

RATINGS (Design Center Rating System)

Vertical Deflection Amplifier⁽¹⁾

Plate Voltage (Max.)	315 Volts
Peak Positive Pulse Plate Voltage (Abs. Max.)	2200 Volts
Grid No. 2 Voltage (Max.)	285 Volts
Peak Negative Pulse Grid Voltage (Max.)	250 Volts
Plate Dissipation (Max.) ⁽²⁾	10.0 Watts
Grid No. 2 Input (Max.) ⁽²⁾	1.5 Watts
Average Cathode Current (Max.)	60 Ma
Peak Cathode Current (Max.)	210 Ma
Bulb Temperature (Max.)	250 °C
Grid Circuit Resistance	
Fixed Bias (Max.)	2.2 Megohms
Cathode Bias (Max.)	2.2 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	250 Volts
Grid No. 2 Voltage	250 Volts
Grid No. 1 Voltage	-18.0 Volts
Plate Current	40 Ma
Grid No. 2 Current	3.0 Ma
Transconductance	5100 μ mhos
Amplification Factor ⁽³⁾	8.7
Ec1 Voltage for Ib = 0.2 Ma (Approx.)	-37 Volts

INSTANTANEOUS PLATE KNEE VALUES

Eb = 60 V; Ec2 = 250 V; Ec1 = 0 V;
Ib = 180 Ma and Ic2 = 30 Ma

NOTES:

- (1) 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 horizontal scanning cycle.
- (2) In stages operating with grid-leak bias, an adequate bias resistor or other suitable means is required to protect the tube in the absence of excitation.
- (3) Amplification factor measured from Grid No. 1 to Grid No. 2.

Color Television Type

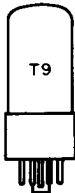
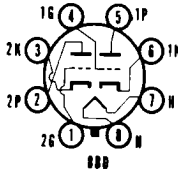
**VERTICAL DEFLECTION
OSCILLATOR and AMPLIFIER**

6EM7

10EM7, 13EM7

Dissimilar Double Triode

Construction	Octal T-9
Base	Octal 8 Pin, B8-58
Basing	.8BD
Outline	9-37
Maximum Diameter	1.188 In.
Maximum Seated Height	2.313 In.
Maximum Overall Height	2.875 In.



ELECTRICAL DATA

HEATER OPERATION

	13EM7	10EM7	6EM7
Heater Voltage	13	9.7	6.3 Volts
Heater Current	450	600	925 Ma
Heater Warm-up Time	11	11	— Seconds
Maximum Heater-Cathode Voltage			
Heater Negative with Respect to Cathode			
Total DC and Peak			200 Volts
Heater Positive with Respect to Cathode			
DC			100 Volts
Total DC and Peak			200 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)

	Section No. 1	Section No. 2
Grid to Plate	4.8	10 Pf
Input: g to (h + k)	2.2	7.0 Pf
Output: p to (h + k)	0.6	1.8 Pf

RATINGS (Design Maximum Rating System)

Vertical Deflection Oscillator and Amplifier⁽¹⁾

	Section No. 1 Oscillator	Section No. 2 Amplifier
DC Plate Voltage (Max.)	330	330 Volts
Peak Positive Pulse Plate Voltage (Abs. Max.)	—	1500 Volts
Peak Negative Pulse Grid Voltage (Max.)	400	250 Volts

Plate Dissipation (Max.) ⁽²⁾	1.5	10 Watts
Average Cathode Current (Max.)	22	50 Ma
Peak Cathode Current (Max.)	77	175 Ma
Grid Circuit Resistance (Self Bias)	2.2	2.2 Megohms

CHARACTERISTICS AND TYPICAL OPERATION

	Section No. 1 ⁽³⁾	Section No. 2
Plate Voltage	250	150 Volts
Grid No. 1 Voltage	-3	-20 Volts
Plate Current	1.4	50 Ma
Transconductance	1600	7200 μ mhos
Amplification Factor	68	5.4
Plate Resistance (Approx.)	40,000	750 Ohms
Ec for Ib = 10 μ a (Approx.)	-5.5	— Volts
Ec for Ib = 100 μ a (Approx.)	—	-45 Volts
Ib at Ec = -28 Vdc (Approx.)	—	10 Ma

INSTANTANEOUS PLATE KNEE VALUES (Section No. 2)

Eb = 60 V; Ec = 0

Ib = 95 Ma

NOTES:

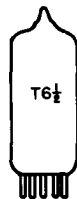
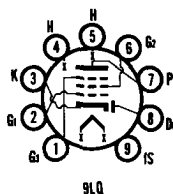
- (1) For operation in a 525 line, 30 frame system as described in "Standards of Good Engineering Practice for Television Broadcast Stations; Federal Communications Commission," the duty cycle of the voltage pulse must not exceed 15% of one horizontal scanning cycle.
- (2) In stages operating with grid-leak bias, an adequate bias resistor or other suitable means is required to protect the tube in the absence of excitation.
- (3) Section No. 1 connects to pins 4, 5, and 6.

6EQ7

12EQ7, 20EQ7

**DETECTOR (D)
IF AMPLIFIER (P)****Diode and Sharp Cutoff Pentode**

Construction Miniature T-6 $\frac{1}{2}$
 Base Button 9 Pin, E9-1
 Basing 9LQ
 Outline 6-3
 Maximum Diameter 0.875 In.
 Maximum Seated Height 2.375 In.
 Maximum Overall Height 2.625 In.

**ELECTRICAL DATA****HEATER OPERATION**

	20EQ7	12EQ7	6EQ7
Heater Voltage	20	12.6	6.3 Volts
Heater Current	100	150	300 Ma
Maximum Heater-Cathode Voltage			
Heater Negative with Respect to Cathode			
Total DC and Peak			200 Volts
Heater Positive with Respect to Cathode			
DC			100 Volts
Total DC and Peak			200 Volts

DIRECT INTERELECTRODE CAPACITANCES (Unshielded)**Pentode Section**

Grid No. 1 to Plate (Max.)	0.002 Pf
Input: g1 to (h + Pk, g3, IS + g2)	5.5 Pf
Output: p to (h + Pk, g3, IS + g2)	5.0 Pf

Coupling

Pentode Grid No. 1 to Diode Plate (Max.)	0.0015 Pf
Pentode Plate to Diode Plate (Max.)	0.095 Pf

RATINGS (Design Maximum Rating System)

Plate Voltage (Max.)	300 Volts
Grid No. 3 Voltage (Positive or Negative) (Max.)	300 Volts
Grid No. 2 Supply Voltage (Max.)	300 Volts
Grid No. 2 Voltage	See Rating Chart (Gen. Info. Sec.)
Positive Grid No. 1 Voltage (Max.)	0 Volt
Negative Grid No. 1 Voltage (Max.)	50 Volts
Plate Dissipation (Max.)	3.0 Watts
Grid No. 3 Input (Max.)	0.2 Watt
Grid No. 2 Input (Max.)	0.6 Watt
Diode Plate Current (Max.)	3.0 Ma