

CPI Electron Device Business - Traveling Wave Tube Transmitter (TWTA)

The PTX7526 high-power transmitter integrates a CPI EDB-manufactured medium-power, ring-loop traveling wave tube (TWT) with an optimized high-density switch-mode power supply to create a single “drop-in” microwave amplifier block.

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

The HPA can be configured to accommodate various TWT models, allowing the users to specify duty cycle and peak power parameters. Duty cycles up to 10% and peak power levels of up to 10 kW are available.

A control interface is included, enabling remote operation and status monitoring, with diagnostic outputs for built-in test (BIT) purposes.

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



The PTX7526 high-power transmitter integrates a CPI EDB manufactured medium-power, ring-loop traveling wave tube (TWT).

FEATURES:

- Frequencies: 9.2 -10.0 GHz
9.35 - 9.85 GHz at 3.5 kW
- Output power: 3500 W min
- Weight: 55 lbs (25.0 kgs) max
- Duty cycle: 4.0% max
- Pulse width: 0.2 to 20.0 us
- VSWR: 2.0:1 max
- Pulse repetition frequency: 20 kHz max

BENEFITS:

- Excellent thermal management
- High reliability
- Compact & lightweight
- Suitable for high-altitude operations
- Resilient in high-humidity environments

APPLICATIONS:

- Radar systems
- Electronic countermeasure (ECM) systems

RF Characteristics

Typical operating characteristics for HPA incorporating a CPI EDB PT6226 TWT (4 kW, 4 %, X-band) ^{Note 1}

Frequency range	9.2 to 10.0 GHz at 1 kW 9.35 to 9.85 GHz at 3.5 kW
Output power	3500 W minimum
Gain at rated power	55 dB
Noise power density (Beam On)	0 dBm/MHz
Noise power density (Beam Off)	-105 dBm/MHz
Second harmonic	-25 dBc max
Duty cycle ^{Note 2}	4.0% max
Pulse width	0.2 to 20.0 μ s
Pulse repetition frequency	20 kHz max
Delay from leading edge of grid window pulse to full RF out	200 ns typ
Delay from trailing edge of grid window pulse to full RF cutoff	200 ns max
Maximum spurious FM measured in a 100 Hz bandwidth	-55 dBc -60 dBc for PRF < 5 kHz and active "pre-trigger" signal
Input VSWR	2.0:1 max
Output VSWR	2.0:1 max
Max rated RF input power	20 dBm

Prime Power Requirements

Prime power	28 V DC to MIL-STD-704E
Power consumption	1000 W max
RF efficiency	14 % typ

Connectors

Prime power input connector	D38999/20 WG-16PN to MIL-C 38999
Control and monitoring connector	M24308/2-4 to MIL-C 24308 (37 way D female)
RF input connector	SMA female
RF output connector	WG flange UG 136 B/U with 8-32 UNC tapped fixing holes (mates with UG135/U)

Grid Window Input Pulse

Input level to hold TWT on	+3.5 V to +15 V into 150 Σ
Input to hold TWT off	<0.8 V into 150 Σ
Pulse width:	Minimum 200 ns Maximum 20 μ s
Pre-trigger Input	High input level +5 to + 15 V into 10 k Ω Low input level < 0.8 V into 10 k Ω (pretrigger pulse nests the grid window pulse and is used to lock the HVPSU inverters to the grid window pulse)

Notes:

- 1 Other characteristics are available to special order
- 2 The duty cycle can be increased for tubes with lower power

Control and Monitoring

Control inputs (<0.8 V LOW, +15 V or O/C HIGH)	
Standby (high)/ operate (low)	
Status outputs (open collector -	
LOW = true, O/C = false)	
Warm up	
Standby commanded	
Operate commanded	
Fault	
Cathode voltage monitor	1 V per kV
Peak cathode current monitor	1 V per A
Peak body (Helix) current monitor	1 V per A

Fault Protection

If the cathode voltage is low, grid drive is inhibited	
Fault protection outputs (Open collector - low = Trip is Active)	
Helix arc	
Excess peak helix current	
Excess mean helix current	
Excess peak beam current	
Excess mean beam current	
Excess duty cycle	
Low/High line voltage	
High cathode voltage	
High inverter current	
Low logic voltage	
TWT overtemperature	
HVPS overtemperature	

Automatic restart	
Auto-reset after fault is available as an option	
Warm up time	180 to 195 seconds

Mechanical

Mechanical outline	See attached drawing
Weight	55 lbs (25.0 kgs) max
Orientation	Any
Finish	Alochrom 1200
Markings/Labels	Type number
	Model number
	Serial number
	Connector indent
Hazard warning	
Cooling	Conduction

Environmental

Ambient temperature (operating)	0 to + 85 °C
Baseplate temperature (PSU)	
85 °C max (operating)	
Altitude (operating)	0 - 50,000 ft
Vibration (operating - 3 axes)	5 g, 5 - 2000 Hz
Shock (3 axes)	20 g , 11 ms half sine
Humidity (non condensing)	95%
Storage temperature	-20° to + 85 °C

