PEREGRINE SEMICONDUCTOR

ADVANCE INFORMATION

PE9301

3.5 GHz Low Power CMOS Divide-by-2 Prescaler For RAD-Hard Applications

Features

- High-frequency operation: 1.5 GHz to 3.5 GHz
- Fixed divide ratio of 2
- Low-power operation: 13 mA typical @ 3 V across frequency
- Small package: 8-lead SOIC
- Low Cost

Product Description

The PE9301 is a high performance monolithic CMOS prescaler with a fixed divide ratio of 2. Its operating frequency range is 1.5 GHz to 3.5 GHz. The PE9301 operates on a nominal 3 V supply and draws only 13 mA. It is packaged in a small 8-lead SOIC and is ideal for Space microwave PLL synthesis solutions.

The PE9301 is manufactured in Peregrine's patented Ultra Thin Silicon (UTSi®) CMOS process, offering the performance of GaAs with the economy and integration of conventional CMOS.

Figure 1. Functional Schematic Diagram

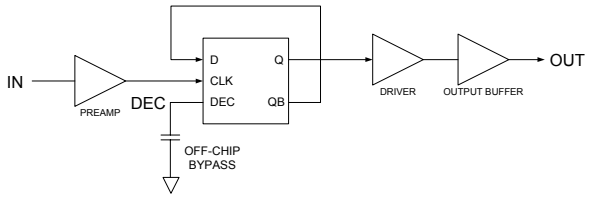


Figure 2. Package Drawing

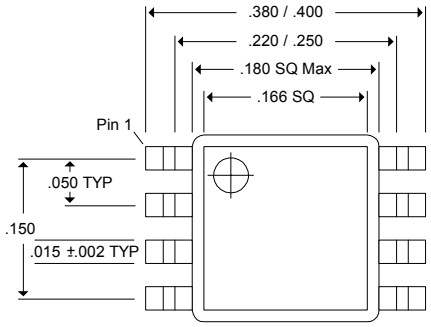


Table 1. Electrical Specifications @ +25 °C (Z_S = Z_L = 50 Ω)

Parameter	Conditions	Minimum	Typical	Maximum	Units
Supply Voltage		2.85	3.0	3.15	V
Supply Current			13	15	mA
Input Frequency (F_{IN})	P_{IN} = -5 dBm min.	1.5		3.5	GHz
Input Power (P_{IN})	F_{IN} = 1.5 to 3.5 GHz	-5		+5	dBm
Output Power		-10			dBm

Figure 3. Pin Configuration

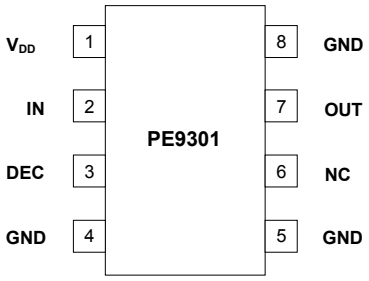


Table 2. Pin Descriptions

Pin No.	Pin Name	Description
1	V_{DD}	Power supply pin. Bypassing is required.
2	IN	Input signal pin. Should be coupled with a capacitor (eg 15 pF).
3	DEC	Power supply decoupling pin. Place a capacitor as close as possible and connect directly to the ground plane.
4	GND	Ground pin. Ground pattern on the board should be as wide as possible to reduce ground impedance.
5	GND	Ground pin.
6	NC	No connection. This pin should be left open.
7	OUT	Divided frequency output pin. This pin should be coupled with a capacitor (eg 47 pF).
8	GND	Ground Pin.

Table 3. Absolute Maximum Ratings

Symbol	Parameter/Conditions	Min	Max	Units
V_{DD}	Supply voltage		4.0	V
T_{ST}	Storage temperature range	-65	150	°C
T_{OP}	Operating temperature range	-40	85	°C
VESD	ESD voltage (Human Body Model)	250		V

Electrostatic Discharge (ESD) Precautions

When handling this UTSi device, observe the same precautions that you would use with other ESD-sensitive devices. Although this device contains circuitry to protect it from damage due to ESD, precautions should be taken to avoid exceeding the rating specified in Table 3.

Latch-Up Avoidance

Unlike conventional CMOS devices, UTSi CMOS devices are immune to latch-up.

Device Functional Considerations

The PE9301 takes an input signal frequency from between 1.5 GHz to3.5 GHz and produces an output signal frequency half that of the supplied input. In order for the prescaler to work properly, several conditions need to be adhered to. It is crucial that pin 3 be supplied with a bypass capacitor to ground. In addition, the input and output signals (pins 2 & 7, respectively) need to be ac coupled via an external capacitor as shown in Figure 5.

The ground pattern on the board should be made as wide as possible to minimize ground impedance.

Figure 4. Test Circuit Block Diagram

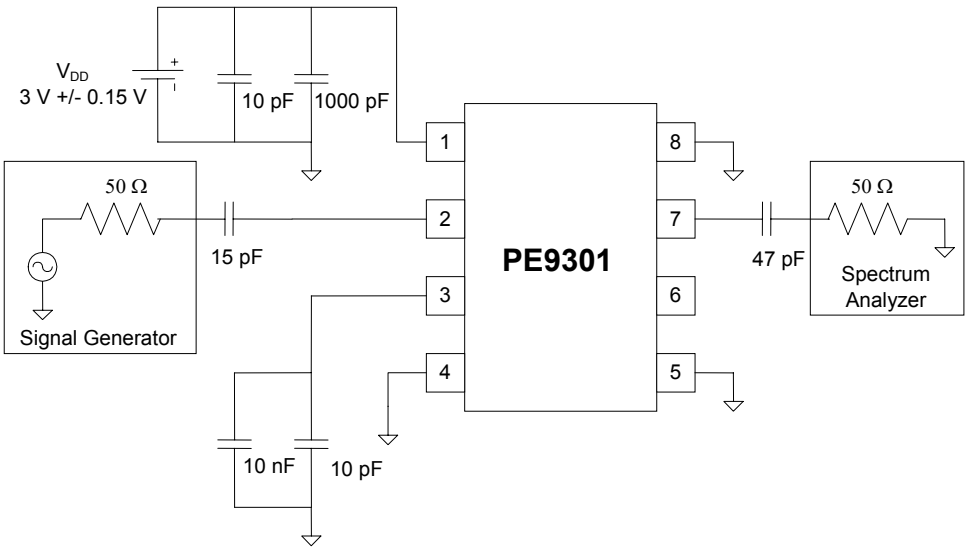
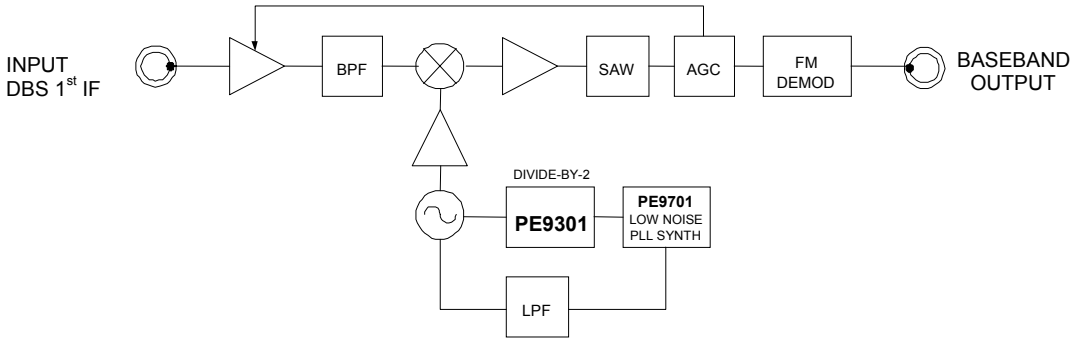


Figure 5. High Frequency System Application

The wideband frequency of operation of the PE9301 makes it an ideal part for use in a DBS down converter system.



Typical Performance Data @ +25C

Figure 6. Typical Input Sensitivity

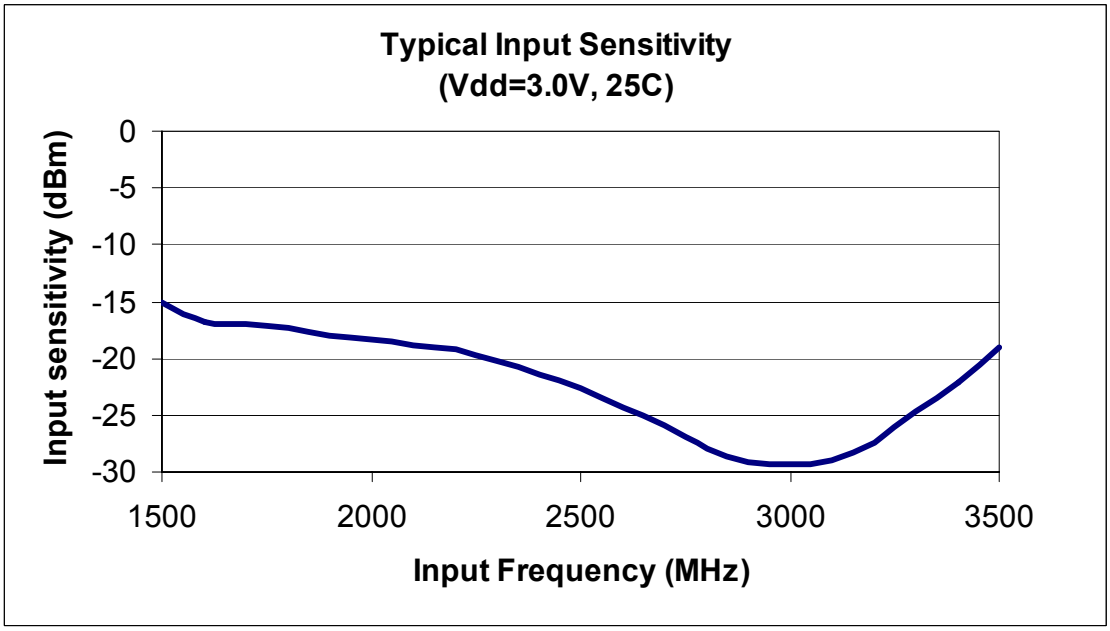


Figure 7. Typical Output Power

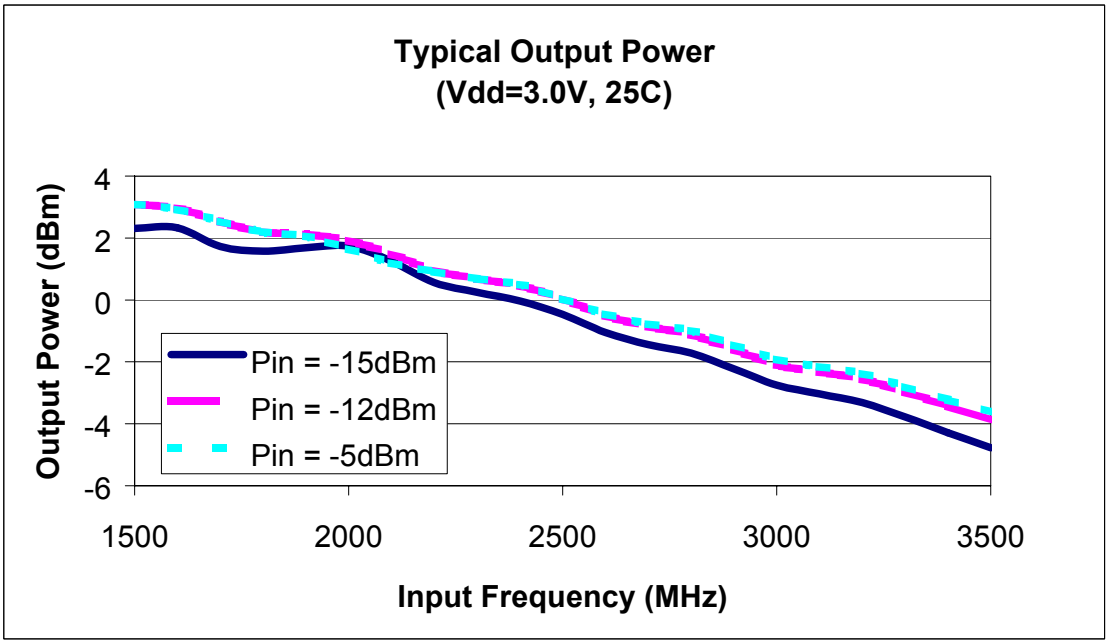


Figure 8. Package Drawing

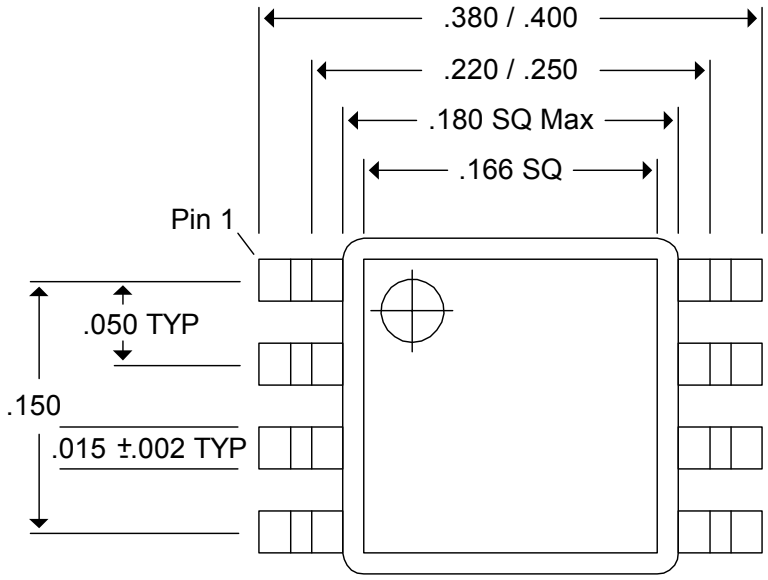


Table 4. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
9301-01	PE9301ES	PE9301 Eng. Samples	8-lead SOIC	Tray
9301-11	PE9301	PE9301 Production Units	8-lead SOIC	Tray
9301-00	PE9301-EK	PE9301 Evaluation Kit	Evaluation Board	1 / Box

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Data Sheet Identification

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Preliminary Specification

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