

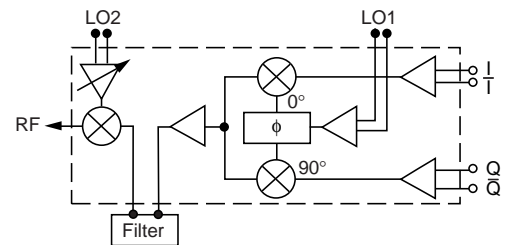
FEATURES

- **WIDE OPERATING FREQUENCY RANGE:**
 $f_{RFOUT} = 800 \text{ MHz to } 1900 \text{ MHz}$
 $f_{MODOUT} = 100 \text{ MHz to } 400 \text{ MHz, } f_{I/Q} = \text{DC to } 10 \text{ MHz}$
- **PORTS FOR EXTERNAL IF FILTER**
- **LOW PHASE DIFFERENCE DUE TO DIGITAL PHASE SHIFTER**
- **WIDE SUPPLY VOLTAGE:** $V_{CC} = 2.7 \text{ to } 5.5 \text{ V}$
- **POWER SAVE FUNCTION**
- **20 PIN SSOP**

DESCRIPTION

The UPC8129GR is a silicon RFIC designed as a quadrature modulator for digital mobile communication systems. This IC consists of a 0.8 GHz to 1.9 GHz up-converter and a 100 MHz to 400 MHz quadrature modulator which have been packaged in a 20 pin SSOP. The device has a power save function and operates with a 2.7 to 5.5 V supply voltage for low power consumption.

FUNCTIONAL BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS (TA = 25°C, VCC = VPS = VAGC = 3.0 V, RPS = 1 kΩ, RAGC = 10 kΩ)

PART NUMBER PACKAGE OUTLINE				UPC8129GR S20 (SSOP 20)		
	SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
Total	I _{CC}	Total Circuit Current (no signal) $V_{PS} \geq 0.5 \text{ V}$ $V_{AGC} = 3 \text{ V, } V_{PS} \leq 0.5 \text{ V}$ $V_{AGC} = 0 \text{ V, } V_{PS} \leq 0.5 \text{ V}$	mA μA μA	20	28 0.6 60	37 10
	PR _{FOUT}	Total Output Power ^{1,2} $f_{RFOUT} = 900 \text{ MHz}$ $f_{RFOUT} = 1900 \text{ MHz}$	dBm dBm	-8	-5 -12	-2
Upconverter	I _{CC}	Circuit Current-Upconverter (no signal) $V_{PS} \geq 0.5 \text{ V}$ $V_{PS} \leq 0.5 \text{ V}$	mA μA		14	5.0
	CG	Conversion Gain ¹ $f_{RF} = 900 \text{ MHz, } f_{LO} = 1150 \text{ MHz}$ $P_{UPCON-IN} = -20 \text{ dBm } f_{RF} = 1900 \text{ MHz, } f_{LO} = 1650 \text{ MHz}$	dB dB		12 5	
	GCR	AGC Gain Control Range $V_{AGC} = 2.5 \text{ V} - 0 \text{ V}$	dB	28	40	
	PR _{F (SAT)}	Maximum Output Power, Upconverter $f_{RF} = 900 \text{ MHz}$ $P_{UPCON-IN} = -4 \text{ dBm } f_{RF} = 1900 \text{ MHz}$	dBm dBm		-1.5 -7	
Modulator	OIP ₃	Output 3rd Order Intercept Point $f_{UPCON-IN} = 250.0 \text{ MHz (250.2 MHz)}$ $f_{RF} = 900 \text{ MHz}$ $f_{RF} = 1900 \text{ MHz}$	dBm dBm		+6 -1	
	I _{CC}	Circuit Current-Modulator (no signal) $V_{PS} \geq 0.5 \text{ V}$ $V_{PS} \leq 0.5 \text{ V}$	mA μA		14	5.0
	P _{MOD}	Output Power-Modulator ²	dBm		-16.5	
	LOL	Lo Carrier Leakage ²	dBc		-40	-26.5
	IMR	Image Rejection ²	dBc		-30	-26.5
	IM _{3/IQ}	I/Q 3rd Order Intermodulation Distortion ²	dBc		-50	
	Z _{I/Q}	I/Q Input Impedance	kΩ		200	
	I _{I/Q}	I/Q Bias Current	μA		5	
	T _{PS (RISE)}	Power Save Rise Time $V_{PS} (\text{Low}) \rightarrow V_{PS} (\text{High})$	μS		2.0	5.0
	T _{PS (FALL)}	Power Save Fall Time $V_{PS} (\text{High}) \rightarrow V_{PS} (\text{Low})$	μS		2.0	5.0
	Output Noise Floor at $\Delta f = \pm 20 \text{ MHz}$	dBc/Hz		-133		

Notes:

1. $PL_{O1} = PL_{O2} = -10 \text{ dBm}$
2. $V_{I/Q} = V_{\bar{I}/\bar{Q}} = 1.5 \text{ V (DC)} + 0.5 \text{ V}_{P-P} (\text{AC}), f_{I/QIN} = 67.7 \text{ kHz}$

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Supply Voltage	V	6.0
V _{PS}	Power Save Voltage	V	6.0
V _{AGC}	AGC Control Voltage	V	6.0
I _{Q(DC)}	IQ DC Offset Voltage	V	4.0
P _D	Power Dissipation ²	mW	430
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-55 to +150

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on 50 x 50 x 1.6 mm double copper clad epoxy glass PWB (T_A = 85°C).

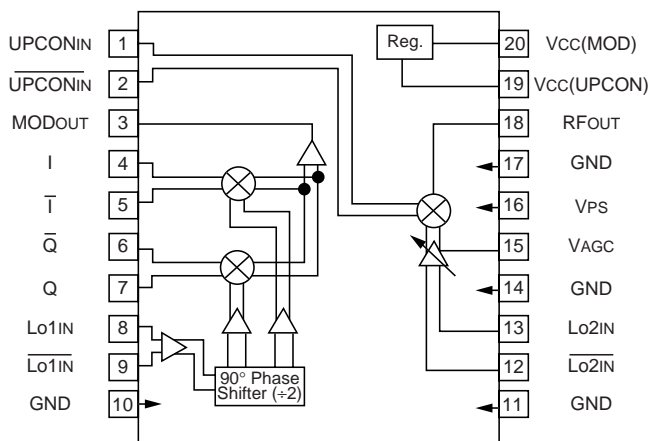
RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V _{CC}	Supply Voltage	V	2.7	3.0	5.5
T _{OP}	Operating Temperature	°C	-40	+25	+85
f _{RFOUT}	Up Converter Output Frequency	MHz	800		1900
f _{UPCONIN}	Up Converter Input Frequency	MHz	100		400
f _{MODOUT}	Modulator Output Frequency				
f _{LO1IN}	Lo1 Input Frequency	MHz	200		800
P _{LO1IN}	Lo1 Input Level	dBm	-15	-10	-5
f _{LO2IN}	Lo2 Input Frequency	MHz	800		1800
P _{LO2IN}	Lo2 Input Level	dBm	-15	-10	-5
f _{I/QIN}	I/Q Input Frequency	MHz	DC		10
V _{I/QIN}	I/Q Input Amplitude ¹	mV _{P-P}		500	600

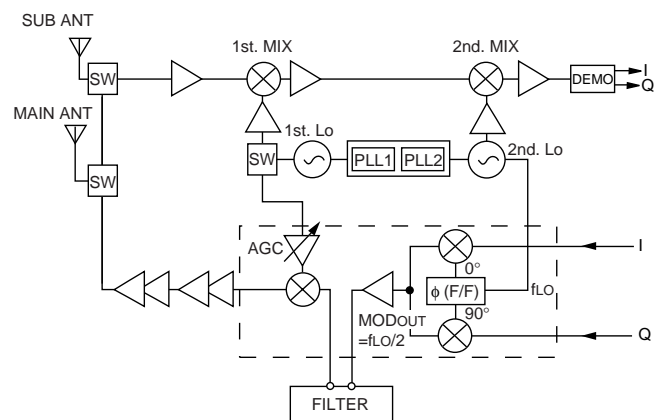
Note:

1. Single ended Input.

INTERNAL BLOCK DIAGRAM

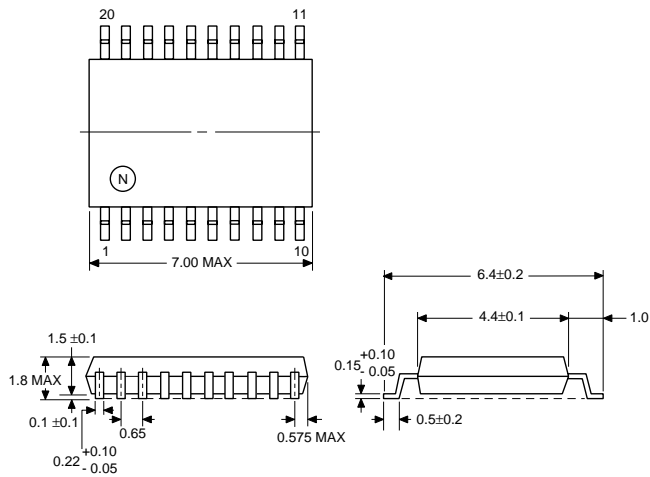


APPLICATION EXAMPLE



OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE SSOP 20



LEAD CONNECTIONS

- | | |
|-------------------------------|------------------------------------|
| 1. Upconverter Input | 11. GND |
| 2. Upconverter Input (Bypass) | 12. LO2 Input (Bypass) |
| 3. Modulator Output | 13. LO2 Input (Upconverter) |
| 4. I Input | 14. GND |
| 5. T Input | 15. V _{AGC} (Upconverter) |
| 6. Q Input | 16. V _{PS} (Power Save) |
| 7. Q Input | 17. GND |
| 8. LO1 Input (Modulator) | 18. RF Output |
| 9. LO1 Input (Bypass) | 19. V _{CC} (Upconverter) |
| 10. GND | 20. V _{CC} (Modulator) |

All dimensions are typical unless specified otherwise.

ORDERING INFORMATION

PART NUMBER	QTY
UPC8129GR-E1	2.5 k/Reel

Note:

Embossed Tape, 12 mm wide,
Pins 1 through 10 are in tape pull-out direction.

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