

## S.Q. TUBE

Special quality U.H.F. triode designed for use as oscillator, amplifier and self-oscillating mixer (max. frequency 800 MHz).

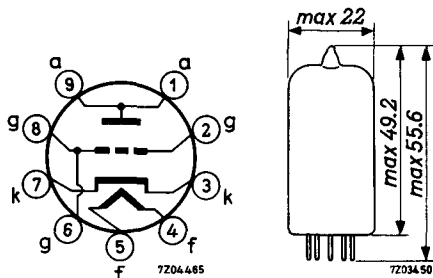
### QUICK REFERENCE DATA

|                          |                                           |         |
|--------------------------|-------------------------------------------|---------|
| Life                     | 10 000 hours                              |         |
| Low interface resistance |                                           |         |
| Mechanical quality       | Shock and vibration resistant             |         |
| Base                     | Noval. Gold plated pins.                  |         |
| Heating                  | Indirect<br>A.C. or D.C.; Parallel supply |         |
| Heater voltage           | $V_f$                                     | 6.3 V   |
| Heater current           | $I_f$                                     | 165 mA  |
| Anode current            | $I_a$                                     | 12 mA   |
| Mutual conductance       | S                                         | 14 mA/V |

### DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval



## CHARACTERISTICS

Column I Nominal value or setting of the tube

II Range values for equipment design: Initial spread

III Range values for equipment design: End of life

|                                                          |             | I   | II          | III       |            |
|----------------------------------------------------------|-------------|-----|-------------|-----------|------------|
| Heater voltage                                           | $V_f$       | 6.3 |             |           | V          |
| Heater current                                           | $I_f$       | 165 | 155 - 175   |           | mA         |
| Anode supply voltage                                     | $V_{ba}$    | 185 |             |           | V          |
| Grid supply voltage                                      | $+V_{bg}$   | 8   |             |           | V          |
| Cathode resistor                                         | $R_k$       | 800 |             |           | $\Omega$   |
| Anode current                                            | $I_a$       | 12  | 11.2 - 12.8 | min. 10.5 | mA         |
| Mutual conductance                                       | $S$         | 14  | 11.5 - 17   | min. 9.5  | mA/V       |
| Amplification factor                                     | $\mu$       | 68  |             |           |            |
| Negative grid current                                    | $-I_g$      |     | max. 0.5    | max. 1.0  | $\mu A$    |
| Cut-off voltage                                          | $-V_g$      |     | max. 5      |           | V          |
| Anode current $I_a = 0.1$ mA                             |             |     |             |           |            |
| Equivalent noise resistance                              | $R_{eq}$    | 250 |             |           | $\Omega$   |
| Input resistance                                         | $r_g$       | 2   |             |           | k $\Omega$ |
| Frequency = 100 MHz                                      |             |     |             |           |            |
| Phase angle of slope                                     | $\varphi_s$ | -7  |             |           | o          |
| Frequency = 100 MHz                                      |             |     |             |           |            |
| Leakage current between cathode and heater               | $I_{kf}$    |     | max. 10     |           | $\mu A$    |
| Voltage between cathode and heater $V_{kf} = 100$ V      |             |     |             |           |            |
| Insulation resistance between anode and other electrodes | $R_{ins}$   |     | min. 100    |           | M $\Omega$ |
| Voltage between anode and other electrode = 300 V        |             |     |             |           |            |
| Insulation resistance between grid and other electrode   | $R_{ins}$   |     | min. 100    |           | M $\Omega$ |
| Voltage between grid and other electrode = 100 V         |             |     |             |           |            |

**CAPACITANCES**

|                                       |             | I    | II          |    |
|---------------------------------------|-------------|------|-------------|----|
| Anode to grid                         | $C_{ag}$    | 2    | 1.7 - 2.3   | pF |
| Anode to cathode                      | $C_{ak}$    | 0.2  | 0.16 - 0.24 | pF |
| Grid to cathode                       | $C_{gk}$    | 3.6  | 3.0 - 4.2   | pF |
| Grid to heater                        | $C_{gf}$    |      | max. 0.3    | pF |
| Cathode to grid and heater            | $C_{k/gf}$  | 6.6  | 5.5 - 7.7   | pF |
| Anode to grid and heater              | $C_{a/gf}$  | 2.1  | 1.75 - 2.45 | pF |
| Grid to cathode and heater            | $C_{g/kf}$  | 3.9  | 3.3 - 4.5   | pF |
| Anode to cathode and heater           | $C_{a/kf}$  | 0.3  | 0.25 - 0.35 | pF |
| Grid to cathode                       | $C_{gk}$    | 5.6  |             | pF |
| Anode current $I_a = 12$ mA           |             |      |             |    |
| <u>With external shield</u>           |             |      |             |    |
| Anode to grid and shield              | $C_{a/gs}$  | 3.1  | 2.8 - 3.4   | pF |
| Grid and shield to cathode and heater | $C_{gs/kf}$ | 4.2  | 3.6 - 4.8   | pF |
| Anode to cathode and heater           | $C_{a/kf}$  | 0.25 | 0.2 - 0.3   | pF |

**SHOCK AND VIBRATION RESISTANCE**

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.

Shock

The tube is subjected 5 times in each of 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of  $30^\circ$ .

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

**LIFE**

Production samples are tested to be within the end of life values (column III) during 10 000 hours.

Heater voltage: The average heater voltage should be 6.3 V. Variations of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life. The tolerance of heater current (column II) should be taken into account.

**LIMITING VALUES** (Absolute max. rating system)

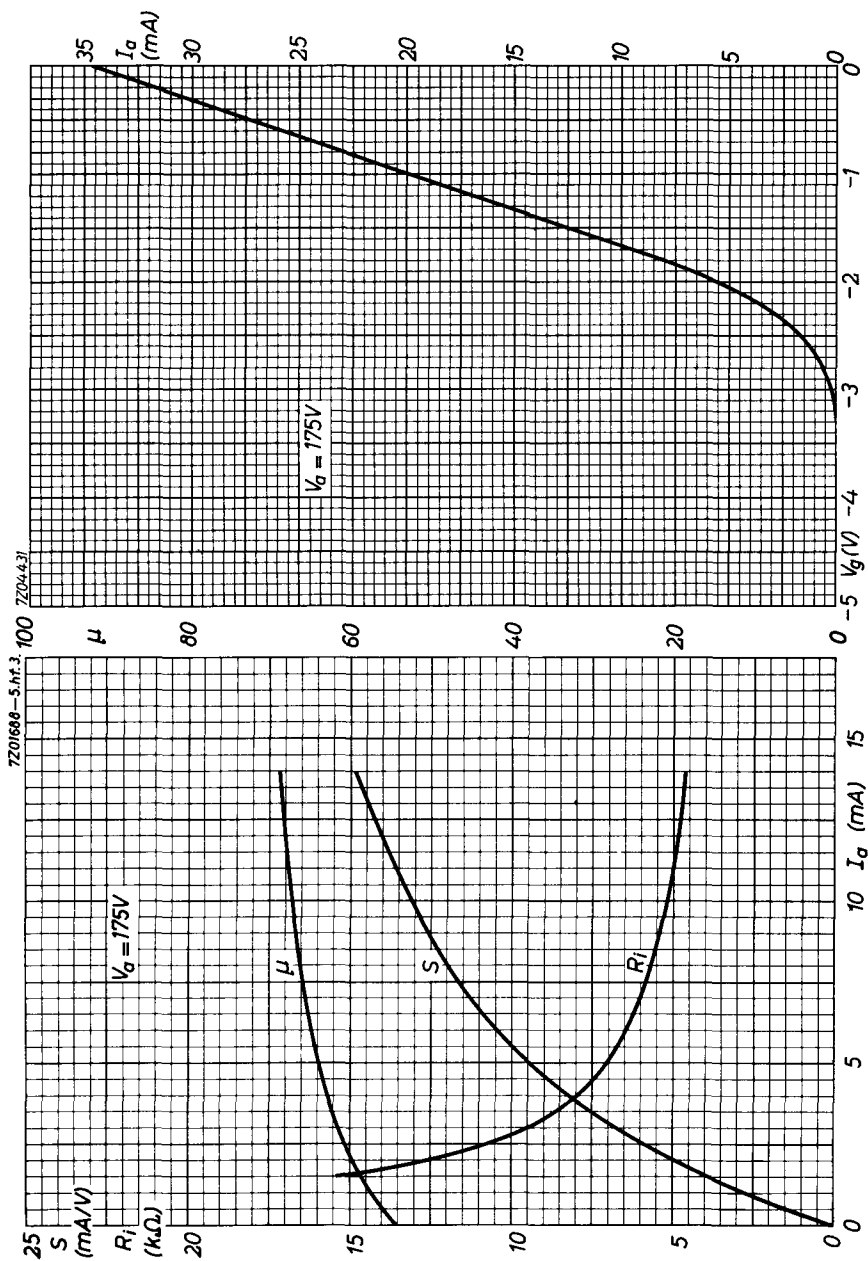
|                                    |            |           |                    |
|------------------------------------|------------|-----------|--------------------|
| Anode voltage                      | $V_{a_o}$  | max. 440  | V                  |
|                                    | $V_a$      | max. 250  | V                  |
| Anode dissipation                  | $W_a$      | max. 2.4  | W                  |
| Grid voltage                       | $-V_g$     | max. 50   | V                  |
| Grid dissipation                   | $W_g$      | max. 20   | mW                 |
| Grid resistor                      | $R_g$      | max. 1.2  | M $\Omega$         |
| Cathode current                    | $I_k$      | max. 20   | mA                 |
| Voltage between cathode and heater | $V_{kf}$   | max. 100  | V                  |
| Bulb temperature                   | $t_{bulb}$ | max. 165  | $^{\circ}\text{C}$ |
| Frequency (as amplifier)           | $f$        | up to 800 | MHz                |

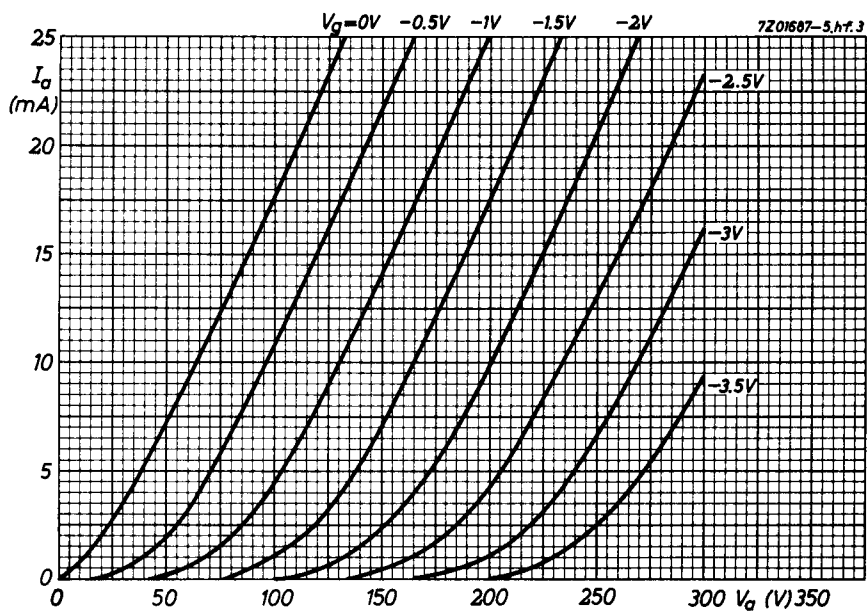
**OPERATING CHARACTERISTICS**As R.F. amplifier, grounded grid

|                      |          |     |     |          |
|----------------------|----------|-----|-----|----------|
| Anode supply voltage | $V_{ba}$ | 185 | 175 | V        |
| Grid supply voltage  | $V_{bg}$ | 8   | 0   | V        |
| Cathode resistor     | $R_k$    | 800 | 125 | $\Omega$ |
| Anode current        | $I_a$    | 12  | 12  | mA       |
| Mutual conductance   | $S$      | 14  | 14  | mA/V     |

As mixer

|                      |          |     |               |
|----------------------|----------|-----|---------------|
| Anode supply voltage | $V_{ba}$ | 220 | V             |
| Anode resistor       | $R_a$    | 5.6 | k $\Omega$    |
| Grid resistor        | $R_g$    | 47  | k $\Omega$    |
| Anode current        | $I_a$    | 12  | mA            |
| Grid current         | $I_g$    | 50  | $\mu\text{A}$ |





# PHILIPS

## Data handbook



**Electronic  
components  
and materials**

**E86C**

| <b>page</b> | <b>sheet</b> | <b>date</b> |
|-------------|--------------|-------------|
| 1           | 1            | 1968.12     |
| 2           | 2            | 1968.12     |
| 3           | 3            | 1968.12     |
| 4           | 4            | 1968.12     |
| 5           | 5            | 1968.12     |
| 6           | 6            | 1968.12     |
| 7           | FP           | 2000.11.19  |