

The 833C is a triode especially designed for RF power amplifier applications, as well as audio frequency power amplifier and modulator service. Maximum ratings apply up to 30 MHz, and reduced ratings up to 75 MHz.

GENERAL CHARACTERISTICS

MECHANICAL

| | |
|---|---------------------------|
| Mounting Position | Vertical, base up or down |
| Cooling | Radiation or forced air |
| Radiation cooling means that there is sufficient free circulation of air around the tube to keep the seal temperatures within limits. | |
| Forced-air cooling means that an air flow of 40 CFM from a 2" diameter nozzle directed vertically on bulb between grid and plate seals is required to limit the temperature between these seals to 145°C. | |

ELECTRICAL

| | |
|------------------------------------|---------------------|
| Filament | Thoriated Tungsten |
| Voltage | 10.0 volts \pm 5% |
| Current | 10 amps |
| Amplification factor | 35 |
| $E_c = -10$ V | |
| $I_b = 200$ mA | |
| Direct Interelectrode Capacitances | |
| Grid to plate | 6.3 pF |
| Grid to filament | 12.3 pF |
| Plate to filament | 8.5 pF |

AF POWER AMPLIFIER AND MODULATOR—CLASS B

MAXIMUM RATINGS, ABSOLUTE VALUES

| | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> | |
|--|--------------------------|-------------|---------------------------|-------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> | <u>ICAS</u> |
| DC Plate Voltage | 3000 | 3300 | 4000 | 4000 V |
| Max-Signal DC plate current ¹ | 500 | 500 | 500 | 500 mA |
| Max-Signal Plate input ¹ | 1125 | 1300 | 1600 | 1800 watts |
| Plate Dissipation ¹ | 300 | 350 | 400 | 450 watts |

| <u>TYPICAL OPERATION</u> (2 Tubes) | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> | |
|--|--------------------------|-------------|---------------------------|-------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> | <u>ICAS</u> |
| DC Plate Voltage | 3000 | 3300 | 4000 | 4000 volts |
| DC Grid Voltage ² | - 70 | - 80 | - 100 | - 100 volts |
| Peak AF Grid-to-Grid Voltage | 400 | 440 | 480 | 510 volts |
| Zero-Signal DC Plate Current | 100 | 100 | 100 | 100 mA |
| Max. Signal DC Plate Current | 750 | 780 | 800 | 900 mA |
| Effective Load Resistance (plate to plate) | 9500 | 10500 | 12000 | 11000 ohms |
| Max.-Signal Driving Power (approx.) | 20 | 30 | 29 | 38 watts |
| Max.-Signal Power Output (approx.) | 1650 | 1900 | 2400 | 2700 watts |

RF POWER AMPLIFIER – CLASS B TELEPHONY

Carrier conditions per tube for use with a max. modulation factor of 1.0

| <u>MAXIMUM RATINGS, ABSOLUTE VALUES</u> | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> | |
|---|--------------------------|-------------|---------------------------|-------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> | <u>ICAS</u> |
| DC Plate Voltage | 3000 | 3300 | 4000 | 4000 volts |
| DC Plate Current | 300 | 300 | 300 | 300 mA |
| Plate Input | 450 | 525 | 600 | 675 watts |
| Plate Dissipation | 300 | 350 | 400 | 450 watts |

TYPICAL OPERATION

| | | | | |
|--------------------------------------|------|------|-------|-------------|
| DC Plate Voltage | 3000 | 3300 | 4000 | 4000 volts |
| DC Grid Voltage ² | - 70 | -100 | - 120 | - 120 volts |
| Peak RF Grid Voltage | 90 | 110 | 120 | 130 volts |
| DC Plate Current | 150 | 150 | 150 | 150 mA |
| DC Grid Current (approx.) | 2 | 2 | 2 | 3 mA |
| Driving Power (approx.) ³ | 10 | 11 | 14 | 21 watts |
| Power Output (approx.) | 150 | 200 | 225 | 250 watts |

PLATE-MODULATED RF POWER AMPLIFIER – CLASS C TELEPHONY

Carrier conditions per tube for use with a max. modulation factor of 1.0

| <u>MAXIMUM RATINGS, ABSOLUTE VALUES</u> | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> | |
|---|--------------------------|-------------|---------------------------|-------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> | <u>ICAS</u> |
| DC Plate Voltage | 2500 | 3000 | 3000 | 4000 volts |
| DC Grid Voltage | -500 | -500 | -500 | -500 volts |
| DC Plate Current | 400 | 400 | 450 | 450 mA |
| DC Grid Current | 100 | 100 | 100 | 100 mA |
| Plate Input | 835 | 1000 | 1250 | 1800 watts |
| Plate Dissipation | 200 | 250 | 270 | 350 watts |

TYPICAL OPERATION

| | | | | |
|--|------|------|------|------------|
| DC Plate Voltage | 2500 | 3000 | 3000 | 4000 volts |
| DC Grid Voltage ⁴ | -300 | -240 | -300 | -325 volts |
| From a grid resistor of | 4000 | 3400 | 3600 | 3600 ohms |
| Peak RF Grid Voltage | 460 | 410 | 490 | 520 volts |
| DC Plate Current | 335 | 335 | 415 | 450 mA |
| DC Grid Current (approx.) ⁵ | 75 | 70 | 85 | 90 mA |
| Driving Power (approx.) ⁵ | 30 | 26 | 37 | 42 watts |
| Power Output (approx.) | 635 | 800 | 1000 | 1500 watts |

Note: Specifications subject to change without notice.

RF POWER AMPLIFIER & OSCILLATOR – CLASS C TELEGRAPHY⁶

and

RF POWER AMPLIFIER – CLASS C FM TELEPHONY

| <u>MAXIMUM RATINGS, ABSOLUTE VALUES</u> | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> | |
|---|--------------------------|-------------|---------------------------|-------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> | <u>ICAS</u> |
| | DC Plate Voltage | 3000 | 3300 | 4000 |
| DC Grid Voltage | -500 | -500 | -500 | -500 volts |
| DC Plate Current | 500 | 500 | 500 | 500 mA |
| DC Grid Current | 100 | 100 | 100 | 100 mA |
| Plate Input | 1250 | 1500 | 1800 | 2000 watts |
| Plate Dissipation | 300 | 350 | 400 | 450 watts |

| <u>TYPICAL OPERATION</u> | <u>Radiation Cooling</u> | | | | <u>Forced-air Cooling</u> | |
|--|--------------------------|------|-------------|------|---------------------------|-------------|
| | <u>CCS</u> | | <u>ICAS</u> | | <u>CCS</u> | <u>ICAS</u> |
| | DC Plate Voltage | 2250 | 3000 | 3000 | 3000 | 4000 |
| DC Grid Voltage ⁷ | -125 | -200 | -160 | -155 | -200 | -225 volts |
| From a grid resistor of | 1500 | 3600 | 2300 | 2150 | 2650 | 2400 ohms |
| From a cathode resistor of | 235 | 425 | 400 | 270 | 380 | 380 ohms |
| Peak RF Grid Voltage | 300 | 360 | 310 | 350 | 375 | 415 volts |
| DC Plate Current | 445 | 415 | 335 | 500 | 450 | 500 mA |
| DC Grid Current (approx.) ⁵ | 85 | 55 | 70 | 70 | 75 | 95 mA |
| Driving Power (approx.) ⁵ | 23 | 20 | 20 | 25 | 26 | 35 watts |
| Power Output (approx.) | 780 | 1000 | 800 | 1150 | 1440 | 1600 watts |

AMPLIFIER or OSCILLATOR – CLASS C

*With Separate, Rectified, Unfiltered, Single-Phase,
Full-Wave Plate Supply*

| <u>MAXIMUM RATINGS, ABSOLUTE VALUES</u> | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> |
|---|--------------------------|-------------|---------------------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> |
| | DC Plate Voltage | 2700 | 3000 |
| DC Grid Voltage | -450 | -450 | -450 volts |
| DC Plate Current | 500 | 500 | 500 mA |
| DC Grid Current | 100 | 100 | 100 mA |
| Plate Input ¹⁰ | 1250 | 1500 | 1800 watts |
| Plate Dissipation | 300 | 350 | 400 watts |

TYPICAL OPERATION

| | <u>Radiation Cooling</u> | | <u>Forced-air Cooling</u> |
|---|--------------------------|-------------|---------------------------|
| | <u>CCS</u> | <u>ICAS</u> | <u>CCS</u> |
| DC Plate Voltage | 2500 | 2750 | 3600 volts |
| DC Grid Voltage ⁸ | -130 | -135 | -155 volts |
| From a grid resistor of | 1560 | 1770 | 2100 ohms |
| DC Plate Current | 450 | 450 | 450 mA |
| DC Grid Current (approx.) | 83 | 76 | 73 mA |
| Driving Power (approx.) ⁹ | 27 | 25 | 26 watts |
| Output-Circuit Efficiency (approx.) | 85 | 85 | 85 % |
| Useful Power Output (approx.) ¹¹ | 1865 | 2040 | 2480 watts |

RATINGS vs. FREQUENCY WITH RADIATION COOLING

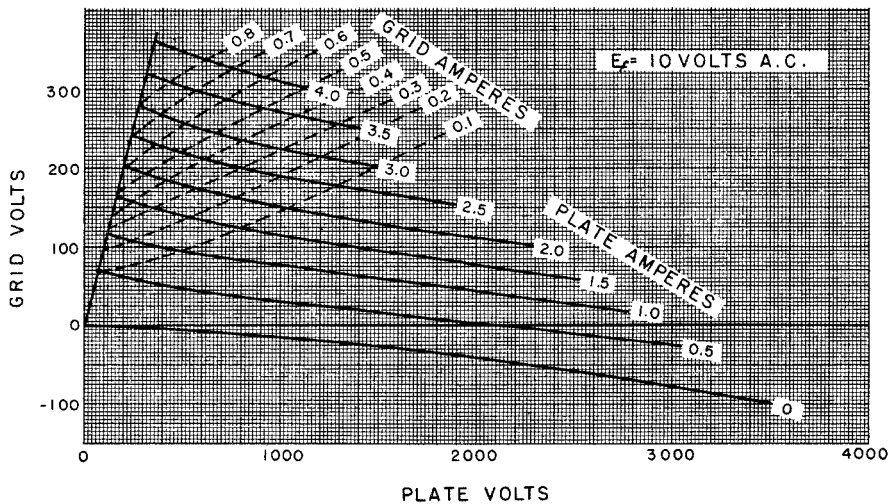
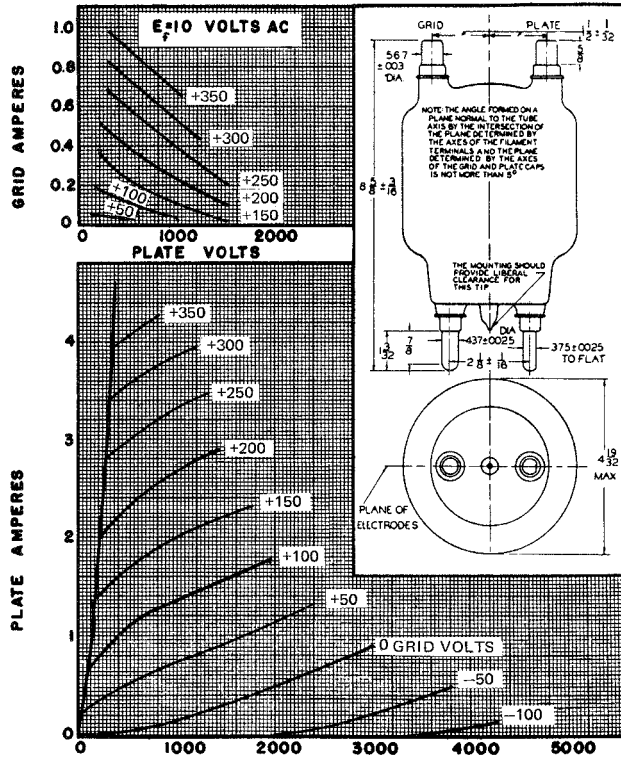
| FREQUENCY | 30 | 50 | 75 | Mc |
|--|-----|----|----|----|
| MAXIMUM PERMISSIBLE PERCENTAGE of MAXIMUM RATED PLATE VOLTAGE and PLATE INPUT: | | | | |
| Class B Telephony | 100 | 98 | 94 | % |
| Class C Telephony | 100 | 90 | 72 | % |
| Class C Telegraphy | 100 | 90 | 72 | % |

RATINGS vs. FREQUENCY WITH FORCED-AIR COOLING

| FREQUENCY | 20 | 50 | 75 | Mc |
|--|-----|----|----|----|
| MAXIMUM PERMISSIBLE PERCENTAGE of MAXIMUM RATED PLATE VOLTAGE and PLATE INPUT: | | | | |
| Class B Telephony | 100 | 97 | 93 | % |
| Class C Telephony | 100 | 83 | 65 | % |
| Class C Telegraphy | 100 | 83 | 65 | % |

FOOTNOTES

- 1 Averaged over any audio-frequency cycle of sine-wave form.
- 2 For AC filament supply.
- 3 At crest of audio-frequency cycle with modulation factor of 1.0.
- 4 Obtained by grid resistor, or from a combination of grid resistor with either fixed supply or cathode resistor.
- 5 Subject to wide variation depending on the impedance of the load circuit. High-impedance load circuits require more grid current and driving power to obtain the desired output. Low-impedance load circuits need less grid current and driving power, but plate-circuit efficiency is sacrificed. The driver stage should have good regulation and should be capable of delivering considerably more than the required driving power.
- 6 Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
- 7 Obtained from fixed supply, by grid resistor, by cathode resistor, or by combination methods.
- 8 Obtained from a grid resistor of the value shown or from a combination of grid resistor and cathode resistor. Fixed bias operation is not recommended. The bias resistor should not be bypassed for the plate and grid voltage supply frequency.
- 9 From a driver with a rectified, unfiltered, single-phase, full wave plate supply.
- 10 Power input to plate is 1.23 times the product of dc plate voltage times dc plate current.
- 11 This value of useful power is measured at load of output circuit having the indicated efficiency.



CONSTANT CURRENT CHARACTERISTICS

Note: Specifications subject to change without notice.