



# 6BE6—3BE6—4BE6—12BE6

## HEPTODE

FOR PENTAGRID CONVERTER APPLICATIONS

**6BE6**  
**3BE6**  
**4BE6**  
**12BE6**  
ET-T891A  
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### DESCRIPTION AND RATING

The 6BE6 is a miniature heptode primarily designed to perform the combined functions of the mixer and oscillator in superheterodyne circuits in both the standard broadcast and FM bands. Its performance in these applications is characterized by high conversion gain and a high degree of oscillator stability with variations in the applied automatic-volume-control bias voltage.

Except for heater ratings, the 3BE6 and 4BE6 are identical to the 6BE6. In addition, they incorporate a controlled heater-warm-up characteristic which makes them especially suited for use in radio or television receivers that employ series-connected heaters.

The 12BE6, which differs from the 6BE6 only in heater ratings and heater-cathode voltage ratings, is especially useful in a-c/d-c radio receivers.

### GENERAL

#### ELECTRICAL

Cathode—Coated Unipotential

	3BE6	4BE6	6BE6	12BE6	
Heater Voltage, AC or DC	3.15	4.2	6.3	12.6	Volts
Heater Current	0.6	0.45	0.3	0.15	Amperes
Heater Warm-up Time*	11	11	...	...	Seconds

#### Direct Interelectrode Capacitances

	With Shield†	Without Shield
Grid-Number 3 to All	7.0	7.0 $\mu\mu f$
Plate to All	13	8.0 $\mu\mu f$
Grid-Number 1 to All	5.5	5.5 $\mu\mu f$
Cathode to All Except Grid-Number 1	20	15 $\mu\mu f$
Grid-Number 3 to Plate, maximum	0.25	0.30 $\mu\mu f$
Grid-Number 1 to Grid-Number 3, maximum	0.15	0.15 $\mu\mu f$
Grid-Number 1 to Plate, maximum	0.05	0.1 $\mu\mu f$
Grid-Number 1 to Cathode	3.0	3.0 $\mu\mu f$

#### MECHANICAL

Mounting Position—Any

Envelope—T-5½, Glass

Base—E7-1, Miniature Button 7-Pin

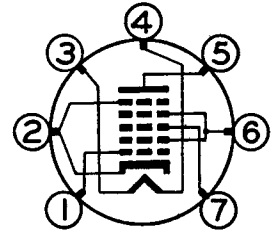
### MAXIMUM RATINGS

#### DESIGN-CENTER VALUES

Plate Voltage	300	Volts
Screen-Supply Voltage	300	Volts
Screen Voltage	100	Volts
Positive DC Grid-Number 3 Voltage	0	Volts
Negative DC Grid-Number 3 Voltage	50	Volts
Plate Dissipation	1.0	Watts
Screen Dissipation	1.0	Watts
DC Cathode Current	14	Milliamperes

	3BE6	4BE6	6BE6	12BE6
Heater-Cathode Voltage				
Heater Positive with Respect to Cathode				
DC Component	100	...	100	Volts
Total DC and Peak	200	...	100	Volts
Heater Negative with Respect to Cathode				
Total DC and Peak	200	...	100	Volts

### BASING DIAGRAM

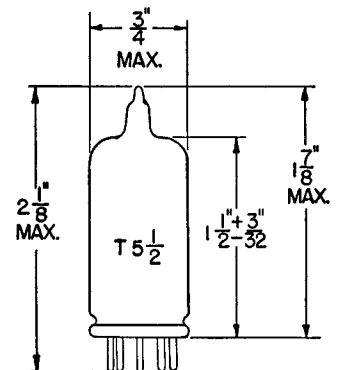


RETMA 7CH

### TERMINAL CONNECTIONS

- Pin 1—Grid Number 1 (Oscillator Grid)
- Pin 2—Cathode and Grid Number 5
- Pin 3—Heater
- Pin 4—Heater
- Pin 5—Plate
- Pin 6—Grids Number 2 and 4 (Screen)
- Pin 7—Grid Number 3 (Mixer Grid)

### PHYSICAL DIMENSIONS



RETMA 5-2

**GENERAL ELECTRIC**

Supersedes ET-T891, dated 8-54

## CHARACTERISTICS AND TYPICAL OPERATION

### CONVERTER SERVICE†

Plate Voltage . . . . .	100	250 Volts
Screen Voltage . . . . .	100	100 Volts
Grid-Number 3 Voltage . . . . .	-1.5	-1.5 Volts
Grid-Number 1 Voltage, RMS . . . . .	10	10 Volts
Grid-Number 1 Resistance . . . . .	20000	20000 Ohms
Plate Resistance, approximate . . . . .	0.4	1.0 Megohms
Conversion Transconductance . . . . .	455	475 Micromhos
Plate Current . . . . .	2.6	2.9 Milliampere
Screen Current . . . . .	7.0	6.8 Milliampere
Grid-Number 1 Current . . . . .	0.5	0.5 Milliampere
Cathode Current . . . . .	10.1	10.2 Milliampere
Grid-Number 3 Voltage, approximate $G_c = 10$ Micromhos . . . . .	-30	-30 Volts
Grid-Number 3 Voltage, approximate $G_c = 100$ Micromhos . . . . .	-6	-6 Volts

### OSCILLATOR CHARACTERISTICS (NOT OSCILLATING)

Plate Voltage . . . . .	100 Volts
Screen, Connected to Plate	
Grid-Number 3 Voltage . . . . .	0 Volts
Grid-Number 1 Voltage . . . . .	0 Volts
Amplification Factor§ . . . . .	20
Transconductance§ . . . . .	7250 Micromhos
Cathode Current . . . . .	25 Milliampere
Grid-Number 1 Voltage, approximate $I_b = 10$ Microampere . . . . .	-11 Volts

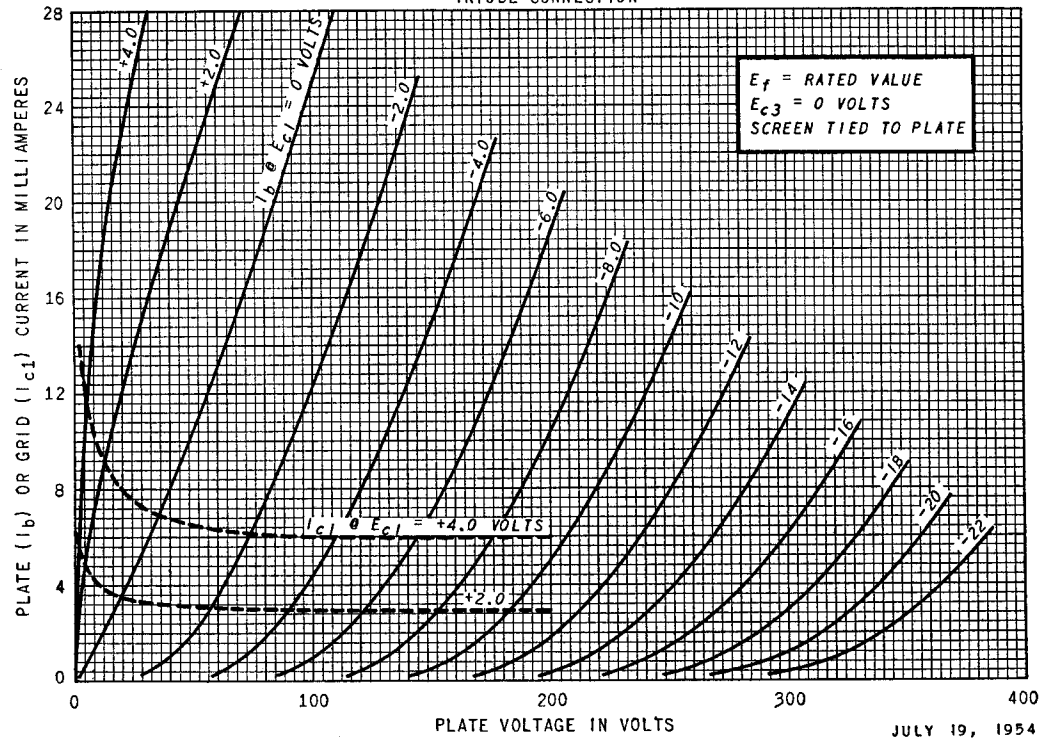
\* The time required for the voltage across the heater to reach 80 percent of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the rated heater voltage divided by the rated heater current.

† With external shield (RETMA 316) connected to pin 2.

‡ Characteristics shown are obtained in the standard RETMA conversion conductance test set which uses separate excitation. The characteristics under these conditions correspond very closely with those obtained in a self-excited oscillatory circuit operating with zero bias.

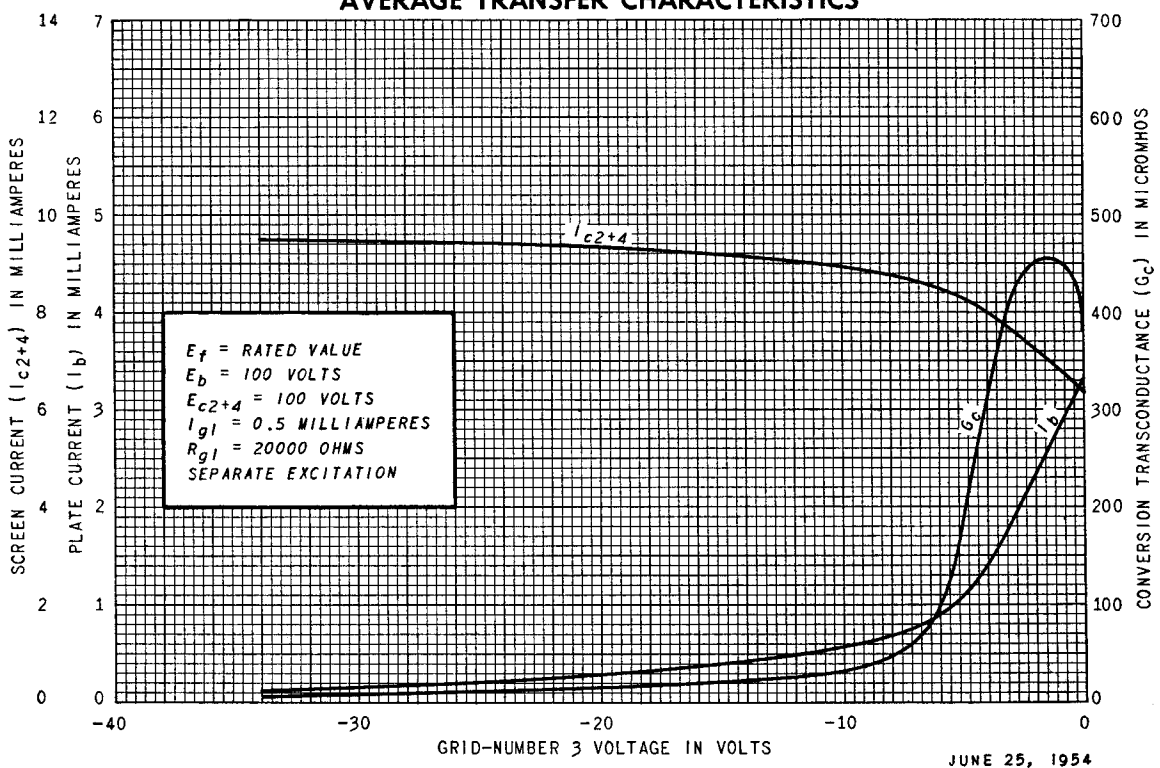
§ Between grid number 1 and grids number 2 and 4 connected to plate.

**AVERAGE PLATE CHARACTERISTICS**  
 TRIODE CONNECTION



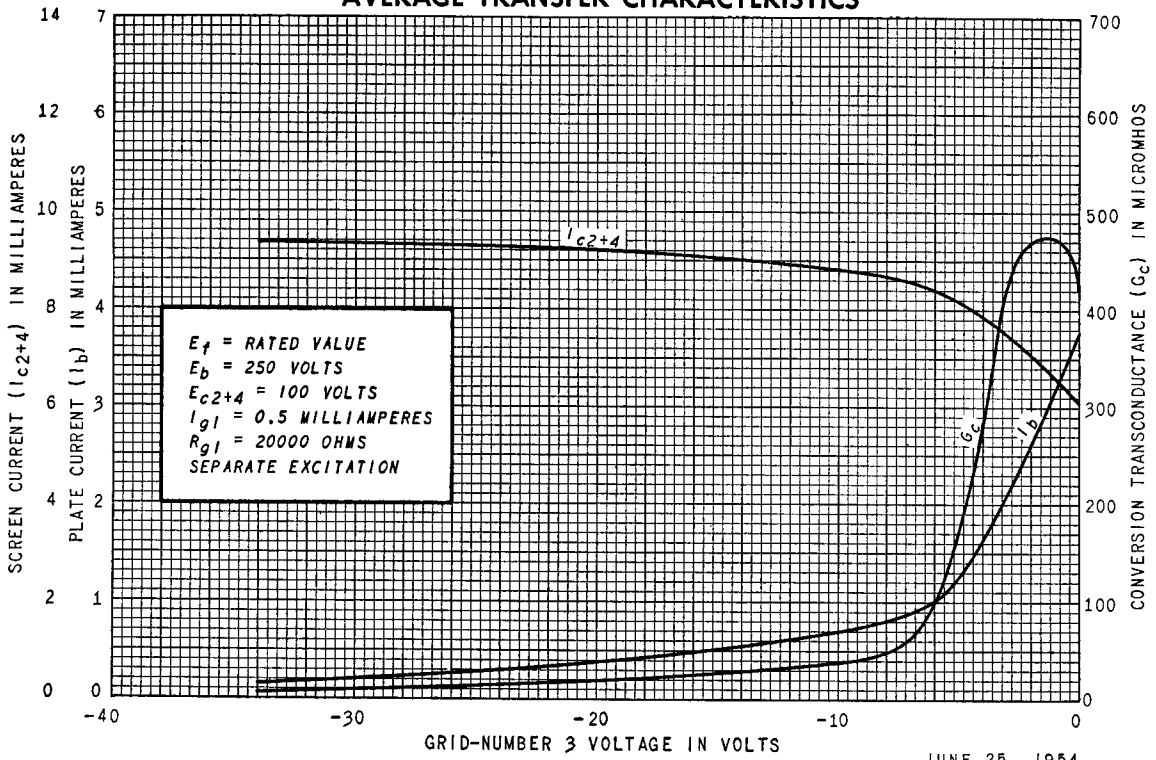
JULY 19, 1954

**AVERAGE TRANSFER CHARACTERISTICS**

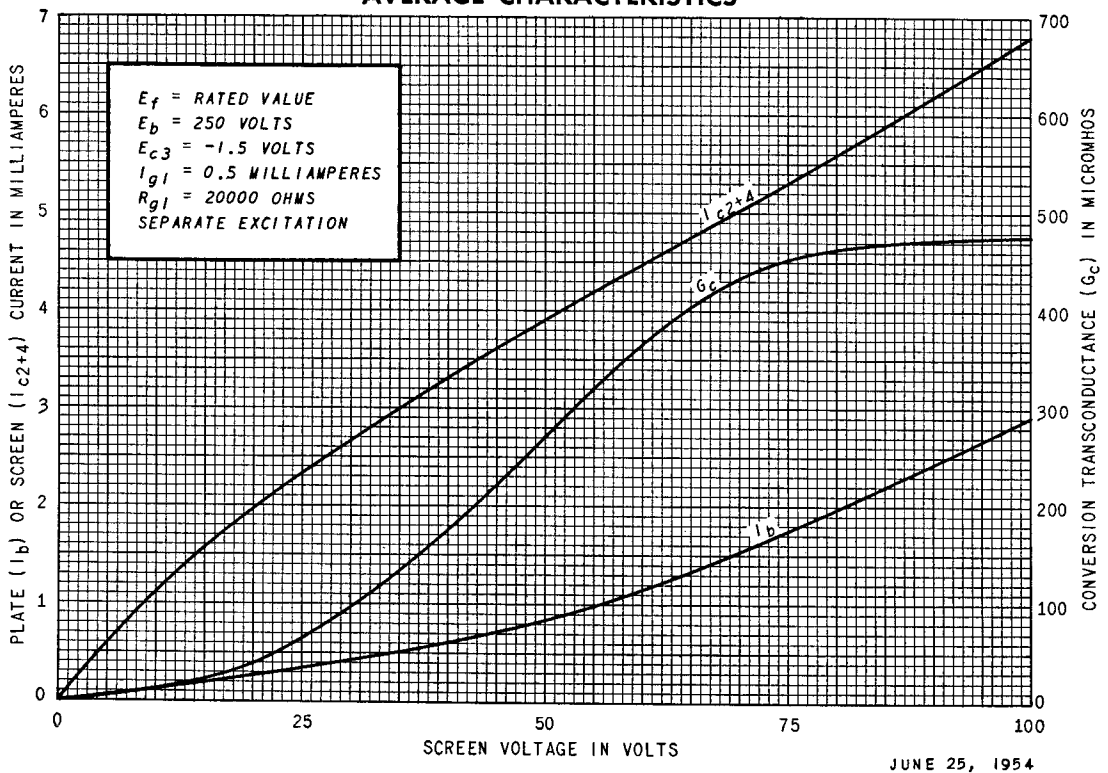


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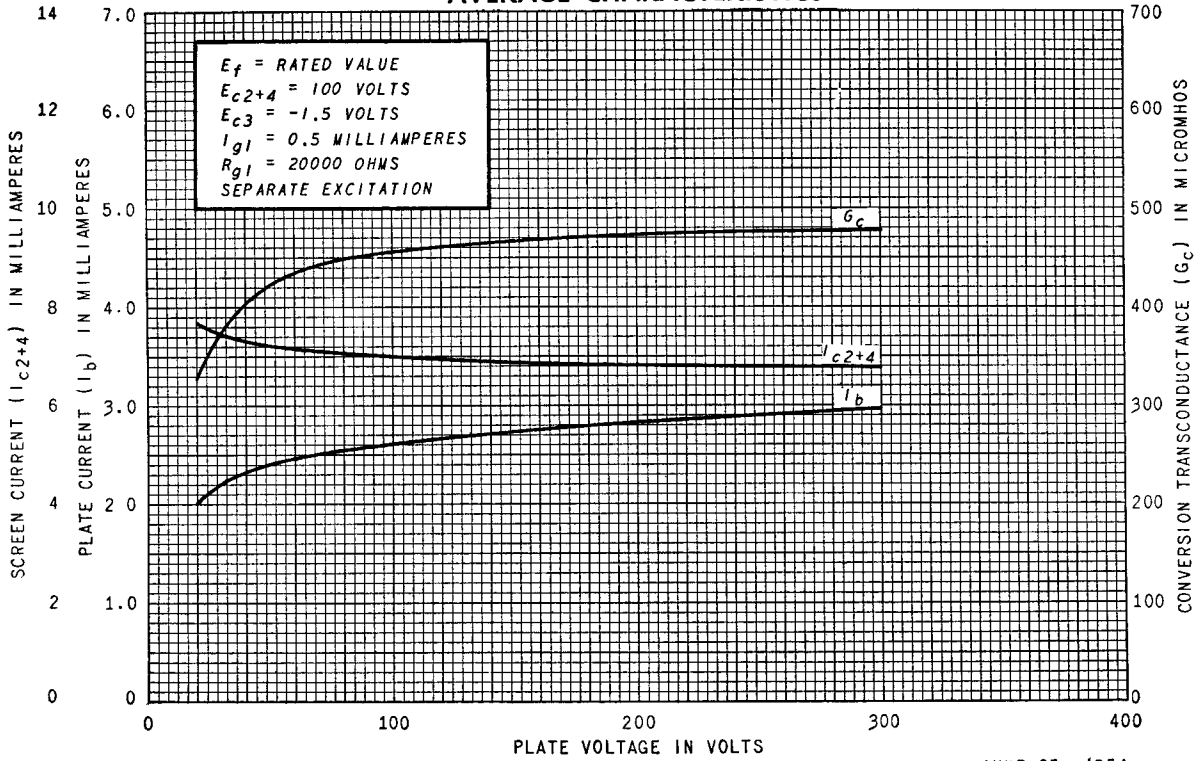
**AVERAGE TRANSFER CHARACTERISTICS**



**AVERAGE CHARACTERISTICS**

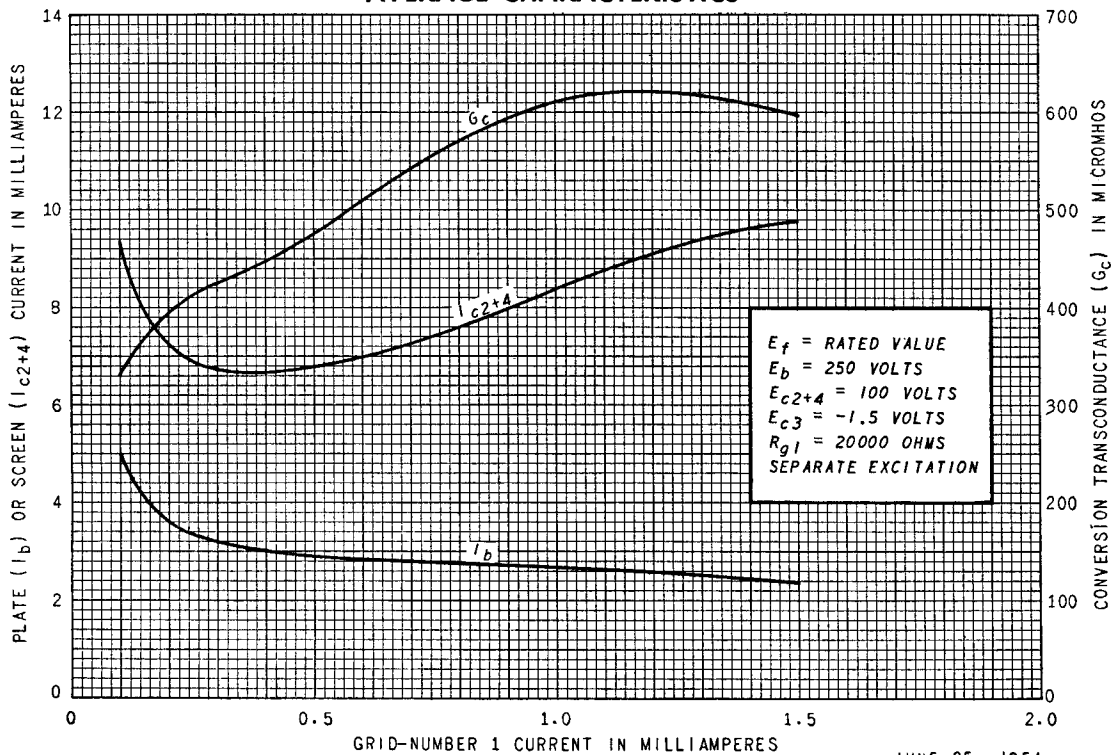


**AVERAGE CHARACTERISTICS**



JUNE 25, 1954

**AVERAGE CHARACTERISTICS**



JUNE 25, 1954