TENTATIVE DATA FOR EIMAC EM-1031 TRAVELING WAVE TUBE

The Eimac EM-1031 is a very rugged, light weight power-amplifier traveling wave tube designed to operate under severe environmental extremes of shock, vibration, altitude and temperature. The EM-1031 utilizes ceramic and metal construction and is focused by a fully temperature-compensated periodic permanent magnet array. This tube will provide a minimum output power of 5 watts CW over the frequency range of 7.0 to 11.0 Gc with a nominal small signal gain of 30 db.

The integral heat sink/mounting flange allows operation to ambient temperatures of +85°C without additional cooling. Flexible leads provide electrical connections to the tube. The integral heat sink/mounting flange permits this high temperature operation without additional cooling required for most applications.

APPLICATIONS:

Wide bandwidth, high power output and high gain make the EM-1031 ideally suited for radar augmentation or ECM applications in high performance aircraft or missile systems.

GENERAL CHARACTERISTICS

ELECTRICAL

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode: Unipotential, oxide coated</td>
<td></td>
</tr>
<tr>
<td>Minimum Heating Time</td>
<td>60 seconds</td>
</tr>
<tr>
<td>Heater: Voltage</td>
<td>6.3 volts</td>
</tr>
<tr>
<td>Current</td>
<td>0.6 amperes</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>25 to 34 decibels</td>
</tr>
<tr>
<td>Minimum Tangential Sensitivity (Broadband)</td>
<td>-50 dbm</td>
</tr>
<tr>
<td>Minimum Saturated Output Power</td>
<td>5 watts</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>7.0 to 11.0 gigacycles</td>
</tr>
<tr>
<td>Input and Output Impedance</td>
<td>50 ohms nominal</td>
</tr>
</tbody>
</table>

MECHANICAL

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Position</td>
<td>Any</td>
</tr>
<tr>
<td>RF Input Coupling</td>
<td>Type N Female Coaxial Fitting</td>
</tr>
<tr>
<td>RF Output Coupling</td>
<td>Type N Female Coaxial Fitting</td>
</tr>
<tr>
<td>Focusing</td>
<td>Periodic Permanent Magnet</td>
</tr>
<tr>
<td>Cooling</td>
<td>Passive Heat Sink</td>
</tr>
<tr>
<td>Maximum Overall Dimensions</td>
<td>See Outline Drawing</td>
</tr>
<tr>
<td>Net Weight (Including Magnets)</td>
<td>4.5 Pounds</td>
</tr>
</tbody>
</table>

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MAXIMUM RATINGS

D-C BEAM VOLTAGE* ............................................. 3400 VOLTS
D-C FOCUS ELECTRODE VOLTAGE:*  
NEGATIVE WITH RESPECT TO CATHODE ....................... 40 VOLTS
D-C CATHODE CURRENT ....................................... 40 MILLIAMPERES

TYPICAL OPERATING CHARACTERISTICS

Frequency ......................................................... 7.0 to 11.0 gigacycles
Minimum Output Power ....................................... 5.0 watts
Small Signal Gain ............................................. 30 decibels
D-C Beam Voltage* .................................. 3350 volts
D-C Cathode Current ....................................... 34 milliamperes
D-C Focus Electrode Voltage* .................. −30 volts
D-C Focus Electrode Current ....................... 0 milliamperes

*All voltages referred to cathode.

APPLICATION

Cooling: The EM-1031 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 ± 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 ± 1% to insure proper operation.

Focus Electrode: The focus electrode power supply must be regulated within ± 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.


Vibration: 10 g to 2000 cps (Curve A of Proc. XII, MIL-E-5272C)
Shock: 25 g, 11 ± 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-1031 TYPICAL OPERATING CHARACTERISTICS

ANODE VOLTAGE  3350 Vdc
CATHODE CURRENT  34 mA
FOCUS VOLTAGE  -30 Vdc
FILAMENT VOLTAGE  6.3 V

SMALL SIGNAL GAIN

FREQUENCY Gc

SATURATED OUTPUT POWER

FREQUENCY Gc

INPUT TO SATURATE

FREQUENCY Gc

BROADBAND TANGENTIAL SENSITIVITY

FREQUENCY Gc

OVERDRIVE

INPUT dbm

OUTPUT dbm

OVERDRIVE

INPUT dbm

OUTPUT dbm
CONNECTIONS

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

[Diagram of EM-1031 with dimensions and connections]