



**EITEL-McCULLOUGH, INC.**  
SAN CARLOS, CALIFORNIA

TENTATIVE DATA

**8198**  
**EM-778**

TRAVELING WAVE TUBE

5.0 to 11.0 Gc.

1 Watt Min.

60 db Gain

**TENTATIVE DATA FOR EIMAC EM-778 TRAVELING WAVE TUBE**

The Eimac 8198/EM-778 is a ruggedized, ceramic and metal, periodic permanent magnet focused, power-amplifier traveling wave tube. It is capable of delivering a minimum CW output power of one watt throughout the frequency range of 5.0 to 11.0 gigacycles with a nominal small signal gain of 60 decibels. The 8198/EM-778 is designed to operate under severe environmental extremes of shock, vibration, temperature and altitude such as encountered in airborne applications.



The use of temperature compensated permanent magnets allows the 8198/EM-778 to be operated over a wide temperature range without degradation of performance. Flexible leads provide electrical connections to the tube.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**

Cathode: Unipotential, oxide coated	
Minimum Heating Time . . . . .	60 seconds
Heater: Voltage . . . . .	6.3 volts
Current . . . . .	0.6 amperes
Noise Figure . . . . .	25 to 34 decibels
Minimum Tangential Sensitivity (Broadband) . . . . .	-50 dbm
Minimum Saturated Output Power . . . . .	1 watt
Frequency Range . . . . .	5.0 to 11.0 gigacycles
Input and Output Impedance . . . . .	50 ohms nominal

**MECHANICAL**

Operating Position . . . . .	Any
RF Input Coupling . . . . .	Type N Female Coaxial Fitting
RF Output Coupling . . . . .	Type N Female Coaxial Fitting
Focusing . . . . .	Periodic Permanent Magnet
Cooling . . . . .	Passive Heat Sink
Maximum Overall Dimensions . . . . .	See Outline Drawing
Net Weight (Including Magnets) . . . . .	4.5 Pounds

**MAXIMUM RATINGS**

D-C BEAM VOLTAGE* . . . . .	3000 VOLTS
D-C FOCUS ELECTRODE VOLTAGE*: NEGATIVE WITH RESPECT TO CATHODE . . . . .	40 VOLTS
D-C CATHODE CURRENT . . . . .	25 MILLIAMPERES



TYPICAL OPERATING CHARACTERISTICS

Frequency . . . . .	5.0 to 11.0 gigacycles
Minimum Output Power . . . . .	1.0 watt
Small Signal Gain . . . . .	60 decibels
D-C Beam Voltage* . . . . .	2900 volts
D-C Cathode Current . . . . .	23 milliamperes
D-C Focus Electrode Voltage* . . . . .	-30 volts
D-C Focus Electrode Current . . . . .	0 milliamperes

\*All voltages referred to cathode.

APPLICATION

**Cooling:** The EM-778 is designed to be heat sink cooled by means of the mounting available and integral with the tube and PPM structure. Under environmental conditions normally encountered in military equipments, additional cooling will not be required.

**Cathode:** The heater voltage should be maintained within  $\pm 5$  per cent of the rated value of 6.3 volts if variations in performance are to be minimized and best tube life obtained.

**Helix:** The helix, collector and anode are internally connected to the tube body and are operated at the same potential. Therefore, it is often convenient to operate these elements at chassis potential, with the cathode and focus electrode at appropriate negative potentials. The cathode potential should be maintained within  $\pm 1\%$  to insure proper operation.

**Focus Electrode:** The focus electrode power supply must be regulated within  $\pm 2$  per cent to minimize variations in performance.

**Special Applications:** For any additional information concerning this tube or its application, write to Microwave Product Manager, Eitel-McCullough, Inc., San Carlos, California.

ENVIRONMENTAL

The EM-778 conforms generally with MIL-E-5272C, "Environmental Testing, Aeronautical and Associated Equipment, General Specification for," and MIL-E-5400, "Electronic Equipment, Aircraft, General Specification for," Class II.

**Vibration:** 10 g to 2000 cps (Curve A of Proc. XII, MIL-E-5272C)

**Shock:** 25 g, 11  $\pm$  1 ms

**Acceleration:** Sustained, 25 g's

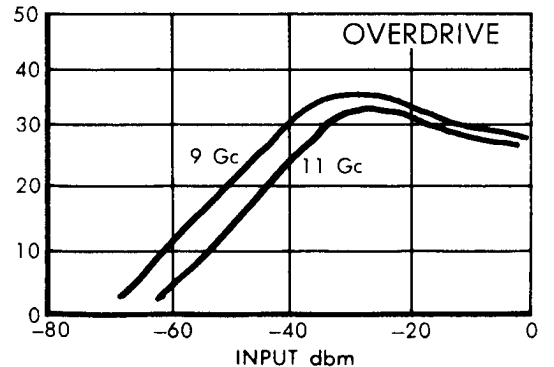
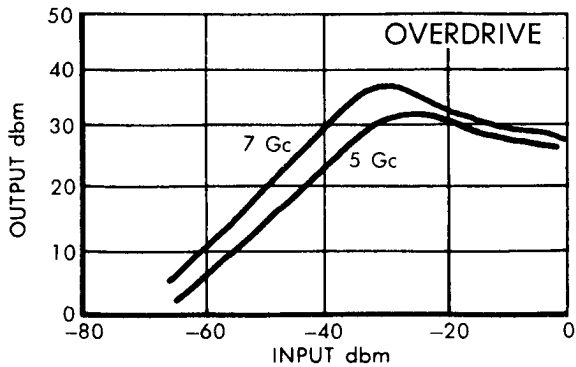
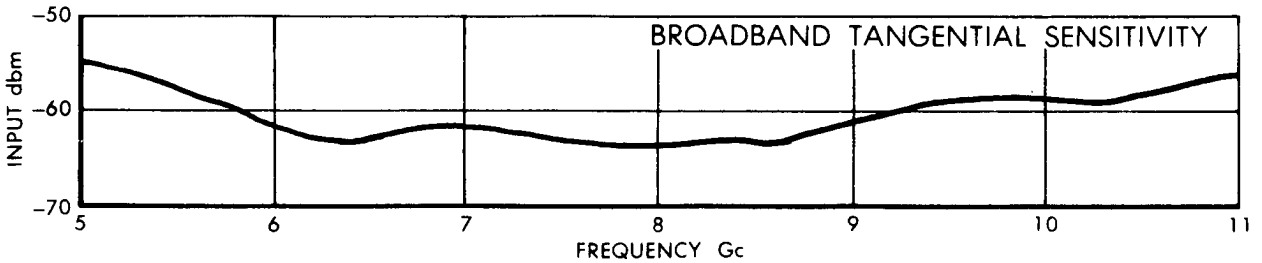
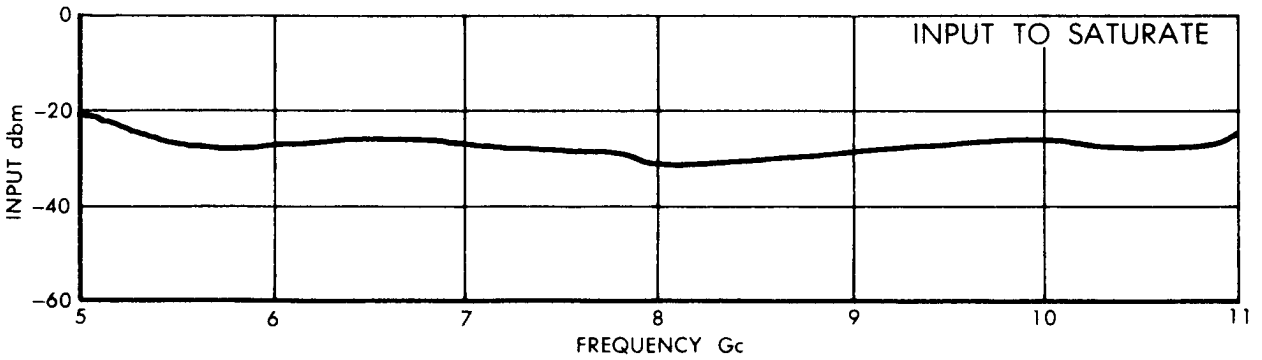
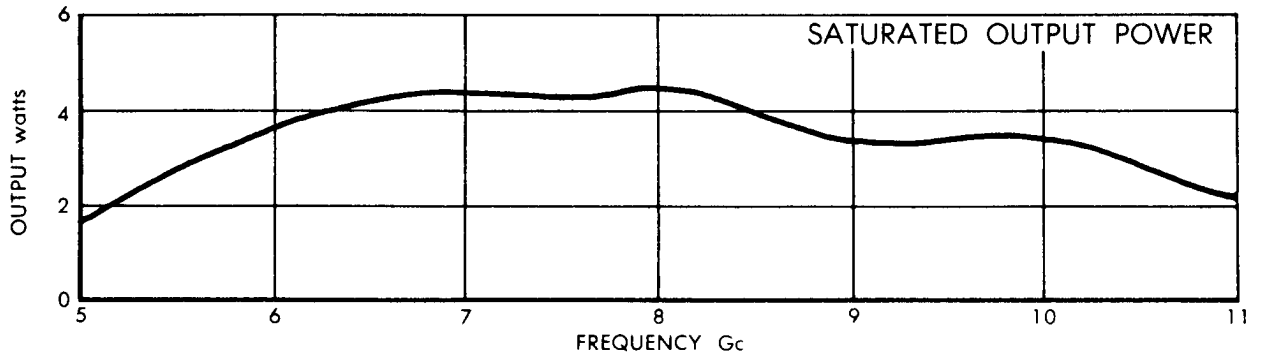
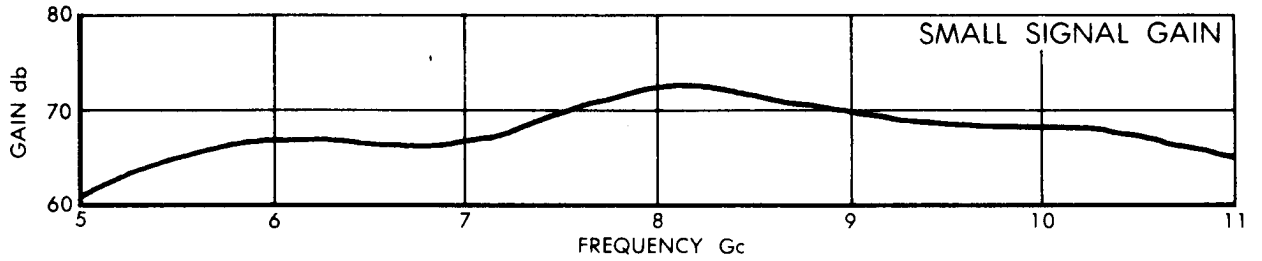
**Temperature:** -54°C to + 85°C

**Altitude:** 70,000 ft.

NOTE: This data should not be used for final equipment design.

**EM-778 TYPICAL OPERATING CHARACTERISTICS**

ANODE VOLTAGE 2900 V<sub>dc</sub> FOCUS VOLTAGE -30 V<sub>dc</sub>  
 CATHODE CURRENT 23 mA<sub>dc</sub> FILAMENT VOLTAGE 6.3 V<sub>ac</sub>





# EM-778

## CONNECTIONS

- 1. HEATER — BROWN
- 2. CATHODE HEATER — YELLOW
- 3. FOCUS ELECTRODE — GREEN
- 4. BODY GROUND — BLACK

