



Thin-Film Cascadable Amplifier 5 to 500 MHz

Technical Data

UTO/UTC 518 Series

Features

- **Frequency Range: 5 to 500 MHz**
- **High Dynamic Range**
- **High Power Output: +24.5 dBm (Typ)**
- **Noise Figure: 5.5 dB (Typ)**
- **Temperature Compensated**

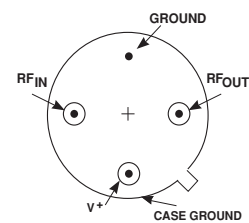
Applications

- **IF/RF Amplification**
- **Output Stage**

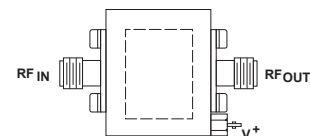
Description

The 518 Series is a thin-film high-power RF amplifier that uses two transistors in parallel for better RF and thermal performance. Resistive feedback and active bias provide temperature compensation and increased immunity to bias voltage variations. Blocking capacitors couple the RF through the amplifier. The 518 Series is available in either the TO-8 hermetic case or connected TC-1A package.

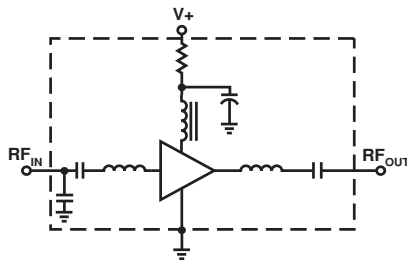
Pin Configuration UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

| Parameter | Maximum |
|--------------------------------|---------------|
| DC Voltage | +17 Volts |
| Continuous RF Input Power | +15 dBm |
| Operating Case Temperature | -55 to +100°C |
| Storage Temperature | -62 to +150°C |
| "R" Series Burn-In Temperature | +100°C |

Thermal Characteristics¹

| | |
|---|--------------|
| θ_{JC} | 75°C/W |
| Active Transistor Power Dissipation | 580 mW |
| Junction Temperature Above Case Temperature | 43°C |
| MTBF (MIL-HDBK-217E, A_{UF} @ 90°C) | 422,100 Hrs. |

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

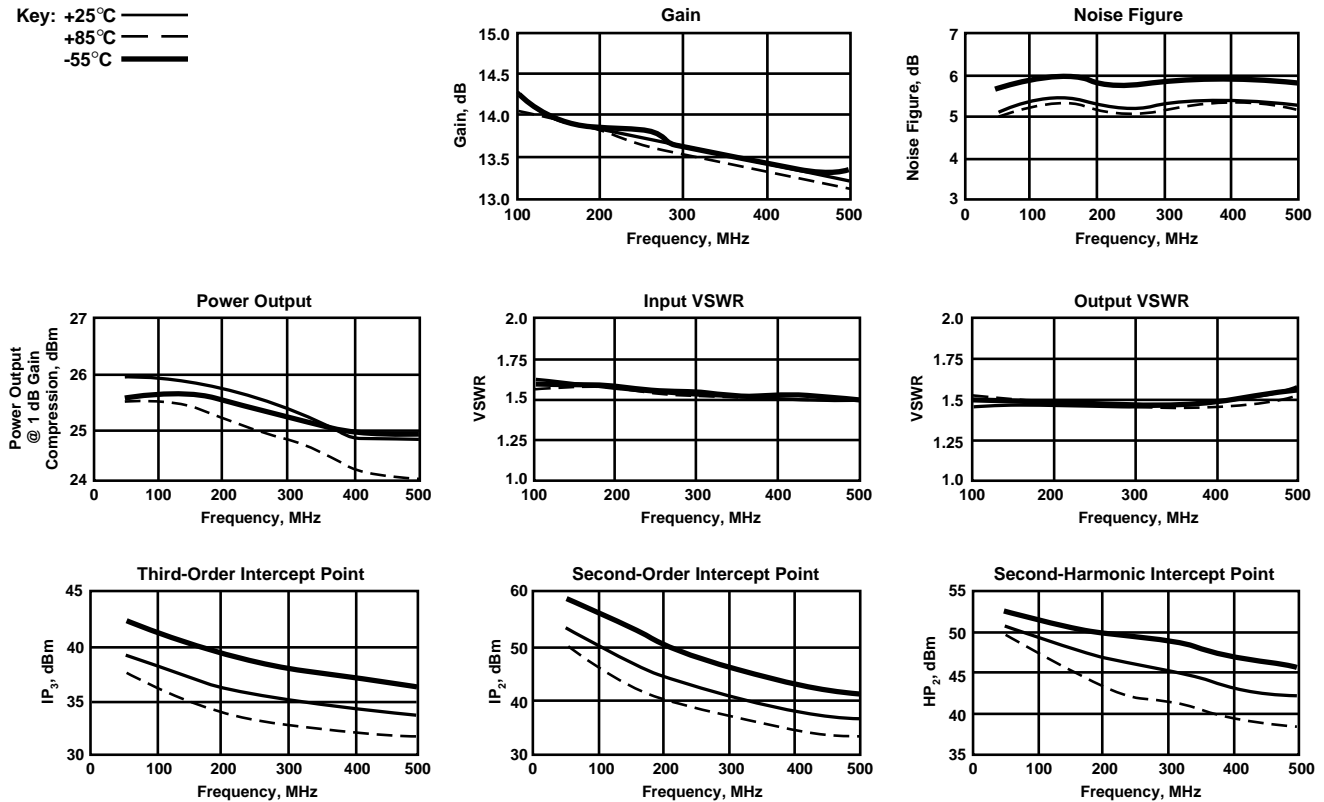
Electrical Specifications

(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

| Symbol | Characteristic | Typical $T_C = 25^\circ\text{C}$ | Guaranteed Specifications | | Unit |
|-----------|---------------------------------------|-------------------------------------|--|---|------|
| | | | $T_C = 0 \text{ to } 50^\circ\text{C}$ | $T_C = -55 \text{ to } +85^\circ\text{C}$ | |
| BW | Frequency Range | 5-500 | 5-500 | 5-500 | MHz |
| GP | Small Signal Gain (Min.) | 13.7 | 13.0 | 12.0 | dB |
| — | Gain Flatness (Max.) | ± 0.4 | ± 0.7 | ± 1.0 | dB |
| NF | Noise Figure (Max.) | 5.5 | 6.0 | 6.5 | dB |
| P_{1dB} | Power Output @ +1 dB Comp. (Min.) | +24.5 | +22.5 | +22.0 | dBm |
| — | Input VSWR (Max.) | <1.5:1 | 2.0:1 | 2.0:1 | — |
| — | Output VSWR (Max.) | <1.51 | 2.0:1 | 2.0:1 | — |
| IP_3 | Two Tone 3rd Order Intercept Point | +35.0 | — | — | dBm |
| IP_2 | Two Tone 2nd Order Intercept Point | +36.0 | — | — | dBm |
| HP_2 | One Tone 2nd Harmonic Intercept Point | +41.0 | — | — | dBm |
| I_D | DC Current | 130 | — | — | 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)**Numerical Readings****Bias = 15.00 Volts**

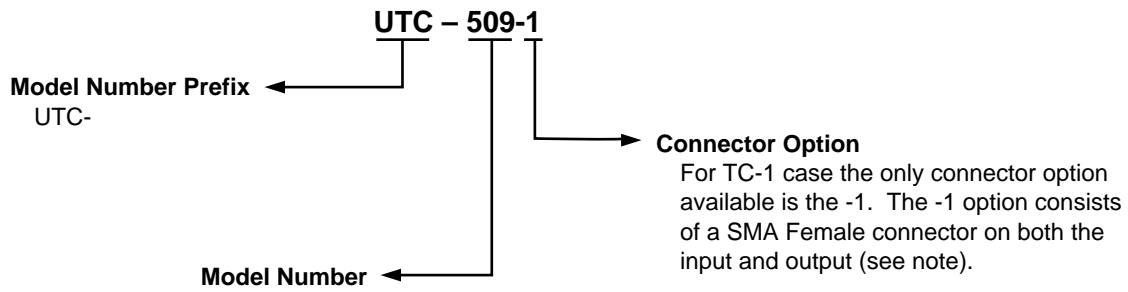
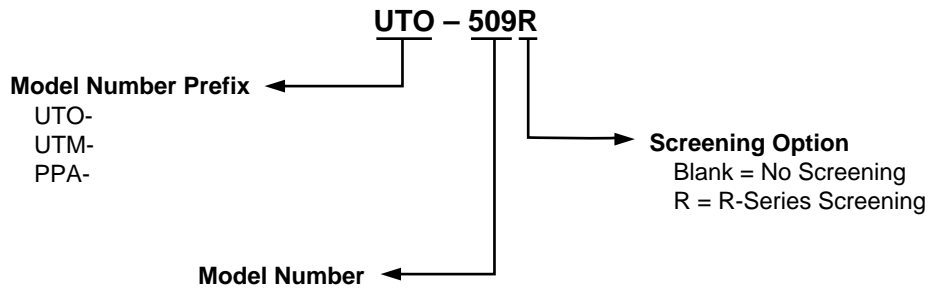
| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.17 | 14.40 | 165.43 | -.32 | .00 | 1.08 | 18.69 |
| 150.0 | 1.21 | 14.36 | 158.09 | -.33 | .39 | 1.09 | 18.59 |
| 200.0 | 1.27 | 14.29 | 151.34 | .26 | .39 | 1.12 | 18.59 |
| 250.0 | 1.32 | 14.20 | 143.97 | .25 | .41 | 1.15 | 18.53 |
| 300.0 | 1.36 | 14.13 | 136.63 | .25 | .41 | 1.19 | 18.41 |
| 350.0 | 1.38 | 13.99 | 129.39 | .35 | .41 | 1.25 | 18.40 |
| 400.0 | 1.38 | 13.92 | 121.85 | .15 | .43 | 1.31 | 18.29 |
| 450.0 | 1.37 | 13.83 | 114.01 | -.34 | .42 | 1.39 | 18.17 |
| 500.0 | 1.36 | 13.82 | 106.71 | -.28 | .41 | 1.48 | 18.00 |
| 550.0 | 1.33 | 13.81 | 99.10 | — | .44 | 1.60 | 17.70 |
| 600.0 | 1.30 | 13.71 | 90.88 | — | .45 | 1.73 | 17.52 |
| 650.0 | 1.31 | 13.62 | 82.75 | — | .49 | 1.87 | 17.30 |
| 700.0 | 1.41 | 13.49 | 73.14 | — | .56 | 2.06 | 17.08 |
| 750.0 | 1.58 | 13.34 | 62.54 | — | .59 | 2.29 | 16.95 |
| 800.0 | 1.84 | 13.12 | 51.78 | — | .61 | 2.52 | 16.82 |
| 850.0 | 2.25 | 13.00 | 40.42 | — | .62 | 2.76 | 16.92 |
| 900.0 | 2.89 | 12.54 | 29.38 | — | .63 | 2.95 | 17.07 |
| 950.0 | 3.79 | 11.91 | 17.68 | — | .71 | 3.00 | 17.62 |
| 1000.0 | 4.95 | 10.98 | 3.94 | — | .68 | 3.04 | 18.33 |
| 1100.0 | 8.02 | 8.44 | -18.71 | — | .59 | 2.88 | 20.34 |
| 1200.0 | 10.92 | 5.12 | -35.58 | — | .44 | 2.71 | 22.48 |
| 1300.0 | 11.89 | 1.57 | -49.19 | — | .34 | 2.57 | 25.36 |
| 1400.0 | 13.98 | -2.16 | -60.92 | — | .22 | 2.57 | 28.28 |
| 1500.0 | 13.12 | -5.73 | -89.36 | — | .00 | 2.61 | 30.23 |

LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters**Bias = 15.00 Volts**

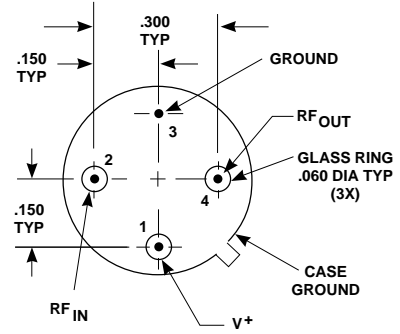
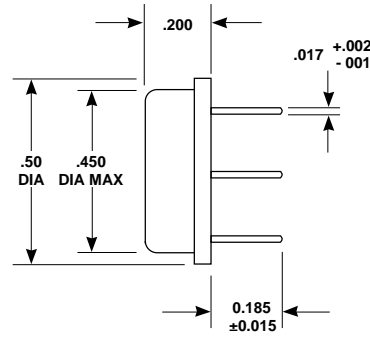
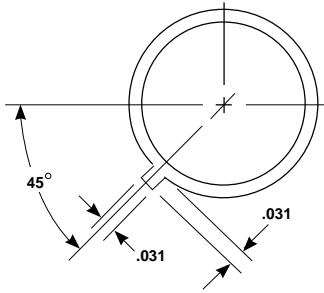
| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|--------|-----------------|--------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .076 | -123.7 | 14.377 | 164.3 | -18.750 | -3.5 | .034 | -161.9 |
| 200.00 | .118 | -134.3 | 14.274 | 149.0 | -18.502 | -7.2 | .058 | -125.5 |
| 300.00 | .147 | -149.8 | 14.131 | 133.4 | -18.527 | -12.6 | .091 | -118.0 |
| 400.00 | .158 | -168.2 | 13.922 | 117.3 | -18.373 | -18.6 | .139 | -118.6 |
| 500.00 | .149 | 165.6 | 13.813 | 101.1 | -18.033 | -26.2 | .199 | -125.0 |
| 600.00 | .126 | 124.1 | 13.710 | 84.4 | -17.551 | -35.1 | .269 | -135.7 |
| 700.00 | .166 | 64.8 | 13.498 | 65.5 | -17.049 | -46.1 | .350 | -151.1 |
| 800.00 | .287 | 15.7 | 13.169 | 43.1 | -16.802 | -60.0 | .434 | -171.8 |
| 900.00 | .478 | -17.3 | 12.596 | 19.0 | -17.038 | -76.5 | .497 | 161.8 |
| 1000.00 | .665 | -45.4 | 11.060 | -7.0 | -18.179 | -96.7 | .509 | 128.8 |
| 1100.00 | .782 | -68.2 | 8.471 | -30.7 | -20.168 | -112.6 | .494 | 96.1 |
| 1200.00 | .835 | -84.2 | 5.222 | -49.4 | -22.480 | -124.5 | .468 | 65.8 |
| 1300.00 | .856 | -96.3 | 1.693 | -63.9 | -25.430 | -133.4 | .444 | 38.9 |
| 1400.00 | .869 | -104.2 | -1.998 | -77.6 | -28.284 | -141.4 | .440 | 15.2 |
| 1500.00 | .877 | -109.5 | -5.585 | -86.9 | -30.265 | -143.2 | .450 | -5.3 |
| 1600.00 | .870 | -113.9 | -9.402 | -94.7 | -32.729 | -143.8 | .449 | -25.3 |
| 1700.00 | .886 | -117.4 | -13.255 | -99.8 | -34.313 | -142.5 | .461 | -48.4 |
| 1800.00 | .876 | -120.8 | -17.945 | -99.2 | -36.121 | -137.2 | .466 | -73.6 |
| 1900.00 | .920 | -124.1 | -23.880 | -82.9 | -37.257 | -136.2 | .470 | -103.5 |
| 2000.00 | .909 | -126.6 | -24.890 | -43.7 | -38.152 | -134.5 | .475 | -137.7 |

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

TC-1A

