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0.8 – 2.7 GHz Quadrature Modulator

RF IF PRODUCT CONCEPT AD834x (3G-MOD)

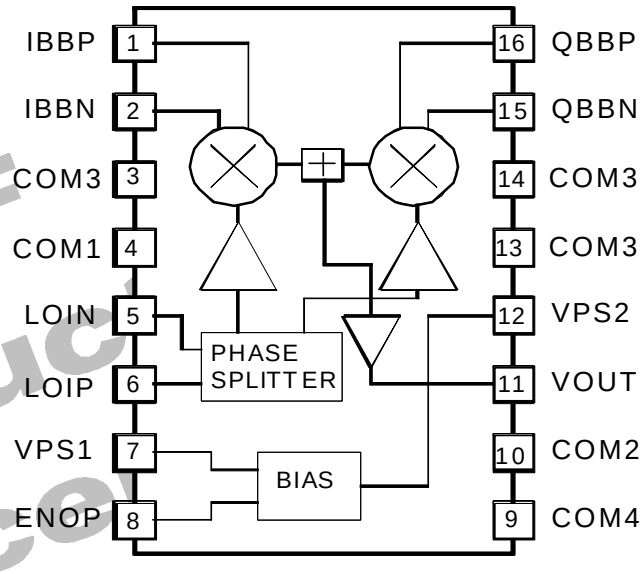
FEATURES

Broad frequency range 0.8 GHz – 2.7GHz
Modulation Bandwidth DC-100 MHz
Output Level 0 dBm
Noise Floor –155 dBm/Hz
High Accuracy
Phase Quadrature Error 1 deg rms
Amplitude Balance 0.2 dB
Single Supply 4.5-5.5 V
75mA Total Current
50mA with output disabled
Pin compatible with AD8346 / AD8345
16-lead exposed paddle TSSOP package

APPLICATIONS

Cellular Communication Systems
W-CDMA/CDMA/GSM/PCS/DCS
Wireless LAN / Wireless Local Loop
Broadband Wireless Access Systems

Functional Block Diagram



PRODUCT DESCRIPTION

The AD834x (3G-MOD) is a silicon RFIC quadrature modulator, designed for use from 0.8 to 2.7 GHz. Its excellent phase accuracy and amplitude balance enable high performance direct RF modulation.

The differential LO signal first passes through a poly-phase phase-splitter. The I- and Q-channel outputs of the phase splitter are buffered to drive the LO inputs of two Gilbert-cell mixers. Two differential V-to-I converters connected to the I- and Q-channel baseband inputs provide the tail currents for the mixers. The outputs of the two mixers are summed together at a differential buffer to drive 50-ohm loads.

APPLICATIONS

The AD834x can be used as a direct to RF transmit modulator in digital communication systems such as GSM, CDMA, W-CDMA basestations and QPSK, QAM broadband wireless access transmitters. It can also be used as the IF modulator within LMDS transmitters.

Additionally, this quadrature modulator can be used with direct digital synthesizers in hybrid phase-locked loops to generate signals over a wide frequency range with millihertz resolution.

The AD834x is supplied in a 16-lead exposed-paddle TSSOP package, measuring 6.5 x 5.1 x 1.1mm. Its performance is specified over a -40 to +85^{o}C temperature range. This device is fabricated on Analog Devices' advanced XFCB-2 Complementary Silicon Bipolar process.

Product Concept Rev. 0 12.21.00

AD834x Specifications (Unless otherwise specified: Vsupply=5V; Tambient=25C; LO=2.1GHz, -2 dBm; I/Q inputs = 0.8V with +/-0.3V swing; Baseband frequency = 1 MHz; LO source & RF output load impedances are 50ohms)

Parameters	Conditions	Min	Typ	Max	Units
RF Output					
Operating Frequency		0.8		2.7	GHz
Output Level	Vin = +/- 0.3V		0		dBm
Compression Level (P1dB)		0	+3		dBm
Nominal Impedance			50		ohm
Output Return Loss			18		dB
Noise Floor	ΔF≥20MHz from carrier		-155	-153	dBm/Hz
Quadrature Error			1		deg. rms
I/Q Amplitude Balance			0.2		dB
LO leakage			-45		dBm
Sideband Rejection			-35		dBc
3rd order distortion	Flo +/- 3*Fbb		-50		dBc
LO Inputs					
LO Drive level		-10		0	dBm
Nominal Impedance			50		ohm
Input Return Loss			8		dB
Baseband Inputs					
Input bias current			10		uA
Input capacitance			2		pF
Bandwidth (0.2dB)				20	MHz
Bandwidth (3dB)	Vin = +/- 0.3V		100		MHz
Output Enable					
Turn-on (ENOP = High)	RF output settles to 0.1dB		TBD		ns
Turn-off (ENOP = Low)	RF output < -30 dBm		TBD		ns
ENBL High Threshold (logic 1)				2.0	V
ENBL Low Threshold (logic 0)		0.5			V
Power Supplies					
Voltage		4.5		5.5	Volts
Current active			75		mA
Current (output disabled)			50		mA