

Microwave Power Modules

For Military and Commercial Applications



communications

Electron Devices

Electron Devices MPMs for Military and

The Microwave Power Module (MPM) is a recent advancement in medium power microwave amplifiers. The MPM is a complete microwave amplifier that includes a vacuum power booster (VPB), also known as a helix traveling wave tube (TWT), an optional solid-state driver amplifier (SSA), and a high density electronic power conditioner (EPC). All three components are housed in a small, compact, lightweight package. Compared to traditional TWT amplifiers,

the MPM is significantly smaller, lighter, more efficient, and has a greater signal-to-noise ratio. Both military and commercial versions are available.

MPMs have been developed to operate from 2 GHz to over 45 GHz. The standard wideband MPMs operate from 2 to 8 GHz, 6 to 18 GHz, and 18 to 40 GHz. Narrowband MPMs operate in the C, X, Ku, Ka, and Q-bands.

MPMs for Military Applications

Highlights

- Can be optimized for narrowband applications
- RF output power of up to 125 W available on select models
- Integral Equalizer available on select models
- Optional Solid State Driver
- Optional AC or 28 VDC available
- Pulse Modulator included on all models
- Package Size as small as 50 cubic inches
- Greater than 25% efficiency

Product Information

MPM Type Number	Frequency Range (GHz)	RF Output Power (W)	Dimensions (inches)	Weight (lbs)	Prime Power (VDC)
M1200	2.0 to 8.0	50 to 100	14.0 x 4.0 x 1.2	5.0	270
M1220	6.0 to 18.0	60 to 100	7.5 x 6.25 x 1.0	3.75	270
M1221	6.0 to 18.0	60 to 100	7.85 x 6.5 x 1.0	4.0	28
M1280	18.0 to 40.0	20 to 60	14.0 x 3.0 x 1.25	4.0	270
M1340	40.0 to 46.0	25	14.0 x 3.0 x 1.25	4.0	270



Common Specifications

Duty	0 to 100% (CW)	Monitors and Indicators	Warm-Up Complete Helix Current High Voltage (Operate) High Voltage Status Fault
Pulse Width	100 nsec to CW	Altitude	Operating 50,000 feet Non-Operating 70,000 feet
PRF	50 kHz (max)	Humidity	Up to 100%, no condensation
Rise Time	30 nsec (max)	Salt-Fog	MIL-STD-810E, Method 509.3
Spectral Purity (Phase Noise)	-50 dBc (max) unsynchronized -60 dBc (max) synchronized >250 kHz from carrier	Vibration	MIL-STD-810, Method 514.4 80-350 Hz, 0.04 g/Hz -3 dB/octave 20-80 Hz -3 dB/octave 350-2000 Hz
Spurious	-50 dBc (max)	Shock	MIL-STD-810, Method 516.3 20 g, 11 msec
Intermodulation	-24 dBc at 7 dB backoff (max)	Acceleration	MIL-STD-810, Method 513.3, 10 g
Turn-On Delay		Fault Protection	Cathode Under Voltage Cathode Warm-Up Over Temperature Line Under Voltage Line Over Voltage Helix Over Current Prime Power Over Current
Heater	2 minutes (max)		
High Voltage	100 msec (max)		
Modulate	150 nsec (max)		
Load VSWR			
Operating	1.5:1 (max)		
No Damage	4.0:1 (max) C, X and Ku 3.0:1 (max) Ka		
Controls	Standby/Operate RF On Power Supply Synchronization (Optional)		
Temperature Baseplate /Ambient	-54 to +85°C (typ)		
Cooling	Conduction		

Commercial Applications

RF performance is up to 125 W continuous wave (CW) output power, noise figures of less than 10 dB, and up to 40% efficiency over narrowband applications. MPMs have found use in a variety of military and commercial applications such as data links for unmanned aerial vehicles, satellite communications, radar illuminators, weather radars and electronic countermeasures.

L-3 Electron Devices has designed the MPM to be modular. Users require a variety of mechanical formats to meet future systems needs, and the use of modularity allows the components within the MPM to be reconfigured to a variety of form factors.

It is this flexible packaging, coupled with the small size, low noise, high efficiency, wide bandwidth, and high output power that makes MPMs the ideal choice for power amplifier requirements.

MPMs for Commercial Applications

Highlights

- **Optimized for SATCOM bands (X, KU, and KA)**
- **RF output power of up to 125 W available on select models**
- **Integral Linearizer available on select models**
- **Optional Solid State Driver**
- **Optional AC input with power factor correction**
- **Optional Pulse Modulator available on select models**
- **Package size as small as 200 cubic inches**
- **Greater than 25% efficiency**

Product Information

MPM Type Number	Frequency Range (GHz)	RF Output Power (W)	Dimensions (inches)	Weight (lbs)	Prime Power (VAC)
M1001	7.9 to 8.4	125	12.0 x 10.5 x 2.0	12.0	115
M1021	12.75 to 14.5	40	10.3 x 9.6 x 2.0	10.0	or
M1025	12.75 to 14.5	80	10.3 x 9.6 x 2.0	10.0	230
M1030	12.75 to 14.5	125	10.3 x 9.6 x 2.0	10.0	Single Phase
M1125	27.5 to 31.0	40	12.0 x 10.0 x 2.0	12.0	



Common Specifications

Spectral Purity (Phase Noise)	-50 dBc (max) >10 kHz from carrier	Monitors and Indicators	Warm-Up Complete Helix Current High Voltage (Operate) Fault
Intermodulation	-24 dBc at 7 dB backoff (max)	Cooling	Conduction
Heater Turn-On Delay	2 minutes (max)	Temperature	
Load VSWR		Baseplate/Ambient	-40 to +55°C
Operating	1.5:1 (max)	Baseplate (under collector)	-40 to +70°C
No Damage	4.0:1 (max) X and Ku 3.0:1 (max) Ka	Altitude	
Fault Protection	Cathode Under Voltage Cathode Warm-Up Over Temperature Line Under Voltage Helix Over Current Prime Power Over Current	Operating	15,000 feet
Controls	Standby/Operate RF On	Non-Operating	70,000 feet
		Humidity	Up to 95%, no condensation
		Vibration	Normal Transportation

NOTE: 2.0 to 8.0 GHz (M1000), 6.0 to 18.0 GHz (M1020) and 18.0 to 40.0 GHz (M1040) wideband models are also available in commercial formats.

All specifications and features subject to change without notice.

Cleared by DoD/DFOISR for public release under (DFOISR case number) on (date of DFOISR letter).

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