from JEDEC release #3320,
June 26, 1961

NOVAR

6BH3, 17BH3, 22BH3

HALF-WAVE VACUUM RECTIFIERS

T9 Bulb — **Novar Tubes For Television Damper Service** — **RCA "Dark Heater"**

RCA-6BH3, 17BH3, and 22BH3 are half-wave vacuum rectifier tubes designed specifically for use as damper diodes in horizontal-deflection circuits of black-and-white television receivers. These novar tubes have integral, all-glass 9-pin bases. The short, large-diameter internal leads to the bases of these tubes assure an exceptionally firm support for the mount structure. These short heavy leads also facilitate electrode cooling by providing very good heat conduction. Two base-pin connections to the plate, in addition to the low heater power, contribute to cool operation. The relatively large pin-circle diameter (0.687 inch) and long pins of the novar base insure firm retention of the tube in its socket.

Rated to withstand a maximum peak inverse plate voltage of 5500 volts, the 6BH3, 17BH3, and 22BH3 can supply a maximum peak plate current of 1100 milliamperes and a maximum dc plate current of 180 milliamperes. Designed with insulation between heater and cathode to withstand negative peak pulses between heater and cathode of as much as 5500 volts with a dc component up to 900 volts, these tubes provide flexibility in choice of deflection circuits.

Also featured in the design of the 6BH3, 17BH3, and 22BH3 is the new RCA "Dark Heater", which functions efficiently at operating temperatures 350° K below those of the heaters in conventional tube types. The dark surface of the new heater radiates heat more efficiently and improves the transfer of heat to the cathode so that optimum cathode temperature may be attained with the heater operating at approximately 1350° K.

The low operating temperature of the "Dark Heater" results in (1) lower internal stresses in the heater wire and smaller thermal change during heater warmup, (2) cooler operation of the heater which minimizes changes in heater shape and reduces the possibility of heater damage and heater shorts, (3) extremely stable current characteristics throughout life, and (4) significant reduction in effects of ac heater leakage.

In addition, these tubes utilize a cathode with a special low-impedance coating to withstand high-voltage pulses encountered in TV damper service. This coating not only minimizes sputtering, but also assures uniform emission over the cathode surface. Furthermore, specially designed micas together with a plate structure having rounded contours to reduce voltage gradients, insure against high-voltage breakdown. Slots in the plate surface surrounding the cathode permit the escape of gas which may be released under abnormal operating conditions and thereby minimize the danger of sustained arcs.

The 17BH3 and 22BH3 are like the 6BH3 except that they are designed respectively, with 600- and 450-milliampere heaters having a controlled warmup time for use in series-heater-string arrangements.

GENERAL DATA

Electrical:

	6BH3	*17BH3*	*22BH3*	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	6.3 ± 10%	17.0	22.4	volts
Current	1.6	0.6 ± 6%	0.45 ± 6%	amp
Warmup time (Average)	-	11	11	sec

Direct Interelectrode Capacitances (Approx. without external shield):

Plate to cathode and heater	6.5	μμf
Cathode to plate and heater	9.0	μμf
Heater to cathode	2.8	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3.84"
Maximum Seated Length	3.46"
Length, Base Seat to Bulb Top (Excluding tip)	2.90" ± .09"
Diameter:	
Maximum	1.188"
Minimum	1.062"
Bulb	T9
Base[a]	Small-Button Novar 9-Pin (JEDEC No.E9-75)

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*[b]

For operation in a 525-line, 30-frame system[c]

PEAK INVERSE PLATE VOLTAGE	5500[d]	max.	volts
PEAK PLATE CURRENT	1100	max.	ma
DC PLATE CURRENT	180	max.	ma
PLATE DISSIPATION	6.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	5500[e]	max.	volts
Heater positive with respect to cathode	300[f]	max.	volts

[a] The *base pins* of the 6BH3, 17BH3, and 22BH3 fit the Cinch Mfg. Co. socket No.149-19-00-024 or equivalent. The socket may be mounted to hold the tube in any position. Socket terminals for pins 1, 3, 6, and 8 should not be used for tie points. It is also recommended that socket clips for these pins be removed to reduce the possibility of arc-over and to minimize leakage.

[b] For further information, see RCA Application Note AN-174, "Design-Maximum System for Rating Electron Tubes", available on request from Commercial Engineering, Radio Corporation of America, Harrison, New Jersey.

[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[d] This rating is applicable where the duty cycle of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[e] The dc component must not exceed 900 volts.

[f] The dc component must not exceed 100 volts.

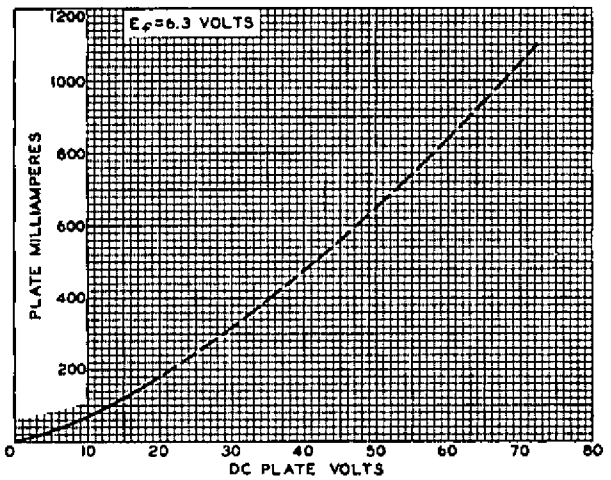
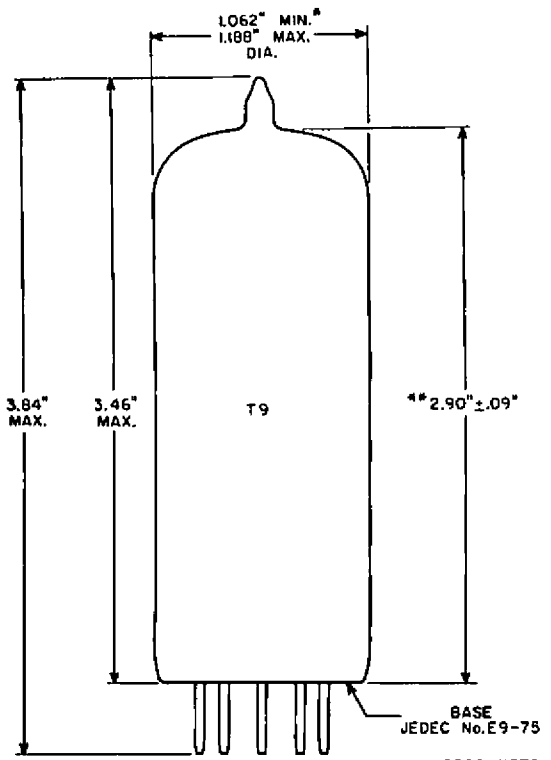


Fig. 1 - Average Plate Characteristic for Type 6BH3 and for Types 17BH3 and 22BH3 except for Heater Voltage.

DIMENSIONAL OUTLINE

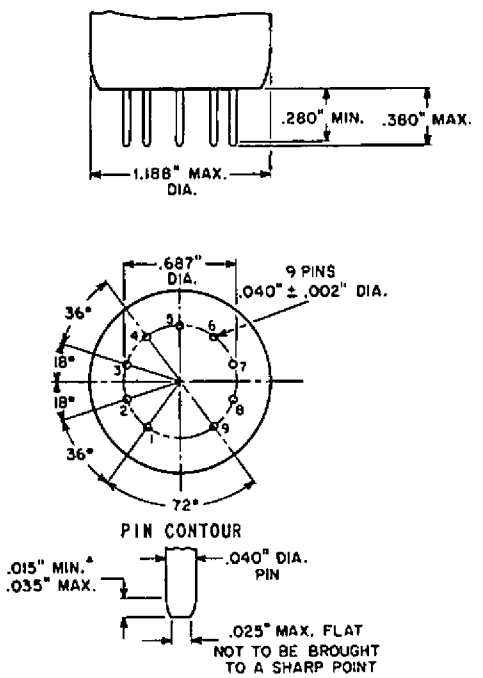


* APPLIES IN ZONE STARTING 0.375" FROM BASE SEAT.

** MEASURED FROM BASE SEAT TO BULB-TOP LINE AS DETERMINED BY A RING GAUGE OF 0.600" I.D.

MALL-BUTTON NOVAR 9-PIN BASE

E9-75



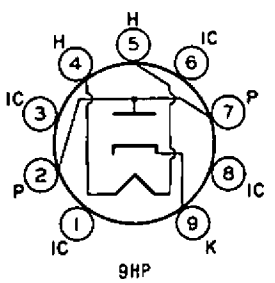
▲ THIS DIMENSION MAY VARY WITHIN THE LIMITS SHOWN AROUND THE PERIPHERY OF ANY INDIVIDUAL PIN. THIS SURFACE OF THE PIN SHALL BE CONVEX OR CONICAL IN SHAPE AND NOT BROUGHT TO A SHARP POINT.

PIN ALIGNMENT GAUGE

BASE-PIN POSITIONS ARE HELD TO TOLERANCES SUCH THAT ENTIRE LENGTH OF PINS WILL WITHOUT UNDUE FORCE PASS INTO AND DISENGAGE FROM GAUGE JEDEC No.GE9-5. THIS GAUGE CONTAINS A FLAT-PLATE SECTION HAVING THICKNESS OF 0.350" AND TEN EQUALLY SPACED HOLES OF 0.0520" ± 0.0005" DIAMETER SO LOCATED ON A 0.6870" ± 0.0005" DIAMETER CIRCLE THAT THE DISTANCE ALONG THE CHORD BETWEEN ANY TWO ADJACENT HOLE CENTERS IS 0.2123" ± 0.0005".

BASING DIAGRAM

Bottom View



9HP

PIN 1 - INTERNAL CONNECTION—DO NOT USE
PIN 2 - PLATE
PIN 3 - SAME AS PIN 1
PIN 4 - HEATER
PIN 5 - HEATER
PIN 6 - SAME AS PIN 1
PIN 7 - PLATE
PIN 8 - SAME AS PIN 1
PIN 9 - CATHODE