



# 5KE8, 6KE8

## MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODES

9-Pin Miniature Types  
For Combined Oscillator-Mixer Applications in TV Receivers

RCA Dark Heater  
High Pentode Transconductance (12000  $\mu$ mhos)

Frame-Grid Pentode  
High Mixer Gain

RCA-5KE8 and 6KE8 are multiunit tubes of the 9-pin miniature type each containing a medium-mu triode and a sharp-cutoff pentode in one envelope. The 5KE8 and 6KE8 are designed primarily for use as combined oscillator-mixer (converter) tubes in television receivers utilizing an intermediate frequency in the order of 40 Mc.

The pentode units of these tubes feature frame-grid construction, high transconductance (12,000 micromhos), and an excellent "knee" characteristic which contributes to high mixer gain.

Each unit of the 5KE8 and 6KE8 has its own cathode to permit flexibility of circuit design. An internal shield is provided to reduce interaction between the units.

The 6KE8 has a 6.3-volt/0.400-ampere heater. The 5KE8 is identical to the 6KE8 except that the 5KE8 has a 0.450-ampere/5.6-volt heater having a controlled 11-second warm-up time.

In addition, the 5KE8 and 6KE8 utilize the RCA Dark Heater which assures long and dependable performance.

### GENERAL DATA

#### Electrical:

##### Heater Characteristics and Ratings:

|                                                   | 5KE8                 | 6KE8               |       |
|---------------------------------------------------|----------------------|--------------------|-------|
| Voltage (AC or DC) . . . . .                      | 5.6 <sup>a</sup>     | 6.3 $\pm$ 0.6      | volts |
| Current . . . . .                                 | 0.450 $\pm$ 0.030    | 0.400 <sup>b</sup> | amp   |
| Warm-up time (Average) . . . . .                  | 11                   | —                  | sec   |
| Peak heater-cathode voltage (Each unit):          |                      |                    |       |
| Heater negative with respect to cathode . . . . . | 200 max              |                    | volts |
| Heater positive with respect to cathode . . . . . | 200 <sup>c</sup> max |                    | volts |

##### Direct Interelectrode Capacitances:<sup>d</sup>

| Triode Unit:                                                                                  |     |  |    |
|-----------------------------------------------------------------------------------------------|-----|--|----|
| Grid to plate . . . . .                                                                       | 1.3 |  | pf |
| Grid to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater . . . . .  | 2.4 |  | pf |
| Plate to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater . . . . . | 2.0 |  | pf |

##### Pentode Unit:

|                                                                                     |                  |  |    |
|-------------------------------------------------------------------------------------|------------------|--|----|
| Grid No.1 to plate . . . . .                                                        | 0.015 max        |  | pf |
| Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater . . . . . | 5.0              |  | pf |
| Plate to cathode & grid No.3 & internal shield, grid No.2, and heater . . . . .     | 3.4              |  | pf |
| Heater to triode cathode and pentode cathode . . . . .                              | 5.5 <sup>e</sup> |  | pf |

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

|                                                 | Triode Unit | Pentode Unit |            |
|-------------------------------------------------|-------------|--------------|------------|
| Plate Supply Voltage . . . . .                  | 125         | 125          | volts      |
| Grid-No.2 Supply Voltage . . . . .              | —           | 125          | volts      |
| Grid-No.1 Supply Voltage . . . . .              | 0           | 0            | volts      |
| Cathode Resistor . . . . .                      | 68          | 33           | ohms       |
| Amplification Factor . . . . .                  | 40          | —            |            |
| Plate Resistance (Approx.) . . . . .            | 5000        | 125000       | ohms       |
| Transconductance . . . . .                      | 8000        | 12000        | $\mu$ mhos |
| Plate Current . . . . .                         | 13          | 10           | ma         |
| Grid-No.2 Current . . . . .                     | —           | 2.8          | ma         |
| Grid-No.1 Voltage (Approx.) for plate $\mu$ a = |             |              |            |
| 100 . . . . .                                   | —5          | —            | volts      |
| 50 . . . . .                                    | —           | —3           | volts      |

#### Mechanical:

|                                                         |                                          |
|---------------------------------------------------------|------------------------------------------|
| Operating Position . . . . .                            | Any                                      |
| Maximum Overall Length . . . . .                        | 2-3/16"                                  |
| Maximum Seated Length . . . . .                         | 1-15/16"                                 |
| Length, Base Seat to Bulb Top (Excluding tip) . . . . . | 1-9/16" $\pm$ 3/32"                      |
| Diameter . . . . .                                      | 0.750" to 0.875"                         |
| Dimensional Outline . . . . .                           | JEDEC No.6-2                             |
| Bulb . . . . .                                          | T6-1/2                                   |
| Base . . . . .                                          | Small-Button Noval 9-Pin (JEDEC No.E9-1) |

#### AMPLIFIER — Class A<sub>1</sub>

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

|                                    | Triode Unit | Pentode Unit |       |
|------------------------------------|-------------|--------------|-------|
| PLATE VOLTAGE . . . . .            | 280 max     | 280 max      | volts |
| GRID-No.2 SUPPLY VOLTAGE . . . . . | —           | 280 max      | volts |
| GRID-No.2 VOLTAGE . . . . .        | —           | See Fig.1    |       |
| GRID-No.1 VOLTAGE:                 |             |              |       |
| Positive-bias value . . . . .      | 0 max       | 0 max        | volts |



|                                                               |        |           |       |
|---------------------------------------------------------------|--------|-----------|-------|
| CATHODE CURRENT . . . . .                                     | 20 max | 20 max    | ma    |
| GRID-No.2 INPUT:                                              |        |           |       |
| For grid-No.2 voltages<br>up to 140 volts . . . . .           | -      | 0.5 max   | watt  |
| For grid-No.2 voltages<br>between 140 and 280 volts . . . . . | -      | See Fig.1 |       |
| PLATE DISSIPATION . . . . .                                   | 2 max  | 2 max     | watts |

#### Maximum Circuit Values:

|                                     | Triode<br>Unit | Pentode<br>Unit |        |
|-------------------------------------|----------------|-----------------|--------|
| Grid-No.1-Circuit Resistance:       |                |                 |        |
| For fixed-bias operation. . . . .   | 0.5 max        | 0.25 max        | megohm |
| For cathode-bias operation. . . . . | 1 max          | 0.5 max         | megohm |

- a At heater amperes = 0.450.
- b At heater volts = 6.3.
- c The dc component must not exceed 100 volts.
- d With external shield JEDEC No.315 connected to cathode of unit under test except as noted.
- e With external shield JEDEC No.315 connected to ground.

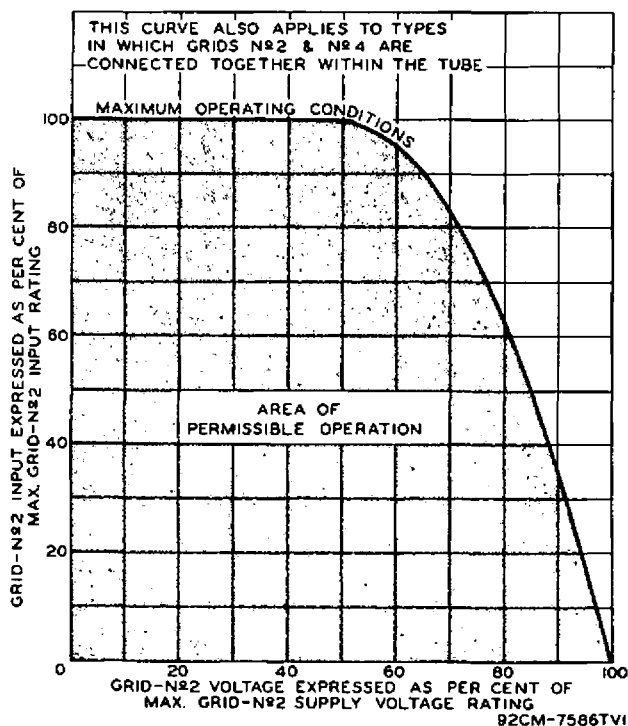


Fig. 1—Grid-No.2-Input Rating Chart for the Pentode Unit of Types 5KE8 and 6KE8.

#### OPERATING CONSIDERATIONS

When the 5KE8 is used in television receivers employing series heater strings, a resistor in series with the string of heaters will minimize voltage surges across any individual heater during starting. The resistor should preferably have a negative temperature characteristic.

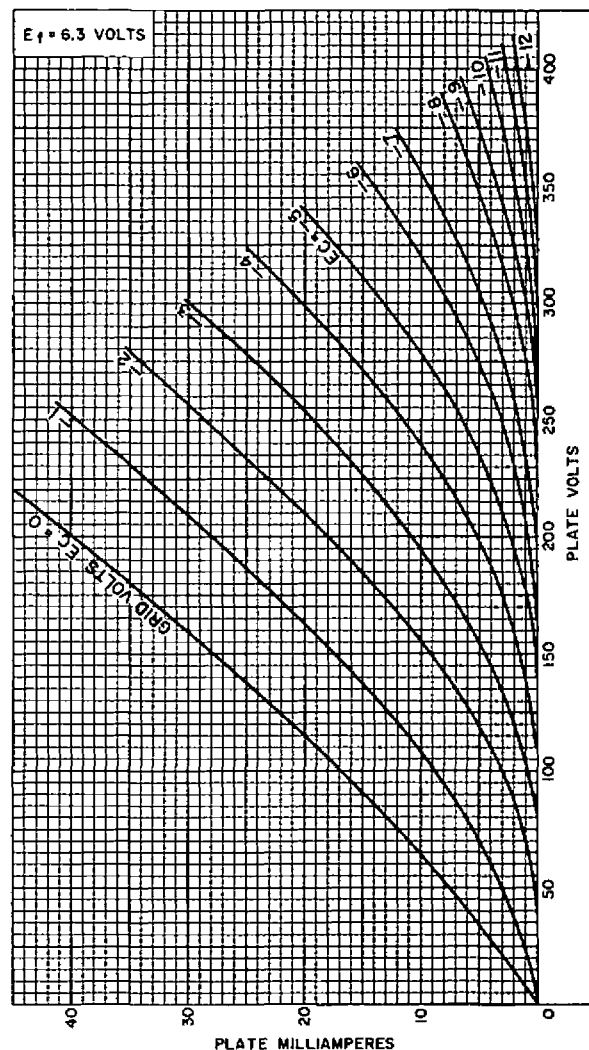
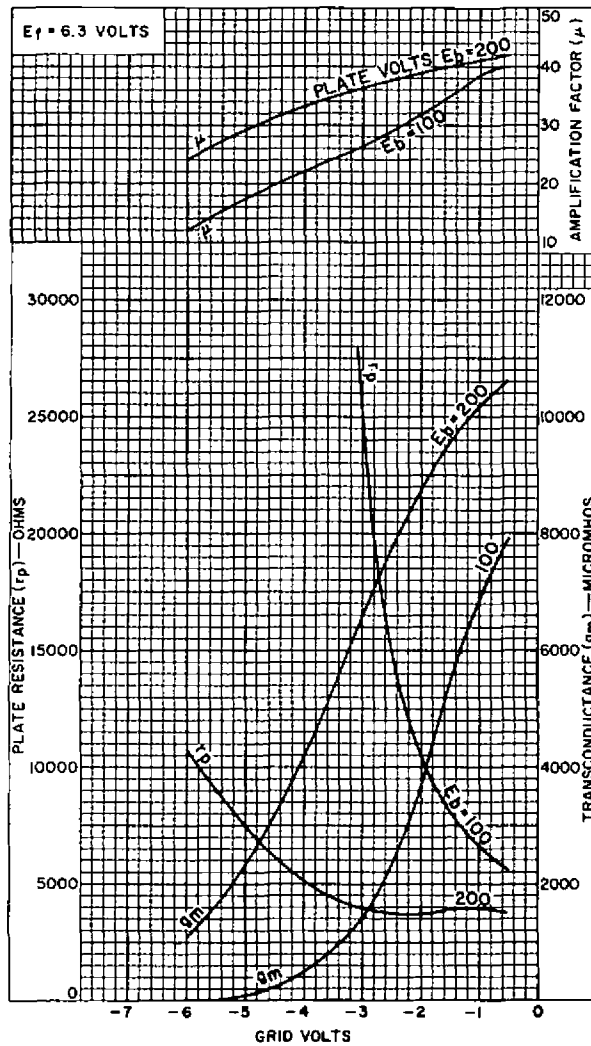
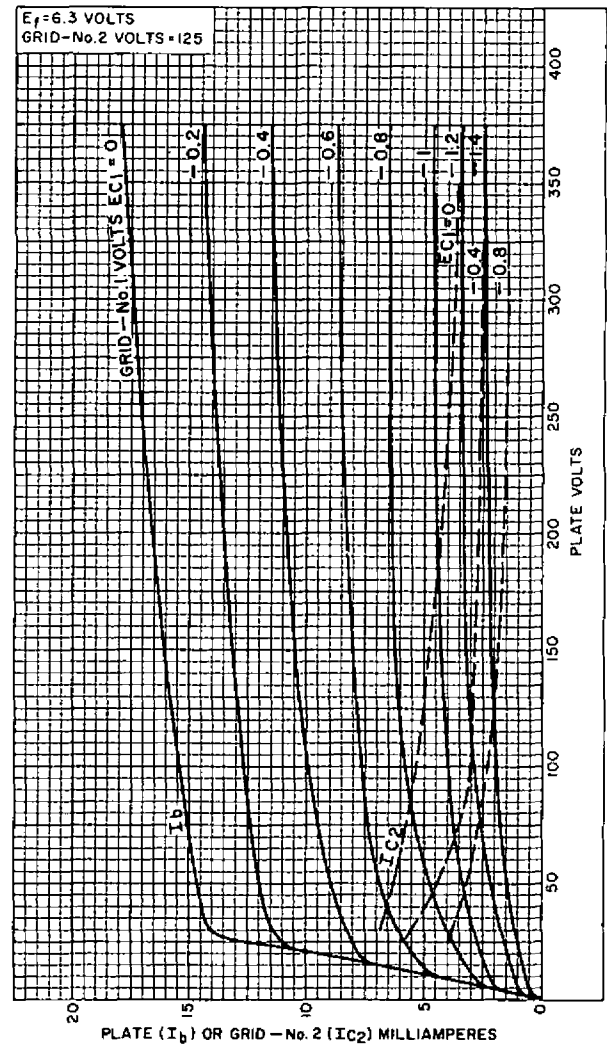


Fig. 2—Average Plate Characteristics for the Triode Unit of Type 6KE8 and for the Triode Unit of Type 5KE8 except for  $E_f = 5.6$  volts.



92CM-11901

Fig. 3—Average Characteristics for the Triode Unit of Type 6KE8 and for the Triode Unit of Type 5KE8 except for  $E_f = 5.6$  volts.



92CM-11903

Fig. 4—Average Characteristics for the Pentode Unit of Type 6KE8 and for the Pentode Unit of Type 5KE8 except for  $E_f = 5.6$  volts.

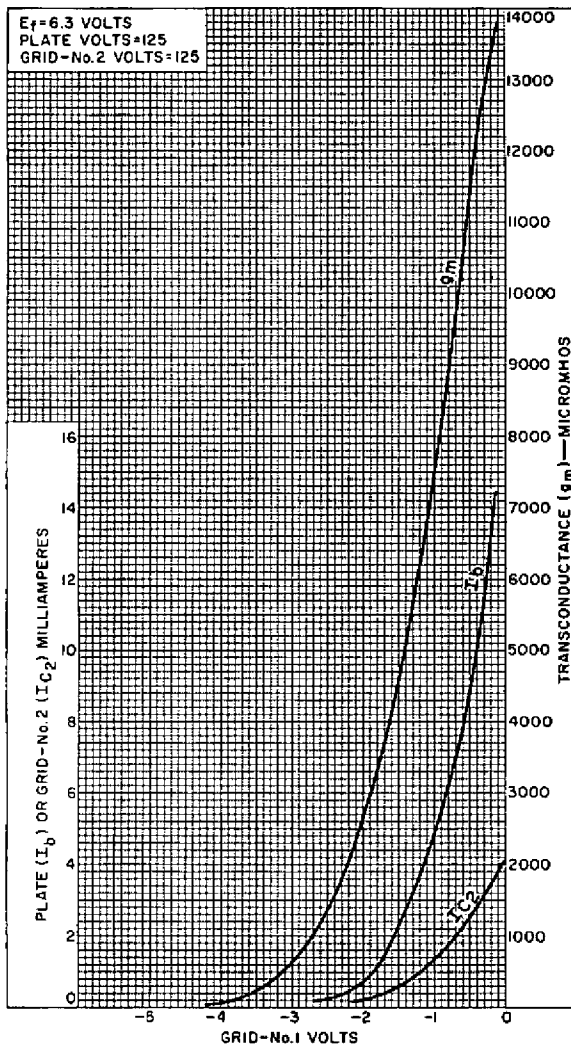
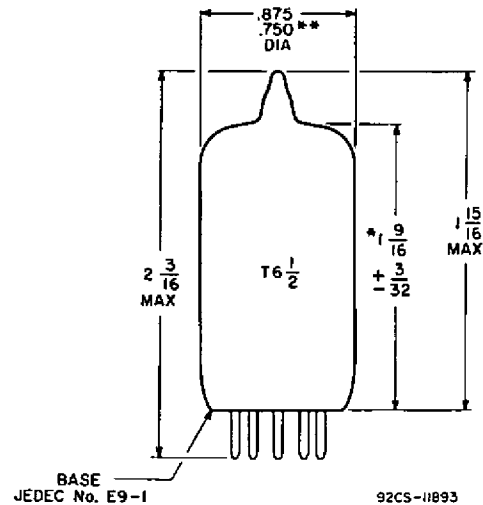


Fig. 5—Average Characteristics for the Pentode Unit of Type 6KE8 and for the Pentode Unit of Type 5KE8 except for  $E_f = 5.6$  volts.

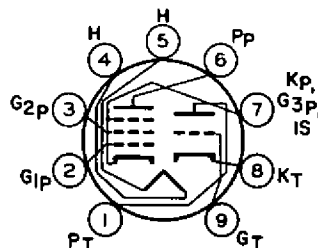
# DIMENSIONAL OUTLINE JEDEC No. 6-2 All Dimensions in Inches



\* MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY RING GAUGE OF 7/16" INSIDE DIAMETER.  
\*\* APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.

## TERMINAL DIAGRAM Bottom View

- Pin 1—Triode Plate
- Pin 2—Pentode  
Grid No. 1
- Pin 3—Pentode  
Grid No. 2
- Pin 4—Heater
- Pin 5—Heater
- Pin 6—Pentode Plate



- Pin 7—Pentode  
Cathode,  
Pentode  
Grid No. 3,  
Internal  
Shield
- Pin 8—Triode  
Cathode
- Pin 9—Triode Grid

JEDEC 90C

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