Sharp-Cutoff Tetrode

NUVISTOR TYPE
For Industrial Applications

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Absolute-Maximum Values)*:		
Voltage (AC or DC)	6.3±0.6	volts
Current at heater volts = 6.3	0.150	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
Direct Interelectrode Capacitances:		
Grid No.1 to plate	0.015 max.	pf
Grid No.1 to cathode, grid No.2, shell, and heater	7.0	pf
Plate to cathode, grid No.2, shell, and heater	1.4	pf
Heater to cathode	1.4	pf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	125	volts
Grid-No.2 Supply Voltage	50	volts
Cathode Resistor	68	ohms
Plate Resistance (Approx.)	0.2	megohm
Transconductance	10600	μmhos
Plate Current	10	ma
Grid-No.2 Current	2.7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-4.5	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	1.050"
Maximum Seated Length	0.840"
Maximum Diameter	0.440"
Weight (Approx.)	1/10 oz
Envelope	Metal Shell MT4 and Ceramic Cylinder
Cap	Skirted Miniature (JEDEC No.C1-44)
Socket	Cinch Mfg. Corp. No.133 65 10 001, or equivalent
Base	Medium Ceramic-Wafer Twelvar 5-Pin (JEDEC No.E5-65)

→ Indicates a change.

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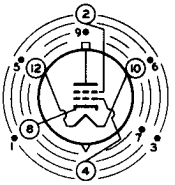
Basing Designation for BOTTOM VIEW. 12AS

Pin 1[a] – Do Not Use
Pin 2 – Grid No.2
Pin 3 – Same as Pin 1
Pin 4 – Grid No.1
Pin 5 – Same as Pin 1
Pin 6 – Same as Pin 1



INDEX ▪ LARGE LUG
● = SHORT PIN

Pin 7 – Same as Pin 1
Pin 8 – Cathode
Pin 9 – Same as Pin 1
Pin 10 – Heater
Pin 12 – Heater
Cap – Plate

INDUSTRIAL SERVICE

Maximum Ratings, *Absolute-Maximum Values:*

For operation at any altitude

PLATE SUPPLY VOLTAGE.	330 max.	volts
PLATE VOLTAGE	250 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE. . .	330 max.	volts
GRID-No.2 VOLTAGE	110 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	55 max.	volts
Peak-positive value	2 max.	volts
CATHODE CURRENT	20 max.	ma
GRID-No.1 CURRENT	2 max.	ma
GRID-No.2 INPUT	0.2 max.	watt
PLATE DISSIPATION	2.2 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:[b]		
For fixed-bias operation.	0.5 max.	megohm
For cathode-bias operation.	1 max.	megohm

[a] Pin is of a length such that its end does not touch the socket insertion plane.
[b] For operation at metal-shell temperatures up to 150° C.

→ CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current.	1	0.140	0.160	amp
Direct Interelectrode Capacitances:				
Grid No.1 to plate.	2	–	0.015	pf
Grid No.1 to cathode, grid No.2, shell, and heater	2	6.0	8.0	pf
Plate to cathode, grid No.2, shell, and heater	2	1.2	1.6	pf
Heater to cathode	2	1.1	1.7	pf
Plate Current (1)	1,3	8.5	11.5	ma
Plate Current (2)	1,4	–	50	μa
Grid-No.2 Current	1,3	–	3.6	ma
Transconductance (1).	1,3	9000	12000	μmhos

→ Indicates a change.

Transconductance (2).	3,5	8000	–	μmhos
Transconductance Change:				
Difference between Transconductance (1) and Transconductance (2), expressed in per cent of Transconductance (1).	–	–	20	%
Reverse Grid Current.	1,6	–	0.1	μa
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode.	1,8	–	5	μa
Heater positive with respect to cathode.	1,8	–	5	μa
Leakage Resistance:				
Between grid No.2 and all other electrodes tied together. . . .	1,7	500	–	megohms
Between grid No.1 and all other electrodes tied together. . . .	1,9	500	–	megohms
Between plate and all other electrodes tied together. . . .	1,10	500	–	megohms

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Measured in accordance with EIA Standard RS-191-A.

Note 3: With dc plate supply volts = 125, grid-No.2 supply volts = 50, cathode resistor = 68 ohms, and cathode-bypass capacitor = 1000 μf.

Note 4: With dc plate volts = 125, dc grid-No.2 volts = 50, dc grid-No.1 volts = -6, and metal shell connected to ground.

Note 5: With 5.7 volts ac or dc on heater.

Note 6: With dc plate volts = 200, dc grid-No.2 volts = 70, dc grid-No.1 supply volts = -1.6, grid-No.1 resistor = 0.5 megohm, and metal shell connected to ground.

Note 7: With grid No.2 100 volts negative with respect to all other electrodes tied together.

Note 8: With 100 volts dc applied between heater and cathode.

Note 9: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . . 1000 max. g

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified impact acceleration. Tubes are held rigid in four different positions in a Navy Type, High-impact (flyweight) Shock Machine and are subjected to 20 blows at the specified maximum impact acceleration. At the end of this test, tubes are criticized for change in transconductance, reverse grid current, and heater-cathode leakage current, and are then subjected to the Variable-Frequency Vibration Test described below.

Fatigue Rating:

Vibrational Acceleration. . . . . 2.5 max. g

This test is performed on a sample lot of tubes to determine ability of tube to withstand the specified vibrational acceleration. Tubes are rigidly mounted, supplied with rated heater voltage only, and subjected for 48 hours to 2.5-g vibrational acceleration at 60 cycles per second in a direction perpendicular to the longitudinal axis of the tube. At the end of this test, tubes are criticized for the same characteristics and end-point values as in the Shock Rating Test described above.

Variable-Frequency Vibration Performance:

This test is performed on a sample lot of tubes from each production run. The tube is operated under the conditions specified in CHARACTERISTICS RANGE VALUES for Transconductance (1) with the addition of a plate-load resistor of 2000 ohms. During operation, tube is vibrated in a direction perpendicular to the longitudinal axis of the tube through the frequency range from 50 to 15,000 cycles per second with a constant vibrational acceleration of 1 g. During the test, tube will not show an rms output voltage across the plate-load resistor in excess of: (1) 35 millivolts from 50 to 6000 cps, (2) 500 millivolts from 6000 to 15,000 cps.

Low-Pressure Voltage-Breakdown Test:

The test is performed on a sample lot of tubes from each production run. In this test, tubes are operated with 240 rms volts applied between plate and all other electrodes and will not break down or show evidence of corona when subjected to air pressures equivalent to altitudes of up to 100,000 feet.

Heater Cycling:

Cycles of Intermittent Operation. . . . . 2000 min. cycles

This test is performed on a sample lot of tubes from each production run under the following conditions: heater volts = 7.5 cycled one minute on and two minutes off; heater 100 volts negative with respect to cathode; grid No.1, grid No.2, plate, and metal shell connected to ground. At the end of this test, tubes are tested for open heaters and heater-cathode shorts.

Shorts and Continuity:

This test is performed on a sample lot of tubes from each production run. Tubes are subjected to the Thyratron-Type Shorts Test described in MIL-E-ID, Ammendent 2, Paragraph 4.7.7, except that tapping is done by hand with a soft rubber tapper[c]. See accompanying *Shorts-Test Acceptance-Limits* curve. Tubes are criticized for permanent or temporary shorts and open circuits.

Early-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that tubes are properly stabilized. In this test, tubes are operated for 20 hours at maximum-rated plate dissipation. After 2 hours of operation and again after 20 hours of operation, tubes are checked for transconductance under the conditions specified in CHARACTERISTICS RANGE VALUES for Transconductance (1). A tube is rejected if its transconductance after 2 or 20 hours of operation has changed more than 10 per cent from the 0-hour value.

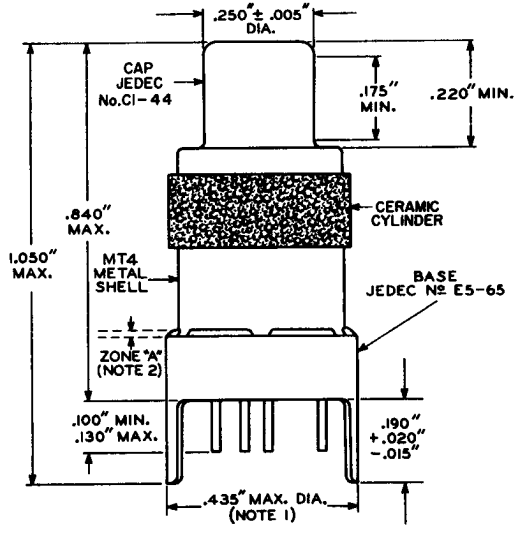
100-Hour Life Performance:

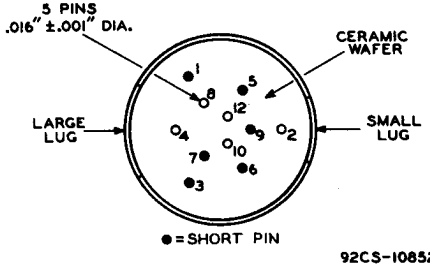
This test is performed on a sample lot of tubes from each production run to insure a low percentage of early-hour inoperatives. Tubes are operated for 100 hours at maximum-rated plate dissipation, and then subjected to the *Shorts and Continuity* Test previously described. Tubes must then show a transconductance of not less than 7500 micromhos under the conditions specified in CHARACTERISTICS RANGE VALUES for Transconductance (1).

1000-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and guard against epidemic failures due to excessive changes in any of the characteristics indicated below. In this test, tubes are operated for 1000 hours at maximum-rated plate dissipation, and then criticized for inoperatives, reverse grid current, heater-cathode leakage current, and leakage resistance. In addition, the average change in transconductance of the lot from the 0-hour value for Transconductance (1) specified in CHARACTERISTICS RANGE VALUES, must not exceed 20 per cent at 500 hours, and 25 per cent at 1000 hours.

[c] Specifications for tapper supplied on request.





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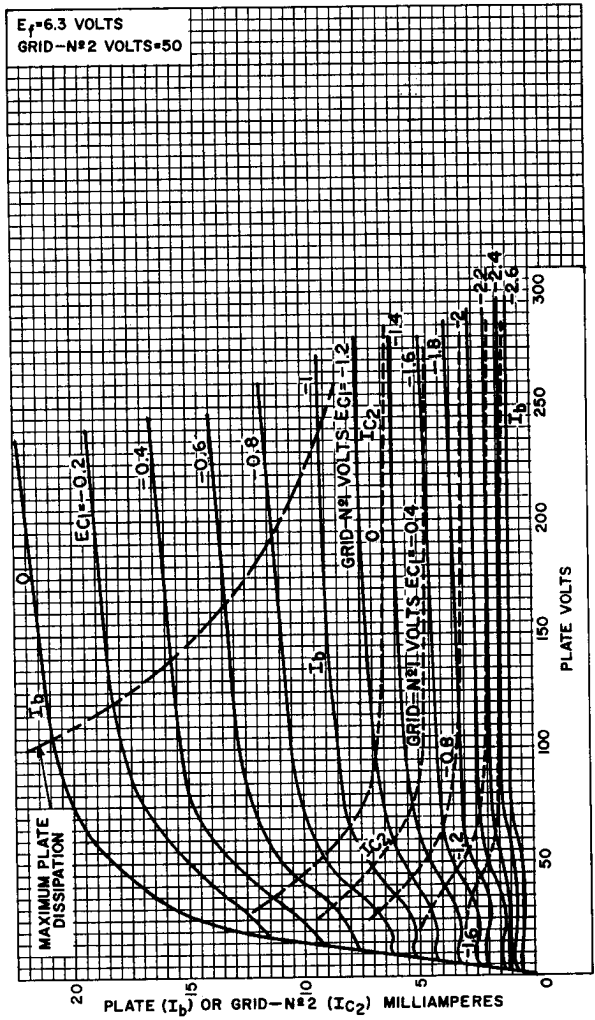
NOTE 1: MAXIMUM OUTSIDE DIAMETER OF 0.440" IS PERMITTED ALONG 0.190" LUG LENGTH.

NOTE 2: SHELL TEMPERATURE SHOULD BE MEASURED IN ZONE "A" BETWEEN BROKEN LINES.

AVERAGE CHARACTERISTICS



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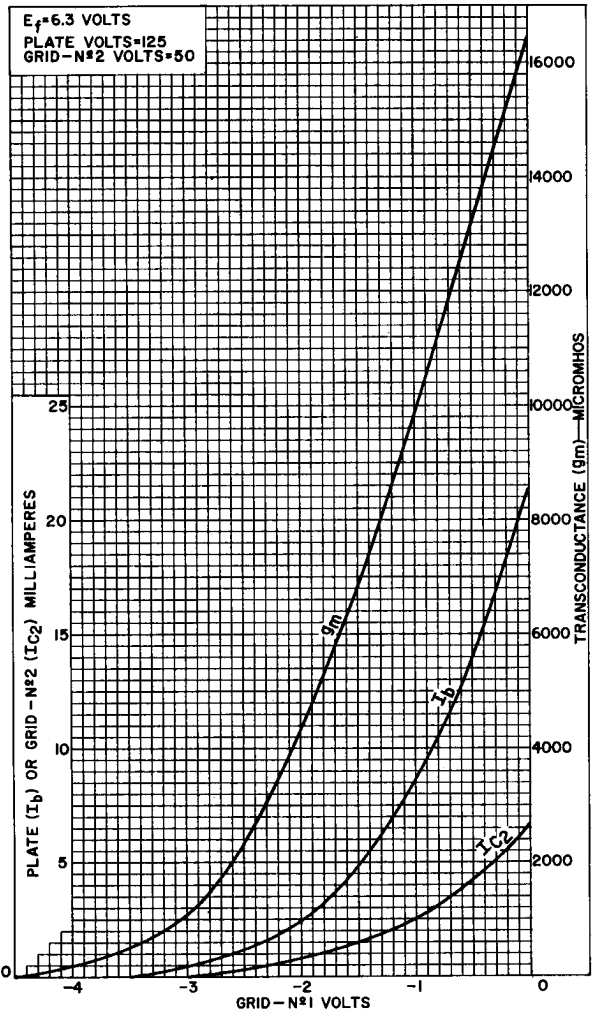
AVERAGE CHARACTERISTICS



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SHORTS-TEST ACCEPTANCE LIMITS