

VENUS is a dual integrated mixer circuit designed to meet the IS95 and PN-3384 receive system specifications operating in the 900 MHz and 1900MHz bands. Venus is part of a complete chipset solution for CDMA phones called the Planet chipset, and is built on a Mitel advanced bipolar process with FT's of 25GHz.

### FEATURES

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

### ORDERING INFORMATION

VENUS/KG/QP1S

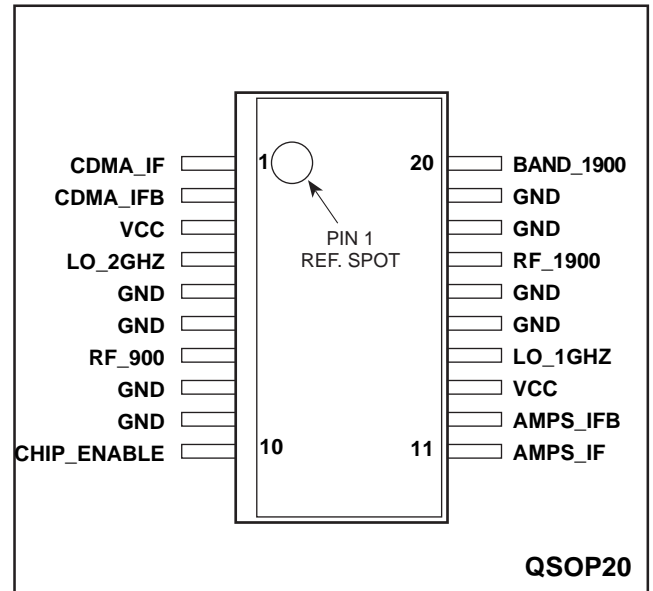


Fig.1 Pin connections - top view

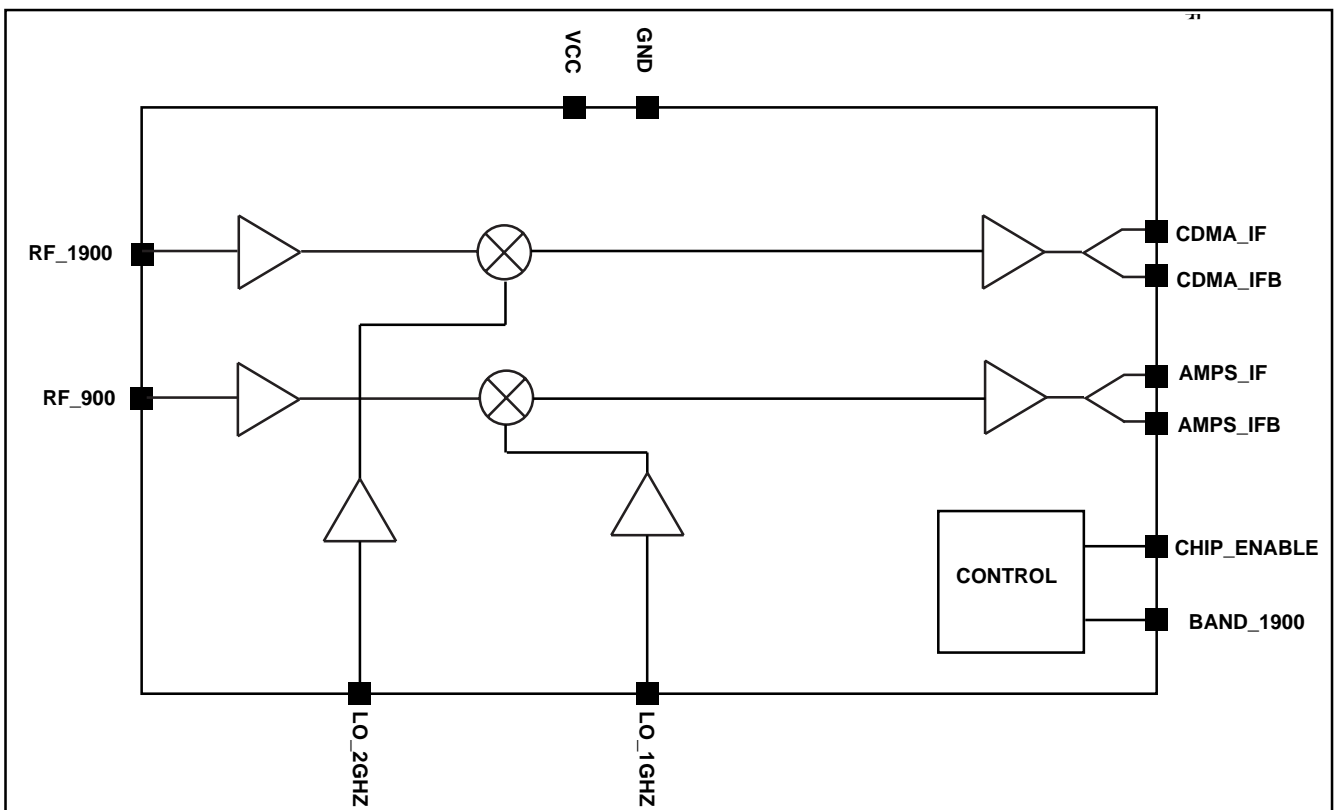


Fig 2. Block diagram

## VENUS

### CIRCUIT DESCRIPTION

The RF section of VENUS 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 gm 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	GND	Ground
7	RF_900	900MHz RF input
8	GND	Ground
9	GND	Ground
10	CHIP_ENABLE	Logic input for chip enable
11	AMPS_IF	AMPS (900MHz mixer) IF SAW output
12	AMPS_IFB	AMPS (900MHz mixer) IF SAW output bar
13	VCC	Positive supply
14	LO_1GHZ	1GHz LO input for 900MHz mixer
15	GND	Ground
16	GND	Ground
17	RF_1900	1900MHz RF input
18	GND	Ground
19	GND	Ground
20	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	

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	27	70	deg C	Ambient
<b>Current Consumption</b>					
Standby Mode, RF section			0.1	mA	
1900MHz Mode operation		34		mA	
900MHz Mode operation		23		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

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### 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 Output =CDMA_IF and CDMA_IFB
Overall Power Gain, RF input to IF output	8	9	10	dB	LO= -10dBm from a 50 Ohm source
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	
Half IF rejection	5			dB	
Third IF rejection	5			dB	
Input 1dB compression	-10			dBm	
Output 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.

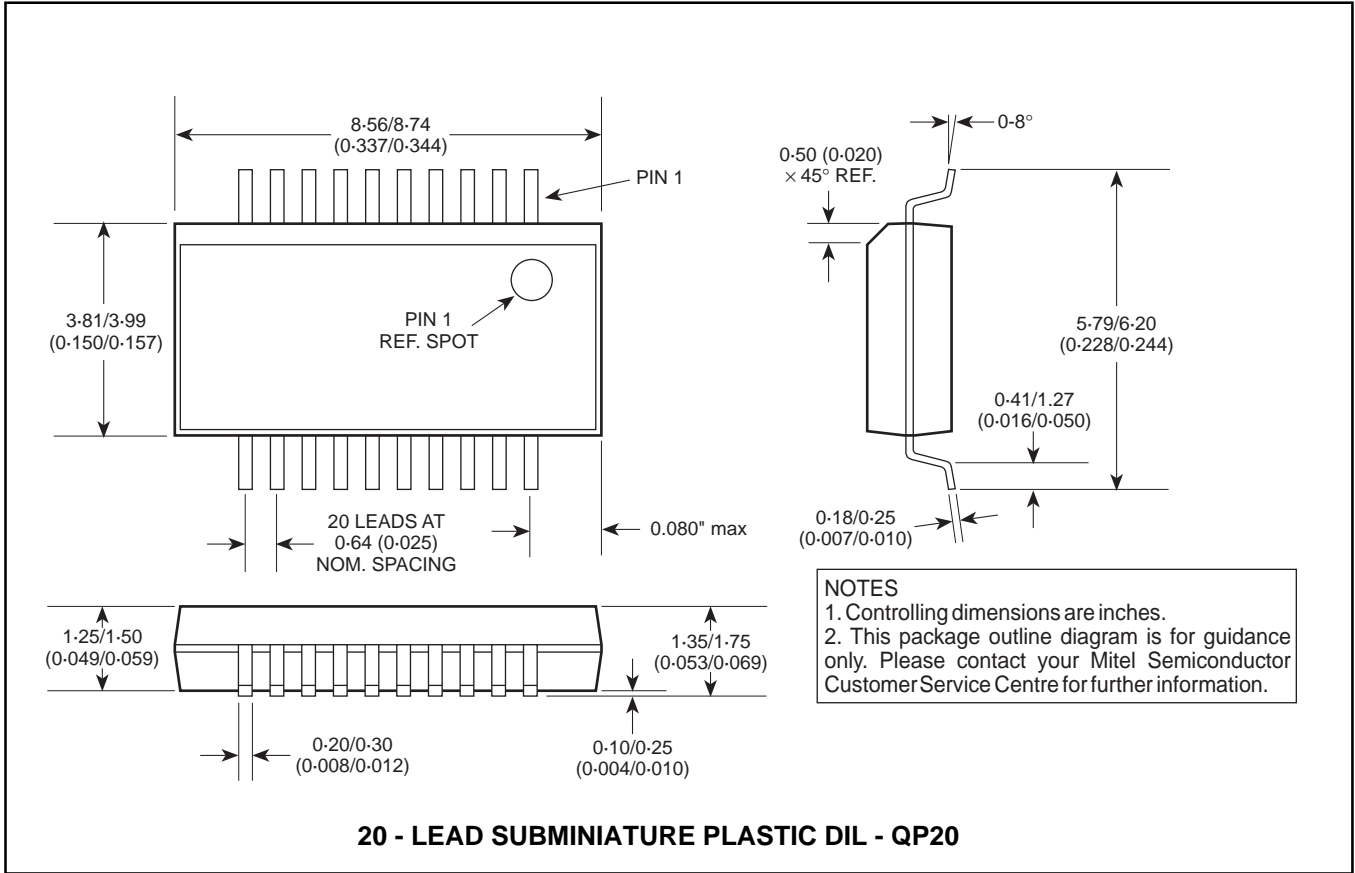
900MHz Signal Path: RF = 881.5MHz, LO = 966.88MHz, IF = 85.38MHz.

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	4			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	
Half IF rejection	5			dB	
Third IF rejection	5			dB	
Input 1dB compression	-8			dBm	
Output 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

# VENUS

## PACKAGE DETAILS

Dimensions are shown thus: mm (in). For further package information, please contact your local Customer Service Centre.



**NOTES**  
 1. Controlling dimensions are inches.  
 2. This package outline diagram is for guidance only. Please contact your Mitel Semiconductor Customer Service Centre for further information.



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