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Peregrine Semiconductor

Product Specification

PE9301

3500 MHz Low Power UltraCMOS® Divide-by-2 Prescaler Radiation Tolerant for Space Applications

EOL Notification Issued 11/2/2017 - No longer available

Product Description

The PE9301 is a high-performance monolithic UltraCMOS® prescaler with a fixed divide ratio of 2. Its operating frequency range is 1500 MHz to 3500 MHz. The PE9301 operates on a nominal 3V supply and draws only 13 mA. It is packaged in a small 8-lead CFP and is ideal for space microwave PLL synthesis solutions.

The PE9301 is manufactured on Peregrine's UltraCMOS process, a patented variation of silicon-on-insulator (SOI) technology on a sapphire substrate, offering the performance of GaAs with the economy and integration of conventional CMOS.

Features

- High-frequency operation: 1500 MHz to 3500 MHz
- Fixed divide ratio of 2
- Low-power operation: 13 mA typical @ 3V across frequency
- Small package: 8-lead CFP
- Low cost

Figure 1. Functional Diagram

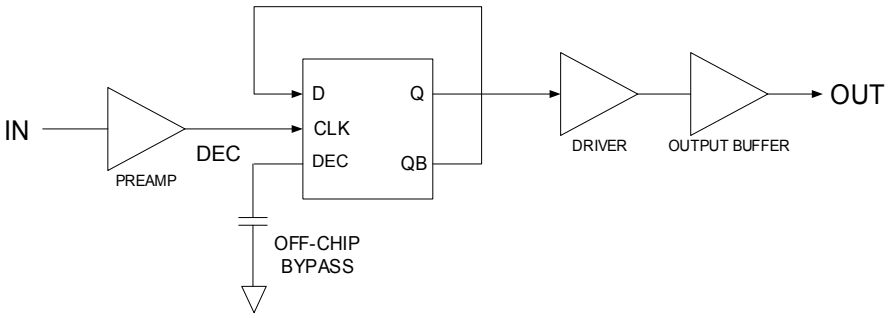


Figure 2. Package Type
8-lead CFP

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

Parameter	Condition	Min	Typ	Max	Unit
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} = 1.5–3.5 GHz	–5		+5	dBm
Output power		–10			dBm

Figure 3. Pin Configuration (Top View)

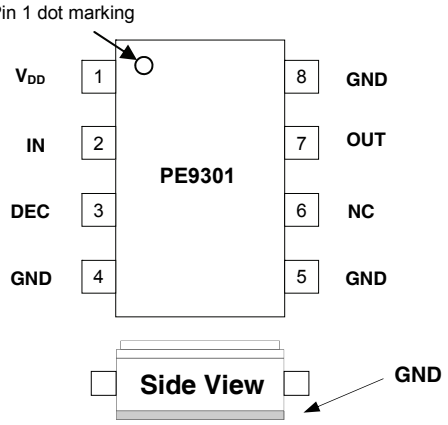


Table 2. Pin Descriptions

Pin #	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.
GND	GND	Bottom of the package is ground. Connecting the bottom of the package to ground is required

Table 3. Absolute Maximum Ratings

Symbol	Parameter/Condition	Min	Max	Unit
V_{DD}	Supply voltage		4.0	V
T_{ST}	Storage temperature range	–65	+150	°C
T_{OP}	Operating temperature range	–40	+85	°C
Θ_{JC}	Theta JC		57	°C/W
T_J	Junction temperature maximum		+125	°C
V_{ESD}	ESD voltage (Human Body Model)	250		V

Exceeding absolute maximum ratings may cause permanent device damage. Functional operation should be restricted to the limits in the DC Electrical Specifications table. Exposure to absolute maximum ratings for extended periods may reduce reliability.

Electrostatic Discharge (ESD) Precautions

When handling this UltraCMOS 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.

Latch-Up Immunity

Unlike conventional CMOS devices, UltraCMOS 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 and 7, respectively) need to be AC coupled via an external capacitor as shown in *Figure 4*.

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

ELDRS

UltraCMOS devices do not include bipolar minority carrier elements, and therefore do no exhibit enhanced low dose rate sensitivity.

Figure 4. Test Circuit Block Diagram

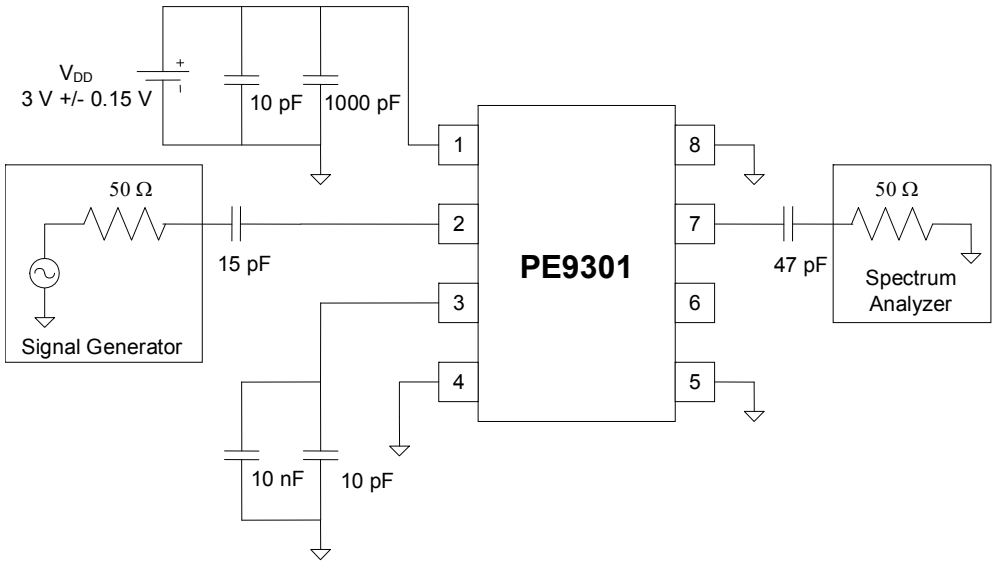
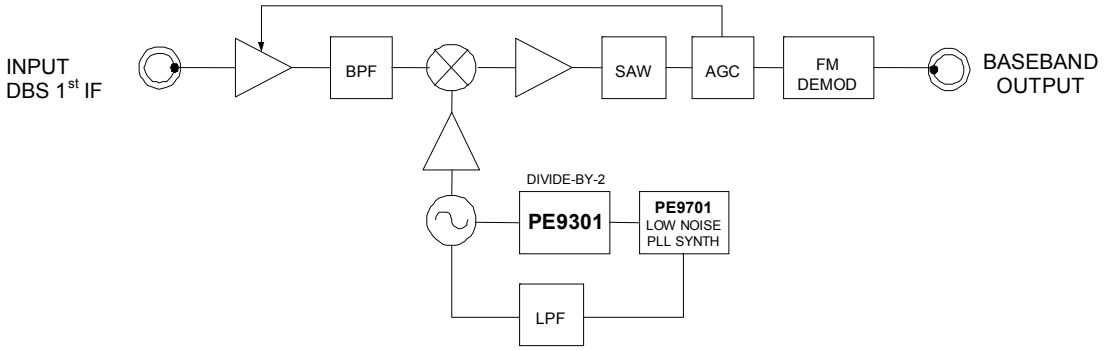


Figure 5. High Frequency System Application

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



Typical Performance Data @ +25 °C

Figure 8. Typical Input Sensitivity

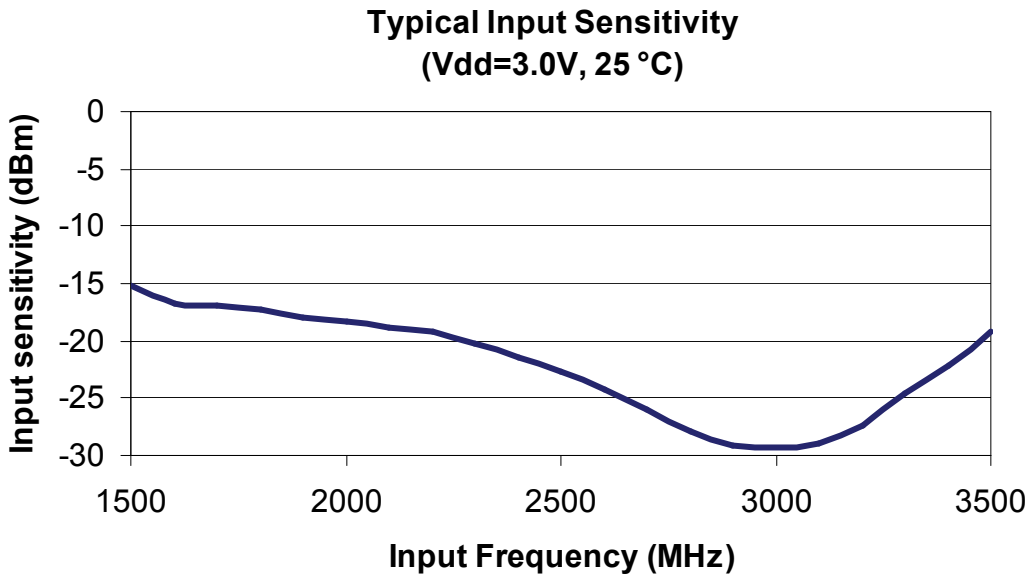


Figure 9. Typical Output Power

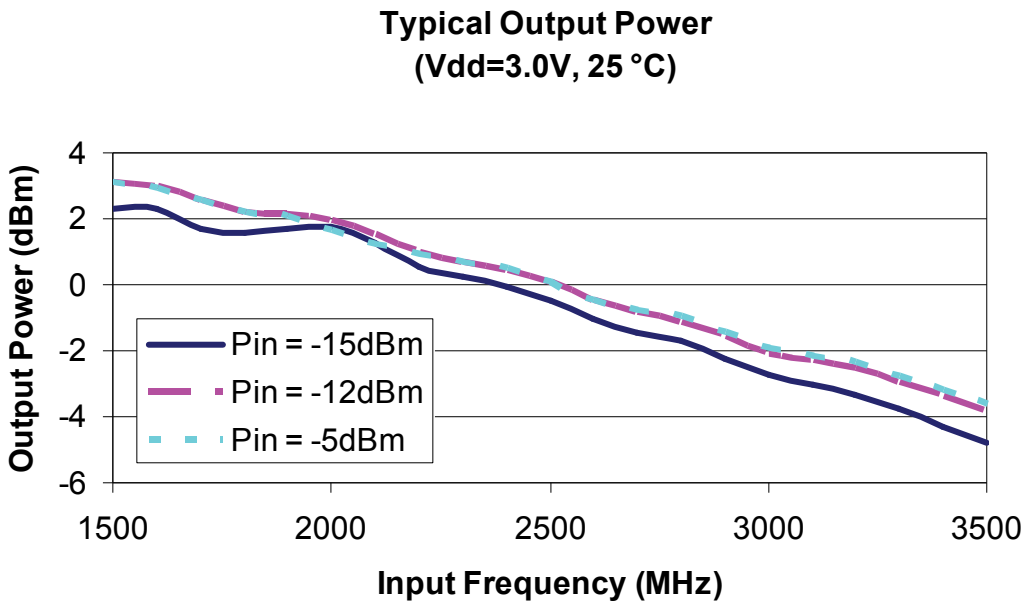
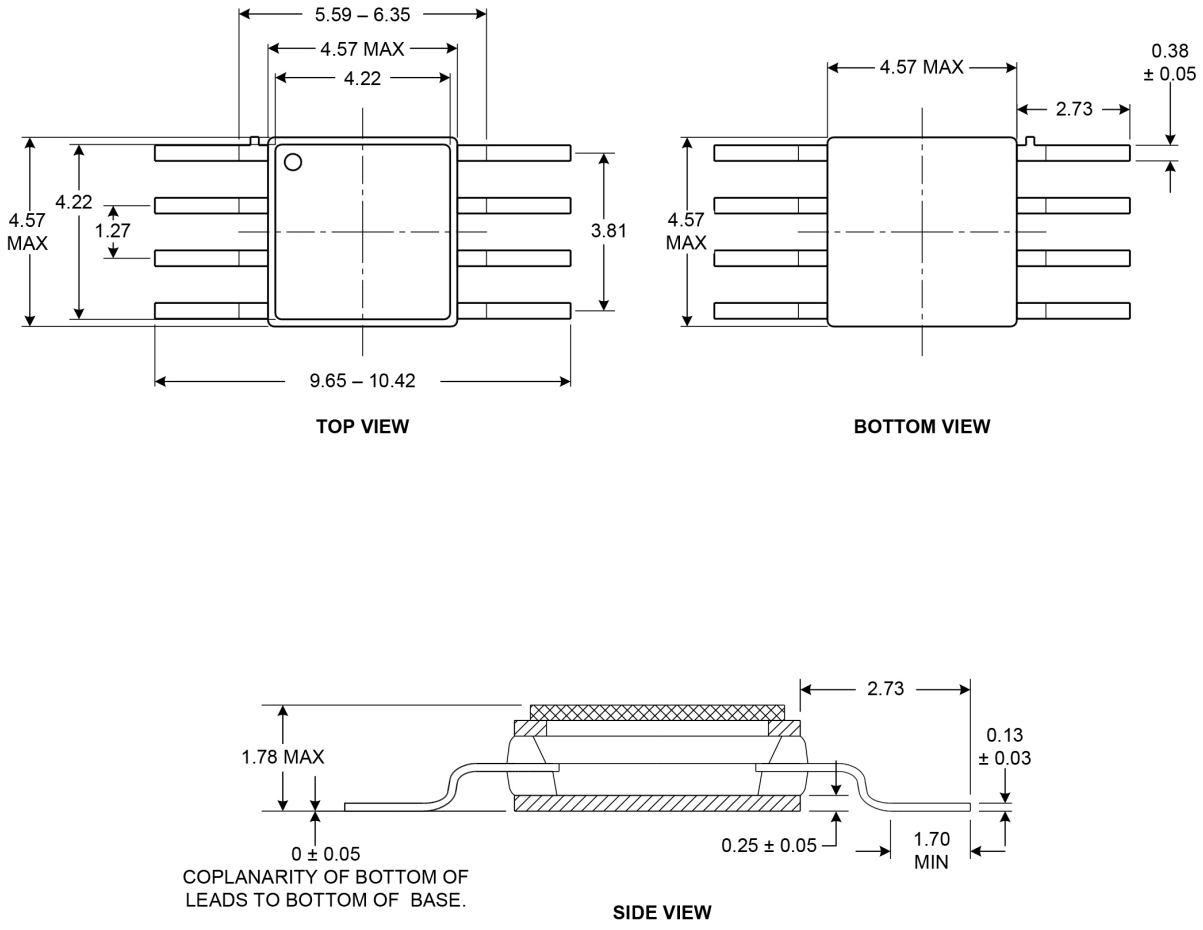


Figure 10. Package Drawing (dimensions are in millimeters)

8-lead CFP

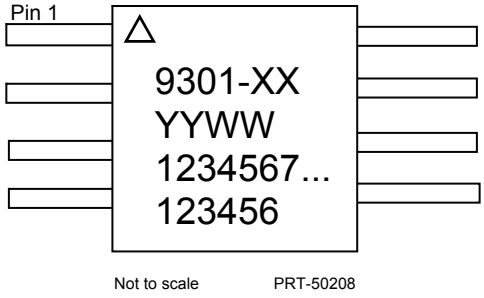
Note: Bottom of the package is ground. Connecting the bottom of the package to ground is required.



DIMS IN MM.
ALL TOLERANCES ARE +/- 0.127
UNLESS OTHERWISE STATED.
NOT TO SCALE

Rev. 97 170809
IIGNALB

Figure 11. Top Marking Specifications



Line 1: Pin 1 indicator △ No e2v or Peregrine logos present
Line 2: Part number (XX will be specified by the purchase order)
Line 3: Date code (last two digits of the year and work week)
Line 4: Wafer lot # (as many characters as room allows)
Line 5: DOP # (e2v internal / 5 digits / optional, as room allows)
Line 6: Serial # (5 digits minimum)

Note: There is **NO** backside symbolization on any of the Peregrine products.

Table 4. Ordering Information / EOL Notification Issued 11/2/2017 - No Longer Available

Order Code	Description	Package	Shipping Method
9301–01*	PE9301–08CFP–50B Engineering samples	8-lead CFP	50 / tray
9301–11	PE9301–08CFP–50B Production units	8-lead CFP	50 / tray
9301–00	PE9301 Evaluation kit	Evaluation board	1 / box

Note: * The PE9301-01 devices are engineering sample (ES) prototype units intended for use as initial evaluation units for customers of the PE9301-11 flight units. The PE9301-01 device provides the same functionality and footprint as the PE9301-11 space qualified device, and intended for engineering evaluation only. They are tested at +25 °C only and processed to a non-compliant flow (e.g. no burn-in, non-hermetic, etc). These units are non-hermetic and are not suitable for qualification, production, radiation testing or flight use.

Sales Contact and Information

Contact Information:
e2v ~ http://www.teledyne-e2v.com ~ inquiries@e2v-us.com

Advance Information: The product is in a formative or design stage. The datasheet contains design target specifications for product development. Specifications and features may change in any manner without notice. ***Preliminary Specification:*** The datasheet 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. ***Product Specification:*** The datasheet contains final data. In the event Peregrine decides to change the specifications, Peregrine will notify customers of the intended changes by issuing a CNF (Customer Notification Form).