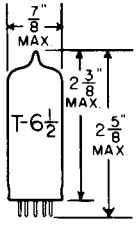
**TUNG-SOL**

# DOUBLE TRIODE

MINIATURE TYPE

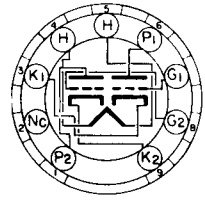



GLASS BULB

COATED UNIPOTENTIAL CATHODES

HEATER
8.4 VOLTS 0.45 AMP
AC OR DC

ANY MOUNTING POSITION




**BOTTOM VIEW**
SMALL BUTTON NOVAL
9 PIN BASE
9ES

THE 8CM7 IS A MEDIUM-MU DOUBLE TRIODE OF THE 9 PIN MINIATURE TYPE CONTAINING TWO DISSIMILAR TRIODES IN ONE ENVELOPE. IT IS INTENDED FOR USE AS A VERTICAL DEFLECTION AMPLIFIER IN 450 MA. SERIES HEATER OPERATED TELEVISION RECEIVERS. 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 WHICH ARE SIMILARLY CONTROLLED.

## DIRECT INTERELECTRODE CAPACITANCES – APPROX.

WITH NO EXTERNAL SHIELD

| | UNIT #1 OSCILLATOR | UNIT #2 AMPLIFIER | |
|---|---|---|---|
| GRID TO PLATE | 3.8 | 3 | μμf |
| GRID TO CATHODE AND HEATER | 2 | 3.5 | μμf |
| PLATE TO CATHODE AND HEATER | 0.5 | 0.4 | μμf |

## RATINGS[A]

INTERPRETED ACCORDING TO DESIGN CENTER SYSTEM[B]

| | UNIT #1 VERTICAL DEFLECTION OSCILLATOR | UNIT #2 VERTICAL DEFLECTION AMPLIFIER | |
|---|---|---|---|
| HEATER VOLTAGE | 8.4 | | VOLTS |
| MAXIMUM PEAK HEATER-CATHODE VOLTAGE: | | | |
| HEATER NEGATIVE WITH RESPECT TO CATHODE | 200 | | VOLTS |
| HEATER POSITIVE WITH RESPECT TO CATHODE | 200[C] | | VOLTS |
| MAXIMUM DC PLATE VOLTAGE | 500 | 500 | VOLTS |
| MAXIMUM PEAK POSITIVE PULSE PLATE VOLTAGE (ABSOLUTE MAXIMUM)[D] | --- | 2 200[E] | VOLTS |
| MAXIMUM CATHODE CURRENT: | | | |
| PEAK | 70 | 70 | MA. |
| AVERAGE | 15 | 20 | MA. |
| MAXIMUM PLATE DISSIPATION | 1.25 | 5.5 | WATTS |
| MAXIMUM GRID CIRCUIT RESISTANCE: | | | |
| CATHODE BIAS | 2.2 | 2.5 | MEGOHMS |
| FIXED BIAS | 2.2 | 1.0 | MEGOHMS |
| GRID RESISTOR BIAS | 2.2 | --- | MEGOHMS |
| HEATER WARM-UP TIME (APPROX.)[F] | 11.0 | | SECONDS |

[A] FOR OPERATION IN A 525-LINE, 30-FRAME SYSTEM AS DESCRIBED IN "STANDARDS OF GOOD ENGINEERING PRACTICE CONCERNING TELEVISION BROADCAST STATIONS", FEDERAL COMMUNICATIONS COMMISSION.

[B] UNLESS OTHERWISE SPECIFIED.

[C] THE DC COMPONENT MUST NOT EXCEED 100 VOLTS.

[D] THIS RATING IS APPLICABLE WHERE THE DURATION OF THE VOLTAGE PULSE DOES NOT EXCEED 15% OF ONE VERTICAL SCANNING CYCLE. IN A 525-LINE, 30-FRAME SYSTEM 15% OF ONE VERTICAL SCANNING CYCLE IS 2.5 MILLISECONDS.

[E] UNDER NO CIRCUMSTANCES SHOULD THIS ABSOLUTE VALUE BE EXCEEDED.

[F] 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.

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**TUNG-SOL**

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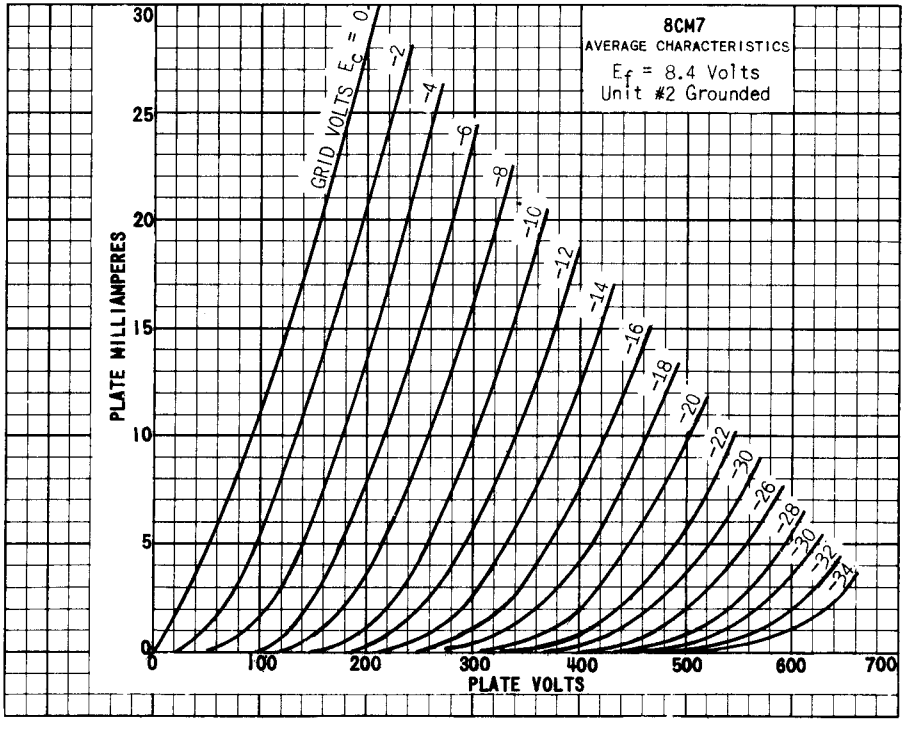
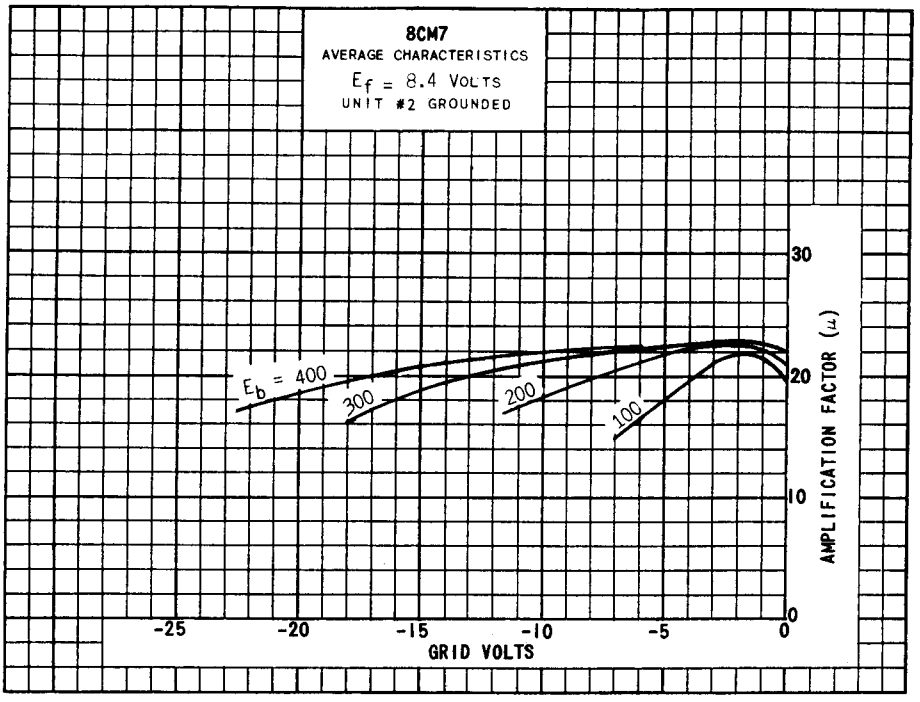
## TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

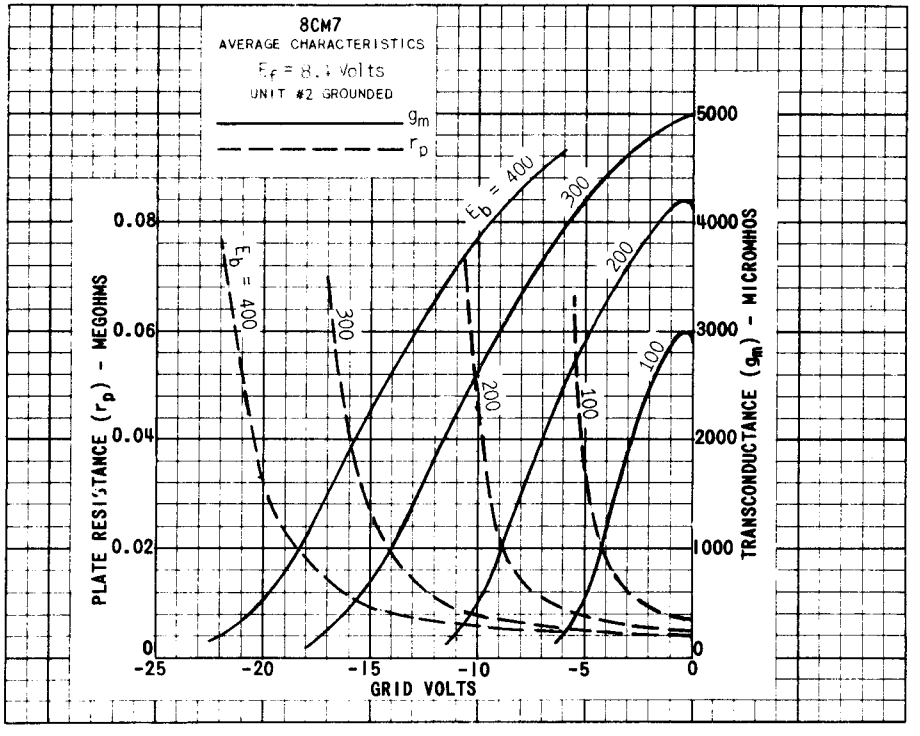
CLASS $A_1$ AMPLIFIER

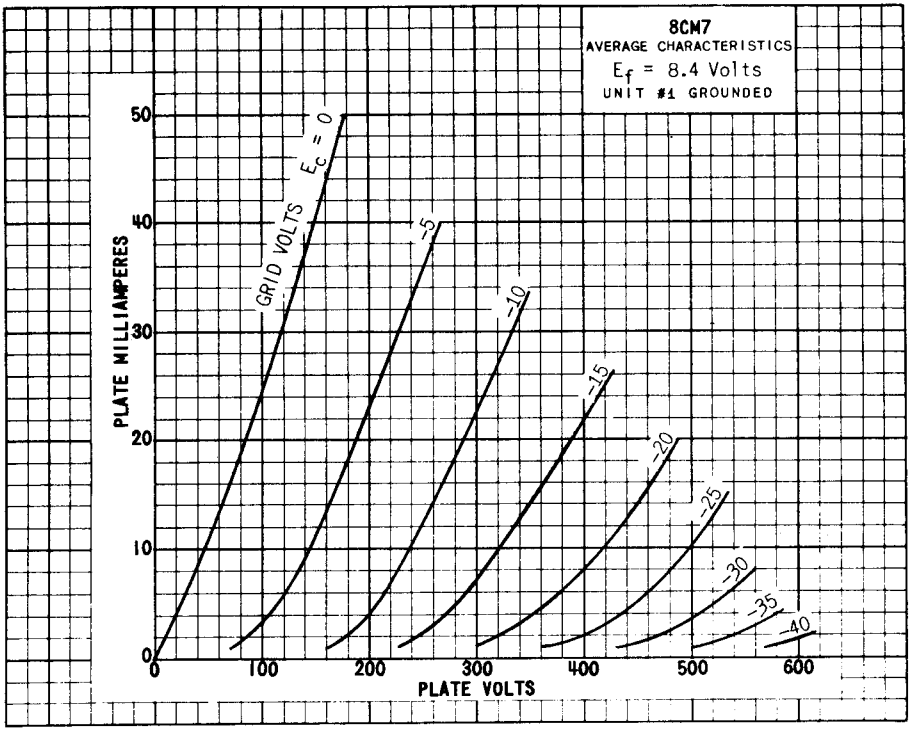
| | UNIT #1 OSCILLATOR | UNIT #2 AMPLIFIER | |
|---|---|---|---|
| HEATER VOLTAGE | 8.4 | | VOLTS |
| HEATER CURRENT | 0.45 | | AMP. |
| PLATE VOLTAGE | 200 | 250 | VOLTS |
| GRID VOLTAGE | −7 | −18 | VOLTS |
| AMPLIFICATION FACTOR | 21 | 18 | |
| PLATE RESISTANCE (APPROX.) | 10 500 | 4 100 | OHMS |
| TRANSCONDUCTANCE | 2 000 | 4 400 | μMHOS |
| PLATE CURRENT | 5 | 20 | MA. |
| PLATE CURRENT FOR GRID VOLTAGE OF −10 VOLTS | 1 | --- | MA. |
| GRID VOLTAGE (APPROX.) FOR $I_b$ = 10 μA. | 14 | --- | VOLTS |

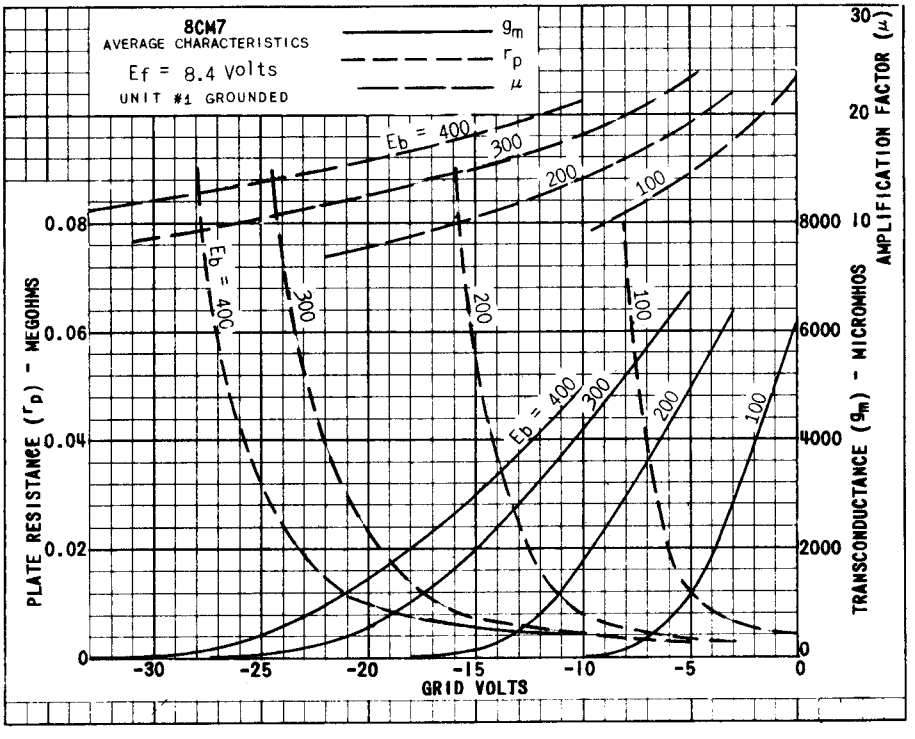
*SIMILAR TYPE REFERENCE: Except for heater ratings, the 8CM7 is identical to the 6CM7.*




8CM7
AVERAGE CHARACTERISTICS
$E_f$ = 8.4 VOLTS
UNIT #2 GROUNDED
$E_b$ = 400
300
200
100
30
20
10
0
AMPLIFICATION FACTOR (μ)
-25
-20
-15
-10
-5
0
GRID VOLTS


8CM7
AVERAGE CHARACTERISTICS
$E_f$ = 8.4 Volts
UNIT #2 GROUNDED
$g_m$
$r_p$
$E_b$ = 400
300
200
100
0.08
0.06
0.04
0.02
0
PLATE RESISTANCE ($r_p$) - MEGOHMS
5000
4000
3000
2000
1000
0
TRANSCONDUCTANCE ($g_m$) - MICROMHOS
-25
-20
-15
-10
-5
0
GRID VOLTS


8CM7
AVERAGE CHARACTERISTICS
Ef = 8.4 Volts
UNIT #1 GROUNDED
PLATE MILLIAMPERES
PLATE VOLTS
GRID VOLTS Ec = 0
-5
-10
-15
-20
-25
-30
-35
-40
0
10
20
30
40
50
100
200
300
400
500
600


8CM7
AVERAGE CHARACTERISTICS
Ef = 8.4 Volts
UNIT #1 GROUNDED
gm
rp
μ
Eb = 400
300
200
100
PLATE RESISTANCE (rp) - MEGOHMS
TRANSCONDUCTANCE (gm) - MICROMHOS
AMPLIFICATION FACTOR (μ)
GRID VOLTS
0
0.02
0.04
0.06
0.08
2000
4000
6000
8000
10
20
30
-5
-10
-15
-20
-25
-30