

TOKYO SHIBAURA ELECTRIC CO., LTD.
KAWASAKI JAPAN

Toshiba

E I A
REGISTRATION DATA

Type **3BHP-**

Date issued May 30 1960



Toshiba 3BHP- is a 3-inch, flat face, single gun, electrostatic and focus cathode-ray tube.

This tube features helical post acceleration, very high deflection sensitivities and half-heater-power.

This tube is particularly suitable for miniaturized (transistorized) oscilloscope in the low voltage operation and also high speed & high precision observation in the high voltage operation.

General :

Heater, for Unipotential Cathode :

Voltage (AC or DC)	6.3 volts
Current	0.3 amp

Direct Interelectrode Capacitances ; Approximate

Cathode to all other electrodes	4 $\mu\text{ft f}$
Grid No. 1 to all other electrodes	6 $\mu\text{ft f}$
D1 to D2	1.7 $\mu\text{ft f}$
D3 to D4	1.2 $\mu\text{ft f}$

D1 to all other electrodes	4.1 $\mu\mu f$
D2 to all other electrodes	4.1 $\mu\mu f$
D3 to all other electrodes	3.1 $\mu\mu f$
D4 to all other electrodes	3.1 $\mu\mu f$
Helical-Post-Accelerator Resistance	min. 30 megohms
Phosphor	
Phosphor Number	P 1 P 2 P 4 P 7 P 11
Fluorescent Color	Green Greenish-yellow White Blue-white Blue
Phosphorescent Color	Green Greenish-yellow White Yellow Blue
Persistence	Medium Long Medium Long Short
Focusing Method	Electrostatic
Deflection Method	Electrostatic
Overall Length	13 $\frac{3}{4}$ " $\pm$ $\frac{3}{8}$ "
Greatest Diameter of Bulb	3" $\pm$ $\frac{1}{8}$ "
Minimum Useful Screen Diameter	2 $\frac{5}{8}$ "
Bulb Contact	J1-21
Base	JEDEC No. B12-37
Basing	14 AQ
Bulb Contact Adjustment	
J1-21 contact aligns with trace of D1-D2 ± 10 degrees.	
J1-21 contact on same side as pin No. 4.	
Base Alignment	
D3-D4 trace aligns with pin No. 1 and tube axis ± 10 degrees.	
Positive voltage on D1 deflects beam approximately toward pin No. 4.	
Positive voltage on D3 deflects beam approximately toward pin No. 1.	
Angle between D1-D2 and D3-D4 traces	90 $\pm$ 2 degrees

Maximum Ratings (Design-center Values):

Post-Accelerator Voltage	7000 max. volts DC
Accelerator Voltage	2000 max. volts DC
Isolation Shield Voltage	2100 max. volts DC
Ratio Post-Accelerator voltage to Accelerator Voltage	6 max.
Grid No. 3 (Focusing Electrode) Voltage	800 max. volts DC
Grid No. 1 Value	
Negative-Bias Value	200 max. volts DC



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Positive-Bias	0 max. volts DC
Positive-Peak Value	2 max. volts
Peak-Heater-Cathode Voltage	
Heater negative with respect to cathode	
During warm-up period not exceed 15 seconds	180 max. volts
After equipment warm-up period	125 max. volts
Heater positive with respect to cathode	125 max. volts
Peak Voltage between Accelerator and any Deflection Electrode	500 max. volts
Accelerator Input	6 max. watts

Characteristics Range Values for Equipment Design :

For any post-accelerator voltage (EC_5) (Note 1) between 1000 and 7000 volts and accelerator voltage (EC_4) (Note 1) 500 and 2000 volts.

Isolation Shield Voltage (Note 2) 95% to 105% of EC_4 volts

Focusing Electrode Voltage 14% to 26% of EC_4 volts

Grid No. 1 Voltage for visual extinction

 of undeflected focused spot -3.0% to -5.5% of EC_4 volts

Focusing Electrode current for any operating condition -15 to +10 μ amp

Deflection Factors (Note 5)

Post-accelerator voltage = Accelerator voltage

D1 and D2 30.2 to 46.3 volts DC/inch/kilo volt of EC_4

D3 and D4 12.7 to 22.9 volts DC/inch/kilo volt of EC_4

Post-accelerator voltage = 6 Accelerator voltage

D1 and D2 65.2 to 85.6 volts DC/inch/kilo volt of EC_4

D3 and D4 23.8 to 34.3 volts DC/inch/kilo volt of EC_4

Useful Scan (Note 5)

Post-accelerator voltage = Accelerator voltage

D1-D2 full screen diameter

D3-D2 $2\frac{3}{8}$ "

Post-accelerator voltage = 6 Accelerator voltage

D1-D2 $2\frac{1}{4}$ "

D3-D4 $1\frac{1}{2}$ "

Spot position (undeflected) (Note 4) 10 max. millimeters

Examples of Use of Design Ranges :

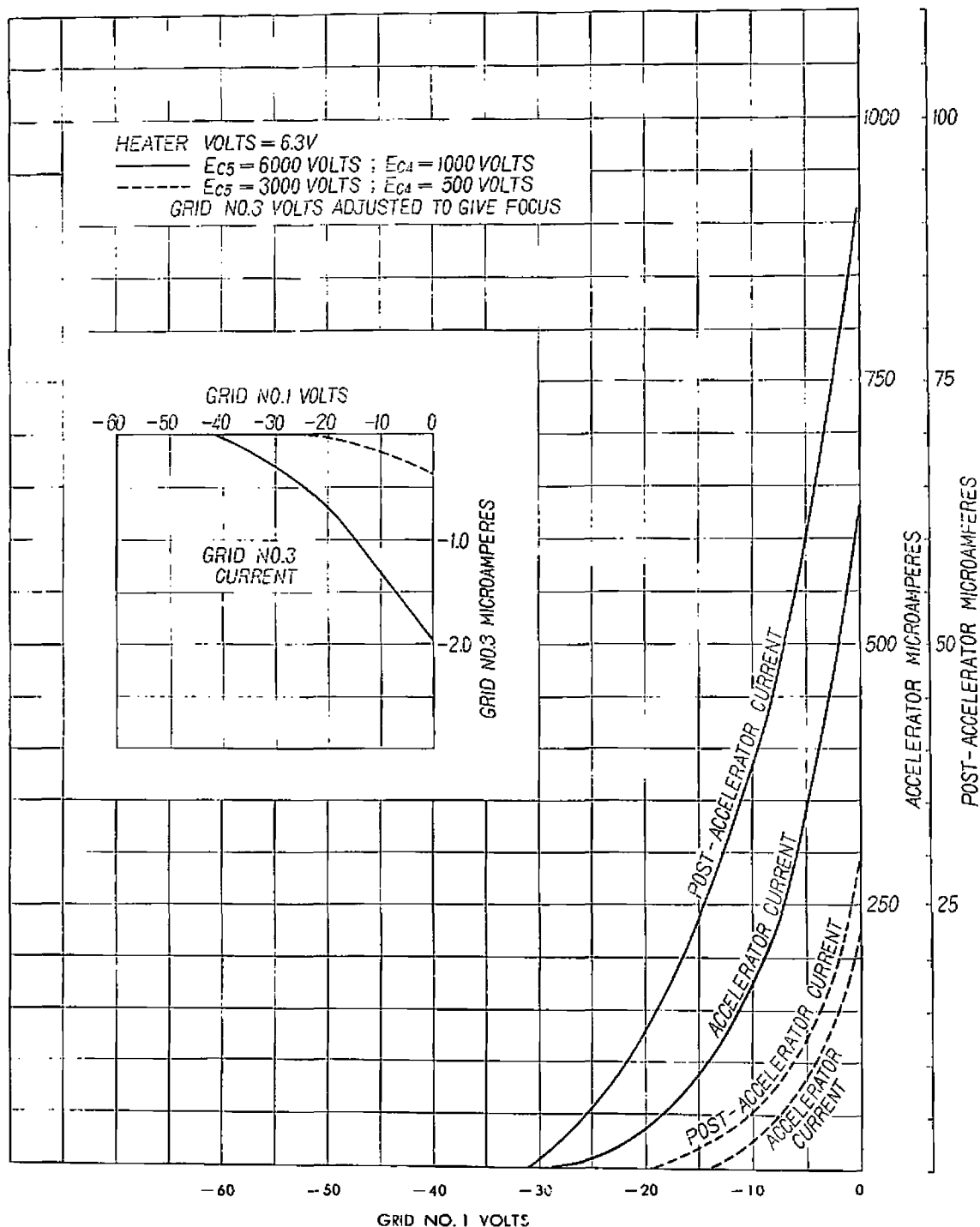
Post-Accelerator Voltage (Note 1)	3000	6000	volts
Isolation Shield Voltage	475 to 525	950 to 1050	volts
Accelerator voltage (Note 3)	500	1000	volts
Grid No. 3 Voltage (Focusing Electrode)	70 to 130	140 to 250	volts
Grid No. 1 Voltage	-15 to -27.5	-30 to -55	volts
<i>Deflection Factors</i>			
D1 and D2	32.6 to 42.8	65.2 to 85.6 volts DC/inch	
D3 and D4	11.9 to 17.2	23.8 to 34.3 volts DC/inch	
Useful Scan D1-D2	2¼"	2¼"	
Useful Scan D3-D4	1½"	1½"	
Pattern Distortion (Note 6)	2	2	% max.

Maximum Circuit Values :

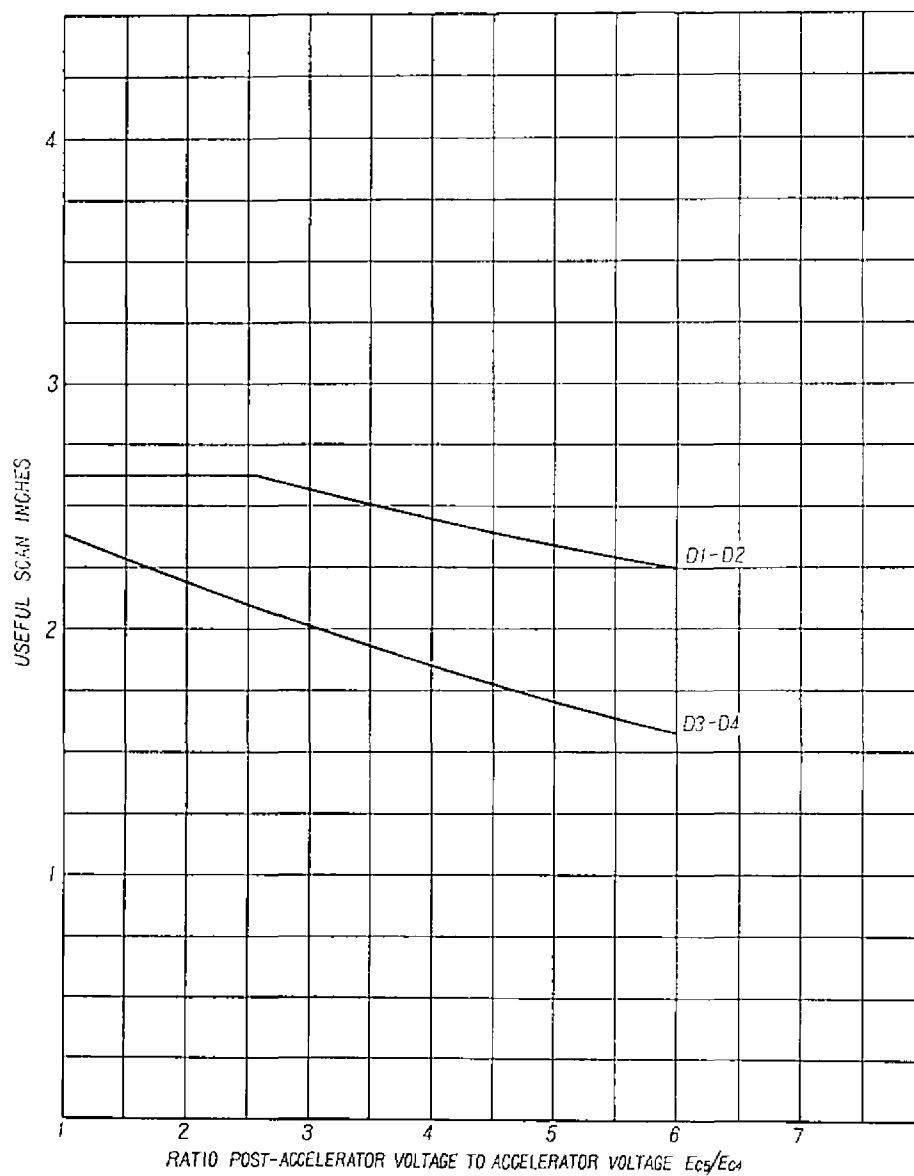
Grid No. 1 Circuit Resistance	1.5 max. megohms
Resistance in any Deflection-Electrode Circuit (Note 4)	5 max. megohms

- NOTES: 1. For P1 and P11 Screens, it is recommended that the post-accelerator voltage be not less than 1000 volts and the accelerator voltage be not less than 500 volts. For P2, P4 and P7 screens, it is recommended that the post-accelerator voltage be not less than 2000 volts.
2. The isolation shield and the lower end of the helical-post-accelerator are connected together within the tube.
With the proper potential on this electrode combination, barrel and pin-cushion distortions are minimized.
3. Connect free deflecting electrode to anode.
4. It is recommended that the deflecting-electrode-circuit resistances be approximately equal.
5. In cases of the operation EC5/EC4 ratio of 1 to 6, Deflection factors characteristics and Useful scan characteristics of following pages are available.
6. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.772" × 1.181" rectangle, will fall within the area bounded by the 1.772" × 1.181" rectangle and an inscribed 1.700" × 1.134" rectangle.

3BH6- AVERAGE CHARACTERISTICS



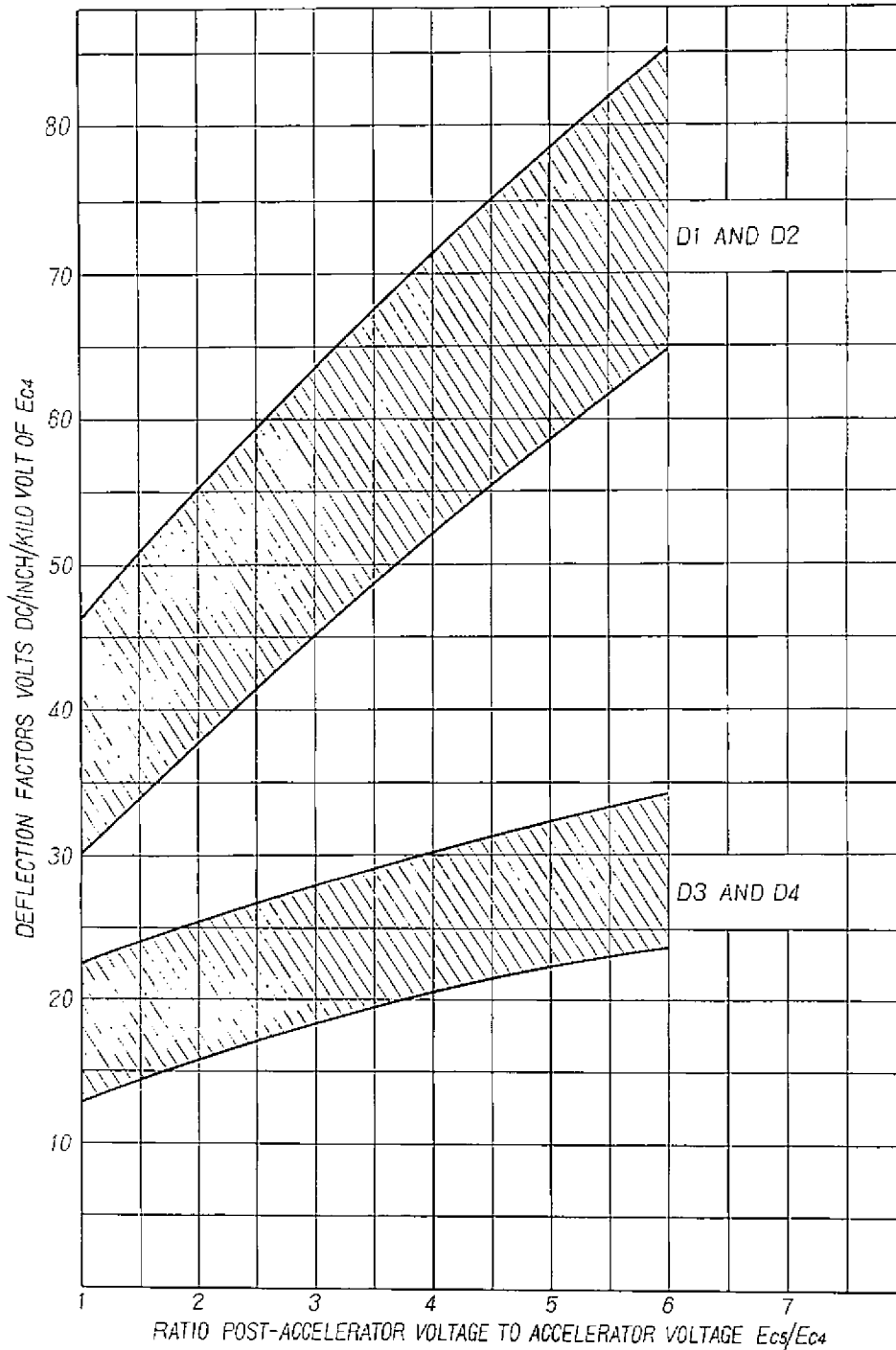
3BHP- USEFUL SCAN CHARACTERISTICS



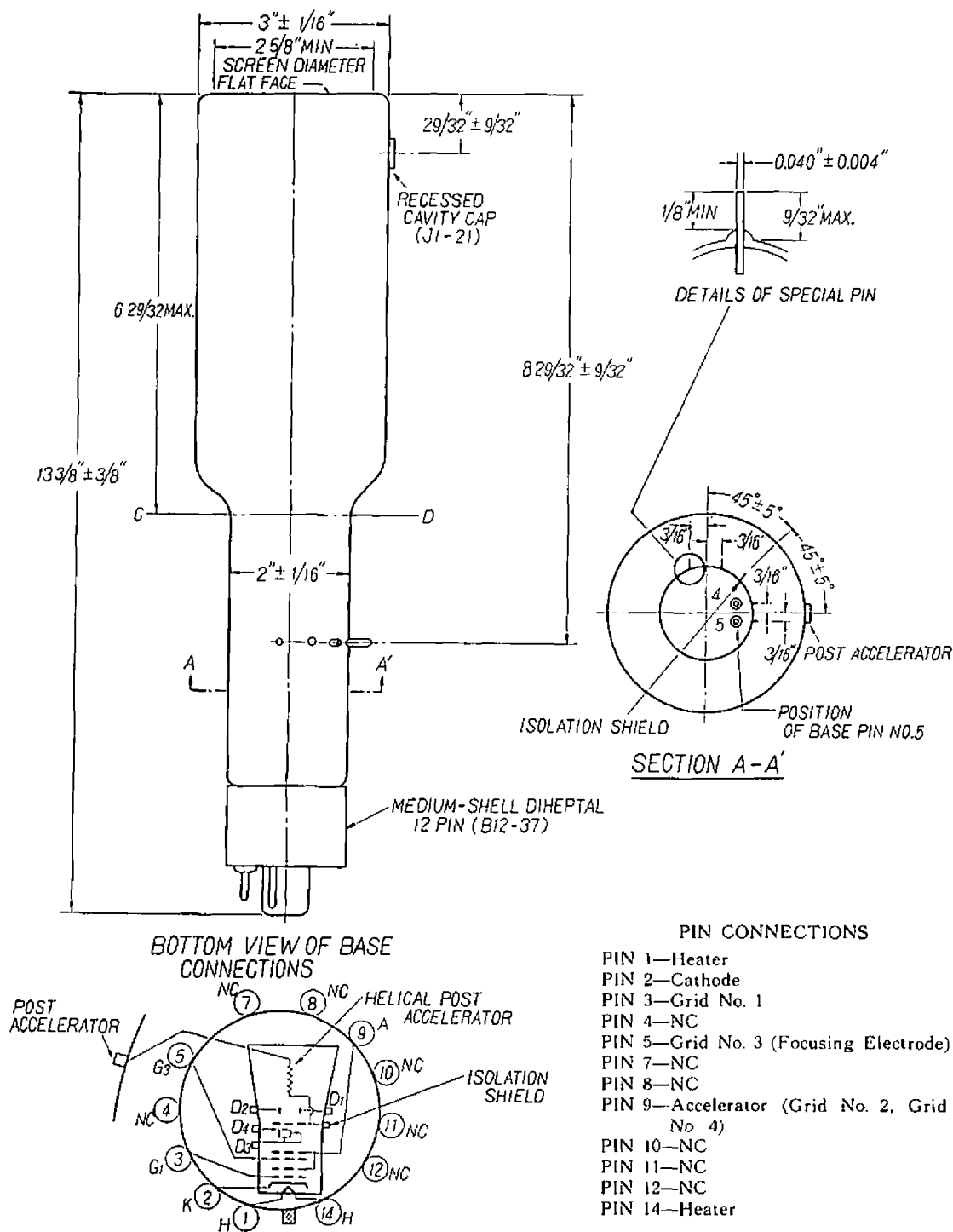


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3BHP- DEFLECTION FACTORS CHARACTERISTICS



DIMENSIONAL OUTLINE OF 3BHP-



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The Toshiba logo is rendered in a classic, elegant script typeface. The word "Toshiba" is written in a fluid, cursive style with a prominent arch over the initial 'T' and a long, sweeping tail on the 'a'. The letters are black and stand out against the white background.

All inquiries as to the data should be addressed to Tokyo Shibaura Electric Co., Ltd., Lamp and Tube Manufacturing and Sales Division, 72 Horikowacho, Kawasaki, Kanagawa-ken, Japan.