

**PRODUCT DESCRIPTION**

Avantek UTO/UTC/PPA cascaded amplifiers is offered in TO-8 packages, TC-1 connectorized cases, and surface-mount PlanarPak packages, respectively. Available with Avantek *R Series* screening, these amplifiers are cascaded modules designed for the best possible performance under difficult operating conditions. They offer unconditional stability and guaranteed performance over the specified frequency response range and temperature extremes. Voltage requirements vary from +5 VDC to +24 VDC, depending on the model. Internally, these units contain various combinations of

Si or GaAs MMICs and discrete components on alumina substrates, with thin-film gold interconnect and resistors. Since these units are cascaded modules, both input and output circuits of each device is optimized for the best 50-ohm impedance match. These amplifiers are ideal for pulse amplification, radar and avionic military systems, and high-speed fiber optic systems. Higher-frequency surface mount amplifiers, up to 18 GHz, can be found in the PPA section, beginning on page 2-4.

**IF/RF AMPLIFIERS**


Guaranteed Specifications at 0° to 50°C Case Temperature

Model	Frequency Response (MHz)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	3rd-Order Intercept Point (dBm)	Input Power (±1% Reg.) Voltage (VDC)	Current (mA)	Case Type	Page Number
	Minimum	Minimum	Maximum	Minimum	Maximum	Typical	Typical	Typical		
<b>10 to 150 MHz (Listed in Order of Increasing Noise Figure)</b>										
<b>UTO/UTC 111</b>	10-100	10.5	1.7	+15.5	0.3	+28 <sup>2</sup>	+15	14	TO-8T	3-14
UTO/UTC 103	10-100	25.5	2.1	+9.5	1.0	+22	+5	15	TO-8T	3-10
UTO/UTC 101	10-100	26.5	2.2	+14.5	1.0	+26	+15	20	TO-8T	3-6
UTO/UTC 104	10-150	24.0	2.3	+9	1.0	+22	+5	20	TO-8T	3-12
UTO/UTC 102	20-150	23.5	3.2	+18	1.0	+32	+15	31	TO-8T	3-8
<b>10 to 200 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 514	30-200	15	2.0	-3	0.75	+7	+15	8	TO-8U	3-60
UTO/UTC/PPA 210	10-200	8.0	2.0	+11	1.0	+29	+15	15	TO-8T	3-16
UTO/UTC 221	10-200	27	2.5	+13.5	0.7	+23	+15	29	TO-8T	3-20
UTO/UTC/PPA 211	10-200	7.5	2.7	+17	1.0	+28	+15	30	TO-8T	3-18
UTO/UTC 222	20-200	28	3.6	+18	0.7	+28	+15	47	TO-8T	3-22
UTO/UTC 250	5-200	30	4.0	-3	1.0	+14	+5	13	TO-8U	3-24
<b>5 to 400 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 443 <sup>3</sup>	10-400	12.5	4.5	+4.5	0.7	+19	+5	10	TO-8T	3-36
UTO/UTC 440 <sup>3</sup>	10-400	12.5	4.5	+8	0.7	+23	+15	15	TO-8T	3-30
UTO/UTC/PPA 441 <sup>3</sup>	20-400	13.5	4.5	+15	0.7	+32	+15	32	TO-8T	3-32
UTO/UTC 444 <sup>3</sup>	10-400	12.5	5.0	+8.0	0.7	+22	+5	15	TO-8T	3-38
UTO/UTC 421	5-400	27	5.5	+6	1.0	+18	+15	38	TO-8U	3-28
UTO/UTC 416	5-400	14	5.5	+10	1.0	+23	+15	35	TO-8U	3-26
UTO/UTC 442 <sup>3</sup>	20-400	13	5.5	+20	0.7	+33	+15	62	TO-8T	3-34
<b>2 to 500 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 511	5-500	15	2.5	-2	1.0	+12	+15	10	TO-8U	3-54
UTO/UTC/PPA 517	5-500	22	2.5	+5	1.0	+15	+15	22	TO-8T	3-66
UTO/UTC/PPA 543 <sup>1</sup>	10-500	10	2.5	+6	1.0	+22	+15	25	TO-8T	3-84
UTO/UTC 510	5-500	15	3.0	-2	1.0	+12	+15	10	TO-8U	3-52
UTO/UTC 512	5-500	20	3.0	+7	1.0	+20	+15	23	TO-8U	3-56
UTO/UTC 554	5-500	28.0	3.0	9.0	0.7	+21	+5	40	TO-8T	3-96
UTO/UTC/PPA 544 <sup>1</sup>	10-500	10	3.0	+12	1.0	+28	+15	36	TO-8T	3-86
UTO/UTC 547	10-500	11.5	3.5	+18	0.7	+31	+15	55	TO-8T	3-92
UTO/UTC 558	5-500	28	3.2	13.5	0.7	+23	+5	70	TO-8T	3-98
UTO/UTC 572 <sup>4</sup>	50-500	18	3.5	+11	0.5	+24	+15	32	TO-8T	3-104
UTO/UTC 501	5-500	14	4.0	-2	1.0	+12	+15	10	TO-8U	3-40
UTO/UTC 521	5-500	27	4.0	+6	1.0	+18	+15	38	TO-8U	3-74
<b>UTO/UTC 526</b>	<b>5-500</b>	<b>26.5</b>	<b>4.0</b>	<b>+19</b>	<b>0.7</b>	<b>+28<sup>2</sup></b>	<b>+15</b>	<b>93</b>	<b>TO-8T</b>	<b>3-80</b>
UTO/UTC 552	5-500	13.5	4.0	+6.5	0.7	+21	+5	18	TO-8T	3-94
UTO/UTC 502	5-500	14	4.0	+7	1.0	+21	+15	23	TO-8U	3-42
UTO/UTC 571 <sup>4</sup>	50-500	14.5	4.0	+10	0.5	+27	+15	32	TO-8T	3-102
UTO/UTC 524	5-500	30	4.0	+14	1.0	+27	+15	70	TO-8T	3-78
<b>UTO/UTC 573</b>	<b>10-500</b>	<b>13</b>	<b>4.3</b>	<b>+11</b>	<b>0.5</b>	<b>+23</b>	<b>+15</b>	<b>33</b>	<b>TO-8U</b>	<b>3-106</b>
UTO/UTC 516	5-500	14	4.5	+10	1.0	+23	+15	35	TO-8U	3-64
UTO/UTC/PPA 520	5-500	14	4.5	+12	0.7	+22	+5	33	TO-8T	3-72
UTO/UTC 533	5-500	16	5.0	+14	0.7	+30	+15	53	TO-8T	3-82
UTO/UTC 545	10-500	10	5.0	+17	0.5	+36	+15	60	TO-8T	3-88
UTO/UTC/PPA 519	5-500	13	5.5	+18	0.7	+29	+15	70	TO-8T	3-70
UTO/UTC/PPA 509	5-500	13	5.5	+20	0.7	+35	+15	90	TO-8T	3-50

NOTE: See notes on page 3-4.

IF/RF AMPLIFIERS (continued)

Guaranteed Specifications at 0° to 50°C Case Temperature

Model	Frequency Response (MHz)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	3rd-Order Intercept Point (dBm)	Input Power (±1% Reg.)		Case Type	Page Number
	Minimum	Minimum	Maximum	Minimum	Maximum	Typical	Voltage (VDC)	Current (mA)		
<b>2 to 500 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 513	5-500	16	6.0	+14	1.0	+29	+24	50	TO-8U	3-58
UTO/UTC 518	5-500	13	6.0	+23	0.7	+35	+15	130	TO-8T	3-68
UTO/UTC 523	5-500	23	7.0	+12	1.0	+25	+15	80	TO-8U	3-76
UTO/UTC 503	5-500	9	7.0	+13	1.0	+29	+24	50	TO-8U	3-44
UTO/UTC 515	2-500	12	7.0	+14	0.5	+24	+15	65	TO-8U	3-62
UTO/UTC 505	10-500	9	7.0	+18	1.0	+29	+15	100	TO-8T	3-48
UTO/UTC 546 <sup>2</sup>	20-500	10	8.0	+23	0.5	+38	+15	110	TO-8T	3-90
UTO/UTC 561 <sup>2</sup>	10-500	11	9.0	+26	0.7	+39	+15	190	TO-8T	3-100
UTO/UTC 504	5-500	6	11.0	+17	1.0	+34	+24	100	TO-8U	3-46
<b>2 to 1000 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 1011	2-1000	14	3.5	-5	0.7	+10	+15	8	TO-8U	3-118
UTO/UTC 1012	5-1000	15	4.0	+4	1.0	+17	+15	18	TO-8U	3-120
UTO/UTC/PPA 1043 <sup>1</sup>	10-1000	10	4.0	+6	1.0	+19	+15	25	TO-8T	3-132
UTO/UTC 1002	5-1000	14	4.0	+7	1.0	+21	+15	23	TO-8U	3-110
UTO/UTC 1054	5-1000	23.5	4.0	+9.5	0.7	+21	+5	40	TO-8T	3-140
UTO/UTC 1058	5-1000	23.5	4.2	+13	0.7	+22	+5	70	TO-8T	3-146
UTO/UTC 1013	5-1000	15	4.5	+9	1.0	+20	+15	29	TO-8U	3-122
UTO/UTC/PPA 1044 <sup>1</sup>	10-1000	10	4.5	+12	1.0	+28	+15	35	TO-8T	3-134
UTO/UTC/PPA 1021	5-1000	22	4.5	+12	1.0	+27	+15	85	TO-8U	3-124
UTO/UTC 1001	5-1000	14	5.0	-2	1.0	+12	+15	10	TO-8U	3-108
UTO/UTC 1052	5-1000	13	5.0	+6	0.7	+18	+5	18	TO-8T	3-136
UTO/UTC/PPA 1007	5-1000	12.5	5.0	+11	0.7	+21	+5	33	TO-8T	3-116
UTO/UTC 1076	10-1000	11.5	5.5	+10	0.5	+22	+15	34	TO-8U	3-148 
UTO/UTC/PPA 1006	5-1000	11	6.0	+17	1.0	+27	+15	70	TO-8T	3-114
UTO/UTC/PPA 1005	5-1000	11	6.0	+20	1.0	+35	+15	90	TO-8T	3-112
UTM-1056	10-1000	25.5	6.5	+12	0.7	+26	+15	135	TO-8T	3-142
UTM-1057	10-1000	26	6.5	+14	0.7	+29	+15	170	TO-8T	3-144
UTO/UTC 1033	5-1000	10	6.5	+14	1.0	+28	+15	48	TO-8T	3-130
UTO/UTC 1024	10-1000	12	6.5	+22 <sup>5</sup>	1.0	+35	+15	155	TO-8T	3-128
UTO/UTC 1023	10-1000	12	8.5	+24.5 <sup>6</sup>	1.0	+36	+15	205	TO-8T	3-126
UTM-1053	5-1000	27	9.0	+5	2.0	+21	+15	90	TO-8T	3-138
<b>1 to 1500 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 1524	10-1500	21	4.5	+7	1.5	+19	+15	60	TO-8U	3-158
UTO/UTC 1511	5-1500	10	4.5	-9	0.5	+1	+15	7	TO-8U	3-154
UTO/UTC 1522	5-1500	18	5.5	+11	1.5	+23	+15	85	TO-8U	3-156
UTO/UTC 1501	5-1500	9	5.5	-3	0.5	+10	+15	10	TO-8U	3-150
UTO/UTC 1502	5-1500	9	7.5	+6	0.5	+19	+15	23	TO-8U	3-152
<b>1 to 2000 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 2031	1-2000	9	5.5	+2	1.0	+14	+15	16	TO-8U	3-178
UTO/UTC 2032	1-2000	9	6.0	+7	1.0	+17	+15	25	TO-8U	3-180
UTO/UTC 2033	1-2000	8	8.5	+14	1.0	+30	+15	50	TO-8T	3-182
<b>5 to 2000 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC/PPA 2012 <sup>2</sup>	500-2000	9	4.0	+12	1.0	+23	+15	50	TO-8U	3-160
UTO/UTC 2021	10-2000	9	4.5	+2	1.0	+14	+15	16	TO-8U	3-164
UTO/UTC 2025	100-2000	9.5	4.5	+25	1.0	+37	+15	175	TO-8T	3-172
UTO/UTC 2052	5-2000	9	5.0	+5.5	0.7	+16	+5	18	TO-8T	3-184
UTO/UTC 2024	5-2000	15	5.5	+5	1.0	+18	+15	38	TO-8U	3-170
UTO/UTC/PPA 2013 <sup>2</sup>	500-2000	9	5.5	+19	1.0	+33	+15	100	TO-8U	3-162
UTO/UTC 2022	5-2000	9	6.0	+7	1.0	+17	+15	25	TO-8U	3-166
UTO/UTC 2055	10-2000	8.5	6.0	+10	0.7	+22	+5	32	TO-8T	3-186
UTO/UTC 2026	10-2000	13.5	7.0	+19	1.0	+31	+15	155	TO-8T	3-174
UTO/UTC 2027	10-2000	13.5	7.0	+16	1.0	+30	+15	108	TO-8T	3-176
UTO/UTC/PPA 2023	10-2000	8	8.5	+14	1.0	+25	+15	50	TO-8T	3-168

NOTE: See notes on page 3-4.

# IF/RF Amplifiers Selection Guide

## IF/RF AMPLIFIERS (continued)

Guaranteed Specifications at 0° to 50°C Case Temperature

Model	Frequency Response (MHz)	Gain (dB)	Noise Figure (dB)	Power Output @ 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	3rd-Order Intercept Point (dBm)	Input Power (±1% Reg.)		Case Type	Page Number
	Minimum	Minimum	Maximum	Minimum	Maximum	Typical	Voltage (VDC)	Current (mA) Typical		
<b>1700 to 2300 MHz (Listed in Order of Increasing Noise Figure)</b>										
UTO/UTC 2311	1700–2300	8	5.0	–3	0.5	+10	+15	15	TO-8U	3–192
UTO/UTC 2302	1700–2300	8	6.5	+3	0.5	+13	+15	18	TO-8U	3–188
UTO/UTC 2303	1700–2300	8	8.0	+10	0.5	+20	+15	30	TO-8U	3–190
UTO/UTC 2321	1700–2300	14	8.0	+10	1.0	+20	+15	70	TO-8U	3–194

- NOTES:
- Both RF input and RF output pins are at DC ground—no blocking capacitor.
  - RF input pin is at DC ground—no input blocking capacitor.
  - A portion of any DC voltage applied to the RF input pin will appear at the RF output pin (i.e., a resistive DC path exists between pins). There is no input or output blocking capacitor.
  - High reverse isolation, Typ.  $S_{12} = -48$  dB at 500 MHz.
  - From 10-500 MHz, Power Output for 1 dB Comp = +24.5 dBm.
  - From 10-500 MHz, Power Output for 1 dB Comp = +26 dBm.
  - Guaranteed at 0° to 50°C min.

**UTC SERIES FACTORY-ASSEMBLED THIN-FILM AMPLIFIERS**

Guaranteed Specifications at 0° to 50°C Case Temperature, V = +15 VDC

Model	Frequency Range (MHz)	Gain (dB) Typ./Min.	Noise Figure (dB) Maximum	Power Output @ 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Intercept Point For IM Products (dBm) Typical	VSWR 50 ohms In/Out :1 Maximum	Input Bias Current (mA) Typical	Case Type
<b>10 to 500 MHz</b>									
UTC5-200	10-500	26.5/25	2.7	+6	1.5	+22	2.0	35	TC-2
UTC5-201	10-500	37/35	2.7	+7	1.5	+20	2.0	33	TC-2
UTC5-202	10-500	51.5/48	2.7	+6	1.5	+18	2.0	60	TC-2
UTC5-203	10-500	64.5/62	2.7	+6	2.0	+18	2.0	70	TC-4
UTC5-210	10-500	27.5/26	3.0	+14	1.5	+30	2.0	78	TC-2
UTC5-211	10-500	38/36	3.5	+14	1.5	+30	2.0	76	TC-2
UTC5-212	10-500	47/45	2.7	+14	1.5	+27	2.0	80	TC-2
UTC5-213	10-500	54/52	2.7	+14	2.0	+27	2.0	92	TC-2
UTC5-214	10-500	67/65	2.7	+14	2.0	+27	2.0	103	TC-4
UTC5-220	10-500	24.5/23	3.5	+23	1.5	+35	2.0	165	TC-2
UTC5-221	10-500	35/33	3.0	+23	2.0	+35	2.0	190	TC-4
UTC5-222	10-500	46/44	3.0	+23	2.0	+35	2.0	193	TC-4
UTC5-223	10-500	60.5/58	3.0	+23	2.0	+35	2.0	210	TC-4
<b>10 to 1000 MHz</b>									
UTC10-210	10-1000	21.5/20	4.5	+11	2.0	+28	2.0	60	TC-2
UTC10-211	10-1000	31/29	3.7	+9	1.5	+20	2.0	37	TC-2
UTC10-212	10-1000	41/39	3.7	+9	2.0	+20	2.0	62	TC-4
UTC10-213	10-1000	52/50	3.7	+12	2.0	+27	2.0	101	TC-4
UTC10-220	10-1000	22.5/21	5.0	+20	1.5	+35	2.0	125	TC-2
UTC10-221	10-1000	33/31	4.5	+20	2.0	+35	2.0	150	TC-4
UTC10-222	10-1000	42/40	3.7	+20	2.0	+35	2.0	127	TC-4
UTC10-223	10-1000	49/47	3.7	+20	2.0	+35	2.0	163	TC-4
<b>10 to 2000 MHz</b>									
UTC20-210	10-2000	19.5/18	5.0	+7	1.5	+17	2.2	41	TC-2
UTC20-211	10-2000	28/26	5.0	+14	2.0	+29	2.2	91	TC-4
UTC20-212	10-2000	34/32	6.0	+14	2.0	+29	2.2	104	TC-4
UTC20-213	10-2000	40/38	6.0	+12	2.0	+29	2.2	126	TC-4

Connector options for TC-2 and TC-4 cases are as follows:

- 1 SMA Female on both
- 2 N Female on both
- 3 BNC Female on both
- 4 TNC Female on both
- 5 SMA Male on both
- 6 SMA Male on input/Female on output
- 7 SMA Female on input/Male on output