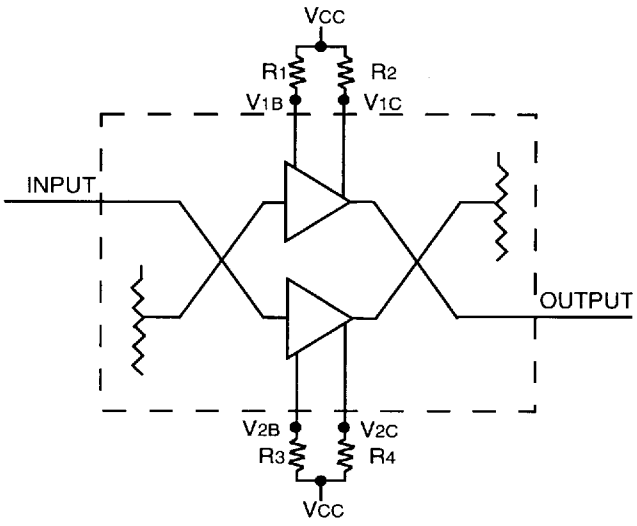
Data Sheet
March 1994

AT&T Microelectronics

2121B Surface-Mount Wide Dynamic Range RF Amplifier

Features

- Covers the common cellular bands
- Frequency range of 750 MHz to 1000 MHz
- 11 dB gain
- 42 dBm third-order intercept point
- 4.0 dB noise figure
- 1.20:1 VSWR
- Packaged in a JEDEC standard 84-pin PLCC
- Requires no heat sink
- Can be cascaded for higher gain



Vcc	R1, R3	R2, R4*
12 Vdc	0 Ω	22.1 Ω, 1/4 W
15 Vdc	3.24 kΩ, 1/8 W	54.9 Ω, 1/2 W

* Larger values for R2 and R4 will result in lower bias current. Reducing current to 125 mA will reduce P1dB and IP3 approximately 3 dB.

Figure 1. 2121B Amplifier Simplified Block Diagram

Description

AT&T's 2121B incorporates a single-stage balanced amplifier with Lange couplers for excellent input and output impedance match, low noise figure, and unconditional stability. The 2121B exhibits exceptional linearity with a typical third-order intercept point of 42 dBm. The 2121B was designed to complement AT&T's 2121A Complex Vector Attenuator (CVA) but can be used anywhere there is a need for gain with high linearity and/or low noise. The 2121B Amplifier is packaged in a surface-mount, JEDEC standard, machine-placeable 84-pin PLCC and needs no external heat sink in ambients up to 85 °C. The 2121B requires two external bias resistors for operation with a 12 V supply (see Figure 1). Four external bias resistors are required for operation with a 15 V supply. Each of the single-ended amplifier paths may be biased from an independent source for fail-soft applications. Bias regulation is internal for stable operation over a wide temperature range. Nominal bias current under small-signal conditions is 185 mA. No external blocking capacitors are required.

Pin Information

Pin #	Symbol	Description
1	INPUT	RF signal input.
43	OUTPUT	RF signal output.
59	V2B	Amplifier 2 bias.
58	V2C	Amplifier 2 bias.
28	V1C	Amplifier 1 bias.
27	V1B	Amplifier 1 bias.
All Others	Gnds	Pins connected to RF ground.

Absolute Maximum Ratings

Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to Absolute Maximum Ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
Ambient Temperature*	T_A	–40	85	°C
Storage Temperature	T_S	–55	125	°C
Soldering Temperature/Duration†	T_{LS}	—	200/60	°C/s
Input Voltages	V_{1B}, V_{2B} V_{1C}, V_{2C}	— —	18 15	V V
RF Signal Input	INPUT	—	20	dBm

* Assumes natural convection and the use of a 6 square inch glass epoxy PWB, 0.062 inches thick, with 100% metallization on the bottom side and 80% metallization on the top side. Package lead temperature should not exceed 105 °C while in operation.
† Assumes the use of 60/40 solder.

Electrical Characteristics (at 25 °C)

Parameter	Symbol	Min	Typ	Max	Unit
Frequency Range	Fo	750	—	1000	MHz
Gain (at 875 MHz)	G	10	11	12	dB
Gain Flatness	—	—	±0.3	±0.6	dB
Group Delay Flatness	—	—	±40	—	ps
Noise Figure	NF	—	4.0	5.0	dB
Input/Output VSWR	VSWR	—	1.2:1.0	1.35:1.0	—
Third-Order Intercept Point	IP3	40.0	42.0	—	dBm
1 dB Compression Point	P1dB	26.0	27.0	—	dBm
Supply Voltage*	Vcc	14.5 11.5	15.0 12.0	15.5 12.5	V
Current Drain†	I	170	185	200	mA

* See Figure 1.
† Under no signal conditions.

Electrical Characteristics (continued)

These are typical performance curves.

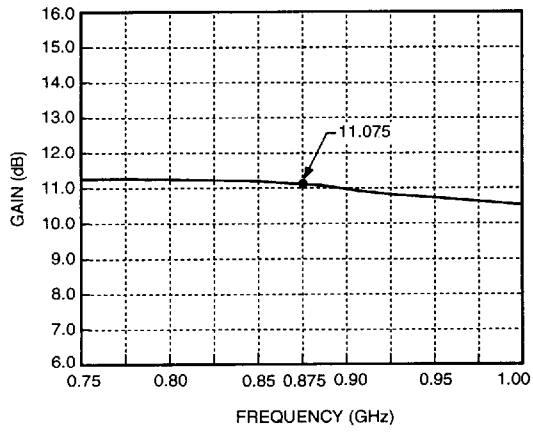


Figure 2. Gain

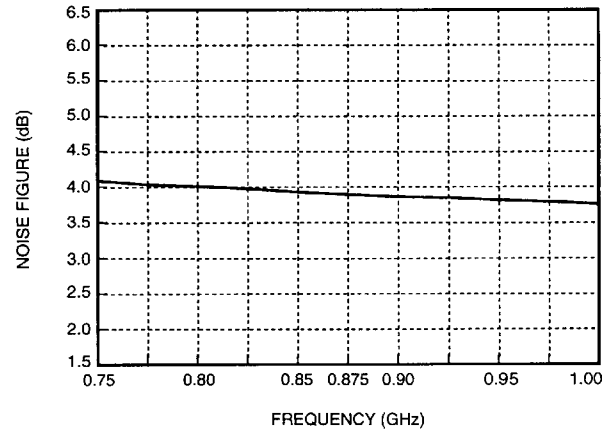


Figure 5. Noise

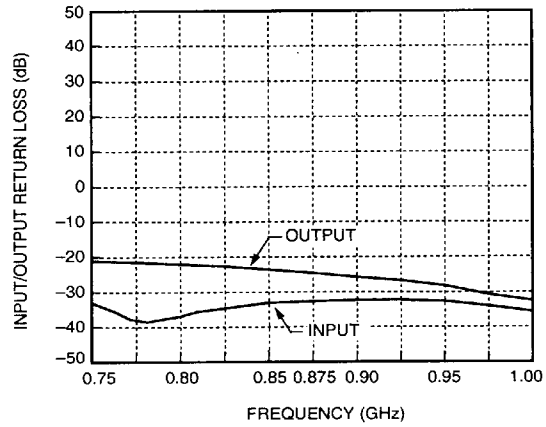


Figure 3. Input Return Loss and Output Return Loss

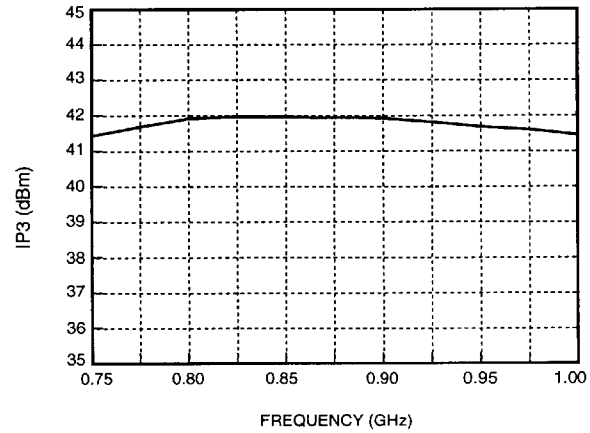


Figure 6. Third-Order Intercept Point

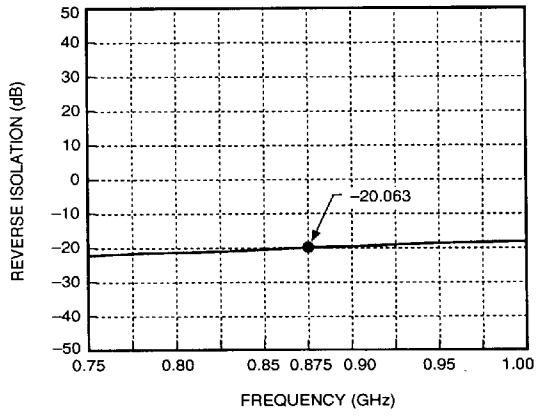
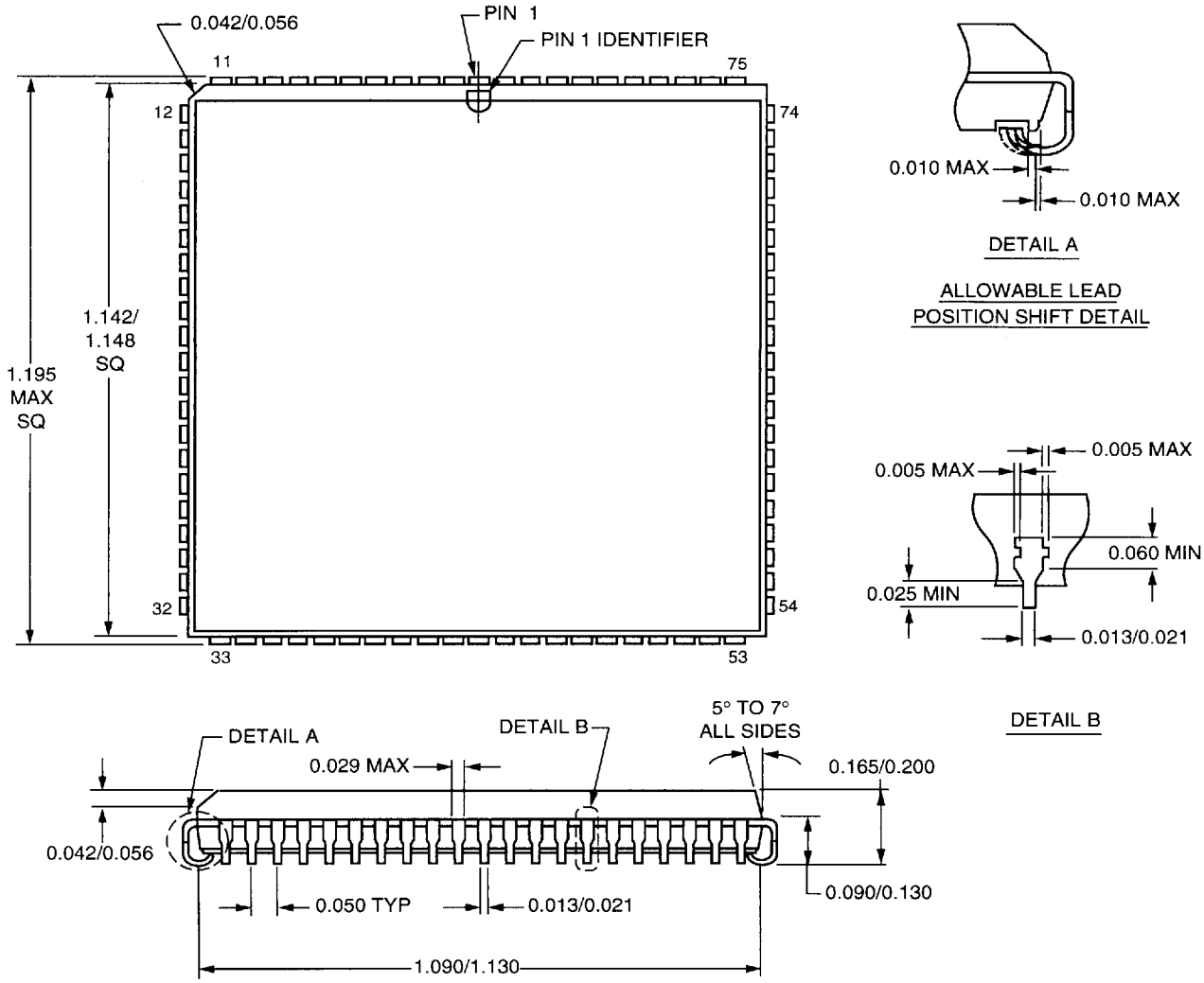


Figure 4. Reverse Isolation

Outline Diagram

84-Pin PLCC

Controlling dimensions are in inches.



Ordering Information

Code	Frequency Range* (MHz)	Part Number
2121B	750 to 1000	C107089096

* Designs for other bands ranging from 300 MHz to 3000 MHz are available upon request.

For additional technical information, contact:

AT&T Applications Specific Standard Modules
AT&T Microelectronics
1600 Osgood Street, RM 21-2B33
North Andover, MA 01845
Tel. (508) 960-6231
FAX (508) 960-1378