2C39-B

PLANAR TRIODE

DESCRIPTION AND RATING

FOR GROUNDED-GRID OSCILLATOR AND AMPLIFIER SERVICE

Metal and Ceramic
High Transconductance
Low Interelectrode Capacitances
Shock Resistant

100 Watts Plate Dissipation

The 2C39-B is a metal-and-ceramic, high-mu triode designed for use as a grounded-grid oscillator or amplifier at frequencies as high as 2500 megacycles.

Features of the 2C39-B include planar electrode construction, high plate dissipation capability, excellent electrode isolation, low radio-frequency losses, high transconductance, and low interelectrode capacitances.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential
Heater Characteristics and Ratings

Heater Voltage, AC or DC	*	Volts
Heater Current at Ef = 6.3 volts	1.03†	Amperes
Direct Interelectrode Capacitances‡		
Grid to Plate: (g to p)	2.01	pf
Grid to Cathode: (g to k)	6.5	pf
Plate to Cathode: (p to k)	0.023	pf

MECHANICAL

Mounting Position—Any—Only Plate Flange to Be Used as a Socket Stop and Clamp

Net Weight, approximate	2	Ounces

Cooling
- Plate and Plate Seal—Conduction and Forced Air
- Grid and Cathode Seals—Conduction and Forced Air
- Recommended Air Flow Cowling—157-JAN
- Recommended Air Flow on Plate Radiator at Sea Level
  - Incoming Air Temperature 25C, Plate Dissipation
    - 100 Watts: 12.5 Cubic Feet Per Minute

MAXIMUM RATINGS

ABSOLUTE-MAXIMUM VALUES

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

Key-Down Conditions per Tube Without Amplitude Modulation§

Heater Voltage*	4.5 to 6.3	Volts
DC Plate Voltage	1000	Volts
Negative DC Grid Voltage	150	Volts
Peak Positive RF Grid Voltage	30	Volts
Peak Negative RF Grid Voltage	400	Volts
DC Grid Current	50	Milliamperes
DC Cathode Current	125	Milliamperes
Plate Dissipation	100	Watts
Grid Dissipation	2.0	Watts
Envelope Temperature at Hottest Point #	250	C

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEPHONY

Carrier Conditions per Tube For Use With a Maximum Modulation Factor of 1.0

Heater Voltage*	4.5 to 6.3	Volts
DC Plate Voltage¶	600	Volts
Negative DC Grid Voltage	150	Volts
Peak Positive RF Grid Voltage	30	Volts
Peak Negative RF Grid Voltage	400	Volts
DC Grid Current	50	Milliamperes
DC Cathode Current	100	Milliamperes
Plate Dissipation	70	Watts
Grid Dissipation	2.0	Watts
Envelope Temperature at Hottest Point #	250	C

Supersedes ET-T1054A dated 9-57

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Heater Voltage	6.3	Volts
Plate Voltage	600	Volts
Grid Voltage△		Volts
Amplification Factor	95	
Transconductance	24800	Micromhos
Plate Current	75	Milliamperes

RADIO FREQUENCY OSCILLATOR—CLASS C

Frequency	500	2500	Megacycles
Heater Voltage	6.0	5.0	Volts
DC Plate Voltage	900	900	Volts
DC Plate Current	90	90	Milliamperes
DC Grid Current	30	27	Milliamperes
DC Grid Voltage	−40	−22	Volts
Useful Power Output	40	17	Watts

* The equipment designer should design the equipment so that heater voltage is centered at some value within the range of 4.5 to 6.3 volts. Heater voltage variations about the center value should be kept as small as practical and should not, in any case, exceed ±5%. The optimum center value of heater voltage depends on the cathode current and on other parameters of circuit design and operation. For specific recommendations, contact your General Electric tube sales representative.

† Heater current of a bogey tube at Ef = 6.3 volts.

‡ Measured in a special shielded socket.

§ Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.

⁂ Where long life and reliable operation are important, lower envelope temperatures should be used.

¶ For modulation factors less than 1.0, a higher d-c plate voltage may be used if the sum of the peak positive audio voltage and the d-c plate voltage does not exceed 1200 volts.

△ Adjusted for Ib = 75 milliamperes.

INITIAL CHARACTERISTICS LIMITS

	Min.	Bogey	Max.	
Heater Current				
Ef = 6.3 volts	950	1030	1100	Milliamperes
Grid Voltage				
Ef = 6.3 volts, Eb = 600 volts, Ib = 75 ma	−1.3	−2.5	−3.5	Volts
Grid Voltage				
Ef = 6.3 volts, Eb = 600 volts, Ib = 1.0 ma	−7.0	−9.5	−15	Volts
Transconductance				
Ef = 6.3 volts, Eb = 600 volts, Ec adjusted for Ib = 75 ma	22000	24800	27500	Micromhos
Amplification Factor				
Ef = 6.3 volts, Eb = 600 volts, Ec adjusted for Ib = 75 ma	75	95	115	
Negative Grid Current				
Ef = 6.3 volts, Eb = 600 volts, Ec adjusted for Ib = 75 ma	.....	.....	3.0	Microamperes
Interelectrode Leakage Resistance				
Ef = 6.3 volts, Polarity of applied d-c interelectrode voltage is such that no cathode emission results				
Grid to Cathode at 500 volts d-c	50	.....	.....	Megohms
Interelectrode Capacitances				
Grid to Plate: (g to p)	1.89	2.01	2.13	Picofarads
Grid to Cathode: (g to k)	6.0	6.5	7.0	Picofarads
Plate to Cathode: (p to k)	0.018	0.023	0.029	Picofarads

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.

SPECIAL PERFORMANCE TESTS

	Min.	Max.	
Oscillator Power Output Tubes are tested for power output as an oscillator under the following conditions: Ef = 5.0 volts; F = 2500 MC, min.; Eb = 1000 volts; Ib = 90 ma	15	....	Watts

Low Pressure Voltage Breakdown Test

Statistical sample tested for voltage breakdown at a pressure of 27 mm Hg. Tubes shall not give visual evidence of flashover when 1000 volts RMS, 60 cps, is applied between the plate and grid terminals.

DEGRADATION RATE TESTS

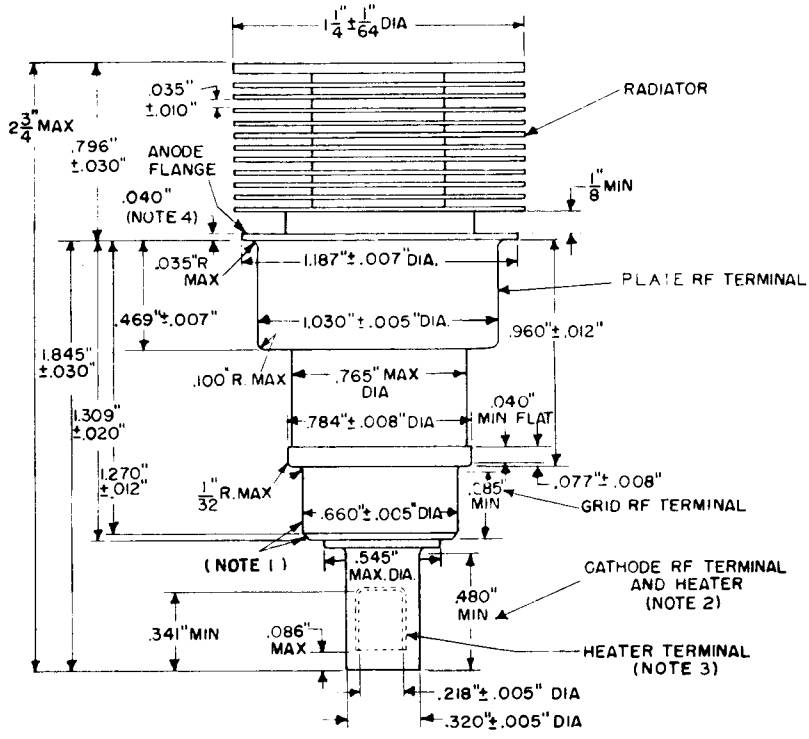
Shock

Statistical sample subjected to 5 input accelerations of approximately 400 G and 1.0 milliseconds duration in each of four positions. The accelerating forces are applied by the Navy-type, High Impact (flyweight) Shock Machine.

500-Hour Life Test

Statistical sample operated for 500 hours as an oscillator to evaluate changes in power output with life.

PHYSICAL DIMENSIONS

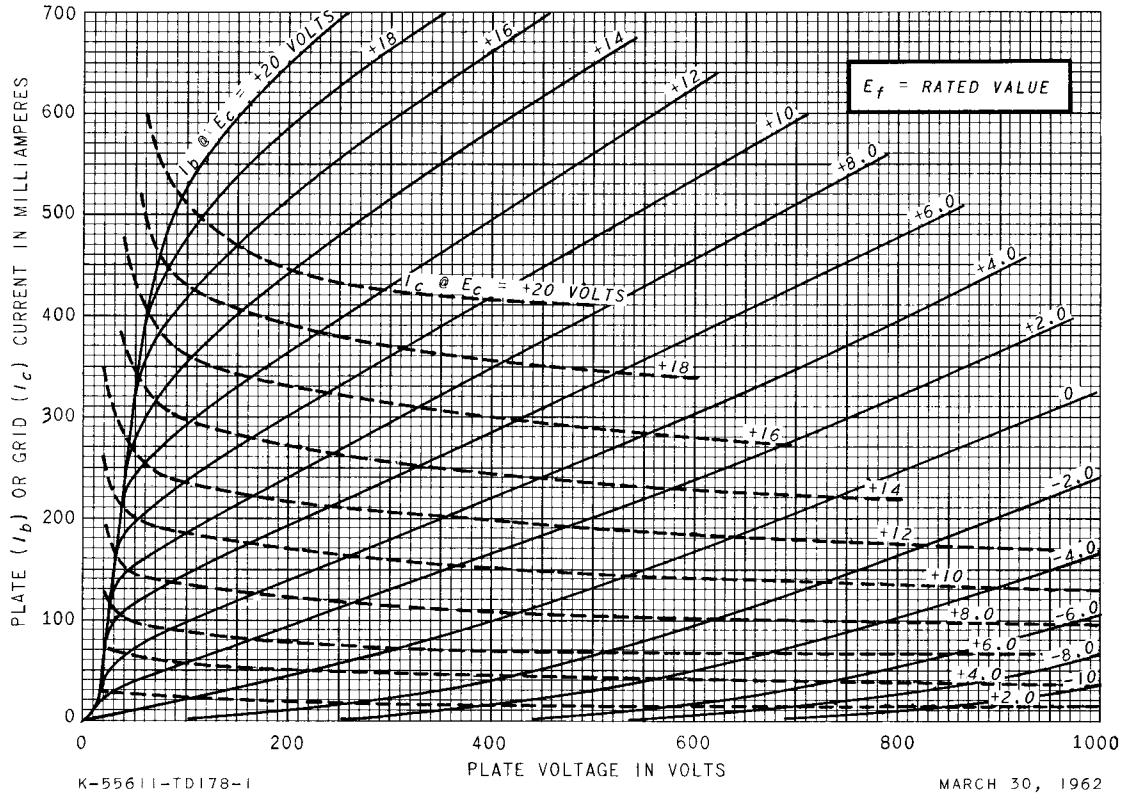


NOTES:

1. Solder not to extend radially beyond grid RF terminal.
2. Total indicated runout of the grid-contact surface and the cathode-contact surface with respect to the anode shall not exceed 0.020".
3. Total indicated runout of the cathode-contact surface with respect to the heater-contact surface shall not exceed 0.012".
4. Only this flange to be used as a socket stop and clamp.

¶ New pages 3 to 6 supersede old pages 3 and 4 dated 12-61.

AVERAGE PLATE CHARACTERISTICS



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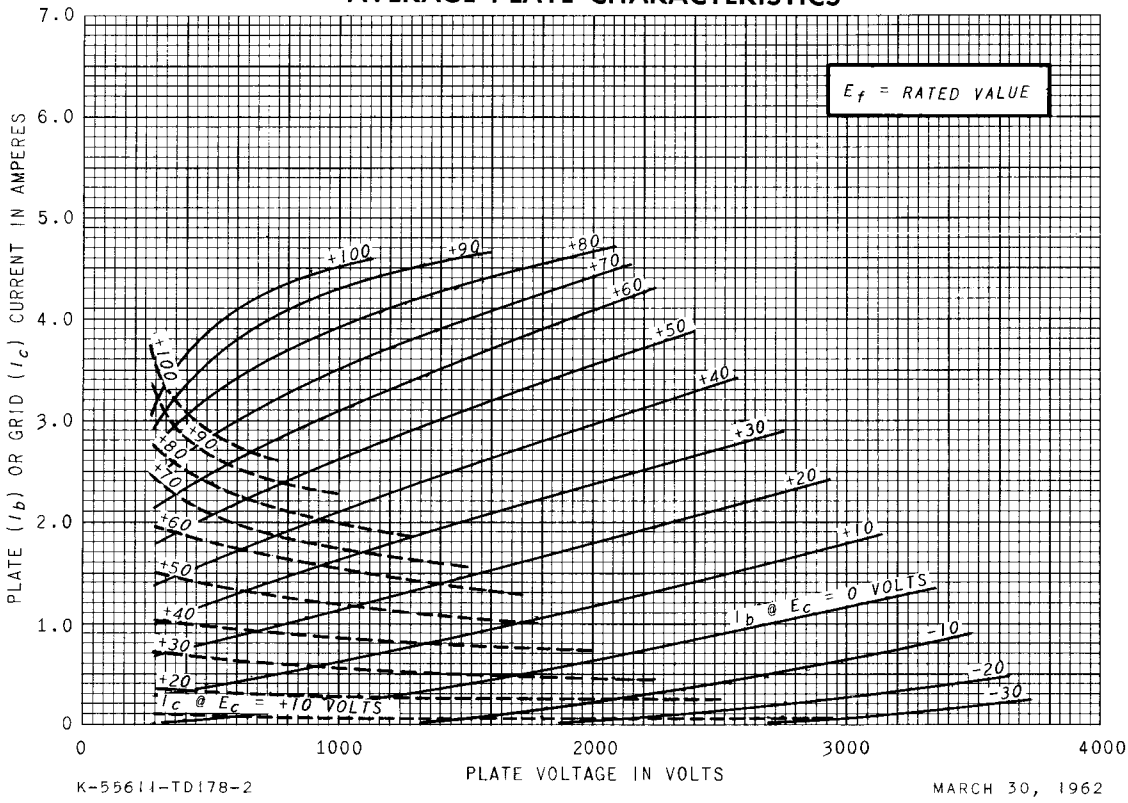
MARCH 30, 1962

AVERAGE PLATE CHARACTERISTICS



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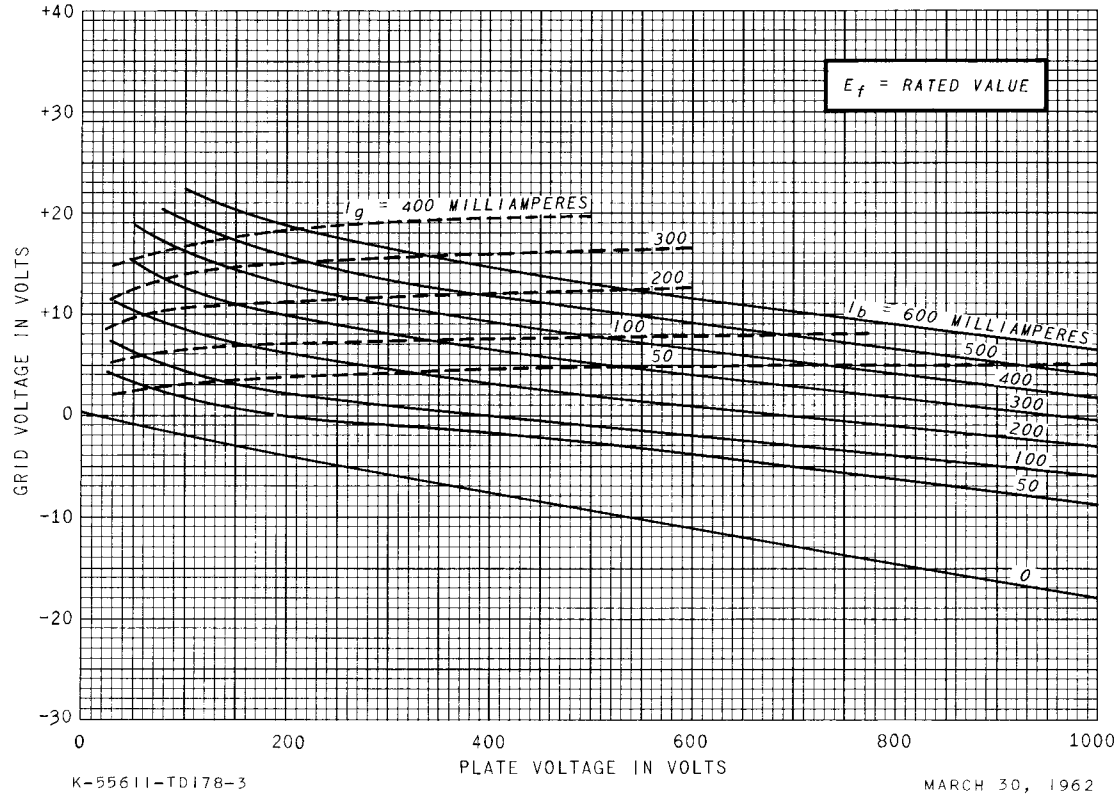
MARCH 30, 1962

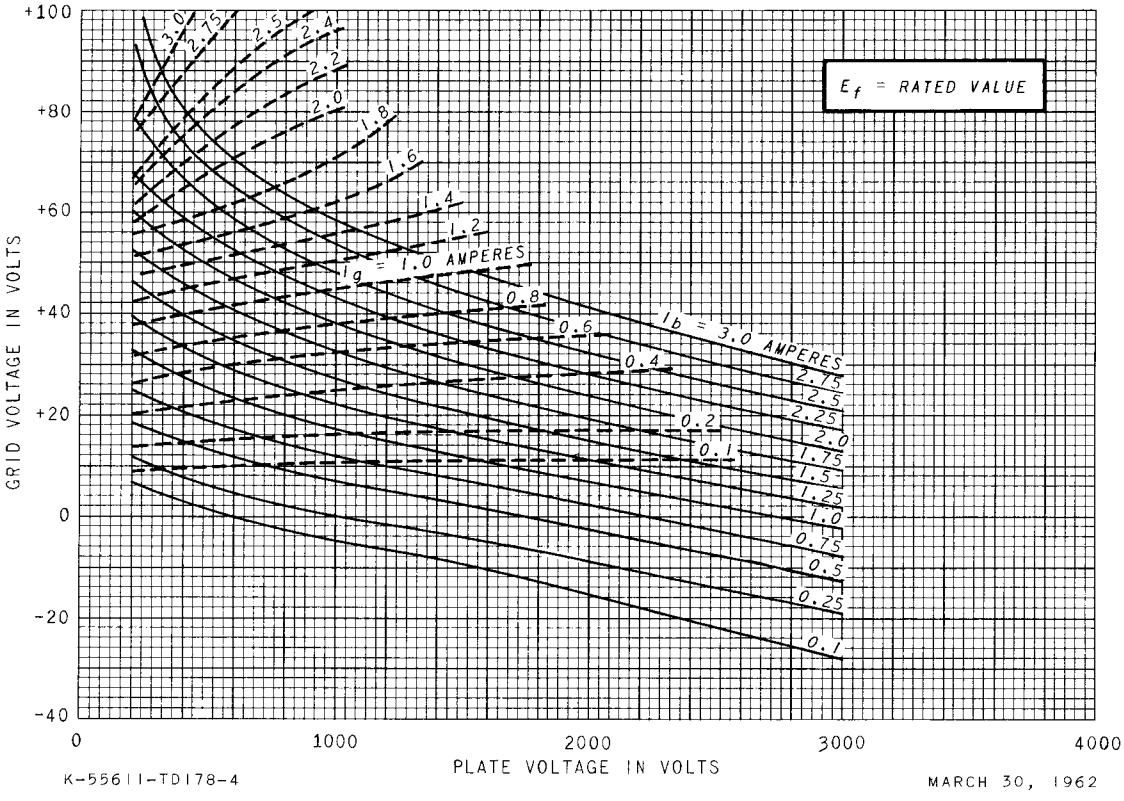
AVERAGE CONSTANT-CURRENT CHARACTERISTICS



K-5561I-TDI78-3

MARCH 30, 1962

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



K-5561I-TDI78-4

MARCH 30, 1962

RECEIVING TUBE DEPARTMENT

GENERAL ELECTRIC

Owensboro, Kentucky