Toshiba 11EP4 is a 11 inch, directly viewed, rectangular, glass picture tube of the low voltage electrostatic focus and 114° magnetic deflection type. The 11EP4 employs short neck, no ion trap gun featuring good focus over entire picture area. 11EP4 has a aluminized screen and its 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 ......................... 600±30 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 ulterior .......... 500 max. PF
  - External conductive coating to ulterior .......... 300 min. PF
- Focusing method ........................................ Electrostatic
- Deflection method .................................... Magnetic
TOSHIBA ELECTRON TUBE

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
Cap ...................... Recessed small cavity (JEDEC No. J1-21)
Base ..................... Small-Button Neoeightner 7-pin (JEDEC B7-205)
Basing designation ................................................. 8HR

GRID-DRIVE SERVICE

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

Maximum and Minimum Ratings, Design - Maximum values:

Ultor voltage ........................................... {14000 max. Volts
8000 min. Volts

Grid No. 4 (focusing) voltage;
  Positive value ...................... 1100 max. Volts
  Negative value ...................... 550 max. Volts

Grid No. 2 voltage ...................... {550 max. Volts
300 min. Volts

Grid No. 1 voltage;
  Negative-peak value ...................... 220 max. Volts
  Negative-bias value ...................... 154 min. Volts
  Positive-bias value ...................... 0 max. Volts
  Positive-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 ulti voltage (Ec_k) between 8000 and 14000 volts and Grid - No. 2 voltage (Ec_k) between 200 and 550 volts.

Grid - No. 4 voltage for focus\(^2\) .................. 0 to 400 Volts

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

See Raster - Cutoff - Range Chart for Grid - Drive Service

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

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

Field strength of adjustable centering magnet\(^3\) . . . 0 to 8 gausses

Examples of Use of Design Ranges:

Ultor voltage\(^5\) ........................................... 10000 Volts

Grid - No. 2 voltage ................................... 400 Volts

Grid - No. 4 voltage for focus\(^2\) .................. 0 to 400 Volts

Grid - No. 1 voltage for visual extinction of focused raster\(^6\) ............... -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 ....................... \{ \begin{align*} 14000 \text{ max.} \\ 8000 \text{ min.} \end{align*} \text{ Volts}
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 ............... \( \{ 700 \text{ max.} \), \( 350 \text{ min.} \)  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 ........................................ \( \{ 6.9 \text{ max.} \), \( 5.7 \text{ min.} \)  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\(^2\) \( (E_{c5} g1) \) between 8000 and 14000 volts and Grid - No. 2 to Grid - No. 1 voltage \( (E_{c2} g1) \) between 400 and 690 volts

Grid - No. 4 to Grid - No. 1 voltage for focus\(^2\) ... 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 \( \mu A \)
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

$E_f = 6.3\ \text{Volts}$
$E_b = 8000 \sim 14000\ \text{Volts (ultor)}$

- Cathode Drive
- Grid Drive

ULTOR MILLIAMPERES

VIDEO SIGNAL VOLTS FROM RASTER CUTOFF

11-1-1963
TOKYO SHIBAURA ELECTRIC CO., LTD.
Raster Cutoff-Range Charts

Grid Drive Service

- $E_f = 6.3$ Volts
- $E_b = 8000 \sim 14000$ Volts (Ultor)
- $E_{e4}$ : Adjusted for focus

Grid No. 2 Volts

Cathode Drive Service

- $E_f = 6.3$ Volts
- $E_b = 8000 \sim 14000$ Volts (Ultor)
- $E_{e4}$ : Adjusted for focus

Cathode to Grid No. 1 Volts

Grid No. 2 to Grid No. 1 Volts
Dimensional Outline

(Dimension in mm & inch)

Screen Diagonal
257 mm Min. (10.12 Min.)

Screen Width
223 mm Min. (8.78 Min.)

586 mm R (23.10 R)
22 mm R (0.87 R)
710 mm R (28.00 R)
580 mm R (22.85 R)
705 mm R (27.76 R)

17 mm R (0.67 R)

243 ± 3 mm (9.57 ± 0.12")
50 mm R (2.00 R) 102°

Reference Line
(Note 2)

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

28.6 ± 1.1 mm
(1.13 ± 0.043")

23.7 mm (0.93")

Y Axis

External Conductive Coating
(Note 4)

For this Contour
Y = 0.576 x^2 + 0.596
(XY in inches)

55 ± 0.4 mm (2.17 ± 0.16")

Ultra Recessed small
Cavity Cap
JEDEC No. J1-21
(Note 1)
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 5: 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.