

# TAT6254B

## Fiber To The Home RF Amplifier 47–1000 MHz



### Specifications

#### Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-60 to +150 °C
Device Voltage, $V_{DD}$	+15 V

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

#### Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
$V_{DD}$		12		V

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

#### Electrical Specifications

(Per Applications Circuit Herein)

Parameter	Conditions	Min	Typical	Max	Units
Operational Frequency Range		47		1000	MHz
RF Gain at 553.25 MHz	See Note 1.		38		dB
Gain Flatness			1.0		dB
Tilt	See Note 2.		4		dB
Equivalent Input Noise			3.0		pA/rtHz
RF Output Level @ 55.25 MHz	See Notes 3 & 5.		14		dBmV/ch
Output Return Loss			16		dB
CSO	See Note 4.		-62		dBc
CTB	See Note 4.		-62		dBc
Gain Control Range	See Note 6.		33		dB
Power Supply Current @ 12V			100		mA

- 1)  $gain = 20 * \log(Z/75)$
- 2) From 47MHz to 1000MHz
- 3) AGC using 3.3%/ch OMI, output level fixed by external AGC
- 4) 80 channels analog NTSC
- 5) Uses 4:1 output transformer
- 6) With suggested RF AGC application circuit, 25dB with Optical AGC application circuit

#### Optical Input and Triplexer Requirements

Parameter	Conditions	Min	Typical	Max	Units
Optical Input Power		-12		-2	dBm
Optical Modulation Index			3.3		%/ch
Triplexer 1550 nm PIN Responsivity			0.875		mA/mW
Triplexer 1550 nm PIN Capacitance				0.9	pF

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## Detailed Device Description

The TAT6254B integrates two low noise high gain trans-impedance amplifiers in a differential configuration followed by an output amplifier. It provides a low input impedance to minimize the effects of photodiode capacitances and stray impedance affects on gain flatness.

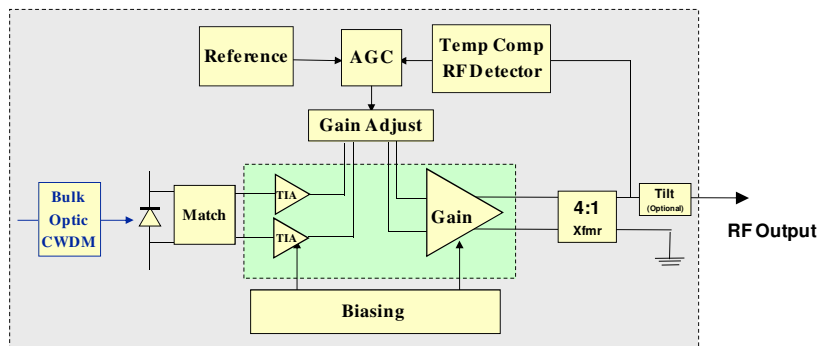
The TAT6254B is fabricated using high gain Gallium Arsenide pHEMT technology developed for high-volume commercial markets. It provides improved gain and noise compared to older MESFET technologies and lower gain pHEMT technologies.

The TAT6254B was designed as a general purpose FTTP receiver. It allows users wide flexibility in setting gain, tilt, and bias levels to best meet the requirements posed by different operators and architectures. The TAT6254B provides the flexibility to address high levels of gain required by GPON and RFoG architectures. Designers can easily modify external circuit values to enable wider optical input ranges, such as needed in newer high digital content FTTH architectures.

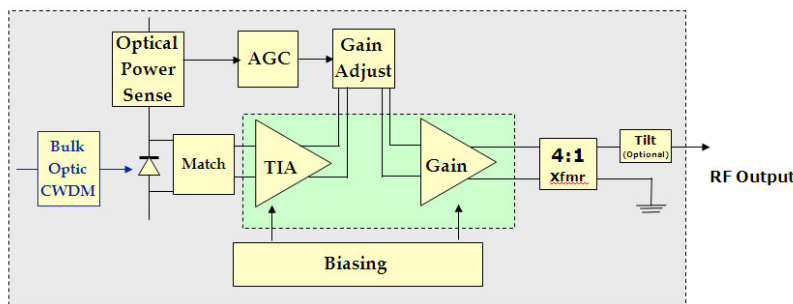
Gain control is accommodated with a low cost external PIN diode circuit placed between the input trans-impedance amplifier and the output amplifier. This helps reduce the die size of the TAT6254B and provides for excellent PIN diode distortion characteristics over a continuous control range. RF AGC, Figure 1, provides 33 dB range. The optical AGC solution, Figure 2, provides 25 dB range, using fewer PIN diodes.

There are no discrete steps over the full gain control range which eliminates the possibility of bit errors from a stepped or switched AGC approach.

RF AGC Solution, Figure 1



Optical AGC Solution, Figure 2



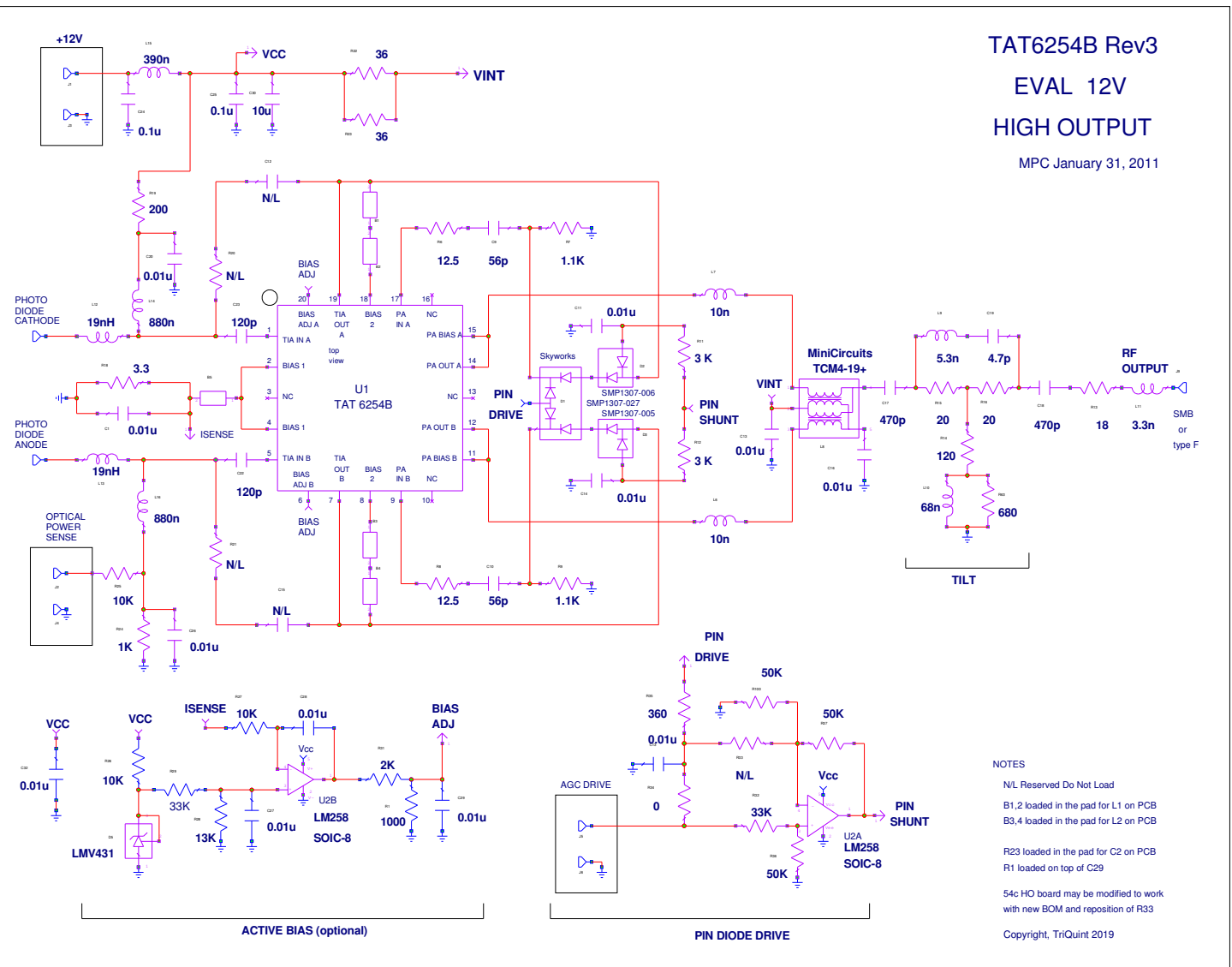
For further information email [sicapplication.engineering@tqs.com](mailto:sicapplication.engineering@tqs.com).

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## Schematic



## Pin Description

Pin	Symbol
1	TIA IN A
2,4	BIAS 1
3,13	NC
5	TIA IN B
6	BIAS ADJ B
7	TIA OUT B
8, 18	BIAS 2
9	PA IN B
11, 12	PA OUT B
14, 15	PA OUT A

# TAT6254B

## Fiber To The Home RF Amplifier 47–1000 MHz

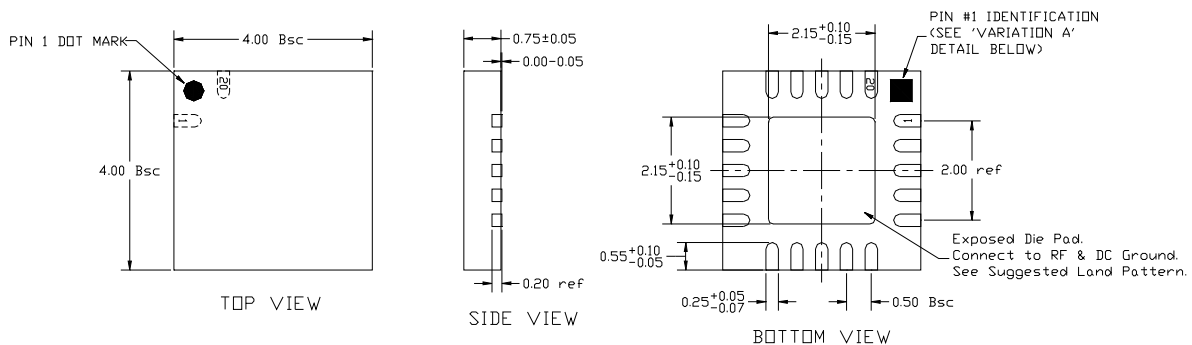


17	PA IN A	Input to post amplifier A
19	TIA OUT A	Output of trans-impedance amplifier A
20	BIAS ADJ A	Bias adjustment for trans-impedance amplifier A
EPAD	GND	Ground

### Mechanical Information

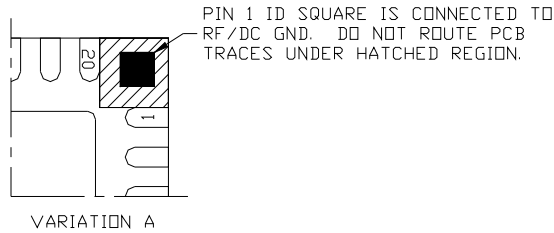
#### Package Information and Dimensions

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.



# TAT6254B

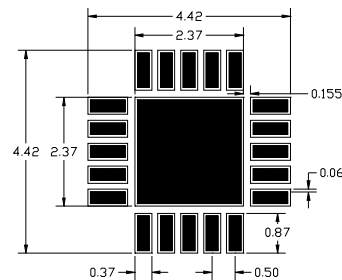
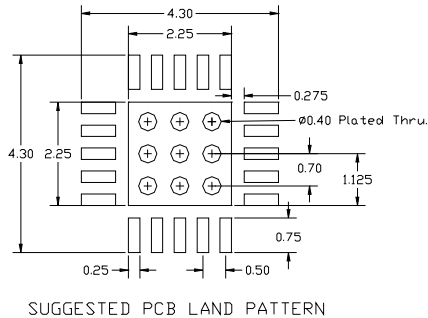
## Fiber To The Home RF Amplifier 47–1000 MHz



Pin #1 Identification Detail

### Mounting Configuration

All dimensions are in millimeters. Angles are in degrees.



## Product Compliance Information

### ESD Information



**Caution! ESD-Sensitive Device**

ESD Rating: Class 1A  
Value: Passes  $\geq 250$  V min.  
Test: Human Body Model (HBM)  
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class IV  
Value: Passes  $\geq 1000$  V min.  
Test: Charged Device Model (CDM)  
Standard:

### Solderability

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

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

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### MSL Rating

The part is rated Moisture Sensitivity Level 1 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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