

# Thin-Film Cascadable Amplifier 100 to 2000 MHz

## Technical Data

### UTO/UTC 2025 Series

#### Features

- **Frequency Range:** 100 to 2000 MHz
- **High Dynamic Range**
- **Medium Gain:** 11.0 dB (Typ)
- **Low Noise:** 3.0 dB (Typ)
- **High Power:** +27 dBm (Typ)
- **Temperature Compensated**

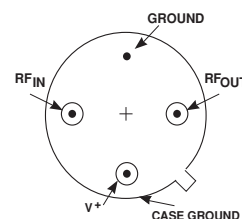
#### Applications

- **Power AMP Driver**
- **High Intercept Requirements**

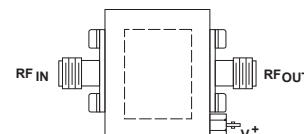
#### Description

The 2025 Series is a wideband, high-power GaAs FET RF amplifier. The combination of high output power and low noise figure provide a unit with very high dynamic range. Active bias and resistive feedback provide for stability over temperature and bias voltage variations. Input/output blocking capacitors couple the RF through the amplifier, while a low VSWR is maintained through inductive tuning. The 2025 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

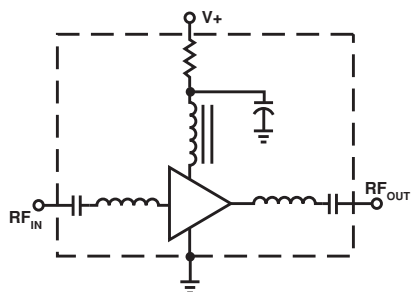
#### Pin Configuration UTO—TO-8T



#### UTC—TC-1A



#### Schematic



#### Maximum Ratings

| Parameter                      | Maximum       |
|--------------------------------|---------------|
| DC Voltage                     | +17 Volts     |
| Continuous RF Input Power      | +19 dBm       |
| Operating Case Temperature     | –55 to +100°C |
| Storage Temperature            | –62 to +150°C |
| “R” Series Burn-In Temperature | +100°C        |

#### Thermal Characteristics<sup>1</sup>

|                                             |              |
|---------------------------------------------|--------------|
| $\theta_{JC}$                               | 36°C/W       |
| Active Transistor Power Dissipation         | 1.28 W       |
| Junction Temperature Above Case Temperature | 46°C         |
| MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)       | 217,400 Hrs. |

**Weight:** (typical) UTO—2.1 grams; UTC—21.5 grams

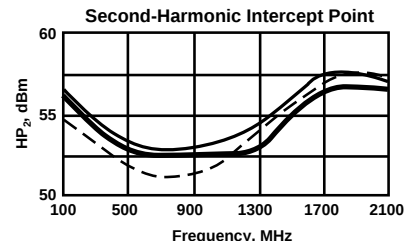
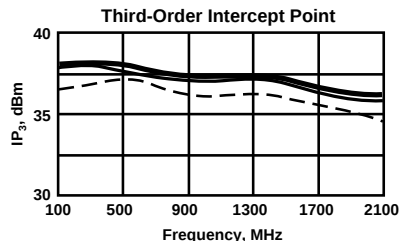
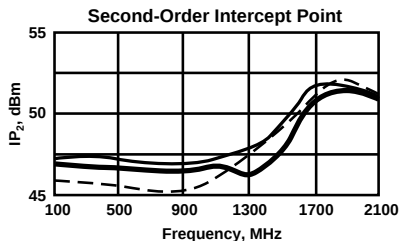
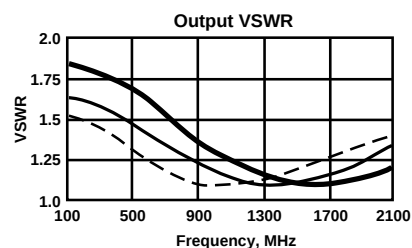
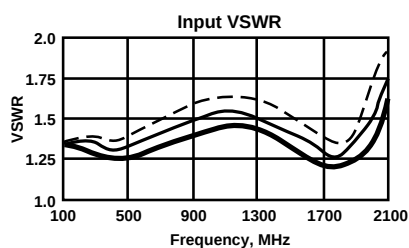
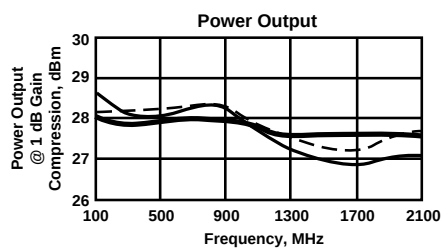
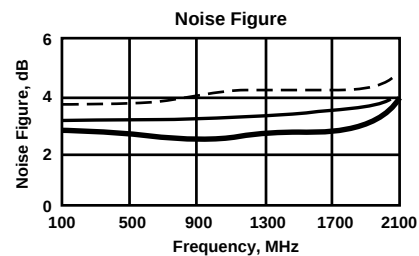
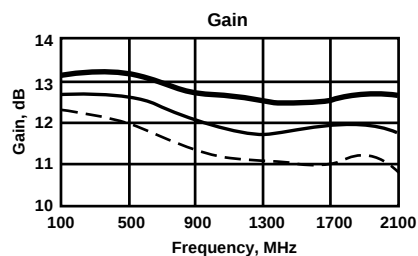
## Electrical Specifications

(Measured in 50  $\Omega$  system @ +15 VDC nominal unless otherwise noted)

| Symbol           | Characteristic                        | Typical<br>$T_C = 25^\circ\text{C}$ | Guaranteed Specifications              |                                           | Unit |
|------------------|---------------------------------------|-------------------------------------|----------------------------------------|-------------------------------------------|------|
|                  |                                       |                                     | $T_C = 0 \text{ to } 50^\circ\text{C}$ | $T_C = -55 \text{ to } +85^\circ\text{C}$ |      |
| BW               | Frequency Range                       | 100-2000                            | 100-2000                               | 100-2000                                  | MHz  |
| GP               | Small Signal Gain (Min.)              | 11.0                                | 9.5                                    | 9.0                                       | dB   |
| —                | Gain Flatness (Max.)                  | $\pm 0.3$                           | $\pm 1.0$                              | $\pm 1.0$                                 | dB   |
| NF               | Noise Figure (Max.)                   | 3.0                                 | 4.5                                    | 5.5                                       | dB   |
| P <sub>1dB</sub> | Power Output @ +1 dB Comp. (Min.)     | +27.0                               | +25.0                                  | +24.0                                     | dBm  |
| —                | Input VSWR (Max.)                     | 1.8:1                               | 2.0:1                                  | 2.2:1                                     | —    |
| —                | Output VSWR (Max.)                    | 1.6:1                               | 2.0:1                                  | 2.2:1                                     | —    |
| IP <sub>3</sub>  | Two Tone 3rd Order Intercept Point    | +37.0                               | +33.0                                  | +32.0                                     | dBm  |
| IP <sub>2</sub>  | Two Tone 2nd Order Intercept Point    | +47.0                               | —                                      | —                                         | dBm  |
| HP <sub>2</sub>  | One Tone 2nd Harmonic Intercept Point | +53.0                               | —                                      | —                                         | dBm  |
| I <sub>D</sub>   | DC Current                            | 175                                 | —                                      | —                                         | mA   |

## Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C —  
+85°C - - -  
-55°C = = =



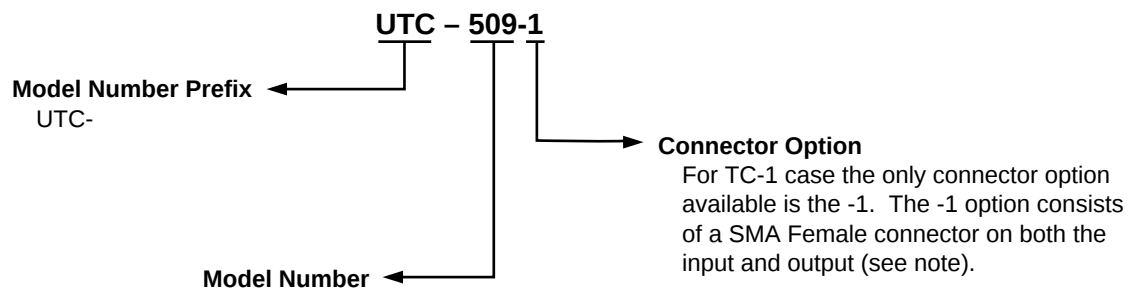
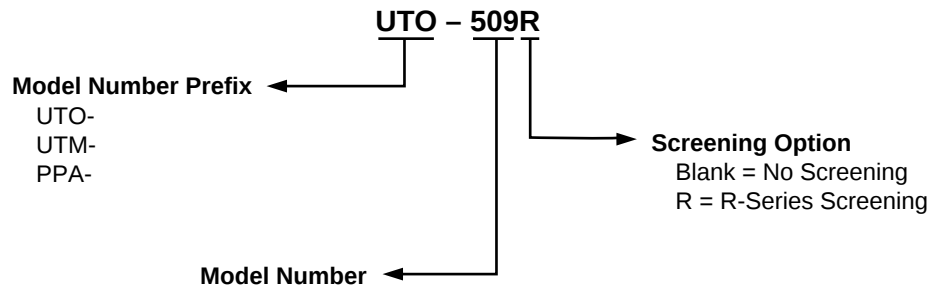
**Automatic Network Analyzer Measurements** (Typical production unit @ +25°C ambient)

**S-Parameters** **Bias = 15.00 Volts**  
**Current = 174.00 mA**

| FREQ<br>GHz | S <sub>11</sub> |        | S <sub>21</sub> |        | S <sub>12</sub> |        | S <sub>22</sub> |         | K     | GPDEL<br>ns | PHASE<br>DEG |
|-------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|---------|-------|-------------|--------------|
|             | Mag             | Ang    | dB              | Ang    | dB              | Ang    | Mag             | Ang     |       |             |              |
| .100        | .14             | -84.7  | 12.4            | 178.2  | -19.0           | -16.1  | .25             | -154.60 | 1.19  | .42         | 4.85         |
| .200        | .11             | -98.5  | 12.5            | 163.1  | -19.5           | -19.9  | .24             | 179.85  | 1.25  | .42         | .24          |
| .300        | .11             | -106.2 | 12.4            | 151.2  | -19.7           | -25.6  | .23             | 165.70  | 1.28  | .33         | -1.20        |
| .400        | .12             | -113.1 | 12.4            | 140.2  | -19.8           | -32.2  | .22             | 155.30  | 1.31  | .31         | -1.81        |
| .500        | .14             | -119.1 | 12.3            | 129.4  | -20.0           | -38.9  | .20             | 145.84  | 1.34  | .30         | -2.10        |
| .600        | .15             | -126.1 | 12.2            | 119.0  | -20.2           | -46.0  | .18             | 137.12  | 1.38  | .29         | -2.07        |
| .700        | .17             | -131.9 | 12.0            | 108.8  | -20.3           | -52.5  | .15             | 128.88  | 1.41  | .28         | -1.78        |
| .800        | .18             | -138.3 | 11.9            | 98.6   | -20.5           | -59.9  | .12             | 120.30  | 1.45  | .28         | -1.56        |
| .900        | .20             | -144.4 | 11.8            | 88.7   | -20.7           | -67.5  | .09             | 110.25  | 1.49  | .27         | -.91         |
| 1.000       | .21             | -151.2 | 11.7            | 79.0   | -20.8           | -75.1  | .07             | 99.02   | 1.54  | .27         | -.15         |
| 1.100       | .22             | -158.8 | 11.6            | 69.4   | -21.1           | -83.0  | .04             | 81.92   | 1.58  | .27         | .69          |
| 1.200       | .22             | -167.1 | 11.5            | 59.6   | -21.3           | -91.2  | .03             | 47.01   | 1.63  | .27         | 1.39         |
| 1.300       | .21             | -176.1 | 11.5            | 49.6   | -21.6           | -99.2  | .03             | 5.14    | 1.68  | .28         | 1.78         |
| 1.400       | .19             | 175.1  | 11.5            | 39.3   | -21.9           | -107.6 | .05             | -20.27  | 1.74  | .29         | 1.96         |
| 1.500       | .17             | 164.3  | 11.5            | 28.9   | -22.1           | -116.2 | .06             | -33.91  | 1.79  | .29         | 2.06         |
| 1.600       | .15             | 149.9  | 11.5            | 18.7   | -22.3           | -125.5 | .07             | -42.38  | 1.84  | .28         | 2.29         |
| 1.700       | .13             | 125.3  | 11.6            | 8.1    | -22.5           | -136.7 | .06             | -41.62  | 1.87  | .29         | 2.17         |
| 1.800       | .11             | 83.3   | 11.7            | -3.9   | -23.0           | -148.1 | .07             | -33.15  | 1.95  | .33         | .66          |
| 1.900       | .13             | 36.2   | 11.7            | -16.8  | -23.6           | -159.1 | .09             | -34.26  | 2.05  | .36         | -1.81        |
| 2.000       | .19             | 3.8    | 11.7            | -30.1  | -24.3           | -170.1 | .11             | -42.50  | 2.18  | .37         | -4.68        |
| 2.100       | .27             | -17.4  | 11.5            | -44.2  | -25.0           | 178.7  | .12             | -56.05  | 2.30  |             |              |
| 2.200       | .36             | -33.7  | 11.2            | -58.9  | -25.8           | 166.6  | .13             | -74.23  | 2.43  |             |              |
| 2.300       | .45             | -47.7  | 10.8            | -74.0  | -26.9           | 153.9  | .15             | -95.76  | 2.62  |             |              |
| 2.400       | .53             | -60.3  | 10.1            | -89.3  | -28.2           | 141.3  | .18             | -119.16 | 2.91  |             |              |
| 2.500       | .61             | -71.9  | 9.2             | -104.3 | -29.9           | 129.0  | .22             | -140.94 | 3.37  |             |              |
| 2.600       | .67             | -82.8  | 8.1             | -118.8 | -31.9           | 117.0  | .27             | -159.57 | 4.07  |             |              |
| 2.700       | .72             | -93.0  | 6.8             | -132.2 | -34.7           | 105.7  | .32             | -175.10 | 5.51  |             |              |
| 2.800       | .76             | -102.5 | 5.4             | -144.2 | -38.5           | 97.0   | .36             | 171.81  | 8.54  |             |              |
| 2.900       | .79             | -111.7 | 3.9             | -155.0 | -45.5           | 98.9   | .40             | 160.79  | 19.57 |             |              |
| 3.000       | .81             | -120.4 | 2.4             | -164.1 | -50.0           | 170.3  | .42             | 151.48  | 34.63 |             |              |
| 3.100       | .82             | -129.1 | .9              | -171.2 | -42.6           | -160.6 | .43             | 143.46  | 16.06 |             |              |
| 3.200       | .82             | -137.8 | -.4             | -178.6 | -38.7           | -164.4 | .43             | 136.41  | 11.60 |             |              |
| 3.300       | .82             | -146.5 | -1.6            | 175.7  | -36.0           | -172.8 | .42             | 130.31  | 9.76  |             |              |
| 3.400       | .82             | -155.2 | -2.6            | 170.6  | -34.5           | 179.1  | .40             | 124.76  | 9.47  |             |              |
| 3.500       | .82             | -164.0 | -3.4            | 165.0  | -33.4           | 169.0  | .37             | 119.78  | 9.50  |             |              |
| 3.600       | .82             | -173.2 | -4.1            | 159.1  | -32.7           | 159.5  | .34             | 115.25  | 9.79  |             |              |
| 3.700       | .82             | 177.8  | -4.7            | 152.5  | -32.1           | 150.0  | .31             | 111.05  | 10.15 |             |              |
| 3.800       | .82             | 168.4  | -5.3            | 144.9  | -31.9           | 139.3  | .29             | 107.01  | 10.70 |             |              |
| 3.900       | .82             | 159.0  | -5.9            | 136.7  | -31.8           | 129.7  | .26             | 102.96  | 11.42 |             |              |
| 4.000       | .83             | 149.6  | -6.5            | 127.6  | -31.9           | 118.1  | .24             | 99.62   | 12.38 |             |              |

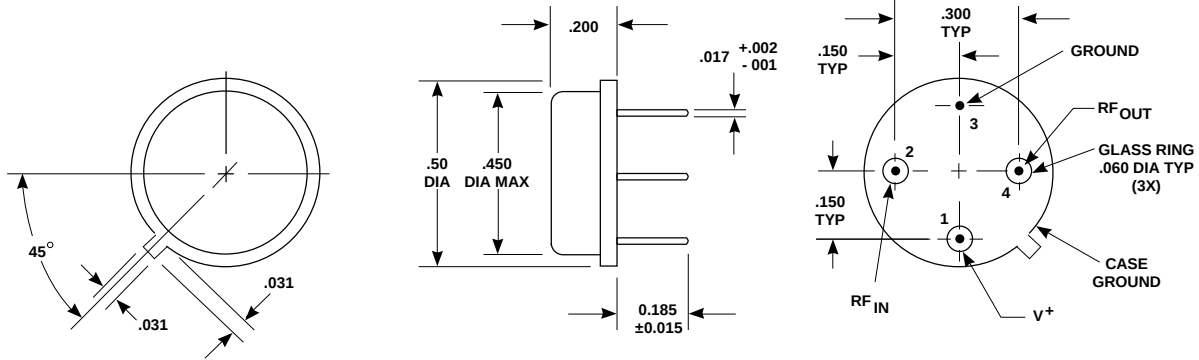
LINEARIZATION RANGE: .10 to 2.00 GHz

## Product Options



Note: R-Series screening is not available in the TC-1 case as the case is non-hermetic.

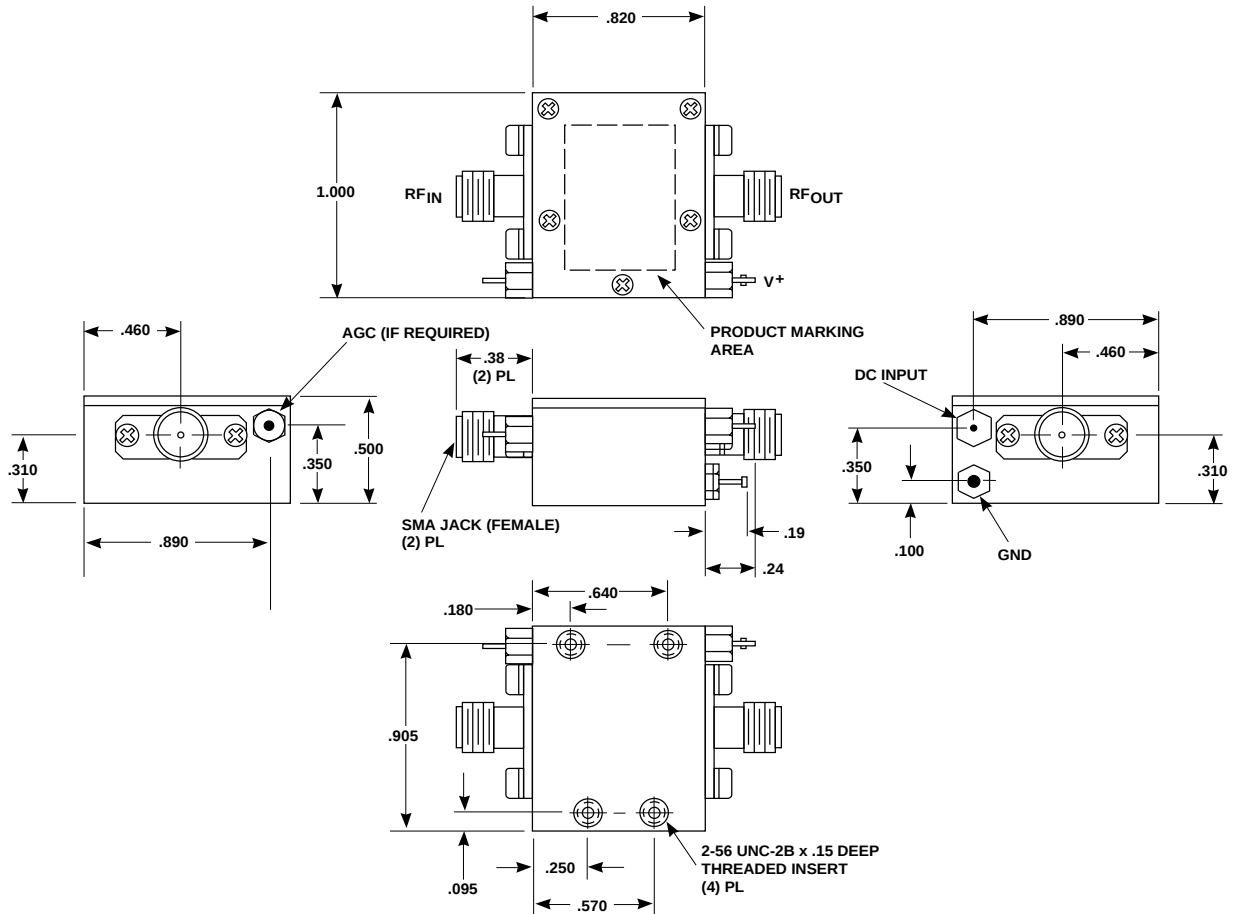
## Case Drawings TO-8T



APPROXIMATE WEIGHT 2.1 GRAMS

NOTES (UNLESS OTHERWISE SPECIFIED):  
 1. DIMENSIONS ARE SPECIFIED IN INCHES  
 2. TOLERANCES: xx ± .02  
 xxx ± .010

## Case Drawings TC-1



TYPICAL WEIGHT WITH CONNECTORS = 21.5 GRAMS

- NOTES: 1. THE TC-1 CASE IS A NON-HERMETIC CASE.  
2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1 CASE IS THE -1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.

- NOTES (UNLESS OTHERWISE SPECIFIED):  
1. DIMENSIONS ARE SPECIFIED IN INCHES  
2. TOLERANCES: xx ± .02  
xxx ± .010

Contact Teledyne Microwave Solutions:  
650-691-9800  
650-962-6845 fax

Check for updates:  
[www.teledynemicrowave.com](http://www.teledynemicrowave.com)