High Efficiency Microwave Power Module PTX8501

CPI Electron Device Business - Microwave Power Module

The PTX8501 microwave power module (MPM) integrates a medium-power, high-efficiency traveling wave tube (TWT) with an optimized high-density switch-mode power supply to produce a single "drop-in" microwave amplifier block.

- High-efficiency design reduces power consumption
- Simple system integration and installation
- No TWT interconnections
- Reduced logistics management

The MPM can be configured to incorporate a variety of TWT models, allowing the user to specify duty and peak power parameters.

The unit will operate with duty cycles up to 10% and peak powers of up to 1 kW with a full 1 GHz bandwidth – representing more than a 50% improvement in efficiency over the previous model.

A control interface is incorporated, allowing remote operation and status monitoring. Internal diagnostic outputs and indicators are also available for Built-In Test (BIT) purposes.

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The PTX8501 microwave power module (MPM) integrates a medium-power, high-efficiency traveling wave tube (TWT

FEATURES:

- Frequency: 9.0 - 10.0 GHz
- Duty cycle: 10% maximum
- Weight: 9.3 lbs (4.2 kgs) max
- VSWR: 2.0:1 max
- Pulsewidth: 0.2 to 100.0 µs

BENEFITS:

- High voltage
- Operate at high altitudes
- Operate in high humidity
- Remote operation and status monitoring

APPLICATIONS:

- Radar systems

RF Characteristics

Typical operating characteristics for the MPM incorporating a 1 kW, 10%, X band TWT. Note 1.

Frequency range	9.0 to 10.0 GHz
Output power	1 kW minimum
Gain at rated power	55 dB minimum
Noise power density (Beam On)	-20 dBm/MHz
Noise power density (Beam Off)	-105 dBm/MHz
Second harmonic	-12 dBc typical
Duty cycle	10 % maximum
Pulse width	0.2 to 100.0 µs
Pulse repetition frequency	20 kHz maximum
Delay from leading edge of grid window pulse to full RF out	200 ns typical
Delay from trailing edge of grid window pulse to full RF cut-off	200 ns typical
Maximum spurious FM measured in a 100 Hz bandwidth	-60 dBc spurious -110 dBc/ Hz random
Input VSWR	2.0:1 maximum
Output VSWR	2.0:1 maximum
Load VSWR	2.0:1 maximum for no damage
Max rated RF input power	+10 dBm

Prime Power Requirements

Prime power	28 V DC to MIL-STD-704E
Power consumption	360 W typical at 1 kW, 10% output

Connectors

Primary power input connector	9 pin D type male
Control and monitoring connector	15 pin D type male
RF input connector	Precision SMA female
RF output connector	Precision TNC female

Grid Window Input Pulse

Input level to hold TWT on	TTL >2.0 V into 100 Ω
Input to Hold TWT off	TTL <0.8 V into 100 Ω
Pulse width:	Minimum 200 ns Maximum 100 µs

Pre-Trigger Input

High input level TTL > 2.0 V into 100 Ω
Low input level TTL < 0.8 V into 100 Ω
(pre-trigger pulse nests the grid window pulse and is used to lock the HVPSU inverter to the grid window pulse).

Notes:
1 Other characteristics are available to special order

Control and Monitoring

Control inputs (TTL) (<0.8 V Low, > 2.0 V High)	Standby (low)/ Operate (high)
Status outputs	Warm up (low = true)
	HV on (high = true)
	Fault (low = true)
Peak body (Helix) Current monitor	1 V per A

Fault Protection

If the cathode voltage is low, grid drive is inhibited.

Internal BIT fault protection outputs (High + 15 V = Trip is Active)	Helix arc
	Excess peak helix current
	Excess mean helix current
	Excess peak beam current
	Excess mean beam current
	Excess duty cycle
	High cathode voltage
	High inverter current
	Low logic voltage
	Low SSA voltage
	TWT overtemperature
	HVPS overtemperature
Automatic restart	Auto-reset after fault
Warmup time	180 to 195 seconds

Mechanical

Mechanical outline	350 x 160 x 50 mm
Weight	9.3 lbs (4.2 kgs) maximum
Orientation	Any
Finish	Nickel plated
Markings/Labels	Type number
	Model number
	Serial number
	Connector ident
	Hazard warning
Cooling	Conduction

Environmental

Ambient temperature (operating)	-40 °C to + 85 °C
Baseplate temperature (PSU)	85 °C maximum hot spot (operating)
Altitude (operating)	0 - 50,000 ft
Vibration (operating - 3 axes)	5 g rms, 5 - 2000 Hz
Shock (3 axes)	6 g, 11 ms half-sine
Humidity (non-condensing)	95%
Storage temperature	-40 °C to + 90 °C

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