



High Efficiency, Class A, 1 Watt Amplifier 10 to 500 MHz

Technical Data

UTO/UTC-565

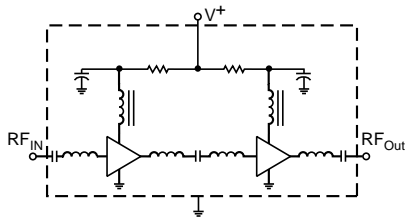
Features

- 1 Watt Output Power
- Low Current: 450 mA
- High Gain: 19.5 dB Typ
- 18 Volt Bias
- Guaranteed Performance -55 to 85°C
- Hermetic TO-3 Package
- SMA Connected Case Option

Applications

- UHF/VHF Transmitters
- Communication Circuits
- Mobile Radio
- Bench Top
- Radar Systems
- ECM Systems

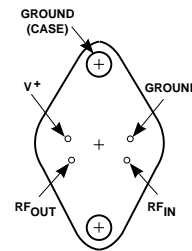
Schematic



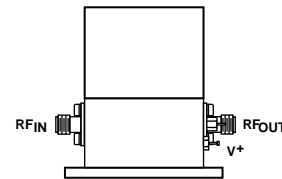
Description

The UTO/UTC-565 is a high gain, high efficiency, Class A, 1 watt amplifier, designed to provide broadband power for a wide variety of applications. The amplifier uses all silicon bipolar transistors to provide ultra reliable performance over the full military temperature range. Applications include bench top test sets, transmitter driver and output stages, and other applications that require high intercept points. Inputs and outputs are matched to 50 Ω for easy integration into new and existing systems. Available packaging for this unit is a hermetic TO-3 or the connectorized UCS-1P case.

Pin Configuration UTO—TO-3



UTC—UCS-1P



Maximum Ratings

| Parameter | Maximum |
|--|---------------|
| DC Voltage | +20 Volts |
| Continuous RF Power (CW or Pulse) | +17 dBm |
| Operating Case Temperature Range UTO/UTC | -55 to +85°C |
| Storage Temperature | -62 to +150°C |
| “R” Series Burn-In Temperature (T _b) | +85°C |

Thermal Characteristics¹

| | |
|---|-----------------------------|
| θ _{JC} | 45°C/W, 45°C/W ² |
| Active Transistor Power Dissipation | 1.1 W, 1.3 W ² |
| Junction Temperature Above Case Temperature | 50°C, 59°C ² |

Notes:

1. Values refer to first and second stages, respectively.

Weight: (typical) UTO — 14.5 grams; UTC — 281 grams

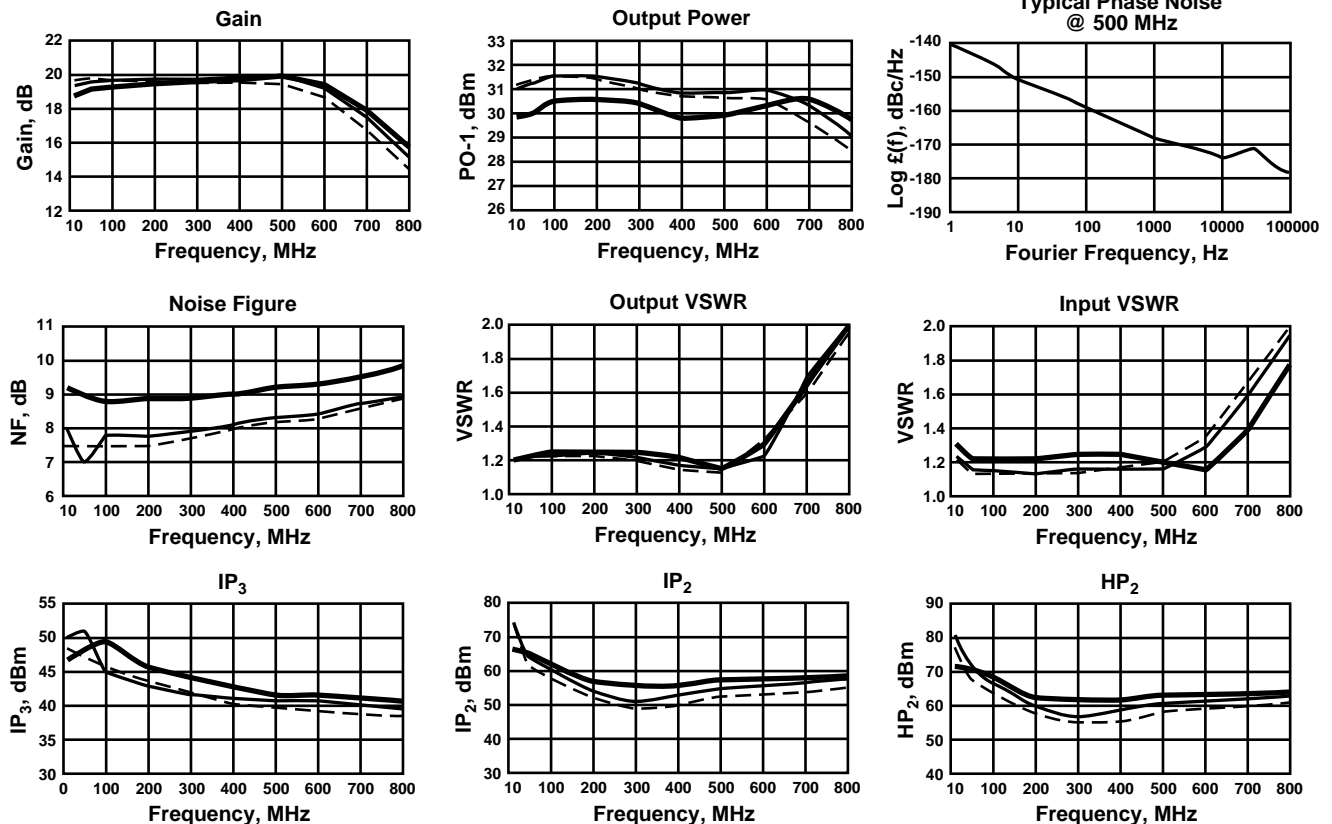
Electrical Specifications (Measured in 50 Ω system, $V_{CC} = +18$ V unless otherwise noted)

| Symbol | Characteristic | Typical $T_C = 25^\circ\text{C}$ | Guaranteed Specifications | | Unit |
|-----------|-------------------------------------|-------------------------------------|---------------------------------|--------------------------------------|--------|
| | | | $T_C = 0$ to 50°C | $T_C = -55$ to $+85^\circ\text{C}^1$ | |
| BW | Frequency Range | 10-500 | 10-500 | 10-500 | MHz |
| GP | Small Signal Gain (Min.) | 19.5 | 17.5 | 17 | dB |
| — | Gain Flatness (Max.) | ± 0.3 | ± 0.7 | ± 1.0 | dB |
| NF | Noise Figure (Max.) | 8 | 11.5 | 12.5 | dB |
| P_{1dB} | Power Output @ +1 dB Comp. (Min.) | +30.5 | +28 | +26.5 | dBm |
| VSWR | Input VSWR (Max.) | 1.3 | 2.0 | 2.0 | — |
| VSWR | Output VSWR (Max.) | 1.3 | 2.0 | 2.0 | — |
| IP_3 | Two Tone 3rd Order Intercept Point | +41 | — | — | dBm |
| IP_2 | Two Tone 2nd Order Intercept Point | +51.0 | — | — | dBm |
| HP_2 | One Tone 2nd Harmonic Intercept Pt. | +57.0 | — | — | dBm |
| I_D | DC Current | 450 | — | — | mA |
| — | Phase Noise @ 500 MHz; 1 kHz Offset | -165 | — | — | dBc/Hz |

Note 1: UTO version only

Typical Performance Over Temperature (@ +18 VDC unless otherwise noted)

Key: $+25^\circ\text{C}$ —
 $+85^\circ\text{C}$ - - -
 -55°C —



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

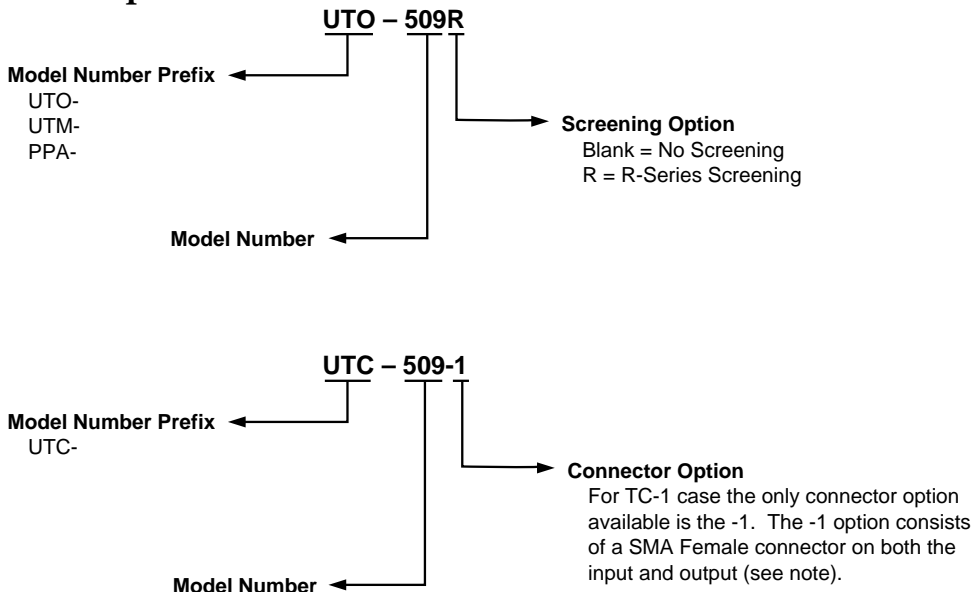
S-Parameters and Numerical Readings

Bias = 18.00 Volts

| Freq. MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | | GPDEL (ns) | PHASE DEV (deg) |
|--------------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|---------------|--------------------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang | | |
| 1.0 | .58 | -43.0 | -5.46 | -174.3 | -34.87 | -12.5 | .90 | -84.2 | 139.83 | — |
| 2.0 | .58 | -95.2 | 16.50 | 134.4 | -34.57 | 160.3 | .48 | -170.3 | 139.83 | — |
| 3.0 | .34 | -125.2 | 18.85 | 83.3 | -33.77 | 95.6 | .18 | 160.4 | 142.43 | — |
| 5.0 | .18 | -144.4 | 19.34 | 46.4 | -33.75 | 53.3 | .08 | -175.7 | 51.34 | — |
| 10.0 | .11 | -161.0 | 19.44 | 20.4 | -33.69 | 25.7 | .09 | -166.0 | 14.46 | 12.50 |
| 20.0 | .10 | -173.5 | 19.51 | 5.4 | -33.62 | 12.0 | .10 | -173.4 | 4.17 | 1.50 |
| 30.0 | .09 | -179.1 | 19.57 | -2.0 | -33.54 | 7.0 | .10 | -177.8 | 2.05 | -1.88 |
| 50.0 | .08 | 175.1 | 19.64 | -12.3 | -33.45 | 1.5 | .11 | 176.5 | 1.44 | -4.22 |
| 100.0 | .08 | 168.4 | 19.73 | -32.9 | -33.31 | -5.9 | .10 | 166.3 | 1.15 | -4.87 |
| 150.0 | .07 | 165.3 | 19.76 | -52.0 | -33.16 | -11.9 | .10 | 157.0 | 1.06 | 04.03 |
| 200.0 | .07 | 162.7 | 19.76 | -70.6 | -33.01 | -17.7 | .10 | 147.4 | 1.04 | -2.75 |
| 250.0 | .07 | 158.9 | 19.76 | -89.1 | -32.85 | -23.4 | .09 | 137.0 | 1.03 | -1.34 |
| 300.0 | .07 | 154.7 | 19.78 | -107.7 | -32.65 | -29.4 | .08 | 126.1 | 1.03 | .05 |
| 350.0 | .07 | 150.5 | 19.82 | -126.4 | -32.50 | -35.9 | .07 | 114.7 | 1.04 | 1.22 |
| 400.0 | .06 | 147.0 | 19.88 | -145.8 | -32.32 | -42.3 | .06 | 104.8 | 1.07 | 1.81 |
| 450.0 | .06 | 147.8 | 19.94 | -165.9 | -32.15 | -49.1 | .04 | 102.9 | 1.12 | 1.65 |
| 500.0 | .05 | 159.6 | 19.94 | 172.9 | -31.93 | -55.9 | .04 | 123.7 | 1.18 | .36 |
| 550.0 | .07 | 176.1 | 19.77 | 150.6 | -31.65 | -62.9 | .06 | 140.1 | 1.24 | — |
| 600.0 | .10 | 177.2 | 19.34 | 127.6 | -31.29 | -70.8 | .10 | 129.3 | 1.28 | — |
| 700.0 | .20 | 152.5 | 17.59 | 83.3 | -30.60 | -91.3 | .21 | 87.4 | — | — |
| 800.0 | .30 | 122.7 | 15.32 | 45.0 | -30.86 | -116.9 | .32 | 47.2 | — | — |
| 900.0 | .40 | 96.7 | 13.31 | 10.7 | -32.15 | -137.3 | .42 | 14.0 | — | — |
| 1000.0 | .53 | 73.0 | 11.62 | -24.2 | -34.38 | -154.1 | .49 | -10.8 | — | — |
| 1200.0 | .82 | 21.1 | 6.80 | -99.9 | -33.54 | -161.0 | .65 | -44.2 | — | — |
| 1400.0 | .89 | -20.0 | -.03 | -159.9 | -33.18 | 157.0 | .79 | -73.5 | — | — |
| 1600.0 | .91 | -46.2 | -7.00 | 153.7 | -36.00 | 124.3 | .86 | -94.1 | — | — |

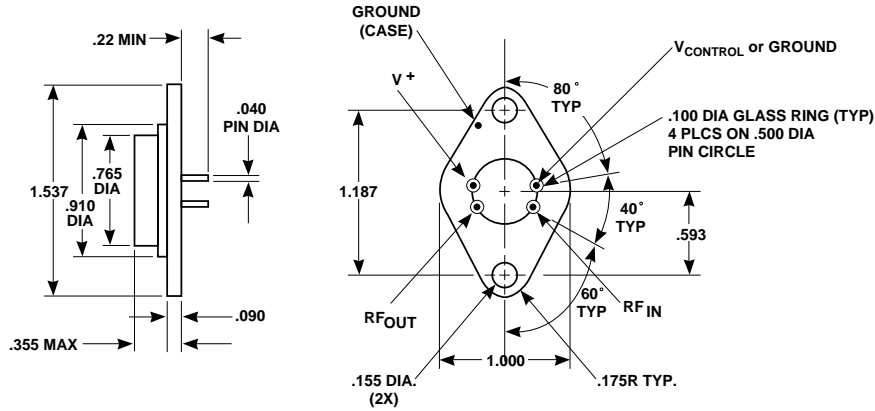
Linearization Range: 10 to 500 MHz

Product Options



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

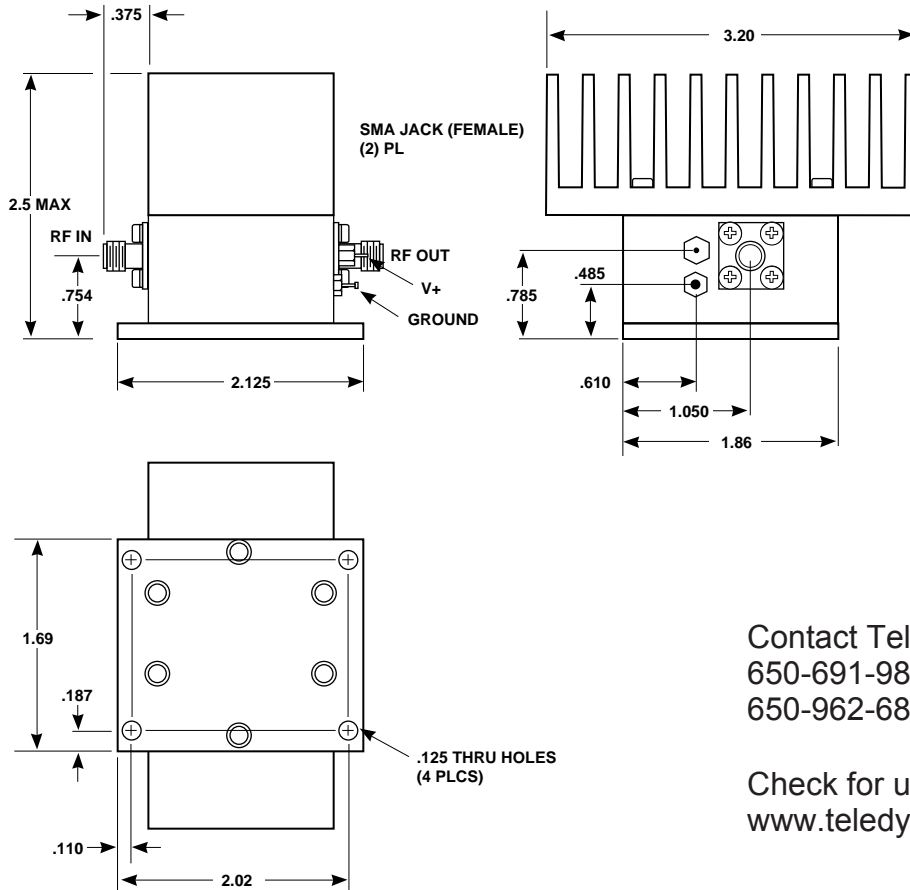
Case Drawings TO-3



APPROXIMATE WEIGHT 14.5 GRAMS

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

UCS-1P



APPROXIMATE WEIGHT 281 GRAMS

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

Check for updates:
www.teledynemicrowave.com

- NOTES (UNLESS OTHERWISE SPECIFIED):
 1. DIMENSIONS ARE SPECIFIED IN INCHES
 2. TOLERANCES: xx ± .02
 xxx ± .010
 3. THE CONNECTOR OPTION AVAILABLE FOR THE UCS-1P CASE IS THE -1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.