



Product Features

- DC 6 GHz
- 17 dB Gain @ 2 GHz
- +19 dBm P1dB @ 2 GHz
- +31 dBm OIP3 @ 2 GHz
- 3 dB Noise Figure at 2 GHz
- Internally matched to 50Ω
- Robust 1000V ESD, Class 1C
- Lead-free/green/RoHS-compliant SOT-363 package

Applications

- Mobile Infrastructure
- CATV / FTTX
- WLAN / ISM
- RFID
- WiMAX / WiBro

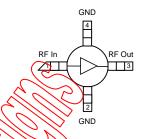
Product Description

The EC1019C is a general-purpose buffer amplifier that offers high dynamic range in a low-cost surface-mount package. At 2000 MHz, the EC1019C typically provides 17 dB of gain, +31 dBm Output IP3, and +19 dBm P1dB.

The EC1019C consists of a Darlington-pair amplifier using the high reliability InGaP/GaAs HBT process technology and only requires DC-blocking capacitors, a bias resistor and an inductive RF choke for operation. The device is ideal for wireless applications and is available in low-cost surface-mountable plastic lead-free/green/RoHS-compliant SOT-86 packages. A SOT-89 version is also available as the EC1019B. All devices are 100% RF and DC tested.

The broadband MMIC amplifier can be directly applied to various current and next generation wireless technologies such as GPRS, GSM, CDMA, and W-CDMA translation, the EC1019C will work for other various applications within the DC to 6 GHz frequency range such as CATV and mobile wireless.

Functional Diagram



1/02/								
Function	Pin No.							
Input	1							
Output/Bias	3							
Ground	2.4							

Specifications (1)

Parameter	Units	Min	Тур	De (
Operational Bandwidth	MHz	DC		6000
Test Frequency	MHz		2000	
Gain	dB	15	17	10
Input Return Loss	dB		19	
Output Return Loss	dB		(120	
Output P1dB	dBm	14.5	718	
Output IP3 (2)	dBm	λ	B31/	8
Noise Figure	dB		130	'
Device Voltage	V	420	NA.T	5.2
Device Current	mA	747	$\frac{2}{30}$	

Test conditions unless otherwise noted: 25°C, Supply Voltage = +6V. Rblas = 16.5Ω, 50Ω system.
 3OIP measured with two tones at an output power of +4 dkm/kms separated by 1 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.

Typical Performance (1)

Sprequency MHz 500 900 1900 214 S21 dB 20.5 19.7 17.2 16.7 S11 dB -26.9 -25.5 -19.9 -15.	Payameter	Units	Typical						
S11 dB -26.9 -25.5 -19.9 -15.		MHz	500	900	1900	2140			
	S21	dB	20.5	19.7	17.2	16.7			
S22 dB -24.4 -17.2 -11.3 -12.	S11	dB	-26.9	-25.5	-19.9	-15.4			
	S22	dB	-24.4	-17.2	-11.3	-12.2			
The state of the s		dBm	+19	+19	+19.5	+19			
Output IP3 (2) dBm +34 +34 +31 +31	Output IP3 (2)	dBm	+34	+34	+31	+31			
Noise Figure dB 2.9 2.9 3.0 3.0	Noise Figure	dB	2.9	2.9	3.0	3.0			

End of Life Notice

Last time buy date: Oct. 9, 2010 Recommended replacement part: ECG055C-G

Absolute Maximum Rating

Parameter	Rating
Storage Temperature	-55 to +150 °C
Device Current	130 mA
RF Input Power (continuous)	+12 dBm
Thermal Resistance, Rth	179°C/W
Junction Temperature	+160°C

Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

Part No.	Description
EC1019C-G	InGaP HBT Gain Block (lead-free/green/RoHS-compliant SOT-86 package)
EC1019C-PCB	700 – 2400 MHz Fully Assembled Eval. Board

Standard tape / reel size = 1000 pieces on a 7" reel

Specifications and information are subject to change without notice

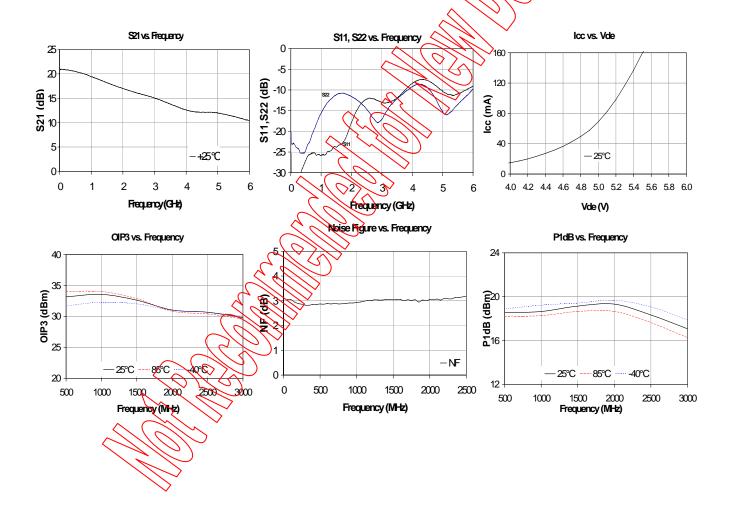




Typical Device RF Performance Supply Bias = +6 V, R_{bias} = 15 Ω , I_{cc} = 70 mA

Frequency	MHz	100	500	900	1900	2140	2400	3500	5800
S21	dB	21.0	20.5	19.7	17.2	16.7	16.2	13.8	10.7
S11	dB	-32.0	-26.9	-25.5	-19.9	-15.4	-12.7	-12.0	-9.9
S22	dB	-23	-24.4	-17.2	-11.3	-12.2	-13.8	-12:2	-11%
Output P1dB	dBm	+19.4	+19.4	+19.4	+19.5	+19.0	+18.8	(2.014)	9
Output IP3	dBm	+33	+33.2	+33.6	+31	+31	+30.7		7
Noise Figure	dB	3.3	2.9	2.9	3.0	3.0	3(1		

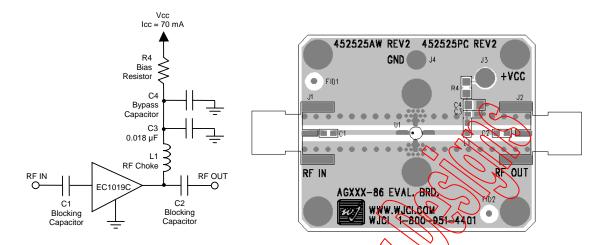
- Test conditions: T = 25° C, Supply Voltage = +6 V, Device Voltage = 4.7 V, Rbias = 16.5 Ω, Icc = 70 mA typical, 50 Ω System.
 3OIP measured with two tones at an output power of +4 dBm/tone separated by 1 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.
 Data is shown as device performance only. Actual implementation for the desired frequency band will be determined by external components bown in the application circuit.







Recommended Application Circuit



Recommended Component Values

Reference			$\langle \phi \rangle \rangle$				
Designator	50	500	900	1900	2200	2500	3500
L1	820 nH	220 nH	68 nH	27 nH	22 nH	18 nH	15 nH
C1, C2, C4	.018 µF	1000 pF	100 pF	68 pF	68 pF	St RF	39 pF

1. The proper values for the components are dependent upon the intended frequency of operation

2. The following values are contained on the evaluation board to achieve optimal broadband performance

Ref. Desig.	Value / Type	Size
L1	39 nH wirewound inductor	0603
C1, C2	56 pF chip capacitor	(0603)
C3	0.018 μF chip capacitor	0603/
C4	Do Not Place	
R4	15 Ω 1% tolerance	0805

Recommended Bias Resistor Values

Supply Voltage	R1 value	Size
6 V	16.4 ohms	0805
7 V	30.7 ohms	1210
8 V	45 ohms	1210
9 V	59 ohms	2010
10 V	74 ohms	2010
12 V	102 ohms	2512

The proper value for R1 is dependent upon the supply voltage and allows for bias stability over temperature. WJ recommends a minimum supply bias of +6 V. A 1% tolerance resistor is recommended.

Typical Device S-Parameters

S-Parameters ($V_{device} = +4.7$, $I_{CC} = 70$ mA, T = 25 % calibrated to device leads)

Freq (MHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
50	-24.85	-7.98	20.43	176.75	-22.76	0.42	-19.95	-3.26
500	-27.17	(-60.24)	20.09	153.21	-22.63	1.05	-24.50	-34.64
1000	-23.41	-46.785	19.25	129.05	-22.38	1.04	-18.46	-90.44
1500	-19.49	28/53	18.19	107.82	-22.09	0.58	-12.87	-100.14
2000	-16.60	74.75	17.15	89.07	-21.57	0.00	-12.94	-95.63
2500	17.88	105.49	16.21	71.51	-20.87	-2.16	-15.63	-78.47
3000	1289	-134.51	15.41	55.02	-20.02	-6.13	-21.87	-147.92
3500	1163	151.23	14.26	39.14	-19.68	-10.34	-13.98	-165.49
4000	1-8/60)	-134.38	13.03	27.44	-19.34	-12.21	-10.61	-125.29
4500	8.09	-135.74	12.56	15.99	-18.43	-14.58	-11.00	-108.79
5000	-10.55	-168.37	12.38	-0.44	-17.23	-23.37	-18.32	-156.08
5500	-11.17	156.03	11.61	-16.12	-16.81	-32.14	-13.00	142.07
6000	-9.71	159.92	10.74	-27.95	-16.53	-37.03	-9.89	159.16

 $Device \ S-parameters \ are \ available \ for \ download \ from \ the \ website \ at: \ http://www.wj.com$

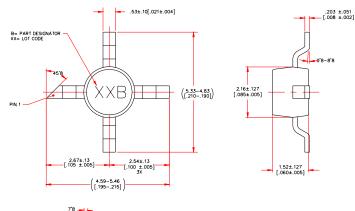


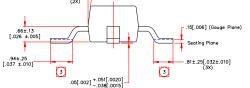


EC1019C-G Mechanical Information

This package is lead-free/Green/RoHS-compliant. The plating material on the pins is annealed matte tin over copper. It is compatible with both lead-free (maximum 260°C reflow temperature) and leaded (maximum 245°C reflow temperature) soldering processes.

Outline Drawing

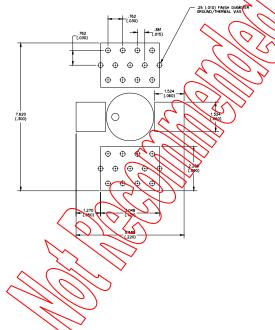




NOTES:

- UNIT WEIGHT .XXX OUNCES MAX.
 DIMENSIONS ARE IN MILLIMETERS NUCHES
- 3 FOOT LENGTH MEASUREMENT IS
- 4. TOLERANCE .XXX ± .381[.015] .XX ± .51[.02]

Land Pattern



Product Marking

The component will be marked with a two-digit numeric lot code (shown as "XX") followed by a "B" designator on the top surface of the package. The obsolete tin-lead package is marked with a wordigit numeric lot code followed with an "A" designator; it may also have been marked with an "A" designator followed by a two digit of code.

Tape and reel specifications for this part are located on the website in the "Application Notes section."

MSL / ESD Rating

Caution! ESD sensitive device.

ESD Rating: Class 1A

Value: Passes between 250 and 500V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

MSL Rating: Level 3 at +260° C convection reflow Standard: JEDEC Standard J-STD-020

Mounting Config. Notes

- Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").
- Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
 Mounting screws can be added near the part to fasten the board to a
- Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
- Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.
- RF trace width depends upon the PC board material and construction.
- 6. Use 1 oz. Copper minimum.
- All dimensions are in millimeters (inches). Angles are in degrees.