



# Thin-Film Cascadable Amplifier 10 to 500 MHz

## Technical Data

### UTO/UTC 545 Series

#### Features

- **Frequency Range: 10 to 500 MHz**
- **High Dynamic Range**
- **High Output Power: +19.0 dBm (Typ)**
- **Medium Gain: 10.0 dB (Typ)**
- **Temperature Compensated**

#### Applications

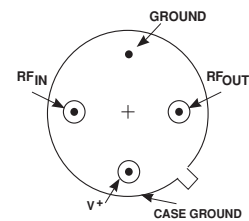
- **IF/RF Amplification**

#### Description

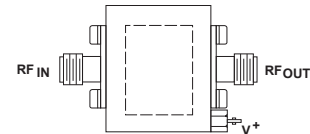
The 545 Series is a thin-film RF bipolar amplifier using lossless feedback for optimum noise figure and high dynamic range, and active bias to compensate for temperature and voltage variations. Internal blocking capacitors couple the RF through the amplifier. The 545 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

#### Pin Configuration

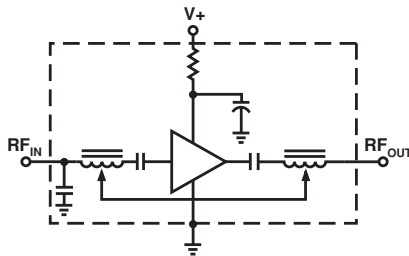
##### UTO—TO-8T



##### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 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>

$\theta_{JC}$	75°C/W
Active Transistor Power Dissipation	720 mW
Junction Temperature Above Case Temperature	54°C
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	1,103,000 Hrs.

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

## Electrical Specifications<sup>1,2</sup>

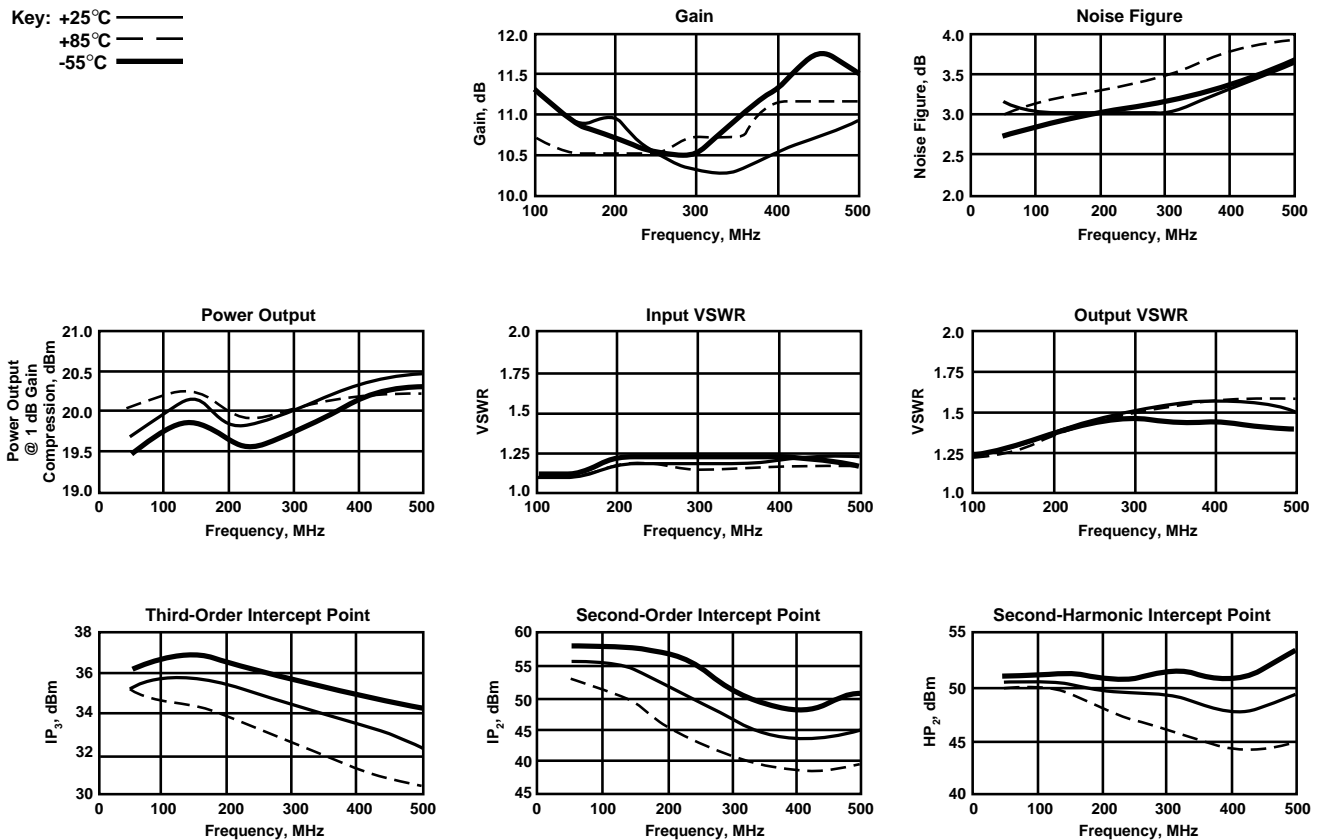
(Measured in 50  $\Omega$  system @ +15 VDC nominal unless otherwise noted)

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	10-500	10-500	10-500	MHz
GP	Small Signal Gain (Min.)	10.5	10.0	10.0	dB
—	Gain Flatness (Max.)	$\pm 0.3$	$\pm 0.5$	$\pm 0.5$	dB
NF	Noise Figure (Max.)	4.5	5.0	5.5	dB
P <sub>1dB</sub>	Power Output @ +1 dB Comp. (Min.)	+19.0	+17.0	+16.0	dBm
—	Input VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.5:1	2.0:1	2.0:1	—
IP <sub>3</sub>	Two Tone 3rd Order Intercept Point	+32.0	—	—	dBm
IP <sub>2</sub>	Two Tone 2nd Order Intercept Point	+45.0	—	—	dBm
HP <sub>2</sub>	One Tone 2nd Harmonic Intercept Point	+48.0	—	—	dBm
I <sub>D</sub>	DC Current	60	—	—	mA

- Notes: 1. Both RF input and RF output pins are at DC ground – no blocking capacitor.  
 2. The UTO-545 is conditionally stable below 300 kHz. Stable operation is assured if the source and load impedances have a 2.0:1 or better VSWR from 100 kHz to 300 kHz.

## 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)

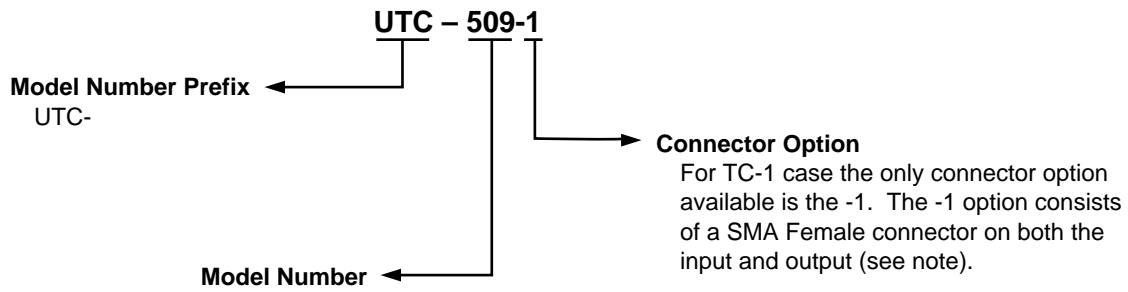
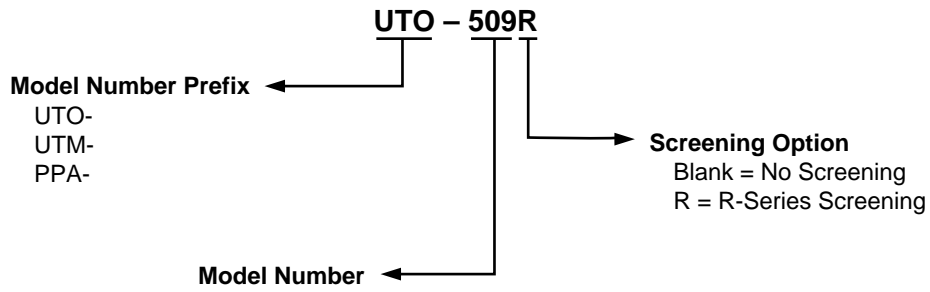
**Numerical Readings**
**Bias = 15.00 Volts**

FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.18	10.43	166.31	-5.59	.00	1.26	20.34
150.0	1.17	10.62	158.10	-4.40	.46	1.32	20.45
200.0	1.16	10.63	149.90	-3.21	.43	1.39	20.42
250.0	1.13	10.71	142.56	-1.15	.42	1.46	20.37
300.0	1.10	10.85	134.67	.34	.44	1.53	20.34
350.0	1.06	10.91	126.57	1.64	.42	1.60	20.29
400.0	1.02	11.06	119.49	3.96	.44	1.65	20.17
450.0	1.07	11.19	110.59	4.45	.50	1.68	20.03
500.0	1.16	11.30	101.37	4.62	.52	1.70	19.88
550.0	1.27	11.42	91.92	4.57	.55	1.68	19.75
600.0	1.42	11.51	81.70	3.75	.58	1.62	19.66
650.0	1.62	11.49	71.07	2.51	.59	1.53	19.64
700.0	1.85	11.43	60.46	1.30	.59	1.44	19.68
750.0	2.15	11.25	49.77	.01	.59	1.31	19.78
800.0	2.53	10.98	39.13	-1.23	.59	1.17	19.94
850.0	2.96	10.58	28.51	-2.46	.57	1.06	20.19
900.0	3.42	10.10	18.60	-2.98	.54	1.08	20.50
950.0	3.99	9.55	9.04	-3.15	.52	1.22	20.83
1000.0	4.56	8.94	-.20	-3.00	.00	1.36	21.22

**S-Parameters**
**Bias = 15.00 Volts**

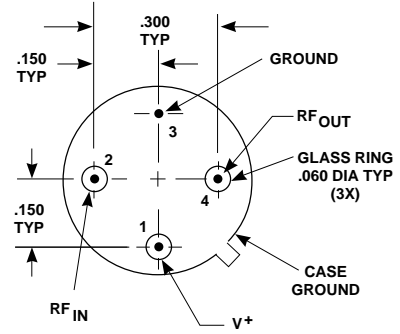
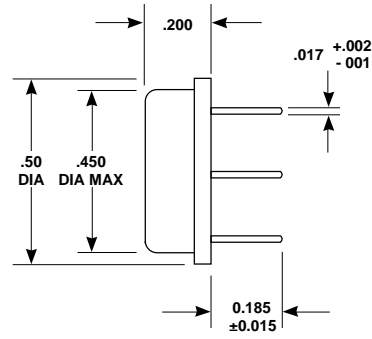
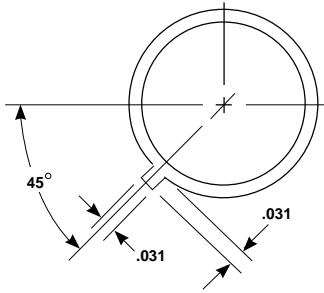
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.081	3.3	10.617	167.5	-20.222	168.9	.120	30.5
200.00	.070	8.5	10.692	155.3	-20.441	160.8	.168	37.0
300.00	.046	10.2	10.888	142.2	-20.313	150.4	.214	34.3
400.00	.004	99.7	11.229	128.7	-20.128	140.0	.246	27.3
500.00	.072	175.8	11.519	114.4	-19.883	130.0	.254	17.4
600.00	.173	169.9	11.655	98.3	-19.765	118.7	.233	5.2
700.00	.300	160.9	11.544	80.4	-19.810	106.1	.170	-7.0
800.00	.433	149.9	11.027	62.4	-20.111	93.5	.075	-11.5
900.00	.546	138.8	10.067	44.5	-20.668	81.3	.054	106.1
1000.00	.633	129.5	8.811	28.4	-21.540	70.0	.162	111.1

## Product Options



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

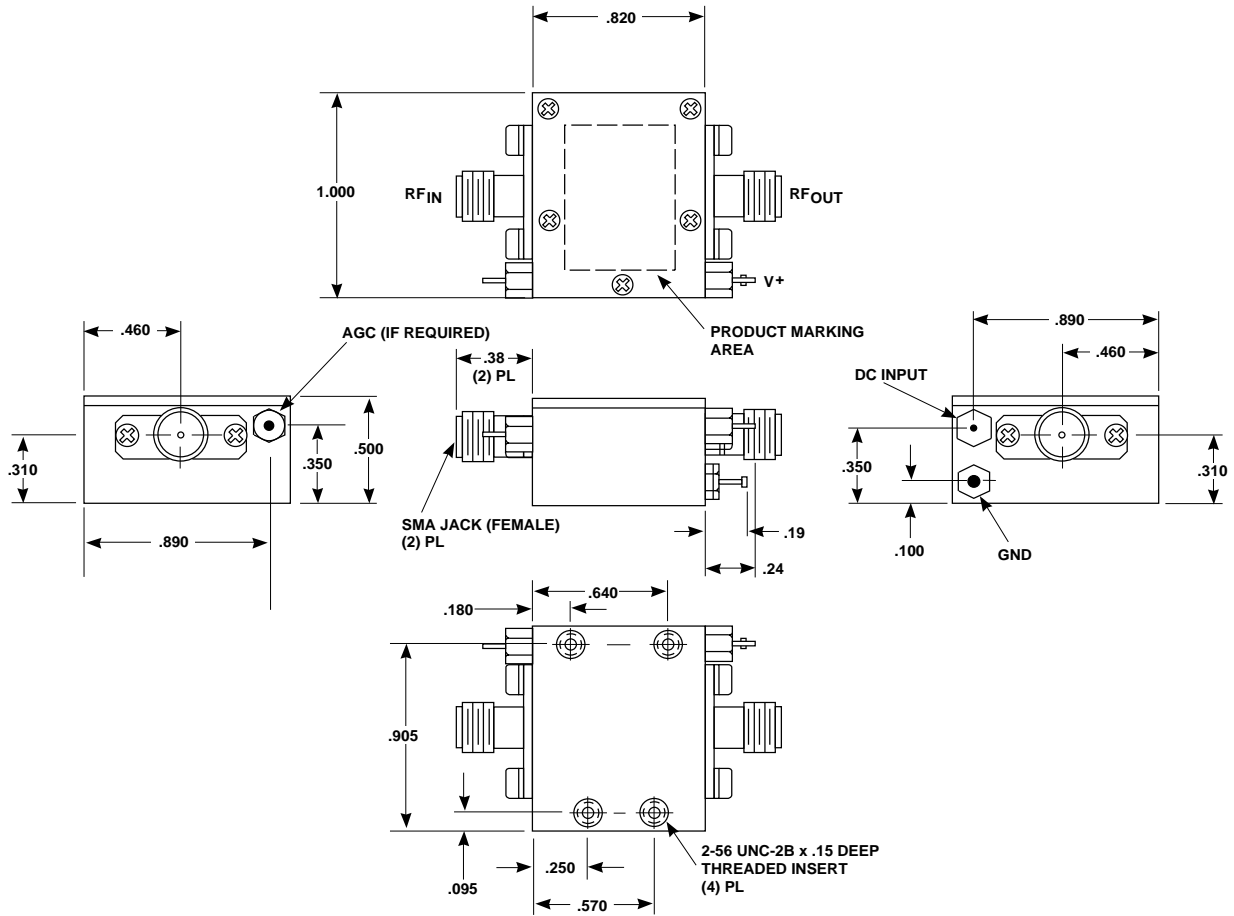
**Case Drawings  
TO-8T**



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

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