

NEC[®]

1.5 GHz BANDWIDTH SILICON MMIC AMPLIFIER

T-74-13-01

UPC1659A
UPC1659B
UPC1659G

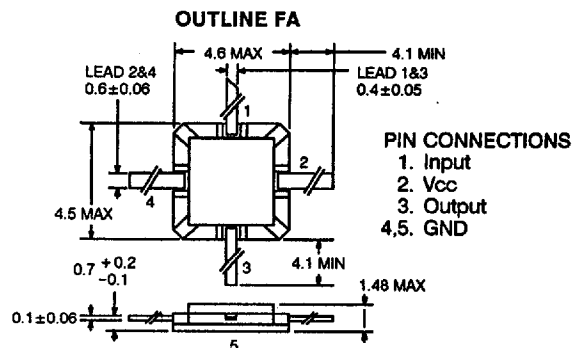
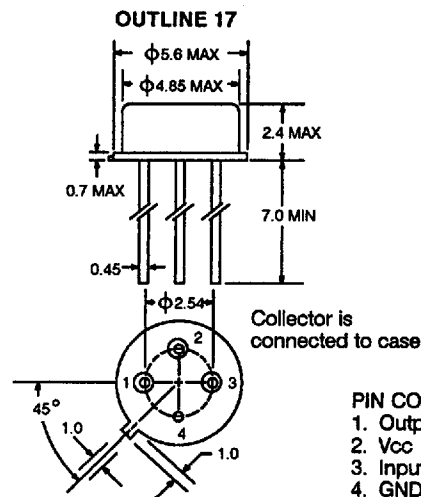
FEATURES

- **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 Ω INPUT AND OUTPUT IMPEDANCE**
- **CASCADABLE FOR MULTI-STAGE AMPLIFIER APPLICATIONS**
- **SMALL SIZE**

DESCRIPTION AND APPLICATIONS

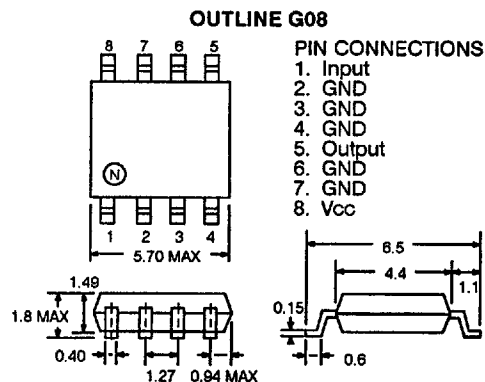
The UPC1659A/B/G are 3-stage silicon monolithic microwave integrated amplifiers that operate between 600 MHz and 2.3 GHz. They provide typically 23 dB of gain. The chip design employs the direct nitride-passivation process to achieve high reliability and low cost. The UPC1659A/B/G are small hermetically 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)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{cc}	Supply Voltage	V	12
P _T	Total Power Dissipation		
	UPC1659A	mW	350
	UPC1659B	mW	500
	UPC1659G	mW	330
R _{TH}	Thermal Resistance (J-C)	°C/W	61
T _{OP}	Operating Temperature		
	UPC1659A/B	°C	-55 to +125
	UPC1659G	°C	-45 to +75
T _{STG}	Storage Temperature	°C	-65 to +200
	UPC1659A/B	°C	-55 to +150
	UPC1659G	°C	-55 to +150

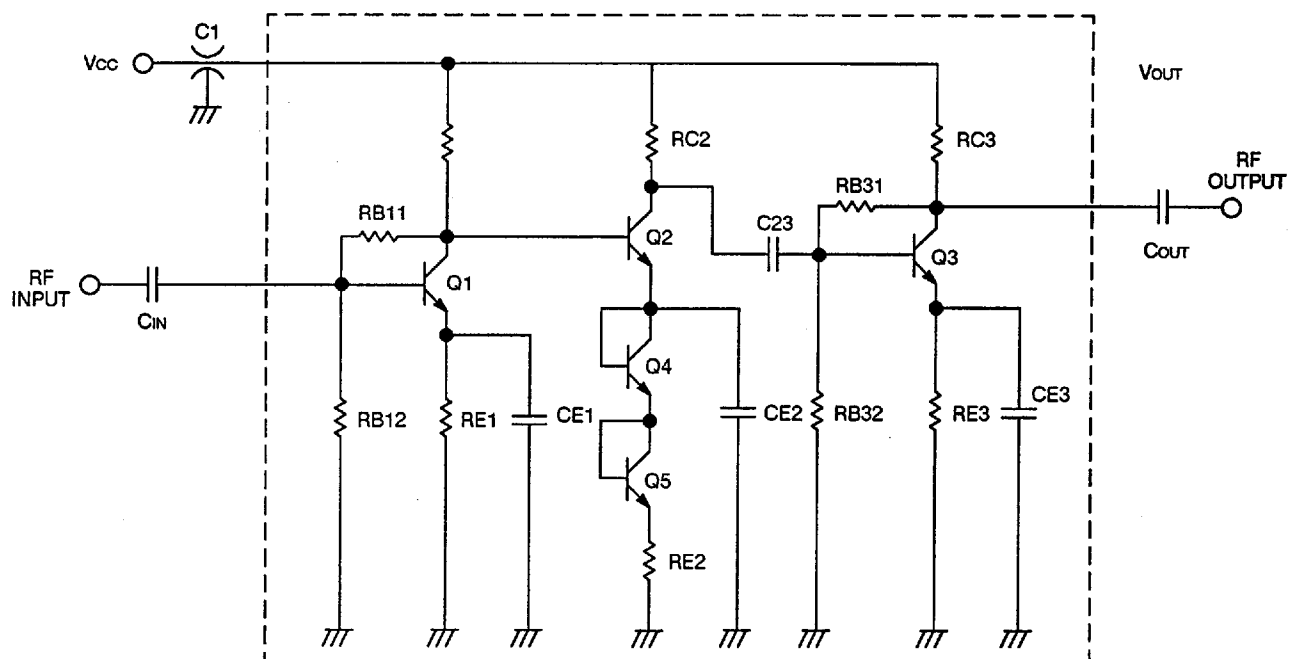


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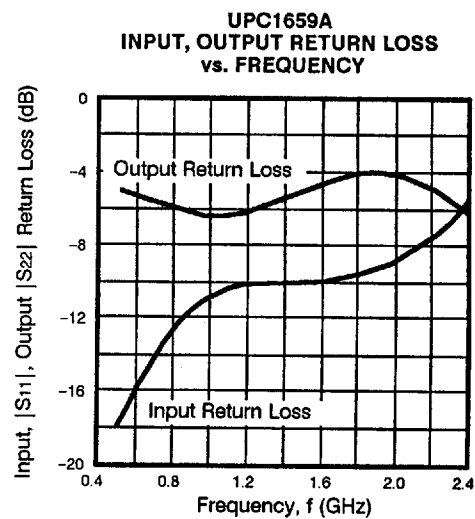
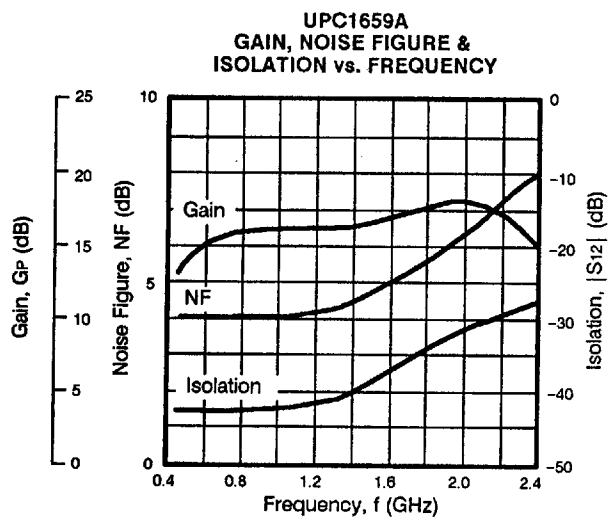
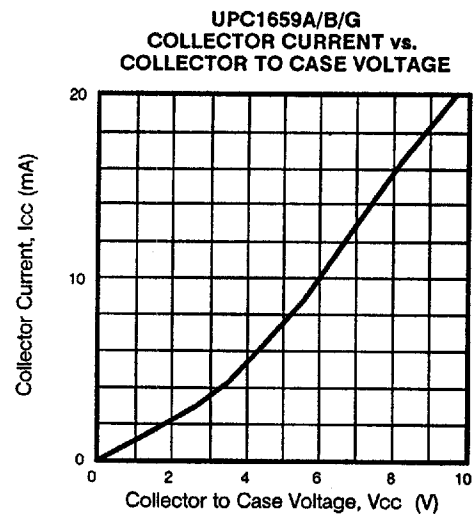
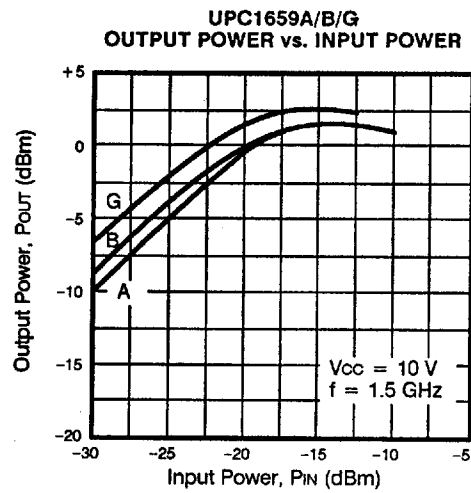
UPC1659A, UPC1659B, UPC1659G**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$)

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 _{cc}	Supply Current at V _{cc} = 10 V	mA	15	21	27	15	21	27	15	21	27
G _P	Gain at V _{cc} = 10 V, f = 1.5 GHz	dB	17	19.5	22	20.5	23	25.5	20	23	26
NF	Noise Figure at V _{cc} = 10 V, f = 1.5 GHz	dB		5	6.5		5	6.5		5	6.5
BW	Frequency Range at V _{cc} = 10 V, at -3 dB Points	GHz	0.6		2.3	0.6		2.3	0.7		1.8
S ₁₂	Isolation at V _{cc} = 10 V, f = 1.5 GHz	dB	34	39		43	48		38	43	
S ₁₁	Input Return Loss at V _{cc} = 10 V, f = 1.5 GHz	dB	7	10		8	11		9	12	
S ₂₂	Output Return Loss at V _{cc} = 10 V, f = 1.5 GHz	dB	3	5		5	7		5	7	
P _{1dB}	Output Power (P _{1dB}) at V _{cc} = 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 ($T_A = 25^\circ\text{C}$)

UPC1659A, UPC1659B, UPC1659G**TYPICAL PERFORMANCE CHARACTERISTICS** ($T_A = 25^\circ\text{C}$)