

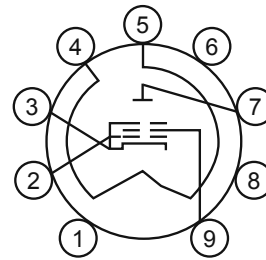
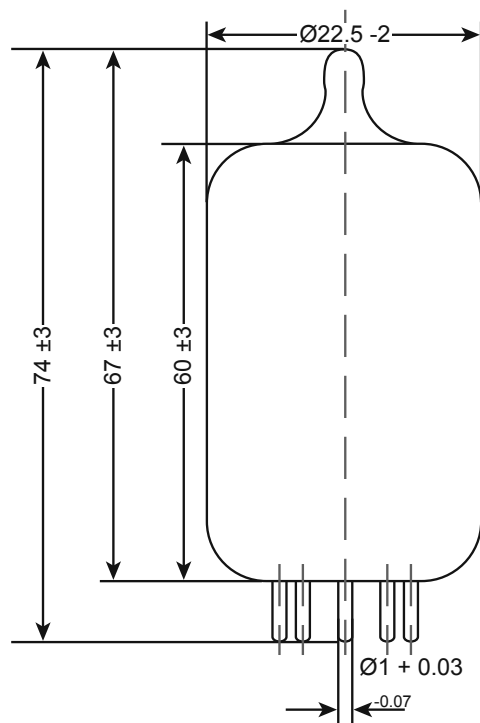
## 1. Overview

The EL84 is a power-amplifier pentode designed for use in the audio-frequency power-output stage of television and radio receivers and high-fidelity amplifiers.

## 2. Specifications

|   |                |
|---|----------------|
| <b>Heater</b>                             |                |
| $U_H$                                     | 6.3 V          |
| $I_H$                                     | 0.76 A         |
| <b>Maximum Ratings</b>                    |                |
| Plate Voltage                             | 500 V          |
| Plate Dissipation                         | 12 W           |
| Grid #2 Voltage                           | 300 V          |
| Grid #2 Dissipation                       | 2 W            |
| Cathodic Current                          | 65 mA          |
| Grid #1 Dissipation                       | -100 V         |
| Heater-Cathode Voltage                    | $\pm 100$ V    |
| Grid #1 Resistance                        |                |
| Cathode Bias                              | 1 M $\Omega$   |
| Fixed Bias                                | 0.3 M $\Omega$ |
| <b>Direct Interelectrode Capacitances</b> |                |
| Input                                     | 10.8 PF        |
| Output                                    | 6.5 PF         |
| Transfer Capacitance                      | 0.5 PF         |
| Grid #1-Heater                            | 0.25 PF        |
| <b>Static Parameter</b>                   |                |
| $U_a$                                     | 256 V          |
| $U_{g_2}$                                 | 256 V          |
| $R_K$                                     | 120 $\Omega$   |
| $I_a$                                     | 48 mA          |
| $I_{g_2}$                                 | 7 mA           |
| $G_m$                                     | $\geq 9$ mA/V  |
| $r_i$                                     | 38 k $\Omega$  |
| $\mu_{g_1-g_2}$                           | 19             |

| Characteristics And Typical Operation<br>Class A1 Amplifier |        |     |      |         |
|---|--------|-----|------|---------|
| U <sub>a</sub>  | 250 V  |     |      |         |
| U <sub>g2</sub>   | 250 V  |     |      |         |
| -U <sub>g1</sub>  | 7.3 V  |     |      |         |
| R <sub>k</sub>  | 135 Ω  |     |      |         |
| R <sub>L</sub>  | 5.2 KΩ |     |      |         |
| Ū <sub>g1</sub> (r.M.S)                                     | 0      | 3.4 | 4.3  | 4.7 V   |
| I <sub>a</sub> (0)  | 48     | —   | —    | — mA    |
| I <sub>a</sub> (max • sig)                                  | —      | —   | 49.5 | 49.2 mA |
| I <sub>g2</sub> (0)   | 5.5    | —   | —    | — mA    |
| I <sub>g2</sub> (max • sig)                                 | —      | —   | 10.8 | 11.6 mA |
| G <sub>m</sub>  | 11.3   | —   | —    | — mA/V  |
| r <sub>i</sub>  | 38     | —   | —    | — kΩ    |
| μ <sub>g1-g2</sub>  | 19     | —   | —    | —       |
| P <sub>out</sub>  | 0      | 4.5 | 5.7  | 6.0 w   |
| D <sub>tot</sub>  | 0      | 6.8 | 10   | — %     |



### Terminal Connections

- Pin 1 – Internal Connection
- Pin 2 – Grid Number 1
- Pin 3 – Cathode and Grid Number 3 (Suppressor)
- Pin 4 – Heater
- Pin 5 – Heater
- Pin 6 – Internal Connection
- Pin 7 – Plate
- Pin 8 – Internal Connection
- Pin 9 – Grid Number 2 (Screen)

| Class A1 Amplifier   |                             |     |      |      |      |       |                     |      |        |         |    |       |
|--|-----------------------------|-----|------|------|------|-------|---------------------|------|--------|---------|----|-------|
| Ua   | 250                         |     |      |      | 250  |       |                     |      | 250 V  |         |    |       |
| Ug <sub>2</sub>  | 250                         |     |      |      | 250  |       |                     |      | 210 V  |         |    |       |
| -Ug <sub>1</sub>   | 7.3                         |     |      |      | 8.4  |       |                     |      | 6.4 V  |         |    |       |
| R <sub>k</sub>   | 135                         |     |      |      | 210  |       |                     |      | 160 Ω  |         |    |       |
| R <sub>L</sub>   | 4.5                         |     |      |      | 7    |       |                     |      | 7 KΩ   |         |    |       |
| Ūg <sub>1</sub> (r.M.S)                                      | 0                           | 3.5 | 4.4  | 4.8  | 0    | 3.5   | 5.5                 | 0    | 3.4    | 3.8 V   |    |       |
| I <sub>a</sub> (0)   | 48                          | —   | —    | —    | 36   | —     | —                   | 36   | —      | — V     |    |       |
| I <sub>a</sub> (max • sig)                                   | —                           | —   | 50.6 | 50.5 | —    | 36.8  | 36                  | —    | 36.6   | 36.5 mA |    |       |
| I <sub>g<sub>2</sub></sub>                                   | 5.5                         | —   | —    | —    | 4.1  | —     | —                   | 3.9  | —      | — mA    |    |       |
| I <sub>g<sub>2</sub></sub> (max • Sig)                       | —                           | —   | 10   | 11   | —    | 8.5   | 14.6                | —    | 7.3    | 8.0 mA  |    |       |
| G <sub>m</sub>   | 11.3                        | —   | —    | —    | 10   | —     | —                   | 10.4 | —      | — mA/V  |    |       |
| r <sub>i</sub>   | 38                          | —   | —    | —    | 40   | —     | —                   | 40   | —      | — kΩ    |    |       |
| μ <sub>g<sub>1</sub>-g<sub>2</sub></sub>                     | 19                          | —   | —    | —    | 19   | —     | —                   | 19   | —      | —       |    |       |
| P <sub>out</sub>   | 0                           | 4.5 | 5.7  | 6.0  | 0    | 4.2   | 5.6                 | 0    | 4.3    | 4.7 W   |    |       |
| D <sub>tot</sub>   | 7.5                         | 10  | —    | —    | —    | 10    | —                   | —    | 10     | — %     |    |       |
| Push-pull Class AB1 Amplifier<br>Amplifier Triode Connection | Push-pull Class B Amplifier |     |      |      |      |       | Push-pull Class AB1 |      |        |         |    |       |
| Ua   | 250                         | 300 | 250  | 300  | 250  | 300 V |                     |      |        |         |    |       |
| Ug <sub>2</sub>  | 250                         | 300 | 250  | 300  | —    | — V   |                     |      |        |         |    |       |
| -Ug <sub>1</sub>   | —                           | —   | 11.6 | 14.7 | —    | — V   |                     |      |        |         |    |       |
| R <sub>k</sub>   | 130                         | 130 | —    | —    | 270  | 270 Ω |                     |      |        |         |    |       |
| R <sub>L</sub>   | 8                           | 8   | 8    | 8    | 10   | 10 kΩ |                     |      |        |         |    |       |
| Ūg <sub>1</sub> (r.M.S)                                      | 0                           | 16  | 0    | 20   | 0    | 16    | 0                   | 20   | 0      | 16.6    | 0  | 20 V  |
| I <sub>a</sub> (0)   | 62                          | —   | 72   | —    | 20   | —     | 15                  | —    | 40     | —       | 48 | — mA  |
| I <sub>a</sub> (max • sig)                                   | —                           | 75  | —    | 92   | —    | 75    | —                   | 92   | —      | 43.4    | —  | 52 mA |
| I <sub>g<sub>2</sub></sub> (0)                               | 7                           | —   | 8    | —    | 2.2  | —     | 1.6                 | —    | —      | —       | —  | — mA  |
| I <sub>g<sub>2</sub></sub> (max • sig)                       | 15                          | —   | 22   | —    | 15   | —     | 22                  | —    | —      | —       | —  | — mA  |
| P <sub>out</sub>   | 0                           | 11  | 0    | 17   | 0    | 11    | 0                   | 17   | 0      | 3.4     | 0  | 5.2 W |
| D <sub>tot</sub>   | —                           | 3   | —    | 4    | —    | 3     | —                   | 4    | —      | 2.5     | —  | 2.5%  |
| Class A1 Amplifier,<br>Triode Connection                     |                             |     |      |      |      |       |                     |      |        |         |    |       |
| Uag <sub>2</sub>   | 250 V                       |     |      |      |      |       |                     |      |        |         |    |       |
| R <sub>k</sub>   | 270 Ω                       |     |      |      |      |       |                     |      |        |         |    |       |
| R <sub>L</sub>   | 3.5 kΩ                      |     |      |      |      |       |                     |      |        |         |    |       |
| Ūg <sub>1</sub> (r.M.S)                                      | 0                           |     |      |      | 2.0  |       |                     |      | 13.4 V |         |    |       |
| I <sub>a</sub> (0)   | 34                          |     |      |      | —    |       |                     |      | — mA   |         |    |       |
| I <sub>a</sub> (max • sig)                                   | —                           |     |      |      | —    |       |                     |      | 36 mA  |         |    |       |
| P <sub>out</sub>   | —                           |     |      |      | 0.05 |       |                     |      | 1.94 W |         |    |       |
| D <sub>tot</sub>   | —                           |     |      |      | —    |       |                     |      | 9%     |         |    |       |