SJM PREWELL

PW115

Gain Block

Features

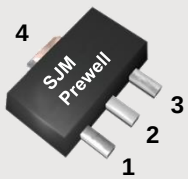
- 5 to 1000MHz
- Gain 16.1dB @ 140MHz
- P1dB 19.5dBm @ 500MHz
- OIP3 41.2dBm @ 70MHz
- Lead-free / Green / RoHS compliant SOT-89 Package

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 **1** RF OUT / Bias **3**
GND **2,4**



ESD/MSL

1 ESD sensitive device. Observe handling precautions.

2 HBM: Class 1C, JESD22-A114

3 CDM: Class C3 , JESD22-C101F

4 MSL 3, J-STD-020

Description

The PW115 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The features of PW115 are high linear performance, high reliability as an IF amplifier and provide stable current variation over temperature. The PW115 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-89 package. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Frequency (MHz)				
		70	140	250	500	900
S21	dB	16.1	16.1	16.0	15.7	15.4
S11	dB	-24	-30	-32	-26	-22
S22	dB	-12	-12	-12	-12	-10
P1dB	dBm	19.3	19.4	19.5	19.5	18.9
OIP3	dBm	41.2	40.6	39.7	36.8	33.0
NF	dB	4.0	3.9	4.0	4.2	4.1
V / I	V/mA	4.78 / 86				
Rth	°C/W	73				

1) Test Conditions : T=25°C, Supply Voltage=5V, Rbias=2ohm, 50ohm System
2) OIP3 measured with two tones at an output power of 8dBm/tone separated by 1MHz.

Absolute Maximum Ratings

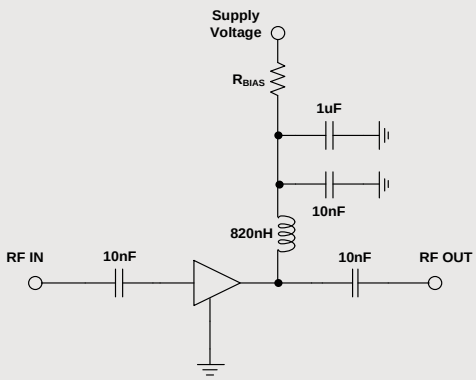
Parameter	Rating	Unit
Device Voltage	7.2	V
Device Current	190	mA
RF Power Input	10	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	187	°C

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 IF Amp Application Circuit Ⅰ

Supply Bias Voltage = 5V, R(bias)= 2ohm, Current= 86mA

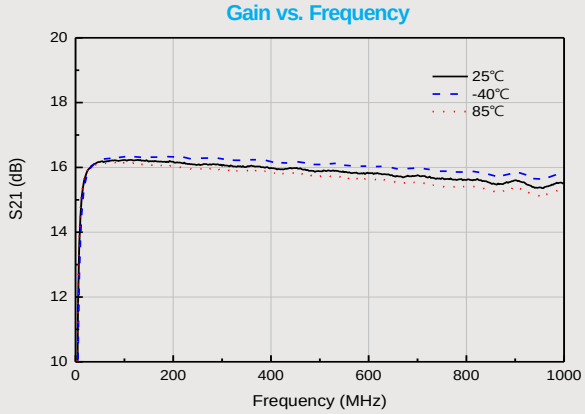
Parameters	Units	Frequency (MHz)					
		50	70	140	250	500	900
S21	dB	16.0	16.1	16.1	16.0	15.7	15.4
S11	dB	-21	-24	-30	-32	-26	-22
S22	dB	-11	-12	-12	-12	-12	-10
P1dB	dBm	19.3	19.3	19.4	19.5	19.5	18.9
OIP3 @ 8dBm	dBm	41.5	41.2	40.6	39.7	36.8	33.0
NF	dB	4.0	4.0	3.9	4.0	4.2	4.1



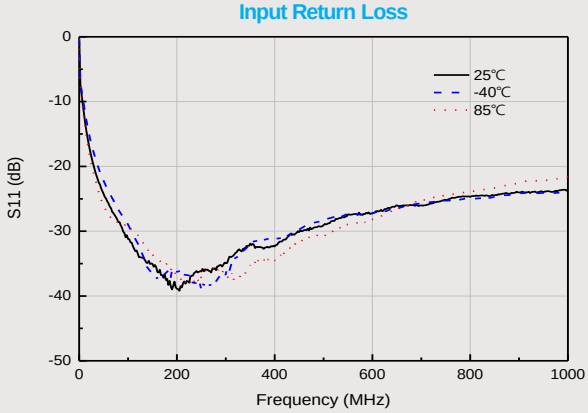
Recommended Bias Values

Supply Voltage (V)	R_{BIAS} Value (ohm)	Size
5	2.0	0805
5.3	5.5	0805
6	13.6	0805
7	25.2	1210
8	36.9	1210
9	48.5	2010
10	60.0	2010
12	83.4	2512

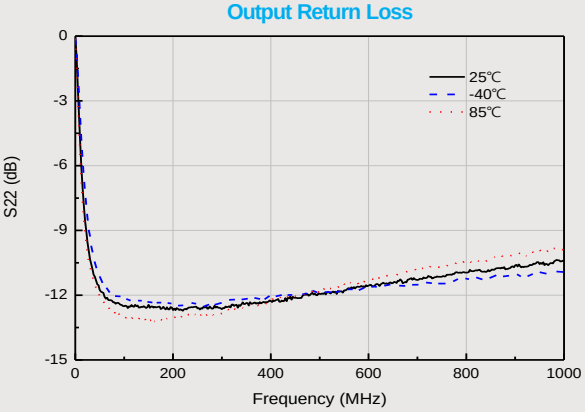
Gain vs. Frequency



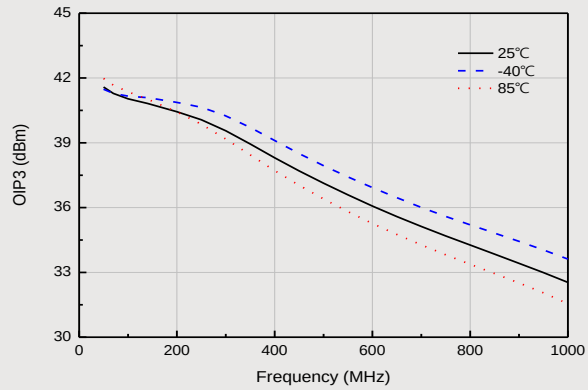
Input Return Loss



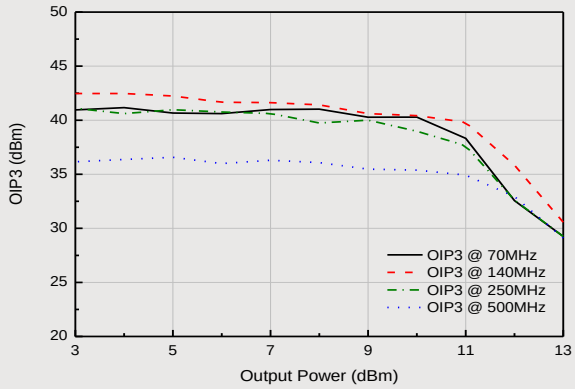
Output Return Loss



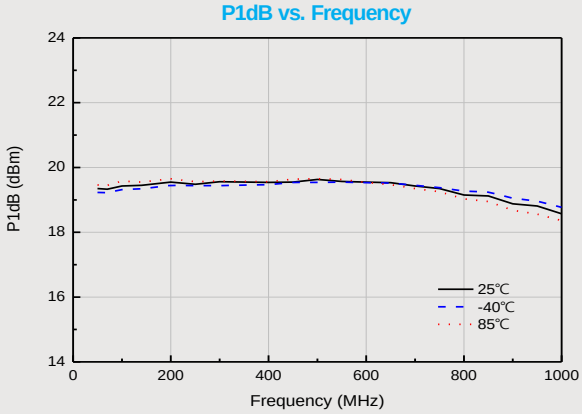
OIP3 vs. Frequency



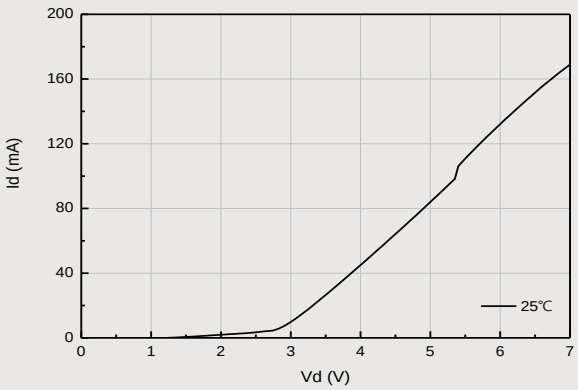
OIP3 vs. Output Power



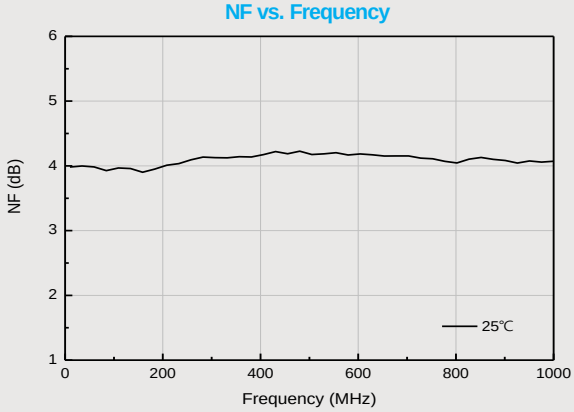
P1dB vs. Frequency



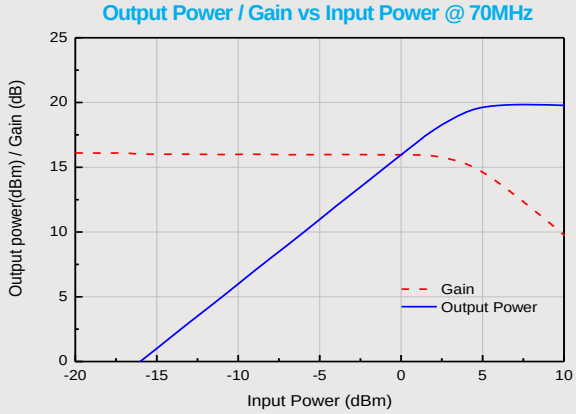
Id vs. Vd



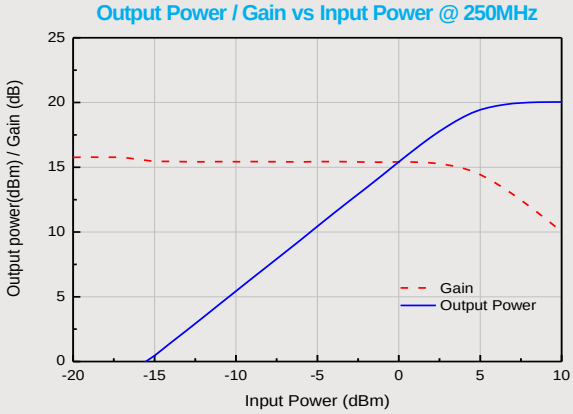
NF vs. Frequency



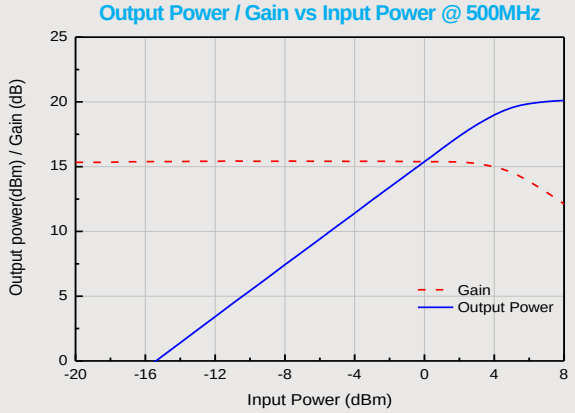
Output Power / Gain vs Input Power @ 70MHz



Output Power / Gain vs Input Power @ 250MHz

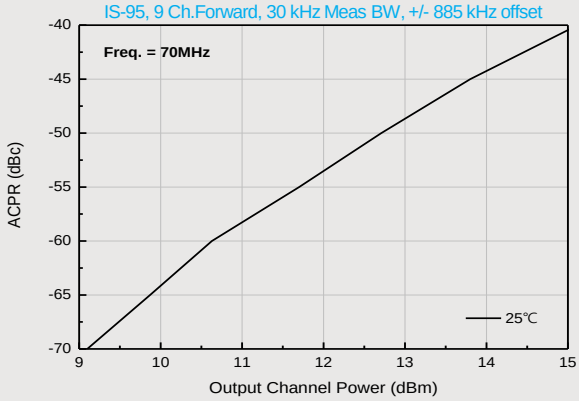


Output Power / Gain vs Input Power @ 500MHz



ACPR IS-95A vs. Channel Power

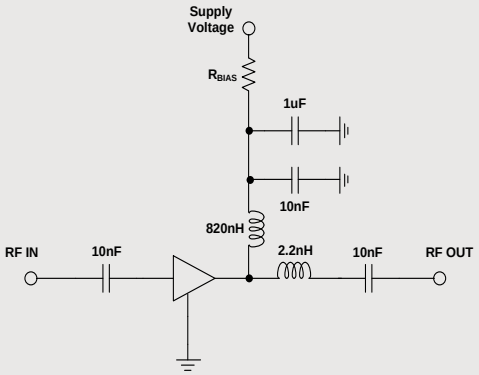
IS-95, 9 Ch.Forward, 30 kHz Meas BW, +/- 885 kHz offset

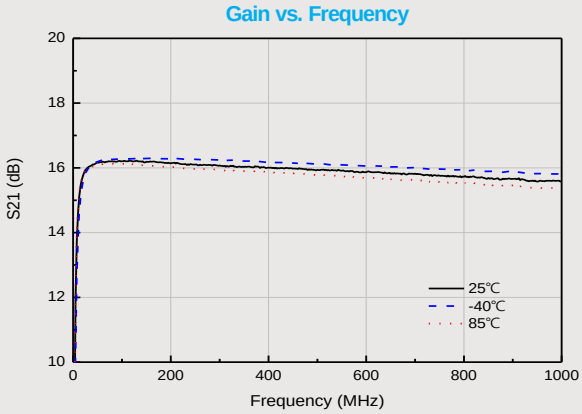


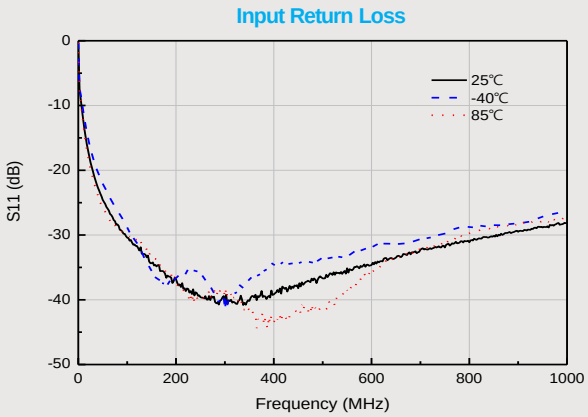
Typical RF Performance for 50 -1000MHz Tuned Application Circuit Ⅱ

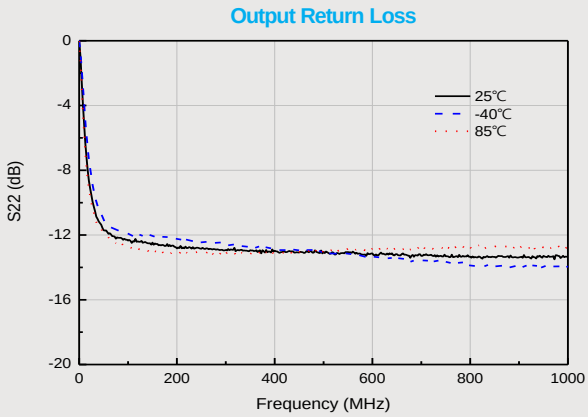
Supply Bias Voltage = 5V, R(bias)= 2ohm, Current= 86mA

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		50	70	140	250	500	900
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S22	dB	-11	-12	-12	-12	-13	-13
P1dB	dBm	19.3	19.3	19.4	19.5	19.4	19.0
OIP3 @ 8dBm	dBm	42.0	40.6	41.5	39.2	37.0	33.2
NF	dB	3.9	3.9	4.0	4.2	4.2	4.0

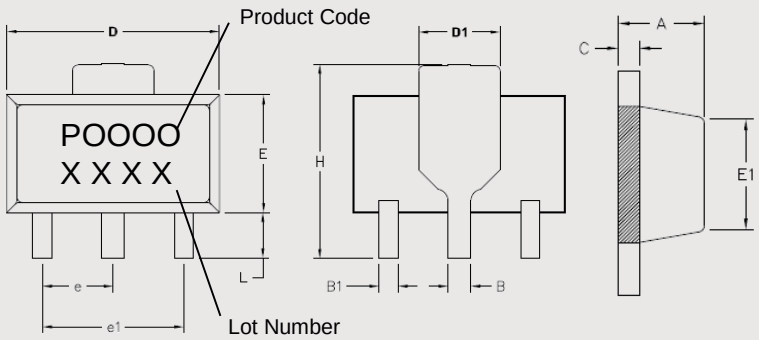






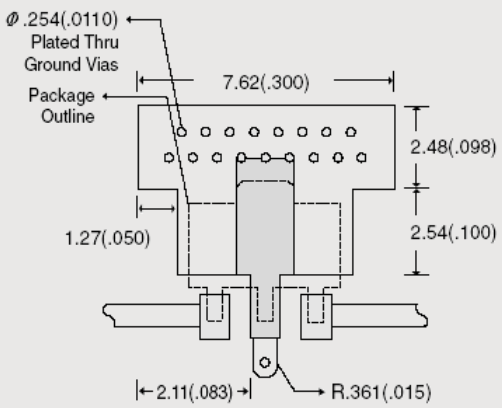


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

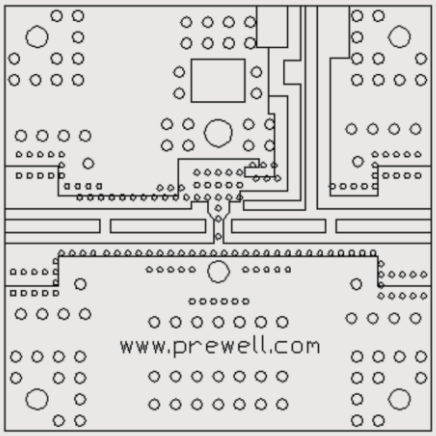


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

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.