MICROWAVE POWER SOLUTIONS

Microwave Power Solutions is the complete set of high power microwave products developed and provided by the Leonardo team based in Palermo since 1956, for the production of high power vacuum electronic devices. In the 90s the product range was expanded with the introduction of chip and wire technology for microwave microelectronics hybrid integrated circuits, modules and sub-assemblies.

Today an extensive expertise in the development and production of state-of-the-art TWTs, mini TWTs, Microwave Power Modules (MPM), TWT-A (TWT Amplifiers) and Solid State Power Amplifiers (SSPA) is available for Airborne, Surface, Missile and Space platforms for the Defense and Aerospace Market.

Microwave Power Solutions from Leonardo have been provided in the four continents for Radar, Security, Surveillance, EW & ESM, Instruments and Communication systems.

TECHNOLOGIES AND CAPABILITIES

Key high power vacuum device technology includes:

› Vacuum technology including brazing, RF induced and resistance welding
› Etching and plating
› Manual and automated microwave high power CW and pulsed testing
› Facilities for inspection, including CNC contactless equipment and SEM electronic microscope.

Key Microelectronic technology includes:

› Fully automated epoxy (and other adhesive) dispensing automatic eutectic attach
› Die placement and wire bonding
› Advanced microwave module assembling
› Automatic testing.

MAGNETRONS AND COUPLED CAVITY TWT

World class design expertise of Magnetrons and Coupled Cavity TWT. Leonardo Microwave Power Solution is among the few players worldwide that still design, develop and produce such Tubes, among legacy products worth to mention:

› Magnetron X-Band with 4kW peak output power 1.0 % duty cycle;
› Coupled Cavity TWT C-Band, X-Band and Ku-Band with peak output power up to 120KW;

These tubes are ideal for several different application such as:

› Seekers and threat simulators;
› SAR (synthetic aperture radar) for standoff airborne application or EO (earth observation) space payloads;
› ATM (Air Traffic Management) systems and wheatear forecast ground radar.

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency Range</th>
<th>Peak Output Power</th>
<th>Heater voltage (preheat &amp; Operate)</th>
<th>Peak Anode Voltage</th>
<th>Peak Anode Current</th>
<th>Duty Cycle</th>
<th>Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET2127</td>
<td>8.9 to 9.3 GHz</td>
<td>4 kW</td>
<td>5 V</td>
<td>5 kW</td>
<td>2.5 A</td>
<td>0.8% max</td>
<td>Free convection</td>
</tr>
<tr>
<td>ET2127</td>
<td>8.9 to 9.3 GHz</td>
<td>120 kW</td>
<td>-46 kV</td>
<td>14.5 A</td>
<td>8% max</td>
<td>Liquid</td>
<td>solenoid</td>
</tr>
<tr>
<td>ET2127</td>
<td>9.4 to 9.8 GHz</td>
<td>12 kW</td>
<td>-22 kV</td>
<td>4 A</td>
<td>2.7% max</td>
<td>Forced air</td>
<td>PPM</td>
</tr>
<tr>
<td>ET2127</td>
<td>9.6 to 10 GHz</td>
<td>20 kW</td>
<td>-26 kV</td>
<td>6.5 A</td>
<td>1.5% max</td>
<td>Forced air</td>
<td>PPM</td>
</tr>
<tr>
<td>ET2127</td>
<td>10.8 to 11.8 GHz</td>
<td>10 kW</td>
<td>-23.5 kV</td>
<td>3.9 A</td>
<td>2.7% max</td>
<td>Forced air</td>
<td>PPM</td>
</tr>
<tr>
<td>ET2127</td>
<td>9 to 10 GHz</td>
<td>12 kW</td>
<td>-25 kV</td>
<td>3.4 A</td>
<td>10.5% max</td>
<td>Liquid</td>
<td>PPM</td>
</tr>
<tr>
<td>ET2127</td>
<td>16.5 to 17 GHz</td>
<td>13.5 kW</td>
<td>-29 kV</td>
<td>2.1 A</td>
<td>2.7% max</td>
<td>Liquid</td>
<td>PPM</td>
</tr>
</tbody>
</table>
HELIX TRAVELLING WAVE TUBE (HX TWT)

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency Range</th>
<th>Power Output</th>
<th>Cathode Voltage</th>
<th>Cathode Current</th>
<th>Duty Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET3201</td>
<td>1 to 2 GHz</td>
<td>280 W</td>
<td>-3.6 kV</td>
<td>475 mA</td>
<td>CW</td>
</tr>
<tr>
<td>ET3301</td>
<td>2 to 4 GHz</td>
<td>250 W</td>
<td>-4.2 kV</td>
<td>450 mA</td>
<td>CW</td>
</tr>
<tr>
<td>ET3407</td>
<td>4 to 8 GHz</td>
<td>280 W</td>
<td>-8 kV</td>
<td>320 mA</td>
<td>CW</td>
</tr>
<tr>
<td>ET3602</td>
<td>2.75 to 29.5 GHz</td>
<td>100 W</td>
<td>-12 kV</td>
<td>115 mA</td>
<td>CW</td>
</tr>
<tr>
<td>ET6306</td>
<td>3.1 to 3.5 GHz</td>
<td>9 kWp</td>
<td>-14.6 kV</td>
<td>3.2 A</td>
<td>2.5% max</td>
</tr>
<tr>
<td>ET6404</td>
<td>6.5 to 9.5 GHz</td>
<td>2 kWp</td>
<td>-9.2 kV</td>
<td>1.6 A</td>
<td>10% max</td>
</tr>
<tr>
<td>ET6510</td>
<td>8 to 16 GHz</td>
<td>2 kWp</td>
<td>-10.7 kV</td>
<td>1.7 A</td>
<td>2% max</td>
</tr>
<tr>
<td>ET6512</td>
<td>8.5 to 10.5 GHz</td>
<td>2 kWp</td>
<td>-10.9 kV</td>
<td>1.5 A</td>
<td>6% max</td>
</tr>
<tr>
<td>ET6529</td>
<td>9.5 to 10.0 GHz</td>
<td>4 kWp</td>
<td>-12 kV</td>
<td>1.5 A</td>
<td>6% max</td>
</tr>
<tr>
<td>ET6535</td>
<td>8.6 to 9.5 GHz</td>
<td>1.5 kWp pk</td>
<td>-8 kV</td>
<td>1.3 A</td>
<td>10%</td>
</tr>
</tbody>
</table>

(*) Preliminary data

MICROWAVE POWER MODULE (MPM)

The Microwave Power Module is a microwave amplifier which includes: the mini TWT, the solid state amplifier and gain equalizer, the RF input and output network and the Electronic Power Conditioner.

All the parts are packaged into a single compact, lightweight housing. With respect to traditional TWT-Amplifiers, the MPM is much smaller, lighter, more efficient, with significant noise reduction.

Based on proprietary novel potting-free concept the HVPS (High Voltage Power Supply) results in high reliable module and very light weight and an easy concept for life cycle support and maintenance.

APPLICATIONS FOR SURFACE, MISSILE OR AIRBORNE PLATFORMS

> EW equipment
> Test and measurement equipment
> Commercial and military radars

KEY FEATURES

The amplifiers are designed for:
> 70 dB typical small signal gain
> -40°C to +90°C operating baseplate temperature (TBP)
> Output power flatness 1dB (typ.)
> -35dBm/MHz noise power density (typ.)

Unit is conductively cooled through baseplate and HVPS is hermetically sealed.

All the amplifiers are very compact, light weight 270 V DC Nominal input (other can be arranged) rack mount available.

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency Range</th>
<th>Power Output</th>
<th>Dimensions/Weight</th>
<th>Duty/PBF</th>
<th>Input Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPM3502</td>
<td>6 to 18 GHz</td>
<td>100W</td>
<td>280x200x38mm / 3.5kg</td>
<td>Up to CW / 250kHz</td>
<td>270VDC</td>
</tr>
<tr>
<td>MPM3503</td>
<td>6 to 18 GHz</td>
<td>120W</td>
<td>210x120x27 mm / 1.85kg</td>
<td>Up to CW / 10kHz</td>
<td>270VDC</td>
</tr>
</tbody>
</table>
SOLID STATE POWER AMPLIFIER (SSPA)

Leonardo solid state power amplifiers are based on gallium nitride (GaN) monolithic microwave integrated circuit (MMIC) provided in an environmentally sealed compact light weight mechanical housing. Output power is saturated, in the same enclosure several different output power level are available, the efficient of these SSPAs is outstanding because the amplifiers are based on a proprietary novel power combining network that enable the compact outline line and light weight.

APPLICATIONS FOR SURFACE, MISSILE OR AIRBORNE PLATFORMS
- Commercial and military radars
- Test and measurement equipment

KEY FEATURES

The amplifiers are designed for:
- 70 dB typical small signal gain
- -40°C to +70°C operating baseplate temperat. (TBP)
- Output power flatness 1dB (typ.)
- -30dBm/MHz noise power density (typ.)
- Very long pulse width

Several control bite are available.
- Status and control interface 5V TTL compatible
- Internal thermal regulation
- Over-temperature protection
- Alarm status communicated via Control connector

Unit is conductively cooled through baseplate and Hermetically sealed

All the amplifiers are very compact 177.8mm x 228.6mm x 40.2mm, weight, less than 4kg. 28 V DC Nominal input (22-33 V) rack mount available.

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency Range</th>
<th>Power Output</th>
<th>Dimensions/Weight</th>
<th>Duty</th>
<th>Input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHXA017</td>
<td>X-Band (9 to 10 GHz)</td>
<td>700W</td>
<td>228.6mm x 177.8mm x 40.2mm / 5kg</td>
<td>25%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA019</td>
<td>X-Band (9 to 9.55 GHz)</td>
<td>600W</td>
<td>228.6mm x 177.8mm x 40.2mm / 3kg</td>
<td>1%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA020</td>
<td>X-Band (9 to 10 GHz)</td>
<td>500 W</td>
<td>228.6mm x 177.8mm x 40.2mm / 3.5 kg</td>
<td>20%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA022</td>
<td>X-Band (8.5 to 11 GHz)</td>
<td>120 W</td>
<td>228.6mm x 177.8mm x 30.5mm / 1.5 kg</td>
<td>25%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA024</td>
<td>X-Band (9 to 10 GHz)</td>
<td>1000 W</td>
<td>228.6mm x 177.8mm x 40.2mm / 4kg</td>
<td>15%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA026</td>
<td>X-Band (9 to 10 GHz)</td>
<td>2000 W</td>
<td>350mm x 250mm x 150mm / 8kg</td>
<td>10%</td>
<td>28VDC</td>
</tr>
<tr>
<td>MHXA027</td>
<td>X-Band (8.5 to 11 GHz)</td>
<td>700 W</td>
<td>228.6mm x 177.8mm x 40.2mm / 4 kg</td>
<td>15%</td>
<td>28VDC</td>
</tr>
</tbody>
</table>

MICROELECTRONICS

- State-of-the-art design expertise in μW solid-state hybrids: multi-assemblies and front-ends
- Up-to-date facilities for hybrids manufacturing including fully automated manufacturing line and RF testing capabilities for modules up to 40GHz.
- Cutting edge expertise for Active Electronically Scanning Antenna Components.

ACTIVE PHASED ARRAY ANTENNA TECHNOLOGY

- Active Components
- Compact Receivers
- Multifunction Hybrids (HPA, TTD, Switch matrix, etc.)
- Antenna Subsystem (Planks, Panels & Manifolds)

RADAR AND EW COMPONENT AND SUBSYSTEM

- Front end and pedestal components
- Receiver, Exciter, Processor components
- Down converter (up to 2 conversion)
- Up converter (up to 2 conversion)
- Stretch module for de-ramp-on-receive SAR mode
- Synthesiser: Very low phase noise, fast switching
- Exciter and LO distributor
- Compact Receiver/Exciter
- Seeker, AOA/RW Receiver
- Multifunction Hybrids
- Broadband front and receiver
- Very wide band assembly
- Front end amplifier and receiver
- Fast switching synthesiser
- Transceiver.
**FEATURES**
- 9 GHz to 10 GHz
- 60.5 dBm typical saturated RF output power (POUT)
- 15% duty cycle max
- -40°C to +70°C operating baseplate temperature (TBP)
- Power consumption 550W typical @10%
- Output power flatness 1dB (typ.)
- -30dBm/MHz noise power density (typ.)
- Status and control interface 5V TTL compatible
- Internal thermal regulation
- Over-temperature protection
- Alarm status communicated via Control connector
- Conductively cooled through baseplate
- Hermetically sealed
- Very compact 177.8mm x 228.6mm x 40.2mm
- Light weight, less than 4kg
- 28 V DC Nominal input (22-33 V)
- Rack mount available.

**APPLICATIONS**
- Commercial and military radars
- Test and measurement equipment

**GENERAL DESCRIPTION**

The MHXA024 is a 1kW peak solid state power amplifier based on gallium nitride (GaN) monolithic microwave integrated circuit (MMIC) that operates between 9 GHz and 10 GHz, provided in an environmentally sealed chassis.

Other DC Supply configuration can be arranged.

**SPECIFICATIONS**

POWER = 28 VDC, overt operating temperature (baseplate -40°C to +70°C). Min values refer to item performance in worst case condition (over temperature/frequency/duty/pulse width).

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
<th>TEST CONDITIONS/COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>9.0</td>
<td>10</td>
<td>GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td>dB</td>
<td>Pin=-25dBm</td>
</tr>
<tr>
<td>Power gain</td>
<td>58.5</td>
<td></td>
<td>dB</td>
<td>Pin=0dBm</td>
<td></td>
</tr>
<tr>
<td>RF OUTPUT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated Output Power (PSAT) over Pin=0dBm</td>
<td>see figure 1 for typical Saturated output power over frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Droop@128usec</td>
<td>1</td>
<td></td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Droop@256usec</td>
<td>1.5</td>
<td></td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Noise Figure</td>
<td>7</td>
<td>10</td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Spurious</td>
<td>-90</td>
<td>-50</td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Harmonics</td>
<td>-30</td>
<td>-20</td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Over pulse protection</td>
<td>350</td>
<td></td>
<td></td>
<td>usec</td>
<td></td>
</tr>
<tr>
<td>TX INHIBIT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (VINH)</td>
<td>3.4 to 5.0</td>
<td></td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Low (VINL)</td>
<td>0.8 to 5.0</td>
<td></td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>On/Off TIME</td>
<td>0.3</td>
<td>0.1</td>
<td>usec</td>
<td>From rising/fall edge of EN/DISABLE to RF</td>
<td></td>
</tr>
<tr>
<td>Propagation delay</td>
<td>10</td>
<td></td>
<td></td>
<td>usec</td>
<td></td>
</tr>
<tr>
<td>Pulse width</td>
<td>256</td>
<td></td>
<td></td>
<td>usec</td>
<td></td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>15</td>
<td></td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold Start</td>
<td>0.5</td>
<td></td>
<td></td>
<td>from dc applied to PS_OK high. Standby</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>+22</td>
<td>28</td>
<td>33</td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td>Output VSWR</td>
<td>1.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load VSWR (without damage)</td>
<td>2.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>4</td>
<td></td>
<td></td>
<td>Kg</td>
<td></td>
</tr>
</tbody>
</table>

**ABSOLUTE MAXIMUM RATINGS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Input (RF IN) Power</td>
<td>5 dBm</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +70°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40°C to +85°C</td>
</tr>
</tbody>
</table>

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

**ESD CAUTION**

ESD (electrostatic discharge) sensitive device. Charged devices and circuits can discharge without detection. Although this product feature patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.
CONNECTORS CONFIGURATION AND FUNCTION DESCRIPITIONS

**CONNECTOR CONFIGURATIONS**

<table>
<thead>
<tr>
<th>CONNECTOR NO.</th>
<th>MNEMONIC</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>RF IN</td>
<td>RF Input. This connector is ac-coupled and matched to 50 Ω.</td>
</tr>
<tr>
<td>J2</td>
<td>RF OUT</td>
<td>RF Output. This connector is ac-coupled and matched to 50 Ω.</td>
</tr>
<tr>
<td>J3</td>
<td>CONTROL</td>
<td>Alarm and Command Interfaces. See Table 4 for pinout.</td>
</tr>
<tr>
<td>J4</td>
<td>+28 VDC</td>
<td>Supply Voltage Connector. See Table 5</td>
</tr>
<tr>
<td>Chassis</td>
<td>GND</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECTOR 4 PIN DEFINITION**

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>HPA INPUT OR OUTPUT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX INHIBIT</td>
<td>TTL INPUT</td>
<td>LOW = STANDBY (RF AMP OFF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HIGH = ENABLED (RF AMP ON)</td>
</tr>
<tr>
<td>9</td>
<td>ground</td>
<td>NA</td>
<td>GROUND</td>
</tr>
<tr>
<td>2 to 7 &amp; 10 to 15</td>
<td>Reserved for manufacturer service pin</td>
<td>Reserved for manufacturer,</td>
<td>service pin</td>
</tr>
</tbody>
</table>

**CONNECTOR 1 PIN DEFINITION**

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>28 Vdc Ref (+)</td>
</tr>
<tr>
<td>A2</td>
<td>28 Vdc FWD (+)</td>
</tr>
<tr>
<td>1, 2, 3, 4, 5</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

**CONNECTOR TYPE**

<table>
<thead>
<tr>
<th>CONNECTOR NO.</th>
<th>MNEMONIC</th>
<th>DESCRIPTION OR PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+28 VDC</td>
<td>DAMM72W2P</td>
</tr>
<tr>
<td>2</td>
<td>RF IN</td>
<td>SMA-F</td>
</tr>
<tr>
<td>3</td>
<td>RF OUT</td>
<td>WR-90 low profile</td>
</tr>
<tr>
<td>4</td>
<td>CONTROL</td>
<td>MIL-C-83515/04B</td>
</tr>
</tbody>
</table>

**MECHANICAL DATA**

Figure 2 - Block diagram and Interfaces

Figure 3 - Dimensions
**ET3702A**
**HIGH POWER 34÷36 GHz TWT**

**FEATURES**
- 34 to 36 GHz Band
- 150 W Output Power
- 30 dB Gain
- High duty pulsed
- Helix type tube
- PPM focused

**ELECTRICAL DATA**

**RF PERFORMANCE (TYPICAL)**
- Frequency range: 34 to 36 GHz
- Output power: 51.2 dBm min, see graph
- Input drive power: 23 dBm max
- RF Gain: 28 dB min, see graph
- Input VSWR (cold): 2.5:1 max
- Output VSWR (cold): 2.5:1 max
- Duty Cycle: 40% max

**TYPICAL POWER SUPPLY REQUIREMENTS**
- Cathode voltage: -13 kV
- Cathode current: 170 mA max
- Anode voltage: 1000 V
- Anode current: 1 mA max
- Helix current: 20 mA max
- BFE voltage: -400 V (beam OFF) 0 V (beam ON)
- BFE current: 1 mA max
- Collector Voltage: 50% of Cathode voltage
- Collector Current: 170 mA
- Heater voltage: 50 V
- Heater current: 1.2 A
- Power Consumption: 1000 W max

**PHYSICAL DATA**

**MECHANICAL**
- Dimensions: 260 (L) 70 (W) 50 (H) (mm, including connectors)
- Weight: 1.5 kg max
- Cooling: Conduction
- RF input interface: WR-28 flat flange
- RF output interface: WR-28 flat flange

**ENVIRONMENTAL**
- Constructional features allow tube operation in severe environmental conditions for defence and commercial applications

Note: all voltages are referenced to cathode, except the cathode and anode which are referenced to ground.

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**ET3702B**
**HIGH POWER 28÷38 GHz TWT**

**FEATURES**
- 28 to 38 GHz Band
- 150 W Output Power
- 30 dB Gain
- High duty pulsed
- Helix type tube
- PPM focused

**ELECTRICAL DATA**

**RF PERFORMANCE (TYPICAL)**
- Frequency range: 28 to 38 GHz
- Output power: 50.5 dBm min, see graph
- Input drive power: 25 dBm max
- RF Gain: 25 dB min, see graph
- Input VSWR (cold): 2.5:1 max
- Output VSWR (cold): 2.5:1 max
- Duty Cycle: 40% max

**TYPICAL POWER SUPPLY REQUIREMENTS**
- Cathode voltage: -13 kV
- Cathode current: 170 mA max
- Anode voltage: 1000 V
- Anode current: 1 mA max
- Helix current: 20 mA max
- BFE voltage: -400 V (beam OFF) 0 V (beam ON)
- BFE current: 1 mA max
- Collector Voltage: 50% of Cathode voltage
- Collector Current: 170 mA
- Collector Voltage: 7000 V
- Heater voltage: 50 V
- Heater current: 1.5 A
- Power Consumption: 1000 W max

**PHYSICAL DATA**

**MECHANICAL**
- Dimensions: 260 (L) 70 (W) 50 (H) (mm, including connectors)
- Weight: 1.5 kg max
- Cooling: Conduction
- RF input interface: WR-28 flat flange
- RF output interface: WR-28 flat flange

**ENVIRONMENTAL**
- Constructional features allow tube operation in severe environmental conditions for defence and commercial applications

Note: all voltages are referenced to cathode, except the cathode and anode which are referenced to ground.
ET3580 HIGH POWER 4.5÷18 GHz TWT

FEATURES
- 4.5 to 18 GHz band
- 150 W Output Power
- 30 dB Gain
- 100% Duty Cycle
- Helix type tube

ELECTRICAL DATA

RF PERFORMANCE
- Frequency range: 4.5 to 18 GHz
- Output power: see graph
- Input drive power: 26 dBm max
- Noise Power density: -25 dBm/MHz max
- Harmonic output ratio: -4 dBc at 4.5 GHz
- -7 dBc at 6 GHz
- -9 dBc at 9 GHz
- Spurious: -50 dBc
- Duty Cycle: 100%

TYPICAL POWER SUPPLY REQUIREMENTS
- Cathode voltage: -4.65 kV
- Cathode current: 230 mA max
- Helix current: 15 mA max
- BFE voltage: -1200 V (beam OFF)
  0V (beam ON)
- BFE current: 0 mA max
- Collector Voltages: 2.85 kV
  2 kV
  1 kV
  1st stage
  2nd stage
  3rd stage
- Collector Currents: 150 mA
  90 mA
  230 mA
  1st stage (with RF)
  2nd stage (with RF)
  3rd stage (NO RF)
- Heater voltage: 5.5V
- Heater current: 1.3 A
- Power Consumption: 630 W max

PHYSICAL DATA

MECHANICAL
- Dimensions: 220 (L); 50 (W); 70 (H) (mm, including connectors)
- Weight: 0.6 kg max
- Cooling: Conduction
- RF input connector: SMA female
- RF output connector: TNC female

ENVIRONMENTAL
- Constructional features allow tube operation in severe environmental conditions for defence and commercial applications

Note: all voltages are referenced to cathode, except the cathode and anode which are referenced to ground.