SiGe Transmit / Receive Front End IC

Description

The T0980 is a monolithic SiGe transmit/ receive front end IC with power amplifier & low noise amplifier.

Electrostatic sensitive device.
Observe precautions for handling.

Features

- High power added efficient power amplifier (Pout typ. 29 dBm)

- Controlled output power

- Low noise preamplifier (NF typ. 1.7 dB)

- Few external components

- PSSO16 plastic package with down set paddle

Block Diagram
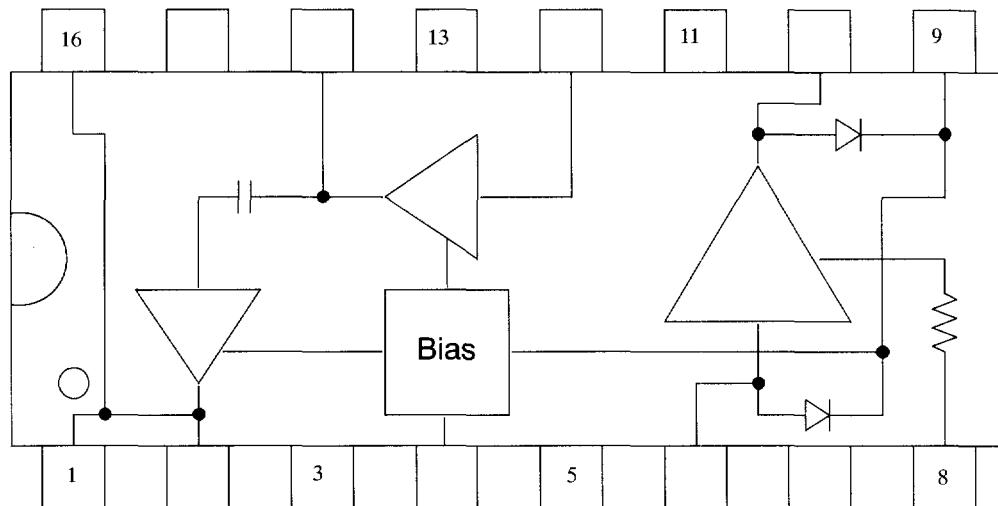
Figure 1. Block diagram

Ordering Information

Extended Type Number	Package	Remarks
T0980-TJS	PSSO16	Tube
T0980-TJQ	PSSO16	Taped and reeled

Preliminary Information

Pin Description

Pin	Symbol	Function
1	V2_PA_OUT	Inductor to power supply and matching network for power amplifier output
2	V2_PA_OUT	Inductor to power supply and matching network for power amplifier output
3	GND	Ground
4	POUT_CONTROL	Power amplifier control input
5	GND	Ground
6	LNA_IN	Low noise amplifier input
7	GND	Ground
8	BIAS_LNA	Resistor to Vs sets the LNA current
9	VS_CTRL	Supply voltage for control of power amplifier
10	LNA_OUT	Low noise amplifier output and supply voltage
11	GND	Ground
12	PA_IN	Power amplifier input
13	GND	Ground
14	V1_PA	Supply voltage for power amplifier
15	GND	Ground
16	V2_PA_OUT	Matching network for power amplifier output
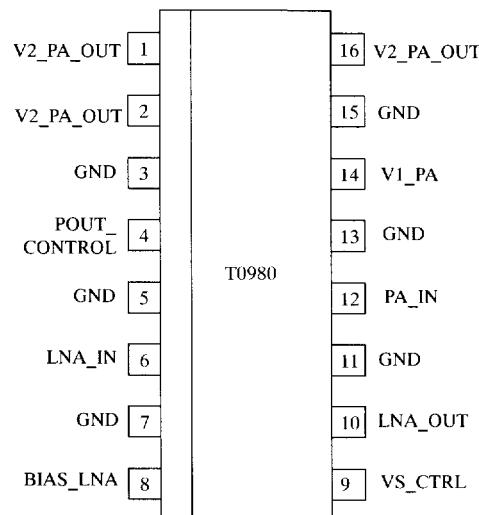
Figure 2. Pinning PSSO16

Absolute Maximum Ratings

All voltages are referred to GND

Parameter		Symbol	Min.	Max.	Unit
Supply voltage PA, TX	Pins 1, 2, 9 and 14	Vs_PA		4.5	V
Supply voltage LNA, RX	Pin 10	Vs_LNA		2.8	V
Junction temperature		Tjmax		150	°C
Storage temperature		Tstg	-55	+125	°C

Operating Range

All voltages are referred to GND. The following table represents the sum of all supply currents.

Parameter	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage PA	TX, Pins 1, 2, 9 and 14	Vs_PA		3.6	4.4	V
Supply voltage LNA	RX, Pin 10	Vs_LNA		2.5	2.6	V

Preliminary Information

Operating Range (continued)

All voltages are referred to GND. The following table represents the sum of all supply currents.

Parameter	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply current PA	TX, Pins 1, 2, 9 and 14	Is_PA		400		mA
Supply current LNA	Pins 10 and 8	Is_LNA		2.5		mA
Ambient temperature		Tamb	-25	25	60	°C

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction ambient	R_{thJA}	25	K/W

ESD Protection: t.b.d.

Electrical Characteristics

Test conditions (unless otherwise specified) : Vs_PA = 3.6 V, Tamb = 25 °C.

Parameter	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Power amplifier [1]						
Supply voltage	TX, Pins 1, 2, 9 and 14	Vs_PA		3.6		V
Supply current	TX, Pins 1, 2, 9 and 14	Is_PA		400		mA
Frequency range	TX	f	400		500	MHz
Power gain	TX	Gp		33		dB
Control voltage	TX, output power (max), Pin 4			2.5		V
	TX, output power (min), Pin 4			0.7		V
Control current	Pin 4		0		400	µA
Shut-down mode	Control voltage ≤ 0.1 V, Pins 1, 2, 9 and 14	Is_PA		10		µA
Power added efficiency	TX @ 450 MHz	PAE	50			%
Saturated output power	TX, input power 3 dBm	Psat		29		dBm
Harmonics	TX, input power 3 dBm	2 fo		-20		dBc
	TX, input power 3 dBm	3 fo		-20		dBc
Low-noise amplifier						
Supply voltage	RX, Pins 8 and 10	Vs_LNA		2.5		V
Supply current	RX @ R1 = 5.6 kΩ, Pins 8 and 10	Is_LNA		2.5		mA
Frequency range	RX	f	400		500	MHz
Power gain	RX @ R1 = 5.6kΩ, Is=2.5 mA	Gp		19		dB
Noise figure	RX @ R1 = 5.6 kΩ, Is=2.5 mA	NF		1.7	2.5	dB
Isolation	RX @ R1 = 5.6 kΩ, Is=2.5 mA	ISO		20		dB
3rd-order input interception point	RX @ R1 = 5.6 kΩ, Is=2.5 mA	IIP3		-10		dBm

Notes : 1)   Power amplifier shall be unconditional stable, maximum duty cycle 100%, true cw-operation, maximum load mismatch 10:1 for 5 s @ 3.6 V

Preliminary Information

Typical Characteristics
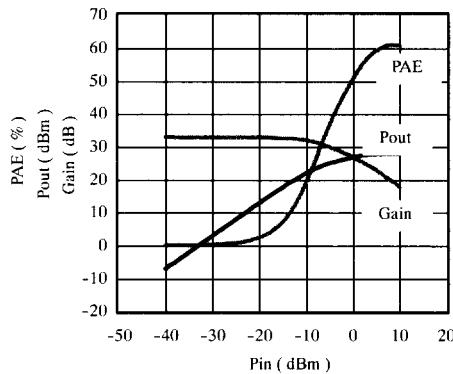
Figure 3. Power sweep
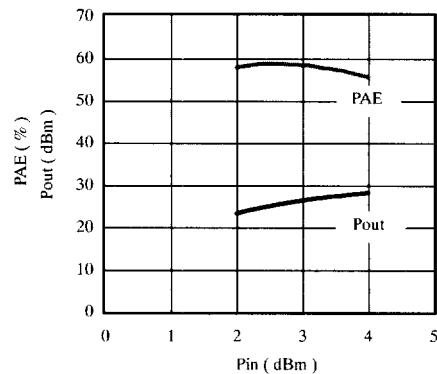
Figure 5. VCO sweep

Figure 4. Ramp sweep

Preliminary Information
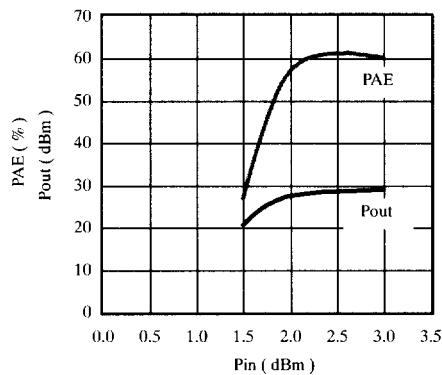
## Typical Application Circuit
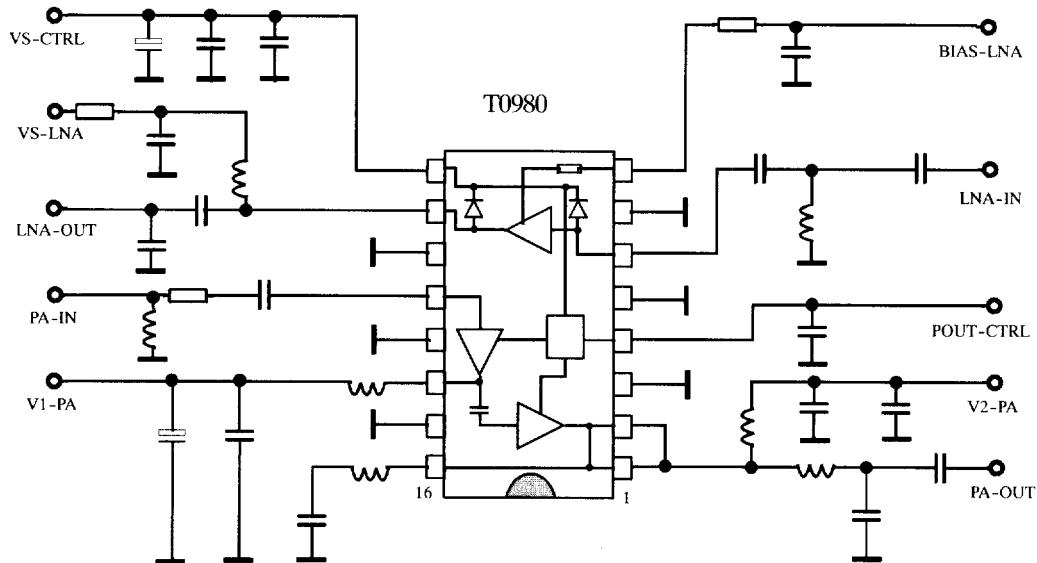
Figure 6. Typical application circuit

Package Information

Package: PSS016

Dimensions in mm
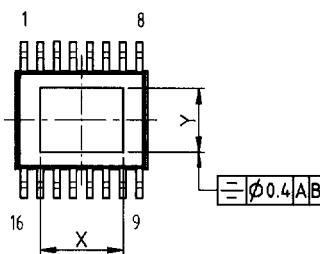
Option	Dim. X	Dim. Y
1	tbd	tbd

tbd = to be defined
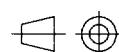
technical drawings
according to DIN
specifications

Preliminary Information