

FEATURES

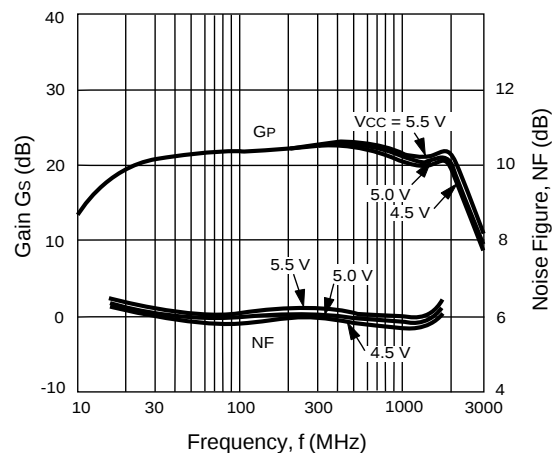
- **HIGH OUTPUT POWER:** +18 dBm PSAT
- **EXCELLENT FREQUENCY RESPONSE:**
2.0 GHz TYP at 3 dB Down
- **HIGH POWER GAIN:** 23 dB TYP at 500 MHz
- **SINGLE SUPPLY VOLTAGE:** 5 V
- **AVAILABLE IN TAPE AND REEL**

DESCRIPTION

The UPC1678 is a silicon monolithic integrated circuit designed as a wide-band amplifier covering the HF to UHF bands. The device features high output power, 18 dBm TYP, high gain, 23 dB TYP and operates from a single 5 volt supply. The UPC1678 is available in two package styles: 8 pin SOP and SSOP packages.

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

NOISE FIGURE AND GAIN
vs. FREQUENCY AND VOLTAGE



ELECTRICAL CHARACTERISTICS (TA = 25°C, VCC = +5 V, f = 500 MHz)

PART NUMBER PACKAGE OUTLINE			UPC1678G, GV G08, S08		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Icc	Circuit Current at No Input Signal	mA	40	49	60
Gs	Small Signal Gain	dB	21	23	25
f3dB	Upper Limit Operating Frequency at 3 dB down below the Gain at 100 MHz	MHz	1700	2000	
PSAT	Saturated Output Power	dBm	15.5	17.5	
NF	Noise Figure	dB		6	
RLIN	Input Return Loss	dB	11	14	
RLOUT	Output Return Loss	dB	1	4	
ISOL	Isolation	dB	30	35	

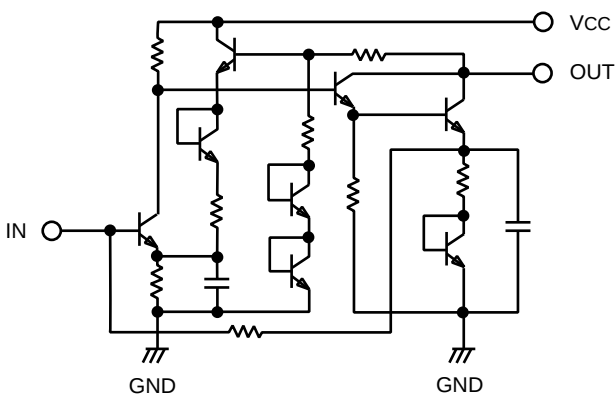
UPC1678G, UPC1678GV

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Power Supply Voltage	V	-0.5 to 6.0
P _{IN}	Input Power	dBm	+10
P _T	Total Power Dissipation ² UPC1678G, GV	mW	330
T _{OP}	Operating Temperature UPC1678G, GV	°C	-45 to +85
T _{STG}	Storage Temperature UPC1678G, GV	°C	-55 to +150

- Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
 2. Mounted on 5 cm x 5 cm x 1.6 mm glass epoxy PWB at T_A = maximum operating temperature..

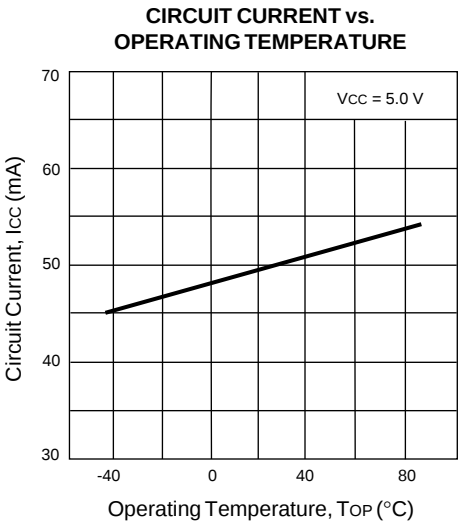
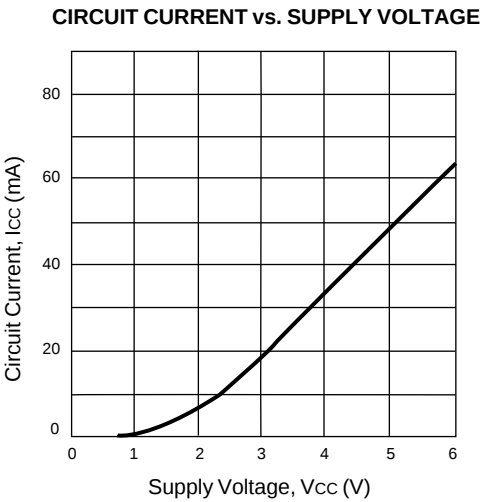
EQUIVALENT CIRCUIT



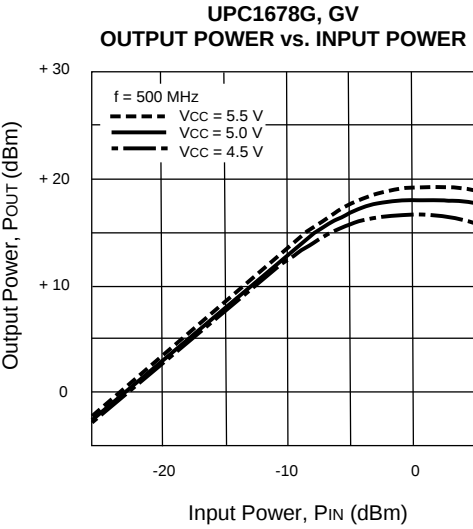
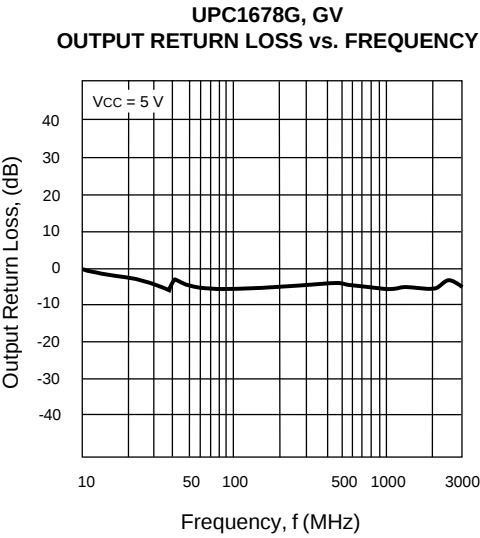
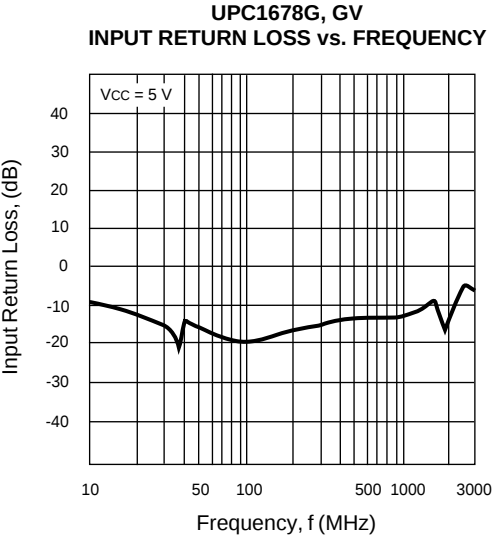
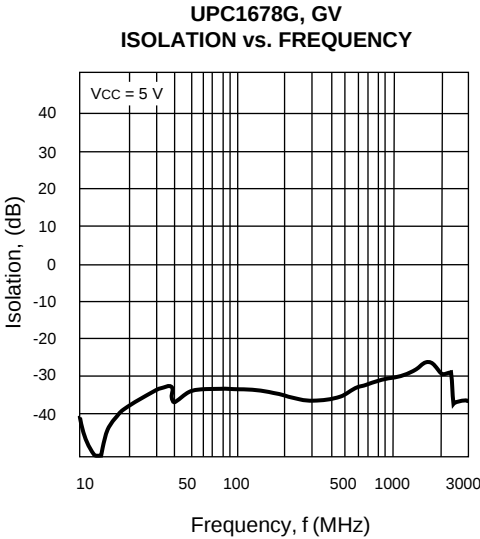
RECOMMENDED OPERATING CONDITIONS

SYMBOLS	CHARACTERISTICS	UNITS	MIN	TYP	MAX
V _{CC}	Supply Voltage	V	4.5	5.0	5.5
T _{OP}	Operating Temperature	°C	-40	+25	+85

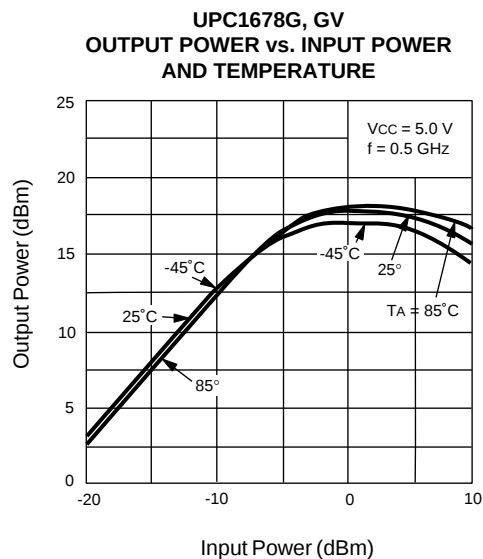
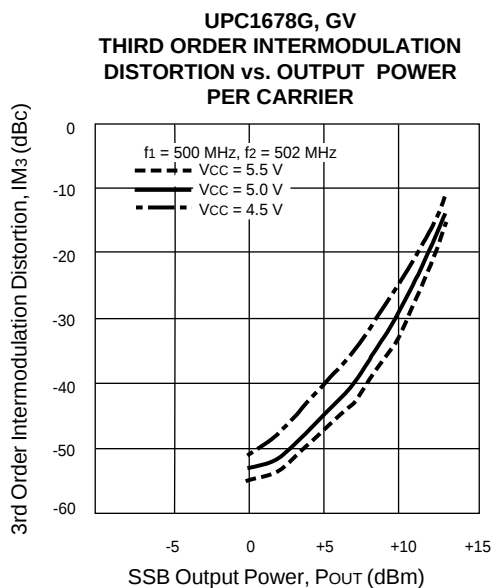
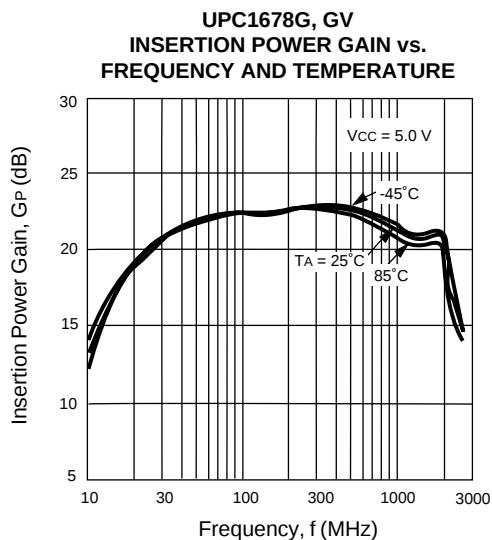
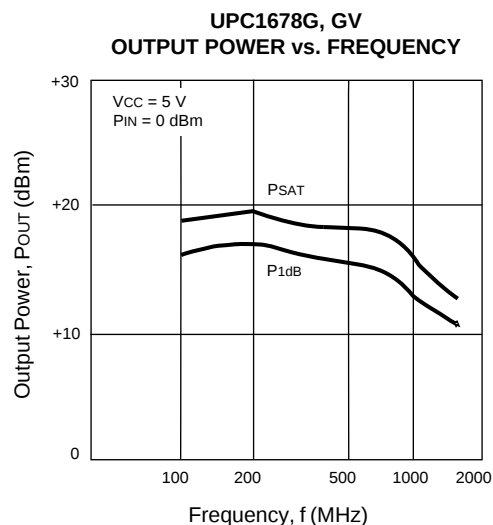
TYPICAL PERFORMANCE CURVES (T_A = 25°C)



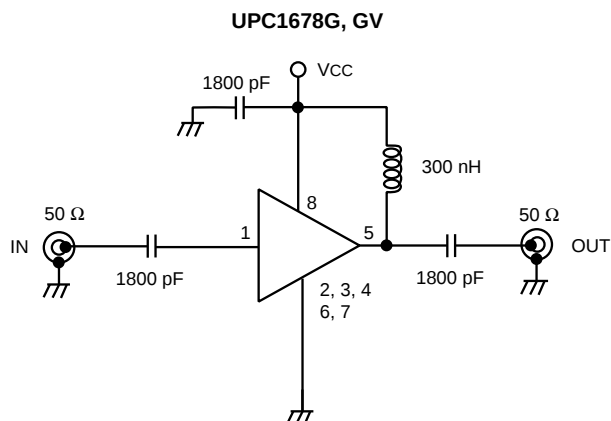
TYPICAL PERFORMANCE CURVES (TA = 25°C)



TYPICAL PERFORMANCE CURVES (T_A = 25°C)



TEST CIRCUIT



Precautions: 1) These devices are ESD sensitive. Use proper precautionary measures when handling and installing these devices.

TYPICAL SCATTERING PARAMETERS ($T_A = 25^\circ\text{C}$)**UPC1678G****V_{CC} = 5 V, I_{CC} = 51 mA**

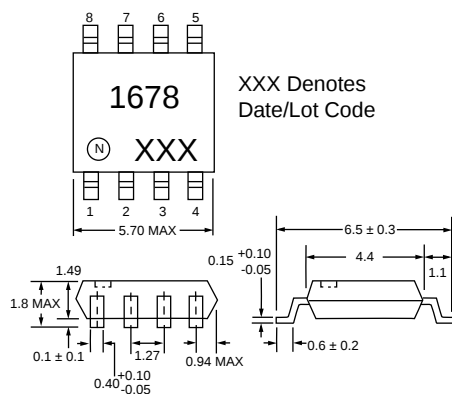
FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	S ₂₁ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.05	0.193	143	9.9	31	0.018	26	0.746	91	1.45	23.5
0.10	0.126	151	12.6	6	0.020	10	0.610	44	1.43	24.1
0.20	0.138	136	13.6	-23	0.018	-13	0.618	6	1.47	24.8
0.40	0.208	88	14.4	-70	0.015	-7	0.691	-44	1.35	26.4
0.60	0.248	43	14.0	-111	0.022	-19	0.681	-85	0.97	28.1
0.80	0.256	2	13.1	-152	0.028	-38	0.635	-121	0.89	26.7
1.00	0.239	-35	12.5	170	0.034	-57	0.610	-155	0.83	25.6
1.20	0.190	-72	11.9	129	0.038	-87	0.646	167	0.77	24.9
1.40	0.152	-115	11.9	92	0.044	-109	0.634	136	0.75	24.4
1.60	0.093	-173	11.4	53	0.045	-136	0.669	98	0.73	24.0
1.80	0.042	81	10.0	8	0.043	-169	0.697	53	0.80	23.6
2.00	0.167	37	9.1	-30	0.041	171	0.626	9	0.98	23.4
2.20	0.214	-7	7.4	-70	0.034	145	0.579	-35	1.46	19.4
2.40	0.256	-38	6.1	-107	0.031	122	0.523	-77	1.99	17.2
2.50	0.292	-53	5.5	-127	0.028	116	0.469	-98	2.49	16.1

UPC1678GV**V_{CC} = 5 V, I_{CC} = 50 mA**

FREQUENCY (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	S ₂₁ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.05	0.136	157	10.2	36	0.018	3	0.683	89	1.59	23.0
0.10	0.106	164	12.1	18	0.025	26	0.609	53	1.25	23.8
0.20	0.126	165	13.2	3	0.020	15	0.621	22	1.34	24.6
0.40	0.174	144	14.4	-17	0.017	50	0.673	-10	1.24	26.4
0.60	0.184	119	15.0	-35	0.024	71	0.657	-37	0.85	27.9
0.80	0.150	107	14.6	-52	0.033	75	0.619	-64	0.78	26.5
1.00	0.102	115	15.1	-70	0.038	77	0.599	-89	0.78	26.0
1.20	0.112	148	14.0	-88	0.040	83	0.585	-116	0.81	25.4
1.40	0.169	151	12.4	-114	0.046	92	0.542	-142	0.81	24.4
1.60	0.180	137	11.3	-131	0.054	99	0.449	-163	0.86	23.2
1.80	0.146	121	7.6	-144	0.063	101	0.335	-177	1.10	18.8
2.00	0.072	89	6.2	-159	0.073	102	0.224	-177	1.25	16.2
2.20	0.045	-37	4.6	-157	0.081	100	0.192	-163	1.49	13.4
2.40	0.137	-84	3.9	-164	0.085	97	0.206	-157	1.60	12.1
2.50	0.180	-95	3.9	-161	0.088	95	0.219	-158	1.54	12.2

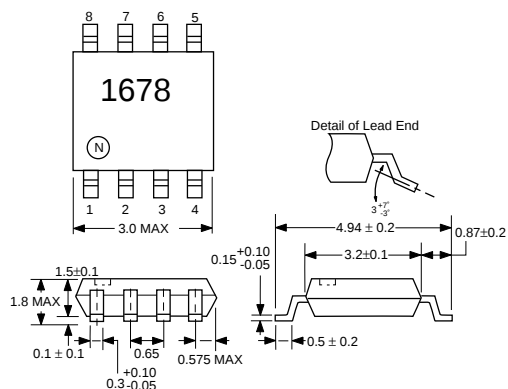
OUTLINE DIMENSIONS (Units in mm)

**UPC1678G
PACKAGE OUTLINE G08**



**LEAD
CONNECTIONS**
 1. Input 5. Output
 2. GND 6. GND
 3. GND 7. GND
 4. GND 8. Vcc

**UPC1678GV
PACKAGE OUTLINE S08**



**LEAD
CONNECTIONS**
 1. Input 5. Output
 2. GND 6. GND
 3. GND 7. GND
 4. GND 8. Vcc

ORDERING INFORMATION

PART NUMBER	QTY
UPC1678G-E1	2500/REEL
UPC1678GV-E1	1000/REEL

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