

1.2 GHz BANDWIDTH LOW NOISE SILICON MMIC AMPLIFIER

UPC1676B
UPC1676G
UPC1676P

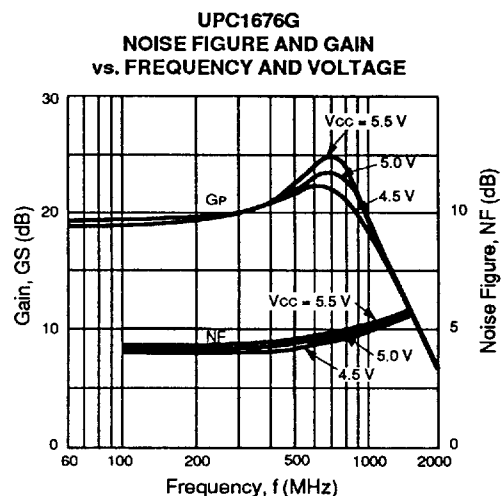
FEATURES

- **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 50Ω**
- **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 ¹ B08			UPC1676G 39			UPC1676P CHIP		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
I_{CC}	Supply Current	mA	14	19	24	14	19	24	14	19	24
G_S	Small Signal Gain	dB	18	20	22	19	22	24	19	22	24
P_{SAT}	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
RL_{IN}	Input Return Loss	dB	18	21		9	12			21	
RL_{OUT}	Output Return Loss	dB	10	13		6	9			13	
ISOL	Isolation	dB	24	28		24	28		24	28	
$R_{TH(J-C)}$	Thermal Resistance (Junction to Case)	$^\circ\text{C/W}$			50						

Note:

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

UPC1676B, UPC1676G, UPC1676P

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

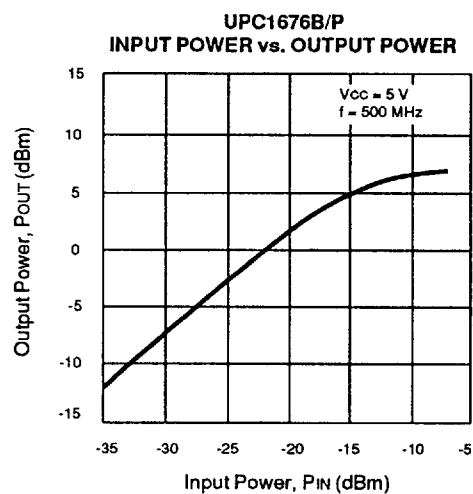
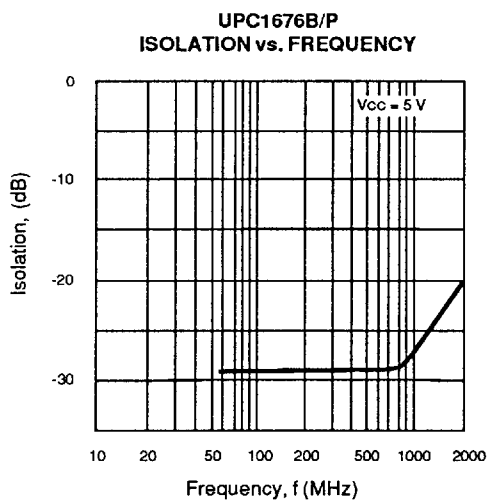
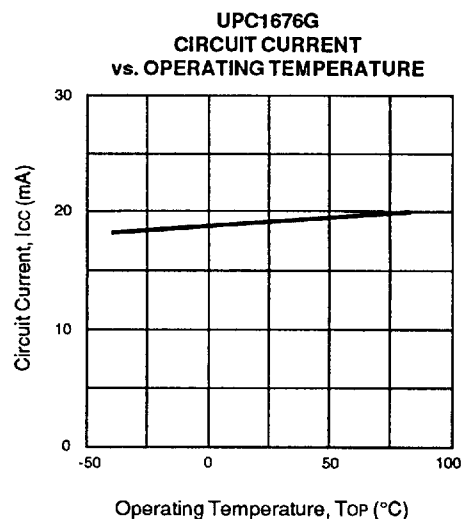
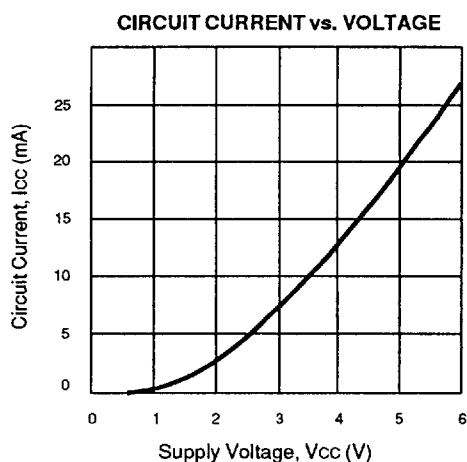
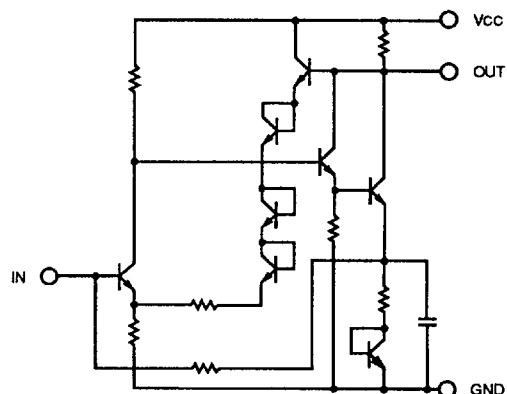
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Power Supply Voltage	V	6
P _T	Total Power Dissipation UPC1676B/P UPC1676G	W mW	1.5 (T _C = +125°C) 200 (T _A = +85°C)
T _{OP}	Operating Temperature UPC1676B/P UPC1676G	°C °C	-55 to +125 -40 to +85
T _{STG}	Storage Temperature UPC1676B/P UPC1676G	°C °C	-65 to +200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

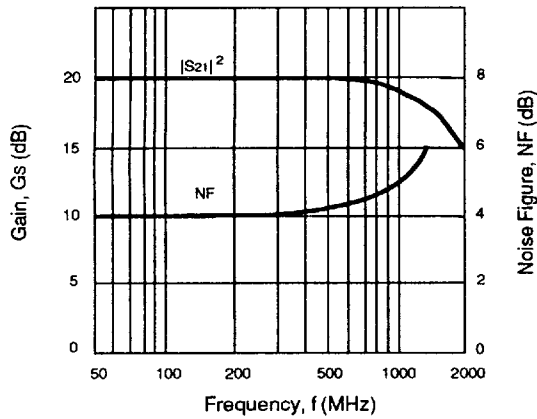
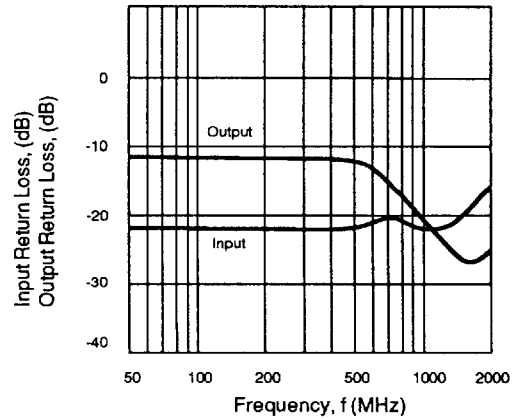
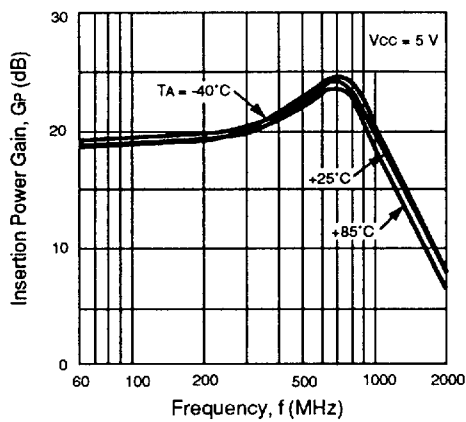
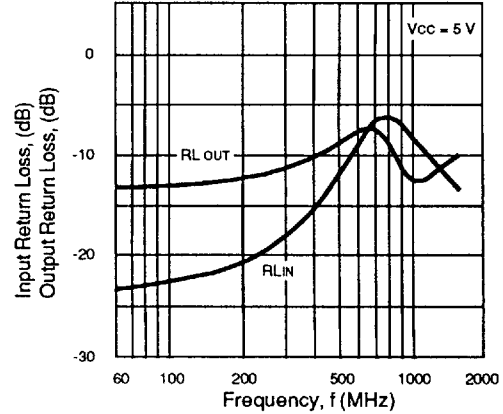
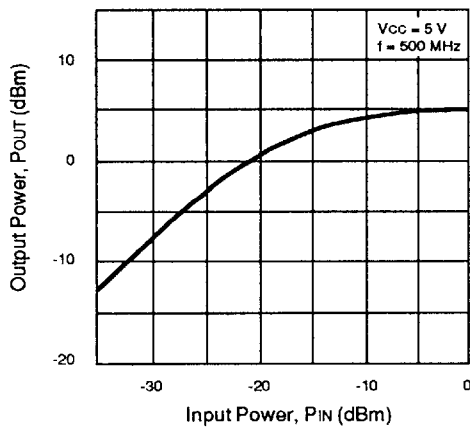
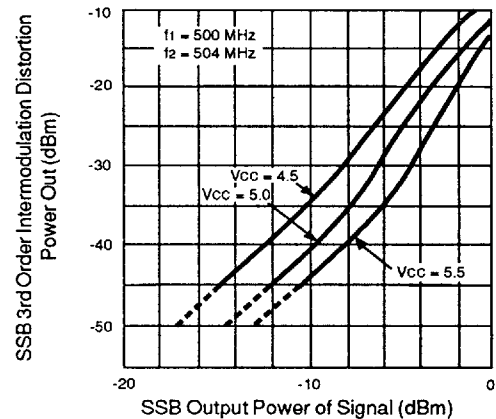
Note:

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

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

EQUIVALENT CIRCUIT



TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)UPC1676B/P
NOISE FIGURE AND
GAIN vs. FREQUENCYUPC1676B/P
INPUT AND OUTPUT
RETURN LOSS vs. FREQUENCYUPC1676G
INSERTION POWER GAIN
vs. FREQUENCY AND TEMPERATUREUPC1676G
INPUT AND OUTPUT
RETURN LOSS vs. FREQUENCYUPC1676G
OUTPUT POWER vs. INPUT POWERUPC1676G
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

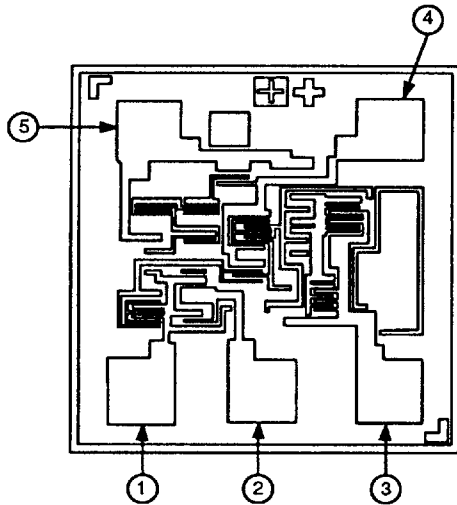
UPC1676P

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 (Units in mm)

UPC1676P (CHIP)



CHIP FEATURES

- Die Size: 0.60 mm x 0.65 mm
- Thickness: 170 ± 30 mm
- Pad Size: 100 mm x 100 mm
- 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

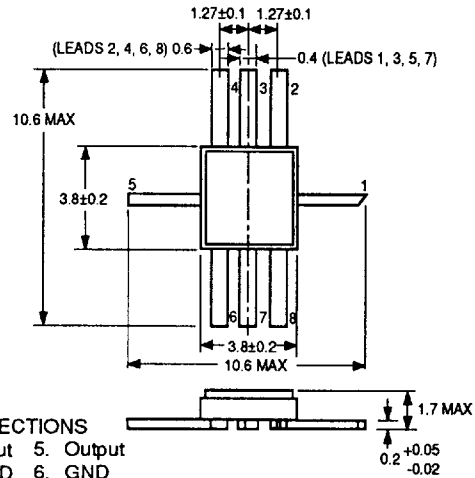
Note:

All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

PART NUMBER	QTY
UPC1676G-T1	3000 / Reel

UPC1676B
PACKAGE OUTLINE B08



UPC1676G
PACKAGE OUTLINE 39

