

TAT7469

CATV 75 Ω pHEMT Dual RF Amplifier



Applications

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

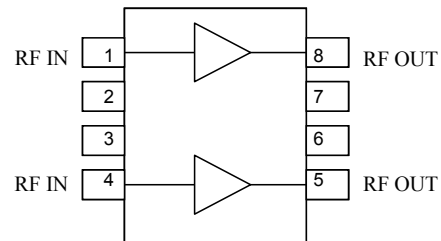
Product Features

- 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



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 °C 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:

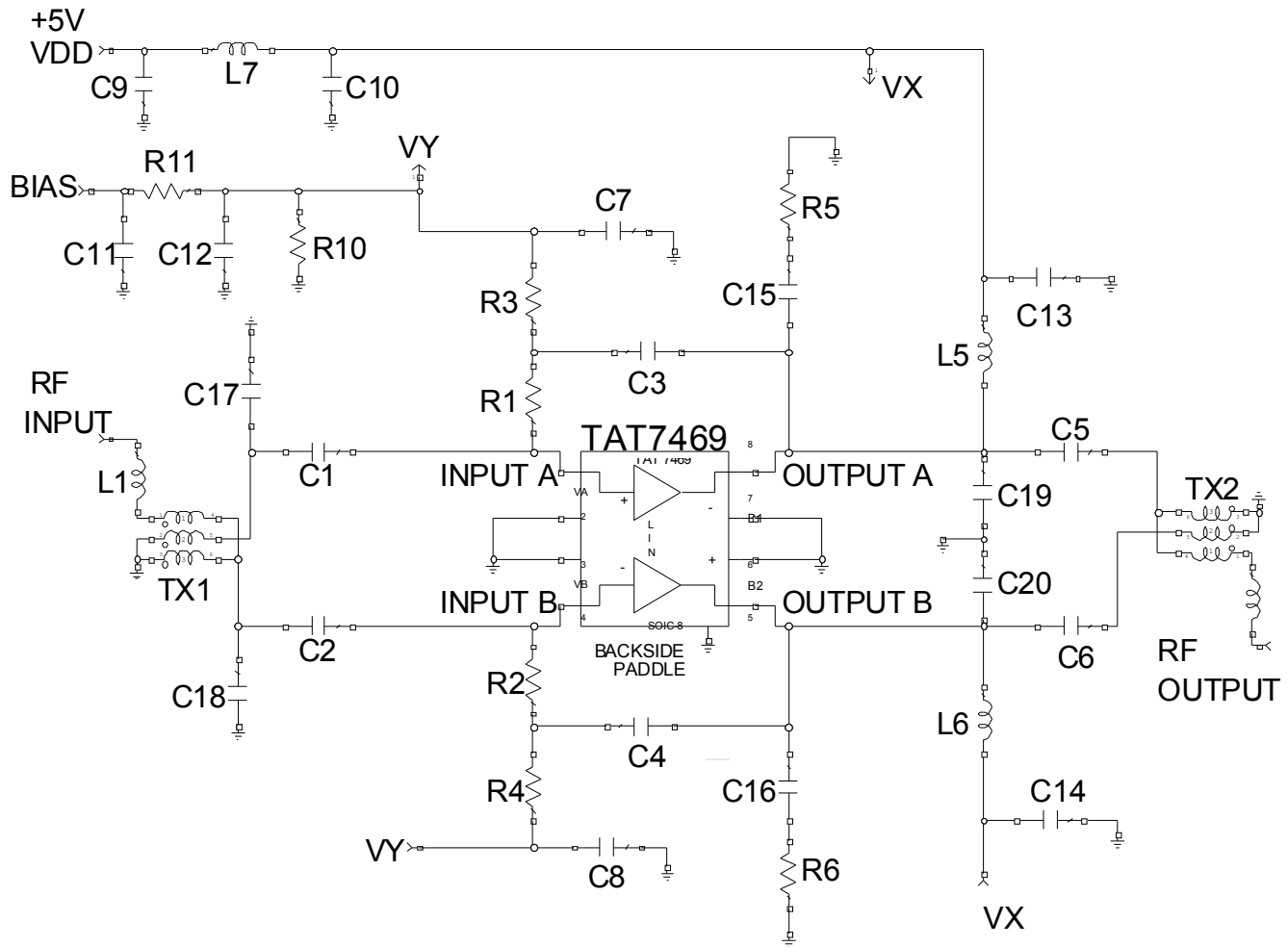
1. Flatness determined by deviation from a straight-line curve fit
2. 10 dBm/ton output, applied tones at 225 MHz and 325 MHz
3. Calculated from difference intermod
4. R3 and R4 are used to set the bias current, 10 k Ω
5. Refer to Thermal Analysis Report.

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CATV 75 Ω pHEMT Dual RF Amplifier



Application Circuit Reference Design 50-1002 MHz



Notes:

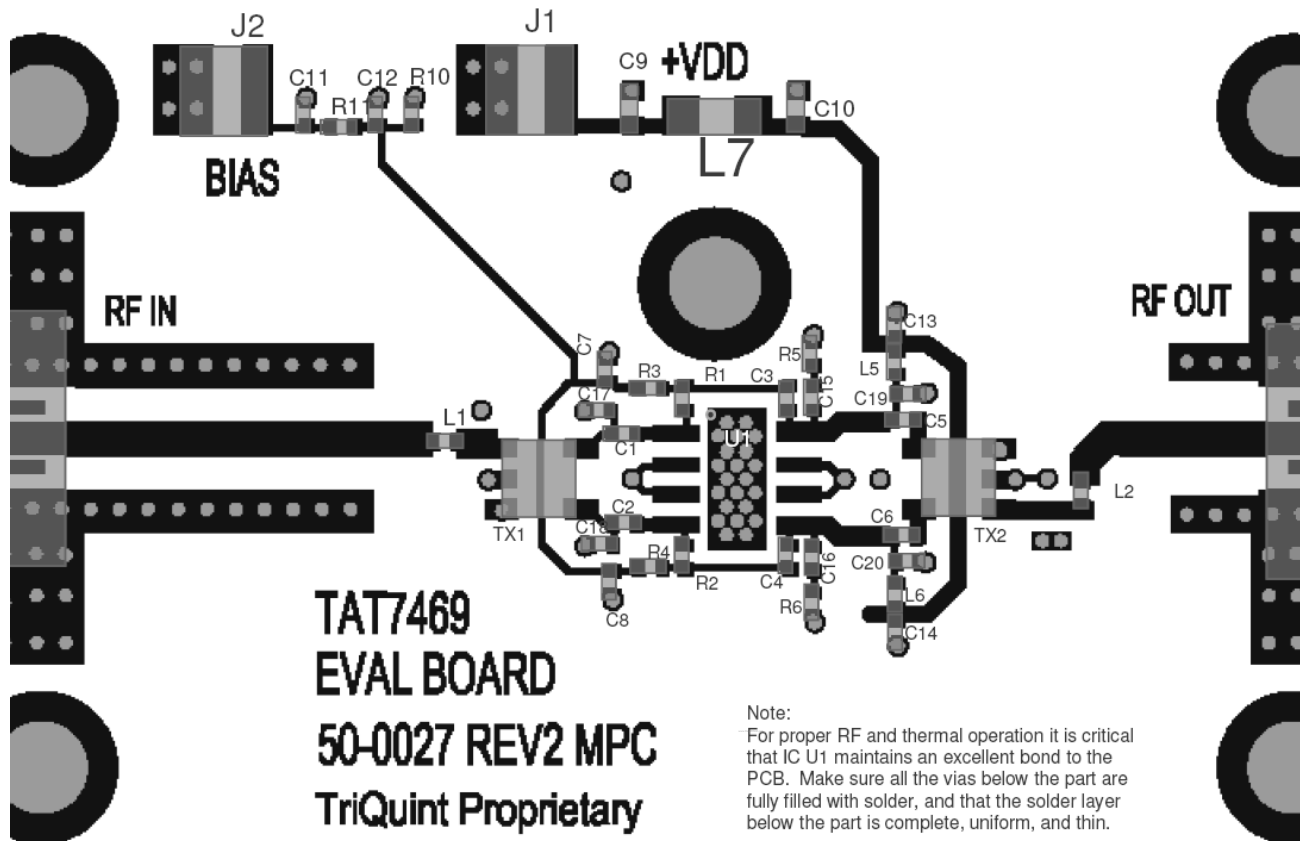
1. See PC Board Layout, page 4 for more information.

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CATV 75 Ω pHEMT Dual RF Amplifier



PC Board Layout



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CATV 75 Ω pHEMT Dual RF Amplifier



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 μ H	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 μ F	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 μ F	Ceramic Cap, 0603, 16 V, NPO, 10 %	various	
R1, R2	820 Ω	Thick Film Res, 0402, 1 %	various	
R3, R4	10 k Ω	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

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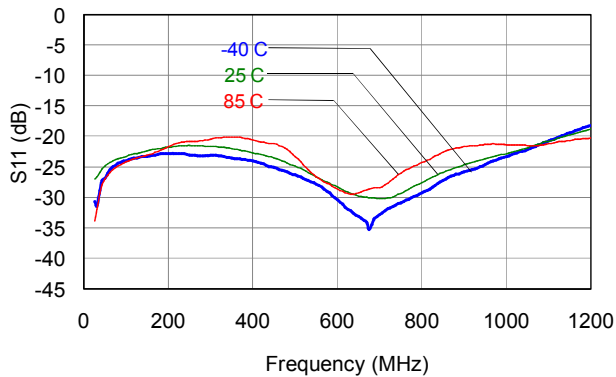
CATV 75 Ω pHEMT Dual RF Amplifier



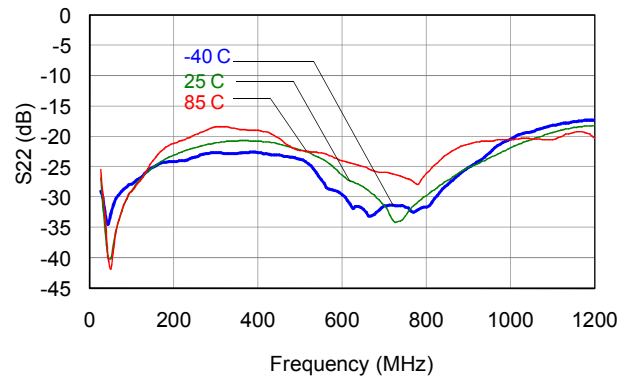
Application Board Typical Performance

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

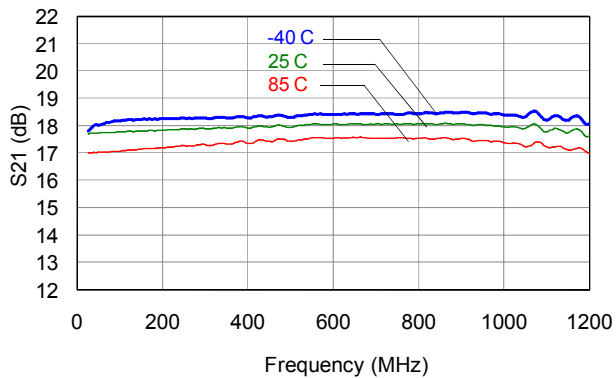
TAT7469 Input Return Loss



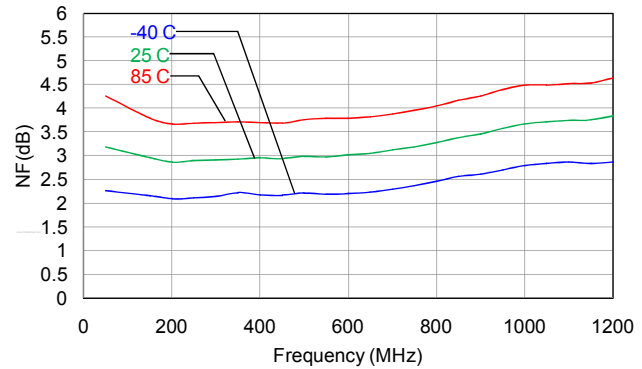
TAT7469 Output Return Loss



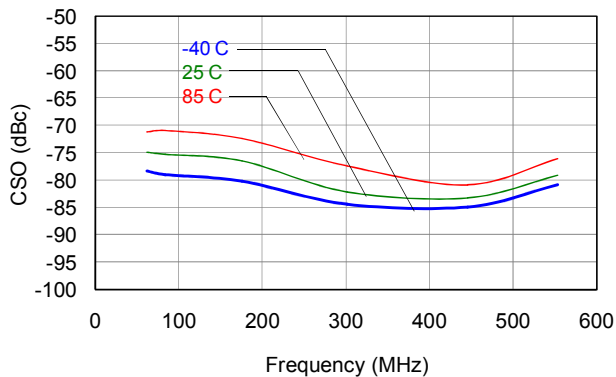
TAT7469 Gain



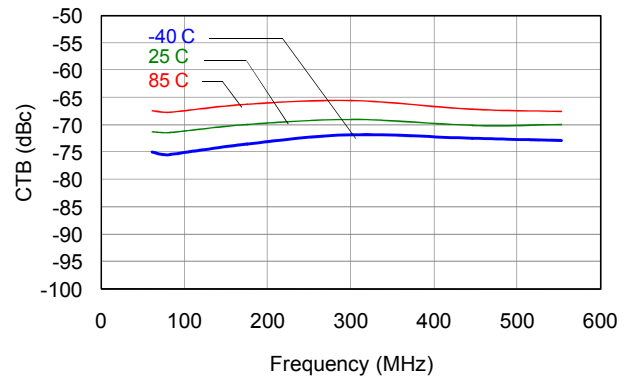
TAT7469 Noise Figure



TAT7469 CSO



TAT7469 CTB



Notes:

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

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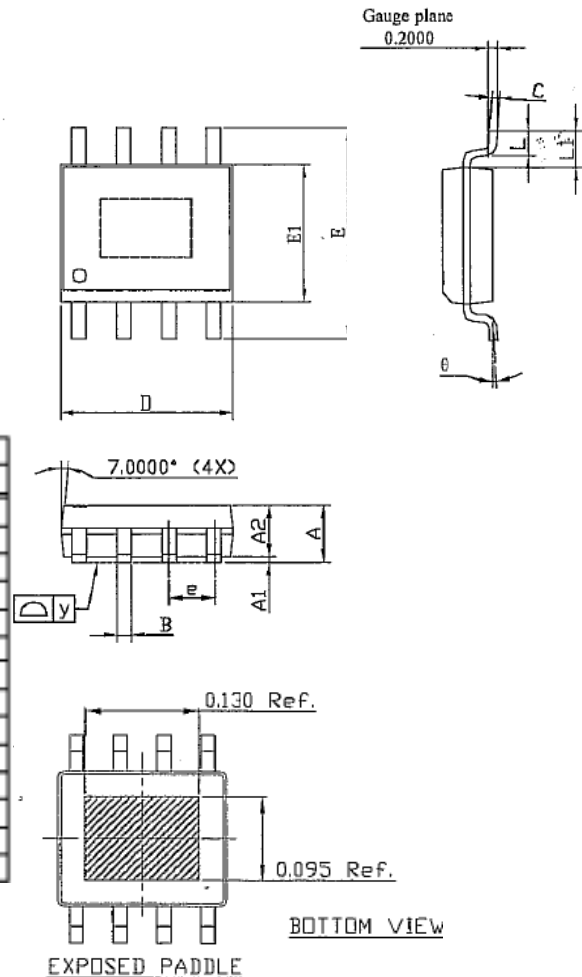
Mechanical Information

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	0.180	—	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

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).

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.

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

Web: www.triquint.com
Email: info-sales@tqs.com

Tel: +1.707.526.4498
Fax: +1.707.526.1485

For technical questions and application information:

Email: sjcappplication.engineering@tqs.com

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