#### STANDARD CHARACTERISTICS FOR REFERENCE (unless otherwise specified, TA = 25°C, Vcc = 3.0 V,

fif = 192.5 MHz, flo = 760 MHz, Plo = -15 dBm, fi/Q = 2.5 MHz)

	PART NUMBER PACKAGE OUTLINE	UPC8194K QFN-20			
SYMBOLS	PARAMETERS AND CONDITIONS	MIN	TYP	MAX	
NF	Noise Figure, Gain = +65 dB	dB	_	9.5	_
EVM	Error Vector Magnitude, IF = 190 MHz, 3.84 Msps QPSK modulation, Gain is adjusted.	%rms	-	3	-
P1dB	Input Power at 1 dB compression point at Gain = +50 dB	dBm	_	-50	-

# ABSOLUTE MAXIMUM RATINGS<sup>1</sup>, (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS	
Vcc	Vcc Supply Voltage		4.0	
VPS, VCONT	Applied Voltage	V	-0.3 to Vcc+0.3	
Та	Operating Ambient Temperature	°C	-40 to +85	
Tstg	Storage Temperature	°C	-55 to +150	
PD	Power Dissipation	mW	309	

Notes:

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

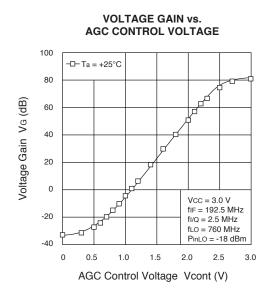
### RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	ТҮР	MAX
Vcc	Supply Voltage	V	2.7	3.0	3.3
Та	T <sub>A</sub> Operating Ambient Temperature		-25	+25	+85
fIF IF Frequency		MHz	-	190	-
fLO	Local Frequency	MHz	-	760	-
Plo	Local input Level	dBm	-18	-15	-12
Zı/Q	I/Q load impedance	kΩ	10	20	
fı/Q	I/Q loutput frequency	MHz	_	_	10

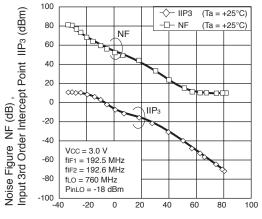
## **ORDERING INFORMATION**

Part Number	Package
UPC8194K-E1-A	20 Pin plastic QFN

# **TYPICAL PERFORMANCE CURVES** (Vcc = 3.0 V, VPs = 2.5 V, fif = 192.5 MHz, flo = 760 MHz, PLO = -15 dBm, fi/q = 2.5 MHz, Vi/q = $400 \text{ mV}_{P-P}$ balanced)

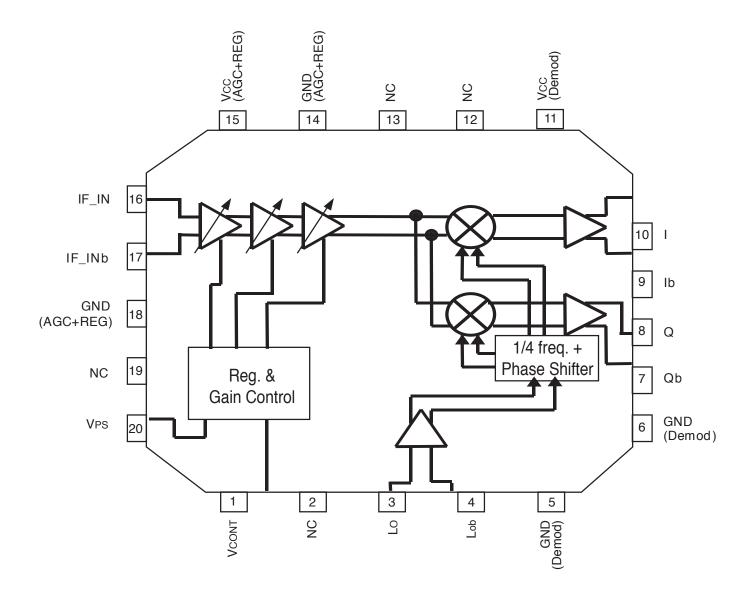


#### NOISE FIGURE and INPUT 3rd ORDER INTERCEPT POINT vs. VOLTAGE GAIN



Voltage Gain VG (dB)

# BLOCK DIAGRAM (Units in mm)



Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V)	Functions and Applications	Internal Equivalent Circuits
1	Vcont	0 to Vcc	-	Gain control pin of AGC amplifier. Variable gains are available in accordance with applied voltage.	$1 \xrightarrow{54 \text{ k}} 12 \text{ k}$
2 19	N.C.	-	-	No connection. This pin is not connected to internal circuit. This pin should be opened or grounded.	_
3	LO	-	1.96	Local signal input pin of I/Q demodulator. Input frequency is 760 MHz.	
4	LOb	-	1.96	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.	3 4 $50 \leq \leq 50$ 6 6 6 6 6 6 6 6
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 impeadance.	
7	Qb	-	1.40	I/Q/Ib/Qb signal output pins.	
8	Q	-	1.40	Each pin is an emitter follower.	8.5 k
9	lb	-	1.40	Each of Ib and Qb is differential output of I and Q.	7)(8)(9)(10)
10	I	-	1.40	Recommendable load impedance is 10 to 20 k $\Omega.$	
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.	
13	TEST 2	0	-	In actual use, this pin should be grounded.	_
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.	_

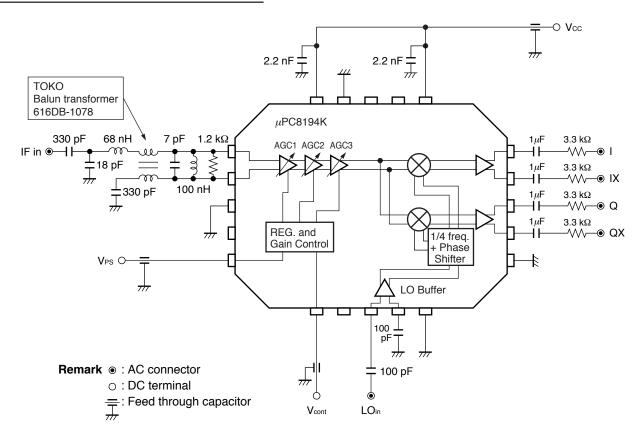
# PIN FUNCTIONS (Pin Voltage is measured at Vcc = 3.0 V)

### **UPC8194K**

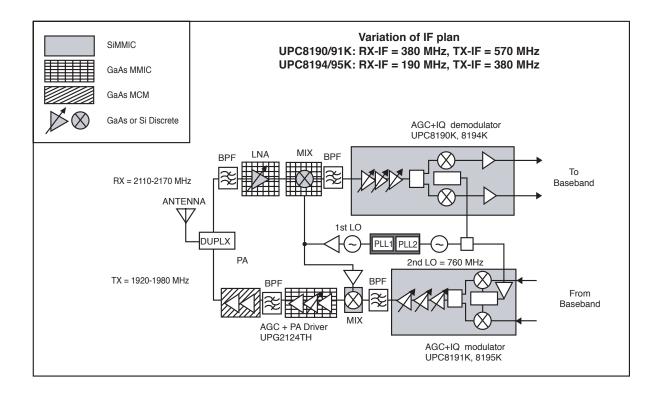
Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V)	Functions	and Applications	Internal Equivalent Circuits
15	VCC (AGC, REG.)	2.7 to 3.3	-	Supply voltage pin internal regulator.	of AGC amplifier and	_
16	IF_IN	-	2.75	IF signal input pin. This pin is input of Balance input betw Input frequency is	veen 16, 17 pin.	
17	IF_INb	-	2.75	IF signal input pin. In the case of signa must be decoupled	al local input, this pin   with capacitor.	
20	Vps	High: 2.2 to Vcc Low: 0 to 0.5	-	Power saving pin. This pin modulator Active/Sleep state	can control with bias as follows. State	20 Vcc 100 k 100 k 100 k ≤
				0 to 0.5 2.2 to 3	Sleep Mode Active Mode	GND

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

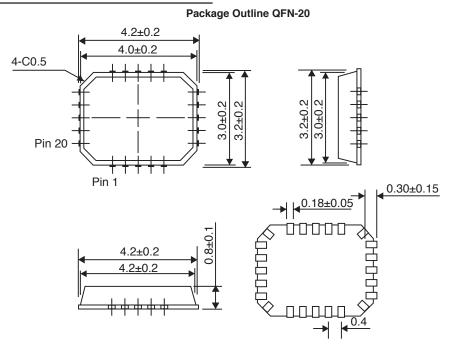
# MEASUREMENT CIRCUIT (Units in mm)



### **APPPLICATION EXAMPLE: W-CDMA**



#### OUTLINE DIMENSIONS (Units in mm)



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.

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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 containe in CEL devices	
Lead (Pb)	< 1000 PPM	-A - A	
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
РВВ	< 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.

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.

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