



## Description

The TTRM2005DR-D02 2x2 Bi-Directional Amplifier is a class AB GaN module with an operating frequency range of 2200 to 2500 MHz. Designed for both military and commercial applications, this amplifier features an input voltage range of +12 to +32 VDC and a saturated RF output power of +42 dBm. With the capability of supporting any signal type and modulation format, all in a low-SWaP package, this unit is ideal for applications where high power-density, efficiency, and linearity are essential.

## TTRM2005DR-D02

### TABLE OF CONTENTS

- Product Features and Applications
- Characteristics and Specifications
- Power Supply Specifications
- Mechanical Specifications
- Interface Specifications
- Environmental Specifications
- Protections and Maximum Ratings
- DC/Control Connectors
- Mechanical Drawing

## Features

- Temperature Monitor Output
- Over-Temperature Protection
- Amplifier Status Output
- Manual Tx/Rx Switching

## Applications

- Unmanned Systems
- Military or Commercial Radio Systems
- Aircraft Systems
- Military MANET
- UAS, UGV, and USV Video/Data Links
- Point-to-Point and Mesh Networking

## CHARACTERISTICS & SPECIFICATIONS

Specifications subject to change without notice. Typical performance at 28VDC at 25°C in a 50Ω system.

### Tx Specifications (Per Channel)

| Parameter                                          | Min. | Typ. | Max  | Unit              |
|----------------------------------------------------|------|------|------|-------------------|
| Operating Frequency                                | 2200 | —    | 2500 | MHz               |
| 64QAM Power Output<br>20 MHz BW, -27 dB EVM Limit  | 36   | —    | —    | dBm               |
| BPSK Power Output<br>20 MHz BW, -7 dB EVM Limit    | 41   | —    | —    | dBm               |
| Saturated Power Output<br>CW Sweep at Design Limit | —    | 42   | —    | dBm               |
| Small Signal Gain                                  | 24   | 25   | —    | dB                |
| Small Signal Gain Flatness                         | —    | —    | 3    | dB (peak to peak) |
| Input Return Loss                                  | —    | —    | -15  | dB                |
| Tx / Rx Switching Time                             | —    | 1    | 2    | μS                |

### Rx Specifications (Per Channel)

| Parameter                  | Min. | Typ. | Max | Unit              |
|----------------------------|------|------|-----|-------------------|
| Small Signal Gain          | 12   | 13   | —   | dB                |
| Small Signal Gain Flatness | —    | —    | 1   | dB (Peak to Peak) |
| Noise Figure               | —    | 1.8  | 2   | dB                |
| Input Return Loss          | —    | —    | -10 | dB                |

### Power Supply Specifications

| Parameter                                          | Min. | Typ. | Max | Unit | Notes                                                          |
|----------------------------------------------------|------|------|-----|------|----------------------------------------------------------------|
| Supply Voltage Range                               | 12   | 28   | 32  | VDC  | —                                                              |
| RMS Operating Current Draw (Idle)                  | —    | 0.25 | —   | A    | 28VDC Supply Voltage,<br>Idle in Receive Mode                  |
| RMS Operating Current Draw<br>(64QAM Power Output) | —    | 0.42 | —   | A    | 28VDC Supply Voltage,<br>802.11 WLAN Signal,<br>50% Duty Cycle |
| RMS Operating Current Draw<br>(BPSK Power Output)  | —    | 0.75 | —   | A    | 28VDC Supply Voltage,<br>802.11 WLAN Signal,<br>50% Duty Cycle |

**CHARACTERISTICS & SPECIFICATIONS (CONT.)**

Specifications subject to change without notice.

**Mechanical Specifications**

| Parameter              | Value                                   | Unit    | Notes |
|------------------------|-----------------------------------------|---------|-------|
| Dimensions (L x W x H) | 3.9 x 3.2 x 1.8<br>(99.1 x 81.3 x 45.7) | in (mm) | —     |
| Cooling                | Integrated Heatsink                     | —       | —     |
| Weight                 | 19 (539)                                | oz (g)  | —     |

**Interface Specifications**

| Parameter                      | Value               | Notes                                                           |
|--------------------------------|---------------------|-----------------------------------------------------------------|
| RF Connectors (Input / Output) | TNC-F / TNC-F       | —                                                               |
| Power / Signal Connector       | 2M801-009-02M7-10PA | Connector appearing on unit<br>(Manufacturer P/N)               |
| Mating Connector               | MKJ1A6F7-10SA       | Mating connector required for interfacing<br>(Manufacturer P/N) |
| Test Integration Cable         | CBL83               | Triad P/N available for purchase separately                     |

**Environmental Specifications**

| Parameter                             | Min.                                                               | Max          | Unit     |
|---------------------------------------|--------------------------------------------------------------------|--------------|----------|
| Operating Temperature (Housing Temp.) | -20                                                                | 85           | °C       |
| Storage Temperature                   | -55                                                                | 85           | °C       |
| Altitude                              | 0 (0)                                                              | 20000 (6096) | ft. (m.) |
| Ingress Protection Rating             | IP67                                                               |              | —        |
| Shock / Vibration                     | Designed to comply with MIL-STD-810 Shock / Vibration Test Methods |              | —        |

**Protections & Maximum Ratings**

| Parameter                         | Value | Unit | Notes                                   |
|-----------------------------------|-------|------|-----------------------------------------|
| Maximum RF Input (Per Channel)    | 33    | dBm  | CW Power                                |
| Over Temp Protection Trip Level   | 90    | °C   | Internally Monitored System Temperature |
| RF Output Open Load Survivability | 42    | dBm  | CW with Open Circuit at Antenna Port    |

## DC / CONTROL CONNECTORS

## Input / Output Pins

| TTRM Connector Part Number |        |        | Mating Connector Part Number |                                                                                                                                                                                                                         |
|----------------------------|--------|--------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2M801-009-02M7-10PA        |        |        | MKJ1A6F7-10SA                |                                                                                                                                                                                                                         |
| Pin                        | Label  | Type   | I/O                          | Notes                                                                                                                                                                                                                   |
| 5                          | Vin    | Power  | N/A                          | Supply Voltage - Range Specified in Data Sheet                                                                                                                                                                          |
| 7                          | Vin    | Power  | N/A                          | Supply Voltage - Range Specified in Data Sheet                                                                                                                                                                          |
| 9                          | Vin    | Power  | N/A                          | Supply Voltage - Range Specified in Data Sheet                                                                                                                                                                          |
| 6                          | GND    | Power  | N/A                          | Power Supply Return (Ground)                                                                                                                                                                                            |
| 8                          | GND    | Power  | N/A                          | Power Supply Return (Ground)                                                                                                                                                                                            |
| 10                         | GND    | Power  | N/A                          | Power Supply Return (Ground)                                                                                                                                                                                            |
| 1                          | STATUS | Signal | Output                       | Amplifier Status<br>TTL HIGH = Normal Operation<br>TTL LOW = Error Condition                                                                                                                                            |
| 2                          | TEMP   | Signal | Output                       | Temp Monitor: Temp in DegC = (Vout - 0.5V) *100                                                                                                                                                                         |
| 3                          | I/O    | Signal | Input                        | TA:<br>TTL High or No Connection = Enable<br>TTL Low = Disable<br><br>Manual Switching TTRM:<br>TTL High = Tx Amp Enabled<br>TTL Low = Rx Amp Enabled<br><br>Automatic Switching TTRM:<br>Pin not required. Do not use. |
| 4                          | N/C    | N/A    | N/A                          | NO CONNECTION                                                                                                                                                                                                           |

## MECHANICAL DRAWING



