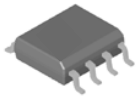
TAT7467H

CATV 75 Ω pHEMT Dual RF Amplifier

Applications

- Replacement for 5 V SOIC-8 Amplifiers
- Edge QAM Output Stage
- MDU Output
- Distribution Amplifiers
- Transmitter Driver Amplifier

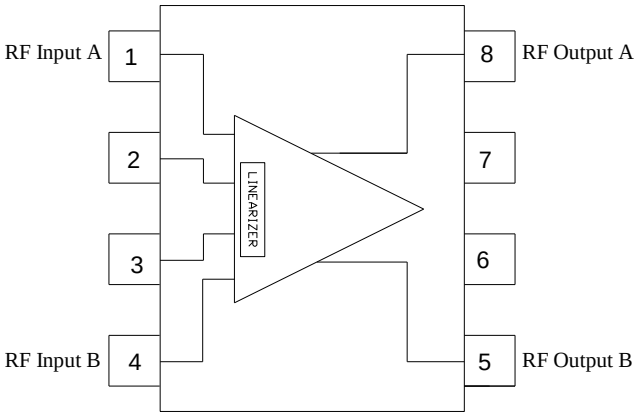


SOIC-8 package

Product Features

- 75 Ω, 40-1002 MHz Bandwidth
- pHEMT device technology
- Meets DOCSIS 3.0 Output Requirements
- 5 V supply voltage
- 380 mA typical current consumption
- On-chip Linearization
- SOIC-8 package

Functional Block Diagram



General Description

The TAT7467H is a 75 Ω fully integrated single-die differential RF Amplifier covering medium power applications in the CATV band. The TAT7467H includes on-chip linearization to improve 3rd order distortion performance while maintaining low power consumption on a 5 V supply. It is fabricated using 6 inch GaAs pHEMT technology to optimize performance and cost.

Pin Configuration

Pin #	Symbol
1	RF Input A
2	Linearizer A
3	Linearizer B
4	RF Input B
5	RF Output B
6	Biasing 2
7	Biasing 1
8	RF Output A
9	Ground Slug

Ordering Information

Part No.	Description
TAT7467H	75 Ω Dual pHEMT Amplifier (lead-free/RoHS compliant SOIC-8 Pkg)
TAT7467H-EB	Amplifier Evaluation Board

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

Specifications

Absolute Maximum Ratings[1]

Parameter	Rating
Device Voltage	+10 V
Storage Temperature	-60 to +150 °C
Operating Temperature	-40 to +85 °C

Notes:
1. 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}		380		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

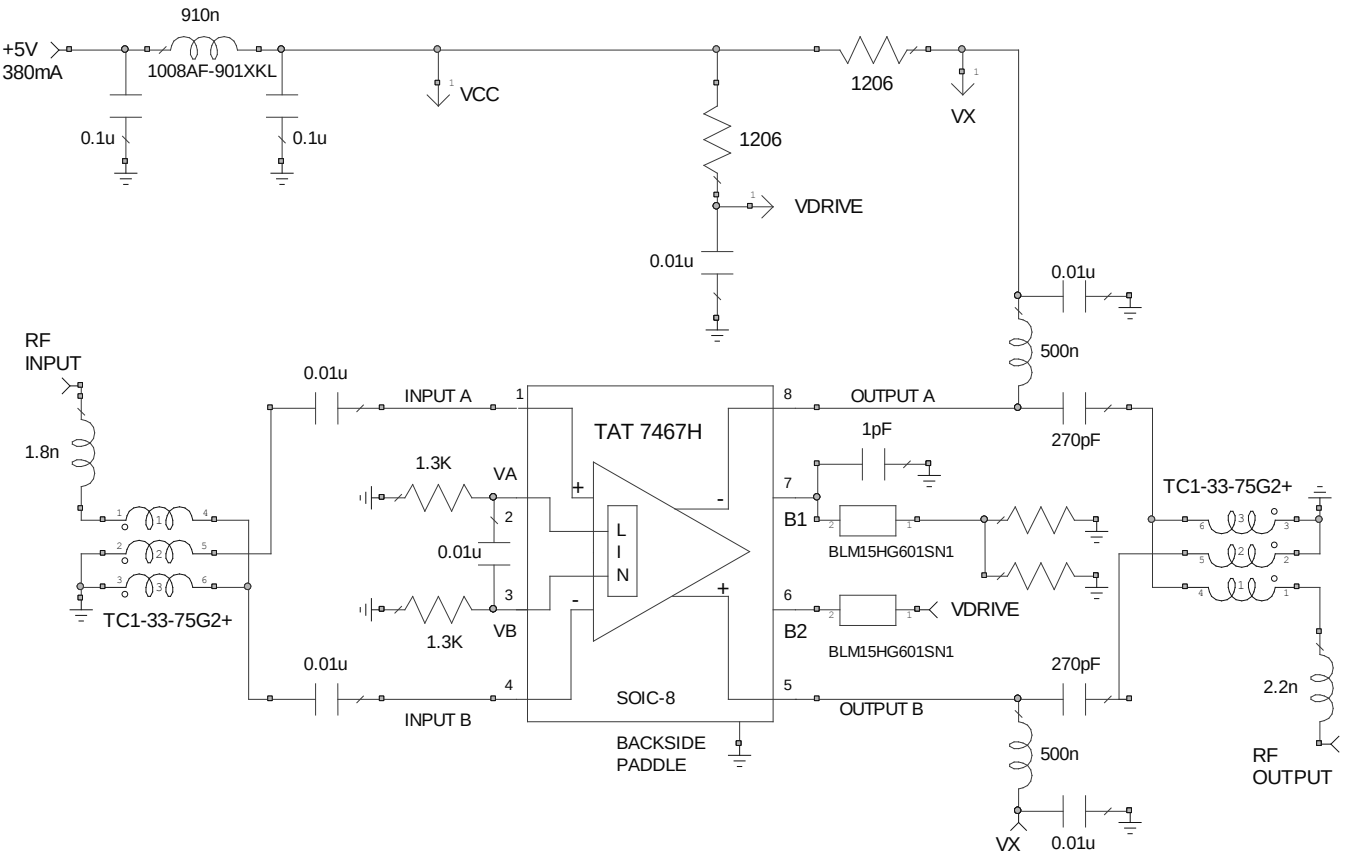
Electrical Specifications

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			16.5		dB
Gain Flatness	See Note 1		+/- 0.75		dB
Noise Figure			4.7		dB
Input Return Loss			18		dB
Output Return Loss			23		dB
EQAM Output Out-of-band Spurious and Noise for single channel on a single port Vout = 62 dBmV/ch	Adjacent, See Note 2 and Note 3			-62	dBc
P1dB			24		dBm
OIP3	See Note 4		43		dBm
Equivalent Harmonics	See Note 5			-63	dBc
V_{SUPPLY}			+5		V
I_{DD}			380		mA
Thermal Resistance (jnc. To case) θ_{jc}			17		°C/W

Notes:
1. Peak deviation from straight line across full band.
2. Production tested at 66 MHz, 330 MHz, and 990 MHz.
3. Adjacent channel (750 kHz from channel block edge to 6 MHz from channel block edge).
4. 100 MHz tone spacing at 0 dBm/tone.
5. Spurious and noise levels in channels coinciding with 2nd harmonic or 3rd harmonic.

Application Circuit 50-1002 MHz



Detailed Device Description

The TAT7467H is a flexible 5 V differential amplifier for medium power CATV applications.

The amplifier of the TAT7467H was specially designed to work with on-chip linearization to provide 3rd order distortion improvement over a wide range of RF power levels and across the full CATV bandwidth. Operation of the linearizer will not affect overall gain by more than 0.7 dB.

For any amplifier bias current, output 3rd order distortion may be improved by adjusting a small bias current of the on-chip linearization circuit. The Application Schematic shows a microprocessor controlled voltage source setting the linearizer currents. Alternate linearizer drive circuitry is possible; consult TriQuint for discussion.

Bias current may be adjusted with changes to external components making the TAT7467H ideal for both input and output gain stages in an EdgeQAM amplifier line-up. For output stage applications, bias currents of between 300 mA to 400 mA are recommended. For input stage applications, bias currents of 230 mA to 280 mA are recommended.

For best performance the TAT7467H bias may be controlled with an active bias circuit as shown in the Application Schematic. The controlled current is referenced to a precision voltage source, commonly found on microprocessors or from a low cost voltage reference.

The TAT7467H is built using a single die, which significantly improves its resulting circuit balance and corresponding 2nd order distortion performance. For best 2nd order performance, an input balun using a 3rd wire construction may be used to improve the input phase balance going into the TAT7467H.

The TAT7467H is packaged in an industry standard SOIC-8 package with a large exposed paddle to enable good heatflow to a backside heatsink. At the maximum recommended bias current of 400 mA the power consumption will be 2 W. The TAT7467H is fabricated using a mature pHEMT process that has demonstrated outstanding reliability performance on other TriQuint products. Please consult TriQuint for further information, sjcapplication.engineering@tqs.com .

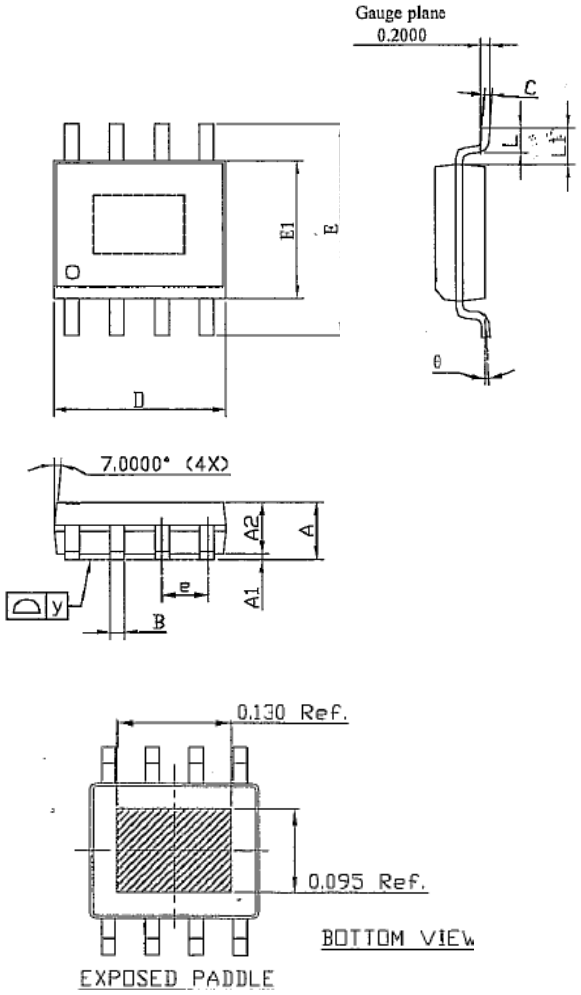
Mechanical Information

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 TAT7467H will be marked with a "TAT7467H" 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 ≥ 400 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.

This 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

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

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