



12B4-A TRIODE

12B4-A
ET-T917
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FOR TV VERTICAL DEFLECTION APPLICATIONS

DESCRIPTION AND RATING

The 12B4-A is a miniature low-mu triode designed primarily for service as a vertical-deflection amplifier in television receivers. The tube features high plate current at relatively low plate voltages and is capable of withstanding the high pulse voltages normally encountered in this application.

In addition, the 12B4-A exhibits a controlled heater warm-up characteristic which makes the tube particularly suited for use in television receivers which employ series-connected heaters. When the 12B4-A is used in conjunction with other 600-milliampere types which exhibit essentially the same heater warm-up characteristic, heater voltage surges across the individual tubes are minimized during the warm-up period.

Except for the controlled heater warm-up characteristic, the 12B4-A is identical to the 12B4.

GENERAL

ELECTRICAL

Cathode — Coated Unipotential	Series	Parallel
Heater Voltage, AC or DC	12.6	6.3 Volts
Heater Current	0.3	0.6 Ampere
Heater Warm-up Time*	—	11 Seconds
Direct Interelectrode Capacitances, approximate†		
Grid to Plate	4.8μF	
Input	5.0μF	
Output	1.5μF	

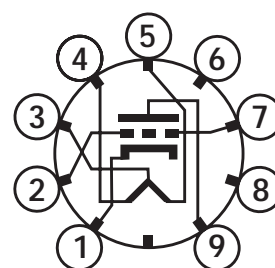
MECHANICAL

Mounting Position—Any
Envelope—T-61/2 Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

	Class A ₁ Amplifier	Vertical- Deflection Amplifier ‡
DC Plate Voltage	550	550 Volts
Peak Positive Plate Voltage	—	1000§ Volts
Peak Negative Grid Voltage	—	250 Volts
Plate Dissipation	5.5	5.5π Watts
DC Cathode Current	—	30 Millamperes
Peak Cathode Current	—	105 Millamperes
Heater-Cathode Voltage		
Heater positive with Respect to Cathode		
DC Component	100	100 Volts
Total DC and Peak	200	200 Volts
Heater positive with Respect to Cathode		
Total DC and Peak	200	200 Volts
Grid Circuit Resistance		
With Fixed Bias	0.47	— Megohms
With Cathode Bias	2.2	2.2 Megohms

BASING DIAGRAM

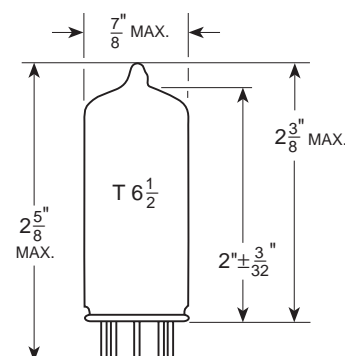


RETMA 9AG

TERMINAL CONNECTIONS

Pin 1 — Cathode
Pin 2 — Grid
Pin 3 — Heater Center-tap
Pin 4 — Heater
Pin 5 — Heater
Pin 6 — No Connection
Pin 7 — Grid
Pin 8 — No Connection
Pin 9 — Plate

PHYSICAL DIMENSIONS

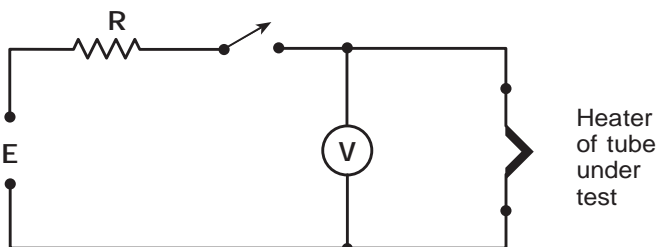


CHARACTERISTICS AND TYPICAL OPERATION

CLASS A₁ AMPLIFIER

Plate Voltage	150	150 Volts
Grid Voltage	-23	-17.5 Volts
Amplification Factor	—	6.5
Plate Resistance, approximate	—	1030 Ohms
Transconductance	—	6030 Micromhos
Plate Current	9.6	34 Milliamperes
Grid Voltage, approximate	—	-32 Volts
$I_b = 200$ Microamperes	—	

* Heater warm-up time is defined as the time required in the circuit shown at the right for the voltage across the heater terminals to increase from zero to the heater test voltage (V_1). For this type, $E = 25$ volts (RMS or DC), $V_b = 5.0$ volts (RMS or DC), and $R = 31.5$ ohms.



† Without external shield.

‡ For operation in a 525-line, 30-frame television system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.

§ Value given is to be considered as an Absolute Maximum Rating. In this case, the combined effect of supply voltage variation, manufacturing variation including components in the equipment, and adjustment of the controls should not cause the rated value to be exceeded.

π In stages operating with grid-leak bias, an adequate cathode-bias resistor or other suitable means is required to protect the tube in the absence of excitation.

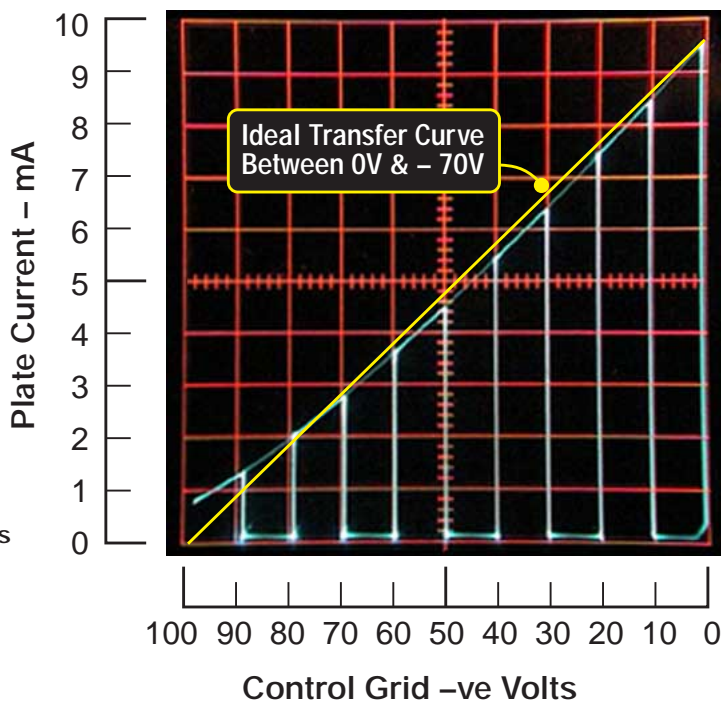
AVERAGE TRANSFER CURVE DATA

Data taken on a Tektronix 570 Characteristic Curve Tracer using the following settings and set-up:

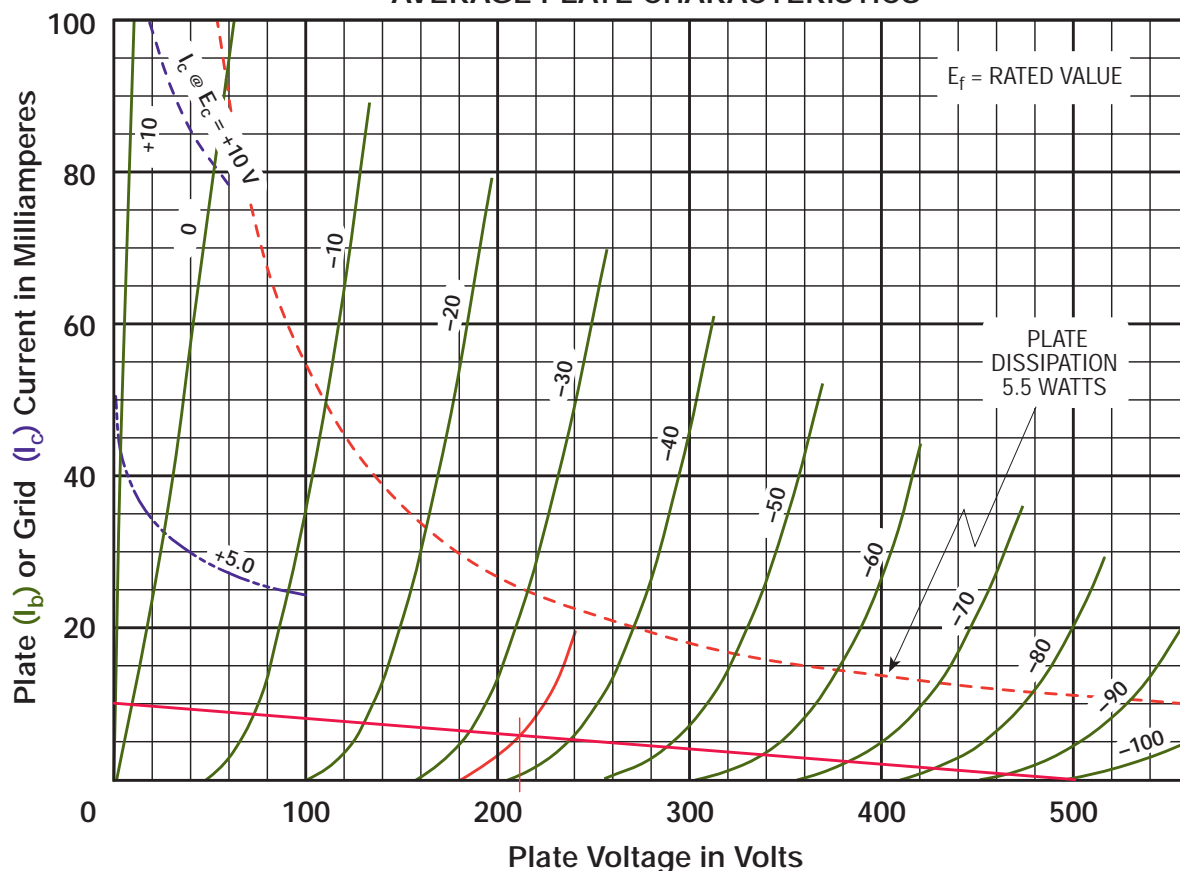
Grid Voltage Step	10 Volts
Starting Voltage	0 Volts
Plate Current	1 mA/div
Load Resistance	50 Kohms
Cathode Resistance	300 Ohms

CLASS A₁ AMPLIFIER — See the "Average Plate Characteristics" for the load line corresponding to operation with the cathode grounded.

B+ Voltage	500 Volts
Plate Voltage	200 Volts
Load Resistance	50 Kohms
Plate Current	6.0 Milliamperes
Cathode Resistance	300 Ohms
Grid-to-Cathode Voltage	-35 Volts
Amplification Factor	5.5
Plate Resistance, r_p , approx.	6000 Ohms
Composite Plate Resistance, r_p'	8000 Ohms
Transconductance	850 Micromhos



AVERAGE PLATE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS

