

Applications

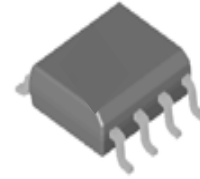
- Replacement for +5 V SOIC-8 Amplifiers
- Edge QAM Output Stage
- MDU Output
- Distribution Amplifiers
- Transmitter Driver Amplifier

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

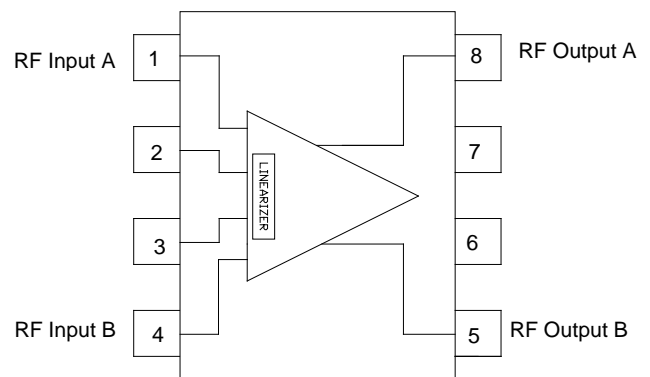
General Description

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.



SOIC-8 Package

Functional Block Diagram



Pin Configuration

Pin #	Label
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
Backside Pad	RF/DC Ground

Ordering Information

Part No.	Description
TAT7467H	75 Ω Dual pHEMT Amplifier
TAT7467H-EB	50-1002 MHz Evaluation Board

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

Absolute Maximum Ratings

Parameter	Rating
Device Voltage	+10 V
Storage Temperature	-60 to +150 °C
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}		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

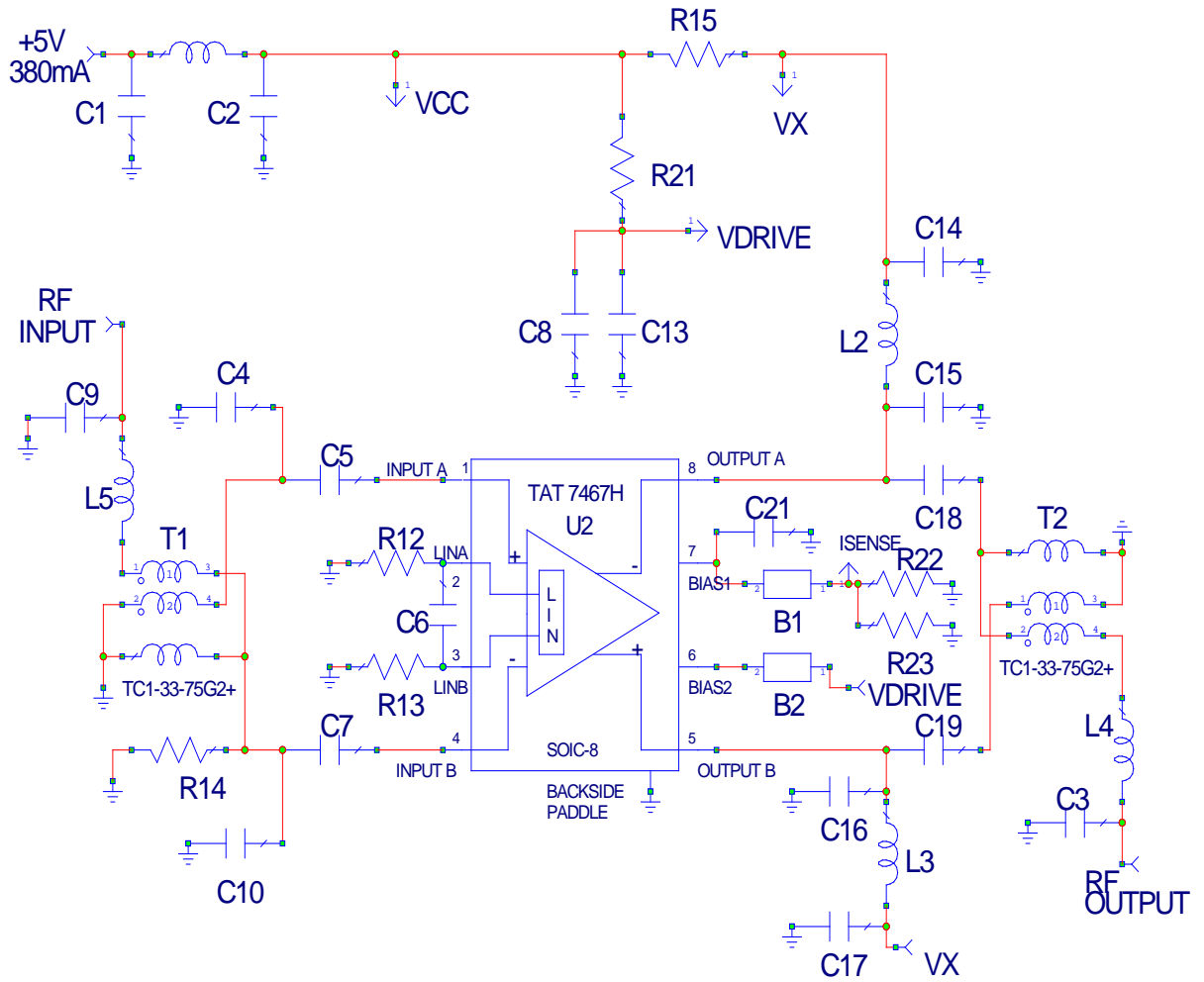
Test conditions unless otherwise stated: V_{DD} = +5 V, I_{DD} = 380 mA, Temp. = +25 °C

Parameter	Conditions	Min	Typ	Max	Units
Operational Frequency Range		50		1002	MHz
Gain			16.5		dB
Gain Flatness ⁽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 V _{OUT} = 62 dBmV / Ch ^(2, 3)	Adjacent			-62	dBc
P1dB			+24		dBm
OIP3 ⁽⁴⁾			+43		dBm
Equivalent Harmonics ⁽⁵⁾				-63	dBc
Thermal Resistance (jnc. To case) θ _{Jc}			14.5		°C / W

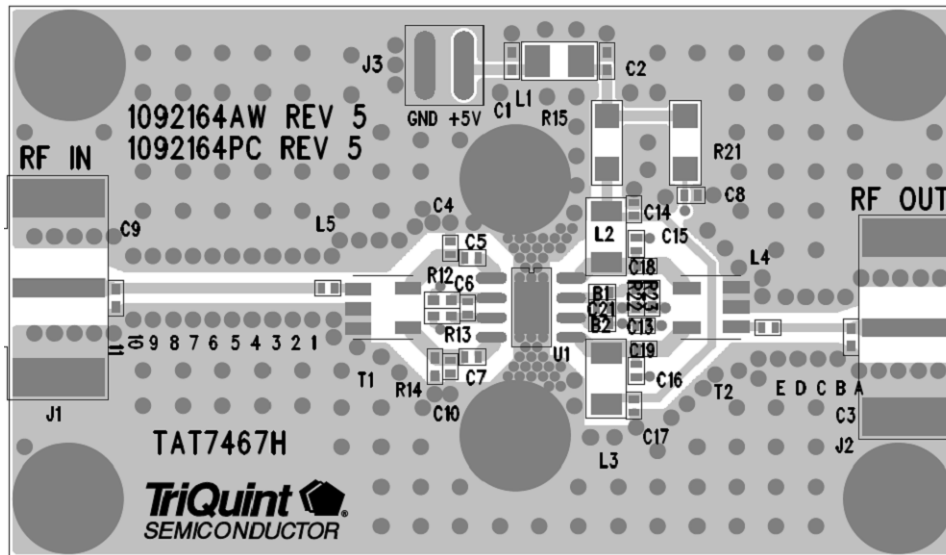
Notes:

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.

TAT7467H-EB Schematic



TAT7467H-EB Evaluation Board



Bill of Material: TAT7467H-EB

Reference Des.	Value	Description	Manufacture	Part Number
U1	--	75 Ohm RF Amplifier	TriQuint	TAT7467H
L5	2.7 nH	Ind, wirewound, 0402, 640 mA, 5%	Various	
T1, T2	1:1	1:1 Balun	Minicircuits	TC1-33-75G2+
C3, C4, C10, C15, C16	0.5 pF	Cap, ceramic, 0402, 50 V, ±0.25 pF	Various	
C5, C6, C7, C13, C14, C17	0.01 µF	Cap, ceramic, 0402, 16 V, 10%	Various	
R12, R13	1.21 kΩ	Res, thick film, 0402, 1/16 W, 1%	Various	
R14	750 Ω	Res, thick film, 0402, 1/16 W, 1%	Various	
R15	1 Ω	Res, thick film, 1206, 5%	Various	
R21	12 Ω	Res, thick film, 1206, 5%	Various	
R22, R23	1.5 Ω	Res, thick film, 0402, 1/16 W, 1%	Various	
C1, C2	0.1 µF	Cap, ceramic, 0402, 16 V, 10%	Various	
L2, L3	500 nH	Ind, bead, 1206, 260 mA, 10%	Murata	LQH31HNR50K03
L1	0.9 µH	Ind, High Current, 1008, 10%	Coilcraft	1008AF-901XKL
C18, C19	270 pF	Cap, ceramic, 0402, 50 V, 10%	Various	
L4	5.6 nH	Ind, wirewound, 0402, 760 mA, 5%	Various	
B1, B2	600 Ω	Bead 600 Ω 0402 300 mA	Murata	BLM15HG601SN1
C8, C9, C21	DNP	Do Not Place		

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 resistors 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.

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.

Package Marking and Dimensions

Marking:

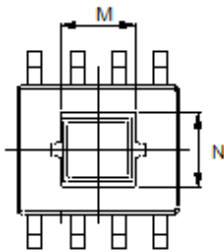
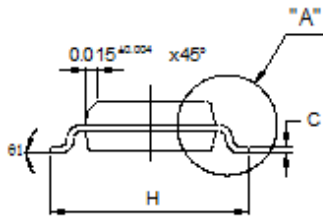
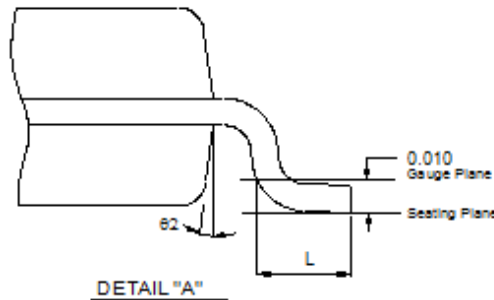
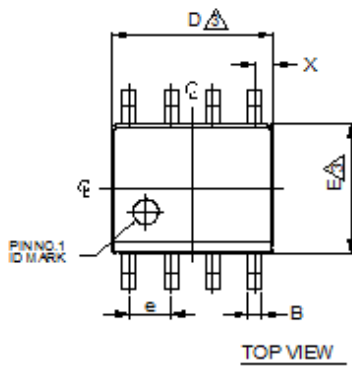
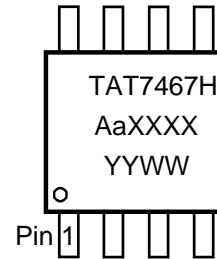
Product Number – TAT7467H

Assembly Code – AaXXXX

Year / Week Code – YYWW

This package is lead-free / RoHS-compliant.

It is compatible with both lead-free (maximum 260 °C reflow temperature) and lead (maximum 245 °C reflow temperature) soldering processes



BOTTOM VIEW

EXPOSED PADDLE

SYMBOL	8 SOIC	
	MIN	MAX
A	0.054	0.068
A1	0.001	0.004
B	0.014	0.019
D	0.189	0.196
E	0.150	0.157
H	0.229	0.244
M	0.087	0.097
N	0.082	0.092
e	0.050 BSC	
C	0.0075	0.0098
L	0.020	0.040
X	0.0215 REF	
61	0°	8°
62	7° BSC	

NOTE:

1. TOP PACKAGE SURFACE TO BE Ni, Pd, Au PLATING
2. BOTTOM PACKAGE SURFACE TO BE Ni, Pd, Au PLATING
3. DIMENSION ARE EXCLUSIVE MOLD FLASH AND GATE BURR.
4. FOOT LENGTH MEASURING IS BASED ON THE GAUGE PLANE METHOD.

Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Class: 1B
Volt. Range: ≥ 500 V to < 1000 V
Test: Human Body Model (HBM)
Standard: ESDA/JEDEC Standard JS-001-2012

ESD Class: C3
Volt. Range: ≥ 1000 V
Test: Machine Model (MM)
Standard: JEDEC Standard JESD22-A115

MSL Rating

MSL Rating: Level 3
Test: 260 °C convection reflow
Standard: JEDEC Standard IPC/JEDEC J-STD-020

Solderability

Compatible with both lead-free (260 °C max. reflow temperature) and tin/lead (245 °C max. reflow temperature) soldering processes.

Package contact plating: Electrolytic Ni/Au

RoHS Compliance

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

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

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

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Email: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

For technical questions and application information:

Email: sjapplication.engineering@tqs.com

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