to Cathode and Heater			3.2	pF
Plate to Cathode and Heater			1.4	pF

* With external shield connected to cathode.

Class A₁ Amplifier

MAXIMUM RATINGS (Design-Center Values)

Plate Voltage	275	volts
Grid Voltage, Positive-bias value	0	volts
Cathode Current	22	mA
Plate Dissipation	2.2	watts

CHARACTERISTICS

Plate-Supply Voltage	150	volts
Cathode-Bias Resistor	220	ohms
Amplification Factor	43	
Plate Resistance (Approx.)	5400	ohms
Transconductance	7700	μmhos
Plate Current	9	mA
Grid Voltage (Approx.) for plate current of 100 μA	-6	volts

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance	0.5	megohm
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6BN6

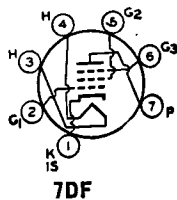
Refer to chart at end of section.

6BN6/6KS6

3BN6, 4BN6

BEAM TUBE

Miniature type used as combined limiter, discriminator, and audio-voltage amplifier in intercarrier television and FM receivers. Outlines section, 5D; requires miniature 7-contact socket. Types 3BN6 and 4BN6 are identical with type 6BN6/6KS6 except for heater ratings.



7DF

	3BN6	4BN6	6BN6/6KS6	12BN6	
Heater Voltage (ac/dc)	3.15	4.2	6.3	12.6	volts
Heater Current	0.6	0.45	0.3	0.15	ampere
Heater Warm-up Time (Average)	11	11	—	—	seconds
Heater-Cathode Voltage:					
Peak value	±200 max	±200 max	±200 max	±200 max	volts
Average value	100 max	100 max	100 max	100 max	volts
Direct Interelectrode Capacitances:					
Grid No.1 to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield				4.2	pF
Grid No.3 to Cathode, Heater, Grid No.1, Grid No.2, and Internal Shield				3.3	pF
Grid No.1 to Grid No.3				0.004 max	pF

Limiter and Discriminator Service

MAXIMUM RATINGS (Design-Maximum Values)

Plate-Supply Voltage	330	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage, Positive peak value	60	volts
Cathode Current	13	mA