

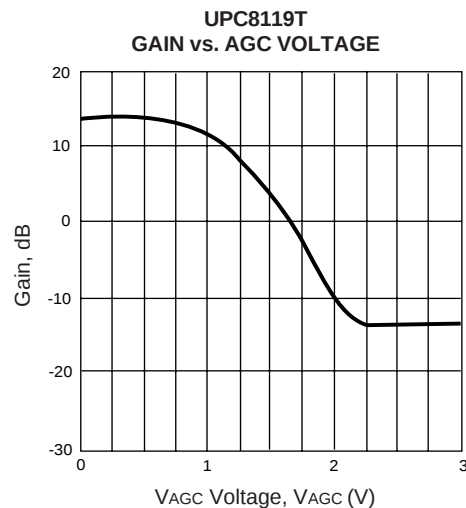
FEATURES

- **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 UPC8119T 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.



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, $Z_S = Z_L = 50\ \Omega$)

PART NUMBER PACKAGE OUTLINE			UPC8119T T06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CC}	Circuit Current (no signal)	mA	7.5	11	15
GCR	Gain Control ² $f = 950\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB	40	50	
	$f = 1440\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB	35	45	
	$f = 1900\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB		22	
GPMAX	Maximum Power Gain, $f = 950\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB	10	12.5	15
	$f = 1440\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB	10	13	16
	$f = 1900\text{ MHz}$, $P_{IN} = -30\text{ dBm}$	dB		12.5	
P_{1dB}	Output Power at 1 dB compression, $f = 950\text{ MHz}$, G_{PMAX}	dBm	0	+3	
	$f = 1440\text{ MHz}$, G_{PMAX}	dBm	+1	+4	
	$f = 1900\text{ MHz}$, G_{PMAX}	dBm		+3	
NF	Noise Figure $f = 950\text{ MHz}$, G_{PMAX}	dB		8.5	11.5
	$f = 1440\text{ MHz}$, G_{PMAX}	dB		7.5	10.5
	$f = 1900\text{ MHz}$, G_{PMAX}	dB		7.2	
RLIN	Input Return Loss $f = 950\text{ MHz}$, G_{PMAX}	dB	3	6	
	$f = 1440\text{ MHz}$, G_{PMAX}	dB	3	6	
ISOL	Isolation $f = 950\text{ MHz}$, G_{PMAX}	dB	27	32	
	$f = 1440\text{ MHz}$, G_{PMAX}	dB	31	36	

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:

1. 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	-	-

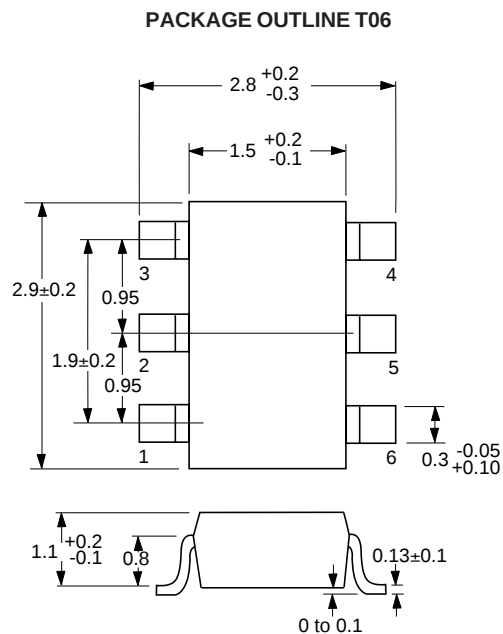
Note:

1. Padj ≤ -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

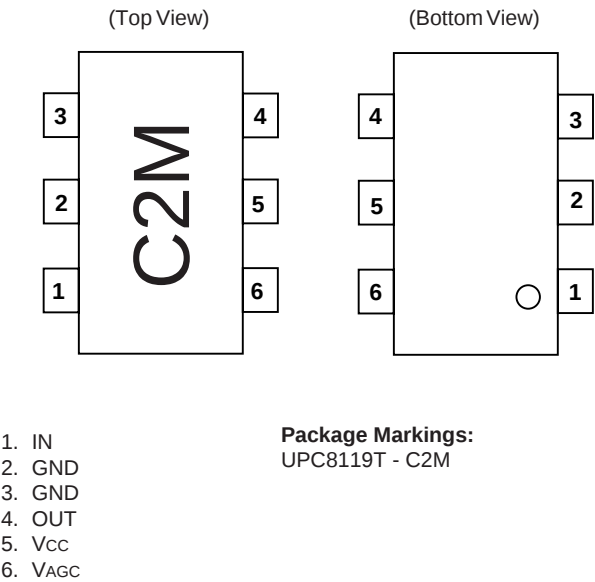
Pin No.	Symbol	Pin Voltage	Description	Equivalent Circuit			
1	IN	—	RF input pin. Input RF signal with 50 Ω source impedance through a coupling capacitor. External matching circuit is not required.				
2 3	GND	0	Ground pin. This pin must be connected to system ground. Form ground pattern as wide as possible 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><tr><th>Device</th><th>Gain Slope vs. V_{AGC}</th></tr><tr><td>UPC8119T</td><td>Down</td></tr></table>		Device	Gain Slope vs. V _{AGC}	UPC8119T
Device	Gain Slope vs. V _{AGC}						
UPC8119T	Down						

OUTLINE DIMENSIONS (Units in mm)



Note:
All dimensions are typical unless otherwise specified.

LEAD CONNECTIONS

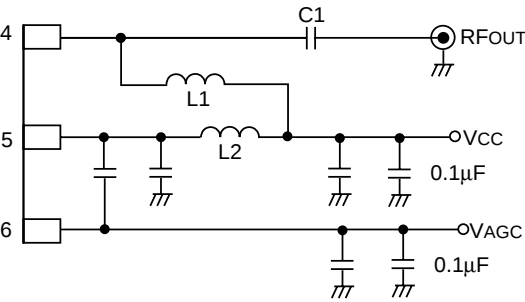


ORDERING INFORMATION

PART NUMBER	QUANTITY
UPC8119T-E3	3K/Reel

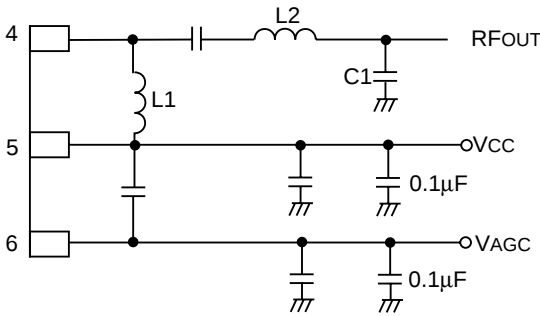
TEST CIRCUIT

900 MHz



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

1900 MHz



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.