



## Features

- Power Amplifier with High Power Added Efficient (PAE),  
 $P_{out}$  Typically 29 dBm
- Controlled Output Power
- Low-noise Preamplifier (NF Typically 1.7 dB)
- Few External Components
- PSSO16 Plastic Package with Down Set Paddle

## Description

The T0980 is a monolithic IC manufactured with Atmel's advanced SiGe technology. The IC performs a transmit and receive front-end dedicated for a frequency range of 400 MHz to 500 MHz. It consists of a Low-Noise Amplifier (LNA) and a Power Amplifier (PA) with good Power Efficiency (PAE).

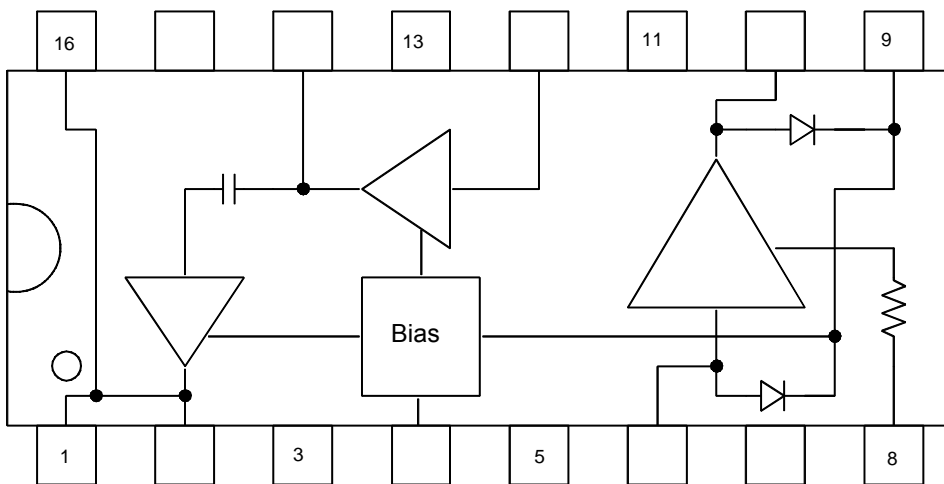
Electrostatic sensitive device.  
Observe precautions for handling.



## SiGe Transmit/ Receive Front- end IC

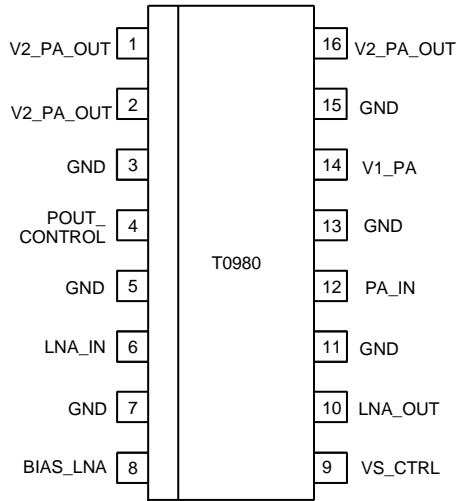
### T0980

Figure 1. Block Diagram



## Pin Configuration

Figure 2. Pinning PSSOP16



## 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 $V_S$ 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

## Absolute Maximum Ratings

All voltages are referred to GND

Parameters	Symbol	Min.	Max.	Unit
Supply voltage PA, TX Pins 1, 2, 9 and 14	$V_{S\_PA}$		4.8	V
Supply voltage LNA, RX Pin 10	$V_{S\_LNA}$		2.8	V
Junction temperature	$T_{jmax}$		150	°C
Storage temperature	$T_{Stg}$	-55	+125	°C
Electrostatic handling HMB; Pins 1, 2, 6, 10, 12 and 16	$V_{ESD}$		200	V
Electrostatic handling HMB; Pins 3, 4, 5, 7, 8, 9, 11, 13, 14 and 15	$V_{ESD}$		2000	V

## Operating Range

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

Parameters	Test Conditions/Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage PA	TX, Pins 1, 2, 9 and 14	$V_{S\_PA}$		3.6	4.5	V
Supply voltage LNA	RX, Pin 10	$V_{S\_LNA}$		2.5	2.6	V
Supply current PA	TX, Pins 1, 2, 9 and 14	$I_{S\_PA}$		400		mA
Supply current LNA	Pins 10 and 8	$I_{S\_LNA}$		2.5		mA
Ambient temperature		$T_{amb}$	-25	25	60	°C

## Thermal Resistance

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

## Electrical Characteristics

Test conditions (unless otherwise specified) :  $V_{S\_PA} = 3.6\text{ V}$ ,  $T_{amb} = 25^\circ\text{C}$ .

Parameters	Test Conditions/Pins	Symbol	Min.	Typ.	Max.	Unit
<b>Power Amplifier <sup>(1)</sup></b>						
Supply voltage	TX, Pins 1, 2, 9 and 14	$V_{S\_PA}$		3.6		V
Supply current	TX, Pins 1, 2, 9 and 14	$I_{S\_PA}$		400		mA
Frequency range	TX	f	400		500	MHz
Power gain	TX	Gp		33		dB
Control voltage	TX, output power (maximum), Pin 4			2.5		V
	TX, output power (minimum), Pin 4			0.7		V
Control current	Pin 4		0		400	$\mu\text{A}$
Shut down mode	Control voltage $\leq 0.1\text{ V}$ , Pins 1, 2, 9 and 14	$I_{S\_PA}$		10		$\mu\text{A}$
Power added efficiency	TX at 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
<b>Low-noise Amplifier</b>						
Supply voltage	RX, Pins 8 and 10	$V_{S\_LNA}$		2.5		V
Supply current	RX at R1 = 5.6 k $\Omega$ , Pins 8 and 10	$I_{S\_LNA}$		2.5		mA
Frequency range	RX	f	400		500	MHz
Power gain	RX at R1 = 5.6 k $\Omega$ , Is = 2.5 mA	Gp		19		dB
Noise figure	RX at R1 = 5.6 k $\Omega$ , Is = 2.5 mA	NF		1.7	2.5	dB
Isolation	RX at R1 = 5.6 k $\Omega$ , Is = 2.5 mA	ISO		20		dB
3rd-order input interception point	RX at R1 = 5.6 k $\Omega$ , Is = 2.5 mA	IIP3		-10		dBm

Note: 1. Power amplifier should be unconditional stable, maximum duty cycle 100%, true cw-operation, maximum load mismatch 10:1 for 5 s at 3.6 V

Typical Characteristics

Figure 3. Power Sweep

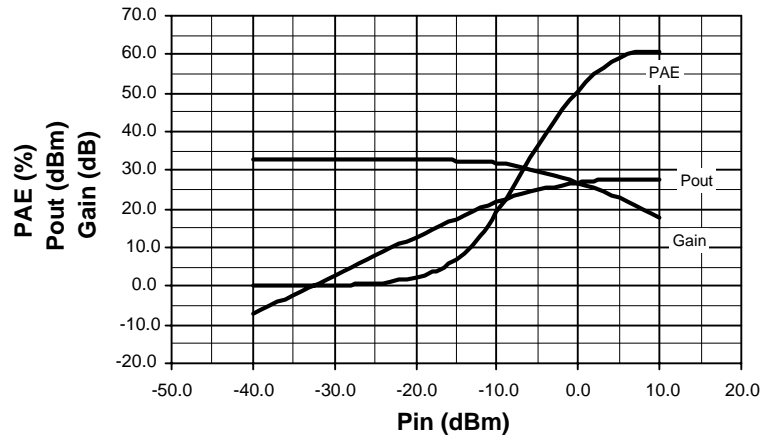


Figure 4. Ramp Sweep

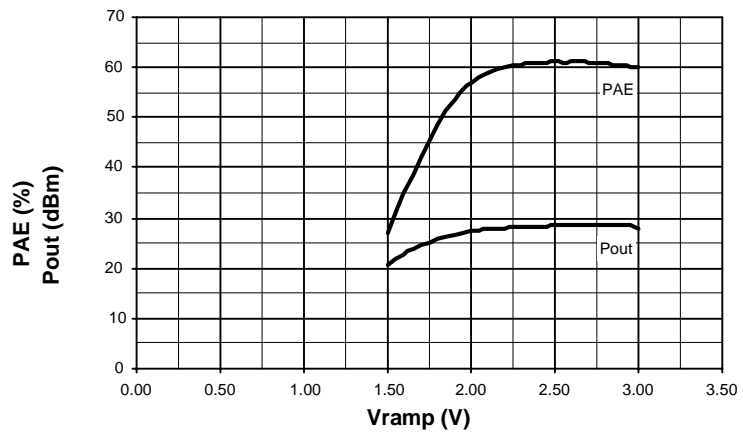
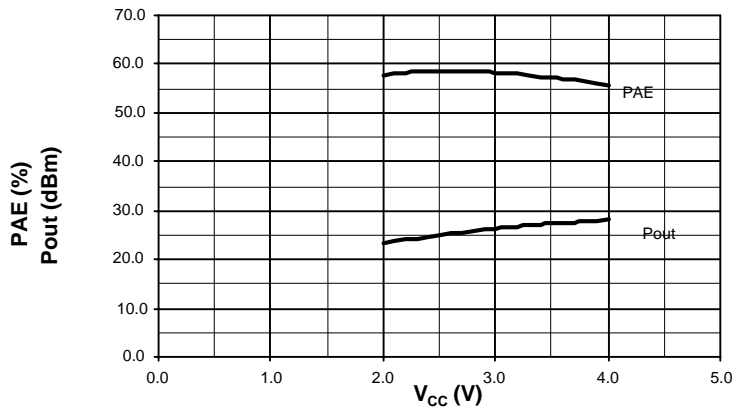


Figure 5. V<sub>CC</sub> Sweep





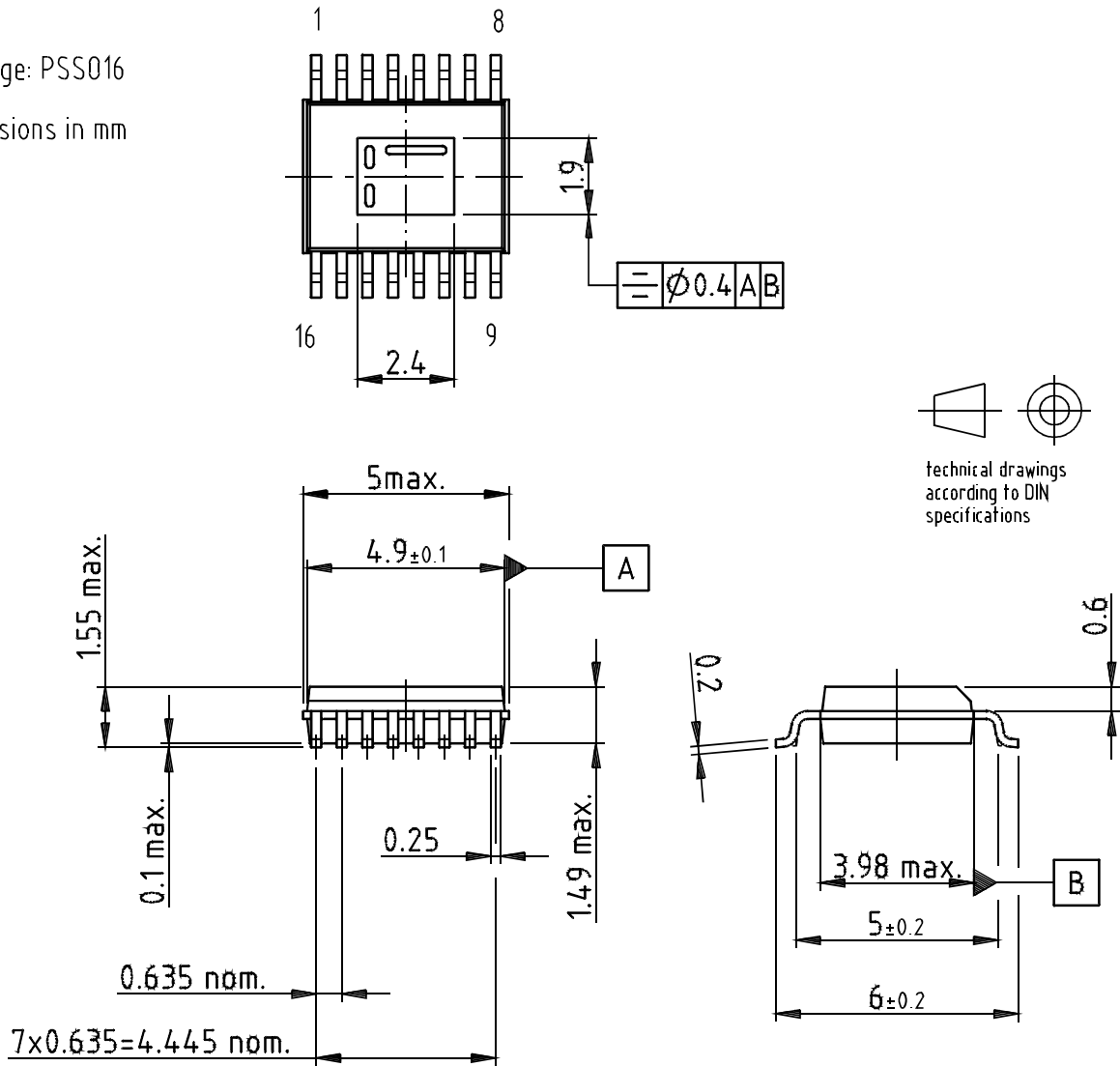
### Ordering Information

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

### Package Information

Package: PSSO16

Dimensions in mm



Drawing-No.: 6.543-5070.02-4

Issue: 1; 30.11.00



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