

ELECTRONIC TUBE REFERENCE

19QP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 monochrome television picture tube using magnetic deflection and high-voltage direct-view operation; manufacturer documentation for 19QP4 provides focusing, deflection, and beam-control characteristics for television picture service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	BASE PINS	6
NOMINAL HEATER	5.3 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	18000 V
MAXIMUM SCREEN VOLTAGE	500 V
CRT ratings, operating conditions, capacitances, and optical/deflection data retained below as parameters.	

19QP4 — Cathode-Ray Picture Tube

The **19QP4** is a direct-view rectangular glass cathode-ray picture tube designed for television display applications. It features a grey filter faceplate, a unipotential cathode, low-voltage electrostatic focusing, and magnetic deflection. The tube is designed to operate with an external single-field ion trap and incorporates an external conductive coating that serves as an electrical component in conjunction with the anode.

Mechanical and Optical Design

The 19QP4 is constructed with a rectangular glass envelope. Its physical dimensions and screen characteristics are highly specified to ensure proper mounting and display area:

- **Overall Length:** $21 \frac{1}{8} \pm \frac{3}{8}$ inches
- **Greatest Bulb Diagonal:** $18 \frac{5}{8} \pm \frac{1}{8}$ inches
- **Greatest Bulb Width:** $17 \frac{1}{16} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Diagonal:** $17 \frac{21}{32}$ inches
- **Minimum Useful Screen Width:** 16 inches
- **Minimum Useful Screen Height:** 12 inches
- **Raster Size:** 12 x 16 inches

The screen utilizes **Phosphor No. 4**, which produces a white fluorescent color and a white phosphorescent color with medium persistence. Deflection is achieved magnetically, with approximate deflection angles of:

- **Horizontal Deflection Angle:** 66 degrees
- **Diagonal Deflection Angle:** 70 degrees

For electrical connection to the high-voltage anode, the tube features a recessed small cavity cap (J1-21) located on the bulb. This contact is aligned with pin position #6 within a tolerance of ± 10 degrees. The base is a small shell duodecal 6-pin configuration (B6-63) with a 12L basing arrangement.

Electrical Connections and Capacitances

The bottom view of the small shell duodecal base provides the following pin connections:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 6	Grid No. 4
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Grid No. 3 / Anode

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 pF
- **Grid No. 1 to all other electrodes:** 6 pF
- **External conductive coating to anode:** 500 pF minimum, 750 pF maximum

The external conductive coating, when combined with the internal anode coating, forms a capacitor that can be utilized for high-voltage filtering in the television receiver power supply.

Maximum Ratings

The following maximum ratings are established under the Design Center system:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere
- **Maximum DC Anode Voltage:** 18,000 Volts
- **Maximum DC Grid No. 4 Voltage:** 500 Volts
- **Maximum DC Grid No. 2 Voltage:** 410 Volts
- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-bias value:** 125 Volts
 - **DC Positive-bias value:** 0 Volts
 - **Positive-peak value:** 2 Volts
- **Maximum DC Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode during warm-up period (not to exceed 15 seconds):** 410 Volts
 - **Heater negative with respect to cathode after equipment warm-up period:** 150 Volts
 - **Heater positive with respect to cathode:** 150 Volts

The maximum allowable circuit resistance for Grid No. 1 is **1.5 Megohms**.

Typical Operating Conditions

Under typical operating conditions, the 19QP4 is configured with the following electrical parameters:

- **DC Anode Voltage:** 12,000 Volts
- **DC Grid No. 4 Voltage:** -50 to +350 Volts (measured with the anode current set to 100 μ A)
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage:** -33 to -77 Volts (required for visual extinction of the undeflected focused spot)
- **DC Ion Trap Current:** Approximately $75 \pm 50\%$ mA when using a Standard Coil No. 111

The electrostatic focusing system utilizes Grid No. 4 to control focus, allowing adjustment within the specified range to achieve optimal spot sharpness. The external single-field ion trap requires a standard coil operating at the specified current to prevent ion burn on the phosphor screen.

Technical Summary

The **19QP4** is a rectangular glass cathode-ray picture tube featuring a 12" x 16" raster size, low-voltage electrostatic focus, and magnetic deflection. Operating with a 6.3 V, 0.6 A heater, it is designed for television applications requiring a medium-persistence white display (Phosphor No. 4). Its design

incorporates an external single-field ion trap and an external conductive coating to assist in anode filtering. With a maximum design-center anode rating of 18,000 V and typical operation at 12,000 V, the 19QP4 provides a standardized display solution for television receivers of its era.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC anode voltage	12000 V	Typical

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	66 degree	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes	5 pF	—



SOURCE OPERATING CONDITIONS

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1966 Tung Sol Electronic Tubes 4 of 4

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE	5.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER POSITIVE WITH RESPECT TO CATHODE	15 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE VOLTAGE	12 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #4 VOLTAGE A – value 1	4 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #4 VOLTAGE A – value 2	-5 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #4 VOLTAGE A – value 3	350 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #2 VOLTAGE – value 2	3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.J – value 1	111 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.J – value 2	75 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.J – value 3	50 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC ANODE VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #4 VOLTAGE – value 1	4 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #4 VOLTAGE – value 2	5 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #2 VOLTAGE – value 2	41 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 1	1 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

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