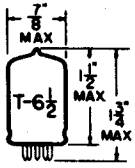
TUNG-SOL

TWIN TRIODE

MINIATURE TYPE

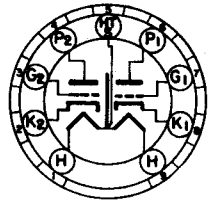


GLASS BULB

HEATER

SERIES	PARALLEL
40±5% VOLTS	20±5% VOLTS
.05 AMP.	0.1 AMP.

ANY MOUNTING POSITION



BOTTOM VIEW

MINIATURE BUTTON
9 PIN BASE

THE TYPE 407A IS A NINE PIN MINIATURE, MEDIUM MU, TWIN TRIODE, FEATURING SEPARATE CATHODES. THE HEATER IS DESIGNED FOR PARALLEL OPERATION AT 20 VOLTS OR FOR SERIES OPERATION AT 40 VOLTS. OTHER CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 2C51 AND THE 5670. A SHIELD IS ATTACHED TO THE CENTER OF THE HEATER TO DECREASE POSSIBLE INTERACTION BETWEEN TRIODE SECTIONS. THE USEFUL FREQUENCY RANGE AS AN AMPLIFIER, MIXER, OSCILLATOR, OR MULTIVIBRATOR EXTENDS FROM LOW FREQUENCY TO VHF.

BECAUSE OF THE INHERENT LOW NOISE AND CHOICE OF EITHER 20 VOLT OR 40 VOLT HEATER OPERATION, THE 407A HAS FOUND WIDE USE IN CARRIER TELEPHONY CIRCUITS.

ELECTRICAL DATA

HEATER VOLTAGE SERIES CONNECTION (USE PINS 1 & 9)	40±5%	VOLTS
PARALLEL CONNECTION (TIE PIN 1 TO PIN 9: USE PIN 5, 1 & 9)	20±5%	VOLTS
HEATER CURRENT SERIES CONNECTION (USE PINS 1 & 9)	.05	AMP.
PARALLEL CONNECTION (TIE PIN 1 TO PIN 9: USE PIN 5, 1, & 9)	0.1	AMP.
CHARACTERISTICS PER SECTION UNDER CONDITIONS E_b = 150 Vdc, E_c = 0, Rk/k = 240 OHMS		
PLATE CURRENT	8.2	MADC
TRANSCONDUCTANCE	5 500	μMHOS
AMPLIFICATION FACTOR	35	
PLATE RESISTANCE (APPROX.)	6 400	OHMS
INTERELECTRODE CAPACITANCES (MEASURED WITH NO SHIELD AND WITH HEATER TIED TO CATHODE OF UNIT UNDER TEST. EACH SECTION TESTED SEPARATELY.)		
GRID TO PLATE	1.3	μμfd
GRID TO CATHODE	2.25	μμfd
PLATE TO CATHODE	1.0	μμfd
HEATER TO CATHODE	2.4	μμfd
INTERELECTRODE CAPACITIES BETWEEN TRIODE SECTIONS PLATE TO PLATE	0.1	μμfd
NOISE AND MICROPHONICS (USING WESTERN ELECTRIC 2B NOISE MEASURING TEST SET WITH WEIGHTING FILTER (#F1A)	8	db

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

MECHANICAL DATA

MOUNTING POSITION	ANY	
BULB	T-6 1/2	
BASE	MINIATURE BUTTON PIN	
NET WEIGHT, AVERAGE	0.3	OUNCES
MAXIMUM VIBRATION RATING (D=.08"@ 25 CPS)	2.5	G

RATINGS

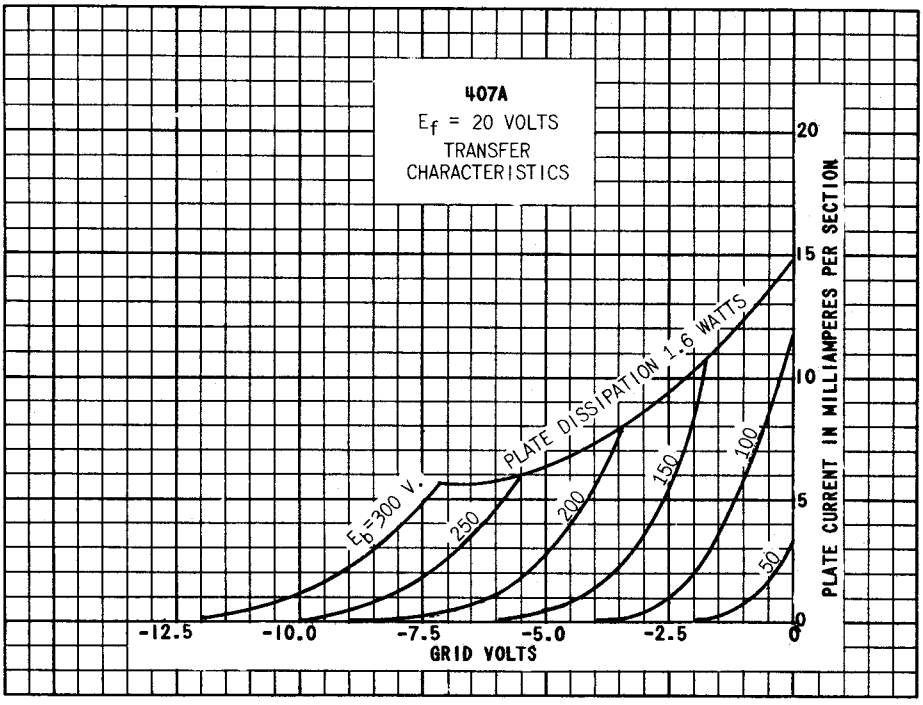
ABSOLUTE VALUES

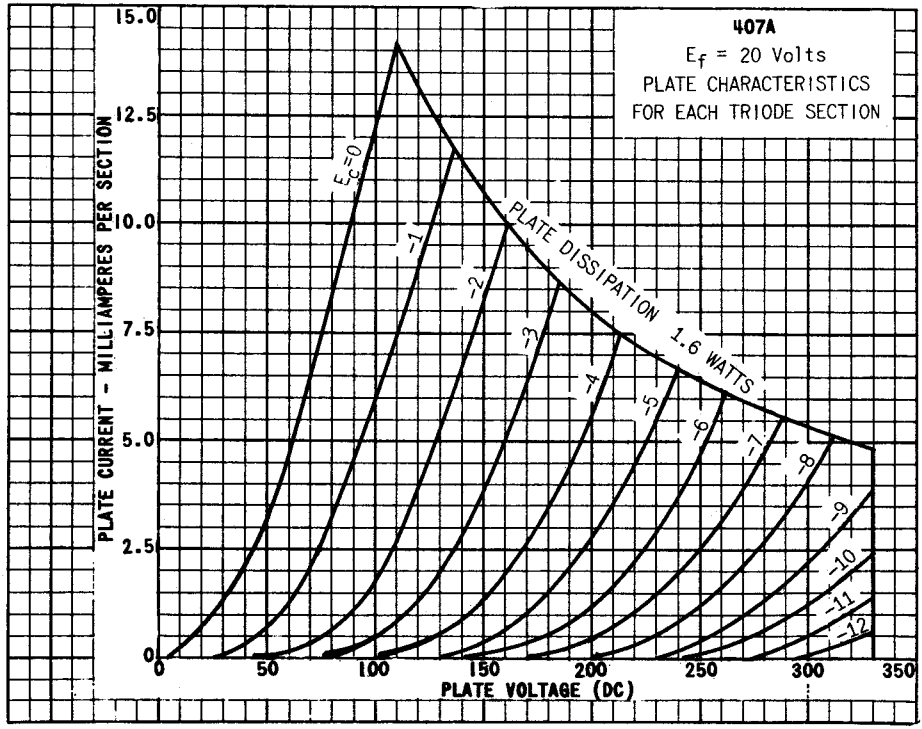
	MINIMUM	MAXIMUM	
HEATER VOLTAGE (20VOLTS NOMINAL)	19	21	VOLTS
(40VOLTS NOMINAL)	38	42	VOLTS
PLATE VOLTAGE DC	---	330	VOLTS
GRID VOLTAGE DC	-55	0	VOLTS
HEATER-CATHODE VOLTAGE	-130	+130	VOLTS
GRID CURRENT PER GRID	---	3.0	MA.
PLATE CURRENT PER PLATE DC	---	18	MA.
POWER DISSIPATION PER PLATE	---	1.6	WATTS
ENVELOPE TEMPERATURE	---	165°	C
ALTITUDE FOR FULL RATINGS	---	60 000	FEET
CIRCUIT VALUES:			
GRID CIRCUIT RESISTANCE PER GRID	---	0.5	MEGOHM

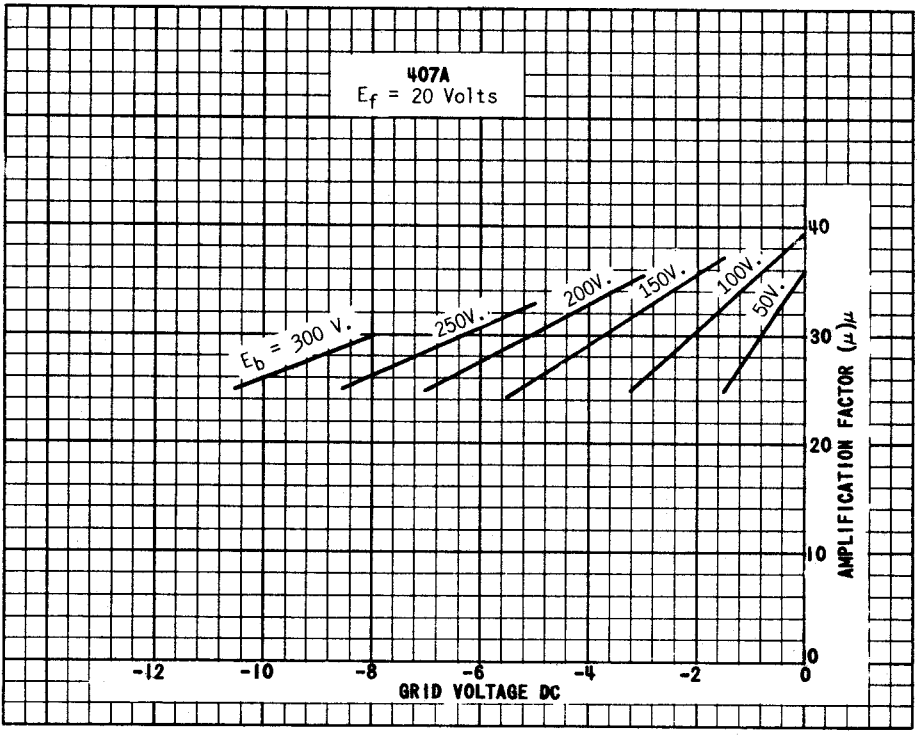
TYPICAL OPERATION

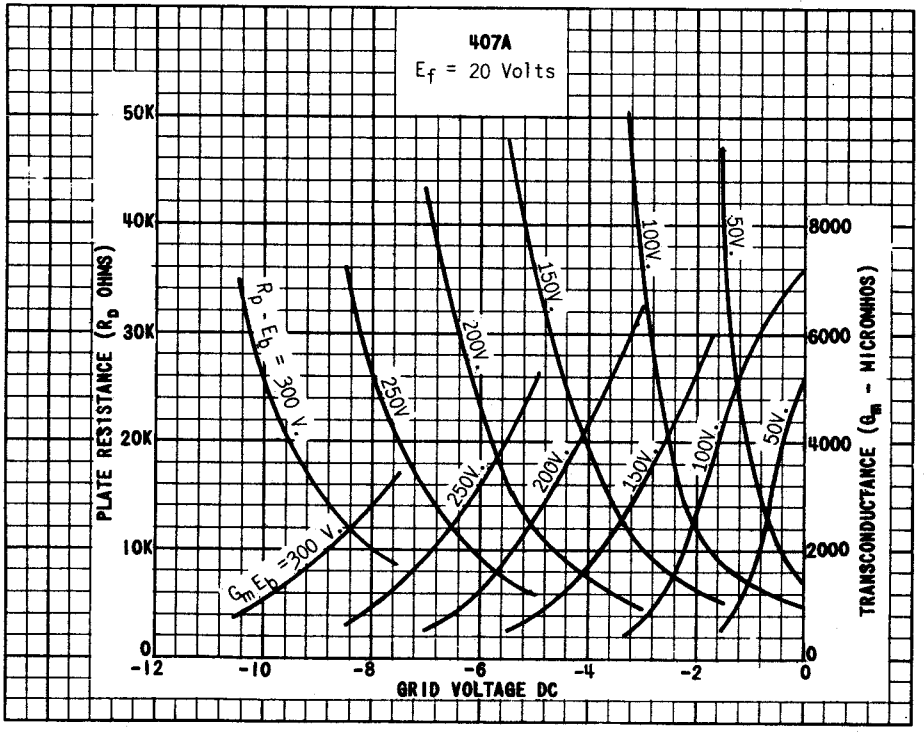
CLASS AB_1 AMPLIFIER

PLATE VOLTAGE	300	VOLTS
CATHODE RESISTOR	800	OHMS
AF GRID TO GRID VOLTAGE (RMS)	14	VOLTS
ZERO-SIGNAL PLATE CURRENT PER SECTION	4.9	MA.
MAXIMUM SIGNAL PLATE CURRENT PER SECTION	6.3	MA.
LOAD IMPEDANCE (PLATE TO PLATE)	27 000	OHMS
TOTAL HARMONIC DISTORTION	10	PERCENT
MAXIMUM SIGNAL POWER OUTPUT	1.0	WATT


407A
E_f = 20 VOLTS
TRANSFER
CHARACTERISTICS
PLATE DISSIPATION 1.6 WATTS
E_b=300 V.
250
200
150
100
50
-12.5
-10.0
-7.5
-5.0
-2.5
0
GRID VOLTS
20
15
10
5
0
PLATE CURRENT IN MILLIAMPERES PER SECTION


407A
E_f = 20 Volts
PLATE CHARACTERISTICS
FOR EACH TRIODE SECTION
E_c=0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
PLATE DISSIPATION 1.6 WATTS
15.0
12.5
10.0
7.5
5.0
2.5
0
PLATE CURRENT - MILLIAMPERES PER SECTION
0
50
100
150
200
250
300
350
PLATE VOLTAGE (DC)


407A
E_f = 20 Volts
E_b = 300 V.
250V.
200V.
150V.
100V.
50V.
AMPLIFICATION FACTOR (μ)μ
40
30
20
10
0
-12
-10
-8
-6
-4
-2
0
GRID VOLTAGE DC


407A
E_f = 20 Volts
PLATE RESISTANCE (R_p OHMS)
50K
40K
30K
20K
10K
0
R_p - E_b = 300 V.
G_m E_b =300 V.
250V.
200V.
150V.
100V.
50V.
TRANSCONDUCTANCE (G_m - MICROMHOS)
8000
6000
4000
2000
0
-12
-10
-8
-6
-4
-2
0
GRID VOLTAGE DC