

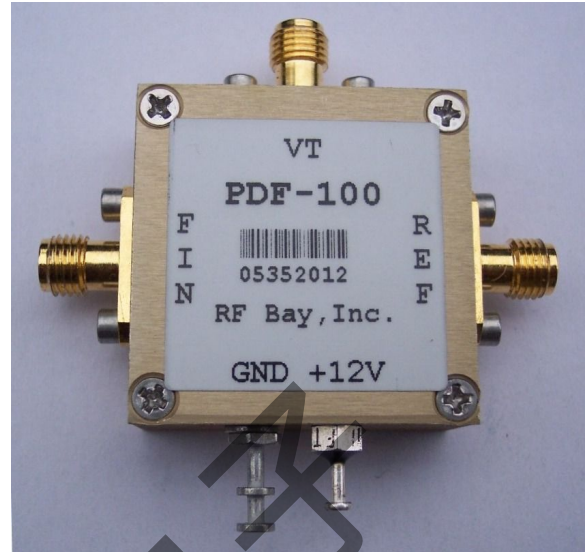
## PDF Series

## 3-300MHz Phase Detector with Loop Filter

### Features

- Frequency Range: 3 to 300MHz
- Input Power: -10 to +17dBm
- Integrated Loop Filter
- Directly Interface to FPS Series
- Directly Interface to VCO Series
- DC Power: 12V
- SMA Connector

### Picture



### Description

PDF-100 is a Phase/Frequency Detector with integrated Loop Filter. It operates with input frequency range from 3MHz to 300MHz, easy to use for Phase Locked Loop application.

### Electrical Specifications @ +25 °C, 50 Ω System, DC Supply = +12V

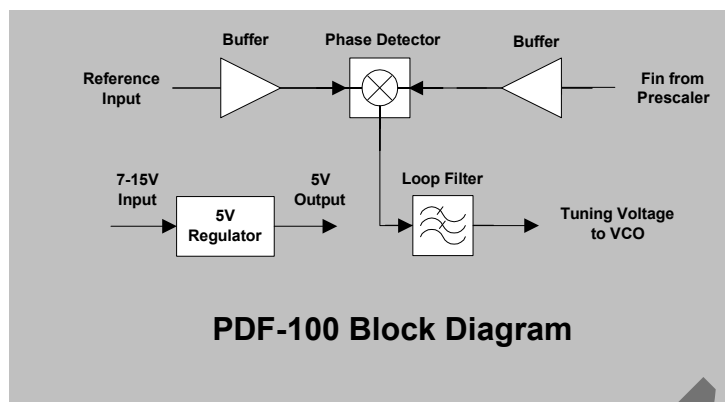
Parameter	Unit	Minimum	Typical	Maximum
Fin and Ref Input Frequency Range	MHz	3		300
Input Power Level	dBm	-10		+17
*Phase Noise @1KHz Offset With FPS-80-8 and VCO-2050 Fo=2000MHz, Ref=25MHz	dBc/Hz	-80	-85	
*Phase Noise @1KHz Offset With FPS-12-13 and VCO-3300 Fo=3300MHz, Ref=275MHz	dBc/Hz	-84	-89	
Loop Filter Bandwidth	KHz	5	10	
Tuning Voltage Output Range	V	0.1		4.9
Input VSWR			1.2:1	2.0:1
Output VSWR			1.2:1	2.0:1
DC Power Supply	V	9	12	15
Supply Current	mA		175	200

\* Phase Noise depends on VCO, reference and loop.

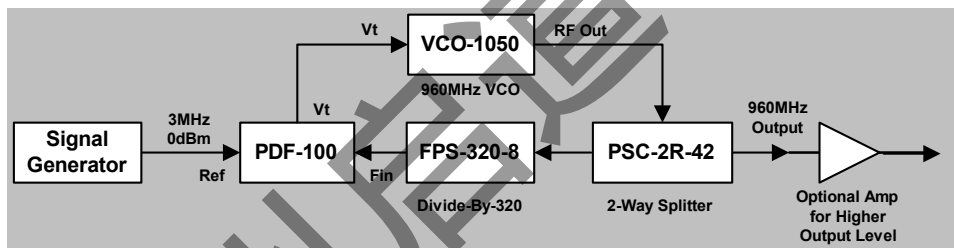
PDF Series

3-300MHz Phase Detector with Loop Filter

Block Diagram



Application Example 1



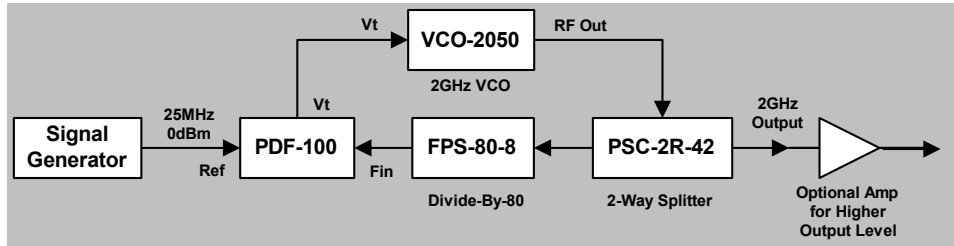
Building Block

RF Bay, Inc. Part Number	Description
PDF-100	3-300MHz Phase Detector with Loop Filter
FPS-320-8	0.8 – 8.0GHz Divide-by-320 Prescaler
VCO-1050	900-1200MHz Voltage Controlled Oscillator
PSC-2R-42	DC-4200MHz 2-Way Power Splitter/Combiner
LPA-4-14	10-4000MHz RF Amplifier

## PDF Series

## 3-300MHz Phase Detector with Loop Filter

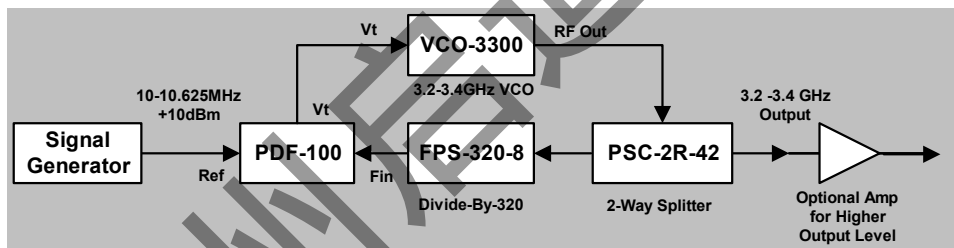
### Application Example 2



#### Building Block

RF Bay, Inc. Part Number	Description
PDF-100	3-300MHz Phase Detector with Loop Filter
FPS-80-8	0.8 – 8.0GHz Divide-by-80 Prescaler
VCO-2050	1950-2150MHz Voltage Controlled Oscillator
PSC-2R-42	DC-4200MHz 2-Way Power Splitter/Combiner
LPA-4-14	10-4000MHz RF Amplifier

### Application Example 3



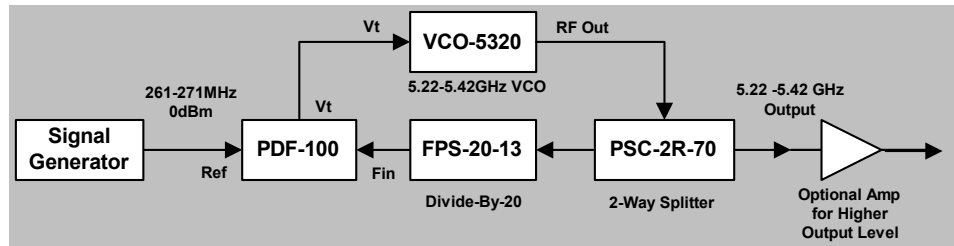
#### Building Block

RF Bay, Inc. Part Number	Description
PDF-100	3-300MHz Phase Detector with Loop Filter
FPS-320-8	0.8 – 8.0GHz Divide-by-320 Prescaler
VCO-3300	3200-3400MHz Voltage Controlled Oscillator
PSC-2R-42	DC-4200MHz 2-Way Power Splitter/Combiner
LPA-4-14	10-4000MHz RF Amplifier

## PDF Series

## 3-300MHz Phase Detector with Loop Filter

### Application Example 4



### Building Block

RF Bay, Inc. Part Number	Description
PDF-100	1-100MHz Phase Detector with Loop Filter
FPS-20-13	0.1 – 13.0GHz Divide-by-20 Prescaler
VCO-5320	5220-5420MHz Voltage Controlled Oscillator
PSC-2R-70	DC-7000MHz 2-Way Power Splitter/Combiner
LPA-6-12/LPA-6-26	100-6000MHz RF Amplifier

### Application Note

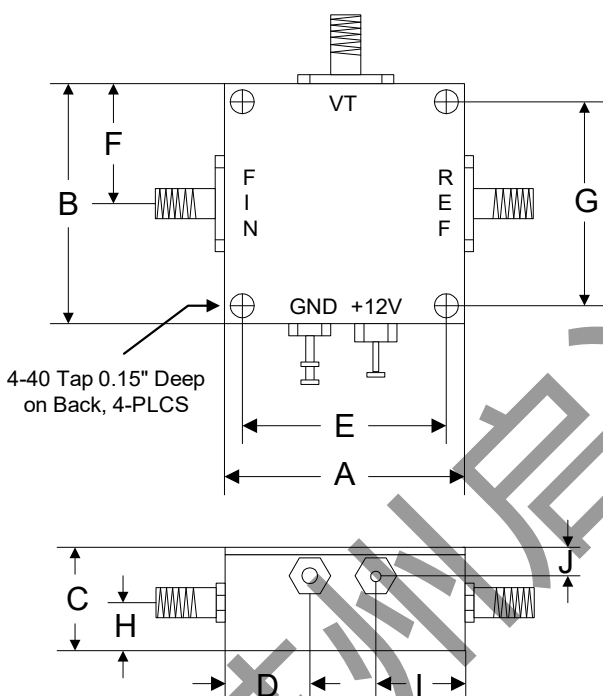
PDF-100 is designed for quick bench setup to generate frequency plan for your system design. In addition to work with RF Bay, Inc. Prescaler, VCO, Power Divider and Amplifier, it also works with widely commercial available similar product. Keep in mind following will help you to improve the system performance:

- 1) With smaller Prescaler divide ratio, the better phase noise performance
- 2) Reference phase noise play critical role for entire system performance
- 3) Running lower DC supply voltage will reduce extra heat from the unit
- 4) In most cases, unit will work with frequency under 3MHz and above 300MHz
- 5) When sweep reference frequency, the switching time is around 300  $\mu$ s
- 6) Different loop filter bandwidth can be specially ordered
- 7) Connection shown in application examples are short SMA coaxial cables

**PDF Series**
**3-300MHz Phase Detector with Loop Filter**
**Absolute Maximum Ratings**

Parameter	Absolute Maximum
RF/REF Input Power	+20dBm
Supply Voltage	+16V
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-55 °C to +125 °C

**ESD Sensitive Material**

**Outline**


Port Frequency Input (Fin) connects to RF output frequency after Prescaler output  
 Port Reference Input (Ref) connects to Signal Generator or other frequency source  
 Port Voltage Tuning (VT) connects to Voltage Controlled Oscillator tuning input

	A	B	C	D	E	F	G	H	I	J
<b>Inch</b>	1.250	1.250	0.563	0.450	1.000	0.625	1.000	0.250	0.500	0.187
<b>mm</b>	31.75	31.75	14.29	11.43	25.40	15.88	25.40	6.35	12.70	4.76