SJM PREWELL

PS103-63

Wideband Gain Block

Features

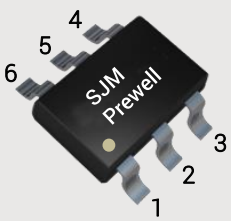
- 5 to 3000MHz
- Gain 22.6dB @ 75MHz
- P1dB 9.3dBm @ 75MHz
- OIP3 22.4dBm @ 75MHz
- Supply Current 21mA
- Lead-free / Green / RoHS compliant SOT-363 Package

Applications

- Base station / Repeater / Mobile / Automotive / Military
  - FDD-LTE, TD-LTE, TDS-CDMA, CDMA, WCDMA, WiMAX, PCS, GSM, GPS, GPRS, TETRA
- IoT / Broadcasting / WLAN
  - FM, DMB, DVB, ISM

Functional Diagram

RF IN 3 RF OUT / Bias 6
GND 1,2,4,5



ESD/MSL

1 ESD sensitive device. Observe handling precautions.

2 HBM: Class 2 , JESD22-A114

3 CDM: Class C3 , JESD22-C101F

4 MSL 3, J-STD-020

Description

The PS103-63 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The PS103-63 features high linear performance, wideband operation and high reliability. The PS103-63 operates from a single voltage supply and requires only two DC-blocking capacitors, a bias resistor and an inductor for operation. The device is a general purpose buffer amplifier that offers high dynamic range in a low cost surface-mounted plastic SOT-363 package. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Frequency (MHz)			
		75	900	1900	2300
S21	dB	22.6	21.2	18.8	17.9
S11	dB	-14	-12	-13	-16
S22	dB	-13	-13	-13	-12
P1dB	dBm	9.3	8.5	8.5	8.4
OIP3	dBm	22.4	21.3	21.3	20.6
NF	dB	2.1	2.1	2.2	2.2
V / I	V/mA	3.35 / 21			
Rth	°C/W	60			

1) Test Conditions : T=25°C, Supply Voltage=4.5V, Rbias=52ohm, 50ohm System
2) OIP3 measured with two tones at an output power of -5dBm/tone separated by 1MHz.

Absolute Maximum Ratings

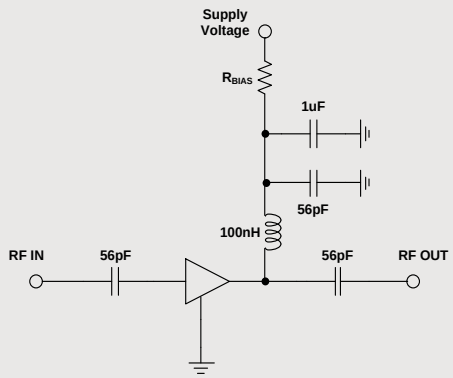
Parameter	Rating	Unit
Device Voltage	8	V
Device Current	100	mA
RF Power Input	5	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	187	°C

1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.

Typical RF Performance for 900MHz Tuned Application Circuit

Supply Bias Voltage = 4.5V, R(bias)= 52 ohm, Current= 21mA

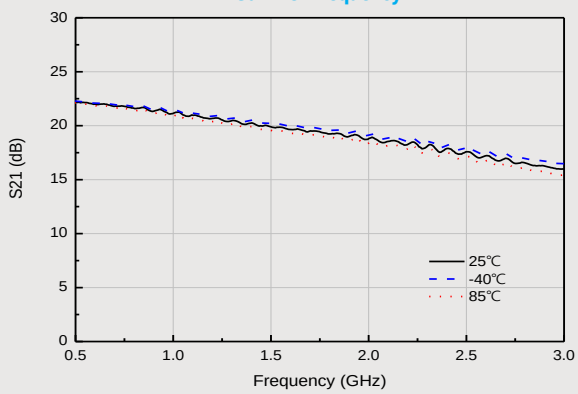
Parameters	Units	Frequency(MHz)					
		500	900	1500	1900	2300	3000
S21	dB	22.1	21.2	19.7	18.8	17.9	15.7
S11	dB	-14	-12	-12	-13	-16	-14
S22	dB	-13	-13	-13	-13	-12	-11
P1dB	dBm	8.8	8.5	8.5	8.5	8.4	6.2
OIP3 @-5dBm	dBm	21.3	21.3	21.1	21.3	20.6	19.1
NF	dB	2.2	2.1	2.2	2.2	2.2	2.3



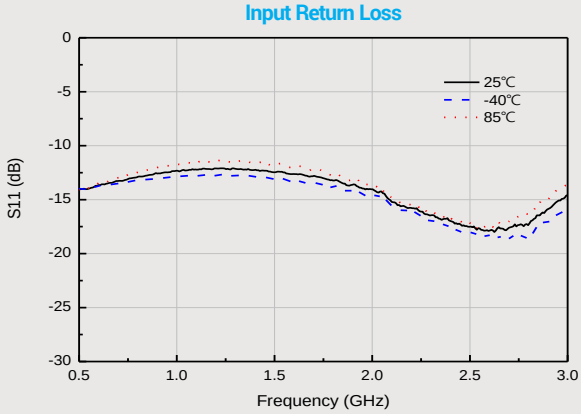
Recommended Bias Values

Supply Voltage (V)	R_{BIAS} Value (ohm)	Size
4.5	52.0	0805
5	76.0	1210
6	123.0	1210
7	171.0	2010
8	218.0	2010
10	313.0	2010
12	408.0	2512

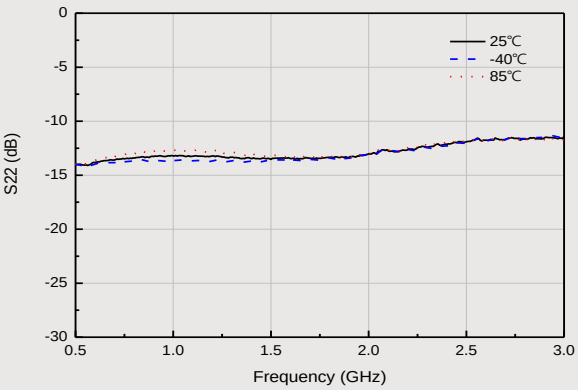
Gain vs. Frequency



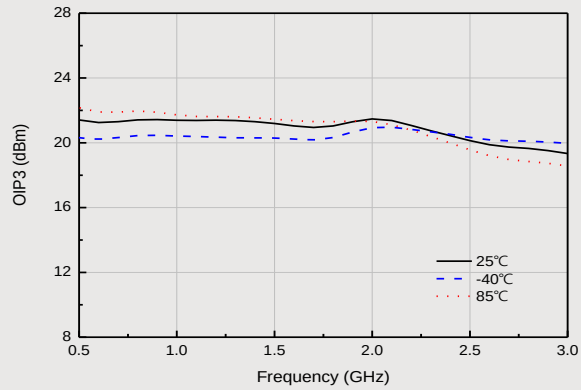
Input Return Loss



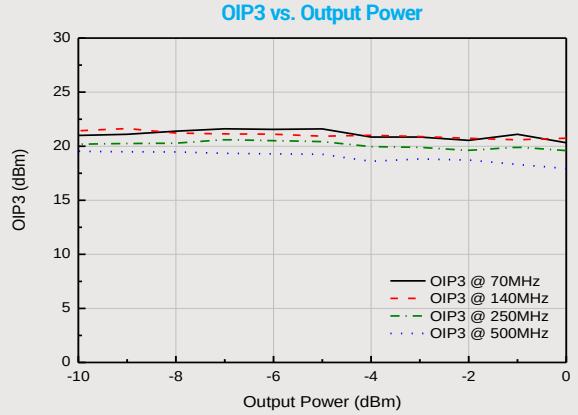
Output Return Loss



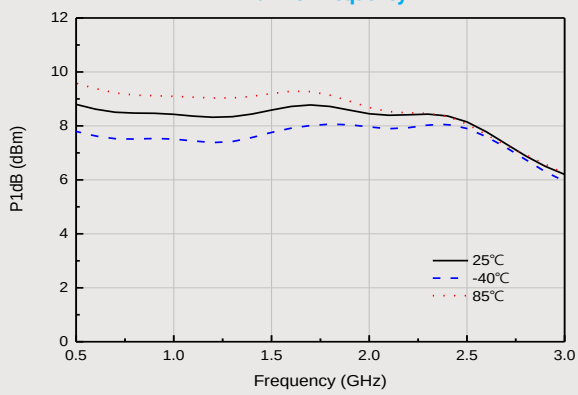
OIP3 vs. Frequency



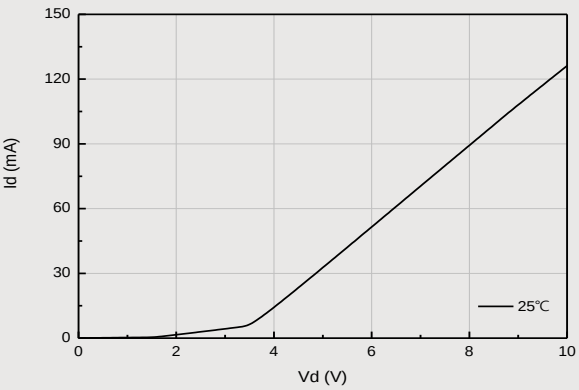
OIP3 vs. Output Power



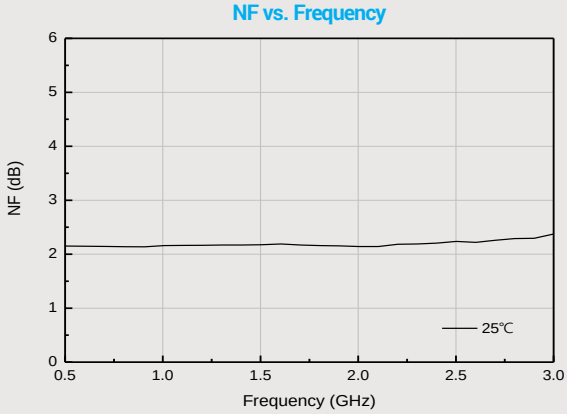
P1dB vs. Frequency



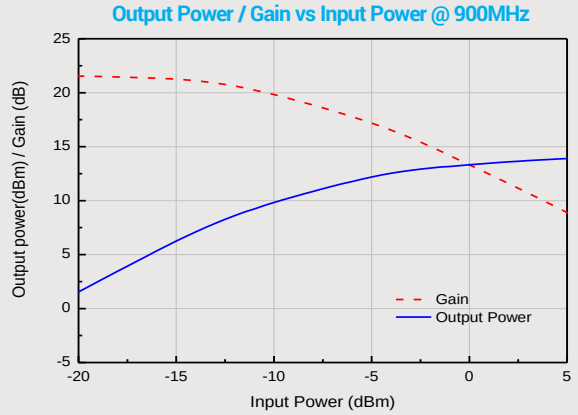
Id vs. Vd



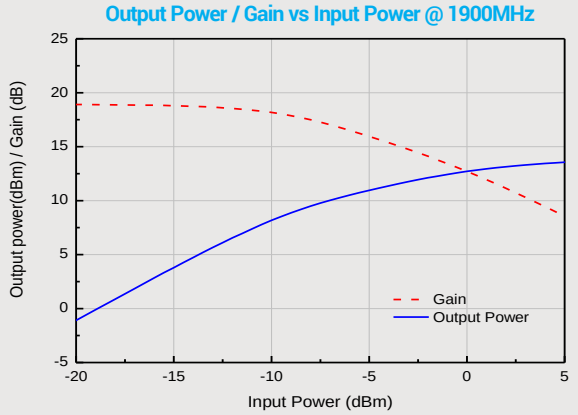
NF vs. Frequency



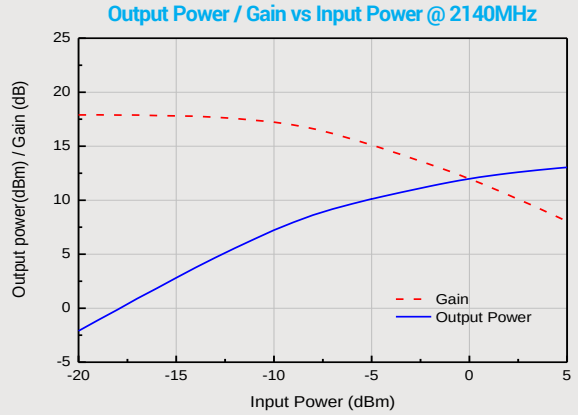
Output Power / Gain vs Input Power @ 900MHz



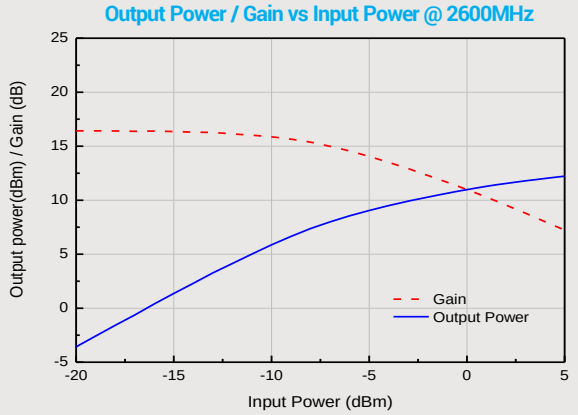
Output Power / Gain vs Input Power @ 1900MHz



Output Power / Gain vs Input Power @ 2140MHz

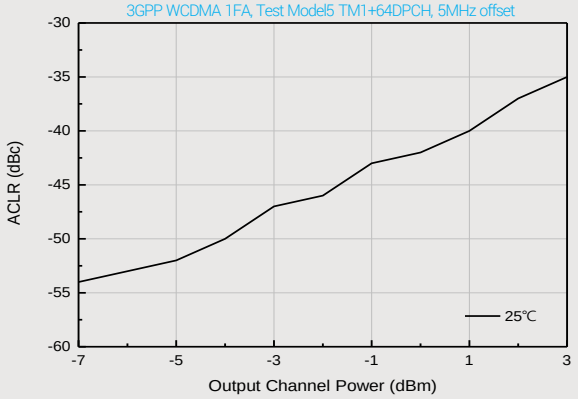


Output Power / Gain vs Input Power @ 2600MHz



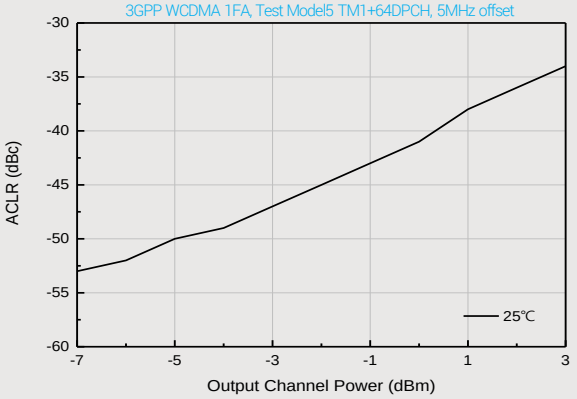
ACLR vs. Channel Power @ 1850MHz

3GPP WCDMA 1FA, Test Model5 TM1+64DPCH, 5MHz offset



ACLR vs. Channel Power @ 2140MHz

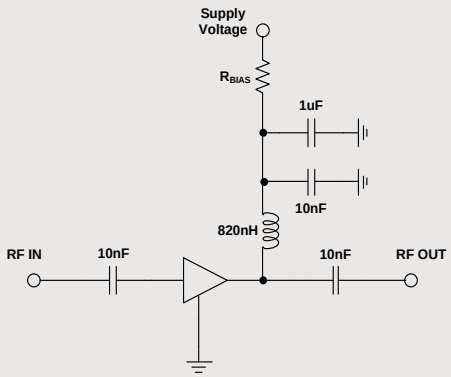
3GPP WCDMA 1FA, Test Model5 TM1+64DPCH, 5MHz offset

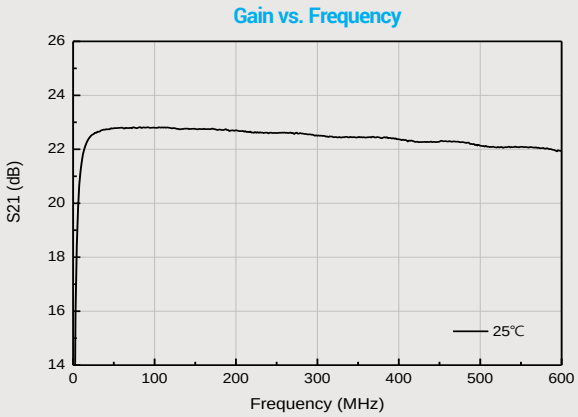


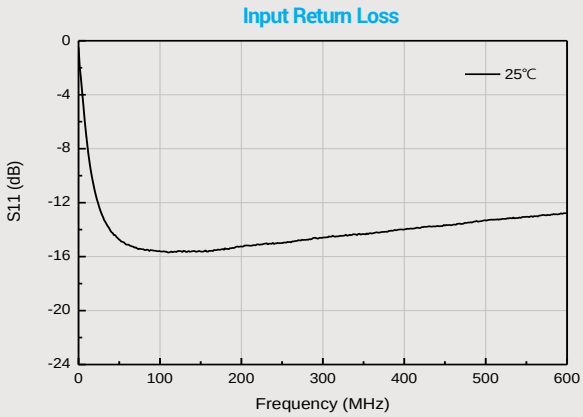
Typical RF Performance for 50 -500MHz Tuned Application Circuit

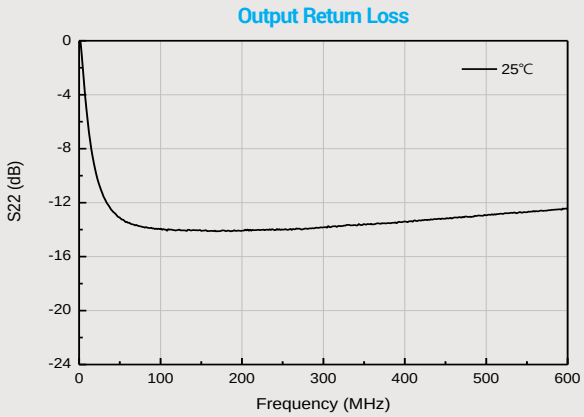
Supply Bias Voltage = 4.5V, R(bias)= 52ohm, Current= 21mA

Parameters	Units	Frequency(MHz)			
		75	125	300	500
S21	dB	22.6	22.6	22.4	22.0
S11	dB	-14	-14	-13	-13
S22	dB	-13	-13	-13	-12
P1dB	dBm	9.3	9.5	9.3	8.7
OIP3@-5dBm	dBm	22.4	23.3	23.3	22.1
NF	dB	2.1	2.1	2.1	2.1

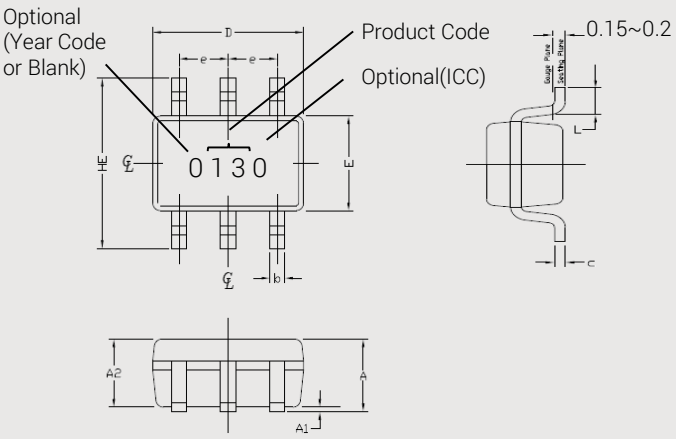






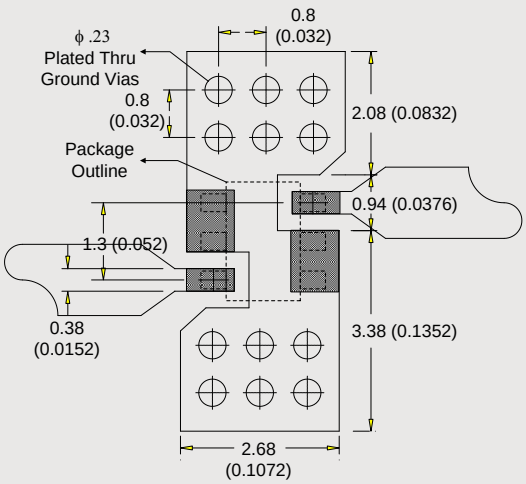


Lead-free /RoHS Compliant / Green SOT-363 Package Outline

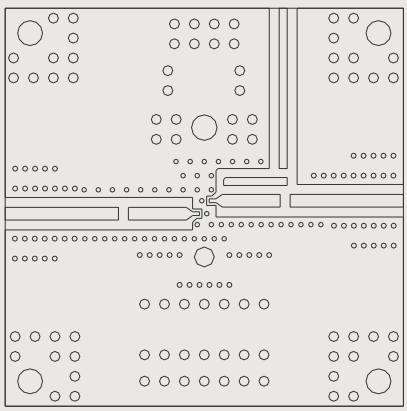


SYMBOL	MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.95	2.30
A	0.80	1.10
A2	0.70	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.15	0.40
c	0.08	0.25
L	0.21	0.26

Land Pattern



Evaluation Board Layout (40x40)



Mounting Instructions

1. Use a large ground pad area with many plated through-holes as shown.
2. We recommend 1 oz copper minimum.
3. Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
4. RF trace width depends on the board material and construction.
5. Add mounting screws near the part to fasten the board to a heatsink.
6. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.