29LE6

BEAM POWER TUBE

Magnoval type used as horizontal-deflection amplifier in television receivers. Outlines section, 40A; requires magnoval 9-contact socket.

- Heater Voltage: 29 volts
- Heater Current: 0.3 ampere
- Heater-Cathode Voltage:
  - Peak value: ±240 volts
  - Average: ±240 volts

**Class A₁ Amplifier**

### CHARACTERISTICS

- Plate Voltage: 40 volts
- Grid-No.3 (Suppressor-Grid) Voltage: 0 volts
- Grid-No.2 (Screen-Grid) Voltage: 135 volts
- Grid-No.1 (Control-Grid) Voltage: 0 volts
- Plate Current: 450 mA
- Grid-No.2 Current: 550 mA
- Grid-No.1 Voltage for plate current of 50 μA: 50 max.

† This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

**Horizontal-Deflection Amplifier**

For operation in a 525-line, 30-frame system

### MAXIMUM RATINGS (Design-Maximum Values)

- Plate Voltage: 275 volts
- Peak Positive-Pulse Plate Voltage#: 6500 volts
- Peak Negative-Pulse Plate Voltage#: 1650 volts
- Grid-No.3 Voltage: 70 volts
- Grid-No.2 Voltage: 275 volts
- Peak Negative-Pulse Grid-No.1 Voltage: 530 volts
- Average Cathode Current: 275 mA

### MAXIMUM CIRCUIT VALUES

- Grid-No.1 Circuit Resistance: 0.5 megohms
- Grid-No.1 Circuit Resistance, for horizontal-deflection circuit: 2.2 megohms

# Pulse duration must not exceed 22% of a horizontal scanning cycle (18 microseconds).

30

Refer to chart at end of section.

30AE3/ PY88

**DIODE**

Miniature type used as booster diodes in line-time-base circuits of transformerless television receivers. Outlines section, 7D; requires miniature 9-contact socket. Heater: volts (ac/dc), 30; amperes, 0.3; maximum heater-cathode volts, 6600 peak.

### MAXIMUM RATINGS (Design-Center Values)

- Supply Voltage at zero current: 550 volts
- Supply Voltage: 250 volts
- Peak Plate Current: 550 mA
**Technical Data**

Average Plate Current .......................................................... 220 mA
Plate Dissipation ...................................................................... 6 watts
Peak Negative-Pulse Plate Voltage* ......................................... 6000 volts

* Under no conditions should an absolute maximum value of 7500 volts be exceeded.
# The pulse duration must not exceed 22 per cent of a cycle, or a maximum of 18 microseconds.

Refer to chart at end of section.
Refer to chart at end of section.
Refer to type 6KD6.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to type 6JS6C.
Refer to type 6MJ6/6LQ6/6JE6C.
Refer to type 6LR8.

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**BEAM POWER TUBE**

31LZ6

Novar type used for horizontal-deflection amplifier in color television receivers. Outlines section, 32C; requires novar 9-contact socket.

Heater Voltage (ac/dc) .............................................................. 31 volts
Heater Current ........................................................................ 0.45 ampere
Heater Warm-up Time ............................................................... 11 seconds
Heater-Cathode Voltage:
  Peak value ........................................................................ 100 volts max
  Average value .................................................................... ±200 volts max
Direct Interelectrode Capacitances:
  Grid No. 1 to Plate .............................................................. 0.6 pF
  Grid No. 1 to Cathode, Heater, Grid No. 2, and Grid No. 3...... 22 pF
  Plate to Cathode, Heater, Grid No. 2, and Grid No. 3 ........................................................................ 11 pF

**Class A, Amplifier**

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>Triode Connection</th>
<th>Pentode Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>125 volts</td>
<td>55 volts</td>
</tr>
<tr>
<td>Peak Positive-Pulse Plate Voltage#</td>
<td>5000 volts</td>
<td>30 volts</td>
</tr>
<tr>
<td>Grid-No. 2 (Screen-Grid) Voltage</td>
<td>50 volts</td>
<td>125 volts</td>
</tr>
<tr>
<td>Grid-No. 1 (Control-Grid) Voltage</td>
<td>50 volts</td>
<td>0 volts</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>3</td>
<td>1000 ohms</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>---</td>
<td>6000</td>
</tr>
<tr>
<td>Transconductance</td>
<td>---</td>
<td>11000</td>
</tr>
<tr>
<td>Plate Current</td>
<td>---</td>
<td>140</td>
</tr>
<tr>
<td>Grid-No. 2 Current</td>
<td>---</td>
<td>140</td>
</tr>
<tr>
<td>Grid-No. 1 Voltage for plate current of 1 mA</td>
<td>---</td>
<td>125</td>
</tr>
</tbody>
</table>

**Horizontal-Deflection Amplifier**

For operation in a 525-line, 30-frame system

**MAXIMUM RATINGS**

| DC Plate Supply Voltage | 890 volts |
| Peak Positive-Pulse Plate Voltage# | 7500 volts |
| Peak Negative-Pulse late Voltage | 1100 volts |
| DC Grid-No. 3 Voltage* | 75 volts |
DC Grid-No.2 Voltage ............................................... 220 volts
Peak Negative-Pulse Grid-No.1 Voltage ....................... 330 volts
Peak Cathode Current ........................................... 1200 mA
Average Cathode Current ....................................... 350 mA
Grid-No.2 Input .................................................. 5 watts
Plate Dissipation .................................................. 30 watts
Bulb Temperature (At hottest point) ......................... 240 °C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance:
For cathode-bias operation .................................... 1 megohm
For grid-leak-bias operation .................................. 10 megohms
For fixed-bias operation ...................................... 0.47 megohm

# Pulse duration must not exceed 15% of one horizontal scanning cycle (10 microseconds).
† Grid No.2 connected to plate.
‡ This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

- In this service, a positive value may be applied to grid No.3 to minimize “snivets” interference; a typical value for this voltage is 30 volts.
- A bias resistor or other means is required to protect the tube in absence of excitation.

32
32ET5
32ET5A
32HQ7
32L7GT
33
33GT7
33GY7

Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.
Refer to chart at end of section.

33GY7A  DIODE—BEAM POWER TUBE

Duodecar type used as combined damper diode and horizontal-deflection amplifier in television receivers. Socket terminals 1, 3, 6 and 7 should not be used as tie points. Outlines section, 15A; requires duodecar 12-contact socket. Type 50GY7A is identical with type 33GY7A except for heater ratings.
### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>33GY7A</th>
<th>50GY7A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage (ac/dc)</td>
<td>33.6</td>
<td>50</td>
</tr>
<tr>
<td>Heater Current</td>
<td>0.45</td>
<td>0.3</td>
</tr>
<tr>
<td>Heater Warm-up Time (Average)</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Heater-Cathode Voltage:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak value</td>
<td>±200 max</td>
<td>±900 max</td>
</tr>
<tr>
<td>Average value</td>
<td>100 max</td>
<td>100 max</td>
</tr>
</tbody>
</table>

### Beam Power Unit as Class A3 Amplifier

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pentode Connection</th>
<th>Triode Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>5000</td>
<td>130</td>
</tr>
<tr>
<td>Grid-No.2 (Screen-Grid) Voltage</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>Grid-No.1 (Control-Grid) Voltage</td>
<td>0</td>
<td>22.5</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>10000</td>
<td>6500</td>
</tr>
<tr>
<td>Transconductance</td>
<td>320</td>
<td>48</td>
</tr>
<tr>
<td>Grid-No.2 Current</td>
<td>22*</td>
<td>2.9</td>
</tr>
<tr>
<td>Grid-No.1 Voltage (Approx.) for plate</td>
<td>-80</td>
<td>-40</td>
</tr>
</tbody>
</table>

* Grid No.2 tied to plate.

* This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

### Beam Power Unit as Horizontal-Deflection Amplifier

**Maximum Ratings**

For operation in a 525-line, 50-frame system

**Maximum Circuit Value**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid-No.1-Circuit Resistance</td>
<td>1</td>
</tr>
</tbody>
</table>

# Pulse duration must not exceed 15% of a horizontal scanning cycle (10 microseconds).

† A bias resistor or other means is required to protect the tube in absence of excitation.

### Damper Service (Diode Unit)

For operation in a 525-line, 30-frame system

**Maximum Ratings**

Peak Inverse Plate Voltage# 4200 volts
Peak Plate Current 810 mA
Average Plate Current 135 mA
Plate Dissipation 3.8 watts

**Characteristics, Instantaneous Value**

Bulb Temperature (At hottest point) 200 °C

Refer to type 6JR6.

Refer to chart at end of section.

Refer to chart at end of section.

Refer to type 6CE3/6CD3/6DT3.

Refer to chart at end of section.