

*Excellence in Electronics***TYPE
CK5744WA**

The CK5744WA is a heater-cathode type high- μ triode of subminiature construction capable of operation as a frequency converter or oscillator in the UHF region. It is also useful in general purpose audio frequency voltage amplifier service. This tube is characterized by long life and stable performance. It is designed for service where severe conditions of high temperature and mechanical shock or vibration are encountered. The flexible terminal leads may be soldered or welded directly to the terminals of circuit components without the use of sockets. Standard inline subminiature sockets may be used by cutting the leads to a suitable length.

MECHANICAL DATA**ENVELOPE:** T-3 Glass**BASE:** None (0.016" tinned flexible leads. Length: 1.5" min.
Spacing: 0.048" center-to-center)**TERMINAL CONNECTIONS:** (Red dot is adjacent to lead 1)

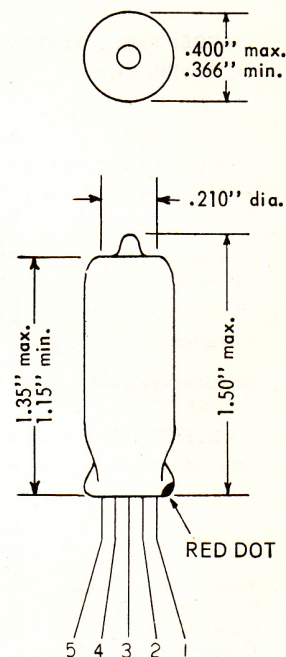
Lead 1 Plate	Lead 4 Grid
Lead 2 Heater	Lead 5 Cathode
Lead 3 Heater	

MECHANICAL RATINGS:

Maximum Impact Acceleration (Shock Test-Note 3)	450 G
Maximum Uniform Acceleration (Centrifuge Test-Note 4)	1000 G
Maximum Vibrational Acceleration (100 Hour Fatigue Test-Note 5)	2.5 G
Maximum Bulb Temperature	220 °C

MOUNTING POSITION: Any**ELECTRICAL DATA**

CAUTION----- To Electronic Equipment Design Engineers: Special attention should be given to the temperature at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may 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.

**RATINGS AND
NORMAL OPERATION:**

Heater Voltage (Note 8)
Plate Voltage
Grid #1 Voltage
Plate Dissipation
Heater-Cathode Voltage
Cathode Current
Cathode Resistance
Grid Circuit Resistance

**MIL-E-1B
SYMBOL**

Ef:
Eb:
Ec1:
Pp:
Ehk:
Ik:
Rk:
Rg:

**ABSOLUTE
MINIMUM**

5.7

-55

-200

**NORMAL
TEST
CONDITIONS
(Note 7)**

6.3
250
0

500

**NORMAL
OPERATION
(Note 6)**

6.3
250
0
1.1
100
4.2
500

**ABSOLUTE
MAXIMUM**

6.9
275

1.6
+200
6.5

1.2

**MIL-E-1B
UNITS**

V
Vdc
Vdc
W
Vdc
mA
ohms
Meg.

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1)

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	LAL	BOGIE	UAL	MAX.	ALD	MIL-E-1B UNITS
Continuity and Tap Shorts		0.4								
ACCEPTANCE TESTS GROUP A.		COMBINED AQL=2.5%								
Heater Current:		0.65	If:	183	-----	200	-----	217	-----	mA
Heater-Cathode Leakage (1): Ehk=+100 Vdc		0.65	Ihk (1):	-----	-----	-----	-----	10	-----	μ Adc
Heater-Cathode Leakage (2): Ehk=-100 Vdc		0.65	Ihk (2):	-----	-----	-----	-----	-10	-----	μ Adc
Grid Current (1):		0.65	Ic (1):	-----	-----	-----	-----	-0.3	-----	μ Adc
Plate Current (1):		0.65	Ib (1):	2.8	3.6	4.2	4.8	5.7	1.2	mA
Plate Current (2):	Ec1=-6.5 Vdc	0.65	Ib (2):	-----	-----	-----	-----	50	-----	μ Adc
Transconductance (1):		0.65	Sm (1):	3200	3650	4000	4350	4800	660	μ mhos

Tentative Data

RAYTHEON MANUFACTURING COMPANY

RECEIVING AND CATHODE RAY TUBE OPERATIONS



RELIABLE SUBMINIATURE TRIODE

ELECTRICAL DATA (cont'd)

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd)

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	LAL	BOGIE	UAL	MAX.	ALD	MIL - E - 1B UNITS
ACCEPTANCE TESTS GROUP A (cont'd)										
AC Amplification:	Esig= 0.2 Vac; Ebb= 100 Vdc; Ecc= 0; Rg1= 10 Meg; Rk= 0; Rp= 0.5 Meg.	0.65	Ep:	6.5	----	----	----	----	----	Vac
ACCEPTANCE TESTS GROUP B										
Insulation of Electrodes:	Ef= 6.3 V									
	Eg-all= - 100 Vdc	2.5	Rg-all:	100	----	----	----	----	----	Meg.
	Ep-all= - 300 Vdc	2.5	Rp-all:	100	----	----	----	----	----	Meg.
Transconductance (2):	Ef= 5.5 V (Note 9)	2.5	Δ Sm (2):	----	----	----	----	10	----	%
AF Noise:	Esig= 50 mVac; Rg1= 0.1 Meg; Rp= 0.2 Meg.	2.5	EB:	----	----	----	----	17	----	VU
Vibration:	F= 40 cps; G= 15; Rp= 10,000 ohms	2.5	Ep:	----	----	----	----	25	----	mVac
Subminiature Lead Fatigue Test:		2.5		4.0	----	----	----	----	----	Arcs

ACCEPTANCE TESTS GROUP C										
Grid Current (2):	After 5 minutes at Ef= 7.0 V; measure grid current at Ef= 7.0 V 3 minute test not permitted.	6.5	Ic (2):	----	----	----	----	-0.3	----	μ Adc
Amplification Factor:	Note 2	6.5	MU:	60	65	70	75	80	7	
Capacitance:			Cgp:	0.65	----	0.8	----	0.95	----	μ t
Capacitance:			Cin:	2.0	----	2.7	----	3.4	----	μ t
Capacitance:			Cout:	1.7	----	2.4	----	3.1	----	μ t

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN	MAX.	MIL - E - 1B UNITS
ACCEPTANCE TESTS GROUP D						
Shock:	Hammer angle= 30°; Note 3					
Post Shock Limits:						
Vibration:	F= 40 cps; G= 15; Rp= 10,000 ohms		Ep:	----	100	mVac
Heater - Cathode Leakage (1):	Ehk= + 100 Vdc		Ihk (1):	----	20	μ Adc
Heater - Cathode Leakage (2):	Ehk= - 100 Vdc		Ihk (2):	----	- 20	μ Adc
Transc. (1) change of individual tubes from initial:	Ef= 6.3 V		Δ Sm (1):	----	20	%
Fatigue:	96 hours; Note 5	6.5				
Post Fatigue Limits:						
Vibration:	F= 40 cps; G= 15; Rp= 10,000 ohms		Ep:	----	100	mVac
Heater - Cathode Leakage (1):	Ehk= + 100 Vdc		Ihk (1):	----	14	μ Adc
Heater - Cathode Leakage (2):	Ehk= - 100 Vdc		Ihk (2):	----	- 14	μ Adc
Transc. (1) change of individual tubes from initial:	Ef= 6.3 V		Δ Sm (1):	----	15	%
ACCEPTANCE TESTS GROUP E						
Glass Strain (Thermal Shock):		10				
Visual and Mechanical Inspection:	Major Combined	0.4				
	Minor A Combined	2.5				
	Minor B per Item	6.5				

ACCEPTANCE LIFE TESTS						
Heater Cycling:	Ef= 7.5 V; Eb= Ec1= 0 V; Ehk= 140 Vac; 1 min. on, 1 min. off			2000	----	cycles
1 Hour Stability Life Test:	TA= room; Ehk= + 200 Vdc; Rg1= 1.0 Meg.					

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RELIABLE SUBMINIATURE TRIODE

ELECTRICAL DATA (cont'd)

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd)

TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	MAX.	MIL - E - 1B UNITS	
ACCEPTANCE LIFE TESTS (cont'd)							
1 Hour Stability Life Test							
End Points:							
Transc. (1) change of individual tubes from initial:	(Typical sample size=25 tubes)	10	$\Delta S_m(1)$:	----	8.0	%	
100 Hour Survival Rate Life Test:	TA=room; Ehk=+200 Vdc; Rg1=1.0 Meg.						
100 Hour Survival Rate Life Test							
End Points:							
Inoperatives:	(Typical Sample Size=200 tubes)	0.65					
TEST	CONDITIONS	AQL %	MIL - E - 1B SYMBOL	MIN.	MAX.	MIL - E - 1B UNITS	Max. defects per Characteristics
500 Hour Intermittent High Temperature Life Test (1):	T Bulb=220°C; Ehk=+200 Vdc; Rg1=1.0 Meg.						
500 Hour Intermittent High Temperature Life Test (1)	(Typical sample size=20 tubes) (Total allowable combined defects=4 tubes)						
End Points:							
Inoperatives:							1
Heater Current:			If:	183	217	mA	4
Heater - Cathode Leakage (1):			Ihk (1):	0	30	μ Adc	2
Heater - Cathode Leakage (2):			Ihk (2):	0	-30	μ Adc	2
Grid Current (1):			Ic (1):	0	-0.6	μ Adc	2
Grid Current (2):			Ic (2):	0	-1.0	μ Adc	2
Transc. (1) change of individual tubes from initial:			$\Delta S_m(1)$:	----	25	%	1
Transc. (2) change of individual tubes from Ef=6.3 V to Ef=5.5 V:			$\Delta S_m(2)$:	----	15	%	4
Insulation of Electrodes:			Rg1-all:	50	----	Meg.	4
Insulation of Electrodes:			Rp-all:	50	----	Meg.	4
1000 Hour Intermittent Life Test (2):	T Bulb=220°C; Ehk=+200 Vdc; Rg1=1.0 Meg.						
1000 Hour Intermittent Life Test (2) End Points:	Read for same characteristics as for Life Test (1). Limits not established.						
5000 Hour Intermittent Life Test (3):	TA=room; Ehk=+200 Vdc; Rg1=1.0 Meg.						
5000 Hour Intermittent Life Test (3) End Points:	Read for same characteristics as for Life Test (1). Limits not established.						

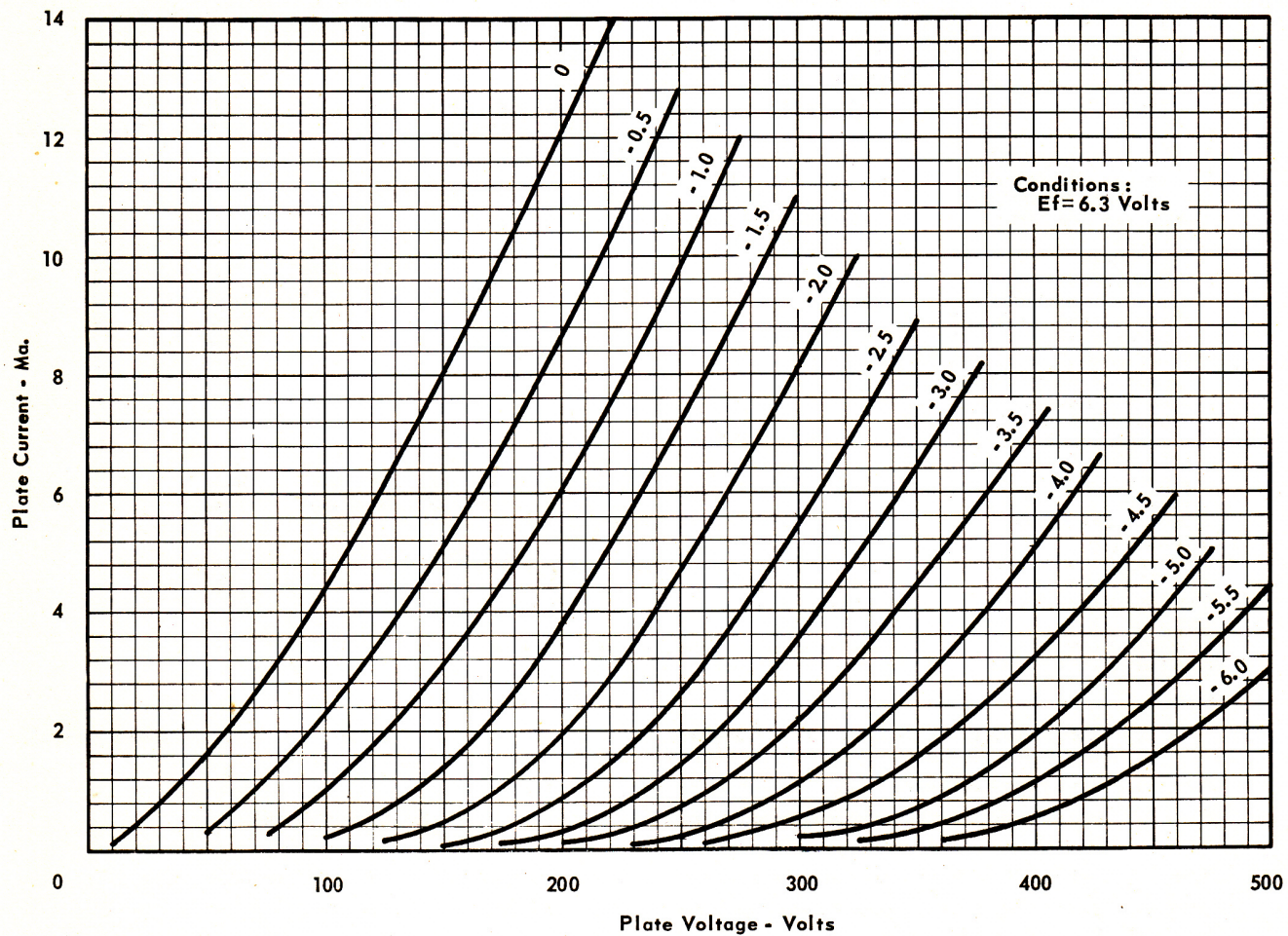
NOTES

- Note 1: Characteristics, Quality Control Test Procedures, and Inspection Levels are made according to the appropriate paragraphs of MIL - E - 1B, "Inspection Instructions for Electron Tubes" and MIL - STD - 105A.
- Note 2: With a cylindrical shield (0.405" I.D. - 1 7/8" long) connected to lead 5.
- Note 3: Test conditions and acceptance criteria per Shock Test procedures of MIL - E - 1B basic specifications.
- Note 4: Centrifuge Test with forces applied in any direction.
- Note 5: Test conditions and acceptance criteria per Fatigue Test procedures of MIL - E - 1B basic specifications.
- Note 6: These normal values represent conditions at which control of reliability may be expected.
- Note 7: These normal test conditions are used for all characteristic tests unless otherwise stated under the individual test item.
- Note 8: For most applications the performance will not be adversely affected by $\pm 10\%$ heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.
- Note 9: Change of transconductance for individual tubes from that value measured at Ef=6.3 V to that value measured at Ef=5.5 V.



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AVERAGE PLATE CHARACTERISTICS



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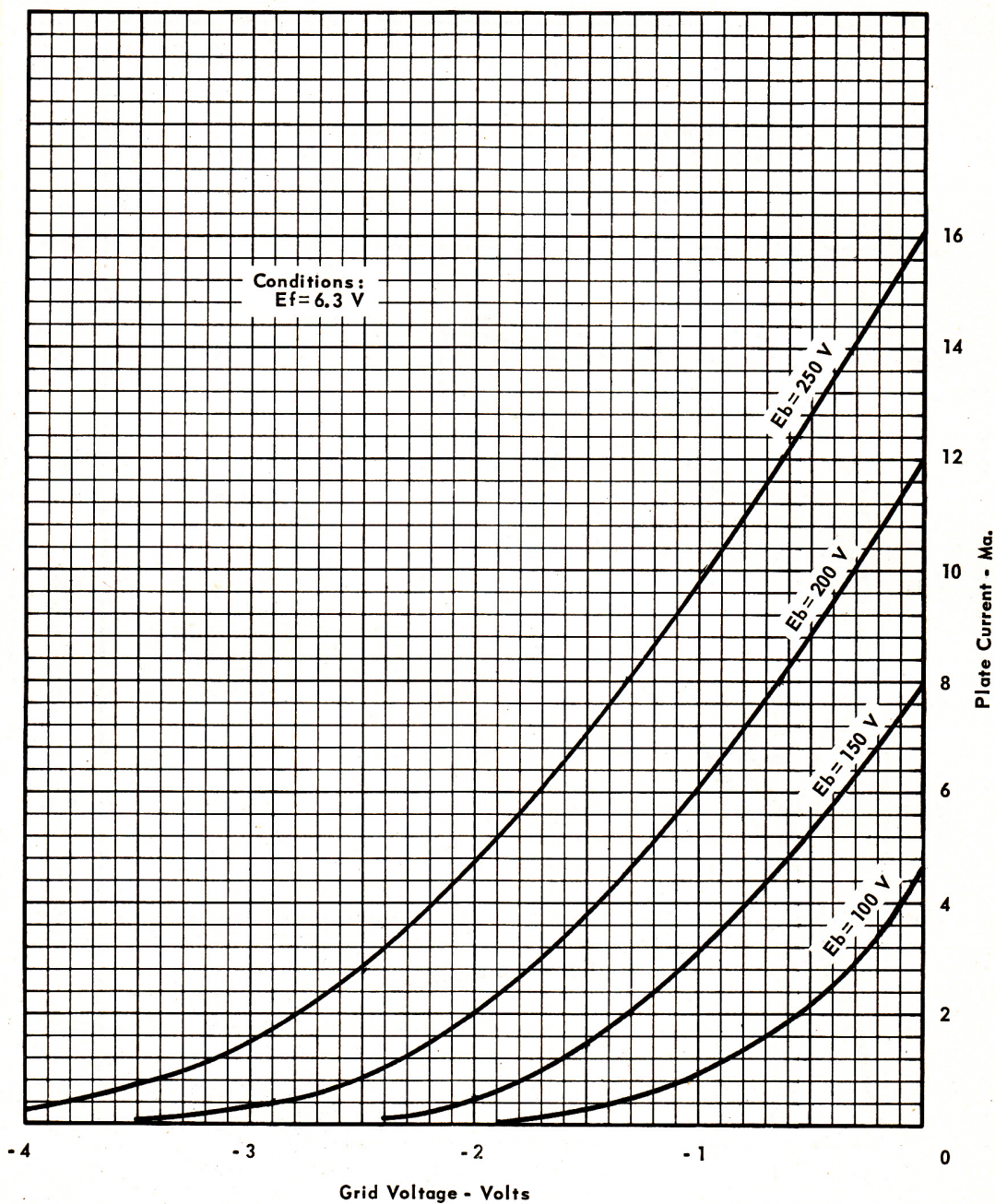
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AVERAGE CHARACTERISTICS



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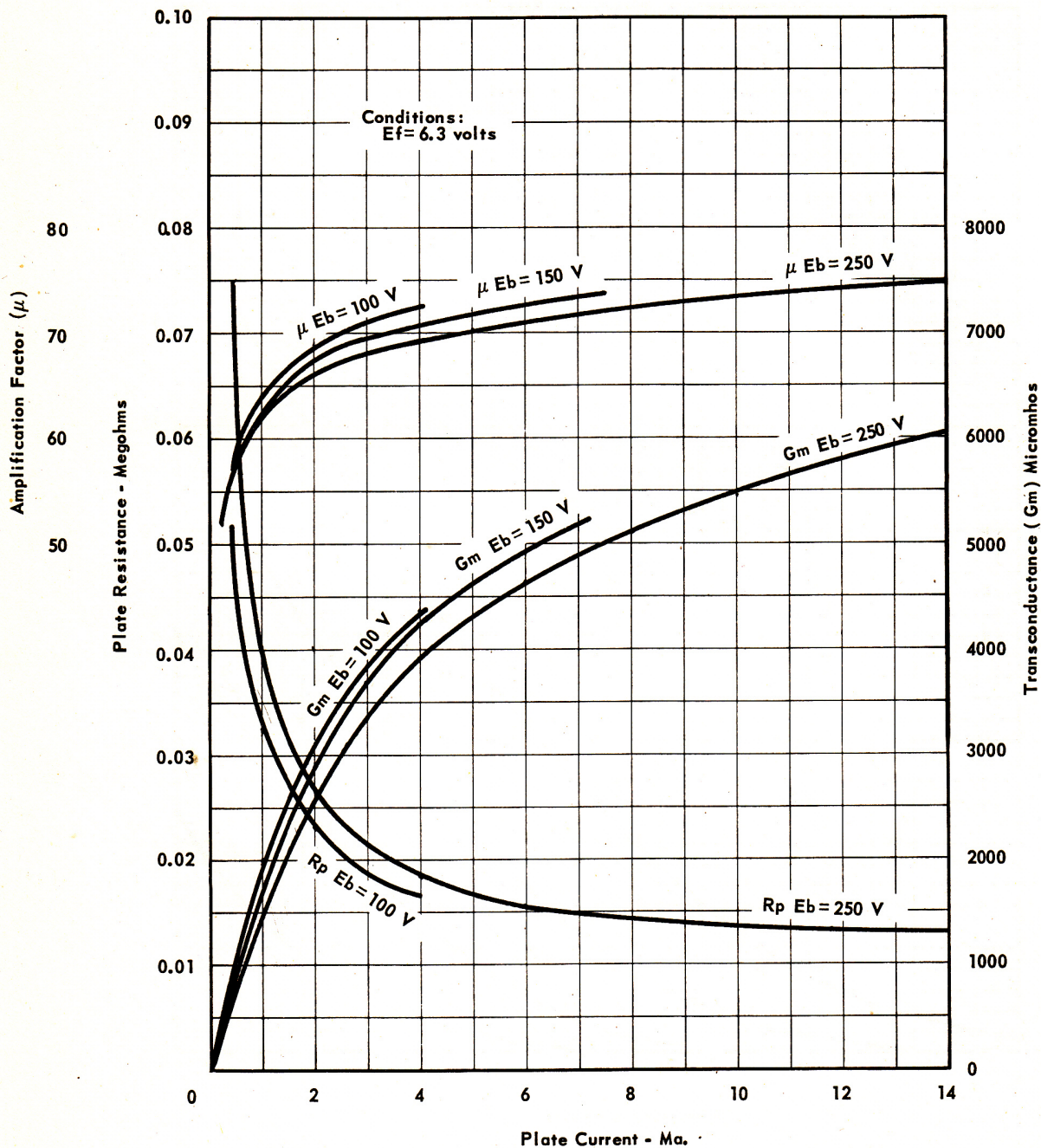
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AVERAGE CHARACTERISTICS



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