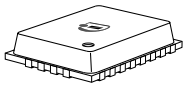
GaAs MMIC

CMY 82

Preliminary Data Sheet

- GaAs receiver front-end for cellular CDMA applications
- Adjustable gain control RF amplifier with 20 dB dynamic range
- Low LO-power demand of typ. – 10 dBm with 2 LO buffer stages
- Optional 1 or 2 LO-buffer stages
- Flat leadless 4.5 × 3.5 mm^2 SMT plastic package
- RF-frequency range: 0.6 - 1.0 GHz
- Operating voltage range: 2.6 to 5 V
- Total current consumption: 14 mA



P-VQFN-24-3

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

Type	**Marking**	**Ordering Code** (tape and reel)	**Package**
CMY 82	on request	on request	P-VQFN-24-3

Maximum Ratings

Parameter	Port	Symbol	Limit Values		Unit
			min.	max.	
Supply Voltage	5, 11, 14 18, 19, 20	V_{DD}	0	5	V
Gate Control Voltage	3	V_{GC}	0	5	V
Power into RF Input	1	$P_{RF\ IN}$	– 10	5	dBm
DC-Voltage at LO Input	6, 8	V_6, V_8	– 3	0.5	V
Power into LO Input	6, 8	$P_{LO\ IN}$	– 14	0	dBm
DC-Voltage at Mixer RF-IF Port	15, 16	V_{15}, V_{16}	– 0.5	0.5	V
Power into Mixer RF Port	16	P_{RFmix}	–	10	dBm
Channel Temperature	–	T_{Ch}	–	150	°C
Storage Temperature	–	T_{stg}	– 55	150	°C

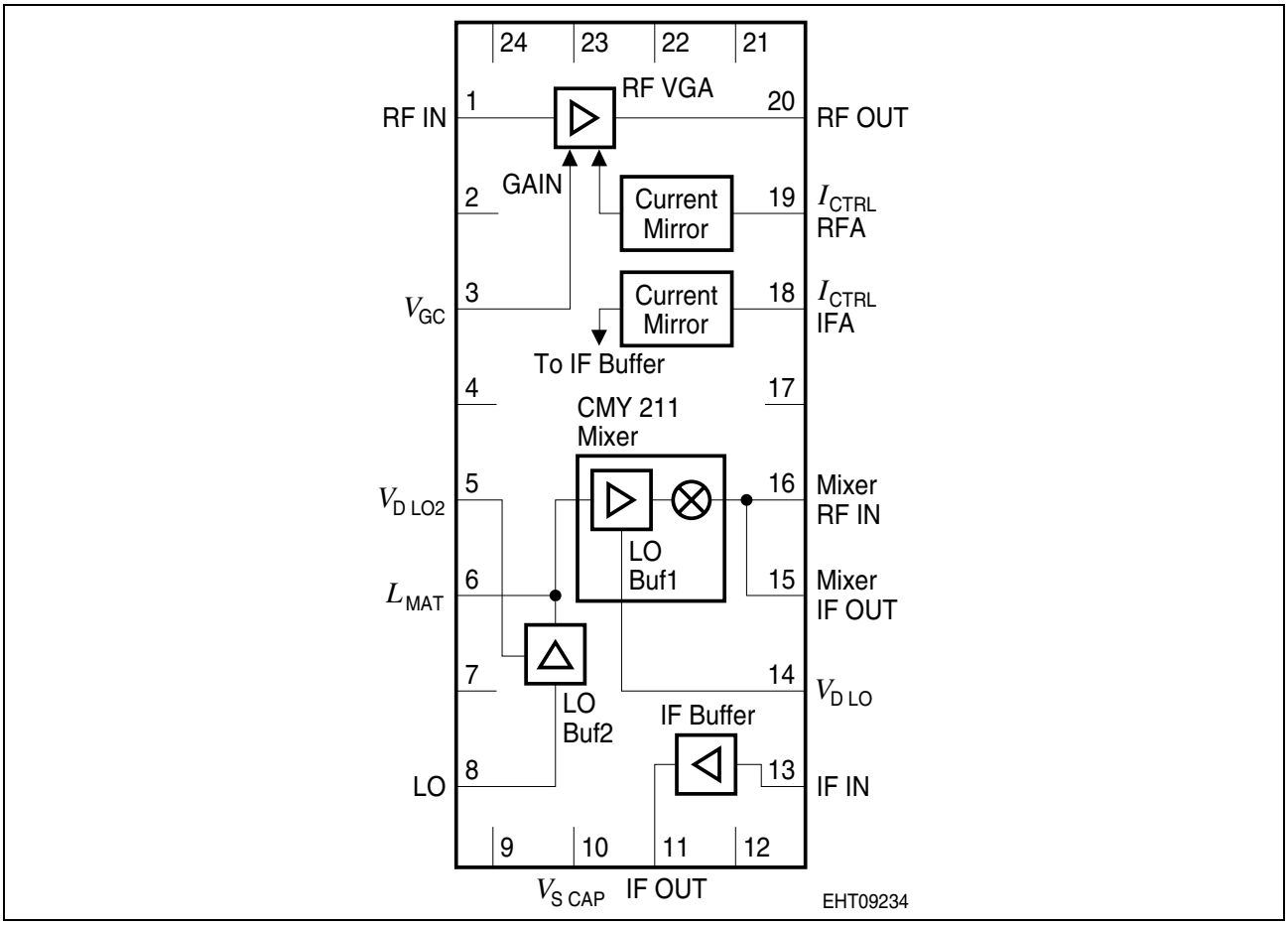


Figure 1 Block Diagram

Electrical Characteristics - Adjustable Gain Control RF Amplifier

Parameter	Comment	Limit Values			Unit
		min.	typ.	max.	
RF – Frequency range	External match	600	–	1000	MHz

Test Conditions

T_A = 25 °C; V_{DD} = 3 V; $V_{Ictrl\ RFA}$ = 3 V; V_{GC} = 2.0 V; f_{RF} = 850 MHz; P_{LO} = – 8 dBm; $Z_S = Z_L$ = 50 Ω; unless otherwise specified

Parameter, Test Conditions	Symbol	Limit Values			Unit
		min.	typ.	max.	
Operating Current[1)]	I_{OP}	–	5	–	mA
Maximum Gain (V_{GC} = 2.0 V)	G_{max}	–	15	–	dB
Dynamic (V_{GC} = 0.5 … 2.0 V)	ΔG	–	20	–	dB
Noise Figure at maximum gain	F	–	1.5	–	dB
RF Input -/ IF Output return loss at maximum gain (external matching required)	RFIrl/IFOrl	8	–	–	dB
3rd Order Input Intercept Point at G_{max}	$IIP3$	–	5	–	dBm
3rd Order Output Intercept Point (V_{GC} = 0.5 … 2.0 V)	$OIP3$	–	18	–	dBm

1) LNA uses an LO-power feeded negative voltage generator; therefore a minimum LO-power of – 14 dBm is required to operate the LNA.

Electrical Characteristics - Mixer Section

Parameter	Comment	Limit Values			Unit
		min.	typ.	max.	
RF – Frequency range	External match	600	–	1000	MHz
LO – Frequency range	External match	500	–	1500	MHz
IF Frequency range	External match	45	–	250	MHz

Test Conditions

T_A = 25 °C; V_{DD} = 3 V; $V_{Ictrl\ IFA}$ = 3 V; f_{RF} = 850 MHz; f_{LO} = 740 MHz;
P_{LO} = – 8 dBm; f_{IF} = 110 MHz; Z_S = Z_L = 50 Ω; unless otherwise specified

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Operating Current (Mixer + 1 LO driver stage)	I_{OP}	–	7	–	mA
Operating Current (Mixer + 2 LO driver stage)	I_{OP}	–	9	–	mA
Conversion Gain	G_C	–	10	–	dB
SSB Noise Figure	F_{SSB}	–	8.5	–	dB
RF Input -/ IF Output return loss (external matching required)	RFIrl/IFOrl	10	–	–	dB
3rd Order Input Intercept Point	$IIP3$	–	10	–	dBm

Electrical Characteristics – Down-Converter

(assuming SAW filter with 2.5 dB insertion loss)

Parameter	Comment	Limit Values			Unit
		min.	typ.	max.	
RF – Frequency range	External match	600	–	1000	MHz
LO – Frequency range	External match	500	–	1500	MHz
IF Frequency range	External match	45	–	250	MHz

Typical Performance

T_A = 25 °C; V_{DD} = 3 V; $V_{Ictrl\ RFA}$ = $V_{Ictrl\ IFA}$ = 3 V; V_{GC} = 2.0 V;
f_{RF} = 850 MHz; f_{LO} = 740 MHz; P_{LO} = – 8 dBm; f_{IF} = 110 MHz;
Z_S = Z_L = 50 Ω; unless otherwise specified

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Total operating current (2 LO driver stages)	I_{OP}	–	14	–	mA
Conversion Gain (incl. SAW)	G_C	–	22.5	–	dB
SSB Noise Figure	F_{SSB}	–	2.5	–	dB
RF Input -/IF Output return loss (external matching required)	RFIrl/IFOrl	8	–	–	dB
3rd Order Input Intercept Point at maximum gain	$IIP3$	–	– 2.5	–	dBm

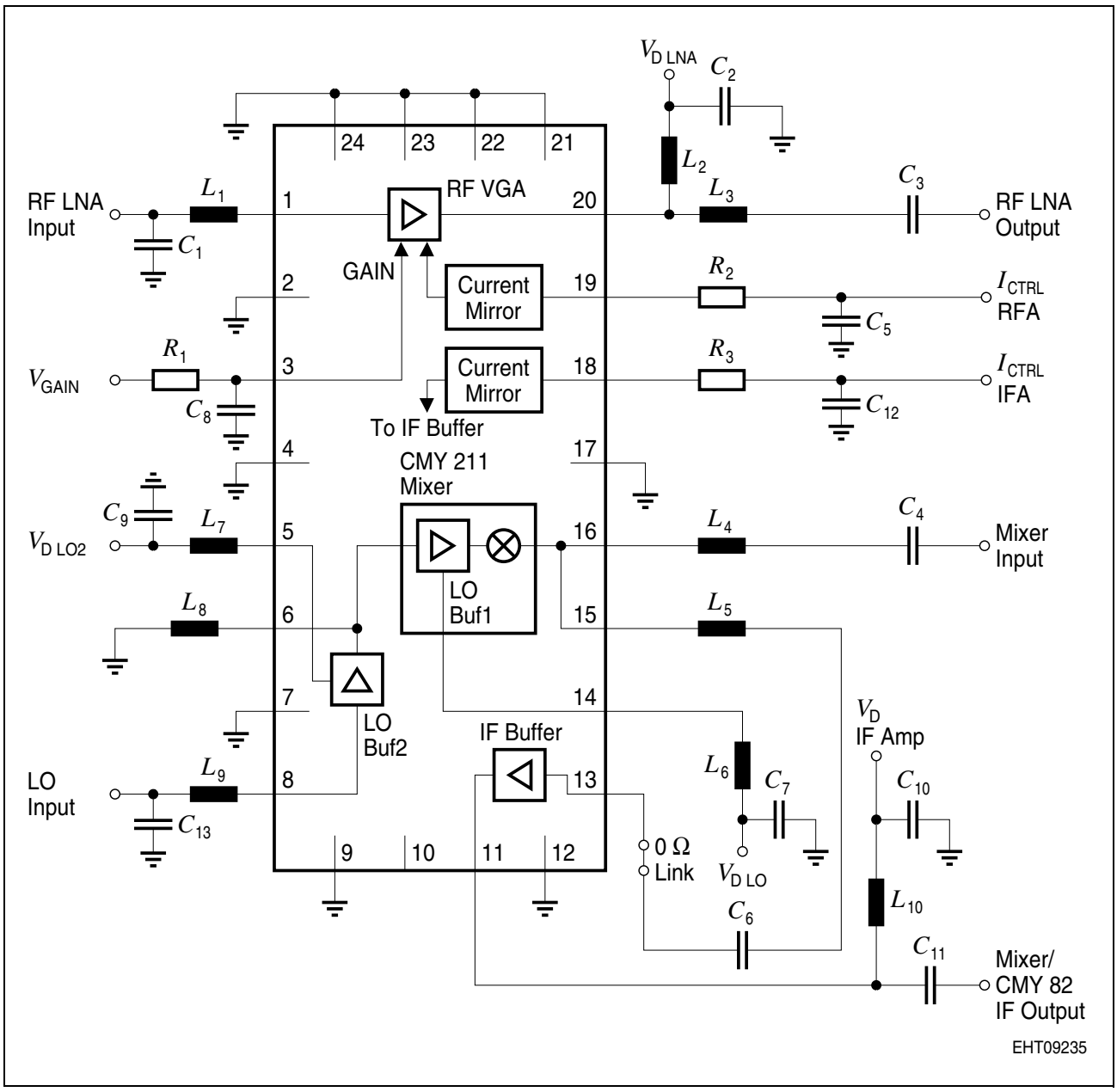


Figure 2 Test Circuit

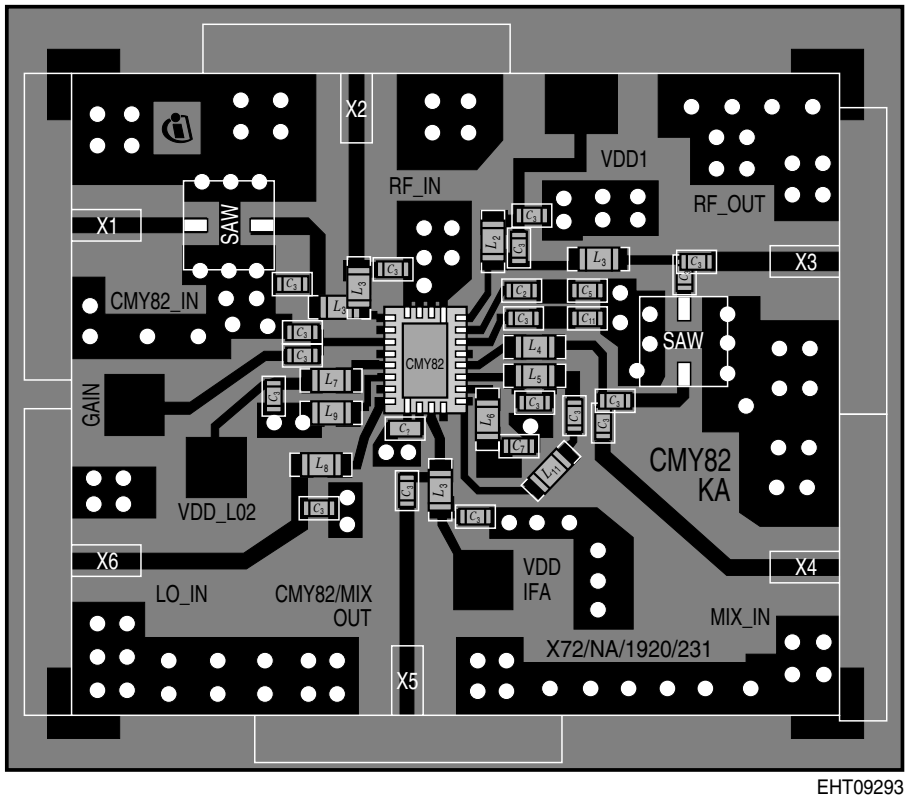


Figure 3 PCB Layout

General Description and Notes for CMY 82

CMY 82 is a general purpose receiver front-end device designed for multiple applications such as cellular mobile phones, ISM bands and pagers. Due to its excellent intermodulation characteristics and its low current consumption, CMY 82 is particularly suited for CDMA receiver applications.

The device combines an RF amplifier with variable gain and an ultra-linear mixer with 2 LO-driver stages in a flat leadless P-VQFN-24-3 package of less than 1 mm height. The input and output matching of the RF amplifier can be adapted externally within a frequency range from 600 to 1000 MHz.

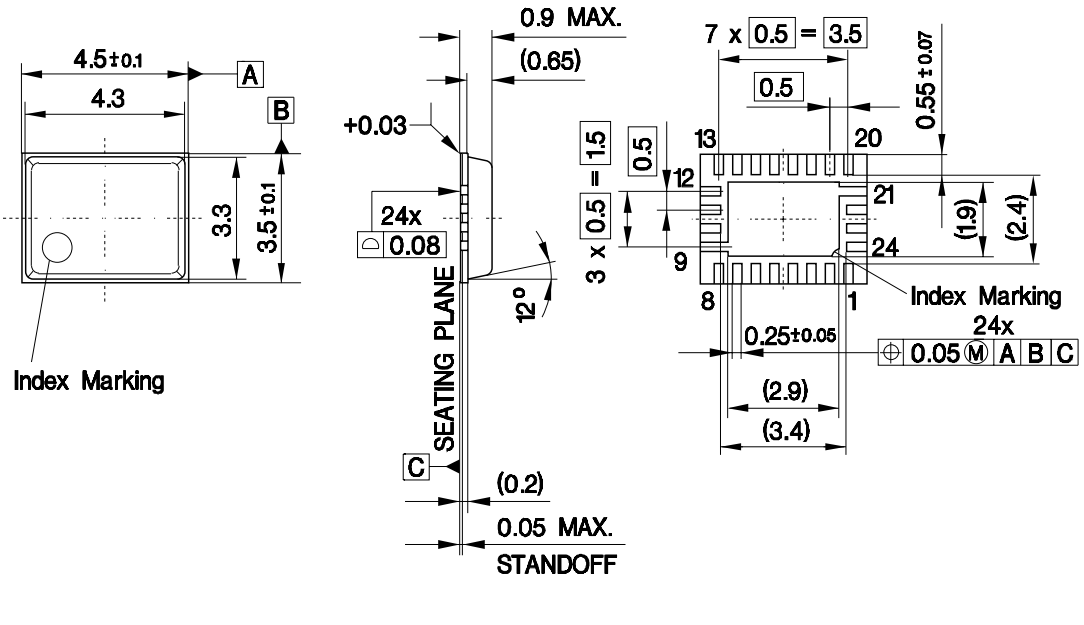
The mixer section of CMY 82 combines low conversion losses and excellent intermodulation characteristics with low LO- and DC-power demand. The internal level controlled LO-buffer enables a good performance over a wide LO level range. If higher input LO power is available, the first LO amplifying stage can optionally be bypassed by inserting the LO signal at pin 6 instead of pin 8, resulting in a reduced current consumption by 2 mA.

The input and output matching of the IF amplifier can be adapted externally within a frequency range from 45 to 250 MHz. By external elements, its input intercept point and therefore the overall intermodulation performance can be increased at the expense of gain.

An integrated negative voltage generator allows to operate the device with one positive supply voltage. For full functionality operation of the device, the operating current of the entire MMIC is typically 14 mA.

Package Outlines

P-VQFN-24-3
(Plastic Very Thin Profile Quad Flat Non Leaded Package)



Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm