TAT7469

CATV 75 Ω pHEMT Dual RF Amplifier

Applications

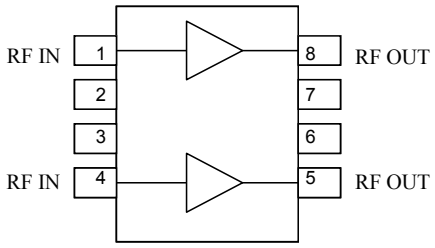
- Edge QAM gain stage
- MDU Output
- Distribution amplifiers
- Node Transimpedance Amplifier

SOIC-8 package

Product Features

- 75 Ω, 50 MHz to 1200 MHz Bandwidth
- Low Noise Figure: 3.2 dB to 1000 MHz
- Adjustable Low Power Consumption
- pHEMT device technology
- SOIC-8 package

Functional Block Diagram



General Description

The TAT7469 is a 75 Ω RF Amplifier designed for CATV use, but capable of operation up to 1200 MHz. The TAT7469 contains two separate amplifiers for push pull applications. It is fabricated using 6-inch GaAs pHEMT technology to optimize performance and cost. Each amplifier contains on-chip active biasing. The bias current set point of each amplifier is adjustable with a single resistor from the input to ground.

Pin Configuration

Pin #	Symbol
1	RF IN A
2, 3, 6, 7	No Internal Connect
4	RF IN B
5	RF OUT B
8	RF OUT A
Backside Slug	GND

Ordering Information

Part No.	Description
TAT7469	75 Ω Dual pHEMT Amplifier (lead-free/RoHS compliant SOIC-8 Pkg)
TAT7469-SC8-EB	Evaluation Board

Standard T/R size = 1000 pieces on a 7" reel.

Specifications

Absolute Maximum Ratings

Parameter	Rating
Device Voltage	+10.0 V
Operating Temperature	-40 to 85 °C

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
V_{DD}		5		V
I_{DD}		250		mA
T_J (for > 10^6 hours MTTF)			145	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions

Electrical Specifications

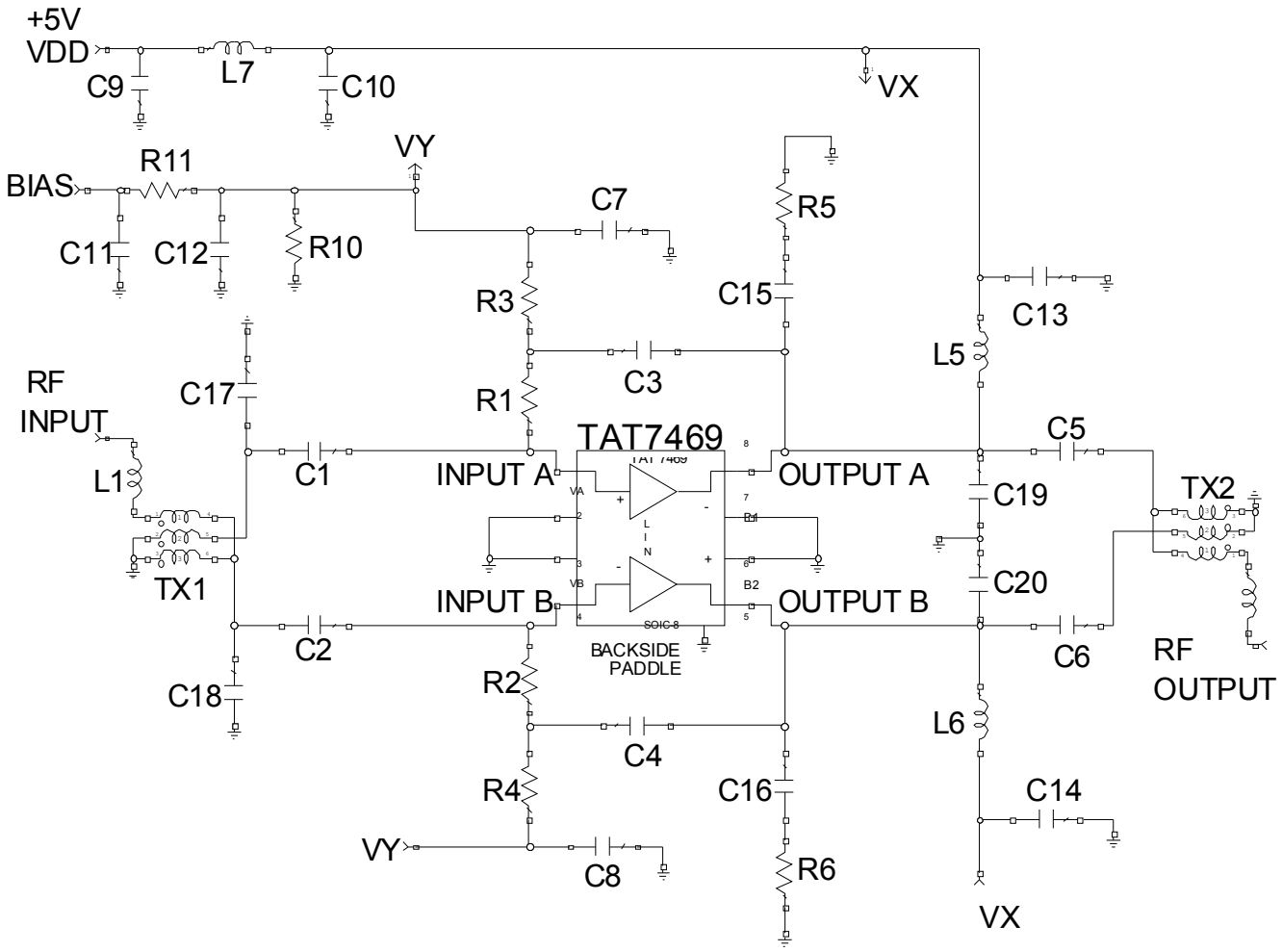
Test conditions unless otherwise noted: 25 ºC Case Temperature, +5 V V_{DD}

Parameter	Conditions	Min	Typical	Max	Units
Operational Frequency Range		50		1002	MHz
Gain			17.5		dB
Gain Flatness	Note 1		±0.75		dB
Noise Figure			3.2		dB
Input Return Loss	To 1000 MHz		18		dB
Output Return Loss	To 1000 MHz		23		dB
Output IP3	Note 2		38		dBm
Output IP2	Note 2, Note 3		68		dBm
I_{DD}	5V, Note 4		250		mA
Thermal Resistance (jnt to case) θ_{jc}	Note 5		16.5		°C/W

Notes:

1. Flatness determined by deviation from a straight-line curve fit
2. 10 dBm/tone output, applied tones at 225 MHz and 325 MHz
3. Calculated from difference intermod
4. R3 and R4 are used to set the bias current, 10 kΩ
5. Refer to Thermal Analysis Report.

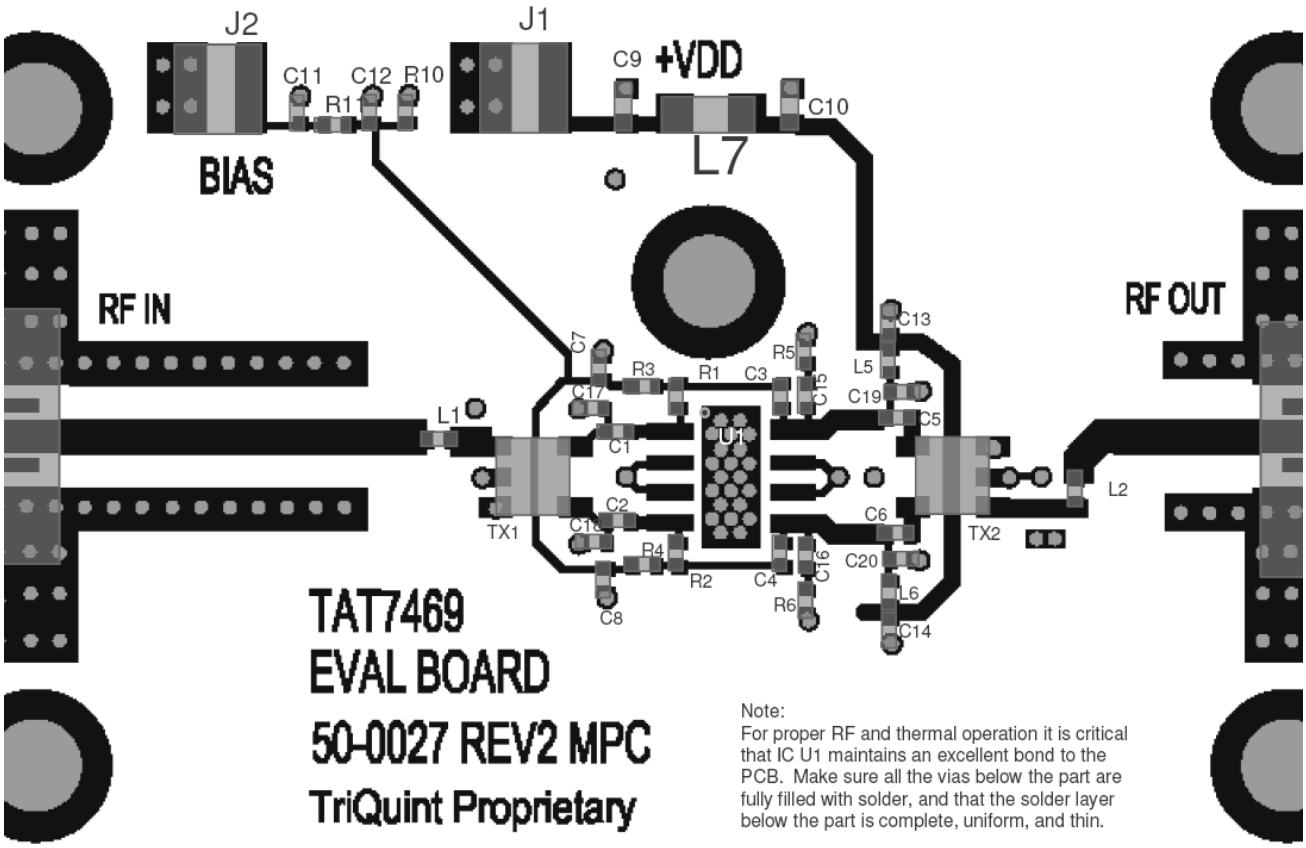
Application Circuit Reference Design 50-1002 MHz



Notes:

1. See PC Board Layout, page 4 for more information.

PC Board Layout



Note:
For proper RF and thermal operation it is critical that IC U1 maintains an excellent bond to the PCB. Make sure all the vias below the part are fully filled with solder, and that the solder layer below the part is complete, uniform, and thin.

Application Circuit BOM 50-1002 MHz

Bill of Material

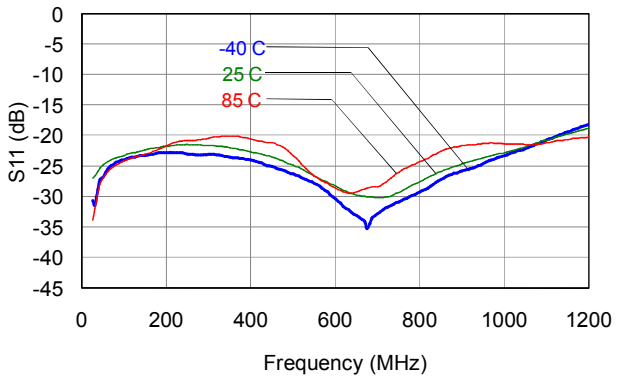
Ref. Desg.	Value	Description[1]	Manufacturer	Part Number
U1		75 Ω Dual pHEMT Amplifier	TriQuint	TAT7469
L1	3.6 nH	Chip Coil, 0402, 5 %	CoilCraft	0402CS-3N6XJLW
L2	2.2 nH	Chip Coil, 0402, 5 %	CoilCraft	0402CS-2N2XJLW
L5, L6	560 nH	Chip Coil, 0402, 5 %	CoilCraft	0402AF-561XJLW
L7	0.9 uH	Chip Coil, 1008, 10%	various	
TX1, TX2	1:1	1:1 Balun, 5 – 3000 MHz	MiniCircuits	TC1-33-75G2+
C1, C2, C3, C4, C7, C8, C11, C12, C13, C14	0.01 uF	Ceramic Cap, 0402, 16 V, NPO, 10 %	various	
C5, C6	470 pF	Ceramic Cap, 0402, 50 V, NPO, 10 %	various	
C15, C16	1.0 pF	Ceramic Cap, 0402, 50 V, ±0.10 pF	AVX	04025A010BAT9A
C17, C18	0.5 pF	Ceramic Cap, 0402, 50 V, ±0.10 pF	AVX	04025A005BAT9A
C9, C10	0.1 uF	Ceramic Cap, 0603, 16 V, NPO, 10 %	various	
R1, R2	820 Ω	Thick Film Res, 0402, 1 %	various	
R3, R4	10 kΩ	Thick Film Res, 0402, 1 %	various	
R5, R6	30 Ω	Thick Film Res, 0402, 1 %	various	
R10	100 Ω	Thick Film Res, 0402, 1 %	various	
R11	0 Ω	Thick Film Res, 0402	various	
C19, C20	N/L	Do Not Place Parts		
J3, J4	F-Edge Mount	75 Ω Female connector	Amphenol	531-40039

Notes:
1. Or equivalent

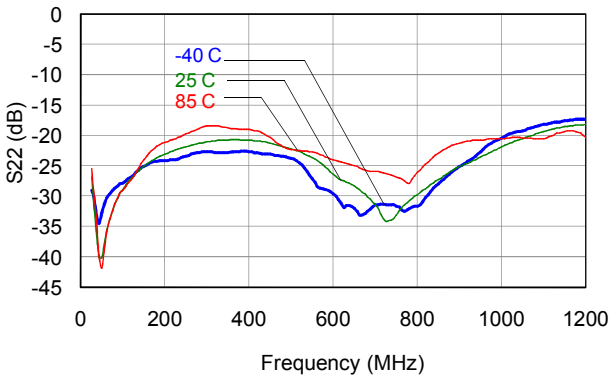
Application Board Typical Performance

V_{DD} = +5 V, I_{DD} = 235 mA (at 25 °C), Temperatures are case temp

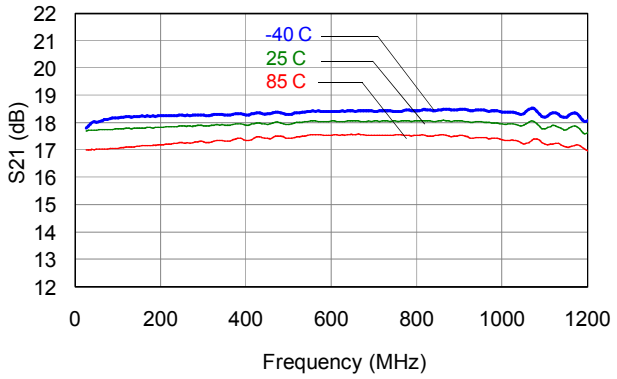
TAT7469 Input Return Loss



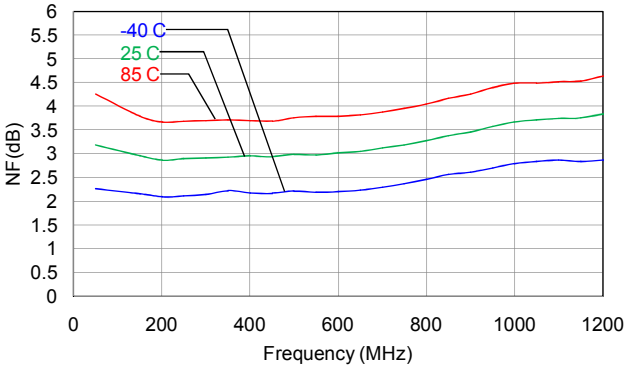
TAT7469 Output Return Loss



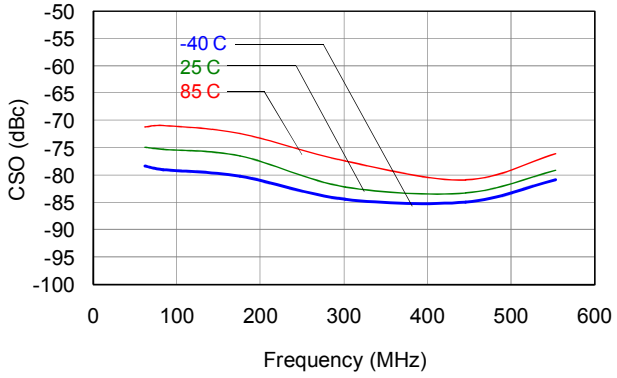
TAT7469 Gain



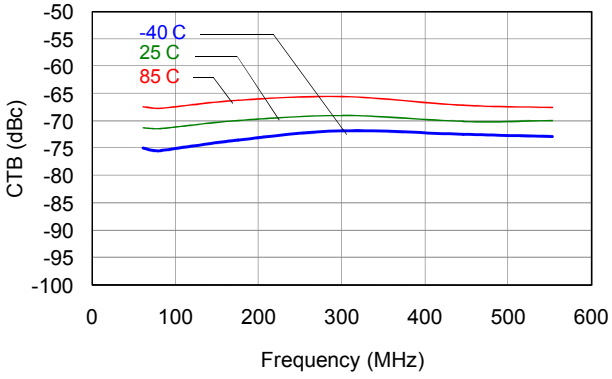
TAT7469 Noise Figure



TAT7469 CSO



TAT7469 CTB



Notes:

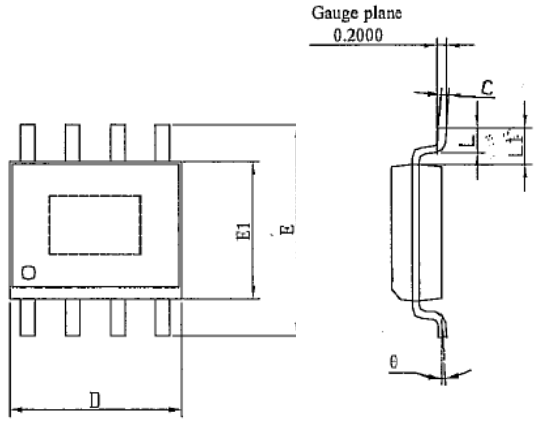
1. CSO and CTB: 39 dBmV/ch at output, 80 ch NTSC flat

Mechanical Information

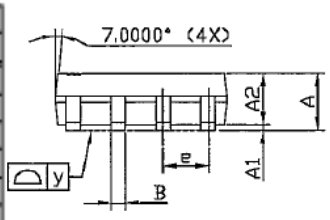
Package Information and Dimensions

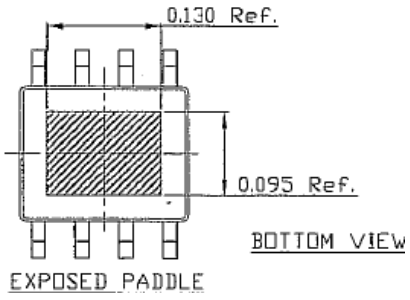
This package is lead-free/RoHS-compliant. The plating material on the leads is 100% Matte Tin. It is compatible with both lead-free (maximum 260 °C reflow temperature) and lead (maximum 245 °C reflow temperature) soldering processes.

The TAT7469 will be marked with a "TAT7469" designator and an 8 digit alphanumeric lot code (XXXXYYWW). The first four digits are the lot code (XXXX). The last four digits are a date code consisting of the year and work week (YYWW) of assembly.



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
A1	0.00	—	0.10	0.000	—	0.004
A2	—	1.45	—	—	0.057	—
B	0.33	—	0.51	0.013	—	0.020
C	0.19	—	0.25	0.007	—	0.010
D	4.80	—	5.00	0.189	—	0.197
E1	3.80	3.90	4.00	0.150	0.153	0.157
e	—	1.27	—	—	0.050	—
E	5.80	6.00	6.20	0.228	0.236	0.244
L	0.40	—	1.27	0.016	—	0.050
y	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°
L1-L1'	—	—	0.12	—	—	0.005
L1	1.04REF			0.041REF		





Product Compliance Information

ESD Information

Caution! ESD-Sensitive Device

ESD Rating:	Class 1 B
Value:	Passes ≥ 600 V min.
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114

ESD Rating:	Class IV+
Value:	Passes ≥ 2000 V min.
Test:	Charged Device Model (CDM)
Standard:	JEDEC Standard JESD22-C101

MSL Rating

Level 3 at +260 °C convection reflow.
The part is rated Moisture Sensitivity Level 3 at 260 °C per JEDEC standard IPC/JEDEC J-STD-020.

Solderability

Compatible with the latest version of J-STD-020, Lead free solder, 260 °C.

is part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

Contact Information

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