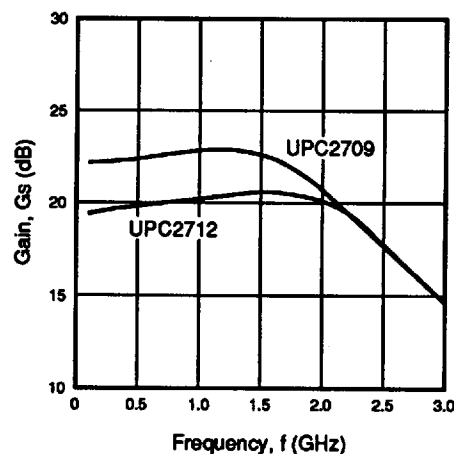


NEC[®]**2.5 GHz SILICON MMIC
WIDE-BAND AMPLIFIER**

T-74-13-01

**UPC2709
UPC2712****FEATURES**

- WIDE FREQUENCY RESPONSE: 2.5 GHz
- HIGH GAIN: 23 dB (UPC2709)
- HIGH SATURATED OUTPUT POWER:
+11.5 (UPC2709)
- 5 V SINGLE SUPPLY VOLTAGE
- SUPER SMALL PACKAGE
- TAPE AND REEL PACKAGING OPTION AVAILABLE

GAIN vs. FREQUENCY**DESCRIPTION**

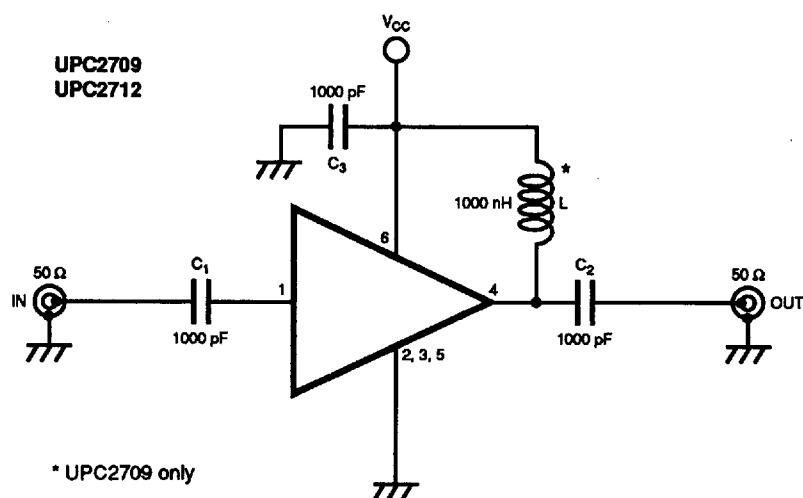
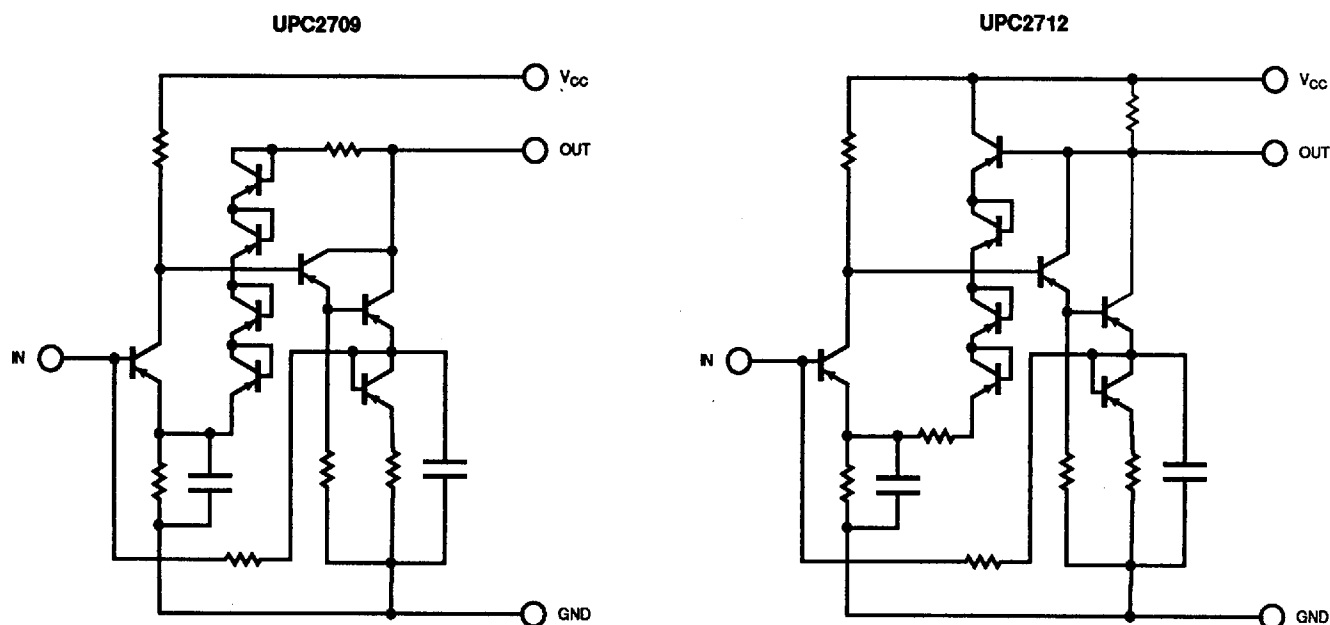
The UPC2709 and UPC2712 are Silicon Monolithic integrated circuits which use the NESAT III process. These devices are suitable as buffer amplifiers for wide-band applications. They are designed for low cost gain stages in cellular radios, GPS receivers, DBS tuners, PCN, and test/measurement equipment.

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

PART NUMBER			UPC2709			UPC2712		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
I _{CC}	Circuit Current (no signal)	mA	19	25	32	9	12	15
G _s	Small Signal Gain, $f = 1\text{ GHz}$	dB	21	23		18	20	
f _u	Upper Limit Operating Frequency (The gain at f _u is 3 dB down from the gain at 0.1 GHz)	GHz	2.0	2.3		2.2	2.6	
ΔG _s	Gain Flatness, $f = 0.1 \sim 1.8\text{ GHz}$ $f = 0.1 \sim 2.0\text{ GHz}$	dB		±1.0			±0.8	
P _{SAT}	Saturated Output Power, $f = 1\text{ GHz}$	dBm	9	11.5		0	3	
NF	Noise Figure, $f = 1\text{ GHz}$	dB		5	6.5		4.5	6
RL _{IN}	Input Return Loss, $f = 1\text{ GHz}$	dB	7	10		9	12	
RL _{OUT}	Output Return Loss, $f = 1\text{ GHz}$	dB	7	10		10	13	
ISOL	Isolation, $f = 1\text{ GHz}$	dB	26	31		28	33	
R _{TH}	Thermal Resistance (Junction to Ambient)	°C/W		200			200	

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

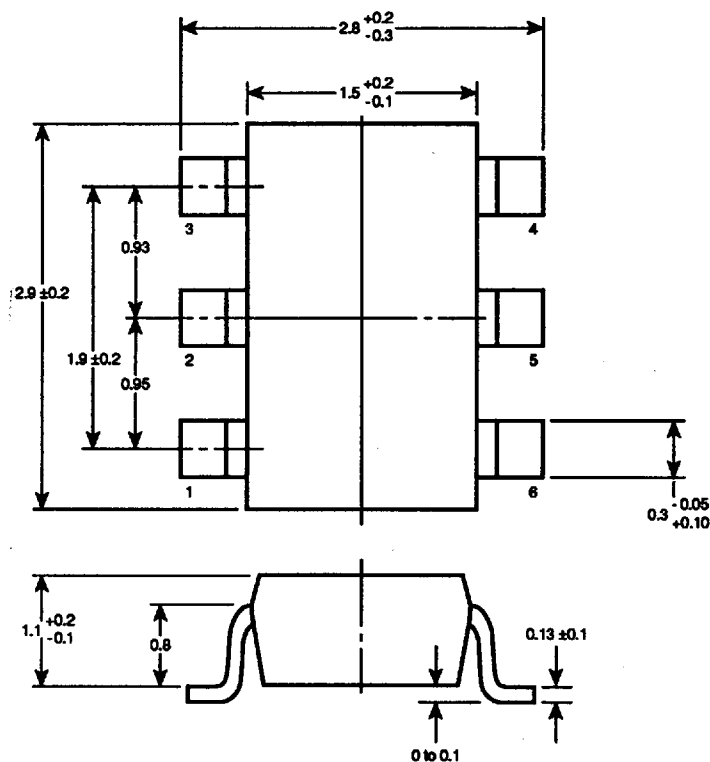
SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CC}	Supply Voltage	V	6 ¹
P_{IN}	Input Power	dBm	+10
P_T	Power Dissipation	mW	280 ²
T_{OP}	Operating Temperature	$^\circ\text{C}$	-40 to +85
T_{STG}	Storage Temperature	$^\circ\text{C}$	-55 to +150

Notes:1. Recommended operating V_{CC} range is 4.5 to 5.5 V max.2. $T_A = +85^\circ\text{C}$.**TEST CIRCUIT****EQUIVALENT CIRCUIT**

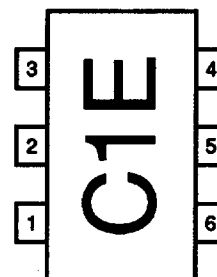
PACKAGE OUTLINE (Units in mm)

LEAD CONNECTIONS

OUTLINE TO6



(TopView)



1. INPUT
2. GND
3. GND
4. OUTPUT
5. GND
6. Vcc

Note: Package Markings:
C1E - UPC2709
C1H - UPC2712

ORDERING INFORMATION

PART NUMBER	QTY
UPC2709TE3	3K/Reel
UPC2712TE3	3K/Reel

Embossed Tape, 8 mm wide.
Pins 1, 2, 3 are in tape pull-out direction.

TYPICAL SCATTERING PARAMETERS

UPC2709

Vcc = 5 V, Icc = 30 mA

FREQ (GHz)	S11		S21		S12		S22		K	S21 (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.10	0.258	-4.1	12.7	-3.7	0.022	7.5	0.234	-4.6	1.66	22.1
0.20	0.261	-2.9	12.8	-12.2	0.024	3.1	0.240	-6.9	1.52	22.1
0.30	0.266	-3.4	12.9	-19.6	0.025	6.3	0.251	-9.6	1.45	22.2
0.40	0.271	-4.6	13.0	-27.0	0.025	6.5	0.260	-13.5	1.42	22.3
0.50	0.272	-6.8	13.1	-34.2	0.026	5.6	0.272	-17.9	1.36	22.3
0.60	0.275	-8.1	13.3	-41.3	0.026	10.5	0.288	-22.1	1.32	22.5
0.70	0.277	-10.4	13.5	-49.2	0.026	9.9	0.303	-28.6	1.29	22.6
0.80	0.278	-12.7	13.6	-57.4	0.026	11.0	0.312	-33.5	1.27	22.7
0.90	0.279	-14.0	13.7	-65.7	0.026	11.8	0.319	-38.4	1.25	22.7
1.00	0.279	-15.2	13.8	-72.3	0.027	15.6	0.324	-43.4	1.20	22.8
1.10	0.279	-18.1	13.9	-81.1	0.027	15.8	0.328	-51.2	1.19	22.9
1.20	0.276	-20.7	14.0	-90.3	0.027	17.7	0.332	-59.0	1.19	22.9
1.30	0.271	-23.3	13.9	-99.8	0.027	16.7	0.332	-67.1	1.20	22.9
1.40	0.263	-25.6	13.8	-109.3	0.027	19.2	0.326	-75.1	1.22	22.8
1.50	0.255	-26.9	13.6	-118.5	0.027	20.4	0.314	-82.5	1.25	22.7
1.60	0.246	-28.6	13.2	-128.3	0.028	20.6	0.302	-90.6	1.27	22.4
1.70	0.238	-30.2	12.7	-138.0	0.029	21.6	0.282	-98.9	1.30	22.1
1.80	0.237	-31.7	12.3	-147.5	0.030	27.9	0.254	-106.8	1.33	21.8
1.90	0.232	-33.1	11.7	-157.2	0.030	31.0	0.226	-113.6	1.40	21.4
2.00	0.222	-33.6	11.0	-166.1	0.031	33.2	0.198	-120.8	1.47	20.8
2.10	0.209	-34.4	10.3	-174.3	0.032	34.6	0.168	-126.7	1.54	20.3
2.20	0.194	-33.1	9.7	-177.5	0.033	35.8	0.143	-132.5	1.61	19.7
2.30	0.184	-30.3	9.0	-169.5	0.034	36.1	0.114	-137.7	1.69	19.1
2.40	0.176	-26.8	8.4	-162.0	0.034	38.5	0.089	-144.4	1.81	18.5
2.50	0.173	-23.2	7.8	-154.8	0.035	39.2	0.065	-150.6	1.90	17.8

UPC2712

Vcc = 5 V, Icc = 12 mA

FREQ (GHz)	S11		S21		S12		S22		K	S21 (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.10	0.262	-9.3	9.3	-6.4	0.021	-1.6	0.071	7.8	2.46	19.3
0.20	0.261	-12.3	9.4	-17.4	0.022	-3.3	0.078	7.2	2.33	19.5
0.30	0.260	-17.0	9.5	-27.7	0.022	-5.1	0.091	6.4	2.29	19.6
0.40	0.258	-21.9	9.6	-37.5	0.023	-6.8	0.110	4.3	2.16	19.7
0.50	0.257	-27.1	9.8	-46.9	0.024	-8.5	0.128	-1.1	2.05	19.8
0.60	0.255	-32.0	9.9	-56.4	0.024	-10.2	0.146	-6.8	2.01	19.9
0.70	0.254	-38.1	10.0	-65.7	0.025	-12.0	0.166	-14.9	1.90	20.0
0.80	0.252	-41.9	10.2	-75.9	0.026	-13.7	0.181	-22.9	1.80	20.1
0.90	0.250	-46.5	10.3	-86.0	0.026	-15.4	0.194	-32.7	1.77	20.3
1.00	0.248	-51.0	10.4	-96.4	0.027	-17.2	0.204	-40.5	1.69	20.4
1.10	0.246	-57.5	10.6	-106.4	0.028	-18.9	0.212	-50.9	1.62	20.5
1.20	0.240	-62.5	10.6	-117.7	0.028	-20.6	0.221	-59.7	1.60	20.5
1.30	0.236	-67.8	10.7	-128.9	0.029	-22.3	0.235	-70.9	1.54	20.6
1.40	0.232	-72.4	10.8	-140.6	0.030	-24.1	0.244	-81.3	1.48	20.6
1.50	0.224	-77.7	10.8	-152.7	0.031	-25.8	0.247	-94.4	1.44	20.7
1.60	0.218	-82.1	10.9	-164.9	0.031	-27.5	0.246	-106.3	1.44	20.7
1.70	0.210	-86.2	10.9	-177.6	0.032	-29.3	0.240	-119.4	1.42	20.7
1.80	0.201	-89.3	10.7	-169.5	0.033	-31.0	0.234	-131.5	1.42	20.6
1.90	0.190	-93.5	10.5	-156.4	0.033	-32.7	0.221	-143.3	1.46	20.4
2.00	0.180	-96.9	10.3	-143.7	0.034	-34.4	0.210	-159.0	1.46	20.3
2.10	0.173	-98.4	10.0	-129.8	0.035	-36.2	0.187	-173.4	1.48	20.0
2.20	0.169	-101.3	9.7	-119.3	0.035	-37.9	0.169	-167.5	1.54	19.7
2.30	0.161	-100.3	8.8	-107.2	0.036	-39.6	0.156	-151.8	1.63	18.9
2.40	0.157	-100.0	8.4	-95.8	0.037	-41.3	0.134	-132.8	1.69	18.4
2.50	0.156	-99.4	7.7	-84.9	0.037	-43.1	0.125	-114.0	1.80	17.8
2.60	0.156	-100.0	7.3	-75.4	0.038	-44.8	0.118	-89.8	1.85	17.3
2.70	0.159	-98.4	6.8	-64.5	0.038	-46.5	0.108	-65.4	2.00	16.6
2.80	0.164	-101.7	6.5	-56.1	0.039	-48.3	0.110	-50.2	2.02	16.2
2.90	0.168	-100.1	5.8	-47.0	0.039	-50.0	0.122	-32.2	2.21	15.3
3.00	0.172	-101.1	5.5	-36.2	0.040	-51.7	0.136	-15.6	2.28	14.8