

MATSUSHITA ELECTRONICS CORPORATION  
TAKATSUKI JAPAN



E I A

Type 5DQP2

REGISTRATION DATA

Date issued October 21, 1961

National 5DQP2 is a 5-inch flat face oscilloscope tube with single gun, electrostatic focus electrostatic symmetrical deflection, helical post acceleration, metal backed screen and very high deflection sensitivity.

The metal backing of screen further improves the high brightness, and a combination of high deflection sensitivity, the tube can very well be used for high frequency and high writing-speed applications.

ELECTRICAL DATA

Heater Voltage .....	6.3 Volts
Heater Current .....	0.3 ± 10% Amperes
Focusing Method .....	Electrostatic
Deflection Method .....	Double Electrostatic
D <sub>1</sub> — D <sub>2</sub> .....	Symmetric
D <sub>3</sub> — D <sub>4</sub> .....	Symmetric
Direct Interelectrode Capacitances Approximate	
Grid No. 1 to All Other Electrodes .....	6.4 μμ F
Cathode to All Other Electrodes .....	4.6 μμ F
D <sub>1</sub> to D <sub>2</sub> .....	1.9 μμ F
D <sub>3</sub> to D <sub>4</sub> .....	1.5 μμ F
D <sub>1</sub> to All Other Electrodes .....	3.5 μμ F
D <sub>2</sub> to All Other Electrodes .....	3.5 μμ F
D <sub>3</sub> to All Other Electrodes .....	2.8 μμ F
D <sub>4</sub> to All Other Electrodes .....	2.8 μμ F
Helical Post Accelerator Resistance .....	200 to 1000 Megohms

OPTICAL DATA

Phosphor Number	P <sub>2</sub>
Fluorescent Color	Green.....



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Phosphorescent Color	Green
Persistense	Long

**MECHANICAL DATA**

Overall Length ..... 18 1/4 ± 3/16 Inches  
 Greatest Diameter of Bulb ..... 5 1/4 ± 3/32 Inches  
 Minimum Useful Screen Diameter ..... 4 1/2 Inches  
 Base (Medium Shell Diheptal 12 Pin) ..... B 12 — 37 Basing

Base Alignment  
 D<sub>3</sub> — D<sub>4</sub> trace aligns with pin No. 1 and tube axis ± 10 degrees.  
 Positive voltage on D<sub>1</sub> deflects beam approximately toward pin No. 11.  
 Positive voltage on D<sub>3</sub> deflects beam approximately toward pin No. 8.

Bulb Contact ..... J<sub>1</sub> — 21  
 Bulb Contact Alignment  
 J<sub>1</sub> — 21 Contact aligns with trace of D<sub>1</sub> — D<sub>2</sub> ± 10 degrees.  
 J<sub>1</sub> — 21 Contact is on same side as pin No. 4  
 Angle between D<sub>1</sub> — D<sub>2</sub> and D<sub>3</sub> — D<sub>4</sub> Trace ..... 90 ± 2 degrees

**MAXIMUM RATING**

Post-Accelerator Voltage ..... 12000 Max. Volts DC  
 Accelerator Voltage ..... 2100 Max. Volts DC  
 Accelerator Input ..... 6 Max. Watts  
 Ratio Post-Accelerator Voltage to  
     Accelerator Voltage ..... 6 Max.  
 Isolation-Shield Voltage ..... 2200 Max. Volts DC  
 Deflection Plate-Shield Voltage ..... 2100 Max. Volts DC  
 Grid No. 3 (Focusing Electrode) Voltage ..... 800 Max. Volts DC  
 Grid No. 1 Voltages  
     Negative-Bias Value ..... 200 Max. Volts DC  
     Positive-Bias Value ..... 0 Max. Volts DC  
     Positive Peak Value ..... 2 Max. Volts  
 Peak Heater-Cathode Voltages  
     Heater Negative with Respect to Cathode ..... 200 Max. Volts  
     Heater Positive with Respect to Cathode ..... 125 Max. Volts  
 Peak Voltage between Accelerator and any Deflection Electrode ..... 500 Max. Volts

**TYPICAL OPERATING CONDITIONS**

Post Accelerator Voltage (Note 1) ..... 10000 Volts DC  
 Isolation-Shield Voltage (Note 2) ..... 1500 to 1870 Volts DC  
 Deflection Plate-Shield Voltage (Note 3) ..... 1580 to 1760 Volts DC  
 Accelerator Voltage (Note 1) ..... 1670 Volts DC



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Grid No. 3 (Focusing Electrode) Voltage .....	180 to 590 Volts DC
Grid No. 1 Voltage .....	-50 to -80 (Note 4) Volts DC
Deflection Factor $D_1$ and $D_2$ .....	70 to 85 Volts DC per Inch
Deflection Factor $D_3$ and $D_4$ .....	15.0 to 18.3 Volts DC per Inch
Useful Scan $D_1 - D_2$ .....	4 Inches
Useful Scan $D_3 - D_4$ .....	1 5/8 Inches
Focusing Electrode Current for any Operating Condition .....	-15 to +10 Microamperes
Spot Position (Undelected) (Note 5) .....	$\frac{3}{8}$ Inches

For accelerator voltage (Note 1) not shown in the preceding table, the following can be used as a guide.

Isolation-Shield voltage (Note 2) .....	90 to 110% of Accelerator Voltage
Deflection Plate-Shield Voltage (Note 3) .....	95 to 105% of Accelerator Voltage
Grid No. 3 (Focusing Electrode) Voltage .....	10.8 to 35.3% of Accelerator Voltage
Grid No. 1 Voltage (Note 4) .....	-3.0 to -4.8% of Accelerator Voltage

### Deflection Factors

Post Accelerator Voltage = 6 Accelerator Voltage

$D_1$ and $D_2$ .....	42 to 51 Volts DC per Inch per Kilovolt of Accelerator
$D_3$ and $D_4$ .....	9 to 11 Volts DC per Inch per Kilovolt of Accelerator

### Useful Scan

Post Accelerator Voltage = 6 Accelerator Voltage

$D_1 - D_2$ .....	4 Inches
$D_3 - D_4$ .....	1 5/8 Inches

## MAXIMUM CIRCUIT VALUE

Grid No. 1 Circuit Resistance .....	1.5 Max. Megohms
Resistance in any Deflection Electrode Circuit (Note 6) .....	5 Max. Megohms

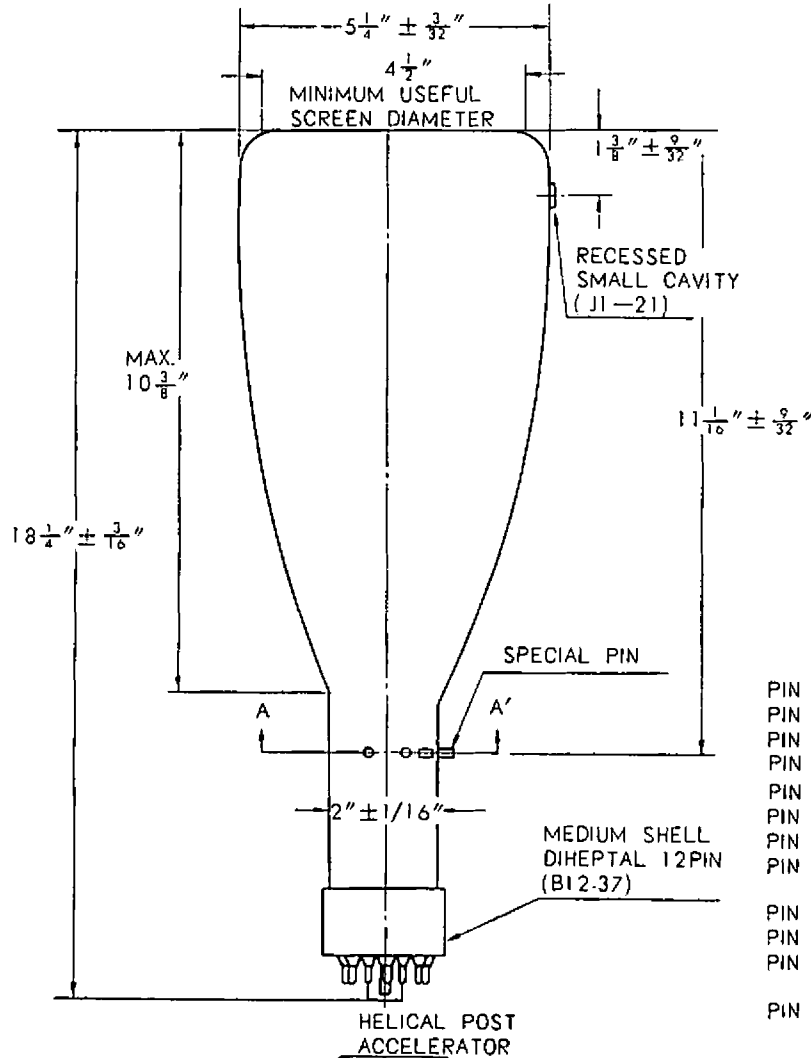
## NOTES

1. It is recommended that the post-accelerator voltage is not less than 6000 volts and the accelerator voltage is not less than 1000 volts, in order to obtain the high light output, because screen of this tube is metalbacked.
2. The isolation-shield and lower end of the helical post-accelerator are connected together in the tube. In general the isolation-shield voltage and the average potential of the deflection plates should be equal. Variation of the isolation-shield voltage serves to correct pin-cushion and barrel-pattern distortion.
3. In general the deflection plate-shield voltage and the average potential of the deflection plates should be equal. Adjustment of the deflection plate-shield voltage provides improved linearity of the vertical deflection.
4. Visual extinction of undeflected focused spot.
5. Connect free deflecting electrode to accelerator.
6. It is recommended that the deflecting circuit resistances are approximately equal.



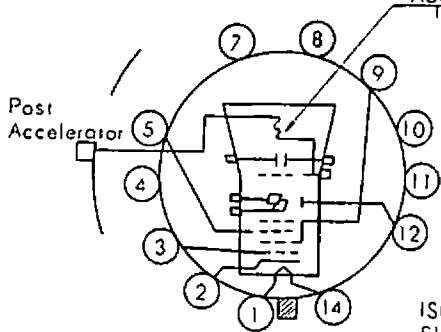
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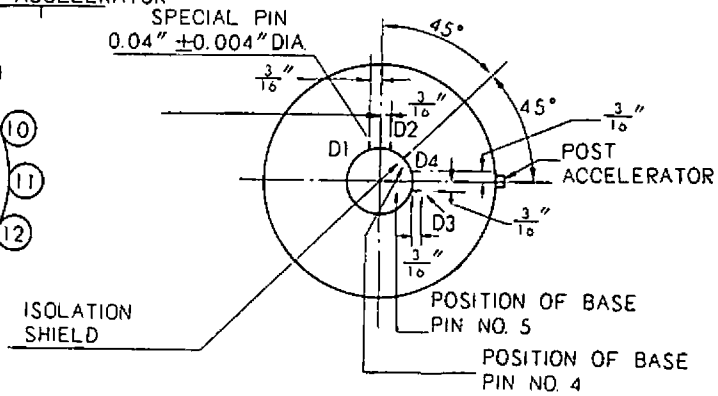


### PIN CONNECTIONS

- PIN 1 —Heater
- PIN 2 —Cathode
- PIN 3 —Grid No. 1
- PIN 4 —N. C.
- PIN 5 —Grid No. 3(Focusing Electrode)
- PIN 7 —N. C.
- PIN 8 —N. C.
- PIN 9 —Accelerator (Grid No. 2 Grid No. 4)
- PIN 10 —N. C.
- PIN 11 —N. C.
- PIN 12 —Deflection Plate-Shield
- PIN 14 —Heater



BOTTOM VIEW OF BASE CONNECTION



SECTION A — A'

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