

High-Mu Triode-Beam Power Tube

NOVAR TYPE

For Combined Vertical-Deflection Oscillator and Amplifier
Service in Color TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Current	I_f	450	mA
Heater Voltage (AC or DC) at $I_f = 450$ mA	E_f	21.0	V
Heater Warm-up Time (Average).		11	s

Direct Interelectrode Capacitances (Approx.)

Without external shield

Triode Unit:

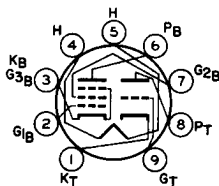
Grid to plate.	C_{gp}	6.0	pF
Input: G_T to (KT, H).	C_i	6.5	pF
Output: P_T to (KT, H).	C_o	1.6	pF

Beam Power Unit:

Grid No.1 to plate	C_{gp}	0.7 max	pF
G_{1B} to (KB + G_{3B} , G_{2B} , H).	C_i	16.0	pF
P_B to (KB + G_{3B} , G_{2B} , H).	C_o	9.0	pF
G_{1B} to P_T		0.12 max	pF
P_B to P_T		0.32 max	pF

Basing Designation for BOTTOM VIEW 9QT

- Pin 1 - Triode Cathode
Pin 2 - Beam Power Grid No.1
Pin 3 - Beam Power Cathode &
Grid No.3
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Beam Power Plate
Pin 7 - Beam Power Grid No.2
Pin 8 - Triode Plate
Pin 9 - Triode Grid

CLASS A₁ AMPLIFIER

For the following characteristics, see Conditions

		Triode Unit	Beam Power Unit	
Amplification Factor	μ	58	-	6.5 ^a
Plate Resistance (Approx.)	r_p	16000	-	12000 -
Transconductance	g_m	3600	-	9300 -
DC Plate Current	I_b	2.3	200 ^b	56 -
DC Grid-No.2 Current	I_g	-	20 ^b	3 -
Cutoff DC Grid-No.1 Voltage				
$I_b = 10 \mu A$	$E_c(\text{co})$	-6.6	-	-
$I_b = 1$ mA (Approx.)	$E_c(\text{co})$	-	-	-26 -
$I_b = 100 \mu A$	$E_c(\text{co})$	-	-	-30 -



Conditions

		Triode Unit		Beam Power Unit	
Heater Voltage	E_f	21.0	21.0	21.0	21.0 V
Plate Voltage.	E_b	250	45	135	120 V
Grid-No.2 Voltage.	E_c	-	125	120	120 V
Grid-No.1 Voltage.	E_c	-4	0	-10	-10 V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length (l_m).	3.710 in
Maximum Seated Length (l_m).	3.330 in
Length, Base Seat to Bulb Top (Excluding tip)	2.810 to 2.990 in
Diameter (d)	1.438 to 1.562 in
Envelope	T12
Bases (alternates)	
Small-Button Novar 9-Pin (JEDEC No.E9-76)	
Small-Button Novar 9-Pin with Exhaust Tip 9-Pin (JEDEC No.E9-88)	

VERTICAL-DEFLECTION OSCILLATOR (Triode Unit)

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400 V
Peak Negative-Pulse Grid Voltage	e_{cm}	400 V
Peak Cathode Current	i_{km}	105 mA
Average Cathode Current.	$I_k(av)$	30 mA
Plate Dissipation.	P_b	2.5 W
Peak Power Output.	P_o	2.5 W

Maximum Circuit Values

Grid-Circuit Resistance	$R_g(ckt)$	
For grid-resistor-bias operation		2.2 M Ω

VERTICAL-DEFLECTION AMPLIFIER (Beam Power Unit)

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400 V
Peak Positive-Pulse Plate Voltage ^c	e_{bm}	2500 ^d V
DC Grid-No.2 (Screen-Grid) Voltage	E_c	300 V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage.	e_{cm}	250 V
Peak Cathode Current	i_{km}	260 mA
Average Cathode Current.	$I_k(av)$	75 mA
Plate Dissipation ^e	P_b	14 W
Grid-No.2 Input ^e	P_c	2.75 W
Envelope Temperature	T_E	210 °C

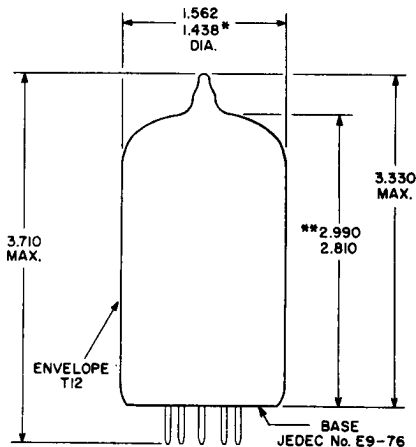
MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance	$R_g(ckt)$	
For fixed-bias operation		1 M Ω
For grid-resistor-bias operation		2.2 M Ω

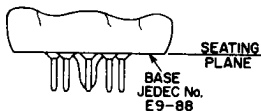


- a Triode connection.
- b This value can be measured by a method involving a recurrent wave form such that the plate dissipation and grid-No.2 input will be kept within ratings in order to prevent damage to the tube.
- c This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycles is 2.5 milliseconds.
- d Absolute Maximum value.
- e An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

DIMENSIONAL OUTLINE
Top Exhaust (JEDEC No. 12-65)



92CS-13502A



92CS-III27R3B

DIMENSIONS IN INCHES

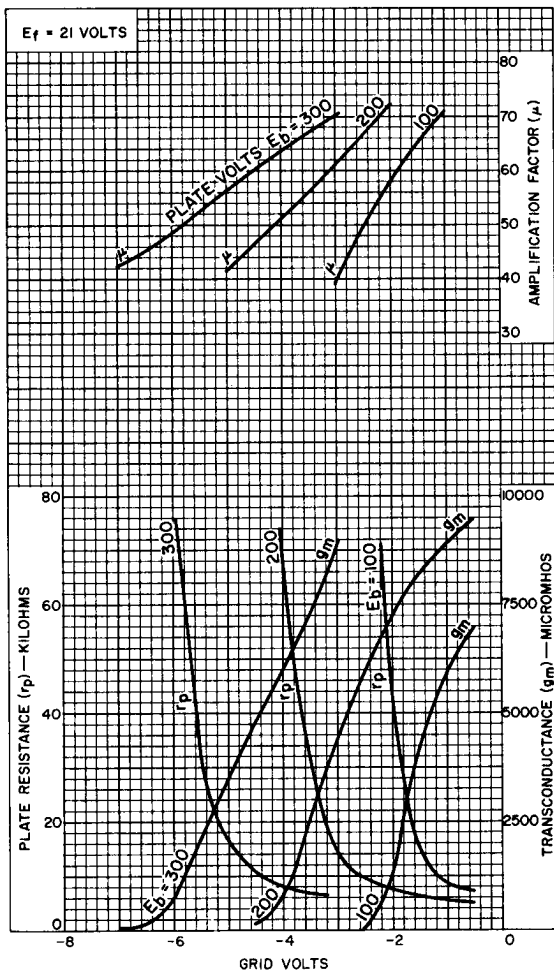
Bottom-exhaust version has the same dimensions for maximum overall length and seated length as the top-exhaust outline shown.

- * Applies to the minimum diameter except in the area of the seal.
- ** Measured from the base seat to bulb-top line as determined by arcing gauge of 0.600" I.D.



Typical Characteristics

Triode Unit

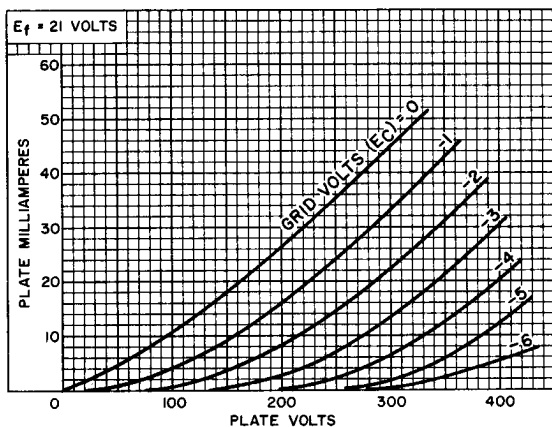


92CM-13506



Typical Plate Characteristics

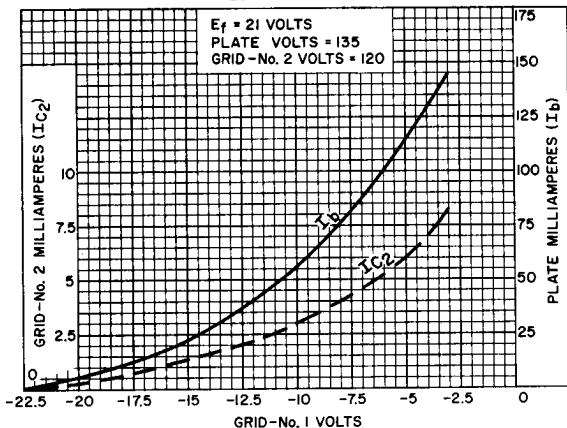
Triode Unit



92CS-13508

Typical Characteristics

Beam Power Unit

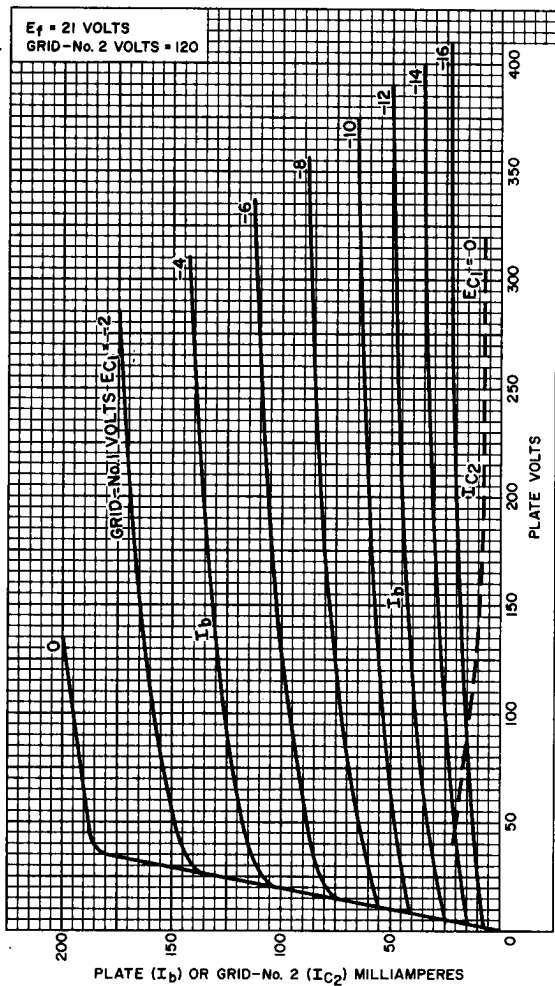


92CS-13509



Typical Characteristics

Beam Power Unit



92CM-13507

