

SPECIAL QUALITY U.H.F. TRIODE

5718

Special quality subminiature medium- μ triode for use as an oscillator at frequencies up to 500Mc/s in equipment where high ambient temperatures, mechanical vibration and shocks are unavoidable and where statistically controlled major electrical characteristics are required.

This data should be read in conjunction with GENERAL NOTES—SPECIAL QUALITY VALVES which precede this section of the handbook, and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

| | | |
|---------|-----|----|
| V_h^1 | 6.3 | V |
| I_h | 150 | mA |

MOUNTING POSITION

Any

Note—Direct soldered connections to the leads of this valve must be at least 5mm from the seal and any bending of the valve leads must be at least 1.5mm from the seal.

CAPACITANCES² (measured without external shield)

| | | |
|------------|-----|-----|
| $C_{a\ g}$ | 1.3 | pF |
| C_{in} | 2.3 | pF |
| C_{out} | 800 | mpF |

CHARACTERISTICS³

| | | |
|-----------------------|------|------------|
| V_a | 100 | V |
| V_g | -1.3 | V |
| I_a | 8.5 | mA |
| g_m | 5.8 | mA/V |
| r_a | 4.7 | k Ω |
| μ | 27 | |
| R_k | 0 | Ω |
| $V_g(I_a < 100\mu A)$ | -7.0 | V |

LIMITING VALUES⁴ (absolute ratings)

| | | |
|---|-----|-------------|
| $V_{h\ max.}$ | 6.6 | V |
| $V_{h\ min.}$ | 6.0 | V |
| $V_{a(b)\ max.}$ | 330 | V |
| $V_a\ max.$ | 165 | V |
| $p_a\ max.$ | 900 | mW |
| $+V_g\ max.$ | 0 | V ← |
| $-V_g\ max.$ | 55 | V |
| $I_a\ max.$ | 22 | mA |
| $I_g\ max.$ | 5.5 | mA |
| $R_{g-k}\ max.$ | 1.2 | M Ω |
| $V_{h-k}\ max.$ | 200 | V |
| Maximum acceleration (continuous operation) | 2.5 | g |
| Maximum shock (short duration) | 500 | g |
| $T_{bulb\ max.}$ | 220 | $^{\circ}C$ |

TEST CONDITIONS (unless otherwise specified)

| | V_h (V) | V_{a-e} (V) | V_{g-e} (V) | R_k (Ω) | C_k (μF) | V_{h-k} (V) | Lot average ⁷ | | Lot standard deviation ⁸ Max. | |
|--|---------------------|------------------|--------------------------|-----------------------|----------------------|------------------|--------------------------|------|--|---------|
| | | | | | | | Min. | Max. | | |
| | 6.3 | 100 | 0 | 150 | 1000 | 0 | | | | |
| TESTS | | | | | | | | | | |
| | A.Q.L. ⁵ | | Individuals ⁶ | | Bogey ⁹ | | Lot average ⁷ | | Lot standard deviation ⁸ Max. | |
| | (%) | | Min. Max. | | Min. Max. | | Min. Max. | | | |
| GROUP A | | | | | | | | | | |
| Heater current | | | | 0.65 | 150 | 140 | 160 | 144 | 156 | — |
| Heater-to-cathode leakage current | | | | 0.65 | — | — | 5.0 | — | — | — |
| $V_{h-k} = \pm 100V$ | | | | | | | | | | μA |
| Reverse grid current | | | | 0.65 | — | 0 | 0.4 | — | — | μA |
| $V_{a-e} = 150V, R_k = 380\Omega$ | | | | | | | | | | |
| Anode current | | | | 0.65 | 8.5 | 6.0 | 11 | 7.5 | 9.5 | — |
| | | | | | — | — | — | — | — | 1.1 |
| Anode current $V_g = -7.0V, R_k = 0\Omega$ | | | | 0.65 | — | — | 100 | — | — | μA |
| Mutual conductance | | | | 0.65 | 5.8 | 4.8 | 6.8 | 5.4 | 6.2 | — |
| | | | | | — | — | — | — | — | 0.4 |
| Sub-group quality level ¹⁰ | | | | 1.0 | — | — | — | — | — | mA/V |
| Inoperatives ¹⁶ | | | | 0.4 | — | — | — | — | — | mA/V |

GROUP B

Insulation

a-rest, measured at -300V
g-rest, measured at -100V

} 2.5 {

100
100

—
—
—
—

MΩ
MΩ

Anode current $V_g = -4V$, $R_k = 0Ω$

2.5

20

—
—
—
—

μA

Change in mutual conductance $V_h = 5.7V$

2.5

—

10

—
—
—
—

%

Reverse grid current $V_h = 7.5V$, $V_{g-e} = -7.0V$
 $R_g = 1.0MΩ$. Measured after 5 minutes pre-
heat under standard test conditions, except
 $V_h = 7.5V$, $R_g = 1.0MΩ$

2.5

0

0.4

—
—
—
—

μA

†A.F. noise at anode, $R_g = 100kΩ$, $R_a = 10kΩ$
 $V_g = -4V$, $R_k = 0Ω$

2.5

—

50

—
—
—
—

mV

Amplification factor

6.5

23

31

—
—
—
—

—

Power oscillation

$f = 500Mc/s$, $V_a = 150V$,
 R_g adjusted to give $I_a = 20mA$

6.5

—

600

—
—
—
—

mW

Capacitances² (unshielded). No applied voltages

C_{in}

—

1.6

—

2.8

—
—
—
—

pF

C_{out}

—

500

—

900

—
—
—
—

mpF

C_{a-g}

—

1.1

—

1.8

—
—
—
—

pF

Low pressure voltage breakdown

Pressure = 55 ± 5mmHg
Voltage = 300V r.m.s. No other applied
voltages

6.5

—

—

—
—
—
—

—

Microphonic noise at the anode at 50c/s,
15g min peak acceleration, $R_a = 10kΩ$

2.5

—

25

—
—
—
—

mV

(r.m.s.)

†The valve is tapped with a specified hammer and the output observed on a meter of specified dynamic response.

| TESTS | A.Q.L. ⁵ (%) | Individuals ⁶ | | Lot average ⁷ | | Lot standard deviations ⁸ Max. |
|--|----------------------------|--------------------------|------|--------------------------|------|---|
| | | Bogey ⁹ | Min. | Max. | Min. | |
| GROUP C | | | | | | |
| Lead fragility test ^{13B} 4 arcs | 2.5 | — | — | — | — | — |
| Fatigue¹⁴ | | | | | | |
| $V_{h-k} = 6.3V$. No other voltages applied. 2.5g min. peak acceleration, fixed frequency $f = 25c/s$ min. 60c/s max. for 32 hours in each of 3 mutually perpendicular planes | | | | | | |
| Post fatigue tests | | | | | | |
| Heater-to-cathode leakage current $V_{h-k} = \pm 100V$. | } 6.5 { | — | — | — | — | — |
| Change in mutual conductance | | — | — | — | — | — |
| Microphonic noise as in group B | | — | — | — | — | — |
| Shock¹⁵ | | | | | | |
| $V_{h-k} = 100V$ (cathode negative), $R_g = 100k\Omega$, 500g | | | | | | |
| Post shock tests | | | | | | |
| Heater-to-cathode leakage current $V_{h-k} = \pm 100V$ | } 20 { | — | — | — | — | — |
| Change in mutual conductance | | — | — | — | — | — |
| Microphonic noise as in group B | | — | — | — | — | — |
| Glass strain test ^{11B} . No applied voltages | 6.5 | — | — | — | — | — |

GROUP D**Heater cycling life test**

$V_h = 7.0V$, 1 minute on, 4 minutes off
 $V_{h-k} = 140V$ r.m.s. (continuous). No other applied voltages

2.5

Stability life test¹⁴

Running conditions $R_g = 1.0M\Omega$,
 $V_{h-k} = 200V$ (cathode negative),
 $T_{ambient} = \text{Room temperature}$

Stability life test end points

Change in mutual conductance after 1 hour 1.0 10

%

Survival rate life test¹⁴

Running conditions $R_g = 1.0M\Omega$,
 $V_{h-k} = 200V$ (cathode negative),
 $T_{ambient} = \text{Room temperature}$

Survival rate life test end points (100 hours)Inoperatives¹⁶ 0.65 1.0

Mutual conductance

4.5

Min.

Max.

mA/V

Intermittent life test

Running conditions, $R_g = 1.0M\Omega$,
 $V_{h-k} = 200V$ (cathode negative),
 $T_{bulb \text{ min.}} = 220^\circ C$

Intermittent life test end points (500 hours)Inoperatives¹⁶

Heater current

Heater-to-cathode leakage current $V_{h-k} = \pm 100V$ Reverse grid current $R_g = 1.0M\Omega$

Change in mutual conductance (individuals)

Change in mutual conductance $V_h = 5.7V$

Insulation as in group B.

Average change in mutual conductance

Sub-group quality level¹⁰

2.5

4.0

4.0

2.5

2.5

4.0

4.0

—

10

mA

 μA

%

%

 $M\Omega$

%

164

10

0.6

20

15

15

—

138

—

0

—

—

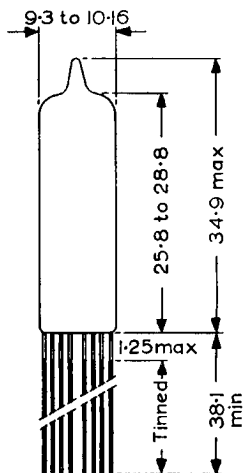
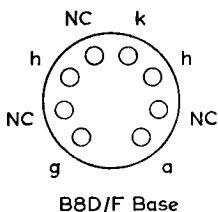
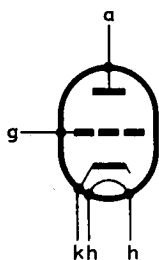
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A.Q.L.⁵

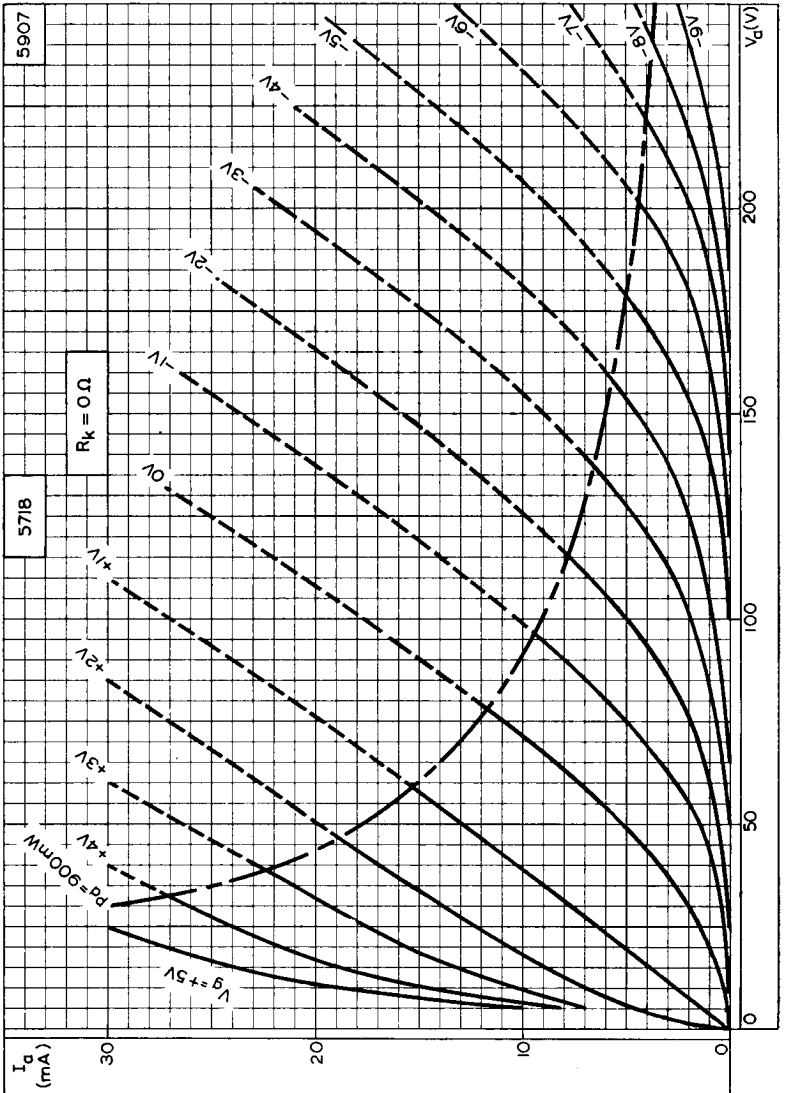
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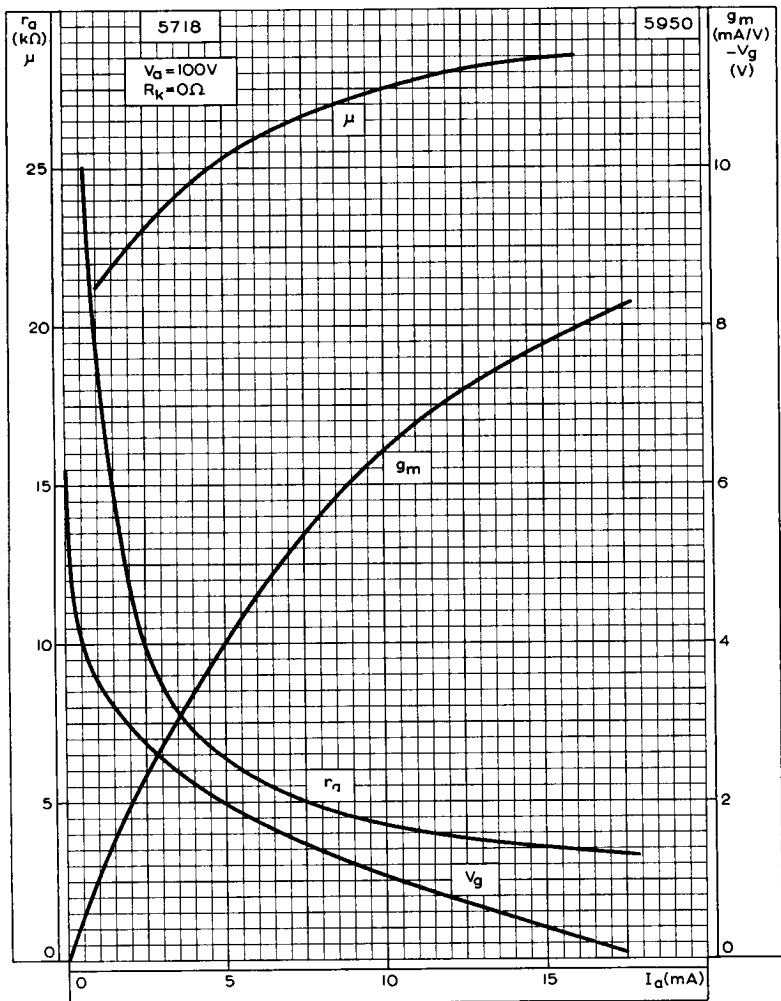


All dimensions in mm

The base and bulb dimensions of this valve are in accordance with BS.448, Section B8D/F.



ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH GRID VOLTAGE AS PARAMETER



ANODE IMPEDANCE, MUTUAL CONDUCTANCE, GRID VOLTAGE AND AMPLIFICATION FACTOR PLOTTED AGAINST ANODE CURRENT

