Agilent HPMX-7113
Single-Band Downconverter Optimized for W-CDMA and Wireless Data Terminal Applications

Data Sheet

Features

- **Wide band operation**
  RF input: 0.4 – 2.4 GHz
  IF output: 50 – 400 MHz
- **High conversion gain (12 dB)**
- **2.7 – 3.6 V operation**
- **Low & adjustable current: 6 – 18 mA**
- **Differential IF outputs**
- **Adjustable IP3 (12 dBm OIP3)**
- **IIP2 > 25 dBm**
- **Standard BCC-16 surface mount package**

Applications

- **W-CMDA handsets**
- **Wireless data terminals**
- **Wireless LAN (802.11)**

General Description

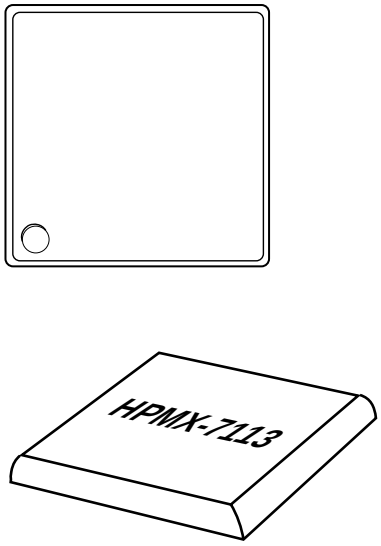
The HPMX-7113 downconverter, part of the **CDMAdvantage** RF chipset, offers a highly integrated solution for W-CDMA handsets and wireless data terminals. This integrated solution leads to improvement in cost and reliability. The HPMX-7113 has an adjustable IP3 which is highly desirable for W-CDMA high dynamic range receivers with good noise and spurious suppression.

The chip is comprised of an RF input LNA followed by a mixer. The output of the downconverter is differential providing common mode rejection. The outputs are high impedance open collectors.

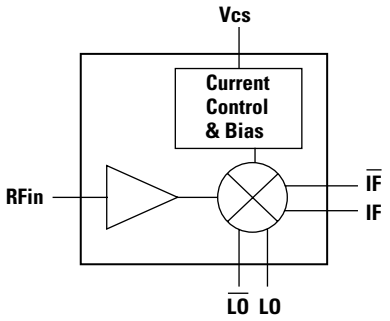
HPMX-7113 features a current control through a DC voltage, Vcs, to accommodate varying linearity requirements. If used dynamically, current control reduces the overall current consumption maximizing battery life. In addition input linearity can be increased by adding inductance to the combined pin 2 and pin 3.

The RFIC is housed in a miniature BCC-16 package and manufactured on high frequency, low noise Si-Bipolar process (25 GHz Ft).

Plastic Package, BCC-16



Functional Block Diagram



For optimal performance, differential LO drive is recommended.

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HPMX-7113 Absolute Maximum Ratings[1]

Parameter	Units	Absolute Maximum
Vcc Supply Voltage	Volt	5
Control Voltage	Volt	Vcc + 0.5
Input RF Power	dBm	5
LO Input Power	dBm	7
Case Temperature	°C	125
Storage Temperature	°C	150

Recommended operating range of Vcc = 2.7 to 3.6 V, T_a = -40 to +85°C.

Note:
1. Operation of this device in excess of any of these limits may cause permanent damage.

HPMX-7113 Standard Test Conditions

Unless otherwise stated, all test data was taken on packaged parts under the following conditions:
Vcc = +3.0 V, $T_{ambient}$ = 25°C, Vcs = 1.8V (Icc = 10.5 mA)
LO input: 2330 MHz, -8 dBm, single-ended
RF input: 2140 MHz, -33 dBm, single-ended
IF input: 190 MHz
$Z_{inmixer}$ = 50Ω, Z_{out} = 500Ω differential (See Figure 4 for test set-up schematic diagram)

HPMX-7113 Summary Characterization Information

Standard test conditions apply unless otherwise noted.

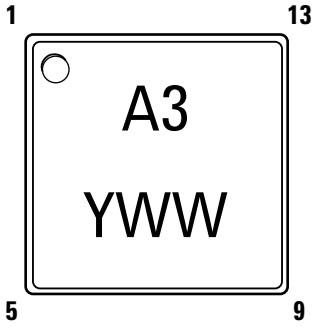
			W-CDMA			
Symbol	**Parameters and Test Conditions**	**Vcs**	**Min.**	**Typ.**	**Max.**	**Units**
Icc	Supply Current	2.2 V 1.8 V 1.4 V		12 10.5 8.5		mA
Gc	Conversion Gain	2.2 V 1.8 V 1.4 V	10	12 11.6 11.1		dB
NF (SSB)	Noise Figure [1]	2.2 V 1.8 V 1.4 V		8.5 8 7.5	10	dB
IIP3	Input Third Order Intercept [2]	2.2 V 1.8 V 1.4 V	-2.0	0.5 -0.5 -2		dBm
OIP3	Output Third Order Intercept	2.2 V 1.8 V 1.4 V		12.5 10.9 9.1		dBm
RL (RF)	RF port Return Loss [3]			>10		dB
RL (IF)	IF port Return Loss [3]			>10		dB
RL (LO)	LO port Return Loss [4]			>10		dB

Notes:
1. LO injection filter present
2. Measured in a 50Ω system
3. Externally matched
4. LO-Balun 4:1

HPMX-7113 BCC-16 Package: Pin Description Table

No.	Mnemonic	Description	Typical Signal
1	RFin	Single-ended RF input	RF signal
2	LGnd	Inductor/Ground	
3	LGnd	Inductor/Ground	
4	Vcs	Current/Linearity control input	DC voltage source
5	Open	Open	
6	Gnd	Ground	
7	Open	Open	
8	LObar	Differential LO input	RF signal
9	Open	Open	
10	LO	Differential LO input	RF signal
11	IFbar	Differential IF output	IF output signal
12	IF	Differential IF output	IF output signal
13	Open	Open	
14	Vcc	IC Vcc input	DC voltage source
15	Open	Open	
16	Open	Open	

HPMX-7113 Package Marking and Pin Reference



Top View

HPMX-7113 Characterization Graphs

Measurements taken at the following conditions, unless noted otherwise: Vcc = 3V, LO frequency = 2330 MHz (-8 dB), 25°C

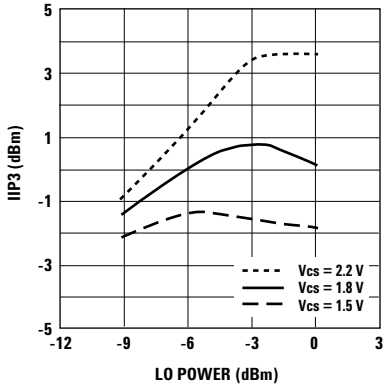


Figure 1. IIP3 vs. LO Power, (25°C).

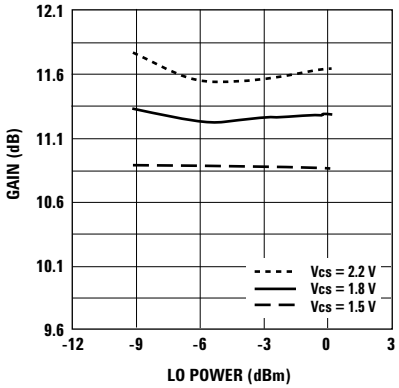


Figure 2. Gain vs. LO Power, (25°C).

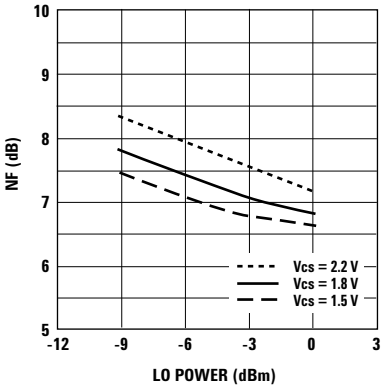


Figure 3. NF vs. LO Power, (25°C).

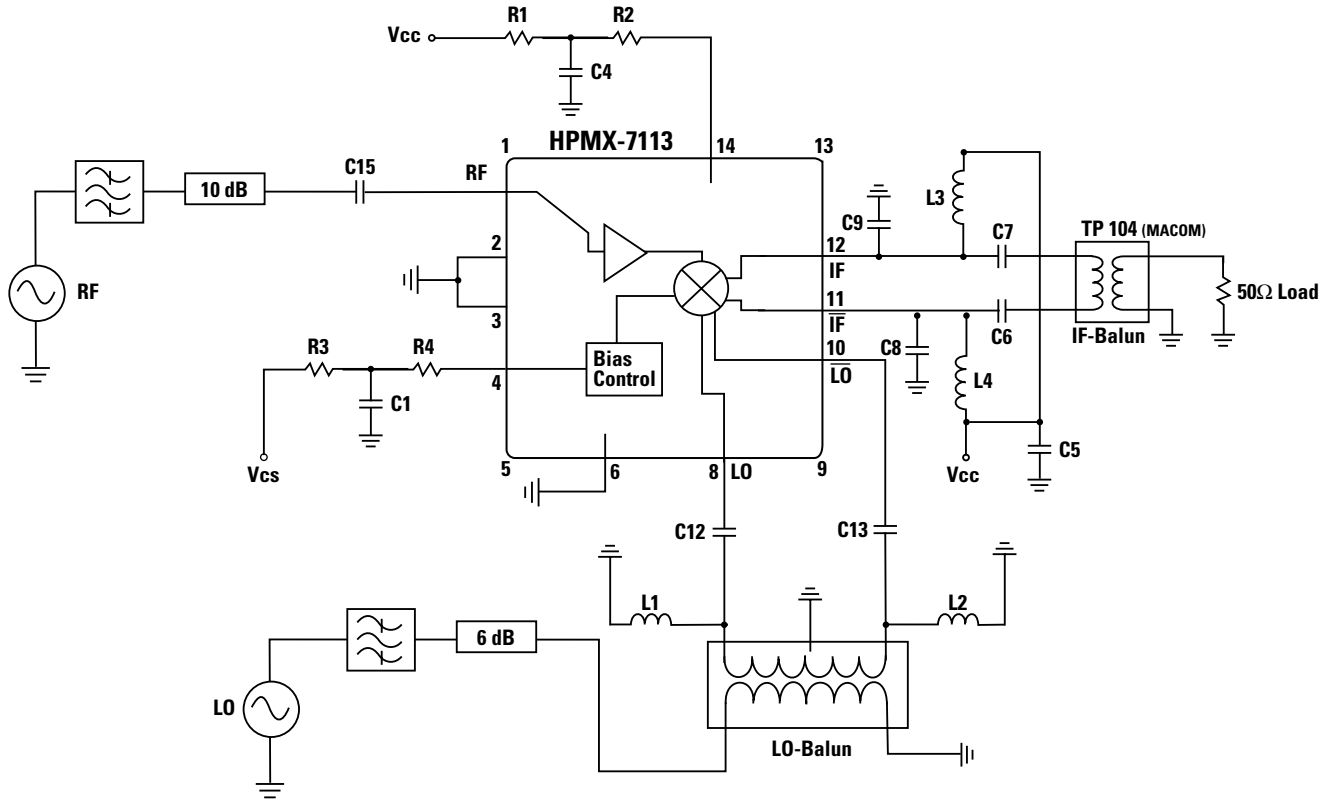


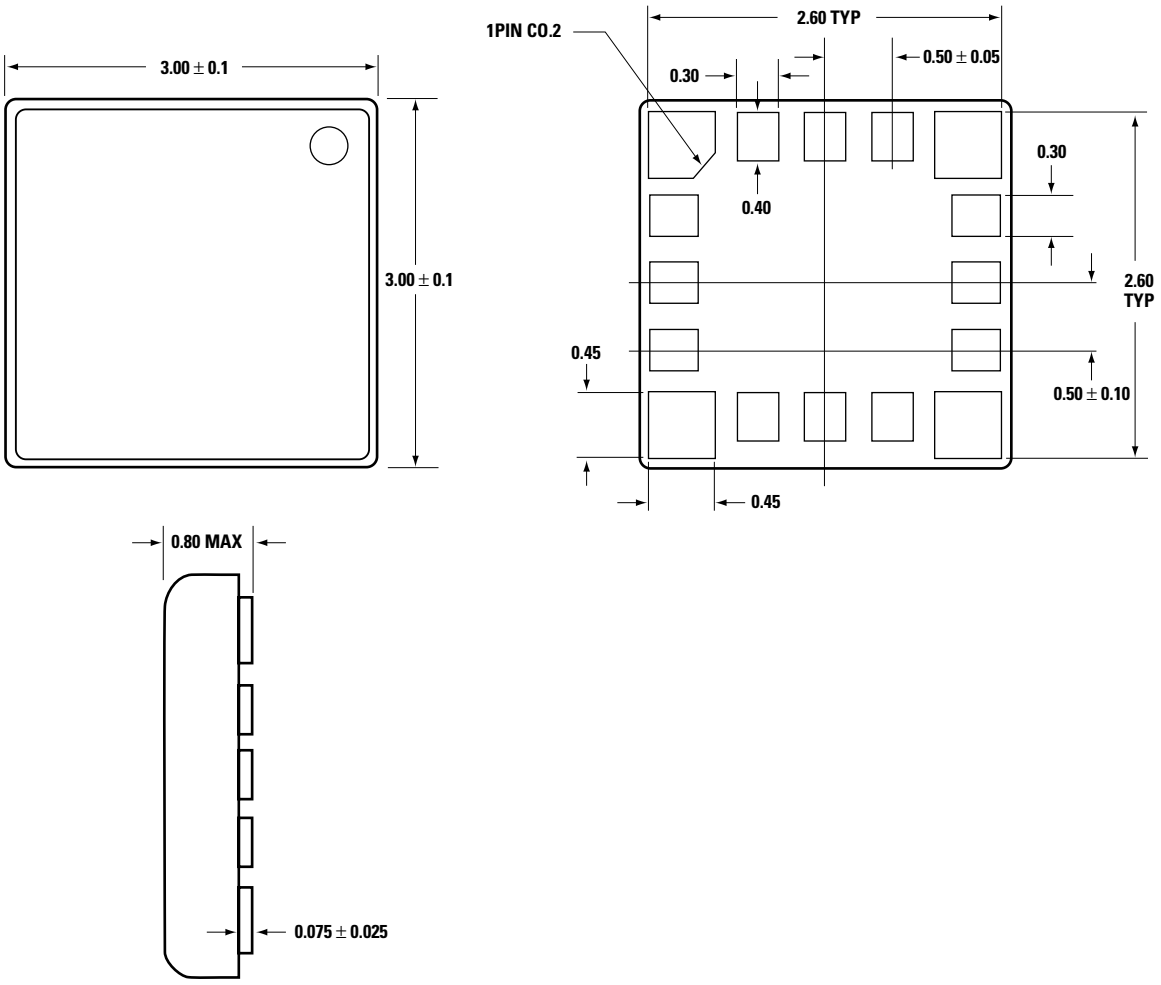
Figure 4. HPMX-7113 Test Diagram for the W-CDMA Applications.

Board Designation	Component	Package
HPMX-7113	Device under test	BCC-16
LO-Balun	LDB20C 201A 2400	MURATA
IF-Balun	TP 104	MACOM
C1, 4, 5	1000 pF	CAP 0402
C12, 13, 15	100 pF	CAP 0402
C6, 7	4.7 pF	CAP 0402
C8, 9	1 pF	CAP 0402
C10	Open	CAP 0402
L1, 2	0.5 nH	IND 0402 TOKO
L3, 4	47 nH	IND 0402 TOKO
R1, 2	2.7Ω	RES 0402
R3, 4	50Ω	RES 0402

Part Number Ordering Information

Part Number	No. of Devices	Container
HPMX-7113-BLK	10	Bulk
HPMX-7113-TR1	1000	7" Tape and Reel

Package Dimensions
Standard BCC-16 Package



All units in millimeters (mm)

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