



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





# RX-IF SiMMIC FOR W-CDMA AGC + I/Q DEMODULATOR

## UPC8190K

### FEATURES

- **Rx-IF:**  
380 MHz
- **LOW POWER CONSUMPTION:**  
 $V_{CC} = 3.0\text{ V}$
- **SMALL 20 PIN QFN PACKAGE**  
Flat lead style for better performance
- **TAPE AND REEL PACKAGING AVAILABLE**

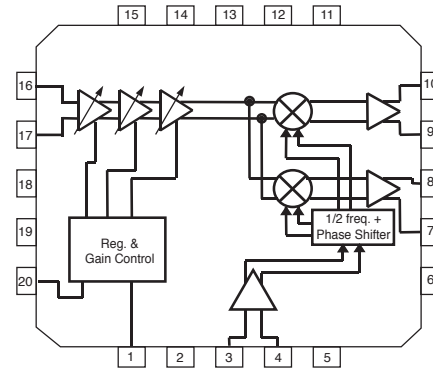
### DESCRIPTION

NEC's UPC8190K is a Silicon Monolithic Integrated Circuit designed as a receiver (RX) section for W-CDMA. The UPC8190K is a RX-IF IC including IF-AGC amplifier and demodulator. This IC is suitable for kit-use for W-CDMA IF section.

This IC was developed using NEC's new ultra high speed silicon bipolar process.

NEC's stringent quality assurance and test procedures ensure the highest reliability and performance.

### BLOCK DIAGRAM



### APPLICATIONS

- **W-CDMA**

### ELECTRICAL CHARACTERISTICS (unless otherwise specified, $T_A = 25^\circ\text{C}$ , $V_{CC} = 3.0\text{ V}$ , $f_{IF} = 382.5\text{ MHz}$ , $f_{LO} = 760\text{ MHz}$ , $P_{LO} = -15\text{ dBm}$ , $f_{I/Q} = 2.5\text{ MHz}$ )

PART NUMBER PACKAGE OUTLINE			UP8190K QFN-20		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
$I_{CC}$	Circuit Current, no signals at power saving mode	mA	-	9	12
		$\mu\text{A}$	-	-	1
$V_{G1}$	Voltage Gain, $V_{CONT} = 2.5\text{ V}$	dB	68	77	-
$V_{G2}$	$V_{CONT} = 0.5\text{ V}$	dB	-	-20	-15
IIP3	Third Order Input Intercept Point, $R_s = 600\Omega$ balanced, Gain= +65 dB $P_{IN} = -70\text{ dB}$ Gain= -10 dB $P_{IN} = -10\text{ dB}$	dBm	-60 0	-55 3	- -
LoL	Local Leakage, Leakage to I/Q port when local = 760 MHz and output = 30mVp-p balanced	dBc	-	-	20
BW(I/Q)	I/Q Bandwidth, 3 dB down	MHz	10	-	-
$V_{OUT(SAT)}$	I/Q Maximum output swing, Balanced output	Vp-p	1	-	-
AE	I/Q Gain Balance, $f_{I/Q} = 2.5\text{ MHz}$	dB	-	-	$\Delta 0.5$
PE	I/Q Phase Error, $f_{I/Q} = 2.5\text{ MHz}$	deg	-	-	$\pm 4$
GACC	Gain Accuracy, $V_{CONT} = 1\text{ to }2\text{ V}$	dB/V	-	$\Delta 4.6$	$\Delta 6$
TPS(Rise)	Rise time from power-saving mode	us	-	-	20
VPS(Rise)	Rising voltage from power-saving mode	V	2.2	-	-
VPS(fall)	Falling voltage from power-saving mode	V	-	-	0.5
GF	Gain Flatness, $f_{IF} \pm 2.5\text{ MHz}$	dB	-	-	$\Delta 0.5$

**STANDARD CHARACTERISTICS FOR REFERENCE** (unless otherwise specified,  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 3.0\text{ V}$ ,  $f_{IF} = 382.5\text{ MHz}$ ,  $f_{LO} = 760\text{ MHz}$ ,  $P_{LO} = -15\text{ dBm}$ ,  $f_{I/Q} = 2.5\text{ MHz}$ )

PART NUMBER PACKAGE OUTLINE			UP8190K QFN-20		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
NF	Noise Figure, Gain = +65 dB	dB	-	9.5	12
EVM	Error Vector Magnitude, IF = 380 MHz, 3.84 Msps QPSK modulation, Gain is adjusted.	%rms	-	3	-
P1dB	Input Power at 1 dB compression point at Gain = +50 dB	dBm	-	-45	-

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** ( $T_A = 25^\circ\text{C}$ )

SYMBOLS	PARAMETERS	UNITS	RATINGS
$V_{CC}$	Supply Voltage	V	4.0
$V_{PS}$ , $V_{CONT}$	Applied Voltage	V	-0.3 to $V_{CC} + 0.3$
$T_a$	Operating Ambient Temperature	$^\circ\text{C}$	-40 to +85
$T_{STG}$	Storage Temperature	$^\circ\text{C}$	-55 to +150

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.

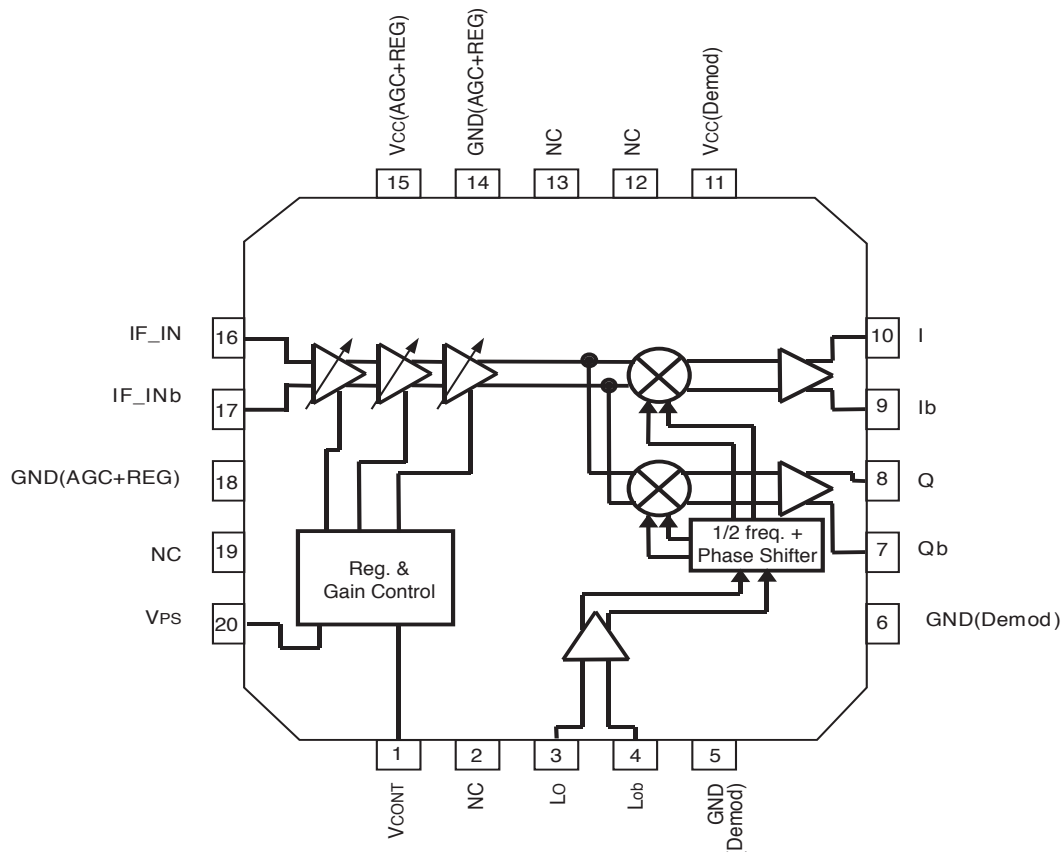
**RECOMMENDED OPERATING CONDITIONS**

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
$V_{CC}$	Supply Voltage	V	2.7	2.85	3.3
$T_A$	Operating Ambient Temperature	$^\circ\text{C}$	-25	+25	+85
$f_{IF}$	IF Frequency	MHz	-	380	-
$f_{LO}$	Local Frequency	MHz	-	760	-
$P_{LO}$	Local Input Level	dBm	-18	-15	-12
ZI/Q	I/Q Load Impedance	k $\Omega$	10	20	-

**ORDERING INFORMATION**

Part Number	Package
UPC8190K-E1-A	20 Pin plastic QFN

**BLOCK DIAGRAM** (Units in mm)



**PIN FUNCTIONS** (Pin Voltage is measured at Vcc = 3.0 V)

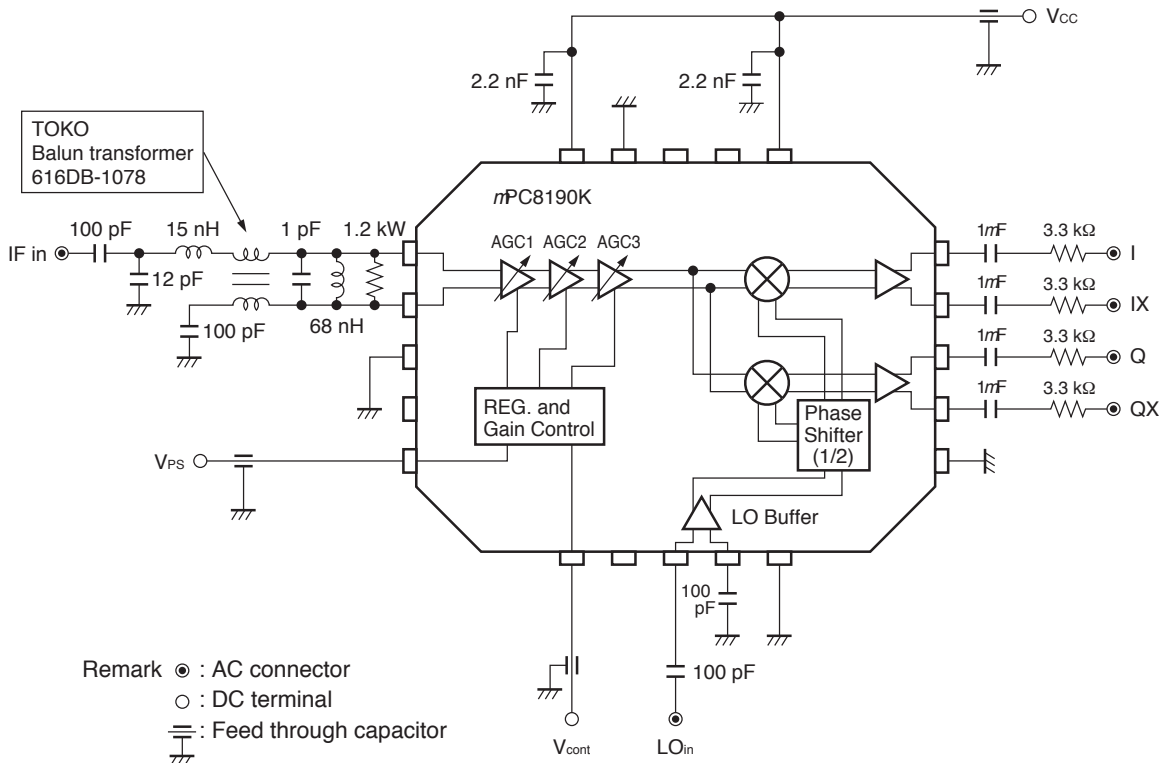
Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V)	Functions and Applications	Internal Equivalent Circuits
1	Vcont	0 to 3.0	-	Gain control pin of AGC amplifier. Variable gains are available in accordance with applied voltage.	
2 19	N.C.	-	-	Non connection. This pin is not connected to internal circuit. This pin should be opened or grounded.	-
3	LO	-	-	Local signal input pin of I/Q demodulator. Input frequency is 760 MHz.	
4	LOb	-	-	Bypass pin of local signal input for I/Q demodulator. In the case of single local input, this pin must be decoupled with capacitor ex. 100 to 1 000 pF.	
5 6	GND (Demod.)	0	-	Ground pin of I/Q demodulator. This pin should be grounded with minimum inductance. Form the ground pattern as widely as possible to minimize ground impedance.	
7	Qb	-	-	I/Q/Ib/Qb signal output pins.	
8	Q	-	-	Each pin is an emitter follower.	
9	Ib	-	-	Each of Ib and Qb is differential output of I and Q.	
10	I	-	-	Recommendable load impedance is 10 to 20 kΩ.	
11	VCC (Demod.)	2.7 to 3.3	-	Supply voltage pin of I/Q demodulator (phase shifter + I/Q Mixer).	-
12	TEST 1	0	-	TEST pin. In actual use, this pin should be grounded.	-
13	TEST 2	0	-		-
14 18	GND (AGC, REG.)	0	-	Ground pin of AGC amplifier and internal regulator. This pin should be grounded with minimum inductance. Form the ground pattern as widely as possible to minimize ground impedance.	-

**PIN FUNCTIONS** (Pin Voltage is measured at Vcc = 3.0 V)

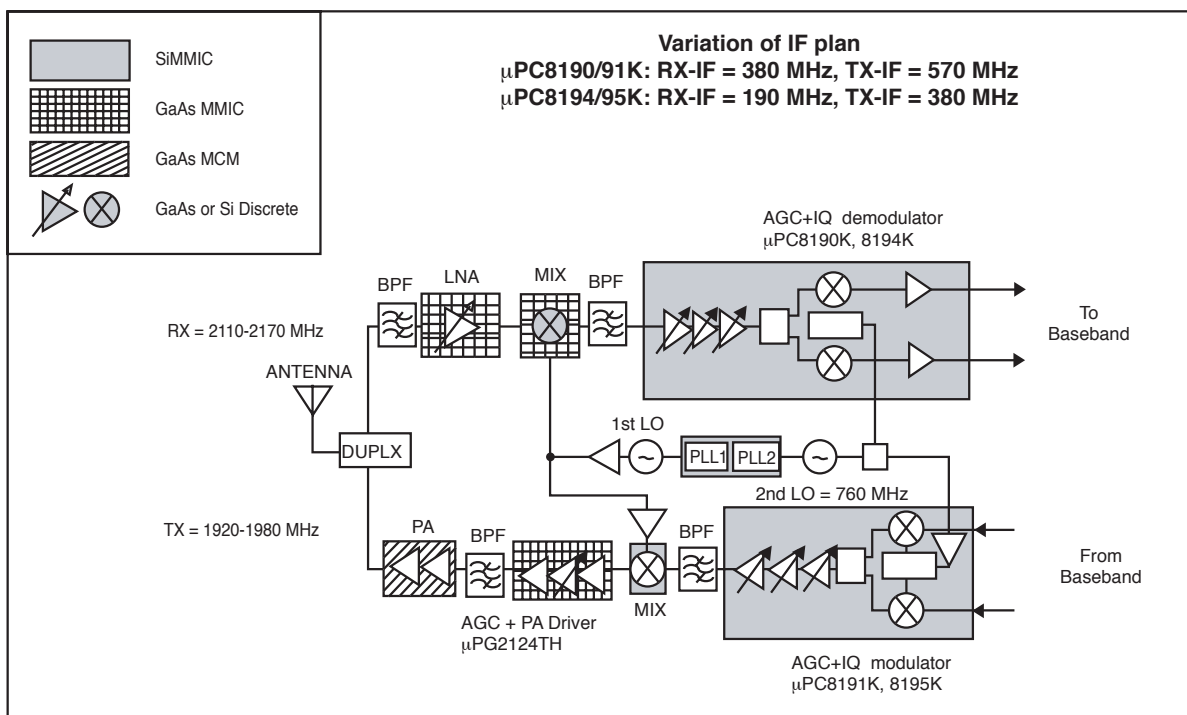
Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V)	Functions and Applications	Internal Equivalent Circuits
15	VCC (AGC, REG.)	2.7 to 3.3	-	Supply voltage pin of AGC amplifier and internal regulator.	—
16	IF_IN	-	-	IF signal input pin. This pin is input of AGC amplifier. Balance input between 16, 17 pin. Input frequency is 380 MHz.	
17	IF_INb	-	-	IF signal input pin. In the case of signal local input, this pin must be decoupled with capacitor.	
20	VPS	H: 2.2 to VCC L: 0 to 0.5	-	Power saving pin. This pin modulator can control Active/Sleep state with bias as follows.	

VPS (V)	State
0 to 0.5	Sleep Mode
2.2 to 3	Active Mode

**MEASUREMENT CIRCUIT** (Units in mm)

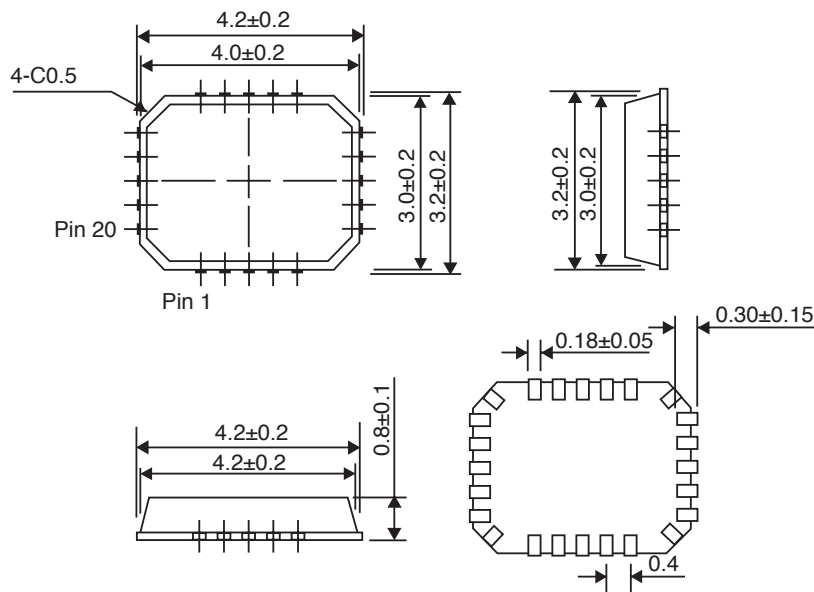


**APPLICATION EXAMPLE: W-CDMA**



**OUTLINE DIMENSIONS** (Units in mm)

Package Outline QFN-20



Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

EXCLUSIVE NORTH AMERICAN AGENT FOR NEC RF, MICROWAVE & OPTOELECTRONIC SEMICONDUCTORS

**CEL CALIFORNIA EASTERN LABORATORIES** • Headquarters • 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • Telex 34-6393 • FAX (408) 988-0279  
 DATA SUBJECT TO CHANGE WITHOUT NOTICE

Internet: <http://WWW.CEL.COM>

04/15/2002

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerning the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.