Ku Band Microwave Power Module

PTXM1000

CPI Electron Device Business - Microwave Power Module

The PTXM1000 microwave power module integrates a "super mini" traveling wave tube (TWT), linearizer, and an optimized high-density switch-mode power supply to create a single "drop-in" microwave amplifier block for any continuous wave (CW) application requiring the highest power and linear performance.

Integration of the TWT and its high-voltage power supply simplifies the system designer's task by eliminating TWT interconnects (and their associated safety and reliability hazards). Integration further reduces the overall system size, simplifying the installation process.

The MPM is factory adjusted to optimize TWT performance. No user adjustments are required, simplifying replacement and reducing replacement times in the field.

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

To learn more about CPI EDB's MPM capabilities, contact CPI EDB at ElectronDevices@cpi-edb.com or call +44 (0)20 8573 5555

The PTXM1000 microwave power module integrates a "super mini" travelling wave tube (TWT)

FEATURES:

- Frequency 13.75 - 14.5 GHz
- RF out power 110 W (+54.5 dBm)
- Duty cycle 100% (CW operation only)
- Single gain 53 dB Nom +/- 3 dB
- Weight 3.75 lbs max (1.7 kgs)

BENEFITS:

- High power
- Compact & reliable
- Operation in the harshest military environments

APPLICATIONS:

- Radar
- Electronic Countermeasure (ECM) systems

RF Characteristics

Typical operating characteristics for the MPM incorporating a 13.75 to 14.5 GHz, 100 W TWT [Note 1.]

Frequency range	13.75 to 14.5 GHz
RF output power (saturated)	110 W (+50.4 dBm) min (14.0 to 14.5 GHz)
Duty cycle	100% (CW operation only)
Small signal gain	53 dB Nom +/- 3 dB
Small signal gain stability	+/-2.0 dB max over 24 hours and over temperature range
Small signal gain variation	+/-1.5 dB over 500 MHz bandwidth
RF input power (for saturation)	0 dBm typical
Second harmonic at saturation	-15 dBc max with matched load
Noise power density (Beam On)	-32 dBm/MHz max
Maximum spurious PM	-60 dBc max (Excluding +/-1MHz of carrier frequency)
Single sideband CW equivalent phase noise Power density	-40 dBc/Hz @ 10 Hz from carrier -60 dBc/Hz @100 Hz from carrier -80 dBc/Hz Max at 1 kHz from carrier -90 dBc/Hz Max at 10 kHz from carrier -100 dBc/Hz Max at >100 kHz from carrier
Noise figure	10 dB (typical)
Input VSWR	1.5:1 max
Output VSWR	2.0:1 max
3rd order 2 tone intermodulation	-25 dBc max @ 2.5 dB back-off [Note 2]
AM/PM conversion	5 °/ dB typical

Prime Power Requirements

Prime power	270 V DC per MIL-STD-704F (±10% normal operating range & abnormal voltage transient)
Power consumption	455 W @ 100 W RF

Connectors

Primary power input connector	Nicomatic: 322YL015D51
Control and monitoring connector	Nicomatic: D221EP00D51-0003-3305+RF
RF input connector	SMA female
RF output connector	TNC female

Control and Monitoring

Control inputs	HV on TWT beam on
Status outputs	Standby HV on Fault

Notes:
1 Other characteristics are available to special order
2 Two equal tones spaced 10 MHz apart. MPM is fitted with a linearizer

Fault protection	
Extensive internal BIT incorporated to monitor most TWT parameters. MPM shuts down under fault conditions. TWT operating parameters can be monitored externally to aid fault location. An overtemperature trip is incorporated.	
Fault outputs	Over temperature summary fault
TWT monitor outputs	Cathode voltage Beam current Helix current
Heater warm-up	90 seconds from power on
Automatic restart	Auto-reset after fault is included (3 restarts) typical

Mechanical

Mechanical outline	190 x 120 x 30 mm excluding fixings and connectors
Weight	3.75 lbs (1.7 kg) max
Orientation	Any
Finish	Nickel plated
Markings/Labels	Type number Model number Serial number Connector ident Hazard warning
Cooling	Conduction via baseplate, +85 °C maximum temperature

Options (available on request)

Alternative prime power 28 V, 115 VAC 3-phase (plug-in or stand-alone converters)
Block up converter (BUC)
RF output assemblies

Environmental

Ambient temperature (operating)	-50 °C to + 85 °C
Ambient temperature (non-operating)	-55°C to + 100 °C
Baseplate temperature (MPM)	85 °C maximum (operating)
Altitude (operating)	0 - 70,000 ft
Vibration (operational)	MIL-STD-810G 514.6 category 13
Vibration (storage and transit)	MIL-STD-810G 514.6 category 8 & 6
Shock	MIL-STD-810G 516.6 procedure functional shock
Acceleration	MIL-STD-810G table 513.6-II (Aircraft operational) MIL-STD-810G table 513.6-I (Aircraft structural)
Humidity (operation & storage)	
MIL-STD-810G part one C-I, constant high humidity (B1)	
EMC performance	
MIL-STD-461E – requires external EMC filter	

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TMDUK-SALE-9037 Issue 3 dated January 2025