

Features

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

Ordering information

VENUS-L/KG/QP1S
VENUS-L/KG/QP1T

Description

VENUS-L is a dual integrated mixer circuit designed to meet the IS95 and J-STD-008 receive system specifications operating in the 900 MHz and 1900MHz bands. Venus-L 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.

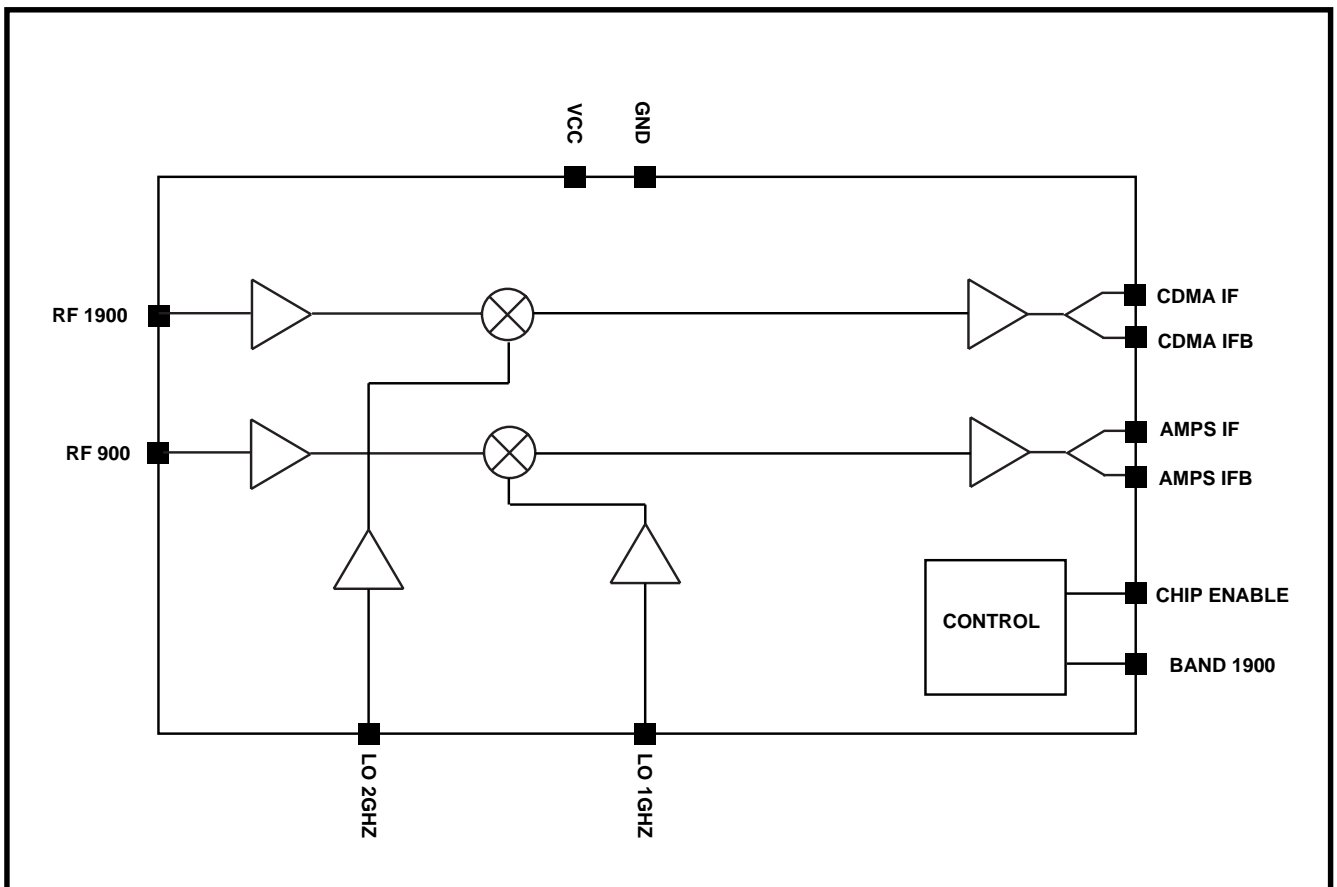


Figure 2. Block diagram

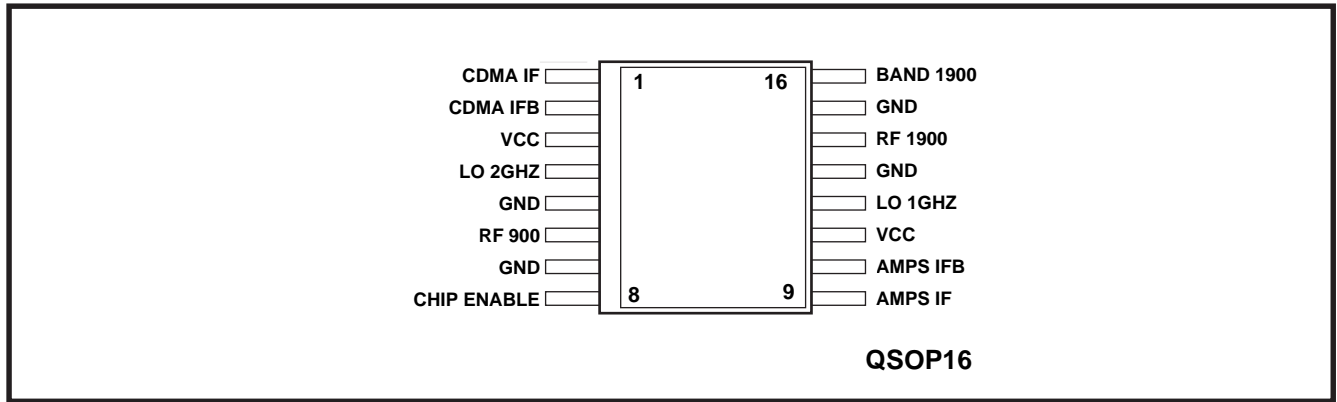


Figure1 Pin Connections

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 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	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		
General					
Supply voltage	2.7	3.0	3.6	V	All Vcc pins. Ambient
Operating. Temperature	-30	25	70	deg C	
Current Consumption					
Standby Mode, RF section		10	100	μA	
1900MHz Mode operation		15		mA	
900MHz Mode operation		13		mA	
Control Logic					
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	μA	All logic inputs
Input low current, IiL	-10		10	μA	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.

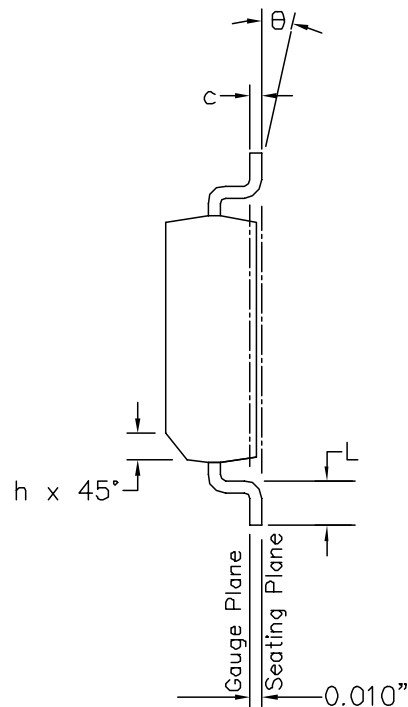
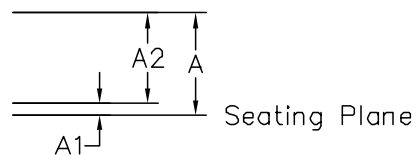
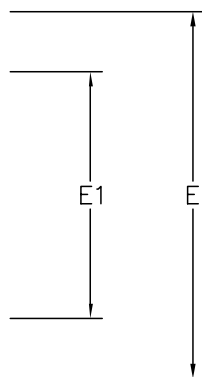
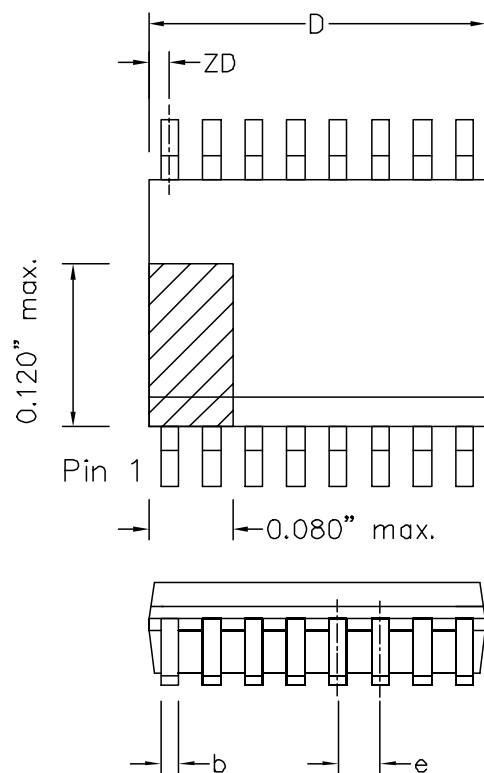
1900MHz Signal Path: RF = 1960MHz, LO = 1749.62MHz, IF = 210.38MHz.

Characteristic	Value			Units	Conditions
	Min	Typ	Max		
1900MHz Signal Path					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 matchin 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 mus 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		Ω	Differential. Will require an external resistor and a simple external matching network.

Electrical Characteristics (AC specification) Continued

$T_{AMB} = -30^{\circ}C$ to $+70^{\circ}C$, $V_{CC} = +2.7$ to $+3.6V$. 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		
900MHz Signal Path					
Overall Power Gain, RF input to IF output	7	8	9	dB	Input=RF 900 Output=AMPS IF and AMPS IFB 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		Ω	Differential. Will require an external resistor and a simple external matching network.
RF LO BUFFERS					
LO feedthrough to IF outputs			-30	dBm	
LO feedthrough to RF inputs			-40	dBm	
LO input level	-10		-5	dBm	
LO input impedance		50		Ω	With simple external matching network
LO port Return Loss		15		dB	With simple external matching network



Symbol	Control Dimensions in inches		Altern. Dimensions in millimetres	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
A2	—	0.059	—	1.50
D	0.189	0.197	4.80	5.00
ZD	0.009	REF.	0.23	REF.
E	0.228	0.244	5.79	6.20
E1	0.150	0.157	3.81	3.99
L	0.016	0.050	0.41	1.27
e	0.025	BSC.	0.64	BSC.
b	0.008	0.012	0.20	0.30
c	0.007	0.010	0.18	0.25
θ	0°	8°	0°	8°
h	0.010	0.020	0.25	0.50
Pin features				
N	16			
Conforms to JEDEC MO-137AB Iss. A				

This drawing supersedes
418/ED/51617/001 (Swindon/Roborough)
TD/D 1028 (Oldham)

Notes:

1. The chamfer on the body is optional. If it is not present, a visual index feature, e.g. a dot, must be located within the cross-hatched area.
2. Controlling dimensions are in inches.
3. Dimension D do not include mould flash, protrusion or gate burrs. These shall not exceed $0.006''$ per side.
4. Dimension $E1$ do not include inter-lead flash or protrusion. These shall not exceed $0.010''$ per side.
5. Dimension b does not include dambar protrusion/intrusion. Allowable dambar protrusion shall be $0.004''$ total in excess of b dimension.

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ORIGINATING SITE: SWINDON

ISSUE	1	2			
ACN	201928	207313			
DATE	27FEB97	24AUG99			
APPRD.					

MITEL SEMICONDUCTOR

Title:
Package Outline Drawing for
16L QSOP-0.150" Body Width(QP)

Drawing Number
GPD00290



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