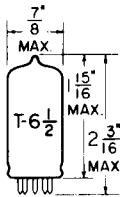


TUNG-SOL

DOUBLE TRIODE

MINIATURE TYPE



GLASS BULB

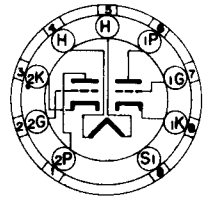
COATED UNIPOTENTIAL CATHODE

HEATER

4.2 VOLTS 0.6 AMP.

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
9 PIN NOVAL

9AU

THE 4BQ7A, A MEDIUM- μ DOUBLE TRIODE USING THE 9 PIN MINIATURE CONSTRUCTION, IS DESIGNED FOR USE IN 600 MA. SERIES HEATER OPERATED RECEIVERS. IT IS INTENDED FOR SERVICE AS THE FIRST RF AMPLIFIER TUBE IN TUNERS OF VHF TELEVISION RECEIVERS OR AS A LOW NOISE IF PRE-AMPLIFIER TUBE IN UHF TELEVISION RECEIVERS EMPLOYING A CRYSTAL MIXER. HIGH TRANSCONDUCTANCE, LOW INPUT CAPACITANCE, LOW INPUT LOADING, AND LOW PLATE TO CATHODE CAPACITANCE MAKE IT SPECIALLY USEFUL IN THE DIRECT-COUPLED RF STAGE OF TELEVISION RECEIVERS UTILIZING A DRIVEN RF-GROUNDED-GRID AMPLIFIER FOR THE CASCODE TYPE OF CIRCUIT. THERMAL CHARACTERISTICS OF THE HEATER ARE CONTROLLED SUCH THAT HEATER VOLTAGE SURGES DURING THE WARM-UP CYCLE ARE MINIMIZED PROVIDED IT IS USED WITH OTHER TYPES THAT ARE SIMILARLY CONTROLLED. WITH THE EXCEPTION OF HEATER RATINGS, ITS CHARACTERISTICS ARE IDENTICAL TO THE 6BQ7A.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD #315

	UNIT #1	UNIT #2	
GRID TO PLATE	1.15	1.15	μ f
INPUT	2.85	-----	μ f
INPUT (GROUNDED GRID)	-----	4.95	μ f
OUTPUT	1.35	-----	μ f
OUTPUT (GROUNDED GRID)	-----	2.27	μ f
PLATE TO CATHODE (MAX.)	0.15	0.15	μ f
HEATER TO CATHODE	2.65	2.70	μ f
PLATE OF UNIT #1 TO PLATE OF UNIT #2 (MAX.)	-----	0.010	μ f
PLATE OF UNIT #2 TO PLATE AND GRID OF UNIT #1 (MAX.)	-----	0.024	μ f

RATINGS

INTERPRETED ACCORDING TO DESIGN CENTER VALUES

CLASS A₁ AMPLIFIER - EACH TRIODE UNIT

HEATER VOLTAGE	4.2	VOLTS
MAXIMUM HEATER CATHODE VOLTAGE:		
HEATER NEGATIVE WITH RESPECT TO CATHODE		
TOTAL DC AND PEAK	200	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE		
DC	100	VOLTS
TOTAL DC AND PEAK	200	VOLTS
MAXIMUM PLATE VOLTAGE	250 ^A	VOLTS
MAXIMUM PLATE DISSIPATION	2	WATTS
MAXIMUM CATHODE CURRENT	20	MA.
MAXIMUM GRID CIRCUIT RESISTANCE	0.5	MEGOMH
HEATER WARM-UP TIME (APPROX.)*	11.0	SEC.

^A UNDER CUT-OFF CONDITIONS, IN RF-GROUNDED-GRID CIRCUITS WITH DIRECT-COUPLED DRIVE, IT IS PERMISSIBLE FOR THIS VOLTAGE TO BE AS HIGH AS 300 VOLTS.

* HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE HEATER TO REACH 80% OF ITS RATED VOLTAGE AFTER APPLYING 4 TIMES RATED HEATER VOLTAGE TO A CIRCUIT CONSISTING OF THE TUBE HEATER IN SERIES WITH A RESISTANCE OF VALUE 3 TIMES THE NOMINAL HEATER OPERATING RESISTANCE.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE.

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A₁ AMPLIFIER - EACH UNIT

	DESIGN CENTER VALUES	
HEATER VOLTAGE	4.2	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE VOLTAGE	150	VOLTS
CATHODE BIAS RESISTOR	220	OHMS
AMPLIFICATION FACTOR	39	
PLATE RESISTANCE	6 100	OHMS
TRANSCONDUCTANCE	6 400	μMHOS
PLATE CURRENT	9	MA.
GRID VOLTS (APPROX.) FOR $I_b = 10 \mu\text{AMP.}$	-10	VOLTS

PUSH-PULL RF GROUNDED GRID CIRCUIT - EACH UNIT

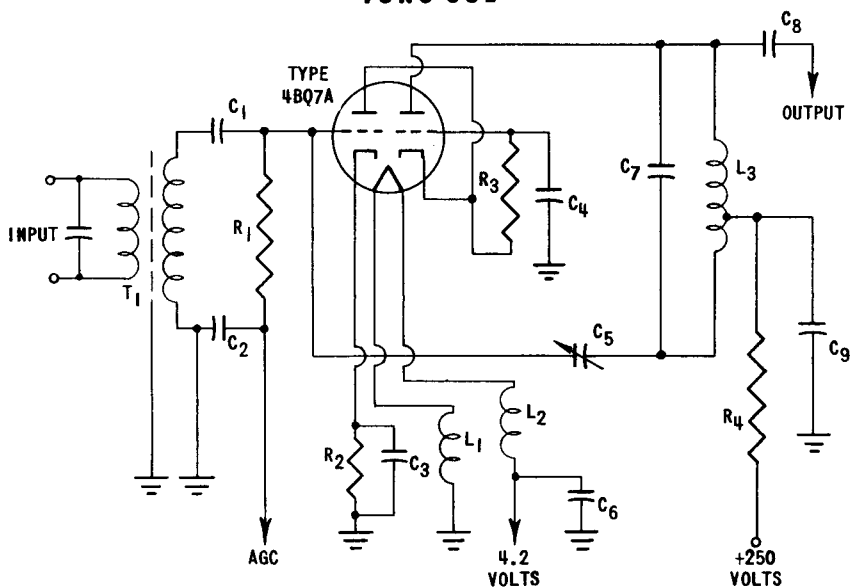
HEATER VOLTAGE	4.2	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE VOLTAGE	150	VOLTS
GRID VOLTAGE (OBTAINED FROM CATHODE RESISTOR)	-2	VOLTS
CATHODE RESISTOR (COMMON TO BOTH UNITS)	100	OHMS
PLATE CURRENT	10	MA.

RF GROUNDED GRID CIRCUIT WITH DIRECT-COUPLED DRIVE

UNIT #1 (DRIVER TUBE) IS DIRECTLY COUPLED TO UNIT #2 (DRIVEN RF-GROUNDED-GRID AMPLIFIER TUBE) AS SHOWN IN ACCOMPANYING CIRCUIT.

	UNIT #1	UNIT #2	
HEATER VOLTAGE	4.2	4.2	VOLTS
HEATER CURRENT	0.6	0.6	AMP.
PEAK HEATER CATHODE VOLTAGE: HEATER NEGATIVE WITH RESPECT TO CATHODE	1	250	VOLTS
PLATE SUPPLY VOLTAGE	250	250	VOLTS
PLATE VOLTAGE	135	115	VOLTS
GRID VOLTAGE	-1	---	VOLTS
GRID RESISTOR	---	0.5	MEGOHM
PLATE CURRENT	10	10	MA.
GRID CURRENT	0	0	MA.
GRID VOLTAGE (APPROX.) FOR $I_b = 10 \mu\text{AMP.}$	-14	---	VOLTS

TUNG-SOL

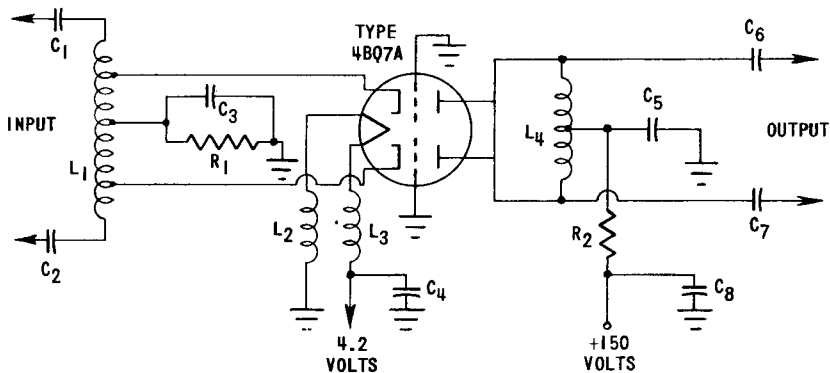


C1: 33 uuf, 400 VOLTS
 C2: 1000 uuf, 400 VOLTS
 C3: 1000 uuf, 400 VOLTS
 C4: 1000 uuf, 400 VOLTS
 C5: 0.5 to 1.5 uuf, 400 VOLTS
 C6: 1000 uuf, 400 VOLTS
 C7: 2 uuf, 400 VOLTS
 C8: 33 uuf, 400 VOLTS
 C9: 1000 uuf, 400 VOLTS

L1, L2: BIFILAR CHOKES, EACH 10
 TURNS NO. 18 ENAMEL WIRE
 1/4" COIL FORM
 L3: TUNED CIRCUIT ELEMENT OF
 TUNER. VALUE DEPENDS ON DIS-
 TRIBUTED CIRCUIT CAPACITANCES.
 TO DETERMINE TAP POINT, TAP
 DOWN TO 80 TO 90% OF TOTAL
 NUMBER OF TURNS

R1: 10000 OHMS, 0.5 WATT
 R2: 100 OHMS, 0.5 WATT
 R3: 500000 OHMS, 0.5 WATT
 R4: 100 OHMS, 0.5 WATT
 T1: TUNED CIRCUIT ELEMENT OF
 TUNER. VALUE DEPENDS ON DIS-
 TRIBUTED CIRCUIT CAPACITANCES.

DRIVEN RF-GROUNDED GRID AMPLIFIER CIRCUIT WITH DIRECT COUPLED DRIVE

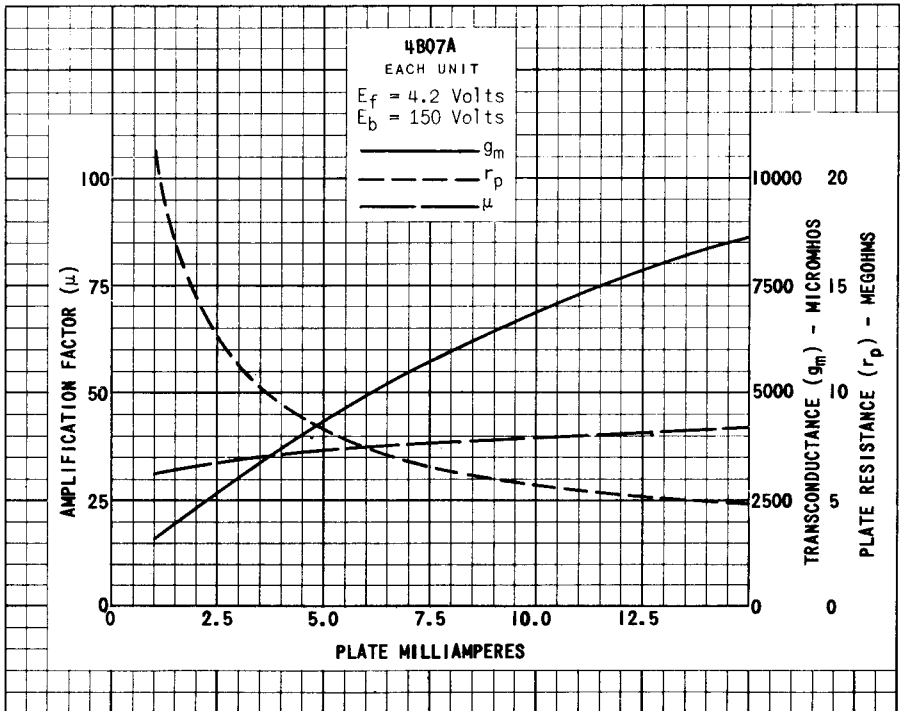
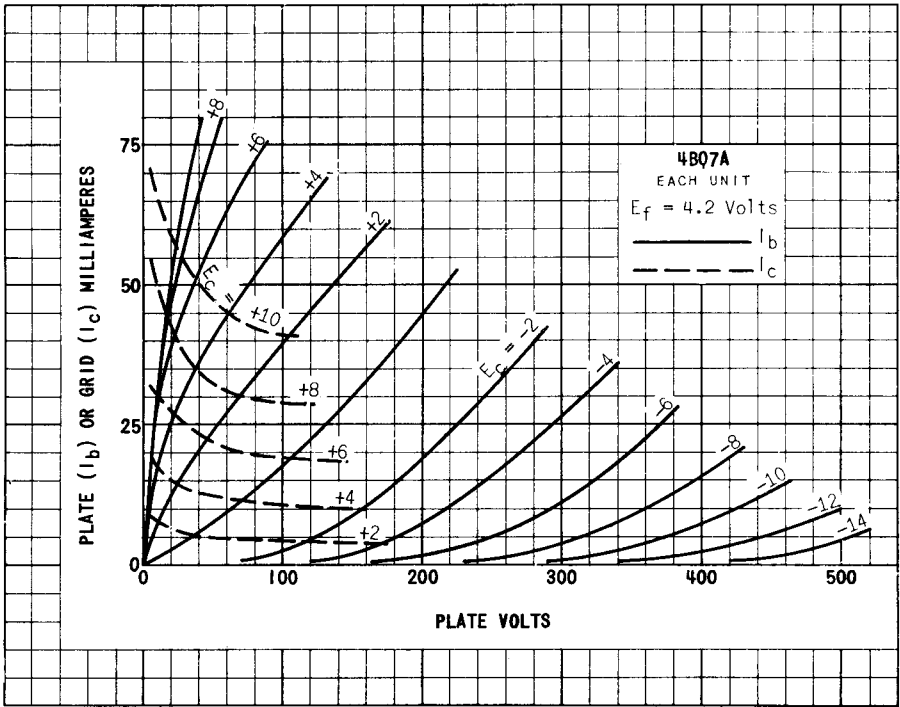


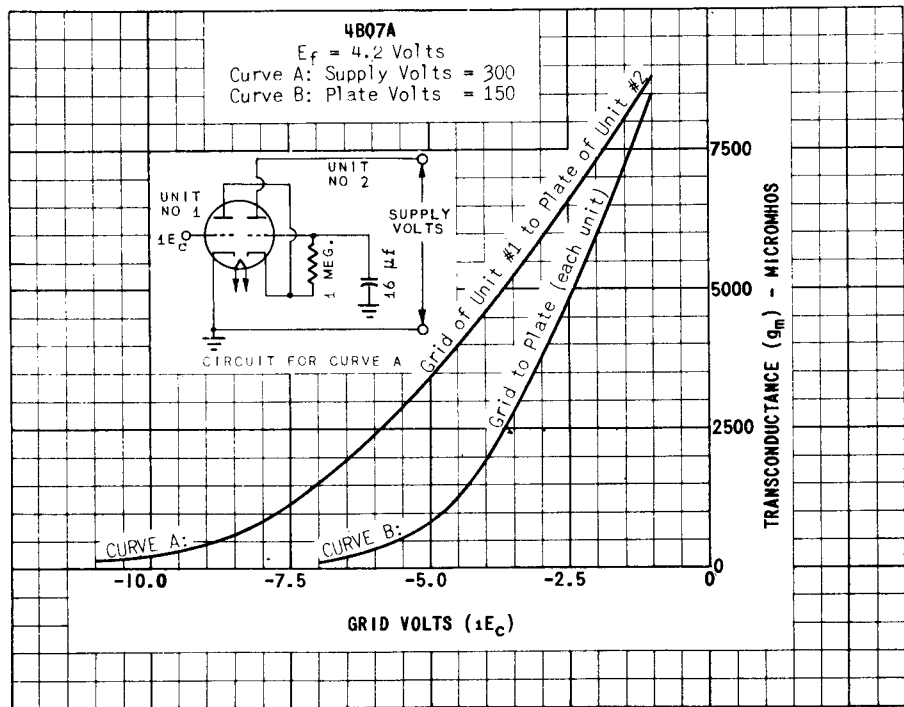
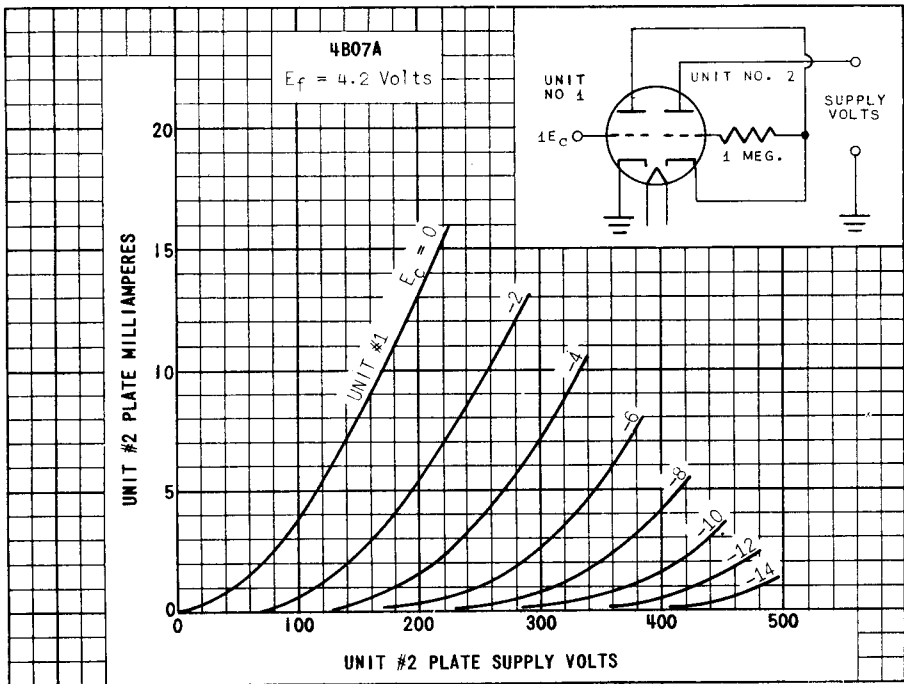
C1 C2 C3 C4 C5:
 1000 uuf, 400 VOLTS
 C6 C7:
 100 uuf, 400 VOLTS
 C8: 1000 uuf, 400 VOLTS

L1 L4: TUNED CIRCUIT ELEMENTS
 OF TUNER. VALUES DEPEND
 ON DISTRIBUTED CIRCUIT
 CAPACITANCES.

L2 L3: BIFILAR CHOKES,
 EACH 10 TURNS OF
 NO. 18 ENAMEL WIRE,
 1/4" COIL FORM.
 R1 R2: 100 OHMS, 0.5 WATT

PUSH-PULL RF GROUNDED-GRID CIRCUIT





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