TST0950

SiGe – Low Noise Amplifier (900 MHz)

Description

The TST0950 is a low-noise amplifier (LNA) in SiGe technology. This LNA offers the possibility to apply a gain switching through a control input pin, and provides a power-down mode function for extending the battery operation time.

In low-gain mode, the output drive capability is not reduced, resulting in improved intermodulation performance. The nominal gain is very precise and has max. ±1.0 dB gain variation over full temperature range and supply-voltage range.

Electrostatic sensitive device.
Observe precautions for handling.

Features

- Input frequency 925 to 960 MHz
- Low noise figure at high gain mode (typ. 2.2 dB)
- Precise gain (19 dB, ±1.0 dB)
- Low– / high gain mode
- High gain flatness (±0.3 dB max.)
- Power-down function
- High reverse isolation (min. –40 dB)
- Small package (TSSO8)

Block Diagram

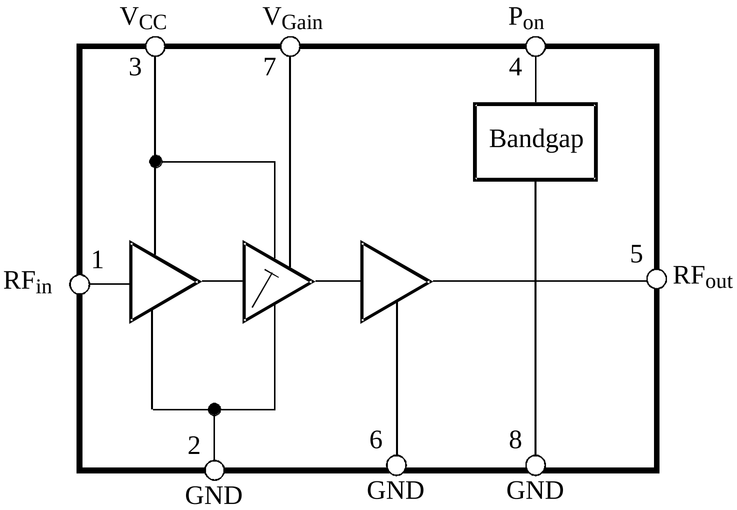


Figure 1. Block diagram

Ordering Information

Extended Type Number	Package	Remarks
TST0950-MFDG3	TSSO8	Taped and reeled

Pin Description

Pin	Symbol	Function
1	RF_{in}	RF input
2	GND	Ground
3	V_{CC}	Supply voltage
4	P_{on}	Power-down input
5	RF_{out}	RF output
6	GND	Ground
7	V_{Gain}	Gain switching input
8	GND	Ground

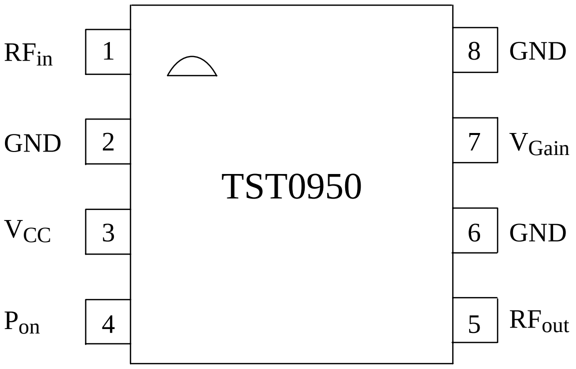


Figure 2. Pinning

Functional Description

The TST0950 is a very precise amplifer, especially designed for GSM telephone applications. The circuit consists of three stages. By attenuating the output signal of the first stage, the complete amplifier gain is reduced and the intermodulation behavior is improved.

Absolute Maximum Ratings

All voltages refer to GND (Pins 2, 6 and 8)

Parameter		Symbol	Min.	Max.	Unit
Supply voltage	Pin 3	V_{CC}	2.7	3.3	V
Junction temperature		T_j	–40	+125	°C
Storage temperature		T_{stg}	–40	+150	°C
Input power	Pin 1	RF_{in}	–	–10	dBm
Power-down input	Pin 4	P_{on}	0	V_{CC}	V
Gain switching input	Pin 7	V_{Gain}	0	V_{CC}	V

Solder Reflow Profile (SMD Packages)

Parameter	Symbol	Value	Unit
Maximum heating rate	T_D	1 to 3	°C/s
Peak temperature in preheat zone	T_{PH}	100 to 140	°C
Duration of time above melting point of solder	t_{MP}	Min. 10 / Max. 130	s
Peak reflow temperature	T_{Peak}	220 to 225	°C
Maximum cooling rate	T_{Peak}	2 to 4	°C/s

Wave Soldering (Through-Hole Packages)

Parameter	Symbol	Value	Unit
Maximum lead temperature (5 s)	T_D	260	°C

Operating Range

All voltages refer to GND (Pins 2, 6 and 8)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	2.7	2.8	2.9	V
Ambient temperature	T_{amb}	–20		+70	°C
Input frequency	IF_{in}	925		960	MHz

Note for biasing: supply first V_{CC}, then P_{on} and V_{Gain} (see absolute maximum ratings)

Electrical Characteristics

Test conditions: V_{CC} = + 2.8 V, T_{amb} = +25°C, unless otherwise specified,
*) with external matching (see application circuit)

Parameter	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Power supply						
Supply voltage	Pin 3	V_{CC}	2.7	2.8	2.9	V
Current consumption active mode power-down mode		 I_a I_{pd}		 10 50	 12 200	 mA µA
IF input						
Input impedance *)	Pin 1	Z_i		50		Ω
Output impedance *)	Pin 5	Z_o		50		Ω
Frequency band		F_{in}	925		960	MHz
Nominal gain	Pin 1 to 5	G	18	19	20	dB
Gain attenuation related to nominal gain	Pin 1 to 5	ΔG	15		17	dB
Gain flatness	Pin 1 to 5		–0.3		+0.3	dB
Noise figure in low-gain mode in high-gain mode	Pin 1 to 5	 NF NF		 11 2.2	 20 2.5	 dB dB
Input VSWR *) in low-gain mode in high-gain mode	LNA active Pin 1	 VSWR VSWR			 2:1 2:1	
Output VSWR *)	LNA active PON = ‘1’ Pin 5	VSWR			2:1	
	LNA inactive PON = ‘0’ Pin 5	VSWR			3:1	
Input 1 dB compression point in low-gain mode in high-gain mode	Pin 1 to 5		 –16 –21			 dBm dBm
Input intercept point 3rd order in low-gain mode in high-gain mode	Pin 1 to 5		 –7 –12			 dBm dBm
Reverse isolation in low-gain mode in high-gain mode	Pin 5 to 1		 40 38			 dB dB

Electrical Characteristics (continued)

Test conditions: V_{CC} = + 2.8 V, T_{amb} = +25°C, unless otherwise specified,
*) with external matching (see application circuit)

Parameter	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Control function						
Control inputs threshold						
high level	Pins 4 and 7	V_{TH}	0.97 × V_{CC}			V
low level		V_{TH}			0.03 × V_{CC}	V
Leakage current on control inputs low level	Pins 4 and 7	I_l			100	µA

Power-Down Logic

Level	P_{on}	Power Status
	‘0’	Power OFF
	‘1’	Power ON

Gain Control Logic

Gain Level	V_{Gain}	Gain
	‘0’	Minimum gain
	‘1’	Maximum gain

Test Circuit

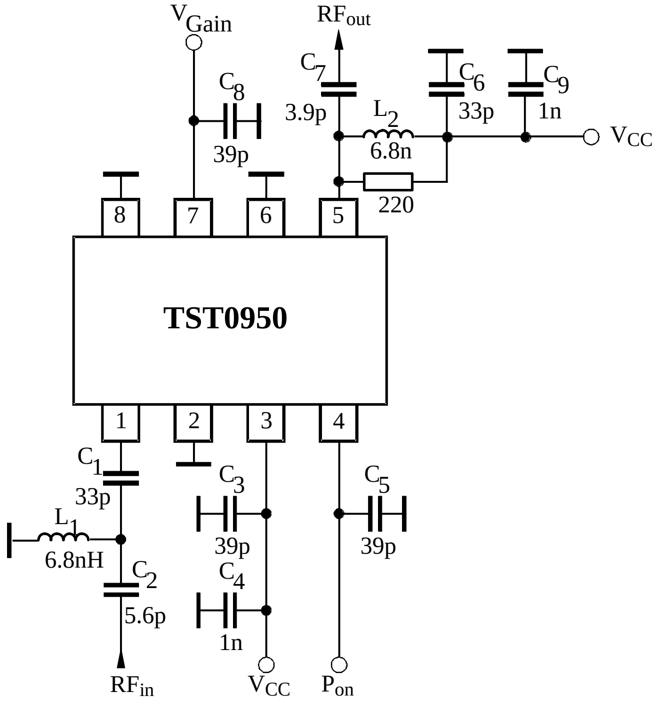
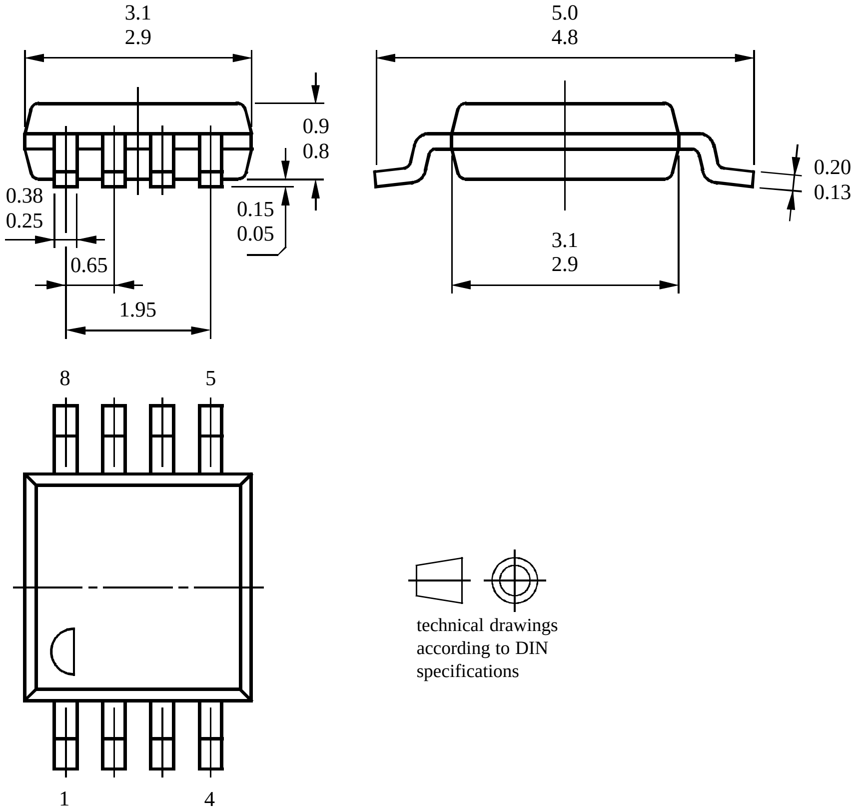


Figure 3. Test circuit

Package Information

Package TSSO8

Dimensions in mm



technical drawings
according to DIN
specifications

Ozone Depleting Substances Policy Statement

It is the policy of **Atmel Germany GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Atmel Germany GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Atmel Germany GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Data sheets can also be retrieved from the Internet: http://www.atmel–wm.com

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