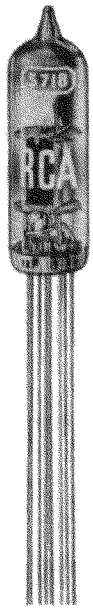
5718

MEDIUM-MU TRIODE

"Premium" Subminiature Type

TENTATIVE DATA

RCA-5718 is a medium-mu subminiature triode of the heater-cathode type designed primarily for use as an rf power amplifier and oscillator in uhf applications where dependable performance under shock and vibration is a major consideration. It is capable of giving a useful power output of nearly one watt at a frequency of 500 megacycles per second. Operation with full input is permissible up to 1000 megacycles per second.



Actual Size

The 5718 features high transconductance, a pure-tungsten heater to give long life under conditions of frequent on-off switching, and a compact design in which special attention has been given to structural details which provide increased mount strength against shock and vibration. In addition, each tube is manufactured under rigid controls and undergoes rigorous tests to insure long and dependable performance.

Because of its high transconductance, the 5718 is suitable for use in cathode follower, multivibrator, and blocking oscillator circuits. It is also useful as a resistance-coupled amplifier.

The 5718 has been combined with and supersedes the 5897.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 5%	volts
Current		0.150	ampere
Direct Interelectrode Capacitances:	*With External Shield*[o]	*Without External Shield*	
Grid to Plate	1.3	1.4	μμf
Input	2.4	2.2	μμf
Output	2.4	0.7	μμf

[o] Having inside diameter of 0.405" and connected to lead No. 5.

Characteristics, Class A$_1$ Amplifier:

Plate Voltage	100	150	volts
Cathode Resistor	150	180	ohms
Amplification Factor	27	27	
Plate Resistance	4650	4150	ohms
Transconductance	5800	6500	μmhos
Plate Current	8.5	13.0	ma
Grid Volts (Approx.) for plate current of 10 μamp	-7	-11	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" ± 0.060"
Diameter	0.383" ± 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline

AMPLIFIER - Class A$_1$

Maximum Ratings, *Absolute Values*:

DC PLATE VOLTAGE	165 max.	volts
PLATE DISSIPATION	3.3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See Chart on Page 2

Maximum Circuit Values:

Grid-Circuit Resistance:
- For cathode-bias operation . . . . 1.2 max. megohms
- For fixed-bias operation . . . . . Not recommended

Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

RF AMPLIFIER and OSCILLATOR - CLASS C

Maximum Ratings, *Absolute Values*:

DC PLATE VOLTAGE	165 max.	volts
DC GRID VOLTAGE	-55 max.	volts
DC PLATE CURRENT	22 max.	ma
DC GRID CURRENT	5.5 max.	ma
PLATE DISSIPATION	3.3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:
- For cathode-bias operation . . . . 1.2 max. megohms
- For fixed-bias operation . . . . . Not recommended

Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance	2	1.1	1.8	μμf
Input Capacitance	2	1.6	2.8	μμf
Output Capacitance	2	0.5	0.9	μμf
Amplification Factor	1,3	23	31	
Plate Current	1,3	6.0	11.0	ma
Plate Current	1,4	-	100	μamp
Transconductance	1,3	4800	6800	μmhos
Transconductance	5,3	4500	-	μmhos
Grid Current	1,6	-	±0.4	μamp

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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CHARACTERISTICS RANGE VALUES (Cont'd)

	Note	Min.	Max.	
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode. . .	1,7	-	7.0	μamp
Heater positive with respect to cathode. . .	1,8	-	7.0	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied .	1,9	100	-	megohms
Between Plate and All Other Electrodes Tied .	1,10	100	-	megohms
Useful Power Output. . . .	1,11	600	-	mw

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Without external shield.

Note 3: With dc plate voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

Note 4: With dc plate voltage of 100 volts, and dc grid voltage of -7 volts.

Note 5: With 5.5 volts ac or dc on heater.

Note 6: With dc plate voltage of 100 volts, cathode resistor of 150 ohms, and grid resistor of 0.5 megohm.

Note 7: With -100 volts dc between heater and cathode.

Note 8: With +100 volts dc between heater and cathode.

Note 9: With grid 100 volts negative with respect to all other electrodes tied together.

Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

Note 11: In self-excited oscillator with dc plate voltage of 150 volts, grid resistor and feedback optimized to give useful power output at a plate current of 20 ma. and frequency of 500 Mc.

SPECIAL TESTS

Shock Test:

Impact Acceleration. . . . . 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to the specified impact acceleration.

Fatigue Test:

Vibrational Acceleration . . . . . 2.5 max. g

Tubes are rigidly mounted and subjected to the specified maximum vibrational acceleration at 60 cycles per second for 32 hours in each of three positions.

Uniform Acceleration Test. . . . . . 1000 max. g

Tubes are subjected to a gradually applied uniform acceleration in each of three positions.

High-Frequency Vibration Test:

RMS Output Voltage . . . . . 25 max. mv

Under the following conditions: A 150-volt plate voltage supply having an impedance not exceeding that of a 40 μf capacitor, plate load resistance of 10000 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Test:

Cycles of Intermittent Operation . . 2500 min. cycles

Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate and grid voltage = 0 volts.

Average Life Test Performance:

The average life test performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150-ohms; and grid resistor of 1 megohm.

The 500-hour end-point limits for the 5718 with heater voltage of 6.3 volts, plate voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3500 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid current not to exceed +1.0 microampere maximum or -1.0 microampere maximum.

OPERATING NOTES

The *maximum ratings* in the tabulated data for the 5718 are limiting values above which the serviceability of the 5718 may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual condition of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

The *heater supply* should be well regulated because life and reliability of the 5718 are adversely affected by departures from the 6.3-volt value. The extent to which life is affected is a function of the amounts of these departures and their durations.

The *flexible leads* of the 5718 are usually soldered to the circuit elements. Soldering of the connections should be made as far as possible from the glass button. If this precaution is not followed, the heat of the soldering may crack the glass seals of the leads and damage the tube.

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	100						200						volts
Plate Load Resistor	0.047		0.10		0.27		0.047		0.10		0.27		megohm
Grid Resistor (of following stage)	0.10	0.27	0.27	0.47	0.27	0.47	0.10	0.27	0.27	0.47	0.27	0.47	megohm
Cathode Resistor	1000	1200	2200	2700	6800	8200	820	1000	1800	2200	4700	5600	ohms
Peak Output Voltage	8.2	8.5	8.2	8.2	7.3	7.4	19	19.5	18.6	18.1	16.2	16.2	volts
Voltage Gain	16.4	17	16.4	16.4	14.6	14.8	19	19.5	18.6	18.1	16.2	16.2	

Note 1: RMS output voltage is based on 5 per cent total harmonic distortion.

Note 2: Coupling capacitors should be selected to give desired frequency response. Cathode resistor should be adequately bypassed.

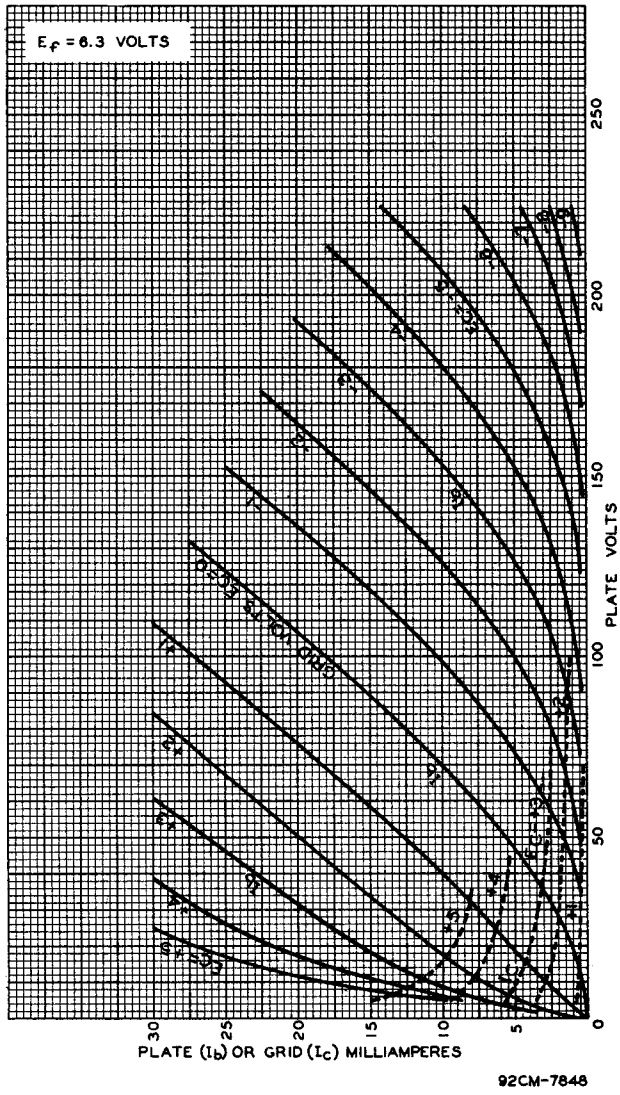


Fig. 1 – Average Plate Characteristics of Type 5718.

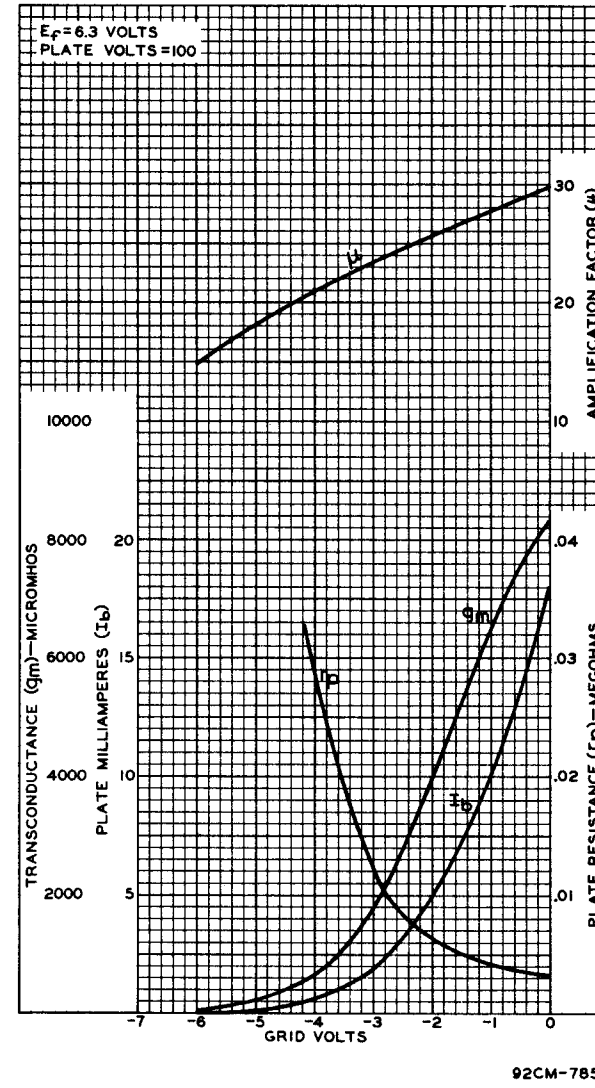


Fig. 2 – Average Characteristics of Type 5718.

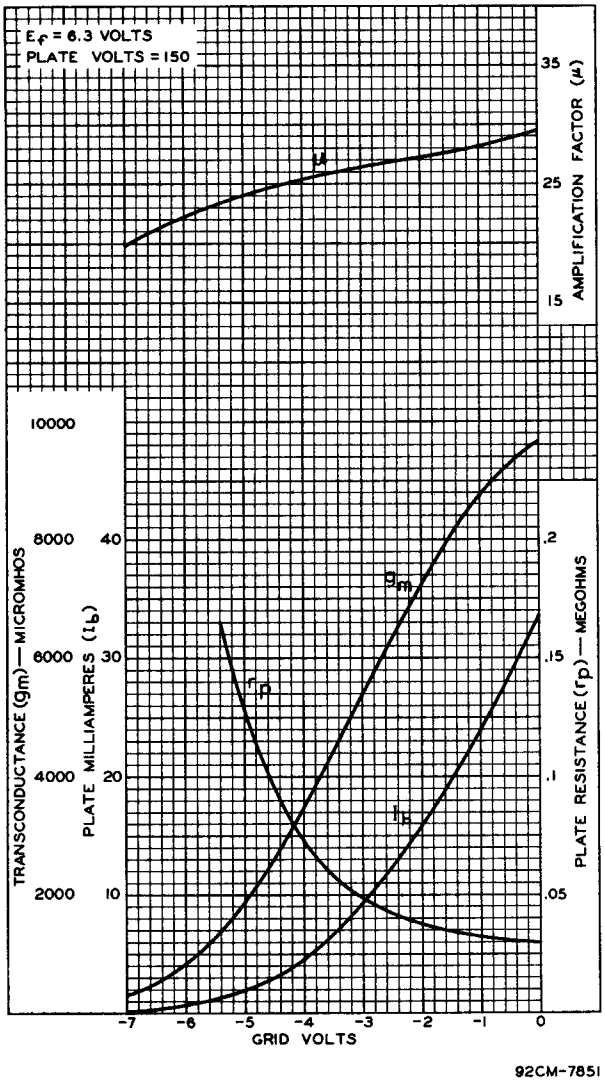
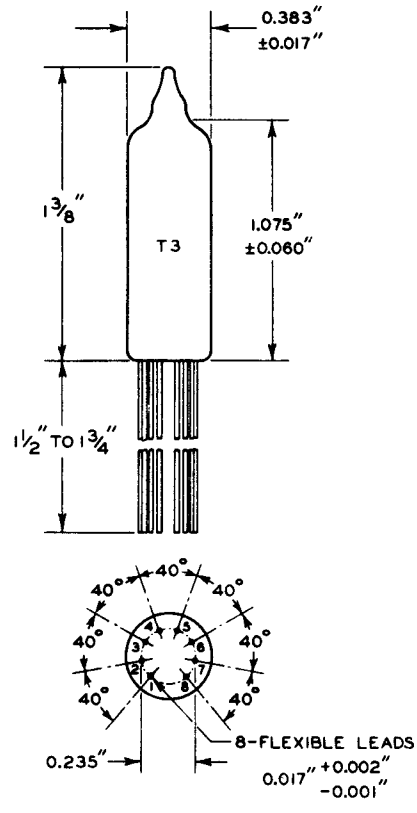


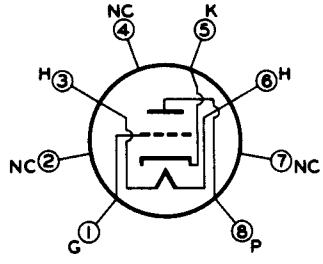
Fig. 3 - Average Characteristics of Type 5718.

DIMENSIONAL OUTLINE



FLEXIBLE LEAD CONNECTIONS

LEAD No. 1: GRID
LEAD No. 2: NO CONNECTION
LEAD No. 3: HEATER
LEAD No. 4: NO CONNECTION



LEAD No. 5: CATHODE
LEAD No. 6: HEATER
LEAD No. 7: NO CONNECTION
LEAD No. 8: ANODE

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