

ELECTRONIC TUBE REFERENCE

# 4BN6

Voltage - Radio Detector Converter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION  
CONSTRUCTION  
TETRODE

Gated-beam FM and intercarrier-sound discriminator tube for limiter-discriminator service in television and FM receivers, combining detection and signal processing in one specialized beam structure.

## GENERAL CHARACTERISTICS

|                     |                   |                      |         |
|---------------------|-------------------|----------------------|---------|
| BASE DESIGNATION    | 7DF               | BASE PINS            | 7       |
| NOMINAL HEATER      | 4.2 V / 450 mA    | PARALLEL HEATER      | – / –   |
| HEATING             | Indirect          | SERIES OPERATION     | Capable |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar |

## 7DF - TERMINAL PINOUT

| TERMINAL  | SECTION | ELEMENT              | STATUS    |
|-----------|---------|----------------------|-----------|
| PIN1 – IS | A       | IS – Internal Screen | CONNECTED |
| PIN1 – K  | A       | K – Cathode          | CONNECTED |
| PIN2 – G1 | A       | G1 – Control Grid    | CONNECTED |
| PIN3 – H  | –       | H – Heater           | CONNECTED |
| PIN4 – H  | –       | H – Heater           | CONNECTED |
| PIN5 – G2 | A       | G2 – Screen Grid     | CONNECTED |
| PIN6 – G3 | A       | G3 – Suppressor Grid | CONNECTED |
| PIN7 – P  | A       | P – Plate (Anode)    | CONNECTED |

## SECTION RATINGS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>SECTION1</b> Tetrode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |
| <b>MAXIMUM PLATE VOLTAGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 300 V |
| <b>MAXIMUM SCREEN VOLTAGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 150 V |
| <b>MAXIMUM PLATE DISSIPATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.5 W |
| <b>MAXIMUM CATHODE CURRENT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 13 mA |
| <b>MAXIMUM HEATER-CATHODE VOLTAGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 200 V |
| <b>WARM-UP TIME</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 11 s  |
| <p><i>Tung-Sol 4BN6 gated-beam electrostatic-deflection FM discriminator combining limiting, frequency detection and audio voltage amplification, particularly intercarrier-sound TV service. Heater 4.2 V 450 mA for controlled approximately 11-second warm-up in 450 mA series-heater strings. Maximum plate SUPPLY voltage 330 V is not identical to a maximum actual plate-electrode voltage; existing 300 V promoted plate limit retained. Manufacturer gives grid voltage max 110 V, peak positive limiter-grid 60 V and DC cathode current maximum 13 mA. Typical 10.7 MHz <math>\pm</math>75 kHz or 4.5 MHz <math>\pm</math>25 kHz limiter-discriminator operating modes have conditional plate-supply and load-resistor specifications. Existing physical Tetrode section and parent RadioDetectorConverter classification retained because this catalog lacks a specific gated-beam discriminator section/type. Capacitances and shielding of limiter/quadrature grids documented.</i></p> |       |

Beam tube used as a combined limiter, discriminator, and audio-voltage amplifier in intercarrier television and FM receivers.



## 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 · Tetrode

| CHARACTERISTIC     |                 |                  |
|--------------------|-----------------|------------------|
| PARAMETER          | PUBLISHED VALUE | CONDITION / NOTE |
| Heater Warmup Time | 11 s            | —                |



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1965 Westinghouse Data Book

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

1965 WESTINGHOUSE DATA BOOK

## Section 1 · Tetrode

| CHARACTERISTICS |                 |                  |
|-----------------|-----------------|------------------|
| PARAMETER       | PUBLISHED VALUE | CONDITION / NOTE |
| Heater Voltage  | 4.2 V           | —                |
| Heater Current  | 450 mA          | —                |

| OTHER                         |                 |                  |
|-------------------------------|-----------------|------------------|
| PARAMETER                     | PUBLISHED VALUE | CONDITION / NOTE |
| Maximum Plate Voltage         | 300 V           | —                |
| Maximum Plate Dissipation     | 1.5 W           | —                |
| Input Signal Center Frequency | 10.7 MHz        | FMDetector       |
| Frequency Deviation           | 75 kHz          | FMDetector       |
| Plate Supply Voltage          | 285 V           | Representative   |
| Plate Voltage                 | 122 V           | Representative   |

| PARAMETER           | PUBLISHED VALUE | CONDITION / NOTE |
|---------------------|-----------------|------------------|
| Accelerator Voltage | 100 V           | Representative   |



SOURCE DATA APPENDIX

#### SOURCE OPERATING CONDITIONS

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# 1966 Tung Sol Electronic Tubes 1 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 1 OF 4

## Section 1 · Tetrode

| OTHER              |                                                    |                  |
|--------------------|----------------------------------------------------|------------------|
| PARAMETER          | PUBLISHED VALUE                                    | CONDITION / NOTE |
| Application        | Gated-beam FM and intercarrier sound discriminator | Section1         |
| Plate voltage      | 100 V                                              | FMDiscriminator  |
| Screen voltage     | 100 V                                              | FMDiscriminator  |
| Limiter-grid drive | As specified in source                             | FMDiscriminator  |

| CHARACTERISTIC      |                 |                  |
|---------------------|-----------------|------------------|
| PARAMETER           | PUBLISHED VALUE | CONDITION / NOTE |
| Heater warm-up time | 11 s            | Section1         |



SOURCE DATA APPENDIX

#### SOURCE OPERATING CONDITIONS

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# 1971 RCA HB3 Binder 4 of 7

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

1971 RCA HB3 BINDER 4 OF 7

## Section 1 · Tetrode

| OTHER          |                 |                                   |
|----------------|-----------------|-----------------------------------|
| PARAMETER      | PUBLISHED VALUE | CONDITION / NOTE                  |
| Heater Current | 420 mA–480 mA   | Published nominal $\pm$ tolerance |
| Heater Voltage | 4.2 V           | At heater current 0.45 A          |

| PARAMETER                          | PUBLISHED VALUE | CONDITION / NOTE                                                        |
|------------------------------------|-----------------|-------------------------------------------------------------------------|
| Warm-Up Time                       | 11 s            | Average                                                                 |
| Plate Supply Voltage               | 330 V           | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Limiter Grid Peak Positive Voltage | 60 V            | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Cathode Current                    | 13 mA           | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Plate Voltage                      | 122 V           | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Accelerator Voltage                | 100 V           | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Cathode Bias Resistor Minimum      | 200 $\Omega$    | Inherited from explicitly referenced 6-volt parent type; heater variant |
| Cathode Bias Resistor Maximum      | 400 $\Omega$    | Inherited from explicitly referenced 6-volt parent type; heater variant |



## SOURCE OPERATING CONDITIONS

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# 1975 RCA RC30

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

1975 RCA RC30

## Section 1 · Tetrode

| OTHER                               |                 |                                                             |
|-------------------------------------|-----------------|-------------------------------------------------------------|
| PARAMETER                           | PUBLISHED VALUE | CONDITION / NOTE                                            |
| Plate Current                       | 9 mA            | Published in approved 6KS6 target datasheet entry; Section1 |
| Grid-Circuit Resistance             | 0.5 M $\Omega$  | Published in approved 6KS6 target datasheet entry; Section1 |
| Heater Voltage (ac/dc) 3.15 4.2 6.3 | 12.6 V          | Published in approved 6KS6 target datasheet entry; Section1 |
| Heater Current 0.6 0.45 0.3         | 150 mA          | Published in approved 6KS6 target datasheet entry; Section1 |
| age) 11                             | 11 seconds      | Published in approved 6KS6 target datasheet entry; Section1 |
|                                     |                 |                                                             |

| PARAMETER                                               | PUBLISHED VALUE                  | CONDITION / NOTE                                            |
|---------------------------------------------------------|----------------------------------|-------------------------------------------------------------|
| Plate-Supply Voltage                                    | <b>330 V</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |
| Grid-No.2 Voltage                                       | <b>110 V</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |
| Grid-No. 1 Voltage, Positive peak value                 | <b>60 V</b>                      | Published in approved 6KS6 target datasheet entry; Section1 |
| Cathode Current                                         | <b>13 mA</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |
| Heater Voltage (ac/dc) 6.3                              | <b>8.4 V</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |
| Heater Current 0.6                                      | <b>450 mA</b>                    | Published in approved 6KS6 target datasheet entry; Section1 |
| Heater Warm-up Time (Average) 11                        | <b>11 seconds</b>                | Published in approved 6KS6 target datasheet entry; Section1 |
| Plate Voltage                                           | <b>330 V</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |
| Grid Voltage -1                                         | <b>-3 V</b>                      | Published in approved 6KS6 target datasheet entry; Section1 |
| Plate Resistance (Approx.) 21000                        | <b>28000 <math>\Omega</math></b> | Published in approved 6KS6 target datasheet entry; Section1 |
| 3600                                                    | <b>2600 <math>\mu S</math></b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Plate Current 1.6                                       | <b>1.6 mA</b>                    | Published in approved 6KS6 target datasheet entry; Section1 |
| Grid Voltage (Approx.) for plate current of 10 /iA -2.6 | <b>-5.5 V</b>                    | Published in approved 6KS6 target datasheet entry; Section1 |
| Peak                                                    | <b>54 mA</b>                     | Published in approved 6KS6 target datasheet entry; Section1 |

| CAPACITANCE                        |                 |                                                             |
|------------------------------------|-----------------|-------------------------------------------------------------|
| PARAMETER                          | PUBLISHED VALUE | CONDITION / NOTE                                            |
| Internal Shield                    | <b>3.3 pF</b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Triode Grid to Triode Plate        | <b>2.6 pF</b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Triode Grid to Cathode and Heater  | <b>3.6 pF</b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Triode Plate to Cathode and Heater | <b>0.26 pF</b>  | Published in approved 6KS6 target datasheet entry; Section1 |
|                                    |                 |                                                             |

| PARAMETER                                                 | PUBLISHED VALUE | CONDITION / NOTE                                            |
|-----------------------------------------------------------|-----------------|-------------------------------------------------------------|
| Diode Cathode to All Other Electrodes (Each Diode Unit)   | <b>5 pF</b>     | Published in approved 6KS6 target datasheet entry; Section1 |
| Diode Plate to Diode Cathode and Heater (Each Diode Unit) | <b>1.9 pF</b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Diode Cathode to Diode Plate and Heater (Each Diode Unit) | <b>4.8 pF</b>   | Published in approved 6KS6 target datasheet entry; Section1 |
| Diode Plate to All Other Electrodes (Each Diode Unit)     | <b>3 pF</b>     | Published in approved 6KS6 target datasheet entry; Section1 |

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