

## Features

- 71-76GHz and 81-86GHz High Power Amplifiers
- Tx Saturated powers up to >+30dBm
- Rx NF <4dB
- High linearity supports 512QAM modulation
- Full 5GHz bandwidths
- >40dB Tx gain with 30dB dynamic control
- Suitable for military or commercial applications
- Low SWAP for airborne & HAPS applications

## Description

Filtronic's range of Hades Active Diplexers are designed to allow our customers to reduce the cost of their E-band radios whilst increasing performance.

Our Active Diplexers incorporate a configurable range of GaAs PAs & LNAs within an E-Band diplexer, maximizing performance whilst reducing size and weight.

Active diplexers can be used in conjunction with a wide range of COTs SMT compatible packaged GaAs or SiGe up and down converter solutions to boost performance beyond that achievable with surface mount products. This allows our customers to deploy configurable "standard power" and "high-power" E-Band links without changing the radio mechanics.

Active diplexers incorporate a Tx RF power detector to facilitate Tx power calibration and ALC. Where specified, the modules can be supplied fully calibrated with Tx detector vs. frequency/power and Rx gain information stored onto an integrated I2C EEPROM. An integrated temperature sensor provides users with accurate amplifier temperature data.

The WR12 port locations & directions can be configured upon request.

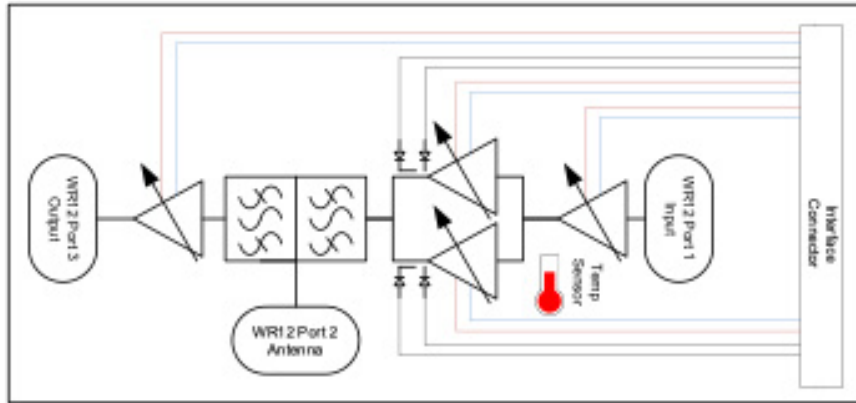
The configurable nature of Hades allows us to incorporate a range of GaAs and/or InP amplifiers in both the Tx and Rx chain and includes the option to power combine 2 GaAs PAs to deliver market leading linear Tx powers to deliver unparalleled performance for long range E-Band communications.

## Options include

| Option | Tx Gain | Tx P <sub>SAT</sub> | Rx Gain | Rx NF | Notes   |
|--------|---------|---------------------|---------|-------|---|
| 1      | -0.7dB  | NA                  | -0.7dB  | NA    | Passive Diplexer                                      |
| 2      | 22dB    | 27dBm               | -0.7dB  | NA    | Diplexer with integrated GaAs HPA                     |
| 3      | 22dB    | 27dBm               | 13dB    | 5dB   | Diplexer with integrated GaAs HPA & LNA               |
| 4      | 33dB    | 27dBm               | 13dB    | 5dB   | Diplexer with integrated GaAs Driver, HPA & LNA       |
| 5      | 33dB    | 27dBm               | 18dB    | 5dB   | Diplexer with integrated GaAs Driver, HPA & LNA       |
| 6      | 45dB    | 30dBm               | 18dB    | 5dB   | Diplexer with integrated GaAs Driver, DUAL HPA* & LNA |

\* Two GaAs HEMT MMICs performance matched and power combined in waveguide to deliver maximum power.

TA448 / TA449 Block Diagram



## TA448 / TA449 Connector pinout

| Pin NO. | Name                  | Description               |
|---------|-----------------------|---------------------------|
| 1       | LNA V <sub>G</sub>    | LNA gate bias voltage     |
| 2       | LNA V <sub>D</sub>    | LNA drain bias voltage    |
| 3       | GND                   | Ground                    |
| 4       | P3V3 I2C              | I2C bias voltage          |
| 5       | I2C SDA               | I2C SDA                   |
| 6       | I2C SCL               | I2C SCL                   |
| 7       | GND                   | Ground                    |
| 8       | Driver V <sub>G</sub> | Driver gate bias voltage  |
| 9       | Driver V <sub>D</sub> | Driver drain bias voltage |
| 10      | GND                   | Ground                    |
| 11      | Tx V <sub>REF1</sub>  | Tx RF reference voltage 1 |
| 12      | Tx V <sub>DET1</sub>  | Tx RF detector voltage 1  |
| 13      | GND                   | Ground                    |
| 14      | HPA 1 V <sub>D</sub>  | HPA 1 drain bias voltage  |
| 15      |                       |                           |
| 16      | HPA 1 V <sub>G</sub>  | HPA 1 gate bias voltage   |
| 17      | HPA 2 V <sub>G</sub>  | HPA 2 gate bias voltage   |
| 18      | HPA 2 V <sub>D</sub>  | HPA 2 drain bias voltage  |
| 19      |                       |                           |
| 20      | GND                   | Ground                    |
| 21      | Tx V <sub>REF2</sub>  | Tx RF reference voltage 2 |
| 22      | Tx V <sub>DET2</sub>  | Tx RF detector voltage 2  |
| 23      | GND                   | Ground                    |
| 24      | Spare 1               | Spare 1 (not connected)   |
| 25      | Spare 2               | Spare 2 (not connected)   |

## TA448 Outline Specification

Over baseplate operating temperature -35 to +70C  
All parameters referenced to common waveguide port.

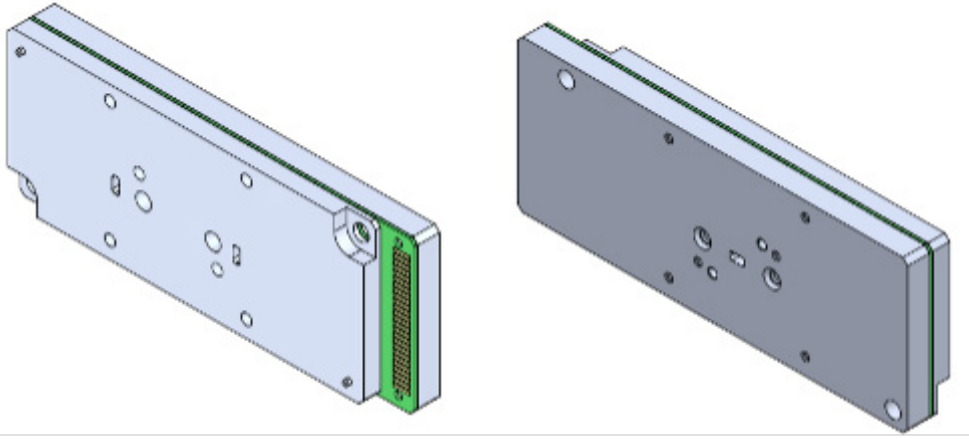
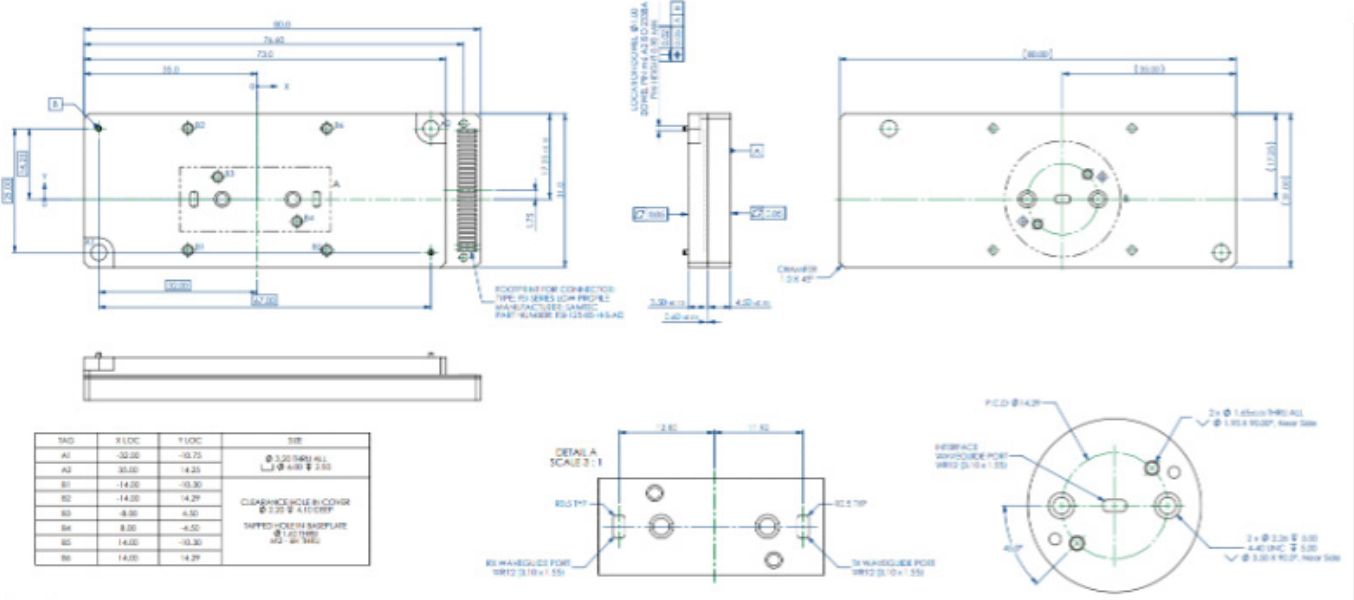
| Function           | Parameter                                 | Min  | Typ.  | Max  | Units |
|--------------------|---|--|-------|------|-------|
| Common             | Diplexer frequency range                  | 71   |       | 86   | GHz   |
|                    | Diplexer waveguide IO port type           |  | WR-12 |      |       |
| Tx                 | Frequency range                           | 71   |       | 76   | GHz   |
|                    | Tx input port type                        |  | WR-12 |      |       |
|                    | Bandwidth                                 | 5  |       |      | GHz   |
|                    | Maximum Small Signal Gain                 |  | 45    |      | dB    |
|                    | $P_{SAT}$                                 |  | 30    |      | dBm   |
|                    | OIP3 @ +24dBm                             |  | 37    |      | dBm   |
|                    | Tx Power control range                    | 30   |       |      | dB    |
|                    | Input return loss                         | 8  |       |      | dB    |
|                    | Output return loss (common port 71-76GHz) | 8  |       |      | dB    |
|                    | RF detector sensitivity at 4dBm           |  | 10    |      | mV/dB |
|                    | RF sensitivity at 24dBm                   |  | 100   |      | mV/dB |
| Rx                 | Frequency range                           | 81   |       | 86   | GHz   |
|                    | Rx output port type                       |  | WR-12 |      |       |
|                    | Bandwidth                                 | 5  |       |      | GHz   |
|                    | Gain (small signal)                       |  | 18    |      | dB    |
|                    | Noise figure                              |  | 5     |      | dB    |
|                    | Input return loss                         | 6  |       |      | dB    |
| Output return loss | 8   |  |       | dB   |       |
| DC                 | Tx Driver $V_D$                           | 2.5  | 3.8   | 4    | V     |
|                    | Tx Driver $I_D$                           | 30   |       | 400  | mA    |
|                    | Tx Driver $V_G$                           | -2   |       | +0.3 | V     |
|                    | Tx HPA1 $V_D$                             | 2.5  | 3.8   | 4    | V     |
|                    | Tx HPA1 $I_D$                             | 75   |       | 1100 | mA    |
|                    | Tx HPA1 $V_G$                             | -2   |       | +0.3 | V     |
|                    | Tx HPA2 $V_D$                             | 2.5  | 3.8   | 4    | V     |
|                    | Tx HPA2 $I_D$                             | 75   |       | 1100 | mA    |
|                    | Tx HPA2 $V_G$                             | -2   |       | +0.3 | V     |
|                    | Rx LNA $V_D$                              |  | 3.5   |      | V     |
|                    | Rx LNA $I_D$                              |  | 75    | 95   | mA    |
| Rx LNA $V_G$       | -3  |  | +0.3  | V    |       |
| Mechanical         | Size                                      | L=80.0, W=31.0, H=8.6                      |       |      | mm    |
|                    | Weight                                    | 52   |       |      | G     |
|                    | DC connector interface                    | Pads to mate with Samtec FSI-125-03-H-S-AD |       |      |       |

### TA449 Outline Specification

Over baseplate operating temperature -35 to +70C  
All parameters referenced to common waveguide port.

| Function           | Parameter                                 | Min  | Typ.  | Max  | Units |
|--------------------|---|--|-------|------|-------|
| Common             | Diplexer frequency range                  | 71   |       | 76   | GHz   |
|                    | Diplexer waveguide IO port type           |  | WR-12 |      |       |
| Tx                 | Frequency range                           | 81   |       | 86   | GHz   |
|                    | Tx input port type                        |  | WR-12 |      |       |
|                    | Bandwidth                                 | 5  |       |      | GHz   |
|                    | Small Signal Gain                         |  | 45    |      | dB    |
|                    | $P_{SAT}$                                 |  | 29.5  |      | dBm   |
|                    | OIP3 @ +24dBm                             |  | 36    |      | dBm   |
|                    | Tx Power control range                    | 30   |       |      | dB    |
|                    | Input return loss                         | 8  |       |      | dB    |
|                    | Output return loss (common port 71-76GHz) | 8  |       |      | dB    |
|                    | RF detector sensitivity at 4dBm           |  | 10    |      | mV/dB |
|                    | RF sensitivity at 24dBm                   |  | 100   |      | mV/dB |
| Rx                 | Frequency range                           | 71   |       | 76   | GHz   |
|                    | Rx output port type                       |  | WR-12 |      |       |
|                    | Bandwidth                                 | 5  |       |      | GHz   |
|                    | Gain (small signal)                       |  | 18    |      | dB    |
|                    | Noise figure                              |  | 5     |      | dB    |
|                    | Input return loss                         | 6  |       |      | dB    |
| Output return loss | 8   |  |       | dB   |       |
| DC                 | Tx Driver $V_D$                           | 2.5  | 3.8   | 4    | V     |
|                    | Tx Driver $I_D$                           | 30   |       | 380  | mA    |
|                    | Tx Driver $V_G$                           | -2   |       | +0.3 | V     |
|                    | Tx HPA1 $V_D$                             | 2.5  | 3.8   | 4    | V     |
|                    | Tx HPA1 $I_D$                             | 75   |       | 1200 | mA    |
|                    | Tx HPA1 $V_G$                             | -2   |       | +0.3 | V     |
|                    | Tx HPA2 $V_D$                             | 2.5  | 3.8   | 4    | V     |
|                    | Tx HPA2 $I_D$                             | 75   |       | 1200 | mA    |
|                    | Tx HPA2 $V_G$                             | -2   |       | +0.3 | V     |
|                    | Rx LNA $V_D$                              |  | 3.5   |      | V     |
|                    | Rx LNA $I_D$                              |  | 75    | 95   | mA    |
| Rx LNA $V_G$       | -3  |  | +0.3  | V    |       |
| Mechanical         | Size                                      | L=80.0, W=31.0, H=8.6                      |       |      | mm    |
|                    | Weight                                    | 52   |       |      | G     |
|                    | DC connector interface                    | Pads to mate with Samtec FSI-125-03-H-S-AD |       |      |       |

### TA448 / TA449 Mechanical Interface



### Contact Us

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