

Product Features

- DC 6 GHz
- 20 dB Gain @ 1 GHz
- +18 dBm P1dB @ 1 GHz
- +34 dBm OIP3@ 1 GHz
- Single Voltage Supply
- 3.4 dB Noise Figure
- 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

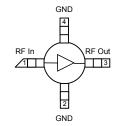
Product Description

The ECG055C is a general-purpose buffer amplifier that offers high dynamic range in a low-cost surface-mount package. At 1000 MHz, the ECG055C typically provides 20 dB of gain, +34 dBm Output IP3, and +18 dBm P1dB.

The ECG055C 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 ECG055B. 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. In addition, the ECG055C will work for other various applications within the DC to 6 GHz frequency range such as CATV and fixed wireless.

Functional Diagram



Function	Pin No.
Input	1
Output/Bias	3
Ground	2, 4

Specifications (1)

Parameter	Units	Min	Тур	Max
Operational Bandwidth	MHz	DC		6000
Test Frequency	MHz		1000	
Gain	dB		19.7	
Output P1dB	dBm		+18	
Output IP3 (2)	dBm		+34	
Test Frequency	MHz		2000	
Gain	dB	17	18	19
Input Return Loss	dB		22	
Output Return Loss	dB		21	
Output P1dB	dBm		+18	
Output IP3 (2)	dBm		+32	
Noise Figure	dB		3.4	
Device Voltage	V	4.2	4.8	5.3
Device Current	mA		65	
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Test conditions unless otherwise noted: 25 °C, Supply Voltage = +6 V, Rbias = 18 Ω, 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.

Typical Performance (1)

Parameter	Units	Typical				
Frequency	MHz	500	900	1900	2140	
S21	dB	20.1	19.7	18.2	17.9	
S11	dB	-35	-26	-22	-22	
S22	dB	-23	-22	-21	-21	
Output P1dB	dBm	+18	+18.1	+18.2	+17.8	
Output IP3	dBm	+34	+34	+32	+30.5	
Noise Figure	dB	3.6	3.4	3.4	3.4	

Not Recommended For New Designs

Recommended replacement parts: AG403-86G

Absolute Maximum Rating

Parameter	Rating
Storage Temperature	-65 to +150 °C
RF Input Power (continuous)	+12 dBm
Device Current	150 mA
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
ECG055C-G	InGaP HBT Gain Block (lead-free/green/RoHS-compliant SOT-86 package)

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

Specifications and information are subject to change without notice



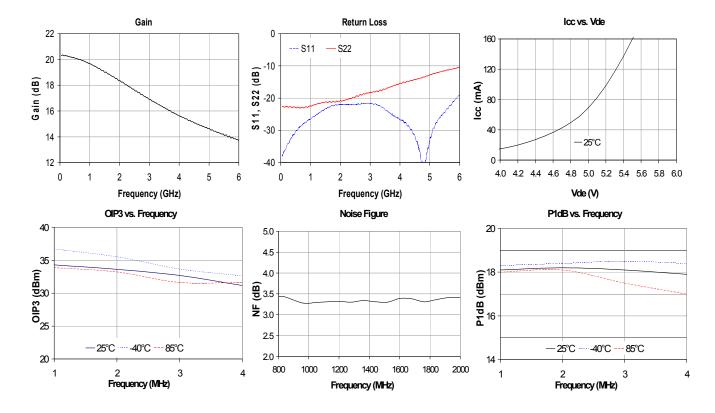


Typical Device RF Performance Supply Bias = +6 V, R_{bias} = 18 Ω , I_{cc} = 65 mA

Frequency	MHz	100	500	900	1900	2140	2400	3500	5800
S21	dB	20.3	20.1	19.7	18.2	17.9	17.6	16.1	13.7
S11	dB	-35	-35	-26	-22	-22	-22	-24	-21
S22	dB	-23	-23	-22	-21	-21	-20	-17	-11
Output P1dB	dBm	+18.2	+18	+18.1	+18.2	+17.8	+17.8	+17.2	
Output IP3	dBm	+33	+33.5	+34.5	+33.5	+32.9	+32		
Noise Figure	dB	3.4	3.6	3.4	3.4	3.4	3.8		

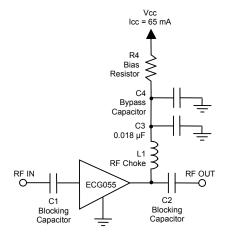
- 1. Test conditions: T = 25 °C, Supply Voltage = +6 V, Device Voltage = 4.8 V, Rbias = 18 Ω, Icc = 65 mA typical, 50 Ω System.
- 2. 3OIP measured with two tones at an output power of +4 dBm/tone separated by 1 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.

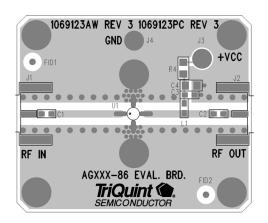
 3. Data is shown as device performance only. Actual implementation for the desired frequency band will be determined by external components shown in the application circuit.





Recommended Application Circuit





Recommended Component Values

Frequency (MHz) Reference 50 Designator 500 1900 2200 2500 3500 L1 820 nH 220 nH 68 nH 27 nH 22 nH 18 nH 15 nH C1, C2, C4 1000 pF 100 pF .018 µF 68 pF 68 pF 56 pF 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	18 Ω 1% tolerance	0805

Recommended Bias Resistor Values

Supply Voltage	R1 value	Size
6 V	18.5 ohms	0805
7 V	33.8 ohms	1210
8 V	49 ohms	1210
9 V	65 ohms	2010
10 V	80 ohms	2010
12 V	111 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} = +4.8 V, I_{CC} = 65 mA, T = 25°C, calibrated to device leads)

Freq (MHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
50	-38.17	9.34	20.30	178.31	-22.39	0.12	-22.58	-1.41
500	-30.35	38.64	20.11	161.09	-22.33	0.74	-23.00	-29.41
1000	-26.51	30.55	19.67	143.04	-22.23	1.87	-22.48	-50.33
1500	-23.32	16.54	19.00	126.43	-22.09	2.57	-21.21	-77.23
2000	-22.01	8.06	18.39	111.18	-21.81	3.37	-20.79	-101.82
2500	-21.87	-3.80	17.62	96.71	-21.55	3.41	-19.71	-119.95
3000	-21.62	-11.61	16.91	83.83	-21.16	3.82	-18.27	-141.35
3500	-23.63	-13.22	16.27	71.31	-20.78	3.21	-17.28	-155.62
4000	-26.77	-23.25	15.65	59.48	-20.29	2.65	-15.32	-170.83
4500	-31.76	-20.76	15.09	47.94	-19.79	1.21	-14.24	174.50
5000	-32.57	122.50	14.65	36.34	-19.25	-0.79	-12.75	163.59
5500	-24.49	133.61	14.16	24.39	-18.78	-3.46	-11.56	150.73
6000	-18.97	125.72	13.73	13.11	-18.29	-6.40	-10.39	140.55

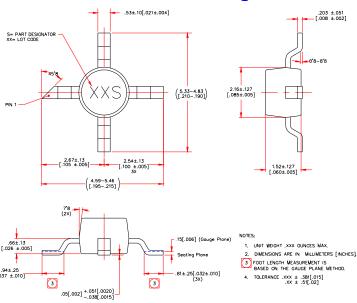
Device S-parameters are available for download from the website at: http://www.triquint.com



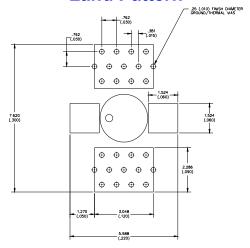
ECG055C-G Mechanical Information

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



Land Pattern



Product Marking

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

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

MSL / ESD Rating



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 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.