

RELIABLE MINIATURE RF SHARP CUT-OFF PENTODE

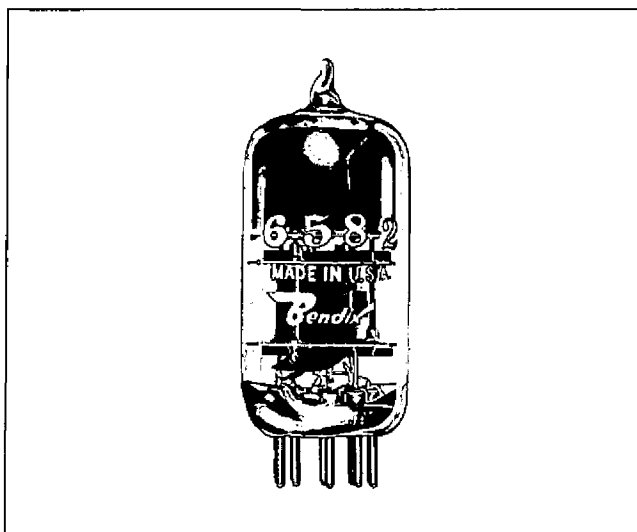


CHART 1. DESIGN CENTER MAXIMUM RATINGS*

Heater Voltage (ac or dc)**	6.3 volts
Plate Voltage	200 volts
Grid #2 Voltage	155 volts
Grid #1 Voltage (max.)	-100 Vdc
Plate Dissipation	2.0 W
Grid #2 Dissipation	0.85 W
Cathode Current	20 mAdc
Heater-Cathode Voltage	250 V
Cathode Warm-up Time	25 sec.
Bulb Temperature (at hottest point on bulb)	165°C

* To obtain greatest life expectancy from tube, avoid designs where the tube is subject to all maximum ratings simultaneously. See application notes.

** Voltage should not fluctuate more than $\pm 5\%$.

CHART 2.

PHYSICAL CHARACTERISTICS

Base	Miniature button 9-pin
Bulb	T-6½
Max. overall length	2⅜ in.
Max. seated height	1⅝ in.
Max. diameter	⅞ in.
Mounting position	Any
Max. bulb temp.	165°C

DESCRIPTION

This miniature nine-pin dual control sharp cut-off, rf pentode is one of the Bendix Red Bank line of reliable vacuum tubes specifically designed for aircraft and industrial applications where freedom from early failure, long average service life and uniform operating characteristics are extremely important. It is intended to replace the 6AK5 in applications where reliability is the primary consideration. Each tube is given a 45-hour run-in under overload vibration and shock conditions. This run-in serves to reduce early failures by eliminating tubes with any minor defects that might lead to failure under actual operating conditions.

In order to keep the lead length as short as possible for use in rf circuits the cathode and grid 1 are brought out to both sides of the tube.

The use of a coil type heater inside an extruded alumina insulator gives a long life heater structure which stands up well under high heater to cathode voltage. The mount structure is so designed that the tube is capable of withstanding severe shock and vibration.

CHART 3. AVERAGE ELECTRICAL CHARACTERISTICS

Heater Current, If.....	.25 A
Plate Voltage, Eb.....	120 Vdc
Grid #2 Voltage, Ec2.....	120 Vdc
Grid #1 Voltage, Ec1.....	-2 Vdc
Plate Current, Ib.....	7.5 mAdc
Grid #2 Current, Ic2.....	2.5 mAdc
Mutual conductance.....	4500 μ mhos
Direct Inter-electrode	
Capacitances	(no shield) (with shield)
Grid #1 to plate.....	.046 .030 max. μ f
Input.....	5.0 5.0 max. μ f
Output.....	3.3 3.4 max. μ f
Life Expectancy.....	10,000 hrs.

THE *Bendix* CORPORATION
Red Bank DIVISION, EATONTOWN, NEW JERSEY

ELECTRICAL CHARACTERISTICS AND TEST DATA

TEST CONDITIONS AND CHARACTERISTICS LIMITS

All Tubes are Stabilized for 45 Hours Under Test Conditions and

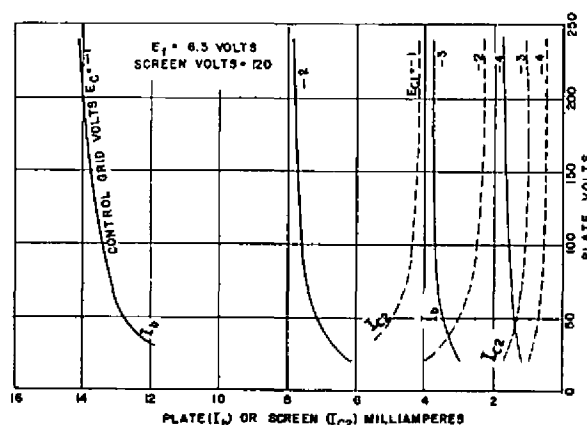
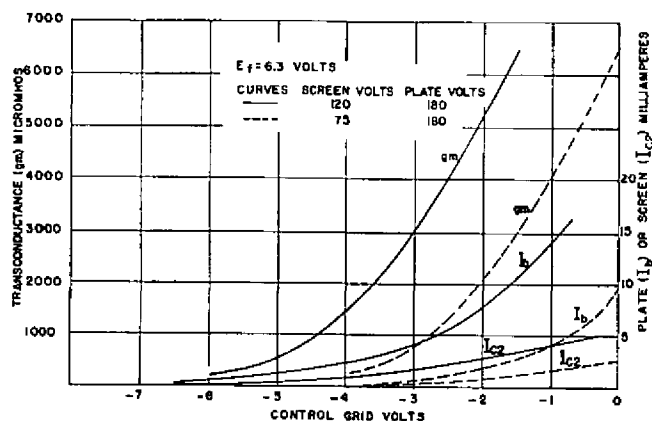
2 G Vibration at 30 Cps. Prior to 100% Testing

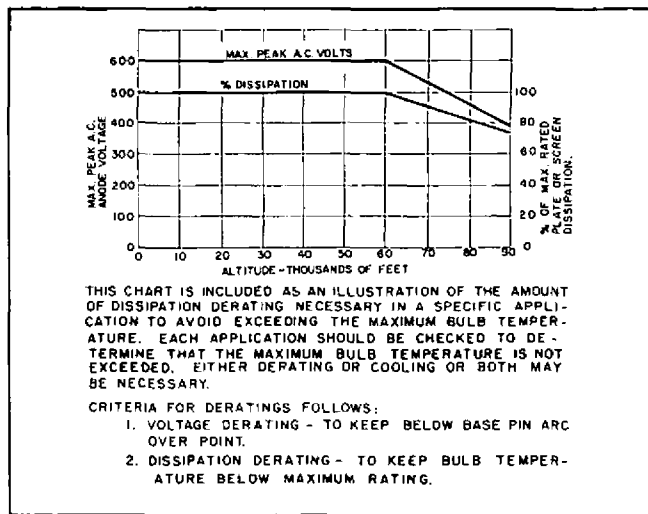
CHARACTERISTIC	SYMBOL	MIN.	DESIGN CENTER	MAX.	UNITS
PRODUCTION TESTS					
Short and Continuity					
Heater Current	If	235	250	265	mA
Heater-Cathode Leakage	Ihk	—	—	10	μ Adc
Grid Current (1)	Ic1	—	—	0.1	μ Adc
Plate Current (1)	Ib	5.0	7.5	11.0	mAde
Screen Grid Current	Ic2	0.8	2.5	4.0	mAde
Transconductance (1)	Sm	3500	4500	5500	μ mhos
DESIGN TESTS					
Transconductance (2) $E_f = 5.7$ V.	ΔS_m	—	—	15	%
Plate Current (2) $E_{c1} = -10$ Vdc	Ib	—	—	200	μ Adc
Plate Current (3) $E_{c1} = -5.5$ Vdc	Ib	5	—	—	μ Adc
Grid Current (2) $E_f = 7.0$ V	Ic1	0	—	0.3	μ Adc
RF Noise $E_{c1} = 15$ mVac	—	—	—	3.0	Mw
AF Noise	Ep	—	—	100	mVac
ELECTRODE:					
TEST CONDITIONS:	6.3 Volts	120 Vdc	-2 Vdc	120 Vdc	± 250 Vdc

ADDITIONAL TESTS

In addition to the production and design tests shown in Chart 3 other tests are performed on a sampling basis to assure a high outgoing quality level. See below.

TEST	CONDITIONS	DURATION
Heater Cycling Life Test	On $2\frac{1}{2}$ Min. Off $2\frac{1}{2}$ Min. $E_f = 7.5$ Ehk = 250	3,000 On-Off Cycles
Life Test	Under "Test Conditions"	1,000 Hours
Life "Expectancy" Test	Under "Test Conditions"	5,000 Hours
High Level Fatigue Test	50G—Shock Excitation 18 Cycles/Sec.	100 Hours
Shock	500 G	20 Impacts
Altitude Test	80,000 Feet	5 Minutes
Glass Strain Test	Boiling Water to Ice Water	15 Seconds in Each
Mount Inspection	100% Test—Microscopic Inspection of 30 Possible Trouble Points	





ALTITUDE RATINGS

EFFECT ON LIFE OF INCREASED RATINGS

See Also Application Notes	OPERATING CONDITIONS		
	CONSERVATIVE	TYPICAL	MAXIMUM
Heater Voltage	6.3 V $\pm$ 2%	6.3 V $\pm$ 5%	6.3 V $\pm$ 10%
Plate Voltage	150 Vdc	185 Vdc	200 Vdc
Screen Voltage	100 Vdc	120 Vdc	155 Vdc
Plate Current (Av.)	2.5 mA	7.5 mA	10 mA
Screen Current (Av.)	1.0 mA	2.5 mA	4.5 mA
Cathode Current (Peak)	8 mA	12 mA	20 mA
H-K Voltage	200 V	250 V	300 V
Bulb Temperature	100°C	140°C	180°C
Altitude	0-20,000 ft	60,000 ft	80,000 ft
Vibration	1 G	2.5 G	5 G
LIFE EXPECTANCY	MAXIMUM	HIGH	MEDIUM

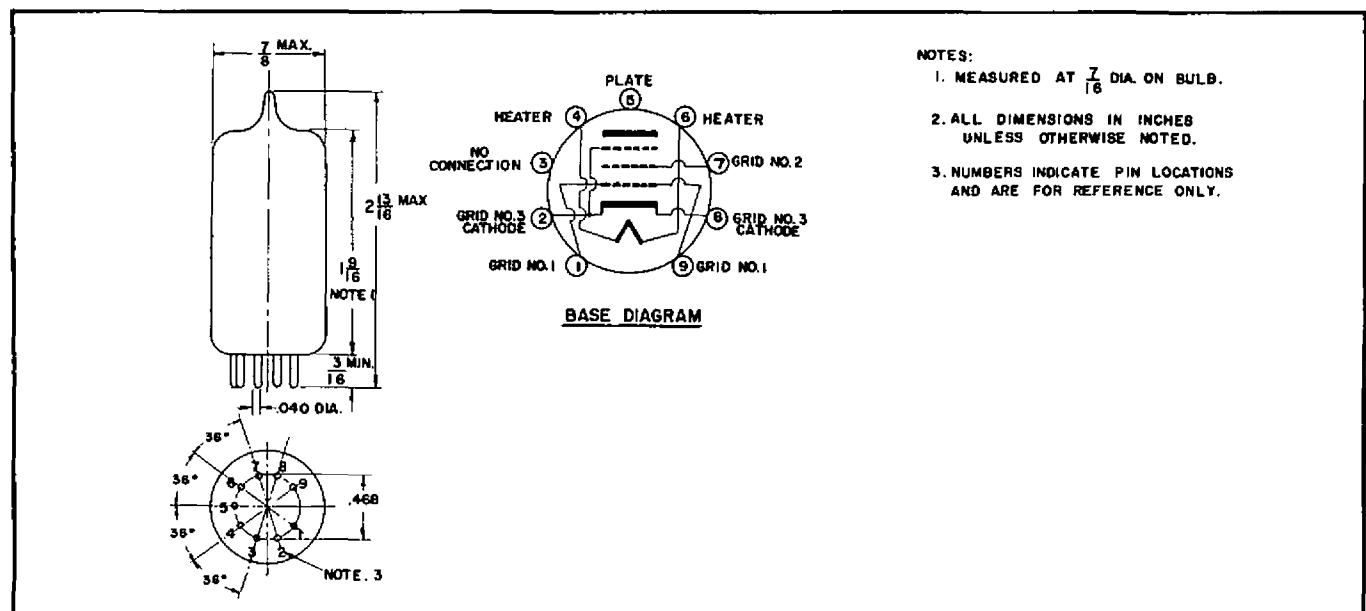
APPLICATION NOTES

Special attention should be given to the temperatures at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy will be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardized if filament voltage ratings are exceeded. Life and reliability of performance are directly related to the degree that regulation of the heater voltage is maintained at its center rated value.

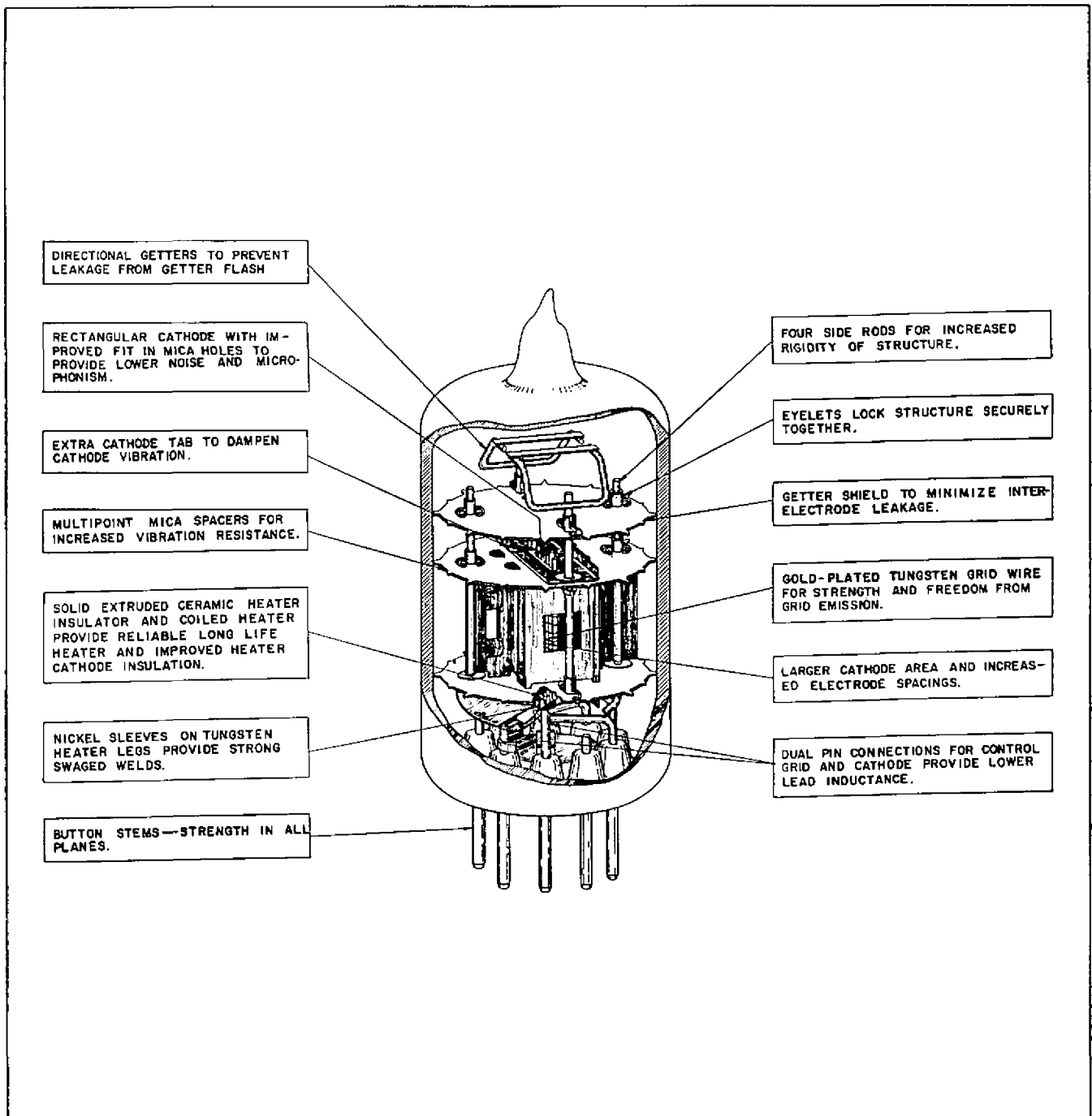
The bulb temperature should never exceed the maximum rated value at the hottest point and cooling should be employed if necessitated by the additive effects of operation at higher altitudes and high dissipation simultaneously or by other sources of heat in the equipment. Each proposed application should be life tested under maximum environmental conditions in order to check that the design gives the desired reliability.

The increased rating chart is presented to emphasize the dangers of operating simultaneously at or near all maxima. In general, the effect on life of operation at increased ratings is additive and cumulative. Interpolation within this chart will give the designer a general idea of the life expectancy and reliability of his application. Each proposed application should be life tested under maximum environmental conditions in order to check that the design gives the desired reliability. When conservatively used this tube has a life expectancy of 10,000 hours.

The altitude rating chart shows the correct voltage derating necessary for various altitude. However, the dissipation derating is only approximate and must be measured for each application because of the additive effects mentioned above.



OUTLINE DRAWING



STRUCTURAL FEATURES OF 6582 PROVIDE HIGH RELIABILITY AND LONG LIFE.

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 Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.
 Canadian Distributor: Aviation Electric Ltd., P.O. Box 6102, Montreal, P.Q.

Printed in U.S.A.