

NEC[®]

T-74-13-01

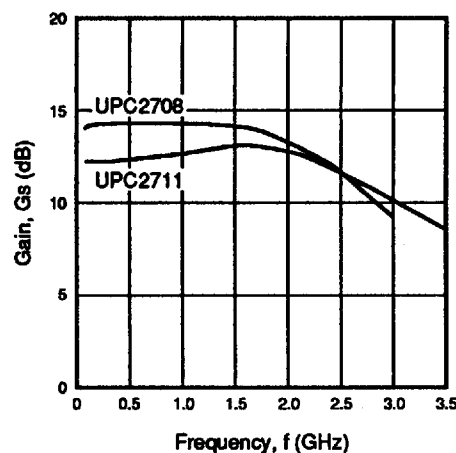
3 GHz SILICON MMIC WIDE-BAND AMPLIFIER

UPC2708
UPC2711

FEATURES

- WIDE FREQUENCY RESPONSE: 3 GHz
- HIGH GAIN: 15 dB (UPC2708)
- MODERATE SATURATED OUTPUT POWER: +10 dBm
- 5V SINGLE SUPPLY VOLTAGE
- SUPER SMALL PACKAGE
- TAPE AND REEL PACKAGING OPTION AVAILABLE

GAIN vs. FREQUENCY



DESCRIPTION

The UPC2708 and UPC2711 are Silicon Monolithic integrated circuits which use the NESAT III process. These devices are suitable as buffer amplifiers for wideband 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°C, V_{CC} = 5 V)

PART NUMBER PACKAGE OUTLINE			UPC2708			UPC2711		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
I _{CC}	Circuit Current (no signal)	mA	20	26	33	9	12	15
G _s	Small Signal Gain, f = 1 GHz	dB	13	15		11	13	
f _u	Upper Limit Operating Frequency (The gain at f _u is 3 dB down from the gain at 0.1 GHz)	GHz	2.7	2.9		2.7	2.9	
ΔG _s	Gain Flatness, f = 0.1 - 2.66 Hz (f = 0.1 - 2.56 Hz)	dB		±0.8			±0.8	
P _{SAT}	Saturated Output Power, f = 0.5 GHz	dBm	7.5	10		-2	1	
NF	Noise Figure, f = 1 GHz	dB		6.5	8		5	6.5
RL _{IN}	Input Return Loss, f = 1 GHz	dB	8	11		20	25	
RL _{OUT}	Output Return Loss, f = 1 GHz	dB	16	20		9	12	
ISOL	Isolation, f = 1 GHz	dB	18	23		25	30	
R _{TH}	Thermal Resistance (Junction to Ambient)	°C/W		200			200	

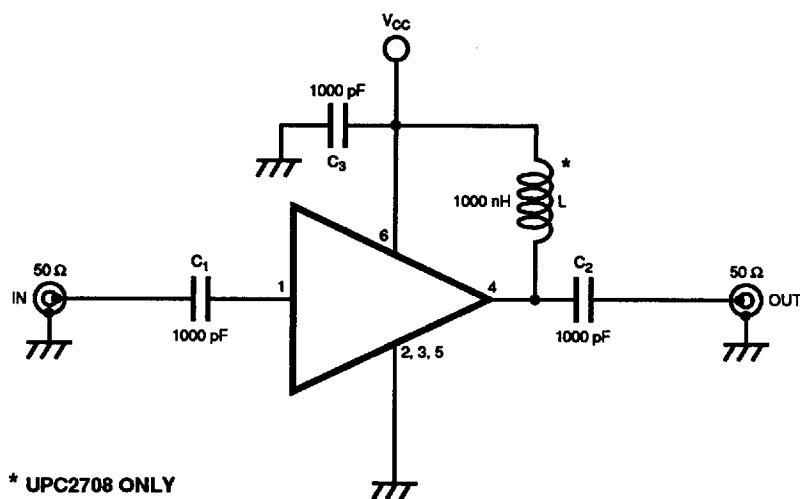
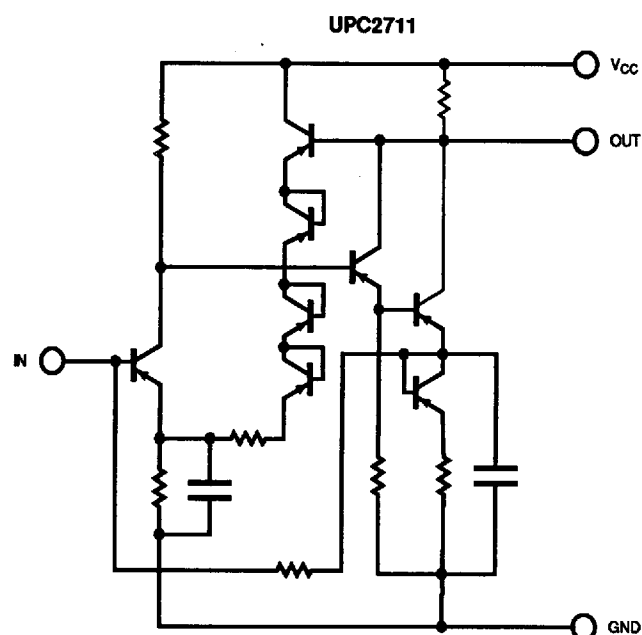
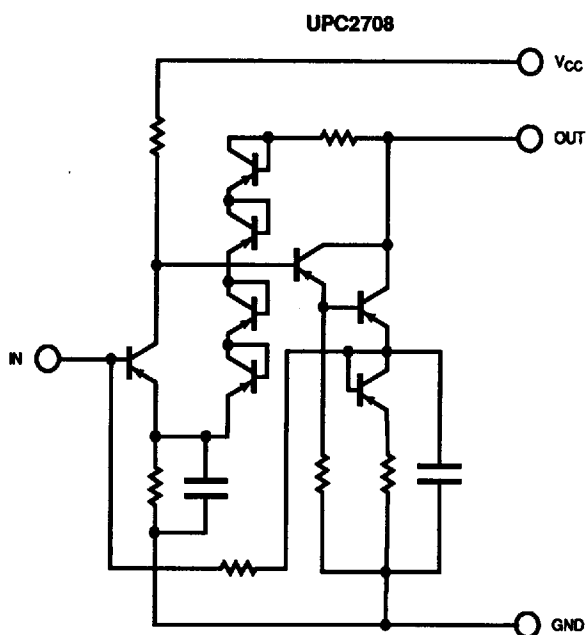
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UPC2708, UPC2711**ABSOLUTE MAXIMUM RATINGS** ($T_A = 25^\circ\text{C}$)

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	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-55 to +150

Notes:

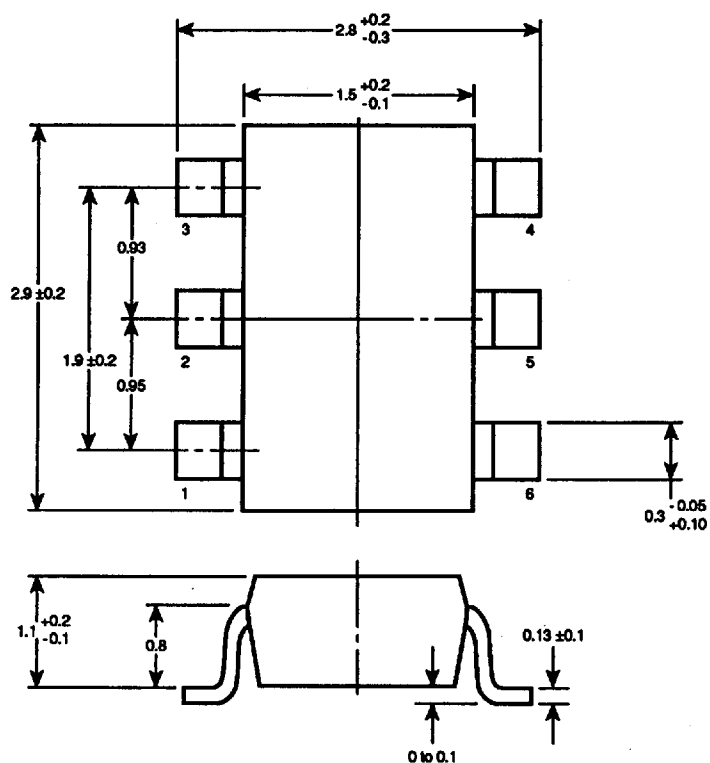
1. Recommended operating V_{CC} range is 4.5 to 5.5 V max.
2. T_A = +85°C.

TEST CIRCUIT**EQUIVALENT CIRCUIT**

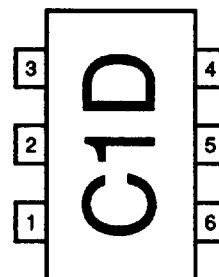
PACKAGE OUTLINE (Units in mm)

LEAD CONNECTIONS

OUTLINE TO6



(TopView)



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

Note: Package Markings:

C1D - UPC2708

C1G - UPC2711

ORDERING INFORMATION

PART NUMBER	QTY
UPC2708TE3	3K/Reel
UPC2711TE3	3K/Reel

Embossed Tape, 8 mm wide.

Pins 1, 2, 3 are in tape pull-out direction.

UPC2708, UPC2711**TYPICAL SCATTERING PARAMETERS****UPC2708**

Vcc = 5 V, Icc = 24 mA

FREQ GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂		k	S ₂₁ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.10	0.040	-3.6	5.1	-3.2	0.073	0.2	0.132	-11.5	1.49	14.2
0.20	0.063	30.7	5.2	-11.6	0.072	-1.3	0.138	-12.1	1.49	14.3
0.30	0.087	41.8	5.2	-18.5	0.071	-3.0	0.139	-13.1	1.50	14.3
0.40	0.112	47.5	5.2	-25.4	0.070	-4.2	0.140	-17.1	1.51	14.3
0.50	0.132	49.4	5.2	-32.3	0.069	-5.6	0.142	-19.8	1.51	14.3
0.60	0.162	49.6	5.2	-38.4	0.068	-5.9	0.144	-21.3	1.52	14.3
0.70	0.187	47.7	5.2	-45.3	0.067	-6.2	0.147	-23.6	1.52	14.3
0.80	0.211	45.7	5.2	-52.3	0.066	-6.6	0.150	-26.1	1.52	14.3
0.90	0.238	44.4	5.2	-59.3	0.065	-6.6	0.153	-28.5	1.52	14.4
1.00	0.265	40.0	5.2	-64.4	0.064	-5.3	0.157	-31.0	1.52	14.4
1.10	0.292	35.6	5.2	-71.7	0.063	-6.2	0.161	-33.5	1.51	14.4
1.20	0.319	32.0	5.2	-79.1	0.063	-5.3	0.165	-36.1	1.48	14.4
1.30	0.341	27.9	5.2	-86.6	0.062	-5.6	0.169	-39.6	1.48	14.4
1.40	0.363	23.8	5.2	-94.2	0.061	-5.5	0.171	-43.7	1.48	14.3
1.50	0.383	19.8	5.2	-101.8	0.061	-5.1	0.173	-46.4	1.46	14.3
1.60	0.404	15.3	5.1	-109.5	0.060	-4.9	0.176	-50.2	1.45	14.2
1.70	0.421	11.2	5.1	-117.5	0.060	-4.3	0.173	-53.9	1.45	14.1
1.80	0.435	6.9	5.0	-125.6	0.060	-3.7	0.168	-57.3	1.46	13.9
1.90	0.451	2.2	4.9	-133.5	0.060	-3.7	0.162	-61.3	1.46	13.7
2.00	0.460	-3.4	4.7	-141.1	0.060	-0.4	0.156	-62.5	1.49	13.4
2.10	0.459	-8.2	4.6	-148.8	0.060	-0.3	0.149	-60.2	1.53	13.2
2.20	0.456	-12.6	4.5	-156.6	0.060	-0.4	0.141	-60.3	1.58	13.0
2.30	0.450	-16.5	4.3	-164.6	0.060	-1.0	0.132	-61.1	1.65	12.6
2.40	0.442	-19.9	4.1	-172.5	0.060	-1.8	0.123	-61.6	1.74	12.3
2.50	0.432	-23.2	3.9	-179.9	0.060	0.7	0.113	-62.3	1.83	11.9
2.60	0.422	-26.5	3.7	-172.7	0.060	0.2	0.100	-61.5	1.95	11.4
2.70	0.407	-28.9	3.5	-165.5	0.060	0.9	0.091	-61.3	2.08	10.9
2.80	0.396	-31.5	3.3	-158.9	0.059	0.1	0.077	-61.6	2.26	10.4
2.90	0.382	-33.5	3.1	-152.4	0.059	0.8	0.067	-60.1	2.42	9.8
3.00	0.365	-35.3	2.9	-146.5	0.059	2.0	0.051	-56.7	2.62	9.3

TYPICAL SCATTERING PARAMETERS

UPC2711

Vcc = 5 V, Icc = 14 mA

FREQ GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂		k	S ₂₁ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.10	0.115	-13.9	4.1	-5.3	0.036	-1.3	0.098	-2.1	3.34	12.3
0.20	0.110	-22.1	4.1	-12.1	0.035	-2.0	0.103	2.7	3.44	12.3
0.30	0.104	-31.2	4.1	-18.3	0.034	-4.8	0.106	4.8	3.54	12.3
0.40	0.096	-41.7	4.2	-24.0	0.033	-5.1	0.116	5.6	3.63	12.4
0.50	0.085	-52.0	4.2	-29.9	0.032	-7.5	0.126	6.6	3.70	12.4
0.60	0.080	-58.8	4.2	-35.6	0.031	-8.9	0.142	4.1	3.82	12.4
0.70	0.071	-74.8	4.2	-41.3	0.030	-10.6	0.150	2.2	3.87	12.6
0.80	0.056	-88.7	4.3	-47.6	0.029	-10.7	0.160	0.5	3.94	12.7
0.90	0.044	-103.9	4.3	-54.2	0.028	-11.4	0.173	-2.6	4.03	12.8
1.00	0.030	-125.2	4.4	-61.0	0.027	-13.2	0.187	-5.3	4.13	12.8
1.10	0.023	-162.0	4.5	-67.5	0.026	-10.9	0.199	-9.6	4.21	13.0
1.20	0.028	149.4	4.5	-74.4	0.024	-11.0	0.211	-13.4	4.47	13.1
1.30	0.041	116.5	4.5	-81.9	0.023	-10.7	0.223	-17.2	4.60	13.2
1.40	0.060	96.8	4.6	-89.4	0.022	-9.9	0.233	-21.3	4.75	13.2
1.50	0.082	84.3	4.6	-96.8	0.021	-9.0	0.245	-25.8	4.89	13.3
1.60	0.103	72.8	4.6	-104.8	0.020	-5.6	0.250	-30.2	5.11	13.2
1.70	0.127	62.9	4.6	-113.0	0.019	-0.9	0.254	-35.0	5.39	13.2
1.80	0.150	53.6	4.5	-121.3	0.019	7.0	0.259	-38.4	5.38	13.1
1.90	0.181	46.7	4.5	-128.8	0.020	15.3	0.259	-41.6	5.08	13.1
2.00	0.201	38.3	4.5	-136.9	0.020	20.8	0.264	-46.0	5.08	13.0
2.10	0.224	31.6	4.4	-145.2	0.021	28.6	0.262	-49.4	4.89	12.8
2.20	0.244	26.8	4.3	-152.6	0.021	28.7	0.261	-53.5	4.94	12.6
2.30	0.264	21.3	4.2	-160.3	0.024	31.5	0.253	-56.6	4.41	12.4
2.40	0.284	17.2	4.1	-167.4	0.026	29.9	0.244	-59.5	4.16	12.2
2.50	0.303	13.0	3.9	-174.6	0.028	32.3	0.233	-61.4	3.96	11.9
2.60	0.318	8.4	3.8	178.2	0.031	33.7	0.222	-62.9	3.70	11.6
2.70	0.334	5.0	3.7	171.7	0.032	33.9	0.211	-62.8	3.68	11.3
2.80	0.347	1.8	3.5	165.2	0.034	31.7	0.198	-62.8	3.58	11.0
2.90	0.360	-1.1	3.4	158.9	0.037	30.7	0.186	-61.1	3.40	10.7
3.00	0.369	-3.9	3.3	152.4	0.039	29.9	0.175	-58.8	3.35	10.4
3.10	0.378	-6.3	3.2	146.3	0.041	28.1	0.168	-54.4	3.30	10.0
3.20	0.386	-8.4	3.1	140.5	0.043	27.3	0.163	-49.0	3.25	9.7
3.30	0.393	-10.1	3.0	134.9	0.045	26.2	0.160	-42.8	3.21	9.4
3.40	0.397	-11.9	2.8	129.0	0.048	24.7	0.162	-37.3	3.14	9.1
3.50	0.399	-13.3	2.7	123.3	0.049	23.0	0.171	-31.2	3.18	8.7