TOSHIBA ELECTRON TUBE

TOSHIBA ELECTRON TUBE 11FP4

PICTURE TUBE

Rectangular Glass Type  Aluminized Screen
Low - Voltage Electrostatic focus  Magnetic Deflection

Toshiba 11FP4 is a 11 inch, directly viewed, rectangular, glass picture tube of the low voltage electro-static focus and 114° magnetic deflection type.
The 11FP4 employs short neck, no ion trap gun featuring good focus over entire picture area.
11FP4 has a aluminized screen and it maximum overall length is only 215 mm or 8.5 inch thus very suitable for portable T.V. Set.

GENERAL DATA

Electrical:

Heater voltage ....................................... 6.3 V
Heater current at 6.3 Volts ......................... 450±22 mA
Heater warm up time ............................... 11 second

Direct interelectrode capacitance

Grid No. 1 to all other electrodes .............. 6 PF
Cathode to all other electrodes ............... 5 PF

External conductive coating to ultor .......... (500 max. 300 min.

Focusing method .......................... Electrostatic
Deflection method ........................ Magnetic

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Deflection angles (approx)

- Diagonal ........................................ 114 deg
- Horizontal ..................................... 102 deg
- Vertical ....................................... 85 deg

Electron gun ................................. Type requiring no ion-trap magnet

Optical:

- Face plate .................................. Filter glass
- Light transmission at center (approx) .......... 75%
- Phosphor .................................... P4-Aluminized
- Fluorescence .................................. White
- Phosphorescence ................................ White
- Persistence .................................... Medium short

Mechanical:

Tube dimensions

- Overall length .............................. 215±7mm (8.46±0.28 inches)
- Greatest width .............................. 243±3mm (9.57±0.18 inches)
- Greatest height ............................. 198±3mm (7.80±0.18 inches)
- Diagonal .................................... 278±3mm (10.95±0.18 inches)
- Neck length .................................. 105±5mm (4.12±0.12 inches)

Screen dimension (minimum)

- Greatest width .............................. 223 min mm (8.78 min inches)
- Greatest height .............................. 177 min mm (6.97 min inches)
- Diagonal .................................... 257 min mm (10.12 min inches)
- Projected area ............................... 38000 mm² (59 sq. inches)
- Weight (approx) ............................. 1.6 kg (3.5 Lbs)
- Operating position .......................... any
TOSHIBA ELECTRON TUBE

Cap ................................ Recessed small cavity (JEDEC No. J1-21)
Base .............................. Small-Button Neoeighter 7-pin (JEDEC B7-208)
Basing designation ...................... 8HR

GRID-DRIVE SERVICE

Unless otherwise specified, voltage values are positive with respect to cathode

**Maximum and Minimum Ratings**

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Value</th>
<th>Minimum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultron voltage</td>
<td>14000 max.</td>
<td>8000 min.</td>
</tr>
<tr>
<td>Grid No. 4 (focusing) voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive value</td>
<td>1100 max.</td>
<td></td>
</tr>
<tr>
<td>Negative value</td>
<td>550 max.</td>
<td></td>
</tr>
<tr>
<td>Grid No. 2 voltage</td>
<td>550 max.</td>
<td>300 min.</td>
</tr>
<tr>
<td>Grid No. 1 voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative-peak value</td>
<td>220 max.</td>
<td></td>
</tr>
<tr>
<td>Negative-bias value</td>
<td>154 min.</td>
<td></td>
</tr>
<tr>
<td>Positive-bias value</td>
<td>0 max.</td>
<td></td>
</tr>
<tr>
<td>Positive-peak value</td>
<td>2 max.</td>
<td></td>
</tr>
<tr>
<td>Heater voltage</td>
<td>6.9 max.</td>
<td>5.7 min.</td>
</tr>
<tr>
<td>Peak heater-cathode voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater negative with respect to cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During equipment warm-up period not exceeding 15 second</td>
<td>450 max.</td>
<td></td>
</tr>
<tr>
<td>After equipment warm-up period</td>
<td>200 max.</td>
<td></td>
</tr>
<tr>
<td>Heater positive with respect to cathode</td>
<td>200 max.</td>
<td></td>
</tr>
</tbody>
</table>

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Equipment Design Ranges:

With any ultior voltage (Ec₁, k) between 8000 and 14000 volts and Grid - No. 2 voltage (Ec₂, k) between 200 and 550 volts.

Grid - No. 4 voltage for focus

<table>
<thead>
<tr>
<th>No. 4 current</th>
<th>-25 to +25</th>
<th>μA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid - No. 2 current</td>
<td>-15 to +15</td>
<td>μA</td>
</tr>
</tbody>
</table>

Field strength of adjustable centering magnet

| 0 to 8 gausses      |

Examples of Use of Design Ranges:

Ultor voltage

| Grid - No. 4 voltage for focus | 0 to 400 | Volts    |

Grid - No. 1 voltage for visual extinction of focused raster

| -36 to -94 Volts |

Maximum Circuit Values:

Grid - No. 1 circuit resistance

| 1.5 max. megohms     |

CATHODE-DRIVE SERVICE

Unless otherwise specified, voltage values are positive with respect to grid - No. 1

Maximum and Minimum Ratings, Design - Maximum values:

Ultor to Grid - No. 1 voltage

| 14000 max. Volts |
| 8000 min. Volts  |
TOSHIBA ELECTRON TUBE

Grid - No. 4 to Grid - No. 1 (focusing) voltage

Positive value .................................. 1100 max. Volts
Negative value ................................. 550 max. Volts
Grid - No. 2 to Grid No. 1 voltage ........... 700 max. Volts
.................................................. 350 min. Volts
Grid - No. 2 to cathode voltage ............... 550 max. Volts

Cathode to Grid - No. 1 voltage

Positive - peak value ......................... 220 max. Volts
Positive - bias value .......................... 154 max. Volts
Negative - bias value .......................... 0 max. Volts
Negative - peak value ........................ 2 max. Volts

Heater voltage .................................. 6.9 max. Volts
.................................................. 5.7 min. Volts

Peak heater - cathode voltage;

Heater negative with respect to cathode

During equipment warm-up period not exceeding 15 second .................. 450 max. Volts
After equipment warm-up period .................. 200 max. Volts
Heater positive with respect to cathode .... 200 max. Volts

Equipment Design Ranges:

With any ultor to Grid - No. 1 voltage \((E_{c1} g_1)\) between 8000 and 14000 volts and Grid - No. 2 to Grid - No. 1 voltage \((E_{c2} g_1)\) between 400 and 690 volts

Grid - No. 4 to Grid - No. 1 voltage for focus .................. 0 to 400 Volts
Cathode to Grid - No. 1 voltage \((E_{kg1})\) for visual extinction of focused raster .... See Raster - Cutoff - Range Chart for Cathode - Drive Service

Grid - No. 4 current ................................ -25 to +25 \(\mu A\)
Grid - No. 2 current ................................ -15 to +15 \(\mu A\)

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TOKYO SHIBAURA ELECTRIC CO., LTD.
Field strength of adjustable centering magnet® ...................... 0 to 8 gausses

Examples of Use of Design Ranges:

Ultor voltage ........................................ 10000 Volts
Grid - No. 2 voltage ................................. 400 Volts
Grid - No. 4 Grid - No. 1 voltage for focus® .... 0 to 400 Volts
Cathode to Grid - No. 1 voltage for visual extinction of focused raster .... 36 to 78 Volts

Maximum Circuit Values:

Grid - No. 1 circuit resistance ................. 1.5 max. megohms

Notes:

1. Brilliance and definition decrease with decreasing voltage of ultor to Grid - No. 1 voltage. In general the ultor voltage or ultor to Grid- No. 1 voltage should not be less than 8000 volts.

2. Individual tubes will have satisfactory focus at same value of Grid-No. 4 (or Grid - No. 4 to Grid No. 1) voltage between 0 and 400 volts with the combined bias voltage and video - signal voltage adjusted to produce an ultor current of 100 micro amperes.

3. Distance from Reference line for suitable P. M. centering magnet should not exceed 2-1/8. Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 5/16 inch radius concentric with the center of the tube face. It is to be noted that the earths magnetic field can cause as much as 7/16 inch deflection of the spot from the center of the tube face.
AVerage Drive Characteristics

$E_t = 6.3$ Volts
$E_b = 8000 \sim 14000$ Volts (ultor)

- --- Cathode Drive
- Grid Drive

Video Signal Volts from Raster Cutoff

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TOKYO SHIBAURA ELECTRIC CO., LTD.
RASHER CUTOFF-RANGE CHARTS

GRID NO. 1 VOLS

GRID NO. 2 VOLS

GRID NO. 2 TO GRID NO. 1 VOLS

Grid Drive Service

\[ E_f = 6.3 \text{ Volts} \]
\[ E_h = 8000 \sim 14000 \text{ Volts (Ultor)} \]
\[ E_{c4} \text{ : Adjusted for focus} \]

Cathode Drive Service

\[ E_f = 6.3 \text{ Volts} \]
\[ E_h = 8000 \sim 14000 \text{ Volts (Ultor)} \]
\[ E_{c4} \text{ : Adjusted for focus} \]
TOSHIBA ELECTRON TUBE

Dimensional Outline

(Dimension in mm & inch)

Screen Diagonal
215 ± 2mm
(8.46 ± 0.08")

110 ± 5mm
(4.33 ± 0.2")

105 ±
(4.13")

Screen Width
223 ± Min
(8.78 Min)

243 ± 3 mm
(9.57 ± 0.12")

57 ± 3 mm
(2.24 ± 0.12")

105 ±
(4.13")

58 ± 3 mm
(2.28")

(2.28")

710 ± R
(28.2 ± R)

580 ± R
(228.5 ± R)

22 ± R
(0.87")

22 ± 3 mm
(0.87")

(2.87")

17 ± R
(0.67")

55 ± 3 mm
(2.17 ± 0.12")

(2.17 ± 0.12")

28 ± 3 mm
(1.10 ± 0.12")

(1.10 ± 0.12")

286 ± 1.1 mm
(1.125 ± 0.043")

Y Axis

External Conductive Coating
(Note 4)

For this Contour
Y = 0.575X² + 0.576

(XY in inches)

Small Button
Neoeight 7-pin Base
JEDEC No. B7-208
(Note 3)

Reference line
(Note 2)

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NOTES FOR DIMENSIONAL OUTLINE

Notes:

1. The plane through the tube axis and Pin No. 4 may vary from the plane through the tube axis and ultor terminal by angular tolerance of ±30 degree. Ultor terminal is on the same side as Pin No. 4.

2. With tube neck inserted through flare end of reference-line gauge JEDEC G-126 and with tube seated in gauge, the reference-line is determined by the intersection of the plane CC' of the gauge with the glass funnel.

3. Socket for this base should not be rigidly mounted it should have flexible leads and be allowed to move freely.

4. External conductive coating must be grounded.

SOCKET CONNECTION BOTTOM VIEW (8HR)

Pin 1: Heater
Pin 2: Grid No. 1
Pin 3: Grid No. 2
Pin 4: Grid No. 4
Pin 6: Grid No. 1
Pin 7: Heater
P : Ultor
C : External conductive coating

All inquiries as to the data should be addressed to Tokyo Shibaura Electric Co., Ltd. Tube and Semiconductor Division, 12, 1-Chome, Yuraku-Cho, Chiyoda-Ku, Hibiya Mitsui Building, Tokyo, Japan.