



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

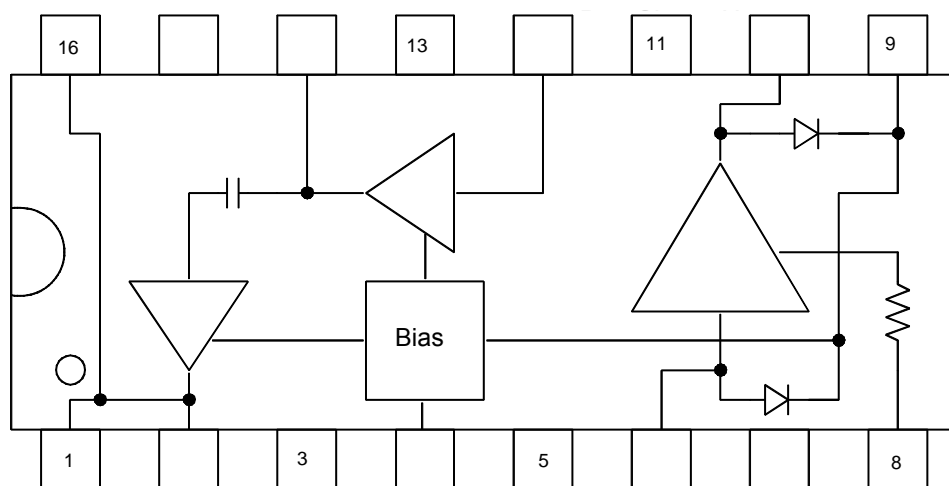
The T0980 is a monolithic IC manufactured with Atmel's advanced SiGe technology. The IC performs a transmit and receive front-end dedicated for a frequency range of 400 MHz to 500 MHz. It consists of a Low-Noise Amplifier (LNA) and a Power Amplifier (PA) with good Power Efficiency (PAE).

Electrostatic sensitive device.

Observe precautions for handling.



Figure 1. Block Diagram



SiGe Transmit/ Receive Front- end IC

T0980

DataShee

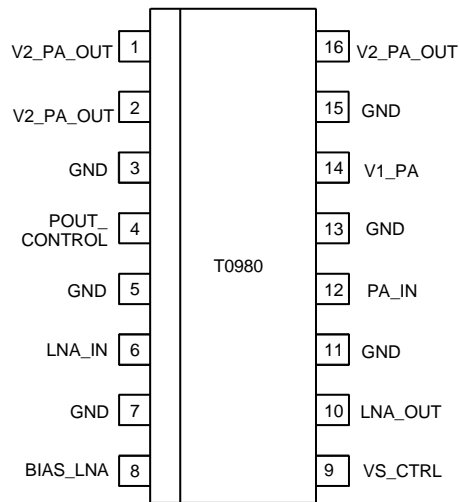
Rev. 4584A-SIGE-01/03

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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
Power Amplifier ⁽¹⁾						
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	μA
Shut down mode	Control voltage $\leq 0.1\text{ V}$, Pins 1, 2, 9 and 14	I_{S_PA}		10		μA
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
Low-noise Amplifier						
Supply voltage	RX, Pins 8 and 10	V_{S_LNA}		2.5		V
Supply current	RX at $R1 = 5.6\text{ k}\Omega$, Pins 8 and 10	I_{S_LNA}		2.5		mA
Frequency range	RX	f	400		500	MHz
Power gain	RX at $R1 = 5.6\text{ k}\Omega$, $I_S = 2.5\text{ mA}$	Gp		19		dB
Noise figure	RX at $R1 = 5.6\text{ k}\Omega$, $I_S = 2.5\text{ mA}$	NF		1.7	2.5	dB
Isolation	RX at $R1 = 5.6\text{ k}\Omega$, $I_S = 2.5\text{ mA}$	ISO		20		dB
3rd-order input interception point	RX at $R1 = 5.6\text{ k}\Omega$, $I_S = 2.5\text{ mA}$	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

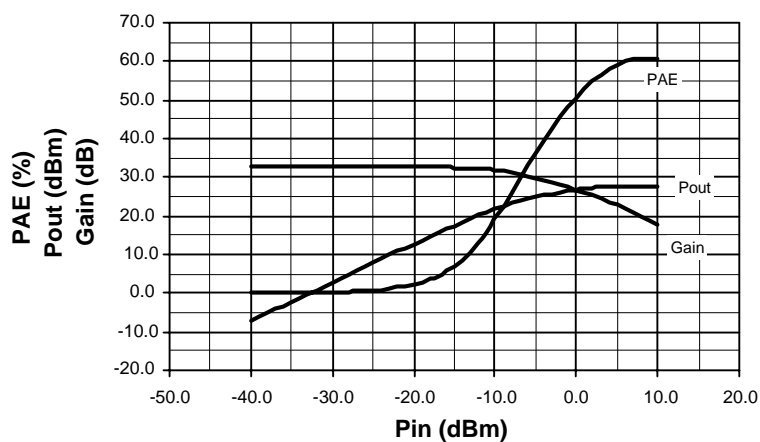


Figure 4. Ramp Sweep

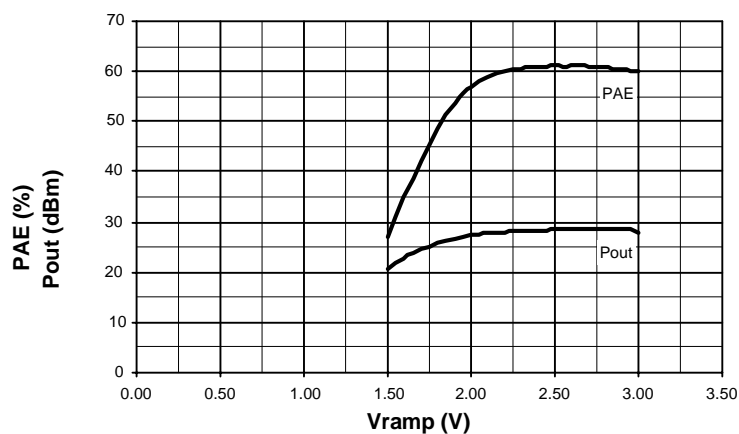


Figure 5. V_{CC} Sweep

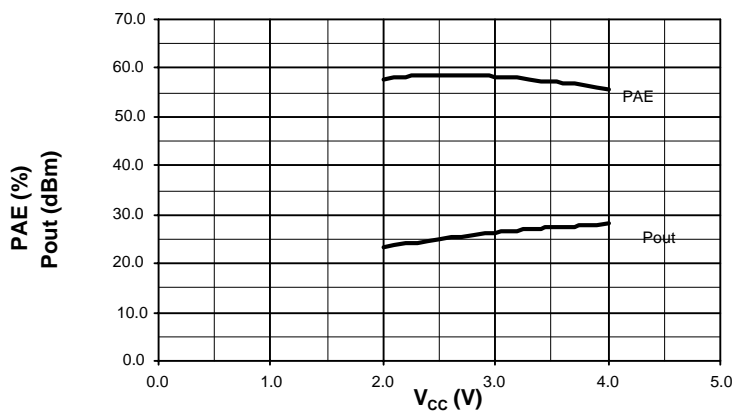
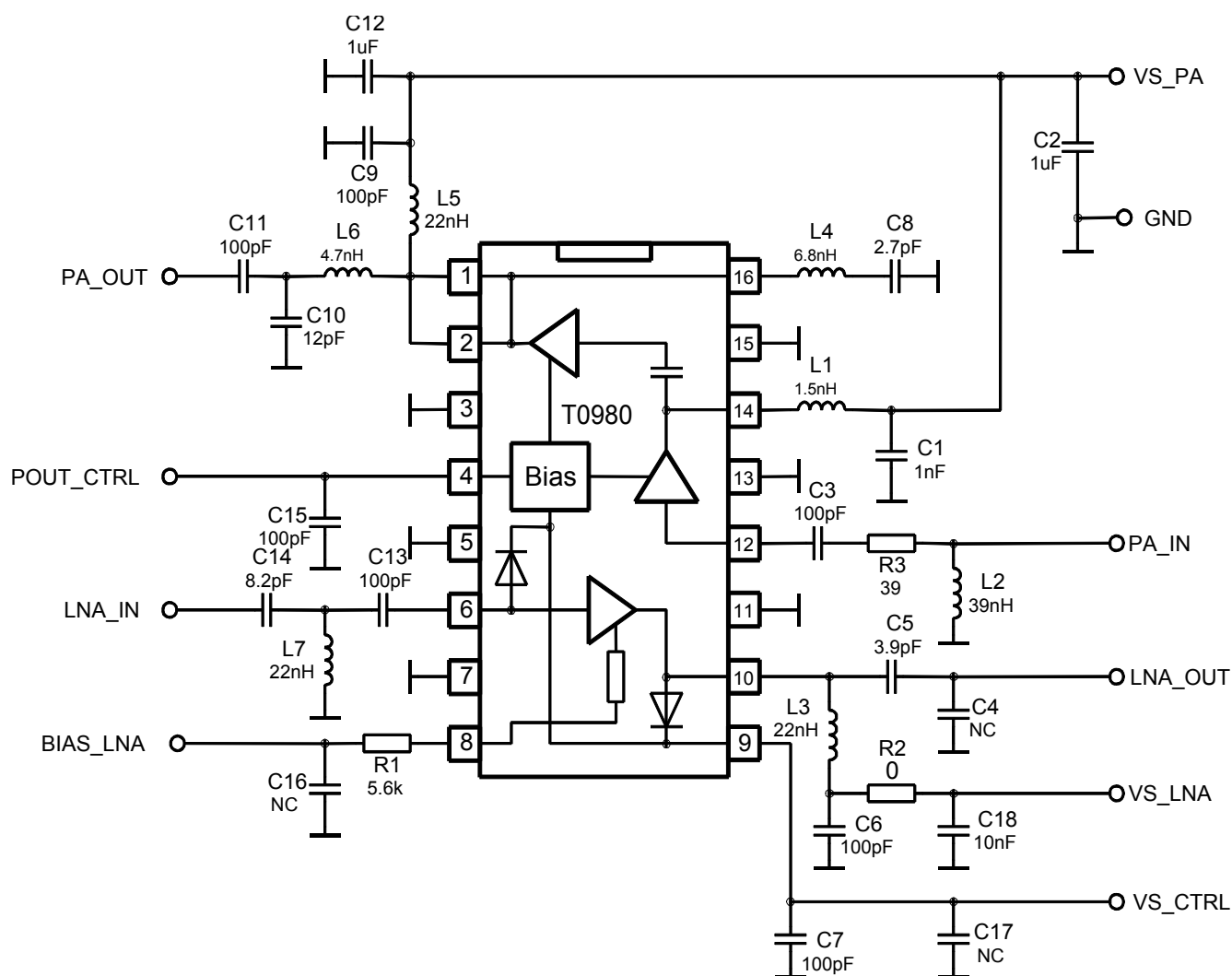


Figure 6. Typical Application Circuit (460 MHz)



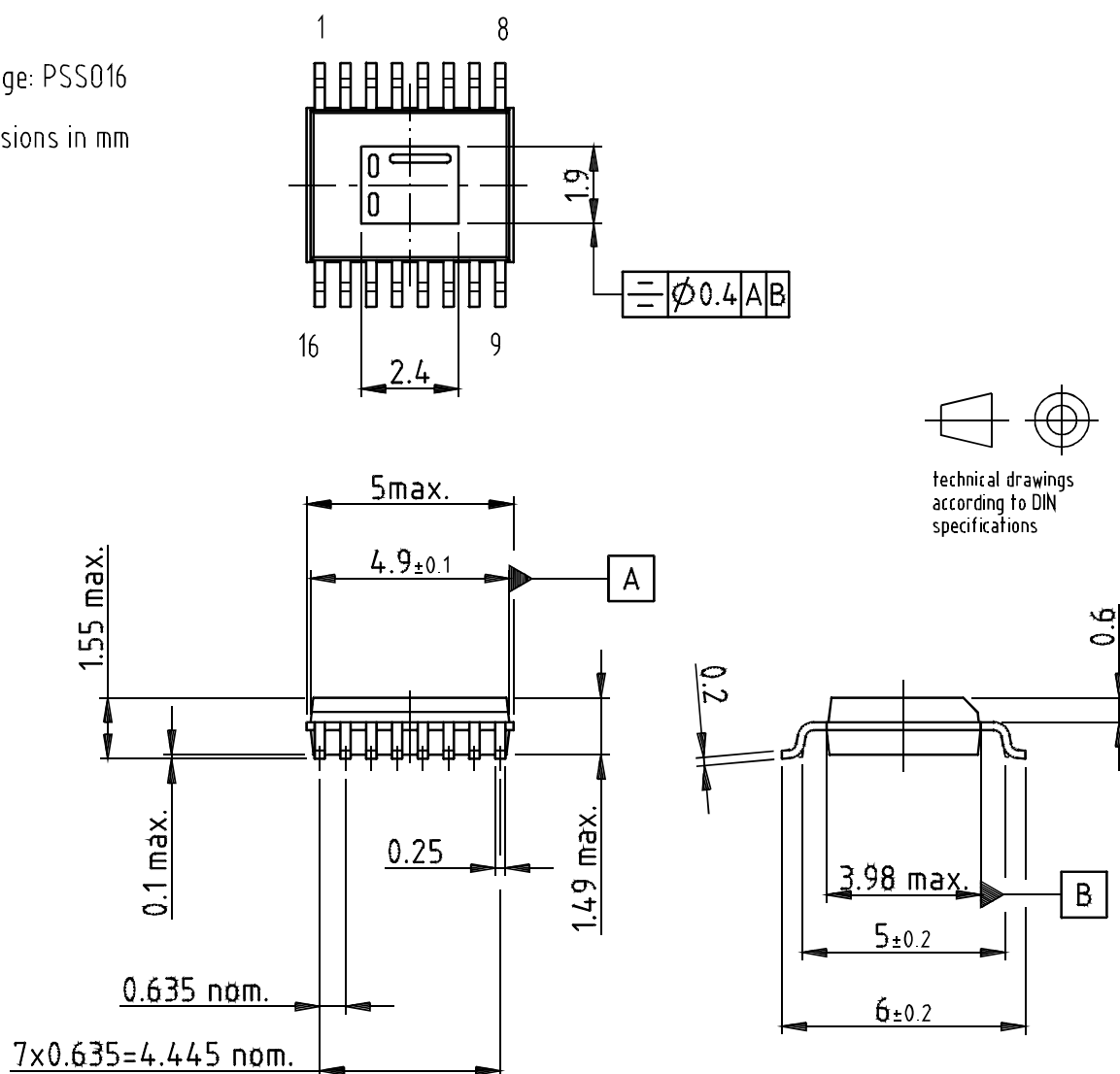
Ordering Information

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

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