

PE9301

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.

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

Figure 1. Functional Schematic Diagram

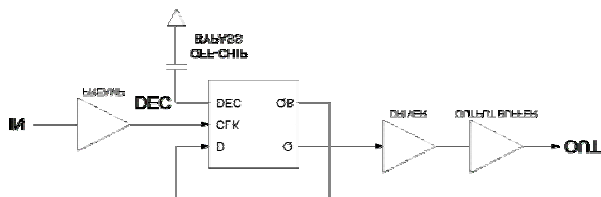


Figure 2. Package Drawing

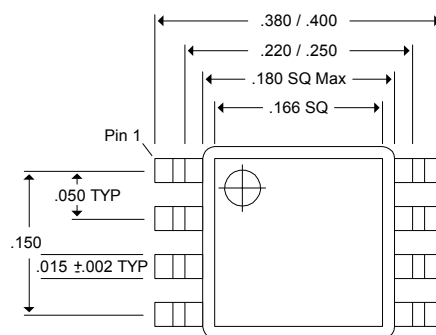


Table 1. Electrical Specifications @ +25 °C ($Z_S = Z_L = 50 \Omega$)

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

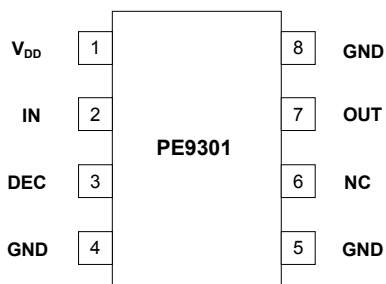


Table 2. Pin Descriptions

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 to 3.5 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

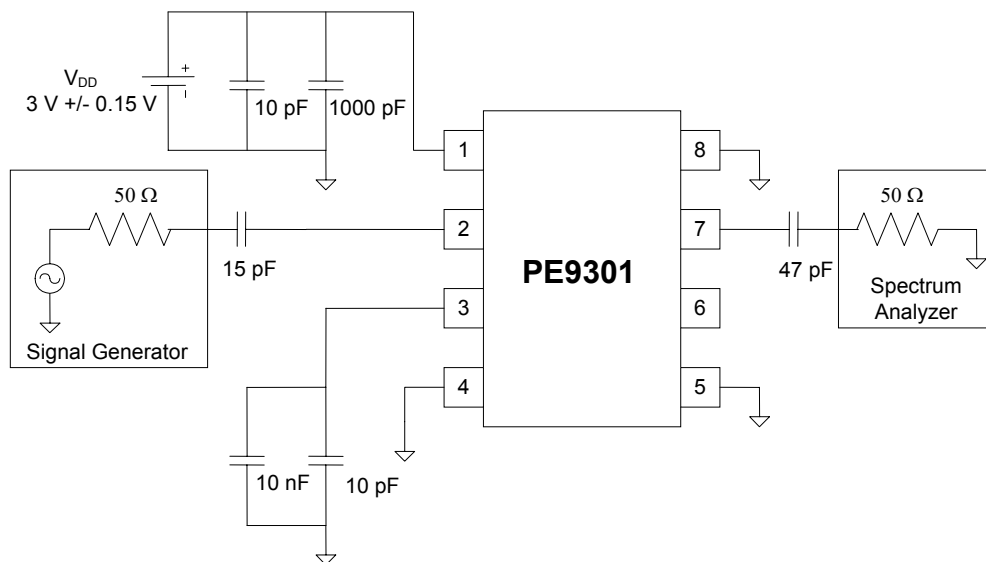
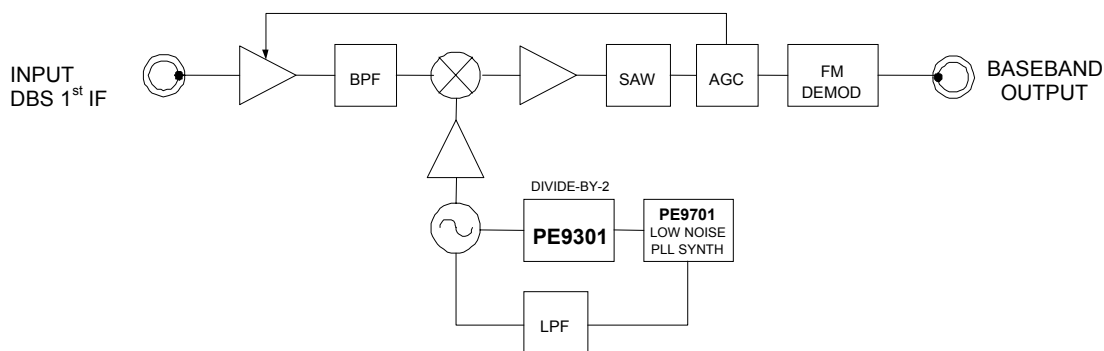


Figure 5. High Frequency System Application

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

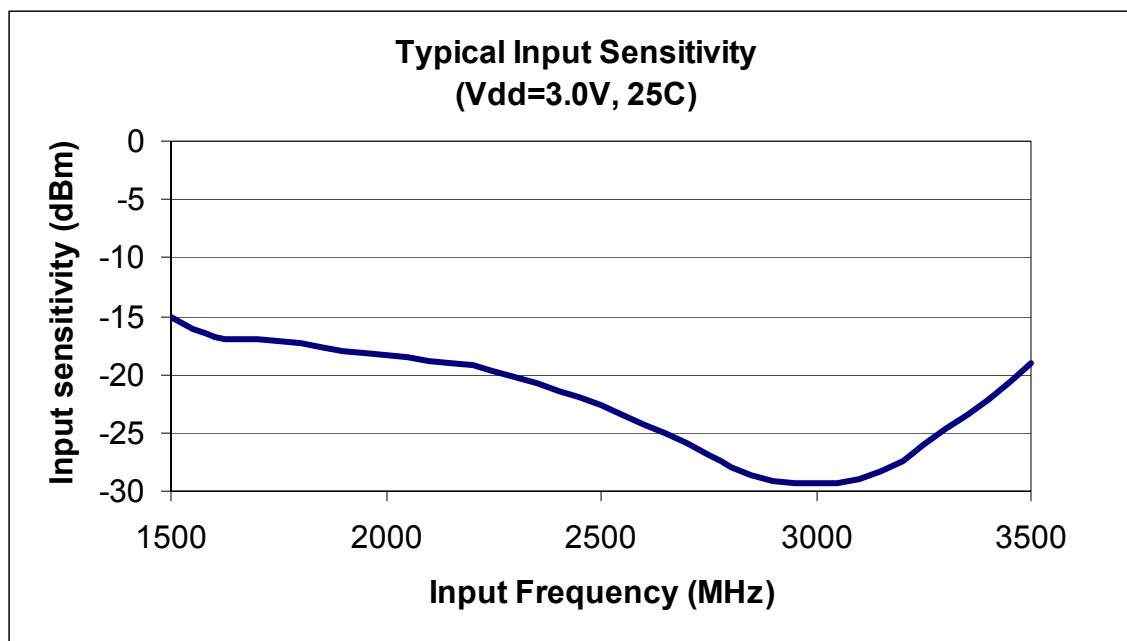
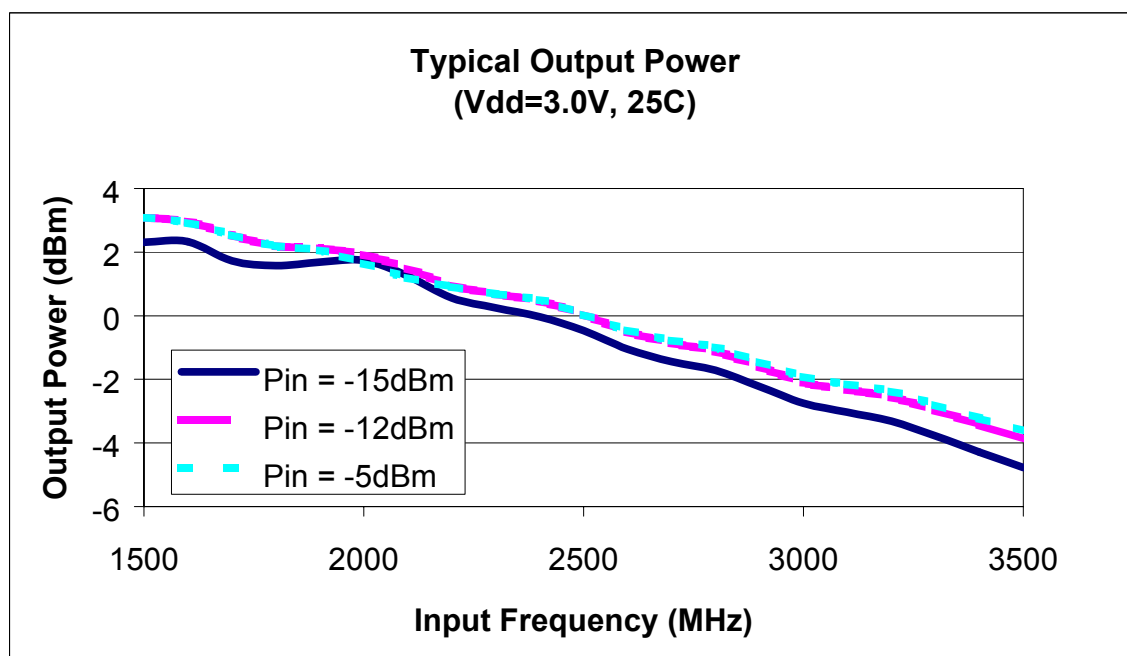


Figure 7. Typical Output Power



8-lead SOIC

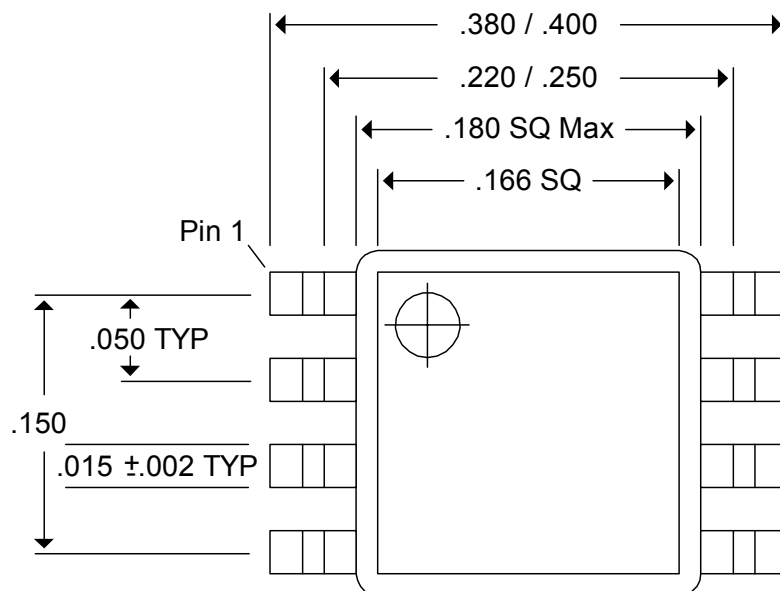


Table 4. Ordering Information

Order Code	Part Marking	Description	Package	Shipping Method
9301-01	PE9301ES	PE9301-08CFP-50B Engineering Samples	8-lead CSOIC	50 / Tray
9301-11	PE9301	PE9301-08CFP-50B Production Units	8-lead CSOIC	50 / Tray
9301-00	PE9301-EK	PE9301 Evaluation Kit	Evaluation Board	1 / Box

Sales Offices

United States

Peregrine Semiconductor Corp.

6175 Nancy Ridge Drive
San Diego, CA 92121
Tel 1-858-455-0660
Fax 1-858-455-0770

Japan

Peregrine Semiconductor K.K.

5A-5, 5F Imperial Tower
1-1-1 Uchisaiwaicho, Chiyoda-ku
Tokyo 100-0011 Japan
Tel: 03-3507-5755
Fax: 03-3507-5601

Europe

Peregrine Semiconductor Europe

Aix-En-Provence Office
Parc Club du Golf, bat 9
13856 Aix-En-Provence Cedex 3
France
Tel 33-0-4-4239-3360
Fax 33-0-4-4239-7227

For a list of representatives in your area, please refer to our Web site at: <http://www.peregrine-semi.com>

Data Sheet Identification

Advance Information

The product is in a formative or design stage. The data sheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

The information in this data sheet is believed to be reliable. However, Peregrine assumes no liability for the use of this information. Use shall be entirely at the user's own risk.

No patent rights or licenses to any circuits described in this data sheet are implied or granted to any third party.

Preliminary Specification

The data sheet contains preliminary data. Additional data may be added at a later date. Peregrine reserves the right to change specifications at any time without notice in order to supply the best possible product.

Peregrine's products are not designed or intended for use in devices or systems intended for surgical implant, or in other applications intended to support or sustain life, or in any application in which the failure of the Peregrine product could create a situation in which personal injury or death might occur. Peregrine assumes no liability for damages, including consequential or incidental damages, arising out of the use of its products in such applications.

Product Specification

The data sheet contains final data. In the event Peregrine decides to change the specifications, Peregrine will notify customers of the intended changes by issuing a PCN (Product Change Notice).

Peregrine products are protected under one or more of the following U.S. patents: 6,090,648; 6,057,555; 5,973,382; 5,973,363; 5,930,638; 5,920,233; 5,895,957; 5,883,396; 5,864,162; 5,863,823; 5,861,336; 5,663,570; 5,610,790; 5,600,169; 5,596,205; 5,572,040; 5,492,857; 5,416,043. Other patents are pending.

*Peregrine, SEL Safe, the Peregrine logotype, Peregrine Semiconductor Corp. and UTSi are registered trademarks of Peregrine Semiconductor Corp.
Copyright © 2003 Peregrine Semiconductor Corp. All rights reserved.*