

TWIN TRIODE

FOR MOBILE COMMUNICATIONS EQUIPMENT

**HIGH-MU
SEPARATE CATHODES**

**HEATER-CYCLING RATING
PROTOTYPE—12AX7**

DESCRIPTION AND RATING

The 6681 is a miniature high-mu twin triode especially suited for use in resistance-coupled voltage amplifiers, phase inverters, multivibrators, and other applications in which high voltage gain is desired. Its electrical characteristics are essentially equivalent to those of the 12AX7.

Intended specifically for use in mobile communications equipment, the 6681 may be operated without serious degradation under normal variations in supply voltage as encountered with automotive electrical systems. Also consistent with the requirements of this equipment, the tube is capable of withstanding appreciable on-off cycling.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential	Series	Parallel
Heater Voltage, AC or DC	12.6*	6.3* Volts
Heater Current	0.15	0.3 Amperes
Direct Interelectrode Capacitances		

	With Shield†	Without Shield
Grid to Plate, Each Section	1.7	1.7 $\mu\mu\text{f}$
Input, Each Section	1.8	1.6 $\mu\mu\text{f}$
Output, Section 1	1.9	0.46 $\mu\mu\text{f}$
Output, Section 2	1.9	0.34 $\mu\mu\text{f}$

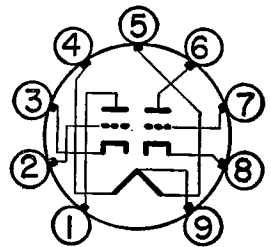
MECHANICAL

- Mounting Position—Any
- Envelope—T-6½, Glass
- Base—E9-1, Small Button 9-Pin

* When operated from automotive electrical systems, the heater may be subjected to voltage variations as great as ± 20 percent. Although such extremes in heater voltage may be tolerated for short periods, increased equipment reliability can be achieved with improved supply-voltage regulation.

† With external shield (RETMA 315) connected to cathode of section under test.

BASING DIAGRAM

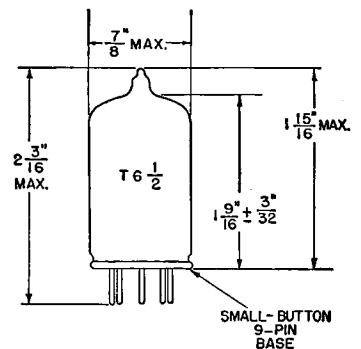


RETMA 9A

TERMINAL CONNECTIONS

- Pin 1—Plate (Section 2)
- Pin 2—Grid (Section 2)
- Pin 3—Cathode (Section 2)
- Pin 4—Heater
- Pin 5—Heater
- Pin 6—Plate (Section 1)
- Pin 7—Grid (Section 1)
- Pin 8—Cathode (Section 1)
- Pin 9—Heater Center Tap

PHYSICAL DIMENSIONS



RETMA 6-2

MAXIMUM RATINGS

DESIGN-MAXIMUM VALUES, EACH SECTION‡

Plate Voltage	330 Volts
Positive DC Grid Voltage	0 Volts
Negative DC Grid Voltage	55 Volts
Plate Dissipation	1.1 Watts
Heater-Cathode Voltage	
Heater Positive with Respect to Cathode	
DC Component	100 Volts
Total DC and Peak	200 Volts
Heater Negative with Respect to Cathode	
Total DC and Peak	200 Volts

‡ Design Maximum Ratings are the limiting values expressed with respect to bogie tubes at which satisfactory tube life can be expected to occur. To obtain satisfactory circuit performance, therefore, the equipment designer must establish the circuit design so that no design-maximum value is exceeded with a bogie tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, and environmental conditions.

CHARACTERISTICS AND TYPICAL OPERATION

Class A₁ Amplifier, Each Section

Plate Voltage	100	250	Volts
Grid Voltage	- 1	- 2	Volts
Amplification Factor	100	100	
Plate Resistance, approximate	80,000	62,500	Ohms
Transconductance	1250	1600	Micromhos
Plate Current	0.5	1.2	Milliamperes

CLASS A RESISTANCE-COUPLED AMPLIFIER

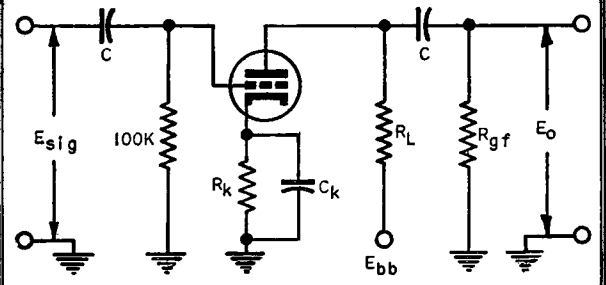
EACH SECTION

LOW IMPEDANCE DRIVE (APPROXIMATELY 200 OHMS)										
R _L	R _{g f}	Ebb = 90 Volts			Ebb = 180 Volts			Ebb = 300 Volts		
		R _k	E _o	Gain	R _k	E _o	Gain	R _k	E _o	Gain
0.10	0.10	2500	4.3	32	1500	15	40	1100	33	43
0.10	0.24	2600	6.5	40	1500	22	49	1200	44	53
0.24	0.24	4400	6.3	45	2500	21	56	2000	44	60
0.24	0.51	4800	8.5	50	2800	27	62	2200	54	66
0.51	0.51	8500	7.3	50	4200	21	63	3500	45	69
0.51	1.0	10000	9.4	55	6500	28	66	4700	55	72

HIGH IMPEDANCE DRIVE (APPROXIMATELY 100K OHMS)										
R _L	R _{g f}	Ebb = 90 Volts			Ebb = 180 Volts			Ebb = 300 Volts		
		R _k	E _o	Gain	R _k	E _o	Gain	R _k	E _o	Gain
0.10	0.10	3400	7.1	28	1900	18	34	1400	35	40
0.10	0.24	3700	9.4	37	2100	25	46	1600	47	50
0.24	0.24	6100	9.8	42	3500	25	53	2500	47	59
0.24	0.51	6800	12	47	3900	30	58	3000	58	63
0.51	0.51	11000	11	47	6200	27	60	4500	52	66
0.51	1.0	12000	14	50	6800	34	64	5300	64	69

Notes:

1. E_o is maximum RMS voltage output for approximately five percent total harmonic distortion.
2. Gain is measured for an output voltage of two volts RMS.
3. R_k is in ohms; R_L and R_{g f} are in megohms.
4. Coupling capacitors (C) should be selected to give desired frequency response. R_k should be adequately by-passed.

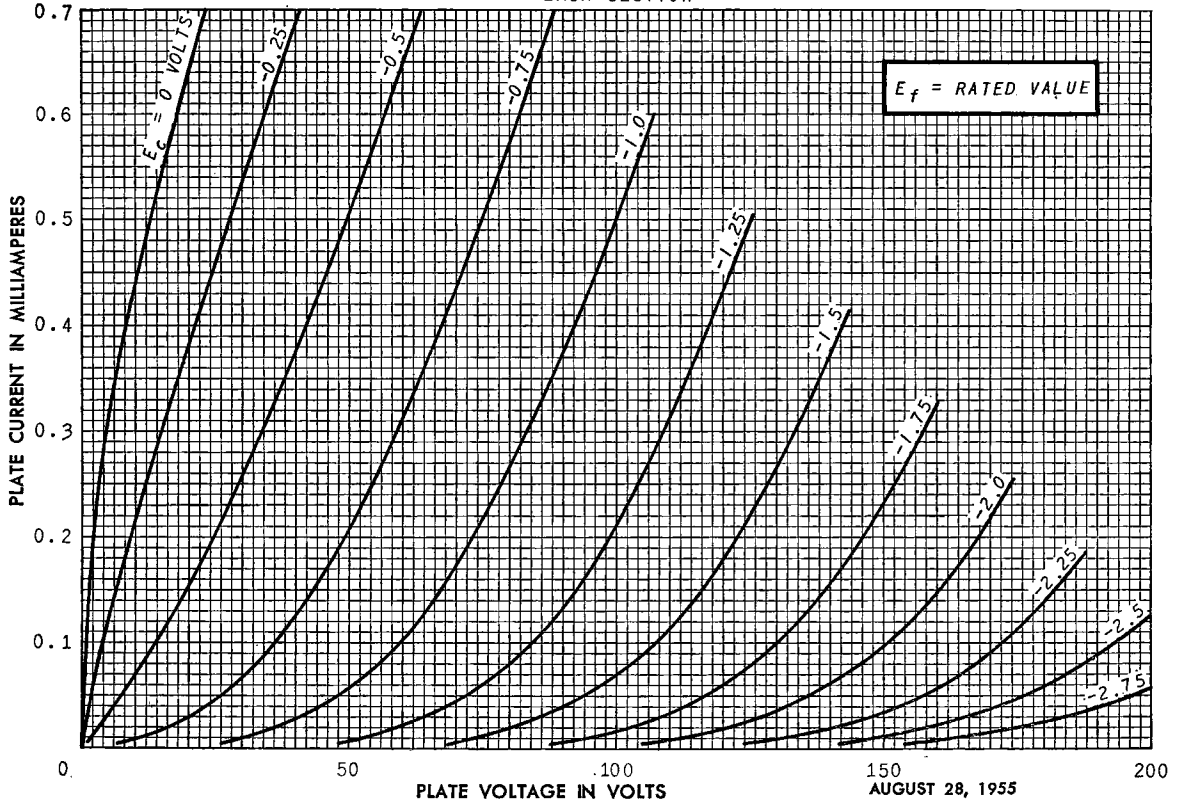


SPECIAL TESTS AND RATINGS

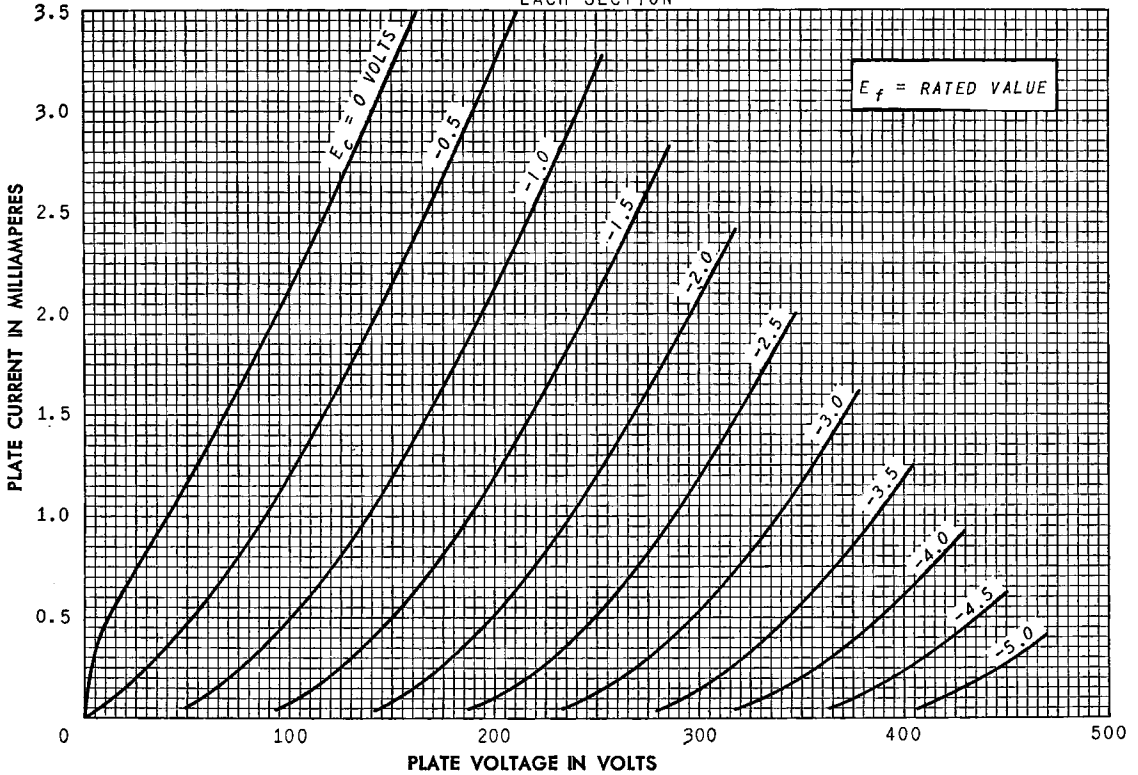
Heater-Cycling Life Test

Statistical sample operated for 2000 cycles minimum to evaluate and control heater-cathode defects. Conditions of test include $E_f = 15.0$ volts (series-heater connection) cycled for one minute on and one minute off, $E_b = E_c = 0$ volts, and $E_{hk} = 135$ volts with heater positive with respect to cathode.

AVERAGE PLATE CHARACTERISTICS EACH SECTION

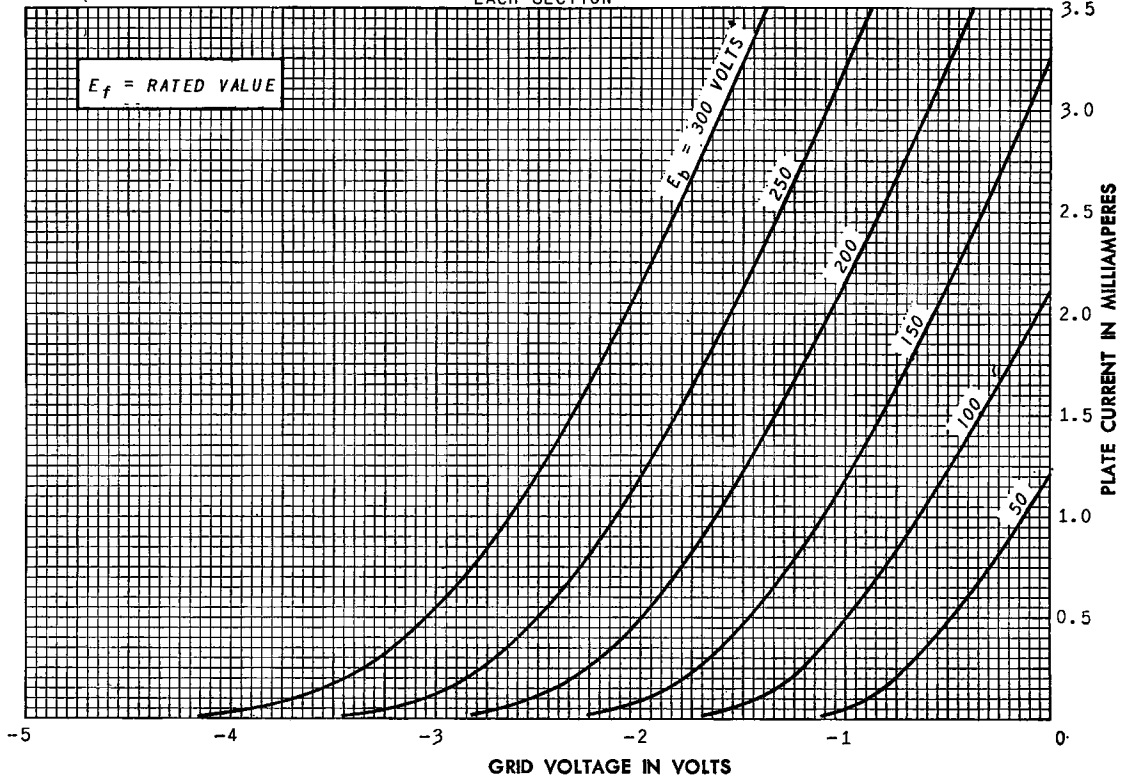


AVERAGE PLATE CHARACTERISTICS EACH SECTION



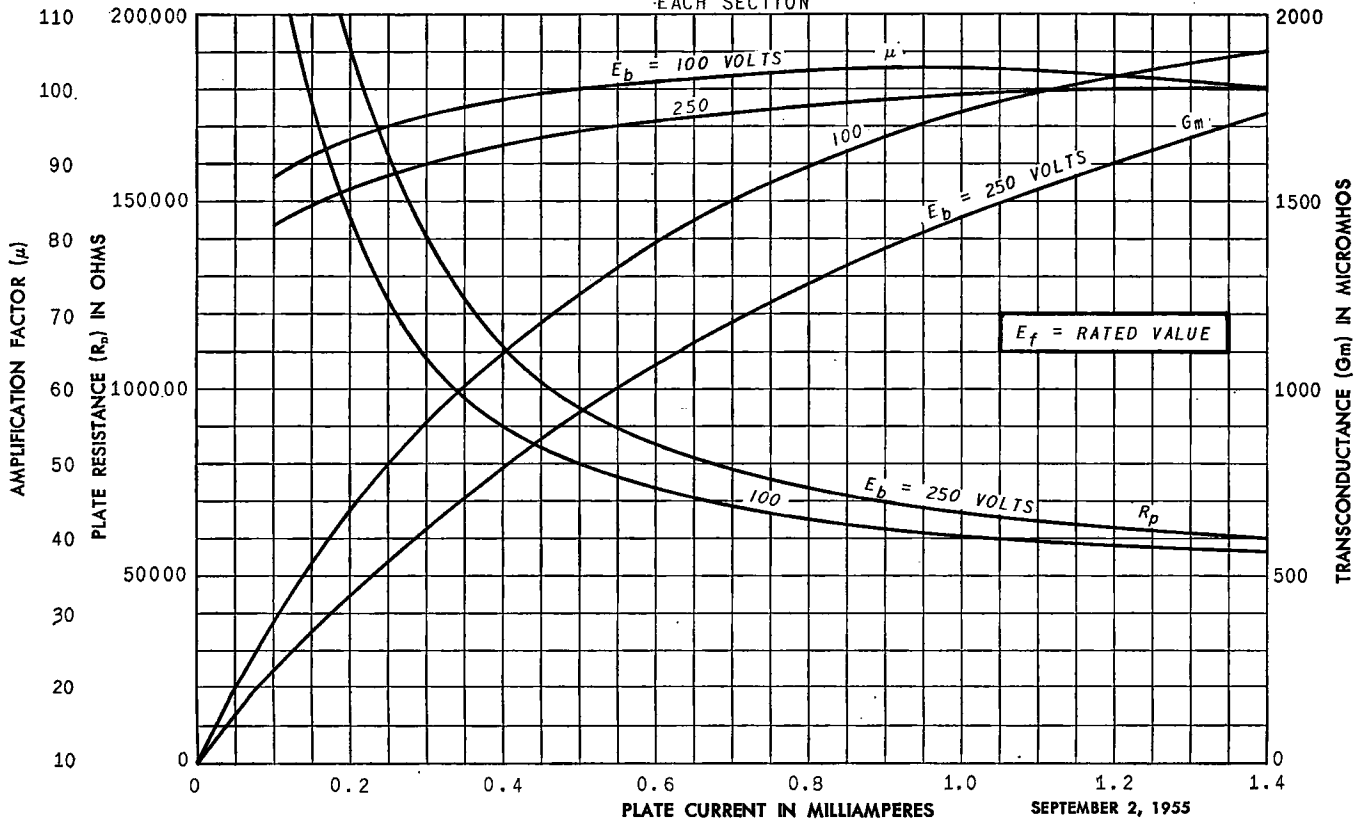
AVERAGE TRANSFER CHARACTERISTICS

EACH SECTION



AVERAGE CHARACTERISTICS

EACH SECTION



TUBE DEPARTMENT
GENERAL  ELECTRIC
Schenectady 5, N. Y.