GEC PLESSEY
SEMICONDUCTORS

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PRELIMINARY INFORMATION

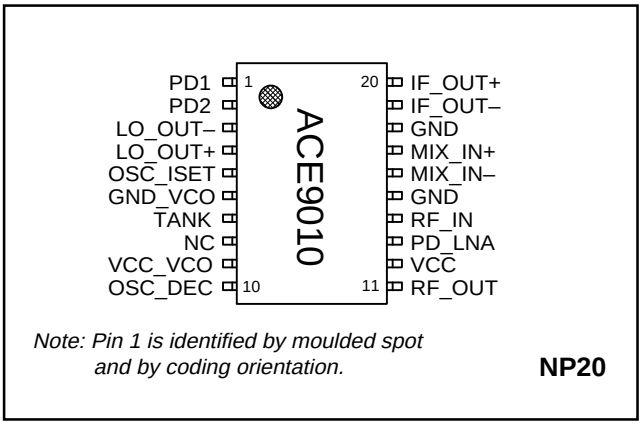
DS4286 1.0

ACE9010

R.F. FRONT END WITH VCO

ACE9010 is a combined LNA, Mixer and VCO for use in the receive path of cellular telephones. High frequency front end functions previously realised in discrete components are integrated into one device. The design is optimised for low power whilst retaining high intercept performance and low noise operation.

Power saving modes are included for battery economy.



Note: Pin 1 is identified by moulded spot and by coding orientation.

NP20

Fig.1 Pin connections - top view

FEATURES

- Low Power and Low Voltage (3·6 to 5·0 V) Operation
- Power Down Modes
- Low Noise Figure - LNA 1.6 dB typical
- 1GHz VCO, Buffer, and Mixer
- Part of the ACE Integrated Cellular Phone Chipset
- Small Outline 20 pin SSOP Package

APPLICATIONS

- AMPS and TACS Cellular Telephones
- GSM and IS54 Digital Cellular Telephones
- Radio Systems

ORDERING INFORMATION

SSOP 20 lead package, code NP20

ACE9010/KG/NP1S - devices shipped in tubes

ACE9010/KG/NP1T - devices shipped on tape

RELATED PRODUCTS

ACE9010 is part of the following chipset:

- ACE9020 Receiver and Transmitter interface
- ACE9030 Radio Interface and Twin Synthesiser
- ACE9040 Audio Processor
- ACE9050 System Controller and Data Modem

ABSOLUTE MAXIMUM RATINGS

Supply voltage	6 V
Storage temperature	- 65 °C to + 150 °C
Operating temperature	- 30 °C to + 85 °C
Voltage at any pin	- 0.3 V to V_{CC} + 0.3 V

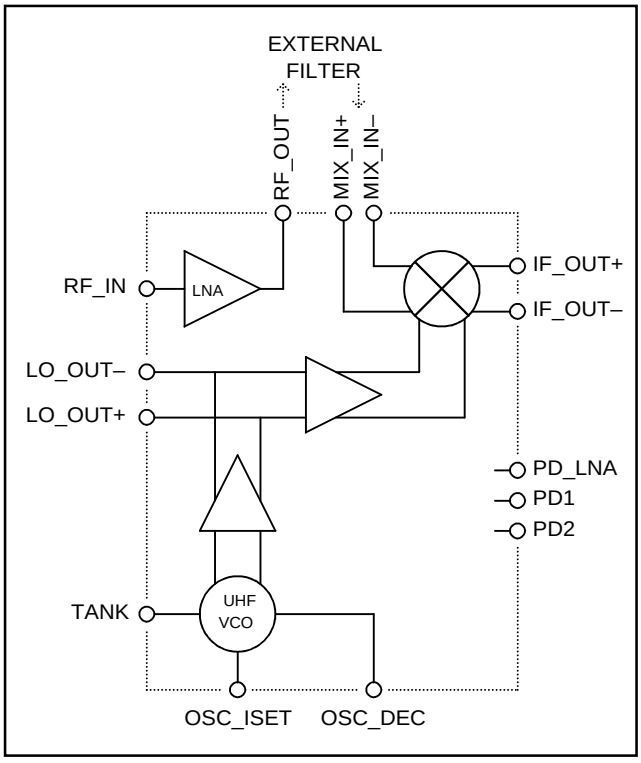


Fig. 2 ACE9010 simplified block digram

PIN CONNECTIONS

Pin No.	Name	Type	Description
1	PD1	I	Power down control input 1
2	PD2	I	Power down control input 2
3	LO_OUT–	I(O)	VCO differential buffer output (LO1 mixer input with VCO powered down)
4	LO_OUT+	I(O)	VCO differential buffer output (LO1 mixer input with VCO powered down)
5	OSC_ISET	I	VCO current set, oscillator emitter, typ. 220 Ω in series with 47 nH to GND
6	GND_VCO	I	VCO ground
7	TANK	I	Oscillator external resonator & varactor circuit connection
8	nc	-	No connection
9	VCC_VCO	Supply	VCO V_{CC} supply (leave open to power VCO down)
10	OSC_DEC	-	VCO decoupling, typ. 12 nF to GND_VCO
11	RF_OUT	O	LNA RF open collector output.
12	VCC	Supply	V_{CC} supply for LNA and mixer
13	PD_LNA	I	LNA power down
14	RF_IN	I	LNA input
15	GND	Supply	Ground
16	MIX_IN–	I	Differential mixer input (with pin 17)
17	MIX_IN+	I	Differential mixer input (with pin 16)
18	GND	Supply	Ground
19	IF_OUT–	O	Mixer I.F. differential output (with pin 20)
20	IF_OUT+	O	Mixer I.F. differential output (with pin 19)

ELECTRICAL CHARACTERISTICS

These characteristics apply over these ranges of conditions (unless otherwise stated):

T_{AMB} = – 30 °C to + 85 °C, V_{CC} = 3·75 ± 0·15 V or 4·85 ± 0·15 V, f_{RF} = 869 to 950 MHz, f_{LO} = 914 to 995 MHz, IF = 45 MHz, Interstage filter loss = 3 dB.

Parameter	Min.	Typ.	Max.	Unit	Conditions
LNA and MIXER					
Supply current			11	mA	
Conversion power gain	17			dB	See note 1
Noise Figure - LNA only		1.6	2.3	dB	
Noise Figure - Total		3.5	4	dB	See note 1
1 dB input compression	–18			dBm	See note 2
VCO					
Supply current		9	12	mA	
Output level		– 5		dBm	
Phase noise, Δf = 25 kHz			– 109	dBc/Hz	
Phase noise, Δf = 45 MHz			– 155	dBc/Hz	

Notes:
1. Includes LNA and Mixer plus interstage filter with 3 dB loss
2. Jamming signal at 45 MHz below f_{RF}

VCO OPTIONS

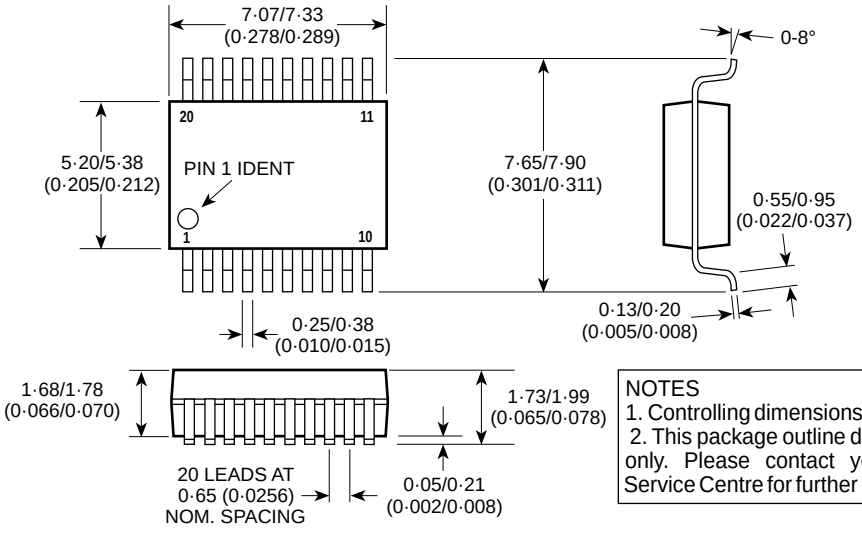
In normal operation the VCO will internally drive the mixer and also drive the outputs LO_OUT– and LO_OUT+ to provide the local oscillator signal to the ACE9020 prescaler and upconverter. It is possible to use an external VCO if preferred, by disconnecting VCC_VCO (pin 9) to power down the VCO and to then drive in on pins LO_OUT– and LO_OUT+.

Power Down Modes

PD2	PD1	PD_LNA	Mode
0	0	x	Sleep
0	1	1	VCO powered on
1	x	1	Receive -All circuitry on
1	x	0	LNA powered off

PACKAGE DETAILS

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



NOTES
1. Controlling dimensions are millimetres.
2. This package outline diagram is for guidance only. Please contact your GPS Customer Service Centre for further information.

20-LEAD SHRUNK MINIATURE PLASTIC DIL (SSOP) - NP20

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