

FEATURES

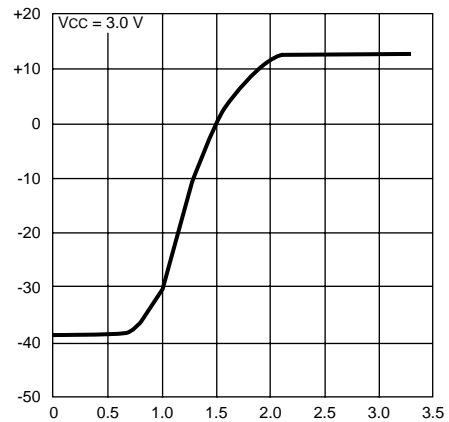
- **FREQUENCY RESPONSE:**
800 MHz to 1.9 GHz
- **SUPPLY VOLTAGE RANGE:**
2.7~3.3 V
- **VAGC:** 0.6~2.3 V
- **SUPER SMALL SURFACE MOUNT PACKAGE**
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**
- **GAIN CONTROL RANGE UP TO 40 dB**

DESCRIPTION

The UPC8120T is a Silicon Monolithic Microwave Integrated Circuit which is manufactured using the NESAT III process. The NESAT III process produces transistors with f_T approaching 20 GHz. This device is suitable as an Automatic Gain Control Amplifier stage in cellular radios, GPS receivers, PCN, and test/measurement equipment.

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

GAIN vs. GAIN CONTROL VOLTAGE



ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = 3.0 V, Z_S = Z_L = 50 Ω)

PART NUMBER PACKAGE OUTLINE			UPC8120T T06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I _{CC}	Circuit Current (no signal)	mA	7.5	11	15
GCR	Gain Control ² , f = 950 MHz, P _{IN} = -30 dBm f = 1440 MHz, P _{IN} = -30 dBm f = 1900 MHz, P _{IN} = -30 dBm	dB dB dB	40 35	50 45 22	
G _{PMAX}	Maximum Power Gain, f = 950 MHz, P _{IN} = -30 dBm f = 1440 MHz, P _{IN} = -30 dBm f = 1900 MHz, P _{IN} = -30 dBm	dB dB dB	10.5 10.5	13 13.5 13	15.5 16.5
P _{1dB}	Output Power at 1 dB compression, f = 950 MHz, G _{PMAX} f = 1440 MHz, G _{PMAX} f = 1900 MHz, G _{PMAX}	dBm dBm dBm	0.5 0	+4 +3 +2.5	
NF	Noise Figure, f = 950 MHz, G _{PMAX} f = 1440 MHz, G _{PMAX} f = 1900 MHz, G _{PMAX}	dB dB dB		9.0 7.5 7.3	12 10.5
RL _{IN}	Input Return Loss, f = 950 MHz, G _{PMAX} f = 1440 MHz, G _{PMAX}	dB dB	3 3	6 6	
ISOL	Isolation, f = 950 MHz, G _{PMAX} f = 1440 MHz, G _{PMAX}	dB dB	26 30	31 35	

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Supply Voltage	V	3.6
V _{AGC}	Gain Control Voltage	V	3.6
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-55 to +150

Notes:

- Operation in excess of any one of these conditions may result in permanent damage.

RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V _{CC}	Supply Voltage	V	2.7	3.0	3.3
V _{AGC}	Gain Control Voltage	V	0.6	-	2.4
T _{OP}	Operating Temperature	°C	-40	25	+85
P _{IN}	Input Level	dBm	-	-	-18 ¹
f	Operating Frequency	MHz	100	-	1900
I _{AGC}	AGC Pin Drive Current	mA	0.5	-	-

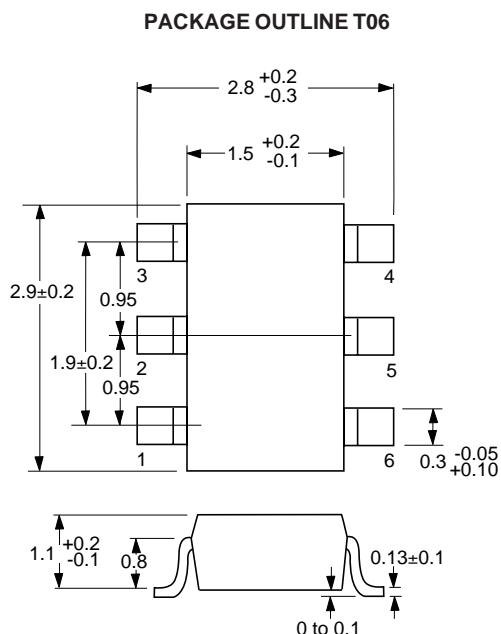
Note:

- P_{adj} ≤ -60 dBc @ Δf = ± 50 kHz.
Wave form condition: π/4 QPSK modulation signal, data rate = 42 kbps, roll off ratio = 0.5, PN9 pattern.

PIN FUNCTIONS

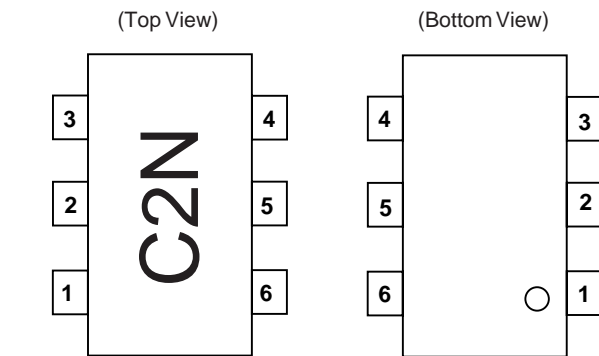
Pin No.	Symbol	Pin Voltage	Description	Equivalent Circuit			
1	IN	—	RF input pin. Input RF signal with 50 Ω source impedance through a coupling capacitor. External matching circuit is not required.				
2 3	GND	0	Ground pin. This pin must be connected to system ground. Form ground pattern as wide as possible to minimize ground impedance.				
4	Out	Same as V _{CC} through external inductor	RF output pin. The output is an open collector with high impedance. External matching circuit is required.				
5	V _{CC}	2.7~3.3	Supply voltage pin. This pin should be connected with a bypass capacitor (e.g., 1000 pF) to minimize ground impedance.				
6	V _{AGC}	0~3.3	Gain Control pin. The gain slope vs. increasing AGC voltage is summarized below: <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Device</th> <th>Gain Slope vs. V_{AGC}</th> </tr> </thead> <tbody> <tr> <td>UPC8120T</td> <td>Up</td> </tr> </tbody> </table>		Device	Gain Slope vs. V _{AGC}	UPC8120T
Device	Gain Slope vs. V _{AGC}						
UPC8120T	Up						

OUTLINE DIMENSIONS (Units in mm)



Note:
All dimensions are typical unless otherwise specified.

LEAD CONNECTIONS



- 1. IN
- 2. GND
- 3. GND
- 4. OUT
- 5. VCC
- 6. VAGC

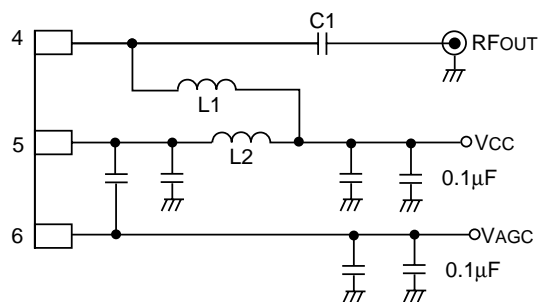
Package Markings:
UPC8120T - C2N

ORDERING INFORMATION

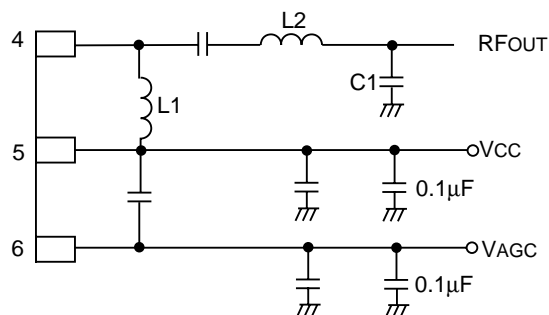
PART NUMBER	QUANTITY
UPC8120T-E3	3K/Reel

TEST CIRCUIT

900 MHz



1900 MHz



FOUT	L1	L2	C1	Unless Noted All Other Caps = 1000pF
900	6.8nH	15nH	1.5pF	
1900	100nH	5nH (TRL)	2.2pF	

Life Support Applications

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