

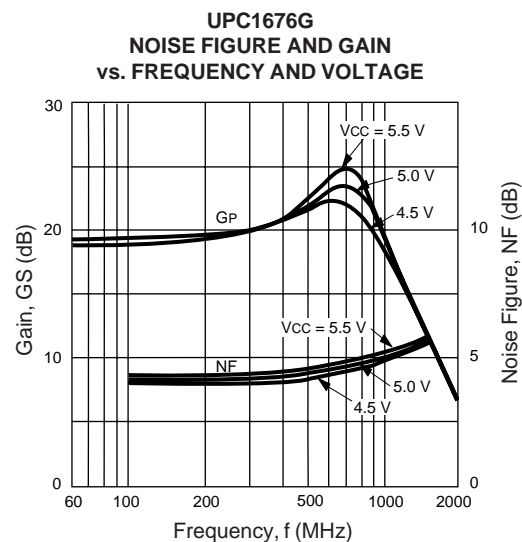
**NEC****1.2 GHz BANDWIDTH LOW  
NOISE SILICON MMIC AMPLIFIER****UPC1676B  
UPC1676G  
UPC1676P****FEATURES**

- **WIDE BANDWIDTH:**  
1200 MHz at 3 dB Point for UPC1676G  
1300 MHz at 3 dB Point for UPC1676B, UPC1676P
- **HIGH POWER GAIN:** 22 dB TYP AT  $f = 500$  MHz
- **HIGH ISOLATION**
- **SINGLE POWER SUPPLY:**  $V_{CC} = 5$  V
- **INPUT/OUTPUT MATCHED TO 50  $\Omega$**
- **AVAILABLE IN TAPE AND REEL (UPC1676G)**

**DESCRIPTION**

The UPC1676 is a silicon monolithic integrated circuit designed for wide-band amplifiers covering the VHF to UHF bands. The series is available in two package styles: a surface mount package (UPC1676G), and an 8 lead ceramic flat package (UPC1676B). Also available in chip form (UPC1676P).

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

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

PART NUMBER PACKAGE OUTLINE			UPC1676B <sup>1</sup> B08			UPC1676G 39			UPC1676P CHIP		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
I <sub>CC</sub>	Supply Current	mA	14	19	24	14	19	24	14	19	24
G <sub>s</sub>	Small Signal Gain	dB	18	20	22	19	22	24	19	22	24
P <sub>SAT</sub>	Saturated Output Power	dBm	3.5	5.5		3	5		3	5	
BW	Bandwidth 3 dB down from gain at 100 MHz	MHz	1000	1300		1000	1200		1000	1300	
NF	Noise Figure	dB		4.5	6		4.5	6		4.5	6
R <sub>LIN</sub>	Input Return Loss	dB	18	21		9	12			21	
R <sub>LOUT</sub>	Output Return Loss	dB	10	13		6	9			13	
ISOL	Isolation	dB	24	28		24	28		24	28	
R <sub>TH(J-C)</sub>	Thermal Resistance (Junction to Case)	$^\circ\text{C}/\text{W}$			50						

Note:

1. Case must be connected to GND for stable RF operation and optimum thermal dissipation.

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25°C)

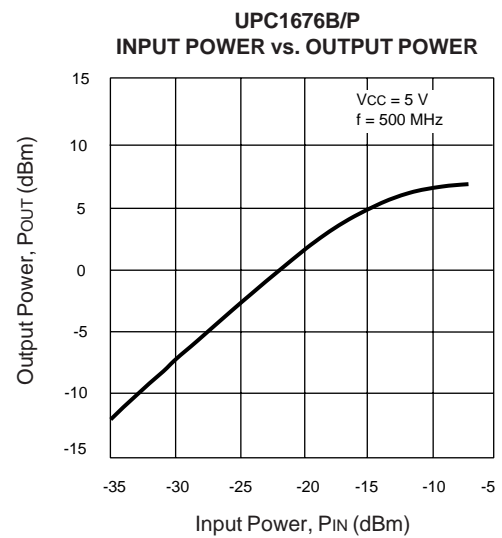
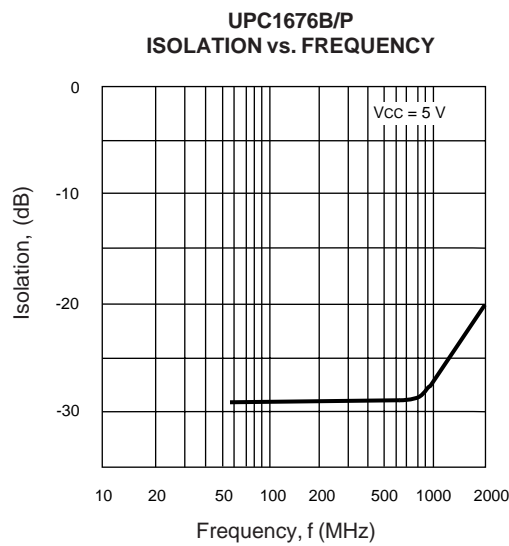
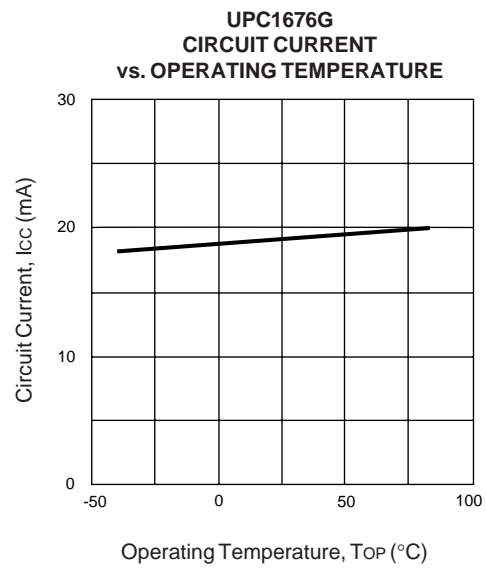
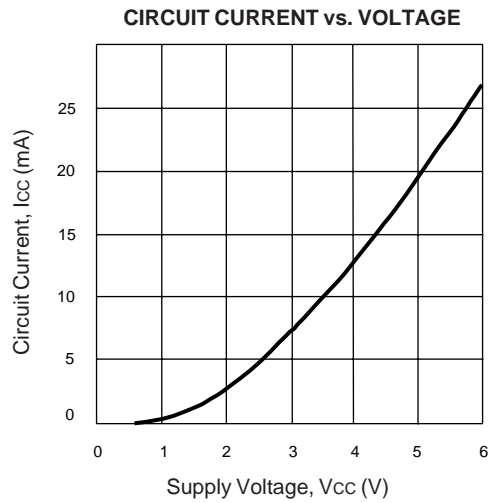
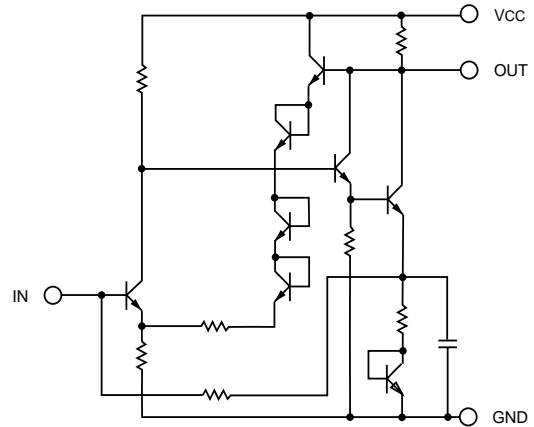
SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CC</sub>	Power Supply Voltage	V	6
P <sub>T</sub>	Total Power Dissipation UPC1676B/P UPC1676G	W mW	1.5 (T <sub>C</sub> = +125°C) 200 (T <sub>A</sub> = +85°C)
T <sub>OP</sub>	Operating Temperature UPC1676B/P UPC1676G	°C °C	-55 to +125 -40 to +85
T <sub>STG</sub>	Storage Temperature UPC1676B/P UPC1676G	°C °C	-65 to +200 -55 to +150

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

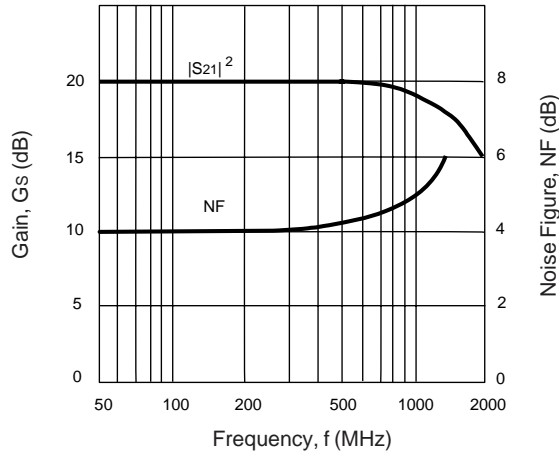
**TYPICAL PERFORMANCE CURVES** (T<sub>A</sub> = 25°C)

**EQUIVALENT CIRCUIT**

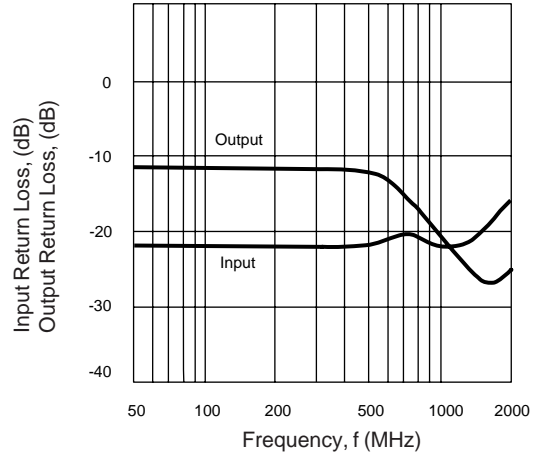


TYPICAL PERFORMANCE CURVES (T<sub>A</sub> = 25°C)

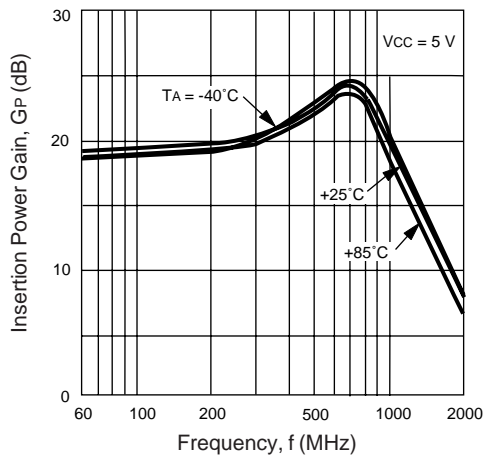
UPC1676B/P  
NOISE FIGURE AND  
GAIN vs. FREQUENCY



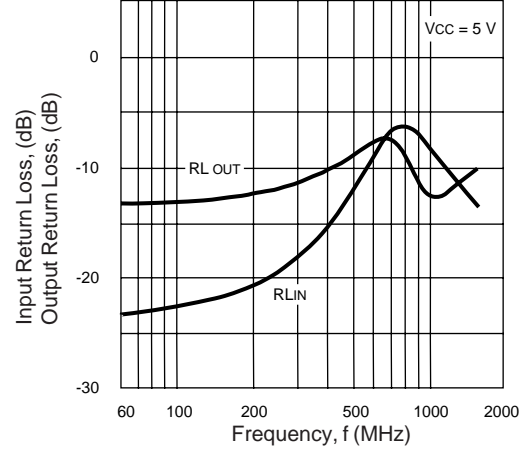
UPC1676B/P  
INPUT AND OUTPUT  
RETURN LOSS vs. FREQUENCY



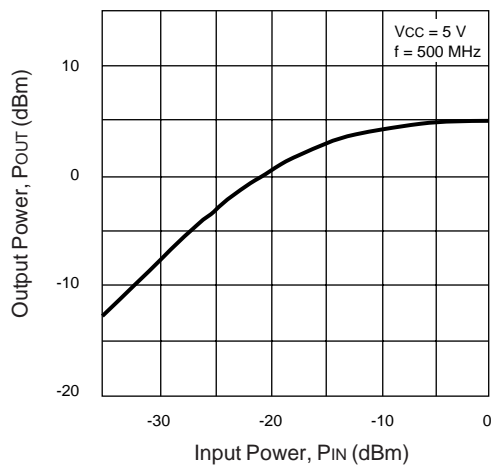
UPC1676G  
INSERTION POWER GAIN  
vs. FREQUENCY AND TEMPERATURE



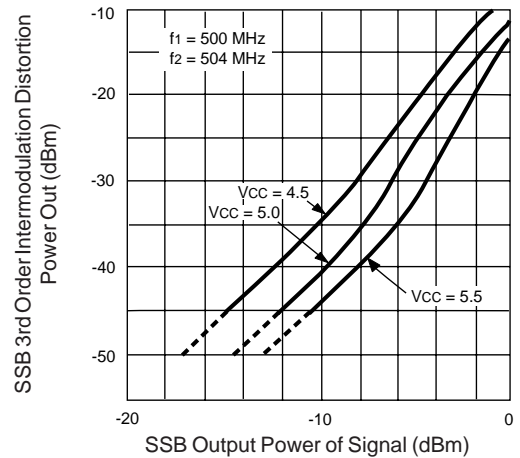
UPC1676G  
INPUT AND OUTPUT  
RETURN LOSS vs. FREQUENCY



UPC1676G  
OUTPUT POWER vs. INPUT POWER



UPC1676G  
THIRD ORDER INTERMODULATION DISTORTION  
vs. OUTPUT POWER AND VOLTAGE



# UPC1676B, UPC1676G, UPC1676P

## TYPICAL SCATTERING PARAMETERS (TA = 25°C)

### UPC1676B

Vcc = 5 V, Icc = 19 mA

FREQUENCY MHz	S11		S21		S12		S22		K	S21 dB
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
50	0.064	-11	10.153	-4	0.040	0	0.216	175	1.39	20.1
100	0.064	-18	10.131	-10	0.039	-3	0.219	165	1.41	20.1
200	0.074	-40	10.209	-23	0.038	-3	0.213	147	1.43	20.2
400	0.095	-86	10.646	-49	0.037	-7	0.211	107	1.39	20.5
600	0.100	-130	11.076	-78	0.036	-11	0.210	60	1.37	20.9
800	0.105	-174	11.035	-110	0.035	-13	0.209	9	1.40	20.9
1000	0.069	148	10.053	-145	0.031	-16	0.209	-46	1.69	20.0
1200	0.030	98	8.525	-176	0.027	-12	0.198	-95	2.21	18.6
1400	0.017	-80	6.795	157	0.030	-6	0.169	-137	2.48	16.6
1600	0.045	-121	5.407	134	0.032	2	0.135	-176	2.91	14.7
1800	0.072	-153	4.372	113	0.035	2	0.107	143	3.29	12.8
2000	0.081	-175	3.566	94	0.041	1	0.088	98	3.45	11.0
2200	0.087	158	2.984	77	0.047	-1	0.096	52	3.58	9.5
2400	0.083	129	2.537	60	0.051	-4	0.111	16	3.86	8.1

### UPC1676G

Vcc = 5 V, Icc = 19 mA

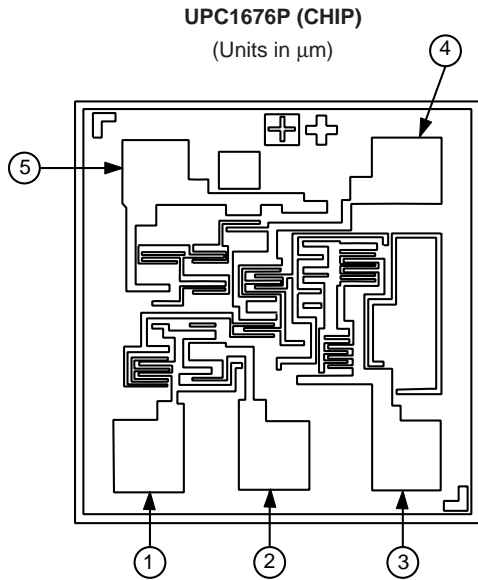
FREQUENCY MHz	S11		S21		S12		S22		K	S21 dB
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
100	0.110	-52.7	9.91	-12.0	0.039	0.3	0.218	172.0	1.43	19.9
200	0.128	-82.7	10.22	-28.0	0.040	-2.7	0.226	154.1	1.35	20.2
400	0.250	-141.3	11.61	-60.7	0.045	-7.7	0.286	111.3	1.03	21.3
600	0.484	160.9	14.84	-101.1	0.057	-20.7	0.392	63.6	0.62	23.4
800	0.813	87.1	17.69	-162.9	0.061	-50.3	0.483	-8.0	0.51	25.0
1000	0.728	15.2	12.19	134.2	0.039	-69.4	0.299	-86.6	0.85	21.7
1200	0.530	-32.1	7.34	93.6	0.032	-58.0	0.151	-152.2	1.68	17.3
1400	0.400	-66.8	4.91	64.2	0.036	-54.3	0.101	133.5	2.42	13.8
1600	0.319	-94.6	3.59	38.8	0.043	-57.6	0.110	69.4	2.92	11.1
1800	0.254	-124.5	2.79	15.1	0.051	-67.0	0.132	25.0	3.28	8.9
2000	0.200	-150.3	2.28	-8.2	0.057	-77.7	0.157	-9.5	3.65	7.2
2200	0.156	-174.9	1.95	-30.5	0.065	-87.3	0.178	-40.7	3.79	5.8
2400	0.112	164.1	1.70	-52.6	0.073	-98.7	0.199	-69.1	3.89	4.6

### UPC1676P

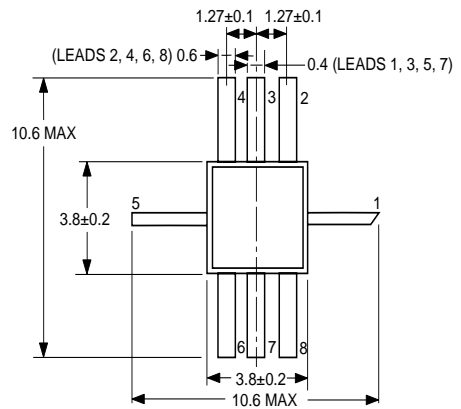
Vcc = 5 V, Icc = 19 mA

FREQUENCY MHz	S11		S21		S12		S22		K	S21 dB
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
50	0.116	-11.5	9.90	-4.0	0.046	-1.0	0.240	174.0	1.28	19.9
100	0.105	-19.5	9.77	-9.0	0.045	-2.0	0.229	168.0	1.31	19.8
200	0.122	-23.0	10.00	-19.0	0.046	4.5	0.242	154.5	1.26	20.0
400	0.131	-48.5	10.27	-39.5	0.046	9.5	0.246	128.0	1.22	20.2
600	0.146	-74.0	10.44	-61.5	0.046	13.5	0.244	98.5	1.19	20.4
800	0.152	-97.8	10.35	-85.5	0.049	16.5	0.233	65.9	1.14	20.3
1000	0.167	-120.4	9.82	-111.5	0.051	13.0	0.231	27.4	1.13	19.8
1200	0.140	-134.8	8.65	-136.0	0.049	19.5	0.182	-10.5	1.31	18.7
1400	0.136	-141.6	7.33	-158.0	0.052	23.5	0.152	-44.5	1.44	17.3
1600	0.149	-139.8	6.12	-176.0	0.060	31.6	0.092	-64.8	1.50	15.7
1800	0.166	-149.8	5.20	167.5	0.068	29.5	0.097	-62.7	1.53	14.3
2000	0.161	-156.3	4.29	151.0	0.069	25.0	0.127	-93.2	1.76	12.6
2200	0.182	-158.4	3.66	137.5	0.075	27.5	0.101	-104.5	1.87	11.3
2400	0.196	-165.4	3.10	124.5	0.080	25.0	0.111	-110.4	2.03	9.8

OUTLINE DIMENSIONS

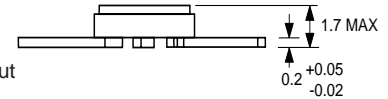


UPC1676B  
PACKAGE OUTLINE B08  
(Units in mm)



LEAD CONNECTIONS

- 1. Input 5. Output
- 2. GND 6. GND
- 3. GND 7. Vcc
- 4. GND 8. GND



CHIP FEATURES

- Die Size: 0.60 mm x 0.65 mm
- Thickness: 170 ± 30 μm
- Pad Size: 100 μm x 100 μm
- Ti/Pt/Au Metallization

BONDING INFORMATION

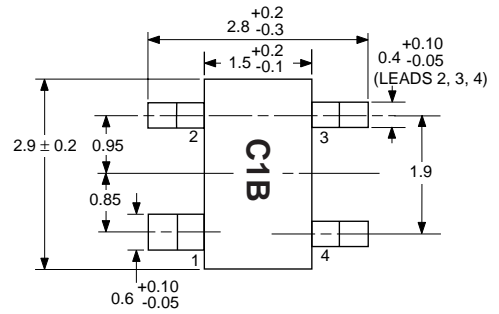
BONDING PAD NO.	BONDING PAD (mm)		PAD CONNECTION
	X AXIS	Y AXIS	
1	-185	210	INPUT
2	-5	-210	GND
3	+185	-210	GND
4	+185	-210	OUTPUT
5	-175	+210	Vcc

Note:  
All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

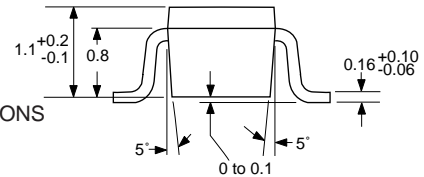
PART NUMBER	QTY
UPC1676G-T1	3000 / Reel

UPC1676G  
PACKAGE OUTLINE 39  
(Units in mm)



PIN CONNECTIONS

- 1. GND
- 2. Output
- 3. Vcc
- 4. Input



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