

# TAT7464

## CATV 75 $\Omega$ pHEMT Dual RF Amplifier



### Applications

- V-ONU receiver output stage
- Multi-Dwelling Units
- Edge QAM
- Push-pull high-output stage
- SAT frequency distribution

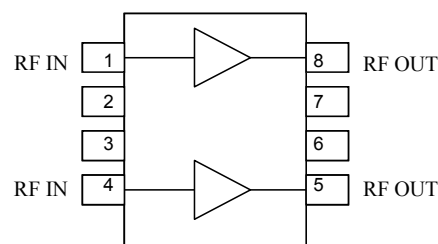


SOIC-8 package

### Product Features

- 50-2600 MHz bandwidth
- pHEMT device technology
- Simple external tuning allows excellent return loss
- 5 V supply voltage
- 210 mA typical current consumption
- Easy bias current adjustment
- 11.7 dB typical gain
- 4.4 dB typical NF from 50 MHz to 1300 MHz
- 38 dBm typical OIP3
- 73 dBm typical OIP2
- 21 dBm typical P1dB
- Low distortion: CSO -83 dBc, CTB -75 dBc, XMOD -68 dBc (33 dBmV/ch at output, 80 ch)
- SOIC-8 package

### Functional Block Diagram



### General Description

The TAT7464 is a 75  $\Omega$  RF Amplifier designed for use from 50 MHz to 2600 MHz, addressing the CATV and Satellite bands in a single part. The TAT7464 contains two separate amplifiers for push pull applications. It provides an easy means for adjusting bias current allowing designers to optimize power consumption for high efficiency applications. The TAT7464 is fabricated using 6-inch GaAs pHEMT technology to optimize performance and cost.

### Pin Configuration

| Pin #        | Symbol     |
|--------------|------------|
| 1            | RF IN      |
| 2, 3, 6, 7   | No Connect |
| 4            | RF IN      |
| 5            | RF OUT     |
| 8            | RF OUT     |
| Exposed Slug | GND        |

### Ordering Information

| Part No.   | Description                                                               |
|------------|---------------------------------------------------------------------------|
| TAT7464    | 75 $\Omega$ Dual pHEMT Amplifier<br>(lead-free/RoHS compliant SOIC-8 Pkg) |
| TAT7464-EB | Amplifier Evaluation Board                                                |

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

### Specifications

#### Absolute Maximum Ratings<sup>1</sup>

| Parameter           | Rating         |
|---------------------|----------------|
| Storage Temperature | -65 to +150 °C |
| Device Voltage      | +10 V          |

Notes:

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

#### Recommended Operating Conditions

| Parameter                                         | Min | Typ | Max | Units |
|---------------------------------------------------|-----|-----|-----|-------|
| V <sub>DD</sub>                                   |     | 5   |     | V     |
| I <sub>DD</sub>                                   |     | 210 |     | mA    |
| T <sub>J</sub> (for > 10 <sup>6</sup> 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, +5 V V<sub>DD</sub>

| Parameter                                                   | Conditions  | Min | Typical | Max  | Units |
|-------------------------------------------------------------|-------------|-----|---------|------|-------|
| Operational Frequency Range                                 |             | 50  |         | 2600 | MHz   |
| Gain                                                        |             |     | 11.7    |      | dB    |
| Gain Flatness                                               | See Note 5. |     | +/- 0.5 |      | dB    |
| Noise Figure                                                | See Note 1. | —   | 4.4     |      | dB    |
| Input Return Loss                                           |             |     | 15      |      | dB    |
| Output Return Loss                                          |             |     | 10      |      | dB    |
| Output P1dB                                                 |             |     | 21      |      | dBm   |
| Output IP3                                                  | See Note 2. |     | 38      |      | dBm   |
| Output IP2                                                  | See Note 2. |     | 73      |      | dBm   |
| XMOD                                                        | See Note 2. |     | -67     |      | dBc   |
| CSO                                                         | See Note 2. |     | -83     |      | dBc   |
| CTB                                                         | See Note 2. |     | -75     |      | dBc   |
| V <sub>supply</sub>                                         |             |     | +5      |      | V     |
| I <sub>DD</sub>                                             |             |     | 210     |      | mA    |
| Thermal Resistance <sup>6</sup> (jnt to case) $\theta_{jc}$ |             |     |         | 26   | °C/W  |

Notes:

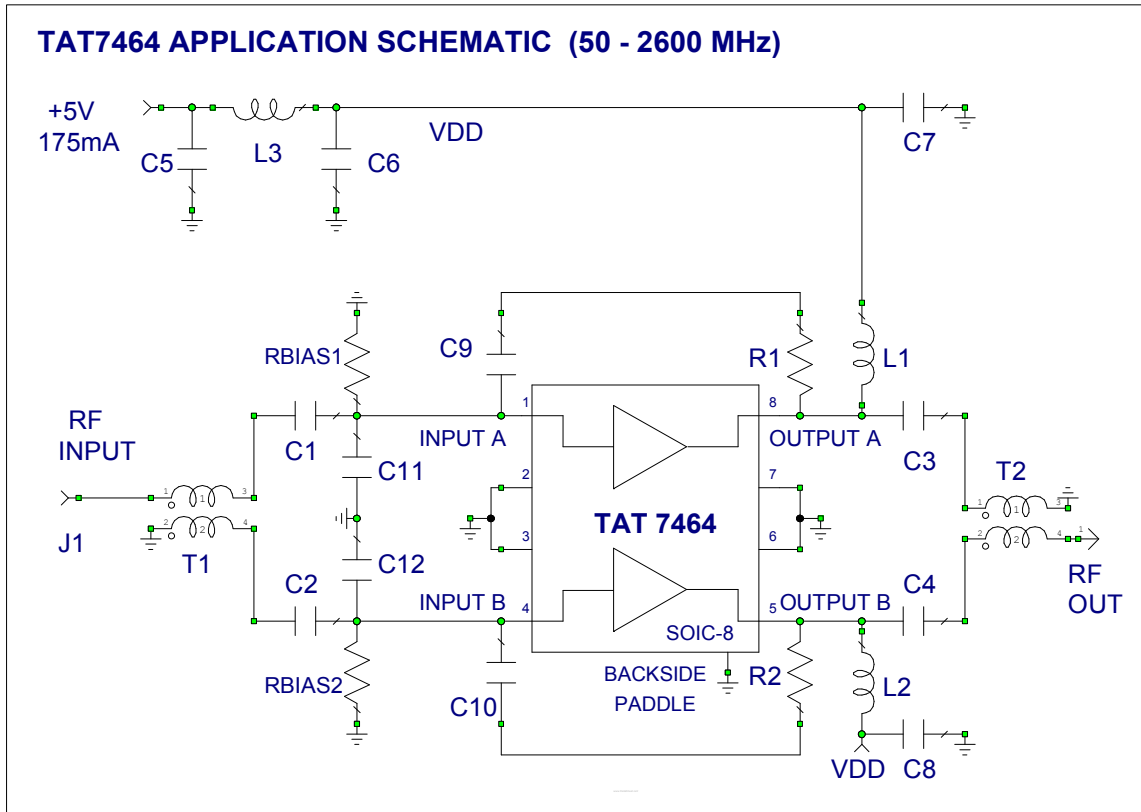
- 50 to 1300 MHz
- 33 dBmV/ch at output, 80 ch flat
- Electrical specifications are measured at specified test conditions.
- Specifications are not guaranteed over all recommended operating conditions.
- Gain flatness defined as the gain deviation from a best-fit straight line.
- Refer to Thermal Analysis Report.

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### Application Circuit 50-2600 MHz



Notes:

1. See PC Board Layout, page 6 for more information.

### Bill of Material

| Ref. Desg.                      | Value        | Description                                        | Manufacturer         | Part Number      |
|---------------------------------|--------------|----------------------------------------------------|----------------------|------------------|
| U1                              |              | 75 $\Omega$ dual pHEMT Amplifier                   | TriQuint             | TAT7464          |
| L1, L2, L3                      | 500 nH       | Chip Coil, Vertical Wire Wound Ferrite, 1206, 30 % | Murata               | LQH31HNR50K      |
| T1, T2                          |              | 1:1 balun <sup>2</sup>                             | Mini-Circuits        | TC1-1-13M-17+    |
| C1, C2, C5, C6, C7, C8, C9, C10 | 0.01 $\mu$ F | Ceramic Chip Cap., 0402, 16 V, 10 %, X7R           | AVX <sup>1</sup>     | 0402YC103KAT     |
| C3, C4                          | 150 pF       | Ceramic Chip Cap., 0402, 50 V, 5 %, NPO            | AVX <sup>1</sup>     | 04025C151JAT2A   |
| C11, C12                        | 0.7 pF       | Ceramic Chip Cap., 0402, 50 V, +/- 0.1 pF          | Yuden                | UVK105CH0R7BW-F  |
| R1, R2                          | 680 $\Omega$ | Thick Film. Chip Res., 0402, 1/16 W, 1 %,          | Dale <sup>1</sup>    | CRCW0402680RFKED |
| RBIAS1, RBIAS2                  | no load      |                                                    |                      |                  |
| J1, J2                          |              | SMB edge mount                                     | Johnson <sup>1</sup> | 131-8701-846     |

Notes:

1. Or equivalent.
2. 1:1 balun may also be constructed using a binocular core (Fair Rite 2843002302; Type 43 material) with 1.5 turns of bifilar wire (MWS T2341222-10)

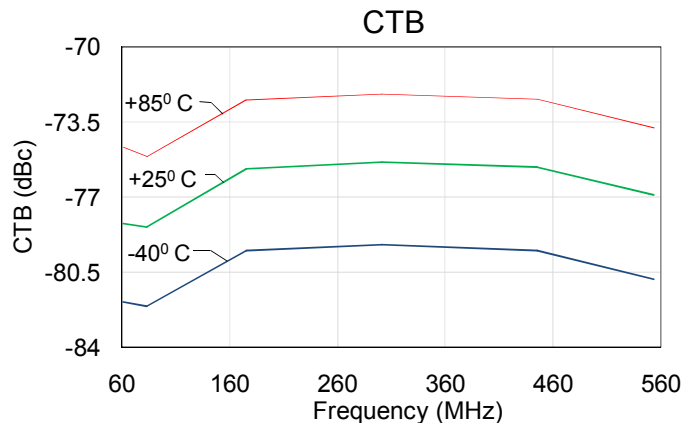
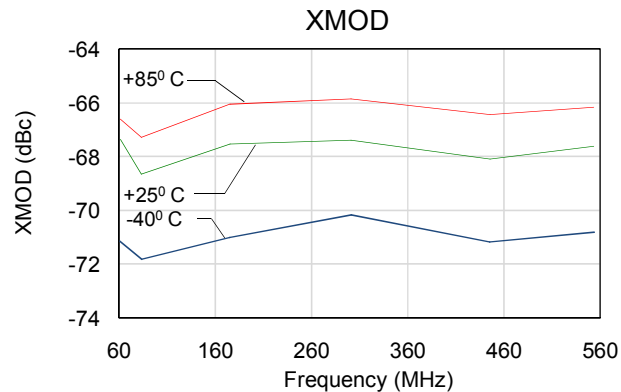
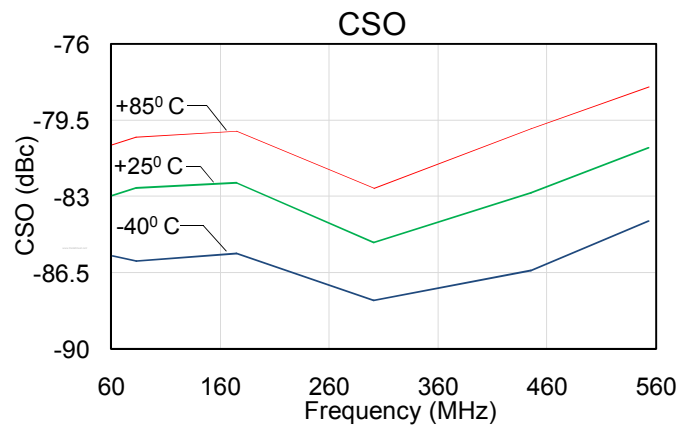
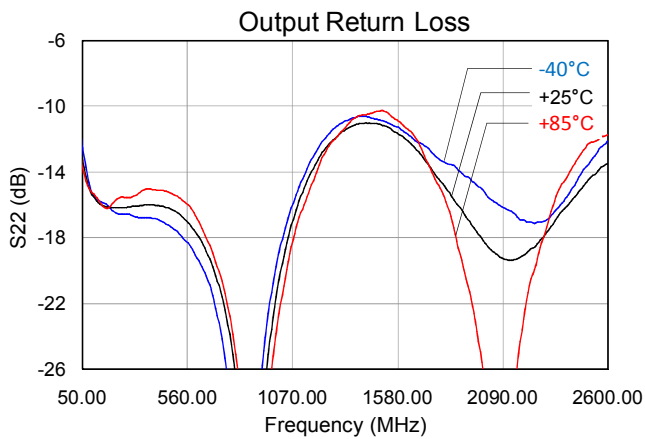
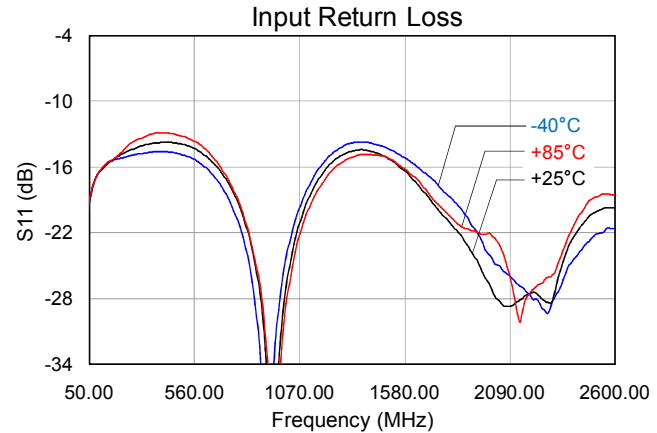
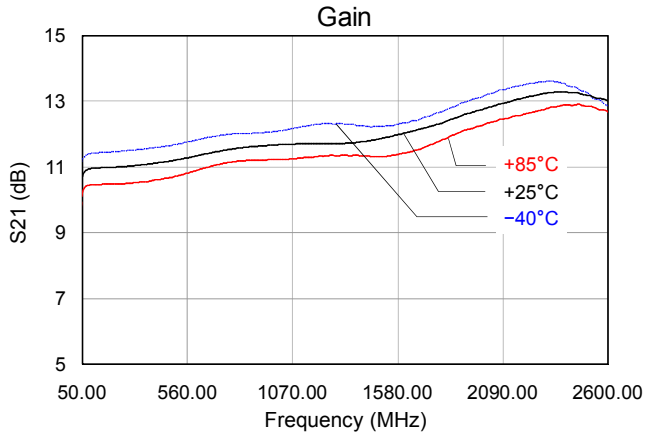
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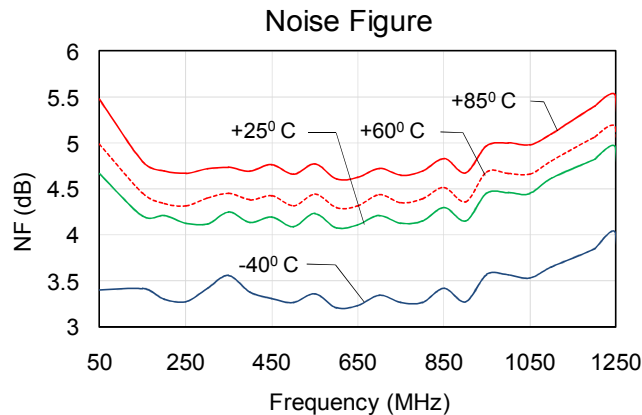
### 50-2600 MHz Application Board Typical Performance

$V_{DD} = +5$  V,  $I_{DD} = 210$  mA



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## Mechanical Information

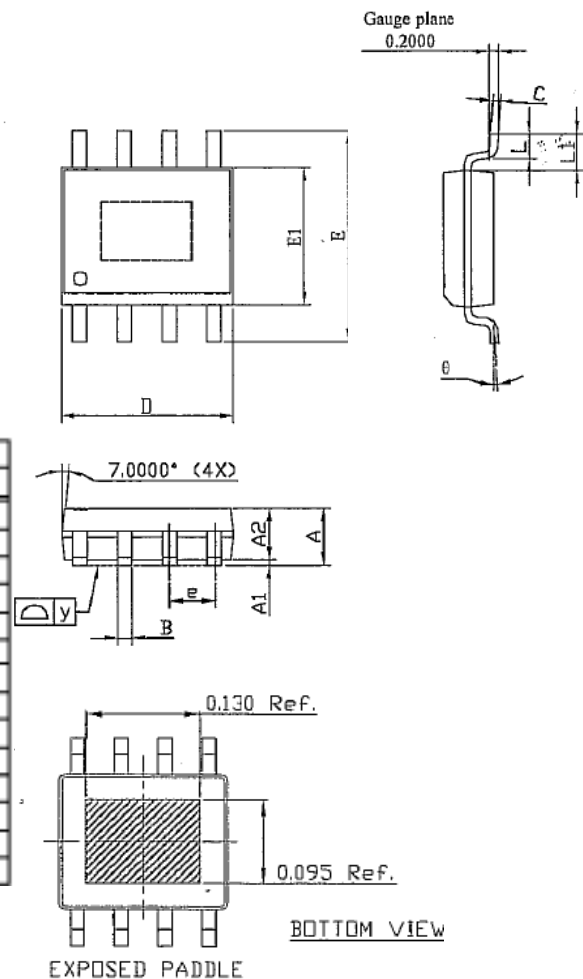
### Package Information and Dimensions

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 TAT7464 will be marked with a “TAT7464” 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.

#### Dimensions in Inches

| 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 A+  
Value: Passes  $\geq 450$  V min.  
Test: Human Body Model (HBM)  
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class III+  
Value: Passes  $\geq 2000$  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.

This 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:

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