

DS5082

ISSUE 2.2

November 2001

### Features

- Selectable dual RF input ports for 900MHz AMPS and 1900MHz CDMA bands.
- Power Management Control

### Description

VENUS-L is a dual integrated mixer circuit designed to meet the IS95 and J-STD-008 receive system specifications, operating in the 900MHz and 1900MHz bands. Venus-L built on a Zarlink advanced bipolar process with an  $F_T$  of 25GHz.

### Ordering Information

VENUSL/KG/QP1S

(16 lead QSOP Package, in tubes)

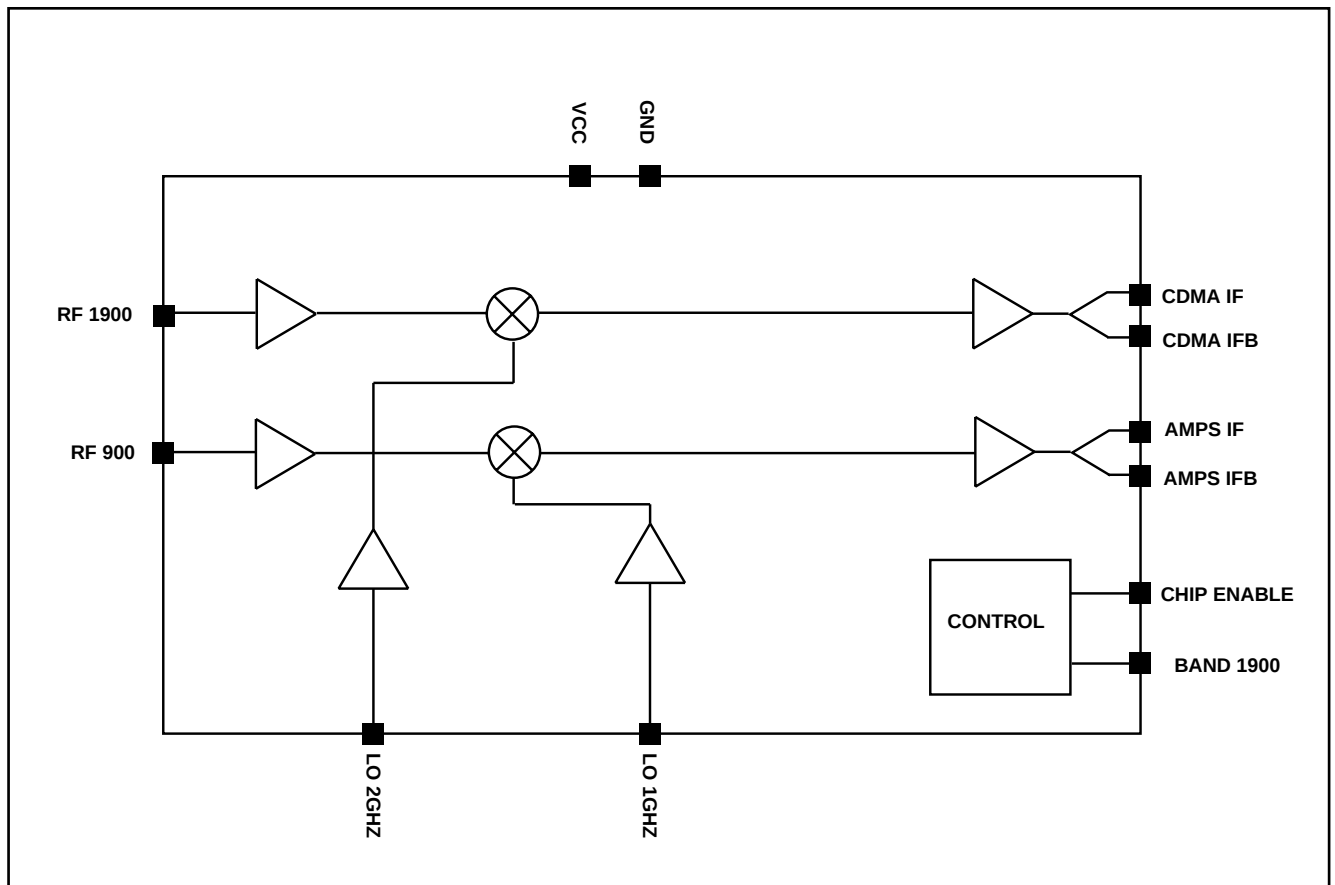
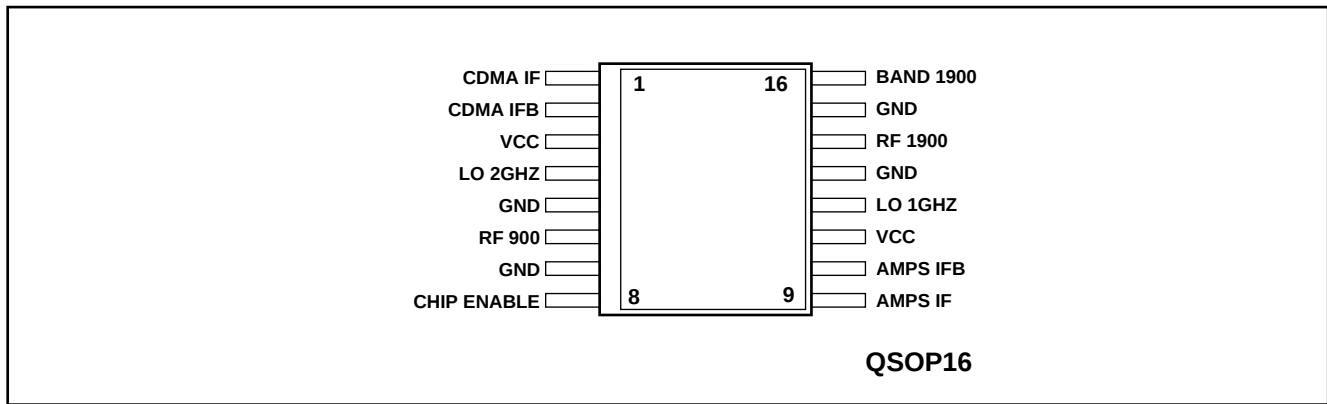


Figure 1 - Block diagram



**Figure 2 - Pin Connections**

## Circuit Description

The RF section of VENUS-L contains all of the circuitry necessary to downconvert the RF signal from 900 MHz or 1900 MHz to an IF of 50-250 MHz, and to correctly interface with a suitable IF SAW filter. Two RF inputs are provided, one for the 1900MHz band and one for the 900 MHz band. The required input is activated by means of the 'BAND 1900' pin.

The input is a  $g_m$  stage which will provide a characteristic impedance to correctly terminate the RF image-reject SAW filter.

Two LO ports are provided, one for 1900MHz band and one for 900 MHz band, both with low noise buffer amplifiers.

External matching components are required on the RF, LO and IF ports.

## Pin Description

| Pin No | Pin Name    | Description                                                   |
|--------|-------------|---------------------------------------------------------------|
| 1      | CDMA IF     | CDMA (1900MHz mixer) IF SAW output                            |
| 2      | CDMA IFB    | CDMA (1900MHz mixer) IF SAW output bar                        |
| 3      | VCC         | Positive supply                                               |
| 4      | LO 2GHZ     | 2 GHz LO input for 1900MHz mixer                              |
| 5      | GND         | Ground                                                        |
| 6      | RF 900      | 900MHz RF input                                               |
| 7      | GND         | Ground                                                        |
| 8      | CHIP ENABLE | Logic input for chip enable                                   |
| 9      | AMPS IF     | AMPS (900MHz mixer) IF SAW output                             |
| 10     | AMPS IFB    | AMPS (900MHz mixer) IF SAW output bar                         |
| 11     | VCC         | Positive supply                                               |
| 12     | LO 1GHZ     | 1GHz LO input for 900MHz mixer                                |
| 13     | GND         | Ground                                                        |
| 14     | RF 1900     | 1900MHz RF input                                              |
| 15     | GND         | Ground                                                        |
| 16     | BAND 1900   | Logic input to select 1900MHz or 900MHz signal path operation |

### Absolute Limits

| Description                | Min. | Typ. | Max.    | Units | Comments            |
|----------------------------|------|------|---------|-------|---------------------|
| Supply voltage, Vcc        |      |      | 4.0     | V     |                     |
| Operating temperature, Top | -30  |      | 70      | deg C | Pin temperature     |
| Storage temperature, Tstg  | -40  |      | 125     | deg C | Ambient temperature |
| Junction temperature       | -30  |      | 125     | deg C |                     |
| Logic input high, VIH      |      |      | Vcc+0.6 | V     |                     |
| Logic input low, VIL       | -0.6 |      |         | V     |                     |

Electrostatic Protection. High frequency RF device. This device has limited ESD protection on some pins (500V Human body Model). Electrostatic handling precautions must be applied.

### Operating Modes

| Description    | CHIP ENABLE | BAND 1900 | Comments                           |
|----------------|-------------|-----------|------------------------------------|
| Standby Mode   | 0           | X         | All circuits powered down          |
| 900MHz (AMPS)  | 1           | 0         | 900MHz (AMPS) signal path enabled  |
| 1900MHz (CDMA) | 1           | 1         | 1900MHz (CDMA) signal path enabled |

### Electrical Characteristics (DC specification)

$T_{AMB} = -30^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ ,  $V_{CC} = +2.7$  to  $+3.6\text{V}$ . These characteristics are guaranteed by either production test or design. They apply within the specified ambient temperature and supply voltage ranges unless otherwise stated.

| Characteristic             | Value   |     |         | Units         | Conditions       |
|----------------------------|---------|-----|---------|---------------|------------------|
|                            | Min     | Typ | Max     |               |                  |
| <b>General</b>             |         |     |         |               |                  |
| Supply voltage             | 2.7     | 3.0 | 3.6     | V             | All Vcc pins.    |
| Operating. Temperature     | -30     | 25  | 70      | deg C         | Ambient          |
| <b>Current Consumption</b> |         |     |         |               |                  |
| Standby Mode, RF section   |         | 10  | 100     | $\mu\text{A}$ |                  |
| 1900MHz Mode operation     |         | 15  |         | mA            |                  |
| 900MHz Mode operation      |         | 13  |         | mA            |                  |
| <b>Control Logic</b>       |         |     |         |               |                  |
| Input logic high, VIH      | Vcc-0.5 |     | Vcc+0.1 | V             | All logic inputs |
| Input logic low, VIL       | -0.1    |     | 0.5     | V             | All logic inputs |
| Input high current, IiH    | -10     |     | 10      | $\mu\text{A}$ | All logic inputs |
| Input low current, IiL     | -10     |     | 10      | $\mu\text{A}$ | All logic inputs |

## Electrical Characteristics (AC specification)

$T_{AMB} = -30^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ ,  $V_{CC} = +2.7$  to  $+3.6\text{V}$ . These characteristics are guaranteed by either production test or design. They apply within the specified ambient temperature and supply voltage ranges unless otherwise stated. Unless otherwise stated the frequencies used for measurements are to be.

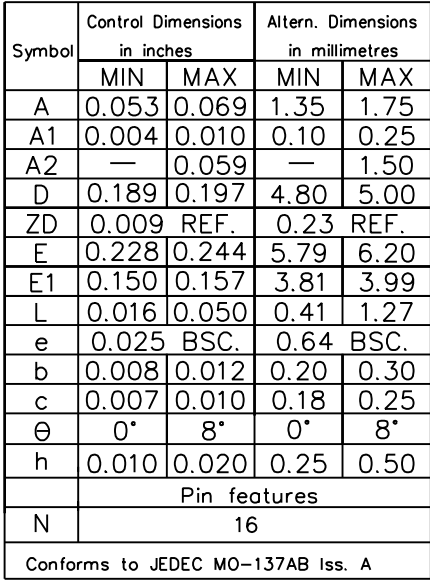
1900MHz Signal Path: RF = 1960MHz, LO = 1749.62MHz, IF = 210.38MHz.

| Characteristic                            | Value |     |      | Units    | Conditions                                                                                                                  |
|-------------------------------------------|-------|-----|------|----------|-----------------------------------------------------------------------------------------------------------------------------|
|                                           | Min   | Typ | Max  |          |                                                                                                                             |
| <b>1900MHz Signal Path</b>                |       |     |      |          | Input = RF 1900<br>Output =CDMA IF and CDMA IFB<br>LO= -10dBm from a 50 Ohm source                                          |
| Overall Power Gain, RF input to IF output | 8     | 9   | 10   | dB       |                                                                                                                             |
| Noise Figure                              |       | 9   | 11   | dB       | Total to IF outputs (SSB).                                                                                                  |
| Input third order intercept point         |       | 4   |      | dBm      |                                                                                                                             |
| RF Input impedance                        |       | 50  |      | Ohm      | With simple external matching network. Matching network must include an inductor connected between the RF 1900 pin and GND. |
| RF port Return Loss                       |       | 15  |      | dB       | With simple external matching network. Matching network must include an inductor connected between the RF 1900 pin and GND  |
| RF Frequency                              | 1800  |     | 2000 | MHz      |                                                                                                                             |
| IF Frequency                              | 50    |     | 250  | MHz      |                                                                                                                             |
| Input 1dB compression                     | -10   |     |      | dBm      |                                                                                                                             |
| Load impedance                            |       |     | 1000 | $\Omega$ | Differential. Will require an external resistor and a simple external matching network.                                     |

### Electrical Characteristics (AC specification) Continued

$T_{AMB} = -30^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ ,  $V_{CC} = +2.7$  to  $+3.6\text{V}$ . These characteristics are guaranteed by either production test or design. They apply within the specified ambient temperature and supply voltage ranges unless otherwise stated. Unless otherwise stated the frequencies used for measurements are to be.  
900MHz Signal Path: RF = 881.5MHz, LO = 966.88MHz, IF = 85.38MHz.

| Characteristic                            | Value |     |      | Units    | Conditions                                                                                                                 |
|-------------------------------------------|-------|-----|------|----------|----------------------------------------------------------------------------------------------------------------------------|
|                                           | Min   | Typ | Max  |          |                                                                                                                            |
| <b>900MHz Signal Path</b>                 |       |     |      |          | Input=RF 900 Output=AMPS IF and AMPS IFB                                                                                   |
| Overall Power Gain, RF input to IF output | 7     | 8   | 9    | dB       | LO= -10dBm from a 50ohm source                                                                                             |
| Noise Figure                              |       | 9   | 11   | dB       | Total to IF outputs (SSB).                                                                                                 |
| Input third order intercept point         |       | 5   |      | dBm      |                                                                                                                            |
| RF Input impedance                        |       | 50  |      | Ohm      | With simple external matching network. Matching network must include an inductor connected between the RF 900 pin and GND. |
| Return Loss                               |       | 15  |      | dB       | With simple external matching network. Matching network must include an inductor connected between the RF 900 pin and GND  |
| RF Frequency                              | 800   |     | 1000 | MHz      |                                                                                                                            |
| IF Frequency                              | 50    |     | 250  | MHz      |                                                                                                                            |
| Input 1dB compression                     | -8    |     |      | dBm      |                                                                                                                            |
| Load impedance                            |       | 850 |      | $\Omega$ | Differential. Will require an external resistor and a simple external matching network.                                    |
| <b>RF LO BUFFERS</b>                      |       |     |      |          |                                                                                                                            |
| LO feedthrough to IF outputs              |       |     | -30  | dBm      |                                                                                                                            |
| LO feedthrough to RF inputs               |       |     | -40  | dBm      |                                                                                                                            |
| LO input level                            | -10   |     | -5   | dBm      |                                                                                                                            |
| LO input impedance                        |       | 50  |      | $\Omega$ | With simple external matching network                                                                                      |
| LO port Return Loss                       |       | 15  |      | dB       | With simple external matching network                                                                                      |



|                                                   |         |         |        |  |                                                                                                                     |                        |                                                                                                   |
|---------------------------------------------------|---------|---------|--------|--|---------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------|
| © Zarlink Semiconductor 2002 All rights reserved. |         |         |        |  |  <b>ZARLINK</b><br>SEMICONDUCTOR | Package Code           | DG                                                                                                |
| ISSUE                                             | 1       | 2       | 3      |  |                                                                                                                     | Previous package codes | Package Outline for 16 lead<br>QSOP (0.150" Body Width)                                           |
| ACN                                               | 201928  | 207313  | 212474 |  |                                                                                                                     | QP / Q                 |                                                                                                   |
| DATE                                              | 27Feb97 | 24Aug99 | 3Apr02 |  |                                                                                                                     |                        | GPD00290<br> |
| APPRD.                                            |         |         |        |  |                                                                                                                     |                        |                                                                                                   |



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