

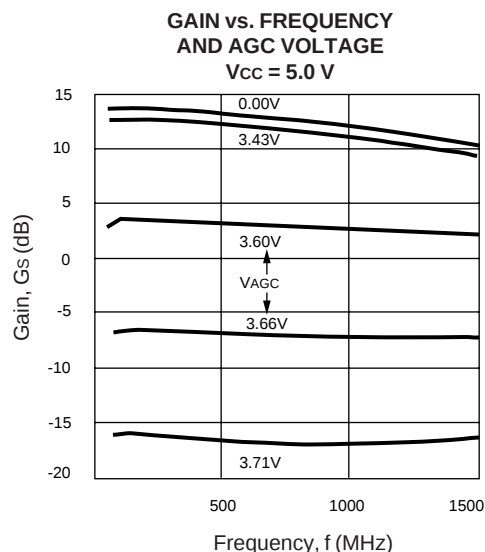
FEATURES

- FREQUENCY RESPONSE TO 1.1 GHz
- 38 dB TYPICAL GAIN CONTROL RANGE
- 5 V, 15 mA BIAS
- DIFFERENTIAL INPUT
- SUPER SMALL SURFACE MOUNT PACKAGE
- TAPE AND REEL PACKAGING OPTION AVAILABLE

DESCRIPTION

The UPC2723T is a Silicon Monolithic integrated circuit which is manufactured using the NESAT III process. The NESAT III process produces transistors with f_T approaching 20 GHz. This device is suitable as an Automatic Gain Control Amplifier stage in cellular radios, GPS receivers, PCN, and test/measurement equipment.

NEC's stringent quality assurance and test procedures assure the highest reliability and performance.



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 5 \text{ V}$, $f = 500 \text{ MHz}$, $V_{AGC} = 0 \text{ V}$)

PART NUMBER PACKAGE OUTLINE			UPC2723T TO6		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CC}	Circuit Current (no signal)	mA	11	15	19
G_S	Small Signal Gain	dB	9.5	13	14.5
f_U	Upper Limit Operating Frequency (The gain at f_U is 3 dB down from the gain at 100 MHz)	MHz	800	1100	
GCR	Gain Control, $V_{AGC} = 0$ to +5 V	dB	33	38	
P_{SAT}	Saturated Output Power	dBm	-5	-2	
P_{1dB}	Output Power, 1 dB compressed	dBm		-3	
NF	Noise Figure	dB		11	13.5
RL_{IN}	Input Return Loss	dB	9	12	
RL_{OUT}	Output Return Loss	dB	2	4	
ISOL	Isolation	dB	32	37	
$R_{TH} (J-A)$	Thermal Resistance (Junction to Ambient) Free Air Mounted on a 50 x 50 x 1.6 mm epoxy glass PWB	$^\circ\text{C/W}$ $^\circ\text{C/W}$			620 230

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Supply Voltage	V	6.0
V _{AGC}	Gain Control Voltage	V	6.0
P _{IN}	Input Power	dBm	0
P _T	Total Power Dissipation ²	mW	280
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-55 to +150

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage.
2. Mounted on a 50 x 50 x 1.6 mm epoxy glass PWB (T_A = 85°C).

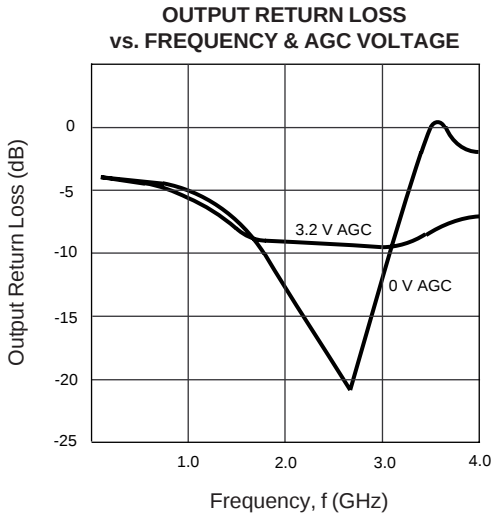
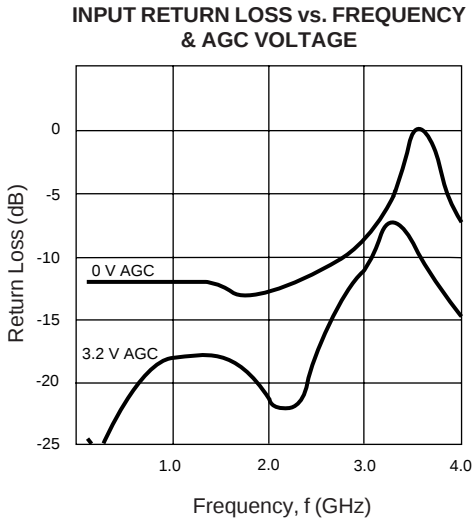
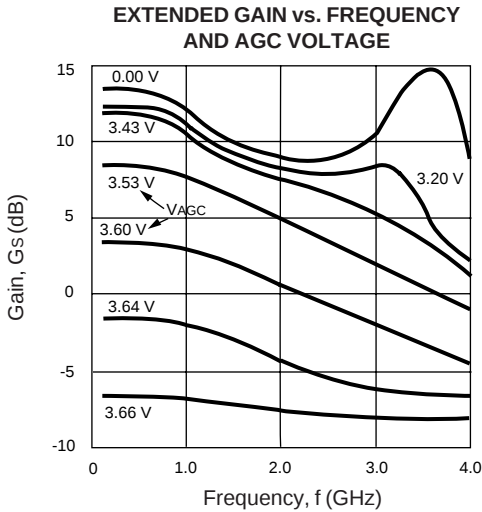
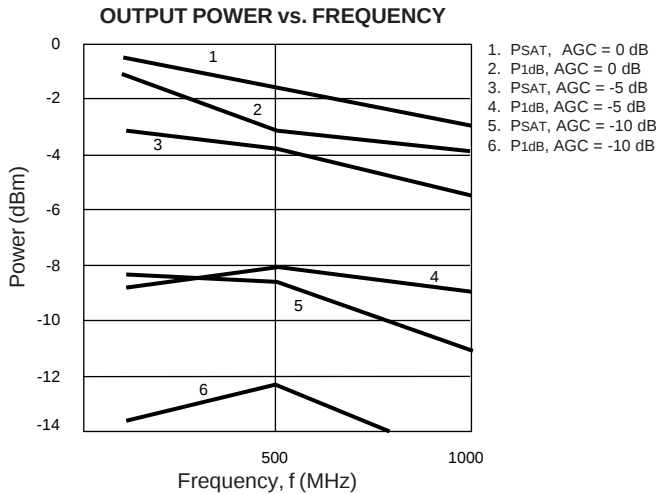
RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V _{CC}	Supply Voltage	V	4.5	5	5.5
V _{AGC} ¹	Gain Control Voltage	V	0	-	5.5
T _{OP}	Operating Temperature	°C	-40	25	85

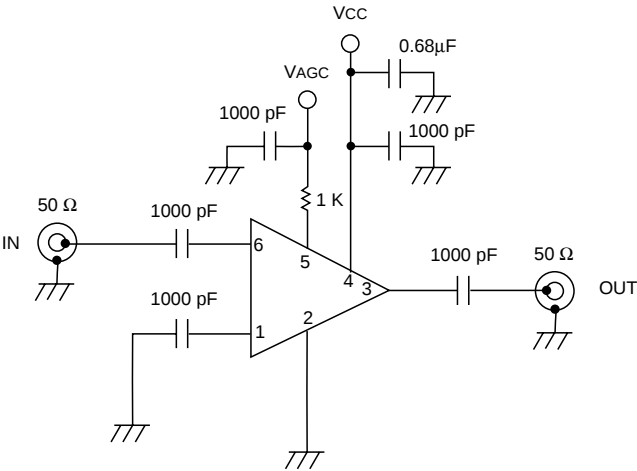
Note:

1. Operation with V_{AGC} below 3.2 V may result in oscillation above 3 GHz. Consult S-Parameter data.

TYPICAL PERFORMANCE CURVES (V_{CC} = 5 V, T_A = 25°C)



TEST CIRCUIT



TYPICAL SCATTERING PARAMETERS (TA = 25°C)

VCC = 5 V, ICC = 15 mA, VAGC = 0 V

FREQUENCY	S11		S21		S12		S22		K ¹	S21
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	(dB)	(dB)
0.10	0.187	-165.7	4.84	-0.5	0.002	-9.5	0.604	-178.5	31.55	13.7
0.20	0.190	172.5	4.83	-11.0	0.001	5.9	0.602	172.3	63.54	13.7
0.30	0.190	158.6	4.76	-19.7	0.002	159.8	0.593	165.2	32.92	13.6
0.40	0.188	147.4	4.70	-27.9	0.003	162.7	0.584	158.7	22.65	13.4
0.50	0.189	138.1	4.57	-35.6	0.005	167.3	0.568	153.4	14.42	13.2
0.60	0.187	129.9	4.45	-42.9	0.007	166.1	0.555	147.1	10.84	13.0
0.70	0.193	119.9	4.34	-50.0	0.008	163.8	0.533	140.9	10.04	12.7
0.80	0.188	115.9	4.22	-56.8	0.010	160.4	0.519	135.6	8.47	12.5
0.90	0.185	107.8	4.07	-63.8	0.012	157.3	0.497	130.3	7.55	12.2
1.00	0.184	101.8	3.88	-70.3	0.015	153.9	0.478	124.9	6.50	11.8
1.20	0.182	93.3	3.63	-82.5	0.024	147.1	0.440	116.3	4.58	11.2
1.40	0.178	87.4	3.38	-93.3	0.032	140.5	0.395	107.8	3.89	10.6
1.60	0.174	84.7	3.14	-103.6	0.038	133.9	0.346	100.3	3.69	9.9
1.80	0.166	83.0	2.99	-113.1	0.044	127.1	0.300	93.1	3.47	9.5
2.00	0.169	84.5	2.86	-122.7	0.052	119.7	0.238	85.7	3.20	9.1
2.20	0.175	90.8	2.81	-131.4	0.063	114.9	0.181	78.3	2.77	9.0
2.40	0.181	100.5	2.79	-140.2	0.075	111.9	0.140	83.6	2.39	8.9
2.60	0.221	107.5	2.81	-147.2	0.087	106.8	0.097	111.7	2.05	9.0
2.80	0.297	111.0	3.00	-155.5	0.104	105.9	0.120	165.0	1.57	9.5
3.00	0.400	112.0	3.43	-166.5	0.124	103.6	0.244	176.0	1.05	10.7
3.20	0.612	99.3	4.18	173.6	0.160	96.1	0.438	176.7	0.446	12.4
3.40	0.886	70.4	5.31	144.7	0.217	82.7	0.767	159.6	-0.065	14.5
3.60	0.884	28.5	5.18	102.4	0.237	56.2	1.085	125.3	-0.358	14.3
3.80	0.644	-3.0	3.75	72.2	0.192	38.1	0.958	94.1	-0.190	11.5
4.00	0.419	-23.0	2.60	54.8	0.153	33.0	0.755	80.1	0.372	8.3

VCC = 5 V, ICC = 15 mA, VAGC = 3.2 V

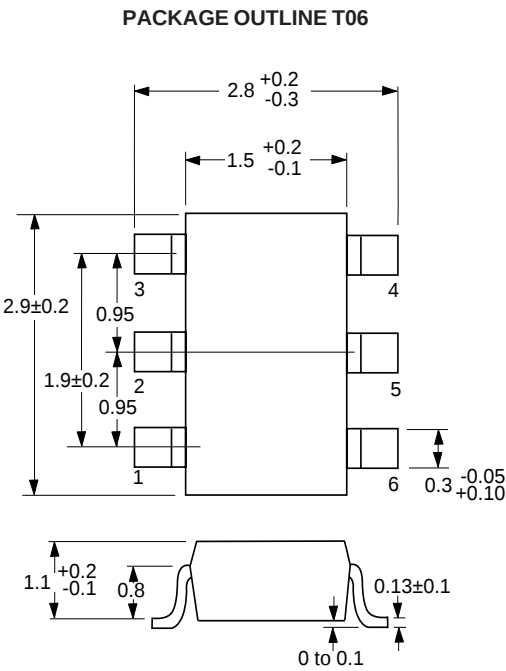
FREQUENCY	S11		S21		S12		S22		K ¹	S21
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	(dB)	(dB)
0.10	0.059	-142.7	4.04	0.4	0.006	169.9	0.626	-175.2	12.54	12.1
0.20	0.049	159.1	4.12	-10.3	0.004	167.5	0.654	175.4	17.36	12.3
0.30	0.059	122.4	4.17	-19.8	0.006	164.4	0.652	167.9	11.49	12.4
0.40	0.075	101.7	4.14	-28.2	0.006	162.3	0.646	161.4	11.71	12.3
0.50	0.083	88.0	4.09	-37.2	0.008	160.4	0.630	155.2	9.20	12.2
0.60	0.092	79.0	4.03	-45.7	0.010	158.6	0.615	149.8	7.69	12.1
0.70	0.105	70.2	3.93	-54.1	0.012	156.5	0.600	145.2	6.76	11.9
0.80	0.114	65.1	3.82	-61.9	0.015	154.7	0.576	139.3	5.81	11.6
0.90	0.121	60.0	3.69	-70.6	0.017	152.9	0.549	135.2	5.54	11.3
1.00	0.126	55.0	3.58	-77.8	0.019	151.1	0.522	130.6	5.32	11.1
1.20	0.127	44.8	3.33	-92.6	0.023	147.4	0.479	123.9	5.01	10.4
1.40	0.131	40.7	3.06	-107.3	0.028	143.9	0.444	117.6	4.68	9.7
1.60	0.122	38.7	2.84	-119.6	0.035	140.6	0.417	113.1	4.18	9.1
1.80	0.102	39.1	2.66	-132.2	0.042	138.4	0.397	109.0	3.82	8.5
2.00	0.083	49.0	2.50	-144.9	0.048	133.5	0.392	105.2	3.59	8.0
2.20	0.078	74.5	2.38	-156.8	0.056	127.0	0.372	101.7	3.31	7.5
2.40	0.108	91.9	2.33	-169.1	0.065	120.4	0.352	100.1	2.95	7.3
2.60	0.153	100.3	2.32	178.3	0.073	114.7	0.338	99.0	2.64	7.3
2.80	0.206	99.2	2.31	164.1	0.086	110.2	0.328	96.9	2.23	7.3
3.00	0.283	88.3	2.38	147.5	0.103	106.2	0.324	100.2	1.76	7.5
3.20	0.337	68.6	2.34	127.8	0.117	99.6	0.332	100.8	1.52	7.4
3.40	0.357	47.5	2.19	106.8	0.135	90.8	0.372	102.0	1.33	6.8
3.60	0.321	27.3	1.87	87.0	0.145	81.7	0.410	98.8	1.42	5.4
3.80	0.248	7.1	1.55	70.6	0.154	73.1	0.432	93.5	1.64	3.8
4.00	0.172	-7.4	1.28	57.2	0.159	64.4	0.440	88.9	1.97	2.1

Note:

1. K-Factor Calculation:

$$K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

OUTLINE DIMENSIONS (Units in mm)

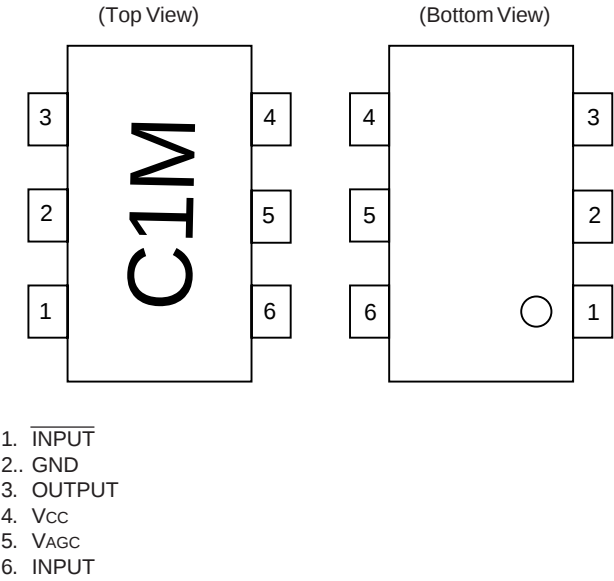


Note:
All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

PART NUMBER	QUANTITY
UPC2723T-E3	3K/Reel

LEAD CONNECTIONS



INTERNAL SCHEMATIC

