ELECTRONICS

7189-A
PENTODE
FOR AF POWER AMPLIFIER APPLICATIONS

DESCRIPTION AND RATING

The 7189-A is a power-amplifier pentode designed for use in the audio-frequency power output stage of television and radio receivers and high-fidelity amplifiers.

The 7189-A is unilaterally interchangeable, both electrically and mechanically, with the 7189. It differs from the 7189 in having a higher screen-voltage rating and in specifying the internal connections to pins 1 and 6.

GENERAL

ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC*	6.3±0.6	Volts
Heater Current‡	0.76	Amperes
Direct Interelectrode Capacitances§		
Grid-Number 1 to Plate:		
(g1 to p)	0.5	pf
Input: g1 to (h + k + g2 + g3)	10.8	pf
Output: p to (h + k + g2 + g3)	6.5	pf

MECHANICAL

Operating Position - Any
Envelope - T-6 1/2, Glass
Base - E9-1, Small Button 9-Pin
Outline Drawing - EIA 6-4

Maximum Diameter	0.875	Inches
Maximum Over-all Length	3.063	Inches
Maximum Seated Height	2.813	Inches

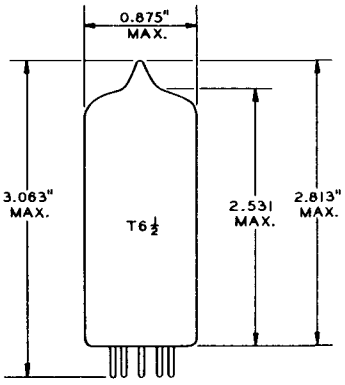
MAXIMUM RATINGS

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey 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 allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey 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 all other electron devices in the equipment.

PHYSICAL DIMENSIONS

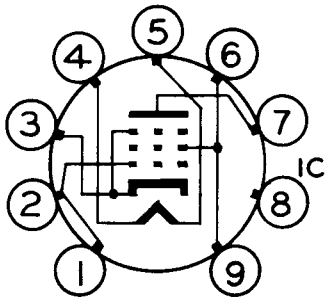


EIA 6-4

TERMINAL CONNECTIONS

Pin 1 - Grid Number 1
Pin 2 - Grid Number 1
Pin 3 - Cathode and Grid Number 3 (Suppressor)
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid Number 2 (Screen)
Pin 7 - Plate
Pin 8 - Internal Connection-Do Not Use
Pin 9 - Grid Number 2 (Screen)

BASING DIAGRAM



EIA 9LE

MAXIMUM RATINGS (Cont'd)

DESIGN-MAXIMUM VALUES

Plate Voltage	440	Volts
Screen Voltage	400¶	Volts
Plate Dissipation	13.2	Watts
Screen Dissipation	2.2#	Watts
DC Cathode Current	72	Milliamperes
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode	100	Volts
Heater Negative with Respect to Cathode	100	Volts
Grid-Number 1 Circuit Resistance		
With Fixed Bias	0.3	Megohms
With Cathode Bias	1.0	Megohms

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Plate Voltage	250	Volts
Screen Voltage	250	Volts
Grid-Number 1 Voltage	-7.3	Volts
Plate Resistance, approximate	40000	Ohms
Transconductance	11300	Micromhos
Plate Current	48	Milliamperes
Screen Current	5.5	Milliamperes
Amplification Factor (Grid-Number 1 to Grid-Number 2)	19.5	

CLASS A_1 AMPLIFIER

Plate Voltage	250	250	250	250	Volts
Screen Voltage	250	250	250	210	Volts
Grid-Number 1 Voltage	-7.3	-7.3	-8.4	-6.4	Volts
Peak AF Grid-Number 1 Voltage	6.1	6.2	4.95	4.8	Volts
Zero-Signal Plate Current	48	48	36	36	Milliamperes
Maximum-Signal Plate Current	49.5	50.6	36.8	36.6	Milliamperes
Zero-Signal Screen Current	5.5	5.5	4.1	3.9	Milliamperes
Maximum-Signal Screen Current	10.8	10	8.5	7.3	Milliamperes
Load Resistance	5200	4500	7000	7000	Ohms
Total Harmonic Distortion, approximate	10	10	10	10	Percent
Maximum-Signal Power Output	5.7	5.7	4.2	4.3	Watts

PUSH-PULL CLASS AB_1 AMPLIFIER, VALUES FOR TWO TUBES

Plate Voltage	250	300	400	Volts
Screen Voltage	250	300	300	Volts
Cathode-Bias Resistor	130	130	---	Ohms
Grid-Number 1 Voltage	---	---	-15	Volts
Peak AF Grid-to-Grid Voltage	22.6	28.2	30	Volts
Zero-Signal Plate Current	62	72	15	Milliamperes
Maximum-Signal Plate Current	75	92	105	Milliamperes
Zero-Signal Screen Current	7.0	8.0	1.6	Milliamperes
Maximum-Signal Screen Current	15	22	25	Milliamperes
Effective Load Resistance, Plate-to-Plate	8000	8000	8000	Ohms
Total Harmonic Distortion	3	4	4	Percent
Maximum-Signal Power Output	11	17	24	Watts

PUSH-PULL CLASS B AMPLIFIER, VALUES FOR TWO TUBES

Plate Voltage	250	300	Volts
Screen Voltage	250	300	Volts
Grid-Number 1 Voltage	-11.6	-14.7	Volts
Peak AF Grid-to-Grid Voltage	22.6	28.2	Volts
Zero-Signal Plate Current	20	15	Milliamperes
Maximum-Signal Plate Current	75	92	Milliamperes
Zero-Signal Screen Current	2.2	1.6	Milliamperes
Maximum-Signal Screen Current	15	22	Milliamperes
Effective Load Resistance, Plate-to-Plate	8000	8000	Ohms
Total Harmonic Distortion	3	4	Percent
Maximum-Signal Power Output	11	17	Watts

CHARACTERISTICS AND TYPICAL OPERATION (Cont'd)

CLASS A_1 AMPLIFIER, TRIODE CONNECTION△

Plate Voltage	250	Volts
Cathode-Bias Resistor	270	Ohms
Peak AF Grid-Number 1 Voltage	9.5	Volts
Zero-Signal Plate Current	34	Milliamperes
Maximum-Signal Plate Current	36	Milliamperes
Load Resistance	3500	Ohms
Total Harmonic Distortion, approximate	9	Percent
Maximum-Signal Power Output	1.95	Watts

PUSH-PULL CLASS AB_1 AMPLIFIER, TRIODE CONNECTION, VALUES FOR TWO TUBES△

Plate Voltage	250	300	Volts
Cathode-Bias Resistor	270	270	Ohms
Peak AF Grid-to-Grid Voltage	23.4	28.2	Volts
Zero-Signal Plate Current	40	48	Milliamperes
Maximum-Signal Plate Current	43.4	52	Milliamperes
Effective Load Resistance, Plate-to-Plate	10000	10000	Ohms
Total Harmonic Distortion	2.5	2.5	Percent
Maximum-Signal Power Output	3.4	5.2	Watts

NOTES

* 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.

¶ The Design-Maximum screen voltage rating is 415 volts in push-pull circuits where the screen of each tube is connected to a tap on the plate winding of the output transformer.

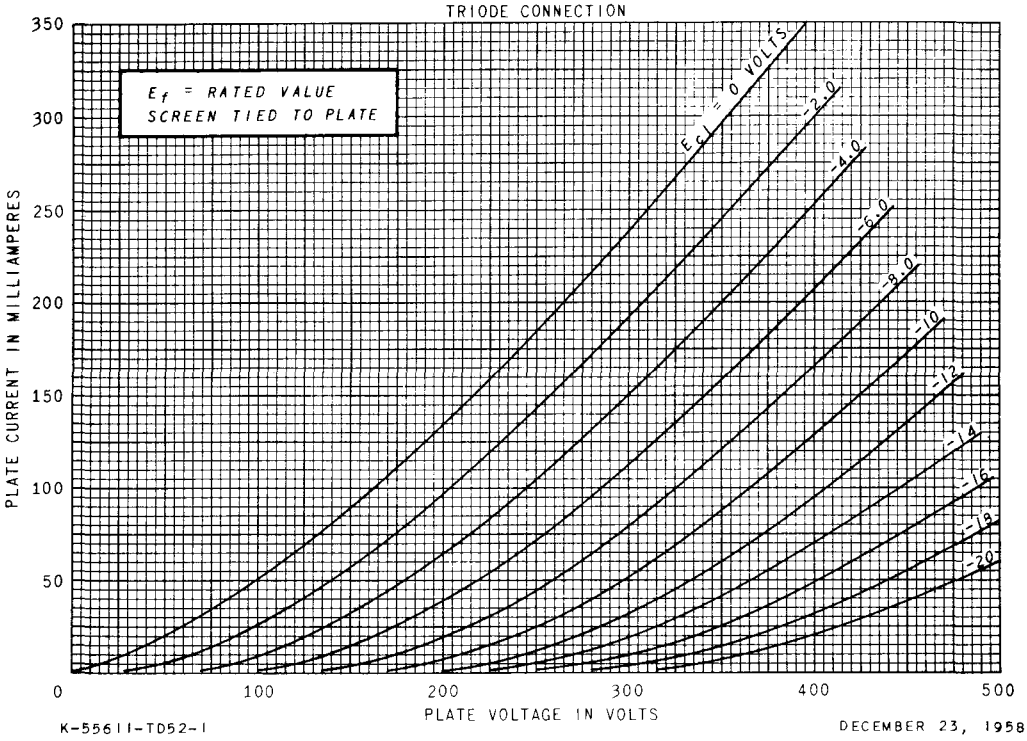
\# Screen dissipation may reach 4.4 watts during periods of maximum input of speech and music signals, under worst probable operating conditions as specified for the Design-Maximum rating system.

△ With screen tied to plate.

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

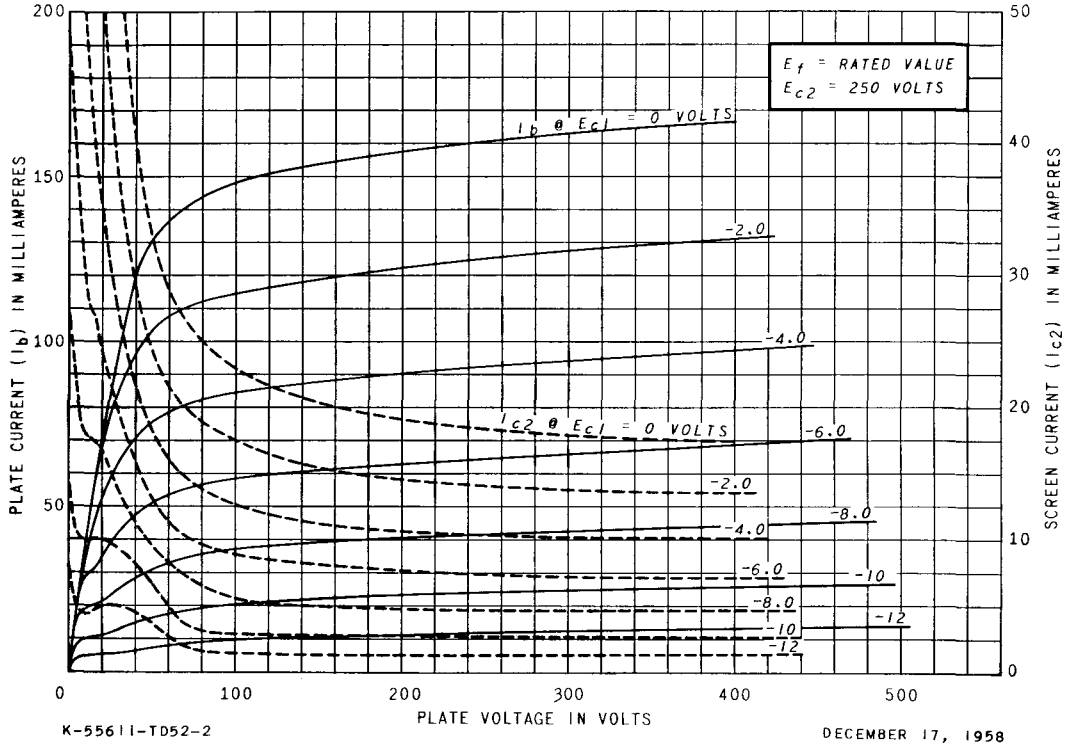
AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



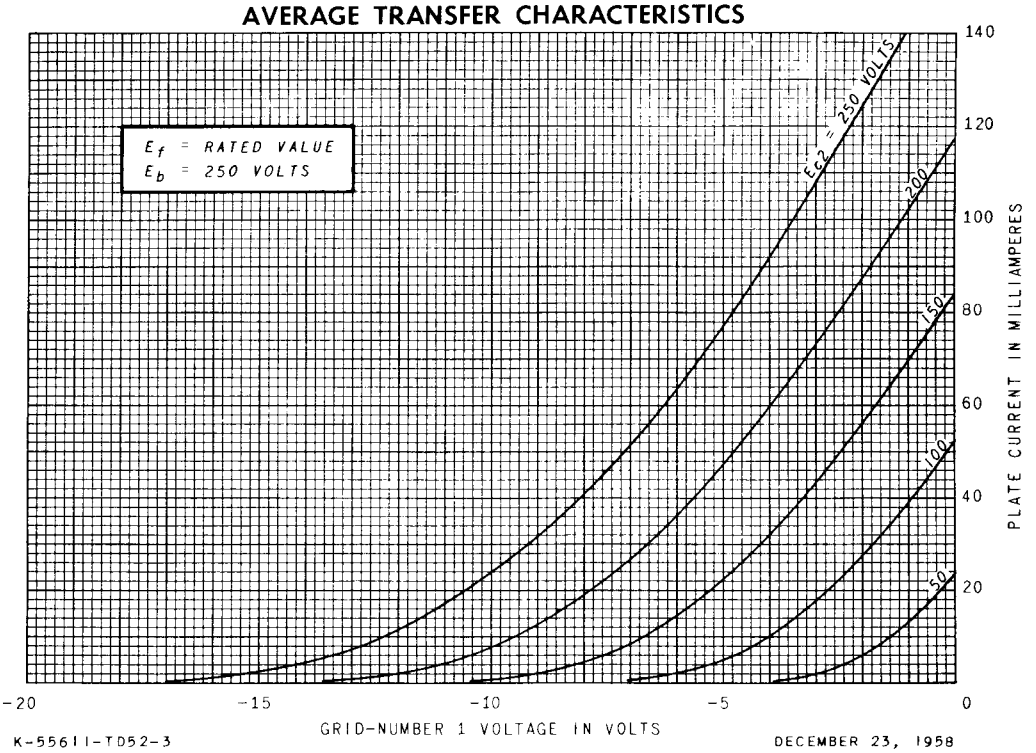
K-55611-TD52-1 DECEMBER 23, 1958

AVERAGE PLATE CHARACTERISTICS



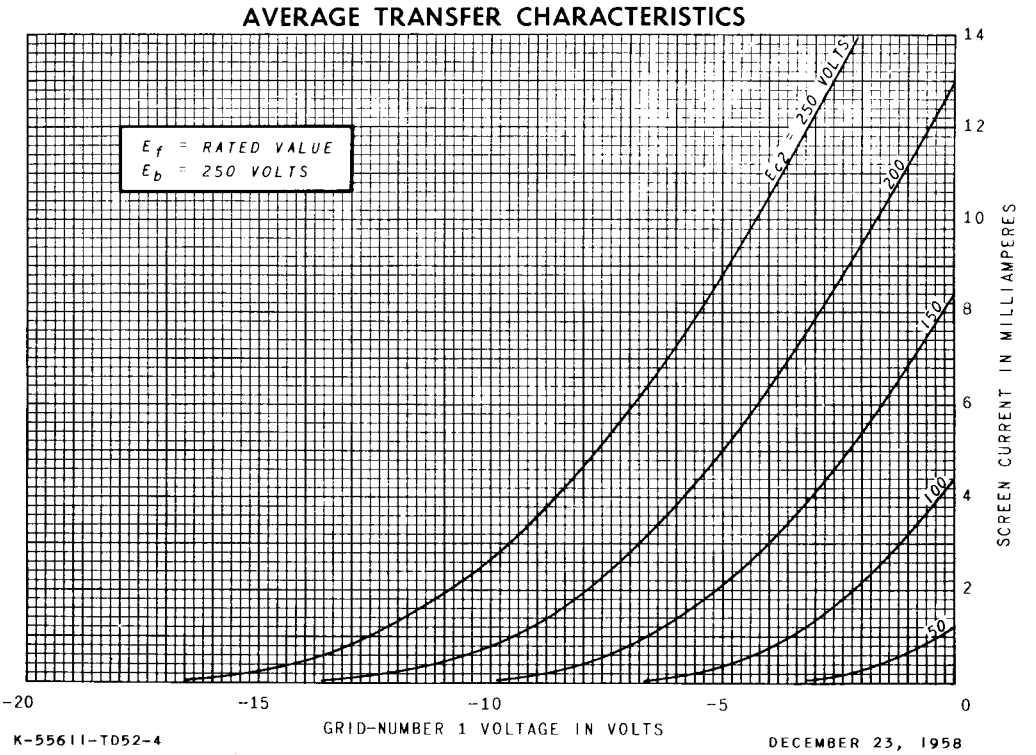
K-55611-TD52-2 DECEMBER 17, 1958

AVERAGE TRANSFER CHARACTERISTICS



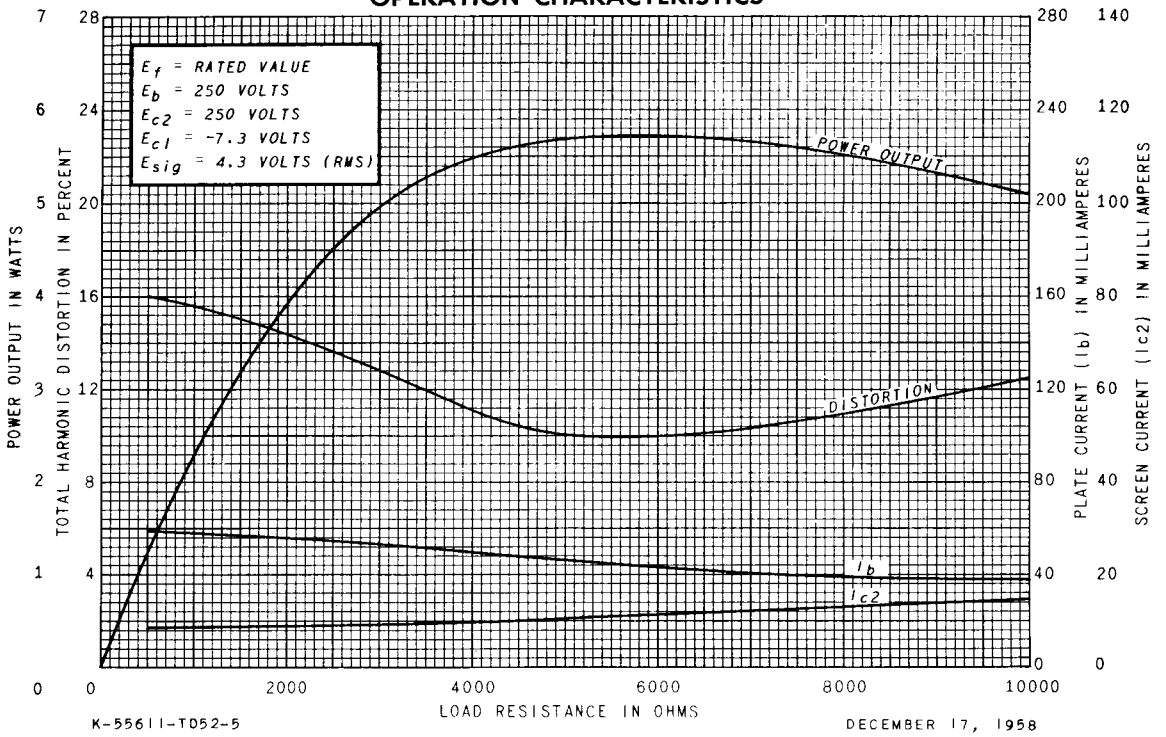
K-55611-TD52-3 DECEMBER 23, 1958

AVERAGE TRANSFER CHARACTERISTICS

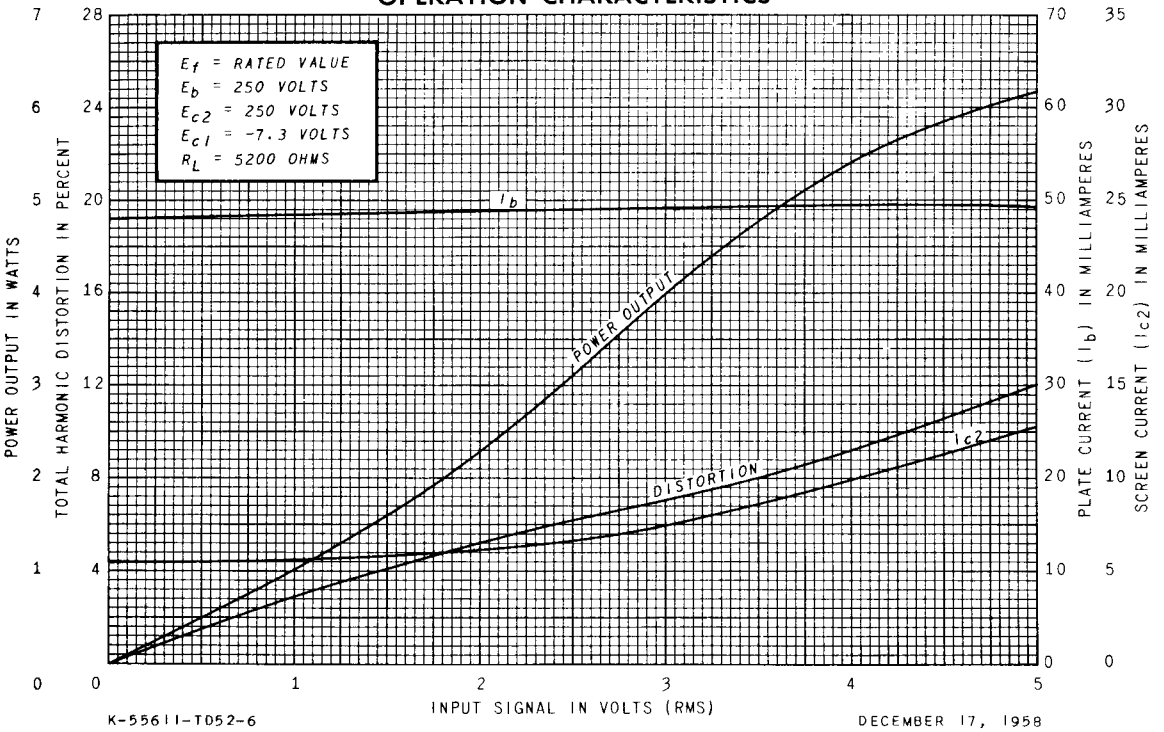


K-55611-TD52-4 DECEMBER 23, 1958

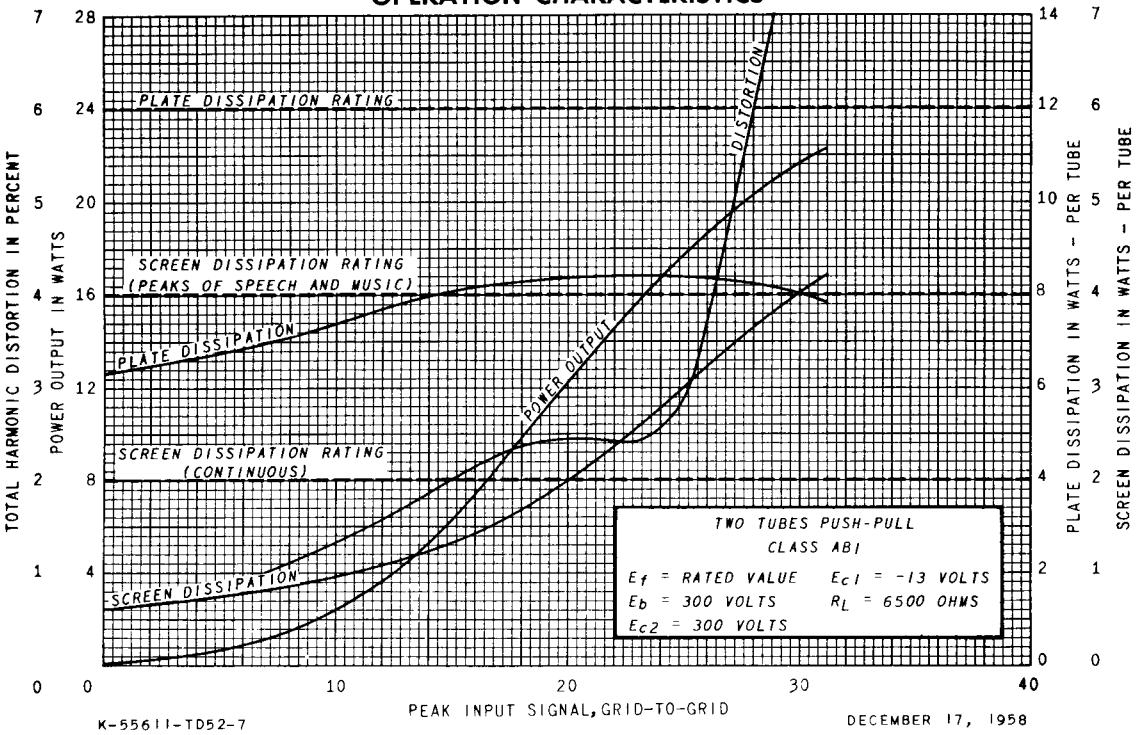
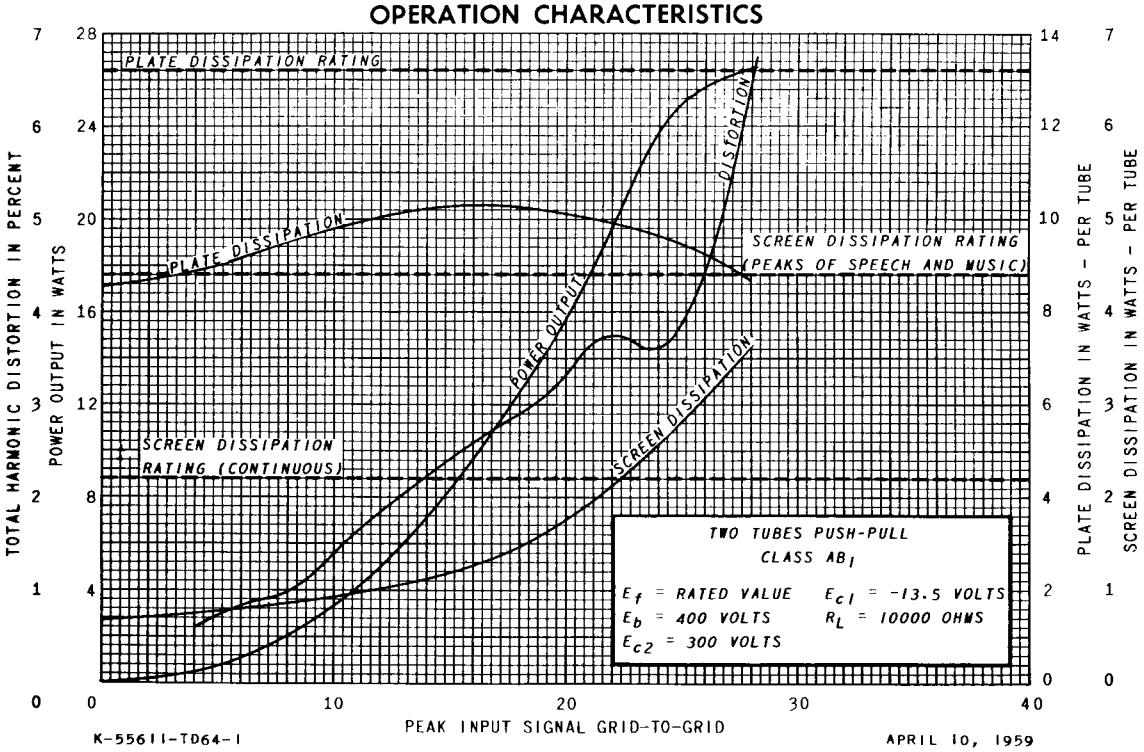
OPERATION CHARACTERISTICS



OPERATION CHARACTERISTICS



OPERATION CHARACTERISTICS



OPERATION CHARACTERISTICS