



# 6GF7, 10GF7, 13GF7

## DUAL TRIODES With Dissimilar Units

Novar Types

RCA-6GF7, 10GF7 and 13GF7 are multiunit tubes of the novar type containing a high- $\mu$  triode and a high-perveance low- $\mu$  triode in one envelope. They are intended especially for use in combined vertical-deflection-amplifier and vertical-deflection-oscillator applications in television receivers using picture tubes having deflection angles up to 110 degrees and operating at high ultor voltages.

Unit No.2, the low- $\mu$  unit, is designed for use in vertical-deflection-amplifier applications. This unit has a high value of plate current at low plate voltage under zero-bias conditions. This feature enables the designer to utilize for scanning purposes a relatively large proportion of the total input power to the deflection-amplifier circuit. In addition, unit No.2 has a maximum-plate-dissipation rating of 11 watts, which permits the tube to be used in circuits requiring large amounts of vertical-deflection power.

Unit No.1, the high- $\mu$  unit, is designed for use in vertical-deflection-oscillator applications.

The 6GF7, 10GF7, 13GF7 utilize a T9 bulb and a small-button novar 9-pin base. Novar construction assures an exceptionally strong mount support, firm retention of the tube in the socket, and relatively cool operation.

Also featured in the design of these tubes is the RCA "Dark Heater", which functions efficiently at operating temperatures 350° K below those of the heaters in conventional tube types. This feature insures long and dependable performance. In addition, the heaters of the 10GF7 and 13GF7 have a controlled warm-up time to insure dependable performance in television receivers using series-heater string arrangements.

### GENERAL DATA

#### Electrical:

	6GF7	10GF7	13GF7	
Heater, for Unipotential Cathodes:				
Voltage (AC or DC)	6.3 ± 10%	9.7	13	volts
Current	0.985	0.6 ± 6%	0.45 ± 6%	amp
Warm-up Time (Average)	-	11	11	sec

#### Direct Interelectrode Capacitances (Approx. without external shield):

	Unit No.1	Unit No.2	
Grid to Plate	4.6	9.0	pf
Grid to Cathode and Heater	2.4	6.5	pf
Plate to Cathode and Heater	0.26	1.4	pf

#### Characteristics Class A<sub>1</sub> Amplifier:

	Unit No.1	Unit No.2	
Plate Voltage	250	150	volts
Grid Voltage	-3	-20	volts
Amplification Factor	64	5.4	
Plate Resistance (Approx.)	40000	750	ohms
Transconductance	1600	7200	$\mu$ mhos
Plate Current	1.4	50	ma
Plate Current for plate volts = 60 and grid volts = 0	-	95	ma
Plate Current for grid volts = -28	-	10	ma
Grid Voltage (Approx.) for plate $\mu$ a = 10	-5.5	-	volts
Grid Voltage (Approx.) for plate $\mu$ a = 100	-	-45	volts

#### Mechanical:

Operating Position	Any
Maximum Overall Length	3.00"
Maximum Seated Length	2.62"
Length, Base Seat to Bulb Top (Excluding Tip)	2.10" to 2.28"
Diameter	1.062" to 1.188"
Bulb	T9
Base	Small-Button Novar 9-Pin (JEDEC No. E9-75)

### VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

#### Maximum Ratings, Design-Maximum Values:

For operation in a 525-line, 30-frame system<sup>a</sup>

DC PLATE VOLTAGE	330 max.	volts
PEAK NEGATIVE PULSE-GRID VOLTAGE	400 max.	volts
CATHODE CURRENT:		
Peak	77 max.	ma
Average	22 max.	ma
PLATE DISSIPATION	1.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 <sup>b</sup> max.	volts

#### Maximum Circuit Values:

Grid-Circuit Resistance:	
For grid-resistor-bias or cathode-bias operation	2.2 max. megohms



## VERTICAL-DEFLECTION AMPLIFIER

*Values are for Unit No. 2*

### Maximum Ratings, Design-Maximum Values:

*For operation in a 525-line, 30-frame system<sup>a</sup>*

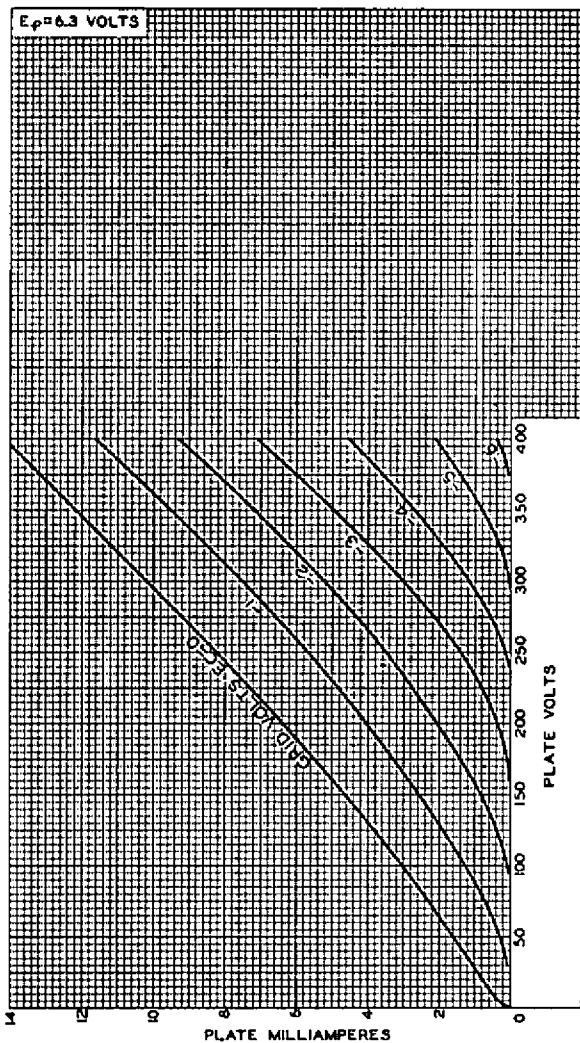
DC PLATE VOLTAGE . . . . .	330 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE <sup>c</sup> . . . . .	1500 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE . . . . .	250 max.	volts
CATHODE CURRENT:		
Peak . . . . .	175 max.	ma
Average . . . . .	50 max.	ma
PLATE DISSIPATION . . . . .	11 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . . . . .	200 max.	volts

Heater positive with respect to cathode . . . . . 200<sup>b</sup> max. volts

### Maximum Circuit Values:

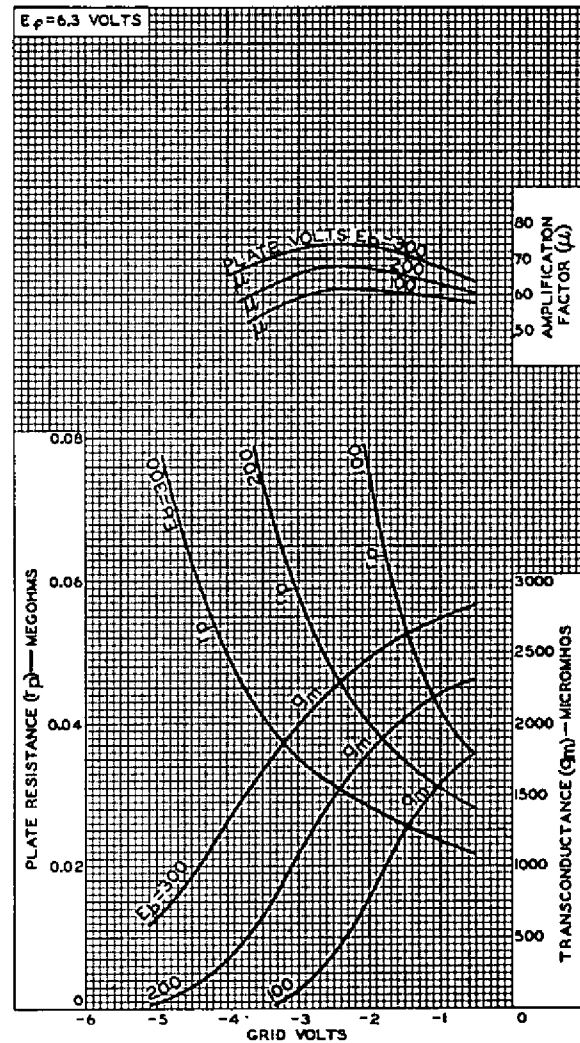
Grid-Circuit Resistance:  
 For grid-resistor-bias operation . . . . . 2.2 max. megohms  
 For cathode-bias operation . . . . . 2.2 max. megohms

- <sup>a</sup> As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations" Federal Communications Commission.
- <sup>b</sup> The dc component must not exceed 100 volts.
- <sup>c</sup> Absolute value. This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.



92CM-9912

Fig. 1 - Average Plate Characteristics for Unit No. 1 of Type 6GF7, and for Unit No. 1 of Types 10GF7 and 13GF7 Except for Heater Voltage.



92CM-9915R1

Fig. 2 - Average Characteristics for Unit No. 1 of Type 6GF7, and for Unit No. 1 of Types 10GF7 and 13GF7 Except for Heater Voltage.

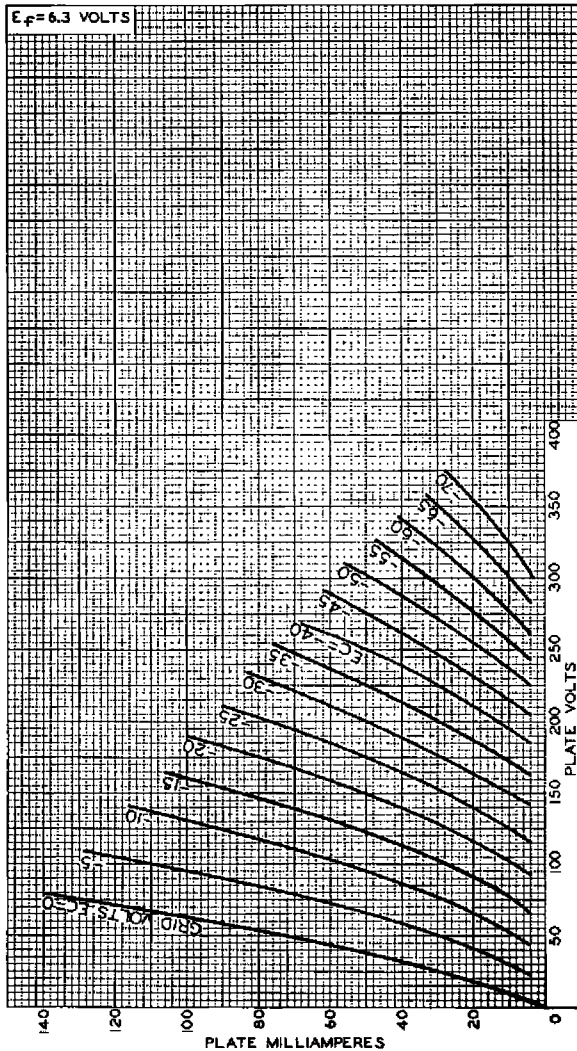


### OPERATING CONSIDERATIONS

The maximum ratings in the tabulated data, except the rating for peak positive-pulse plate voltage, are established in accordance with the following definition of the *Design-Maximum Rating System* for rating electron tubes.

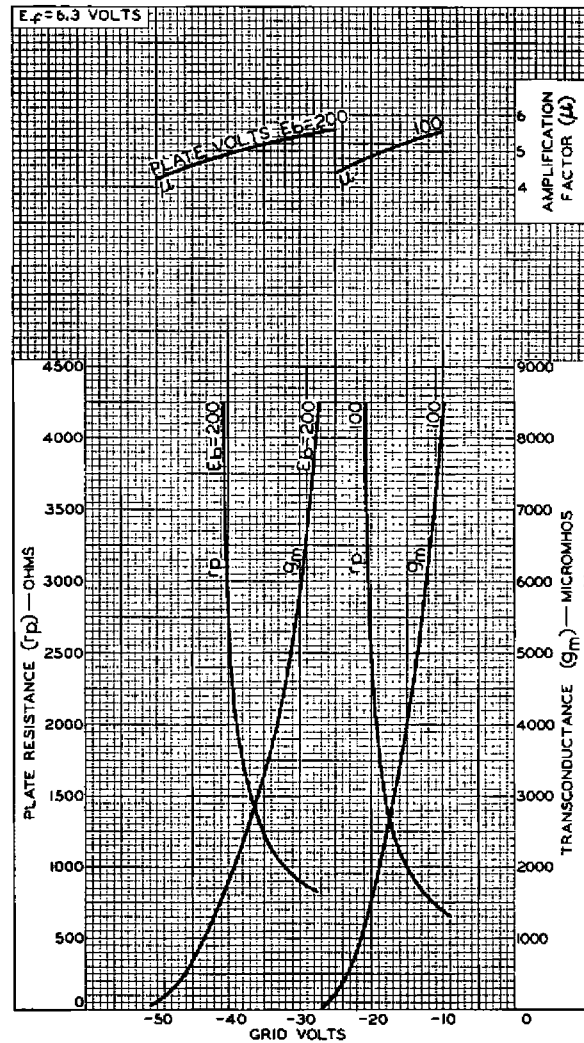
changes in operating conditions due to variations in device characteristics.

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



92CM-10466

Fig. 3 - Average Plate Characteristics for Unit No. 2 of Type 6GF7, and for Unit No. 2 of Types 10GF7 and 13GF7 Except for Heater Voltage.



92CM-10467

Fig. 4 - Average Characteristics for Unit No. 2 of Type 6GF7, and for Unit No. 2 of Types 10GF7 and 13GF7 Except for Heater Voltage.

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.

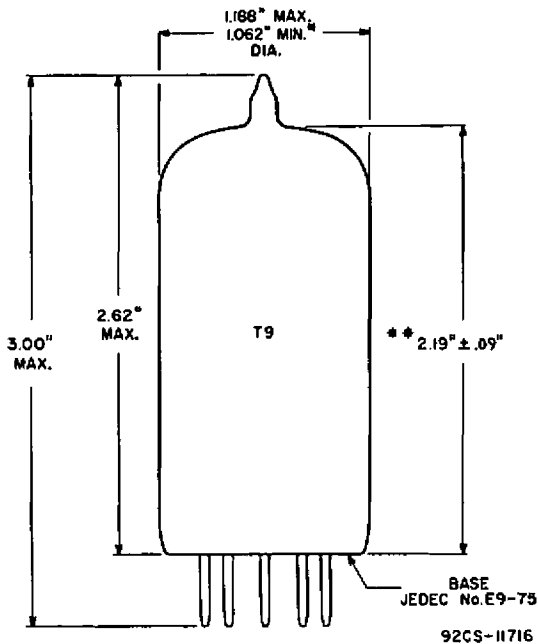
operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, and environmental conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking responsibility for the effects of

The bulb becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided around the 6GF7, 10GF7, and 13GF7.



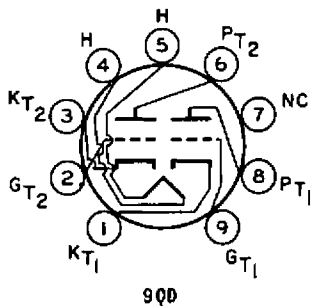
### DIMENSIONAL OUTLINE



\* APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.  
 \*\* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" I.D.

### BASING DIAGRAM Bottom View

- PIN 1 - CATHODE OF TRIODE UNIT NO.1
- PIN 2 - GRID OF TRIODE UNIT NO.2
- PIN 3 - CATHODE OF TRIODE UNIT NO.2
- PIN 4 - HEATER
- PIN 5 - HEATER



- PIN 6 - PLATE OF TRIODE UNIT NO.2
- PIN 7 - NO CONNECTION
- PIN 8 - PLATE OF TRIODE UNIT NO.1
- PIN 9 - GRID OF TRIODE UNIT NO.1

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