



# 1.5 GHz BANDWIDTH SILICON MMIC AMPLIFIER

T-74-13-01

UPC1659A  
UPC1659B  
UPC1659G

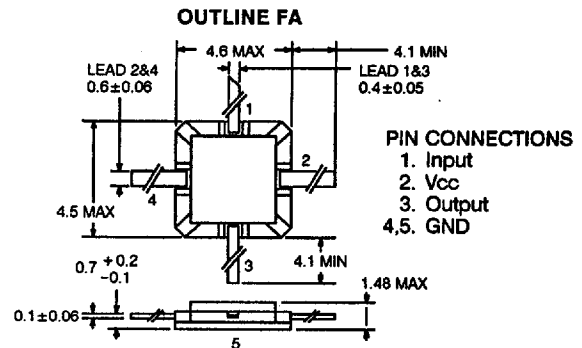
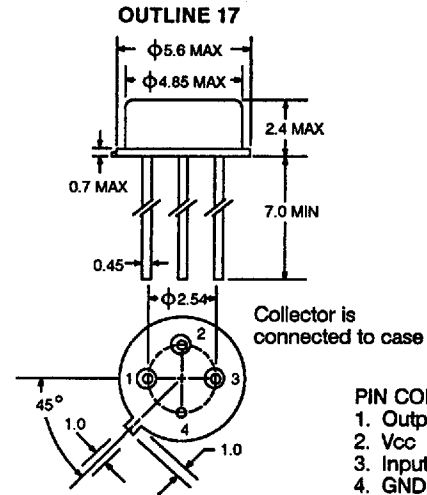
## FEATURES

- **WIDE-BAND PERFORMANCE**  
(UPC1659A/B: 0.6 to 2.3 GHz)  
(UPC1659G: 0.6 to 1.75 GHz)
- **HIGH ISOLATION:** Greater than 40 dB
- **HIGH GAIN:** 23 dB TYP at  $f = 1.5$  GHz
- **50  $\Omega$  INPUT AND OUTPUT IMPEDANCE**
- **CASCADABLE FOR MULTI-STAGE AMPLIFIER APPLICATIONS**
- **SMALL SIZE**

## DESCRIPTION AND APPLICATIONS

The UPC1659A/B/G are 3-stage silicon monolithic microwave integrated amplifiers that operate between 600 MHz and 2.3 GHz. They provide typically 23 dB of gain. The chip design employs the direct nitride-passivation process to achieve high reliability and low cost. The UPC1659A/B/G are small hermetically sealed devices that are available in can (UPC1659A), flat package (UPC1659B) and 8-pin DIP (UPC1659G) packages to adapt to a wide variety of component designs. This amplifier is well suited as a narrow-band IF amplifier for TVRO, DBS and satellite transmitter and receiver applications. As a wide-band IF amplifier, it could be designed into military or commercial mobile, airborne or ship-based communications systems.

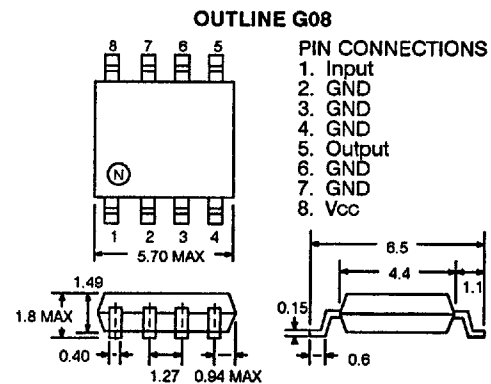
## OUTLINE DIMENSIONS (Units in mm)



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## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Vcc	Supply Voltage	V	12
PT	Total Power Dissipation	UPC1659A	mW 350
		UPC1659B	mW 500
		UPC1659G	mW 330
Rth	Thermal Resistance (J-C) UPC1659B	°C/W	61
TOP	Operating Temperature	UPC1659A/B	°C -55 to +125
		UPC1659G	°C -45 to +75
Tstg	Storage Temperature	UPC1659A/B	°C -65 to +200
		UPC1659G	°C -55 to +150



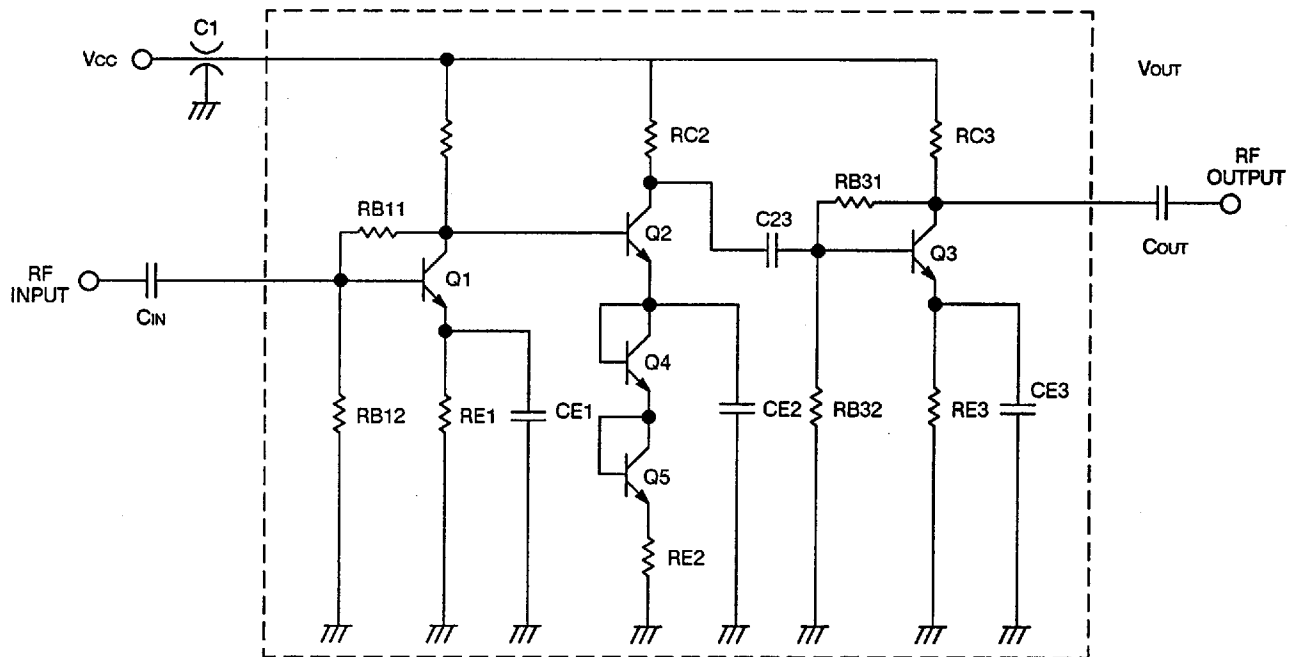
**UPC1659A, UPC1659B, UPC1659G**

**ELECTRICAL CHARACTERISTICS** (TA = 25°C)

PART NUMBER PACKAGE OUTLINE			UPC1659A 17			UPC1659B FA			UPC1659G* G08		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
I <sub>cc</sub>	Supply Current at V <sub>cc</sub> = 10 V	mA	15	21	27	15	21	27	15	21	27
GP	Gain at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dB	17	19.5	22	20.5	23	25.5	20	23	26
NF	Noise Figure at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dB		5	6.5		5	6.5		5	6.5
BW	Frequency Range at V <sub>cc</sub> = 10 V, at -3 dB Points	GHz	0.6		2.3	0.6		2.3	0.7		1.8
S <sub>12</sub>	Isolation at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dB	34	39		43	48		38	43	
S <sub>11</sub>	Input Return Loss at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dB	7	10		8	11		9	12	
S <sub>22</sub>	Output Return Loss at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dB	3	5		5	7		5	7	
P <sub>1dB</sub>	Output Power (P <sub>1dB</sub> ) at V <sub>cc</sub> = 10 V, f = 1.5 GHz	dBm	0	+3		0	+3		0	+3	

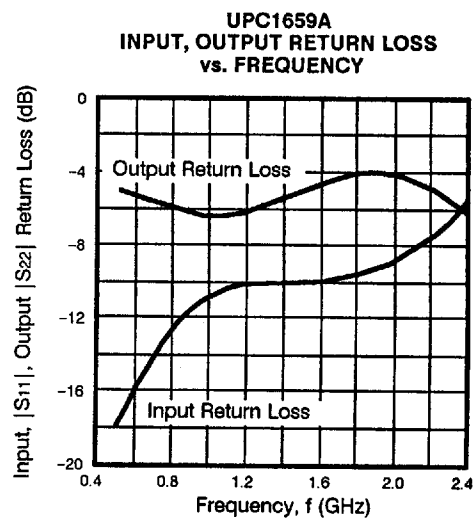
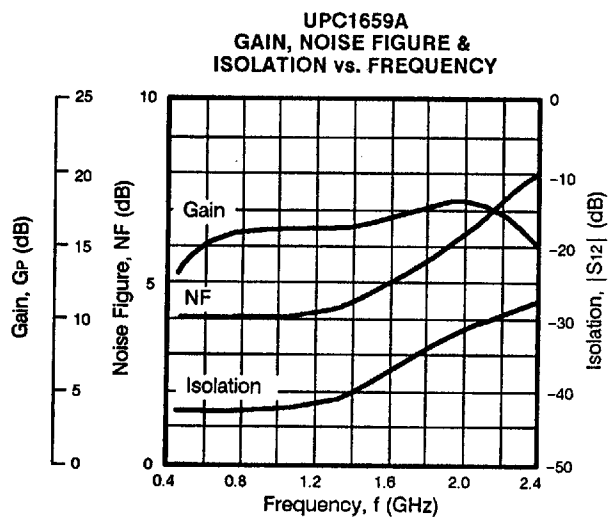
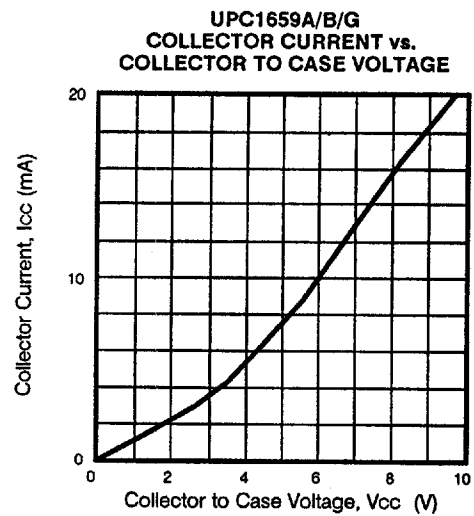
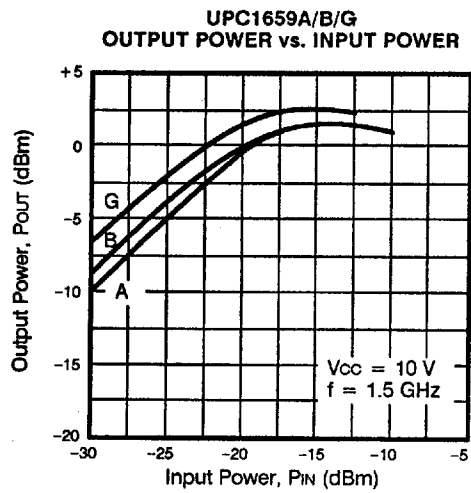
\*UPC1659G was tested at f = 1 GHz

**EQUIVALENT CIRCUIT AND EXTERNAL COMPONENTS REQUIRED**



- C1: 1000 pF feedthrough capacitor
- CIN: Input DC blocking capacitor (100 to 500 pF chip)
- COUT: Output DC blocking capacitor (100 to 500 pF chip)
- Vcc: 10 V

TYPICAL PERFORMANCE CHARACTERISTICS (TA = 25°C)



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**UPC1659A, UPC1659B, UPC1659G**

**TYPICAL PERFORMANCE CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ )

