

METAL-CERAMIC TRIODE

DESCRIPTION AND RATING

The 8083 is a high-mu triode of ceramic-and-metal planar construction primarily intended for radio-frequency amplifier service from low frequencies into the ultra-high frequency range.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential	
Heater Characteristics and Ratings	
Heater Voltage, AC or DC†	6.3 ± 0.3 Volts
Heater Current†	0.24 Amperes
Direct Interelectrode Capacitances§	
Grid to Plate: (g to p)	1.2 pf
Input: g to (h+k)	1.8 pf
Output: p to (h+k)	0.032 pf
Heater to Cathode: (h to k)	1.5 pf

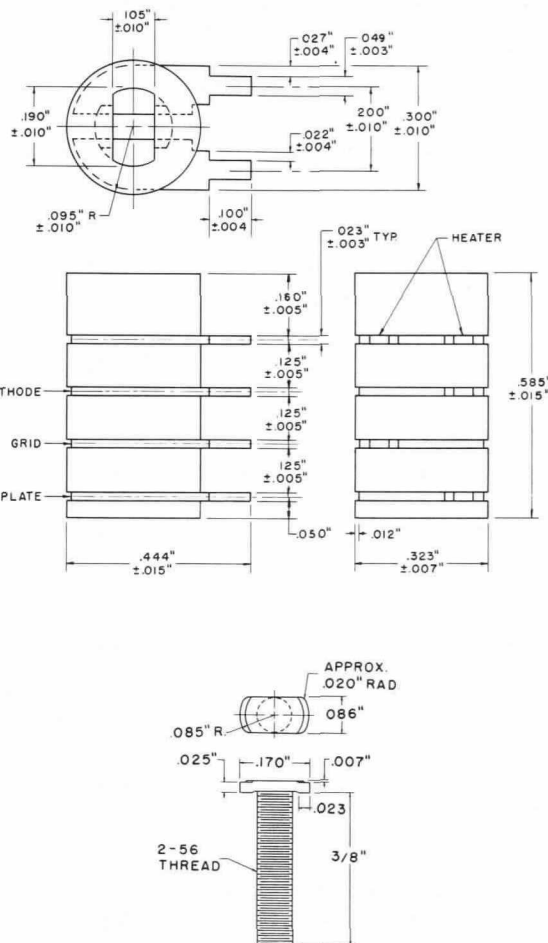
MECHANICAL

Mounting Position—Any ¶

MAXIMUM RATINGS

ABSOLUTE-MAXIMUM VALUES

Plate Voltage	250 Volts
Peak Plate Voltage	400 Volts
Positive Peak and DC Grid-to-Cathode Voltage	0 Volts
Negative Peak and DC Grid-to-Cathode Voltage	50 Volts
Plate Dissipation	1.1 Watts
DC Cathode Current	11 Milliampere
Heater-Cathode Voltage	
Heater Positive with Respect to Cathode	50 Volts
Heater Negative with Respect to Cathode	50 Volts
Grid-Circuit Resistance, with Fixed Bias Δ	
Envelope Temperature at Hottest Point#	250 C



Absolute-Maximum ratings are limiting values of operating and environmental conditions applicable to any electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making no allowance for equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration and of

all other electron devices in the equipment.

The equipment manufacturer should design so that initially and throughout life no absolute-maximum value for the intended service is exceeded with any tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of the tube under consideration and of all other electron devices in the equipment.

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Plate Voltage.....	150	Volts	Plate Resistance, approximate.....	9000	Ohms
Grid Voltage.....	+6.0	Volts	Transconductance.....	10500	Micromhos
Cathode-Bias Resistor.....	910	Ohms	Plate Current.....	7.2	Milliamperes
Amplification Factor.....	94		Grid Voltage, approximate Ib = 100 Microamperes.....	-2.2	Volts

FOOTNOTES

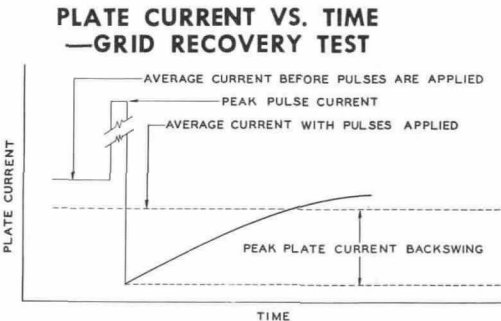
- † The equipment designer should design the equipment so that heater voltage is centered at the specified bogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.
- ‡ Heater current of a bogey tube at Ef = 6.3 volts.
- § Without external shield.
- ¶ One method of mounting the 8083 is to use a stainless-steel "T" bolt (see drawing) to attach the mounting base of the tube to a chassis or circuit board. The "T" bolt should be inserted in the slot in the base of the tube, turned 90 degrees, and attached to the chassis or circuit board with a 2-56 nut and lock washer. Torque used to tighten the nut should not exceed 3 inch-pounds.
- △ If resistance is used in the cathode or plate circuits, the grid-circuit resistance may be as high as (10000 + 100 RK + 10RL) ohms, where RK is the cathode-bias resistance in ohms, and RL is the DC plate load resistance in ohms.
- # Operation below the rated maximum envelope temperature is recommended for applications requiring the longest possible tube life. The 8083 is also capable of operation at envelope temperatures much higher than the rated maximum value. For specific recommendations concerning higher temperature operation, contact your General Electric tube sales representative.

SPECIAL PERFORMANCE TESTS

Noise Figure	Maximum
Ef = 6.3 volts, Ebb = 250 volts, Rk = 82 ohms, RL = 18000 ohms, F = 200 mc.....	5.5 Decibels
Grid Recovery	
Change in Average Plate Current.....	0.6 Milliamperes
Peak Plate Current Backswing.....	1.0 Milliamperes

Tubes with poor grid recovery affect circuit operation, when the grid is driven positive by a pulse of signal or noise, somewhat as if a parallel RC circuit were in series with the grid. This effect may occur in tubes of any type, but is unimportant in many applications. In the majority of 8083 tubes the effect is negligible, but to eliminate the few in which it may be excessive, tubes are tested under the following conditions: Ef = 6.3 volts, Ebb = 250 volts, RL = 0.01 meg, Ec adjusted for Ib = 3.0 ma.

Upon application to the grid of a 5 volt positive pulse (ppr = 60 pps, duty factor = 0.0012) the change in average plate current is noted, and the peak plate current backswing is measured. The following diagram shows qualitatively the plate current-time relationship for a tube (with poor grid recovery) subjected to this test.



SPECIAL PERFORMANCE TESTS (Continued)

Low Pressure Voltage Breakdown Test

Statistical sample tested for voltage breakdown at a pressure of 8mm Hg, to simulated an altitude of 100,000 feet. Tubes shall not give visual evidence of flashover or corona when 300 volts RMS, 60 cps, is applied between the plate and grid terminals.

DEGRADATION RATE TESTS

Fatigue

Statistical sample vibrated for a total of six hours, three hours in each of two planes, at a peak acceleration of 10G. Frequency is continuously varied from 30 cps to 2000 cps and back to 30 cps, with a period of ten minutes. Tubes are operated during the test with $E_f = 6.3$ volts, $E_b = 150$ volts, and $R_k = 82$ ohms. Following the test, tubes are evaluated for low frequency vibrational output, heater-cathode leakage, heater current, and transconductance.

Shock

Statistical sample subjected to 5 impact accelerations of approximately 450G in each of four positions. The accelerating forces are applied by the Navy-type, High Impact (flyweight) Shock Machine using a 30° hammer angle. Tubes are mounted by T-bolt with 3 inch-pounds torque, and operated during the test with $E_f = 6.3$ volts, $E_b = 150$ volts, $E_{hk} = +100$ volts, $R_g = 0.1$ Meg, and $R_k = 82$ ohms. Following the test, tubes are evaluated for low frequency vibrational output, heater-cathode leakage, heater current, and transconductance.

Stability Life Test

The statistical sample subjected to the Intermittent Life Test is evaluated for percent change in transconductance of individual tubes, from the initial reading to readings following 2 hours and 20 hours of the life test.

Survival Rate Life Test

The statistical sample subjected to the Intermittent Life Test is evaluated for shorted and open elements and transconductance following approximately 100 hours of life test.

Intermittent Life Test

Statistical sample operated for 1000 hours under the following conditions: $E_f = 6.3$ volts (cycled—on $1\frac{3}{4}$ hours, off $\frac{1}{4}$ hour), $E_b = 150$ volts, $E_{cc} = +6.0$ volts, $E_{hk} = -70$ volts d-c, $R_k = 910$ ohms, and $R_g = 0.1$ meg. Tubes are evaluated, following 500 and 1000 hours of life test, for shorted and open elements, heater current, transconductance, heater-cathode leakage, and interelectrode leakage resistance.

Interface Life Test

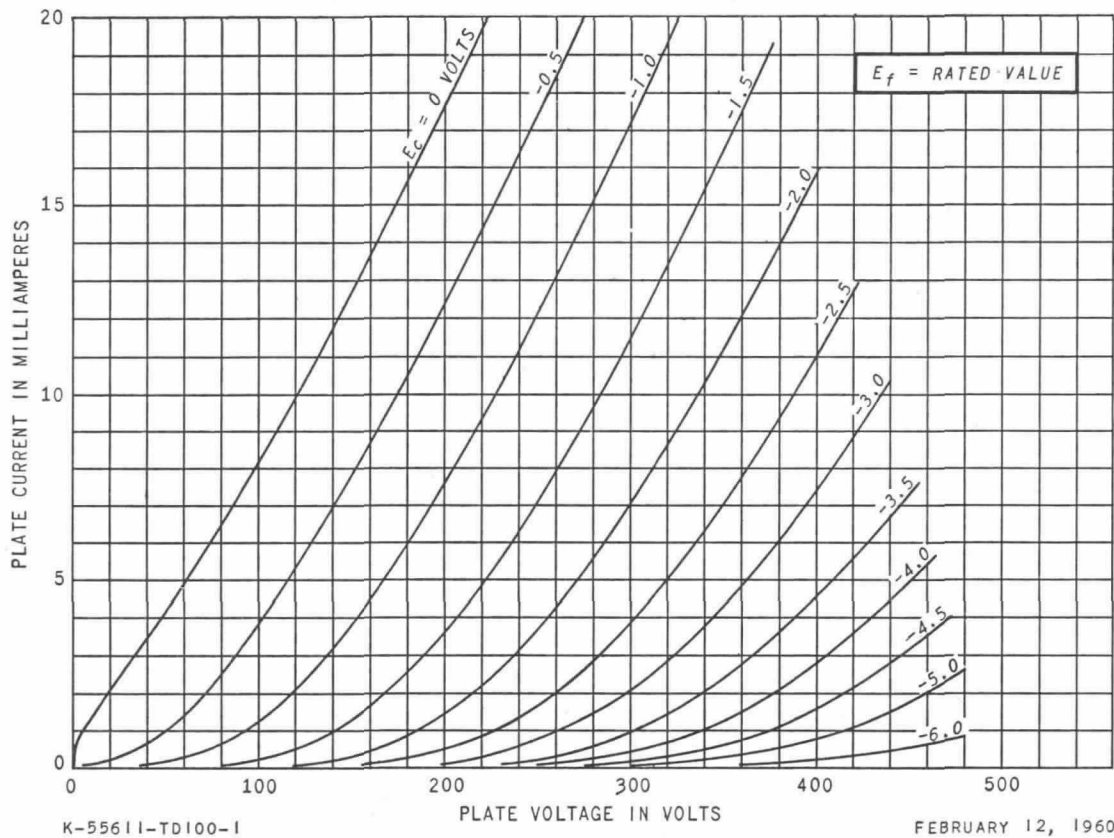
Statistical sample operated for 1000 hours with $E_f = 6.6$ volts, no other voltages applied, and evaluated for cathode interface resistance following the life test.

Heater-Cycling Life Test

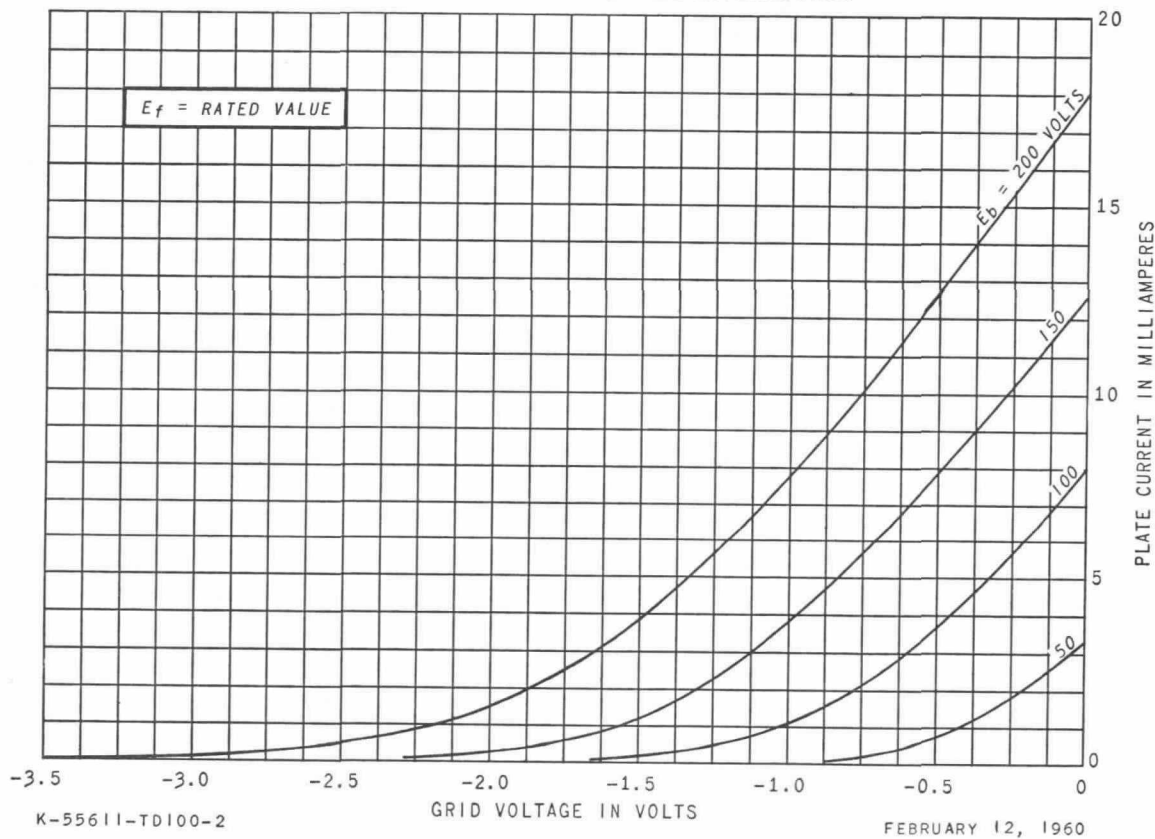
Statistical sample operated for 2000 cycles minimum to evaluate and control heater-cathode defects. Conditions of test include $E_f = 7.0$ volts cycled for one minute on and one minute off, $E_b = E_c = 0$ volts, and $E_{hk} = 70$ volts with heater positive with respect to cathode. Following this test, tubes are evaluated for open heaters, heater-cathode shorts, and heater-cathode leakage current.

Note: The conditions for some of the indicated tests have deliberately been selected to aggravate tube failures for test and evaluation purposes. In no sense should these conditions be interpreted as suitable circuit operating conditions.

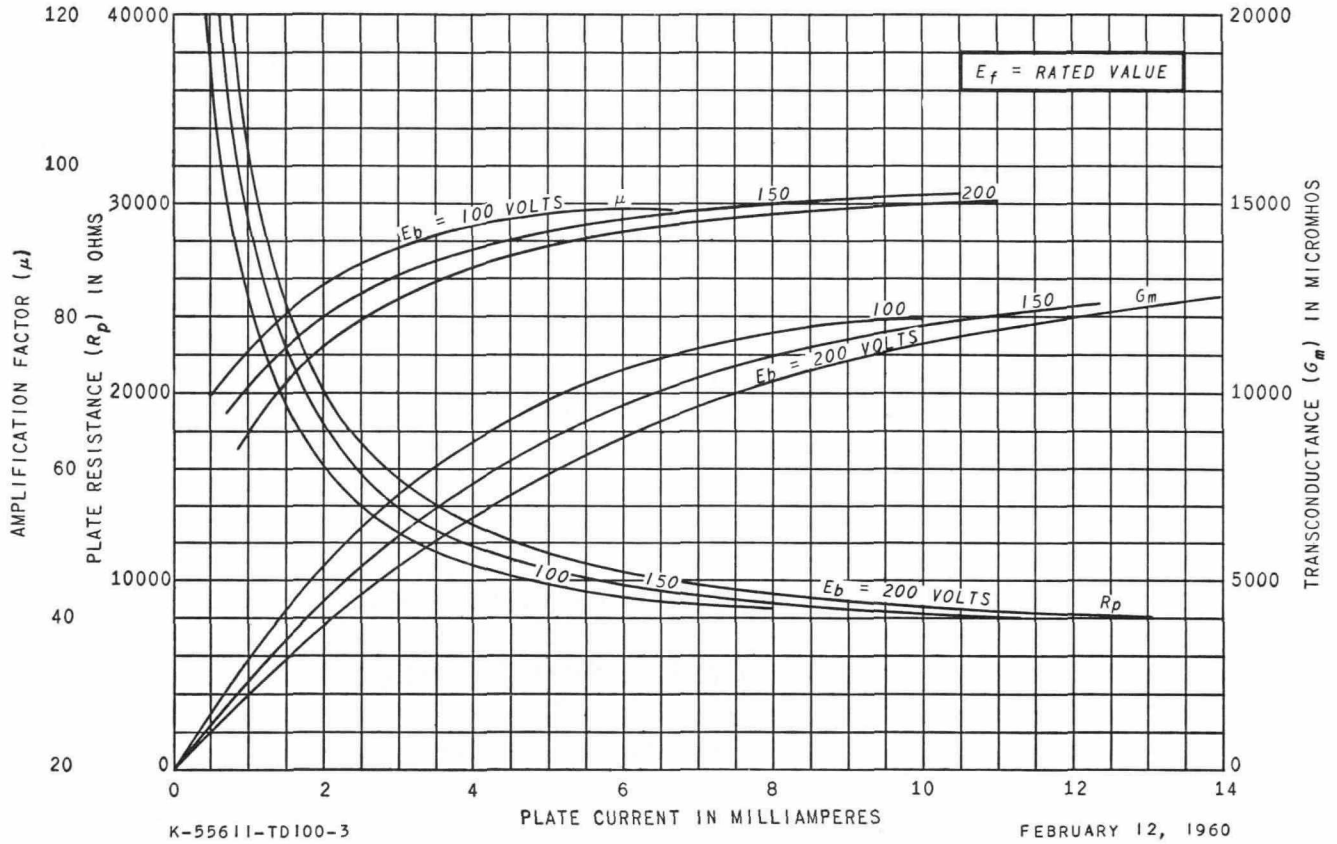
AVERAGE PLATE CHARACTERISTICS



AVERAGE TRANSFER CHARACTERISTICS



AVERAGE CHARACTERISTICS



RECEIVING TUBE DEPARTMENT
GENERAL ELECTRIC
Owensboro, Kentucky